

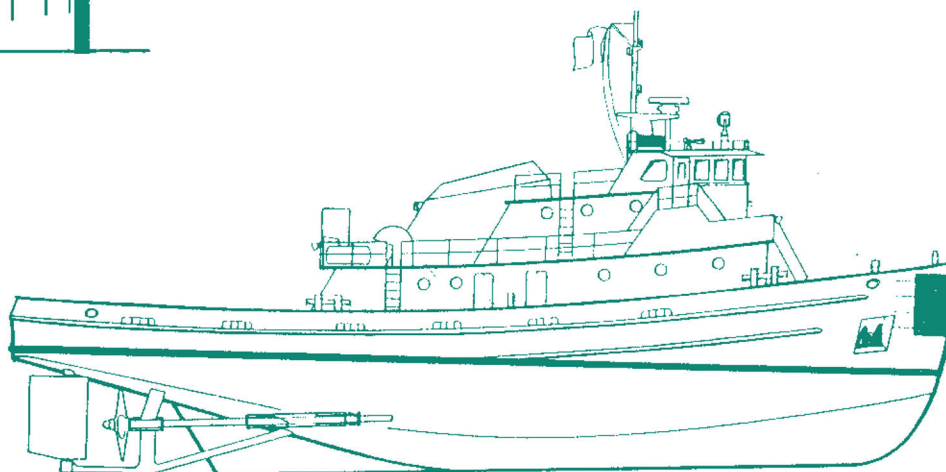
with LAGNIAPPE!



Catalog Vol. H

Marine Supplies and Oilfield Specialties

Serving the Industry Since 1947



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Byrne, Rice & Turner, Inc.

1172 Camp Street
New Orleans, LA 70130

Office: 504 525-7137

Fax: 504 525-6303

e-mail: sales@brtmarine.com

Application For Credit

Name: _____ Date: _____

Bill To: _____ Ship To: _____

Phone: _____ Fax: _____ e-mail: _____

Business Form (Partnership, Corp., etc.): _____ How Long: _____

PARTNERS, PRINCIPAL OFFICERS AND/OR STOCKHOLDERS:

Name: _____ Address: _____

Name: _____ Address: _____

Name: _____ Address: _____

No change in business form shall be effective until the 15th day after written notice of such change is delivered to Byrne, Rice & Turner, Inc.

Bank: _____

Contact: _____ Account #: _____ Type: _____

TRADE REFERENCES: *We Require 6 - Your application will not be processed with less.*

	<u>Name</u>	<u>Phone</u>	<u>FAX</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

By execution of this application the applicant agrees that all sales on credit shall be on the following terms:

1. Byrne, Rice and Turner, Inc. reserves the right to accept or reject any order and previously quoted prices are subject to change without notice.
2. Payment is due within 30 days from date of invoice.
3. Service charges of 1.5% per month (18% annually) to be added to the outstanding balance in applicant's account which is unpaid 31 days from date of invoice.
4. If account is referred for collection, all costs thereof to be paid by applicant, including, but not limited to, attorney's fees of 25% of account balance, including service charges, but not less than \$50.00.
5. No merchandise shall be returned to Byrne, Rice & Turner, Inc. without authorization of a representative of Byrne, Rice & Turner, Inc.
6. **Sales Tax will be added to all invoices unless exemption certificate is provided with application.**

Do you require purchase order numbers: Yes No

Applicant or Authorized Officer: _____
(signature) (printed)

Individually Guaranteed by: _____
(signature) (printed)



Dear Customer,

I want to express our sincerest thanks because you pay our salaries. This catalog is our attempt to provide you with up to date information on the wide variety of supplies that we handle. Many new products have been added to this latest edition. We represent so many manufacturers that it is impractical to publish their entire lines here. If you don't see the particular product that you are looking for, call us anyway because we can almost always get it.

Byrne, Rice & Turner, Inc. has been serving the marine industry since 1947. Our personnel are knowledgeable and eager to serve you. We listen to our customers. We welcome feedback from you in order to better serve you. If there is a particular item you want us to stock, or a type of service that you need, please bring it to our attention so if possible we can accommodate you.

We do warehouse and distribute many of the items represented. In some cases, we are the exclusive distributorship. Although it is impossible for us to keep all of the items contained here, we do regularly evaluate stocking requirements on the basis of changing customer demand to ensure customer satisfaction. It is not our intention to imply that we manufacture or have any exclusive rights of distribution to all of these items.

Long time customers know they can expect a little something extra from Byrne, Rice and Turner. Atwood Rice Jr. set that standard for us for many years and although he passed away in 2004 we still endeavor to follow his example. This catalog is not a departure from that tradition. You will find that even our catalog contains a little LAGNIAPPE! In keeping with New Orleans tradition, lagniappe is "a little something extra" a sort of baker's dozen if you will.

Sprinkled throughout this catalog you will find humorous, helpful, and thought provoking items for your enjoyment. Many of the dark bordered section dividers contain articles of patriotic thought. The United States was blessed with a unique beginning. Many individuals purchased the freedoms we enjoy today at great price. Liberty is an idea that was embraced by our culture. Liberty is not solely threatened from external sources. Internal threats also can eat away at our liberty like a cancer. It can be gradually lost to ideas whose inferiority is hidden by their appeal to immediate gratification. Edmund Burke said, "All that is required for evil to triumph is for good men to do nothing." It is our sincerest hope that none of us will take the blessings of this country for granted, and that more countries may make these blessings their own. We look forward to hearing from you, and truly wish God's best for you and your loved ones.

Sincerely,

John Rice

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GUIDE TO THE LAGNIAPPE

(pronounced "Lan-yap")

Scattered throughout the catalog—often tucked into the corner of a page—are humorous, helpful or thought-provoking tid-bits. We want you to enjoy using our catalog.

We hope you always enjoy doing business with us.

Think about this:

- a.. The number of physicians in the US is 700,000.
- b.. Accidental deaths caused by Physicians per year is 120,000.
- c.. Accidental deaths per physician is 0.171. (US Dept. of Health & Human Services)

Then think about this:

- a.. The number of gun owners in the US is 80,000,000.
- b.. The number of accidental gun deaths per year (all age groups) is 1,500.
- c.. The number of accidental deaths per gun owner is .0000188

Statistically, doctors are approximately 9,000 times more dangerous than gun owners.

FACT: NOT EVERYONE HAS A GUN, BUT ALMOST EVERYONE HAS AT LEAST ONE DOCTOR.

Please alert your friends to this alarming threat.

We must ban doctors before this gets out of hand.

As a public health measure I have withheld the statistics on lawyers for fear that the shock could cause people to seek medical attention.

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HULL

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Rolling Back Government: Lessons from New Zealand

Maurice P. McTigue

Maurice P. McTigue is a distinguished visiting scholar at the Mercatus Center at George Mason University, where he directs the government accountability project. Previously, he was a member of the New Zealand Parliament and New Zealand's ambassador to Canada, and was closely involved in New Zealand's deregulation of labor markets, deregulation of the transportation industry, and restructuring of the fishing industry through the creation of conservation incentives. He also served as Minister of Employment, Minister of State Owned Enterprises, Minister of Railways, Minister of Works and Development, Minister of Labour and Minister of Immigration. Among his many honors, Mr. McTigue is a recipient of the Queen's Service Order, bestowed by Queen Elizabeth II in a ceremony at Buckingham Palace. In the U.S., he was recently appointed to the Office of Personnel Management Senior Review Committee, formed to make recommendations for human resources systems at the Department of Homeland Security. He also sits on the Performance Management Advisory Committee for the Commonwealth of Virginia.

The following is adapted from a lecture delivered on February 11, 2004, on the Hillsdale campus, during a five-day seminar on "The Conditions of Free-Market Capitalism," co-sponsored by the Center for Constructive Alternatives and the Ludwig von Mises Lecture Series.

If we look back through history, growth in government has been a modern phenomenon. Beginning in the 1850s and lasting until the 1920s or '30s, the government's share of GDP in most of the world's industrialized economies was about six percent. From that period onwards—and particularly since the 1950s—we've seen a massive explosion in government share of GDP, in some places as much as 35-45 percent. (In the case of Sweden, of course, it reached 65 percent, and Sweden nearly self-destructed as a result. It is now starting to dismantle some of its social programs to remain economically viable.) Can this situation be halted or even rolled back? My view, based upon personal experience, is that the answer is "yes." But it requires high levels of transparency and significant consequences for bad decisions—and these are not easy things to bring about.

What we're seeing around the world at the moment is what I would call a silent revolution, reflected in a change in how people view government

accountability. The old idea of accountability simply held that government should spend money in accordance with appropriations. The new accountability is based on asking, "What did we get in public benefits as a result of the expenditure of money?" This is a question that has always been asked in business, but has not been the norm for governments. And those governments today that are struggling valiantly with this question are showing quite extraordinary results. This was certainly the basis of the successful reforms in my own country of New Zealand.

New Zealand's per capita income in the period prior to the late 1950s was right around number three in the world, behind the United States and Canada. But by 1984, its per capita income had sunk to 27th in the world, alongside Portugal and Turkey. Not only that, but our unemployment rate was 11.6 percent, we'd had 23 successive years of deficits (sometimes ranging as high as 40 percent of GDP), our debt had grown to 65 percent of GDP, and our credit ratings were continually being downgraded. Government spending was a full 44 percent of GDP, investment capital was exiting in huge quantities, and government controls and micro-management were pervasive at every level of the economy. We had foreign exchange controls that meant I couldn't buy a subscription to *The Economist* magazine without the permission of the Minister of Finance. I couldn't buy shares in a foreign company without surrendering my citizenship. There were price controls on all goods and services, on all shops and on all service industries. There were wage controls and wage freezes. I couldn't pay my employees more—or pay them bonuses—if I wanted to. There were import controls on the goods that I could bring into the country. There were massive levels of subsidies on industries in order to keep them viable. Young people were leaving in droves.

Spending and Taxes

When a reform government was elected in 1984, it identified three problems: too much spending, too much taxing and too much government. The question was how to cut spending and taxes and diminish government's role in the economy. Well, the first thing you have to do in this situation is to figure out what you're getting for dollars spent. Towards this end, we implemented a new policy whereby money wouldn't simply be allocated to government agencies; instead, there would be a purchase contract with the senior executives

of those agencies that clearly delineated what was expected in return for the money. Those who headed up government agencies were now chosen on the basis of a worldwide search and received term contracts—five years with a possible extension of another three years. The only ground for their removal was non-performance, so a newly-elected government couldn't simply throw them out as had happened with civil servants under the old system. And of course, with those kinds of incentives, agency heads—like CEOs in the private sector—made certain that the next tier of people had very clear objectives that they were expected to achieve as well.

The first purchase that we made from every agency was policy advice. That policy advice was meant to produce a vigorous debate between the government and the agency heads about how to achieve goals like reducing hunger and homelessness. This didn't mean, by the way, how government could feed or house more people—that's not important. What's important is the extent to which hunger and homelessness are actually reduced. In other words, we made it clear that what's important is not how many people are on welfare, but how many people get off welfare and into independent living.

As we started to work through this process, we also asked some fundamental questions of the agencies. The first question was, "What are you doing?" The second question was, "What should you be doing?" Based on the answers, we then said, "Eliminate what you shouldn't be doing"—that is, if you are doing something that clearly is not a responsibility of the government, stop doing it. Then we asked the final question: "Who should be paying—the taxpayer, the user, the consumer, or the industry?" We asked this because, in many instances, the taxpayers were subsidizing things that did not benefit them. And if you take the cost of services away from actual consumers and users, you promote overuse and devalue whatever it is that you're doing.

When we started this process with the Department of Transportation, it had 5,600 employees. When we finished, it had 53. When we started with the Forest Service, it had 17,000 employees. When we finished, it had 17. When we applied it to the Ministry of Works, it had 28,000 employees. I used to be Minister of Works, and ended up being the only employee. In the latter case, most of what the department did was construction and engineering, and there are plenty of people who can do that

without government involvement. And if you say to me, "But you killed all those jobs!"—well, that's just not true. The government stopped employing people in those jobs, but the need for the jobs didn't disappear. I visited some of the forestry workers some months after they'd lost their government jobs, and they were quite happy. They told me that they were now earning about three times what they used to earn—on top of which, they were surprised to learn that they could do about 60 percent more than they used to! The same lesson applies to the other jobs I mentioned.

Some of the things that government was doing simply didn't belong in the government. So we sold off telecommunications, airlines, irrigation schemes, computing services, government printing offices, insurance companies, banks, securities, mortgages, railways, bus services, hotels, shipping lines, agricultural advisory services, etc. In the main, when we sold those things off, their productivity went up and the cost of their services went down, translating into major gains for the economy. Furthermore, we decided that other agencies should be run as profit-making and tax-paying enterprises by government. For instance, the air traffic control system was made into a stand-alone company, given instructions that it had to make an acceptable rate of return and pay taxes, and told that it couldn't get any investment capital from its owner (the government). We did that with about 35 agencies. Together, these used to cost us about one billion dollars per year; now they produced about one billion dollars per year in revenues and taxes.

We achieved an overall reduction of 66 percent in the size of government, measured by the number of employees. The government's share of GDP dropped from 44 to 27 percent. We were now running surpluses, and we established a policy never to leave dollars on the table: We knew that if we didn't get rid of this money, some clown would spend it. So we used most of the surplus to pay off debt, and debt went from 63 percent down to 17 percent of GDP. We used the remainder of the surplus each year for tax relief. We reduced income tax rates by half and eliminated incidental taxes. As a result of these policies, revenue increased by 20 percent. Yes, Ronald Reagan was right: lower tax rates do produce more revenue.

Subsidies, Education, and Competitiveness

...What about invasive government in the form of subsidies? First, we need to recognize that the main problem with subsidies is that they make

people dependent; and when you make people dependent, they lose their innovation and their creativity and become even more dependent.

Let me give you an example: By 1984, New Zealand sheep farming was receiving about 44 percent of its income from government subsidies. Its major product was lamb, and lamb in the international marketplace was selling for about \$12.50 (with the government providing another \$12.50) per carcass. Well, we did away with all sheep farming subsidies within one year. And of course the sheep farmers were unhappy. But once they accepted the fact that the subsidies weren't coming back, they put together a team of people charged with figuring out how they could get \$30 per lamb carcass. The team reported back that this would be difficult, but not impossible. It required producing an entirely different product, processing it in a different way and selling it in different markets. And within two years, by 1989, they had succeeded in converting their \$12.50 product into something worth \$30. By 1991, it was worth \$42; by 1994 it was worth \$74; and by 1999 it was worth \$115. In other words, the New Zealand sheep industry went out into the marketplace and found people

who would pay higher prices for its product. You can now go into the best restaurants in the U.S. and buy New Zealand lamb, and you'll be paying somewhere between \$35 and \$60 per pound.

Needless to say, as we took government support away from industry, it was widely predicted that there would be a massive exodus of people. But that didn't happen. To give you one example, we lost only about three-quarters of one percent of the farming enterprises—and these were people who shouldn't have been farming in the first place. In addition, some predicted a major move towards corporate as opposed to family farming. But we've seen exactly the reverse. Corporate farming moved out and family farming expanded, probably because families are prepared to work for less than corporations. In the end, it was the best thing that possibly could have happened. And it demonstrated that if you give people no choice but to be creative and innovative, they will find solutions.

New Zealand had an education system that was failing as well. It was failing about 30 percent of its children—especially those in lower socio-economic areas. We had put more and more money into education for

20 years, and achieved worse and worse results.

It cost us twice as much to get a poorer result than we did 20 years previously with much less money. So we decided to rethink what we were doing here as well. The first thing we did was to identify where the dollars were going that we were pouring into education. We hired international consultants (because we didn't trust our own departments to do it), and they reported that for every dollar we were spending on education, 70 cents was being swallowed up by administration. Once we heard this, we immediately eliminated all of the Boards of Education in the country. Every single school came under the control of a board of trustees elected by the parents of the children at that school, and by nobody else. We gave schools a block of money based on the number of students that went to them, with no strings attached. At the same time, we told the parents that they had an absolute right to choose where their children would go to school. It is absolutely obnoxious to me that anybody would tell parents that they must send their children to a bad school. We converted 4,500 schools to this new system all on the same day.

Continued on page B-85



The previous article by Maurice P. McTigue comes to you courtesy of Imprimis, Hillsdale College's award-winning monthly speech digest. With nearly 800,000 readers, it is also America's fastest-growing journal of opinion. Do you have friends and business associates who would be interested in receiving Imprimis?



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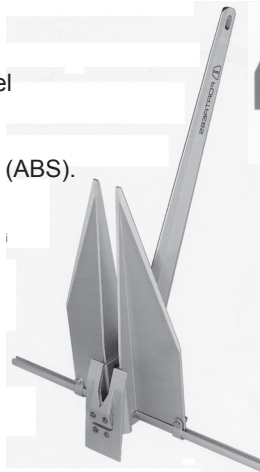
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FORTRESS Model	FX-7	FX-11	FX-16	FX-23	FX-37	FX-55	FX-85	FX-125
Boat Length feet	16-27	28-32	33-38	39-45	46-51	52-58	59-68	69-150
Boat Length meters	5-8	8-10	10-12	12-14	14-15	16-18	18-21	21-46
Anchor Weight lbs.	4	7	10	15	21	32	47	69
Anchor Weight kg	1.8	3.2	4.5	6.8	9.5	14.5	21.3	31.3
Replaces Steel Anchors lbs.	6-9	10-13	14-18	19-28	33-50	50-65	70-90	100-170
Replaces Steel Anchors kg	3-4	5-6	6-8	9-13	15-23	23-29	32-41	45-77

In test after test conducted around the world, no other anchor has set faster or could match the holding power of the FORTRESS anchor. FORTRESS anchors are manufactured from a hardened Aluminum Magnesium Alloy, making them stronger and lighter than competitive steel anchors. FORTRESS is the only anchor that is Type Approved by the American Bureau of Shipping (ABS).

- Sizes for boats up to 150 feet (46 meters).
- Lifetime Parts Replacement Warranty
- Adjustable fluke angle for soft mud.
- Disassembles for easy storage
- 90 day money back guarantee.
- Rust proof and non-magnetic.
- Tough anodized finish.
- No welds to fail.



FORTRESS
MARINE ANCHORS
NOT JUST STRONGER, LIGHTER!

Guardian
UTILITY ANCHORS

Guardian Model	G-5	G-7	G-11	G-16	G-23	G-37	G-55	G-85	G-125
Boat Length feet	12-16	17-22	23-27	28-33	34-41	42-47	48-53	54-62	63-72
Boat Length meters	4-5	5-7	7-8	8-10	10-12	12-14	14-16	16-19	19-22
Anchor Weight lbs.	2.5	4	6	7	13	18	29	42	65
Anchor Weight kg	1.1	1.8	2.7	3.2	5.9	8.2	13.2	19.1	29.5
Replaces Steel Anchors lbs.	4-6	6-9	10-13	14-18	19-28	33-50	50-65	70-90	100-170
Replaces Steel Anchors kg	2-3	3-4	5-6	6-8	9-13	15-23	23-29	32-41	45-77

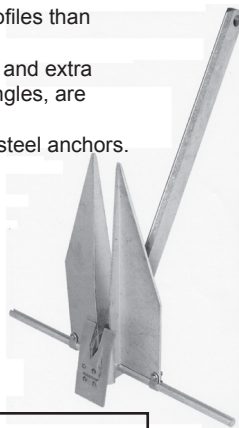
Guardian Anchors are manufactured from the same hardened Aluminum-Magnesium Alloy as FORTRESS, making them stronger and lighter than competitive steel anchors. Guardian Anchors are engineered for fast setting and strong holding power.

Guardian Anchors use slightly smaller extrusion profiles than FORTRESS.

Also, several FORTRESS precision machining steps and extra features, such as anodizing and adjustable fluke angles, are eliminated.

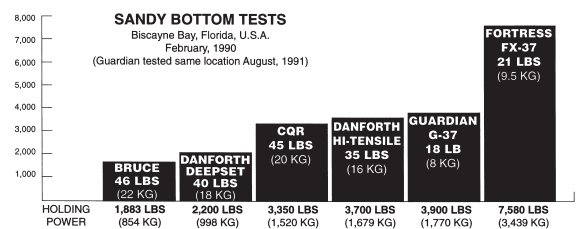
The result is a very affordable alternative to heavy steel anchors.

- Sizes for boats up to 72 feet (22 meters).
- One Year Parts Replacement Warranty
- Disassembles for easy storage
- 90 day money back guarantee.
- Rust proof and non-magnetic.
- No welds to fail.



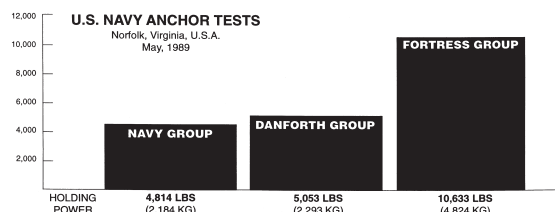
Test #2: The Biscayne Bay Sandy Bottoms Test

Verified by E. S. Maloney, author of "Chapman Piloting, Seamanship & Small Handling", (often called "The Boater's Bible"). These tests were conducted under controlled conditions in one of the world's most common bottoms: coarse-grain sand. The tests compared the results of tests of 6 of the most popular anchors of similar sizes, using a 70 ft. commercial tug boat as the test vessel. This test was witnessed by nearly a dozen editors of major boating magazines, as well as representatives from competing anchor manufacturers.



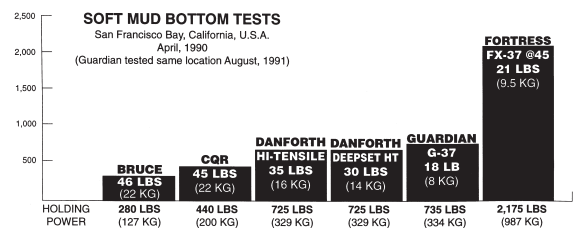
Test #1: The United States Navy Comparative Anchor Tests

Conducted by the U.S. Navy at the Little Creek Naval Amphibious Base in Norfolk, Virginia in May 1989. These tests were in support of a special Navy project to find lightweight, high performance anchors for its high-tech fleet of 90 ft. long "LCAC" Assault Hovercraft. Several sizes and types of anchor designs were tested, including several Navy design fluke anchors, such as the "Stato", NAV-Moor" and "LWT" which are not available to the public. These anchors weighed up to 300 lbs. The tests were conducted in a variety of bottoms over a two day period. In every test, the FORTRESS anchors set faster and out performed all other anchors!



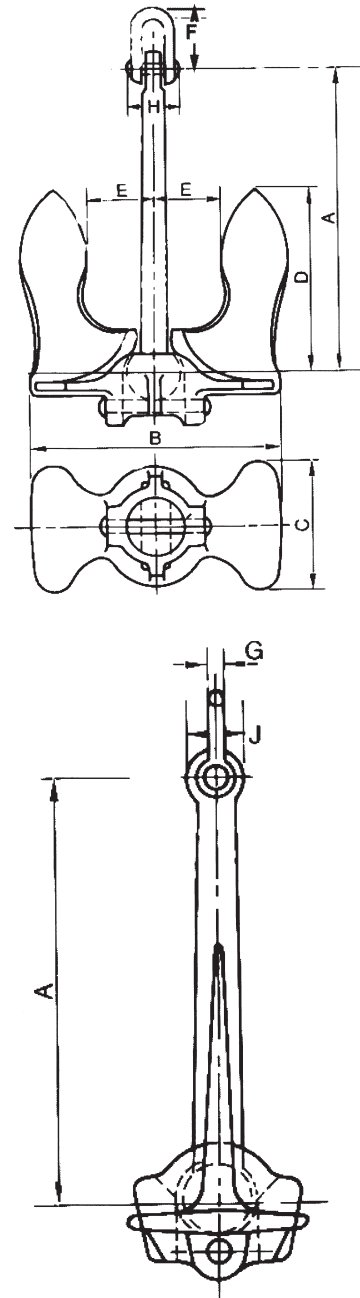
Test #3: The San Francisco Bay Muddy Bottoms Test

Sponsored by a major U.S. marine equipment supplier, the Soft Mud Anchor Tests were also verified by E. S. Maloney and witnessed by boating journalists and competing manufacturers. The Soft Mud Tests served to illustrate the dramatic effects differing bottom types can have upon various anchor designs. These tests also marked the debut of FORTRESS' revolutionary adjustable shank-fluke angle feature, which provided a whopping 263% holding power increase in soft mud!



ANCHORS - STOCKLESS

Anchor Weight	A	B	C	D	E	F	G	H	J	Proof Test
200	27	18	9-1/2	15-1/8	5-1/8	5-1/2	1	5	4	8300
300	32	23-1/4	11-11/16	17-3/16	6-11/16	5-1/2	1	5	4-1/2	10900
400	32	25-3/4	13	19	7	5-1/2	1	5	4-1/2	10300
500	35	26-1/2	14	20	7	7	1-1/4	6	5-1/2	15000
700	38	29-1/2	15-5/8	23-1/2	8-1/8	7	1-1/4	6	5-3/4	18700
775	38	32	16-7/8	24-3/4	8-5/8	7	1-1/4	6	5-3/4	20500
900	42	32	17	34	9	7-1/2	1-1/2	6-1/2	6-1/2	22300
1000	42	33-5/8	18	25-1/8	9-3/4	7-1/2	1-1/2	6-1/2	6-1/2	24100
1260	46	36-3/8	18-3/4	28-3/8	9-7/8	8-1/2	1-3/4	7-1/2	6-3/4	28800
1430	49	39	20	28-7/8	10-3/4	9-3/4	2	8-1/2	7	31700
1540	49	40	20-1/2	30-1/2	11	9-3/4	2	8-1/2	7	33600
1600	49	40	20-1/2	30-1/2	11	9-3/4	2	8-1/2	7	34600
1750	52	41-1/2	21	33-1/4	11-3/8	9-3/4	2	8-1/2	7-1/4	37150
1875	52	43	22	34-3/4	12	9-3/4	2	8-1/2	7-1/4	38400
1950	52	43	22	34-3/4	12	9-3/4	2	8-1/2	7-1/4	40550
2100	58	44-3/4	23	33-3/8	12-1/8	9-3/4	2	8-1/8	7-1/2	43050
2500	58	44-3/4	23-1/4	33-3/8	12-1/8	9-3/4	2	8-1/2	7-1/2	49650
3000	64	47	25-1/2	36	12-3/4	12	2-1/2	10	8-3/4	57700
4000	70-5/8	53-1/4	27-1/2	39-1/4	14-1/2	12	2-1/2	10	9-1/2	72600
4500	70-5/8	56-3/4	29	42	15	12	2-1/2	10	9-1/2	79700
5000	76	57-1/2	30	42	15-5/8	15	3	12	10-1/4	86500
6000	76	63-1/2	33-1/4	47	17-1/4	15	3	12	10-1/4	99100
6300	76	63-1/2	33-1/4	47	17-1/4	15	3	12	10-1/4	102700
6500	82	63-1/2	33	47-5/8	17-1/4	15	3	12	10-3/4	105100
6750	82	65	33-3/4	48-3/4	17-5/8	15	3	12	10-3/4	107900
7000	82	66-5/8	34-3/4	49-3/4	18	15	3	12	10-3/4	110700
7600	82	67-1/2	34-3/4	49-3/4	18-3/8	15	3	12	10-3/4	117300
8100	93-1/2	66-1/4	34-1/4	48-7/8	18-1/4	17	3-1/2	13-1/4	11-1/2	122500
8600	93-1/2	68-1/2	35-3/4	50-1/2	18-1/2	17	3-1/2	13-1/4	11-1/2	127500
9000	96	70-1/4	36-3/8	51-3/4	19-1/8	17	3-1/2	13-1/4	11-1/2	131400
10000	96	75-1/2	39	58	21	19	4	14-3/4	12	140400
11000	96	75-1/2	39	58	21	19	4	14-3/4	12	148500
12000	96	76-3/4	40	58	20-3/4	19	4	14-3/4	12	156100
13000	98	76-3/4	40	58	20-3/4	19	4	14-3/4	12	163500
14000	103	80-1/2	44	60	22-1/4	19	4	14-3/4	13	170500
15000	103	86	46	65	24	19	4	14-3/4	13	176800
16000	108	86	46	65	24	19	4	14-3/4	13	182800
18000	112	88-1/4	48-1/4	65-5/8	24-3/4	22	4-1/2	16-3/4	13	194200
18900	112	88-1/4	48-1/4	65-5/8	24-3/4	22	4-1/2	16-3/4	13	198800
20000	112	96	50	72	26	22	4-1/2	16-3/4	14	204300
25000	120	103	53-3/4	77-1/2	28	22	4-1/2	16-3/4	15	227000
30000	128	110	57-1/4	82-1/2	29-7/8	24	5	18-3/4	16	247600
35000	135	116	60	87	31-1/2	25	5	19	17	265600
40000	140	121	63	91	21	26	5-1/2	20	17-1/2	278200
45000	147	126	65	94	34	27	5-1/2	21	18	287550
50000	152	131	68	99	35	28	6	21-1/2	19	292600

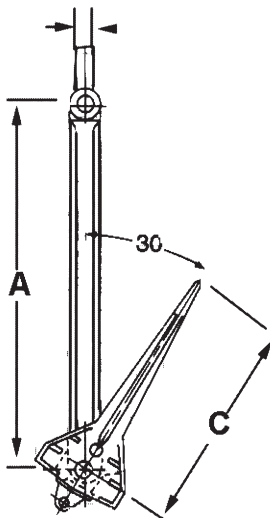
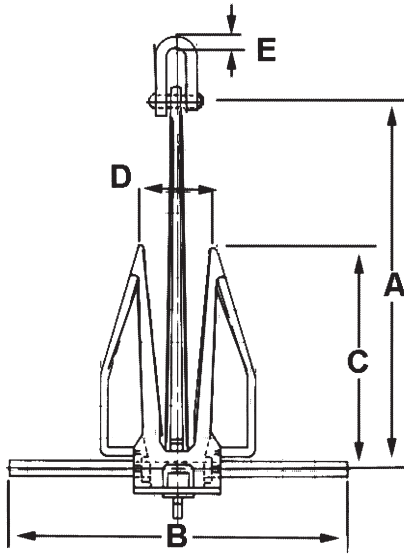


*Specifications are in pounds and inches.

Love is grand;
divorce is a hundred grand.

ANCHORS - WORKBOAT

PROOF TEST LOAD FOR SUPERIOR HOLDING POWER ANCHORS



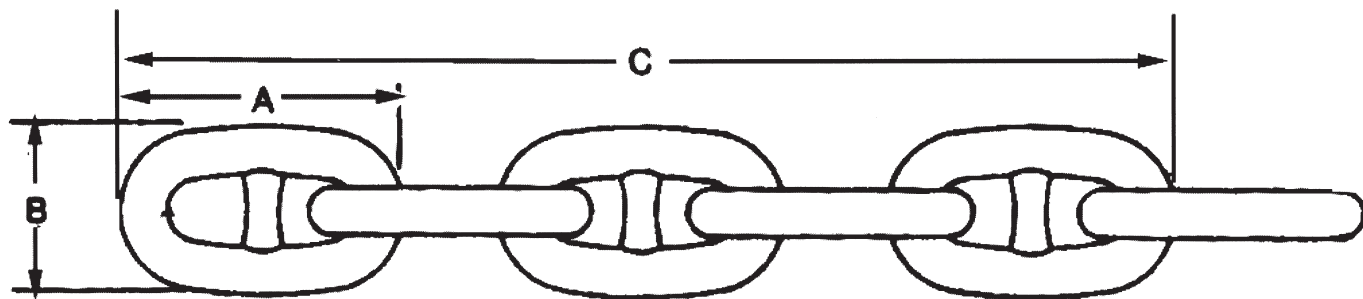
Anchor Weight	A	B	C	D	E	Proof Test
8	20	19	11-1/2	1-1/2	3/8	300
16	25	23-3/4	14-1/2	1-7/8	1/2	560
30	30-1/4	28-3/4	17-1/2	1-7/8	1/2	1000
50	34-3/4	33	20	2-3/8	5/8	1500
75	38	36	22	2-1/2	3/4	2070
100	41-1/2	39-1/2	24	3-3/8	7/8	2608
150	46-3/4	44-1/2	27	4	7/8	4200
200	52-1/2	45-1/2	33	6-1/8	7/8	10100
300	56	48-1/2	36-3/4	13/12	1-1/8	13000
500	63	54-1/2	39-3/4	15-1/8	1-1/2	18300
750	67-1/2	58-1/2	44-11/16	16-1/2	1-1/2	24100
1000	72	62	45-3/8	18-3/4	2	30000
1500	77	70-7/8	51-3/16	19-3/8	2	41000
2000	83	71-3/4	52	22-5/8	2-1/2	52500
2500	89	84-1/2	59	13-7/8	2-1/2	62500
3000	94	89	59	14-3/8	3	72500
4000	104	98-3/4	65-1/2	15-3/8	3	90500
5000	112	106-1/2	70-1/2	18	3-3/8	105500
6000	118	112	74	18-5/8	3-3/4	121500
8000	129	122-1/2	77-3/8	20-1/4	4-1/8	145500
10000	138	131	87	21-7/8	4-1/2	165500
12000	145	145	91	23	4-3/4	183000
14000	152	152	95-3/4	24	5	198000
16000	160	160	101	25-1/4	5-1/4	210000
20000	172	163	108-3/8	27-1/4	5-5/8	233000
30000	197	187	112	31-1/4	6-1/2	278000
35000	207	196	118	33	6-1/2	289500
40000	216	205	123	34-1/2	7	296000
50000	232	222	133	37-1/2	7-1/2	309500
60000	246	235	141	40	7-1/2	321000
70000	258	247	148	42	8	336000
80000	271	259	156	44	8	349400
90000	282	269	162	46	8-1/2	362900
100000	293	280	168	48	8-1/2	376000

*Specifications are in pounds and inches.

DIMENSIONS VARY AMONG MANUFACTURERS.
PLEASE CONTACT US FOR SPECIFIC DIMENSIONS.

I am in shape.
Round is a shape.

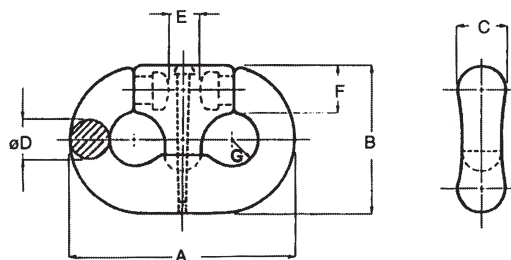
STUD LINK ANCHOR CHAIN



CHAIN SIZE		DIMENSIONS					TEST REQUIREMENTS				No. of links per 15-Fathom Shot
Inches	mm	Link Length A	Link Width B	Length over 5-links C	Grip Radius D	Weight per 15fm shot (Approx.)	Grade 2		Grade 3		
							Proof Load	Break Load	Proof Load	Break Load	
3/4	19	4-1/2	2-5/8	16-1/2	1/2	480	34000	47600	47600	68000	357
11-3/16	20	4-7/8	2-7/8	17-7/8	1-17/32	570	39800	55700	55700	79500	329
7/8	22	5-1/4	3-1/8	19-1/4	37/64	660	46000	64400	64400	91800	305
15/16	24	5-5/8	3-5/16	20-5/8	5/8	760	52600	73700	73700	105000	285
1	25	6	3-9/16	22	21/32	860	59700	83600	83600	119500	267
1-1/16	27	6-3/8	3-3/4	23-3/8	11/16	970	67200	94100	94100	135000	251
1-1/8	29	6-3/4	4	24-3/4	25/32	1080	75000	105000	105000	150000	237
1-3/16	30	7-1/8	4-1/4	26-1/8	25/32	1220	83400	116500	116500	167000	225
1-1/4	32	7-1/2	4-1/2	27-1/2	25/32	1350	92200	129000	129000	184000	213
1-5/16	33	7-7/8	4-3/4	28-7/8	7/8	1490	101500	142000	142000	203000	203
1-3/8	34	8-1/4	4-15/16	30-1/4	7/8	1630	111000	155000	155000	222000	195
1-7/16	36	8-5/8	5-1/16	31-5/8	15/16	1780	120500	169000	169000	241000	187
1-1/2	38	9	5-3/8	33	63/64	1940	131000	183500	183500	262000	179
1-9/16	40	9-3/8	5-5/8	34-3/8	1-1/32	2090	142000	198500	198500	284000	171
1-5/8	42	9-3/4	5-7/8	35-3/4	1-1/16	2240	153000	214000	214000	306000	165
1-11/16	43	10-1/8	6-1/16	37-1/8	1-3/32	2410	166500	229000	229000	327000	159
1-3/4	44	10-1/2	6-5/16	38-1/2	1-5/32	2590	176000	247000	247000	352000	153
1-13/16	46	10-7/8	6-1/2	39-7/8	1-3/16	2790	188500	264000	264000	377000	147
1-7/8	48	11-1/4	6-3/4	41-1/4	1-1/4	2980	201000	281000	281000	402000	143
1-15/16	50	11-5/8	7	42-5/8	1-9/32	3180	214000	299000	299000	427000	139
2	51	12	7-3/16	44	1-5/16	3360	227000	318000	318000	454000	133
2-1/16	52	12-3/8	7-7/16	45-3/8	1-3/8	3570	241000	337000	337000	482000	129
2-1/8	54	12-3/4	7-5/8	46-3/4	1-27/64	3790	255000	357000	357000	510000	125
2-3/16	56	13-1/8	7-7/8	48-1/8	1-15/32	4020	269000	377000	377000	538000	123
2-1/4	58	13-1/2	8-1/8	49-1/2	1-1/2	4250	284000	396000	396000	570000	119
2-5/16	59	13-7/8	8-5/16	50-7/8	1-17/32	4490	299000	418000	418000	598000	117
2-3/8	60	14-1/4	8-9/16	52-1/4	1-9/16	4730	314000	440000	440000	628000	113

Time may be a great healer, but it's a lousy beautician.

FITTINGS - DETACHABLE CHAIN LINK

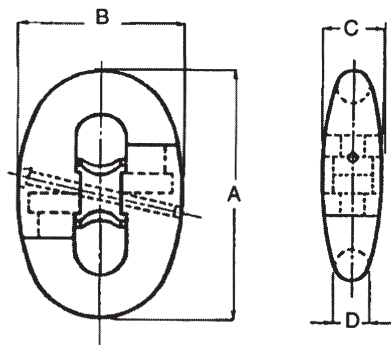


CHAIN SIZE		A	B	C	D	E	F	G	GRADE 3		Wt. Lbs.
Inches	mm								Proof Test in Pounds	Break Test in Pounds	
3/4	19	4.1/2	2.29/32	15/16	3/4	7/8	15/16	1/2	48,000	75,000	2.1
13/16 - 7/8	21 - 22	5.1/4	3.3/8	1.3/32	7/8	1.1/8	1.3/32	19/32	64,000	98,000	3.4
13/16 - 1	24 - 25	6	3.7/8	1.1/4	1	1.5/32	1.1/4	21/32	84,000	129,000	5.1
1.1/16-1.1/8	27 - 29	6.3/4	4.3/8	1.13/32	1.1/8	1.1/4	1.13/32	3/4	106,000	161,000	7.2
1.3/16 - 1.1/4	30 - 32	7.1/2	4.27/32	1.9/16	1.1/4	1.15/32	1.9/16	27/32	130,000	198,000	9.9
1.5/16 - 1.3/8	33 - 34	8.1/4	5.5/16	1.23/32	1.3/8	1.5/8	1.23/32	29/32	157,000	235,000	13.3
1.7/16 - 1.1/2	36 - 38	9	5.13/16	1.7/8	1.1/2	1.3/4	1.7/8	1	185,000	280,000	17.3
1.9/16 - 1.5/8	40 - 42	9.3/4	6.5/16	2	1.5/8	1.31/32	2	1.1/16	216,000	325,000	22.0
1.11/16 - 1.3/4	43 - 44	10.1/2	6.25/32	2.1/4	1.3/4	2.1/16	2.3/16	1.5/32	249,000	390,000	27.5
1.13/16 - 1.7/8	46 - 48	11.1/4	7.1/4	2.1/2	1.7/8	2.5/32	2.11/32	1.15/64	285,000	432,000	32
1.15/16 - 2	50 - 51	12	7.3/4	2.1/2	2	2.5/16	2.1/2	1.5/16	322,000	488,000	36
2.1/16 - 2.1/8	52 - 54	12.3/4	8.1/4	2.21/32	2.1/8	2.1/2	2.21/32	1.13/32	362,000	548,000	44
2.3/16 - 2.1/4	56 - 58	13.1/2	8.23/32	2.13/16	2.1/4	2.5/8	2.13/16	1.1/2	403,000	610,000	52
2.5/16 - 2.3/8	59 - 60	14.1/4	9.7/32	3.1/16	2.3/8	2.3/4	2.15/16	1.9/16	447,000	675,000	61
2.7/16 - 2.1/2	62 - 64	15	9.11/16	3.1/8	2.1/2	2.7/8	3.1/8	1.21/32	492,000	744,000	71
2.9/16 - 2.5/8	66 - 67	15.3/4	10.3/16	3.1/4	2.5/8	3.1/16	3.1/16	1.3/4	540,000	813,000	82
2.11/16 - 2.3/4	68 - 70	16.1/2	10.5/8	3.7/16	2.3/4	3.3/16	3.7/16	1.13/16	590,000	885,000	95
2.13/16 - 2.7/8	71 - 73	17.1/4	11.1/8	3.19/32	2.7/8	3.11/32	3.3/8	1.29/32	640,000	965,000	107
2.15/16 - 3	75 - 76	18	11.5/8	3.3/4	3	3.17/32	3.3/4	1.31/32	693,000	1,045,000	120
3.1/16 - 3.1/8	78 - 79	18.3/4	12.1/8	4	3.1/8	3.5/8	3.11/16	2.3/64	748,000	1,128,000	138
3.3/16 - 3.1/4	81 - 83	19.1/2	12.5/8	4.1/16	3.1/4	3.5/8	4.1/16	2.5/32	804,100	1,210,000	161
3.5/16 - 3.3/8	84 - 86	20.1/4	13.3/32	4.7/32	3.3/8	3.15/16	4.7/32	2.1/4	862,200	1,296,000	177
3.7/16 - 3.1/2	87 - 89	21	13.9/16	4.3/8	3.1/2	4.1/16	4.3/8	2.19/64	922,000	1,383,100	195
3.9/16 - 3.5/8	90 - 92	21.3/4	14	4.9/16	3.5/8	4.3/16	4.9/16	2.5/16	1,021,000	1,566,000	215
3.11/16 - 3.3/4	94 - 95	22.1/2	14.1/2	4.11/16	3.3/4	4.11/16	4.11/16	2.7/16	1,120,000	1,750,000	256
3.13/16 - 3.7/8	97 - 98	23.1/4	15	5	3.7/8	4.1/2	4.3/4	2.5/8	1,205,000	1,863,400	271
3.15/16 - 4	100 - 102	24	15.1/2	5.3/16	4	4.5/8	4.15/16	2.11/16	1,298,000	1,966,000	288

Never be afraid to try something new.

Remember, amateurs built the ark, professionals built the Titanic.

FITTINGS - KENTER JOINING SHACKLE



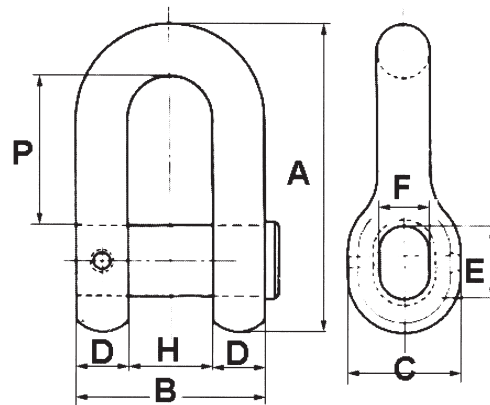
$$\begin{aligned} A &= 6d \\ B &= 4.2d \\ C &= 1.5d \\ D &= 1.0d \end{aligned}$$

NOMINAL DIAMETER (D)		A	B	C	WEIGHT		GRADE 3	
inches	mm	inches	inches	inches	lbs	kg	Proof Test Lbs.	Break Test Lbs.
3/4	19	4-1/2	3-1/4	1-1/4	2.40	1.09	47600	68000
7/8	22	5-1/4	3-3/4	1-1/4	3.80	1.75	64400	91800
15/16	24	5-3/4	4	1-1/2	4.60	2.10	73700	105000
1	25	6	4-1/4	1-1/2	4.80	2.50	83600	119500
1-1/8	29	6-3/4	4-3/4	1-3/4	10.50	4.80	105000	150000
1-1/4	32	7-1/2	5-1/4	2	11.00	5.00	129000	184000
1-3/8	34	8-1/4	5-3/4	2	14.30	6.50	155000	222000
1-7/16	36	8-3/4	6	2-1/4	17.60	8.00	169000	241000
1-1/2	38	9	6-1/4	2-1/4	19.80	9.00	183500	262000
1-5/8	42	9-3/4	6-3/4	2-1/2	26.50	12.00	214000	306000
1-3/4	44	10-1/2	7-1/4	2-3/4	30.90	14.00	247000	352000
1-13/16	46	11	7-1/2	2-3/4	33.10	15.00	264000	377000
1-7/8	48	11-1/4	8	2-3/4	39.70	18.00	281000	402000
2	51	12	8-1/2	3	46.30	21.00	318000	454000
2-1/8	56	12-3/4	9	3-1/4	52.90	24.00	357000	510000
2-1/4	58	13-1/2	9-1/2	3-1/2	68.00	31.00	396000	570000
2-3/8	60	14-1/4	10	3-1/2	75.00	34.00	440000	628000
2-7/16	62	14-3/4	10-1/4	3-3/4	79.40	36.00	462000	660000
2-1/2	64	15	10-1/2	3-3/4	83.80	38.00	484000	692000
2-5/8	67	15-3/4	11	4	90.40	41.00	530000	758000
2-3/4	70	16-1/2	11-1/2	4-1/4	115.70	52.40	578000	826000
2-7/8	73	17-1/4	12	4-1/4	132.30	60.00	628000	897000
3	76	18	12-1/2	4-1/2	154.30	70.00	679000	970000
3-1/2	89	21	14-3/4	5-1/4	249.10	113.00	900000	1285000
4	102	24	16-3/4	6	359.40	163.00	1143000	1632000

Conscience is what hurts when everything else feels so good.

FITTINGS - ANCHOR JOINING

"D" TYPE SHACKLE



A - 8.7 d
 B - 5.2 d
 C - 3.1 d
 D - 1.4 d
 E - 1.8 d
 F - 1.4 d
 H - 2.4 d
 P - 4.6 d

SIZE inches	mm	A	B	C	D	E	F	H	P	Weight Lbs.	Weight Kg.
3/4	19	6-1/2	3-7/8	2-3/8	1	1-3/8	1	1-3/4	3-1/2	5.5	2.5
7/8	22	7-5/8	4-1/2	2-3/4	1-1/4	1-5/8	1-1/4	2-1/8	4	8.4	3.8
1	25	8-3/4	5-1/4	3-1/8	1-3/8	1-3/4	1-3/8	2-3/8	4-5/8	13.2	6
1-1/8	29	9-3/4	5-7/8	3-1/2	1-5/8	2	1-5/8	2-3/4	5-1/8	18.5	8.4
1-1/4	32	10-7/8	6-1/2	3-7/8	1-3/4	2-1/4	1-3/4	3	5-3/4	24.9	11.3
1-3/8	35	12	7-1/8	4-1/4	1-7/8	2-1/2	1-7/8	3-1/4	6-3/8	34.2	15.5
1-1/2	38	13	7-3/4	4-5/8	2-1/8	2-3/4	2-1/8	3-5/8	6-7/8	43.7	19.8
1-5/8	41	14-1/8	8-1/2	5	2-1/4	2-7/8	2-1/4	3-7/8	7-1/2	56.9	25.8
1-3/4	44	15-1/4	9-1/8	5-3/8	2-1/2	3-1/8	2-1/2	4-1/4	8	70.3	31.9
1-7/8	48	16-3/8	9-3/4	5-7/8	2-5/8	3-3/8	2-5/8	4-1/2	8-5/8	85.5	38.8
2	51	17-3/8	10-3/8	6-1/4	2-3/4	3-5/8	2-3/4	4-3/4	9-1/4	105.8	48
2-1/8	54	18-1/2	11	6-5/8	3	3-7/8	3	5-1/8	9-3/4	125.7	57
2-1/4	57	19-5/8	11-3/4	7	3-1/8	4	3-1/8	5-3/8	10-3/8	147.7	67
2-3/8	60	20-5/8	12-3/8	7-3/8	3-3/8	4-1/4	3-3/8	5-3/4	10-7/8	176.6	80.1
2-1/2	64	21-3/4	13	7-3/4	3-1/2	4-1/2	3-1/2	6	11-1/2	204.1	92.6
2-5/8	67	22-7/8	13-5/8	8-1/8	3-5/8	4-3/4	3-5/8	6-1/4	12-1/8	234.6	106.4
2-3/4	70	23-7/8	14-1/4	8-1/2	3-7/8	5	3-7/8	6-5/8	12-5/8	267.6	121.4
2-7/8	73	25	15	8-7/8	4	5-1/8	4	6-7/8	13-1/4	310.2	140.7
3	76	26-1/8	15-5/8	9-1/4	4-1/4	5-3/8	4-1/4	7-1/4	13-3/4	350.5	159

*Dimensions are in inches.

Talk is cheap
because supply exceeds demand.

POLYPROPYLENE ROPE

Monofilament

Yellow, Yellow/Yellow/Black, All Black, Yellow w/2 Blue Tracers, All Blue

Dia.	Length	Yellow w/2 Blue Tracers	All Yellow Item No.	Blue	Black	2 Yellow 1 Black
1"	x 600'	701200	300200	301230	301105	301038
1"	x 1200'	701205	300205			
1-1/8"	x 600'	701210	300210			
1-1/4"	x 600'	701220	300220		301118	301040
1-5/16"	x 600'					
1-1/2"	x 600'	701235	300236			301042
						301043
1-5/8"	x 600'		300242			
1-3/4"	x 600'		300247			301044
2"	x 600'	701250	300251			301045
						301046
2-1/4"	x 600'					301052
2-1/2"	x 600'		300261			301047
2-5/8"	x 600'					301048
3"	x 600'		300271			
3-1/4"	x 600'					
4"	x 600'		300291			301054

Even if you are on the right track, you'll get run over if you just sit there.

SUPER STRENGTH BLUE STEEL™ POLY ROPE

CWC Brand Hi Strength Coextrusion Polyolefin

Item No.	Size	Approx. Wt. per 100'	Average Tensile Strength
402115	1" x 600'	19.2	24,300
402120	1-1/8" x 600'	26.2	31,600
402125	1-1/4" x 600'	29.6	34,600
402135	1-1/2" x 600'	43.3	48,500
402142	1-5/8" x 600'	52.6	60,000
402145	1-3/4" x 600'	65.1	70,000
402150	2" x 600'	83.4	87,800
402160/63	2-1/4" x 600'	112.7	112,700
402170	2-1/2" x 600'	128.6	128,700
	2-5/8" x 600'	145.4	145,000
402195	3" x 600'	187.7	185,200

"8" Braid Super Blue Steel™ Poly

Item No.	Size	Approx. Wt. per 100'	Average Tensile Strength
402137	1-1/2" x 600'	53 Lb.	50,860 Lb.
402143	1-5/8" x 600'	56	60,000
402146/47	1-3/4" x 600'	65.5	74,700
402155/56	2" x 600'	80.2	91,400
402165/66	2-1/4" x 600'	108.5	120,600
402180/81	2-1/2" x 600'	124.4	137,800
402188/89	2-5/8" x 600'	141.1	155,000
402200/01	3" x 600'	178.1	197,100
402210	3-1/4" x 600'	220	238,600
402225	4" x 600'	314.5	336,600
	4-1/2" x 600'	426.9	456,900
	5" x 600'	481.4	515,200

- **Put Up:**
1-1/4" x 600' & Smaller
on Reels
1-1/2" x 600' & Larger
on Coils
- **Special Note:**
720' coils are "8" Braid &
includes 6' eye with chaff-
ing gear at each end

FILM POLYPROPYLENE ROPE

Yellow

Item No.	Description
400130	1" x 600'
400138	1-1/8" x 600'
400140	1-1/4" x 600'
400155	1-1/2" x 600'
	1-3/4" x 600'
400200	2" x 600'
	2-1/4" x 600'
400210	2-1/2" x 600'
	3" x 600'

NYLON ROPE

White, 3 Strand

Item No.	Description
315140	1" x 600'
315145	1" x 1200'
315150	1-1/8" x 600'
315160	1-1/4" x 600'
315200	1-1/2" x 600'
	1-5/8" x 600'
315217	1-3/4" x 600'
315220	2" x 600'
315230	2-1/4" x 600'
315235	2-1/2" x 600'
315240	2-5/8" x 600'
315250	3" x 600'

An optimist thinks that this is the best possible world.
A pessimist fears that this is true.

ICE BLUE STEEL™ COMBO ROPE

ICE BLUE STEEL™ rope is ideal for very high strength mooring lines, head ropes, net ropes or any application where you need the floatability and the durability of a combo rope.

Blended Polyester/Hi-Strength Blue Steel™

3 Strand Item No.	8 Braid Item No.		mm	Weight (Lbs./100 Ft)	Breaking Avg. (Lbs.)	Strengths Min. (Lbs.)	Price
403300		3/8" Dia.	10	3.6	4,675	4,250	Prices
		7/16" Dia.	11	5.0	5,896	5,360	On
403302		1/2" Dia.	12	6.4	7,216	6,560	Request
		9/16" Dia.	14	8.2	9,075	8,250	
403304		5/8" Dia.	17	10.4	11,308	10,280	
403305		3/4" Dia.	18	14.0	14,674	13,340	
		7/8" Dia.	22	20.0	20,229	18,390	
403310		1" Dia.	24	24.3	24,640	22,400	
403314		1-1/8" Dia.	28	32.0	32,450	29,500	
403315		1-1/4" Dia.	30	37.0	37,400	34,000	
403320	403420	4-1/2" Cir.	36	56.0	54,000	48,000	
	403425	5-1/2" Cir.	44	78.3	76,000	69,200	
403330/31	403430	6" Cir.	48	99.0	95,900	87,200	
		6-1/2" Cir.	52	112.1	109,100	99,200	
403335	403435/37	7" Cir.	56	133.7	130,300	118,400	
403340/41	403440	7-1/2" Cir.	60	149.6	145,800	132,600	
	403445	8" Cir.	64	168.5	164,100	149,200	
		8-1/2" Cir.	68	198.4	184,400	167,700	
403350	403450	9" Cir.	72	212.0	206,800	187,800	
		10" Cir.	80	260.7	254,000	230,900	
		11" Cir.	88	313.8	305,600	277,800	
		12" Cir.	96	370.8	358,900	326,300	

CONSTRUCTION:

Core Yarns:

BLUE STEEL™ POLY

The widely used Super Hi - Strength Poly Floating Line. Made from high tenacity coextrusion Polyolefin yarn.

Cover Yarns:

POLYESTER HIGH TENACITY

Abrasion resistance, high melting point, high U.V. resistance with excellent wet and dry strength and minimal 0 to 1% water absorption.

POLYPLUS - POLY/DAC - PLUS 3

Blended Polyester / Polypro Rope

Poly/Dac Item No.	Poly Plus Item No.	Plus 3 Item No.	Description
325120	755120	325820	1" x 600'
	755125		1" x 1200'
325130	755130	325830	1-1/8" x 600'
325140	755140	325840	1-1/4" x 600'
325147	755150	325845	1-1/2" x 600'
325157	755160	325850	1-5/8" x 600'
325167	755165	325855	1-3/4" x 600'
325173	755200	325860	2" x 600'
325182	755205	325865	2-1/4" x 600'
325187	755210	325870	2-1/2" x 600'
325191	755215	325875	2-5/8" x 600'
325197	755220	325880	3" x 600'

- Poly/Dac: White color with two black tracers. All sizes are on reels.
- Poly Plus-Plus 3: White Color with two red tracers. Sizes: 1/4" through 1-1/4" on reels. 1-1/2" and larger on coils. Reels are special order with upcharge.

Politicians and diapers have one thing in common.
They should both be changed regularly and for the same reason.



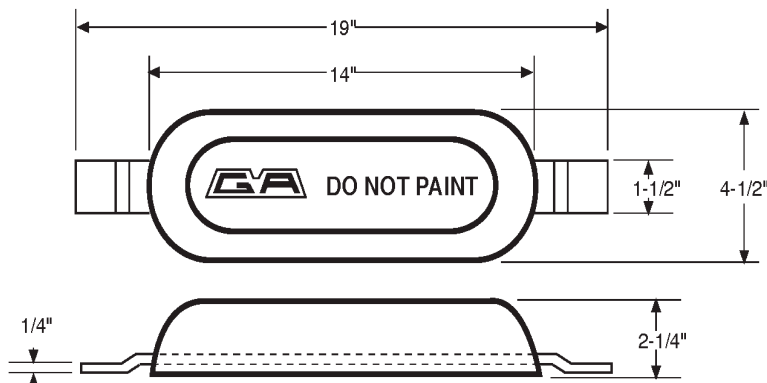
Zinc Hull Anodes



GA-26

Contains single galvanized steel longitudinal strap. Can be bolted or welded to hull. Particularly suited for smaller ships, coastal vessels, harbor tugs, etc.

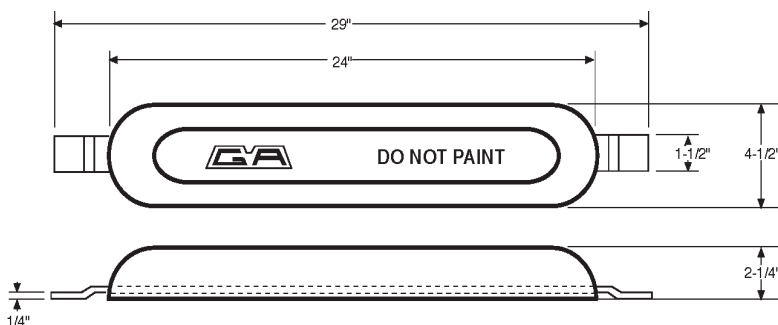
Weight	26 lbs	11.8 kg
Width	4 1/2"	114 mm
Height	2 1/4"	57 mm
Length	14"	356 mm
Current Rating	1 (amp-yrs)	



GA-48

Contains single longitudinal galvanized steel strap for welding to hull. Particularly suited for major ships, 10,000 DWT and upward.

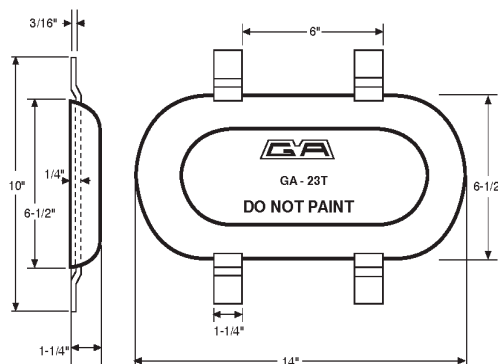
Weight	48 lbs	21.8 kg
Width	4 1/2"	114 mm
Height	2 1/4"	57 mm
Length	24"	61 mm
Current Rating	2 (amp-yrs)	



Tapered GA-23T

Contains two cast-in galvanized steel mounting straps.

Weight	22.5 lbs	10.2 kg
Width	6 1/2"	165 mm
Height	1 1/4"	32 mm
Length	14"	356 mm
Current Rating	1 (amp-yrs)	



There will always be death and taxes; however, death doesn't get worse every year.

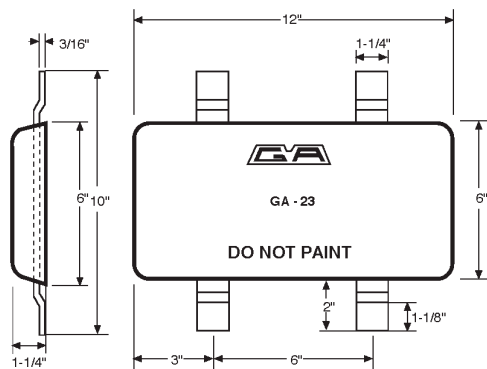


Military Anodes

The anodes shown here conform to the latest modification of MIL-A-18001.

Anodes in this series contain two cast-in galvanized steel mounting straps (brass mounting straps are also available) or two cast-in cored holes on 6" centers. (GA-23C & GA-42C)

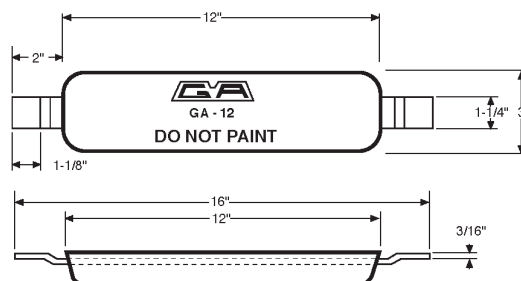
Product Number	Mil.	Wt.		W		H		L		Current Rating
	Spec.	Lbs	Kg	in	mm	in	mm	in	mm	(amp-yrs)
GA-23	ZHS-23	22	10	6	152	1 ¹ / ₄	32	12	30	1
GA-23C	ZHC-23	22	10	6	152	1 ¹ / ₄	32	12	30	1
GA-42	ZHS-47	42	19	6	152	2 ¹ / ₂	64	12	30	1
GA-42C	ZHC-47	40	18	6	152	2 ¹ / ₂	64	12	30	1



These anodes contain a single cast-in galvanized steel mounting strap measuring 3/16" x 1 1/4" x 16".

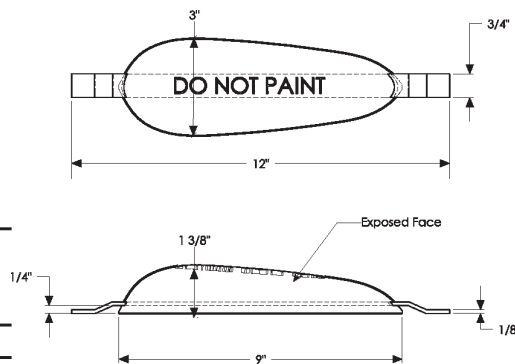
Option: Holes in straps

Product Number	Mil. Spec.	Wt.		W		H		L		Current Rating (amp-yrs)
		Lbs	Kg	in	mm	in	mm	in	mm	
GA-12	ZSS-12	11	5	3	76	1 ¹ / ₄	3	12	30	0.5
GA-24	ZSS-24	22	10	3	76	2 ¹ / ₂	6	12	30	1.0



A teardrop-shaped anode containing a single, cast-in galvanized steel strap.

Product Number	Mil. Spec.	Wt. Lbs	Kg	W in	mm	H in	mm	L in	mm	Current Rating (amp-yrs)
GA-TD6	ZTS	5	2.3	3	76	1 1/4	32	9	41	0.25

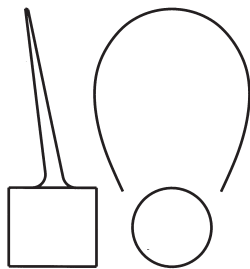


In just two days,
tomorrow will be yesterday.



Standard Propeller Designs

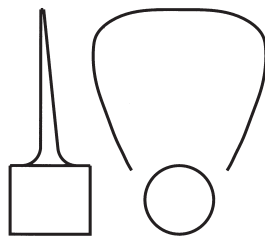
(Available in 3, 4, & 5 Blades)



"Answer"

.67 DAR in four blades

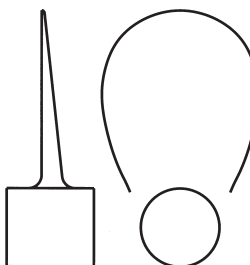
This design provides good performance in moderate horsepower / diameter ratios. Aft rake provides improved smoothness of operation by increasing hull and skeg clearance.



"Dominator"

.81 DAR in four blades

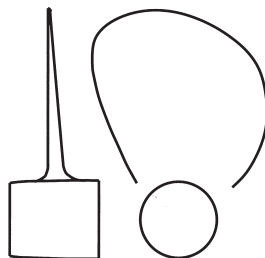
This high area blade design provides a propeller solution when horsepower are high and diameter is limited by a particular hull design.



"Pusher"

.7 DAR in four blades

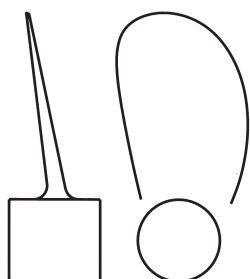
This design provides surface appropriate for moderate horsepower / diameter ratios. Elliptical blade shape and no rake configuration enhance backing performance desired in river push boat operations.



"Cruiser"

.68 DAR in four blades

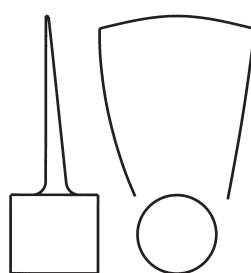
This higher skew design is appropriate for the faster pleasure and commercial passenger vessels. This propeller is designed with heavier root sections to support the demands of current higher horsepower engines.



"Sound - B"

.5 DAR in four blades

This modified troost BB design provides smooth ahead performance by using moderate skew and rake of the propeller blades. Long slim blades help optimize the propeller performance.



"Kaplan"

Blade area ratio varies

The kaplan propeller with its full blade width at the tip of the blades is designed to provide good performance in nozzle installations. Blade numbers and area ratios are adjusted to the particular vessel needs.

Available in Stainless Steel, Bronze and Nickle Aluminum Bronze.

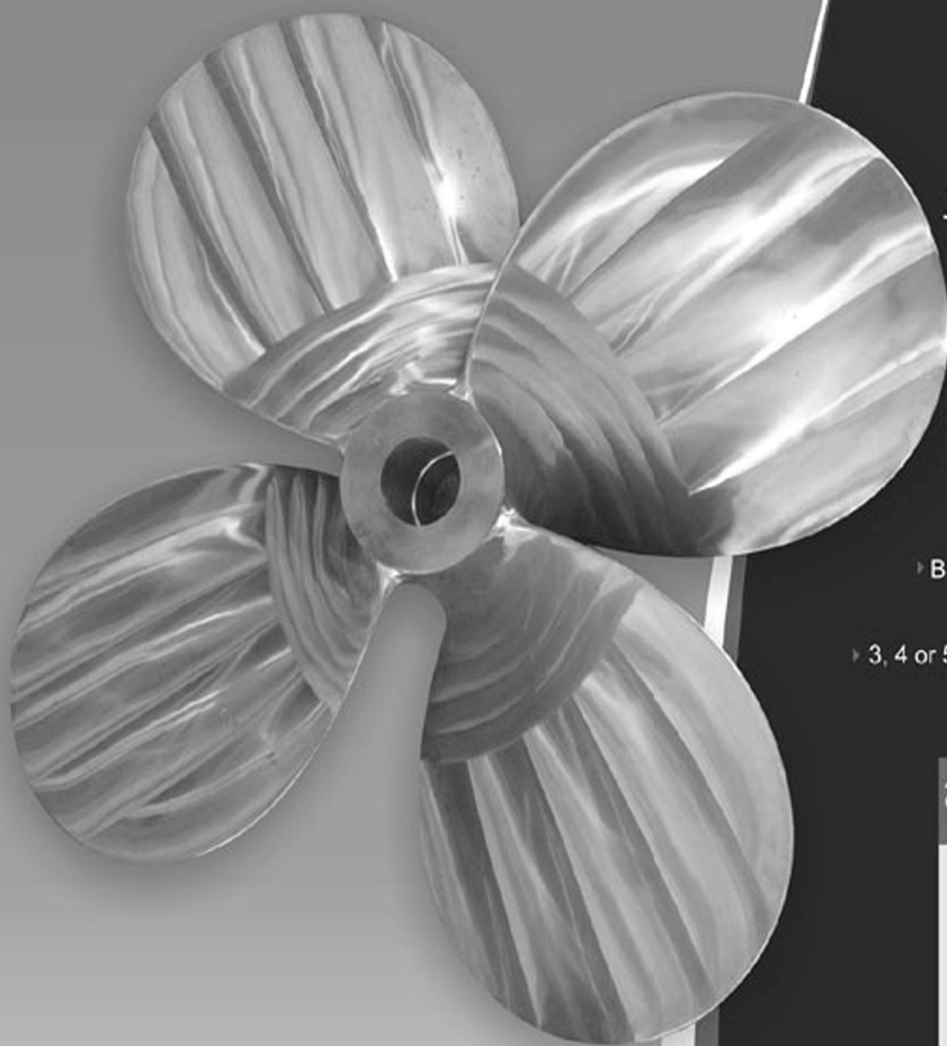
Amazing Coincidences

WHAT GOES AROUND...

"In 1965, at age four, Roger Lausier was saved from drowning off a beach at Salem, Mass., by a woman named Alice Blaise. Nine years later, in 1974, on the same beach, Roger paddled his raft into the water and pulled a drowning man from the water. The man was Alice Blaise's husband."

-The Book of Lists

TITAN



3 TO 5 BLADES 30" - 160" DIAMETER

TITAN offers you:

PERFORMANCE

- ▶ Hard working propeller.
- ▶ Built to take heavy demands of tugs, workboats & heavy duty vessels.
- ▶ Greater thrust in a smaller diameter.

HEAVY-DUTY

- ▶ Blade sections are larger than standard propellers for vessels with limited propeller space.
- ▶ 3, 4 or 5 blades from 30" up to 160" diameter.

4 Blades 0.67 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
30	52	11.5	118
32	60	12.6	135
34	70	13.0	152
36	80	13.8	170
38	93	14.0	190
40	115	15.4	210
42	130	16.1	232
44	146	16.9	255
46	164	17.7	278
48	183	18.4	303
50	217	19.2	329
52	240	20.0	356
54	265	20.7	384
56	291	21.5	413
58	336	22.3	443
60	367	23.1	474
62	400	23.8	506
64	445	24.6	539
66	481	25.4	573
68	521	26.1	608
70	585	26.9	645
72	630	27.7	682
74	676	28.4	720
76	739	29.2	760
78	791	30.0	800
80	846	30.8	842

The specifications on the table may vary according to customer needs. In the interest of continuous development and research, RICE PROPULSION reserves the right to modify any specifications stated herein.



We have a full line of Propellers and Nozzles to meet any requirement. Our engineering & development department is at your service to assist you to determine the ideal propeller for your boat.

3 TO 5 BLADES 30" - 160" DIAMETER

The Nautilus propeller is one of our latest developments. Its skewed design reduces the propeller pressure pulses to minimum level, allowing the smoothest and quietest operation.

It is ideal for applications where underwater noise and vibration requirements are critical.

NAUTILUS offers you:

PERFORMANCE

- ▶ Low noise and vibration.
- ▶ Smooth and quiet operation.

MED-HIGH SPEED

- ▶ Blade area ratio may vary to meet your requirements.
- ▶ 3, 4 or 5 blades, ISO Class S, from 30" to 60" in dia., Class I and II up to 150" in dia.

4 Blades 0.5 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
30	38	8.4	88
32	43	8.9	101
34	50	9.5	113
36	65	10.1	127
38	73	10.6	142
40	82	11.2	157
42	104	11.8	173
44	115	12.3	190
46	126	12.9	208
48	239	13.4	226
50	153	14.0	245
52	176	14.6	265
54	192	15.1	286
56	209	15.5	308
58	237	16.2	330
60	257	16.8	353
62	278	17.4	377
64	301	17.9	402
66	326	18.5	428
68	351	19.1	454
70	410	19.6	481
72	439	20.2	509
74	470	20.7	538
76	529	21.3	567
78	563	21.9	597
80	599	22.4	628

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DELFIN

3 TO 5 BLADES 30" - 160" DIAMETER


DELFIN offers you:

PERFORMANCE

- Most Versatile.
- Based on famous B-Troost Series.
- Used Worldwide on fishing, supply and workboats.

POWER

- Blade area may vary without changing the number of blades to obtain greater thrust or more speed.
- 3 to 7 hydro-dynamic cross-section blades, with integrated hub shapes.



4 Blades 0.5 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
30	32	8.1	88
32	43	8.7	101
34	49	9.2	113
36	56	9.8	127
38	64	10.3	142
40	82	10.9	157
42	91	11.4	173
44	107	12.0	190
46	113	12.5	208
48	126	13.1	226
50	152	13.9	245
52	167	14.1	265
54	183	14.7	286
56	200	15.2	308
58	235	15.8	330
60	255	16.3	353
62	276	16.9	377
64	307	17.4	402
66	331	18.0	428
68	357	18.5	454
70	406	19.1	481
72	435	19.6	509
74	465	20.2	538
76	510	20.7	567
78	544	21.1	597
80	579	21.8	628

The specifications on the table may vary according to customer needs. In the interest of continuous development and research, RICE PROPULSION reserves the right to modify any specifications stated herein.

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KAPLAN

3 TO 5 BLADES 30" - 160" DIAMETER

The Kaplan propeller is another example of our most advanced technology.

This propeller is designed to be used with a nozzle in order to give shrimpers and workboats more thrust, by considerably increasing the efficiency of propellers carrying heavy loads while working at low speeds.

KAPLAN offers you: PERFORMANCE

- Advanced technology.
- High efficiency with nozzle.
- More thrust from propellers carrying heavy loads at low speeds.
- Mn Bze, Stainless Bze or Aqualloy.

With our leading technology, we can offer you more efficient systems.

4 Blades 0.5 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
39	78	10.8	149
41	86	11.3	165
43	94	11.9	182
45	108	12.5	199
47	127	13	217
49	137	13.6	236
51	159	14.1	255
53	172	14.7	276
55	197	15.2	297
57	211	15.8	319
59	228	16.4	342
61	252	16.9	365
63	281	17.5	390
65	309	18	415
67	348	18.6	441
69	370	19.1	467
71	394	19.7	495
73	446	20.2	523
75	473	20.8	552
77	501	21.4	582
79	565	21.9	613
83	730	23	676
87	807	24.2	743
91	941	25.3	813
95	1032	26.4	886
99	1189	27.5	962

The specifications on the table may vary according to customer needs. In the interest of continuous development and research, RICE PROPULSION reserves the right to modify any specifications stated herein.

We have a full line of Propellers and Nozzles to meet any requirement. Our engineering & development department is at your service to assist you to determine the ideal propeller for your boat.

KA-SPEED

3 TO 5 BLADES 30" - 160" DIAMETER KA-SPEED offers you:

PERFORMANCE

- ▶ Reduced force-excitation level of the propeller.
- ▶ Better blade stress distribution.
- ▶ Smooth and silent operation (better than Kaplan propellers).
- ▶ Blade area ratio according to your needs.

The Ka-Speed was developed by adding the advantages of skewed propellers to the traditional Kaplan style.

It was conceived to be installed into our Rice Speed Nozzle* for best performance, but it may also be installed in a Kort nozzle.

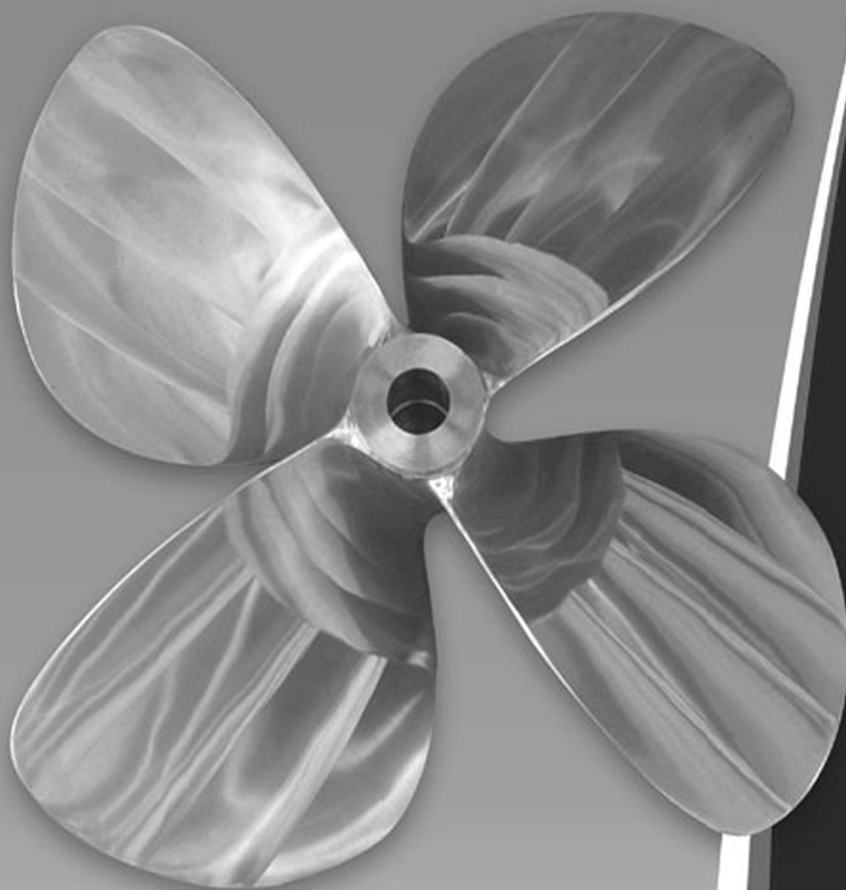
*U.S. Patent No. 5799394

4 Blades 0.5 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
39	90	10.8	149
41	98	11.3	165
43	108	11.9	182
45	119	12.5	199
47	147	13	217
49	160	13.6	236
51	173	14.1	255
53	188	14.7	276
55	204	15.2	297
57	230	15.8	319
59	249	16.4	342
61	268	16.9	365
63	289	17.5	390
65	333	18	415
67	357	18.6	441
69	382	19.1	467
71	408	19.7	495
73	436	20.2	523
75	493	20.8	552
77	524	21.4	582
79	557	21.9	613
83	742	23	676
87	820	24.2	743
91	957	25.3	813
95	1050	26.4	886
99	1209	27.5	962

The specifications on the table may vary according to customer needs. In the interest of continuous development and research, RICE PROPULSION reserves the right to modify any specifications stated herein.

We have a full line of Propellers and Nozzles to meet any requirement. Our engineering & development department is at your service to assist you to determine the ideal propeller for your boat.

CRUCERO



3 TO 5 BLADES 30" - 60" DIAMETER CRUCERO offers you:

**PERFORMANCE, COMFORT
AND EFFICIENCY.
A WAY OF LIFE AT RICE.**

Designed for pleasure craft and crew boats, our Crucero propeller has become one of our most popular models.

The Crucero will help your boat reach its top performance levels and planning velocity while eliminating hull-damaging vibrations.

It provides a smooth and comfortable ride for you and your passengers.

4 Blades 0.67 Dar. Diam.	W (kg)	Max Blade Width (in)	Area per blade (in ²)
30	42	11.7	117
32	52	12.5	134
34	64	13.2	151
36	76	14.0	169
38	83	14.8	189
40	87	15.6	209
42	95	17.1	231
44	111	17.9	253
46	122	18.7	277
48	141	19.5	302
50	154	20.3	327
52	176	21.1	354
54	190	21.9	382
56	205	22.7	410
58	222	23.6	440
60	249	24.4	471

The specifications on the table may vary according to customer needs. In the interest of continuous development and research, RICE PROPULSION reserves the right to modify any specifications stated herein.

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HEAVY DUTY RIVER PROPELLERS

**3 TO 5 BLADES
30" - 160" DIAMETER**

- › Exclusive designs, customized according to the needs of each and every one of our clients.
- › Extra heavy-duty sections for river applications.
 - › Designs available to be used either as open wheel or inside a nozzle.
 - › General use for river workboats.
- › Blade area is larger than standard for boats with limited propellers space.
- › 3, 4 or 5 blades from 30" up to 150" in diameter.





RICE NOZZLES

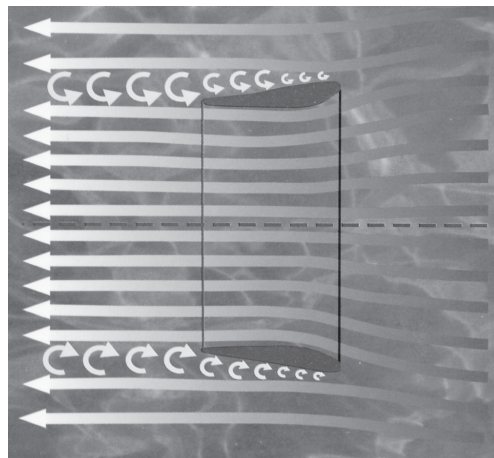
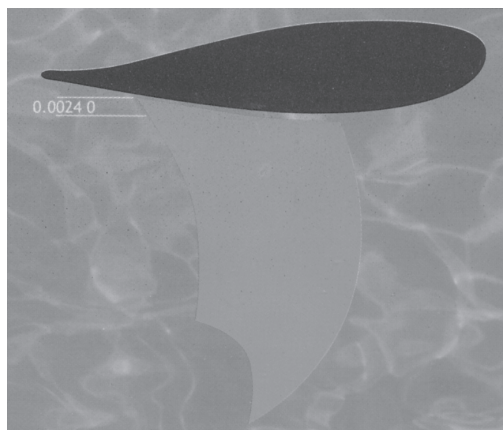
More Power in your boat without further modifications!

The benefits of Nozzle Systems on low speed boats are out of the question. It is proven that in tugboats they provide up to 40% more bollard pull than an open propeller, using the same power plant on the same boat. For fishing boats in the 3-4 knot range you may gain up to 30% more power.

At **Rice Propulsion**, committed to our continuous research & development philosophy, we revised the Kort Nozzle, developed in the 30's and still in use in some boats with no significant modifications. We came with our new patented* design that changed everything: from the method of fabrication to the nozzle section, thus resulting a considerable reduction in the drag coefficient.

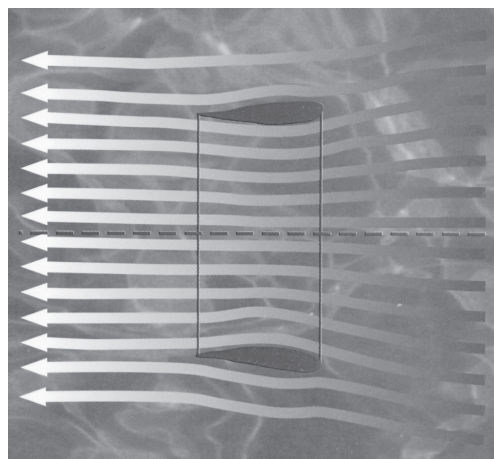
Due to this hydrodynamic profile combined with the work area of the propeller in the center of the **Rice Nozzle*** (approximately 40% smaller than the area of the entrance of the nozzle), the acceleration and mass of the water flow through the inside of the nozzle are increased by 40%. Therefore, the propeller pitch required to impulse this mass of water is higher than the one used in Kort Nozzles.

With this increase in the propeller pitch, water leaves the nozzle faster, dropping pressure substantially in the inside of the nozzle and creating a differential with the outside surface. Because of this pressure difference, a force is created on the external surface of the NOZZLE that is always perpendicular to this surface. Because of the design of the outside trail part of the NOZZLE, the horizontal component of this force creates an additional thrust of the NOZZLE, increasing the total thrust of the vessel.



Kort 19^a profile: Drag coef. = 0.17

When nozzle sections from a Kort 19-A and a Rice Nozzle* are compared, the drag coefficient of our nozzle is 17 times lower. This is because of the Rice Speed Nozzle* section profile that was selected from NASA air wing sections with high lift/low drag coefficient, conditions that allow maximum thrust/speed possible.



Rice Speed profile: Drag coef. = 0.01

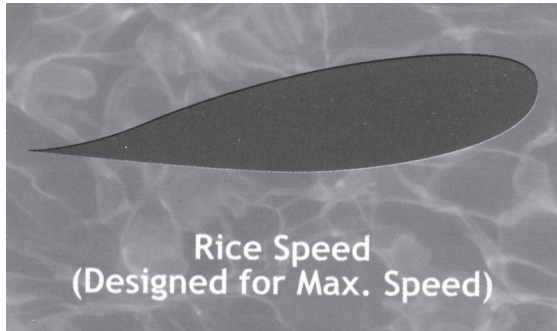
When redesigning our Nozzle System, we also decreased roundness tolerances, allowing us to reduce the tip propeller clearance from 0.6% to 0.4%, increasing the efficiency of the Propeller-Nozzle unit.

*US PATENT # 5799394



RICE NOZZLES

Rice Speed Nozzle*

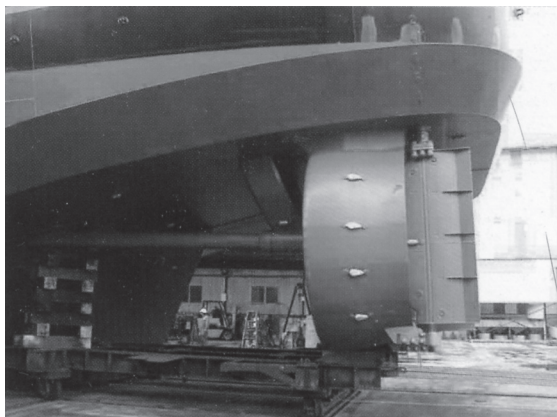


Rice Thrust Nozzle*

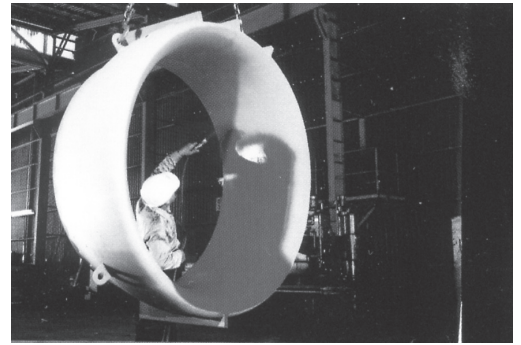


The **Rice Thrust Nozzle*** is designed to obtain more bollard pull. When compared to any Kort-37 system you gain:

- 8 - 13% more bollard pull
- 8 - 10% more free running speed
- 8 - 12% fuel savings



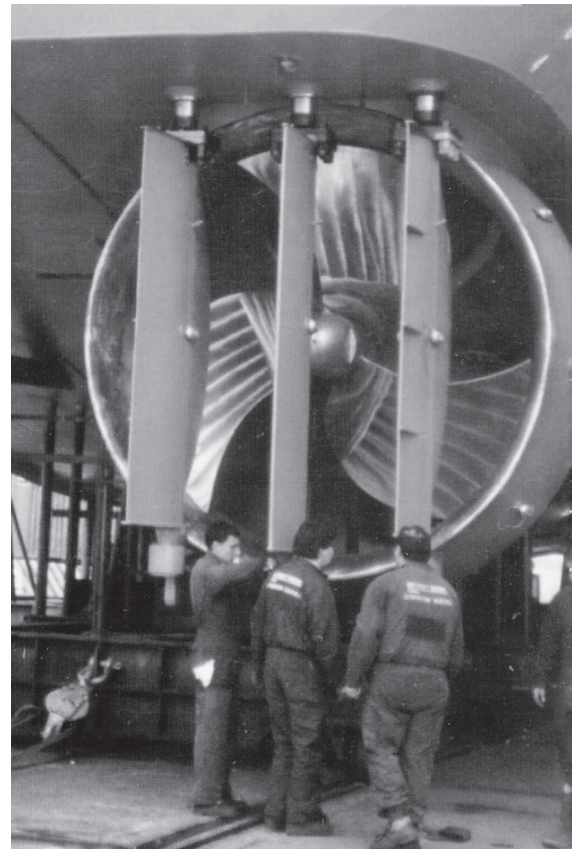
*US PATENT # 5799394



The **Rice Speed Nozzle*** is designed to obtain additional speed to the boat. When compared to any Kort-19^a system you obtain:

- 3% more bollard pull
- 12% more free running speed
- 6 - 8% fuel savings

HIGH ASPECT RATIO TRIPLE RUDDERS



To improve maneuverability to the **Rice Nozzle Systems** we have incorporated the high aspect ratio triple rudders. All together will provide the most efficient, conventional propulsion system available in the market that will satisfy you for years.



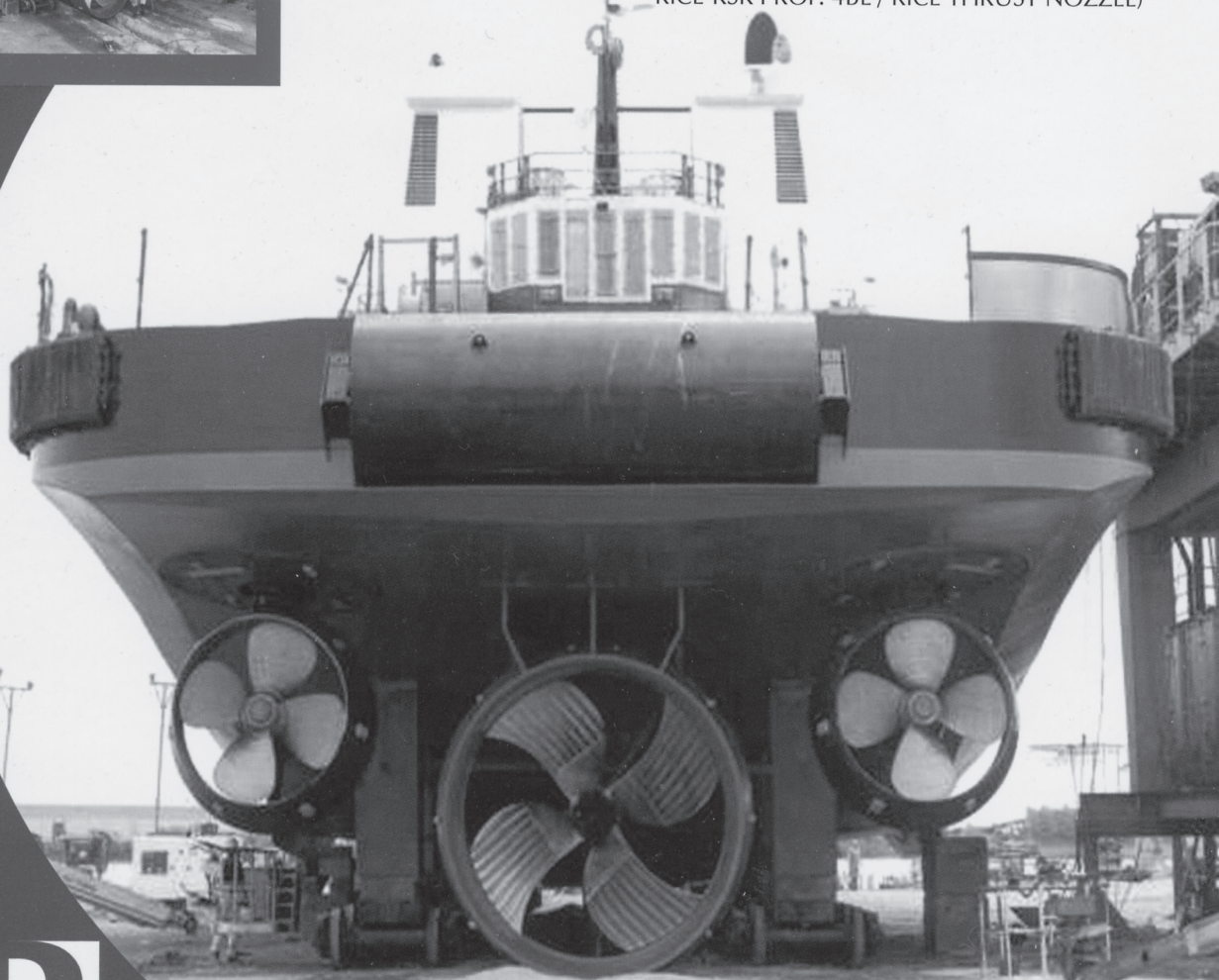
*31.8Lb/hp OF BOLLARD PULL NOBODY DOES IT BETTER THAN **RICE THRUST NOZZLE SYSTEM**

U.S. PATENT # 5799394

BUILDER : BENDER SHIPBUILDING
VESSELS : "SIDNEY, DEVIN & KELLY CANDIES"
CLASSIFICATION BY ABS
DIMS : 138' X 48' X 15'

(2) OUTBOARD Z-DRIVE UNITS- 2100 HP
EACH (90.55"D. KA 4 BL./ KORT)

(1) CENTER UNIT-5,000 HP (144"D.
RICE-KSK PROP. 4BL / RICE THRUST NOZZLE)



RICE
R
METALMEC
RICE NOZZLES

BOLLARD PULL TRIALS RESULTS:

- TOTAL BOLLARD PULL (ALL ENGINES): 260050Lbs.
- TOTAL PERFORMANCE: 28.27 Lbs/Hp (12.61 Kg/Hp)
- RICE SYSTEM BOLLARD PULL (ALONE): 159000Lbs
- RICE SYSTEM PERFORMANCE: 31.8 Lbs/Hp (14.2 Kg/Hp)
- TOTAL FREE RUNNING SPEED (ALL ENGINES): 13.3KNOTS
- RICE SYSTEM FREE RUNNIG SPEED (ALONE): 11.7 KNOTS
- PERFORMANCE CERTIFICATES AVAILABLE IN FILE





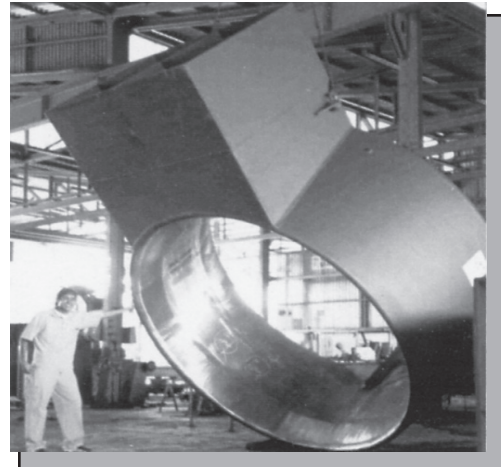
RIVER H-D NOZZLES

The new H-D River Nozzles by Rice is designed to meet the heavy demands of river service. If you work your boat on the river you already know that they encounter extraordinary problems due to the erosion from river sand and shallow operations. Extraordinary problems call for extraordinary solutions.

RICE HAS THAT SOLUTION:
A NOZZLE DEVELOPED FOR THIS
PARTICULAR APPLICATION.

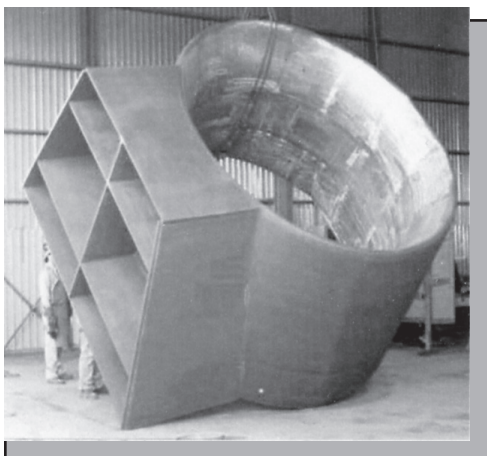
ADVANTAGES:

- **EXTENDED LIFE AND DURABILITY**
Superior construction and design combines on all stainless steel shell with heavier internal components to yield the best performance in the most demanding conditions.
- **WELDINGS.** All internal and external welding is continuous and in compliance with ABS regulations. All factory welders are ABS and Germanischer Lloyd certified.
- **EASY INSTALATION.** Qualified naval



architects will adapt the nozzle design to your hull and provide all necessary installation information to the shipyard.

- **EXTRA SMOOTH SS INNER SHELL.** Rice H-D nozzles have an extremely smooth stainless steel inner shell to minimize any cavitation that may be caused by turbulence.
- **FUEL SAVINGS.** Rice offers propeller and nozzle sizing service free of charge according to vessel and power specifications to get the lowest possible level of fuel consumption.
- **RELIABILITY.** You can expect top quality, fast deliveries and the lowest prices for similar construction in the market. Your nozzles are always delivered on time.
- **QUALITY CONTROL.** Rice is an ISO 9001 certified nozzle manufacturer and committed to offer you the best product on the market.



More Amazing Coincidences

Survivor

"On three separate occasions-in 1664, 1785, and 1860—there were shipwrecks where only one person survived the accident. Each time that one person's name was Hugh Williams."

-The Book of Useless Information

PSS SHAFT SEAL PACKLESS SEALING SYSTEM

- **DRIPLESS OPERATION**

**Eliminates Needless Bilge
Pumping**

- **LOW MAINTENANCE**

**No More Packing and
Repacking**

- **REDUCED COST**

**Eliminates Shaft Wear
and Minimizes
Corrosion**



How does the PSS Shaft Seal work?

The PSS Shaft Seal is a mechanical face seal. The seal is created between the flat surfaces of the rotating stainless steel collar, the stationary carbon flange and a rubber bellows. The rubber bellows is attached to the vessels stern tube (note: specify stern tube diameter when ordering) with hose clamps and the carbon flange is attached to the front side of the rubber bellows with hose clamps. The stainless steel collar is fit on the shaft in front of the carbon flange. The stainless steel collar is then used to compress the rubber bellows before the collar is secured to the shaft with set screws. This compression (pre-load) maintains contact between the faces and allows the PSS to compensate for the thrust from the propeller. The carbon flange is bored larger than the shaft diameter, allowing it to “float” around the shaft and thus compensate for most misalignment and vibration problems. The stainless steel collar is sealed to the shaft by two o-rings that are recessed into the bore of the collar. These o-rings rotate with the shaft and stainless steel collar and do not experience wear during operation.

Warning!

All mechanical seals look very similar. There is, however, a big difference in materials used in the components and subsequently in the way the seals will perform.

What makes the PSS Shaft Seal different and why is it considered the best on the market?

1. HIGH DENSITY CARBON/GRAPHITE FLANGE

This space age composite is machined to shape. The face is then lapped to 4 light bands. Once installed and operational the carbon/graphite face will actually polish the stainless steel rotor face during the initial minutes of operation. This polishing process ensures a perfect seal and eliminates the necessity of a spray guard. The high density of this composite greatly increases its impact and wear resistance. At a maximum operating temperature of 500° F, the carbon guards against most overheating situation, unlike other designs. The carbon/graphite flange should never need replacing under normal operation conditions. Some Captains have recorded over 40,000 engine hours on their PSS Shaft Seals.

3. BELLOWS

The nitrile bellows is resistant to petroleum based products and set retention. It provides the best combination of durability, strength and elasticity. The stern tube end of the bellow is available in 1/4" increments. Both shaft and stern tube diameters are necessary when ordering.

4. DOUBLE HOSE CLAMPS

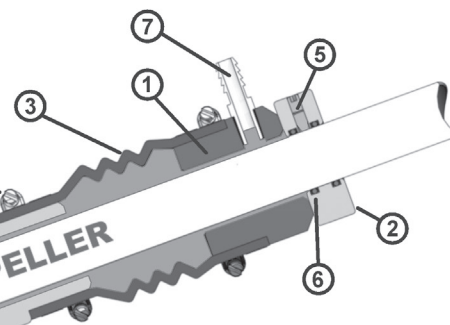
Two stainless steel hose clamps are used to secure the bellow at both the stern tube and flange ends.

5. DOUBLE ALLEN HEAD SET SCREWS

Allen head set screws with cupped ends are threaded into the rotor and secured to the propeller shaft. A second set screw is then threaded into each hole to secure the first screw and to prevent it from possibly backing out. The set screws also have an anti-vibration treatment applied.

2. STAINLESS STEEL ROTOR

The one-piece stainless steel (Type 316) rotor is slid down the shaft and is secured with double set screws, after compression is applied to the bellows. Precision tolerances are maintained by computer controlled lathes. The stainless steel rotor should never need replacing under normal operating conditions.



6. DOUBLE O-RINGS

The nitrile O-Rings are fit inside the stainless steel rotor to seal the rotor to the propeller shaft. Nitrile is the material used due to its superior resistance to petroleum products, temperature variations and resistance to tearing. These O-rings are stationary and do not wear.

7. NYLON HOSE BARB FITTING

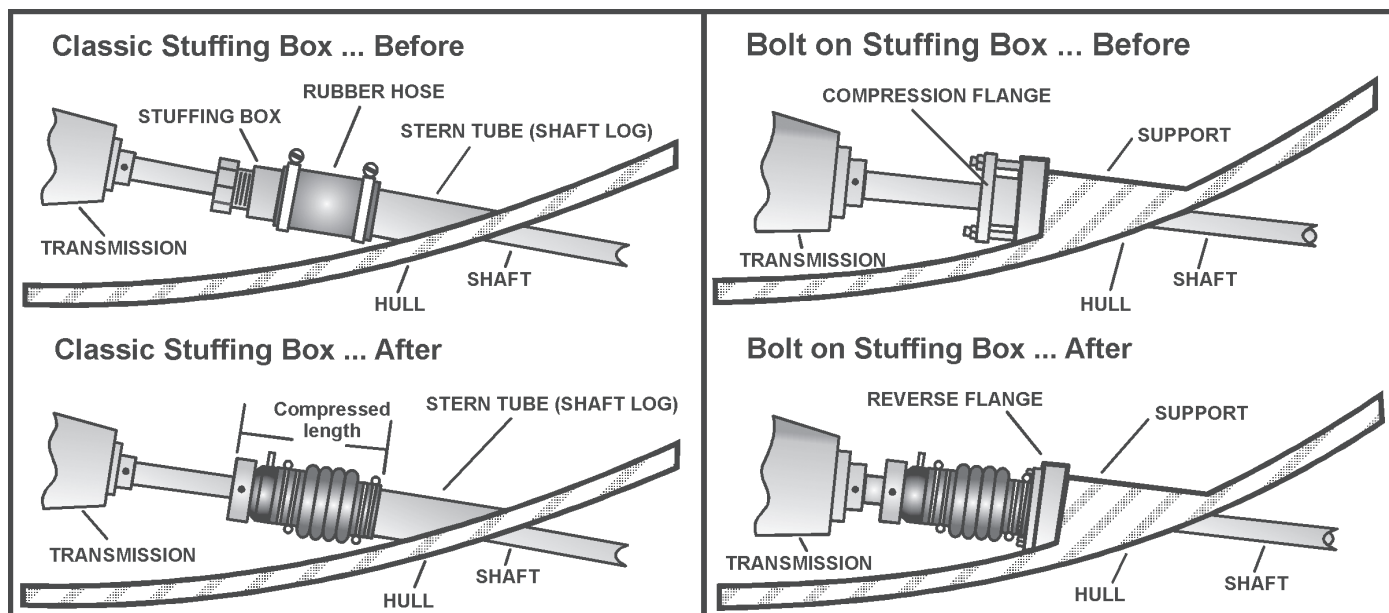
The nylon hose barb fitting is threaded into the carbon flange. The barb fitting is used to plumb water to the seal or to run a vent line.


STEP .1 SHAFT SELECTION

Carefully measure your shaft diameter. We have PSS Shaft Seals to fit both metric shafts and S.A.E shafts.

STEP 2. STERN TUBE OUTSIDE DIAMETER

The stern tube is also known as the shaft log. Select the type of stuffing box currently installed on your boat from the drawing below, and measure the stern tube outside diameter.



SHAFT DIAMETER	Stern Tube Diameters (specify one) O.S. (OVER SIZED) Requires larger bellow and carbon cuff reducer.	COMPRESSED LENGTH 
3/4", 7/8" 20mm, 22mm	1 1/4", 1 1/2", 1 3/4", 2", 2 1/4" O.S. (2 1/2")	6 1/4" (6 3/4")
1", 1 1/8" 25mm, 28mm, 30mm	1 1/4", 1 1/2", 1 3/4", 2", 2 1/4" O.S. (2 1/2")	6 1/4" (6 3/4")
1 1/4", 1 3/8" 32mm, 35mm	1 3/4", 2", 2 1/4", 2 1/2" O.S. (2 3/4", 3", 3 1/4", 3 1/2")	6 1/2" (7 3/4")
1 1/2" 38mm, 40mm	2", 2 1/4", 2 1/2", 2 3/4", 3", 3 1/4", 3 1/2" O.S. (3 3/4", 4")	8 1/8" (8 1/4")
1 3/4" 45mm	2 1/4", 2 1/2", 2 3/4", 3", 3 1/4", 3 1/2" O.S. (3 3/4", 4")	8 1/8" (8 1/4")
2" 50mm, 55mm	2 1/2", 2 3/4", 3", 3 1/4", 3 1/2" O.S. (3 3/4", 4")	8 1/8" (8 1/4")
2 1/4", 2 1/2" 60mm, 65mm	3 1/4", 3 1/2", 3 3/4", 4" O.S. (4 1/4", 4 1/2", 4 3/4", 5")	8 1/2" (9 1/8")
2 3/4" 70mm	4", 4 1/4", 4 1/2", 4 3/4", 5" O.S. (5 1/4", 5 1/2", 5 3/4", 6")	9 1/4" (9 5/8")
3" 75mm, 80mm	4", 4 1/4", 4 1/2", 4 3/4", 5" O.S. (5 1/4", 5 1/2", 5 3/4", 6")	9 1/4" (9 5/8")
3 1/4", 3 1/2" 85mm, 90mm	4 1/2", 4 3/4", 5", 5 1/4" 5 1/2", 5 3/4", 6"	9 3/4"
3 5/8", 3 3/4" 95mm	4 1/2", 4 3/4", 5", 5 1/4" 5 1/2", 5 3/4", 6"	9 3/4"

PSS Shaft Seals are available up to 6" (150mm) shaft diameters as standard. **Over 6" Call for quote.** When ordering please supply shaft and stern tube Diameter.

AQUALOY 22

AQUALOY 22 HIGH STRENGTH

Aqualoy 22 and High Strength 22 offer the best combination of corrosion resistance and strength for any marine shaft application and is superior to Type 316 and Monel 400 in both corrosion resistance and strength. Although highly corrosion resistant, cathodic protection is recommended to avoid galvanic corrosion in salt and brackish water environments. It is an ideal choice for pleasure craft due to its ability

to resist corrosion when sitting idle in seawater for long periods of time. Aqualoy 22 High Strength provides the same corrosion resistance as the Aqualoy 22 but also offers the strength of Aqualoy 17 in 2-1/4" through 6" diameter. It is ideal for those vessels requiring higher strength shafts while maintaining the highest possible corrosion resistance available.

Chemical Composition

Carbon, Max.	.06
Manganese, Max.	4.00 - 6.00
Phosphorus, Max.	.04
Sulfur, Max.	.03
Silicon, Max.	1.00
Molybdenum	1.50 - 3.00
Chromium	20.50 - 23.50
Nickel	11.50 - 13.50
Nitrogen	0.20 - 0.40
Columbium	0.10 - 0.30
Vanadium	0.10 - 0.30
Iron	Balance

Physical Properties (AQUALOY 22 is non-magnetic)

Density at 75F (24C)	0.285 lbs/in ³ (7.88 gm/cm ³)
Modulus of Elasticity	
<i>Tension</i>	28,900,000 psi (199,000 Mpa)
<i>Torsion (Rigidity)</i>	10,800,000 psi (72,900 Mpa)
Poisson's Ratio	.0312

Minimum Mechanical Properties

	3/4" to 1-1/4"	Over 1-1/4" to 2"	Over 2" to 2-1/2"	Over 2-1/2" to 3"	Over 3" to 12"	High Strength 2-1/4 to 6"
Ultimate Tensile Strength, psi (Mpa)	145,000 (1000)	135,000 (931)	120,000 (827)	115,000 (793)	100,000 (689)	130,000 (896)
0.2% Yield Strength, psi (Mpa)						
<i>Tension</i>	130,000 (896)	105,000 (724)	95,000 (655)	75,000 (517)	55,000 (379)	105,000 (724)
<i>Torsion</i>	86,600 (597)	70,000 (483)	63,300 (434)	50,000 (345)	36,600 (252)	70,000 (483)
Elongation, % in 2" (50.88mm)	18	20	20	25	30	15
Reduction of Area, %	45	50	50	50	50	45
Impact Charpy V-Notch	80	100	100	100+	100+	100
(Typical) ft-lbs (J)	(108)	(136)	(136)	(136+)	(136+)	(136)

AQUALOY 22 meets the following specifications (Analysis Only): ASTM A 276, ASTM A 479 and AMS 5764.

AQUALOY 19

Nitrogen strengthened, Aqualoy 19 is an austenitic alloy and is non-magnetic. Applications include sportfishermen and other pleasure crafts as well as workboats where better corrosion resistance is neces-

sary. To avoid galvanic corrosion in salt or brackish water, installation of Navy grade zinc anodes is recommended.

Chemical Composition

Carbon, Max.	.08
Manganese, Max.	2.00
Silicon, Max.	1.00
Chromium	18.00 - 20.00
Nickel	8.00 - 10.50
Phosphorus, Max.	.04
Nitrogen	0.20 - 0.30
Sulfur, Max.	.03
Iron	Balance

Physical Properties (AQUALOY 19 is non-magnetic)

Density at 75F (24C)	0.286 lbs/in ³ (7.916 gm/cm ³)
Modulus of Elasticity	
<i>Tension</i>	29,000,000 psi (199,949 Mpa)
<i>Torsion (Rigidity)</i>	11,200,000 psi (76,140 Mpa)
Poisson's Ratio	.0295

Aqualoy 19 Minimum Mechanical Properties

	Up to 1-1/2"	Over 1-1/2" to 2"	Over 2" to 2-1/2"	Over 2-1/2" to 3"	Over 3" to 12"
Ultimate Tensile Strength, psi (Mpa)	130,000 (896)	115,000 (793)	105,000 (724)	100,000 (690)	95,000 (655)
0.2% Yield Strength, psi (Mpa)					
<i>Tension</i>	105,000 (724)	85,000 (586)	60,000 (414)	55,000 (379)	50,000 (345)
<i>Torsion</i>	70,000 (483)	57,000 (393)	40,000 (276)	36,600 (252)	33,000 (228)
Elongation, % in 2" (50.88mm)	20	25	30	35	35
Reduction of Area, %	55	55	55	55	55
Impact Charpy V-notch	100+	100+	100+	100+	100+
(Typical) ft-lbs (J)	(136+)	(136+)	(136+)	(136+)	(136+)

Note: if higher mechanical properties are required, please inquire.

AQUALLOY 17

Aqualoy 17 has the highest strength and hardness of all stainless steel boat shafting alloys over 2 inches in diameter. Corrosion resistance is comparable to Type 304. Vessel applications include tugs, trawlers, crew boats, patrol boats and other workboats due to its high strength in the larger diameters. To avoid galvanic corro-

sion, cathodic protection is recommended for salt or brackish water environments. Navy grade zinc anodes, properly installed, should provide satisfactory protection against galvanic corrosion. For sizes over 8" in diameter, please inquire.

Chemical Composition

Carbon, Max.	.07
Manganese, Max.	1.00
Phosphorus, Max.	.04
Sulfur, Max.	.03
Silicon, Max.	1.00
Chromium	15.00 - 17.00
Nickel	3.50 - 5.00
Copper	3.00 - 5.00
Columbium + Tantalum	0.15 - 0.45
Iron	Balance

Physical Properties (Aqualoy 17 is magnetic)

Density at 75F (24C)	0.284 lbs/in ³ (7.87 gm/cm ³)
Modulus of Elasticity	
<i>Tension</i>	29,100,000 psi (200,600 Mpa)
<i>Torsion (Rigidity)</i>	11,270,000 psi (77,700 Mpa)
Poisson's Ratio	.0291

Minimum Mechanical Properties

For 3/4" through 8"	
Ultimate Tensile Strength, psi (Mpa)	135,000 (931)
0.2% Yield Strength, psi (Mpa)	
<i>Tension</i>	105,000 (724)
<i>Torsion</i>	70,000 (483)
Elongation, % in 2" (50.88mm)	16
Reduction of Area, %	50
Impact Charpy V-notch	50
(Typical) ft-lbs (J)	(68)
Hardness Typical	
<i>Rockwell</i>	C28/37
<i>Brinell</i>	277/352

AQUALLOY 17 meets the following specifications (Analysis and Mechanical Properties for H1150 only): AMS-5643 and ASTM-A-564.

Still More Amazing Coincidences

SECRET-AGENT KID

"James Bond, 15, a pupil at Argoed High School, North Wales, and a candidate for examinations in 1990, was given the examination number 007 by a computer quirk."

-The World's Most Incredible Stories

DURAMAX® MARINE LLC

DURAMAX® "490" RUDDER BUSHINGS

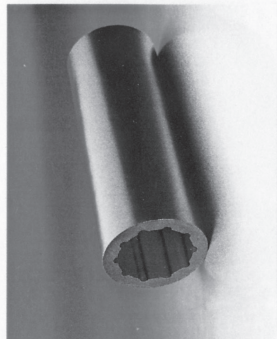
DURAMAX® hard rubber bushings are molded from a nitrile composition formulated to withstand the rugged "impact" service encountered in ship's rudder steering system. They possess high rigidity for maximum stability, while still retaining a degree of resiliency required to dampen peak shock loads.

DURAMAX® bushings are molded with full length internal lubricant grooves. Grease, oil or water serve equally well as lubricants. DURAMAX® solid rubber bushings are resistant to deterioration by hydrocarbons, acids, salt water and electrolysis.

ALL DIMENSION IN INCHES

PART NO.	CODE NO.	I.D.* SIZE	O.D.* SIZE	FULL LENGTH	I.D. ACROSS WATER GROOVES	NETWEIGHT FULLLENGTH (POUNDS)
812100038	DX150	1.458	2.352	11	1.625	1.10
812100044	DX175	1.700	2.595	13	1.970	1.50
812100051	DX200	1.958	3.076	15	2.200	2.50
812100057	DX225	2.180	3.329	7.50	2.575	2.30
812100064	DX250	2.442	3.681	9	2.750	2.70
812100070	DX275	2.708	3.923	10	2.970	3.00
812100076	DX300	2.952	4.205	11	3.390	4.00
812100083	DX325	3.198	4.429	12	3.600	4.00
812100089	DX350	3.437	5.192	13	3.760	7.50
812100095	DX375	3.669	5.182	14	4.050	3.50
812100102	DX400	3.933	5.450	15	4.285	7.50
812100108	DX425	4.167	5.684	16	4.550	9.00
812100114	DX450	4.429	6.026	17	4.685	11.00
812100121	DX475	4.650	6.010	18	5.050	10.00
812100127	DX500	4.933	6.682	19	5.310	15.00

CAUTION: *Duramax® Bushings are supplied with molded I.D. and O.D. dimensions which allow ample material for finish machining. However, the finish bore should not remove more than 70% of the lubricant groove depth. IN ADDITION TO THE PRESS FIT, DURAMAX® BUSHINGS MUST BE MECHANICALLY SECURED WITH SET SCREWS.

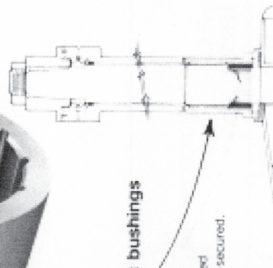


DURAMAX® "490" RUDDER BUSHINGS



DURAMAX
non-metallic bushings

To be fully enclosed
and mechanically secured.



DURAMAX "490" PRODUCT REPORT

PHYSICAL PROPERTIES:

1. Material	DURAMAX	Load PSI	Deflection	Temperature
2. Deformation		225	.004"	72° F
		300	.0045"	72° F
3. Compressive Strength		15,000	Elastic Limit	72° F
4. Tensile		3000 PSI		
5. Expansion and Contraction		814 Tensile	Contraction	Recovery
			.002" .0025"	-20° F
6. Absorption		Aging	Liquid	Temp.
		70 hrs.	ASTM #3 Oil	212° F
				+4.9%
		70 hrs.	ASTM #3 Oil	100° F
				+less than 1%
		70 hrs.	ASTM #3 Oil	72° F
				Negligible
		70 hrs.	H ₂ O	212° F
				+2.6%
		70 hrs.	H ₂ O	100° F
				Negligible
7. Range of working temperature				-20° to +180° F continuous service

MACHINING I.D. - O.D. CLEARANCES AND ALLOWANCES

TABLE X-Running Clearances

NOM. ID	2	3	4	5	6	7	8	9	10	11	12	13	14
ALLOWANCES	.012	.013	.014	.015	.016	.017	.018	.019	.020	.021	.022	.023	.024

TABLE Y- Thermal Factor

NOM. ID	2	3	4	5	6	7	8	9	10	11	12	13	14
ALLOWANCES	.004	.006	.008	.010	.012	.014	.016	.018	.020	.022	.024	.026	.028

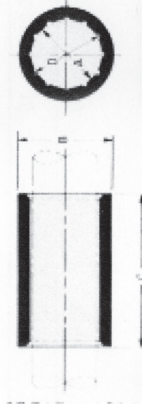
TABLE Z

NOM. ID	2	3	4	5	6	7	8	9	10	11	12	13	14
ALLOWANCES	.005	.005	.005	.005	.005	.005	.008	.008	.008	.010	.010	.010	.010

To determine total I.D. Clearance - add Tables X*, Y* and Z*.
To determine total O.D. - add Tables Y* and Z* in same column.

EXAMPLE:

$$8" \text{ I.D.} = 8.000" + .018" = 8.018" \\ 12" \text{ O.D.} = 12.000" + .008" = 12.008"$$



Duramax® Ultra-X™

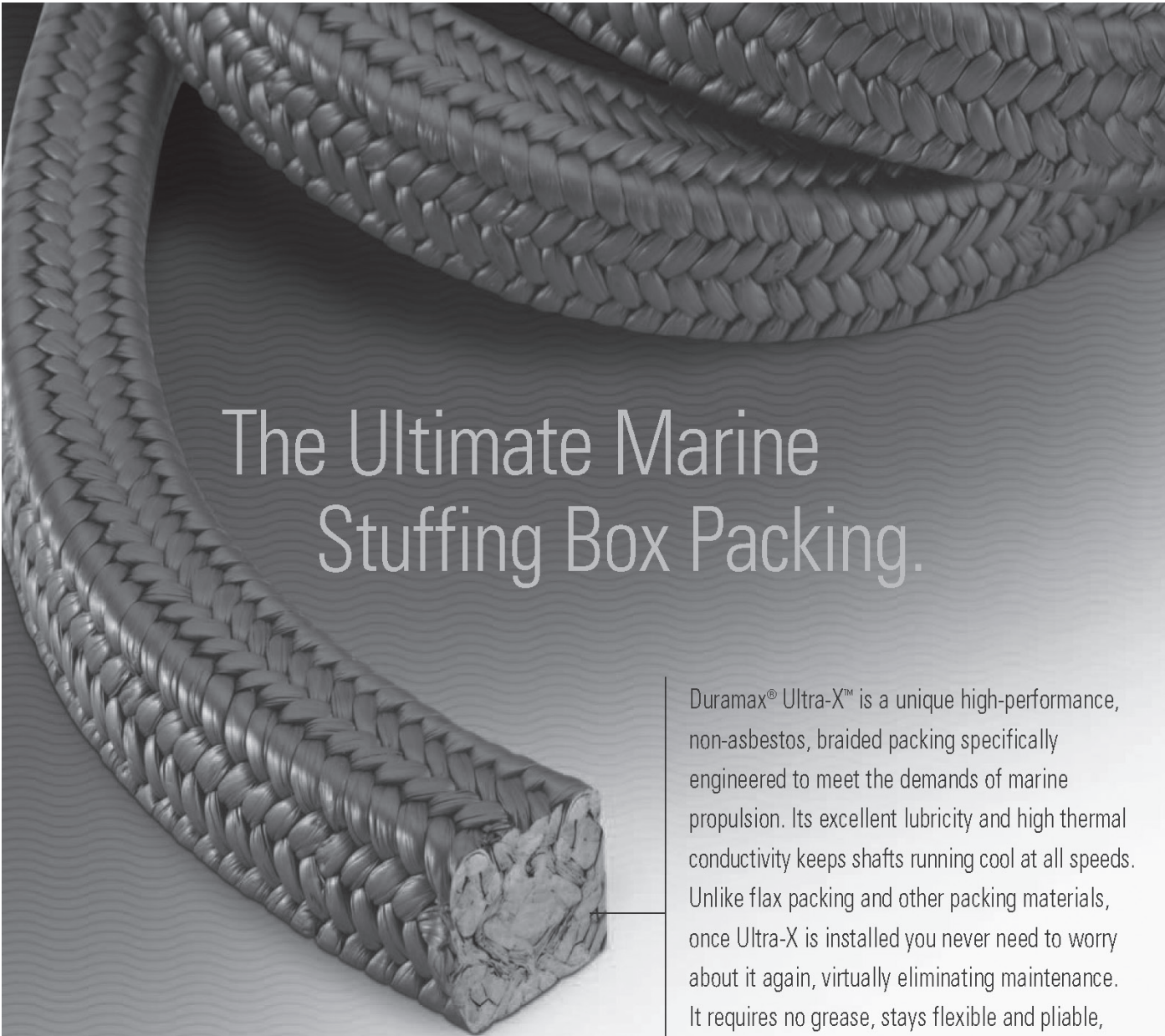
High Performance Compression Packing

- ▷ Engineered Specifically for Heavy-Duty Marine Service
 - Stern Tube Stuffing Boxes
 - Bulkhead Stuffing Boxes
 - Rudder Stuffing Boxes
- ▷ 300% Lower Friction than Flax Packing
- ▷ Superior Thermal Conductivity
- ▷ Outlasts Flax more than 5 to 1



PRODUCT INFORMATION AND SELECTION GUIDE

DURAMAX MARINE®



The Ultimate Marine Stuffing Box Packing.

Duramax® Ultra-X™ is a unique high-performance, non-asbestos, braided packing specifically engineered to meet the demands of marine propulsion. Its excellent lubricity and high thermal conductivity keeps shafts running cool at all speeds. Unlike flax packing and other packing materials, once Ultra-X is installed you never need to worry about it again, virtually eliminating maintenance. It requires no grease, stays flexible and pliable, will not harden, swell or become brittle – virtually eliminating costly damage caused by extensive shaft scoring and wear.

Key Features of Duramax® Ultra-X™ Packing Material

- ▶ **Dissipates frictional heat:** Over five times more thermally conductive than flax and PTFE
- ▶ **Grease-free installation:** Self-lubricating and conformable, easy to install and remove after use.
- ▶ **Virtually eliminates shaft scoring:** Stays pliable, never hardens or becomes abrasive, even at high shaft speeds
- ▶ **Leakage practically eliminated:** Doesn't shrink, keeps bilge drier and free of oily contaminants
- ▶ **Lasts over 5 times longer than other packing:** Doesn't get consumed in use, holds its shape and dimension

Engineered Specifically for the Marine Industry.

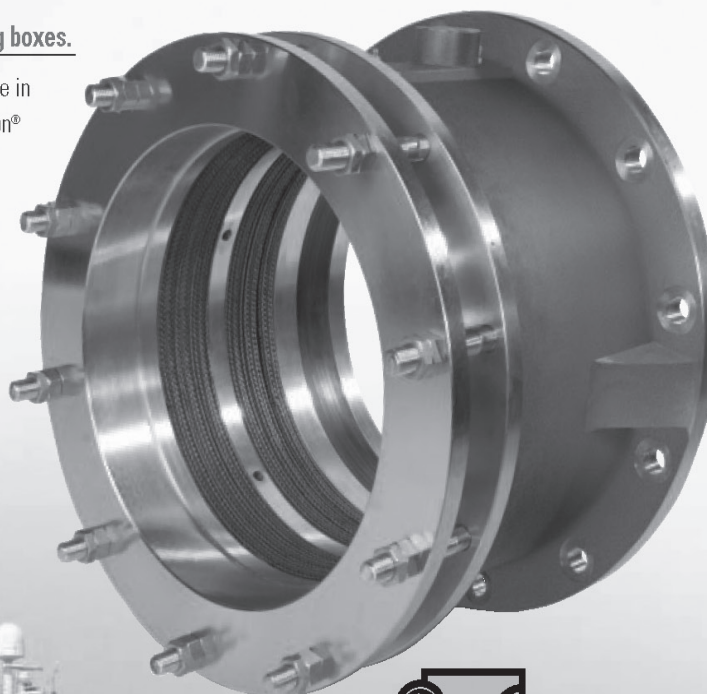
You can use Duramax® Ultra-X™ with confidence knowing it is a product of Duramax Marine®, manufacturer of Johnson® Heavy-Duty Stuffing Boxes, the most recognized, highest quality stuffing boxes in the marine industry. Duramax Marine® is also the world leader in water-lubricated bearing technology. We keep your propulsion systems moving full steam ahead.

Designed for optimum performance in all marine stuffing boxes.

Duramax® Ultra-X packing is engineered for optimal performance in all marine applications. It complements the operation of Johnson® Cutless® bearings and helps meet the demands of marine propulsion.

Lasts more than 5X longer than flax and PTFE packing.

Ultra-X is designed to eliminate the high cost of packing failure. It will reduce your downtime and maintenance costs – not to mention eliminating expensive equipment replacement costs.

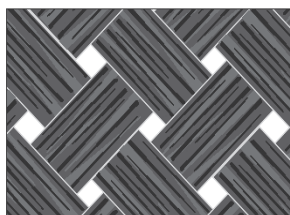


What is Duramax® Ultra-X™ High-Performance Packing?

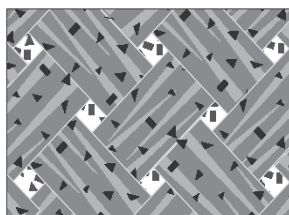


Imbided Graphite vs. Loose Blending of Graphite.

Duramax Marine® uses unique patented manufacturing technology to encapsulate graphite particles and impregnate specialized lubricants into expanded PTFE strands. It greatly outperforms competitors' packing that loosely blends graphite particles between the strands during the braiding process.



Imbided graphite in
Duramax Ultra-X Fiber



Loose graphite in standard
PTFE braiding

Duramax® Ultra-X™ is a braided hydrophobic fiber packing. Because of its composition and design it lasts more than 5X longer and outperforms all flax and PTFE packings in marine stern tube, rudder and bulkhead applications.

► **Expanded PTFE:**

Outperforms standard flax and PTFE

► **High tensile strength:**

Will not get consumed in use

► **Graphite imbided/silicone impregnated:**

Lowest friction of any marine packing

► **Self-lubricating:**

Virtually needs no water for lubrication

► **Stays pliable:**

Never gets brittle, hard or abrasive

► **High thermal conductivity:**

Over 5 times more thermally conductive than flax and PTFE

► **Grease-free installation:**

Easy to cut and handle. Conforms easily

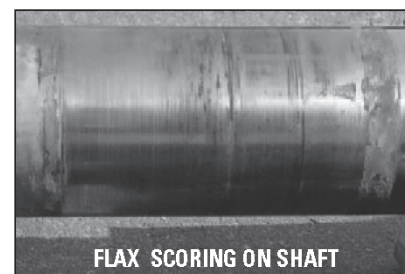
► **Low life-cycle cost:**

Virtually eliminates maintenance, shaft scoring & replacement

Eliminates Equipment Damage Caused by Other Packings.

Duramax® Ultra-X™ is engineered so you will never experience packing failure that causes excessive shaft scoring. It always runs cool and always stays pliable. It never gets hard and abrasive, so expensive shaft repair or replacement is a thing of the past. Unlike flax, Duramax® Ultra-X is not consumed in use, which means you don't need to constantly adjust the gland or add more rings of packing to maintain your seal. Ultra-X eliminates the headaches associated with other type packing materials by lowering maintenance and operating costs thus reducing downtime.

There are competitors with lower priced "Look-alike" black PTFE fiber packing. Many of these look-alike packings use pure PTFE which is known for its thermal expansion. Besides having low tensile strength the thermal expansion of this material creates high heat and friction which results in significant shaft scoring and loss of seal. Duramax Ultra -X will simply work as well or better than any other braided packing designed for marine applications.

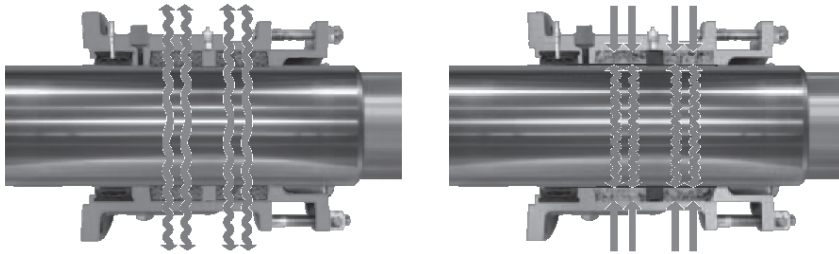


Duramax® Ultra-X eliminates excessive shaft scoring that causes leaking, packing replacement and equipment damage.

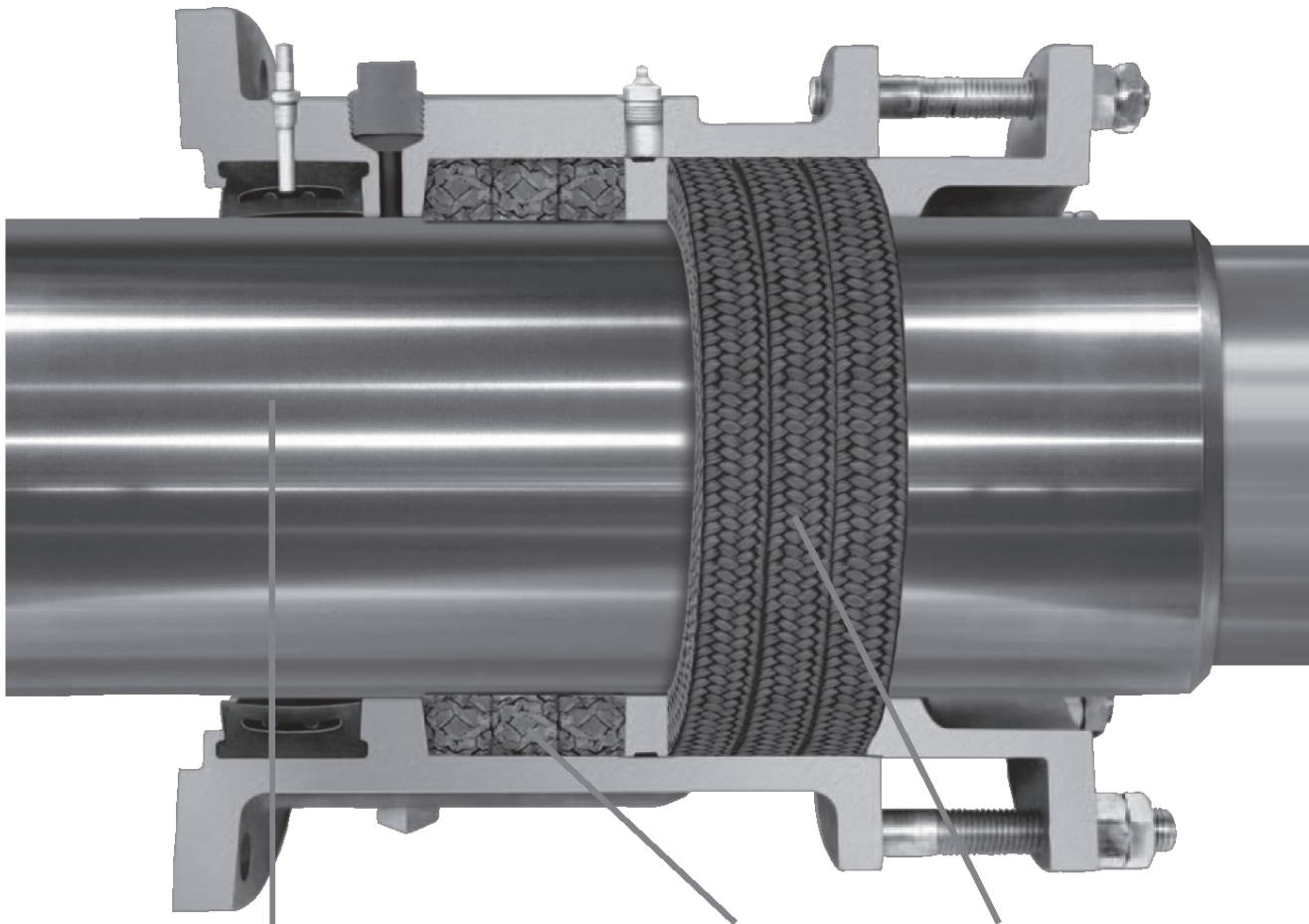
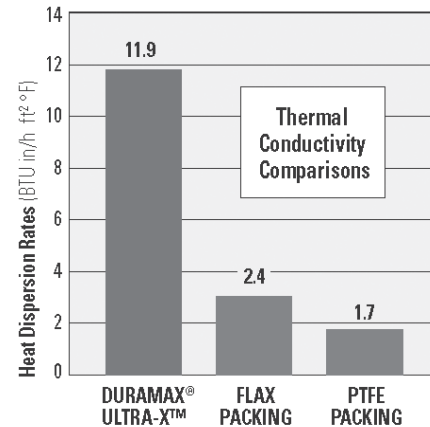
Always Runs Cool, Even at High Shaft Speeds.

Transfers frictional heat to stuffing box.

Duramax® Ultra-X™ dissipates frictional heat from the shaft transferring it to the stuffing box, which functions as a heat sink, lowering the temperature of the shaft and packing at all shaft speeds. In contrast, flax packing acts as an insulator, trapping frictional heat that can cause shaft damage and loss of seal.



Duramax® Ultra-X Packing transfers heat to stuffing box. **Flax packing** acts as insulator trapping heat to shaft.



Minimizes shaft wear and equipment damage.

Ultra-low friction Duramax® Ultra-X always remains pliable. Flax and PTFE packing will harden, get brittle and consumed in use, resulting in shaft scoring and costly replacement. Abrasives will not embed into Ultra-X packing unlike flax with its sticky lubricants which actually act as a holder for abrasives causing shaft damage.

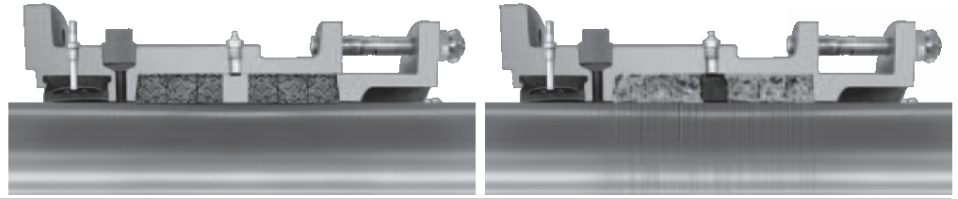
Practically eliminates a dripping stuffing box.

Ultra-X experiences no shrinkage, keeps its shape and dimension, and requires virtually no water for lubrication. Keeps bilge dry and clean of oily contaminants.

Experiences no packing failure.

Duramax® Ultra-X experiences no thermal expansion. It is not consumed during operation, so it never needs additional rings before the next scheduled haul out. This eliminates the need for constant gland adjustments.

Duramax® Ultra-X™ VS. FLAX



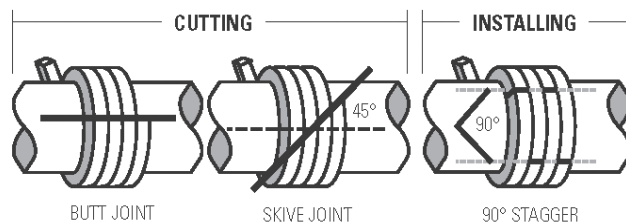
	DURAMAX® Ultra-X	FLAX
Ease of Installation	Pliable, conforms easily for clean, tight seal	Messy to handle, cut and install
Lubrication	Self-lubricating, virtually no water needed	Requires water
Replacement	Stays flexible and pliable, easy to remove	Dries out, gets brittle, difficult to remove
Operating Condition	Stays pliable, non-abrasive	Hardens, becomes brittle and abrasive
Resistance to Overheating	Maximum temperature 550°F	Maximum temperature 150°F
Thermal Expansion	Virtually none	Will experience swelling
Leakage	Practically eliminated	Will experience leakage
Heat Dispersion	11.9 BTU in/h ft² °F	2.4 BTU in/h ft² °F
Environment	No oily contaminated water in bilge, no EPA issues	Needs holding tanks or remediation
Maintenance	Once installed, needs no maintenance	Need to add rings when consumed
Equipment Damage	Virtually eliminates shaft scoring and wear	Gets hard and abrasive causing costly damage
Longevity	Normally lasts until scheduled haul out	Consumed or destroyed at high shaft speeds

Easy Installation.

Easy to handle and cut.

Duramax® Ultra-X is a welcome replacement for messy flax packing. It cuts cleanly and easily. Just cut the rings to the proper lengths and install with no grease needed. Ultra-X does not require grease in stern tube applications where water is present. In bulkhead stuffing boxes it is recommended that grease is added to aid in lubricating the packing. Grease will not harm Ultra-X packing.

To cut Ultra-X packing to the proper length, wrap the packing on a mandrel that matches the shaft or use part of the shaft that is outside the stuffing box. Rings can be cut with butt (square) or skive (diagonal) joints. Joints of successive rings should be staggered – at least 90 degrees apart.



Conforms quickly for a leak-proof seal.

Duramax® Ultra-X packing is soft and pliable. It conforms easily to the stuffing box gland and packing areas.

One adjustment, then never worry about it again.

Once Ultra-X is in place, tighten the gland follower. After a short run-in period, make one adjustment - then never worry about it again. Ultra-X will normally last until the next haul out, without much more than an occasional glance at its drip rate.

Easy to remove for repacking.

Unlike flax and PTFE that hardens and becomes brittle, Duramax® Ultra-X isn't destroyed in use. It always stays pliable and easy to remove.

Trouble Free Operation.

Meets Environmental Requirements.

When using Duramax® Ultra-X™ your bilge will be free of contaminants. It needs virtually no water for lubrication, and it doesn't shrink - practically eliminating a stuffing box drip. It makes it easy to comply with environmental requirements that regulate overboard pumping of polluted bilge water.

Ultra-X is the Most Versatile and Cost Effective.

Compared to other packing options, the life cycle cost of Duramax® Ultra-X is much lower. With the high cost of shaft repair or replacement due to other packing failures, why settle for less. Durability, long service life, and consistent high performance makes Duramax® Ultra-X your most cost-effective packing solution on the market.

Backed By Duramax® Marine.

Duramax® Ultra-X will assure you the highest performance of any braided packing on the market today – whether it's in a Johnson® Heavy-Duty Stuffing Box or any other marine stuffing box you are currently using. Like all Duramax Marine® products, it is designed to reduce your maintenance costs, operating costs and reduce downtime – and is backed up by a team of Duramax Marine® product experts to answer any questions or solve your maintenance problems.

Available in 16 Standard Sizes.

Size*	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"	1-3/8"	1-1/2"
Approx. FT/LB	67	35	20	13	9.5	7	5	4	3.2	2.3	1.8	1.4	1.2	1	.9	.7

- Duramax Ultra-X comes packed standard on spools of: 1, 3, 5 and 10 pounds.
- Bulk spools of 25 and 35 pounds are also available.

*Custom size packing is available upon request.

Duramax Marine® Engineering Solutions you can trust.



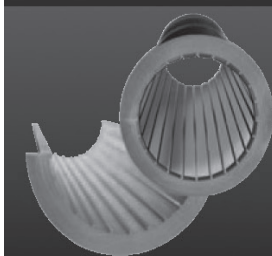
INNOVATION.
EXPERIENCE.
RESULTS.

Duramax Marine® is committed to providing excellence in every product we manufacture. Our Johnson Cutless® marine and industrial bearings, heat exchangers, impact protection systems and sealing systems are known worldwide for their engineered quality and dependable performance. Please contact the factory for information on any of the following Duramax Marine® products:



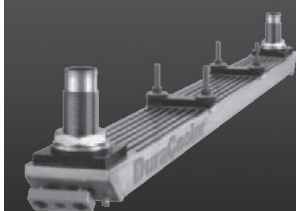
JOHNSON CUTLESS® WATER-LUBRICATED BEARING SYSTEMS

Johnson Cutless® Sleeve and Flanged Bearings
DX 490 Rudder Bushings



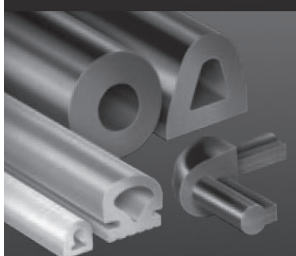
DURAMAX® ADVANCED WATER-LUBRICATED BEARING SYSTEMS

Johnson® Demountable Stave Bearings
ROMOR® I Stave Bearings and Segmental Housings
ROMOR® C- Partial Arc Bearings
DMX® Polymer Alloy Bearings
Industrial Pump Bearing Systems



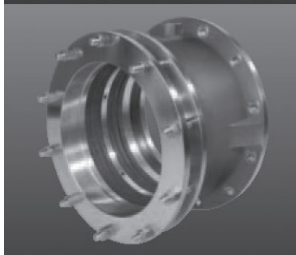
DURAMAX® HEAT EXCHANGE SYSTEMS

DuraCooler® Keel Coolers
Duramax® Demountable Keel Coolers
Duramax® BoxCoolers



DURAMAX® IMPACT PROTECTION SYSTEMS

Johnson® Commercial Dock Bumpers, Fenders & Tow Knees
Weatherstrip Door Gaskets, Window Channel and Hatch Cover Gaskets
LINERITE® Composite Batterboard Systems



DURAMAX® SHAFT SEALING SYSTEMS

Duramax® Shaft Seal Systems
Johnson® Heavy-Duty Air Seal Stuffing Boxes
Duramax® Ultra-X™ High Performance Compression Packing
Johnson® Strong Boy Stern Castings and Stuffing Boxes

DURAMAX MARINE®

DURAMAX® Ultra-X™

HIGH PERFORMANCE MARINE PACKING

Installation Instructions

The following steps are important for maximum service life.

1. PREPARATION: Remove old packing from stuffing box. Clean box and shaft thoroughly. Examine shaft or sleeve for wear or scoring. Replace if wear is excessive.

2. IMPORTANT: MAKE SURE PACKING IS THE PROPER SIZE. To determine correct size, first measure the diameter of the shaft (at position where packing will operate). Then measure the internal diameter of the stuffing box (for the OD of the ring). Subtract the ID measurement from the OD measurement and divide by 2. The result is the required size. Ultra-X Packing is available in any size from 1/4" to 1-1/2".

3. ALWAYS CUT THE PACKING INTO SEPARATE RINGS. Never wind packing into stuffing box. Rings can be cut with butt (square) or skive (diagonal) joints. **IMPORTANT: IF POSSIBLE CUT EACH RING ON A MANDREL,** with the same diameter of the shaft in the stuffing box area, to keep proper joint angle. **Note: If there is no shaft wear, rings can be cut using the shaft outside the stuffing box.** Rings should be cut to correct size - or service life could be reduced. When cutting rings, hold packing tightly on the mandrel, but don't stretch packing excessively. Ultra-X can easily be cut with a sharp utility knife.

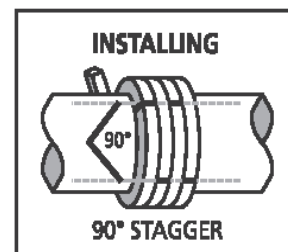
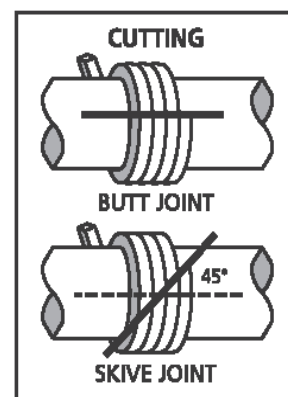
4. INSTALL ONE RING AT A TIME. Make sure packing is clean of any dirt from handling. Joints of successive rings should be staggered - at least 90 degrees apart. Each ring should be seated firmly using tamping tool. When the packing rings can be reached by the nose of the gland, tamping should be supplemented by the gland.

5. BREAK-IN PROCEDURE IS CRITICAL TO INSURE LONG PACKING LIFE. After the last ring is installed, take up bolts finger tight. Do not jam the packing into place by excessive gland loading. Make sure gland bolts are taken up evenly. Stopping leakage at this point will cause the packing to burn up. For proper break-in Ultra-X must be packed loosely for the first 5-10 hours of operation.

6. AFTER THE INITIAL BREAK-IN PERIOD THE GLAND MAY BE TIGHTENED TO THE DESIRED LEAKAGE.

Operation NOTES: Because of the superior thermal conductivity of Ultra-X, the stuffing box may run hotter when compared to traditional flax packing. This is normal. Ultra-X packing minimizes shaft wear and scoring by transferring frictional heat to the stuffing box which acts as a heat sink. Flax packing acts as an insulator keeping harmful heat on the shaft.

Ultra-X does not require grease in stern tube applications where water is present. In bulkhead stuffing boxes it is recommended that grease is added to aid in lubricating the packing. Grease will not harm Ultra-X packing.



Duramax® Ultra-X™ is designed for use in any marine stuffing box.

Duramax Ultra-X will assure you the highest performance of any braided marine packing on the market today - whether it's in a Johnson® Heavy-Duty Stuffing Box or any other marine stuffing box.

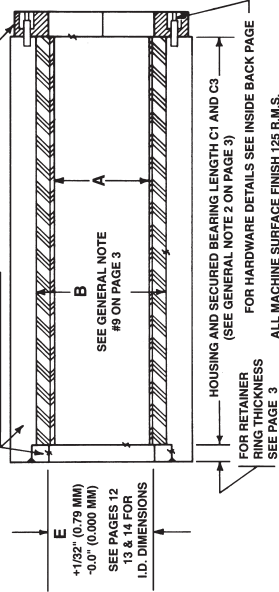
Unmatched high performance in both salt water or fresh water environments.

Ultra-X is engineered to operate in all marine environments. Its unique imbedded construction eliminates the potential for galvanic corrosion making it safe for any marine application.



GUTLESS BEARINGS

FOR COMPRESSION HEAD DETAILS & DRILLING DIAGRAM SEE PAGES 12, 13, & 14
RETAINER RING AND BEARING HOUSING
NOT SUPPLIED BY DURAMAX MARINE, LLC

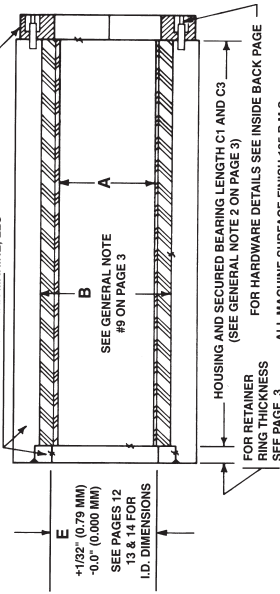


Demountable Rubber Stave Bearing Dimensions



GUTLESS BEARINGS

FOR COMPRESSION HEAD DETAILS & DRILLING DIAGRAM SEE PAGES 12, 13, & 14
RETAINER RING AND BEARING HOUSING
NOT SUPPLIED BY DURAMAX MARINE, LLC



Demountable Rubber Stave Bearing Dimensions

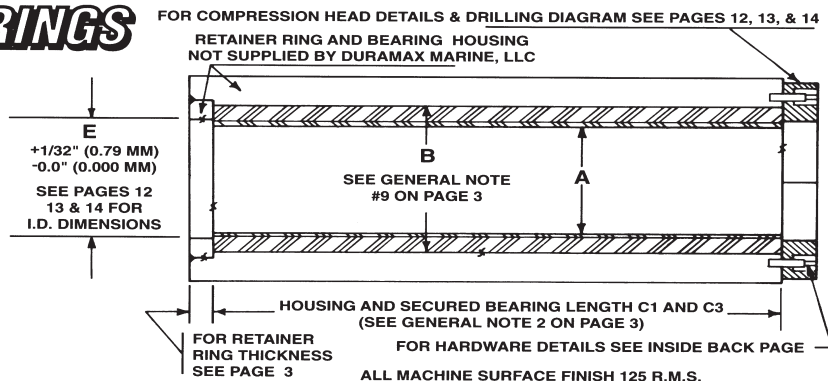
O.D. SHAFT OR SLEEVE JOURNAL	A	REFERENCE PART NUMBER	BEARING CODE SIZE	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3)				HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3)				NORMAL SHAFT CLEARANCE (SECURED BEARING)	
				INCHES	MM	INCHES	MM	C1 (FULL LENGTH)	MM	C3 (HALF LENGTH)	MM	INCHES	MM
2 1/2"	43.500	L-0212-0312 x 4	2600	3.500	88.900	10	254.001	5	127.000	.012-.023	.305-.384		
3	76.200	L-0300-0412 x 4	2600-032	4.500	114.300	14	355.601	7	177.800	.012-.023	.305-.384		
3 1/2	88.900	L-0312-0412 x 4	2601	5.500	139.700	17	431.801	8 1/2	215.900	.015-.024	.381-.610		
4	101.600	L-0400-0512 x 4	2602	6.125	155.575	19	482.601	9 1/2	241.300	.015-.024	.381-.610		
4 1/4	107.950	L-0414-0512 x 4	2603	6.500	165.100	21	533.401	10 1/2	266.701	.018-.030	.457-.762		
4 1/2	114.300	L-0412-0618 x 4	2604	6.500	165.100	21	533.401	10 1/2	266.701	.018-.030	.457-.762		
4 3/4	120.650	L-0434-0618 x 4	2605	7.500	190.500	23	584.201	11 1/2	292.101	.018-.030	.457-.762		
5	133.350	L-0500-0612 x 4	2606	8.000	203.200	25	635.001	12 1/2	317.501	.018-.030	.457-.762		
5 1/4	137.000	L-0512-0712 x 4	2607	8.500	215.900	27	685.801	13 1/2	342.901	.020-.032	.508-.813		
5 1/2	146.050	L-0534-0712 x 4	2608	9.250	234.950	29	736.601	14 1/2	368.301	.020-.032	.508-.813		
6	152.400	L-0600-0800 x 6	2609	10.250	260.351	32	812.802	16	406.401	.020-.034	.508-.864		
6 1/4	158.750	L-0612-0812 x 6	2610	11.000	279.901	35	889.002	17 1/2	444.501	.020-.034	.508-.864		
6 1/2	165.100	L-0612-0812 x 6	2611	11.750	298.451	38	965.202	19	482.601	.022-.038	.559-.965		
6 3/4	171.450	L-0634-0812 x 6	2613	12.750	323.851	41	1041.40	20 1/2	520.701	.024-.040	.609-1.016		
7	177.800	L-0700-0914 x 6	2614	13.750	349.250	44	1117.60	22	558.801	.026-.042	.660-1.067		
7 1/4	184.150	L-0714-0914 x 6	2615	14.500	368.301	47	1193.80	23 1/2	596.901	.026-.042	.660-1.067		
7 1/2	190.500	L-0712-1014 x 6	2616	16.250	412.750	53	1346.20	26 1/2	673.101	.028-.044	.711-1.178		
7 3/4	196.850	L-0734-1014 x 6	2617	17.250	438.150	56	1422.40	28	711.201	.029-.045	.737-1.143		
8	203.200	L-0800-1014 x 6	2618	18.250	463.551	59	1498.60	29 1/2	749.301	.029-.045	.737-1.143		
8 1/4	209.550	L-0814-1100 x 8	2619										
8 1/2	215.900	L-0812-1100 x 8	2620										
8 3/4	222.600	L-0834-1100 x 8	2621										
9	228.600	L-0900-1134 x 8	2622										
9 1/4	234.950	L-0914-1134 x 8	2623										
9 1/2	241.300	L-0912-1134 x 8	2624										
9 3/4	247.650	L-0934-1234 x 8	2625										
10	254.001	L-1000-1234 x 8	2626										
10 1/4	260.351	L-1014-1234 x 8	2627										
10 1/2	266.701	L-1012-1334 x 10	2628										
10 3/4	273.051	L-1034-1334 x 10	2629										
11	279.401	L-1100-1334 x 10	2630										
11 1/4	285.751	L-1114-1412 x 10	2631										
11 1/2	292.101	L-1112-1412 x 10	2632										
11 3/4	298.451	L-1134-1412 x 10	2633										
12	304.801	L-1200-1512 x 10	2634										
12 1/4	311.150	L-1214-1512 x 10	2635										
12 1/2	317.500	L-1212-1512 x 10	2636										
12 3/4	323.850	L-1234-1614 x 10	2637										
13	330.200	L-1300-1614 x 10	2638										
13 1/4	336.550	L-1314-1614 x 10	2639										
13 1/2	342.901	L-1312-1714 x 12	2640										
13 3/4	349.250	L-1334-1714 x 12	2641										
14	355.601	L-1400-1714 x 12	2642										
14 1/4	361.951	L-1414-1814 x 12	2643										
14 1/2	368.301	L-1412-1814 x 12	2644										
14 3/4	374.651	L-1434-1814 x 12	2645										

O.D. SHAFT OR SLEEVE JOURNAL	A	REFERENCE PART NUMBER	BEARING CODE SIZE	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3)				HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3)				NORMAL SHAFT CLEARANCE (SECURED BEARING)	
				INCHES	MM	INCHES	MM	C1 (FULL LENGTH)	MM	C3 (HALF LENGTH)	MM	INCHES	MM
15	381.000	L-1500-1900 x 12	2646	19.000	482.601	62	1574.80	31	787.400	.030-.046	.762-1.168		
15 1/4	387.350	L-1514-1900 x 12	2647	20.000	508.000	65	1651.00	32 1/2	825.502	.032-.048	.813-1.219		
15 1/2	393.700	L-1534-2000 x 12	2648	20.500	520.700	68	1727.20	34	863.602	.035-.050	.838-1.270		
15 3/4	400.050	L-1600-2000 x 12	2650	21.250	539.751	71	1803.40	35 1/2	901.702	.035-.050	.838-1.270		
16	406.401	L-1612-2012 x 12	2651	22.000	558.801	74	1879.60	37	939.802	.036-.052	.914-1.321		
16 1/4	412.750	L-1614-2000 x 12	2652	22.750	577.850	77	1955.80	38 1/2	977.902	.038-.054	.965-1.372		
16 1/2	419.100	L-1612-2012 x 12	2653	23.500	596.900	80	2032.00	40	1016.00	.040-.056	1.016-1.422		
16 3/4	425.450	L-1634-2012 x 12	2654	24.250	615.950	83	2108.20	41 1/2	1054.10	.040-.056	1.016-1.422		
17	431.801	L-1700-2012 x 12	2655	25.000	635.001	86	2184.40	43	1092.20	.043-.060	1.092-1.524		
17 1/4	438.150	L-1714-2114 x 14	2656	25.750	654.051	89	2260.60	44 1/2	1130.30	.044-.062	1.118-1.575		
17 1/2	444.501	L-1712-2112 x 14	2657	26.500	673.100	92	2336.80	46	1168.40	.047-.065	1.194-1.651		
17 3/4	450.850	L-1734-2114 x 14	2658	27.250	692.150	95	2413.00	47 1/2	1206.50	.047-.065	1.194-1.651		
18	457.201	L-1800-2200 x 14	2659	28.000	711.201	98	2489.20	49	1244.60	.048-.066	1.219-1.676		
18 1/4	463.550	L-1814-2200 x 14	2660	28.750	730.250	101	2565.41	50 1/2	1282.70	.051-.069	1.295-1.753		
18 1/2	469.900	L-1812-2200 x 14	2661	29.500	749.300	104	2641.61	52	1320.80	.055-.070	1.321-1.778		
18 3/4	476.250	L-1834-2234 x 14	2662										
19	482.601	L-1900-2234 x 14	2663										
19 1/4	488.950	L-1914-2234 x 14	2664										
19 1/2	495.300	L-1912-2312 x 14	2665										
19 3/4	501.650	L-1934-2312 x 14	2666										
20	508.000	L-2000-2312 x 14	2667										
20 1/4	514.350	L-2014-2414 x 14	2668										
20 1/2	520.700	L-2012-2414 x 14	2669										
20 3/4	527.050	L-2034-2414 x 14	2670										
21	533.401	L-2100-2500 x 16	2671										
21 1/4	539.750	L-2114-2500 x 16	2672										
21 1/2	546.100	L-2112-2500 x 16	2673										
21 3/4	552.450	L-2134-2534 x 16	2674										
22	558.801	L-2200-2534 x 16	2675										
22 1/4	565.150	L-2214-2534 x 16	2676										
22 1/2	571.500	L-2212-2612 x 16	2677										
22 3/4	577.850	L-2234-2612 x 16	2678										
23	584.201	L-2300-2612 x 16	2679										
23 1/4	590.550	L-2314-2714 x 16	2680										
23 1/2	596.900	L-2312-2714 x 16	2681										
23 3/4	603.250	L-2334-2714 x 16	2682										
24	609.601	L-2400-2800 x 18	2683										
24 1/4	615.950	L-2414-2800 x 18	2684										
24 1/2	622.300	L-2412-2800 x 18	2685										
24 3/4	628.650	L-2434-2834 x 18	2686										
25	635.001	L-2500-2834 x 18	2687										
25 1/4	641.350	L-2514-2834 x 18	2688										
25 1/2	647.700	L-2512-2912 x 20	2689										
25 3/4	654.050	L-2534-2912 x 20	2690										
26	660.401	L-2600-2912 x 20	2691										



CUTLESS BEARINGS

Demountable Rubber Stave Bearing Dimensions



O.D. SHAFT OR SLEEVE JOURNAL		BEARING CODE SIZE	REFERENCE PART NUMBER	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3)		HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3)				NORMAL SHAFT CLEARANCE (SECURED BEARING)	
A				B		C1 (FULL LENGTH)		C3 (HALF LENGTH)			
INCHES	MM			INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM
26¼	666.750	L-2614-3014 x 20	2691	30.250	768.353	107	2717.81	53½	1358.90	.052-.070	1.321-1.778
26½	673.100	L-2612-3014 x 20	2692								
26¾	679.450	L-2634-3014 x 20	2693								
27	685.801	L-2700-3100 x 20	2694	31.000	787.403	110	2743.21	55	1397.00	.055-.073	1.397-1.854
27¼	692.150	L-2714-3100 x 20	2695								
27½	698.500	L-2712-3100 x 20	2696								
27¾	704.850	L-2734-3134 x 20	2697	31.750	806.453	113	2870.21	56½	1435.10	.056-.074	1.422-1.880
28	711.201	L-2800-3134 x 20	2698								
28¼	717.550	L-2814-3134 x 20	2699								
28½	723.900	L-2812-3212 x 20	2600-001	32.500	825.503	116	2946.41	58	1473.20	.059-.077	1.499-1.956
28¾	730.250	L-2834-3212 x 20	2600-002								
29	736.601	L-2900-3212 x 20	2600-003								
29¼	742.950	L-2914-3314 x 22	2600-004	33.250	844.553	119	3022.61	59½	1511.30	.059-.077	1.499-1.956
29½	749.300	L-2912-3314 x 22	2600-005								
29¾	755.650	L-2934-3314 x 22	2600-006								
30	762.003	L-3000-3400 x 22	2600-007	34.000	863.602	122	3098.81	61	1549.40	.060-.080	1.524-2.032
30¼	768.353	L-3014-3400 x 22	2600-008								
30½	774.703	L-3012-3400 x 22	2600-009								
30¾	781.053	L-3034-3434 x 22	2600-010	34.750	882.653	125	3175.01	62½	1587.50	.063-.083	1.600-2.108
31	787.403	L-3100-3434 x 22	2600-011								
31¼	793.753	L-3114-3434 x 22	2600-012								
31½	800.103	L-3112-3512 x 24	2600-013	35.500	901.703	128	3251.21	64	1625.60	.064-.084	1.626-2.134
31¾	806.453	L-3134-3512 x 24	2600-014								
32	812.803	L-3200-3512 x 24	2600-015								
32¼	819.153	L-3214-3614 x 24	2600-016	36.250	920.752	131	3327.41	65½	1663.70	.064-.084	1.626-2.134
32½	825.503	L-3212-3614 x 24	2600-017								
32¾	831.853	L-3234-3614 x 24	2600-018								
33	838.203	L-3300-3700 x 24	2600-019	37.000	939.802	134	3403.61	67	1701.80	.067-.087	1.702-2.210
33¼	844.553	L-3314-3700 x 24	2600-020								
33½	850.903	L-3312-3700 x 24	2600-021								
33¾	857.253	L-3334-3734 x 24	2600-022	37.750	958.852	137	3479.81	68½	1739.90	.068-.088	1.727-2.235
34	863.603	L-3400-3734 x 24	2600-023								
34¼	869.953	L-3414-3734 x 24	2600-024								
34½	876.303	L-3412-3812 x 26	2600-025	38.500	977.902	140	3556.01	70	1778.00	.071-.091	1.803-2.311
34¾	882.653	L-3434-3812 x 26	2600-026								
35	889.004	L-3500-3812 x 26	2600-027								
35¼	895.354	L-3514-3914 x 26	2600-028	39.250	996.952	143	3632.21	71½	1816.10	.071-.091	1.803-2.311
35½	901.703	L-3512-3914 x 26	2600-029								
35¾	908.054	L-3534-3914 x 26	2600-030								

WHICH GENDER...?

ZIPLOC BAGS - male, because they hold everything in, but you can always see right through them.

SWISS ARMY KNIFE - male, because even though it appears useful for a wide variety of work, it spends most of its time just opening bottles.

KIDNEYS - female, because they always go to the bathroom in pairs.

SHOE - male, because it is usually unpolished, with its tongue hanging out.

COPIER - female, because once turned off, it takes a while to warm up.

TIRE - male, because it goes bald and often is over inflated.

HOT AIR BALLOON - male, because to get it to go anywhere you have to light a fire under it... and, of course, there's the hot air part.

SPONGES - female, because they are soft and squeezable and retain water.

WEB PAGE - female, because it is always getting hit on.

SUBWAY - male, because it uses the same old lines to pick people up.

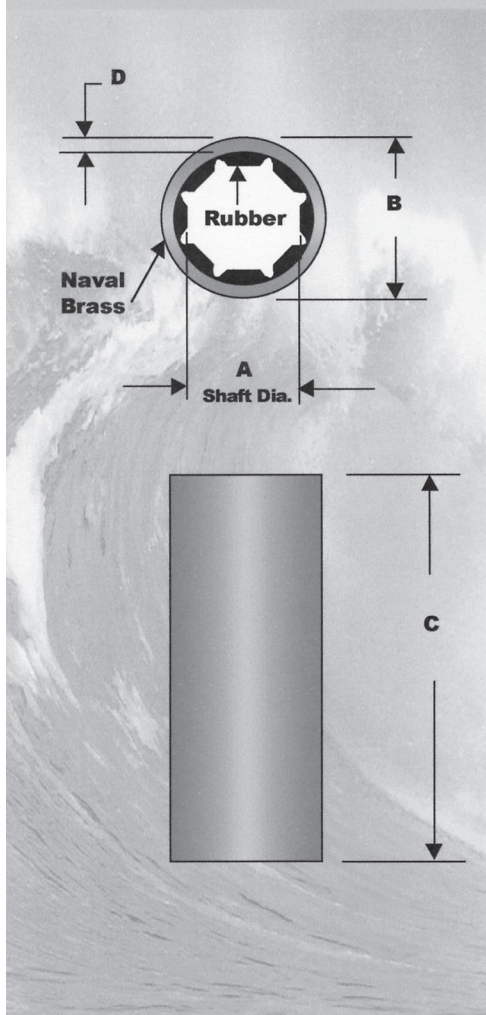
HOURLASS - female, because over time, the weight shifts to the bottom.

HAMMER - male, because it hasn't evolved much over the last 5,000 years, but it's handy to have around.

REMOTE CONTROL - female... HA! You thought we'd say male. But consider: it gives men pleasure, he'd be lost without it, and while he doesn't always know the right buttons to push, he keeps trying.

JOHNSON & MORSE BEARINGS AVAILABLE

STANDARD BRASS SLEEVE SERIES



Morse Marine Bearings
Metso Minerals Industries, Inc.

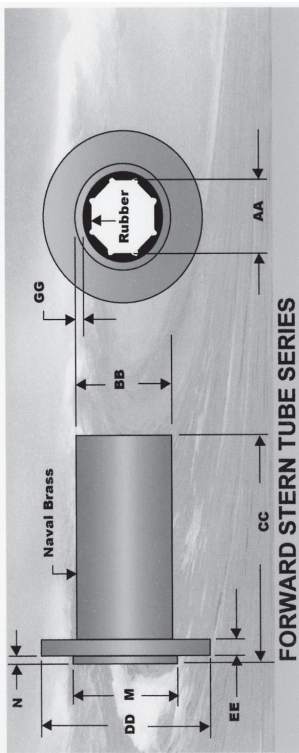
PART NO.	CODE NAME	UNIT WT.	SHAFT DIA. (A)	OUTSIDE DIA. (B)	LENGTH INCH (C)	METAL WALL (D)
E00100	ALBACORE	0.50	3/4	1-1/4	3	1/8
E00200	BLenny	0.31	7/8	1-1/4	3-1/2	1/16
E00300	BARRACUDA	0.69	7/8	1-3/8	3-1/2	1/8
E00400	BASS	0.75	7/8	1-1/2	3-1/2	1/8
E00500	BETTA	0.13	1	1-1/4	3	1/32
E00600	BLACKFISH	0.31	1	1-1/4	4	1/32
E00700	BLOATER	0.38	1	1-3/8	4	1/16
E00800	BONITO	0.81	1	1-1/2	4	1/8
E00900	BROADBILL	0.88	1	1-5/8	4	1/8
E01000	BULLHEAD	1.25	1	2	4	1/8
E01100	CAMA	0.50	1-1/8	1-1/2	4-1/2	1/16
E00650	CARIBE	0.47	1	1-1/4	6	1/32
E01200	CARP	1.00	1-1/8	1-5/8	4-1/2	1/8
E01300	CATFISH	1.19	1-1/8	1-3/4	4-1/2	1/8
E01400	CHOBIE	1.38	1-1/8	2	4-1/2	1/8
E01500	CHOGSET	0.50	1-1/4	1-1/2	5	1/8
E01600	CHUB	1.13	1-1/4	1-3/4	5	1/8
E01700	COD	1.50	1-1/4	2	5	1/8
E01800	CROAKER	1.75	1-1/4	2-1/8	5	1/8
E01900	DEVILFISH	1.44	1-3/8	1-7/8	5-1/2	1/8
E02000	DOGFISH	1.69	1-3/8	2	5-1/2	1/8
E02100	DOLPHIN	1.75	1-3/8	2-1/8	5-1/2	1/8
E02200	EEL	2.13	1-3/8	2-3/8	5-1/2	1/8
E02300	FLAMEN	1.13	1-1/2	2	4-3/8	1/8
E02400	FLATFISH	1.63	1-1/2	2	6	1/8
E02500	FLOUNDER	2.19	1-1/2	2-3/8	6	1/8
E02600	GAR	1.88	1-5/8	2-1/8	6-1/2	1/8
E02700	GRAYBACK	2.75	1-5/8	2-5/8	6-1/2	1/8
E02800	GROUPEr	2.38	1-3/4	2-3/8	7	1/8
E02900	HADDO	2.81	1-3/4	2-5/8	7	1/8
E03000	HAKE	3.00	1-7/8	2-5/8	7-1/2	1/8
E03100	HALIBUT	3.69	1-7/8	2-15/16	7-1/2	1/8
E03200	HERRING	3.06	2	2-5/8	8	1/8
E03300	KINGFISH	3.88	2	3	8	1/8
E03350	LAMPREY	4.85	2	3	10	1/8
E03400	MACKEREL	3.69	2-1/8	2-15/16	8-1/2	1/8
E03500	MANTA	4.50	2-1/8	3-1/8	8-1/2	1/8
E03650	MARGATE	4.90	2-1/4	3	9	1/8
E03600	MARLIN	3.94	2-1/4	2-15/16	9	1/8
E03700	MINNOW	4.44	2-1/4	3-1/8	9	1/8
E03800	MUDFISH	5.44	2-1/4	3-3/8	9	1/8
E03900	MULLET	5.44	2-3/8	3-3/8	9-1/2	1/8
E04000	MUSKY	4.63	2-1/2	3-1/8	10	1/8
E04100	PERCH	5.50	2-1/2	3-3/8	10	1/8
E04200	PICKEREL	5.75	2-5/8	3-3/8	10-1/2	1/8
E04300	PICUDA	5.63	2-3/4	3-3/8	11	1/8
E04150	PIKE	6.47	2-1/2	3-1/2	10	1/8
E04400	PINFISH	6.88	2-3/4	3-3/4	11	1/8
E04500	PORGY	7.13	2-7/8	3-3/4	11-1/2	1/8
E04600	RAY	7.06	3	3-3/4	12	1/8
E04700	REDFIN	7.94	3	4	12	1/8
E04800	REDFISH	9.25	3-1/8	4-1/4	12-1/2	1/8
E04900	ROCKFISH	8.13	3-1/4	4	13	1/8
E05000	SAILFISH	9.38	3-1/4	4-1/4	13	1/8
E05100	SALMON	10.63	3-3/8	4-1/2	13-1/2	1/8
E05200	SANDFISH	9.56	3-1/2	4-1/4	14	1/8
E05300	SAWFISH	10.25	3-1/2	4-1/2	14	1/8
E05400	SCULPIN	10.81	3-5/8	4-1/2	14-1/2	1/8
E05500	SHAD	11.00	3-3/4	4-1/2	15	1/8
E05600	SHARK	17.56	3-3/4	5	15	3/16
E05700	SILVERFISH	18.19	3-3/4	5-1/4	15	3/16
E05800	SMELT	20.00	3-7/8	5-1/4	15-1/2	3/16
E05900	SNAPPER	18.25	4	5	16	3/16
E06000	SOCKEYE	19.63	4	5-1/4	16	3/16
E06100	SPEARFISH	20.06	4-1/8	5-1/4	16-1/2	3/16
E06200	SQUIT	22.00	4-1/4	5-1/2	17	3/16
E06300	STREAKER	24.31	4-3/8	5-3/4	17-1/2	3/16
E06400	SUCKER	22.00	4-1/2	5-1/2	18	3/16
E06500	SUNFISH	24.63	4-1/2	5-3/4	18	3/16
E06600	SWORDFISH	34.00	4-5/8	6-1/8	18-1/2	1/4
E06700	TARPON	34.00	4-3/4	6-1/8	19	1/4
E06800	TROUT	33.00	4-7/8	6-1/8	19-1/2	1/4
E06900	WAHOO	35.00	5	6-1/8	20	1/4
E07000	WALLEYE	39.00	5	6-1/2	20	1/4
E07100	WANDTAIL	44.00	5-1/4	6-3/4	21	1/4
E07200	WAP	48.00	5-1/4	7	21	1/4
E07300	WARFISH	57.00	5-3/8	6-3/4	21-1/2	1/4
E07400	WARSAW	62.00	5-3/8	7	21-1/2	1/4
E07500	WHITEFISH	59.00	5-1/2	7	22	1/4
E07600	WINDFISH	44.50	5-5/8	7	22-1/2	1/4
E07700	YELLOWTAIL	48.00	5-3/4	7	23	1/4
E07800	YOWLING	52.00	5-7/8	7-1/2	24	1/4
E07900	ZANCLUS	55.00	6	7-1/2	24	1/4

I am having an out of money experience.

JOHNSON & MORSE BEARINGS AVAILABLE

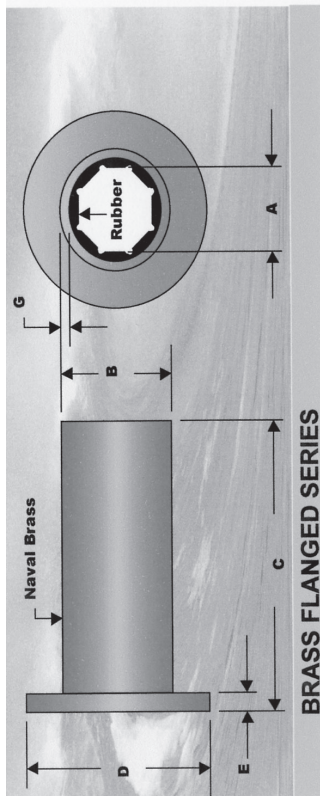
Part Number	Code Name	Unit Wt. Lbs.	Shaft Dia. A	O.D. B	Length C	Met. Wall G	Flange D x E
E23900	Yanqui	545	12-1/4"	15"	46-1/2"	5/8"	18-3/4x3/4
E24000	Yapok	545	12-1/2"	15-1/4"	47-1/2"	5/8"	19X3/4
E24100	Yarborough	550	12-3/4"	15-1/2"	48-1/2"	5/8"	19-1/4x3/4
E24200	Yataghan	563	13"	15-7/8"	50"	11/16"	19-5/8x7/8
E24300	Yoeman	610	13-1/4"	16-1/8"	51"	11/16"	19-7/8x7/8
E24400	York	640	13-1/2"	16-3/8"	52"	11/16"	20-1/8x7/8
E24500	Zephyr	650	13-3/4"	16-5/8"	53"	11/16"	20-3/8x7/8
E24600	Zeppelin	675	14"	16-7/8"	54"	11/16"	20-5/8x7/8
E24700	Zeppo	701	14-1/4"	17-1/8"	55"	11/16"	20-7/8x7/8
E24800	Zircon	754	14-1/2"	17-1/2"	56"	3/4"	21-1/4x7/8
E24900	Zodiac	775	14-3/4"	17-3/4"	57"	3/4"	21-1/2x7/8
E25000	Zulu	795	15"	18"	58"	3/4"	21-3/4x7/8

Non-standard sizes, materials and special features are available upon request.



Part Number	Unit Wt. Lbs.	Shaft Dia. AA	O.D. BB	Length CC	Met. Wall GG	Flange DD x EE	Pilot M x N
FB1300	75	6"	7-3/4"	15"	3/8"	11-3/8x9/16	8x3/8
FB1400	77	6-1/4"	8"	15"	3/8"	11-3/8x9/16	8x3/8
FB1500	91	6-1/2"	8-3/8"	15"	7/16"	13-1/2x5/8	8-5/8x3/8
FB1600	99	6-3/4"	8-3/4"	15"	7/16"	13-3/4x5/8	9x3/8
FB1700	116	7"	9"	17-1/2"	7/16"	13-3/4x5/8	9x3/8
FB1800	122	7-1/4"	9-1/4"	17-1/2"	7/16"	14-1/8x5/8	9-5/8x3/8
FB1900	123	7-1/2"	9-5/8"	17-1/2"	7/16"	14-1/2x5/8	10x3/8
FB2000	126	7-3/4"	9-7/8"	17-1/2"	1/2"	14-1/2x5/8	10x3/8
FB2100	145	8"	10-1/4"	20"	1/2"	14-7/8x5/8	10-3/8x3/8
FB2200	150	8"	10-1/2"	20"	1/2"	14-7/8x5/8	10-3/8x3/8
FB2300	157	8-1/4"	10-1/2"	20"	1/2"	15-1/4x5/8	10-3/4x3/8
FB2400	162	8-1/2"	10-3/4"	20"	1/2"	15-1/4x5/8	10-3/4x3/8
FB2500	170	8-3/4"	11"	20"	1/2"	15-5/8x3/4	11-1/8x3/8
FB2600	193	9"	11-1/4"	22-1/2"	1/2"	16x3/4	11-1/2x3/8
FB2700	200	9-1/4"	11-1/2"	22-1/2"	1/2"	16x3/4	11-1/2x3/8
FB2800	205	9-1/2"	11-3/4"	22-1/2"	1/2"	16-3/8x3/4	11-7/8x3/8
FB2900	217	9-3/4"	12-1/8"	22-1/2"	9/16"	16-7/8x3/4	12-3/8x3/8
FB3000	240	10"	12-3/8"	25"	9/16"	16-7/8x3/4	12-3/8x3/8
FB3100	244	10-1/4"	12-5/8"	25"	9/16"	17-7/8x3/4	12-3/4x3/8
FB3200	247	10-1/2"	12-7/8"	25"	9/16"	18-1/4x3/4	13-1/8x3/8
FB3300	270	10-3/4"	13-1/8"	25"	9/16"	18-1/4x3/4	13-1/8x3/8
FB3400	300	11"	13-1/2"	27-1/2"	9/16"	18-5/8x3/4	13-1/2x3/8
FB3500	312	11-1/4"	13-3/4"	27-1/2"	9/16"	19x3/4	13-7/8x3/8
FB3600	326	11-1/2"	14-1/8"	27-1/2"	5/8"	19x3/4	13-7/8x3/8
FB3700	335	11-3/4"	14-3/8"	27-1/2"	5/8"	19-3/8x3/4	14-1/8x3/8
FB3800	360	12"	14-3/4"	30"	5/8"	19-3/4x3/4	14-1/2x3/8

All materials meet U.S. Navy Specification MIL-B-17901B(SH) Class II



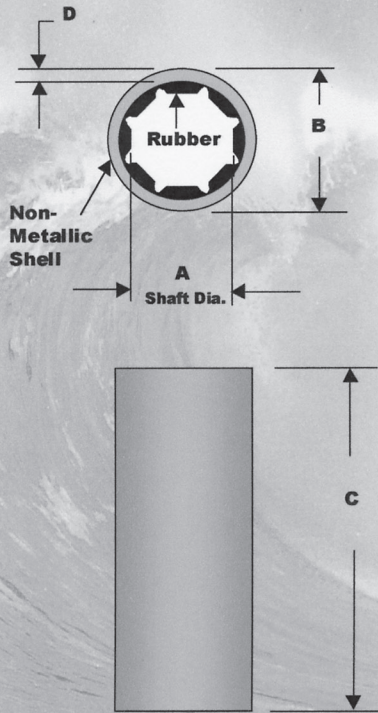
Part Number	Code Name	Unit Wt. Lbs.	Shaft Dia. A	O.D. B	Length C	Met. Wall G	Flange D x E
E20100	Abalone	29	3"	4-1/4"	12"	1/2"	6-3/4x1/2
E20200	Barnacle	30	3-1/4"	4-1/2"	13"	1/2"	7x1/2
E20300	Crab	38	3-1/2"	4-7/8"	14"	1/2"	7-3/8x1/2
E20400	Crawfish	45	3-3/4"	5-1/2"	15"	1/2"	7-3/4x1/2
E20500	Lobster	50	4"	5-1/2"	16"	1/2"	8x1/2
E20600	Mussel	55	4-1/4"	5-3/4"	17"	1/2"	8-1/4x1/2
E20700	Nautilus	63	4-1/2"	6"	18"	1/2"	8-7/8x1/2
E20800	Octopus	66	4-3/4"	6-1/4"	19"	1/2"	9-1/8x1/2
E20900	Oyster	81	5"	6-3/4"	20"	9/16"	9-5/8x9/16
E21000	Prawn	88	5-1/4"	6-7/8"	21"	9/16"	9-7/8x9/16
E21100	Scallop	95	5-1/2"	7-1/4"	22"	9/16"	10-1/4x9/16
E21200	Seahorse	98	5-3/4"	7-1/4"	23"	9/16"	10-1/4x9/16
E21300	Shrimp	109	6"	7-3/4"	24"	9/16"	11x9/16
E21400	Bark	101	6-1/4"	8"	22-1/2"	9/16"	10-5/8x9/16
E21500	Brig	125	6-1/2"	8-3/8"	23-1/2"	9/16"	11x9/16
E21600	Canoes	135	6-3/4"	8-3/4"	24-1/2"	9/16"	11-3/8x9/16
E21700	Caravel	142	7"	9"	25-1/2"	9/16"	11-5/8x9/16
E21800	Clipper	150	7-1/4"	9-1/4"	26-1/2"	9/16"	11-7/8x9/16
E21900	Corsair	168	7-1/2"	9-5/8"	27-1/2"	9/16"	12-1/4x9/16
E22000	Corvette	187	7-3/4"	9-7/8"	28-1/2"	9/16"	12-1/2x9/16
E22100	Cutter	200	8"	10-1/4"	29-1/2"	5/8"	13-1/4x5/8
E22200	Cutterfine	232	8"	10-1/2"	29-1/2"	5/8"	13-1/4x5/8
E22300	Dogger	230	8-1/4"	10-1/2"	30-1/2"	5/8"	13-1/2x5/8
E22400	Frigate	235	8-1/2"	10-3/4"	31-1/2"	5/8"	13-3/5x5/8
E22500	Galleon	240	8-3/4"	11"	32-1/2"	5/8"	14x5/8
E22600	Gondola	255	9"	11-1/4"	33-1/2"	3/4"	14-1/4x3/4
E22700	Ketch	275	9-1/4"	11-1/2"	34-1/2"	3/4"	14-5/8x3/4
E22800	Outrigger	278	9-1/2"	11-3/4"	35-1/2"	3/4"	14-7/8x3/4
E22900	Sampán	350	9-3/4"	12-1/8"	36-1/2"	3/4"	15-1/4x3/4
E23000	Schooner	355	10"	12-3/8"	37-1/2"	3/4"	15-1/2x3/4
E23100	Scouter	360	10-1/4"	12-5/8"	38-1/2"	3/4"	15-7/8x3/4
E23200	Shallop	365	10-1/2"	12-7/8"	39-1/2"	3/4"	16-1/8x3/4
E23300	Sloop	385	10-3/4"	13-1/8"	40-1/2"	3/4"	16-3/8x3/4
E23400	Smack	438	11"	13-1/2"	41-1/2"	3/4"	17-1/4x3/4
E23500	Snow	432	11-1/4"	13-3/4"	42-1/2"	3/4"	17-1/2x3/4
E23600	Tartan	496	11-1/2"	14-1/8"	43-1/2"	3/4"	17-7/8x3/4
E23700	Yacht	486	11-3/4"	14-3/8"	44-1/2"	3/4"	18-1/8x3/4
E23800	Yawl	529	12"	14-3/4"	45-1/2"	3/4"	18-1/2x3/4

All materials meet U.S. Navy Specification MIL-B17901B(SH) Class II

The real art of conversation is not only to say the right thing at the right time, but also to leave unsaid the wrong thing at the tempting moment.

JOHNSON & MORSE BEARINGS AVAILABLE

STANDARD NON-METALLIC SERIES



Morse Marine Bearings
Metso Minerals Industries, Inc.

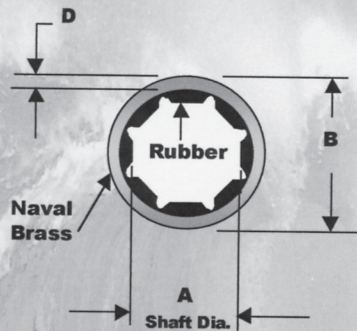
PART NO.	CODE NAME	UNIT WT.	SHAFT DIA. (A)	OUTSIDE DIA. (B)	LENGTH INCH (C)	SHELL WALL (D)
EF0100	ADDER	0.13	3/4	1-1/4	3	1/8
EF0200	AGII	0.19	7/8	1-3/8	3-1/2	1/8
EF0300	ANCHOVY	0.19	7/8	1-1/2	3-1/2	1/8
EF0350	ANABLEPS	0.15	1	1-1/4	4	1/32
EF0375	ARROWANA	0.17	1	1-3/8	4	1/16
EF0400	ANGEL	0.19	1	1-1/2	4	1/8
EF0500	BARBEL	0.25	1	1-5/8	4	1/8
EF0600	BILLFISH	0.50	1	2	4	1/8
EF0650	BLOODFIN	0.40	1-1/8	1-1/2	4-1/2	1/16
EF0700	BLUEFISH	0.25	1-1/8	1-5/8	4-1/2	1/8
EF0800	BONE	0.31	1-1/8	1-3/4	4-1/2	1/8
EF0900	BREAM	0.44	1-1/8	2	4-1/2	1/8
EF0950	BIRCHARDI	0.46	1-1/4	1-1/2	5	1/32
EF1000	BRILL	0.25	1-1/4	1-3/4	5	1/8
EF1100	BURBOT	0.50	1-1/4	2	5	1/8
EF1200	CAPELIN	0.63	1-1/4	2-1/8	5	1/8
EF1300	CHIRUS	0.44	1-3/8	1-7/8	5-1/2	1/8
EF1400	CISCOES	0.50	1-3/8	2	5-1/2	1/8
EF1500	COAL	0.63	1-3/8	2-1/8	5-1/2	1/8
EF1600	CONEY	0.81	1-3/8	2-3/8	5-1/2	1/8
EF1700	CORBINA	0.50	1-1/2	2	6	1/8
EF1800	CRAIG	0.50	1-1/2	2-3/8	6	1/8
EF1900	CRAMP	0.50	1-5/8	2-1/8	6-1/2	1/8
EF2000	DIDON	1.13	1-5/8	2-5/8	6-1/2	1/8
EF2100	DORADE	0.81	1-3/4	2-3/8	7	1/8
EF2200	GERRES	1.00	1-3/4	2-5/8	7	1/8
EF2300	GILTHEAD	1.00	1-7/8	2-5/8	7-1/2	1/8
EF2400	GLOBE	1.50	1-7/8	2-15/16	7-1/2	1/8
EF2500	GOBIE	0.94	2	2-5/8	8	1/8
EF2600	GUPPY	1.56	2	3	8	1/8
EF2700	HADDOCK	1.31	2-1/8	2-15/16	8-1/2	1/8
EF2800	HAYHO	1.88	2-1/8	3-1/8	8-1/2	1/8
EF2900	HOLIA	1.38	2-1/4	2-15/16	9	1/8
EF3000	HOOPID	1.81	2-1/4	3-1/8	9	1/8
EF3100	HORNED	2.19	2-1/4	3-3/8	9	1/8
EF3200	JUREL	2.13	2-3/8	3-3/8	9-1/2	1/8
EF3300	LAUNCE	1.44	2-1/2	3-1/8	10	1/8
EF3400	LOACH	1.75	2-1/2	3-3/8	10	1/8
EF3500	LUMP	1.81	2-5/8	3-3/8	10-1/2	1/8
EF3600	MIDGE	1.75	2-3/4	3-3/8	11	1/8
EF3700	MONDA	2.63	2-3/4	3-3/4	11	1/8
EF3800	MORAY	2.56	2-7/8	3-3/4	11-1/2	1/8
EF3900	NUMB	2.38	3	3-3/4	12	1/8
EF4000	OARFISH	3.00	3	4	12	1/8
EF4100	OX	3.75	3-1/8	4-1/4	12-1/2	1/8
EF4200	ONO	2.75	3-1/4	4	13	1/8
EF4300	PADDLE	3.50	3-1/4	4-1/4	13	1/8
EF4400	PIPE	4.13	3-3/8	4-1/2	13-1/2	1/8
EF4500	PLAICE	3.88	3-1/2	4-1/4	14	1/8
EF4600	PILOT	4.00	3-1/2	4-1/2	14	1/8
EF4700	PIPER	3.50	3-5/8	4-1/2	14-1/2	1/8
EF4800	SPRAT	3.13	3-3/4	4-1/2	15	1/8
EF4900	SALTIE	5.81	3-3/4	5	15	3/16
EF5000	SOLE	7.13	3-3/4	5-1/4	15	3/16
EF5100	SARDINE	6.38	3-7/8	5-1/4	15-1/2	3/16
EF5200	SKATE	4.75	4	5	16	3/16
EF5300	SKITTLE	6.38	4	5-1/4	16	3/16
EF5400	STAR	5.63	4-1/8	5-1/4	16-1/2	3/16
EF5500	SAND	7.13	4-1/4	5-1/2	17	3/16
EF5600	SPOTTED	8.81	4-3/8	5-3/4	17-1/2	3/16
EF5700	STING	6.13	4-1/2	5-1/2	18	3/16
EF5800	STRUGEON	8.13	4-1/2	5-3/4	18	3/16
EF5900	STERLET	10.50	4-5/8	6-1/8	18-1/2	1/4
EF6000	SEA	10.00	4-3/4	6-1/8	19	1/4
EF6100	SCALD	9.31	4-7/8	6-1/8	19-1/2	1/4
EF6200	SCARINA	8.50	5	6-1/8	20	1/4
EF6300	SCOMBER	12.25	5	6-1/2	20	1/4
EF6400	SEACAL	13.25	5-1/4	6-3/4	21	1/4
EF6500	SHANNY	15.75	5-1/4	7	21	1/4
EF6600	SKIPJACK	12.00	5-3/8	6-3/4	21-1/2	1/4
EF6700	SCAD	14.00	5-3/8	7	21-1/2	1/4
EF6800	TUNNY	13.50	5-1/2	7	22	1/4
EF6900	SKIPPY	12.63	5-5/8	7	22-1/2	1/4
EF7000	SNOOK	12.25	5-3/4	7	23	1/4
EF7100	SPINOUS	18.00	5-7/8	7-1/2	24	1/4
EF7200	SERRONO	16.00	6	7-1/2	24	1/4

It's frustrating when you know all the answers, but nobody bothers to ask you the questions.

JOHNSON & MORSE BEARINGS AVAILABLE

STANDARD BRASS SLEEVE BEARINGS

CODE CONVERTER



Morse Marine Bearings
Metso Minerals Industries, Inc.

PART NO.	CODE NAME	SHAFT DIA. (A)	OUTSIDE DIA. (B)	LENGTH INCH (C)	METAL WALL (D)	Duramax Code
E00100	ALBACORE	3/4	1-1/4	3	1/8	Able
E00200	BLENNY	7/8	1-1/4	3-1/2	1/16	Acid
E00300	BARRACUDA	7/8	1-3/8	3-1/2	1/8	Apex
E00400	BASS	7/8	1-1/2	3-1/2	1/8	Atom
E00500	BETTA	1	1-1/4	3	1/32	
E00600	BLACKFISH	1	1-1/4	4	1/32	Back
E00700	BLOATER	1	1-3/8	4	1/16	Bait
E00800	BONITO	1	1-1/2	4	1/8	Bale
E00900	BROADBILL	1	1-5/8	4	1/8	Band
E01000	BULLHEAD	1	2	4	1/8	Base
E01100	CAMA	1-1/8	1-1/2	4-1/2	1/16	Beam
E00650	CARIBE	1	1-1/4	6	1/32	
E01200	CARP	1-1/8	1-5/8	4-1/2	1/8	Belt
E01300	CATFISH	1-1/8	1-3/4	4-1/2	1/8	Bend
E01400	CHOBIE	1-1/8	2	4-1/2	1/8	Bill
E01500	CHOGSET	1-1/4	1-1/2	5	1/8	Bind
E01600	CHUB	1-1/4	1-3/4	5	1/8	Bird
E01700	COD	1-1/4	2	5	1/8	Bite
E01800	CROAKER	1-1/4	2-1/8	5	1/8	Blow
E01900	DEVILFISH	1-3/8	1-7/8	5-1/2	1/8	Boat
E02000	DOGFISH	1-3/8	2	5-1/2	1/8	Bold
E02100	DOLPHIN	1-3/8	2-1/8	5-1/2	1/8	Bond
E02200	EEL	1-3/8	2-3/8	5-1/2	1/8	Boot
E02300	FLAMEN	1-1/2	2	4-3/8	1/8	
E02400	FLATFISH	1-1/2	2	6	1/8	Boss
E02500	FLOUNDER	1-1/2	2-3/8	6	1/8	Brad
E02600	GAR	1-5/8	2-1/8	6-1/2	1/8	Brew
E02700	GRAYBACK	1-5/8	2-5/8	6-1/2	1/8	Brim
E02800	GROUPER	1-3/4	2-3/8	7	1/8	Brow
E02900	HADDO	1-3/4	2-5/8	7	1/8	Buck
E03000	HAKE	1-7/8	2-5/8	7-1/2	1/8	Bulb
E03100	HALIBUT	1-7/8	2-15/16	7-1/2	1/8	Bull
E03200	HERRING	2	2-5/8	8	1/8	Call
E03300	KINGFISH	2	3	8	1/8	Calm
E03350	LAMPREY	2	3	10	1/8	
E03400	MACKEREL	2-1/8	2-15/16	8-1/2	1/8	Came
E03500	MANTA	2-1/8	3-1/8	8-1/2	1/8	Cape
E03650	MARGATE	2-1/4	3	9	1/8	
E03600	MARLIN	2-1/4	2-15/16	9	1/8	Care
E03700	MINNOW	2-1/4	3-1/8	9	1/8	Cart
E03800	MUDFISH	2-1/4	3-3/8	9	1/8	Case
E03900	MULLET	2-3/8	3-3/8	9-1/2	1/8	Cook
E04000	MUSKY	2-1/2	3-1/8	10	1/8	Cord
E04100	PERCH	2-1/2	3-3/8	10	1/8	Corn
E04200	PICKEREL	2-5/8	3-3/8	10-1/2	1/8	Crab
E04300	PICUDA	2-3/4	3-3/8	11	1/8	Crow
E04150	PIKE	2-1/2	3-1/2	10	1/8	
E04400	PINFISH	2-3/4	3-3/4	11	1/8	Curd
E04500	PORGY	2-7/8	3-3/4	11-1/2	1/8	Cure
E04600	RAY	3	3-3/4	12	1/8	Dane
E04700	REDFIN	3	4	12	1/8	Dare
E04800	REDFISH	3-1/8	4-1/4	12-1/2	1/8	Dark
E04900	ROCKFISH	3-1/4	4	13	1/8	Darn
E05000	SAILFISH	3-1/4	4-1/4	13	1/8	Dell
E05100	SALMON	3-3/8	4-1/2	13-1/2	1/8	Dike
E05200	SANDFISH	3-1/2	4-1/4	14	1/8	Dine
E05300	SAWFISH	3-1/2	4-1/2	14	1/8	Dock
E05400	SCULPIN	3-5/8	4-1/2	14-1/2	1/8	Dole
E05500	SHAD	3-3/4	4-1/2	15	1/8	Done
E05600	SHARK	3-3/4	5	15	3/16	Dove
E05700	SILVERFISH	3-3/4	5-1/4	15	3/16	Draw
E05800	SMELT	3-7/8	5-1/4	15-1/2	3/16	Dull
E05900	SNAPPER	4	5	16	3/16	Earn
E06000	SOCKEYE	4	5-1/4	16	3/16	Ease
E06100	SPEARFISH	4-1/8	5-1/4	16-1/2	3/16	Echo
E06200	SQUIT	4-1/4	5-1/2	17	3/16	Edit
E06300	STREAKER	4-3/8	5-3/4	17-1/2	3/16	Eise
E06400	SUCKER	4-1/2	5-1/2	18	3/16	Epic
E06500	SUNFISH	4-1/2	5-3/4	18	3/16	Edge
E06600	SWORDFISH	4-5/8	6-1/8	18-1/2	1/4	Even
E06700	TARPON	4-3/4	6-1/8	19	1/4	Ever
E06800	TROUT	4-7/8	6-1/8	19-1/2	1/4	Evil
E06900	WAHOO	5	6-1/8	20	1/4	Face
E07000	WALLEYE	5	6-1/2	20	1/4	Fact
E07100	WANDTAIL	5-1/4	6-3/4	21	1/4	Fade
E07200	WAP	5-1/4	7	21	1/4	Fare
E07300	WARFISH	5-3/8	6-3/4	21-1/2	1/4	Fear
E07400	WARSAW	5-3/8	7	21-1/2	1/4	Felt
E07500	WHITEFISH	5-1/2	7	22	1/4	Find
E07600	WINDFISH	5-5/8	7	22-1/2	1/4	Flat
E07700	YELLOWTAIL	5-3/4	7	23	1/4	Fork
E07800	YOWLING	5-7/8	7-1/2	24	1/4	Fuel
E07900	ZANCLUS	6	7-1/2	24	1/4	Gale

A day without sunshine is like night.

FOR HEAVY-DUTY SERVICE AT FORWARD STERN TUBE LOCATION

Sizes - 2-1/2" to 15" (63.50 to 381.00mm)

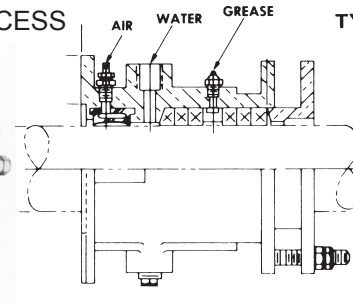
Ruggedly built of highest quality cast naval bronze, with extra-thick fillet-reinforced flanges and precision machining, Johnson heavy-duty stuffing boxes qualify for the most demanding service. Emphasis in design is on extra strength at critical stress-points, and on equitable stressdistribution through mounting and gland flanges.

(*) Standard units are of cast bronze; also available in cast aluminum or mild steel.

FIG. 1786-IR - WATER-GREASE LUBRICATION, WITH "AIR-SEAL"

For use with water-lubricated stern tube bearings. Fig. 1786-IR is fitted with inflatable "AirSeal" ring; also inlets for water lubrication to bearings, and "zerk" fitting with lantern-ring for grease lubrication of packing.

TYPE 1 - FEMALE RECESS



TYPE 2—MALE PILOT

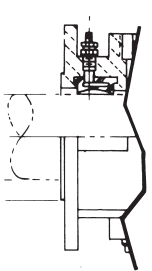
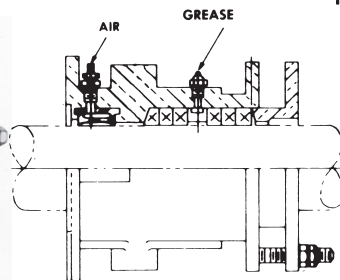


FIG. 1787-IR - GREASE LUBRICATION, WITH "AIR-SEAL"

Identical to Fig. 1786-IR, but does not include inlets for water lubrication. Suitable for a short stern-tube where a forward bearing is not used. Includes "zerk" fitting and lanternring for grease lubrication of packing.

TYPE 3 - FEMALE RECESS



TYPE 4—MALE PILOT

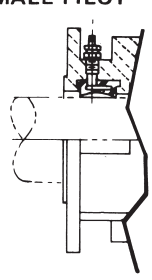


FIG. 1788-IR -WATER LUBRICATION ONLY, WITH "AIR-SEAL"

Fitted with water inlet for bearing lubrication. Does not include grease fitting or lanternring; packing gland accommodates seven rings of packing as opposed to six for greaselubricated glands. For use with self-lubricated packing.

TYPE 5 - FEMALE RECESS

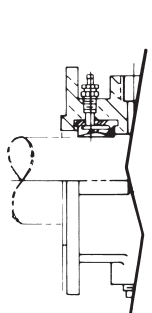
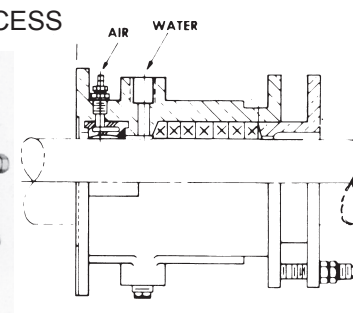
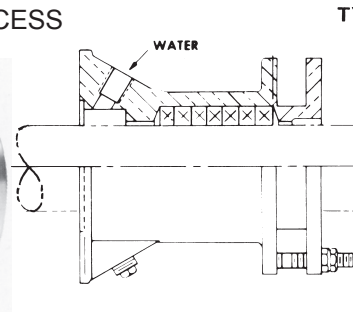
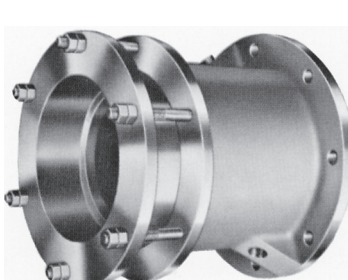


FIG. 1789 - WATER LUBRICATION

Lower in cost, does not include "Air-Seal" feature nor packing grease fitting, but is otherwise the equal of the foregoing models. Water inlet delivers water to stern tube bearings.

TYPE 7 - FEMALE RECESS



TYPE 8—MALE PILOT

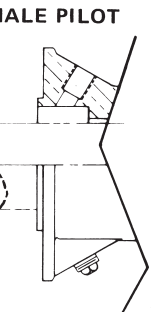
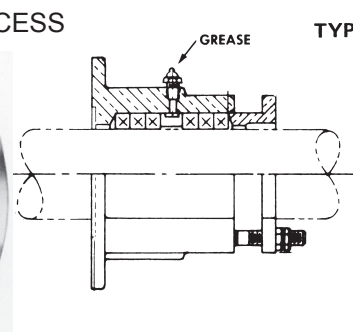
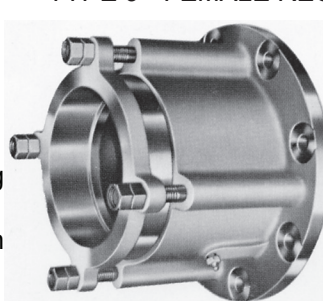


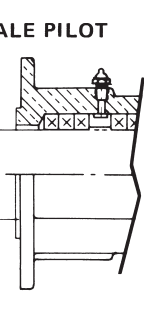
FIG. 1790 - GREASE LUBRICATED 2-1/2" to 7-3/4" (63.50 to 196.85mm)

For vessels with shafts up to 7-3/4" (196.85 mm) this economical unit offers high efficiency at moderate cost. Equipped with grease-fitting, lantern-ring and space for six rings of packing. Four glandstuds are mounted in ridges cast in barrel, providing high strength for gland compression.

TYPE 9 - FEMALE RECESS



TYPE 10—MALE PILOT



**More and more commercial vessels are discovering they're staying at work
on the water longer (and out of expensive dry dock) thanks to the...
PROPELLER SHAFT SEAL SYSTEM**

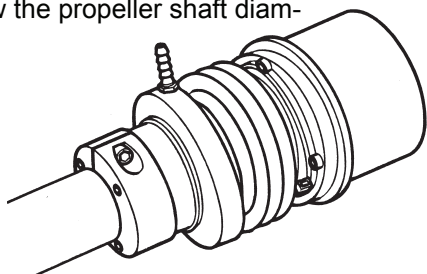
The Duramax Shaft Seal System is readily adaptable to nearly all inboard propulsion systems with shafts from 3/4" to 2" in diameter. It is ideal for retrofit or OEM.

Boats and ships using Duramax shaft seals stay at work longer... because the seals last longer. They're watertight, corrosion resistant and never need repacking. Shafts last longer because the Duramax system eliminates shaft wear at the seal and reduces vibration.

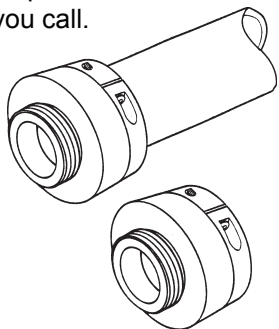
The Duramax system makes pumping out your bilge (except for rain water and spray) a thing of the past. Duramax seals (unlike stuffing boxes) keep water out... leaving the bilge clean and dry. Duramax is also helping captains and owners avoid costly federal water pollution fines. That's because the Duramax Shaft Seal System is leak free, unlike the messy old-fashioned stuffing boxes it replaces.

The Duramax Shaft Seal System is showing up on trawlers, crew boats, ferries, work boats, shrimpers, tugboats, pusher boats... everywhere there's a job to be done on the water.

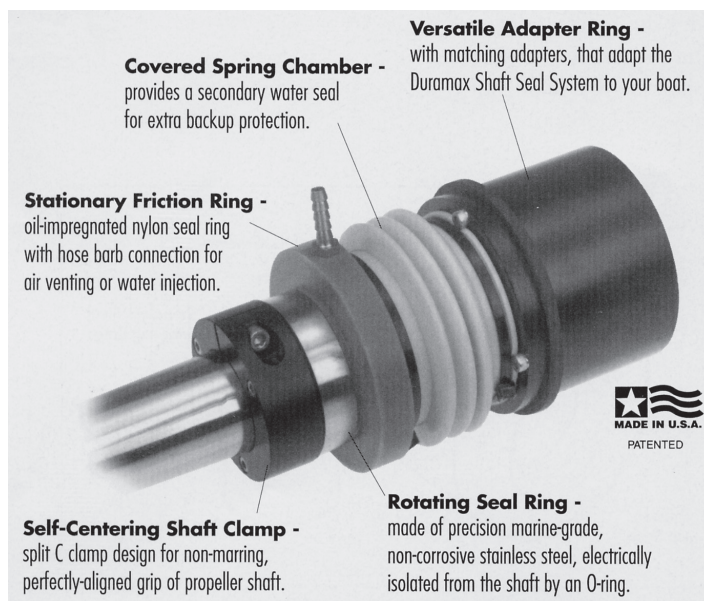
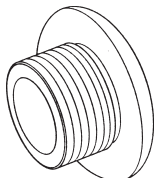
The **Shaft Seal Assembly** is the main body of the Duramax Shaft Seal System. To determine which assembly to order, know the propeller shaft diameter when you call.



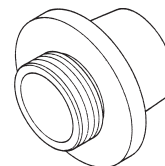
To determine which **Stern Tube Clamp Adapter** to order, know the propeller shaft and stern tube diameters when you call.



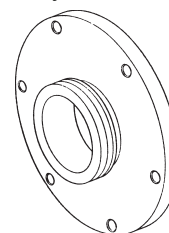
The **Thru-Hull Adapter** is used for new construction and for major overhauls or retrofit. To determine which thru-hull adapter to order, know the propeller shaft diameter when you call.



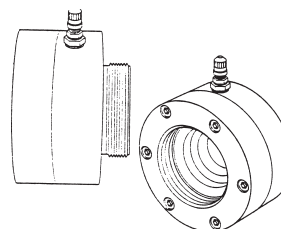
To determine which Hose Adapter to order, know the propeller shaft and stern tube diameters when you call.



The **Flange Adapter** is used for new construction and for major overhauls or retrofit. To determine which flange adapter to order, know the propeller shaft and flange diameter when you call.



The **Air Seal Adapter** is the ultimate protection for your vessel. It is the first line of defense in the event of shaft seal catastrophe. The air seal bladder can be pumped up with air to completely seal off any water flow into the boat. It is a damage control device and is not to be used when the shaft is turning. To determine which air seal adapter to order, know the propeller shaft diameter when you call.



STEERING PARTS & ACCESSORIES

RUDDER PORTS — A & B Series

Outside Mount

PART NUMBER	SHAFT SIZE	FLANGE SIZE	FLANGE ANGLE	BARREL LENGTH	WEIGHT, EACH
OORP100A	1"	3 1/2" sq.	90°	3 3/4"	4.0 lbs
OORP113A	1 1/8"	3 1/2" sq.	90°	3 3/4"	4.0 lbs
OORP125A	1 1/4"	4 1/2" sq.	90°	6"	6.0 lbs
OORP125B	1 1/4"	4 1/2" sq.	85°	6"	6.0 lbs
OORP125B12	1 1/4"	4 1/8" sq.	12°	6 1/8"	6.22 lbs
OORP125B19	1 1/4"	4" sq.	19°	2 1/4"	3.5 lbs
OORP125B23	1 1/4"	4 1/4" sq.	23°	4 1/2"	6.0 lbs
OORP138B	1 3/8"	4 1/2" sq.	85°	6"	6.0 lbs
OORP138B12	1 3/8"	4 1/8" sq.	12°	6 1/8"	6.0 lbs
OORP138A	1 3/8"	4 1/2" sq.	90°	6"	6.0 lbs
OORP150A	1 1/2"	5 1/8" sq.	90°	5"	14.3 lbs
OORP150B12	1 1/2"	4 1/8" sq.	12°	7"	6.94 lbs
OORP175A	1 3/4"	5 1/8" sq.	90°	5"	15.0 lbs
OORP200A	2"	5 1/8" sq.	90°	5"	18.0 lbs
OORP200B9°	2"	5 3/4" sq.	9°	5 1/8"	12.0 lbs
OORP200B12	2"	5 3/4" sq.	12 1/2°	6 5/16"	11.0 lbs
OORP225A	2 1/4"	6" sq.	90°	6 1/16"	22.5 lbs
OORP250A	2 1/2"	6" sq.	90°	6 1/16"	21.0 lbs
OORP275A	2 3/4"	6 3/4" sq.	90°	6 1/2"	32.0 lbs
OORP300A	3"	6 3/4" sq.	90°	6 1/2"	30.0 lbs



A - Series



B - Series

A - Series are 90°. B - Series are angled.
*Manganese Bronze

RUDDER COLLAR

Cast Bronze

PART NUMBER	SHAFT SIZE	WEIGHT, EACH
OORC100	1"	0.43 lbs
OORC113	1 1/8"	0.75 lbs
OORC125	1 1/4"	0.63 lbs
OORC138	1 3/8"	1.20 lbs
OORC150	1 1/2"	1.13 lbs
OORC175	1 3/4"	1.16 lbs
OORC200	2"	2.90 lbs
OORC225	2 1/4"	3.00 lbs
OORC250	2 1/2"	2.80 lbs
OORC275	2 3/4"	6.00 lbs
OORC300	3"	5.50 lbs



RUDDER PORT — Oval Flange

Cast Bronze

PART NUMBER	SHAFT SIZE	BOLT SIZE	LENGTH UNDER FLANGES	BASE SIZE	WEIGHT, EACH
OORPO100	1"	3/8"	3"	2 1/4 x 4 3/8"	3.00 lbs
OORPO113	1 1/8"	3/8"	3"	2 1/4 x 4 3/8"	2.85 lbs
OORPO125	1 1/4"	3/8"	4 1/4"	3 x 5 3/4"	5.00 lbs
OORPO138	1 3/8"	3/8"	4 1/4"	3 x 5 3/4"	5.00 lbs
OORPO150	1 1/2"	1/2"	3 3/4"	3 1/2 x 7"	6.00 lbs



TILLER ARMS — Bolt & Keyway Type

Malleable Iron - Manganese Bronze

PART NUMBER IRON	PART NUMBER BRONZE	SHAFT SIZE	OVERALL LENGTH	C TO C DIM.	KEYWAY	WEIGHT, EACH
33TA10X60M	10TA10X600	1"	9 1/4"	6"	1/4"	1.45 lbs
33TA10X70M	10TA10X700	1"	9 1/4"	7"	1/4"	1.45 lbs
33TA11X60M	10TA11X600	1 1/8"	9 1/4"	6"	1/4"	1.40 lbs
33TA11X70M	10TA11X700	1 1/8"	9 1/4"	7"	1/4"	1.40 lbs
33TA12X60M	10TA12X600	1 1/4"	8 1/2"	6"	1/4"	3.00 lbs
33TA12X70M	10TA12X700	1 1/4"	9 1/4"	7"	1/4"	2.60 lbs
33TA12X90M	10TA12X900	1 1/4"	11 1/2"	9"	1/4"	2.80 lbs
33TA13X60M	10TA13X600	1 3/8"	8 1/2"	6"	1/4"	2.60 lbs
33TA13X70M	10TA13X700	1 3/8"	9 1/4"	7"	1/4"	2.60 lbs
33TA13X90M	10TA13X900	1 3/8"	11 1/2"	9"	1/4"	2.80 lbs
33TA15X60M	10TA15X600	1 1/2"	8 1/2"	6"	3/8"	4.00 lbs
33TA15X10M	10TA15X100	1 1/2"	15 3/4"	10"	3/8"	5.00 lbs
33TA17X10M	10TA17X100	1 3/4"	15 3/4"	10"	3/8"	5.00 lbs
N/A	10TA20X100	2"	15 3/4"	10"	3/8"	5.50 lbs
N/A	10TA22X170	2 1/4"	17"	13 1/2"	1/2"	7.00 lbs
N/A	10TA25X170	2 1/2"	17"	13 1/2"	1/2"	7.00 lbs

DIETING

I went on a fourteen-day diet, but all I lost was two weeks.

Minutes at the table don't put on weight—it's the seconds.

My doctor has the greatest diet of all: eat all you want, chew-but don't swallow.

If you cheat on your diet—you gain in the end.

The second day of a diet is always easier than the first-by the second day you're off it.

I told the doctor I get very tired when I go on a diet. So he gave me pep pills. You know what happened? I ate faster.

SHAFT LOG SELF-ALIGNING

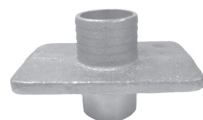
Logs Only

Cast Bronze

BASE TYPE	PART NUMBER	SHAFT SIZE	BASE SIZE	HOSE I.D.	WEIGHT, EACH
A	OOSLL100A	1"	5 ³ / ₄ x 3"	1 ³ / ₄ "	2.0 lbs
A	OOSLL113A	1 ¹ / ₈ "	5 ³ / ₄ x 3"	1 ³ / ₄ "	2.0 lbs
A	OOSLL125A	1 ¹ / ₄ "	6 ¹ / ₂ x 3"	2 ¹ / ₄ "	2.9 lbs
B	OOSLRL125	1 ¹ / ₄ "	6 x 4"	2 ¹ / ₄ "	4.0 lbs
B	OOSLRL138	1 ³ / ₈ "	7 x 4 ¹ / ₂ "	2 ¹ / ₂ "	6.9 lbs
B	OOSLRL150	1 ¹ / ₂ "	7 x 4 ¹ / ₂ "	2 ¹ / ₂ "	6.9 lbs
B	OOSLRL175	1 ³ / ₄ "	8 ¹ / ₄ x 6"	3"	9.8 lbs
B	OOSLRL200	2"	8 ¹ / ₄ x 6"	3"	9.8 lbs
B	OOSLRL225	2 ¹ / ₄ "	6 x 10"	3 ¹ / ₂ "	12.0 lbs
B	OOSLRL250	2 ¹ / ₂ "	6 x 10"	3 ¹ / ₂ "	12.0 lbs



A - Oval Base



B - Rectangular Base

SHAFT LOG – Square Base,

Complete Assembly

Cast Bronze

PART NUMBER	SHAFT SIZE	BASE SIZE	LENGTH	C. TO C. BASE HOLES	HOSE I.D. SIZE	HOLE SIZE	WEIGHT, EACH
OOSLS125G	1 ¹ / ₄ "	3 ¹ / ₁₆ " sq	3 ³ / ₄ "	2 ³ / ₈ "	2"	1/4" c.s.	5 lbs
OOSLS138G	1 ³ / ₈ "	4 ⁵ / ₈ " sq	3 ¹ / ₂ "	3 ¹ / ₈ "	2 ⁵ / ₈ "	1/2" c.s.	9 lbs
OOSLS150G	1 ¹ / ₂ "	4 ⁵ / ₈ " sq	3 ¹ / ₂ "	3 ¹ / ₈ "	2 ⁵ / ₈ "	1/2" c.s.	9 lbs



SHAFT LOG - Complete Assembly

Cast Bronze

PART NUMBER	SHAFT SIZE	ANGLE	BASE LENGTH	WIDTH	OVERALL LENGTH	HOSE I.D.	WEIGHT, EACH
OOSL100X	1"	12°	11"	3"	16 ¹ / ₈ "	1 ¹ / ₂ "	4.70 lbs
OOSL100	1"	13°	12 ¹ / ₂ "	3 ¹ / ₂ "	19 ¹ / ₄ "	1 ³ / ₄ "	7.00 lbs
OOSL113	1 ¹ / ₈ "	13°	12 ¹ / ₂ "	3 ¹ / ₂ "	19 ¹ / ₄ "	1 ³ / ₄ "	7.00 lbs
OOSL113H*	1 ¹ / ₈ "	12°	14"	4 ¹ / ₄ "	21"	2 ¹ / ₄ "	10.30 lbs
OOSL125	1 ¹ / ₄ "	12°	20 ¹ / ₂ "	4 ¹ / ₂ "	28"	2 ¹ / ₄ "	15.20 lbs
OOSL138	1 ³ / ₈ "	12°	24"	5 ¹ / ₄ "	33"	2 ¹ / ₂ "	17.75 lbs
OOSL138L	1 ³ / ₈ "	8°	28 ¹ / ₂ "	5 ¹ / ₄ "	36 ¹ / ₂ "	2 ¹ / ₂ "	21.00 lbs
OOSL150**	1 ¹ / ₂ "	12°	24"	5 ¹ / ₄ "	33"	2 ¹ / ₂ "	17.75 lbs
OOSL150L**	1 ¹ / ₂ "	8°	28 ¹ / ₂ "	5 ¹ / ₄ "	36 ¹ / ₂ "	2 ¹ / ₂ "	21.00 lbs
OOSL175**	1 ³ / ₄ "	9°	32 ¹ / ₂ "	7"	41"	3"	31.50 lbs
OOSL175L**	1 ³ / ₄ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	56"	3 ¹ / ₂ "	48.00 lbs
OOSL200**	2"	9°	32 ¹ / ₂ "	7"	41"	3"	31.50 lbs
OOSL200L**	2"	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	56"	3 ¹ / ₂ "	48.00 lbs
OOSL225**	2 ¹ / ₄ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	56"	3 ¹ / ₂ "	51.00 lbs
OOSL250**	2 ¹ / ₂ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	56"	3 ¹ / ₂ "	51.00 lbs

*Heavy

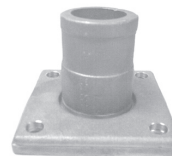
**These parts are made in Right & Left Hand Threads



SHAFT LOG – Square Base, Log Only

Cast Bronze

PART NUMBER	SHAFT SIZE	BASE SIZE	C. TO C.	HOSE I.D. SIZE	HOLE SIZE	WEIGHT, EACH
OOSLLR125G	1 ¹ / ₄ "	3 ¹ / ₁₆ " sq	2 ³ / ₈ "	2"	1/4" c.s.	2 lbs
OOSLLR138G	1 ³ / ₈ "	4 ⁵ / ₈ " sq	3 ¹ / ₈ "	2 ⁵ / ₈ "	1/2" c.s.	5 lbs
OOSLLR150G	1 ¹ / ₂ "	4 ⁵ / ₈ " sq	3 ¹ / ₈ "	2 ⁵ / ₈ "	1/2" c.s.	5 lbs



SHAFT LOG – Log Only

Cast Bronze

PART NUMBER	SHAFT SIZE	ANGLE	BASE LENGTH	WIDTH	OVERALL LENGTH	HOSE I.D.	WEIGHT, EACH
OOSLL100X	1"	12°	11"	3"	14 ¹ / ₂ "	1 ¹ / ₂ "	3.00 lbs
OOSLL100	1"	13°	12 ¹ / ₂ "	3 ¹ / ₂ "	17"	1 ³ / ₄ "	4.50 lbs
OOSLL113	1 ¹ / ₈ "	13°	12 ¹ / ₂ "	3 ¹ / ₂ "	17"	1 ³ / ₄ "	4.50 lbs
OOSLL113H*	1 ¹ / ₈ "	12°	14"	4 ¹ / ₄ "	18 ¹ / ₂ "	2 ¹ / ₄ "	7.63 lbs
OOSLL125	1 ¹ / ₄ "	12°	20 ¹ / ₂ "	4 ¹ / ₂ "	25 ¹ / ₂ "	2 ¹ / ₄ "	9.50 lbs
OOSLL138	1 ³ / ₈ "	12°	24"	5 ¹ / ₄ "	30 ¹ / ₂ "	2 ¹ / ₂ "	15.00 lbs
OOSLL138L	1 ³ / ₈ "	8°	28 ¹ / ₂ "	5 ¹ / ₄ "	34"	2 ¹ / ₂ "	16.00 lbs
OOSLL150	1 ¹ / ₂ "	12°	24"	5 ¹ / ₄ "	29 ¹ / ₂ "	2 ¹ / ₂ "	15.00 lbs
OOSLL150L	1 ¹ / ₂ "	8°	28 ¹ / ₂ "	5 ¹ / ₄ "	34"	2 ¹ / ₂ "	16.00 lbs
OOSLL175	1 ³ / ₄ "	9°	33"	6 ¹ / ₂ "	38 ¹ / ₂ "	3"	25.50 lbs
OOSLL175L	1 ³ / ₄ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	53"	3 ¹ / ₂ "	39.00 lbs
OOSLL200	2"	9°	33"	6 ¹ / ₂ "	38"	3"	25.50 lbs
OOSLL200L	2"	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	53"	3 ¹ / ₂ "	39.00 lbs
OOSLL225	2 ¹ / ₄ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	53"	3 ¹ / ₂ "	39.00 lbs
OOSLL250	2 ¹ / ₂ "	7°	46 ¹ / ₄ "	7 ¹ / ₂ "	53"	3 ¹ / ₂ "	39.00 lbs

*Heavy



MOTOR ACCESSORIES



PROPELLER KEYS

Naval Bronze in One Foot Lengths

PART NUMBER	SIZE	PART NUMBER	SIZE
KEYS18x1FT	3/16"	KEYS50x1FT	1/2"
KEYS25x1FT	1/4"	KEYS56x1FT	9/16"
KEYS31x1FT	5/16"	KEYS62x1FT	5/8"
KEYS37x1FT	3/8"	KEYS75x1FT	3/4"
KEYS43x1FT	7/16"		

Also available in Stainless Steel

PACKING BOX

Complete Assembly

PART NUMBER	SHAFT SHAFT	HOSE SIZE	WEIGHT, EACH
OOPB75	3/4"	1 1/2"	1.75 lbs
OOPB88	7/8"	1 3/4"	1.75 lbs
OOPB100	1"	1 3/4"	1.75 lbs
OOPB100FG	1"	2"	1.90 lbs
OOPB100X	1"	1 1/2"	1.75 lbs
OOPB100225	1"	2 1/4"	2.30 lbs
OOPB113	1 1/8"	1 3/4"	1.75 lbs
OOPB113FG	1 1/8"	2"	1.90 lbs
OOPB113H	1 1/8" hvy	2 1/4"	2.80 lbs
OOPB125	1 1/4"	2 1/4"	2.87 lbs
OOPB125FG	1 1/4"	2"	2.30 lbs
OOPB138	1 3/8"	2 1/2"	3.37 lbs
OOPB150*	1 1/2"	2 1/2"	3.37 lbs
OOPB175*	1 3/4"	3"	8.00 lbs
OOPB200*	2"	3"	8.00 lbs
OOPB175-L	1 3/4"	3 1/2"	9.00 lbs
OOPB200-L	2"	3 1/2"	9.00 lbs
OOPB225*	2 1/4"	3 1/2"	12.00 lbs
OOPB250*	2 1/2"	3 1/2"	12.00 lbs
OOPB275	2 3/4"	4 1/2"	31.00 lbs
OOPB300*	3"	4 1/2"	30.00 lbs



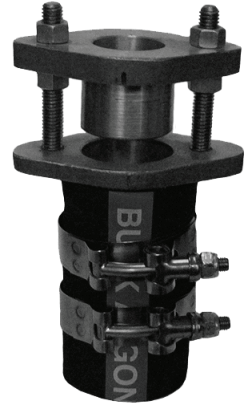
A complete assembly includes all parts shown (2 clamps). The nut, stud and body are finely machined cast bronze. Hose is 5-ply marine exhaust hose. Clamp is all stainless steel up to and including 1 1/4" hoses. Larger sizes have heavy duty malleable iron clamp with rustproof plating.



PACKING BOX — Two Bolt Type w/Hose & Clamps

Cast Bronze

PART NUMBER	SHAFT SIZE	OVERALL LGTH	STUD SIZE	HOSE I.D. SIZE	WEIGHT, EACH
OOPBS125G	1 1/4"	7 9/16"	3/8" -16	2"	3 lbs
OOPBS138G	1 3/8"	8 5/16"	3/8" -16	2 5/8"	4 lbs
OOPBS150G	1 1/2"	8 5/16"	3/8" -16	2 5/8"	4 lbs



PACKING BOX — Self-Aligning Bolt Type

Cast Bronze

PART NUMBER	FOR HOSE I.D.	SHAFT SIZE	WEIGHT, EACH
OOPB125G	2 1/4"	1 1/4"	4.0 lbs
OOPB138G	2 1/2"	1 3/8"	4.0 lbs
OOPB150G	2 1/2"	1 1/2"	4.0 lbs
OOPB175G	3"	1 3/4"	8.5 lbs
OOPB200G	3"	2"	8.5 lbs
OOPB225G	3 1/2"	2 1/4"	11.0 lbs
OOPB250G	3 1/2"	2 1/2"	11.0 lbs
OOPB200GH	3 1/2"	2"	22.0 lbs
OOPB225GH	3 1/2"	2 1/4"	22.0 lbs
OOPB250GH	3 1/2"	2 1/2"	22.0 lbs
OOPB275GH	4"	2 3/4"	31.0 lbs
OOPB300GH	4"	3"	31.0 lbs
OOPB300GH45	4 1/2"	3"	27.0 lbs

Furnished with Hose and Clamps.



Brain cells come and brain cells go, but fat cells live forever.

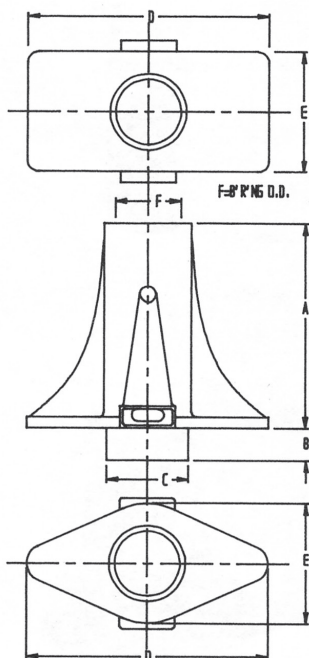
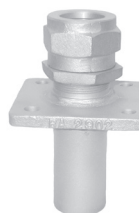
TOURNAMENT OVAL STUFFING BOX RUDDER PORTS

PART NUMBER	SHAFT DIA.	BASE SIZE	OVERALL LENGTH	HOLES DRILLED	WEIGHT, EACH
2875	3/4"	4"	2 1/8"	7/16"	1.4 lbs
2876	1"	4 1/8"	2 1/8"	7/16"	2.0 lbs
2877	7/8"	4 1/8"	2 1/8"	9/16"	2.0 lbs



TOURNAMENT REGULAR RUDDER PORT

PART NUMBER	SHAFT DIA.	BASE SIZE	OVERALL LENGTH	HOLES DRILLED	WEIGHT, EACH
2902	1 1/4"	4 x 4"	6"	3/8"	4.4 lbs
2903	1 3/8"	4 x 4"	6"	3/8"	4.2 lbs
2904	1 1/2"	4 x 4"	6"	3/8"	4.5 lbs



TOURNAMENT BRONZE STERN CASTINGS

Housing Only

PART NUMBER	SHAFT SIZE	FLANGE TYPE	DIMENSIONS							WEIGHT
			A	B	C	D	E	F		
10118	1 1/8"	OVAL	5 1/8"	3/4"	2 1/8"	5 3/8"	2 3/4"	1 3/4"	4.9 lbs	
10122	1 3/8"	OVAL	6 3/16"	7/8"	2 3/8"	6 1/2"	3"	2 1/8"	6.0 lbs	
10124	1 1/2"	OVAL	6 3/16"	1"	2 5/8"	7"	3 1/2"	2 3/8"	10.2 lbs	
10020	1 1/4"	RECT	5 3/8"	7/8"	2 3/8"	5 3/4"	3"	1 7/8"	6.2 lbs	
10022	1 3/8"	RECT	6 3/16"	1"	2 1/2"	6 1/2"	3 1/4"	2"	7.2 lbs	
10024	1 1/2"	RECT	6 13/16"	1"	2 3/4"	3 1/2"	7"	2 3/8"	12.0 lbs	
10032	2"	RECT	9"	1 1/4"	3 3/8"	9 1/4"	4 1/2"	2 5/8"	20.5 lbs	
10036	2 1/4"	RECT	10"	1 1/2"	3 3/4"	10 1/8"	5 1/4"	3"	30.8 lbs	
10040	2 1/2"	RECT	11"	1 5/8"	4"	11 1/2"	5 3/4"	3 3/8"	38.5 lbs	
10044	2 3/4"	RECT	12"	1 3/4"	4 1/2"	12 3/4"	6 3/8"	3 5/8"	45.8 lbs	
10048	3"	RECT	12 7/8"	2"	4 3/4"	14 1/8"	7"	3 3/4"	55.0 lbs	
10056	3 1/2"	RECT	15"	2 1/2"	5 1/4"	15 1/2"	8"	4 1/2"	75.0 lbs	

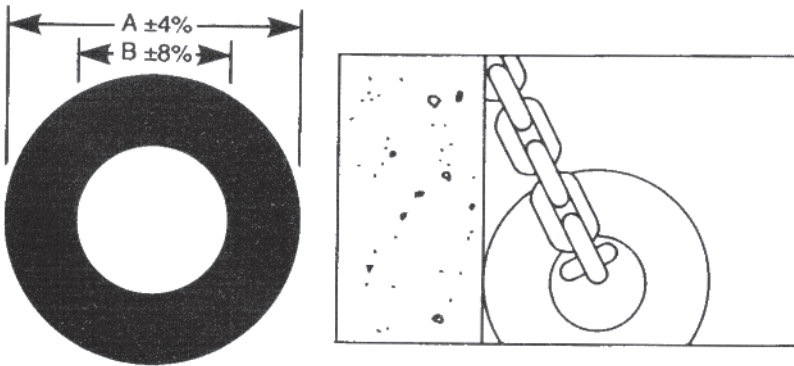
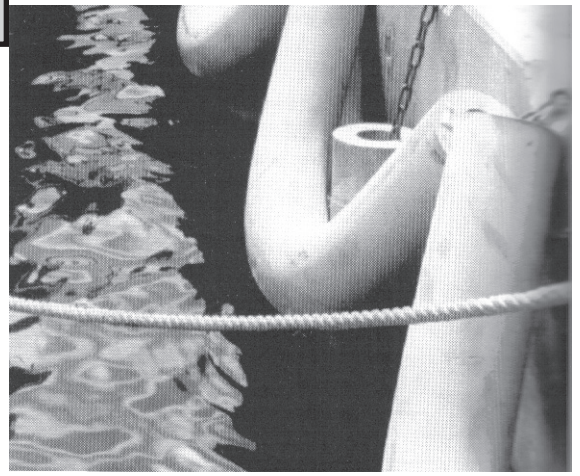
Holes are drilled in Flange only when specified.

Age doesn't always bring wisdom. Sometimes age comes alone.

STANDARD CYLINDRICAL FENDERS

The inherent lateral flexibility of Cylindrical fenders give them the widest range of mounting options available. They may be draped, suspended, or strung on chains to provide protection through tidal changes or where substantial vessel draft variations are anticipated.

Where straight mounting is desired, a metal bar through the bore will provide the lateral stiffness required. They may also be curved to meet special contours on structures or vessels.

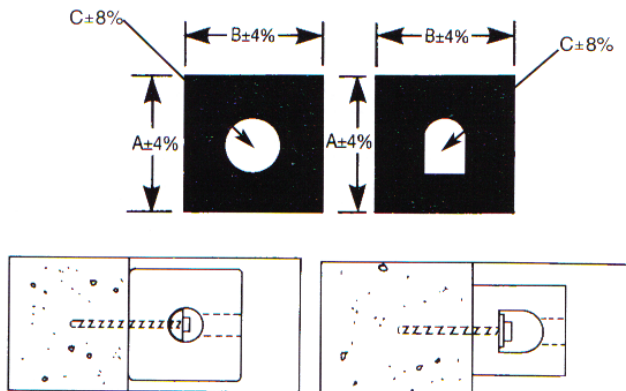


STANDARD CYLINDRICAL					
O.D.	A	B	APPROX.		
	MM	I.D.	MM	LBS./FT.	Kg/M
3"	76	1-3/8"	35	3	4
5"	127	2-1/2"	64	8	11
7"	178	3"	76	16	24
7"	178	3-1/2"	89	15	22
7"	178	5"	127	10	14
8"	203	3-1/2"	89	21	31
8"	203	4"	102	19	29
9"	229	3"	76	29	43
10"	254	5"	127	30	45
12"	305	4"	102	51	76
12"	305	6"	152	43	65
15"	381	5"	127	80	120
15"	381	7-1/2"	191	68	101
18"	457	6"	152	116	172
18"	457	9"	229	98	145
21"	533	10-1/2"	267	133	198
24"	610	12"	305	173	258
27"	686	13-1/2"	343	220	327
28"	711	14"	356	236	351

RECTANGULAR FENDERS

The Rectangular profile is the most rigid of our rubber fender designs. It may be surface mounted where tidal actions are not a consideration and where berthing angles are low. It may be mounted horizontally or vertically behind timbers to provide extra cushioning where dock loading must be kept low.

It can be precurved during extrusion for solid mounting on vessels. This versatility in protecting both structures and vessels is enhanced by a wide range of available sizes.

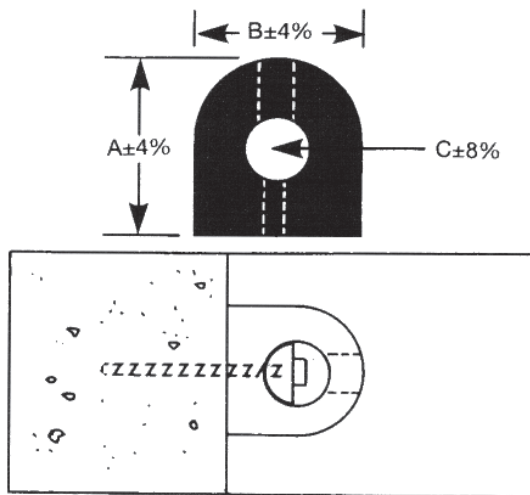
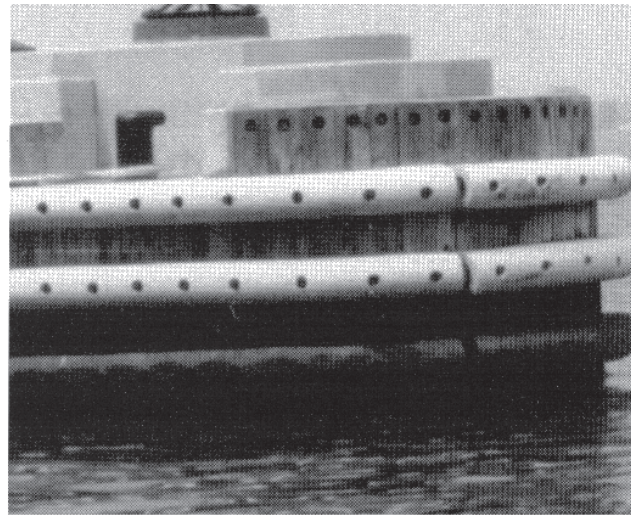


RECTANGULAR

Height A		Width B		"C" Bore		Weight	
mm	in.	mm	in.	mm	in.	kg/m	lbs./ft.
89	3-1/2"	114	4-1/2"	25	1"	11	8
127	5"	152	6"	64	2-1/2"	19	13
127	5"	165	6-1/2"	64	2-1/2"	21	14
152	6"	254	10"	76	3"	40	27
178	7"	254	10"	76	3"	48	32
203	8"	203	8"	76x76	3"	43	29
203	8"	203	8"	76	3"	43	29
203	8"	254	10"	76	3"	55	37
203	8"	254	10"	76x76	3"	55	37
254	10"	254	10"	102	4"	67	45
254	10"	254	10"	102x102	4"	65	44
254	10"	305	12"	102	4"	82	55
254	10"	305	12"	102x102	4"	80	54
254	10"	305	12"	127	5"	76	51
305	12"	305	12"	102	4"	100	67
305	12"	305	12"	127	5"	95	64
305	12"	305	12"	152x152	6"	85	57
305	12"	305	12"	152	6"	88	59
305	12"	356	14"	152	6"	106	71
356	14"	356	14"	152	6"	128	86
356	14"	356	14"	152x152	6"	125	84
356	14"	356	14"	178x178	7"	116	78
406	16"	406	16"	152	6"	173	116
457	18"	457	18"	254	10"	187	126
508	20"	508	20"	204	8"	266	179

D-SHAPED FENDERS

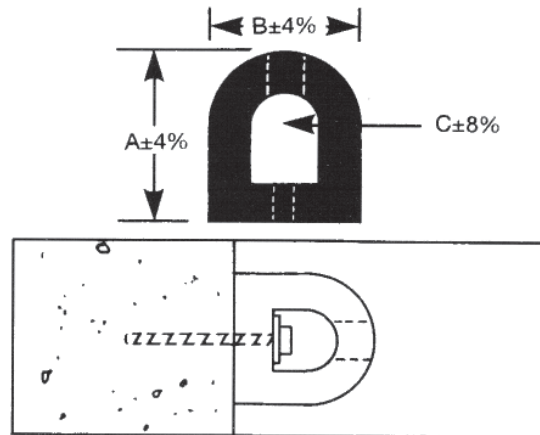
We manufacture D-Series fenders with either a cylindrical or a "D" shaped bore to provide for varying mounting requirements. Designed for use on tugs and barges, they offer long term durability for applications where repeated compression cycles are encountered in pushing service. They also offer the excellent physical characteristics needed to handle the high loading which occurs both on initial contact, and throughout the service cycle.



"D" SERIES
Cylindrical Bore

A HEIGHT		B WIDTH		C BORE		APPROX.	
IN	MM	IN	MM	IN	MM	LBS/FT	KG/M
5	127	6½	165	2½	64	12	18
6	152	5	127	2½	64	11	17
6	152	6	152	3	76	13	19
6	152	8	203	3	76	17	26
8	203	8	203	3	76	26	38
8	203	10	254	3	76	32	47
10	254	10	254	4	102	39	58
10	254	12	305	4	102	47	70
12	305	12	305	5	127	56	83
14	356	14	356	6	152	75	112
14	356	18	457	Double 3	Double 76	104	155

Standard production lengths available up to 20 ft.
Contact factory if longer lengths are required.



"D" SERIES
"D" Shaped Bore

SIZE		A HEIGHT		B WIDTH		C BORE		APPROX.	
IN	MM	IN	MM	IN	MM	IN	MM	LBS/FT	KG/M
3	76	2½	67	3½	81	2½	60x41	2	3
4	102	4	102	4	102	2x2	51x51	5	8
4½	114	3½	98	4½	113	2½	75x41	6	9
5	127	5	127	5	127	2	51x51	10	14
6	152	6	152	6	152	3	76x76	12	18
8	203	8	203	8	203	4	102x102	22	33
10	254	10	254	10	254	4	102x102	38	57
12	305	12	305	12	305	6	152x152	49	73
14	356	14	356	14	356	7	178x178	67	100

Standard production lengths available up to 20 ft.
Contact factory if longer lengths are required.

DIAMOND

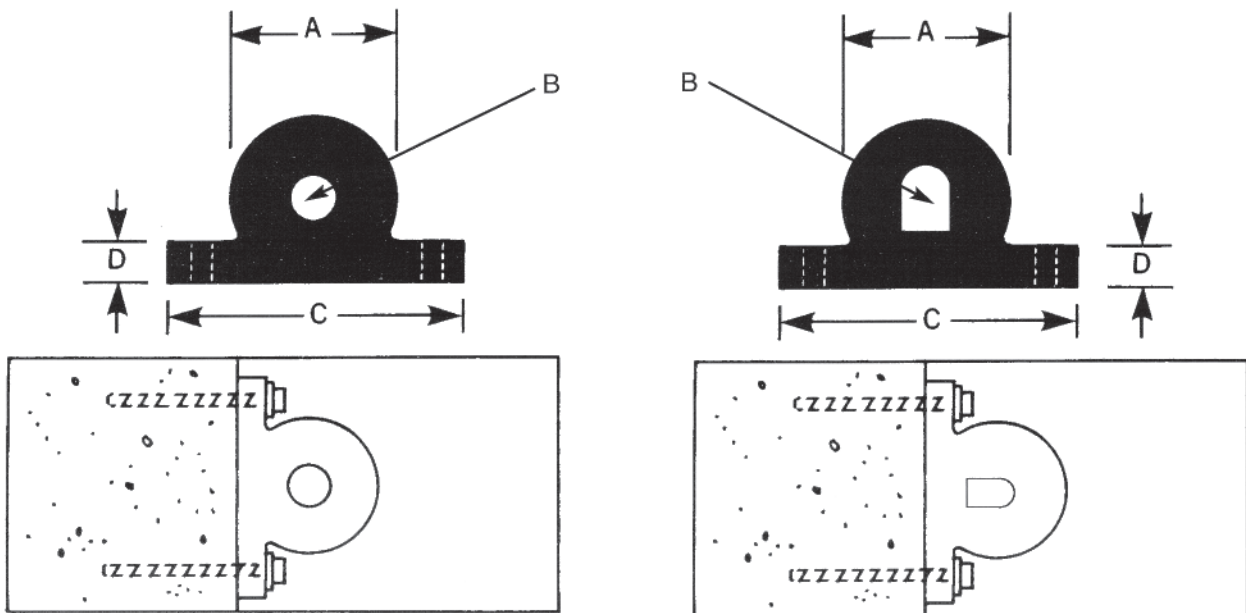
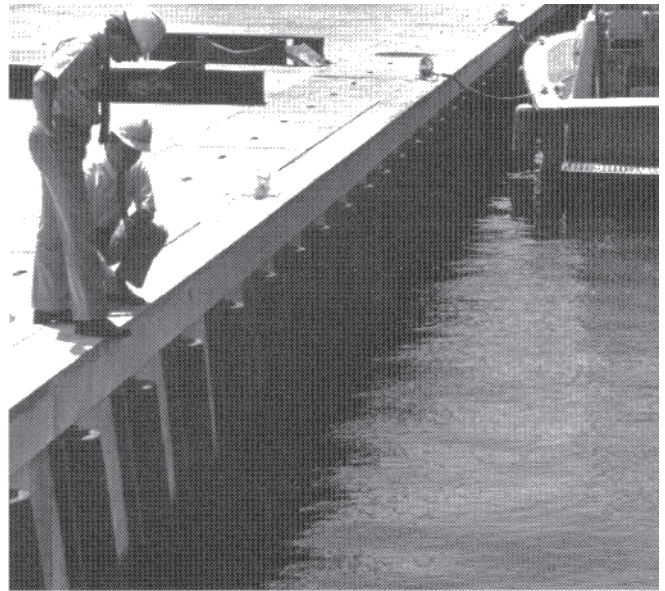
A diamond is a chunk of coal that made good under pressure.

DIPLOMACY

A diplomat is a man who can convince his wife she looks vulgar in diamonds-and fat in a mink coat.

WING TYPE FENDERS

Wing Type fenders are designed for vessel mounting. They combine the impressive energy absorption capabilities of a cylindrical design with the convenience of wing mounting. They are available from 3" to 12" O.D. to tailor the protection to the vessel's size and purpose: from pleasure craft through pilot boats, heavy tugs, barges and ferries.



WING TYPE

A O.D.		B BORE		C FLANGE BASE WIDTH		D FLANGE THICKNESS		APPROX. LBS/FT KG/M	
IN	MM	IN	MM	IN	MM	IN	MM		
3	76	1	25	6	152	³ / ₄	19	5	7
4	102	2	51	6½	165	1	25	7	10
4	102	1	25	6½	165	1	25	8	12
6	152	2	51	9½	241	1½	38	18	25
6	152	3	76	9	229	1½	38	15	22
6	152	4	102x102	9½	241	1½	38	16.6	24.4
8	203	4	102	12	305	2	51	27	40
10	254	3	76	16	406	2½	64	49	73
10	254	4	102	16	406	2½	64	46	68
12	305	6	152	18	457	3	76	61	91

Standard production lengths available up to 20 ft.
Contact factory if longer lengths are required.

TRAPEZOIDAL DOCK FENDERS

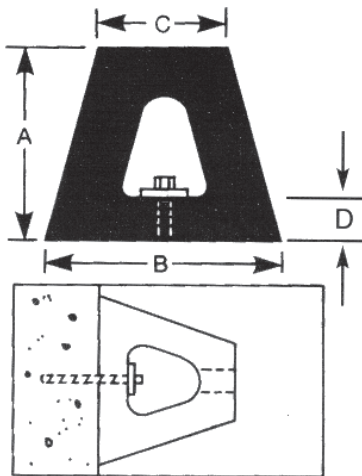


Trapezoidal dock fenders have high energy absorption and low reaction load transmission characteristics similar to V-Series fenders. However, the engineering of the Trapezoidal base results in a smoother loading curve and more uniform deceleration. This produces an efficiency which allows a smaller section of Trapezoidal fender to absorb a greater amount of impact than other cross sections.

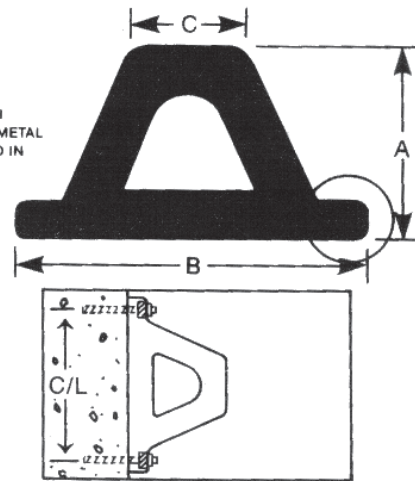
Two types of Trapezoidal fender are available to offer installation and design flexibility.

The "R-Series" is designed for mounting directly to open faced structures using a steel bar through the bore. They may also be used behind, or on the face of, conventional timbering.

A "W-Series" Trapezoidal fender is extruded with wings which can incorporate an optional external mounting groove. They are installed with metal mounting bars.



OPTION:
AVAILABLE WITH
GROOVES AND METAL
BARS FASTENED IN
PLACE.



TRAPEZOIDAL — "R" SERIES
Inside Bar Mounted

Code	A Height		B Base		C Top		D Base		Approx.	
	IN	MM	IN	MM	IN	MM	IN	MM	LBS/FT	KG/M
10R	10	254	12-3/4	324	5-1/2	140	2-1/4	57	37	55
13R	13	330	16-5/8	422	7-3/8	187	2-3/4	70	61	91
15R	15	381	19-1/8	486	8-5/8	219	2-3/4	70	81	121
17R	17	432	21-5/8	549	9-7/8	251	2-7/8	73	104	155
20R	20	508	23-1/4	590	11-1/4	286	3-3/4	95	138	205

Standard production lengths available up to 20 ft.
Contact factory if longer lengths are required.

TRAPEZOIDAL — "W" SERIES
Metal Bar Mounted

Code	A Height		B Base		A Top		Approx.		C/L	
	IN	MM	IN	MM	IN	MM	LBS/FT	KG/M	IN	MM
10W	10	254	18-1/2	470	5-1/2	140	44	65	15	381
13W	13	330	21-1/2	546	7-3/8	187	68	101	18	462
15W	15	381	24-3/4	629	8-5/8	219	93	138	21	539

Standard production lengths available up to 20 ft.
Contact factory if longer lengths are required.

EDUCATION

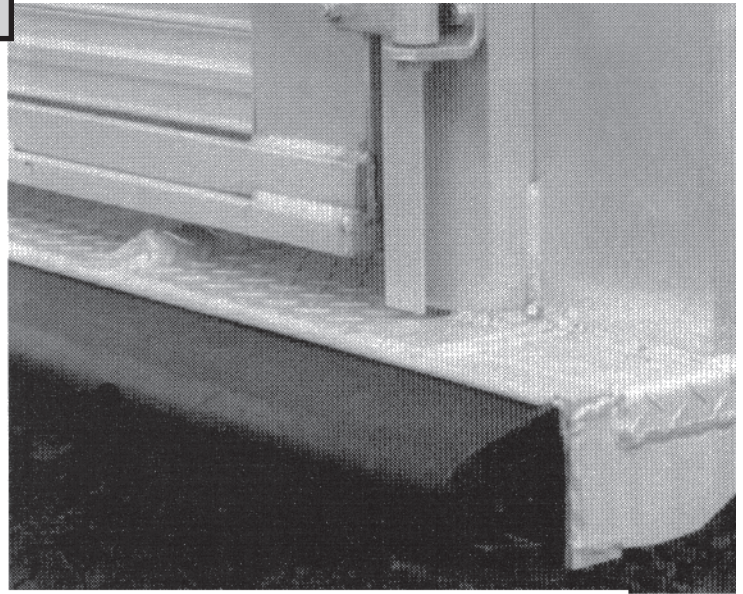
A self-taught man usually has a poor teacher and a worse student.

Educate a man and you educate an individual—educate a woman and you educate a family.

Agnes Cripps

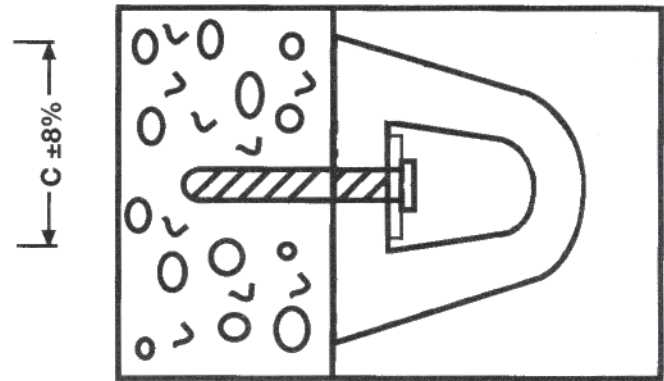
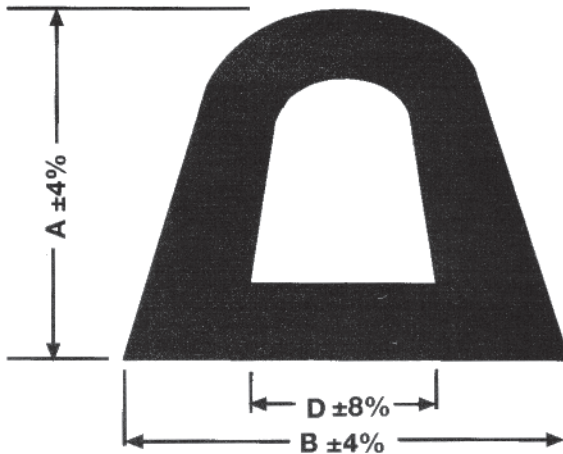
M-SERIES FENDERS

M-Series fenders offer protection for small vessel dock structures as well as having many industrial uses. They can protect trucks, loading docks and industrial property. They can be easily moved to meet changing conditions.



M-SERIES

CODE	A		B		C		D		E	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
M-2	2	51	2-1/4	57	1	25	1-1/4	32	3/8	9
M-4	3-3/4	96	4-1/2	115	2	51	2	51	1-1/2	38
M-6	6	152	6-3/4	172	2-7/8	73	3	76	2-3/8	60

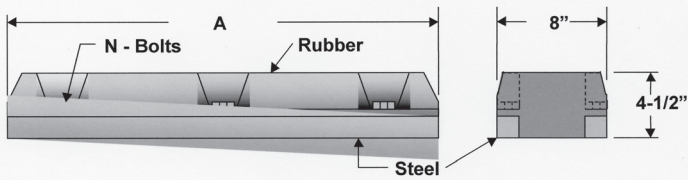


Surely the shortest commencement address in history—and for me one of the most memorable—was that of Dr. Harold E. Hyde, president of New Hampshire's Plymouth State College. He reduced his message to the graduating class to these three ideals: "Know yourself—Socrates. Control yourself—Cicero. Give yourself—Christ." *Walter T. Tatara*

If you think education is expensive—try ignorance. *Derek Bok*

Educate men without religion and you make them but clever devils. *Duke of Wellington*

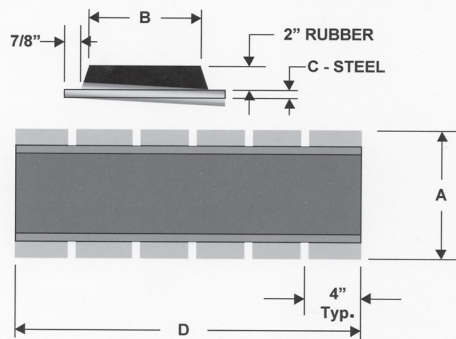
PUSHNEE BOLT-ON BUMPERS



PART No.	A	N	Wt. Lbs.
E42007	36"	6	110
E42011	17-1/2"	4	55

Bolt-On Bumpers are supplied with weld-on mounting bars and mounting bolts. Just position the mounting bars. Weld the bars in place and attach the rubber bumper element.

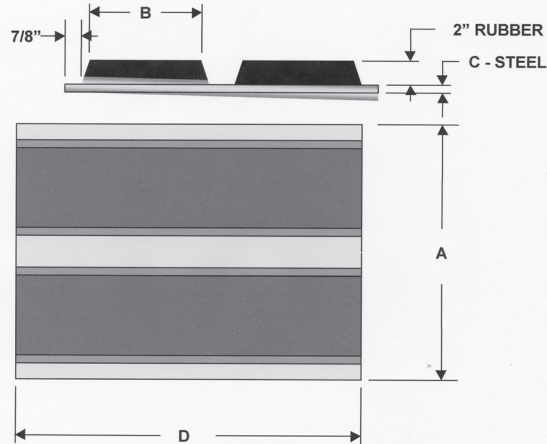
FLEXNEE MODULAR WELD-ON BUMPERS



PART No.	A	B	C	D	Wt. Lbs.
E42075	10	7	3/4	36	75
E43075	10	7	3/4	48	99
E42076	10	7	1/2	36	60
E43076	10	7	1/2	48	80
E42077	10	7	1/4	36	42
E43077	10	7	1/4	48	55

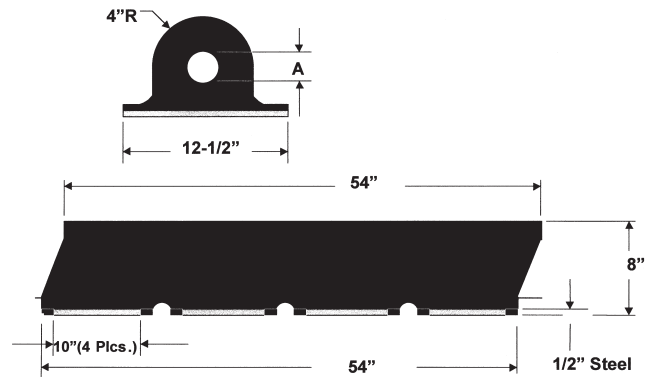
Flat Double Style

PUSHNEE WELD-ON BUMPERS



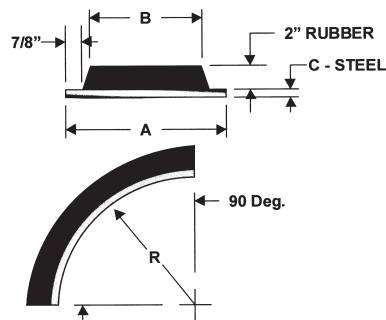
PART No.	A	B	C	D	Wt. Lbs.
E42002	20	7	3/4	36	200
E43002	20	7	3/4	48	267
E42034	20	7	1/2	36	150
E43034	20	7	1/2	48	200
E42035	20	7	1/4	36	100
E43035	20	7	1/4	48	133

HEAVY DUTY D-MODULAR BUMPERS



PART No.	A	Wt. Lbs.
E44300	4"	133
E44311	2"	168

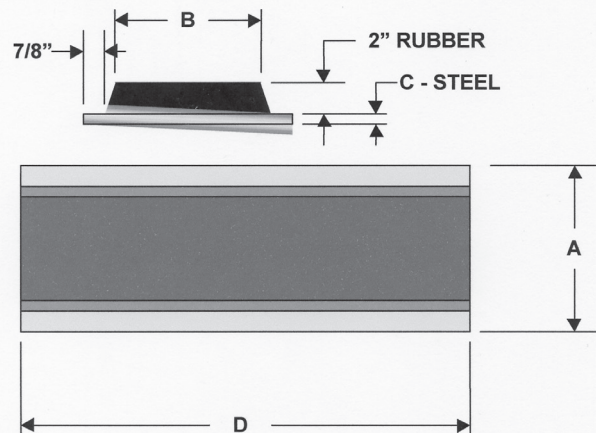
Curved Style PUSHNEE WELD-ON BUMPERS



PART No.	A	B	C	R	Wt. Lbs.
E42012	10	7	3/4	18	100
E42049	10	7	1/2	18-1/4	70
E42050	10	7	1/4	18-1/2	43

Flat Single Style

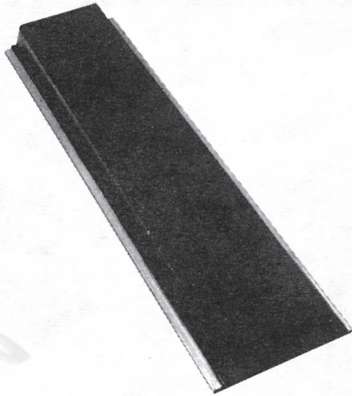
PUSHNEE WELD-ON BUMPERS



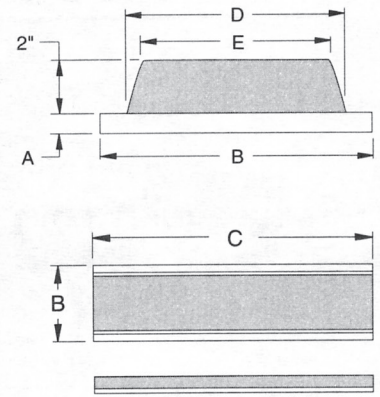
PART No.	A	B	C	D	Wt. Lbs.
E42000	10	7	3/4	36	100
E43000	10	7	3/4	48	133
E42010	10	7	1/2	36	77
E43010	10	7	1/2	48	103
E42004	10	7	1/4	36	50
E43004	10	7	1/4	48	67
E42005	13-1/2	10-1/4	3/4	36	138
E42041	13-1/2	10-1/4	1/2	36	110
E42042	13-1/2	10-1/4	1/4	36	75

TOW-KNEE PUSHER PLATES

SINGLE TOW - KNEES



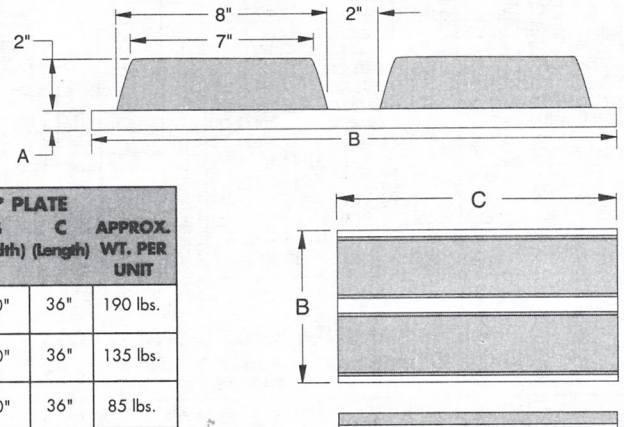
PART NUMBER	STEEL * PLATE			RUBBER		APPROX. WT. PER UNIT
	A (Thick- ness)	B (Width)	C (Length)	D (Base Width)	E (Surface Width)	
DB - 1408	3/4"	10"	36"	8"	7"	90 lbs.
DB - 1409	1/2"	10"	36"	8"	7"	65 lbs.
DB - 1410	1/4"	10"	36"	8"	7"	50 lbs.
DB - 1508	3/4"	13-1/2"	36"	11-1/4"	10-1/4"	130 lbs.
DB - 1509	1/2"	13-1/2"	36"	11-1/4"	10-1/4"	90 lbs.
DB - 1510	1/4"	13-1/2"	36"	11-1/4"	10-1/4"	70 lbs.



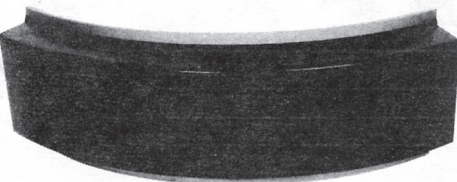
DOUBLE TOW - KNEES



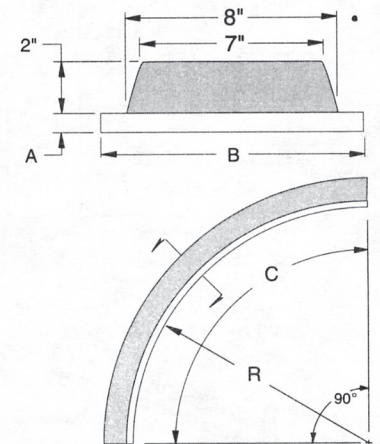
PART NUMBER	STEEL * PLATE			APPROX. WT. PER UNIT
	A (Thick- ness)	B (Width)	C (Length)	
DB - 1608	3/4"	20"	36"	190 lbs.
DB - 1609	1/2"	20"	36"	135 lbs.
DB - 1610	1/4"	20"	36"	85 lbs.



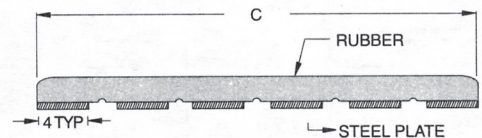
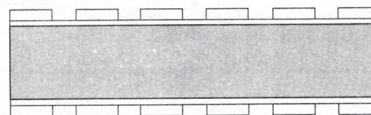
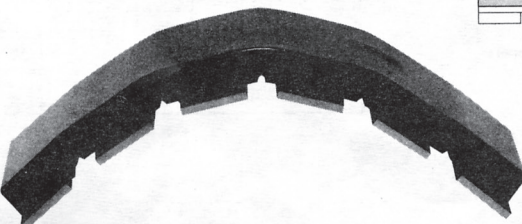
PRECURVED TOW - KNEES



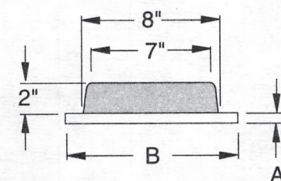
PART NUMBER	R Radius	STEEL * PLATE			APPROX. WT. PER UNIT
		A (Thick- ness)	B (Width)	C (Length)	
DB - 1708	18"	3/4"	10"	28-1/4"	80 lbs.
DB - 1709	18-1/4"	1/2"	10"	28-5/8"	60 lbs.
DB - 1710	18-1/2"	1/4"	10"	29-1/16"	40 lbs.



SEGMENTED TOW - KNEES



PART NUMBER	R Radius	STEEL * PLATE			APPROX. WT. PER UNIT
		A (Thick- ness)	B (Width)	C (Length)	
DB - 1909	VARIABLE	1/2"	10"	35 - 1/2"	53 lbs.

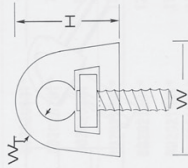


*Aluminum plates available on special request

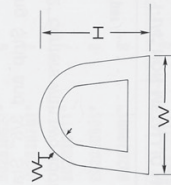


DURAMAX® MARINE, LLC

100 SERIES — "D" SHAPE

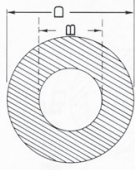


CODE NO.	COLOR	J.R. PART NO.	BASE WIDTH W	HEIGHT H	WALL THKNS. WT	WT./FT.	PRICE/FT.	LENGTH UP TO
DB-50	BLACK	802005001	2 1/8"	2"	7/16"	1.3 LBS.		60 FT.
DB-50 B	GREY	802005002	"	"	"	1.6		"
DB-50C	WHITE	802005003	"	"	"	1.6		"
DB-75	BLACK	802007501	3 1/8"	2 7/8"	11/16"	2.8		60 FT.
DB-75B	GREY	802007502	"	"	"	3.4		"
DB-75C	WHITE	802007503	"	"	"	3.4		"
DB-100	BLACK	802009001	4 1/4"	3 7/8"	3/4"	4.6		60 FT.
DB-100B	GREY	802009002	"	"	"	5.3		"
DB-100C	WHITE	802009003	"	"	"	5.3		"

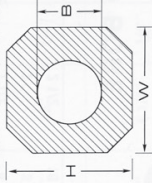


DB-101	BLACK	802010101	4 1/4"	3 7/8"	3/4"	4.6 LBS.		60 FT.
DB-115	BLACK	802011501	4 1/2"	3 3/4"	3/4"	4.7		60'
DB-125	BLACK	802012501*	6 3/4"	6"	1 1/2"	13.6		20'
DB-150	BLACK	802015001*	9 1/2"	8"	1 1/2"	19.5		20'

200 SERIES — CYLINDRICAL BORE



CODE NO.	J.R. PART NO.	OUTSIDE DIAMETER D	BORE B	WT./FT.	PRICE/FT.	LENGTH UP TO
DB-202	802020201	3"	1"	3.2 LBS.		60 FT.
DB-203	802020301	3"	1 1/2"	2.7		60'
DB-205	802020501	5"	2 1/2"	8		30'
DB-206	802020601*	7"	3"	16		20'
DB-207	802020701*	7"	3 1/2"	15.5		20'
DB-208	802020801*	8"	4"	18.2		20'
DB-210	802021001*	10"	5"	32		20'
DB-212	802021201*	12"	6"	46		20'
DB-215	802021501*	15"	7 1/2"	67		20'
DB-218	802021801*	18"	9"	96.7		10'



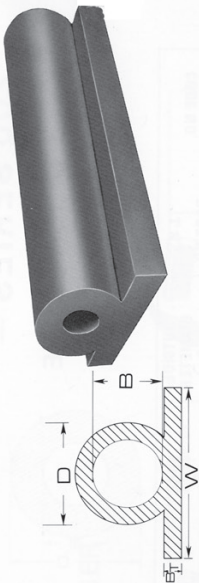
300 SERIES — RECTANGULAR BORE

CODE NO.	J.R. PART NO.	HEIGHT H	WIDTH W	BORE B	WT./FT.	PRICE/FT.	LENGTH UP TO
DB-302	802030201	2"	4"	SOLID	3.9 LBS.		60 FT.
DB-303	802030301	3 1/2"	4 1/2"	1"	8		60'
DB-304	802030401	5"	5"	2 1/2"	9.8		60'
DB-305	802030501	5"	6 1/2"	2 1/2"	13		40'
DB-305A	802030511	5 1/2"	6"	2 1/2"	13.9		40'
DB-306	802030601*	6"	6 1/2"	2 1/2"	17.4		20'
DB-306A	802030611*	6"	6"	2 7/8"	14.6		20'
DB-306B	802030621*	6"	7"	2 1/2"	18		20'
DB-307	802030701*	7"	10"	3"	34.1		20'
DB-307A	802030711*	7"	10"	3 1/2"	30		20'
DB-308	802030801*	8"	8"	3"	28.2		20'
DB-309	802030901*	8"	10"	3"	39.5		20'
DB-309A	802030911*	9"	10"	SOLID	50.7		20'
DB-310	802031001*	10"	10"	4"	42.4		20'
DB-311	802031101*	10"	12"	4"	60		20'
DB-312	802031201*	12"	12"	5"	65		20'
DB-313	802031301*	12"	12"	4"	68.5		20'
DB-314	802031401*	14"	14"	6"	83		20'



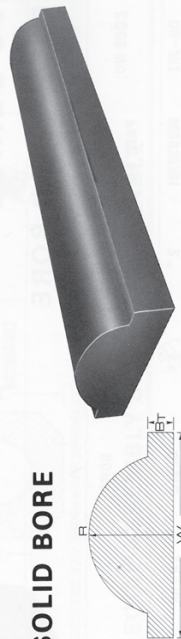
400 SERIES

WING TYPE "O" BORE



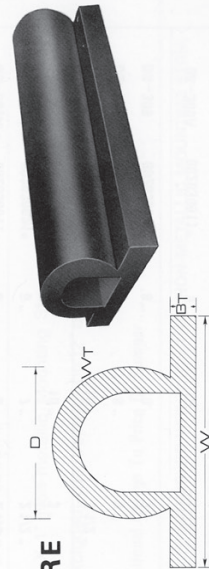
CODE NO.	J. R. PART NO.	BASE WIDTH W	BASE THICKNESS BT	OUTSIDE DIAMETER D	BORE B	WT./FT.	PRICE PER FT.	LENGTH UP TO
DB-404	802040401	4"	1/2"	2 1/2"	1"	3.5 LBS.		60 FT.
DB-405	802040501	5"	1/2"	2 1/2"	1"	4		60'
DB-406	802040601	6"	3/4"	3"	1"	5.3		60'
DB-407	802040701	6 1/2"	1"	4"	2"	7		60'
DB-408	802040801	6 1/2"	1"	4"	1"	8.9		60'
DB-409	802040901	9"	1 1/2"	6"	3"	14.4		20'
DB-410	802041001	9 1/2"	1 1/2"	6"	2"	16.2		20'
DB-412	802041201	12"	2"	8"	4"	27		20'
DB-416	802041601*	16"	2 1/2"	10"	4"	46		20'

WING TYPE SOLID BORE



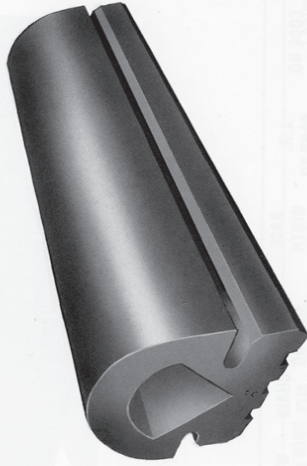
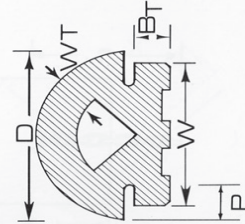
CODE NO.	J. R. PART NO.	BASE WIDTH W	BASE THICKNESS BT	RADIUS R	WT./FT.	PRICE PER FT.	LENGTH UP TO
DB-460	802046001*	10"	1 1/4"	4"	13.6 LBS.		20 FT.

WING TYPE "D" BORE



CODE NO.	J. R. PART NO.	BASE WIDTH W	BASE THICKNESS BT	OUTSIDE DIAMETER D	WALL THICKNESS WT	WT./FT.	PRICE PER FT.	LENGTH UP TO
DB-440	802044001*	9 1/2"	1 1/2"	6"	1"	14.9 LBS.		20 FT.

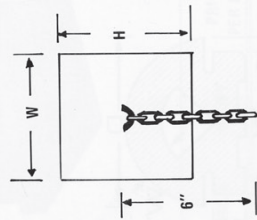
500 SERIES—FAN NOSE



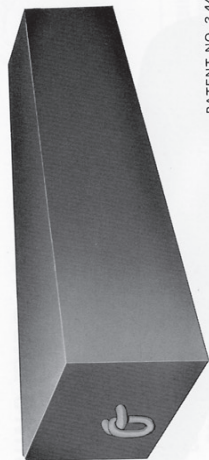
CODE NO.	COLOR	J. R. PART NO.	BASE WIDTH W	BASE THKNS. BT	OUTSIDE DIAMETER D	P	WALL THKNS. WT	WT./FT.	PRICE	LGTH. UP TO
DB-503	BLACK	802050301								
DB-503 *	WHITE	802050303	2 1/2"	17/32"	3"	1/4"	5/8"	2.5 LBS.		60 FT.
DB-503 *	GREY	802050302								
DB-504	BLACK	802050401								
DB-504 *	WHITE	802050403	3 3/4"	25/32"	4 1/4"	1/4"	3/4"	3.2		60'
DB-504 *	GREY	802050402								
DB-506	BLACK	802050601								
DB-506 *	WHITE	802050603	5 7/16"	1"	6"	5/16"	1"	9.0		40'
DB-506 *	GREY	802050602								
DB-508	BLACK	802050801*								
DB-508 *	WHITE	802050803*	7 1/4"	1 3/16"	8"	3/8"	1 1/2"	15.5		20'
DB-508 *	GREY	802050802*								
DB-510	BLACK	802051001*								
DB-510 *	WHITE	802051003*	9 1/4"	1 11/16"	10"	3/8"	1 1/2"	24.8		20'
DB-510 *	GREY	802051002*								
DB-512	BLACK	802051201*								
DB-512 *	WHITE	802051203*	11"	2"	12"	9/16"	2"	28.6		20'
DB-512 *	GREY	802051202*								



600 SERIES — RECTANGULAR CHAIN

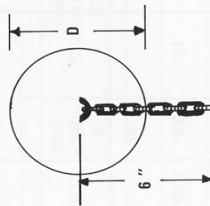


PATENT NO. 3,447,794



CODE NO.	J. R. PART NO.	BASE WIDTH W	CHAIN SIZE H	WT. PER FOOT	PROOF COIL CHAIN LOAD LIMIT	PRICE PER FOOT	ALLOY CHAIN LOAD LIMIT	PRICE PER FOOT
DB-604*	802060401*	5"	5"	14 LBS.	1750 LBS.	4250 LBS.	CONTACT	FACTORY
DB-605	802060501*	6 1/2"	5"	18	1750	4250	FACTORY	
DB-606	802060601*	6 1/2"	6"	22	2450	6600		
DB-608*	802060801*	8"	8"	36	4250	11250		
DB-609	802060901*	10"	8"	46	6375	16500	FOR	
DB-610	802061001*	10"	10"	65	6375	16500		
DB-612	802061201*	12"	12"	85	6375	16500	PRICES	
DB-614	802061401*	14"	14"	110	6375	16500		

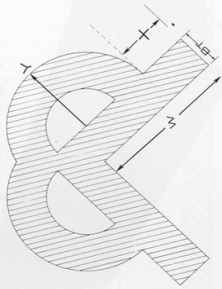
700 SERIES — CYLINDRICAL CHAIN



PATENT NO. 3,447,794

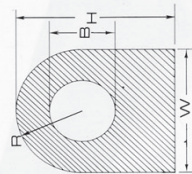
CODE NO.	J. R. PART NO.	OUTSIDE DIAMETER "D"	CHAIN SIZE	APPROX. WT. PER FOOT	PROOF COIL CHAIN LOAD LIMIT	PRICE PER FOOT	ALLOY CHAIN LOAD LIMIT	PRICE PER FOOT
DB-705*	802070501*	5"	5/16"	12 LBS.	1750 LBS.	4250 LBS.	CONTACT	FACTORY
DB-706	802070601*	6"	3/8"	16	2450	6600	FACTORY	
DB-707	802070701*	7"	1/2"	23	4250	11250		
DB-708	802070801*	8"	5/8"	30	6375	16500	FOR	
DB-709*	802070901*	9"	5/8"	37	6375	16500		
DB-710*	802071001*	10"	3/4"	47	9125	23000		
DB-711*	802071101*	11"	3/4"	55	9125	23000	PRICES	
DB-712	802071201*	12"	1"	68	12400	38750		

800 SERIES — CORNER GUARD



CODE NO.	J. R. PART NO.	BASE WIDTH W	BASE THKNS. BT	WING LENGTH X	OUTSIDE DIAMETER Y	WT. / FT.	PRICE PER FT.	LGTHS. UP TO
DB-809	802080901*	5 9/16"	1 1/2"	2"	3"	21 LBS.		10 FT.

900 SERIES — RECTANGULAR "D"




CODE NO.	J. R. PART NO.	BASE WIDTH W	HEIGHT H	BORE B	RADIUS R	WT. / FT.	PRICE PER FT.	LGTHS. UP TO
DB-906	802090601	5"	6"	2 1/2"	2 1/2"	10.9 LBS.		40 FT.
DB-908	802090801*	8"	8"	3"	4"	25		20'
DB-909	802090901*	8"	10"	3"	4"	34		20'
DB-910	802091001*	10"	10"	3"	5"	42		20'
DB-910A	802091011*	10"	10"	4"	5"	39		20'
DB-912	802091201*	12"	12"	4"	6"	66		20'
DB-912A	802091211*	12"	12"	5"	6"	65		20'
DB-914	802091401*	14"	14"	6"	7"	75		20'




90° MOLDED INSERT CORNER


FOR DB-50 BUMPER

DB - 51	BLACK	J. R. PART NO.	802005101		
DB - 52	GREY	" " "	802005202		
DB - 53	WHITE	" " "	802005303		

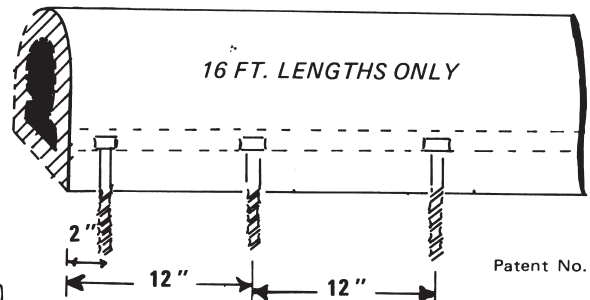
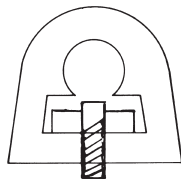
FOR DB-75 BUMPER

DB - 76	BLACK	J. R. PART NO.	802007601		
DB - 77	GREY	" " "	802007702		
DB - 78	WHITE	" " "	802007803		

FOR DB-100 BUMPER

DB - 103	BLACK	J. R. PART NO.	802009301		
DB - 104	GREY	" " "	802009402		
DB - 105	WHITE	" " "	802009503		

SPECIAL ASSEMBLY SERVICE AVAILABLE



Patent No. 3,225,731

DB-60 STRIP BUMPER (SPECIFY COLOR)

DB 50 furnished complete with 3/8" X 1" Non-metallic Mounting Strip and 3/8" Stainless Steel Studs protruding 2-1/2" beyond Base (Nuts Excluded). Studs spaced on 12" centers with two additional Studs added 2" from each end.

J.R. Part No. 802006000

Add Additional Charge To Price Of Bumper

DB-80 STRIP BUMPER

J.R. Part No. 802008000

DB 75 FURNISHED WITH 3/8" x 1-1/4" NON-METALLIC MOUNTING STRIP, 3/8" STAINLESS STUDS.

DB-110 STRIP BUMPER

J.R. Part No. 802009500

DB 100 FURNISHED WITH 3/8" x 1-3/4" NON-METALLIC MOUNTING STRIP, 1/2" STAINLESS STUDS



A NEW GENERATION IN GIANT MARINE FENDERS! IT'S HARD NOT TO BE IMPRESSED WITH JIM BUOY'S NEW LINE OF SUPER GIANT MARINE FENDERS!

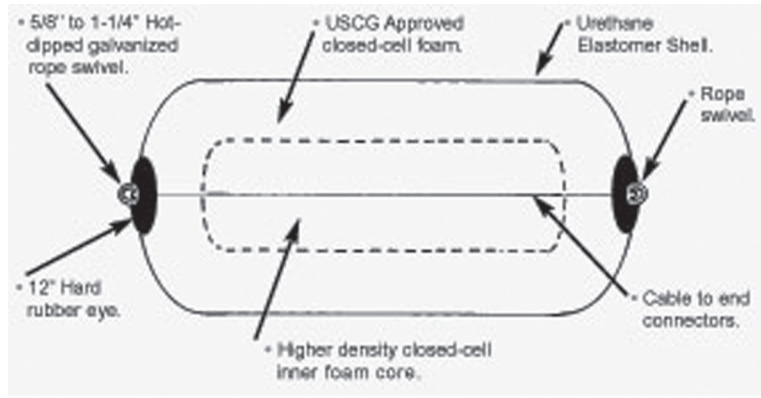
Not an inflatable but a 98% closed-cell inner foam core that will never Blow-out or sink - even bullet holes will not materially affect its function! Often referred to in the industry as the "hull saver", Jim Buoy's unique design is not simply a roll of foam but is a carefully crafted, quality product incorporating the same U.S. Coast Guard Approved foam used in the Jim-Buoy Industrial Life Preservers. The end product is a rugged fender that provides "stop-gap" compression when hard hit time after time; not only protecting the ship from damage but the dock and *even the fender itself!*



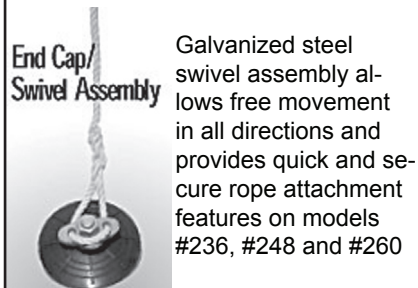
Giant Marine Fenders

HIGHLY RESISTANT TO ABRASIONS AND PUNCTURES.

Encased in an outer covering of "Elastomic Skin" (up to 5/16" thick material, some reinforced with nylon mesh) plus a urethane skin base, the Jim Buoy Giant Marine Fenders are extremely resilient and able to flex with the rigors of high energy berthing over and over again, providing the user with extended service under all conditions. All Models may be mounted vertically or float horizontally. Models up to 24" diameter feature a 1" thru-hole that provides easy access for tethering while the larger models are furnished with a specially designed "end cap" that incorporates a 5/8" or 1-1/4" shaft and galvanized steel rope swivel for maximum strength at this critical area of stress (*see illustration below*).



The diagram at left clearly shows the many advanced design features found in Jim Buoy's new Giant Marine Fenders - *proven features gained from Jim Buoy's many years of experience in the manufacture of high quality marine products!*



Installation Tips - Fenders vertically when coming along side another ship or dock allowing the line from the lower end of the Fender to be free. After the ship's lines are secure, pull the Fender to a horizontal position. Use additional Fenders during rough weather.

Repair Service - If your fender is damaged by misuse or eventual "wear and tear", repair kits are available from Jim Buoy. Arrangements may also be made for Jim Buoy to recondition them to near-new condition and return to owner as needed - please inquire for complete details.

SPECIFICATIONS							
Model #	Dia.	Lth.	Thru-hole size material	Rec. vessel size	Stand-Off distance	colors	Ship Wt.
214	14"	44"	1" PVC	-	8"	Wht., Org, Blk	21 lbs
218	18"	50"	1" PVC	-	12"	Wht., Org, Blk	31 lbs.
224	24"	53"	1" PVC	-	14"	Wht., Org, Blk	50 lbs
236	36"	60"	5/8" gal. shaft w/swivel 1-1/4" gal.	500-700 tons	24"	White/Black	150 lbs
248	48"	96"	5/8" gal. shaft w/swivel 1-1/4" gal.	2500 tons	30"	White/Black	230 lbs
260	60"	96"	5/8" gal. shaft w/swivel	5000 tons	36"	White/Black	320 lbs

Marine Guard™ Foam-Filled Marine Fenders

These foam-filled marine fenders are on the leading edge of fendering technology and innovation. They utilize state-of-the-art materials and processes, which are unsurpassed in the industry.

Today's vessels demand the absolute best protection for berthing operations. This Product is entrusted more and more each day to guard marine investments worldwide with our 'made-to-fit' foam-filled fendering systems.

CONSTRUCTION FEATURES

Marine Guard™ Fenders' Skin

The Marine Guard™ fender's protective coating is composed of a nylon filament reinforced polyurethane skin. This thick, durable and resilient coating is exclusively engineered and manufactured.

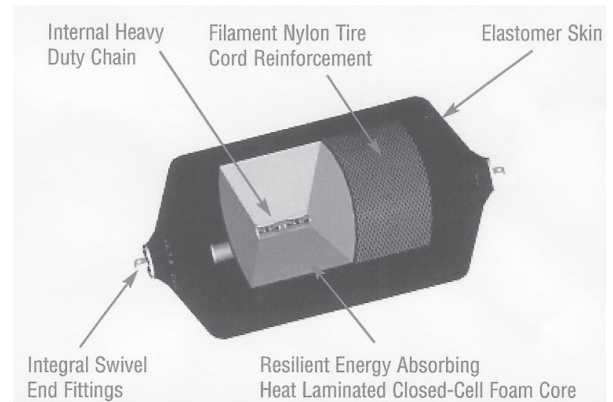
Our proprietary formulation, the most advanced in the industry, offers the best resistance to salt water, UV and Ozone degradation, while offering the utmost in strength and resiliency.

The tensile and tear strengths, as well as hydrolytic stability, of our polyurethane elastomer surpasses that of similar urethane products and is far superior to that of the rubber composition found in pneumatic and buckling fenders.

Foam Core

The foam core is constructed entirely of 100% closed-cell foam. The foam core is the energy absorbing part of the fender and yields much less reaction force than pneumatic and buckling type fenders.

Unlike pneumatic fenders, Marine Guard™ and Marine Cushion™ foam-filled fenders cannot experience catastrophic failure if the skin is punctured.



Anger
Never go to bed mad. Stay up and fight.
Phyllis Diller

The greatest remedy for anger is delay
Seneca

Anger is a stone cast into a wasp's nest.
Malabar proverb

Animals
To his dog, every man is Napoleon;
hence the constant popularity of dogs.
Aldous Huxley

Swivel End Fittings

Marine Guard's™ integral swivel end fittings are constructed of the highest quality stainless steel or hot-dipped galvanized steel. The swivel end fittings are designed to provide a point of attachment while not impeding in the functionality of the fender. Lateral and longitudinal compressions are not affected by the swivel end fittings or their internal housings and the swivels will continue to function even while the fender is fully compressed.

Internal Chain

The end fittings of Marine Guard™ foam-filled fenders are internally connected with a heavyduty, stud-link chain.

This feature provides superior pull through strength, increased tensile strength and a distribution of energies and stresses. Since a pneumatic fender does not have this feature, it does not offer the same pull through strength as a Marine Guard™ fender.



APPLICATIONS



Versatile & Easy Installation

The Marine Guard™ foam-filled fender design allows easy installation in a variety of ways, either fixed (horizontally or vertically) or floating.

In general, there are three ways of attaching a Marine Guard™ foam-filled fender.

- 1) A fixed fender: Using double chain attachments, the fender is held permanently in a fixed position. The fender may be mounted horizontally or vertically in this manner.
- 2) As a fixed/floating fender: Attached with fixed mounting chains, allowing the fender to rise and lower with small tidal fluctuations.
- 3) A floating fender: Using a sliding sleeve or ring around steel piles, allowing the fender to float freely where extreme tidal fluctuations occur.



A floating fender with sliding sleeve and chain attachments.



A fixed fender with double chain



**attachments
A floating fender with fixed chain attachments**

PERFORMANCE FEATURES

High Energy Absorbing

Marine Guard™ foam-filled fenders have both a high-energy absorption and low reaction force. They absorb up to 40% more energy than equally sized pneumatic fenders.

Marine Guard™ foam-filled fenders are fully functional even if the skin is punctured

Low Reaction Force

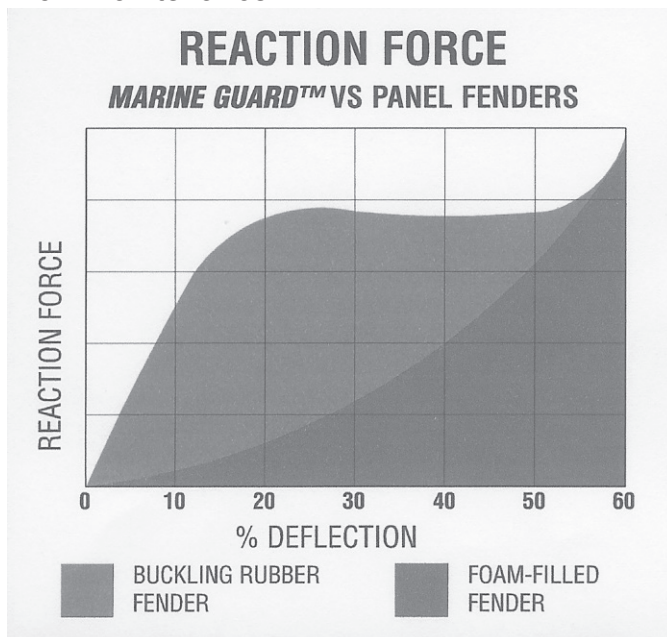
Marine Guard™ foam-filled fenders are designed and constructed to absorb energy at a higher rate and experience a substantially lower reaction force than pneumatic or buckling fenders.

As depicted in the graph below, buckling rubber fenders (graphed in red) reach nearly 80% of its reaction force within the first 25% of compression. Marine Guard™ foam-filled fenders have a gradual, sloping reaction force curve (graphed in blue) and experience less than 20% reaction force at the same 25% compression.

Typically, fenders do not experience the total rated energy absorption during normal docking procedures meaning less fender compression. This equates to 80% the reaction force of the vessel's hull pressure will be experienced almost every time it docks wherever buckling style fenders are used.

Buckling style fenders will have a greater negative impact on docks, piers, wharves and vessels. A cost analysis would show reduced maintenance expenditures over time. Marine Guard™ foam-filled

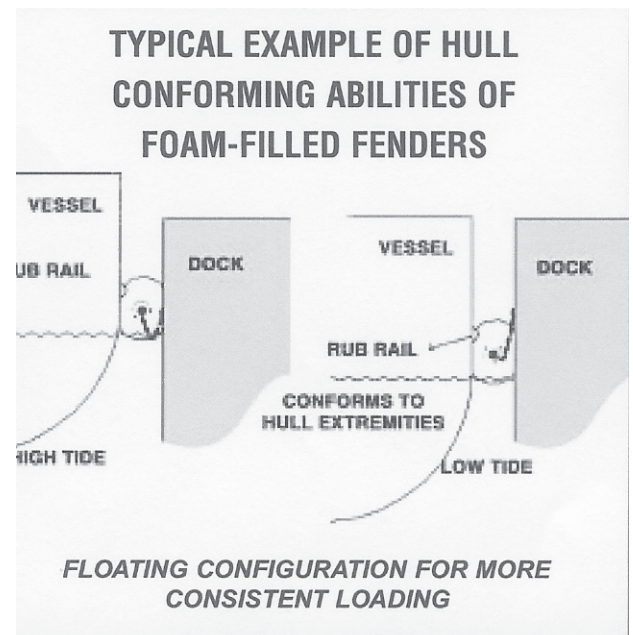
Low Maintenance



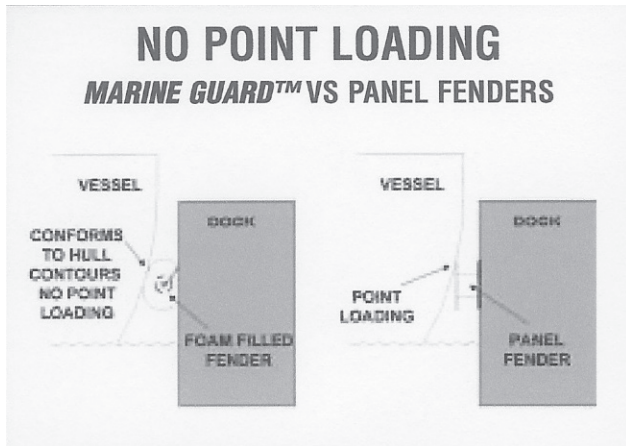
Unlike pneumatic fenders, there are no air pressure relief or inflation valves to maintain. Just install the fenders and expect many years of hassle free, dependable service.

Unsinkable

Marine Guard™ foam-filled fenders are constructed of closedcell foam, making them virtually unsinkable. This design will not explode or sink and it retains its energy absorbing and standoff capabilities even if the skin has been damaged fenders are the best protection for your investment!

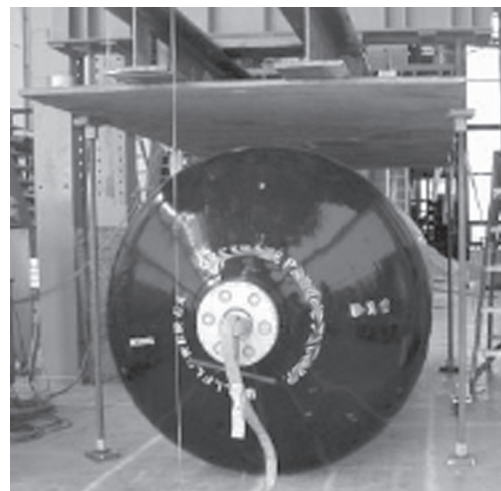
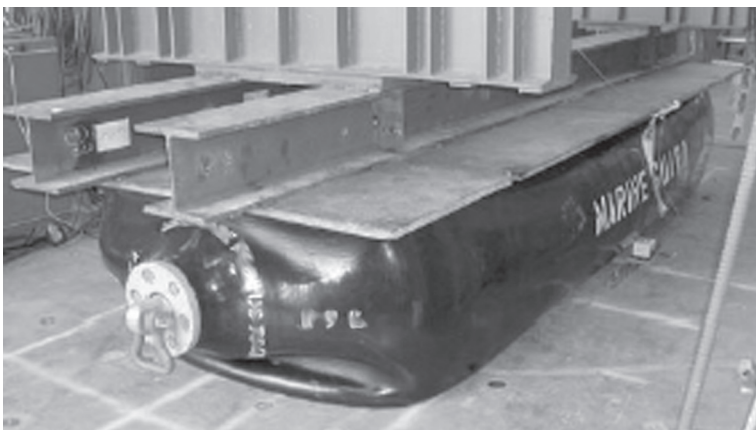


Laboratory Tested



Laboratory Tested

Marine Guard™ fenders are tested for quality and performance by independent testing laboratories. Our stringent quality control programs ensure our customers receive a fender of the highest quality, reliability and performance. These programs meet all requirements of the U.S. Military Quality Assurance Specification MIL-I-45208.



FENDER TEST AT 60% COMPRESSION
 Performed at University of California
 San Diego
 CLP Structural Research Laboratories

MARINE GUARD FOAM FILLED FENDERS PERFORMANCE DATA

FENDERS		STANDARD CAPACITY				HIGH CAPACITY				EXTRA HIGH CAPACITY				SUPER HIGH CAPACITY			
SIZE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
ENGLISH	METRIC																
ft x ft	m x m	ft - kips	ton-m	kips	ton	ft - kips	ton-m	kips	ton	ft - kips	ton-m	kips	ton	ft - kips	ton-m	kips	ton
2 x 4	0.6 x 1.2	11	2	20	9	14	2	26	12	21	3	38	17	29	4	52	24
2 x 6	0.6 x 1.8	18	3	33	15	23	3	43	20	34	5	63	29	47	7	86	39
2 x 8	0.6 x 2.4	25	4	47	21	33	5	61	28	48	7	89	40	65	9	122	55
2 x 10	0.6 x 3.0	32	4	60	27	42	6	78	35	61	8	114	52	83	11	156	71
3 x 5	0.9 x 1.5	31	4	45	20	40	6	59	27	59	8	86	39	81	11	117	53
3 x 6	0.9 x 1.8	39	5	48	22	51	7	62	28	74	10	91	41	101	14	125	57
3 x 8	0.9 x 2.4	55	8	68	31	72	10	88	40	105	15	129	59	143	20	177	80
3 x 10	0.9 x 3.0	71	10	88	40	92	13	114	52	135	19	167	76	185	26	229	104
3 x 12	0.9 x 3.7	87	12	108	49	113	16	140	64	165	23	205	93	226	31	281	127
3 x 14	0.9 x 4.3	103	14	128	58	134	19	166	75	196	27	243	110	268	37	333	151
4 x 6	1.2 x 1.8	60	8	56	26	78	11	73	33	114	16	106	48	156	22	146	66
4 x 8	1.2 x 2.4	89	12	83	38	116	16	108	49	169	23	158	72	231	32	216	98
4 x 10	1.2 x 3.0	118	16	111	50	153	21	144	65	224	31	211	96	307	42	289	131
4 x 12	1.2 x 3.7	146	20	136	62	190	26	177	80	277	38	258	117	380	53	354	161
4 x 16	1.2 x 4.9	203	28	189	86	264	37	246	112	386	53	359	163	528	73	491	223
4 x 20	1.2 x 6.1	260	36	242	110	338	47	315	143	494	68	460	209	676	93	629	285
5 x 8	1.5 x 2.4	135	18	100	45	176	24	130	59	257	36	190	86	351	49	260	118
5 x 10	1.5 x 3.0	180	25	134	61	234	32	174	79	342	47	255	116	468	65	348	158
5 x 12	1.5 x 3.7	225	31	167	75	293	41	217	98	428	59	317	144	585	81	434	197
5 x 14	1.5 x 4.3	269	37	200	91	350	48	260	118	511	71	380	172	699	97	520	236
5 x 16	1.5 x 4.9	313	43	233	106	407	56	303	137	595	82	443	201	814	113	606	275
5 x 18	1.5 x 5.5	357	49	266	121	464	64	346	157	678	94	505	229	928	128	692	314
6 x 12	1.8 x 3.7	300	41	186	84	390	54	242	110	570	79	353	160	780	108	484	220
6 x 14	1.8 x 4.3	364	50	225	102	473	65	293	133	692	96	428	194	946	131	585	265
6 x 16	1.8 x 4.9	427	59	265	120	555	77	345	156	811	112	504	229	1,110	154	689	313
6 x 18	1.8 x 5.5	491	68	305	138	638	88	397	180	933	129	580	263	1,277	177	793	360
6 x 20	1.8 x 6.1	554	77	344	156	720	100	447	203	1,053	146	654	297	1,440	199	894	406
7 x 14	2.1 x 4.3	487	67	259	117	633	88	337	153	925	128	492	223	1,266	175	673	305
7 x 16	2.1 x 4.9	574	79	305	138	746	103	397	180	1,091	151	580	263	1,492	206	793	360
7 x 18	2.1 x 5.5	660	91	351	159	858	119	456	207	1,254	173	667	303	1,716	237	913	414
7 x 20	2.1 x 6.1	747	103	397	180	971	134	516	234	1,419	196	754	342	1,942	269	1,032	468
7 x 22	2.1 x 6.7	833	115	443	201	1,083	150	576	261	1,583	219	842	382	2,166	300	1,152	523
8 x 14	2.4 x 4.3	619	85	288	130	805	111	374	170	1,176	163	547	248	1,609	223	749	340
8 x 16	2.4 x 4.9	733	101	341	155	953	132	443	201	1,393	193	648	294	1,906	264	887	402
8 x 18	2.4 x 5.5	847	117	394	179	1,101	152	512	232	1,609	223	749	340	2,202	305	1,024	464
8 x 20	2.4 x 6.1	961	133	447	203	1,249	173	581	264	1,826	253	849	385	2,499	346	1,162	527
8 x 22	2.4 x 6.7	1,075	149	500	227	1,398	193	650	295	2,043	283	950	431	2,795	387	1,300	590
9 x 16	2.7 x 4.9	890	123	368	167	1,157	160	478	217	1,691	234	699	317	2,314	320	957	434
9 x 18	2.7 x 5.5	1,032	143	427	194	1,342	186	555	252	1,961	271	811	368	2,683	371	1,110	503
9 x 20	2.7 x 6.1	1,175	163	486	220	1,528	211	632	287	2,233	309	923	419	3,055	423	1,264	573
9 x 22	2.7 x 6.7	1,318	182	545	247	1,713	237	709	322	2,504	346	1,036	470	3,427	474	1,417	643
10 x 16	3.0 x 4.9	1,081	150	402	182	1,405	194	523	237	2,054	284	764	347	2,811	389	1,045	474
10 x 18	3.0 x 5.5	1,258	174	468	212	1,635	226	608	276	2,390	331	889	403	3,271	452	1,217	552
10 x 20	3.0 x 6.1	1,435	198	534	242	1,866	258	694	315	2,727	377	1,015	460	3,731	516	1,388	630
10 x 22	3.0 x 6.7	1,612	223	600	272	2,096	290	780	354	3,063	424	1,140	517	4,191	580	1,560	708
10 x 24	3.0 x 7.3	1,811	250	674	306	2,286	316	850	386	3,341	462	1,244	564	4,572	632	1,702	772
11 x 18	3.4 x 5.5	1,482	219	501	265	1,927	267	651	295	2,816	389	952	432	3,853	533	1,303	591
11 x 20	3.4 x 6.1	1,696	241	573	279	2,141	296	745	338	3,223	446	1,090	494	4,410	610	1,491	676
11 x 22	3.4 x 6.7	1,910	264	646	293	2,483	343	840	381	3,629	502	1,227	557	4,966	687	1,680	762
12 x 24	3.7 x 7.3	2,595	358	850	385	3,374	467	1,105	501	4,931	682	1,615	733	6,747	933	2,210	1,002
13 x 26	4.0 x 7.9	3,240	448	985	447	4,212	583	1,281	581	6,156	851	1,872	849	8,424	1,165	2,561	1,162
14 x 28	4.3 x 8.5	4,000	553	1,130	513	5,200	719	1,469	665	7,600	1,051	2,147	974	10,400	1,438	2,938	1,333

*ACTUAL VALUES MAY VARY PLUS OR MINUS 15% DUE TO VARIATIONS IN MATERIALS, TEMPERATURES, TOLERANCES AND SPEED OF COMPRESSION

Marine Cushion™

Foam-Filled Marine Fenders

Marine Cushion™ foam-filled fenders are constructed with the same quality materials and technology as our Marine Guard™ foam-filled fenders. Their proven reliability provides superior and dependable protection to out perform other types of fenders in the toughest marine environments.

Marine Cushion™ External Chain & Tire Net

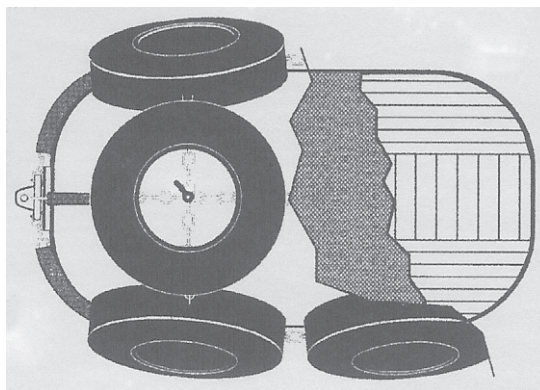
The fender's chain & tire nets are constructed with only the toughest materials. Aircraft tires are used exclusively in the net construction along with heavy-duty chains and mounting hardware. All metal pieces are hot-dipped galvanized for excellent corrosion resistance and every chain intersection is secured with a shackle. Heavy-duty rubber tubing is used over the exposed lengths of chain to guard against abrasion.

Marine Cushion™ Fenders Skin

Like Marine Guard™ fenders, the Marine Cushion™ skin is made of a tough polyurethane coating. Nylon tire cord is also continually wound around the fender as the coating is applied, embedding the filament into the skin.

Marine Cushion™ Foam Core

The internal foam core is constructed of a 100% closedcell, resilient, energy absorbing foam. Heat lamination of the foam makes the core a single solid piece of foam with the laminated bond, between layers of foam, being stronger than the foam itself. No adhesives are ever used in the fabrication process, which will degrade over time and yield an inferior product.



Marine Cushion's™ external chain & tire net surrounding the fender produces superior longitudinal strength and abrasion protection. By transferring tensile loads to the external net through the end fittings, stress on the fender is minimized. Like Marine Guard™ fenders, the Marine Cushion™ foam-filled fenders have high energy absorption and low reaction force characteristics, making the choice simple when berthing operations are being considered. We take the headache out of deciding which fender to choose by making the best fender available.



STANDARD CAPACITY MARINE CUSHION FOAM FILLED FENDERS

ENGLISH SIZES

FENDERS		STANDARD CAPACITY			
SIZE		ENERGY ABSORPTION @ 60% COMPRESSION		REACTION FORCE @ 60% COMPRESSION	
ENGLISH	METRIC				
ft x ft	m x m	ft - kips	ton-m	kips	ton
3 x 6	0.92 x 1.83	36	5	56	25.4
4 x 8	1.22 x 2.44	85	12	98	44
5 x 10	1.53 x 3.05	165	23	152	68
5 x 16	1.53 x 4.88	262	36	243	110
6 x 12	1.83 x 3.66	282	39	217	98.4
7 x 14	2.13 x 4.27	445	62	294	133
8 x 12	2.44 x 3.66	465	64	268	121
8 x 16	2.44 x 4.88	661	91	381	173
9 x 14	2.75 x 4.27	729	101	373	169
9 x 18	2.75 x 5.49	937	130	480	218
10 x 16	3.05 x 4.88	976	135	450	204
10 x 20	3.05 x 6.10	1,280	177	590	267
11 x 18	3.35 x 5.49	1,389	192	581	263
11 x 22	3.35 x 6.71	1,697	235	711	322
12 x 24	3.70 x 7.30	2,196	304	844	383
13 x 26	3.96 x 7.90	2,784	385	987	447
14 x 28	4.27 x 8.53	3,379	467	1,128	511

METRIC SIZES

FENDERS		STANDARD CAPACITY			
SIZE		ENERGY ABSORPTION @ 60% COMPRESSION		REACTION FORCE @ 60% COMPRESSION	
METRIC	ENGLISH				
m x m	ft x ft	ft - kips	ton-m	kips	ton
1.00 x 1.50	3.3 x 4.9	33	5	47	21
1.00 x 2.00	3.3 x 6.6	48	7	67	30
1.20 x 2.00	3.9 x 6.6	64	9	76	34
1.35 x 2.50	4.4 x 8.2	103	14	109	49
1.50 x 3.00	4.9 x 9.8	155	21	146	66
1.70 x 3.00	5.6 x 9.8	196	27	162	73
2.00 x 3.50	6.6 x 11.5	317	44	222	101
2.00 x 4.00	6.6 x 13.1	371	51	259	117
2.20 x 4.50	7.2 x 14.8	500	69	321	146
2.50 x 4.00	8.2 x 13.1	541	75	305	138
2.50 x 5.50	8.2 x 18.0	794	110	447	203
3.00 x 6.00	9.8 x 19.7	1,213	168	571	259
3.30 x 4.50	10.8 x 14.8	1,007	139	430	195
3.30 x 6.50	10.8 x 21.3	1,581	219	675	306
3.30 x 10.6	10.8 x 34.8	2,774	384	1,184	537
4.20 x 8.40	13.8 x 27.6	3,322	459	1,109	503

Above information is for our Standard Capacity Marine Cushion foam filled marine fenders. Actual values for all sizes may vary plus or minus 15% from stated values due to variations in material properties, temperature, dimensional tolerance and speed of compression. Marine Cushion foam filled marine fenders are also available in Low Reaction, High, Extra High and Super High Capacity models.

OTHER TOUGH QUALITY PRODUCTS



Floating Monopile Donut Fenders



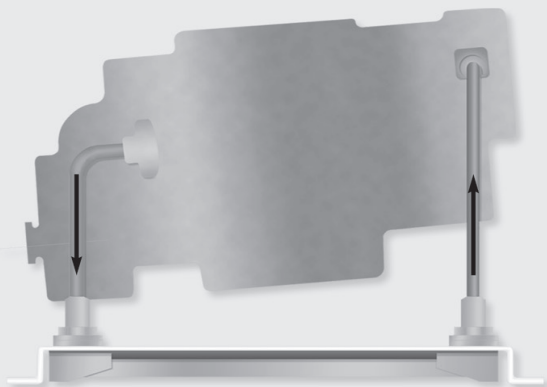
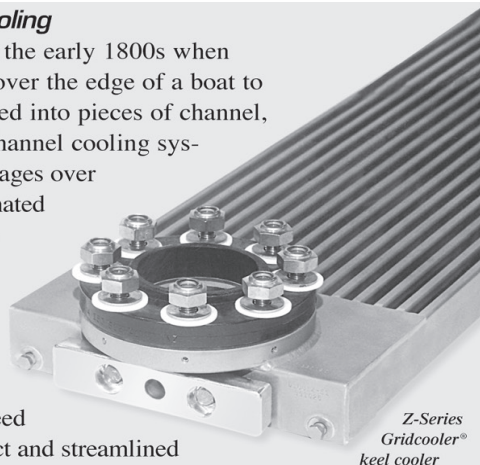
Pile Coatings



Resilient Buoys and Floats

A Brief History of Keel Cooling

Keel cooling first appeared in the early 1800s when someone hung a copper tube over the edge of a boat to condense steam. It later evolved into pieces of channel, welded onto the hull. These channel cooling systems offered important advantages over raw water cooling. They eliminated silt and sand buildup in engine jackets and protected engines against salt water corrosion. Unfortunately, their sheer bulk reduced a ship's capacity and increased its drag. They were also prone to seaweed foulup. Clearly, a more compact and streamlined cooler was needed. This led to packaged keel coolers and the R.W. FERNSTRUM success story.



Engine jacket water is piped directly to the Fernstrum GRIDCOOLER® keel cooler, which cools the water and then sends it back to the engine. The GRIDCOOLER® keel cooler is in constant contact with the sea water for transfer of heat.



Engineered Keel Cooling

When you choose a Fernstrum GRIDCOOLER® keel cooler, you're getting more than well-built hardware. You're getting the most cost-effective, dependable form of keel cooling available — backed by decades of experience. We're proud of our reputation, and we work hard to keep it.

To ensure that you get precisely what you need, we begin by asking a lot of questions. We'll need to know your engine make and model number, horsepower and rpm rating, heat rejection, freshwater flow rate, and the temperature requirements of the water entering and leaving the cooler. If you don't have all this information, we'll get it for you — we maintain



Ongoing product research and development studies ensure continual improvement in efficiency, durability and quality.

current files on all major marine engine manufacturers. We'll also need your vessel's hull design, its maximum speed at full rated power, and the maximum water temperature in which it will operate. With this data, we can determine exactly what size GRIDCOOLER® keel coolers your vessel will need — under its most severe operating conditions.

Quality and Testing Methods

- Only the finest quality materials are used in manufacturing a Fernstrum GRIDCOOLER® keel cooler. Much of the materials used have metallurgical specifications proprietary to Fernstrum, based on decades of manufacturing experience - enhancing the durability and performance of the product.
- Quality control begins as soon as material is received. All material is 100 percent inspected. No random sampling methods are used. After inspection, raw material is assigned lot numbers for traceability throughout the manufacturing process.
- For customer protection, each unit is assigned its own serial number and inspection sheet. The inspection sheet tracks material lot numbers and the results of all testing throughout production. Additionally, employee identification is recorded for each step through the production process.
- Experienced craftsmen use only the-finest silver brazing alloys. Less expensive materials do not meet Fernstrum's high quality standards.
- Multiple quality assurance checks are made throughout the production process - including two separate underwater air tests to assure the integrity of brazed or welded joints.
- Cleanup by sandblasting is done in a specially constructed semiautomatic blasting cabinet.
- Ultrasonic testing is used to check the brazed joints of each unit to assure that every GRIDCOOLER® keel cooler is of superior strength. Each unit is checked for dimensional accuracy, square and straightness.
- On successful completion of all quality checks, each unit receives its own Quality Assurance tag - your assurance of excellence!
- Each unit is carefully boxed in a triple-corrugated, weather resistant fiberboard. Special wood crating is available for long-term storage upon request.
- Each GRIDCOOLER® keel cooler is shipped with all the gaskets, washers and nuts necessary for installation, as well as with installation suggestions.



Custom Configurations

The **Fernstrum GRIDCOOLER®** is available in standard as well as many custom configurations to accommodate installation and maintenance concerns. Custom designs are a Fernstrum specialty and are limited only by imagination. We are happy to discuss your application and assist in designing or determining a custom configuration that adds value to your cooling system. Some of the more common configurations are listed.

E-SERIES® GRIDCOOLER® keel coolers have zinc anodes mounted at the ends of the units. This modification is available upon request at no additional charge and works well for fishing vessels where entanglement of nets is a concern.

EXTENDED NOZZLES may be ordered for vessels with thick hulls.

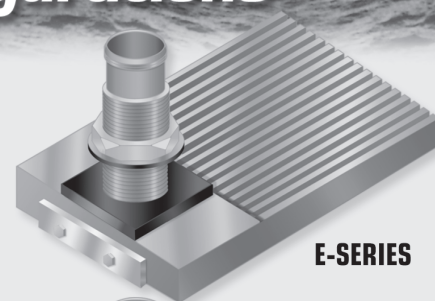
L-SERIES® GRIDCOOLER® keel coolers (shown here in multi-pass configuration) with extended support plates reduce the number of hull penetrations needed for installation.

F-SERIES® GRIDCOOLER® keel coolers have flange connections and may eliminate the need for cofferdams.

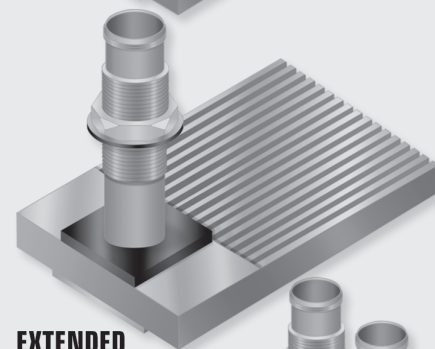
Z-SERIES® GRIDCOOLER® keel coolers have lower profile flange connections with all mounting hardware and mating flanges included. Custom insulators provide isolation from the hull, if necessary. L-Series support plates are included as standard in this configuration. This patent-pending design eases installation on double hulled vessels and may eliminate the need for cofferdams.

MATERIALS — Fernstrum **GRIDCOOLER®** keel coolers are available in either 90/10 copper-nickel or marine grade aluminum rectangular tubing. Copper/nickel units have natural anti-foulant properties. The tubing is very ductile, so it can be slightly bent or twisted to conform to the ship's hull. Aluminum units are made of alloys that are compatible with vessels having aluminum hulls.

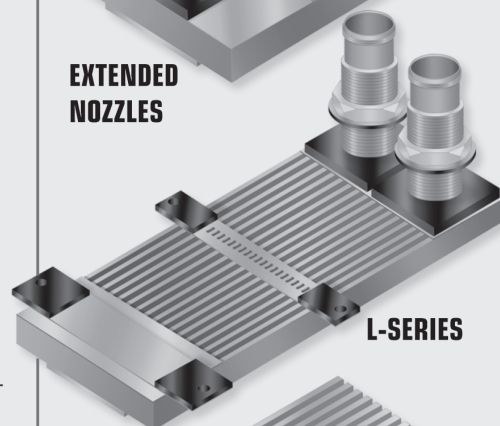
COMPRESSION SEALING HARDWARE is available upon request to help assure a leak-free seal at the nozzles and is recommended for customers utilizing cofferdams in their installation.



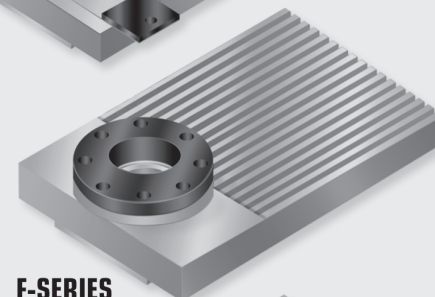
E-SERIES



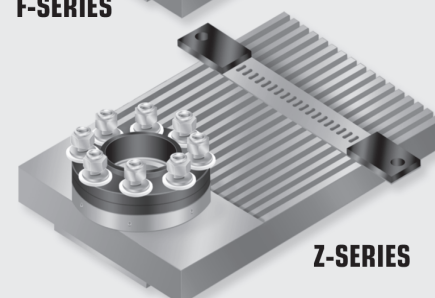
EXTENDED NOZZLES



L-SERIES



F-SERIES



Z-SERIES

Boudreaux meets a man on his Hawaiian vacation.

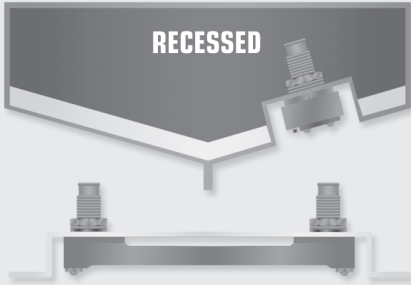
Boudreaux goes to Hawaii on vacation.

Down at de pool, a man sits down next to Boudreaux. Boudreaux says. "Hey, how you doing? My name is Boudreaux and I'm here on vacation. My house caught eetself on fire. I got a leettle extra from de insurance company. Dat's how I came here on dis vacation." "Well that's interesting," responded the man "I'm here from California. My house flooded. I used the extra insurance money for this vacation."

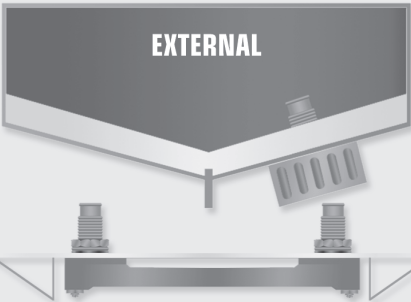
"Mais dats good," said Boudreaux "but let me axe you one ting. How de heck did you start de flood?"

Common Installations

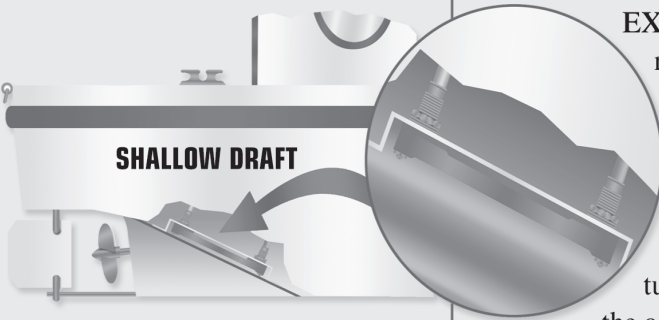
RECESSED



EXTERNAL



SHALLOW DRAFT



SIDE MOUNTED



The **Fernstrum GRIDCOOLER®** keel cooler can be mounted almost anywhere on a ship's hull, giving the flexibility to match the installation to the hull design and operating conditions of any boat. For example; on shallow draft river work boats, the GRIDCOOLER® unit may be mounted on the side of the hull or beside the skeg. On towboats, the GRIDCOOLER® unit may be installed near the propeller to take advantage of its slipstream during heavy towing. On fast moving vessels, the unit is normally recessed along side the keel. See the Fernstrum GRIDCOOLER® keel cooler installation guide for more information.

RECESSED — Recessing a GRIDCOOLER® keel cooler streamlines the installation and greatly increases protection from damage. Independent tests conducted at the Vienna Model Test Basin have shown that drag is negligible when GRIDCOOLER® keel coolers are recessed into a ship's hull. If possible, the ends of the recess should be flared to allow a free flow of water over the entire cooler.

EXTERNAL — If the GRIDCOOLER® keel cooler can't be recessed, fairing blocks and side plates may be used for protection and streamlining.

SHALLOW DRAFT — Because of their compact size, Fernstrum GRIDCOOLER® keel coolers may be mounted along the keel or skeg, or even in the rake or tunnel of shallow draft river boats. This takes advantage of the additional water current created by the propeller.

SIDE MOUNTED — GRIDCOOLER® keel coolers may be side mounted to avoid damage due to running aground or if there isn't room for a bottom mount to the hull.



Aspiration

Make no little plans; they have no magic to stir men's blood. Make big plans, aim high in hope and work. Daniel H. Burnham

Aspirin

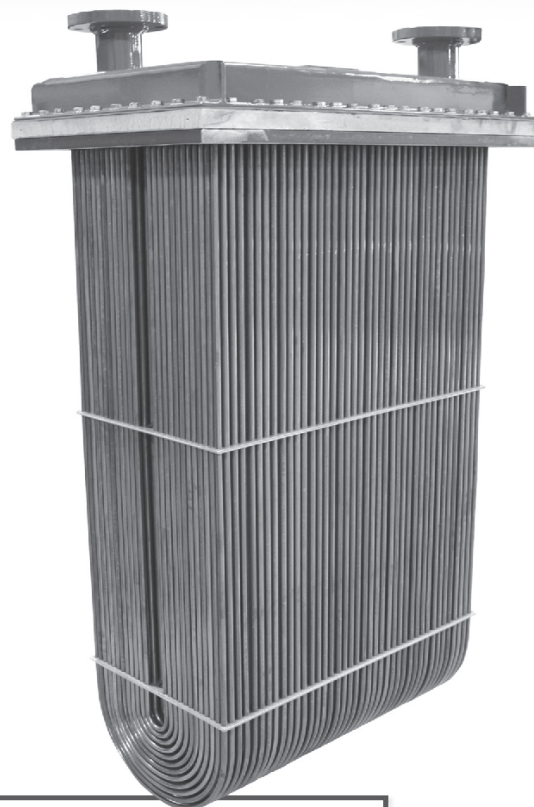
They now have a pill that's half aspirin and half glue. It's for people who get splitting headaches.



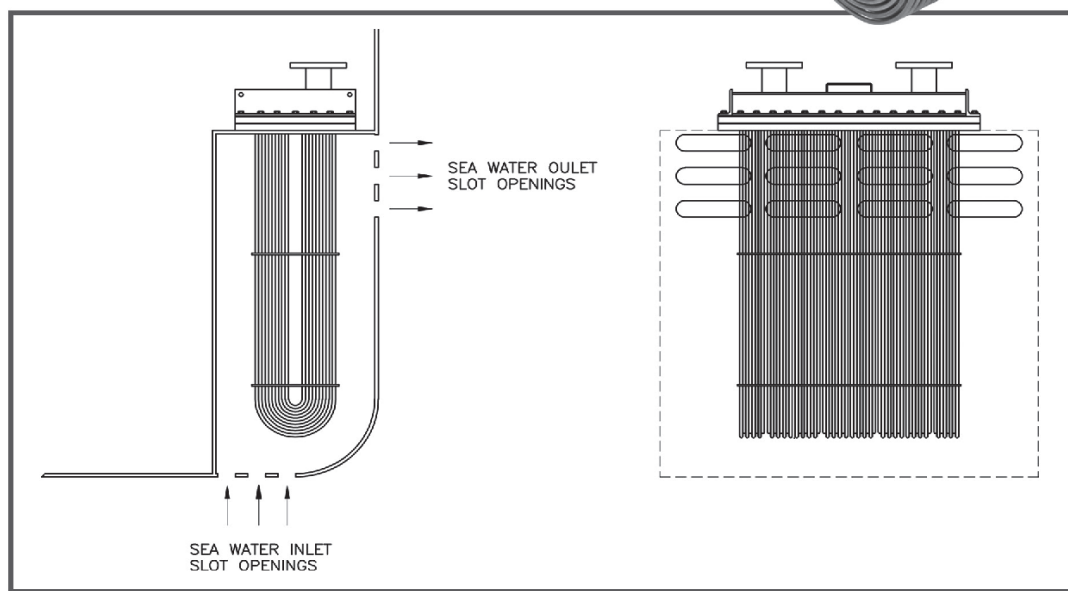
The Weka - FERNSTRUM Boxcoolers are a compact heat exchanger that is mounted in a sea chest within the confines of the ship's hull. This mounting configuration offers excellent protection from submerged obstacles, and also allows flexibility in sizing. Openings in the side and bottom of the sea chest allow heat to be exchanged to the seawater, through convection. This eliminates the need for a raw water pump and strainers, typical of an inboard heat exchanger.

It is important to note that the Weka - FERNSTRUM Boxcooler units are constructed of a 90-10 Copper Nickel, this provides a boxcooler with inherent Anti-Foulant capability. This eliminates the need for expensive Impressed Current Anti-Fouling (ICAF) systems with heavy consumable copper anodes that are supplied with coated boxcoolers. Not only are the ICAF systems expensive to install, they can be difficult to maintain due to their location in the enclosed sea chest underneath the coated boxcooler unit.

Exclusive to the Weka - FERNSTRUM Copper Nickel Boxcooler units are the Weka Protector Type T[®] and the Weka Guard. This equipment helps to minimize potential damage to the boxcooler by means of stray electrical currents and keeps the surface of the tubes free from corrosion. By doing this, the copper nickel boxcooler maintains its inherent anti-fouling capabilities and the tubes are protected from marine growth.



Installation Example



The three great philosophical questions that all philosophers concern themselves with are these:

Where did I come from (the question of origin)?

Why am I here (the question of purpose)?

Where am I going (the question of destiny)?

Origins

One of the many problems with evolutionary thought is this: How did nonliving chemicals manage to organize themselves so as to spring to life? Many believe that life began with a very simple life-form and gradually developed into more complex life forms. The truth is, there is no such thing as a "simple" life-form. Even the most simplistic living organisms are very complex. Let's consider a hypothetical simple cell, so simple that none like I'm going to describe actually exist in our world. Our hypothetical simple cell would need a vast number of internal parts- at least 239 protein molecules, each containing 445 amino acids, all of which are made up of 10 to 20 atoms. Of the hundreds of different amino acids, only 20 are used in proteins, and they cannot simply float around randomly. All 445 of them must be lined up single file, in perfect sequential order, for the protein to function. For a single cell to spring to life, 445 amino acids would have to accidentally line up perfectly, not once, but 239 times to form 239 proteins to spontaneously become a living cell. All things considered, a single cell contains as much data as all the individual letters in the world's largest library- that's about a trillion bits of information. So much for the "simple" single cell.

Let's assume no supernatural designer was needed for this elaborate process of spontaneous generation. Let's crunch the numbers and apply the laws of probability to the spontaneous generation of a single living cell through this illustration. Suppose you number ten pennies from one to ten and place all ten of them in your pocket. When you reach into your pocket and randomly select a penny, the odds of picking a specific penny are 1 in 10. But the odds of pulling the pennies out in sequential order, replacing each penny after it is selected, are 1 in 10 billion. That means you could try to randomly select ten pennies in proper sequence 10 billion times before getting it right. That could take years. Now compare that to the odds of the simple cell getting organized by itself, and the impossibility of the task become pretty obvious.

continued (end of Section D)

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DECK

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Rolling Back Government: Lessons from New Zealand

Maurice P. McTigue

(Continued from Index A page A-8)

But we went even further: We made it possible for privately owned schools to be funded in exactly the same way as publicly owned schools, giving parents the ability to spend their education dollars wherever they chose. Again, everybody predicted that there would be a major exodus of students from the public to the private schools, because the private schools showed an academic advantage of 14 to 15 percent. It didn't happen, however, because the differential between schools disappeared in about 18-24 months. Why? Because all of a sudden teachers realized that if they lost their students, they would lose their funding; and if they lost their funding, they would lose their jobs. Eighty-five percent of our students went to public schools at the beginning of this process. That fell to only about 84 percent over the first year or so of our reforms. But three years later, 87 percent of the students were going to public schools. More importantly, we moved from being about 14 or 15 percent below our international peers to being about 14 or 15 percent above our international peers in terms of educational attainment.

Now consider taxation and competitiveness: What many in the public sector today fail to recognize is that the challenge of competitiveness is worldwide. Capital and labor can move so freely and rapidly from place to place that the only way to stop business from leaving is to make certain that your business climate is better than anybody else's. Along these lines, there was a very interesting circumstance in Ireland just two years ago. The European Union, led by France, was highly critical of Irish tax policy—particularly on corporations—because the Irish had reduced their tax on corporations from 48 percent to 12 percent and business was flooding into Ireland. The European Union wanted to impose a penalty on Ireland in the form of a 17 percent corporate tax hike to bring them into line with other European countries. Needless to say, the Irish didn't buy that. The European community responded by saying that what the Irish were doing was unfair and uncompetitive. The Irish Minister of Finance agreed: He pointed out that Ireland was charging corporations 12 percent, while charging its citizens only 10 percent. So Ireland reduced the tax rate to 10 percent for corporations as well. There's another one the French lost!

When we in New Zealand looked at our revenue gathering process, we found the system extremely complicated in a way that distorted business as well as private decisions. So we asked ourselves some questions: Was our tax system concerned with collecting revenue? Was it concerned with collecting revenue and also delivering social services? Or was it concerned with collecting revenue, delivering social services and changing behavior, all three? We decided that the social services and behavioral components didn't have any place in a rational system of taxation. So we resolved that we would have only two mechanisms for gathering revenue—a tax on income and a tax on consumption—and that we would simplify those mechanisms and lower the rates as much as we possibly could. We lowered the high income tax rate from 66 to 33 percent, and set that flat rate for high-income earners. In addition, we brought the low end down from 38 to 19 percent, which became the flat rate for low-income earners. We then set a consumption tax rate of 10 percent and eliminated all other taxes—capital gains taxes, property taxes, etc. We carefully designed this system to produce exactly the same revenue as we were getting before and presented it to the public as a zero sum game. But what actually happened was that we received 20 percent more revenue than before. Why? We hadn't allowed for the increase in voluntary compliance. If tax rates are low, taxpayers won't employ high priced lawyers and accountants to find loopholes. Indeed, every country that I've looked at in the world that has dramatically simplified and lowered its tax rates has ended up with more revenue, not less.

What about regulations? The regulatory power is customarily delegated to non-elected officials who then constrain the people's liberties with little or no accountability. These regulations are extremely difficult to eliminate once they are in place. But we found a way: We simply rewrote the statutes on which they were based. For instance, we rewrote the environmental laws, transforming them into the Resource Management Act—reducing a law that was 25 inches thick to 348 pages. We rewrote the tax code, all of the farm acts, and the occupational safety and health acts. To do this,

we brought our brightest brains together and told them to pretend that there was no pre-existing law and that they should create for us the best possible environment for industry to thrive. We then marketed it in terms of what it would save in taxes. These new laws, in effect, repealed the old, which meant that all existing regulations died—the whole lot, every single one.

Thinking Differently About Government

What I have been discussing is really just a new way of thinking about government. Let me tell you how we solved our deer problem: Our country had no large indigenous animals until the English imported deer for hunting. These deer proceeded to escape into the wild and become obnoxious pests. We then spent 120 years trying to eliminate them, until one day someone suggested that we just let people farm them. So we told the farming community that they could catch and farm the deer, as long as they would keep them inside eight-foot high fences. And we haven't spent a dollar on deer eradication from that day onwards. Not one. And New Zealand now supplies 40 percent of the world market in venison. By applying simple common sense, we turned a liability into an asset.

Let me share with you one last story: The Department of Transportation came to us one day and said they needed to increase the fees for driver's licenses. When we asked why, they said that the cost of relicensing wasn't being fully recovered at the current fee levels. Then we asked why we should be doing this sort of thing at all. The transportation people clearly thought that was a very stupid question: Everybody needs a driver's license, they said. I then pointed out that I received mine when I was fifteen and asked them: "What is it about relicensing that in any way tests driver competency?" We gave them ten days to think this over. At one point they suggested to us that the police need driver's licenses for identification purposes. We responded that this was the purpose of an identity card, not a driver's license. Finally they admitted that they could think of no good reason for what they were doing—so we abolished the whole process! Now a driver's license is good until a person is 74 years old, after which he must get an annual medical test to ensure he is still competent to drive. So not only did we not need new fees, we abolished a whole department. That's what I mean by thinking differently.

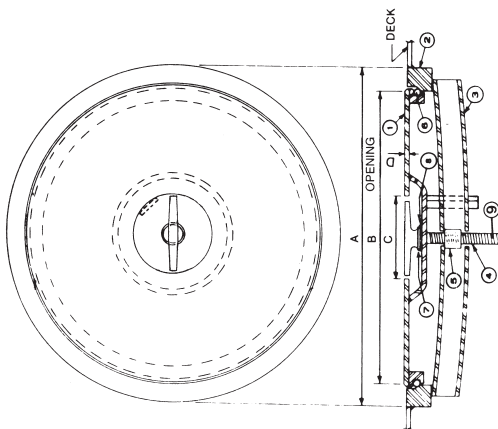
There are some great things happening

along these lines in the United States today. You might not know it, but back in 1993 Congress passed a law called the Government Performance and Results Act. This law orders government departments to identify in a strategic plan what it is that they intend to achieve, and to report each year what they actually did achieve in terms of public benefits. Following on this, two years ago President Bush brought to the table something called the President's Management Agenda, which sifts through the information in these reports and decides how to respond. These mechanisms are promising if they are used properly. Consider this: There are currently 178 federal programs designed to help people get back to work. They cost \$8.4 billion, and 2.4 million people are employed as a result of them. But if we took the most effective three programs out of those 178 and put the \$8.4 billion into them alone, the result would likely be that 14.7 million people would find jobs. The status quo costs America over 11 million jobs. The kind of new thinking I am talking about would build into the system a consequence for the administrator who is responsible for this failure of sound stewardship of taxpayer dollars. It is in this direction that the government needs to move.



NASHVILLE BRIDGE COMPANY

probably from Louisiana if...
You've ever wore shorts at Christmas time.

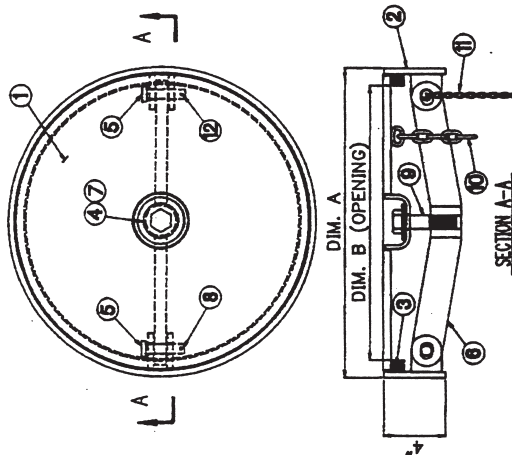


PIECE NO.	DESCRIPTION	PART NUMBER	MATERIAL
1	COVER ASSEMBLY	DF-430-180	SEE NOTE 1 BELOW
2	DECK RING	20389	MILD STEEL
3	STRONGBACK	6750	GALVANIZED STEEL
4	TEE HANDLE	15334	STAINLESS STEEL
5	NUT	13870	BRASS
6	GASKET	16993	NEOPRENE
7	WASHER	507	BRASS
8	WASHER	17256	NEOPRENE
9	PIN	604	BRASS
		6556	NEOPRENE
		21636	STAINLESS STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	WT. (lbs.)
DF-430-180	6297	18	20 3/4	18	5	3/8	70
	6335 (GALVANIZED)						74
DF-430-24	6270	24	26 1/4	24	5	3/8	116
	6289 (GALVANIZED)						120

FLUSH WATERTIGHT HATCH

NOTE 1: INCLUDES ALL PIECES EXCEPT PC NO. 2 - DECK RING
The specifications and details described by drawings or text in this literature are subject to change without notice.



PIECE NO.	PART NO.	DF-540-1775	DF-540-1875	DF-540-1975	DF-540-2175	MATERIAL
1	COVER ASSEMBLY	92673	92916	92924	92932	MILD STEEL
2	COAMING ASSEMBLY	92681	92940	92959	92967	MILD STEEL
3	HATCH GASKET **	92703	92975	92983	92991	NEOPRENE *
4	BOLT GASKET	92711	92711	92711	92711	NEOPRENE *
5	CLEVIS PIN	92770	92770	92770	92770	GALVANIZED STEEL
6	STRONG BACK	92762	93033	93041	93068	MILD STEEL
7	WASHER	92908	92908	92908	92908	GALVANIZED STEEL
8	COTTER	92789	92789	92789	92789	GALVANIZED STEEL
9	BOLT	92746	92746	92746	92746	STAINLESS STEEL
10	CHAIN (FOR HATCH COVER)	92797	92797	92797	92797	GALVANIZED STEEL
11	CHAIN (FOR CLEVIS PIN)	92800	92800	92800	92800	GALVANIZED STEEL
12	HAR PIN COTTER W/ MK NO. 11	92800	92800	92800	92800	GALVANIZED STEEL

MODEL NO.	PART NO.	SIZE	A	B	WEIGHT (lbs.)
DF-540-1775	89915	17 1/2"	20"	17 1/2"	86
DF-540-1875	93009	18 1/2"	21"	18 1/2"	92
DF-540-1975	93017	19 1/2"	22"	19 1/2"	99
DF-540-2175	93025	21 1/2"	24"	21 1/2"	113

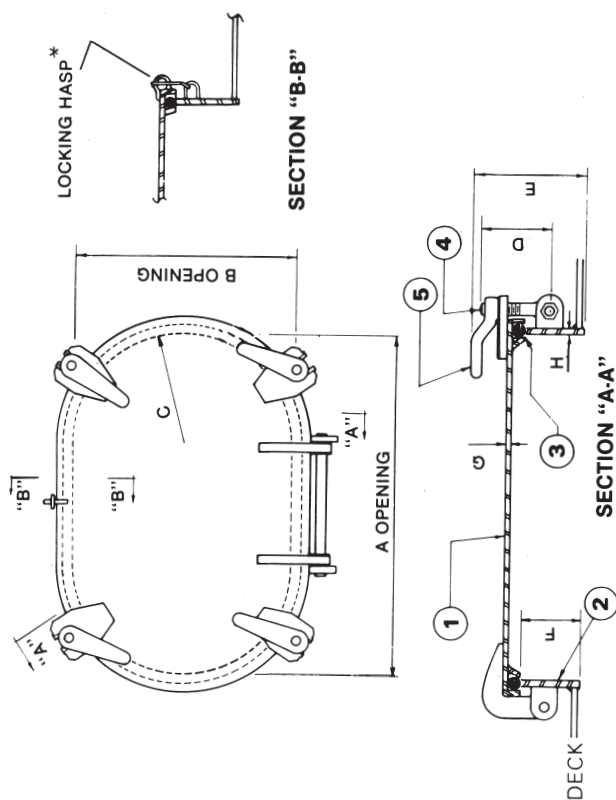
SINGLE BOLT HATCH

**Gasket Included w/coaming assembly. *Other gasket material available.

probably from Louisiana if...
 You pronounce Lafayette as "Laffy-ette" not "La-fy-ette"



NASHVILLE BRIDGE COMPANY

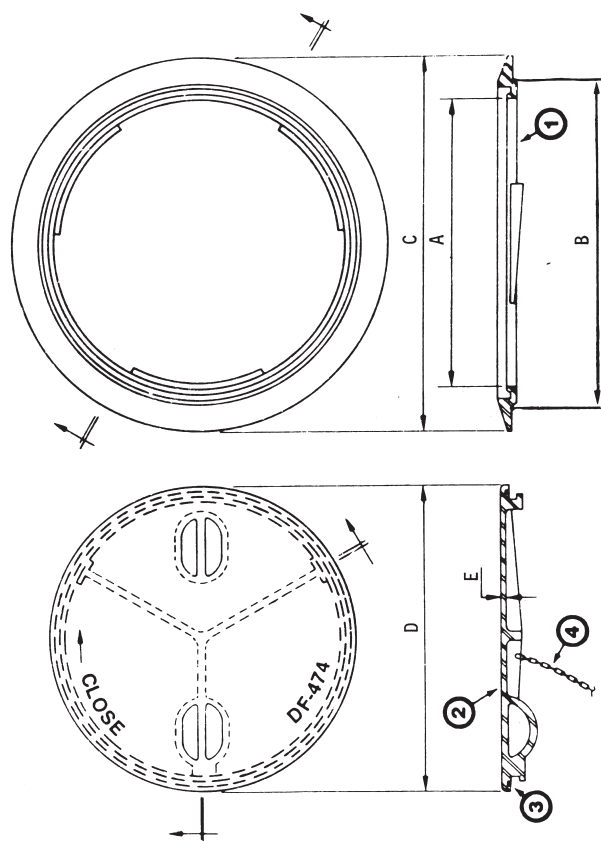


PIECE NO.	DESCRIPTION	PART NUMBER	MATERIAL
1	COVER ASSEMBLY**	DF-174-5	DF-464-5
2	COAMING	77887	78484
3	GASKET	74098	19550
4	TUMBLE BOLT	74497	78530
5	DOG HANDLE	10774	10774
	FLAME SCREEN*	74837	74837
		17051	19445

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-174-5	72451	15 x 23	23	15	7 1/2	5 1/4	8 1/2	5	5/16	3/8	96
DF-464-5	78514	18 x 24	24 1/4	18 1/4	9 1/4	5 1/4	8 1/2	5	5/16	3/8	106

RAISED WATERTIGHT HATCH

*OPTIONAL EXTRA **Gasket inc. w/ Cover Assembly 1 Other gasket material available
 Other optional extras include galvanized finish, a flame screen and a variety of coaming heights
 The specifications and details described by drawings or text in this literature are subject to change without notice.



PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	DECK RING	82325	CAST STEEL
2	COVER	82333	CAST STEEL
3	GASKET	82341	NEOPRENE
4	CHAIN	82368	STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	WT. (lbs.)
DF-474	82317	18	18 3/4	21 1/4	24 3/4	20	3/8	85

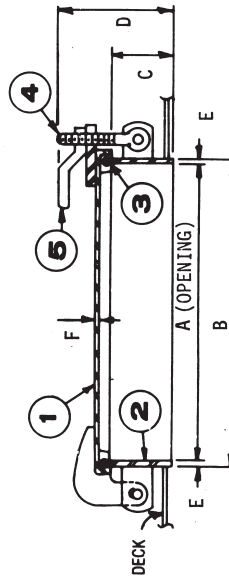
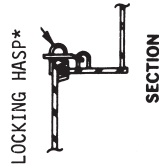
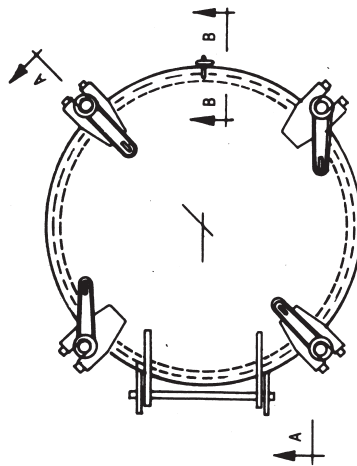
TWIST LOCK HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.



NASHVILLE BRIDGE COMPANY

Marie called de newspaper.
 Marie called de newspaper
 and tole dem dat her husband
 Boudreaux had died.
 De news paper person said,
 "Oh, aham so sorry to hear
 dat, would you like for me to
 switch you to de obituary sec-
 tion"?
 Marie answered, "No, jus' con-
 nect me wit de boats for sale
 department".



SECTION "A-A"

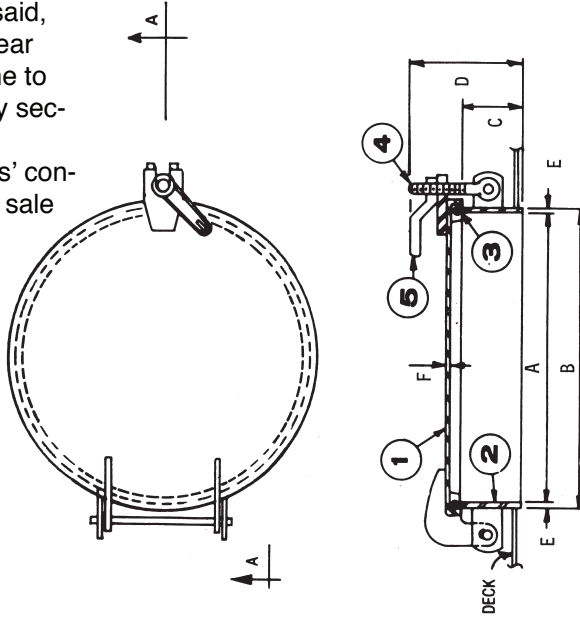
PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER ASSEMBLY**	77895	MILD STEEL
2	COAMING	75027	MILD STEEL
3	GASKET	74497	NEOPRENE†
4	TUMBLE BOLT	10774	BRONZE
5	DOG HANDLE	74837	MALLEABLE IRON

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-343-5	74950	19	19	19 3/4	5	8 1/2	3/8	5/16	92

RAISED WATERTIGHT HATCH

*OPTIONAL EXTRA †Other gasket material available **Gasket incl. w/ Cover Assembly.
 Other optional extras include galvanized finish, a flame screen and a variety of coaming heights.
 The specifications and details described by drawings or text in this literature are subject to change without notice.

R/01



SECTION "A-A"

PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER	75019	MILD STEEL
2	COAMING	75027	MILD STEEL
3	GASKET	74497	NEOPRENE
4	TUMBLE BOLT	10774	BRONZE
5	DOG HANDLE	74837	MALLEABLE IRON

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-543-5	21598	19	19	19 3/4	5	8 1/2	3/8	5/16	86

RAISED HATCH - SINGLE DOG

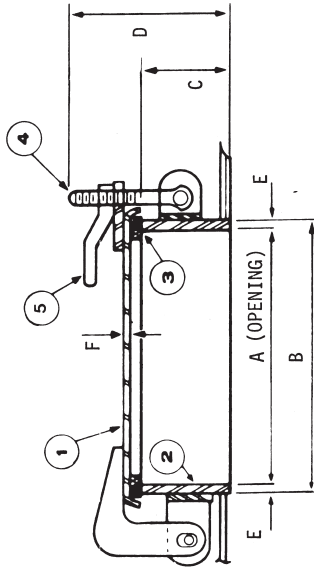
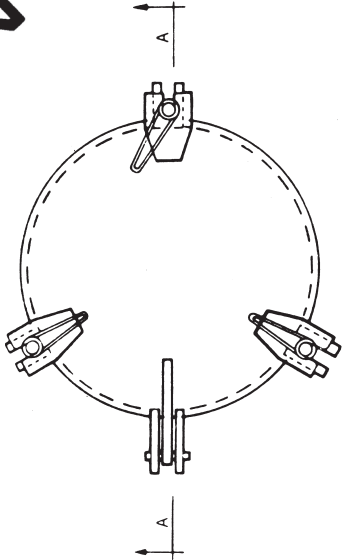
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"Boo" Boudreaux's Report Card

"Boo" Boudreaux come home wit' a really bad report card las' week, an' his daddy was really upset.

When "Boo" got to school on Monday morning. he went up to hees teacher. and an-nounced to her, "Teacher, I tink I better warn you. My Poppa said dat if I don't start getting better grades soon, somebody is gonna get a real bad spanking!"



SECTION "A-A"

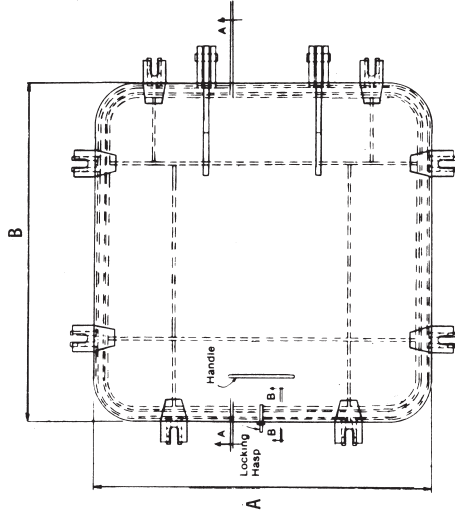
PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER ASSEMBLY*	77909	MILD STEEL
2	COAMING	76155	MILD STEEL
3	GASKET	75981	NEOPRENE
4	TUMBLE BOLT	10774	BRONZE
5	DOG HANDLE	74837	MALLEABLE IRON

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-456-5	75965	12	12	12 1/4	5	8 1/2	3/8	5/16	56

RAISED WATERTIGHT HATCH

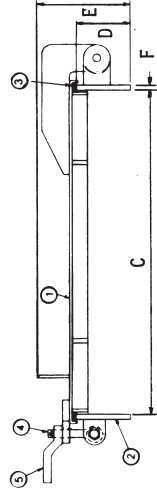
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NASHVILLE BRIDGE COMPANY



NOTE
Dog Handles not shown
in plan for clarity.

PLAN



SECTION "A-A"

PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER	87742	MILD STEEL
2	COAMING	87742	MILD STEEL
3	GASKET	87742	NEOPRENE
4	TUMBLE BOLT	10774	BRONZE
5	DOG HANDLE	17744	BRASS

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-475-5	87742	30 x 30	31 13/16	31 13/16	30	5	8 3/8	7/16	220

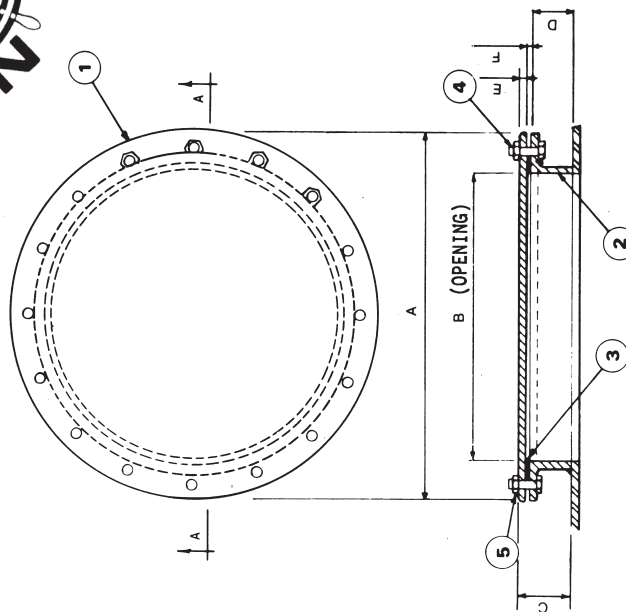
RAISED WATERTIGHT HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.

probably from Louisiana if...
 You learned to drive a boat before you could drive a car



NASHVILLE BRIDGE COMPANY



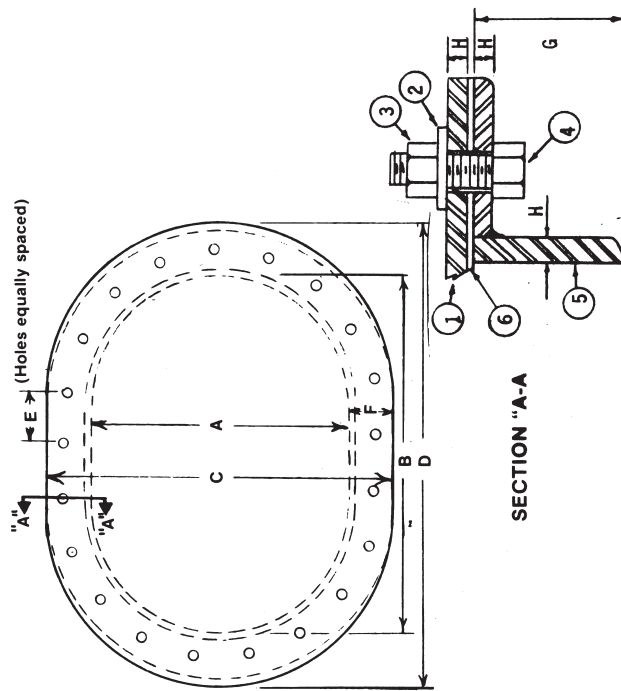
SECTION "A-A"

PIECE NO.	DESCRIPTION	PART NUMBER		MATERIAL	
1	HATCH COVER	DF-154-18	DF-154-14	MILD STEEL	
2	COAMING	77216	76767	MILD STEEL	
3	GASKET	77232	76783	MILD STEEL	
4	5/8" BOLT	77224	76775	NEOPRENE	
5	5/8" NUT	14613	14613	STEEL	
		16179	16179	BRASS	

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-154-14	15407	14	19	14	3 1/4	2 1/2	3/8	3/8	60
DF-154-18	77240	18	23	18	3 1/4	2 1/2	3/8	3/8	78

CLEAN OUT HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.



SECTION "A-A"

PIECE NO.	DESCRIPTION	PART NUMBER		MATERIAL	
1	COVER PLATE	DF-501	DF-502	STEEL	
2	WASHER	21342	21350	BRASS	
3	HEX NUT	21237	21237	STAINLESS	
4	HEX BOLT	21245	21245	STEEL	
5	COAMING	14005	14005	STEEL	
6	GASKET	21369	21377	NEOPRENE	
		21385	21393		

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-501	21091	15 x 23	15	23	20	28 3/4	3 3/8	2 1/2	2 1/2	3/8	85
DF-502	21105	18 x 24	18	24	23	29 3/4	3 1/4	2 1/2	2 1/2	3/8	106

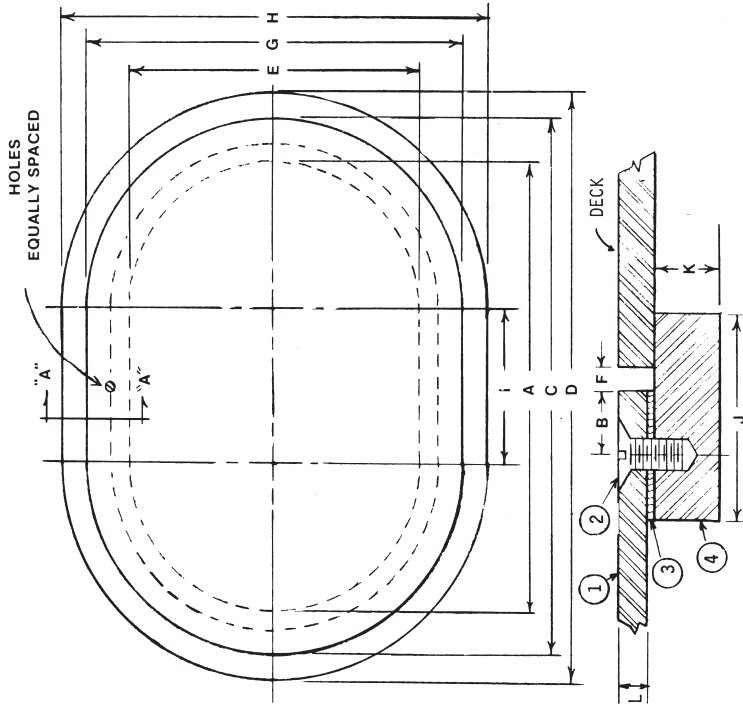
RAISED BOLTED HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.



NASHVILLE BRIDGE COMPANY

probably from Louisiana if...
You know the meaning of a "Delcambre Reeboks"
(that would be a pair of all white fishing boots)



SECTION "A-A"

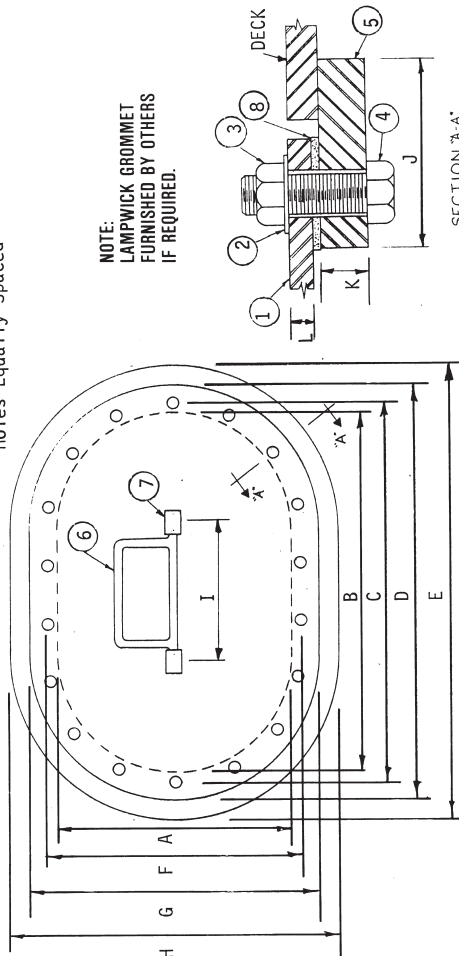
PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER	21180	STEEL
2	SCREW	21199	STAINLESS STEEL
3	GASKET	21202	NEOPRENE
4	DECK RING	21210	STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	L	WT. (lbs.)
DF-505	21148	15 x 23	23	13/32	27 3/8	30 1/8	15	3/8	19 3/8	22 1/8	8	3 9/16	1 1/8	1/2	160

FLUSH SCREW HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.

Holes Equally Spaced



NOTE:
LAMPWICK GROMMET
FURNISHED BY OTHERS
IF REQUIRED.

PIECE NO.	DESCRIPTION	PART NUMBER	MATERIAL
1	COVER	DF-503	MILD STEEL
2	WASHER	21229	BRASS
3	NUT	21237	STAINLESS STEEL
4	BOLT	21245	STEEL
5	DECK RING	14613	MILD STEEL
6	HANDLE	21253	MILD STEEL
7	HANDLE RETAINER	21261	MILD STEEL
8	GASKET	21288	MILD STEEL
		21296	NEOPRENE

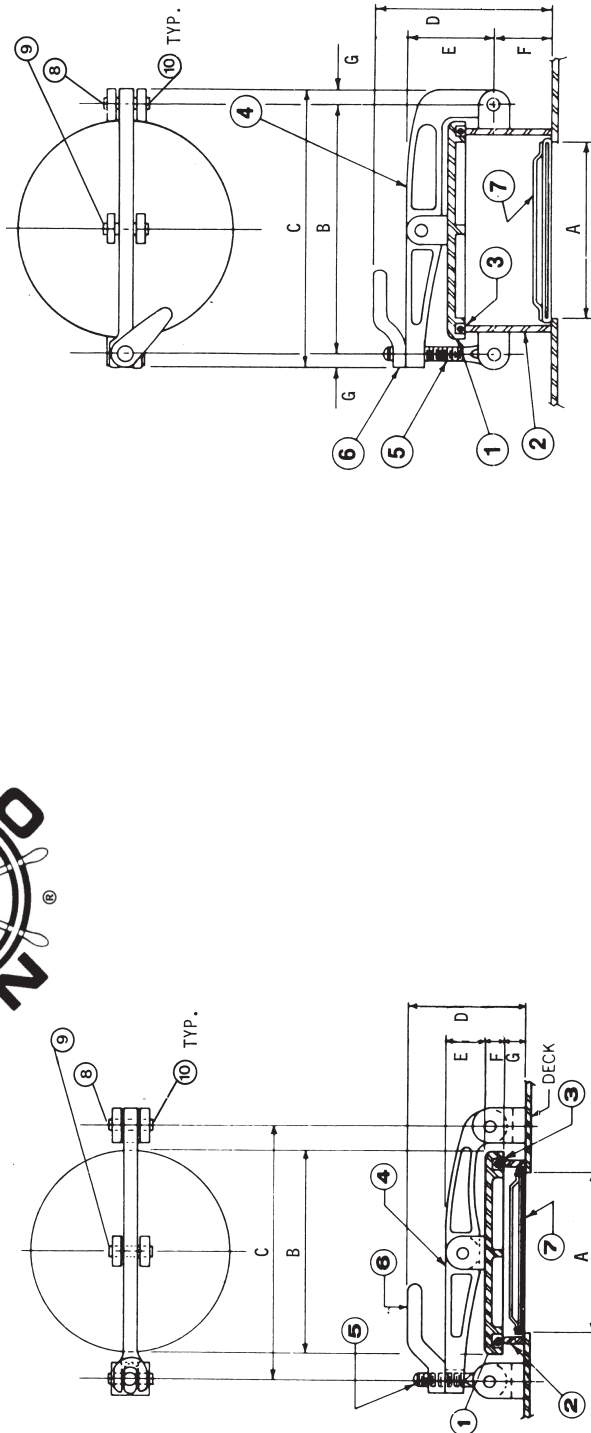
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	L	WT. (lbs.)
DF-503	21113	15 x 23	15	23	24 1/4	26 1/2	29	16 1/4	18 1/2	21	9	3	3/4	3/8	95
DF-504	21121	18 x 24	18	24	25 1/4	27 1/2	30	19 1/4	21 1/2	24	9	3	3/4	3/8	112

FLUSH BOLTED HATCH

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NASHVILLE BRIDGE COMPANY



Boo and Tee see a leettle green creature.

Pierre and Boudreaux were on a weekend hunt when dev witnessed a UFO landing.

As de leettle green creatures descended from de craft Pierre said, "Mais what's dat?"

Boudreaux answered, as he aimed hees gun: "I don't know me, Pierre. But you better go back to de camp and put some rice on."

PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER	6637	CAST IRON
2	COAMING	75671	MILD STEEL
3	GASKET	17167	NEOPRENE
4	ARM	6831	MALLEABLE IRON
5	TUMBLE BOLT	10774	BRONZE
6	DOG HANDLE	74837	MALLEABLE IRON
7	FLAME SCREEN	6629	STAINLESS STEEL
8	HEX HEAD BOLT	20842	BRONZE
9	HEX HEAD BOLT	20850	BRONZE
10	ESNA NUT	20869	STAINLESS STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	WT. (lbs.)
DF-144	6645	8	7 1/2	9 1/2	12	5 5/16	1 1/8	13/16	7/8	22

ULLAGE HATCH

The specifications and details described by drawings or text in this literature are subject to change without notice.

PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	COVER	83062	CAST IRON
2	COAMING	19526	MILD STEEL
3	GASKET	82449	NEOPRENE
4	ARM	19461	MALLEABLE IRON
5	TUMBLE BOLT	10774	BRONZE
6	DOG HANDLE	74837	MALLEABLE IRON
7	FLAME SCREEN	19496	STAINLESS STEEL
8	HEX HEAD BOLT	20842	BRONZE
9	HEX HEAD BOLT	20850	BRONZE
10	ESNA NUT	20869	STAINLESS STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	WT. (lbs.)
DF-569	83097	10	9 1/2	13 1/4	14 3/4	9 5/8	4 3/8	3 1/2	3/4	42

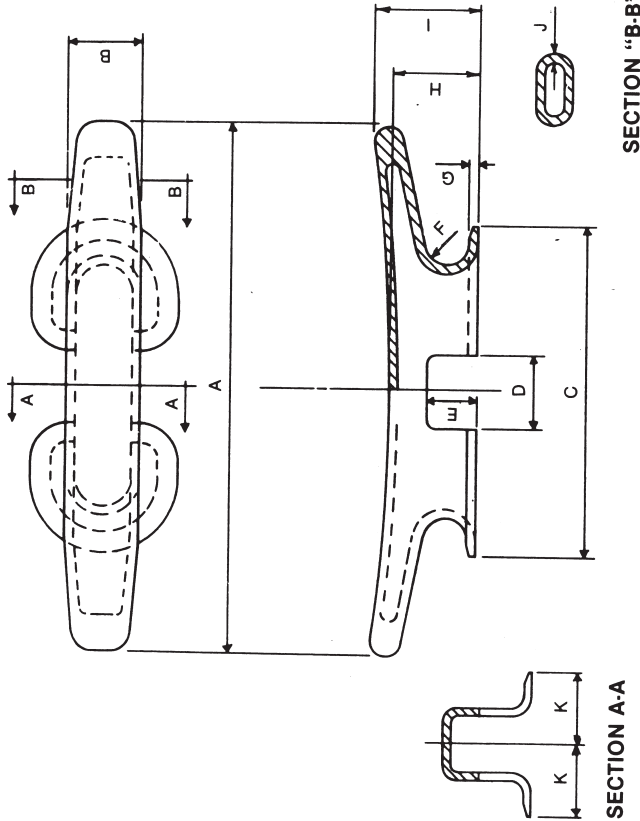
ULLAGE HATCH

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De police Sargent axed Boudreaux what hees wife say before she died.
 Boudreaux's wife was killed in an accident. When de police questioned him, de Sargent axed. "Did she say anything before she died?"
 Boudreaux said. "She spoke wit'out interruption for bout forty years."

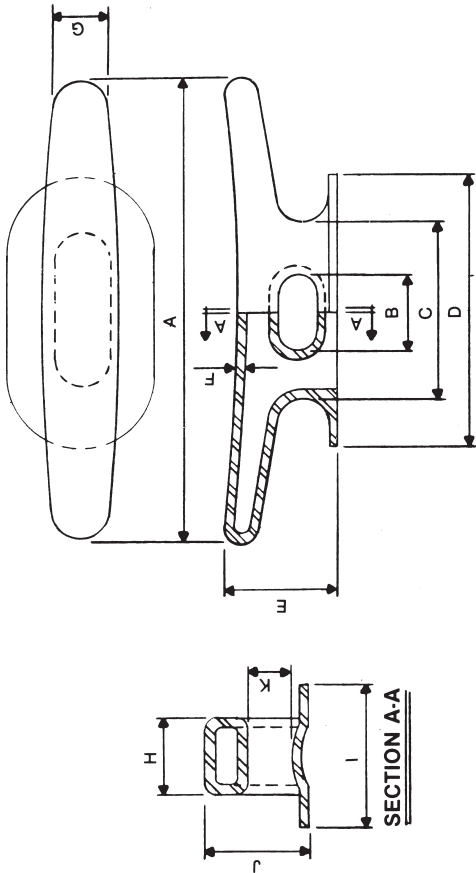
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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	WT. (lbs.)
DF-48A	18597	36	36	5	22 1/2	5	3 1/2	1 1/2	5/8	5/8	7/8	9/16	5	81
DF-36A	6890	42	42	6	25 1/2	7 1/2	3 3/4	1 1/2	5/8	6 1/2	7 1/2	9/16	5 1/2	114
DF-159A	6483	48	48	6 1/2	27	8	5	1 1/2	5/8	8 3/4	10	9/16	5 3/4	175

CAST STEEL LEVEL

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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	WT. (lbs.)
DF-30	18562	24	24	3 1/4	9	10 1/2	5 5/8	1/2	3	4	7 1/2	5 1/8	2 1/4	50
DF-482	20265	36	36	8 1/4	17	23 1/2	8	9/16	4	5	11	6 1/4	3 1/4	98
DF-483	20273	42	42	9 5/8	20	26 3/4	9	5/8	4 3/4	6	12 1/2	7 7/8	4 1/8	160
DF-484	20257	48	48	11	23	30	10	3/4	5 1/2	7	14	9	5	220

CAST STEEL LEVEL CHOCKS

The specifications and details described by drawings or text in this literature are subject to change without notice.

De New Job

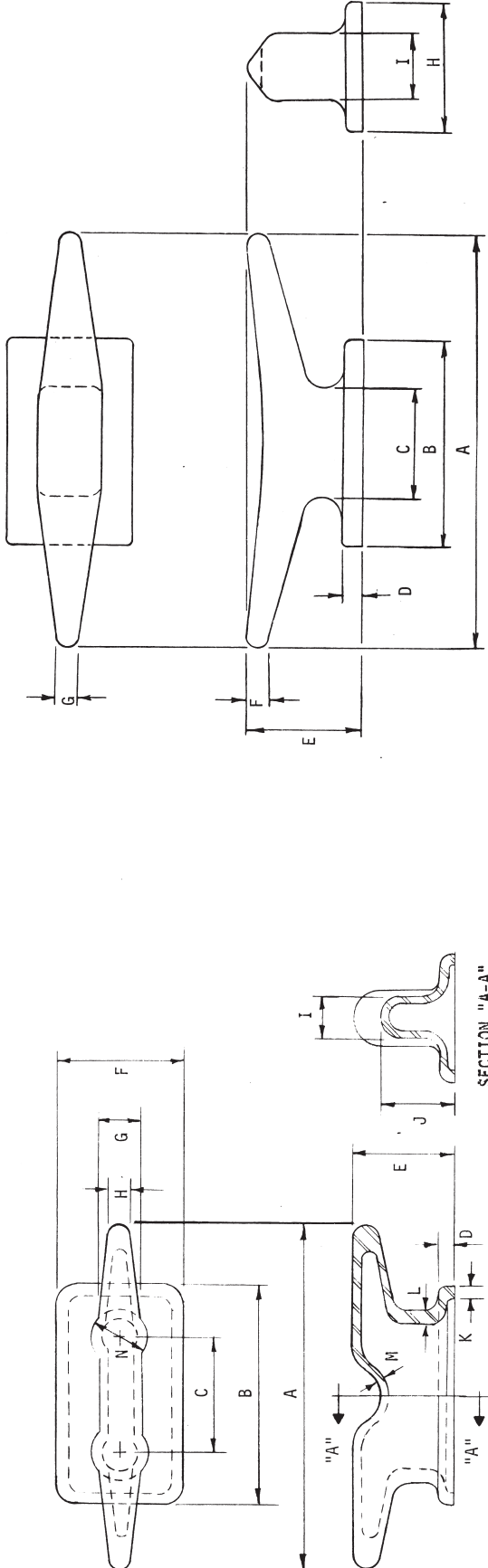
Boudreaux walked in de house de udder day and tells Marie. "Cher, I jus' found a great job! Go to work at 10:00 and get off at 2:30 every day. never no overtime. off every weekend. and it pays \$600.00 a week."

Marie says. "Mais dat sounds too good to be true."

Boudreaux tells her. "Oh it's true alrat. You start Monday."



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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	WT. (lbs.)
DF-488	89338	30	30	19	10	1 3/8	8 7/8	11 1/4	3 1/2	1 3/4	3 3/4	6 5/8	1	1 1/4	3/4	5	180

CAST STEEL HEAVY LEVEL

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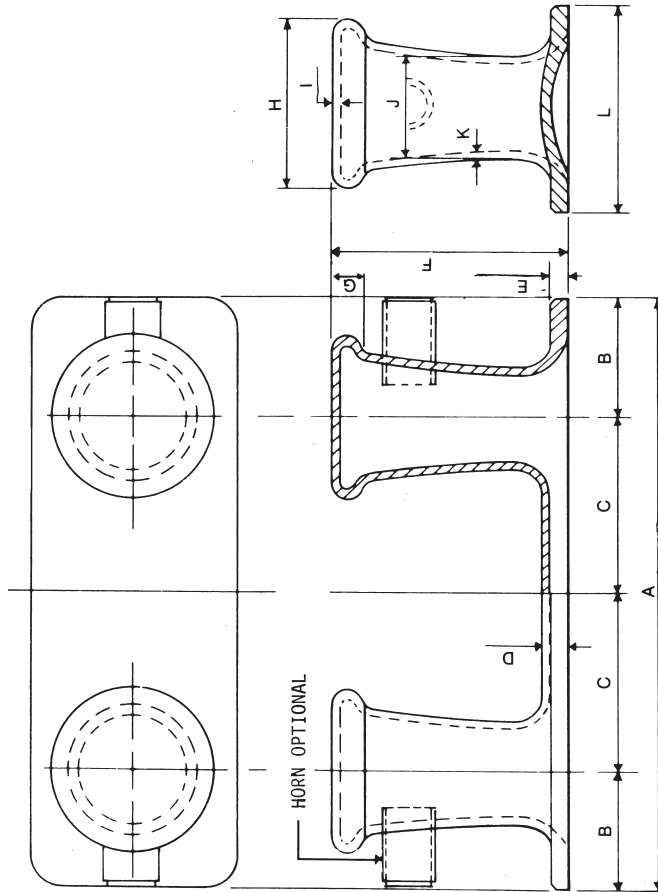
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	WT. (lbs.)
DF-518	87920	18	18	9	4 3/4	7/8	5	1	1	5 1/2	2 1/8	34

CAST STEEL LEVEL

The specifications and details described by drawings or text in this literature are subject to change without notice.



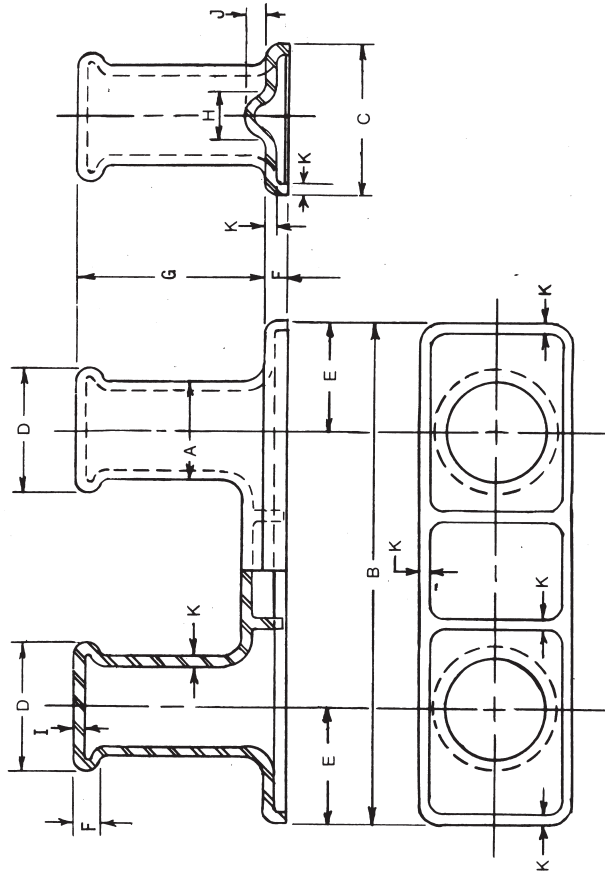
NASHVILLE BRIDGE COMPANY



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	L	WT. (lbs.)
DF-2	7005	8	40	8	12	2	1 1/4	16	2	11	5/8	7	5/8	14	320
DF-2A	20281	w/Horn													330
DF-40	6858	10	45	9	13 1/2	2 1/4	1 1/4	18	2	13 1/2	3/4	9	1 1/4	15	545
DF-40A	77054	w/Horn													560

CAST STEEL DOUBLE BITTS

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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	WT. (lbs.)
DF-491	89362	12	12	60	18	15	13 1/2	3	22 1/2	6	1	2	1 1/4	990
DF-498	21164	14	14	66	21	17 1/2	13	3 1/2	26 1/4	7	1	2	1 1/2	1350

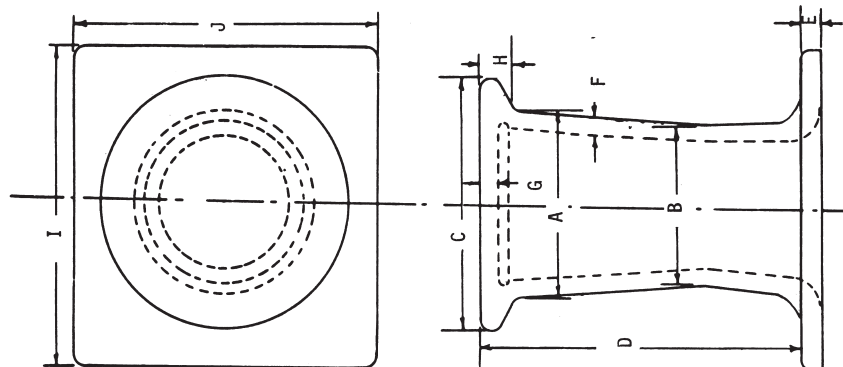
CAST STEEL DOUBLE BITTS

The specifications and details described by drawings or text in this literature are subject to change without notice.



NASHVILLE BRIDGE COMPANY

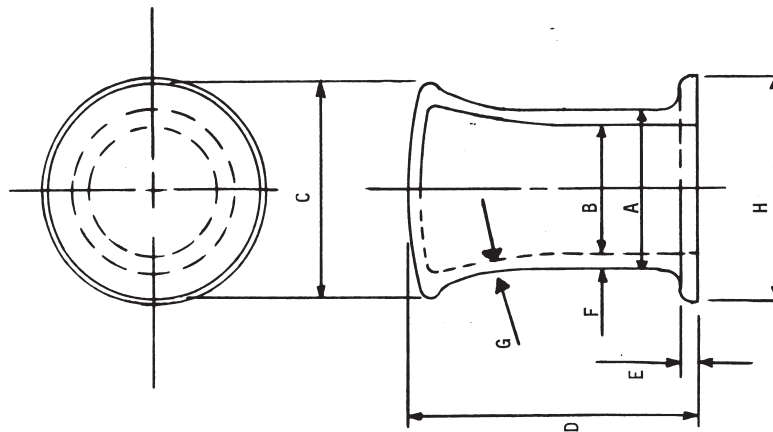
Rene' wanted to bury his dead dog in de people cemetery behind de church. Rene' Champagne lived for many years wit' only hees dog for a companion. One sad day he found hees dog dead from old age. He went to hees parish priest and axed eef services could be said for hees dog. De good fader said "Oh no. we can't have services for a dog here, but deres a new church down de street dat might be willing."
 "Fader do you t'ink \$50,000 might be enough of a donation?"axed Mr. Champagne.
 "Of course, why deedn' you tell me your dog was a Catholic?"



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	WT. (lbs.)
DF-S88	87971	8	8	7	11	14 ⁹ / ₁₆	1 ¹ / ₄	1	3/4	1 ¹ / ₂	14	14	160

CAST STEEL SINGLE BITT

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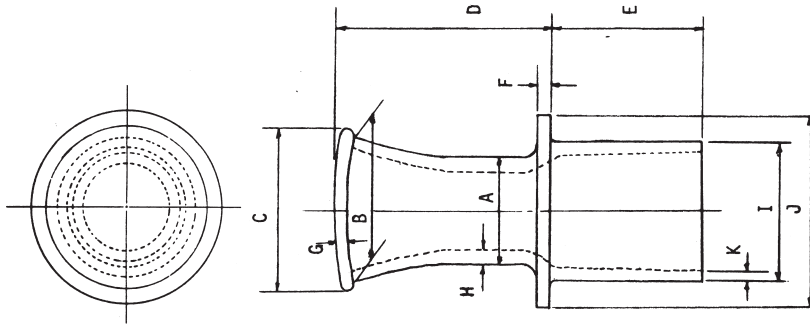
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-SB10	20230	10	10	8	13 ¹ / ₂	18	1	1	3/4	14	190

CAST STEEL SINGLE BITT

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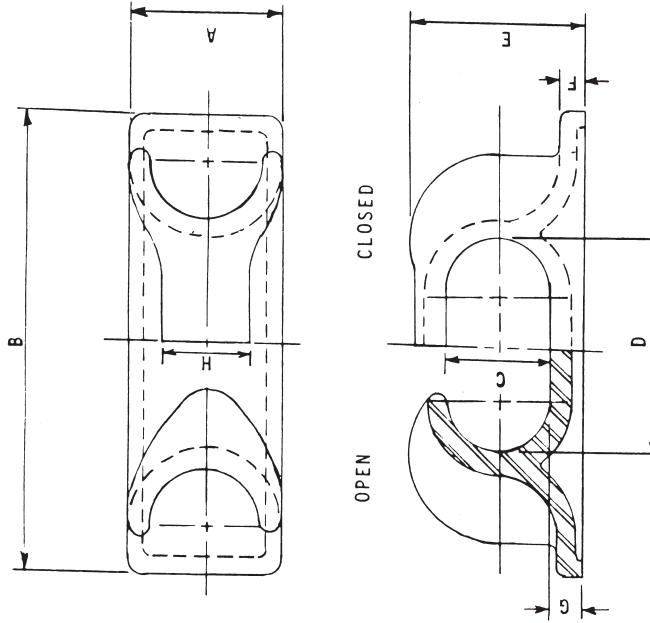
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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	WT. (lbs.)
DF-530	21555	8	8	10 1/2	12	16	11	1	1	1	10 1/4	14	3/4	260

CAST STEEL SINGLE BITT THRU DECK

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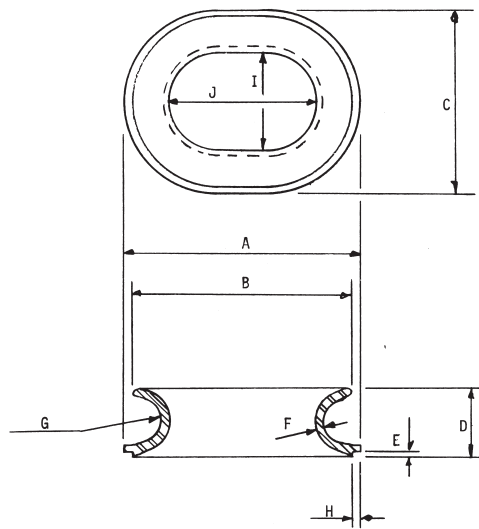
MODEL NO.	PART NO.	SIZE (Opening)	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-496	89451	4 x 8 Open	6	19 3/4	4	8	6 3/4	1	1 3/8	—	75
DF-497	89478	Closed								3 1/2	84
DF-495	89443	5 x 11 Open	8	25 1/4	5 3/8	10 3/4	9	1 5/16	1 13/16	—	132
DF-485	20362	6 x 12 Open	9	27 3/4	6	12	10 1/8	1 1/2	2 1/16	—	175
DF-480	89397	Closed								5 1/4	191
DF-489	89346	8 x 16 Open	12	36	8	16	13 3/8	1 7/8	2 5/8	—	435
DF-490	89354	Closed								7	455

CAST STEEL CHOCKS

The specifications and details described by drawings or text in this literature are subject to change without notice.

probably from Louisiana if...

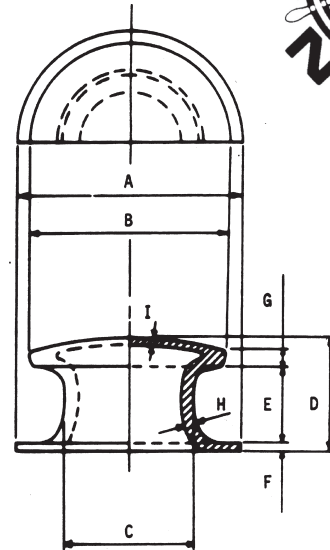
Your burial plot is six feet over rather than six feet under.



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	WT. (lbs.)
DF-528	21512	8 x 12	19	17½	15	5½	3/8	1¼	1½	3/4	8	12	130

CAST STEEL MOORING RING

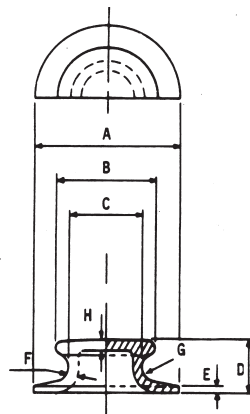
The specifications and details described by drawings or text in this literature are subject to change without notice.



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	WT. (lbs.)
DF-185	14567	10	17	15	10	8½	5¼	5/8	1½	1	1/2	138

CAST STEEL BUTTON CHOCK

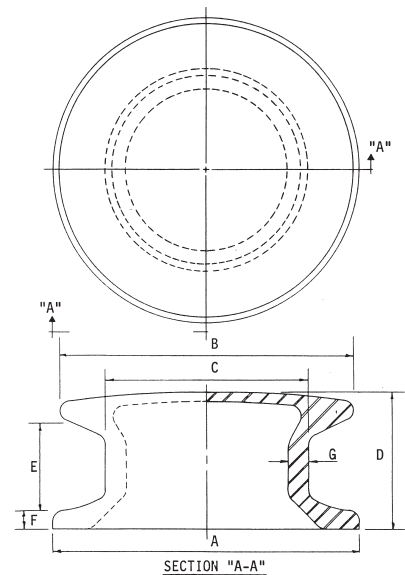
The specifications and details described by drawings or text in this literature are subject to change without notice.



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-192	6408	6	12	8½	6	4¼	1/2	3/4	1½	3/4	38

CAST STEEL BUTTON CHOCK

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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	WT. (lbs.)
DF-473	77461	8	13	12½	8¼	5¼	3 11/16	3/4	7/8	75

CAST STEEL BUTTON CHOCK

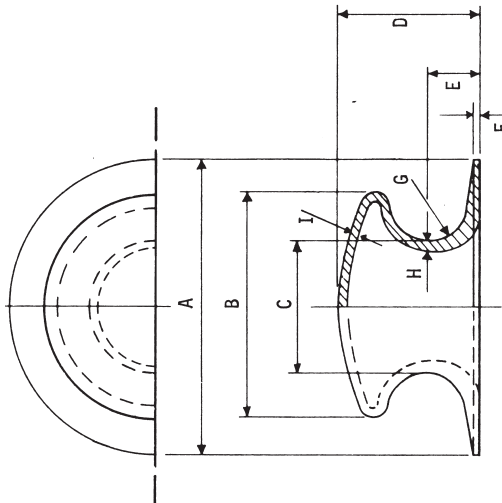
The specifications and details described by drawings or text in this literature are subject to change without notice.

probably from Louisiana if...
You've ever had Community Coffee.



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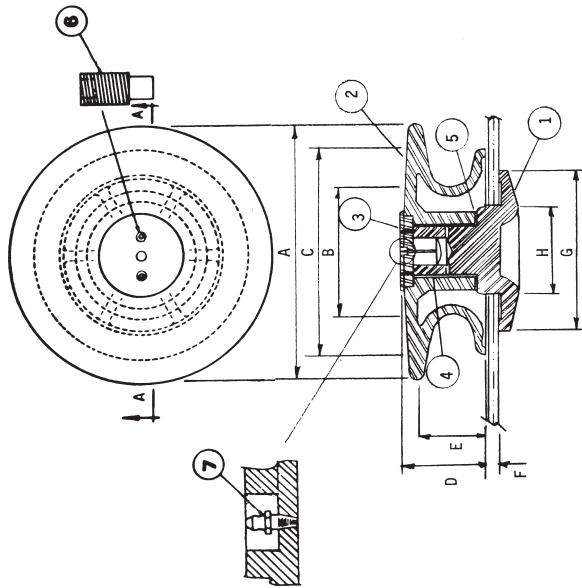
probably from Louisiana if...
When giving directions you use words like
“uptown”, “downtown”, “backatown”, riverside”,
“lakeside”, “northshore”, “westbank”, “down the
bayou” or “across the river”



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	WT. (lbs.)
DF-194	16128	9	20	15 1/2	9	9 1/2	3 1/2	5/8	2 1/2	3/4	1/2	158

CAST STEEL BUTTON CHOCK

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SECTION "A-A"

PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	BASE	6971	CAST STEEL
2	ROLLER	6947	CAST STEEL
3	CAP	6939	BRASS
4	BUSHING	6920	BRASS
5	WASHER	6912	BRASS
6	SET SCREW	74918	STEEL
7	GREASE FITTING	70505	STEEL

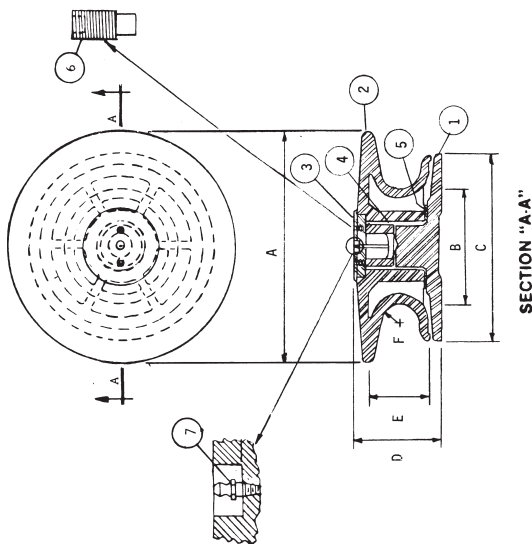
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-11	6998	16	16	8	13	5 3/32	4 1/8	7/8	10	5 1/8	126

THRU DECK ROLLER BUTTON CHOCK

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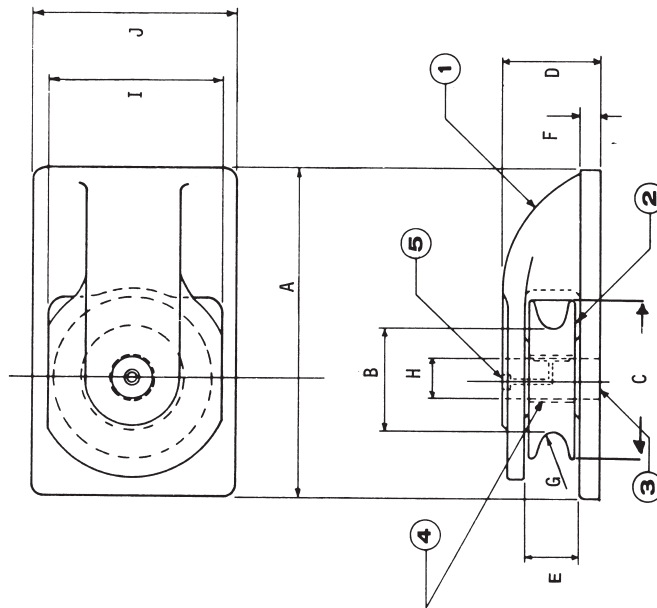


PIECE NO.	DESCRIPTION	PART NUMBER		MATERIAL
		DF-512	DF-511	
1	BASE	89257	89257	CAST STEEL
2	ROLLER	89230	6947	CAST STEEL
3	CAP	6939	6939	BRASS
4	BUSHING	6920	6920	BRASS
5	WASHER	6912	6912	BRASS
6	SET SCREW	74918	74918	STEEL
7	GREASE FITTING	70505	70505	STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-512	89222	12	12	8	13	6	4	1 1/4	125
DF-511	89249	16	16	8	13	6	4 1/8	1 1/4	130

ROLLER BUTTON CHOCK

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PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	BASE	6467	CAST STEEL
2	ROLLER	6734	CAST STEEL
3	PIN	76198	COLD ROLLED STEEL
4	BUSHING	6726	BRASS
5	GREASE FITTING	9865	STEEL

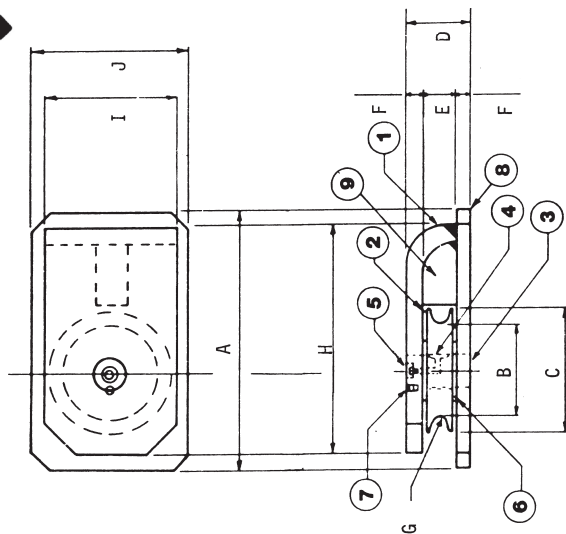
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	WT. (lbs.)
DF-164	6475	11	22	6 3/4	10 3/4	6 1/4	3 1/4	1 1/2	5/8	2 11/16	12	14	296

SINGLE ROLLER CHOCK

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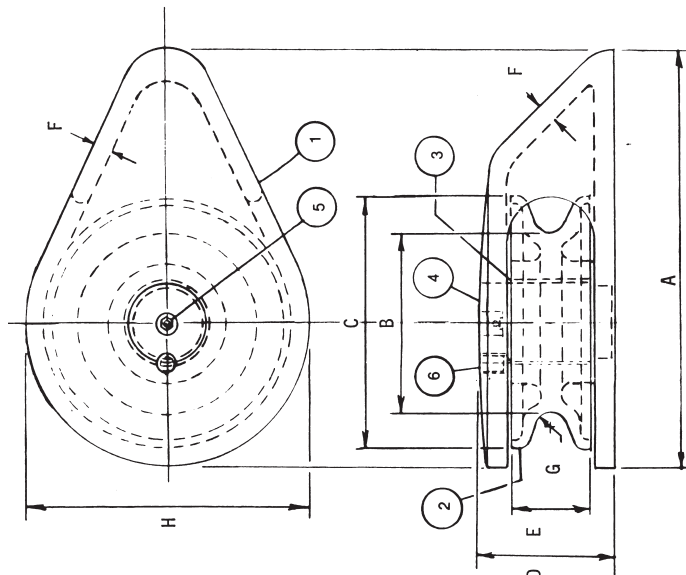


PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	ROLLER CHOCK TOP	76986	STEEL
2	ROLLER SHEAVE	77003	STEEL
3	PIN	77038	STEEL
4	BUSHING	77410	BRONZE
5	GREASE FITTING	70505	STEEL
6	WASHER	77046	BRASS
7	TACK WELD		
8	ROLLER CHOCK BOTTOM	76988	STEEL
9	SEPARATOR BAR	77011	STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	WT. (lbs.)
DF-361	13862	8	16 1/2	6	8	3 13/16	1 13/16	1	3/8	14 1/2	8 1/2	10	123

SINGLE ROLLER CHOCK

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PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	BASE	89273	CAST STEEL
2	ROLLER	89281	CAST STEEL
3	BUSHING	89303	BRASS
4	PIN	89311	STEEL
5	GREASE FITTING	70505	STEEL
6	SET SCREW	70599	STEEL

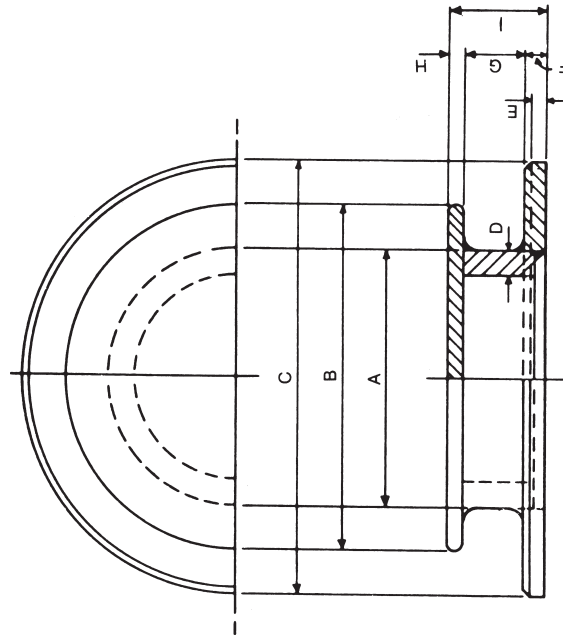
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-927	89265	8	13	5 1/16	7 7/8	4 1/4	2 7/16	5/8	17/32	9	55

SINGLE ROLLER CHOCK

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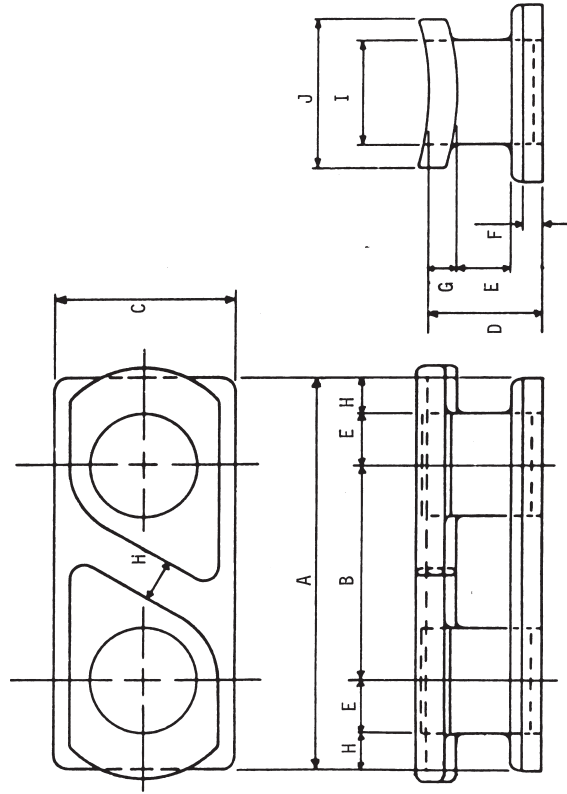
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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	WT. (lbs.)
DF-148	6610	3 1/2	3 1/2	7	8	*	3/4	1	1 3/4	1/2	3 1/4	33
DF-129	6688	8 1/2	8 5/8	11 5/8	14 5/8	7/8	1/2	3/4	1 3/4	1/2	3	52
DF-129A	6661	11	11	14	17	1	1/2	3/4	1 3/4	1/2	3	72
DF-158	6505	8 1/2	8 5/8	11 5/8	14 5/8	7/8	1/2	3/4	3	1/2	4 1/4	62
DF-158A	6491	12	12	15	18	3/4	1/2	3/4	3 5/8	1/2	4 1/8	83

MILD STEEL WIRE ROPE BUTTON

*DF-148 Bitt Post is Solid
The specifications and details described by drawings or text in this literature are subject to change without notice.



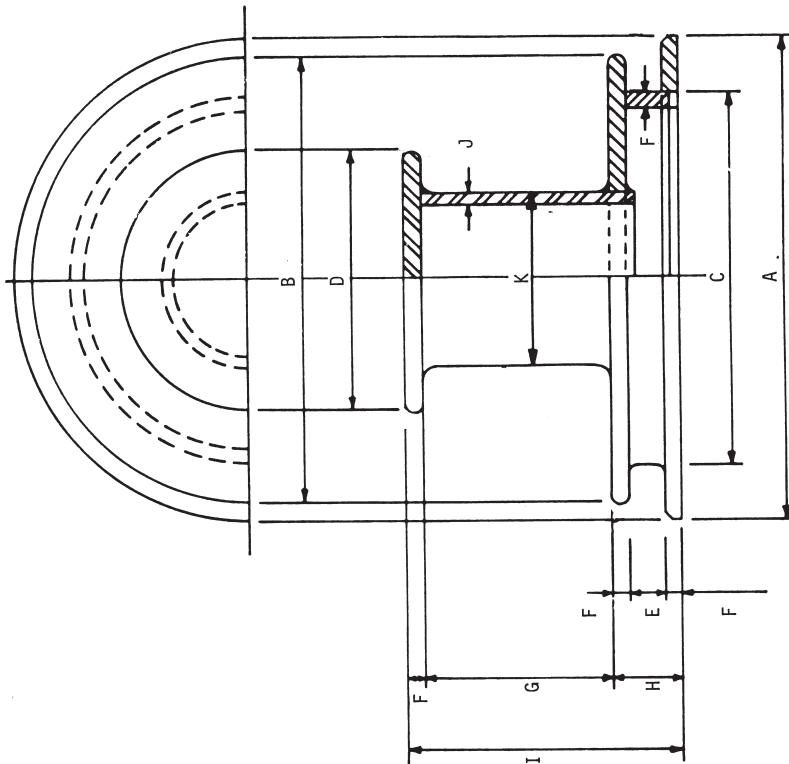
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	WT. (lbs.)
DF-149	6602		13 3/8	7 3/8	6	3 5/8	1 3/4	5/8	7/8	1 1/4	3 1/2	5	47

MILD STEEL WIRE ROPE OPEN CHOCK

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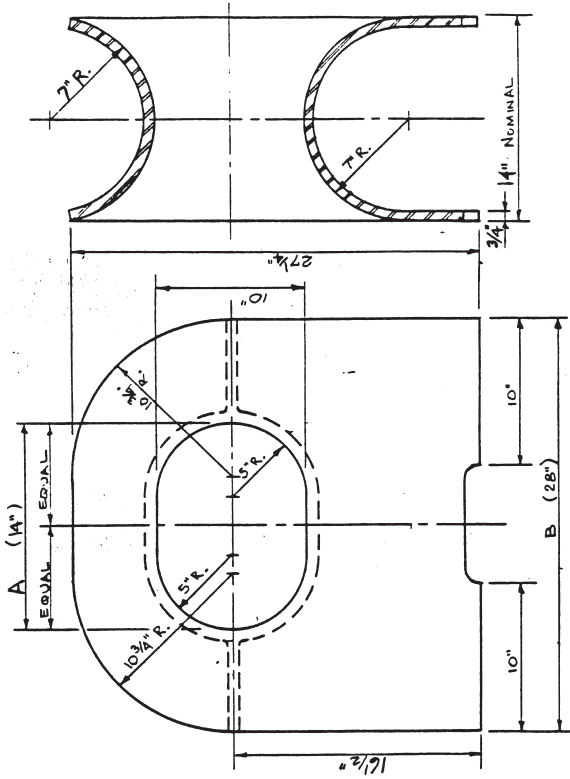
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MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	J	K	WT. (lbs.)
DF-163	13803		24	22	18	12	2 5/8	3/4	7 3/8	4 1/8	12 1/4	1 1/2	8 3/8	210

MILD STEEL COMBINATION BITT

The specifications and details described by drawings or text in this literature are subject to change without notice.



PIECE NUMBER	MATERIAL
21601	CAST STEEL
STOCK NUMBER	DATE OF DRAWING
DF-531	MARCH 1991
NAME	SHIPPING WEIGHT
10" x 14" PANAMA CANAL CHOCK	330 LBS

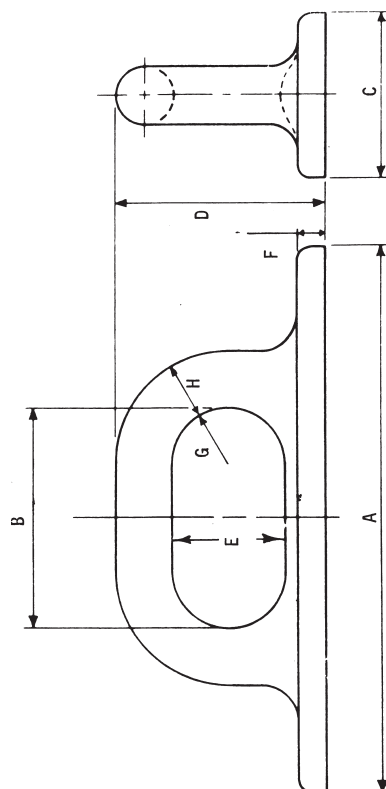
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probably from Louisiana if...

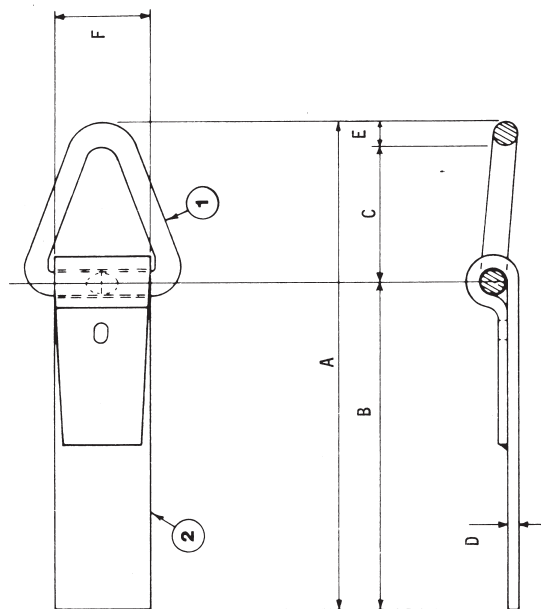
When you refer to a geographical location "way up North," you are referring to places like Shreveport, Little Rock or Memphis, "where it gets real cold!"



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-196	16713		20	8	6	7 ⁵ / ₈	4	1	2	2 ¹ / ₈	55

CAST STEEL D-RING

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PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	RATCHET STRAP RING	75736	MILD STEEL
2	RATCHET STRAP PLATE	75744	MILD STEEL

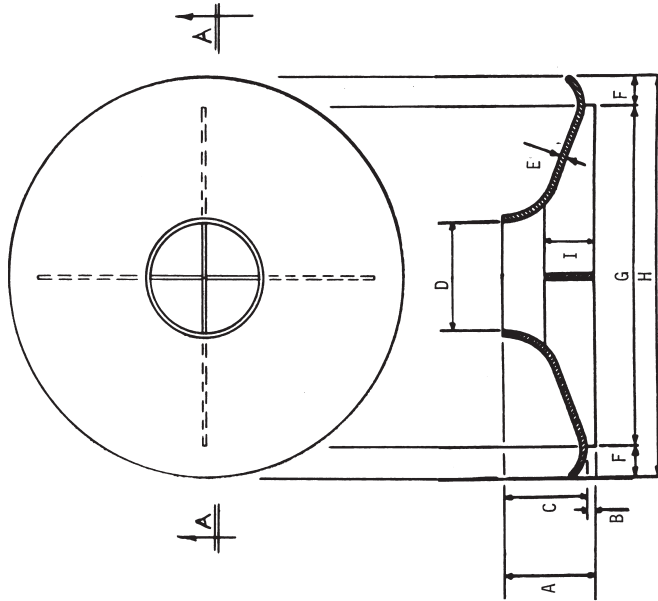
MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	WT. (lbs.)
DF-80	6807		35 ⁵ / ₈	24	9 ⁷ / ₈	3/4	1 ³ / ₄	7	83

RATCHET STRAP

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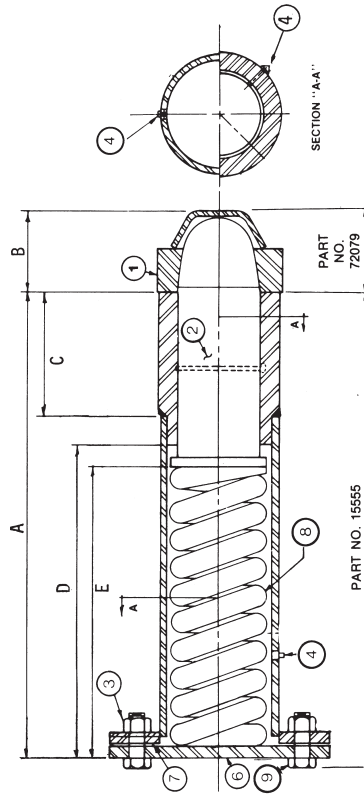


SECTION "A-A"

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	I	WT. (lbs.)
DF-82-6	6793	6	4 ¹³ / ₁₆	7/8	3 ¹⁵ / ₁₆	6 ¹ / ₁₆	5/16	1 ⁹ / ₁₆	16 ⁷ / ₈	20	2 ¹ / ₂	33
DF-82-8	13749	8	5 ³ / ₈	1 ⁷ / ₁₆	3 ¹⁵ / ₁₆	8 ¹ / ₁₆	5/16	1 ⁹ / ₁₆	16 ⁷ / ₈	20	3	31
DF-82-10	17191	10	6 ⁷ / ₁₆	2 ¹ / ₄	3 ¹⁵ / ₁₆	10	5/16	1 ⁹ / ₁₆	16 ⁷ / ₈	20	4	34

STEEL SUCTION BELLMOUTH

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PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	LOCKING PIN SOCKET ASSEMBLY	72079	STEEL
2	LOCKING PIN ASSEMBLY	72109	STEEL
3	1 1/8" DIA. HEAVY HEX NUT	15989	STEEL
4	GREASE FITTING	9873	STEEL
6	SPRING KEEPER PLATE	72176	STEEL
7	GASKET	75140	NEOPRENE
8	INTERLOCKING SPRING	7064	STEEL
9	1 1/8" DIA. x 3 1/4" HEAVY HEX BOLT	72222	STEEL

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	WT. (lbs.)
DF-134	15555		33 ³ / ₈	5 ⁷ / ₈	9	22 ⁷ / ₈	21 ¹ / ₈	470

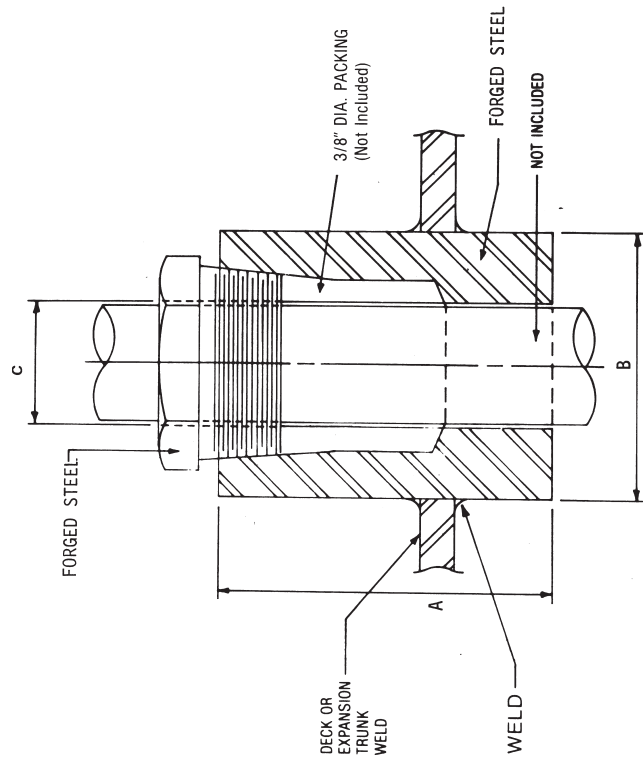
INTERLOCKING DEVICE

DF-134 Pin Assembly #15555 & Socket Assembly #72079 are ordered separately.

The specifications and details described by drawings or text in this literature are subject to change without notice.



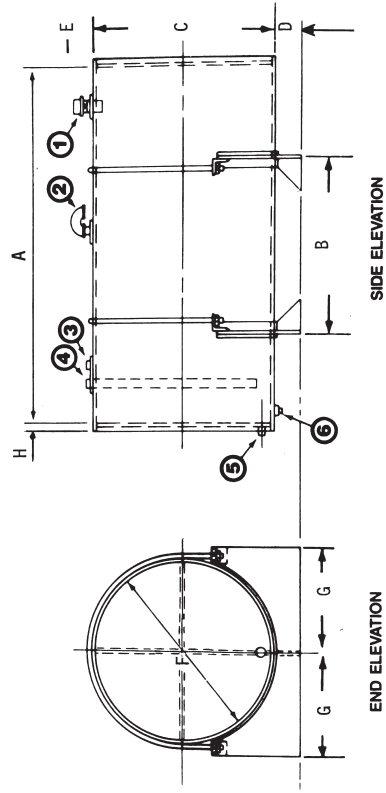
NASHVILLE BRIDGE COMPANY



MODEL NO.	PART NO.	SIZE	ROD	A	B	C	WT. (lbs.)
DF-437-3/4	75191	3/4	3/4	3/8	2 1/2	13/16	4
DF-437-1	6254	1	1	3/8	2 1/2	1 1/16	3 1/2
DF-437-1 1/4	75175	1 1/4	1 1/4	3 3/8	3	1 5/16	5 1/2
DF-437-1 1/2	75183	1 1/2	1 1/2	3 3/8	3	1 9/16	5

STUFFING GLAND

The specifications and details described by drawings or text in this literature are subject to change without notice.



PIECE NO.	DESCRIPTION
1	2" ϕ FILL w/BRASS CAP AND CHAIN
2	2 1/2" ϕ VENT w/STAINLESS STEEL FLAME SCREEN
3	1" ϕ RETURN CONNECTION
4	1" ϕ RETURN CONNECTION
5	1" ϕ OPTIONAL SUCTION OR DRAIN w/PLUG
6	1 1/2" ϕ DRAIN w/PLUG

MODEL NO.	PART NO.	SIZE	A	B	C	D	E	F	G	H	WT. (lbs.)
DF-448	6246	300 Gal.	72	35	36 3/8	6	7	36	20	1/2	714

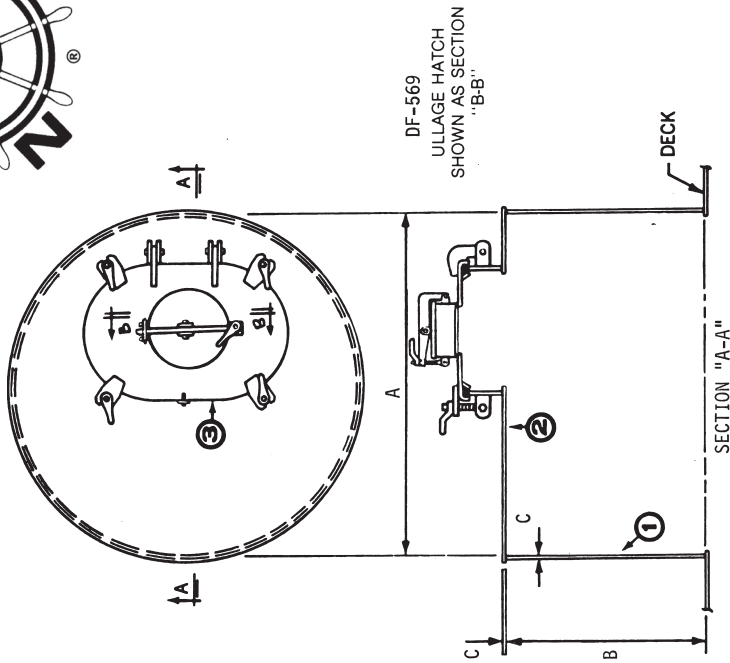
FUEL OIL TANK

MATERIAL: STEEL

The specifications and details described by drawings or text in this literature are subject to change without notice.
TANK TESTED TO 5 P.S.I., & BUILT IN ACCORDANCE WITH U.S. COAST GUARD SPECIFICATIONS FOR RIVER SERVICE.



NASHVILLE BRIDGE COMPANY

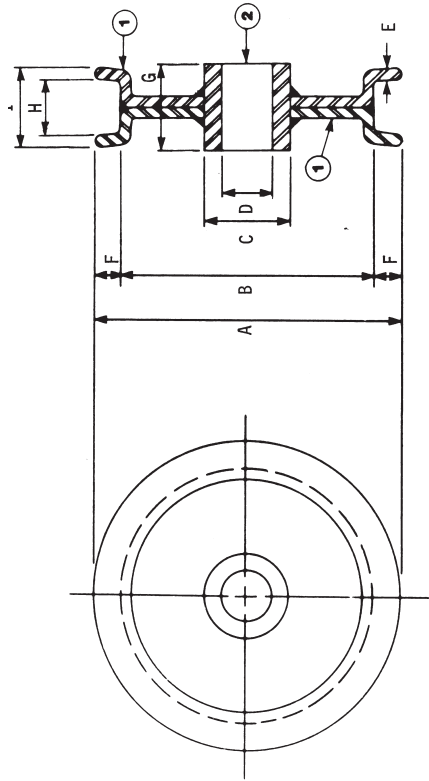


PIECE NO.	DESCRIPTION	PART NUMBER	MATERIAL
1	COAMING	DF-470	DF-449
2	COVER	76171	76171
3	RAISED HATCH w/Ullage Hatch	76163	76163
		85316	8214

MODEL NO.	PART NO.	SIZE	A	B	C	WT. (lbs.)
DF-449	6238	24 H. x 42 Dia. w/DF-144	42	24	5/16	520
DF-470	85308	24 H. x 42 Dia. w/DF-569	42	24	5/16	540

EXPANSION TRUNK

The specifications and details described by drawings or text in this literature are subject to change without notice.

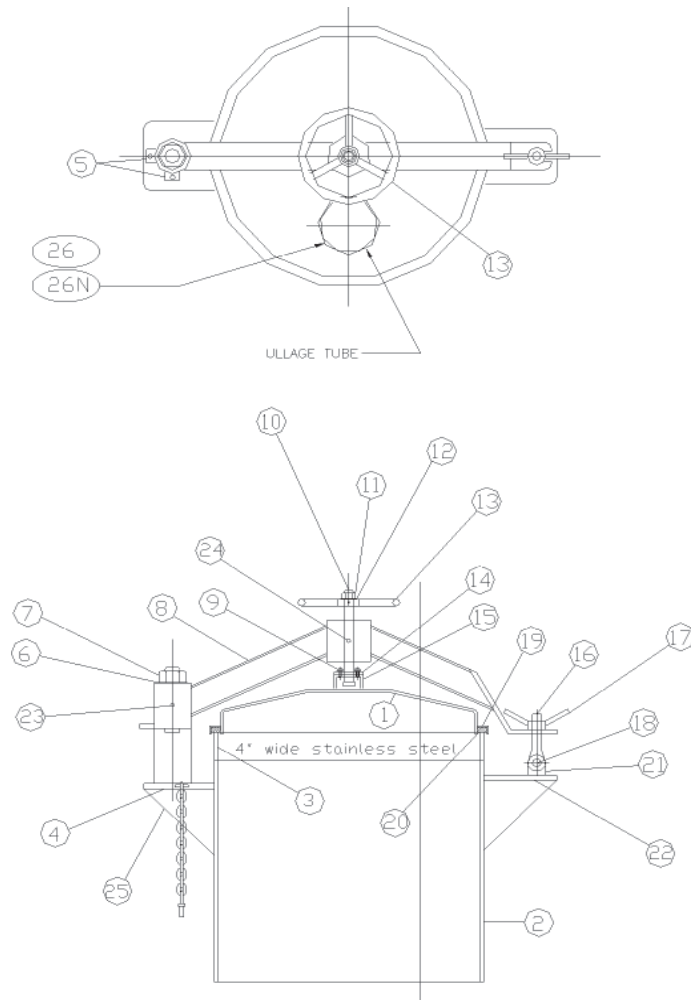


PIECE NO.	DESCRIPTION	PART NO.	MATERIAL
1	SIDE PLATE	79847	MILD STEEL
2	HUB	79855	COLD ROLLED STEEL

ROLLING COVER WHEEL

The specifications and details described by drawings or text in this literature are subject to change without notice.

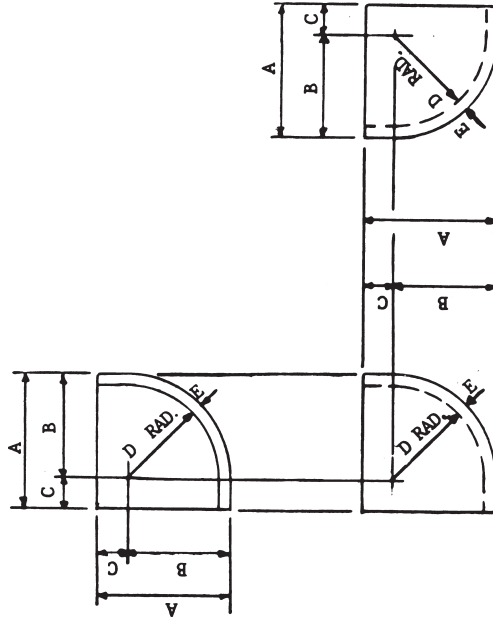
OCEAN DOME



Piece No.	Description	Material
1	COVER	MILD STEEL
2	COAMING	ABS GRADE A STEEL
3	SS COAMING	STAINLESS STEEL
4	PIN PAD	MILD STEEL
5	LOCKING PIN PAD	MILD STEEL
6	WASHER	BRASS
7	HEX NUT	STAINLESS STEEL
8	YOKE	MILD STEEL
9	HEX NUTS	MILD STEEL
10	SPINDLE	STAINLESS STEEL
11	HEX NUT	STAINLESS STEEL
12	WASHER	BRASS
13	HANDWHEEL	MILD STEEL
14	SPINDLE PAD CAP	MILD STEEL
15	SPINDLE PAD	MILD STEEL
16	DROP BOLT	BRASS
17	WING NUT	BRASS
18	DROP BOLT PAD	BRASS
19	GASKET RETAINER	MILD STEEL
20	GASKET	NEOPRENE
21	PIN PAD	MILD STEEL
22	DROP BOLT PAD	MILD STEEL
23	GREASE FITTING	BRASS
24	GREASE FITTING	BRASS
25	PAD BRACKETS	MILD STEEL
26	RETAINER RING	MILD STEEL
26N	FLAME SCREEN	STAINLESS STEEL



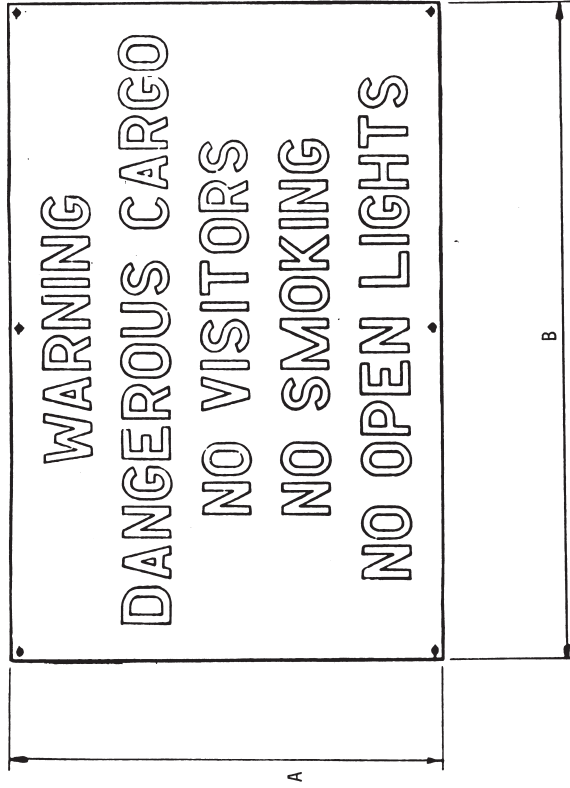
NASHVILLE BRIDGE COMPANY



MODEL NO.	PART NO.	SIZE	A	B	C	D	E	WT. (lbs.)
DF-486-6	87998	6	8 ³ / ₄	6 ³ / ₄	2	6	3/4	54
DF-487-12	88005	12	14 ³ / ₄	12 ³ / ₄	2	12	3/4	167

STEEL CORNER PLATES

The specifications and details described by drawings or text in this literature are subject to change without notice.



- NOTES: 1. THIS SIGN CONFORMS TO 46CFR151.45-2(e)(1)
2. INFORMATION SHOWN ON BOTH SIDES OF SIGN

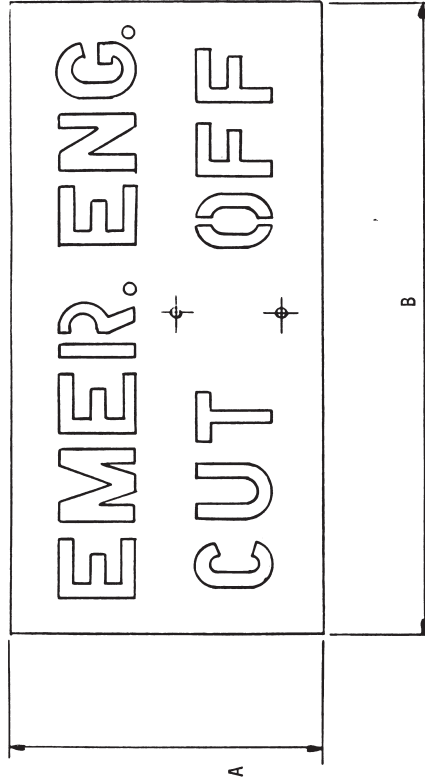
MODEL NO.	PART NO.	SIZE	A	B	WT. (lbs.)
DF-125	6718	27 x 40	27	40	5

ALUMINUM WARNING SIGN

The specifications and details described by drawings or text in this literature are subject to change without notice.



NASHVILLE BRIDGE COMPANY



- NOTES: 1. INFORMATION SHOWN ON BOTH SIDES OF SIGN
2. THIS SIGN CONFORMS TO 46 CFR 32.50-35 (a)

MODEL NO.	PART NO.	SIZE	A	B	WT. (lbs.)
DF-335	6351	8 x 16	8	16	4

ALUMINUM EMERGENCY ENGINE CUT OFF SIGN

The specifications and details described by drawings or text in this literature are subject to change without notice.



- NOTE: 1. THIS SIGN CONFORMS TO 33 CFR 155.450 (a)
2. INFORMATION SHOWN ON ONE SIDE OF SIGN
3. WHITE LETTERS ON RED BACKGROUND

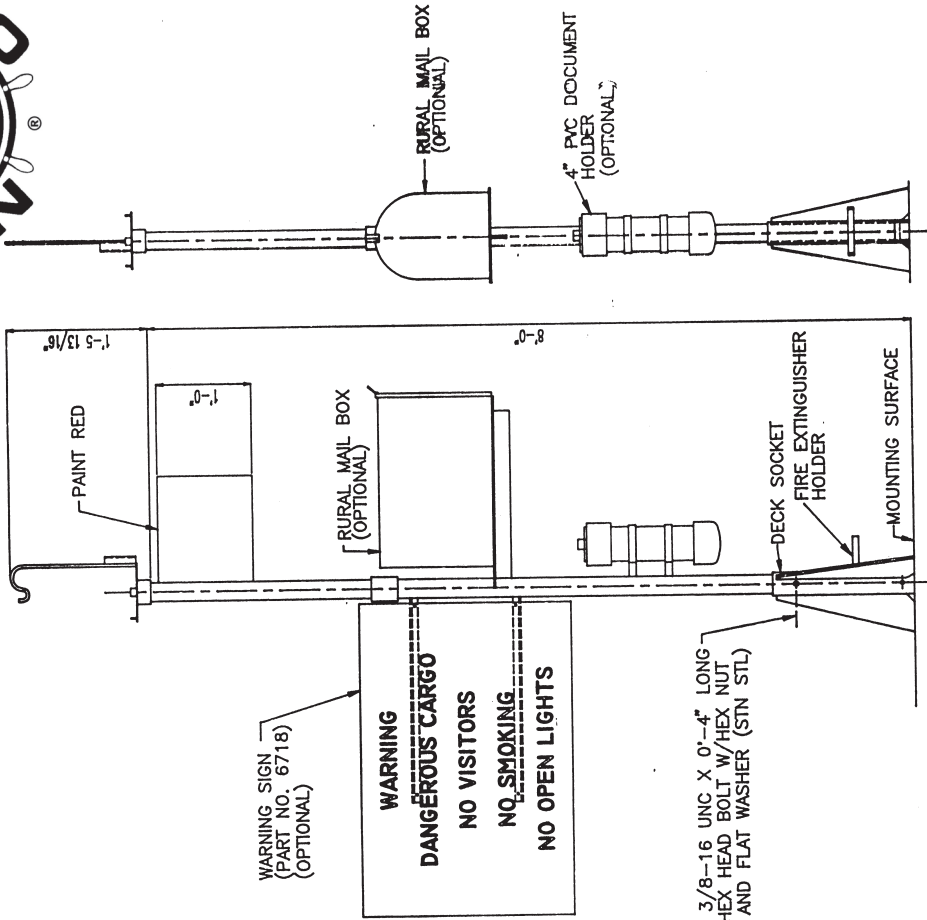
MODEL NO.	PART NO.	SIZE	A	B	WT. (lbs.)
DF-513	75434	8 x 14	7 7/8	13 13/16	1 1/2

PLASTIC OIL POLLUTION WARNING SIGN

The specifications and details described by drawings or text in this literature are subject to change without notice.

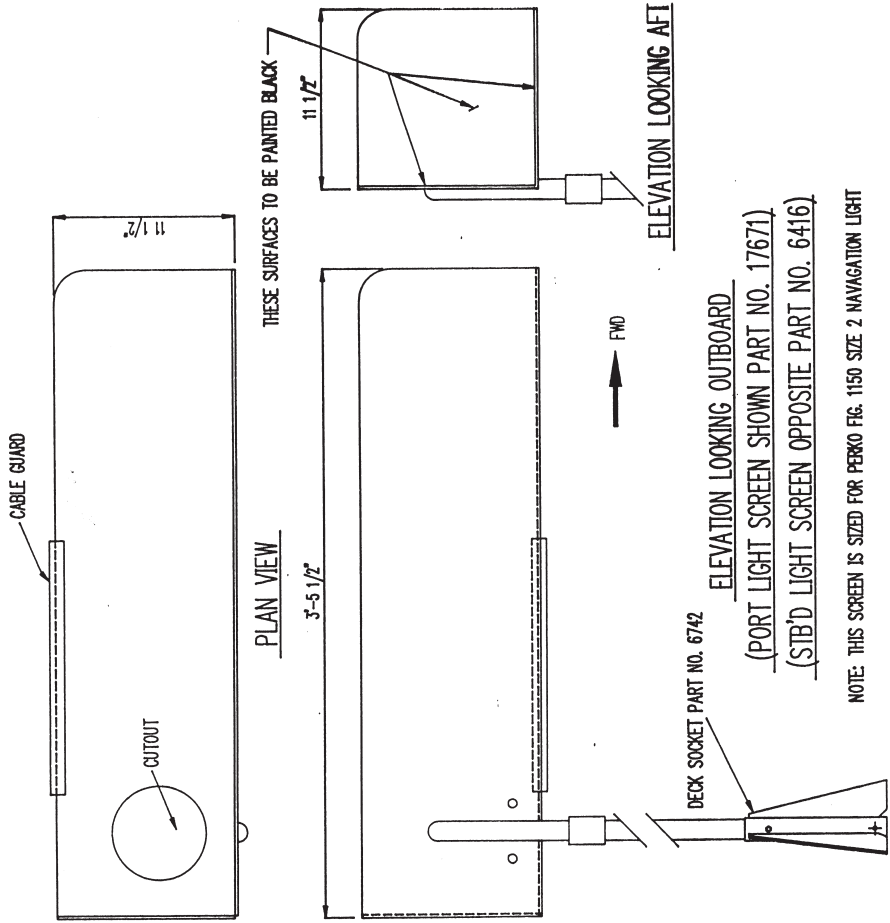


NASHVILLE BRIDGE COMPANY



MODEL NO.	PART NO.	WEIGHT (lbs)
DF-84	6785	

BARGE FLAG POLE AND WARNING SIGN



NOTE: THIS SCREEN IS SIZED FOR PERKO FIG. 1150 SIZE 2 NAVIGATION LIGHT

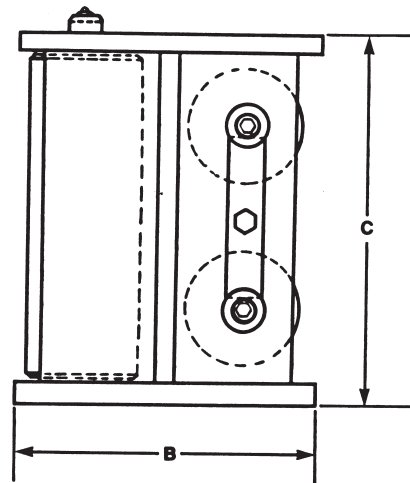
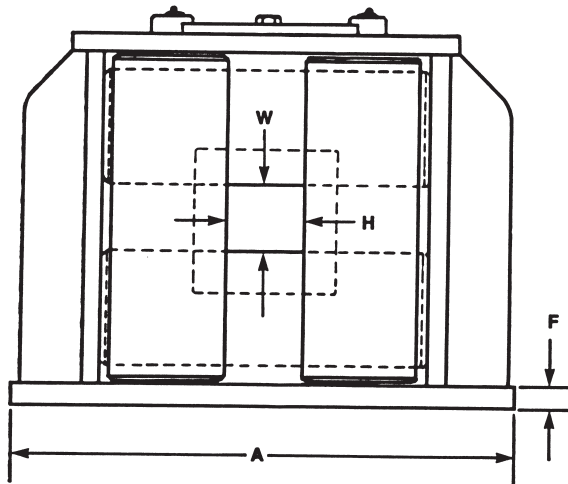
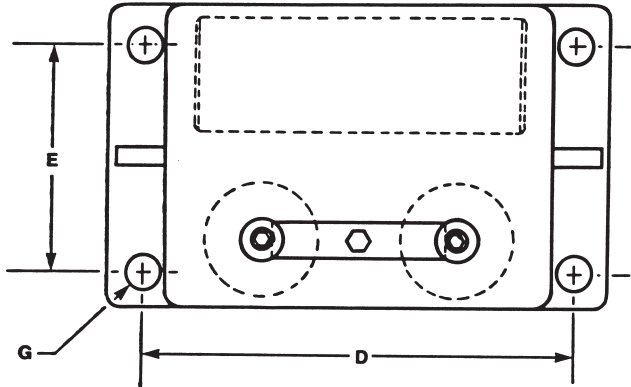
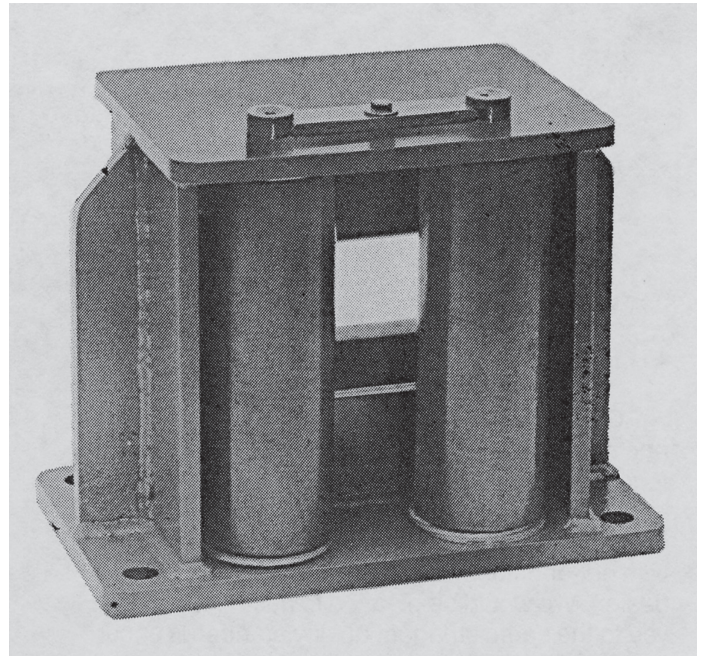
MODEL NO.	PART NO.	DESCRIPTION	WEIGHT (lbs)
	17671	PORT LIGHT SCREEN	
	6416	STB'D LIGHT SCREEN	
	6742	DECK SOCKET	

RUNNING LIGHT STANDS (PORT AND STB'D)

SKOOKUM®

Roller Fairleads

- Alloy steel rollers, heat treated
- Bronze bushings
- "Stressproof" steel pins
- Bolt down bases



MODEL NO.	WIRE ROPE SIZE	VERTICAL ROLLER	HORIZONTAL ROLLER	OPENING WxH	A	B	C	D	E	F	G	ROLLER PIN	NO. BOLT HOLES	LBS. KGS.
RF-0	in. 5/16-3/8	2 1/4x6 1/2	2 1/4x6 1/2	2 1/4x2 1/4	12	5 1/4	8 3/16	10 1/4	3 3/8	1/2	25/32	1	4	52
	mm. 8-10	57x165	57x165	57x57	305	133	208	260	98	13	20	25		24
RF-1	in. 3/8-7/8	4x11 3/8	4x11 3/8	2 3/4x2 3/4	17 1/2	10 1/2	13 3/8	15	8	3/4	1 1/16	1 3/8	4	235
	mm. 16-22	102x289	102x289	70x70	444	267	333	381	203	19	27	35		107
RF-2	in. 1-1 1/4	6x15 3/8	5x11	5x4	26	17	18 1/2	22	12 1/2	1 1/8	1 17/32	1 1/2	4	700
	mm. 25-32	152x391	127x279	127x102	660	432	470	559	318	29	39	38		318
RF-3	in. 1 3/4	8x22 1/2	8x22 1/2	6 1/2x6 1/2	36 3/4	23	27 1/8	31	8	1 1/2	1 13/16	3	6	2400
	mm. 44	203x572	203x572	165x165	933	584	689	787	203	38	46	76		1089

probably from Louisiana if...

You plan your wedding around hunting season & LSU football

FREEMAN OFFERS THE WIDEST SELECTION OF DOOR MODELS AND OPTIONS TO MEET YOUR SPECIFICATIONS



FREEMAN doors are built rugged with precision working components of stainless steel, marine aluminum and other quality materials. The precise fit and adjustable dogging of a Freeman door, along with its positive door jamb seal make it your best choice for new and old vessels alike.

A FREEMAN door is strong enough to withstand the onslaught of solid water, yet tight enough to keep out years of rain and spray. Typical installations include wheel-house, cabin side, engine room, stateroom access, and more.

FREEMAN doors offer a wide selection of options and a variety of styles to fit most applications. You'll be assured of rugged FREEMAN MARINE quality throughout! The elegant yet functional outward appearance masks the strength within.

All FREEMAN doors use our unique tight seal. A single piece, hollow neoprene or silicone gasket on the door's perimeter seals against the door jamb sealing edge, creating a high compression, uniformly tight seal. Mounting the gasket on the door rather than on the frame prevents premature failure of the gasket, common among doors with a frame mounted gasket.

FREEMAN doors solidly constructed and fully insulated, double-skin panel doors are suitable for the following typical high traffic access installations: pilothouse, galley, engine and staterooms, salon, main deck and above. Workboat, fishboat, and yacht alike rely on FREEMAN MARINE to provide superior construction at an affordable price.



probably from Louisiana if...

You offer somebody a "coke" and then ask them what kind: Coca-Cola, Dr. Pepper Pepsi, 7Up?

1110 SERIES STANDARD DUTY DOOR *WEATHER TIGHT SINGLE PANEL

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1110 SERIES Standard Duty, Weather Tight Rated, Single Panel Doors have double-skin panel construction offering rugged simplicity yet broad flexibility for configuring to your specific needs. These doors have .080" mill finished aluminum door skins captured in an extruded aluminum panel framework, clamp grip style windows with 3/16" clear glass, and marine grade lever handle locksets. The outer skin is trapped by the door panel extrusion, and the inner skin is riveted.

Solidly constructed and fully insulated, double-skin panel doors are suitable for the following typical high traffic access installations: pilothouse, galley, engine and staterooms, salon, main deck and above. Workboat, fishboat, and yacht alike rely on FREEMAN MARINE to provide superior construction at an affordable price.

STANDARD DUTY DESIGN FEATURES

- .080" Aluminum Panel Skins - Outside and Inside
- Welded Panel Frame for Strength.
- Outer Skin Captured in Frame Extrusion, Riveted Inner Skin.
- Gasket on Door Panel for Long Life and Positive Sealing.
- Radius or Mitered Corners.
- Bolt-in, Weld-in or Clamp-in Frames.
- Fully Welded Internal Doublers at All Seams.
- Mill Finish Aluminum Door Skins.
- Cast Aluminum Dogging Handles with Powder Coated Finish.
- Stainless Steel Dog Shafts.
- Glass Filled Striker Wedges.
- Solid Polyurethane Insulation.
- Stainless Steel Hinges.
- Stainless Steel Fasteners.
- Clamp-Grip Window with 3/16" Clear Tempered Glass - Options Available.

Where suitable, doors can be designated to include additional windows and/or dogs or omit windows and/or dogs. Pilothouse doors are often provided with windows in both top and bottom of the panel to allow greater operator visibility to deck or waterline areas.



Interior view of a typical standard duty door, showing door dog used here to secure the two halves of a dutch panel door, providing a weathertight seal and preventing unauthorized entry



Shown are two of the many custom window options available in standard duty doors.



probably from Louisiana if...

You can name all of your 3rd cousins

1120 SERIES HEAVY DUTY DOOR *WEATHER TIGHT SINGLE PANEL

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1120 SERIES Heavy-Duty, *Weather Tight Rated, Single Panel Doors feature thick panel skins (.160"), extra internal reinforcements, no seams exposed and all welded construction creating a rugged, seamless closure in individually dogged versions. Heavy-Duty doors feature a lineal brushed finish, a trademark of FREEMAN Heavy Duty Doors that creates a durable, uniform texture.

When specified with optional FREEMAN Bristol yacht quality paint to your color specifications, the 1120 Series' seamless welded construction makes an impressive, rugged portal that features long lasting beauty. Double-skin panel construction offers rugged simplicity yet allows for a broad variety of configurations. These doors offer welded in windows and can accommodate special glazing. Solidly constructed and fully insulated and moderately priced, Freeman Heavy-Duty doors are suitable for the following typical high traffic access installations: Pilothouse, Galley, Engine Room, Aft Salon and Main Deck

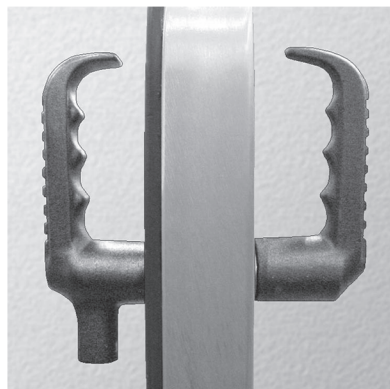


HEAVY-DUTY DESIGN FEATURES

- .160" Thick Aluminum Panel Skins Standard - .125" to .250" Available
- Welded Frame & Skin Construction.
- Gasket on Door Panel for Long Life and Positive Sealing.
- Radius or Mitered Corners.
- Bolt-in, Weld-in or Clamp-in Frames.
- Additional Internal Stiffeners for Extra Ruggedness.
- Lineal Sanded Finish Standard. Yacht-Quality Painted Finish Available.
- Solid Insulation Standard - Optional Materials Available.
- Welded In Window - Glazing and Tint Options Available.
- Stainless Steel Dog Shafts.
- Cast Aluminum Handles - Powder Coat Standard - Options Available.
- Glass Filled Striker Wedges.
- Stainless Steel Hinges.
- Stainless Steel Fasteners.

Pilothouse doors are often provided with windows in both top and bottom of the panel to allow greater operator visibility to deck or waterline areas. Where suitable, doors can be designated to include additional windows and/or dogs or omit windows and/or dogs.

Below left shows interior (dog) and exterior contours of typical powder coated cast aluminum handle set. Below right is a mitered corner engine room door showing door mounted gasket, cast aluminum dog/handles and optional round window



probably from Louisiana if...

Every so often, you have waterfront property.

1130 SERIES **WATERTIGHT RATED PREMIUM PANEL SINGLE DOORS

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1130 SERIES ** Watertight Rated, Premium Panel Single Doors feature a rugged knife-edge seal, robust gasket and floating hinges to provide a premium watertight seal when properly adjusted and dogged closed.

Thick panel skins (.160" up to .250"), extra internal reinforcements, no seams exposed and all welded construction create the rugged, seamless closure that is demanded from a premium, individually dogged door.

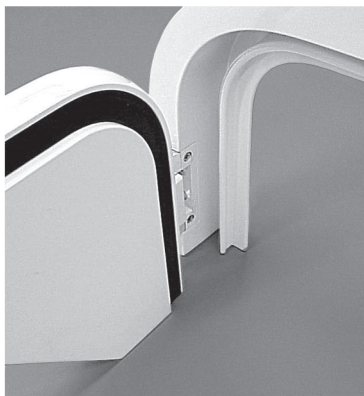
When Bristol yacht quality painted to your color specifications by Freeman, the 1130 Series' seamless welded construction makes an impressive, rugged portal that features long lasting beauty. These doors offer welded in windows and can accommodate special glazing.

Solidly constructed, fully insulated and moderately priced, FREEMAN Premium Panel doors are suitable for engine room, transom and bulkhead applications.

** Degree of watertightness depends on number of dogs, proper installation and sealing adjustment. Watertight doors are individually defined, specified and fabricated for each application.

PREMIUM PANEL DESIGN FEATURES

- 160" Thick Aluminum Panel Skins Standard - Up to .250" Available.
- Welded Frame & Skin Construction.
- Gasket on Door Panel for Long Life and Positive Sealing.
- Welded In Window - Glazing and Tint Options Available.
- Bolt-in, Weld-in or Clamp-in Frames.
- Cast Aluminum Handles, Powder Coat Standard - Options Available.
- Solid Insulation Standard - Optional Materials Available.
- Additional Internal Stiffeners for Extra Ruggedness.
- Lineal Sanded Finish Standard - Yacht-Quality Painted Finish Available.
- Stainless Steel Dog Shafts.
- Glass Filled Striker Wedges.
- Stainless Steel Hinges.
- Stainless Steel Fasteners.
- Radius Corners.



These photos illustrate the knife edge seal and panel mounted gasket (left), and dog/handle detail (right).



probably from Louisiana if...

You can pronounce Tchoupitoulas but can't spell it. (also, Thibodaux, Opelousas, Pontchartrain, Ouachita, Atchafalaya),

1400 SERIES QUICK-ACTING, SINGLE ACTUATION PANEL DOORS

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1400 SERIES QUICK-ACTING DOOR SYSTEM.

- Patented Chain Drive Dogging System.
- Heavy-duty Panels.
- Models Available For Weather Tight Or Watertight Rated Locations.
- 1500 And 1600 Series Doors Also Available With "Quick-acting" Dogging.

FREEMAN MARINE'S Quick-Acting door is designed to fill a need in the marine industry for handsome, double skinned, fully insulated doors, suitable for both yacht and commercial use. Actuating a single handle easily dogs doors; several styles of internal and external handles are available. The quick-acting dogging system utilizes a patented chain drive mechanism that is fully contained between the inner and outer skins of the door, affording protection from the elements.

FREEMAN MARINE'S 1400 Series Doors offer the utmost in versatility. FREEMAN'S patented chain-drive dogging system allows the installation of full length, centrally located and specially shaped windows; this design feature is not available on competitive products.

FREEMAN MARINE'S Quick-Acting Doors feature quality construction marine grade aluminum, 316L stainless steel, and other durable marine grade materials are used throughout. All doors are fully welded internally with doublers at all seams and cross-braced to provide even more rigidity.

Several hinge configurations are available including surface, barrel, concealed yoke and pantograph.

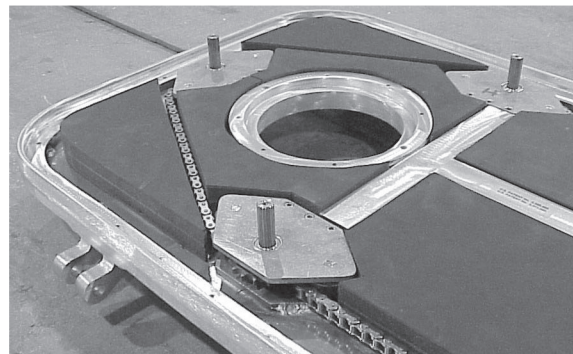
FOR WEATHER TIGHT RATED INSTALLATIONS:
1420 Series Doors featuring an adjustable sealing stop in the door coming should be specified.

FOR WATERTIGHT RATED INSTALLATIONS:
1430 Series Doors that utilize knife-edge sealing and a large gasket surface are the correct choice.

Doors are normally supplied with four to six dogs; additional dogs can be specified for larger doors. A keyed locking system that secures all the dogs by engaging the drive chain is a popular option.



Three styles of Quick-Actuating handles are depicted above. Below: Model 1430 water door under construction reveals the internal stiffeners, port window, Quick-Acting chain drive mechanism and accostic insulation.



probably from Louisiana if...

You don't worry when you see ships riding higher in the river than the top of your house.

1500 SERIES DUTCH PANEL DOORS STANDARD DUTY, HEAVY DUTY & PREMIUM

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1500 SERIES DUTCH PANEL DOORS.

- AVAILABLE IN BOTH STANDARD DUTY (1510) AND HEAVY-DUTY (1520) MODELS .

FREEMAN MARINE'S Dutch door performs like a single panel door when regular access is needed, yet the top half can be operated separately from the bottom half to improve ventilation and visibility.

The same high quality tooling and processes used to make FREEMAN single panel doors are put to work in the construction of each Dutch door.

A gasketed seam seals the top and bottom halves of the door to each other. Offering simplicity yet broad variation of style, solidly constructed and fully insulated, typical Dutch door applications include the galley and pilothouse of all types of craft.

Several examples of Freeman Marine standard and heavy duty Dutch doors are shown, including a unit with angled frame and window, fabricated to the customer's exact specifications.



probably from Louisiana if...

You judge a po-boy by the number of napkins used. (Amen) You Got dat rite

1600 SERIES FRENCH PANEL DOORS STANDARD DUTY, HEAVY DUTY & PREMIUM

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1600 SERIES FRENCH PANEL DOORS.

- AVAILABLE IN BOTH STANDARD DUTY (1610) AND HEAVY-DUTY (1620) MODELS.

When wider access is needed, FREEMAN MARINE'S French door performs like two single panel doors that seal to each other.

The same high quality tooling and construction techniques used to make the single panel door are put to work in the construction of each French door. A gasketed seam seals the two door panels to each other.

Common vessel locations for French doors are in high traffic entryways and passageways.

Where suitable, doors can be designated to include additional windows and/or dogs or omit windows and/or dogs.



Depicted are several styles of Freeman Marine French doors, including standard and heavy duty types and two views of a unit (open & closed) with maximum windows. This latter unit has concealed latches to secure the inactive panel and to prevent unauthorized entry.



probably from Louisiana if...

The waitress at your local sandwich shop tells you a fried oyster po-boy dressed is healthier than a Caesar salad.

1700 SERIES SLIDING DOORS **STANDARD DUTY, HEAVY DUTY & PREMIUM**

FREEMAN
MARINE EQUIPMENT, INC.

FREEMAN MARINE'S 1700 SERIES SLIDING DOORS

- 1710 SERIES: "SINGLE AXIS" - ECONOMICAL... AND VERY VERSATILE.
- 1720 SERIES: "DUAL-AXIS " - FULL PERIMETER NEOPRENE GASKET & CAM- ACTUATED WEATHER TIGHT SEALING.

Wherever you need a sliding door - pilothouse, aft salon, or mid-ship access - FREEMAN MARINE Sliding Doors will perform smoothly, reliably and elegantly.

FREEMAN MARINE Sliding Doors can be specified in virtually any size required and a variety of configurations - single panel, bi-parting, and multi-panel styles. Custom sized windows designed to complement adjacent vessel windows can be ordered. Passive solid panels as well as sidelights are also available.

FREEMAN MARINE Sliding Doors are finished in yacht-quality linear polyurethane and offer attention to detail, durability, performance and style not found in ordinary sliding doors.

Panels are precision crafted from rugged aluminum extrusions and sheet, roll on noise-isolating rollers and latch with the highest quality hardware available.

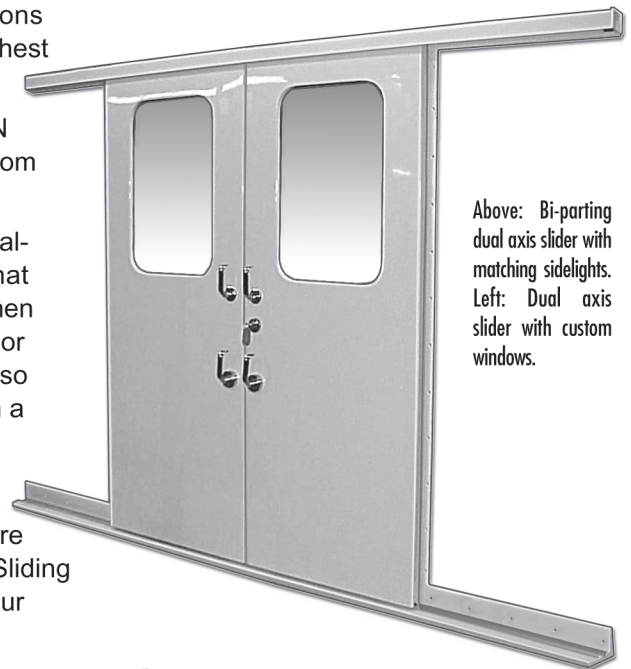
- DUAL-AXIS "FULL PERIMETER" GASKET & CAM ACTION SEALING - 1720 SERIES. A Patented Design Exclusively from FREEMAN MARINE.

FREEMAN MARINE proudly offers its exclusive, patented Dual-Axis sealing feature - a single lever actuated mechanism that creates a weather tight, full perimeter, positive gasket seal when the door is fully closed and "cammed in". Ideal for both exterior and interior applications, this single handle camming ability also acts as a HOLD OPEN FEATURE to secure the door panel in a secure, stationary position at any point along its track.

- "SINGLE AXIS" SLIDING DOORS - 1710 SERIES

When cost is a consideration or the door's location allows more traditional felt strip sealing, FREEMAN MARINE Single-Axis Sliding Doors are usually specified. The same craftsmen that build our Dual-Axis doors craft these doors with the same careful attention to detail. The only real differences are the track and sealing design. Reliability, craftsmanship and attention to detail are without compromise.

Most 1720 sliders are fully finish-painted and provided with windows and operating hardware per customer's specification. Note separate operating handles for the locksets and the internal camming mechanism.



Above: Bi-parting dual axis slider with matching sidelights.
Left: Dual axis slider with custom windows.



probably from Louisiana if...
You know the definition of "dressed."

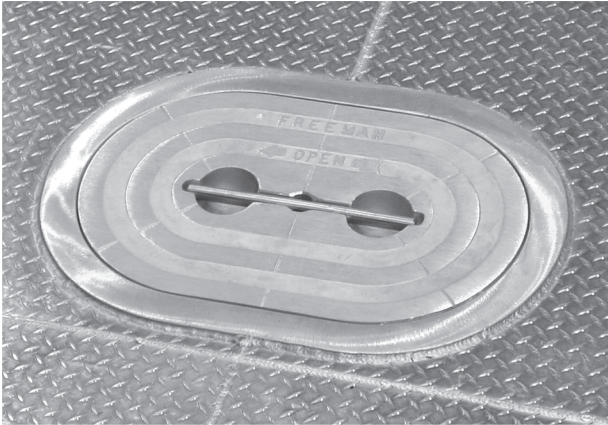
WIDEST RANGE OF MODELS AND FEATURES OF ANY BRAND

FREEMAN MARINE 2400 Series Cast Hatches

are specified and used on a wide variety of yachts, fishing boats, tugs, barges, research vessels, offshore tenders, rescue craft and other workboats. The FREEMAN hatch is designed for new boats, for replacing other hatches in standard openings, or for improving existing craft. They can be installed in any deck style or material using stock



Round and square hinged cast hatches with aluminum deck rings ready to install in steel, aluminum, wood or fiberglass decks. In the center is an elliptical cast lift-out hatch with a stainless steel weld-in deck ring.



- **Top Value**

A FREEMAN Cast Hatch is the best buy for every flush hatch application. Measure it against any other hatch for long life of materials, strength of design, precision fit, smooth action, dependable mechanism, and built-in, never-lost handle.

- **Value Added**

Yacht-quality linear polyurethane, powder coat, and anodized finishes available.

- **Unique**

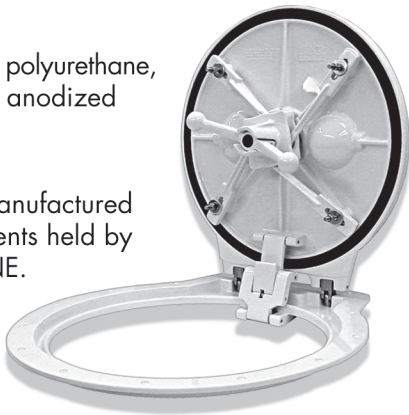
Developed and manufactured under various patents held by FREEMAN MARINE.

- **Fast Acting**

Simply grasp the handle and pull, the shaft slides up into place, and with less than a quarter of a turn completely disengages the locking mechanism. The dogs and linked handle do the work smoothly in just a second.

- **Easy Lift**

With the locking mechanism disengaged, the hatch is merely resting on the deck ring and can be lifted out with one hand.



- **Positive Dogging**

Closing is just as quick and easy. Evenly spaced dogging arms (either 3, 4 or 8 per hatch) exert uniform pull on the cover plate. Handle position shows when dogging arms are engaged or loose.

- **Hatch Sealed**

Hatch and handle fit flush with the deck, the handle in recessed lock position. The FREEMAN Cast Hatch handle is always there when you need it.

- **Watertight**

Designed to seal up to 25-foot head, the double-sealing gasket actually seals tighter under pressure.

- **Versatile**

Installs in steel, aluminum, wood or fiberglass decks. Complete unit includes aluminum or steel mounting ring for bolting or welding installations.

- **Reliable**

The unique design, fit, finish and adjustability of the dogging mechanism assures smooth, consistent action - no binding or jamming of parts. This hatch, adjusted to proper tensions, can't be over or under tightened by mistake. It operates the same each time.

- **Low Maintenance**

All parts are made of superior materials designed especially for marine and other abusive environments. The hatch and most parts are corrosion resistant aluminum. All other components are stainless steel, acetal or compatible.

- **Customer Approvals**

U.S. Coast Guard, CE, ISO-12216 compliant, ABS, Lloyd's Register of Shipping, Bureau Veritas and German Lloyd's approvals have been awarded and may be obtained for specific intended uses. FREEMAN Cast Hatches are currently in use on Coast Guard vessels and U.S. Naval craft of all types.

probably from Louisiana if...

You can eat Popeye's, Haydel's and Zapp's for lunch and wash it down with Barq's and several Abitas, without losing it all on your stoop.

2400 SERIES ALUMINUM CAST HATCH VARIETY & FEATURES

FREEMAN
MARINE EQUIPMENT, INC.

MORE SIZES AND STYLES TO FIT YOUR APPLICATION

Whether it's for new construction or improving an existing craft, easy-to-install and precision crafted deck hatches are a must for convenient access and watertight integrity on commercial vessels. No company knows this better and offers more models of Cast Hatches than FREEMAN MARINE of Gold Beach, Oregon USA



Lift out 15"X24" Cast Aluminum hatch with compression seal aluminum deck ring.

Often copied but never equaled, FREEMAN offers more fit-for-purpose styles and more optional features than any other cast hatch manufacturer in the world. FREEMAN'S size range reaches from an 8" (201mm) opening size round lift-out all the way up to an impressive 36"x36" (915mm x 915mm) square hinged hatch with integral hold-open. FREEMAN MARINE provides mounting ring models to adapt their cast aluminum hatch covers to virtually any deck style or material.

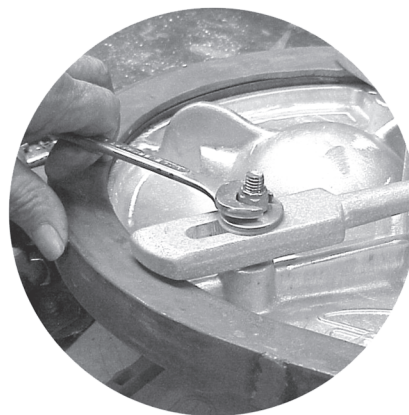


24" Square hinged hatch with steel deck ring. Note raised T-Handle in the open position.

TWO IMPORTANT FEATURES DISTINGUISH FREEMAN CAST ALUMINUM HATCHES FROM OTHER DESIGNS:

#1...The standard pocketed, stainless steel T-handle is built in - permanently part of the hatch so it's right there where you need it every time. It can't get lost. Simply grasp the handle and pull, the shaft slides up into place, and with less than a quarter of a turn the locking mechanism completely disengages. It's a matter of one or two seconds. The alignment of the handle shows when dogging arms are engaged or loose.

#2...The evenly spaced dogging arms (either 3, 4 or 8 depending on size of hatch) exert uniform sealing pressure on the cover plate. The unique design, fit and adjustability of FREEMAN'S dogging mechanism assure smooth, consistent action - no binding or jamming of parts. Adjusted to proper tensions, a FREEMAN HATCH can't be over or under tightened by mistake. It operates the same each time.



Each dog can be easily adjusted for even, balanced tension assuring smooth operation, security and longevity of FREEMAN cast aluminum hatches.

Reliability and accessibility of service parts is always a concern for critical vessel components. While ruggedly designed and precision crafted, deck hatches are often subjected to the most severe conditions and encounter more than a few "hard knocks". Whether it's a original replacement gasket for periodic scheduled maintenance or parts needed to repair a hatch regrettably damaged, BYRNE, RICE & TURNER keeps substantial inventories of FREEMAN parts for immediate shipment.

probably from Louisiana if...

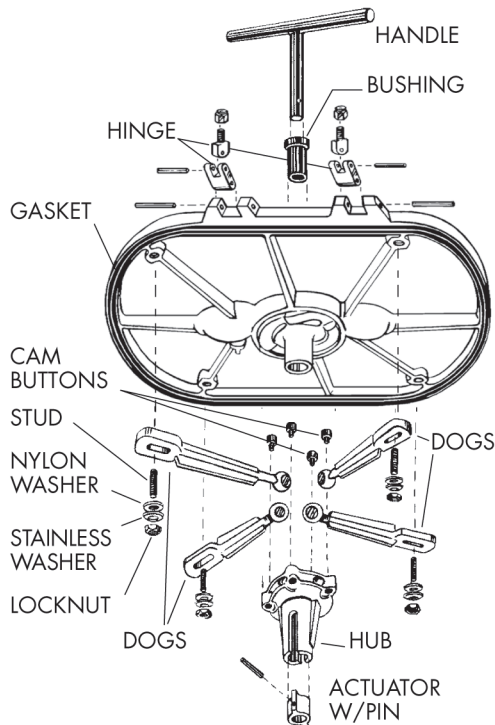
The smell of a crawfish boil turns you on more than HBO.

2400 SERIES ALUMINUM CAST HATCH STYLES

FREEMAN
MARINE EQUIPMENT, INC.

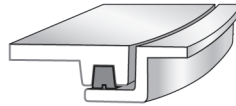
TYPICAL HATCH COVER ASSEMBLY

With Complete Mechanism Installed
Shape & optional hinge vary by model

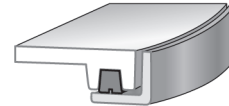


KNIFE EDGE OR COMPRESSION?

- **Compression Seal 2400 Series Hatches** have easy-to-clean spigots, feature long gasket life, and are economical to purchase.
- Aluminum Deck Rings are intended to be weld installed into aluminum decks and bolt installed into other deck materials.

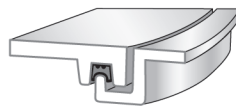


Compression Seal w/Aluminum Deck Ring

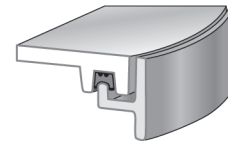


Compression Seal w/Steel Deck Ring

- Steel Deck Rings are to be weld installed into steel decks only.
- Watertight seal intermittent to 25 foot head, continuous 10 foot head top-loaded pressure (on properly installed and adjusted hatch assemblies).
- Specify any special performance criteria and/or certification requirements at time of order.
- **Knife Edge Seal 2400 Series Hatches** feature a coaming with drain gutter and an aggressive sealing rim edge. A drain fitting can be installed to minimize water from entering enclosure when hatch is initially opened.

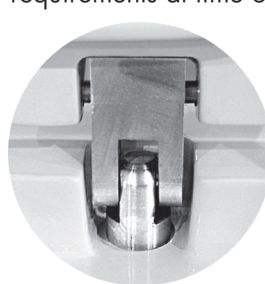


Knife Edge Seal w/Aluminum Deck Ring



Knife Edge Seal w/Steel Deck Ring

- Aluminum Deck Rings are intended to be weld installed into aluminum decks and bolt installed into other deck materials.
- Steel Deck Rings are to be weld installed into steel decks only.
- Specify any special performance criteria and/or certification requirements at time of order.



Interior view of standard Freeman "floating" hinge installed on hatch assembly.



• Hinged Hatches

For hinged models the unique hinging device allows the hatch to be opened more than 180 degrees and "floats" when the hatch is closed to facilitate a tighter seal. Round hatches 18" and larger, and all oval and square hatches with aluminum covers are available hinged from the factory.



This 2435-Series (above) (19" x 26") flush-top cast hatch features a watertight, knife edge sealing edge with integral gutter. When closed, the hatch provides a totally flush deck surface. It has been custom assembled with a concealed, below deck yoke hinge and integral hold open.

probably from Louisiana if...

You're not afraid when someone wants to "ax you something."

ROUND HATCHES

- Round hatch sizes 8", 12", and 15" are ideal for quick-acting access into shaft alleys, for fish sorting, void inspection, ventilation and access to valving, piping, wiring, controls, and other areas where seaworthy security is required.



8" & 12" Round hatch with compression seal and aluminum ring.

- 18", 20", 22", 24" and 30" round clear opening manhole-sized access hatches are ideal for entry and escape of all types, especially when a person must be able to pass through the opening. Escape route applications, storage access, lazarette access, fish sorting, and many more applications are common Freeman Marine installations.



24" Round hinged hatch with knife edge seal and aluminum ring (left) and an 18" Round lift out hatch with knife edge steel ring (right).

OVAL HATCHES

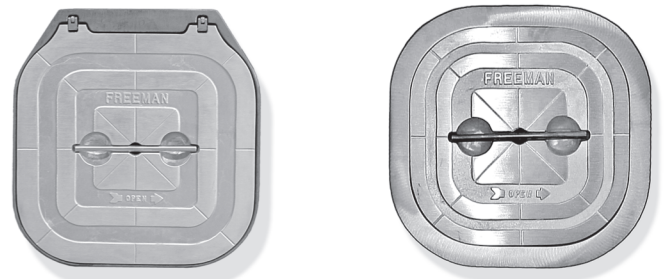
- Oval Style 12"x18", 15"x24" and 19"x26" lift out or hinged clear opening hatches are ideal for manhole-sized access of all types, especially when deck framing restricts cutout dimensions. Escape route application, storage access, lazarette access, fish sorting, and many more applications are common oval shaped Freeman hatch installations. The 15"x24" clear opening dimension is a standard used by many throughout the world as a crawl-through access opening.



Two 15" X 24" Oval hatches. Left: Lift out style with knife edge seal aluminum ring. Right: Hinged hatch with knife edge seal steel ring.

SQUARE & RECTANGULAR HATCHES

- Square hatch sizes 20"x20", 22"x22", 24"x24", 30"x30" and 36"x36" are best for quick-acting access, escape routes, gear storage and where other types of large manhole-sized watertight security is required.
- The square models utilize a knife-edge sealing surface design that reduces the possibility of water dripping into a compartment when the hatch is opened, yet offer the advantages of flush deck versatility. The diagonal dimension opening is greater than standard oval or round shape hatches.



Above Left: Square hinged hatch with knife edge seal steel ring. Above Right: Lift out style with knife edge seal aluminum ring. Right: Rectangular hinged hatch with knife edge seal aluminum ring.



probably from Louisiana if...

You don't learn until high school that Mardi Gras is not a national holiday.

2400 SERIES ALUMINUM CAST HATCH OPTIONS

FREEMAN
MARINE EQUIPMENT, INC.



24" Smooth Top Hatch with optional yoke hinge, hold open and inside escape handle.

HANDLES

- Quarter-turn of center spindle engages or disengages mechanism on all models. All hatches feature uniform & equally spaced dogging with adjustable dog pressures.
- Attached topside T handle standard. Optional removable tools include stowed key style, bi-square, hex drive, or interlocking spanner wrench and spindle combinations.
- Optional Inside escape handles, wheels, or levers available for installation on hatches with clear opening greater than 18" (455mm).

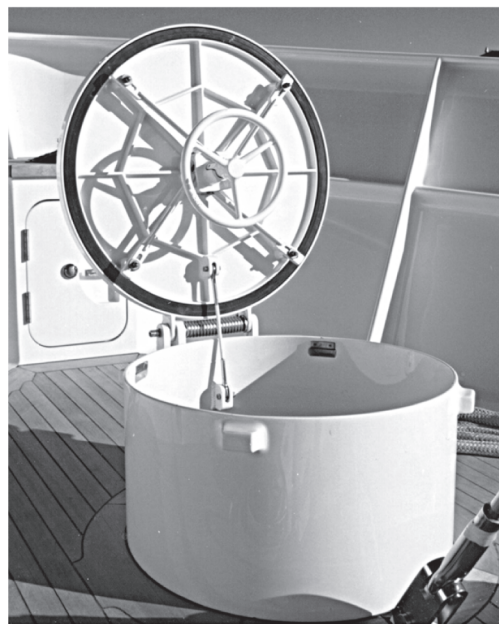
MATERIALS

- Deck rings/coamings available in aluminum, steel, or stainless steel; hot-dip galvanizing is available for steel rings. Optional coaming extensions are available on custom basis.
- Most models utilize standard mechanism aluminum alloy. Stainless steel mechanism available as option on most models.
- Where the term 'CRES' (corrosion resistant steel) or 'Stainless Steel' is used it shall mean type 316 stainless steel unless otherwise specified.

GASKETS

- Neoprene gaskets standard on all hatches-flat surface seal (50 durometer, operating range -60F to +260F) or knife-edge seal (25 durometer, operating range -20F to +225F). Optional gaskets include harder durometer for heavy traffic areas, Buna-N where contact with fuel or oil based materials may occur and other compositions for specialty applications.
- Specialty applications and options are available. Specific intended use approvals may or may not be necessary or available. Contact FREEMAN MARINE or local dealer for additional information.
- Assembly weights shown in charts are standard assembly units using materials shown. Complete assembly weights will be dependent upon options selected for final configuration.

Optimal below deck escape handle.



30" Round Cast Hatch installed on knife edged raised coaming. Note optional inside wheel and spring loaded hold open.

probably from Louisiana if...

You don't realize until high school what a "county" is.

2400 SERIES ALUMINUM CAST HATCH COMPRESSION SEAL/ALUMINUM RING

FREEMAN
MARINE EQUIPMENT, INC.



30" Round lift out with aluminum ring



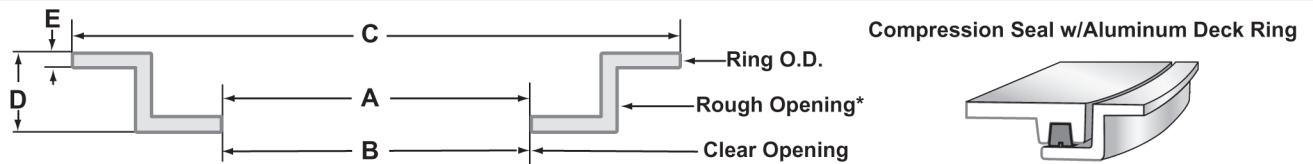
22" Round hinged with aluminum ring



8" Round lift out with aluminum ring



15"X24" Oval lift out with aluminum ring



PART NO.	"SIZE"	SHAPE	STYLE	DIMENSIONS								MECHANISM				ASSEMBLY WEIGHT	
				CLEAR OPENING		ROUGH OPENING*								STD. MATERIAL	DOG QTY.	LBS.	KGS.
				A (inches)	A (mm)	B	C	D	E	OVERALL (inches)	OVERALL (mm)						
2401-0002	8"	ROUND	LIFT-OUT	7.9	201	10.3	12.0	1	0.31	9.8	249	ALUMINUM ALLOY	3	8	3.6		
2402-0002	12"	ROUND	LIFT-OUT	11.9	302	14.8	17.4	1.3	0.31	13.9	353	ALUMINUM ALLOY	3	13	5.9		
2403-0002	15"	ROUND	LIFT-OUT	15.0	381	17.8	21.5	1.3	0.31	17.0	432	ALUMINUM ALLOY	3	23	10.4		
2404-0002	18"	ROUND	LIFT-OUT	18.0	457	20.9	24.5	1.4	0.31	20.0	508	ALUMINUM ALLOY	3	30	13.6		
2406-0002	20"	ROUND	LIFT-OUT	19.8	503	22.8	26.5	1.3	0.31	21.9	556	ALUMINUM ALLOY	4	36	16.3		
2408-0002	22"	ROUND	LIFT-OUT	22.0	559	24.8	28.5	1.6	0.31	24.0	610	ALUMINUM ALLOY	4	39	17.7		
2411-0002	24"	ROUND	LIFT-OUT	23.3	592	26.6	30.5	1.4	0.31	25.8	655	ALUMINUM ALLOY	4	52	23.6		
2415-0002	30"	ROUND	LIFT-OUT	30.0	762	33.5	37.3	1.4	0.31	32.5	826	STAINLESS STEEL	4	81	36.7		
2431-0002	12"x18"	OVAL	LIFT-OUT	12.0x18.0	305x457	15.0x21.0	18.8x24.8	1.5	0.31	14.1x20.3	358x516	ALUMINUM ALLOY	4	29	13.2		
2433-0002	15"x24"	OVAL	LIFT-OUT	14.6x23.4	371x594	17.6x26.6	21.3x30.3	1.5	0.25	16.3x25.9	414x658	ALUMINUM ALLOY	4	35	15.9		
2441-0002	18"	ROUND	HINGED	18.0	457	20.9	24.5	1.6	0.27	20.0	508	ALUMINUM ALLOY	3	35	15.9		
2443-0002	20"	ROUND	HINGED	19.6	498	22.8	26.5	1.7	0.40	21.9	556	ALUMINUM ALLOY	4	44	20.0		
2445-0002	22"	ROUND	HINGED	22.0	559	24.8	28.5	1.7	0.40	24.0	610	ALUMINUM ALLOY	4	45	20.4		
2447-0002	24"	ROUND	HINGED	23.4	594	26.4	30.5	1.7	0.40	25.8	655	ALUMINUM ALLOY	4	59	26.8		
2452-0002	30"	ROUND	HINGED	30.0	762	33.5	37.3	1.7	0.40	32.5	826	STAINLESS STEEL	4	82	37.2		
2471-0002	12"x18"	OVAL	HINGED	12.0x18.0	305x457	15.0x21.0	18.8x24.8	1.5	0.31	14.1x20.3	358x516	ALUMINUM ALLOY	4	31	14.1		
2473-0002	15"x24"	OVAL	HINGED	14.6x23.5	371x597	17.6x26.5	21.6x30.5	1.5	0.31	16.3x25.9	414x658	ALUMINUM ALLOY	4	37	16.8		

*DOES NOT INCLUDE HINGE POCKETS

FREEMAN
MARINE EQUIPMENT, INC.

probably from Louisiana if...

You believe that purple, green and gold look good together (and you will even eat things those colors).

2400 SERIES ALUMINUM CAST HATCH COMPRESSION SEAL/STEEL RING

FREEMAN
MARINE EQUIPMENT, INC.



15"X24" Oval hinged with steel ring



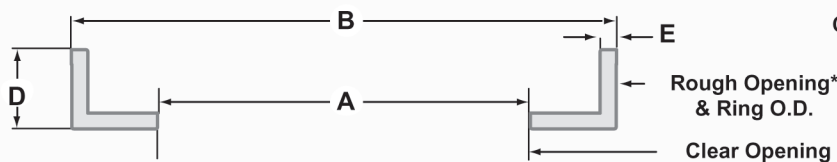
18" Round lift out with steel ring



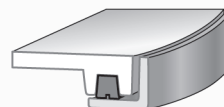
12" Round lift out with steel ring



5"X24" Oval hinged inside view



Compression Seal w/Steel Deck Ring



PART NO.	SIZE	SHAPE	STYLE	DIMENSIONS							MECHANISM				ASSEMBLY WEIGHT	
				CLEAR OPENING		ROUGH OPENING*										
				A (inches)	A (mm)		B	D	E	OVERALL (inches)						
2402-0003	12"	ROUND	LIFT-OUT	11.9	302	14.5	1.3	0.25	13.9	353	ALUMINUM ALLOY	3	16	7.3		
2403-0003	15"	ROUND	LIFT-OUT	15.0	381	17.6	1.3	0.25	17.0	432	ALUMINUM ALLOY	3	26	11.8		
2404-0003	18"	ROUND	LIFT-OUT	18.0	457	20.5	1.3	0.25	20.0	508	ALUMINUM ALLOY	3	32	14.5		
2406-0003	20"	ROUND	LIFT-OUT	19.8	503	22.4	1.3	0.25	21.9	556	ALUMINUM ALLOY	4	37	16.8		
2408-0003	22"	ROUND	LIFT-OUT	22.0	559	24.6	1.5	0.25	24.0	610	ALUMINUM ALLOY	4	40	18.1		
2411-0003	24"	ROUND	LIFT-OUT	23.3	592	26.5	1.5	0.25	25.8	655	ALUMINUM ALLOY	4	54	24.5		
2415-0003	30"	ROUND	LIFT-OUT	30.0	762	33.3	1.3	0.25	32.5	826	STAINLESS STEEL	4	87	39.5		
2431-0003	12"x18"	OVAL	LIFT-OUT	12.0x18.0	305x457	14.8x19.8	1.3	0.25	14.1x20.3	358x516	ALUMINUM ALLOY	4	30	13.6		
2433-0003	15"x24"	OVAL	LIFT-OUT	14.6x23.4	371x594	17.4x26.5	1.3	0.25	16.3x25.9	414x658	ALUMINUM ALLOY	4	37	16.8		
2441-0003	18"	ROUND	HINGED	18.0	457	20.8	1.3	0.25	20.0	508	ALUMINUM ALLOY	3	38	17.2		
2443-0003	20"	ROUND	HINGED	19.6	498	22.4	1.3	0.25	21.9	556	ALUMINUM ALLOY	4	47	21.3		
2447-0003	24"	ROUND	HINGED	23.4	594	26.5	1.5	0.25	25.8	655	ALUMINUM ALLOY	4	62	28.1		
2452-0003	0"	ROUND	HINGED	30.0	762	33.3	1.5	0.25	32.5	826	STAINLESS STEEL	4	118	53.5		
2471-0003	12"x18"	OVAL	HINGED	12.0x18.0	305x457	14.8x20.6	1.3	0.25	14.1x20.3	358x516	ALUMINUM ALLOY	4	31	14.1		
2473-0003	15"x24"	OVAL	HINGED	14.6x23.5	371x597	17.6x26.5	1.3	0.25	16.3x25.9	414x658	ALUMINUM ALLOY	4	38	17.2		
2481-0103	18"	ROUND	LIFT-OUT	18.0	457	20.5	1.5	0.25	19.9	505	STAINLESS STEEL	3	75	34.0		
2482-0103	24"	ROUND	LIFT-OUT	23.3	592	26.5	1.5	0.25	25.8	655	STAINLESS STEEL	4	110	49.9		
2483-0103	15"x24"	OVAL	LIFT-OUT	14.8x23.8	376x605	17.5x26.5	1.5	0.25	16.9x25.6	429x650	STAINLESS STEEL	4	85	28.6		

*DOES NOT INCLUDE HINGE POCKETS

FREEMAN
MARINE EQUIPMENT, INC.

probably from Louisiana if...

You go to buy a new winter coat (what most people refer to as windbreakers)

2400 SERIES ALUMINUM CAST HATCH KNIFE EDGE SEAL/ALUMINUM RING

FREEMAN
MARINE EQUIPMENT, INC.



22" Square hinged with aluminum ring



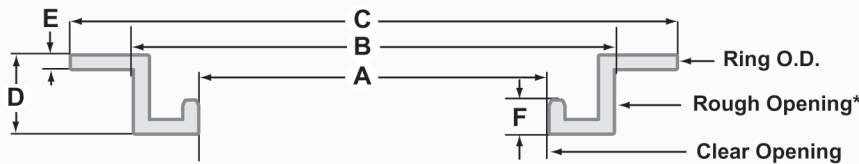
15"x24" Oval lift out with aluminum ring



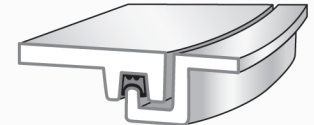
22" Round lift out inside view



18"x24" Rectangular hinged with aluminum ring



Knife Edge Seal w/Aluminum Deck Ring



PART NO.	"SIZE"	SHAPE	STYLE	DIMENSIONS							MECHANISM		ASSEMBLY WEIGHT	
				CLEAR OPENING		ROUGH OPENING*								
				A (inches)	A (mm)	B	C	D	E	F	STD. MATERIAL		DOG QTY.	LBS.
2405-0002	18"	ROUND	LIFT-OUT	18.0	457	20.0	24.0	1.5	0.38	0.8	ALUMINUM ALLOY	3	38	17.2
2407-0002	20"	ROUND	LIFT-OUT	20.0	508	22.0	26.0	1.4	0.38	0.7	ALUMINUM ALLOY	4	44	20.0
2409-0002	22"	ROUND	LIFT-OUT	22.0	559	24.0	28.0	1.4	0.38	0.7	ALUMINUM ALLOY	4	49	22.2
2412-0002	24"	ROUND	LIFT-OUT	24.1	612	26.1	30.6	1.6	0.38	0.6	ALUMINUM ALLOY	4	65	29.5
2421-0002	18"x24"	RECTANGLE	LIFT-OUT	18.0x24.0	457x610	20.5x26.5	24.5x30.5	1.6	0.38	0.7	ALUMINUM ALLOY	4	36	16.3
2422-0002	20"x20"	SQUARE	LIFT-OUT	20.3x20.3	517x517	22.8x22.8	26.8x26.8	1.6	0.38	0.7	ALUMINUM ALLOY	4	43	19.5
2423-0002	22"x22"	SQUARE	LIFT-OUT	22.0x22.0	559x559	24.5x24.5	28.5x28.5	1.6	0.38	0.7	ALUMINUM ALLOY	4	45	20.4
2424-0002	24"x24"	SQUARE	LIFT-OUT	24.5x24.5	622x622	27.0x27.0	31.0x31.0	1.6	0.38	0.7	ALUMINUM ALLOY	4	57	25.9
2426-0006	30"x30"	SQUARE	LIFT-OUT	30.0x30.0	762x762	32.5x32.5	36.5x36.5	1.6	0.25	0.7	STAINLESS STEEL	4	75	31.0
2428-0002	36"x36"	SQUARE	LIFT-OUT	36.0x36.0	914x914	39.3x39.3	42.0x42.0	2.5	0.31	0.9	ALUMINUM ALLOY	8	104	48.0
2434-0002	15"x24"	OVAL	LIFT-OUT	15.2x24.2	386x615	17.2x26.2	21.0x30.0	1.6	0.31	0.6	ALUMINUM ALLOY	4	35	15.9
2435-0002	19"x26"	OVAL	LIFT-OUT	19.2x26.2	488x665	21.2x28.2	25.0x32.0	1.6	0.31	0.6	ALUMINUM ALLOY	4	43	19.5
2442-0002	18"	ROUND	HINGED	18.0	457	20.0	24.0	1.5	0.38	0.8	ALUMINUM ALLOY	3	39	17.7
2444-0002	20"	ROUND	HINGED	20.0	508	22.0	26.0	1.4	0.38	0.7	ALUMINUM ALLOY	4	45	20.4
2448-0002	24"	ROUND	HINGED	24.1	612	26.1	30.6	1.6	0.38	0.6	ALUMINUM ALLOY	4	66	29.9
2461-0002	18"x24"	RECTANGLE	HINGED	18.0x24.0	457x610	20.5x26.5	24.5x30.5	1.6	0.38	0.7	ALUMINUM ALLOY	4	36	16.3
2462-0002	20"x20"	SQUARE	HINGED	20.3x20.3	517x517	22.8x22.8	26.8x26.8	1.6	0.38	0.7	ALUMINUM ALLOY	4	45	20.4
2463-0002	22"x22"	SQUARE	HINGED	22.0x22.0	559x559	24.5x24.5	28.5x28.5	1.6	0.38	0.7	ALUMINUM ALLOY	4	46	20.9
2464-0002	24"x24"	SQUARE	HINGED	24.5x24.5	622x622	27.0x27.0	31.0x31.0	1.6	0.38	0.7	ALUMINUM ALLOY	4	58	26.3
2466-0006	30"x30"	SQUARE	HINGED	30.0x30.0	762x762	32.5x32.5	36.5x36.5	1.6	0.25	0.7	STAINLESS STEEL	4	78	35.4
2468-0002	36"x36"	SQUARE	HINGED	36.0x36.0	914x914	39.3x39.3	42.0x42.0	2.5	0.31	0.9	ALUMINUM ALLOY	8	119	54.0
2474-0002	15"x24"	OVAL	HINGED	15.2x24.2	386x615	17.2x26.2	21.0x30.0	1.6	0.31	0.6	ALUMINUM ALLOY	4	35	15.9
2475-0002	19"x26"	OVAL	HINGED	19.2x26.2	488x665	21.2x28.2	25.0x32.0	1.6	0.31	0.6	ALUMINUM ALLOY	4	44	20.0

*DOES NOT INCLUDE HINGE POCKETS

probably from Louisiana if...

Your last name isn't pronounced the way it's spelled.

2400 SERIES ALUMINUM CAST HATCH KNIFE EDGE SEAL/STEEL RING

FREEMAN
MARINE EQUIPMENT, INC.



22" Square hinged with steel ring



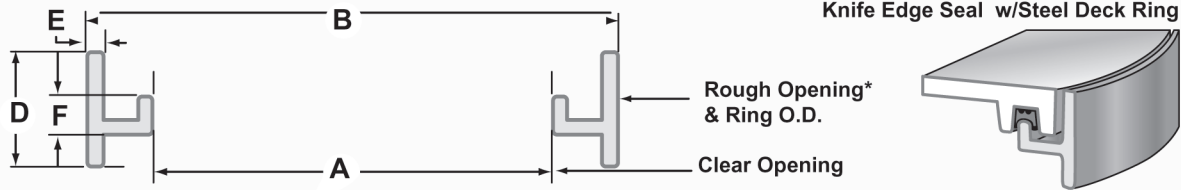
18" Round lift out with steel ring



15"X24" Oval lift out with steel ring



22" Square hinged inside view



PART NO.	"SIZE"	SHAPE	STYLE	DIMENSIONS						MECHANISM		ASSEMBLY WEIGHT	
				CLEAR OPENING		ROUGH OPENING*							
				A (inches)	A (mm)	B				D	E		F
2405-0003	18"	ROUND	LIFT-OUT	18.0	457	20.6	2.5	0.31	1.0	ALUMINUM ALLOY	3	36	16.3
2407-0003	20"	ROUND	LIFT-OUT	20.0	508	22.6	2.5	0.31	1.0	ALUMINUM ALLOY	4	41	18.6
2412-0003	24"	ROUND	LIFT-OUT	24.1	612	26.7	2.5	0.31	1.0	ALUMINUM ALLOY	4	59	26.8
2421-0003	18"x24"	RECTANGLE	LIFT-OUT	18.0x24.0	457x610	20.5x26.5	2.5	0.31	0.9	ALUMINUM ALLOY	4	61	27.7
2422-0003	20"x20"	SQUARE	LIFT-OUT	20.3x20.3	517x517	22.8x22.8	2.5	0.31	0.9	ALUMINUM ALLOY	4	74	33.6
2423-0003	22"x22"	SQUARE	LIFT-OUT	22.0x22.0	559x559	24.5x24.5	2.5	0.31	0.9	ALUMINUM ALLOY	4	92	41.7
2424-0003	24"x24"	SQUARE	LIFT-OUT	24.5x24.5	622x622	27.0x27.0	2.5	0.31	0.9	ALUMINUM ALLOY	4	96	43.5
2426-0007	30"x30"	SQUARE	LIFT-OUT	30.0x30.0	762x762	32.5x32.5	2.5	0.31	0.9	STAINLESS STEEL	4	113	51.3
2428-0003	36"x36"	SQUARE	LIFT-OUT	36.0x36.0	914x914	39.3x39.3	2.5	0.31	0.9	ALUMINUM ALLOY	8	134	60.8
2434-0003	15"x24"	OVAL	LIFT-OUT	15.2x24.2	386x615	17.7x26.7	2.5	0.31	0.9	ALUMINUM ALLOY	4	54	24.5
2435-0003	19"x26"	OVAL	LIFT-OUT	19.2x26.2	488x665	21.7x28.7	2.5	0.31	0.9	ALUMINUM ALLOY	4	61	27.7
2442-0003	18"	ROUND	HINGED	18.0	457	20.6	2.5	0.31	1.0	ALUMINUM ALLOY	3	42	19.1
2444-0003	20"	ROUND	HINGED	20.0	508	22.6	2.5	0.31	1.0	ALUMINUM ALLOY	4	48	21.8
2446-0003	22"	ROUND	HINGED	22.0	559	24.6	2.5	0.31	1.0	ALUMINUM ALLOY	4	51	23.1
2448-0003	24"	ROUND	HINGED	24.1	612	26.7	2.5	0.31	1.0	ALUMINUM ALLOY	4	65	29.5
2461-0003	18"x24"	RECTANGLE	HINGED	18.0x24.0	457x610	20.5x26.5	2.5	0.31	0.9	ALUMINUM ALLOY	4	66	29.9
2462-0003	20"x20"	SQUARE	HINGED	20.3x20.3	517x517	22.8x22.8	2.5	0.31	0.9	ALUMINUM ALLOY	4	76	34.5
2464-0003	24"x24"	SQUARE	HINGED	24.5x24.5	622x622	27.0x27.0	2.5	0.31	0.9	ALUMINUM ALLOY	4	97	44.0
2466-0007	30"x30"	SQUARE	HINGED	30.0x30.0	762x762	32.5x32.5	2.5	0.31	0.9	STAINLESS STEEL	4	114	51.7
2468-0003	36"x36"	SQUARE	HINGED	36.0x36.0	914x914	39.3x39.3	2.5	0.31	0.9	ALUMINUM ALLOY	8	149	67.6
2474-0003	15"x24"	OVAL	HINGED	15.2x24.2	386x615	17.7x26.7	2.5	0.31	0.9	ALUMINUM ALLOY	4	60	27.2
2475-0003	19"x26"	OVAL	HINGED	19.2x26.2	488x665	21.7x28.7	2.5	0.31	0.9	ALUMINUM ALLOY	4	67	30.0

*DOES NOT INCLUDE HINGE POCKETS

probably from Louisiana if...

You know what a nutria rat is but you still pick it to represent your baseball team. (Geaux Zephyrs)



EASY ORDER Form

Item	Qty	Clear Opening w x h	Sealing Performance	Opening Style	Panel Type	Frame Material	Install Method	Window Size	Door Handing	Insulation	Door Hardware	Other
		Cutout Opening w x h				Corner Type					Keying	
			Weather Tight Watertight	Single-1100 Quick Acting-1400 Dutch-1500 French-1600 Slider-1700	0.080 0.160 0.190 0.250	Aluminum Steel Stainless Radius Mitered	Bolt In Weld In Clamp In	10 x 16 15 x 20 15 x 24 Top Half Full 7" Rd. 12" Rd.	RH LH RH Active LH Active	Rigid Foam Acoustic FireMaster	Lockset Passage Key Alike Key Different	Painted Bare Metal Pantograph
OPTIONS												
OPTIONS												
OPTIONS												
OPTIONS												

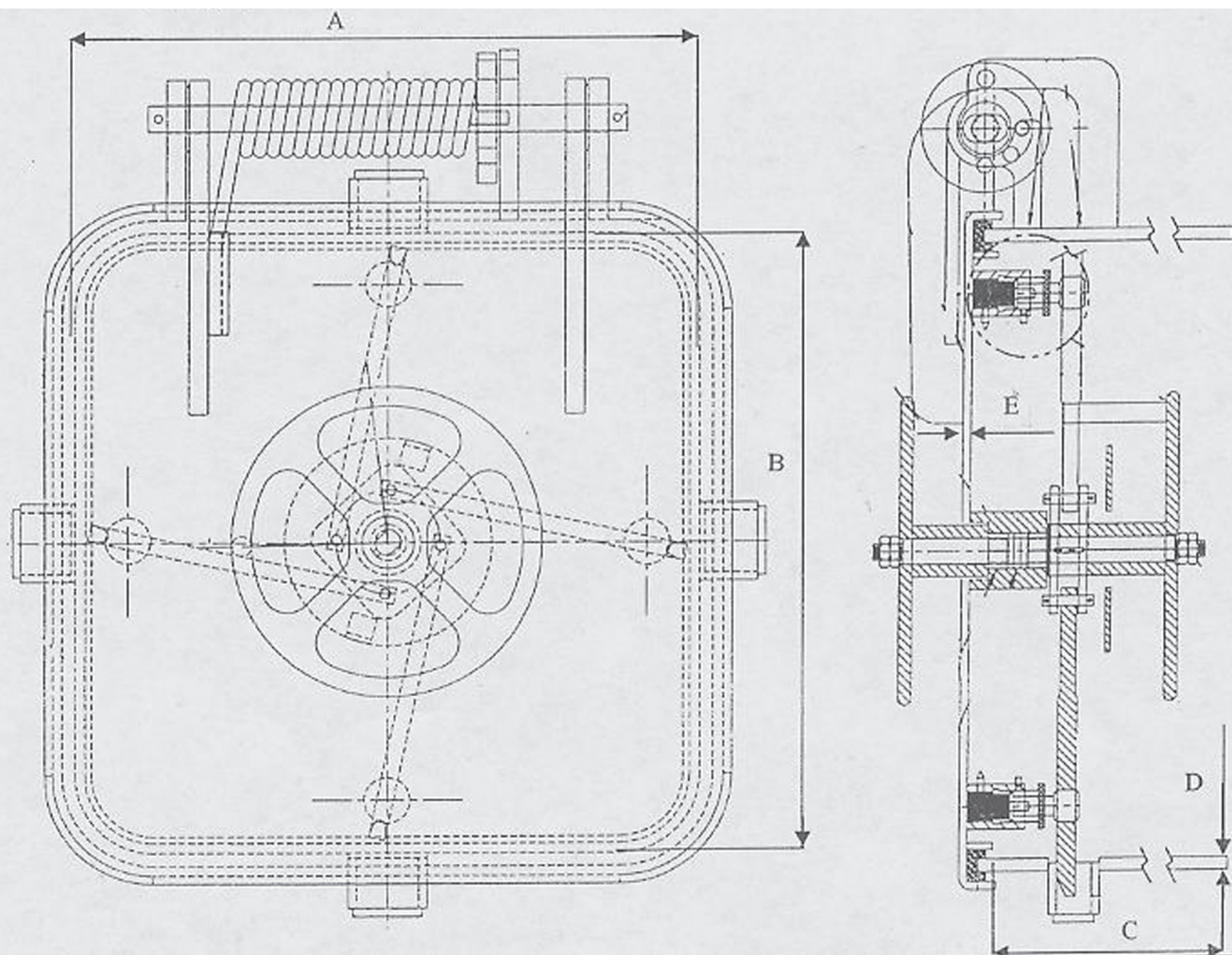
From: Name: _____ Project: _____

Company: _____ Phone: _____

Address: _____ Fax: _____

City, State: _____ Email: _____

Country: _____



PIECE NO.	PART	PART NUMBER	MATERIAL
1	COVER		MILD STEEL
2	COAMING		MILD STEEL
3	GASKET		NEOPRENE*
4	SPRING	24025	STAINLESS STEEL
5	HINGE PIN	30400	STAINLESS STEEL
6	COTTER PIN	24029	STAINLESS STEEL
7	HAND WHEEL	30526	MILD STEEL

ABS CERTIFIED PDA # 01-HS211271B

MODEL NO.	PART NO.	A.	B.	C.	D.	E.
DF-615-2424	24x24QA4S	24	24	24	1/2"	5/16"
DF-615-3030	30x30QA4S	30	30	24	1/2"	5/16"
DF-615-3636	36x36QA4S	36	36	24	1/2"	5/16"

QUICK ACTING SQUARE HATCH

*Other gasket materials available.

The specifications and details described by drawings or text in this literature are subject to change without notice.



NABRICO MARINE PRODUCTS

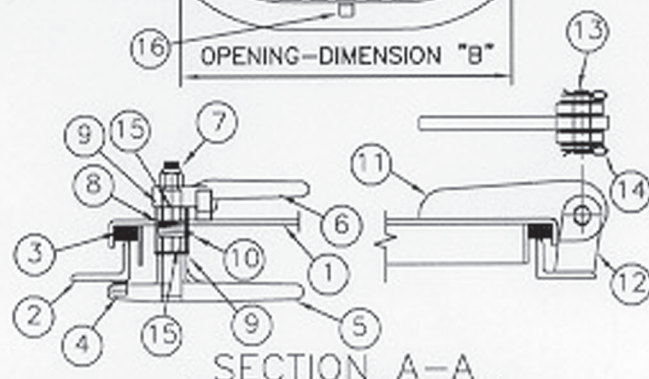
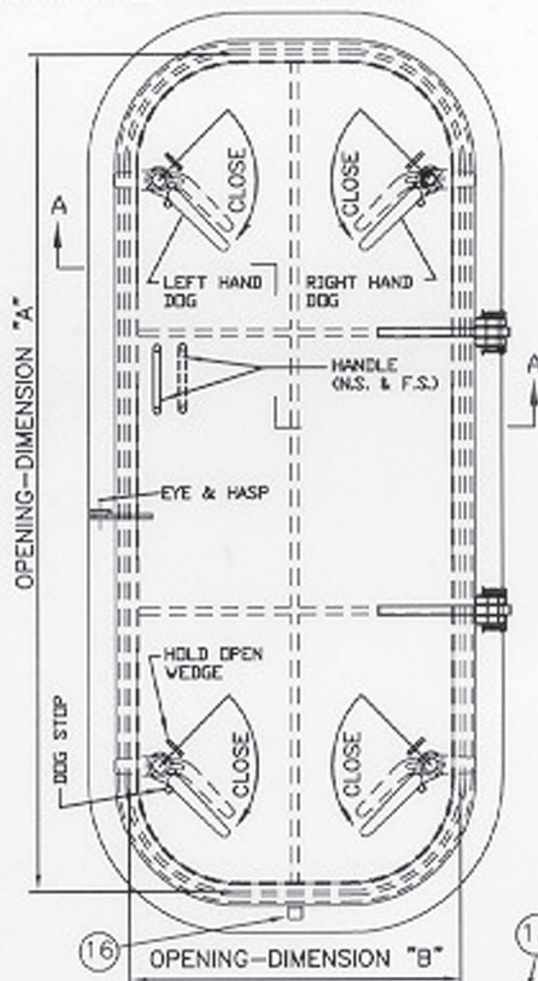
PIECE NO.	PART
1	DOOR PANEL
2	COAMING
3	GASKET
4	WEDGE
5	DOG-RIGHT OR LEFT HAND
6	DOG HANDLE
7	HEX NUT
8	PACKING
9	SHIMS
10	GREASE FITTING
11	HINGE BLADE
12	HINGE PAD
13	HINGE PIN
14	COTTER
15	BUSHING
16	CENTERING LUG

WHEN ORDERING SPECIFY:

RIGHT HAND OR LEFT HAND DOOR
NUMBER OF DOGS



ORIENTATION (RIGHT HAND/LEFT HAND)



SECTION A-A

MODEL NO.	MFGR PART NO.	A	B	MODEL NO.	MFGR PART NO.	A	B
DF-605-2460	24X60M4DRH	24"	60"	DF-605-3054	30X54M4DLH	30"	54"
DF-605-2460	24X60M4DLH	24"	60"	DF-605-3060	30X60M4DRH	30"	60"
DF-605-2472	24X72M4DRH	24"	72"	DF-605-3060	30X60M4DLH	30"	60"
DF-605-2472	24X72M4DLH	24"	72"	DF-605-3072	30X72M4DRH	30"	72"
DF-605-2866	28X66M4DRH	28"	66"	DF-605-3072	30X72M4DLH	30"	72"
DF-605-2866	28X66M4DLH	28"	66"	DF-605-3666	36X66M4DRH	36"	66"
DF-605-2872	28X72M4DRH	28"	72"	DF-605-3666	36X66M4DLH	36"	66"
DF-605-2872	28X72M4DLH	28"	72"	DF-605-3672	36X72M4DRH	36"	72"
DF-605-3054	30X54M4DRH	30"	54"	DF-605-3672	36X72M4DLH	36"	72"

ABS CERTIFICATION NO. 01-HS195940-PDA WATERTIGHT DOORS-4 DOG

The specifications and details described by drawings or text in this literature are subject to change without notice.



NABRICO MARINE PRODUCTS

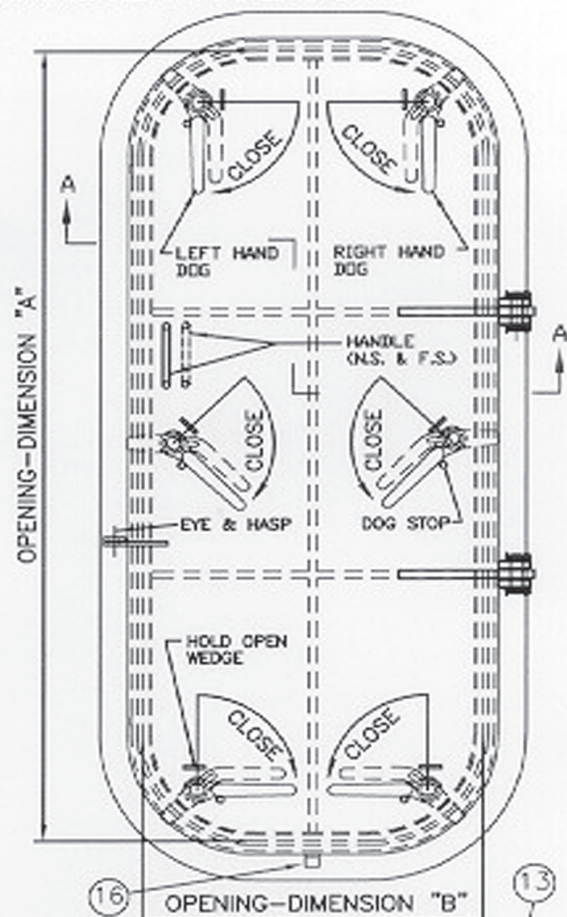
PIECE NO.	PART
1	DOOR PANEL
2	COAMING
3	GASKET
4	WEDGE
5	DOG—RIGHT OR LEFT HAND
6	DOG HANDLE
7	HEX NUT
8	PACKING
9	SHIMS
10	GREASE FITTING
11	HINGE BLADE
12	HINGE PAD
13	HINGE PIN
14	COTTER
15	BUSHING
16	CENTERING LUG

WHEN ORDERING SPECIFY:

RIGHT HAND OR LEFT HAND DOOR
NUMBER OF DOGS



ORIENTATION (RIGHT HAND/LEFT HAND)

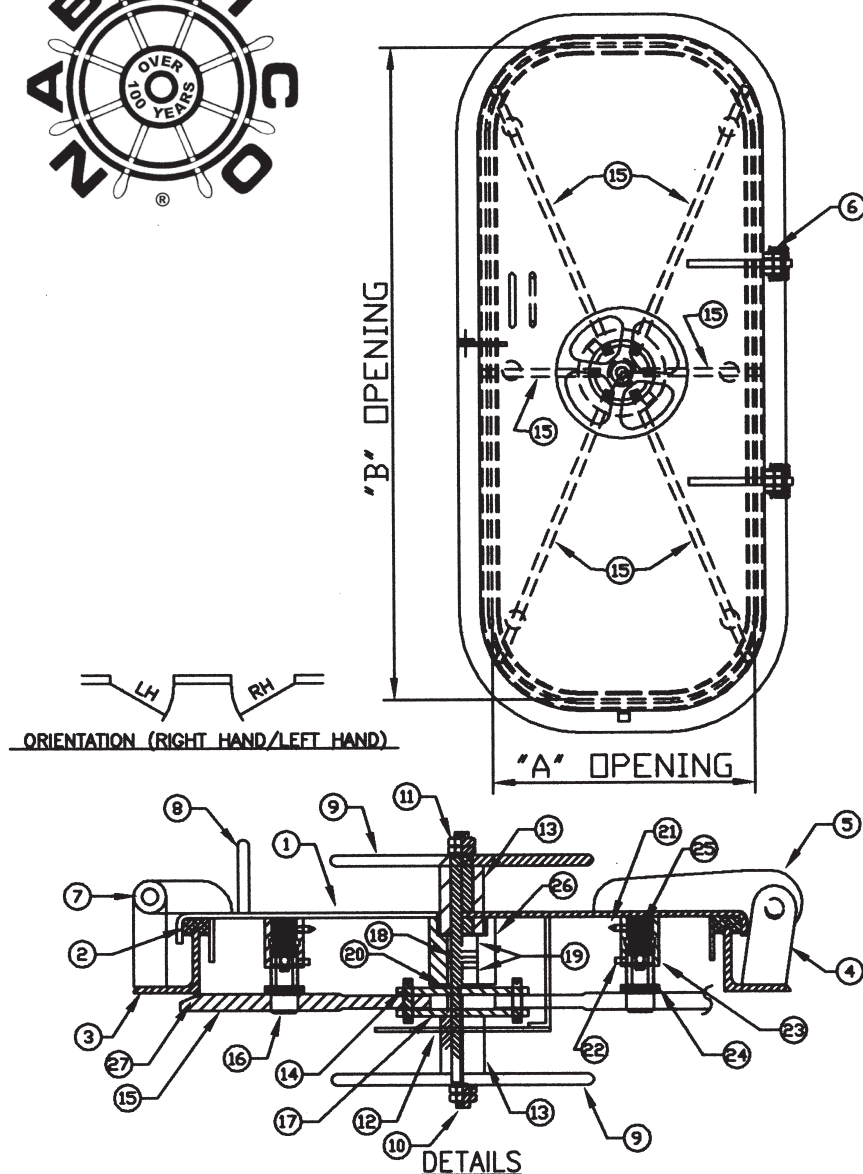


SECTION A-A

MODEL NO.	MFG PART NO.	A	B	MODEL NO.	MFG PART NO.	A	B
DF-600-2460	24X60M6DRH	24"	60"	DF-600-3054	30X54M6DLH	30"	54"
DF-600-2460	24X60M6DLH	24"	60"	DF-600-3060	30X60M6DRH	30"	60"
DF-600-2472	24X72M6DRH	24"	72"	DF-600-3060	30X60M6DLH	30"	60"
DF-600-2472	24X72M6DLH	24"	72"	DF-600-3072	30X72M6DRH	30"	72"
DF-600-2866	28X66M6DRH	28"	66"	DF-600-3072	30X72M6DLH	30"	72"
DF-600-2866	28X66M6DLH	28"	66"	DF-600-3666	36X66M6DRH	36"	66"
DF-600-2872	28X72M6DRH	28"	72"	DF-600-3666	36X66M6DLH	36"	66"
DF-600-2872	28X72M6DLH	28"	72"	DF-600-3672	36X72M6DRH	36"	72"
DF-600-3054	30X54M6DRH	30"	54"	DF-600-3672	36X72M6DLH	36"	72"

ABS CERTIFICATION NO. 01-HS195940-PDA WATERTIGHT DOORS-6 DOG

The specifications and details described by drawings or text in this literature are subject to change without notice.



MARK	ITEM	MATERIAL
1	DOOR PANEL	STEEL
2	GASKET	NEOPRENE
3	FRAME	STEEL
4	HINGE PAD	STEEL
5	HINGE BLADE	STEEL
6	HINGE PIN	STEEL
7	EYE & HASP	STEEL
8	HANDLE	STEEL
9	HANDWHEEL	STEEL
10	CENTER SHAFT	STEEL
11	JAM NUT	BRASS
12	COVER PLATE	STEEL
13	SLEEVE	STEEL
14	PIN	STEEL
15	DOG	STEEL
16	SWIVEL GUIDE	BRONZE
17	ROTATING BLOCK	STEEL
18	PACKING	GRAPHITE
19	BUSHING	NYLON
20	SHIMS	STEEL
21	GREASE FITTING	STAINLESS
22	SET SCREW	STAINLESS
23	SWIVEL HOUSING	STEEL
24	ADJUSTMENT FITTING	STEEL
25	SPRING	STAINLESS
26	CENTER HOUSING	STEEL
27	WEDGE	STEEL

MODEL NO.	MFGR PART NO.	A	B
DF-610-2460	24X60Q6DRH	24"	60"
DF-610-2460	24X60Q6DLH	24"	60"
DF-610-2472	24X72Q6DRH	24"	72"
DF-610-2472	24X72Q6DLH	24"	72"
DF-610-2866	28X66Q6DRH	28"	66"
DF-610-2866	28X66Q6DLH	28"	66"
DF-610-2872	28X72Q6DRH	28"	72"
DF-610-2872	28X72Q6DLH	28"	72"
DF-610-3054	30X54Q6DRH	30"	54"

MODEL NO.	MFGR PART NO.	A	B
DF-610-3054	30X54Q6DLH	30"	54"
DF-610-3060	30X60Q6DRH	30"	60"
DF-610-3060	30X60Q6DLH	30"	60"
DF-610-3072	30X72Q6DRH	30"	72"
DF-610-3072	30X72Q6DLH	30"	72"
DF-610-3666	36X66Q6DRH	36"	66"
DF-610-3666	36X66Q6DLH	36"	66"
DF-610-3672	36X72Q6DRH	36"	72"
DF-610-3672	36X72Q6DLH	36"	72"

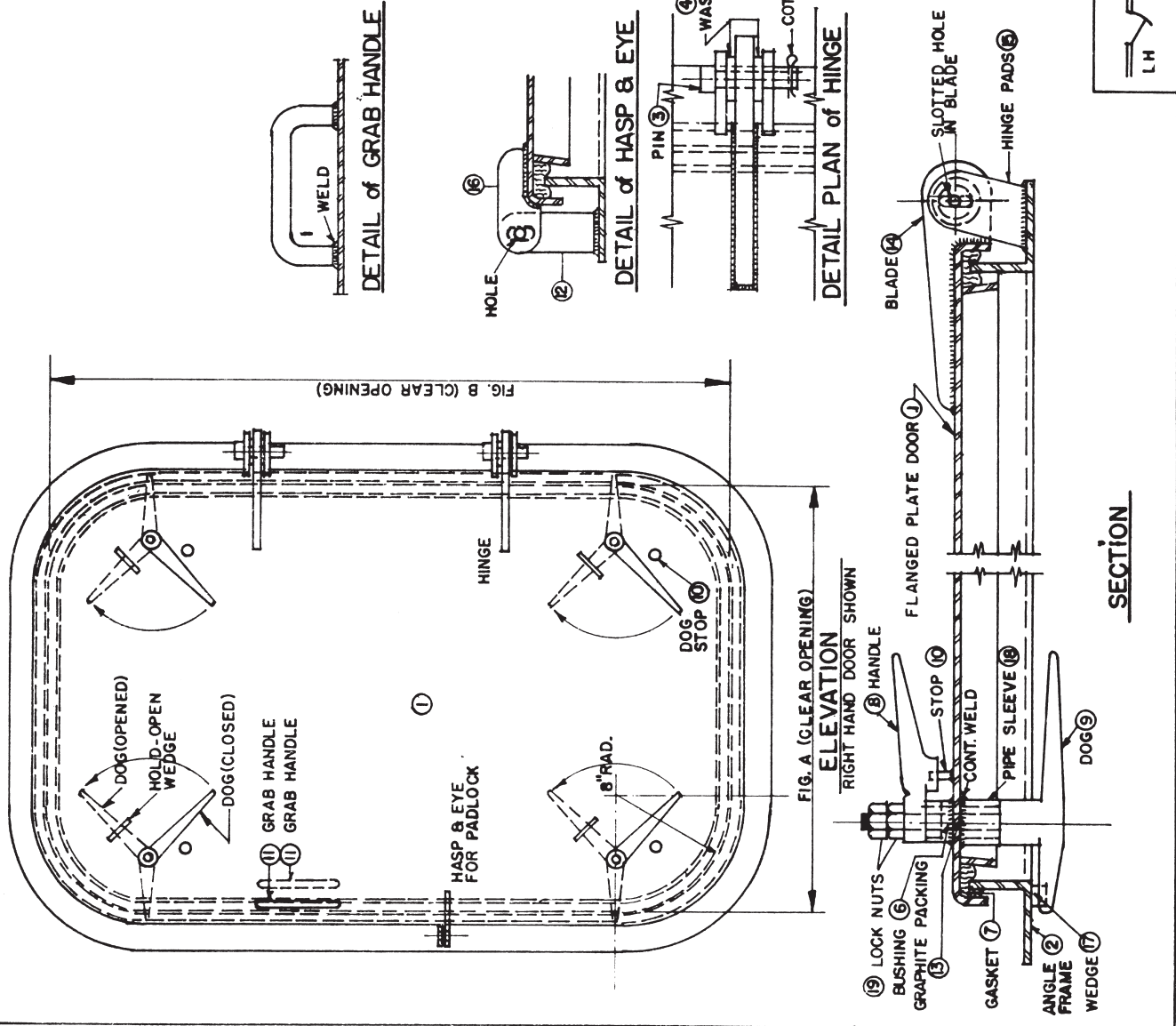
ABS CERTIFICATION NO. 01-HS211271A-PDA

QUICK ACTING 6 DOG DOOR

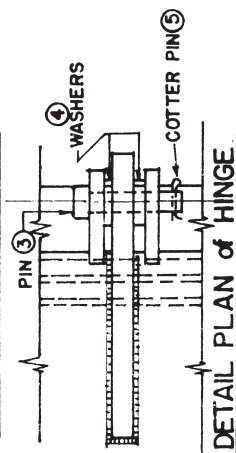
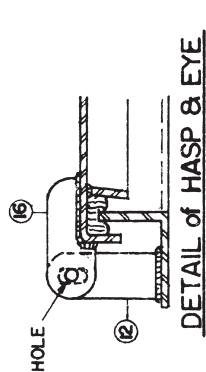
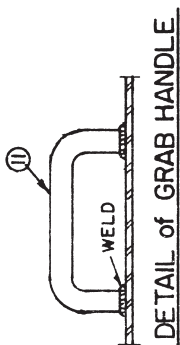
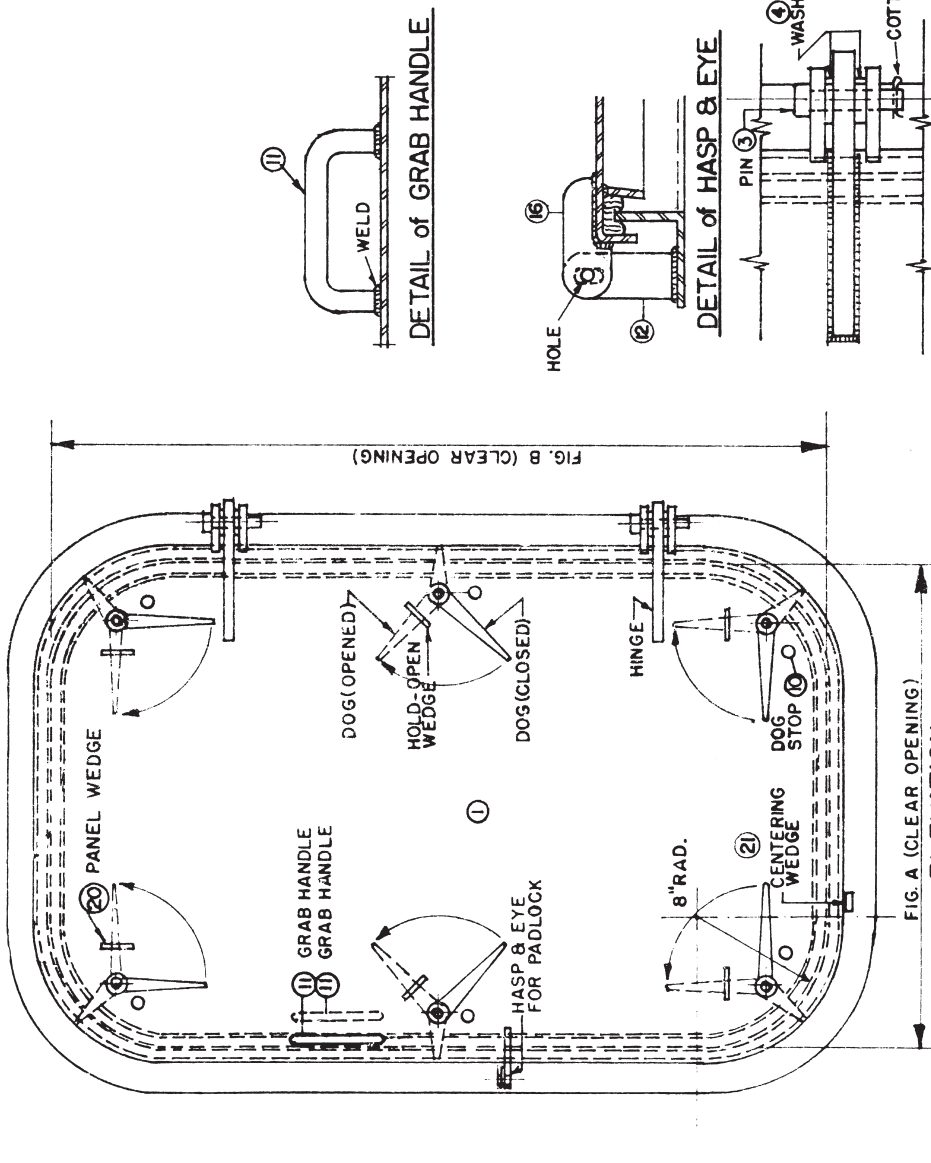
The specifications and details described by drawings or text in this literature are subject to change without notice.

probably from Louisiana if...
You have a ditch on at least one side of your property

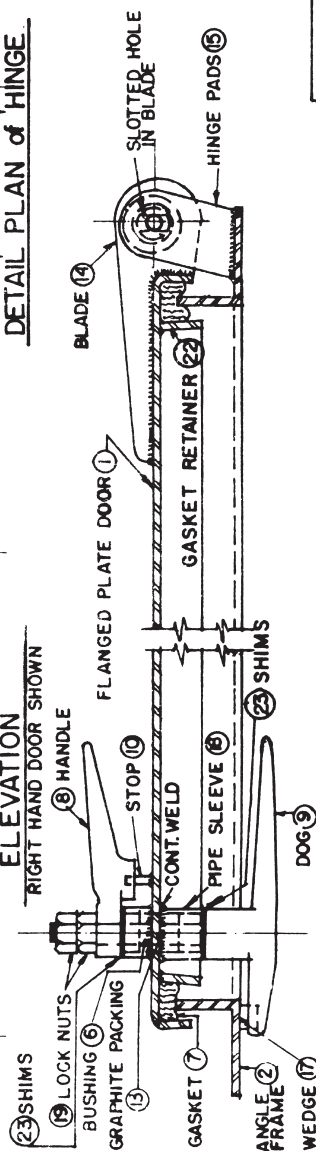
SCHEDULE OF MATERIALS		
PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	BRASS	
4	BRASS	
5	BRASS	
6	DELTRIN	
7	NEOPRENE	
8	FRG. ST.	
9	FRG. STL.	
10	MILD STEEL	
11	MILD STEEL	
12	MILD STEEL	
13	GRAPHITE	
14	MILD STEEL	
15	MILD STEEL	
16	MILD STEEL	
17	MILD STEEL	
18	MILD STEEL	
19	MILD STEEL	



SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	BRASS	
4	BRASS	
5	BRASS	
6	DELTRIN	
7	NEOPRENE	
8	FRG. STL.	
9	FRG. STL.	
10	MILD STEEL	
11	MILD STEEL	
12	MILD STEEL	
13	GRAPHITE	
14	MILD STEEL	
15	MILD STEEL	
16	MILD STEEL	
17	MILD STEEL	
18	MILD STEEL	
19	MILD STEEL	
20	MILD STEEL	
21	MILD STEEL	
22	MILD STEEL	
23	BRASS	



DETAIL PLAN of HINGE

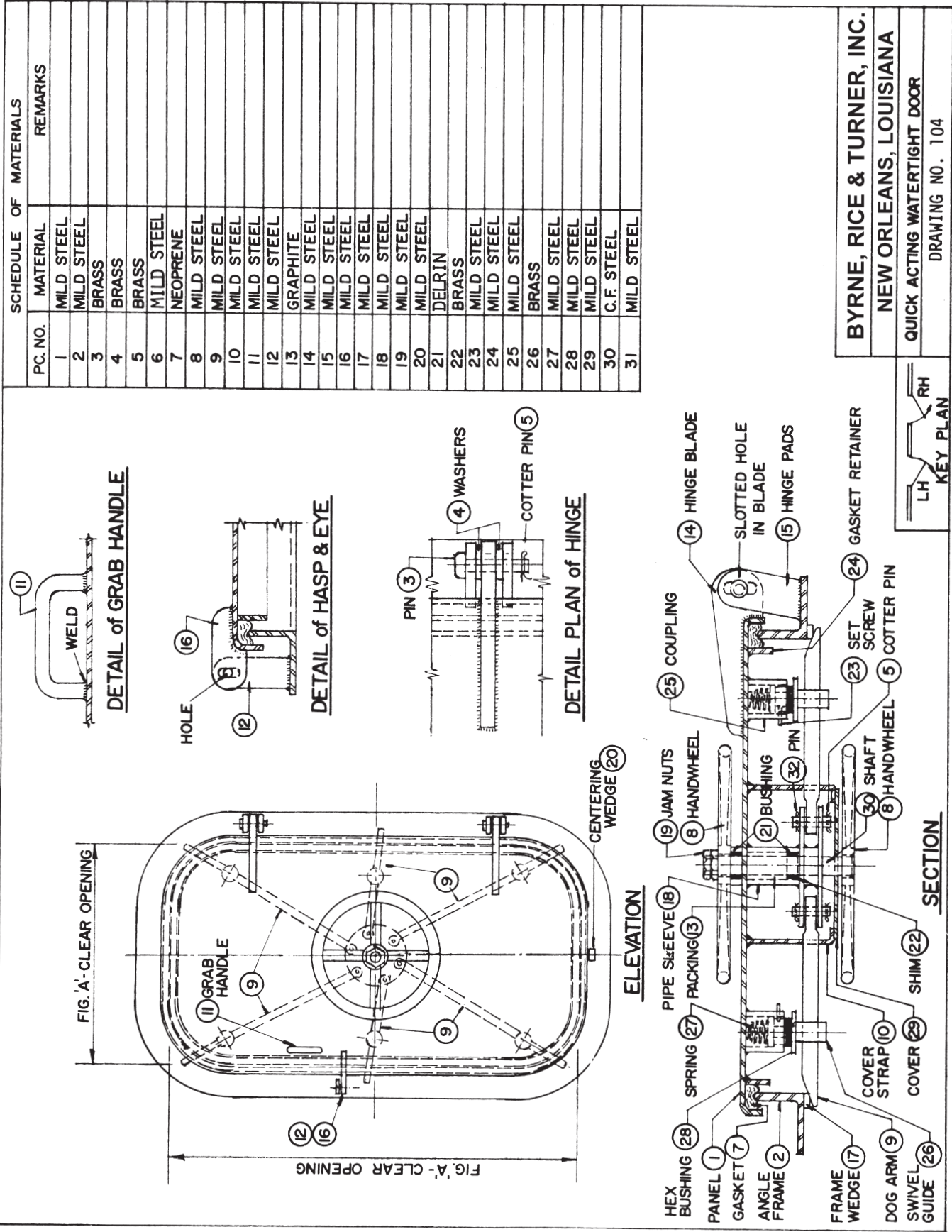


SECTION

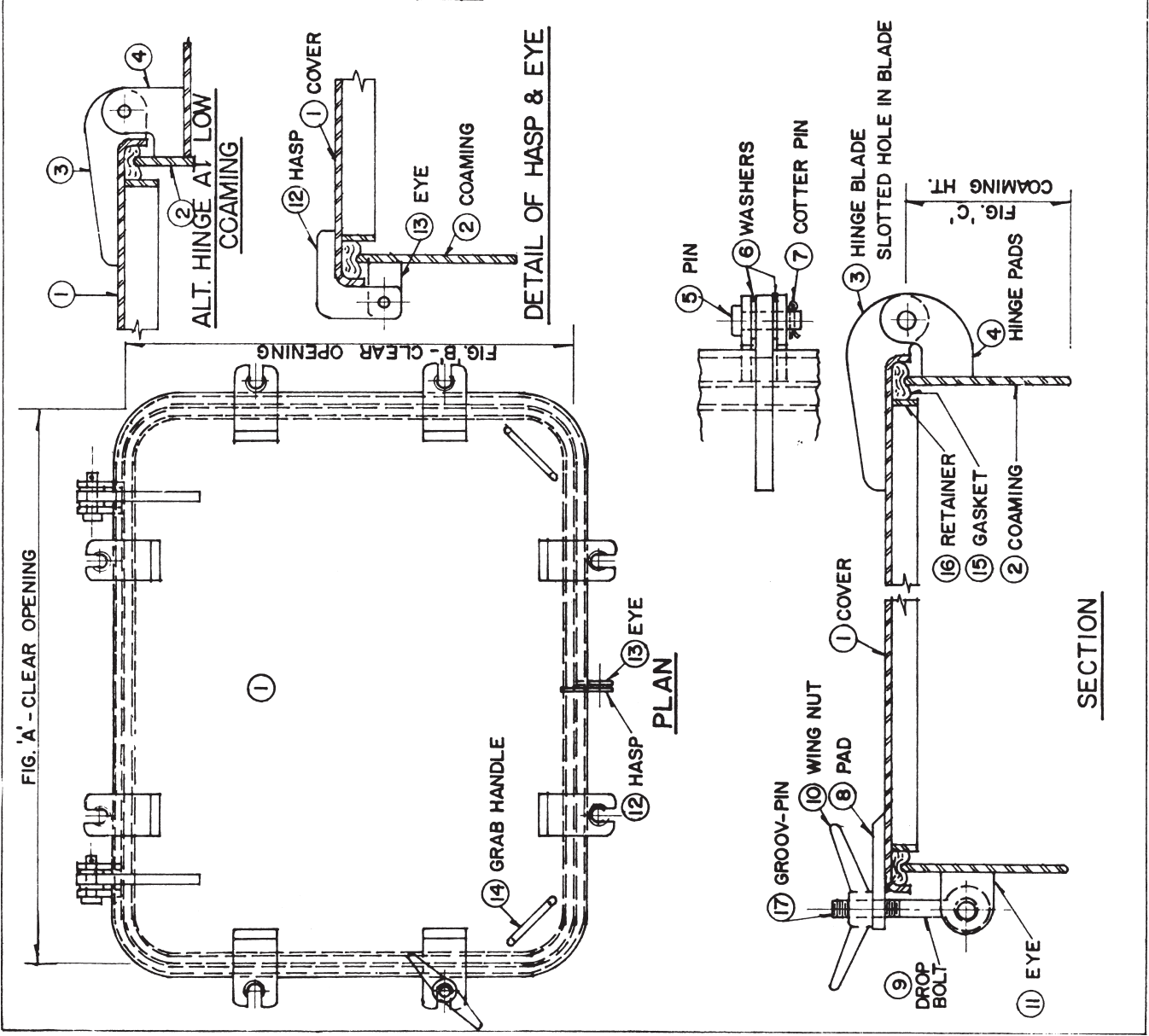
BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 WATERTIGHT DOOR WITH SIX (6) DOGS
 DRAWING NO. 102



probably from Louisiana if...
You have spent a summer afternoon on the Lake Pontchartrain seawall catching blue crabs.

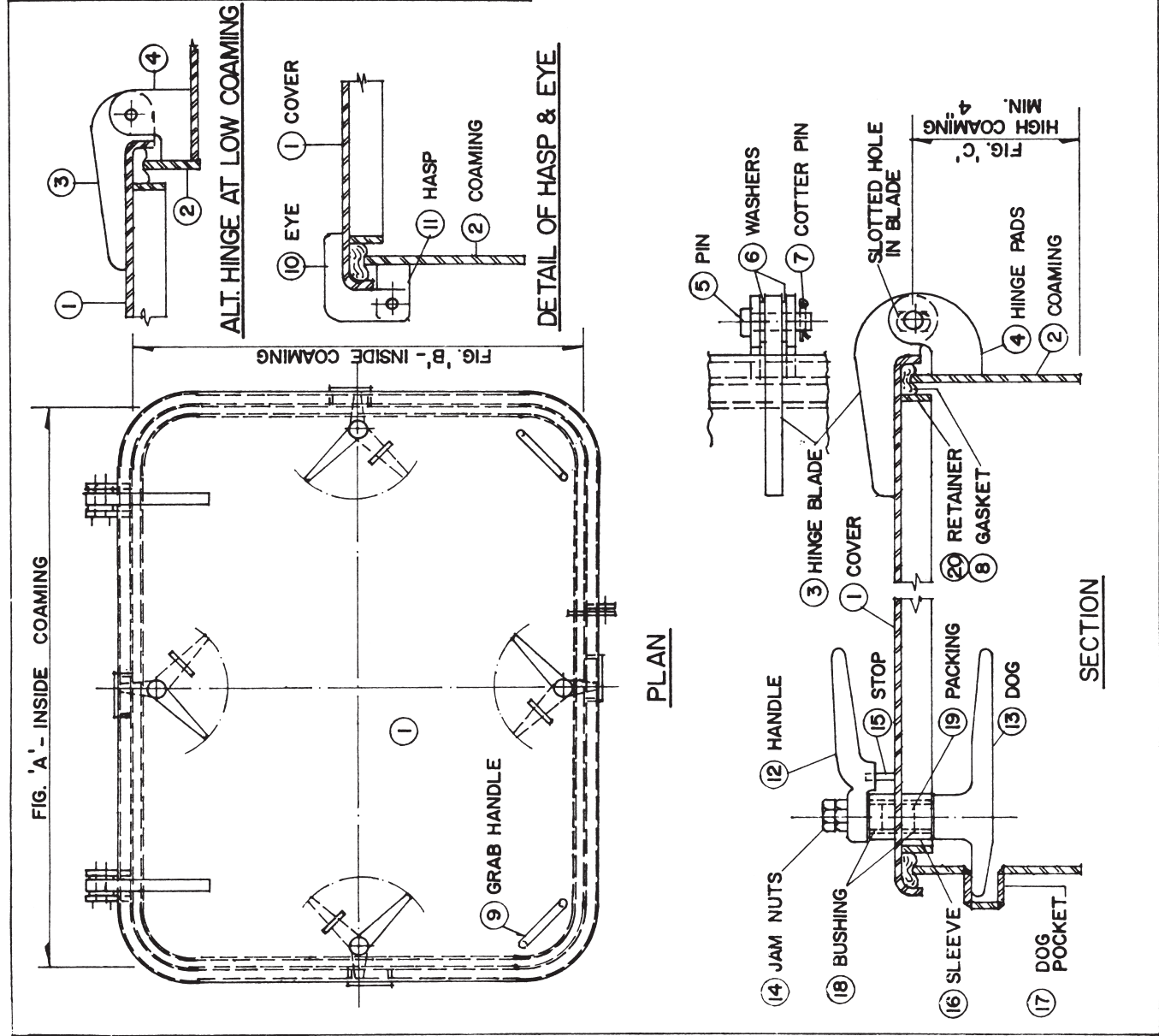


SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	BRASS	
6	BRASS	
7	BRASS	
8	MILD STEEL	
9	BRONZE	
10	BRONZE	
11	MILD STEEL	
12	MILD STEEL	
13	MILD STEEL	
14	MILD STEEL	
15	NEOPRENE	
16	MILD STEEL	
17	STAINLESS	
18	BRASS	

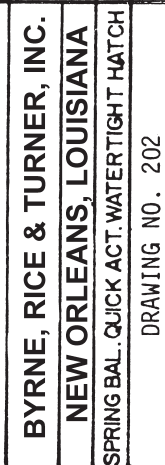


BYRNE, RICE & TURNER
NEW ORLEANS, LOUISIANA
WATERTIGHT HATCH WITH DROP BOLTS
DRAWING NO. 200

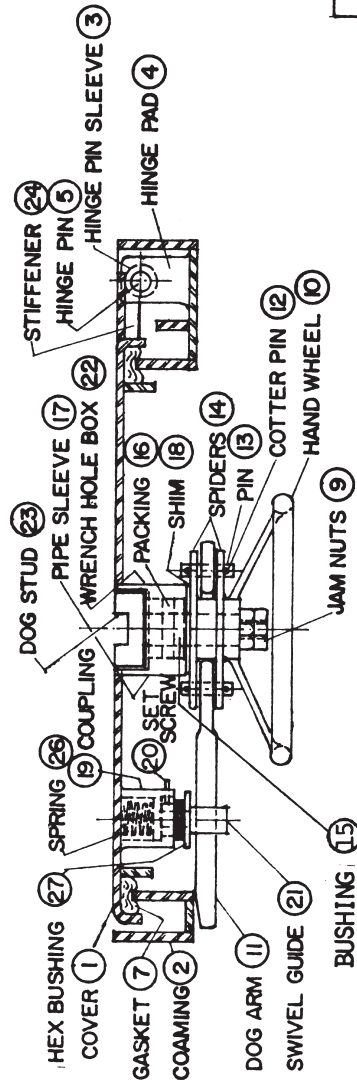
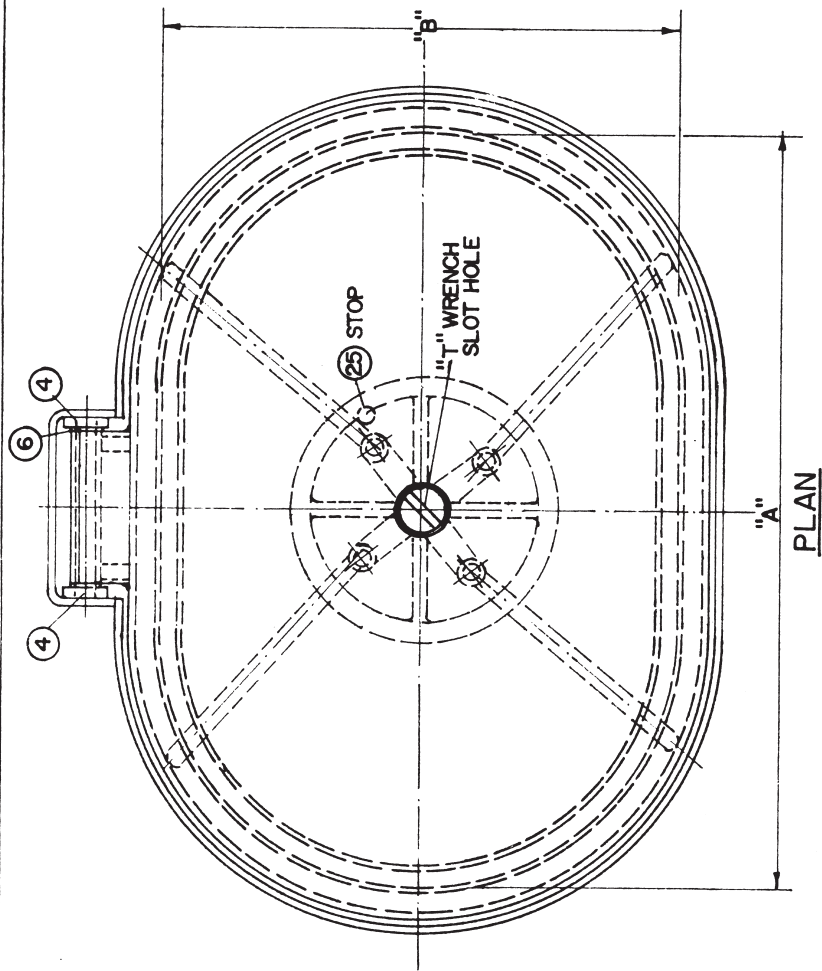
SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	BRASS	
6	BRASS	
7	BRASS	
8	NEOPRENE	
9	STEEL	
10	MILD STEEL	
11	MILD STEEL	
12	FRG. STEEL	
13	FRG. STEEL	
14	STEEL	
15	STEEL	
16	STEEL	
17	STEEL	
18	DELFIN	
19	GRAPHITE	
20	MILD STEEL	



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT HATCH
DRAWING NO. 201

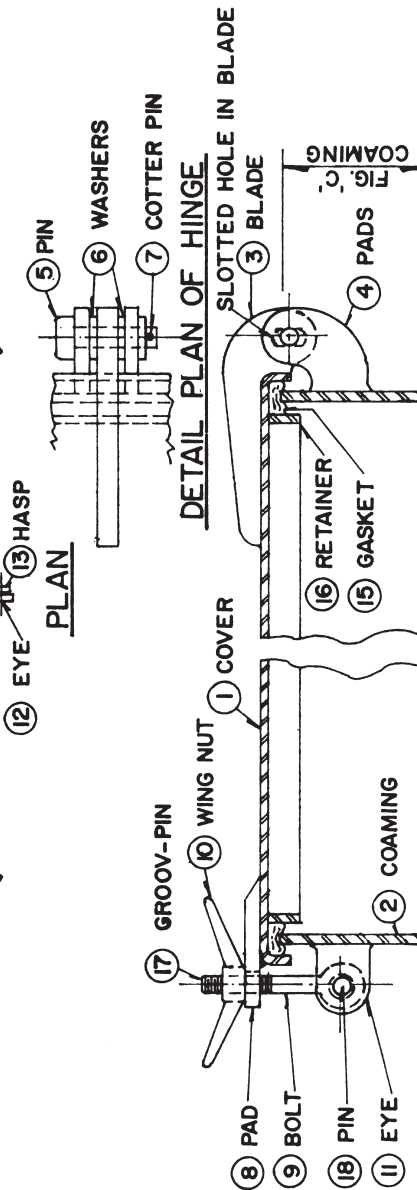
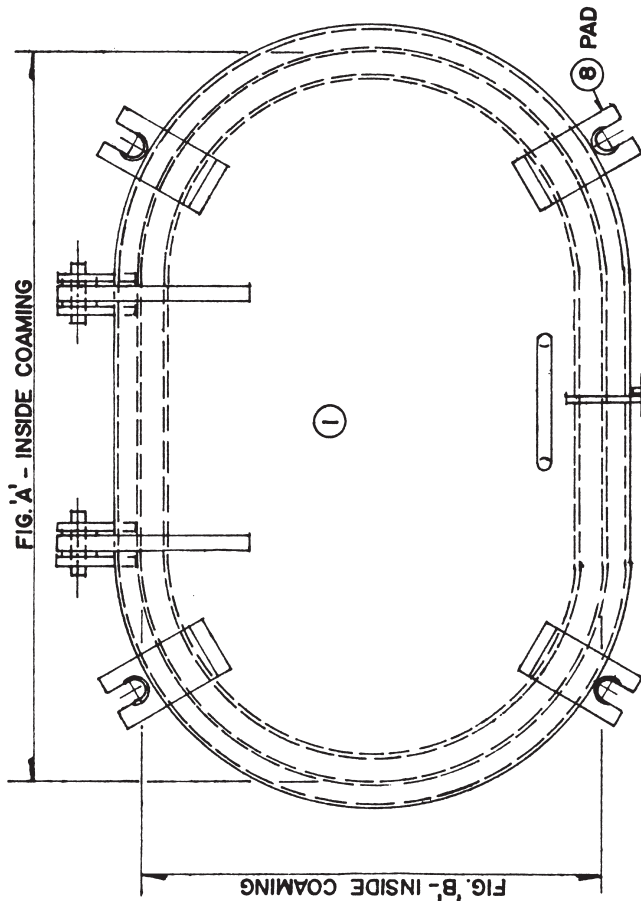


SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	COLD FINISH	
6	BRASS	
7	NEOPRENE	
8	MILD STEEL	
9	MILD STEEL	
10	MILD STEEL	
11	MILD STEEL	
12	BRASS	
13	BRASS	
14	MILD STEEL	
15	DELRI	
16	GRAPHITE	
17	MILD STEEL	
18	BRASS	
19	MILD STEEL	
20	MILD STEEL	
21	BRASS	
22	MILD STEEL	
23	BRASS	
24	MILD STEEL	
25	MILD STEEL	
26	SPRING STEEL	
27	MILD STEEL	



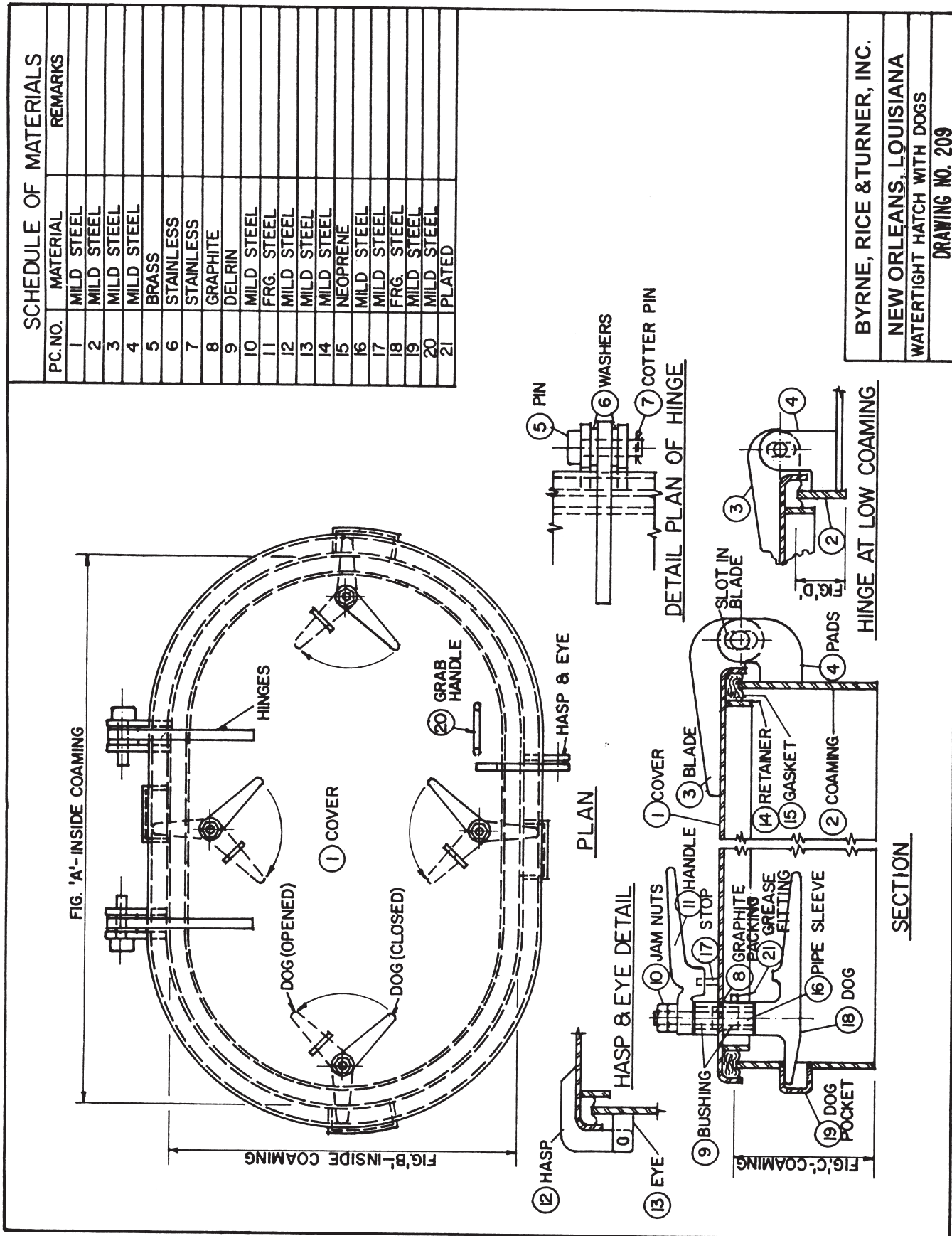
BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 QUICK ACTING OVAL WATERTIGHT HATCH
 DRAWING NO. 204

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	BRASS	
6	BRASS	
7	BRASS	
8	MILD STEEL	
9	MANGANESE BRONZE	
10	MANGANESE BRONZE	
11	STEEL	
12	MILD STEEL	
13	MILD STEEL	
14	STEEL	
15	NEOPRENE	
16	MILD STEEL	
17	STAINLESS	
18	BRASS	

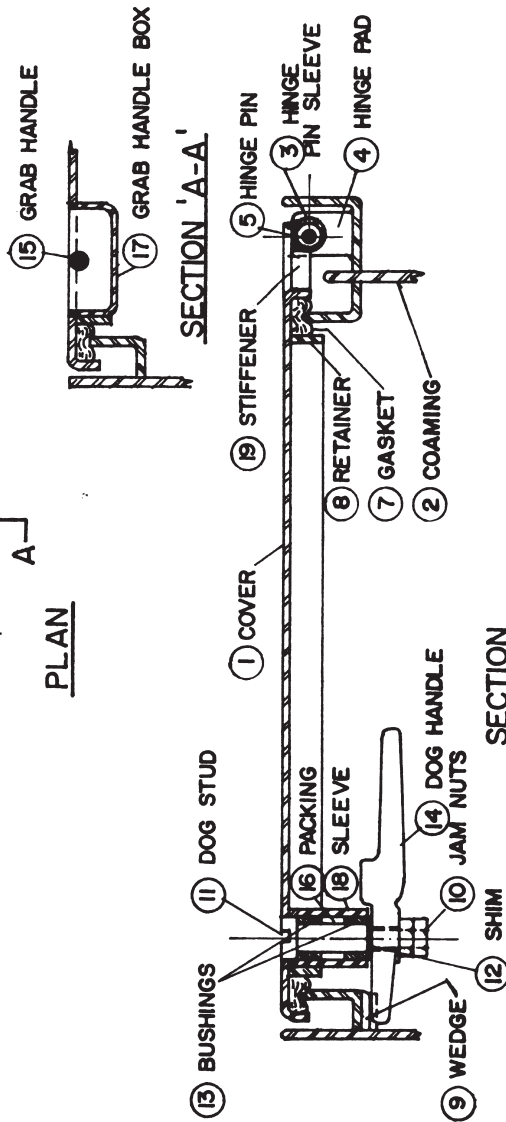
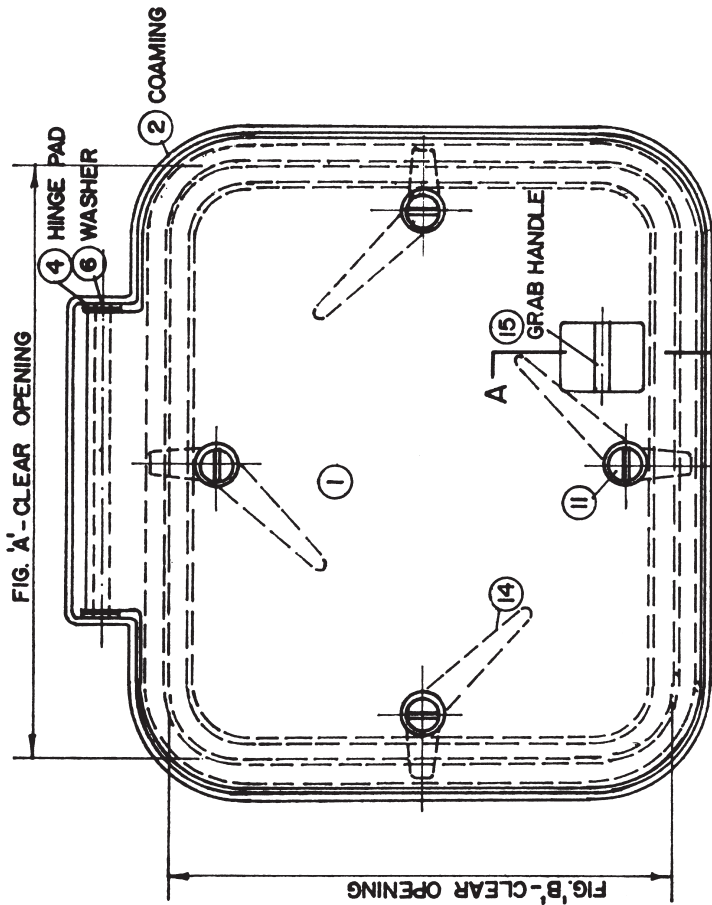


SECTION

BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 WATERTIGHT HATCH WITH DROP BOLTS
 DRAWING NO. 208

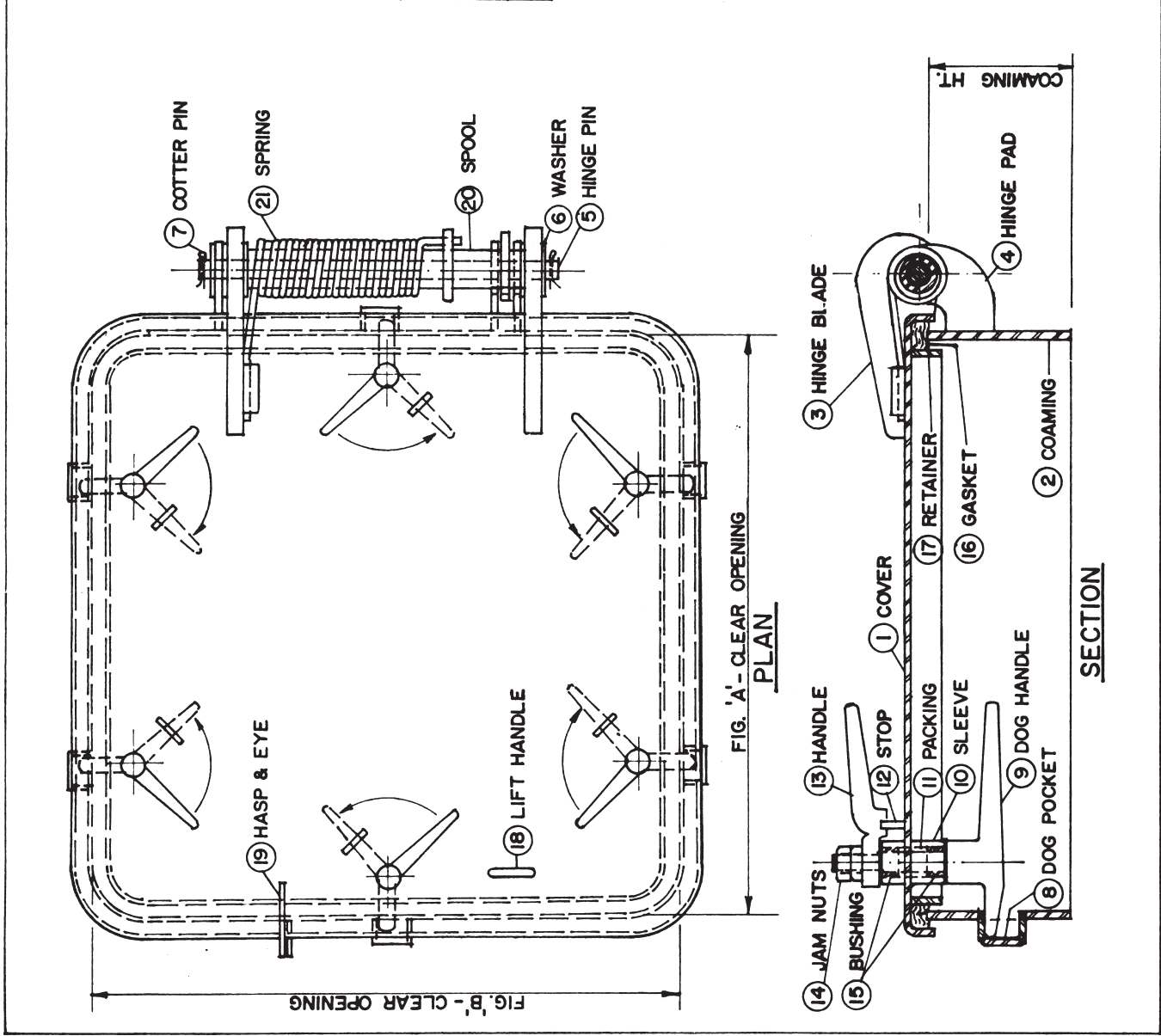


SCHEDULE OF MATERIALS		
PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	COLD FINISH	
6	BRASS	
7	NEOPRENE	
8	MILD STEEL	
9	MILD STEEL	
10	STEEL	
11	MANGANESE BRONZE	
12	BRASS	
13	DELTRIN	
14	MILD STEEL	
15	MILD STEEL	
16	GRAPHITE	
17	MILD STEEL	
18	MILD STEEL	
19	MILD STEEL	



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT FLUSH HATCH
DRAWING NO. 211

SCHEDULE OF MATERIALS		
PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	COLD FINISH	
6	BRASS	
7	BRASS	
8	MILD STEEL	
9	FRG. STEEL	
10	MILD STEEL	
11	GRAPHITE	
12	MILD STEEL	
13	FRG. STEEL	
14	STEEL	
15	DELRI	
16	NEOPRENE	
17	MILD STEEL	
18	MILD STEEL	
19	MILD STEEL	
20	MILD STEEL	
21	SPRING STEEL	



BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 WATERTIGHT HATCH - SPRING BALANCED
 DRAWING NO. 214

HINGE PLATE REMOVED
TO SHOW SPRING ASSY.

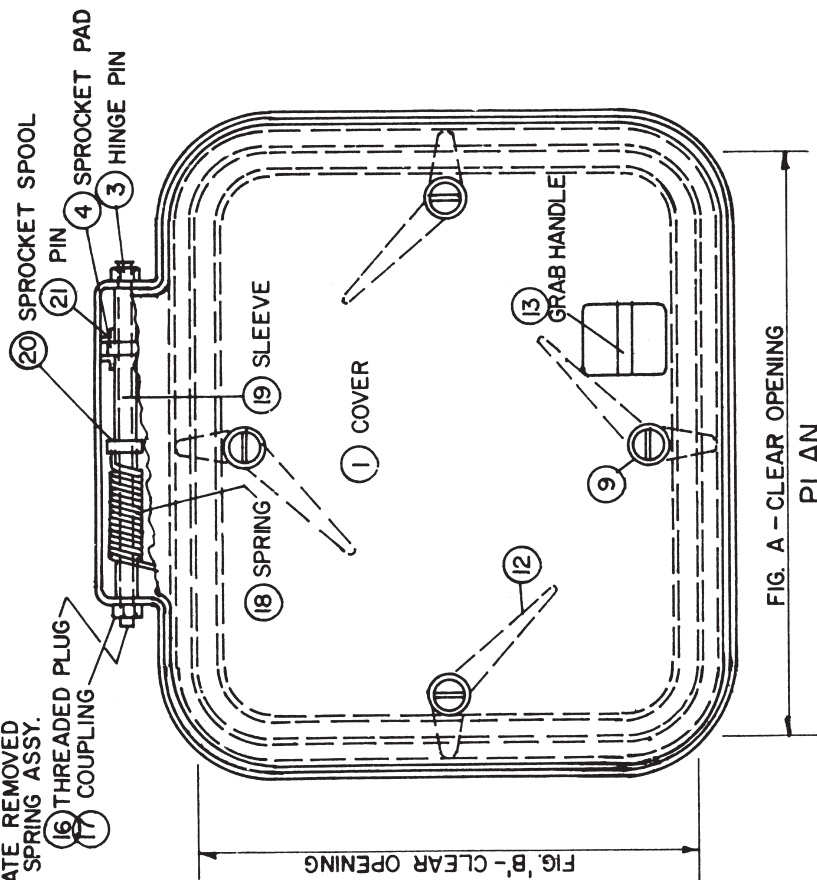
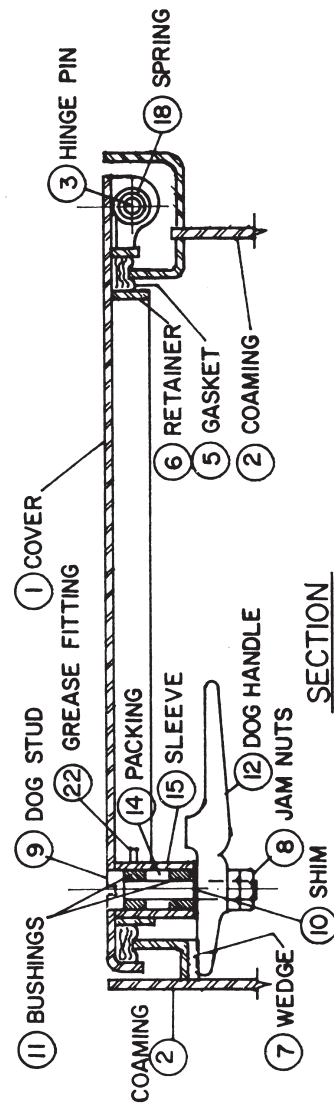


FIG. A - CLEAR OPENING

PLAN



SECTION

NOTES:

1. COVER OPENS TO APPROX. 100 DEG.

SCHEDULE OF MATERIALS

PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	COLD FINISH	
4	MILD STEEL	
5	NEOPRENE	
6	MILD STEEL	
7	FORGED STEEL	
8	STEEL	
9	BRASS	
10	STAINLESS	
11	DEL RIN	
12	MANGANESE BRONZE	
13	MILD STEEL	
14	GRAPHITE	
15	MILD STEEL	
16	MILD STEEL	
17	COLD FINISH	
18	SPRING STEEL	
19	MILD STEEL	
20	MILD STEEL	
21	MILD STEEL	
22	PLATED	

BYRNE, RICE & TURNER, INC.

NEW ORLEANS, LOUISIANA

WATERTIGHT FLUSH HATCH WITH SPRING
BALANCED COVER & RECESSED SPRING

DRAWING NO. 217

COVER PLATE NOT SHOWN
TO SHOW SPRING ASSY.

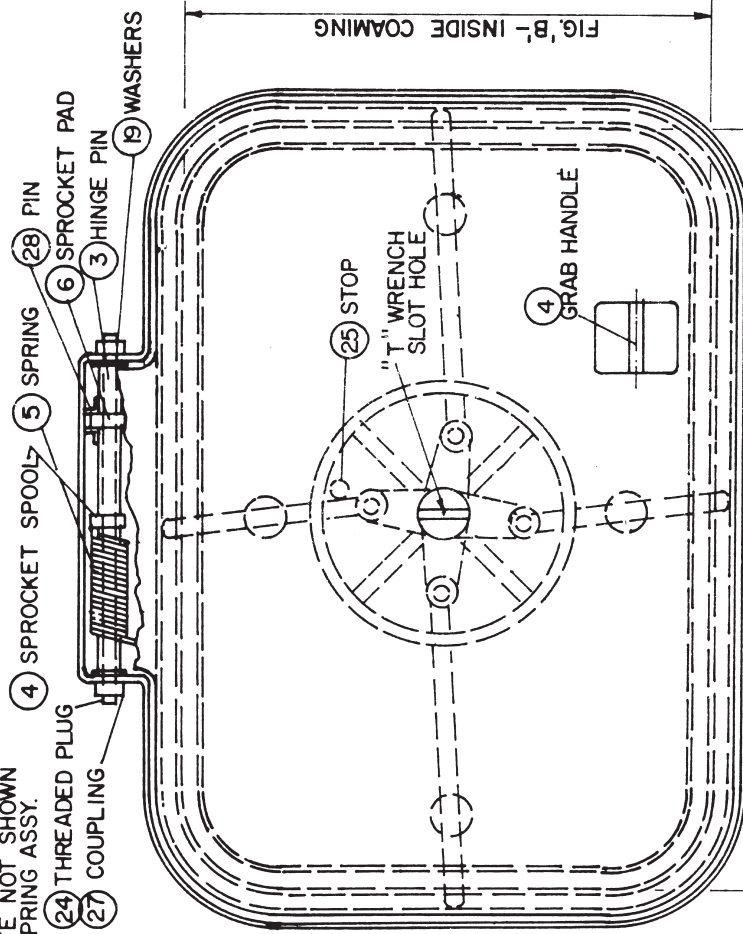
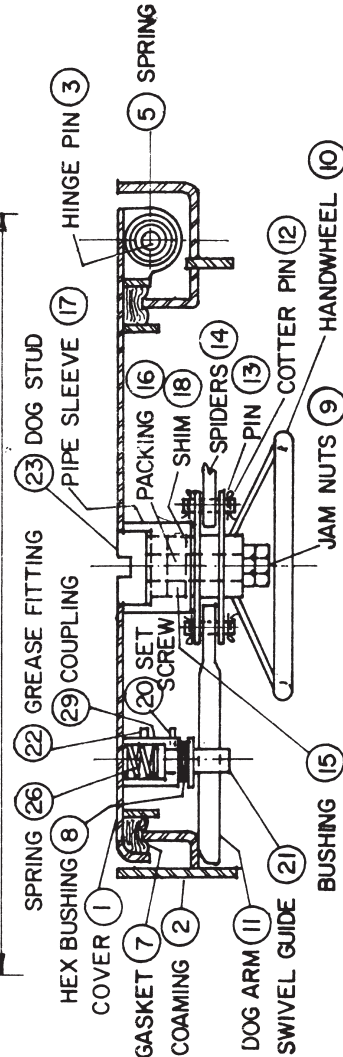


FIG. 'B' - INSIDE COAMING

PLAN

FIG. 'A' - INSIDE COAMING



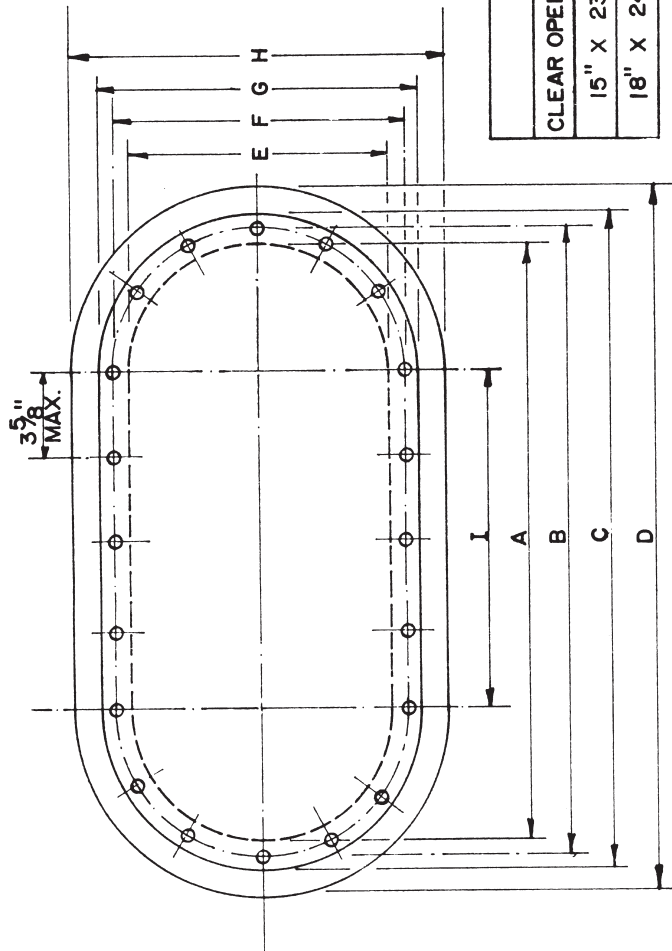
SECTION

SCHEDULE OF MATERIALS

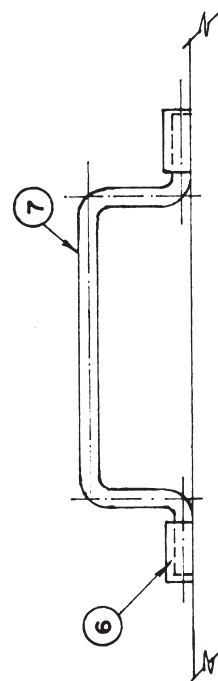
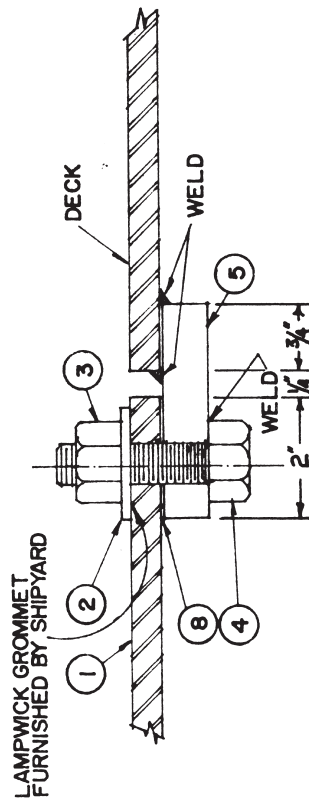
PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	COLD FINISH	
4	MILD STEEL	
5	SPRING STL.	
6	MILD STEEL	
7	NEOPRENE	
8	MILD STEEL	
9	STEEL	
10	ALUMINIUM	
11	COLD FINISH	
12	STAINLESS	
13	BRASS	
14	MILD STEEL	
15	DEL RIN	
16	GRAPHITE	
17	COLD FINISH	
18	STAINLESS	
19	STAINLESS	
20	MILD STEEL	
21	BRASS	
22	PLATED	
23	BRASS	
24	MILD STEEL	
25	MILD STEEL	
26	SPRING STL.	
27	MILD STEEL	
28	MILD STEEL	
29	MILD STEEL	

BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
QUICK ACTING WATERTIGHT FLUSH HATCH
WITH RECESSED SPRING
DRAWING NO. 219

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	STEEL	
2	PLATED STEEL	
3	BRASS	
4	STEEL	
5	STEEL	
6	STEEL	
7	STEEL	
8	NEOPRENE	



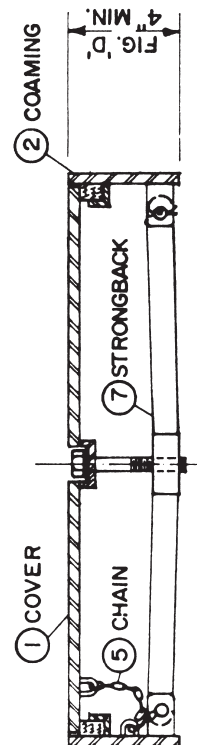
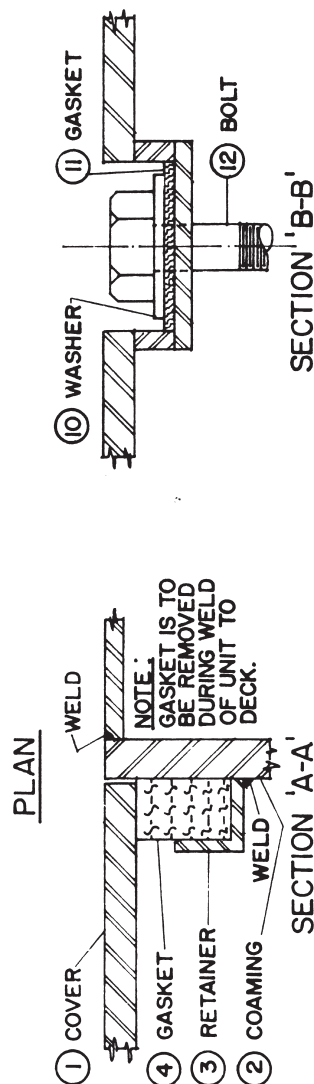
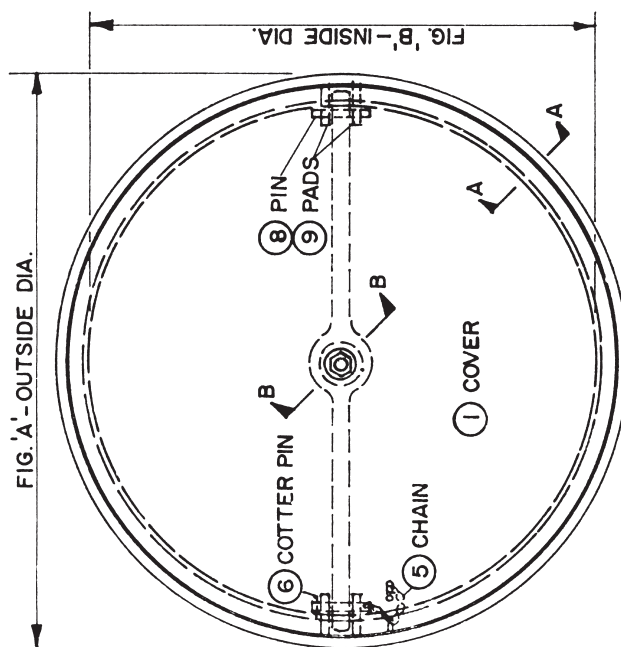
DIMENSION SCHEDULE									
CLEAR OPENING	A	B	C	D	E	F	G	H	I
15" X 23"	23"	24 1/4"	27"	29"	15"	16 1/4"	19"	21"	8"
18" X 24"	24"	25 1/4"	28"	30"	18"	19 1/4"	22"	24"	6"



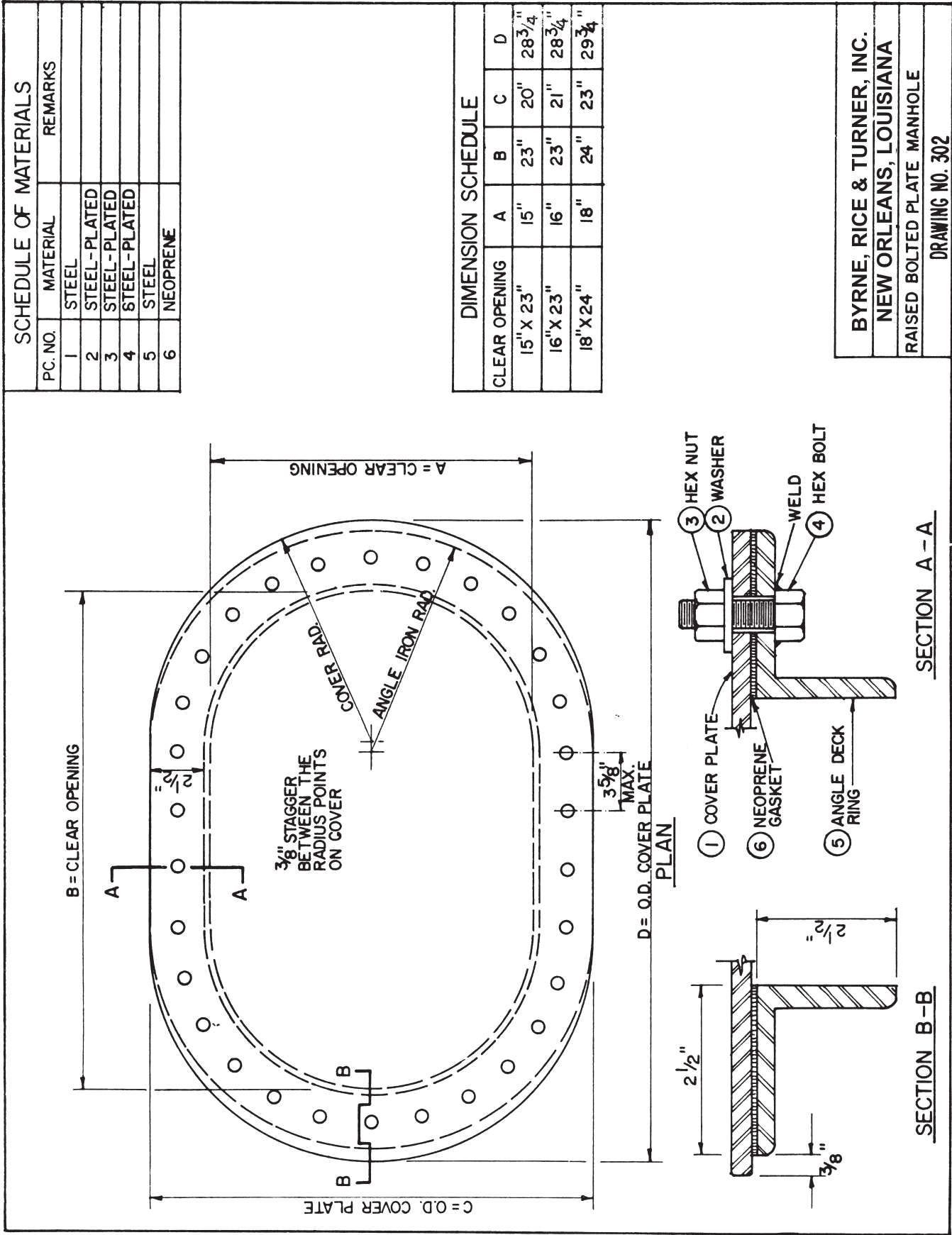
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT MANHOLE COVER
DRAWING NO. 300 - REV #1

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	NEOPRENE	
5	STEEL	
6	STEEL	
7	MILD STEEL	
8	COLD FINISH	
9	MILD STEEL	
10	BRASS	
11	NEOPRENE	
12	STAINLESS	

NOTE:
 20" O.D. — 17 3/4" I.D.
 21" O.D. — 18 3/4" I.D.
 22" O.D. — 19 3/4" I.D.
 24" O.D. — 21 3/4" I.D.

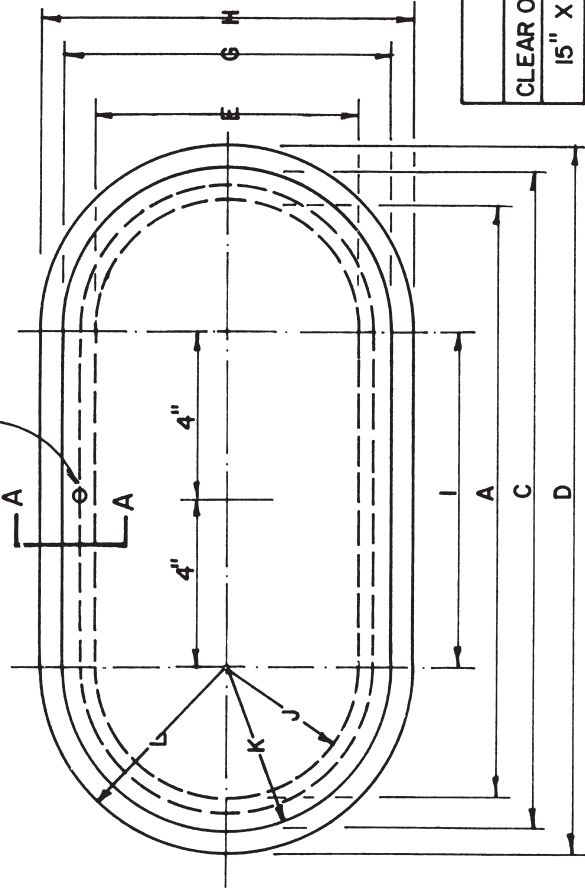


BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
SINGLE BOLT MANHOLE
DRAWING NO. 301



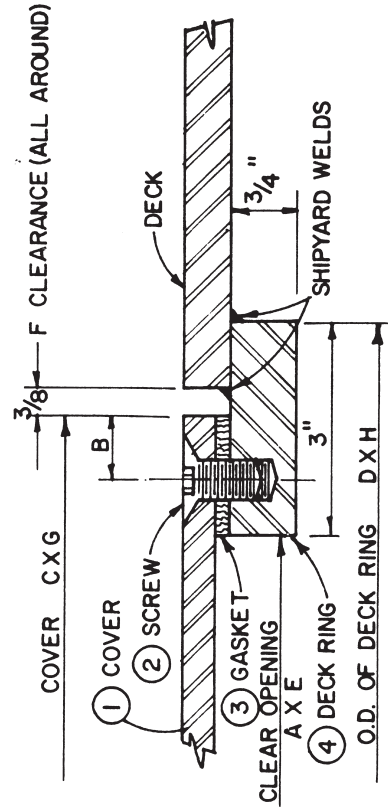
SCHEDULE OF MATERIALS		
PC.NO.	MATERIAL	REMARKS
1	STEEL	
2	STAINLESS	
3	NEOPRENE	
4	STEEL	

(26) - FLAT HEAD SOCKET CAP
SCREWS (EQUALLY SPACED)



PLAN

DIMENSION SCHEDULE												
CLEAR OPENING	A	B	C	D	E	F	G	H	I	J	K	L
15" X 23"	23"	1 1/8"	27"	29"	15"	3 3/8"	19"	21"	8"	7 1/2"	9 1/2"	10 1/2"

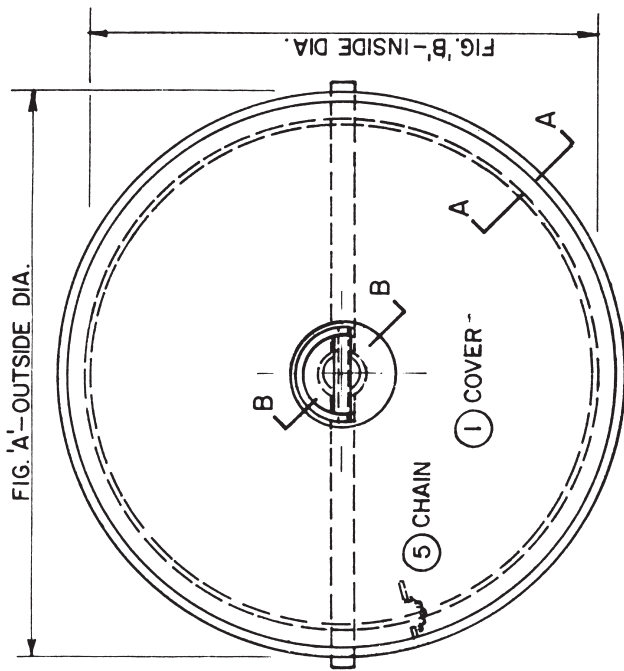


SECTION "A-A"

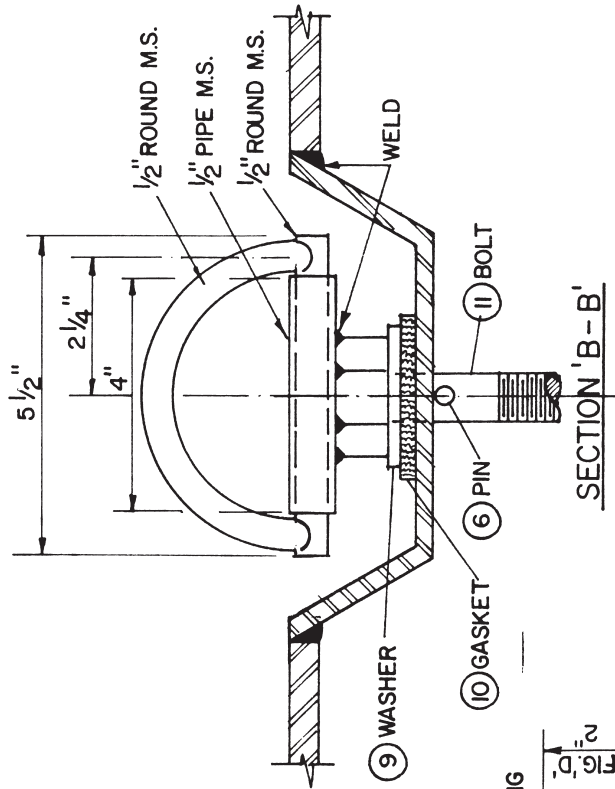
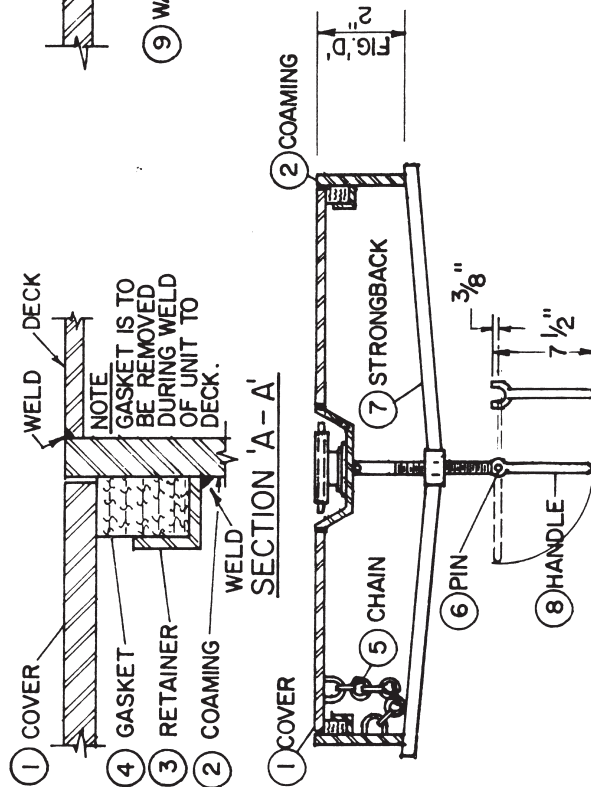
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
FLUSH BOLTED PLATE MANHOLE
DRAWING NO. 303

SCHEDULE OF MATERIALS		
PC.NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	NEOPRENE	
5	STEEL	
6	STAINLESS	
7	MILD STEEL	
8	MILD STEEL	
9	STAINLESS	
10	NEOPRENE	
11	STAINLESS	

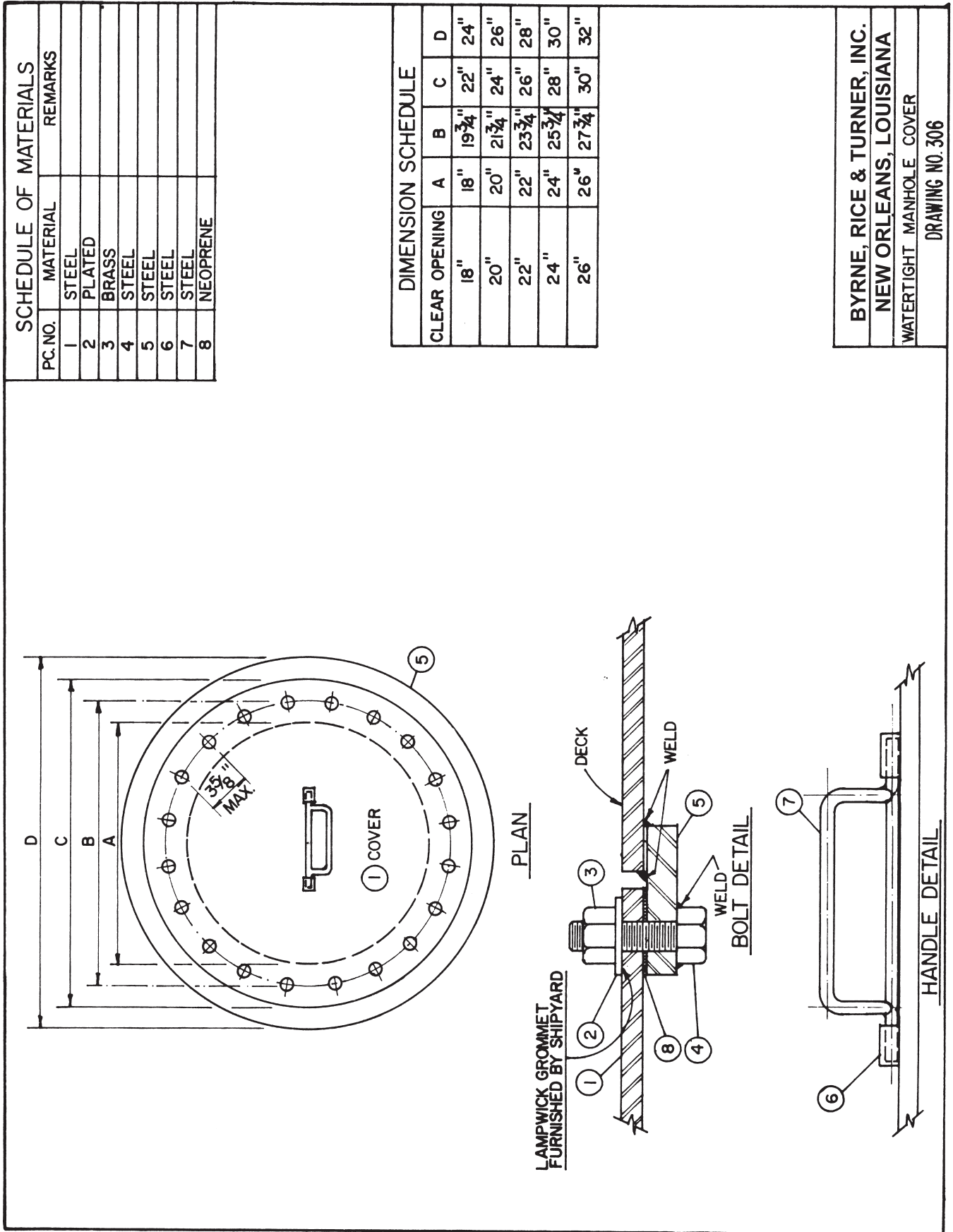
NOTE:
 20" O.D. — 17 3/4" I.D.
 21" O.D. — 18 3/4" I.D.
 22" O.D. — 19 3/4" I.D.
 24" O.D. — 21 3/4" I.D.

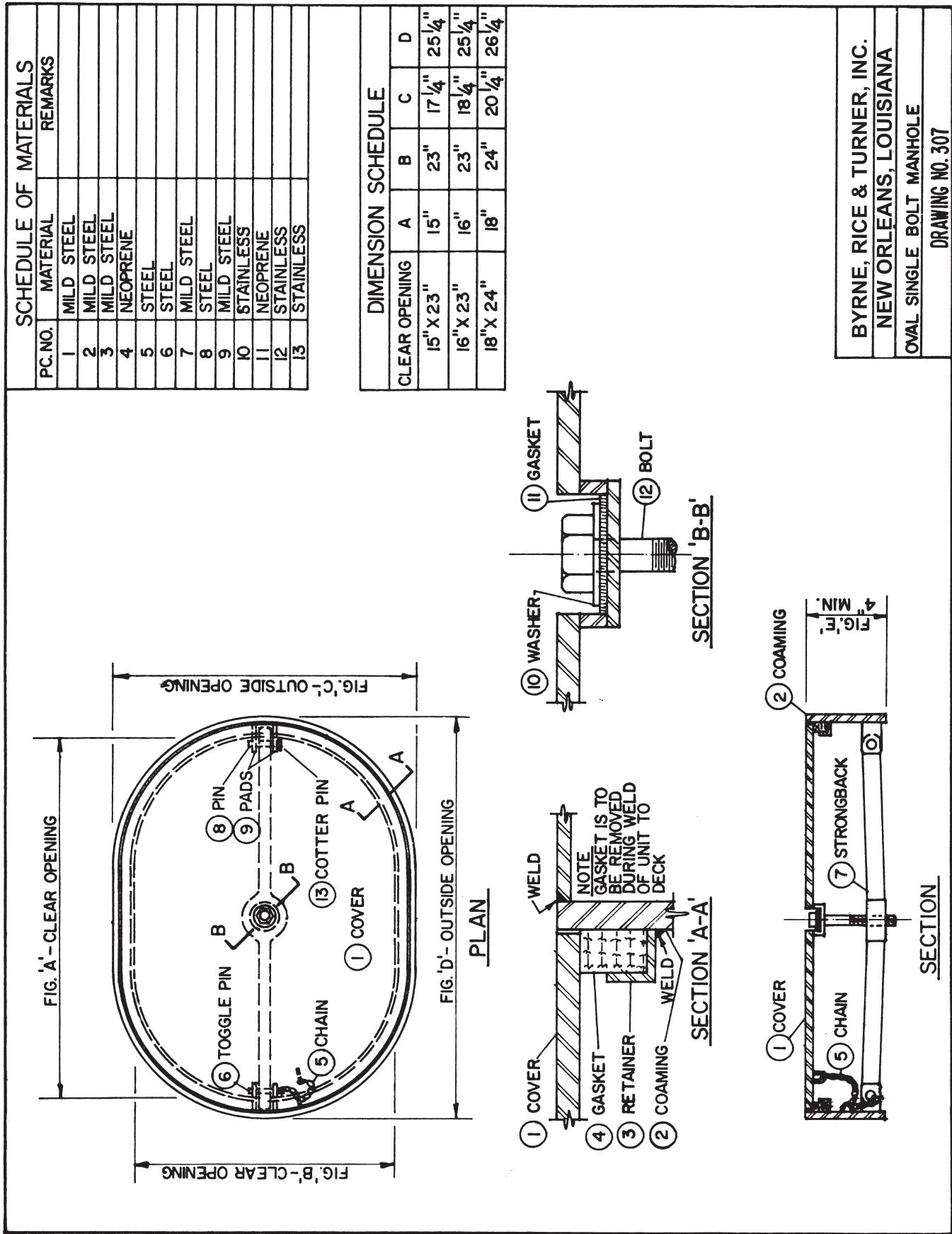


PLAN

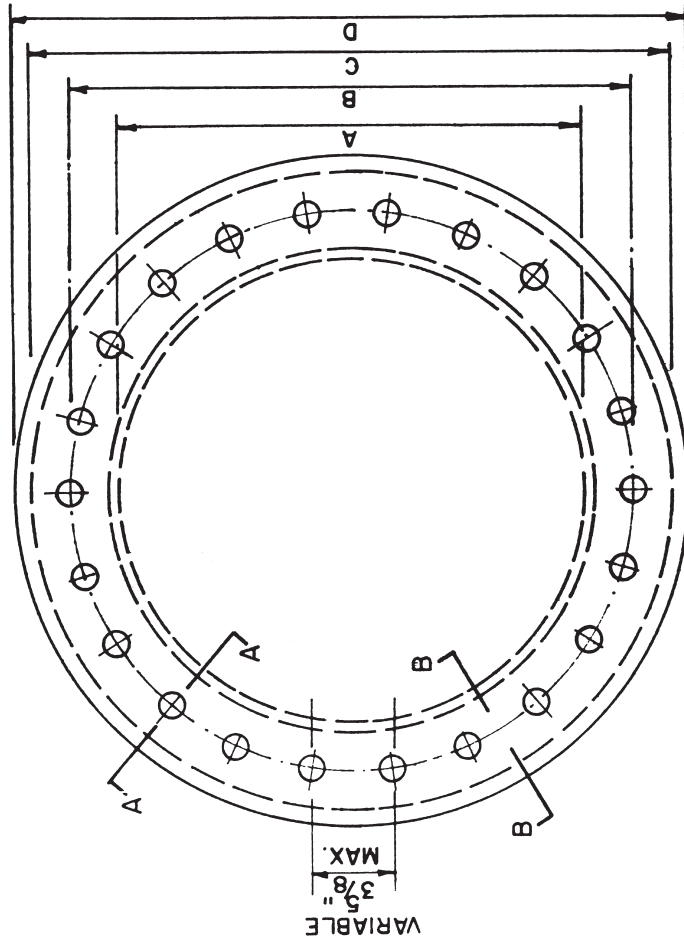


BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 SINGLE BOLT MANHOLE WITH FOLD
 DOWN HANDLE
 DRAWING NO. 305



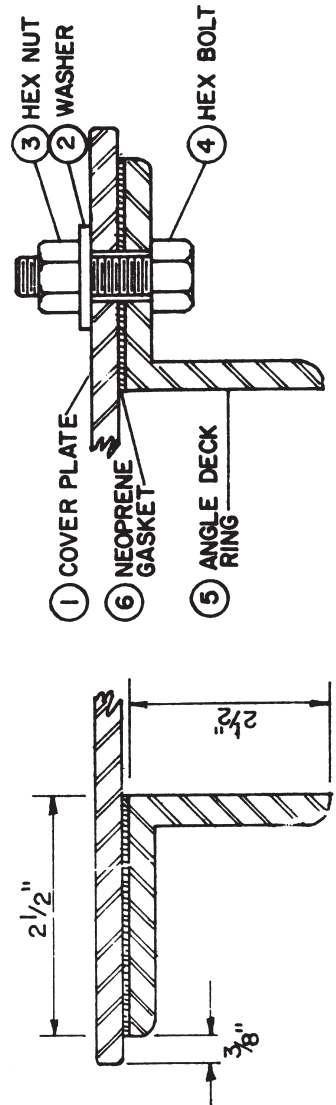


SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	STEEL	
2	PLATED	
3	PLATED	
4	MILD STEEL	
5	STEEL	
6	NEOPRENE	



PLAN

DIMENSION SCHEDULE				
NO. BOLTS	CLEAR OPENING	A	B	C D
22	18"	18"	20 3/4"	23" 23 3/4"
22	20"	20"	22 3/4"	25" 25 3/4"
22	22"	22"	24 3/4"	27" 27 3/4"
22	24"	24"	26 3/4"	29" 29 3/4"

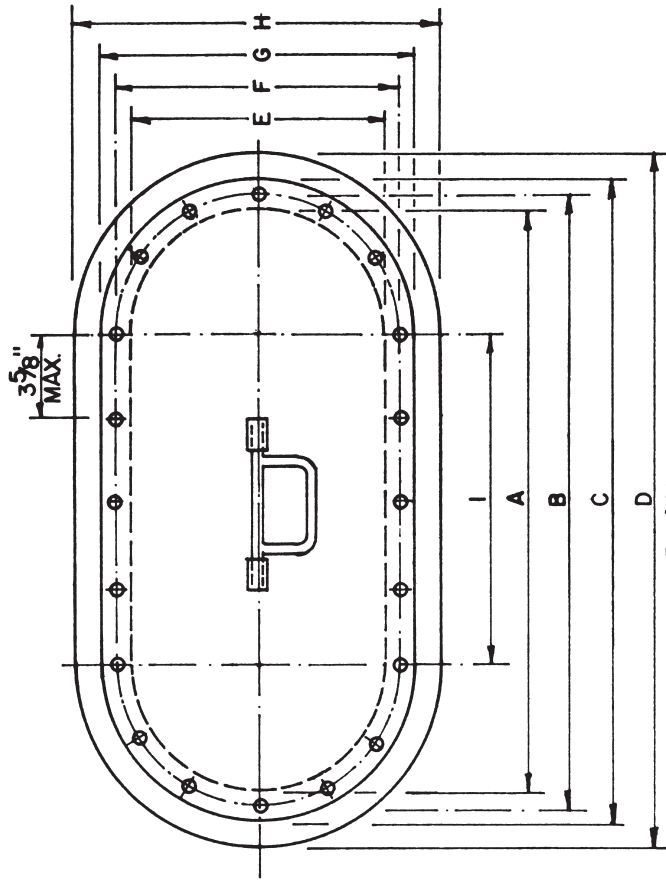


SECTION 'A-A'

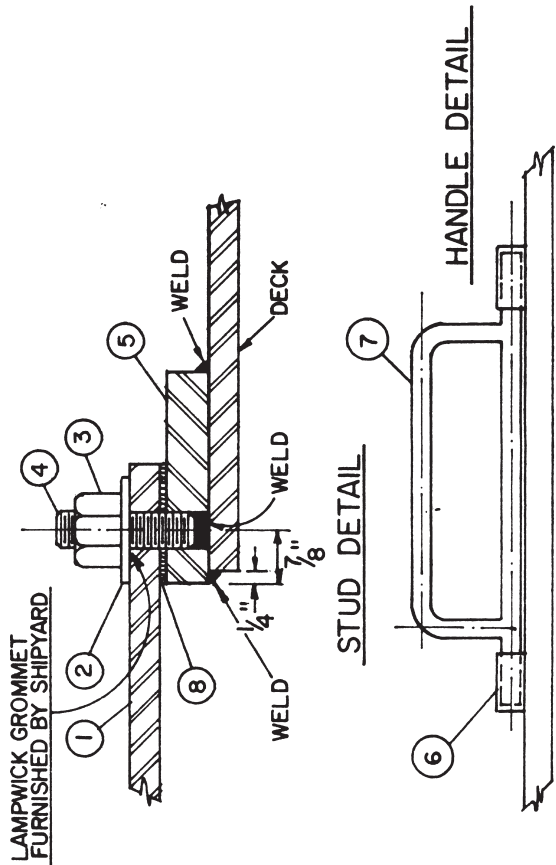
SECTION 'B-B'

BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
ROUND RAISED BOLTED MANHOLE
DRAWING NO. 308

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	STEEL	
2	PLATED	
3	PLATED	
4	MILD STEEL	
5	STEEL	
6	STEEL	
7	STEEL	
8	NEOPRENE	



DIMENSION SCHEDULE									
CLEAR OPENING	A	B	C	D	E	F	G	H	I
15" X 23"	23"	24 3/4"	26 1/2"	29"	15"	16 3/4"	18 1/2"	21"	8"
18" X 24"	24"	25 1/4"	27 1/2"	30"	18"	19 1/4"	21 1/2"	24"	6"



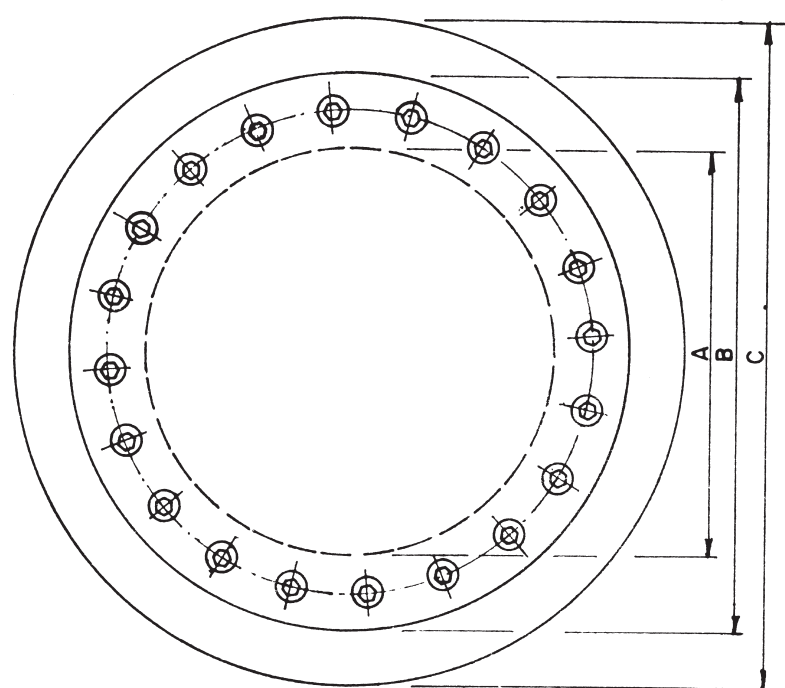
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
BOLTED PLATE MANHOLE WITH STUDS
DRAWING NO. 309

SCHEDULE OF MATERIALS

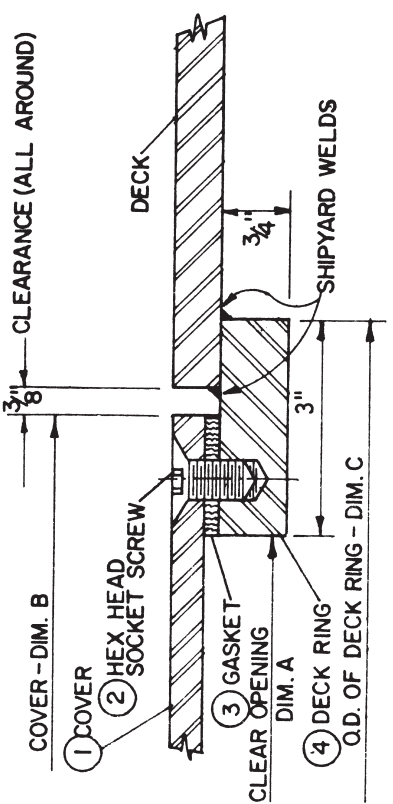
PC.NO.	MATERIAL	REMARKS
1	STEEL	
2	STAINLESS	
3	NEOPRENE	
4	STEEL	

DIMENSION SCHEDULE

CLEAR OPENING	A	B	C
18"	18"	21"	24"
20"	20"	24"	26"
22"	22"	26"	28"
24"	24"	28"	30"



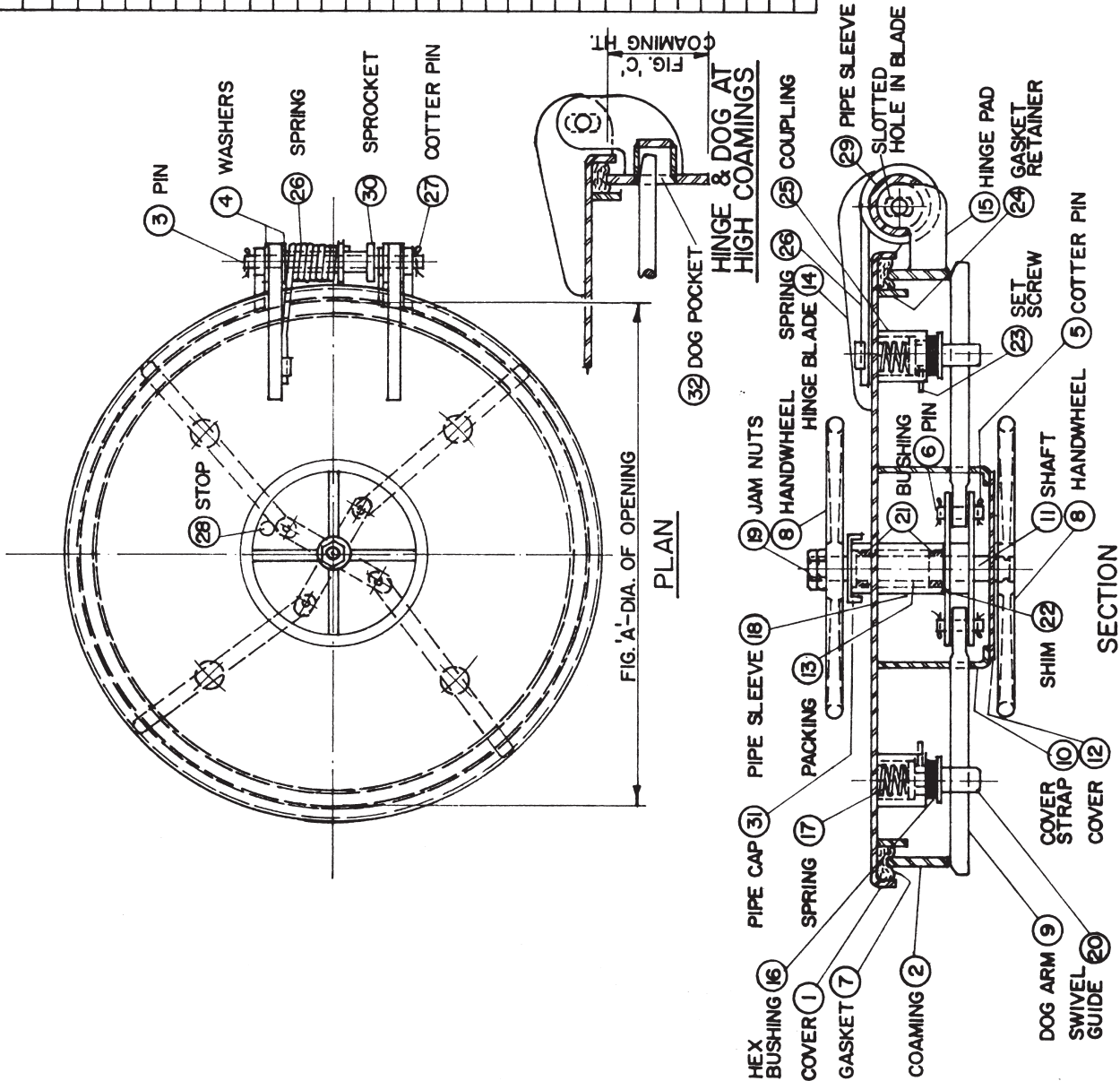
PLAN



SECTION

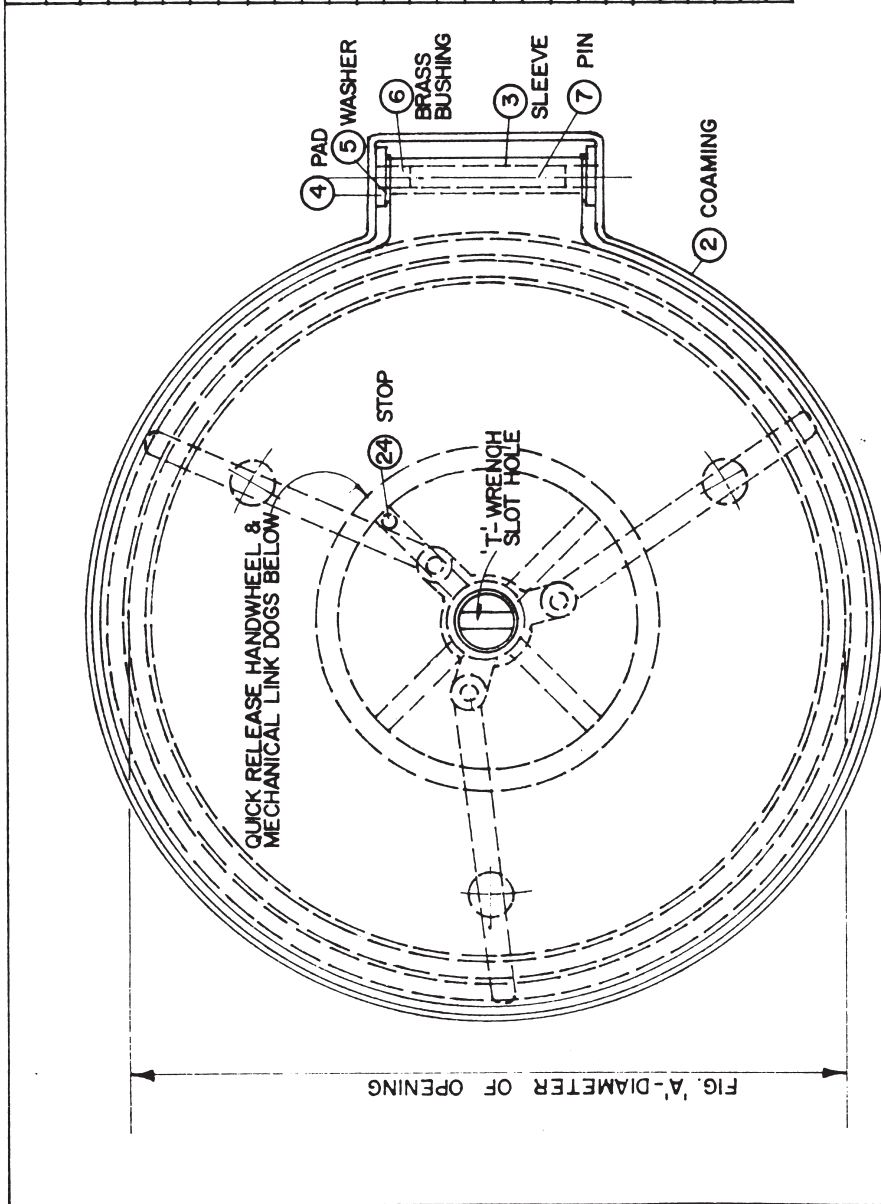
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
FLUSH BOLTED PLATE MANHOLE
DRAWING NO. 310

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	COLD FINISH	
4	BRASS	
5	MILD STEEL	
6	COLD FINISH	
7	NEOPRENE	
8	MILD STEEL	
9	MILD STEEL	
10	MILD STEEL	
11	COLD FINISH	
12	MILD STEEL	
13	GRAPHITE	
14	MILD STEEL	
15	MILD STEEL	
16	MILD STEEL	
17	SPRING STEEL	
18	STEEL	
19	STEEL	
20	BRASS	
21	DELURIN	
22	BRASS	
23	STEEL	
24	MILD STEEL	
25	STEEL	
26	SPRING STEEL	
27	MILD STEEL	
28	MILD STEEL	
29	MILD STEEL	
30	MILD STEEL	
31	STEEL	
32	MILD STEEL	

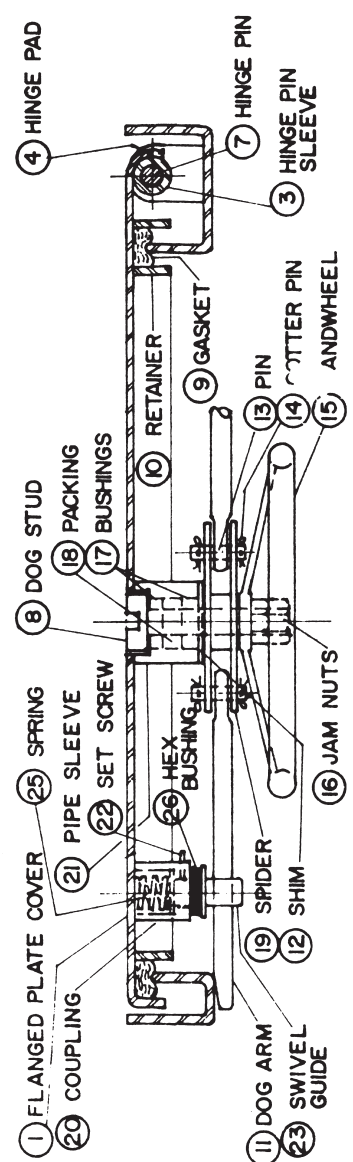


BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 QUICK ACTING WATERTIGHT SCUTTLE WITH
 SPRING BALANCED COVER

DRAWING NO. 400



PLAN



SECTION

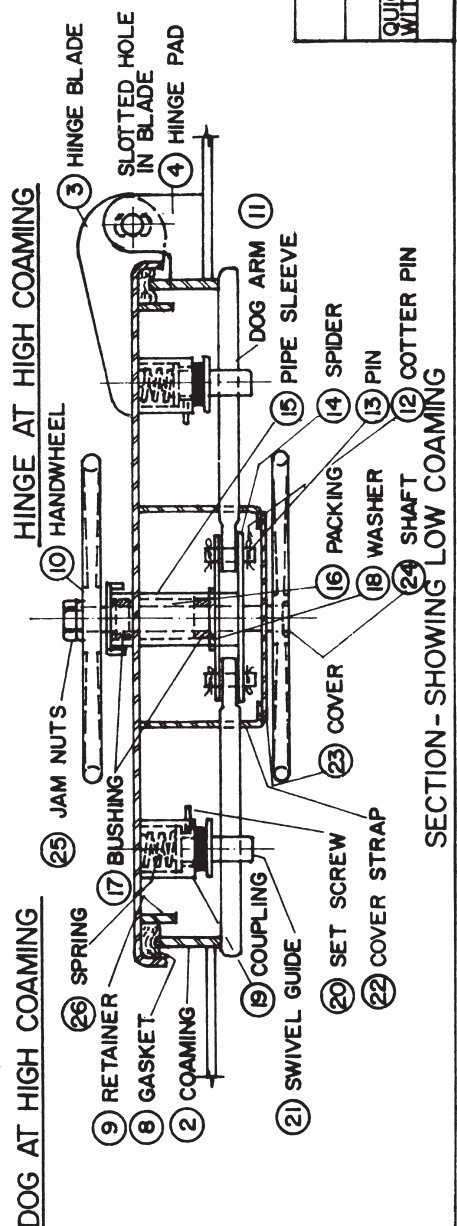
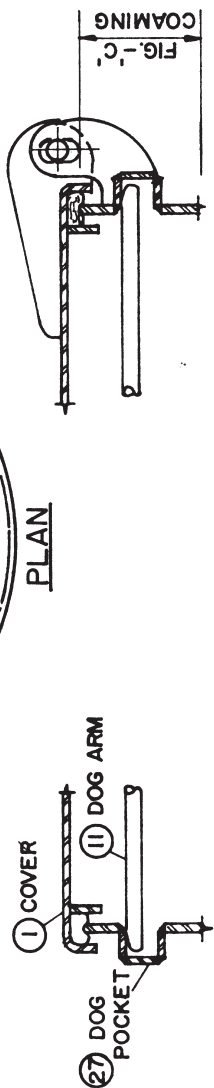
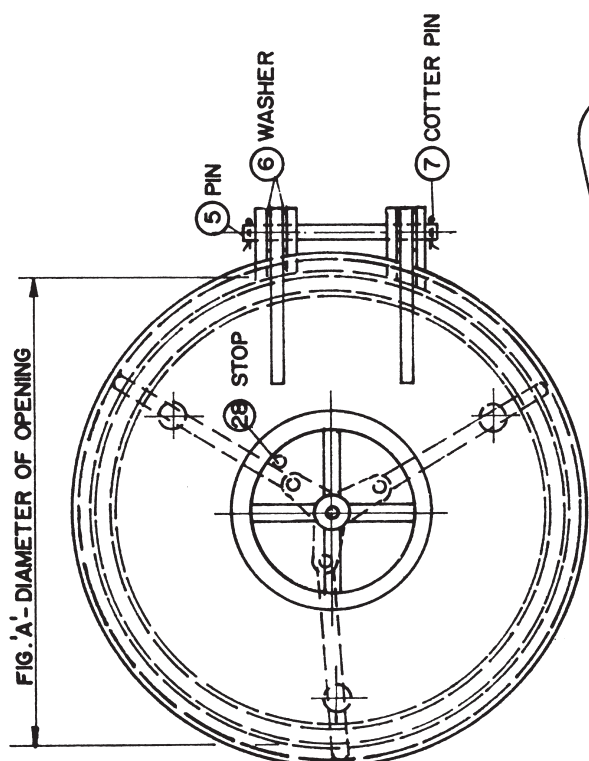
SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	BRASS	
6	BRASS	
7	COLD FINISH	
8	MILD STEEL	
9	NEOPRENE	
10	MILD STEEL	
11	MILD STEEL	
12	BRASS	
13	COLD FINISH	
14	MILD STEEL	
15	MILD STEEL	
16	MILD STEEL	
17	DEL RIN	
18	GRAPHITE	
19	MILD STEEL	
20	MILD STEEL	
21	MILD STEEL	
22	MILD STEEL	
23	BRASS	
24	MILD STEEL	
25	SPRING STEEL	
26	MILD STEEL	

BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
FLUSH QUICK ACTING WATERTIGHT ROUND SCUTTLE

DRAWING NO. 401

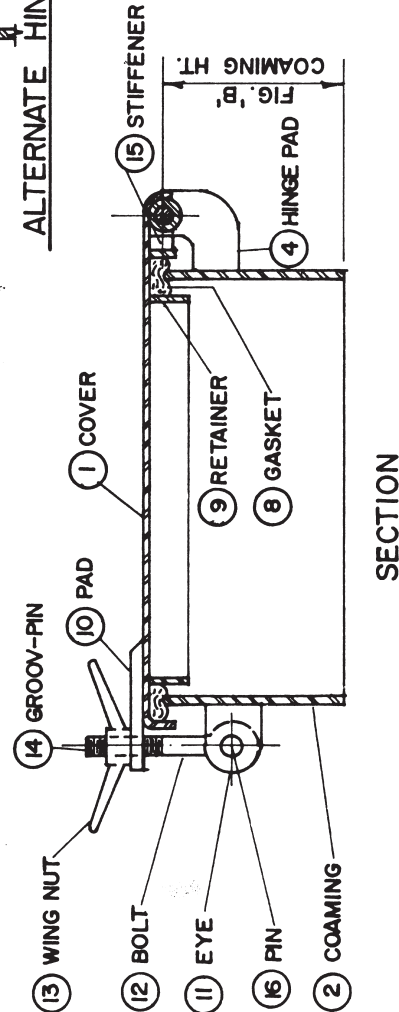
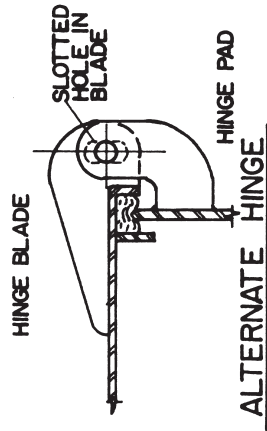
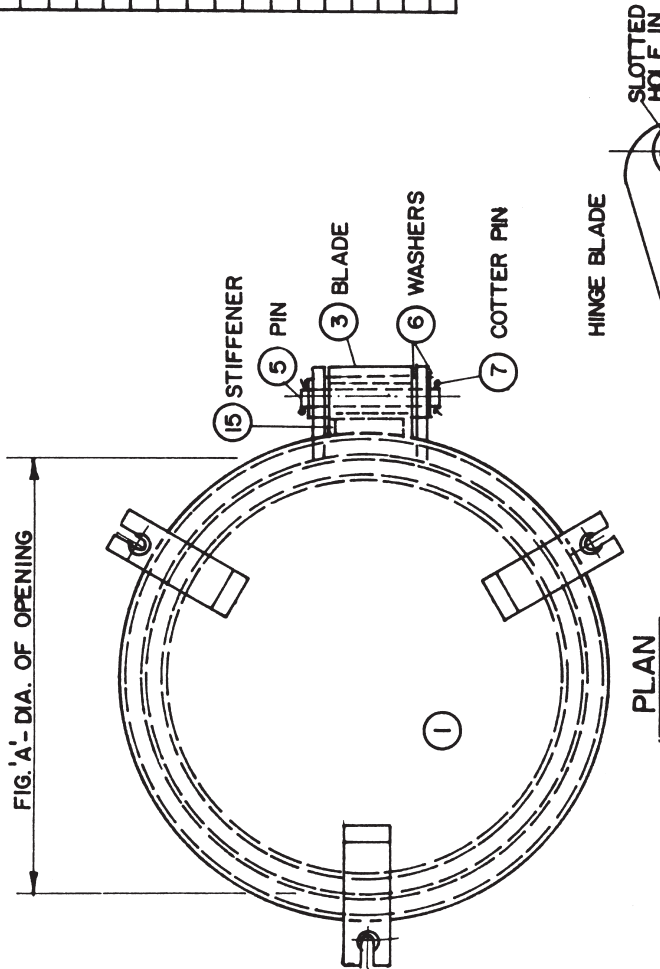
SCHEDULE OF MATERIALS

PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	COLD FINISH	
6	BRASS	
7	BRASS	
8	NEOPRENE	
9	MILD STEEL	
10	MILD STEEL	
11	MILD STEEL	
12	MILD STEEL	
13	COLD FINISH	
14	MILD STEEL	
15	MILD STEEL	
16	GRAPHITE	
17	DELTRIN	
18	BRASS	
19	MILD STEEL	
20	MILD STEEL	
21	BRASS	
22	MILD STEEL	
23	MILD STEEL	
24	COLD FINISH	
25	BRASS	
26	STEEL	
27	MILD STEEL	
28	MILD STEEL	

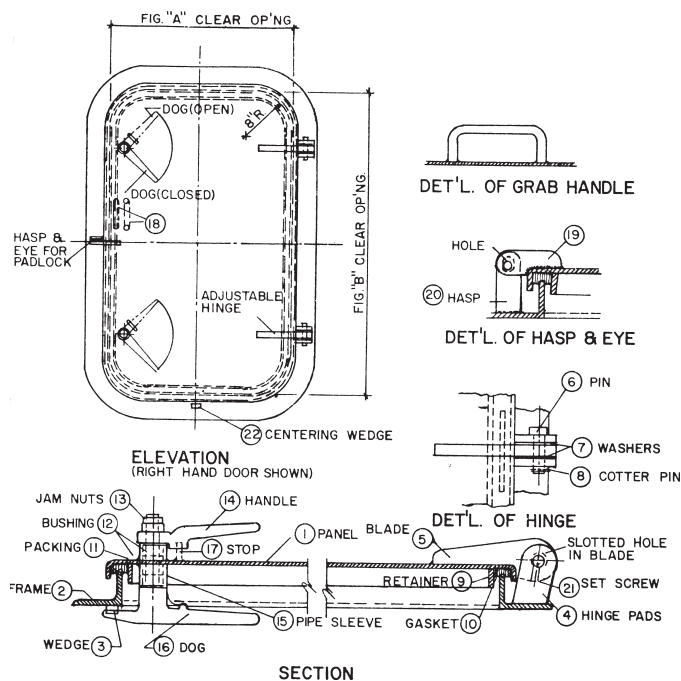


BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 QUICK ACTING WATERTIGHT ROUND SCUTTLE
 WITH THREE DOGS
 DRAWING NO. 402

SCHEDULE OF MATERIALS		
PC. NO.	MATERIAL	REMARKS
1	MILD STEEL	
2	MILD STEEL	
3	MILD STEEL	
4	MILD STEEL	
5	COLD FINISH	
6	BRASS	
7	BRASS	
8	NEOPRENE	
9	MILD STEEL	
10	MILD STEEL	
11	MILD STEEL	
12	BRONZE	
13	BRONZE	
14	STAINLESS	
15	MILD STEEL	
16	BRASS	



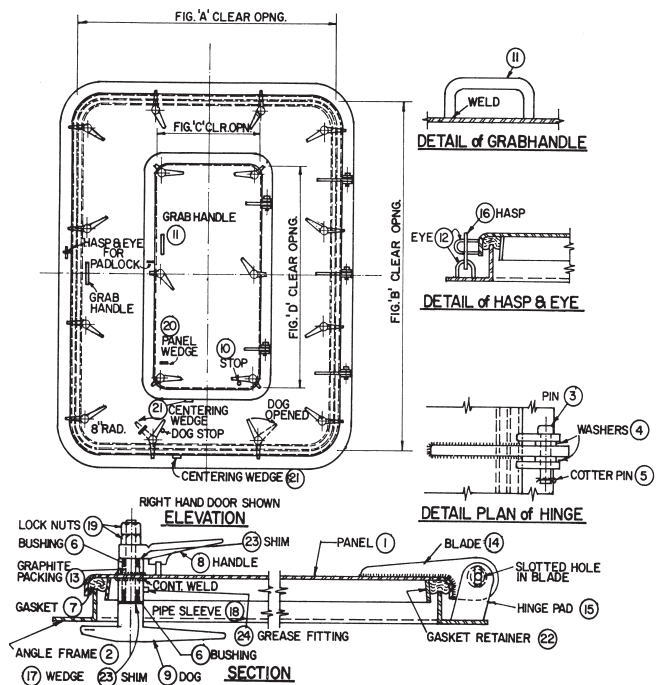
BYRNE, RICE & TURNER, INC.
 NEW ORLEANS, LOUISIANA
 WATERTIGHT SCUTTLE W/DROP BOLTS
 DRAWING NO. 404



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA

GASTIGHT & WEATHERTIGHT DOOR W/ 2 DOGS

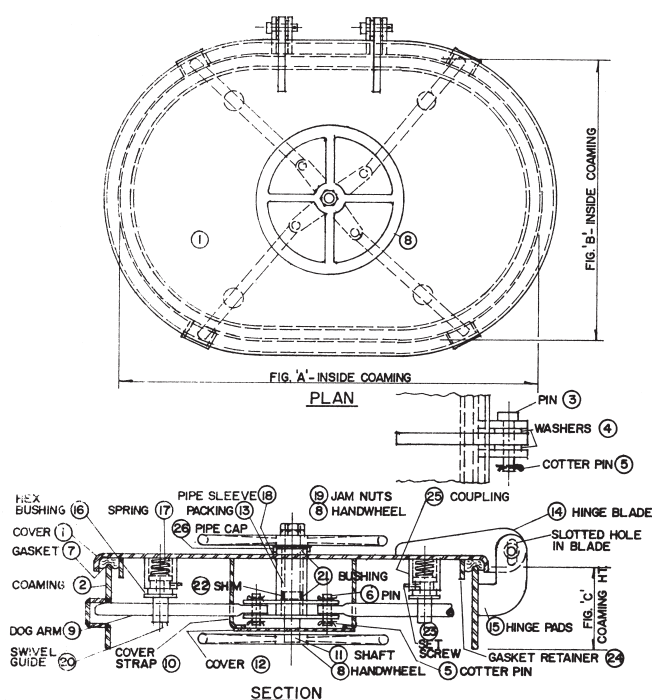
DRAWING NO. 100



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA

WATERTIGHT DOOR - PERSONAL & EQUIP.

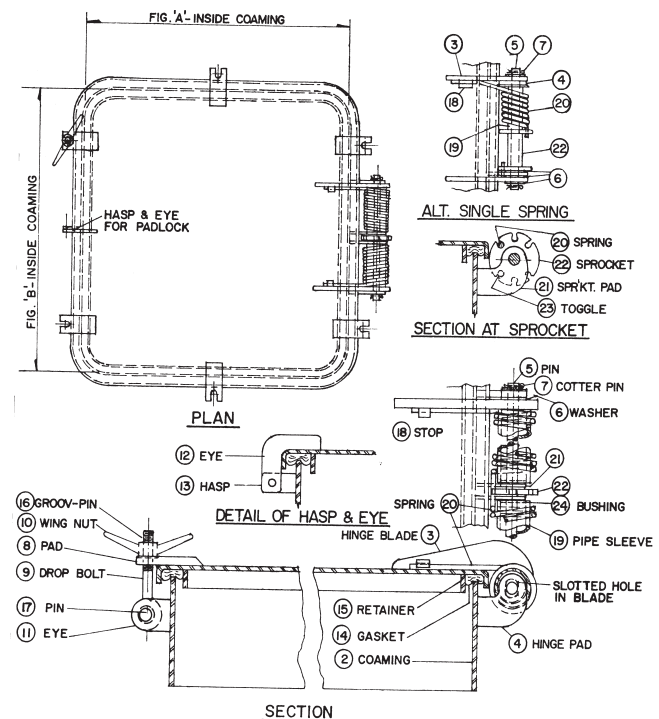
DRAWING NO. 107



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA

QUICK ACTING WATERTIGHT HATCH

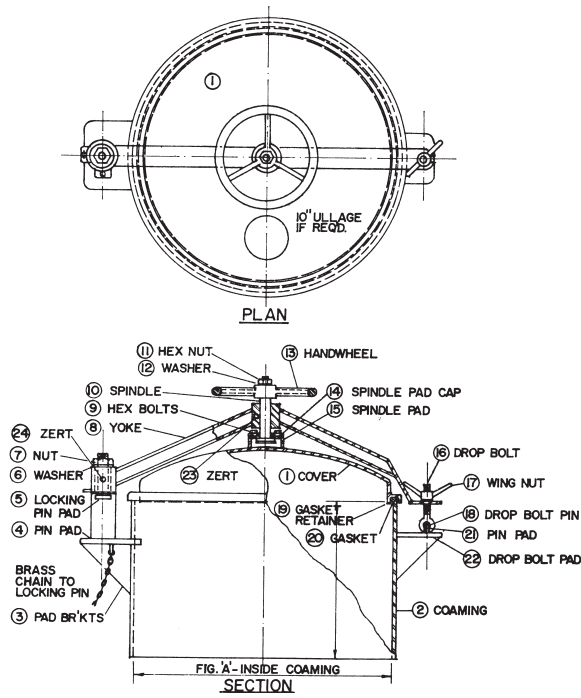
DRAWING NO. 203



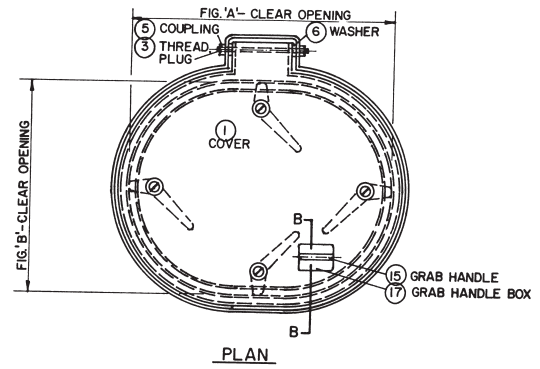
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA

SPRING BAL. RECTANGULAR OR SQ. DOG HATCH

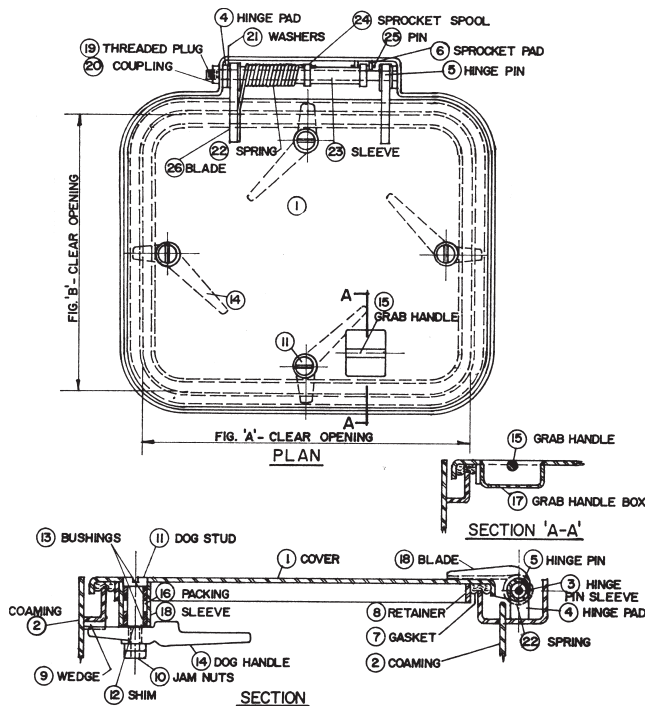
DRAWING NO. 207



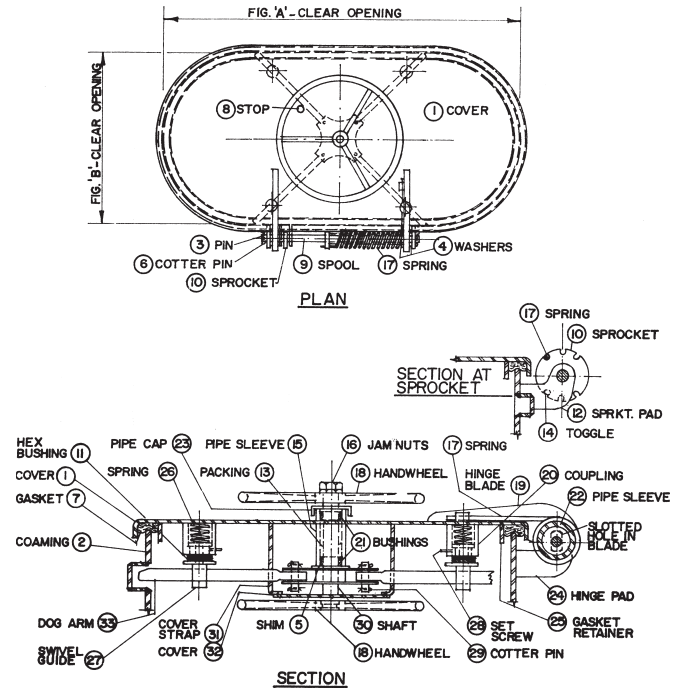
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
 OIL CARGO HATCH
 DRAWING NO. 210



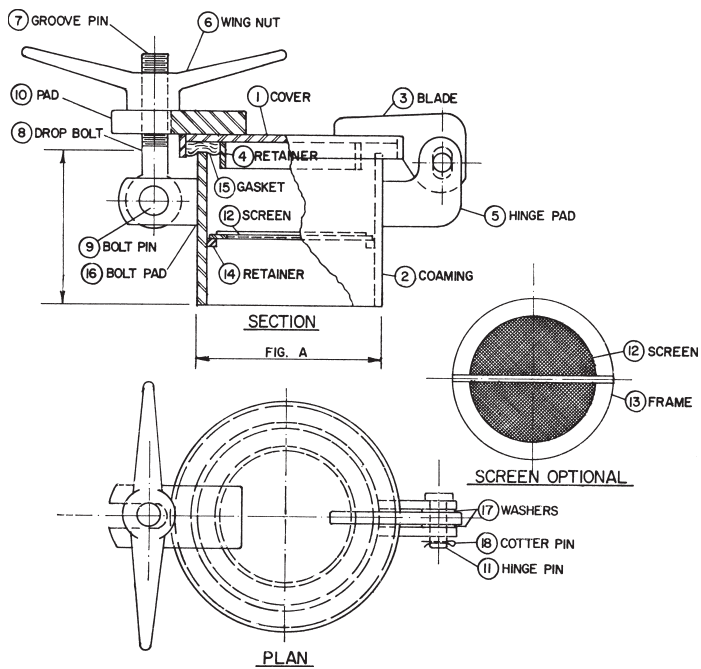
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
 WATERTIGHT FLUSH OVAL HATCH
 DRAWING NO. 212



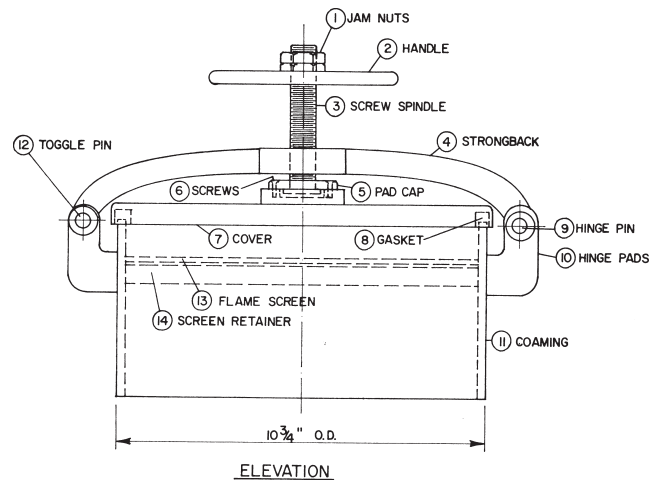
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
 WATERTIGHT FLUSH HATCH W SPRING BAL. COVER
 DRAWING NO. 213



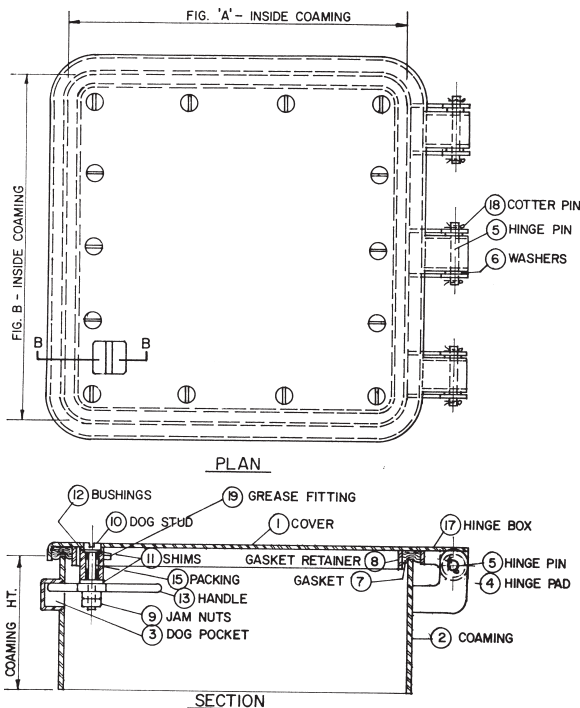
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
 SPRING BAL. QUICK ACTING WATERTIGHT OVAL HATCH
 DRAWING NO. 215



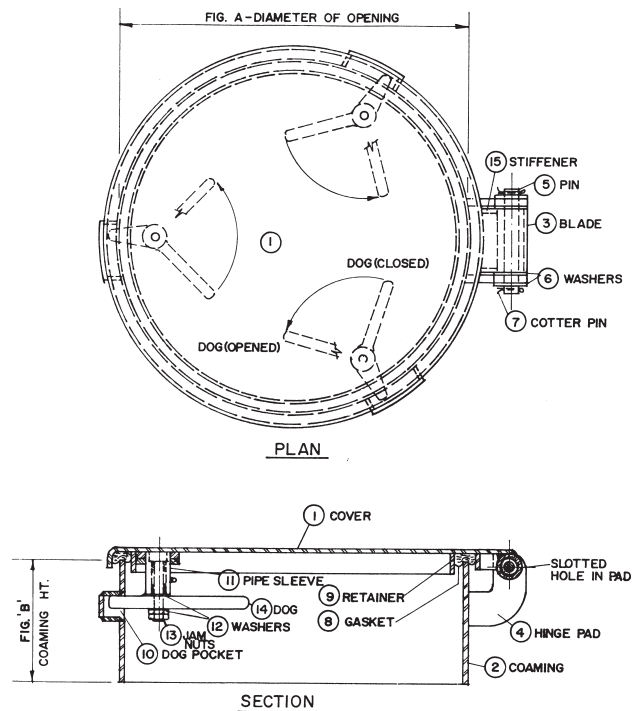
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
ULLAGE HATCH
DRAWING NO. 218



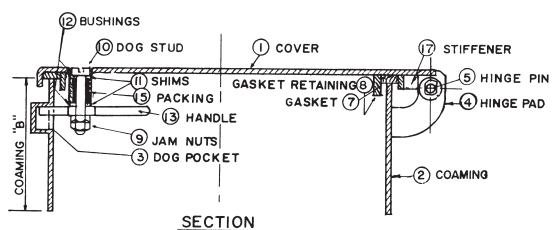
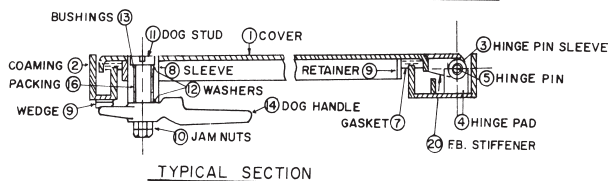
BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
ULLAGE HATCH
DRAWING NO. 220



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT RECTANGULAR HATCH
DRAWING NO. 221

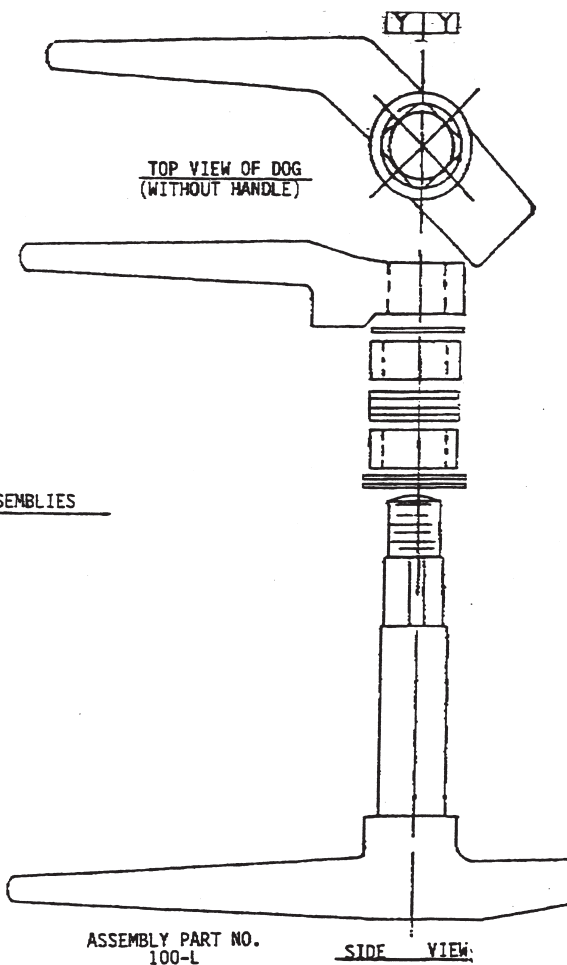
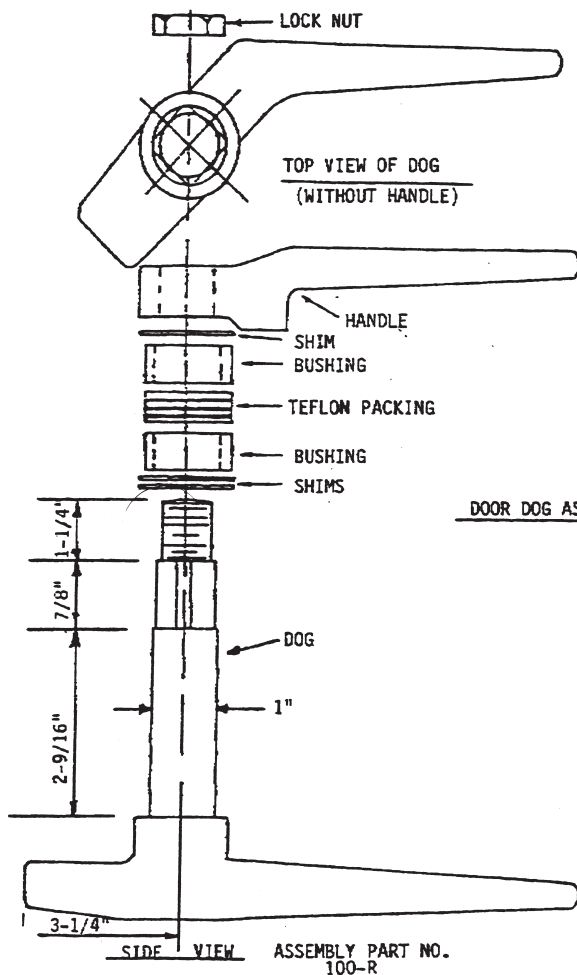


BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT SCUTTLE - OPERATE BELOW ONLY
DRAWING NO. 406



BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT FLUSH SCUTTLE
DRAWING NO. 407

BYRNE, RICE & TURNER, INC.
NEW ORLEANS, LOUISIANA
WATERTIGHT RAISED SCUTTLE - FLUSH COVER
DRAWING NO. 408



HOLLOW METAL JOINER DOORS AND FRAMES

Panel and flush type doors are constructed of either cold rolled steel, stainless steel, aluminum or honeycomb core with aluminum covering. All doors are stiffened by use of vertical zee sections, spot welded approximately 4" oc to each face of the door. Bottom and Top of door are horizontally reinforced by channels tack welded in place. Doors are filled with fiber glass insulation.

Reinforcements: Steel plate reinforcements are welded to the interior of the door, and are accurately fitted for hinges and locks. Similar reinforcements are provided for hold back hooks, door closers, bumpers and other surface installed hardware for which drilling and tapping is to be done on location.

Finish: All welds are ground and rough edges rounded. Doors are thoroughly cleaned of grease and other impurities, filled flush so as to completely conceal all welds and painted with a rust resistant primer.

Frame sections are formed to meet the desired architectural shape to conform to bulkhead conditions. They are adequately reinforced for striker plates and hinges.

All doors and frames meet the requirements of section 72-05-25 (b) of 1958 Coast Guard Rules and Regulations for passenger Vessels CG-256 Jan. 1, 1958.

HARDWARE INFORMATION

We are prepared to furnish doors and frames with hardware installed at the plant and shipped as a complete unit ready for installation. The following are recommended hardware setups for various locations:

FOR STATEROOM DOORS, LOCKER DOORS, AND DOORS TO MISCELLANEOUS SPACE:

1½ pair butts, bronze 4" x 4".

1 set mortise cylinder locks with latch bolt and dead bolt. Latch bolt operated by knobs either side, dead bolt operated by key outside and turn piece inside. (Oval knobs and roses both sides.)

FOR PASSAGE DOORS AND DOORS NOT REQUIRING LOCKING:

1½ pair butts, bronze 4" x 4".

1 mortise latch set without locking feature. Latch bolt operated by knobs from either side. (Oval knobs and roses both sides.)

FOR PRIVATE TOILET AND SHOWER DOORS:

1½ pair butts, bronze 4" x 4".

1 mortise privacy lock with latch bolt and dead bolt. Latch bolt operated by knobs either side. Dead bolt operated by turn piece from inside and emergency key outside. When door is locked turning inside knob retracts both latch bolt and dead bolt rendering a panic proof function. (Oval knobs and roses both sides.)

FOR SCREEN DOORS:

1 pair 4" spring hinges.

1 set mortise screen door locks having small round knob on one side and small lever handle, other side. Locking button on inside.

FINISHES: Material can be furnished in either dull or polished bronze finishes.

REQUEST FOR QUOTATION SHEET JOINER DOOR - SERIES 2000

TYPE - (Drawing. no)

FRAME -

SILL -

SIZE - Clear opening or plate cut

MATERIAL -

QUANTITY -

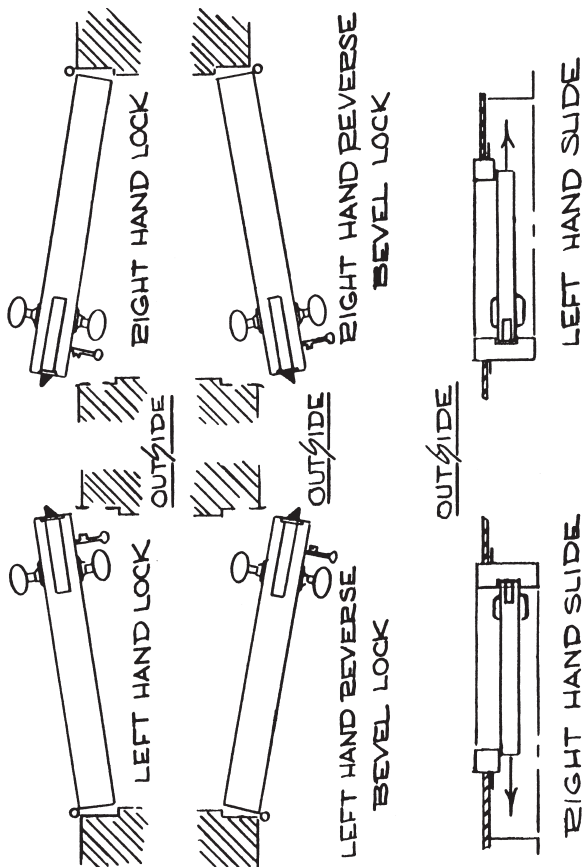
HANDINGS -

GLASS - Size, thickness, type

HARDWARE -

SPECIAL REQUIREMENTS:

MORTISE OR PIN LOCKS



DETERMINING HANDS AND BEVELS OF DOORS

(A) The hand of a door is determined from the Outside. Standing outside the door if the butts are on the right it is a right hand door. If the butts are on the left it is a left hand door.

The outside of an Entrance door is the deck side.

The outside of a Room door is the passage side.

The outside of a room door is the room side.

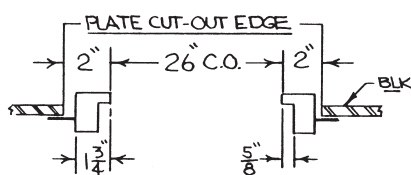
The outside of a Communicating door is the side from which, when the door is closed, the butts can not be seen.

The outside of Twin doors is the side between the two doors.

(B) If, when standing outside, the door opens from you, or inward, it takes a lock with regular bevel latch bolt; if it opens toward you, or outward, it takes a lock with reverse bolt bevel latch bolt.

DOOR CLEAR OPENING - 26" X 75"

SILL TYPE - CC-2003 A, B, C



CLEAR OPENING - 26" x 75"

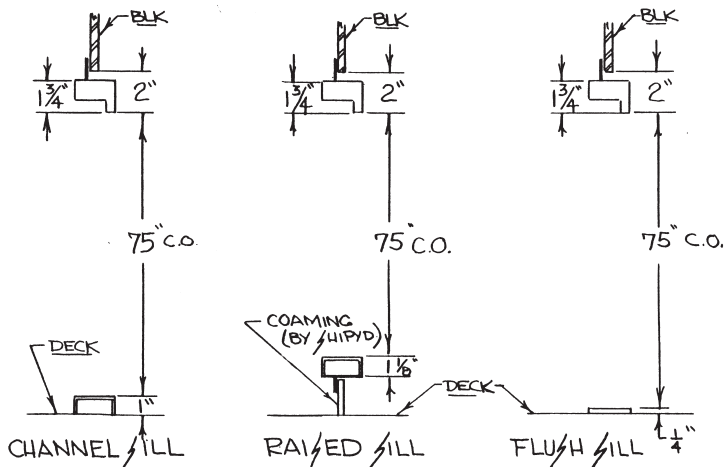
DOOR SIZE - 27" x 75 $\frac{1}{2}$ "

PLATE CUT-OUT WIDTH x HEIGHT

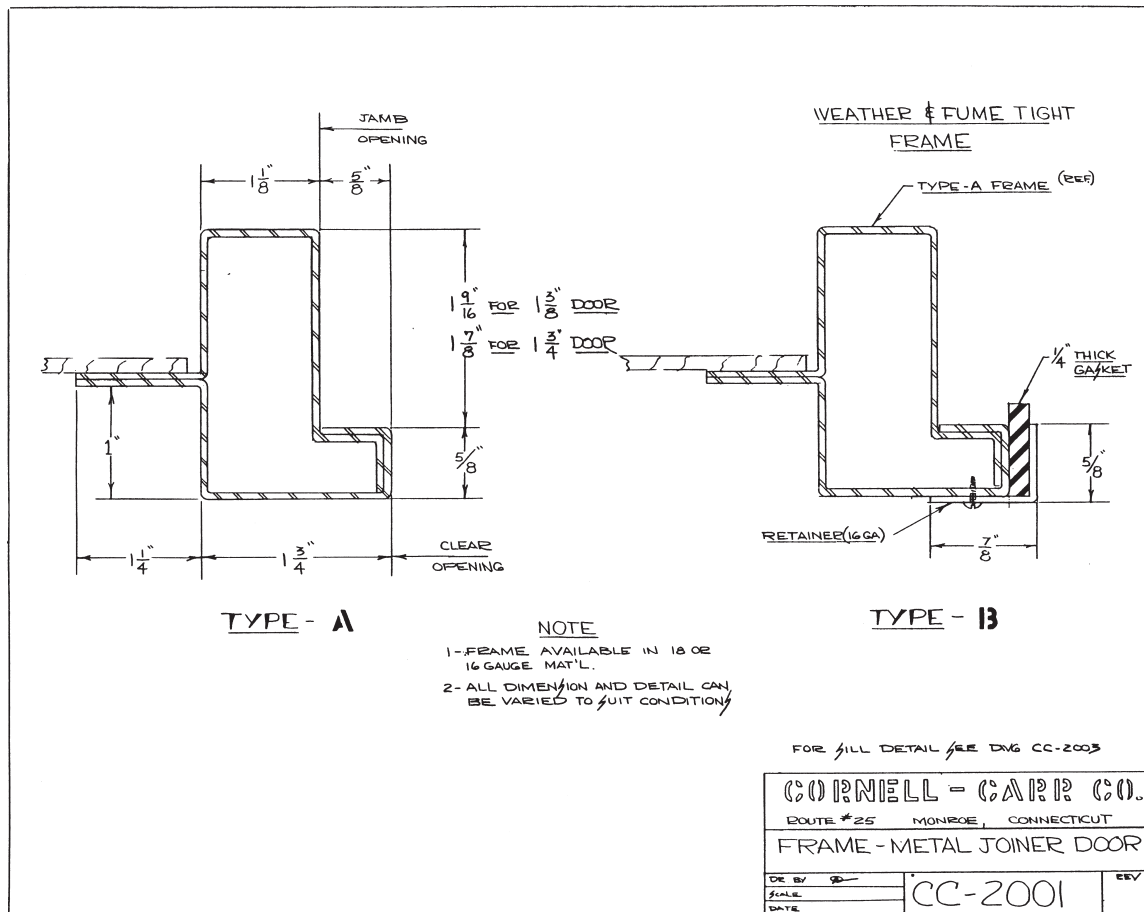
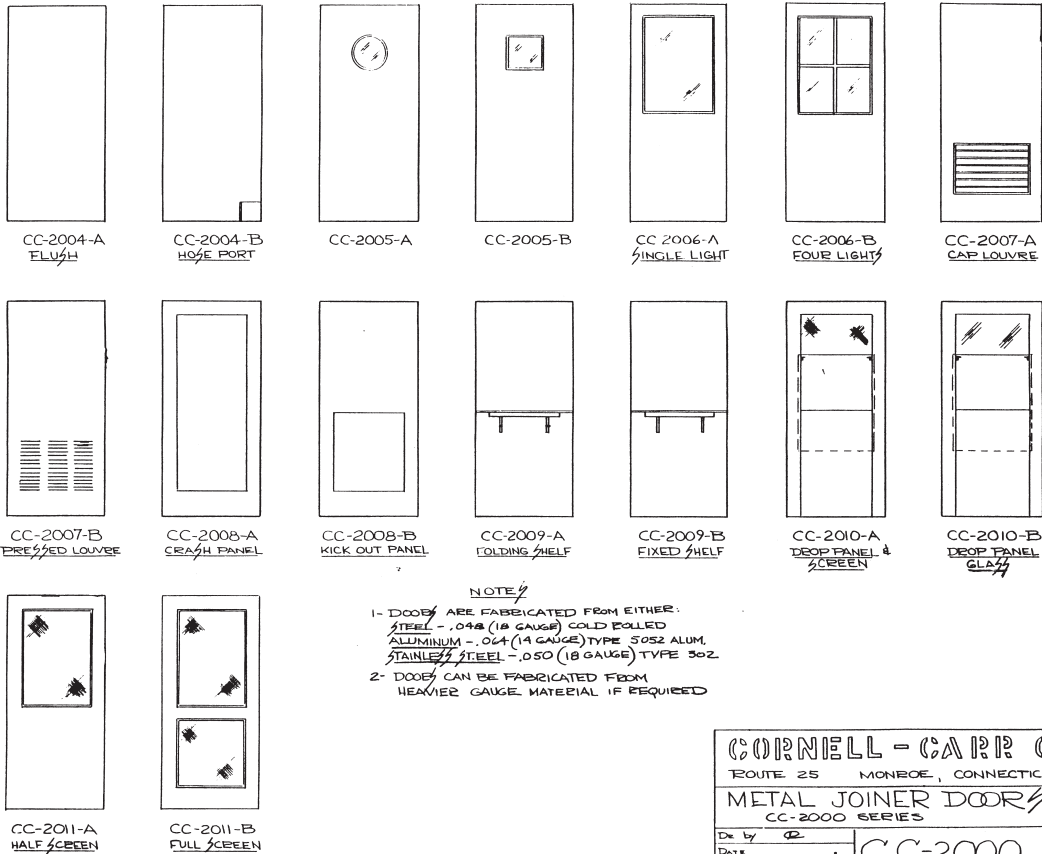
A-CHANNEL ILL — 30" x 78"

B-RAISED HILL - 30" X 78 1/8"

C-FLUGHILL - 30" X 77 $\frac{1}{4}$ "



TOLERANCES — FRACTIONAL DIMENSION ±				DECIMAL DIMENSION ±		
PLATE CUT-OUT OPENING JOINER DOOR						
MAT: _____				CORNELL - CARR CO., INC. MONROE, CONN.		
FINISH: _____						
REF. DWG. NO.	REV.	DESCRIPTION	DATE	DWN. BY	CHK. BY	DATE
				SCALE	DWG. CC. 2000 SERIE 4	





WEATHER-TIGHT DOORS AND FRAMES

The Cornell-Carr Company weather-tight door was designed to meet the requests of naval architects and marine engineers. In protected harbors and rivers where weather conditions do not require the heavy water-tight steel doors, a light weight weather-tight door is usually sufficient. These doors have dogging mechanism which secure against rain, light wave pressure and spray.

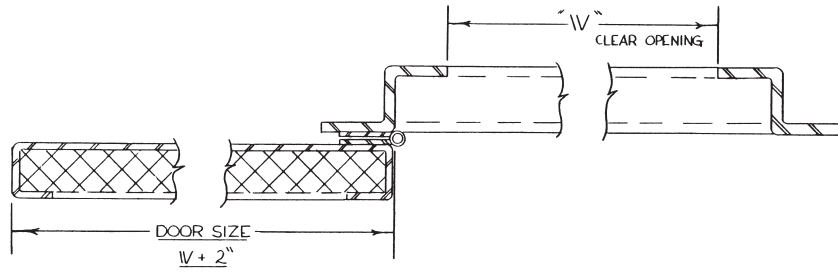
Doors fit in exterior bulkhead locations resulting in a pleasing appearance, along with ease of operation. Doors and frames can be flush mounted. They can be furnished with a narrow frame for insertion into existing bulkheads. The frames can be welded or secured by bolting.

Our special fabricated interlocking door and frame with neoprene gasket insures weather tightness at all times. The rubber gasket is secured in place and is resistant to the effects of oil, paints, salt, etc. The gasket is easily replaceable and may be obtained from our company upon request. The 12-gauge steel front panel and the optional 18-gauge back panel are stiffened with structural angles, and insulated with 1½" thickness of insulation. Dutch doors are available and framed glass can be inserted in all doors upon request. Doors can be furnished in aluminum or stainless steel or a combination of both. Doors are coated inside with a special chemical to prevent rot. They are primed with a rust preventive paint on the outside surfaces.

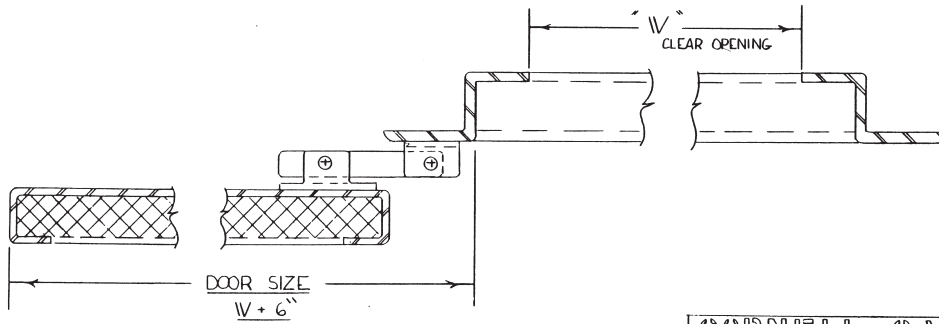
REQUEST FOR QUOTATION WATER TIGHT DOOR - SERIES 4000

TYPE - (Drawing. no.)
DESCRIPTION -
QUANTITY -
SIZE - clear opening or plate cut
MATERIAL -
HANDINGS -
GLASS THICKNESS
HARDWARE -
SPECIAL REQUIREMENTS:

FLUSH HINGE



ADJUSTABLE HINGE



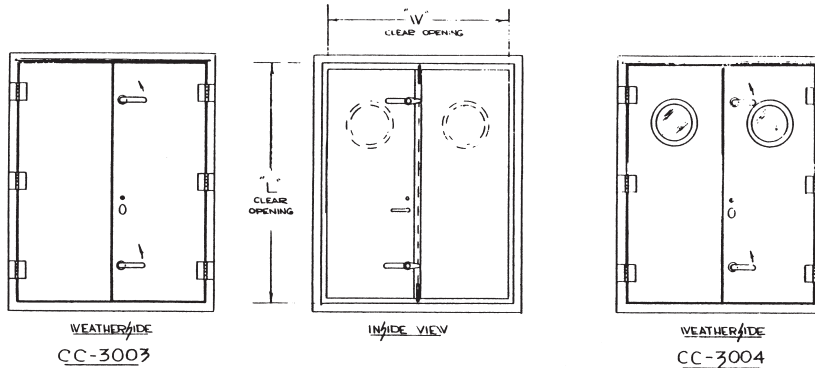
CORNELL-CARR CO.
ROUTE # 25 MONROE, CONNECTICUT

SWING OPENINGS

DIVN BY ~ JBP
SCALE ~
DATE ~ 8-8-77

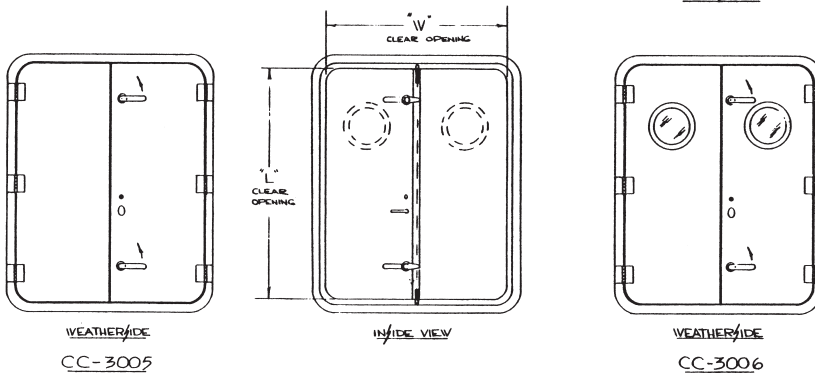
CC-3000B

REV.



NOTE

- 1- DOORS ARE RIGHT HAND LOCK (AS SHOWN IN 5/8) UNLESS SPECIFIED OTHERWISE
- 2- DIMENSION "W" & "L" CAN BE AS REQUIRED
- 3- DOOR CAN BE BACKED TO CUSTOMER'S SPEC.
- 4- FIXED LIGHT SIZE 10" DIA LOCATION TO SPEC.



FOR SECTIONAL VIEW SEE DWG.
NO. CC-3019

CORNELL-CARR CO.

ROUTE # 26 MONROE, CONNECTICUT

DOUBLE DOOR-WEATHERTIGHT

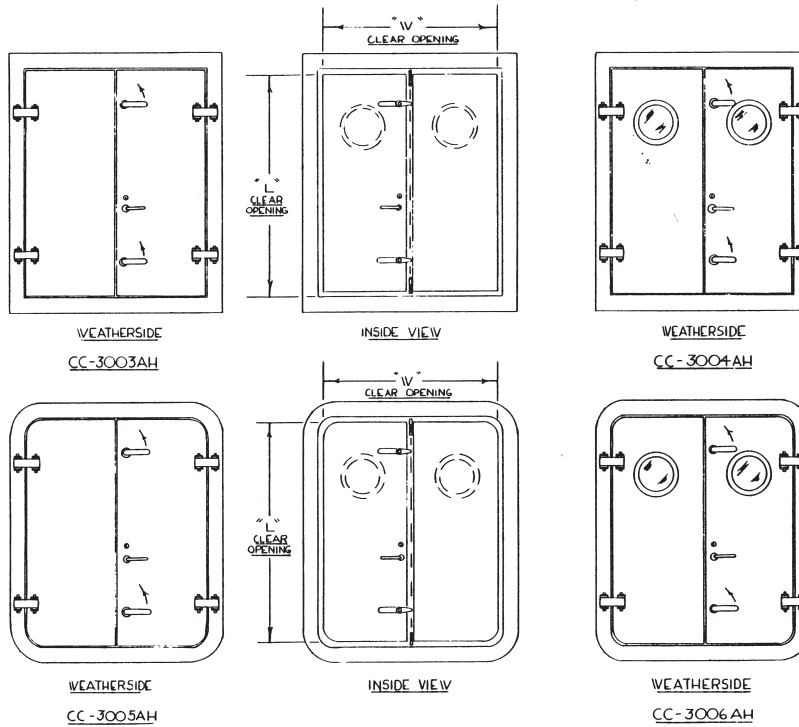
WITH MORTISE LOCK - SQUARE OF SHOWN CONWAY

DES BY ~ CC

DATE ~

FILE ~

CC-3001FH

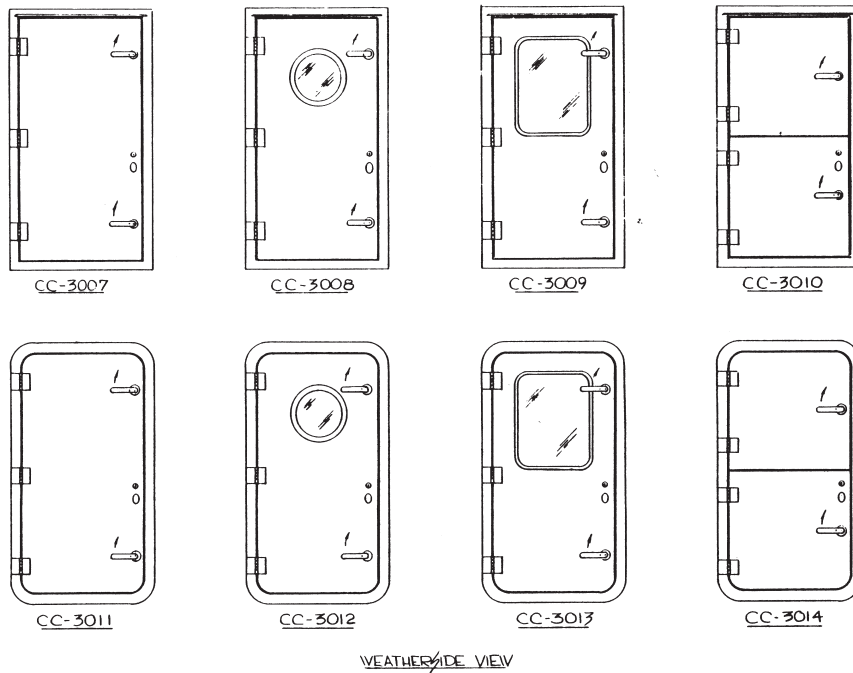


NOTES

- 1- DOORS ARE RIGHT HAND LOCK (AS SHOWN IN $\frac{1}{8}$ UNLESS OTHERWISE SPECIFIED).
- 2- DIMENSION "W" & "L" CAN BE AS REQUIRED
- 3- DOOR CAN BE RACKED TO CUSTOMERS SPEC.
- 4- FIXED LIGHT SIZE 10" DIA. LOCATION TO SPEC.

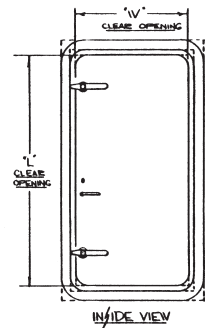
FOR SECTIONAL VIEW SEE DWG.
NO. CC-3019 - STEEL CONSTRUCTION

CORNELL - CARR CO.	
ROUTE # 25	MONROE, CONNECTICUT
DOUBLE DOOR - WEATHERTIGHT ADJUSTABLE HINGES	
DATE - 1/2/77	REV
SCALE -	CC-3001AH A



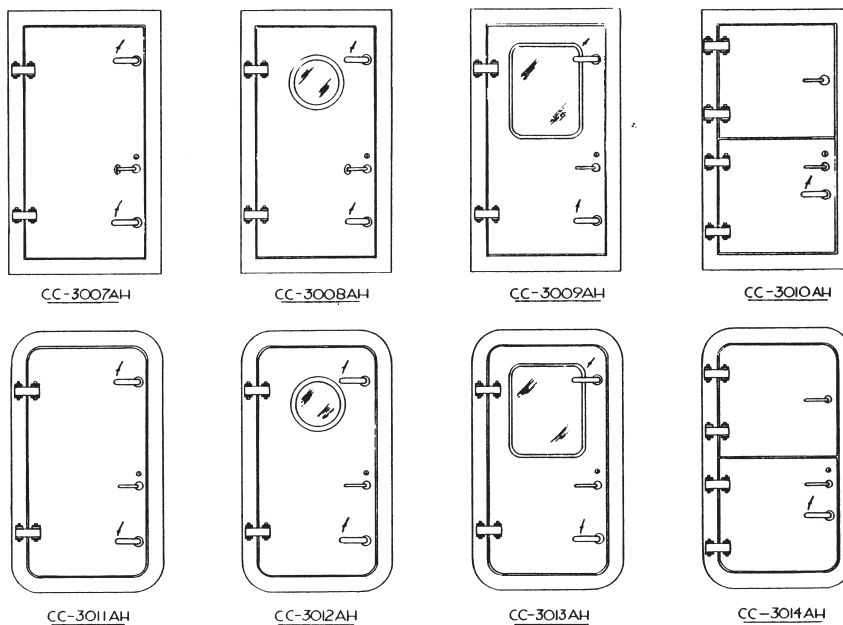
NOTE

- 1- DOORS ARE LEFT HAND (AS SHOWN IN $\frac{1}{8}$) UNLESS SPECIFIED OTHERWISE
- 2- DIMENSION "W" & "L" CAN BE AS REQUIRED.
- 3- DOOR CAN BE RACKED TO CUSTOMERS SPEC.
- 4- FIXED LIGHT SIZE 10" DIA. LOCATION TO SPEC.



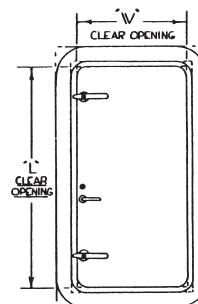
FOR SECTIONAL VIEW SEE DWG.
NO. CC-3015 - STEEL CONSTRUCTION
CC-3016 - STEEL CONSTR. DOOR & SCREEN
CC-3017 - ALUMINUM CONSTRUCTION
CC-3018 - ALUM. CONSTR. DOOR & SCREEN

CORNELL - CARR CO.	
ROUTE # 25	MONROE, CONNECTICUT
SINGLE DOOR - WEATHERTIGHT WITH MOTIVE LOCK - SQUARE OR ROUND CORNERS	
DATE - 1/2/77	REV
SCALE -	CC-3002FH



WEATHERSIDE VIEW

- NOTES**
- 1- DOORS ARE LEFT HAND (AS SHOWN IN $\frac{1}{8}$) UNLESS OTHERWISE SPECIFIED.
 - 2- DIMENSION "W" CAN BE AS REQUIRED.
 - 3- DOOR CAN BE RACKED TO CUSTOMER SPEC.
 - 4- FIXED LIGHT SIZE 10" DIA. LOCATION TO SPEC.



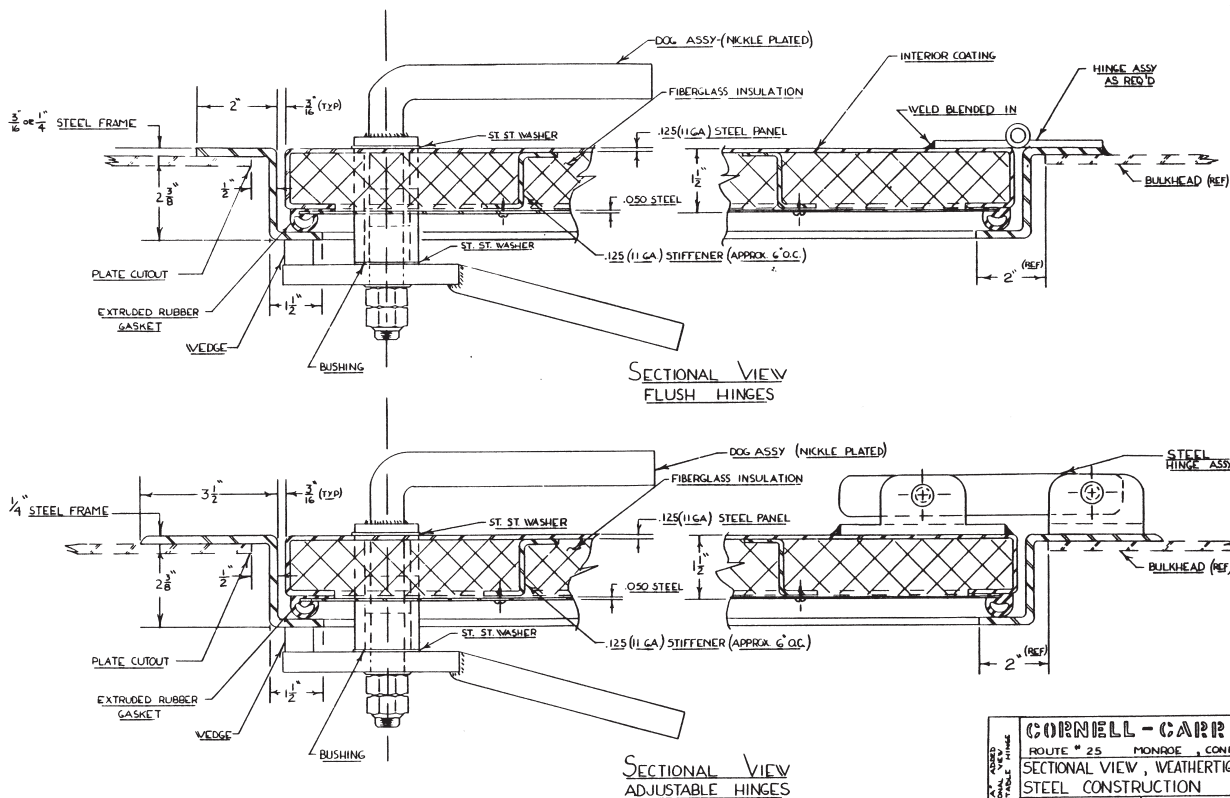
INSIDE VIEW

FOR SECTIONAL VIEW SEE DIVE NO.
 NO. CC-3015 - STEEL CONSTRUCTION
 CC-3016 - STEEL CONST. DOOR & SCREEN
 CC-3017 - ALUMINUM CONSTRUCTION
 CC-3018 - ALUM. CONST. DOOR & SCREEN.

CORNELL - CARR CO.

ROUTE # 25 MONROE, CONNECTICUT
 SINGLE DOOR - WEATHERTIGHT
 ADJUSTABLE HINGES
 FOR BY - JRP
 SCALE -
 DATE - 7/27/77

CC-3002AH A



CORNELL - CARR CO.

ROUTE # 25 MONROE, CONNECTICUT
 SECTIONAL VIEW, WEATHERTIGHT DOOR
 STEEL CONSTRUCTION
 FOR BY - JRP
 SCALE -
 DATE - 7-28-77

CC-3015 A

WATERTIGHT DOORS AND FRAMES

The CORNELL - CARR COMPANY watertight door assemblies are designed to meet the severest weather conditions of modern shipping and built to meet rugged standards, along with smooth operational qualities. Doors and frames can be flush mounted and secured by bolting or welding. A special stainless steel hinge pin makes adjusting easy and dependable. Dutch Doors are available. A special rust preventative primer paint is applied to all doors.

DOOR CAN BE FABRICATED TO BUREAU OF SHIPS DRAWINGS

805-1400050
805-1400056
805-1400057
805-1400059
805-1400062
805-1400064
805-1400065
805-1400066
805-1400069
805-1400070
805-1400071
805-1400073
805-1400074
805-1400075
805-1626433

18", 21" & 25" Raised & Flush Scuttles

REQUEST FOR QUOTATION WATER TIGHT DOOR - SERIES 4000

TYPE - (Drawing. no.)
DESCRIPTION -
QUANTITY -
SIZE - w & I dim. or plate cut out
MATERIAL -
NUMBER DOGS -
HANDINGS -
FIXED LIGHT - (if req'd.)
GLASS THICKNESS
HARDWARE -
PS I -
SPECIAL REQUIREMENTS:

REVISION BLOCK		
LTR.	DESCRIPTION	DATE
	NEW ISSUE	7/7/08 RCM



DOOR CLOSER
(IF REQ'D)

DOOR CLOSER REINFORCEMENT
12 GA STEEL (IF REQ'D)

SECTION A-A

DIMENSION											
ITEM NO.	QTY	PLATE CUTOUT	OVERALL FRAME			BACK OF FRAME			CLEAR OPENING		REMARKS
			X	Y	T	V	W	L	A	B	

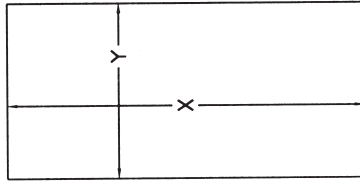
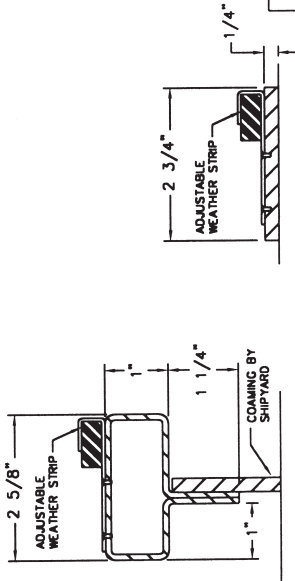
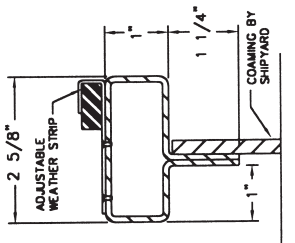


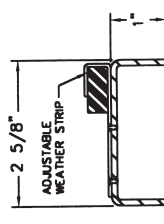
PLATE CUTOUT



FLUSH SILL
TYPE C



RAISED SILL
TYPE B



CHANNEL SILL
TYPE A

- NOTES:
1. DOOR STYLE CC-2019
 2. SILL AVAILABLE IN STYLES: CC-2003
TYPE-A (CHANNEL)
TYPE-B (RAISED)
TYPE-C (FLUSH)
 3. AVAILABLE IN (STEEL SHOWN),
STAINLESS STEEL OR ALUMINUM
 4. DOOR CLEAR OPENING AS REQ'D
 5. SCREWS NOT SHOWN FOR CLARITY
 6. REPLACE LATCH P/N 2078 WOULD

AR 13	SCREW, FH #8	SST	8-32 x 1/2"	SEE NOTE 2
AR 12	SCREW, FH #8	SST	8-32 x 1/2"	SEE NOTE 5
AR 11	BUMPERS	RUBBER	P/N 2075	
1 10	STRIKE PLATE	SST	P/N 2071-1	
1 9	LATCH	SST	P/N 2071	SEE NOTE 6
3 8	HINGE	SST	P/N 2185	
1 7	STRIKER SUPPORT	SST	1-1/4" x 1/4"	
AR 6	STIFFENER	SST	16 GA.	
1 5	LOCK REINFORCEMENT	STEEL	16 GA.	
1 4	FRAME SUPPORT	STEEL	1-3/4" x 1/4"	
1 3	HINGE SUPPORT	STEEL	1-5/8" x 1/4"	
1 2	SILL	STEEL	CC-2003 (SEE NOTE 2)	
1 1	FRAME	STEEL	CC-2001 TYPE A	

QTY	PC#	DESCRIPTION	MATERIAL	REMARKS
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BILL OF MATERIALS			
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UNLESS NOTED SEE UNLESS - BUILDING DOOR 1 1/4\"/>			
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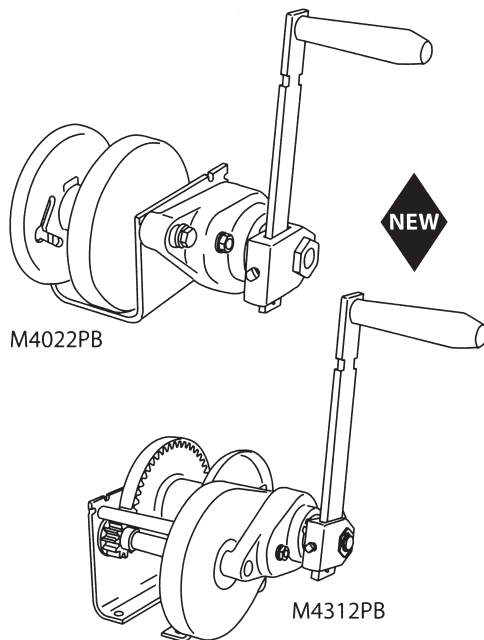
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Spur Gear Hand Winches

Up to 2,000 lb capacity

- **Machine Cut Spur Gears** for accurate and long lasting service.
- **Automatic Brake Models** provide positive load control for lifting and lowering operations. Brake models have PB suffix.
- **Corrosion Resistant** zinc and iridescent dichromate plated finish protects against corrosion in harsh environments.
- **Quick Disconnect Anchor** for quickly attaching or removing wire rope equipped with a swagged ball fitting.
- **Bronze and radial ball bearings** provide smooth and efficient operation.
- **Large Diameter Drums** minimize wear to extend wire rope life.
- **Gear Covers** protect gears and help prevent injuries.
- **Stainless Steel Models Available** for harsh environments, see models with SS suffix. Stainless steel models are electro-polished for added corrosion resistance.
- **Wire Rope Assemblies** sold separately.

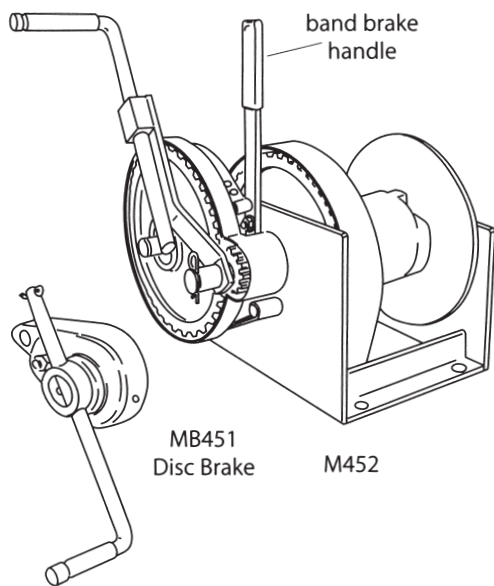
Spur Gear Hand Winches – Configurations and Performance Characteristics

model number	description	load rating (lb)			wire rope dia.	drum capacity (ft) ¹			single gear ~ ratio	double gear ratio	force ² to lift 1000 lb	approx. ship wt. (lb)
		1st layer	mid drum	full drum		1st layer	mid drum	full drum				
M401	500 lb – marine duty (for pulling only)	500	400	300	1/8 3/16	7 4	60 27	130 60	—	—	—	8
M4022	1000 lb – marine duty (for pulling only)	1000	700	500	1/8 3/16	4 3	52 26	130 57	2.85:1	—	40 lb	11
M4022PB	1000 lb – marine duty with brake (for lifting)	1000	700	500	1/8 3/16	4 3	52 26	130 57	2.85:1	—	41 lb	15
M4032	1000 lb – marine duty (for pulling only)	1000	700	500	1/8 3/16	11 7	110 51	250 110	2.85:1	—	40 lb	13
M4032PB	1000 lb – marine duty with brake (for lifting)	1000	700	500	1/8 3/16	11 7	110 51	250 110	2.85:1	—	41 lb	17
M4042PBSS	1000 lb – stainless steel with brake (for lifting)	1000	800	600	1/8 in 3/16 in 1/4 in	12 8 5	110 48 27	240 110 59	3.83:1	— (single gear)	46 lb	24
M4312	2000 lb – marine duty (for pulling only)	2000	1600	1200	3/16 1/4 5/16	8 5 4	48 27 17	110 59 39	3.83:1	14.7:1 (double gear)	20 lb	23
M4312PB	2000 lb – marine duty with brake (for lifting)	2000	1600	1200	3/16 1/4 5/16	8 5 4	48 27 17	110 59 39	—	14.7:1 (double gear)	17 lb	28
M4312PBSS	2000 lb – stainless steel with brake (for lifting)	2000	1600	1200	3/16 in 1/4 in 5/16 in	8 5 4	48 27 17	110 59 39	—	14.7:1 (double gear)	17 lb	28
M4412	2000 lb – marine duty (for pulling only)	2000	1600	1200	3/16 1/4 5/16	18 14 11	97 52 35	210 120 77	3.83:1	14.7:1 (double gear)	20 lb	25
M4412PB	2000 lb – marine duty with brake (for lifting)	2000	1600	1200	3/16 1/4 5/16	18 14 11	97 52 35	210 120 77	—	14.7:1 (double gear)	17 lb	30

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Approximate handle force required to lift 1000 lb with an empty drum, and maximum handle length.

³ Please contact factory or nearest Thern Distributor for firm fixed price and delivery.



Spur Gear Hand Winches Double Reduction

Up to 10,000 lb capacity

- **Machine Cut Spur Gears** for accurate and long lasting service.
- **Automatic Brake Models** provide positive load control for lifting and lowering operations. Brake models have B suffix.
- **Corrosion Resistant** durable paint finish combined with zinc and iridescent dichromate plating protects against corrosion.
- **Bronze and radial ball bearings** provide smooth and efficient operation.
- **Large Diameter Drums** minimize wear to extend wire rope life.
- **Spring Loaded Ratchets** for positive engagement with gear.
- **Steel Gear Covers** protect gears and help prevent injuries.
- **Handles Adjust** in length to change force required to move load.
- **Wire Rope Assemblies** sold separately.

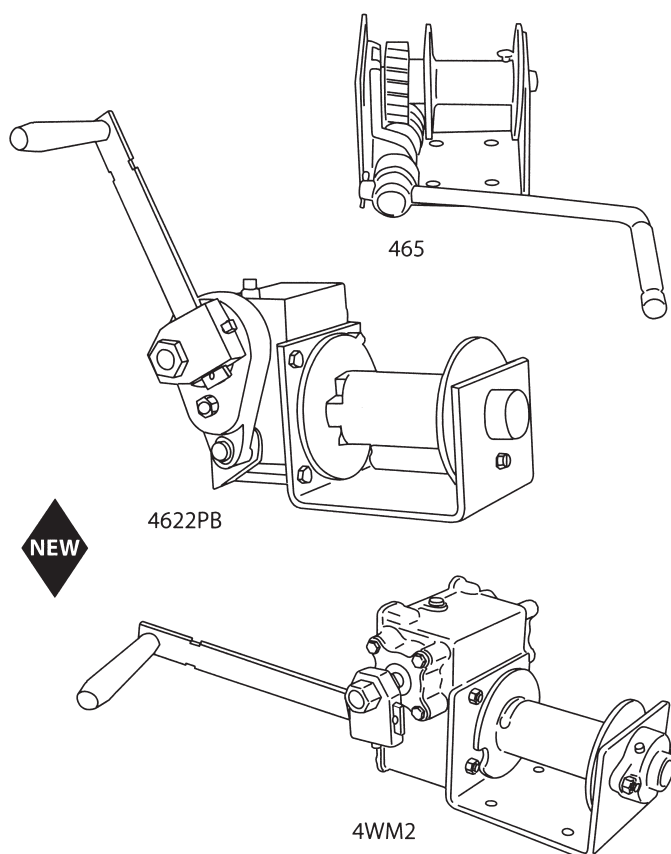
Spur Gear Hand Winches – Configurations and Performance Characteristics

model number	description	load rating (lb)			wire rope dia.	drum capacity (ft) ¹			single gear ratio	double gear ratio	force ² to lift 1000 lb	approx. ship wt. (lb)
		1st layer	mid drum	full drum		1st layer	mid drum	full drum				
M452	4000 lb – marine duty (for pulling only)	4000	3300	2500	1/4 5/16 3/8	23 18 14	130 89 64	300 200 140	4.42:1	19.54:1	10 lb (double gear)	81
M452B	4000 lb – marine duty with brake (for lifting)	4000	3300	2500	1/4 5/16 3/8	23 18 14	130 89 64	300 200 140	—	19.54:1	10 lb (double gear)	89
M452B-A	4000 lb – marine duty with brake (for lifting) 4 inch drum width	4000	3300	2500	1/4 5/16 3/8	13 9 7	83 56 40	190 120 89	—	19.54:1	10 lb (double gear)	75
M492	10,000 lb – marine duty (for pulling only)	10,000	7400	5400	5/16 3/8 1/2	27 21 15	240 170 100	540 390 230	5.00:1	25.00:1	8 lb (double gear)	166
M492B	10,000 lb – marine duty with brake (for lifting)	10,000	7400	5400	5/16 3/8 1/2	27 21 15	240 170 100	540 390 230	—	25.00:1	8 lb (double gear)	173
M492-12	10,000 lb – marine duty (for pulling only) 12 inch drum width	10,000	7400	5400	5/16 3/8 1/2	46 37 27	380 270 160	850 610 360	5.00:1	25.00:1	8 lb (double gear)	183
M492B-12	10,000 lb – marine duty with brake (for lifting) 12 inch drum width	10,000	7400	5400	5/16 3/8 1/2	46 37 27	380 270 160	850 610 360	—	25.00:1	8 lb (double gear)	190
MB451	disc brake only for M452 (for lifting)											13
MB491	disc brake only for M492 and M492-12 (for lifting)											15
HW452	hand wheel only for M452 (for pulling only)											19
HW492	hand wheel only for M492 and M492-12 (for pulling only)											20

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Approximate handle force required to lift 1000 lb with an empty drum, and maximum handle length.

³ Please contact factory or nearest Thern Distributor for firm fixed price and delivery.



Worm Gear Hand Winches

Up to 4000 lb capacity

- **Machine Cut Worm Gears** provide accurate operation and long lasting service.
- **Enclosed Oil Bath** provides continuous lubrication of gears to minimize wear, except on Model 465. On Model 4WM2 oil seals keep oil in and dirt out.
- **Hex Drive** and handle are included. Model 4WM2 can be power driven with a maximum 400 rpm drill-motor.
- **Automatic Brake Models** provide positive load control for lifting. Brake models have a PB or B suffix. Model 4WM2 features an internal mechanical brake.
- **Corrosion Resistant** durable paint finish protects against corrosion in harsh environments.
- **Bronze Bearings** on most models for smooth operation.
- **Large Diameter Drums** minimize wire rope wear.
- **Handles Adjust** in length to change force required to move the load.
- **Mounting Options**³ include floor, wall, or ceiling. Add 10% for factory modification for wall or ceiling mount, adapter plate may be required.
- **Wire Rope Assemblies** sold separately.

Worm Gear Hand Winches – Configurations and Performance Characteristics

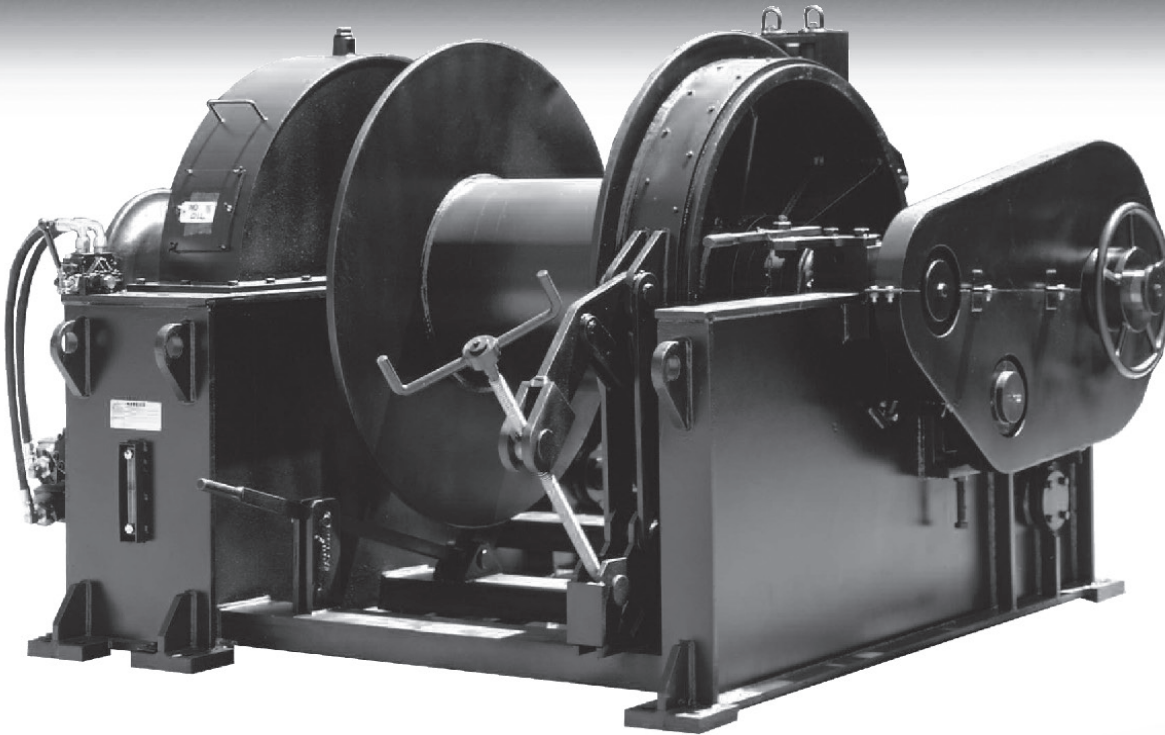
model number	description	load rating (lb)			wire rope dia. (in)	drum capacity (ft) ¹			gear ratio	force ² to lift 1000 lb	approx. ship wt. (lb)
		1st layer	mid drum	full drum		1st layer	mid drum	full drum			
465	750 lb – open gears (recommended for pulling only)	750	600	400	1/8 3/16	7 4	58 27	130 59	20:1	21 lb	12
462	1000 lb – enclosed gearing (recommended for pulling only)	1000	700	500	1/8 3/16	7 4	61 28	140 61	15:1	34 lb	15
4622PB	1000 lb – enclosed gearing with brake (for lifting)	1000	700	500	1/8 3/16	7 4	61 28	140 61	15:1	26 lb	20
472	2000 lb – enclosed gearing (recommended for pulling only)	2000	1700	1300	3/16 1/4 5/16	15 11 8	65 35 23	140 77 52	24:1	24 lb	32
4WM2	2000 lb – enclosed gearing with brake (for lifting)	2000	1500	1200	1/4	11	35	77	32:1	14 lb	43
	ED120BD – electric drill-motor drive kit – for 4WM2 only – 400 rpm – 120 VAC with 1-1/8" hex socket										12
482	4000 lb – enclosed gearing (recommended for pulling only)	4000	3300	2500	1/4 5/16 3/8	23 18 14	140 91 65	300 200 140	26:1	31 lb	97
482B	4000 lb – enclosed gearing with brake (for lifting)	4000	3300	2500	1/4 5/16 3/8	23 18 14	140 91 65	300 200 140	26:1	31 lb	110

¹ Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

² Approximate handle force required to lift 1000 lb with an empty drum, and maximum handle length.

³ Please contact factory or nearest Thern Distributor for firm fixed price and delivery.

NABRICO

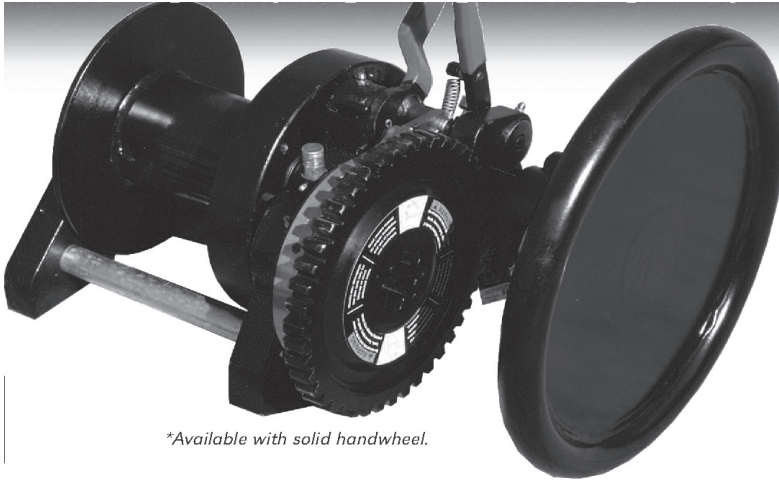


NABRICO ANCHOR WINCH

General Features

- Fabricated steel construction.
- Three coat zinc and epoxy paint system for complete marine environment protection.
- Electric or hydraulic power.
- Jaw clutched drum.
- Single or double warping heads.
- Spur gear reduction operating in oil bath.
- Level wind available.
- Drum band brake and holding dog.
- Drum capacity and line pull to meet customer requirements.

5 TON CAPACITY WINCH



**Available with solid handwheel.*

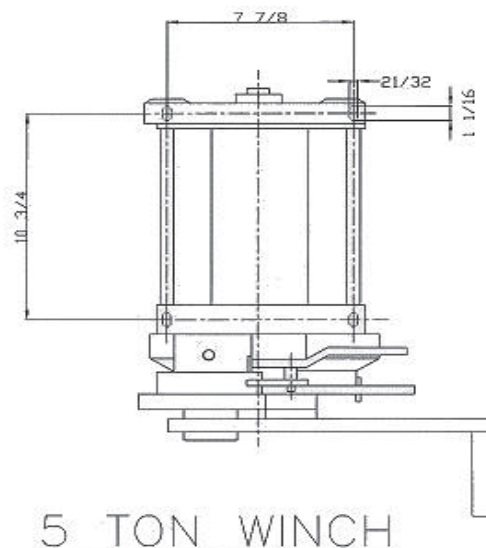


MODEL	LINE PULL SPEED		SHOCK LOAD	HAND BRAKE HOLDING OR DOG
	SLOW	FAST		
5 Ton	10,000	8500	8500 (3 ft. drop)	14,000

ALL ABOVE NUMBERS ARE POUNDS

CABLE CAPACITY (FULL DRUM)							
	DRUM WIDTH	1/4	5/16	3/8	7/16	1/2	WEIGHT
5 Ton	6"				200	170	116

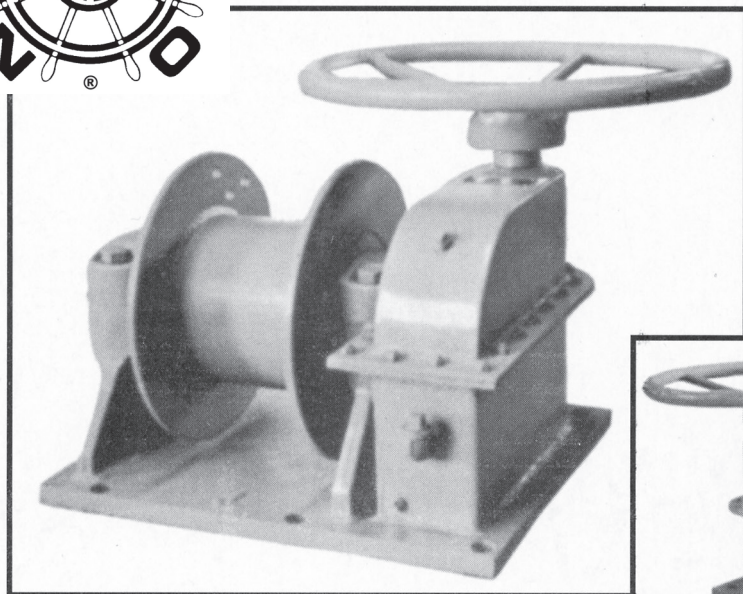
- All steel construction.
- Machine cut gears and stainless steel ratchets.
- Bronze brushed bearings.
- Alemite fittings for proper lubrication.
- Positive no-slip tension.
- Fast cranking with handwheel.
- Quick release cam action.
- Full load rated hand brake with stainless steel braking surface.
- Corrosion-resistant hardware.
- Available coatings: blasted and painted or galvanized.



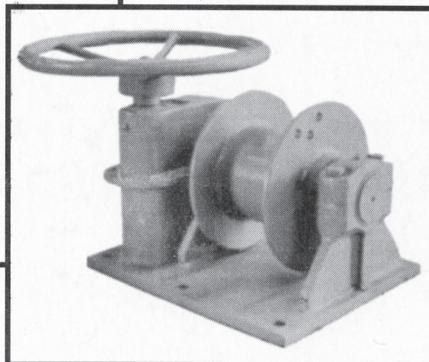
5 TON WINCH



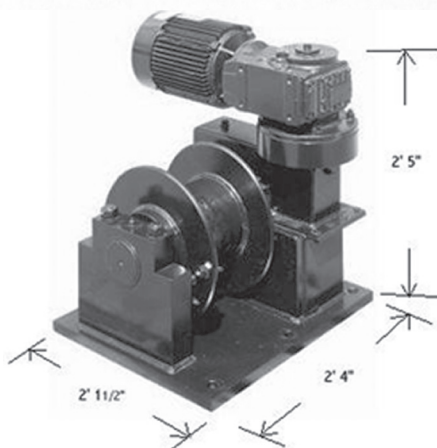
PARKER TOWING WINCHES



Parker Towing Winches have been in the marine market place for more than forty-five years. Still to be marketed under the Parker name but owned by NABRICO, they will benefit from the added support of NABRICO's commitment to quality, inventory maintenance, continuing product improvement and customer service.



- Available in **25-TON SIZES** and in **RIGHT- AND LEFT-HANDED STYLES**.
- **EASY TO INSTALL.** Just bolt to base attachment bars welded to steel deck.
- **CONTINUOUS GOOD CONNECTIONS** without damage or slippage.
- **LITTLE MAINTENANCE** or replacement costs because there is nothing to wear out.
- **SIMPLE ROPE ATTACHMENT** to winch drum.



MODEL	BASE DIMENSION	WEIGHT	CAPACITY OF DRUM	RATING	GEAR RATIO
LR 250	20"X24"	850 lbs.	65' of 1" rope	25 tons	30 to 1
LL 250	20"X24"	850 lbs.	65' of 1" rope	25 tons	30 to 1

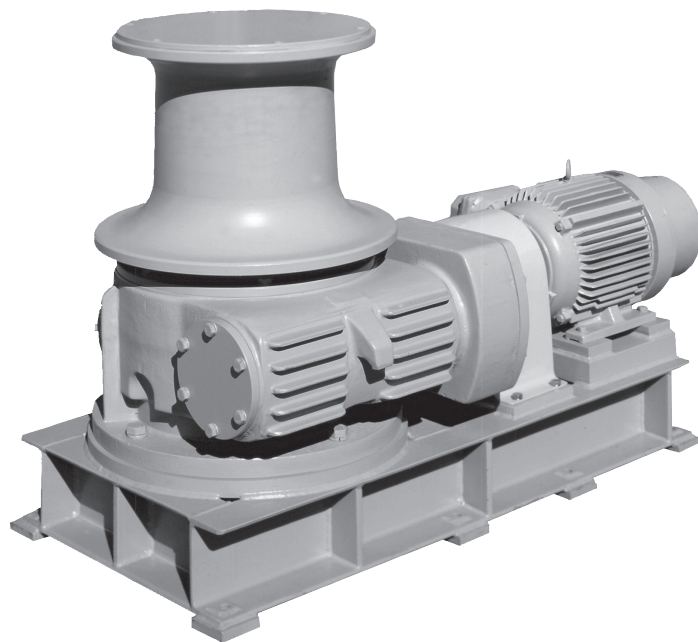
MODEL	MOUNT	HOLDING BRAKE & OR DOG (1)	LINE PULL @ FIRST LAYER OF CABLE				LINESPEED @ FIRST LAYER OF 1 IN. CABLE NO LOAD	DRUM FLANGE DIAM.	DRUM		DRUM CAPACITIES (FT.)					MOTOR	WEIGHT	MOUNTING DIMENSIONS		
			40 TON-429: 1 RATIO, 30 TON-343:1 RATIO						DIAM	WIDTH (2)	CABLE SIZE							WIDTH	LENGTH	HEIGHT
			@ RATED AMPS	@ MOTOR STALL	HAND CRANK @ MOTOR SHAFT	HAND CRANK @ TOP SHAFT														
DF-500			LBS.	LBS.	LBS.	LBS.	FPM	IN.	IN.	IN.	1/2	5/8	3/4	7/8	1	HP	LBS.			
25-10	Right or Left	25	5,800	7,500	NA	5,000	25.0	14.75	8.00	10.25	230	195	125	90	65	5.4	1,400	2' 4"	2' 11/2"	2' 5"



CAPSTANS

ELECTRIC

- Vertical thru-deck or above deck models.
- Fabricated steel construction.
- Polished steel capstan head.
- Head size to 36" diameter.
- Single or variable speeds available.
- Line pull up to 30,000 lbs.
- Static or bollard pull up 300,000 lbs.
- Zinc and epoxy coatings for full marine environment protection.
- Planetary or worm and spur gearing.



HYDRAULIC

- Vertical thru-deck or above deck models.
- Fabricated steel construction.
- Polished steel capstan head.
- Head size to 36" diameter.
- Single or variable speeds available.
- Line pull up to 30,000 lbs.
- Static or bollard pull up 300,000 lbs.
- Zinc and epoxy coatings for full marine environment protection.
- Planetary or worm and spur gearing.
- Model shown:
 - 16" diameter polished steel head.
 - Rated line pull 12,500 lbs. at 30 fpm.
 - Designed for above deck mounting.
 - Other sizes and features available.



DF-529 Low Profile Winch



Features

- Revolutionary new high load release dog system with anti-backlash drag brake that is activated automatically with the release of the dog.
- All steel construction.
- Proven 40 ton holding capacity.
- Precision machined side plates, gears, ratchet, and shafts to maintain proper gear tooth engagement and minimize wear.
- Easy cable attachment and solid drum gear.
- Right and left hand models for use in pairs.
- Quick release hand brake.
- Lever ratchet for extra high tension.
- Low profile design.
- Available in D-Ring, Button, and Doubler plate mounts.
- Bolted connections for easy maintenance.
- Hot dipped galvanized or blasted and painted.
- 22-3/4"H X 12-1/2"W X 12-3/4"L.

Perspective...

FOR ALL OF YOU WHO STILL THINK YOU ARE HAVING A BAD DAY...

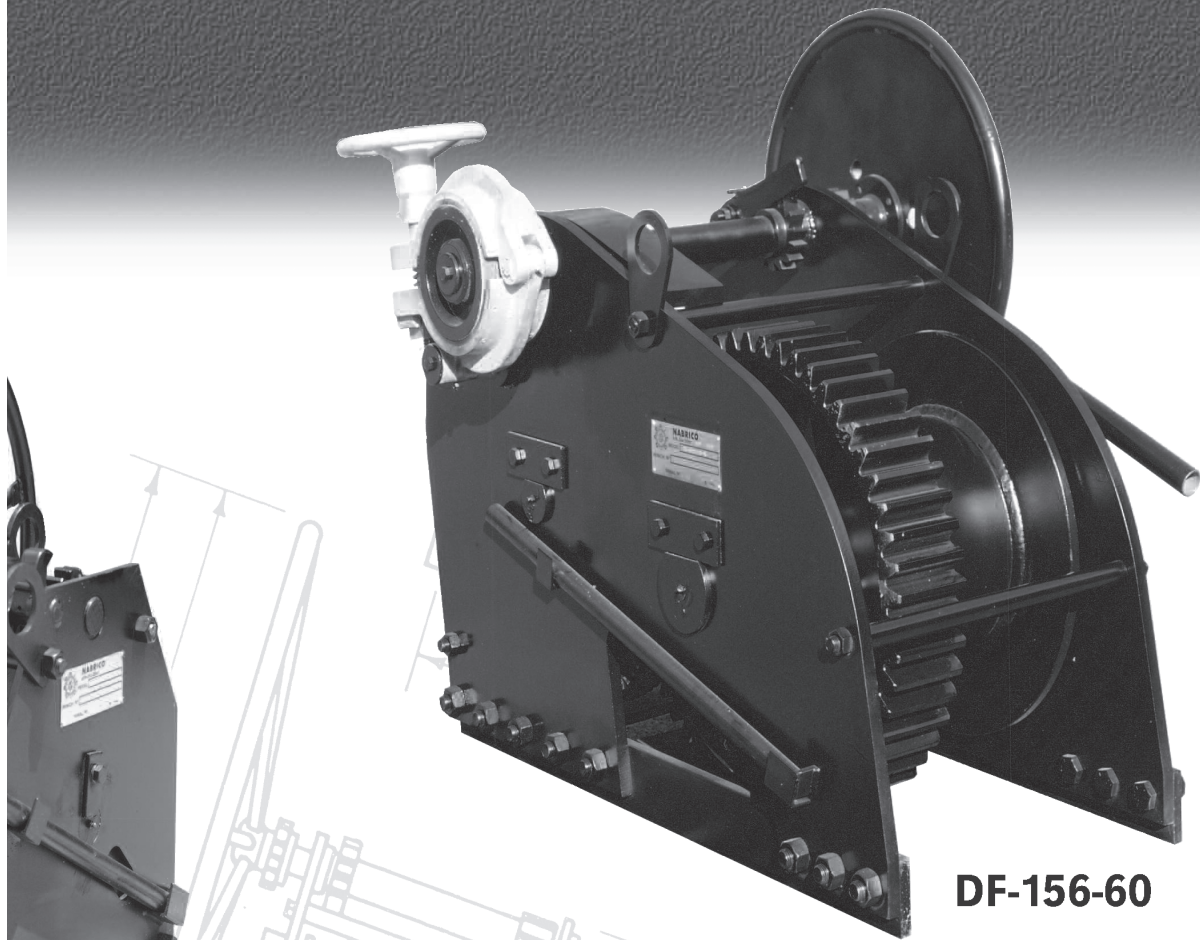
In a hospital's Intensive Care Unit, patients always died in the same bed, on Sunday morning, at about 11:00 a.m., regardless of their medical condition.

This puzzled the doctors and some even thought it had something to do with the supernatural. No one could solve the mystery as to why the deaths occurred around 11:00 a.m. on; Sunday, so a worldwide team of experts was assembled to investigate the cause of the incidents.

The next Sunday morning, a few minutes before 11:00 a.m., all of the doctors and nurses nervously waited outside the ward to see for themselves what the terrible phenomenon was all about. Some were holding wooden crosses, prayer books, and other holy objects to ward off the evil spirits.

Just when the clock struck 11:00, Pookie Johnson, the part-time Sunday sweeper, entered the ward and unplugged the life support system so he could use the vacuum cleaner.

MANUAL WINCHES



DF-156-60

Features

- All steel construction.
- Machine cut gears and stainless steel ratchets.
- Bronze bushed bearings.
- Alemite fittings for proper lubrication.
- True right and left hand models for use in pairs.
- Positive no-slip tension.
- Fast cranking with handle.
- Quick release cam action.
- Full load rated hand brake with Stainless Steel braking surface.
- Corrosion-resistant hardware.
- Lever ratchet for extra high tension.
- Blasted and painted, galvanized and other coatings available.

MODEL	MOUNT	DOG HOLDING (1)	LINE PULL (1)		GEAR RATIO	DRUM FLANGE DIAM.	DRUM		DRUM CAPACITIES (FT.)										WEIGHT (LBS.)	OVERALL DIMENSIONS		
			HANDWHEEL ONE MAN	RACHET W/ STANDARD EXTENSION ONE MAN			DIAM	WIDTH (2)	CABLE SIZE											WIDTH	HEIGHT	LENGTH
		IN.							IN.	IN.	7/16	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4				
DF-156		S.T.	LB.	LB.		IN.	IN.	IN.	7/16	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2					
10-6-M	Right/Left	10	5,200	7,000	5.57:1	18	8.625	6.0	353	317	174	129						500	1'7 7/16"	3'4 3/4"	4'4"	
20-7-M	Right/Left	20	14,000	14,400	18.57:1	16	10.75	7.25	270	186	109	57	39	21				850	2'0 1/4"	3'3 5/16"	5'7"	
40-11-M	Right/Left	40	14,000	17,800	18.57:1	19	12.75	11.25			287	176	130	84	36	26		1250	2'5 1/40"	3'6"	6'9"	
40-18-M	Right/Left	40	14,000	17,800	18.57:1	19	12.75	18.125			463	279	151	139	58	51		1350	3'0 1/4"	3'6"	6'9"	
60-11-M	Right/Left	60	24,000	28,800	27.0:1	24	14.00	10.625			572	325	262	200	119	111	62	2100	2'8 7/8"	4'2"	6'8"	

For additional information, drawings and specifications contact NABRICO.

CERTIFIED HAND WINCH SPECIFICATIONS

MODEL	MOUNT	DOG HOLDING (1)	LINE PULL (1)		GEAR RATIO	DRUM FLANGE DIAM.	DRUM	
			HANDWHEEL ONE MAN	RATCHET W/ STANDARD EXTENSION ONE MAN			DIAM.	WIDTH (2)
DF-156		S.T.	LB.	LB.		IN.	IN.	IN.
10-6-M	Right or Left	10	5,200	7,000	5.57:1	18	8.625	6.00
60-11-M	Right or Left	60	24,000	28,800	27.0:1	24	14.00	10.625

(1) Holding & line pull ratings are for first layer of cable.
(2) Wider drum widths are available on request.

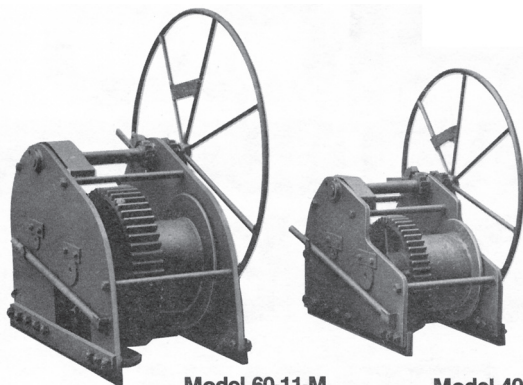


MOUNTING DIMENSIONS

MODEL	DRUM CAPACITIES (FT.)										WEIGHT (LB.)	A	B	C	D	E	F	G
	CABLE SIZE																	
DF-156	7/16	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2								
10-6-M	353	317	174	129							500	1'7 1/8"	9'3/8"	2'1"	3'0"	3'4 1/4"	1'9"	2'7 1/4"
60-11-M			572	325	262	200	119	111	62		2100	2'8 1/8"	1'10 1/2"	2'10 1/4"	4'6 1/8"	4'10 1/2"	3'10 1/4"	2'9 1/8"

(Figures shown in parenthesis are in centimeters.)

The specifications and details described by drawings or text in this literature are subject to change without notice. Winches portrayed in drawings, photographs and copy are not designed for lifting or lowering persons or equipment.



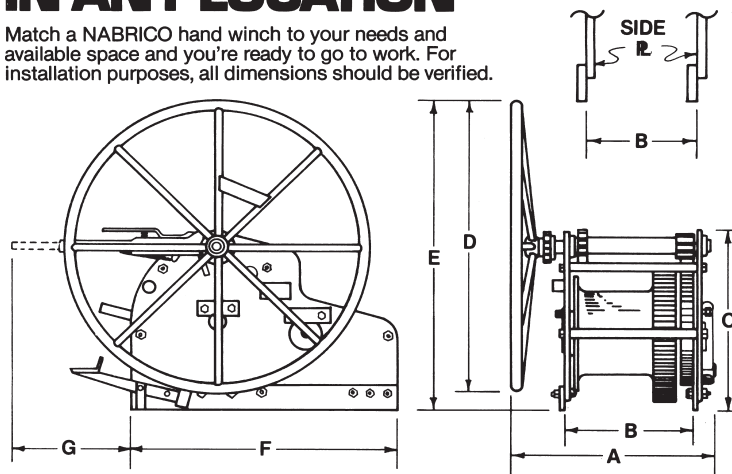
Model 60-11-M

Model 40-11-M

Model 10-6-M

TO HANDLE EVERY JOB, IN ANY LOCATION

Match a NABRICO hand winch to your needs and available space and you're ready to go to work. For installation purposes, all dimensions should be verified.



FEATURES

- All steel construction.
- Machine cut gears and ratchets.
- Bronze bushed bearings.
- Alemite fittings for proper lubrication.
- True right and left hand models for use in pairs.
- Positive no-slip tension.
- Fast cranking with handle.
- Quick release action.
- Foot brake for run-out control.
- Lever ratchet for extra high tension.



NABRICO

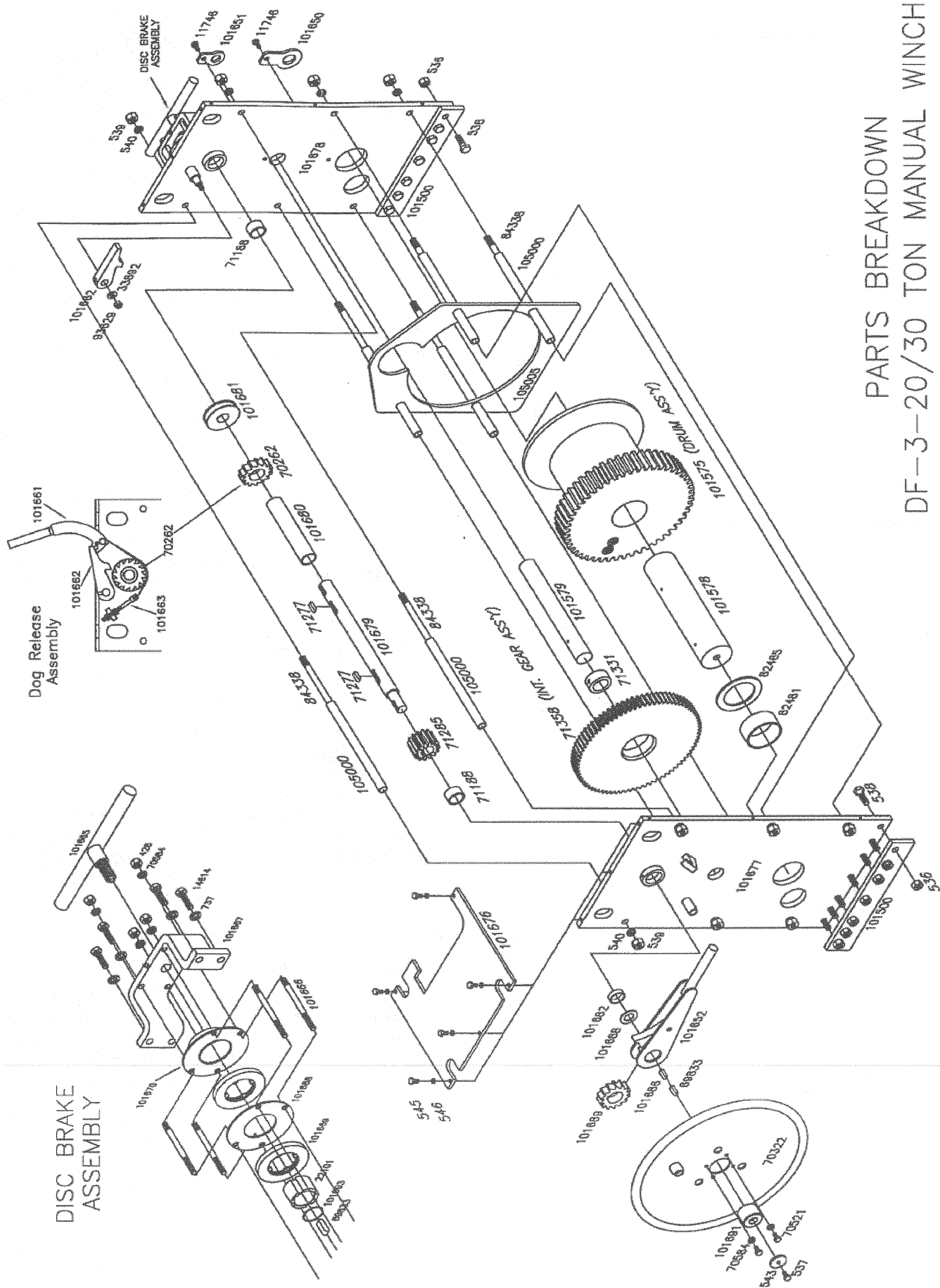


DF-3 Hand Winch

Features & Specifications

- Revolutionary new high load release dog system.
- High load release brake with secondary anti-backlash drag brake that is activated automatically with the release of the dog.
- High load release brake is a multi-disc system that incorporates all stainless steel moving parts.
- Fastest acting and most powerful brake available.
- 4 bolt hub removable handwheel.
- New simpler heavy duty ratchet assembly with no springs or levers.
- Totally enclosed drive train with the smallest deck foot print in the industry.
- Minimal maintenance.
- Easy to repair.
- All stainless steel and silicon bronze fasteners including separator rods.
- 3-ply conveyor belt covers (damage and corrosion-resistant).
- Saltwater package standard with 3-step paint system.
- Galvanized coating available.
- Heaviest winch in its class.
- True right and left hand models for use in pairs.

MODEL	MOUNT	HOLDING DOG & OR BRAKE	LINE PULL @ FIRST LAYER		DRUM CAPACITIES (FT.)				WEIGHT	DIMENSIONAL DATA		
			HANDWHEEL ONE MAN	RACHET W/ STANDARD EXTENSION ONE MAN	5/8	3/4	7/8	1		W	L	H
DF-3-20/30	RIGHT OR LEFT	30 TONS	14000	22000	233	141	123	67	1109	18 5/8	22	35 1/2
DF-3-40	RIGHT OR LEFT	40 TONS	14000	18000	285	173	150	83	1567	19 1/2	23 1/4	43 1/2



PARTS BREAKDOWN DF-3-20/30 TON MANUAL WINCH

A.2 Parts Breakdown (cont'd)

DF-3 (20 / 30 Ton) Manual Upright Winch Parts List		
(refer to winch drawing for location)		
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers
Heavy Hex Nut 3/4" (SS)	12	536
Hex Head Bolt 1/2" x 2" (SS)	1	537
Hex Head Bolt 3/4" x 2-1/2" (SS)	12	538
Hex Nut 7/8" (SS)	12	539
Lock Washer 7/8" (SS)	12	540
Washer 9/16" ID x 2-1/2" OD (SS)	1	543
Hex Head Bolt 3/8" x 1" (SS)	6	545
Lock Washer 3/8" (SS)	6	546
Hex Head Bolt 5/8" x 1"	2	11746
Flat Washer 5/8" (Brass)	2	33892
Key (Handwheel Hub) 3/8" SQ x 1-3/4"	1	69833
Locking Dog Gear	1	70262
Hand Wheel Assembly with Speed Handle	1	70322
Hex Head Bolt 1/2" x 1" (SS)	4	70521
Lock Washer 1/2" (SS)	4	70584
Key (Drive Pinion) 3/8" SQ x 2-1/2"	1	71277
Key (Locking Dog Gear) 3/8" SQ x 2-1/2"	1	
Drive Pinion	1	71285
Intermediate Shaft Collar	1	71331
Intermediate Gear Assembly	1	71358
Drum Washer	1	82465
Drum Pipe Spacer	1	82481
Pipe Separator Rod (SS)	6	84338
Slotted Hex Nut 5/8" (Brass)	2	93629
Base Bar	2	101500
Drum Assembly	1	101575
Drum Shaft	1	101578
Intermediate Shaft	1	101579
Keeper Plate (BIG)	1	101650
Keeper Plate (small)	1	101651
Locking Dog (with bronze bushing)	1	101662
Brake Band Assembly	1	101663
Top Plate	1	101676
Drive Shaft	1	101679
Pipe Spacer (drive shaft)	1	101680
Brake Drum	1	101681
Pipe Spacer (hand ratchet area)	1	101682
Key (Ratchet Gear) 1/2" SQ x 1-5/8"	1	101686
Washer 1-9/16" ID x 2-11/16" OD (SS)	1	101688
Ratchet Gear	1	101689
Hand Wheel Hub Insert (SS)	1	101691
Pipe Separator	6	105000
Cable Guard Plate	1	105005

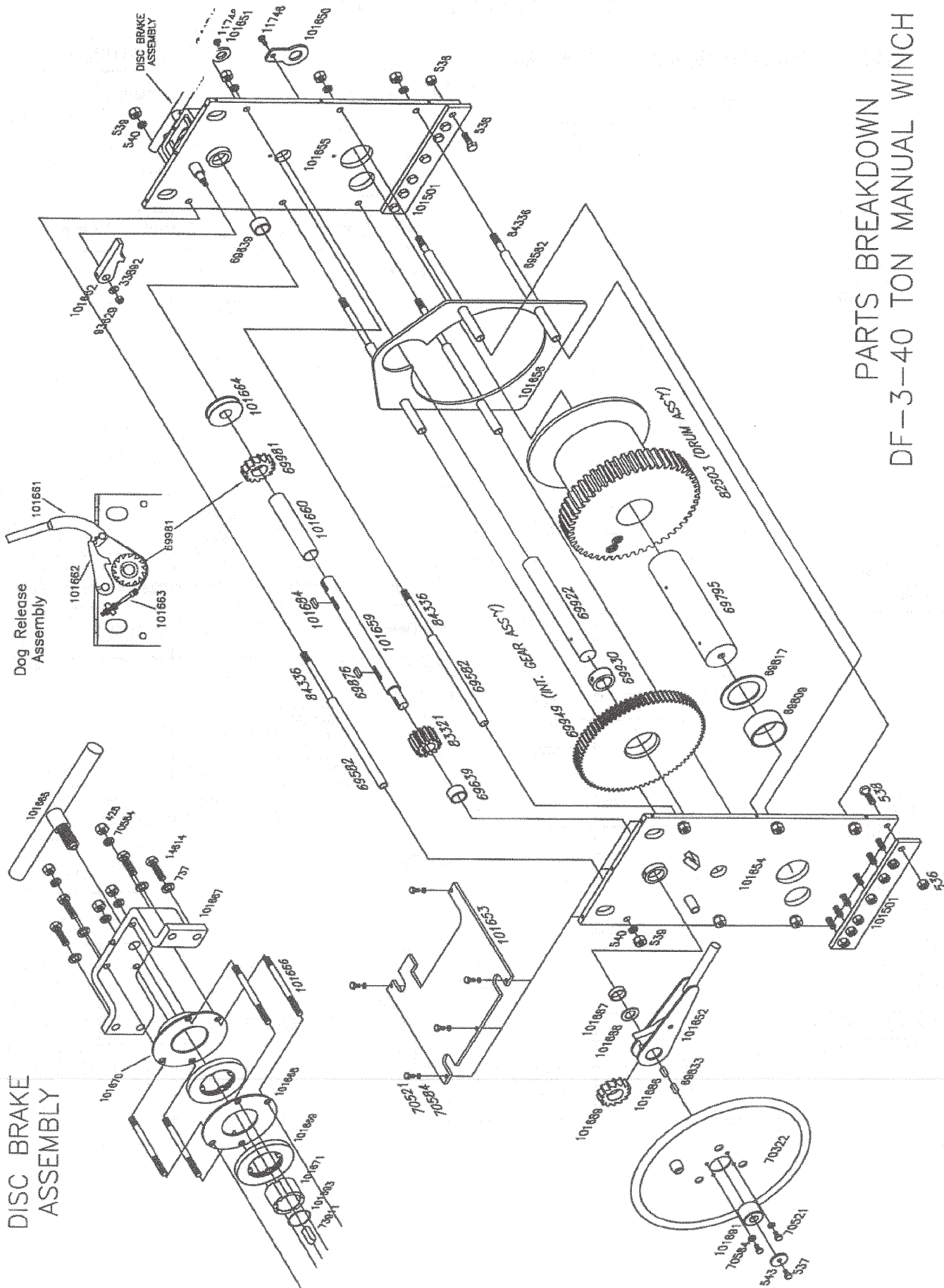
DF-3 Bushings and Bearings		
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers
Drive Shaft Bushing	2	71188
Drum Gear Bushing	2	71226
Intermediate Gear Bushing	1	71382

DF-3 Left Hand or Right Hand Specific Components		
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers
Left Hand Winch		
Hand Ratchet Assembly	1	101652
Locking Dog Handle Assembly	1	101661
Side Plate Assembly (Hand Wheel Side)	1	101677
Side Plate Assembly (Disc Brake Side)	1	101678
Right Hand Winch		
Side Plate Assembly (Hand Wheel Side)	1	101694
Side Plate Assembly (Disc Brake Side)	1	101695
Locking Dog Handle Assembly	1	101696
Hand Ratchet Assembly	1	101698

DF-3 Miscellaneous Components (not shown in drawings)		
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers
Cover Mounting Stud 3/8" x 1-1/2"	10	549
Brass Wing Nut 3/8"	10	550
Ratchet Handle Extension	1	70323
Protective Rubber Cover	2	80223
U-Bolt with Fasteners (7/8" Wire Rope)	1	82562

DF-3 Disc Brake Assembly		
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers
Hex Nut 1/2" (SS)	4	428
Lock Washer 5/8" (SS)	4	737
Hex Head Bolt 5/8" x 2" (SS)	4	14614
Sleeve (Disc Brake)	1	22101
Key (Brake Sleeve) 3/8" SQ x 1-3/4"	1	69833
Lock Washer 1/2" (SS)	4	70584
Handle Assembly	1	101665
Threaded Rod (SS)	4	101666
Brake Housing	1	101667
Engaging Plate	1	101668
Brake Disc	2	101669
Engaging Cap	1	101670
Rubber O-Ring	1	101693

DISC BRAKE ASSEMBLY



PARTS BREAKDOWN DF-3-40 TON MANUAL WINCH

A.2 Parts Breakdown (cont'd)

DF-3 (40 Ton) Manual Upright Winch Parts List		
(refer to winch drawing for location)		
Part Description	Quantity	DF-3 (40 Ton) Part Numbers
Heavy Hex Nut 3/4" (SS)	14	536
Hex Head Bolt 1/2" x 2" (SS)	1	537
Hex Head Bolt 3/4" x 2-1/2" (SS)	14	538
Hex Nut 7/8" (SS)	12	539
Lock Washer 7/8" (SS)	12	540
Washer 9/16" ID x 2-1/2" OD (SS)	1	543
Hex Head Bolt 5/8" x 1"	2	11746
Flat Washer 5/8" (Brass)	2	33892
Pipe Separator	6	69582
Drum Shaft	1	69795
Drum Pipe Spacer	1	69809
Drum Washer	1	69817
Key (Handwheel Hub) 3/8" SQ x 1-3/4"	1	69833
Key (Drive Pinion) 1/2" SQ x 2-3/4"	1	69876
Intermediate Shaft	1	69922
Intermediate Shaft Collar	1	69930
Intermediate Gear Assembly	1	69949
Locking Dog Gear	1	69981
Hand Wheel Assembly with Speed Handle	1	70322
Hex Head Bolt 1/2" x 1" (SS)	9	70521
Lock Washer 1/2" (SS)	9	70584
Drum Assembly	1	82503
Drive Pinion	1	83321
Pipe Separator Rod (SS)	6	84336
Slotted Hex Nut 5/8" (Brass)	2	93629
Base Bar	2	101501
Keeper Plate (BIG)	1	101650
Keeper Plate (small)	1	101651
Top Plate	1	101653
Cable Guard Plate	1	101656
Drive Shaft	1	101659
Pipe Spacer (drive shaft)	1	101660
Locking Dog (with bronze bushing)	1	101662
Brake Band Assembly	1	101663
Brake Drum	1	101664
Key (Locking Dog Gear) 1/2" SQ x 2-1/2"	1	101684
Key (Ratchet Gear) 1/2" SQ x 1-5/8"	1	101686
Pipe Spacer (hand ratchet area)	1	101687
Washer 1-9/16" ID x 2-11/16" OD (SS)	1	101688
Ratchet Gear	1	101689
Hand Wheel Hub Insert (SS)	1	101691

DF-3 Bushings and Bearings		
Part Description	Quantity	DF-3 (40 Ton) Part Numbers
Drive Shaft Bushing	2	69639
Intermediate Gear Bushing	1	69973
Drum Gear Bushing	2	82511

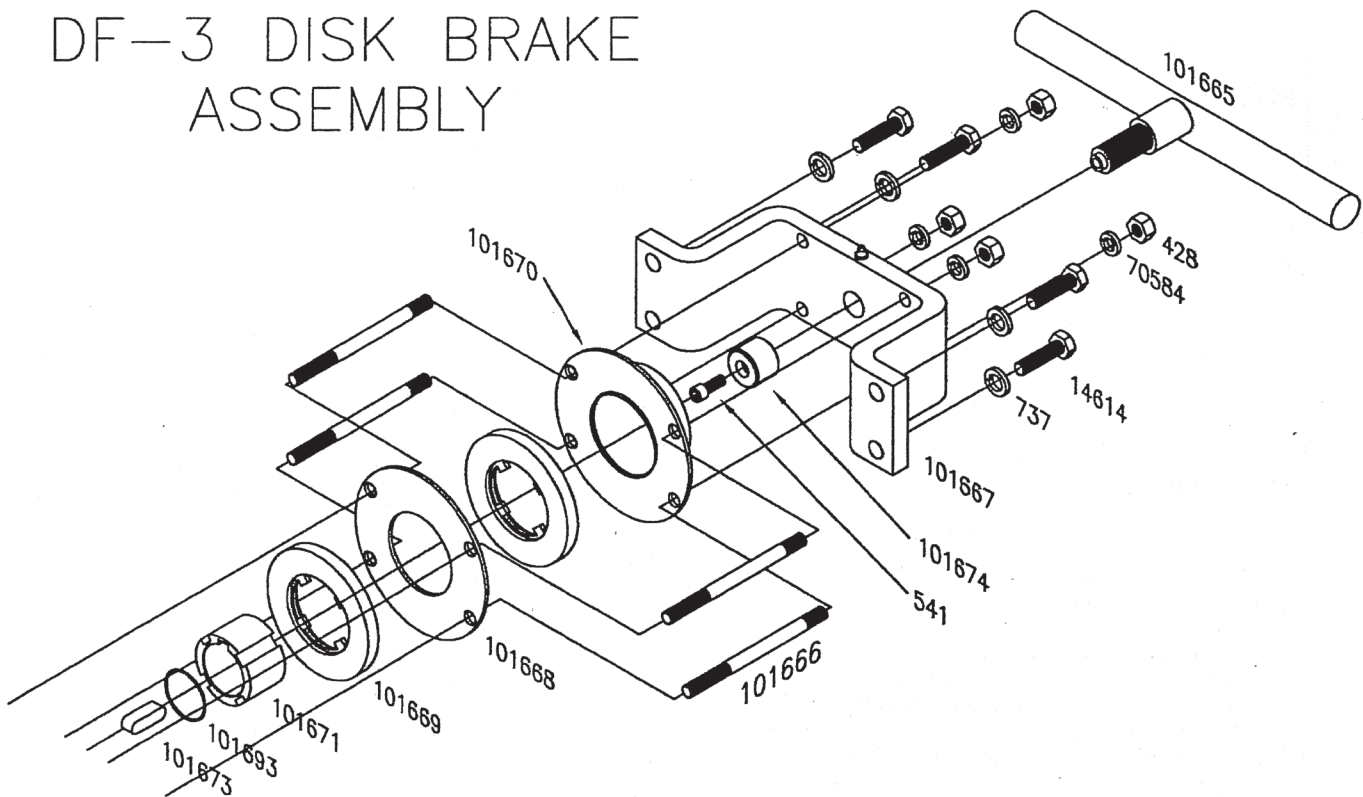
DF-3 Left or Right Hand Specific Components		
Part Description	Quantity	DF-3 (40 Ton) Part Numbers
Left Hand Winch		
Hand Ratchet Assembly	1	101652
Side Plate Assembly (Hand Wheel Side)	1	101654
Side Plate Assembly (Disc Brake Side)	1	101655
Locking Dog Handle Assembly	1	101661
Right Hand Winch		
Locking Dog Handle Assembly	1	101696
Hand Ratchet Assembly	1	101698
Side Plate Assembly (Hand Wheel Side)	1	101699
Side Plate Assembly (Disc Brake Side)	1	101707

DF-3 Miscellaneous Components (not shown in drawings)		
Part Description	Quantity	DF-3 (40 Ton) Part Numbers
Cover Mounting Stud 3/8" x 1-1/2"	10	549
Brass Wing Nut 3/8"	10	550
Ratchet Handle Extension	1	70323
Protective Rubber Cover	2	80243
U-Bolt with Fasteners (1" Dia. Wire Rope)	1	82570

DF-3 Disc Brake Assembly		
Part Description	Quantity	DF-3 (40 Ton) Part Numbers
Hex Nut 1/2" (SS)	4	428
Lock Washer 5/8" (SS)	4	737
Hex Head Bolt 5/8" x 2" (SS)	4	14614
Lock Washer 1/2" (SS)	4	70584
Key (Brake Sleeve) 1/2" SQ x 1-3/4"	1	73911
Handle Assembly	1	101665
Threaded Rod (SS)	4	101666
Brake Housing	1	101667
Engaging Plate	1	101668
Brake Disc	2	101669
Engaging Cap	1	101670
Sleeve (Disc Brake)	1	101671
Rubber O-Ring	1	101692

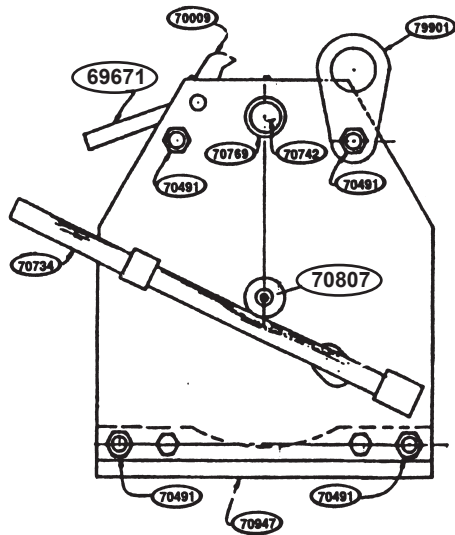
A.2 Parts Breakdown (cont'd)

DF-3 DISK BRAKE ASSEMBLY

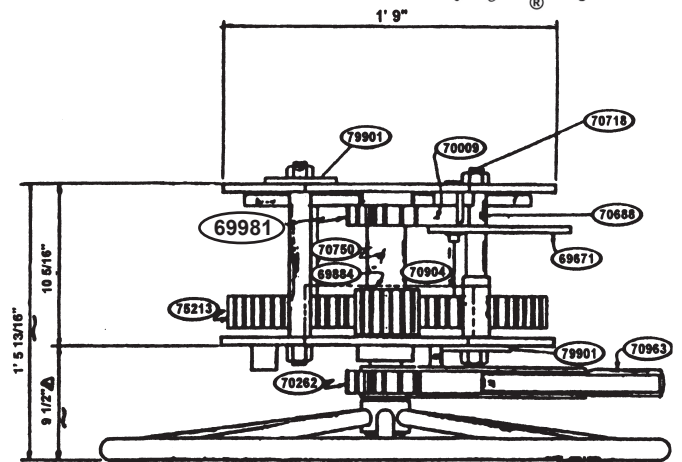


DF-3 Disk Brake Assembly			
Part Description	Quantity	DF-3 (20/30 Ton) Part Numbers	DF-3 (40 Ton) Part Numbers
Hex Nut 1/2" (SS)	4	428	428
SHCS 3/8" x 1" (SS)	1	541	541
Lock Washer 5/8" (SS)	4	737	737
HH Bolt 5/8" x 2" (SS)	4	14614	14614
Lock Washer 1/2" (SS)	4	70584	70584
Handle Assembly	1	101665	101665
Threaded Rod (SS)	4	101666	101666
Brake Housing	1	101667	101667
Engaging Plate	1	101668	101668
Brake Disk	2	101669	101669
Engaging Cap	1	101670	101670
Sleeve (Disk Brake)	1	22101	101671
Key (1/2" SQ)	1	22103	101673
Handle Stop	1	101674	101674
Rubber O-Ring	1	101693	101692

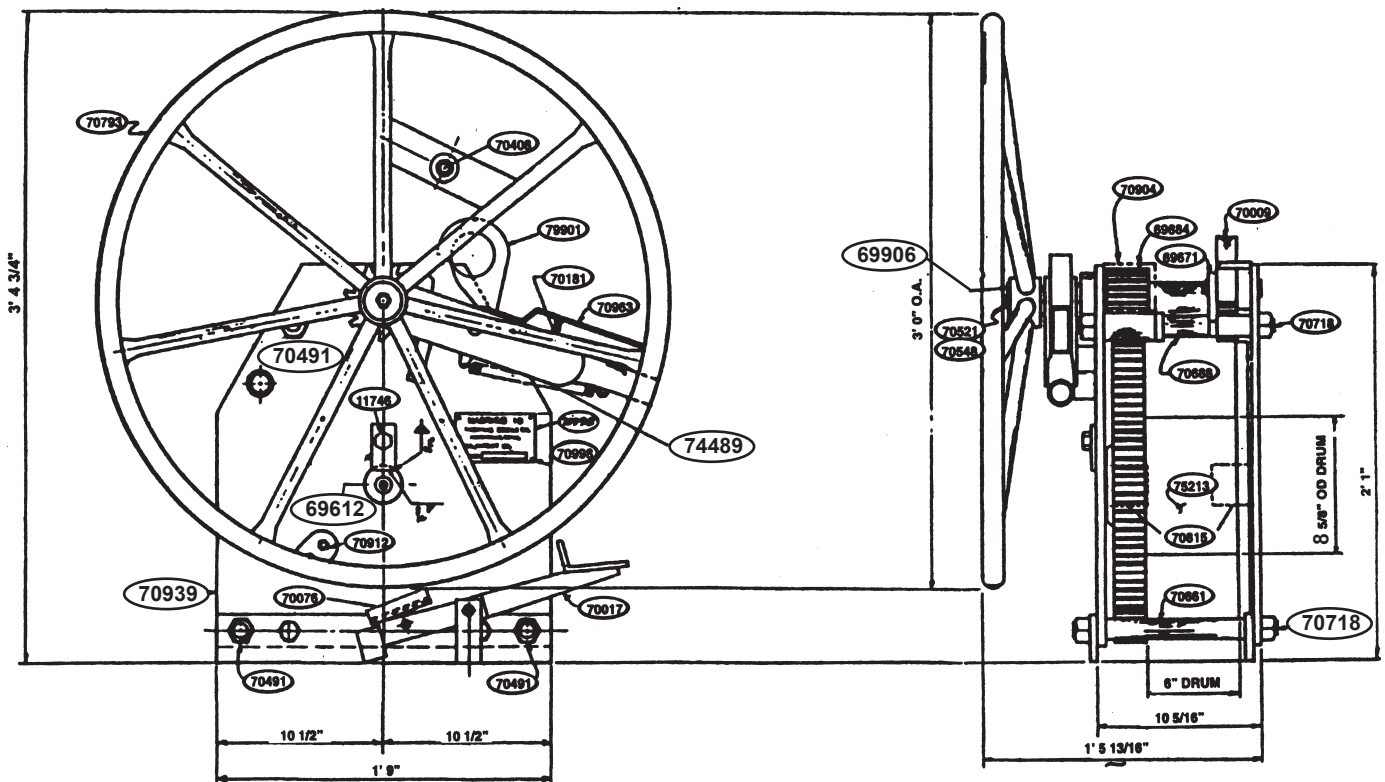
10TON MANUAL WINCH



LEFT SIDE ELEVATION



PLAN



RIGHT SIDE ELEVATION

FRONT ELEVATION

Guidry saved de olives.

Guidry went to de bar and ordered martini after martini. Each time he took de olives and put dem in a jar. When de jar was full and all de drinks finished, Guidry started to leave.

"S'cuse me," said a customer at de udder end of de bar. He was puzzled over what Guidry had done. "What was dat all bout'?"

"Nutin." said de Guidry . "my wife jus sent me out for a jar of olives."

10 TON MANUAL WINCH

PART NO.	QUAN.	DESCRIPTION
11746	1	5/8" x 1" Lg. H/H Machine Bolt
69612	1	Keeper Plate
69671	1	Locking Pawl Dog Assembly
69884	1	Drive Pinion
69906	1	Washer
69981	1	Locking Gear
70009	1	Locking Pawl
70017	1	Brake Assembly
70076	1	Brake Shoe Assembly
70181	1	Latch Spring (Compression)
70262	1	Ratchet Gear
70408	1	Handle
70491	8	7/8"-9NC Hex Nut
70521	1	1/2"-13NC x 1" Lg. H/H Machine Bolt
70548	1	1/2" Lockwasher
70572	4	#6 x 5/16 Lg. Drive Screw
70661	2	Pipe Separator
70688	2	Pipe Separator
70718	4	Pipe Separator Rod
70734	1	Ratchet Handle Extension
70742	1	Drive Shaft
70750	1	Pipe Spacer
70769	2	Drive Shaft Bearing
70793	1	Handwheel Assembly
70807	1	Drum Shaft
70815	2	Drum Shaft Bearing
70904	1	Drive Pinion Guard
70912	1	Cable Clamp
70939	1	Right Side Plate Assembly
70947	1	Left Side Plate Assembly
70963	1	Ratchet Handle Assembly
70998	1	Name Plate
74489	1	Ratchet Pawl Spring
75213	1	Drum Assembly
79901	2	Lifting Lug

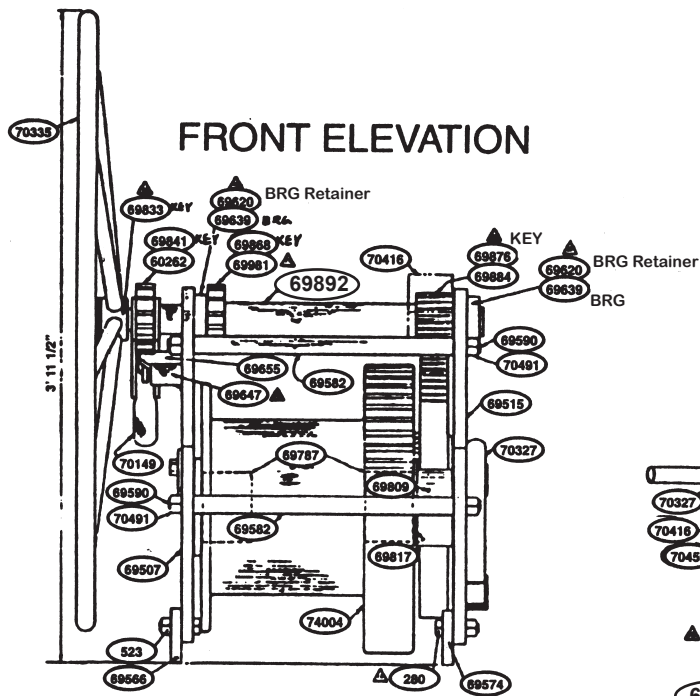
Boudreaux is sick

Boudreaux wasn't feeling too good de udder night. At about 2:00AM he called Doc Thibodeaux and axed him, "Hey Doc, how much you charge for a house call?" Ole Doc Thibodeaux sleepily answered "Twenty-five dollars." Boudreaux den axed, "Mais, how much you charge for an office viseet" Thibodeaux tells him "Fifteen dollars." Boudreaux says, "Mais. OK, I'll meet you at your office in fifteen minutes!"

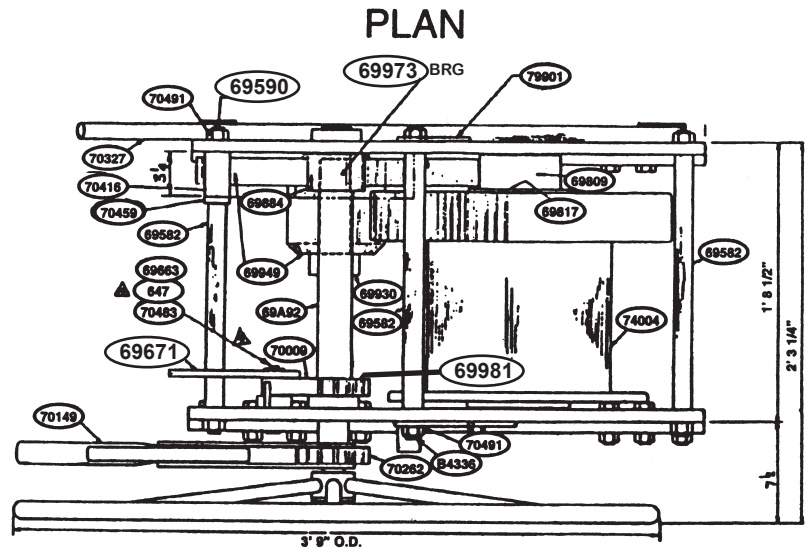
PARTS LIST FOR LEFT HAND WINCH

71005	1	Left Side Plate Assembly
71013	1	Right Side Plate Assembly
70955	1	Right Hand Ratchet Assembly
71048	1	Left Hand Pinion Guard

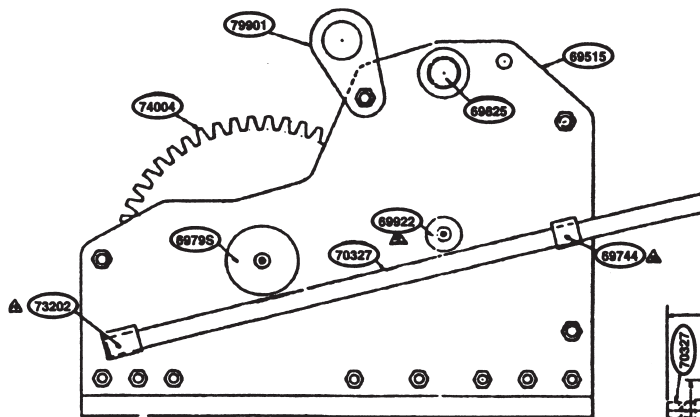
40 TON MANUAL WINCH



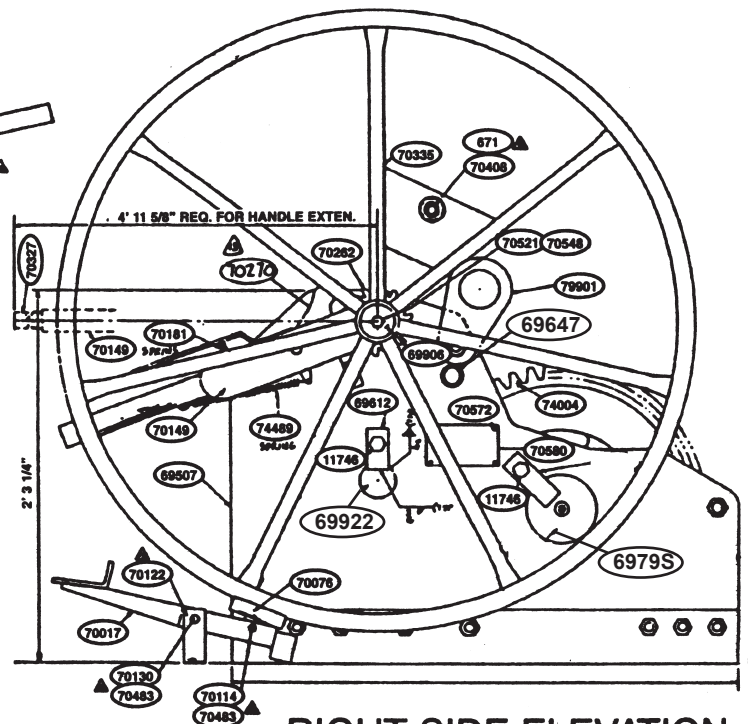
FRONT ELEVATION



PLAN



LEFT SIDE ELEVATION



RIGHT SIDE ELEVATION

probably from Louisiana if...

If you ever had to wait for the bridge to "come down"
so you can get home

40 TON MANUAL WINCH PARTS LIST

PART	QTY	DESCRIPTION
280	16	3/4" - IONC x 20" Lg. Hex Hd. Mach. Bolt
523	16	3/4" - 1 ONC Hvy. Hex Nut
647	1	S/8" - SAE Flat Washer
671	1	5/16" Flat Steel Washer
11746	2	5/8" - 11 NC x 1 " Lg. Hex Hd. Mach.Bolt
69566	1	Side Plate Base Bar
69574	1	Side Plate Base Bar
69582	4	Pipe Separator
69604	1	Keeper Plate
69612	1	Keeper Plate
69620	2	Bearing Retainer
69639	2	Drive Shaft Bearing
69647	1	Ratchet Handle Stop
69655	1	Ratchet Release Bar
69663	1	Locking Dog Pin
69671	1	Locking Pawl Dog Assembly
69744	1	Top Bracket for Extension Handle
69787	2	Drum Bearing
6979S	1	Gear shaft
69809	1	Pipe Spacer
69817	1	Washer (7 1/8" O.D.x4 31/32" I.D. x 1/4" Thk.)
69825	1	Drive Shaft
69833	1	Key (3/8" Sq. x 13/4" Lg.)
69841	1	Key (3/8" Sq. x 1 3/16" Lg.)
69868	1	Key (1 1/2" Sq. x 1 1/4" Lg.)
69876	1	Key (1/2" Sq. x 2 3/4" Lg.)
69884	1	Drive Pinion
69A92	1	Pipe Spacer
69906	1	Washer (2 1/2" O.D. x 9/16" I.D. x 5/16" Thk.)
69922	1	Intermediate Shaft
69930	1	Intermediate Shaft Collar
69949	1	Drive Gear and Pinion Assembly
69973	1	Drive Gear Pinion Searing
69981	1	Locking Gear
70009	1	Locking Pawl
70017	1	Brake Assembly
70076	1	Brake Shoe Assembly
70114	1	Brake Shoe Pin
70122	1	Brake Mounting Bracket
70130	1	Brake Mounting Bracket Pin
70181	1	Latch Spring
70262	1	Ratchet Gear
70327	1	Ratchet Handle Assembly
70335	1	Handwheel Assembly 70408 1 Handle
70483	5	1/8" Dia. x 1" Lg. Cotter Key

PART QTY DESCRIPTION

70491	8	7/8" - 9NC Hex Nut
70521	2	1/2" - 13 NC x 1 " Lg. Hex Hd. Bolt

70548	20	1/2" Std. Lockwasher
70572	4	#6 x 5/16" Lg. Drive Screw
70580	1	Nameplate
74004	1	Drum Assembly
74489	1	Ratchet Pawl Spring
79901	2	Lifting Lug
B4336	4	Pipe Separator Rod

PARTS LIST FOR RIGHT HAND WINCH

69507	1	Right Side Plate Assembly
69515	1	Left Side Plate Assembly
70149	1	Ratchet Handle Assembly
70416	1	Drive Pinion Guard
73202	1	Ext. Handle Lower Bkt.

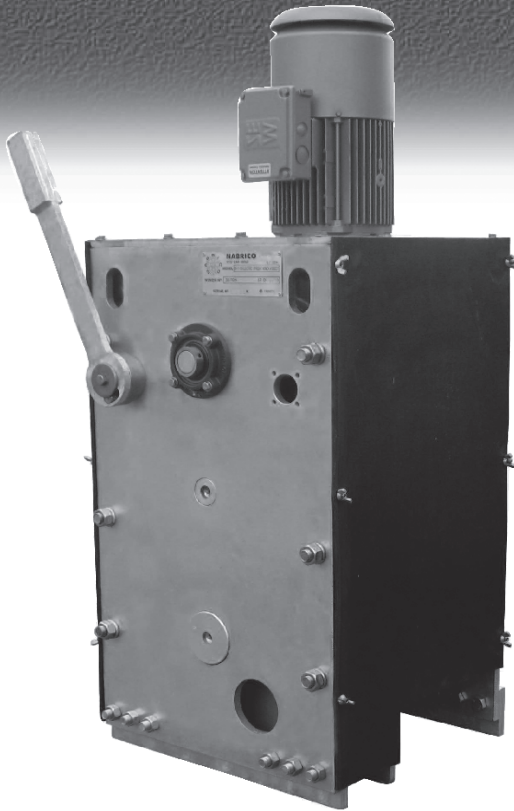
PARTS LIST FOR LEFT HAND WINCH

69523	1	Left Side Plate Assembly
69531	1	Right Side Plate Assembly
70629	1	Ratchet Handle Assembly
70637	1	Drive Pinion Guard
73210	1	Ext. Handle Lower Bkt.

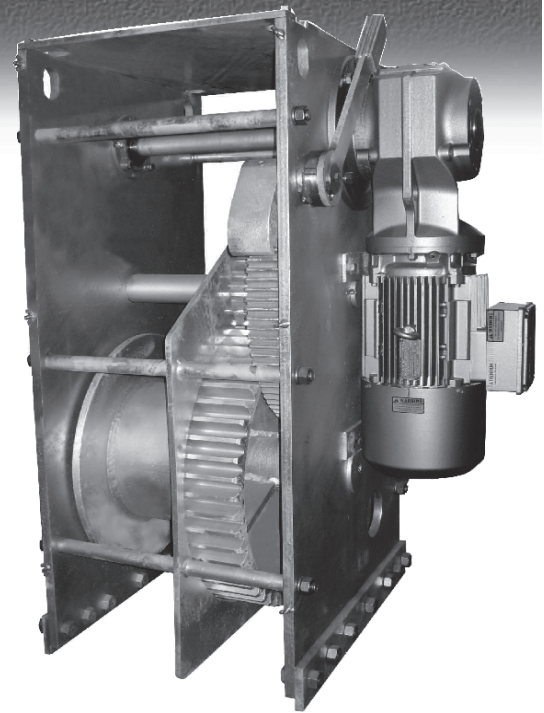
Boudreaux gets de las' rites

Boudreaux waz lying on his dead bed, and waz receiving las' rites from his parish pries'. De good Fader tells Boudreaux, "Eet is time for you to denounce de devil and all his evil." Boudreaux says noting. Fader once again tells Boudreaux, "Eet is time for you to denounce de devil and all his evil." Still Boudreaux says noting. De pries' axed Boudreaux, "Why are you refusing to denounce de devil?" Den Boudreaux tells him. "Fader, until I know where I'm going, I don't want to take no chances to aggravate anybody!"

POWER WINCHES



30 TON



40, 50, 65 TON

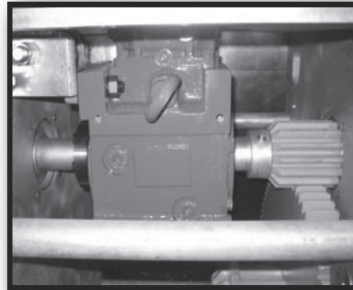
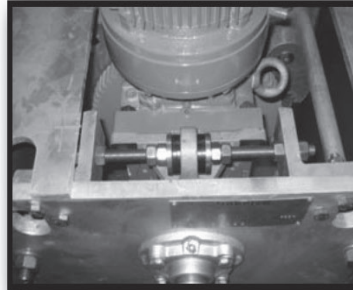
Features

- Salt water package standard.
- Hot-dipped galvanized.
- Stainless steel or silicon bronze fasteners.
- 3-ply conveyor belt covers (damage and corrosion-resistant).
- New thick, 3-tooth locking dog with large lever release and failsafe disc brake.
- Crane and hoist-duty motor, NEMA design, with high-efficiency worm gear box.
- Control box option: NEMA 4X stainless steel.
- Provisions for emergency manual operation.
- Minimal maintenance and easy to repair.
- Over 100 fewer parts than other electric winches (no chain, sprockets, ball bearings, or top shaft - 40 & 50 ton).
- Variable frequency drive option available. Amp draw limits, variable speeds and motor protection.
- Heaviest winch in its class.
- 30 Ton - 5.4 HP motor standard.
- 40 Ton - 7.5 HP motor standard.
- 50 Ton - 10 HP motor standard.
- 65 Ton - 10 HP motor standard.
- Other motors and ratios available.

MODEL	MOUNT	LINE PULL				LINESPEED @ FIRST LAYER OF 1 IN. CABLE NO LOAD	DRUM FLANGE DIAM.	DRUM		DRUM CAPACITIES (FT.)					MOTOR	WEIGHT	MOUNTING DIMENSIONS		
		@ RATED AMPS	@ MOTOR STALL	HAND CRANK @ MOTOR SHAFT	MOTOR			DIAM	WIDTH	CABLE SIZE							WIDTH	LENGTH	HEIGHT
DF-1		LBS.	LBS.	LBS.	HP	FPM	IN.	IN.	IN.	1/2	5/8	3/4	7/8	1	HP	LBS.			
30-11	Universal	13,000	19,500	19,000	5.4	18	17.25	10.75	11	361	228	138	120	66	5.4	1,700	18 5/8"	22"	56 3/8"
40-11	Left or Right	18,000	27,000	22,000	7.5	18	19	12.75	11.25		287	180	130	100	7.5	1,850	20 1/8"	23 1/4"	52 1/2"
50-11	Left or Right	29,400	44,100	30,000	10	12.5	19	12.75	11.25		287	180	130	100	10	1,850	20 1/8"	23 1/4"	52 1/2"
65-11	Left or Right	32,000	48,000	30,000	10	10	24	14	10.625		572	325	262	200	10	3,200	23 1/4"	30"	62 5/8"



NABRICO



DF-1 Electric Winch Features & Specifications

- Salt water package standard on all power winches.
- Hot-dipped galvanized.
- Stainless or silicon bronze fasteners.
- 3-ply conveyor belt covers (damage and corrosion-resistant).
- 3-tooth locking dog with large release and fail-safe disc brake.
- Provisions for emergency manual operation with cordless drill.
- NEMA motor design with cycloidal gearbox.
- Control box option: NEMA 4X stainless steel.
- Minimal maintenance and easy to repair.
- Variable frequency drive option available. Amp draw limits, variable speeds, and motor protection.
- Made as one model adjustable to true right or left hand models for use in pairs.
- Over 100 fewer parts than other electric winches (no chain or sprockets).
- Heaviest winch in its class.
- 30 Ton - 5 HP motor standard.
- 40 Ton - 7.5 HP motor standard.
- 50 Ton - 10 HP motor standard.
- 65 Ton - 10 HP motor standard.
- Other line pulls and speeds available.

MODEL	HOLDING DOG & OR BRAKE	LINE PULL		LINE SPEED 1ST LAYER FPM	DRUM CAPACITIES (FT.)					WEIGHT LBS.	DIMENSIONAL DATA		
		@ RATED AMPS-LBS	@ MOTOR STALL		1/2	5/8	3/4	7/8	1		W	L	H
DF-1-30	30 TONS	12500	18750	14	361	228	138	120	66	1700	20"	22"	55"
DF-1-40	40 TONS	15600	23400	16	-	287	180	130	100	1850	21"	24"	67"
DF-1-50	50 TONS	20800	31200	16	-	287	180	130	100	1850	21"	24"	69"
DF-1-65	65 TONS	37800	56700	9	-	572	325	262	200	3200	24"	30"	79"

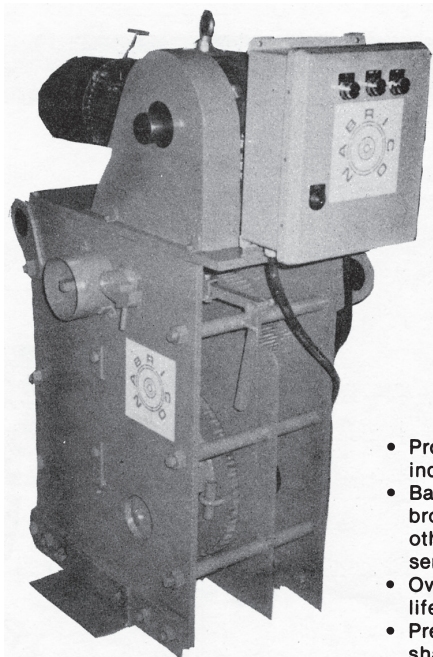
CERTIFIED ELECTRIC WINCH SPECIFICATIONS

MODEL	MOUNT	HOLDING BRAKE &/ OR DOG	LINE PULL @ FIRST LAYER OF CABLE				LINESPEED @ FIRST LAYER OF 1 IN. CABLE NO LOAD
			40 TON-429: 1 RATIO, 30 TON-343:1 RATIO		18.6:1 RATIO		
			@ RATED AMPS	@ MOTOR STALL	HAND CRANK @ MOTOR SHAFT	HAND CRANK @ TOP SHAFT	
DF-500		S. Tons	LBS.	LBS.	LBS.	LBS.	FPM
40-11-14	Universal	40	14,000	24,000	15,000	2,500	15.3
30-7-15	Universal	30	13,000	24,000	22,000	4,000	16.0

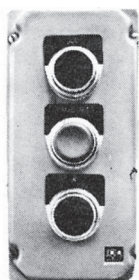
The specifications and details described by drawings or text in this literature are subject to change without notice. Winches portrayed in drawings, photographs and copy are not designed for lifting or lowering personnel.

MODEL	DRUM FLANGE DIAM.	DRUM		DRUM CAPACITIES (FT.) ¹					MOTOR	WEIGHT	MOUNTING DIMENSIONS		
		DIAM.	WIDTH ²	CABLE SIZE							A	B	C
DF-500	IN.	IN.	IN.	½	⅝	¾	⅞	1	HP	LBS.	A	B	C
40-11-14	19	12.75	11.25		260	180	130	100	5	1,900	1' 9"	3' 8"	3' 5¼"
30-7-15	16	10.75	7.25	186	109	57	39		5	1,600	1' 3⅜"	2' 1½"	4' 4¼"

(1) These capacities are based on uniform cable winding.
The amount of tension applied when spooling the cable will also affect the length.



The NABRICO 30 ton all electric winch is designed to cover minimum deck space.

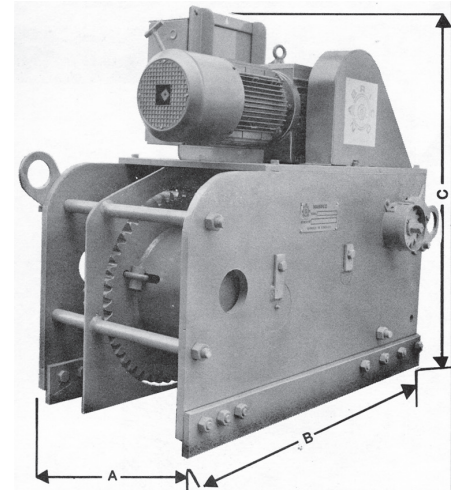


Remote controls are available as an option.

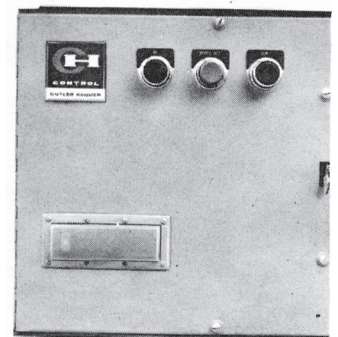


FEATURES

- Proven holding capacity certified by independent testing laboratory.
- Ball bearings on high speed shaft and large bronze bushings with grease fittings on all other shafts for long life and dependable service.
- Oversized sprockets and chain for extended life.
- Precision machined side plates, gears and shafts to maintain proper gear tooth engagements and minimize wear.
- Improved cable attachment and solid drum gear.
- Totally enclosed 5 horsepower crane and hoist electric motor with high efficiency gear box attached.
- Free-wheeling feature to allow faster cable pull out.
- Provisions for emergency manual operation from three locations. One location utilizes the entire winch gear reduction.
- Mechanical locking dog for emergency use in case of motor brake failure.
- Electric brake can be manually operated in case of motor or power failure.
- Cable guard prevents cable damage from gears.
- Quiet operation.
- Minimal maintenance.



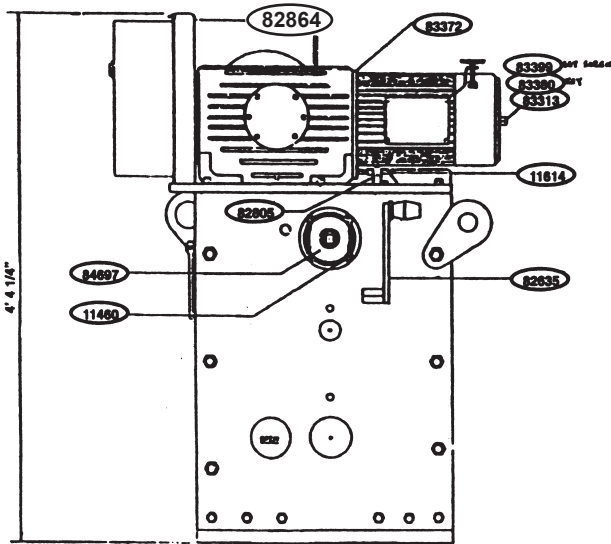
The NABRICO electric winch, with a proven 40 ton holding capacity, is powered by a 5 horsepower NEMA design "D", crane and hoist motor. It is attached to a heavy duty "fail safe" electric brake.



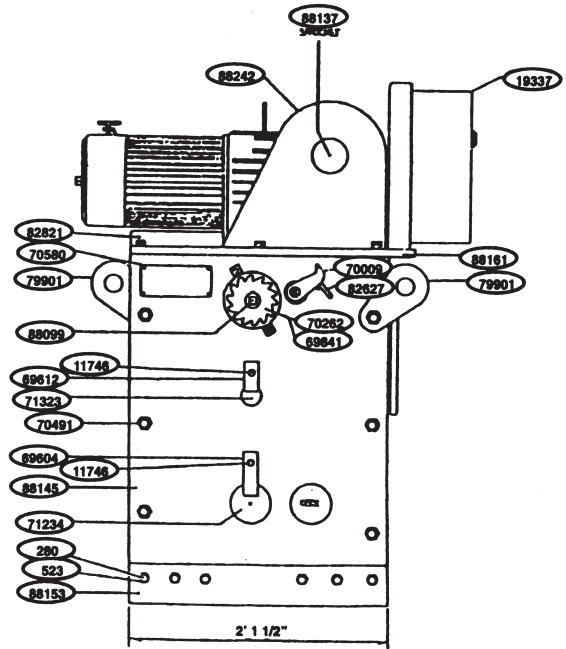
Winch comes complete with all electrical controls. Connect to a power source and the winch is ready to operate.



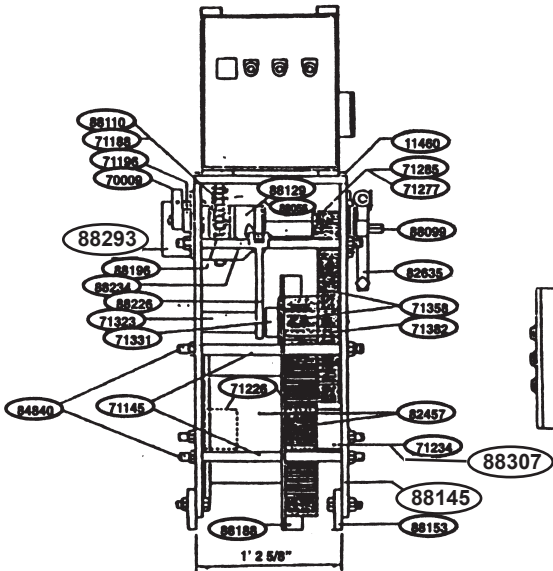
30 TON ELECTRIC WINCH



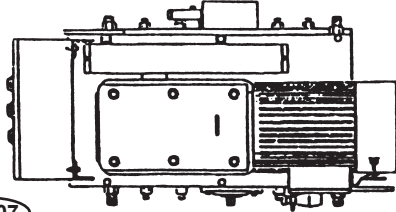
RIGHT ELEVATION



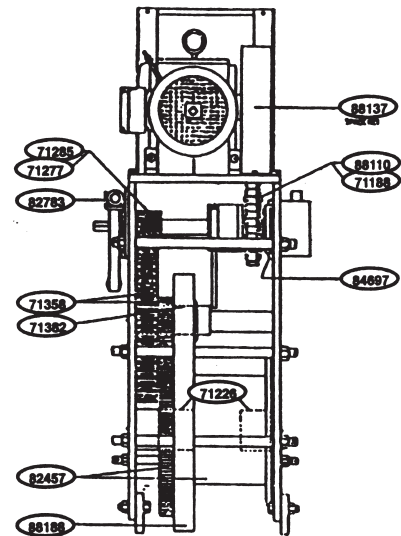
LEFT ELEVATION



FRONT ELEVATION



PLAN



REAR ELEVATION

probably from Louisiana if...

If you've ever been to a wedding and someone either danced in a #3 washtub or with a broom and this was considered normal

30 TON ELECTRIC WINCH PARTS LIST

PART NO. QTY DESCRIPTION

280	12	3/4" X 2 1/2" Lg. Hex Hd. Bolt
523	12	3/4" Hex Nut
11460	14	3/8" x 1 3/4" Lg. Hex Hd. Machine Bolt
11614	2	1 1/2" x 2 1/4" Lg. Hex Hd. Bolt
11746	2	5/8" x 1" Lg. Hex Hd. Machine Bolt
19887	1	Control Cabinet
21644	1	Control Box Support (Right Hand)
69604	1	Keeper Plate
69612	1	Keeper Plate
69841	1	Keystock 3/8" x 13/16
70009	1	Locking Pawl
70262	1	Locking Gear
70491	12	7/8" Hex Nut
70580	1	Name Plate
71145	6	Pipe Separator
71188	1	Top Shaft Sprocket Bushing
71196	1	Locking Pawl Spacer
71226	2	Drum Bearing
71234	1	Drum Gear Shaft
71277	1	Keystock 3/8" x 2 1/2"
71285	1	Drive Pinion
71323	1	Intermediate Shaft
71331	1	Intermediate Shaft Collar
71358	1	Drive Gear and Pinion Assembly
71882	1	Drum Gear Pinion Bearing
79901	2	Lifting Lug

PART NO. QTY DESCRIPTION

82457	1	Drum Assembly
82481	1	Drum Shaft Spacer
82627	1	Locking Pawl Pull Pan
82635	1	Handcrank Assembly
83046	1	Eurodrive Brake, Electric Motor
82783	1	Handcrank Rack
92805	1	Alignment Lugs
22821	1	Motor Guard
82864	1	Control Box Supports (Left Hand)
e2880	1	Drive Shaft Guard Assembly
84697	2	Sealmaster Bearing SFC-25
84840	6	Pipe Separator Rod
8905h	1	Keystock 3/8" x 3 1/2"
88099	1	Drive Shaft Assembly
88110	1	Browning 1008 17 Tooth Sprocket
88129	1	Jaw Clutch Hub
88137	1	Browning 100B20 Tooth Sprocket
88145	2	Side Plate
88153	2	Side Plate Base Bar
88161	1	Brake Gear Motor Base Plate
83189	1	Cable Guard Plate
88196	42	Pitches 100 Roller Chain
88226	1	Jaw Clutch Handle
88284	1	Jaw Clutch Yoke
88242	1	Chain Guard

Boudreaux's wife has'a crab boil

Boudreaux waz **waiting** by his house cause his wife waz missing.

He head a knock at de door, so he answered eet. His buddy Tibodeaux waz at de door.

Tibodeaux says, "Boudreaux I got some good news and I got some bad news. De bad news is dat we foun' your wife drowned in de lake. De good news is when we picked her up out de lake she had 3 dozen crabs holt'ing on, so bring some beer cause we're gonna have a crab boil".

40 TON ELECTRIC WINCH PARTS LIST

PART	QTY	DESCRIPTION
280	14	3/4" x 2-1/2- Lg H/H Machine Bolt (Base Bars)
329	6	1/2" x 1-3/4' Lg H/H Machine Bolt (Top Platel
523	18	3/4" Hex Nut (Base Bars & Brake Motor)
558	2	1/2" Hex Nut (Jacking Bolt Locknut)
582	6	1/4" Hex Nut (Chain Guard 8 Control Box)
620	4	3/4 Flat washer (Brake - Gear Motor)
728	4	3/4" Lock washer (Brake - Gear Motor)
760	2	5/16- Lock washer (Drive Shaft Guard)
779	6	1/4" Lock Washer (Chain Guard 8 Control Box)
922	2	5/16"X3/4 Lg H/H Cap Screw (Dr Sh Guard)
1023	2	1/4" x 1-1 /4- Lg H/H Cap Screw (Chain Guard)
9865	3	1/8" Grease Fitting (Drum Shaft 8 Int Shaft)
11592	2	1/2 x 2- Lg. H/H Machine Bolt (Ball Bearings)
11740	2	5/8" x 1- Lg H/H Machine Bolt (Keeper Plate)
11878	4	3/4" x S3/4- Lg H/H Machine Bolt (Brake-GM)
20184	2	1/2" x 2-1/4 Lg H/H Cap Screw (Jacking Bolt)
21644	1	Control Box Support (Right Hand)
69582	4	Pipe Separator
69604	1	Keeper Plate (Drum Shaft)
69612	1	Keeper Plate (Intermediate Shaft)
69728	1	Locking Pawl Spacer
69795	1	Drum Gear Shaft
69809	1	Pipe Spacer (Drum)
69817	1	Washer (Drum)
69868	1	Key (Locking Gear)
69876	1	Key (Drive Pinion)
69884	1	Drive Pinion
69922	1	Intermediate Shaft
09930	1	Intermediate Shaft Collar
69949	1	Drive Gear 8 Pinion Assembly
69973	1	Drive Gear Pinion Bearing (included in P/N 69949)
69981	1	Locking Gear
70009	1	Locking Pawl
70475	1	S/Bw Fl-ct'wOsher (Locking Pawl)
70483	1	1/8" x 1<< Lg Cotter Pin (Locking Pawl)
70491	8	7/8" Hex Nut (Pipe Separator Rods)
70505	2	1/4 Grease Fitting (Jaw Clutch Hub L Spkt)
70548	14	1/2" Lock Washer (Brake- GI BP L Ball Brg)
70572	4	6 x 5/16- Lg Drive Screw (Name Plate)
70580	1	NABRICO Name Plate
70599	1	5/BZ x 5/8 Lg Set Screw (Int Shaft Collar)
73593	1	Control Box w/o Holes
79774	1	Locking Pawl Pin
79901	2	Lifting Lugs
82503	1	Drum Assembly
H2SI	1	Drum Bearing (included in P/N 82503)
82600	1	Side Plate Base Bar

De little t'ings

Boudreaux and Marie waz having some trouble, so dey did de right thing and went to a marriage counselor. After a few visits, and a lot of questioning and listening. de coun-selor said that he had discovered de main problem.

He stood up, went over to Marie, axed her to stand, and gave her a hug. He looked at Boudreaux and said, "This is w'at your wife needs, at least once a day!" - Boudreaux frowned, thought for a moment. den said. "OK, w'at time do you want me to bring her back tomorrow?"

CERTIFIED HYDRA-ELECTRIC WINCH SPECIFICATIONS

MODEL	MOUNT	HOLDING BRAKE &/ OR DOG (1)	LINE PULL			LINESPEED AT DRUM SURFACE NO LOAD	H.E. GEAR RATIO	MANUAL GEAR RATIO
			HYDRA-ELECTRIC		HANDWHEEL ONE MAN			
			RATED (2)	MAX				
DF-156		S.T.	LB.	LB.	LB.	FPM		
10-6HE	Right or Left	10	2272 at 830 psi	3150 at 1119 psi	7,000	23.5	29.25:1	5.57:1
20-7HE	Right or Left	20	9382 at 1138 psi	11700 at 1381 psi	14,000	17.2	92.86:1	18.57:1
40-11HE	Right or Left	40	17213 at 1695 psi	18000 at 1797 psi	15,000	12.8	92.86:1	18.57:1
60-11HE	Right or Left	60	31771 at 1998 psi	33480 at 2105 psi	24,000	9.9	135.20:1	27.0:1

- (1) Holding & line pull ratings are for first layer of cable.
 (2) Hydra-Electric line pull pressures are pre-set for RATED conditions.
 (3) Also available in wider drum widths upon request.



MODEL	DRUM FLANGE DIAM.	DRUM		DRUM CAPACITIES (FT.)									MOTOR	WEIGHT		MOUNTING DIMENSIONS		
		DIAM.	WIDTH ³	CABLE SIZE										H.E.	BASIC	A	B	C
				1/16	1/8	3/16	1/4	3/8	1/2	5/8	3/4	1						
DF-156	IN.	IN.	IN.										HP	LB.	LB.			
10-6HE	18	8.625	6.00	353	317	174	129						3	897	690	10 ⁵ / ₁₆ "	1' 10 ¹ / ₂ "	3' 6 ³ / ₈ "
20-7HE	16	10.75	7.25	270	186	109	57	39	21				7.5	1284	1010	1' 3 ¹ / ₂ "	2' 6"	3' 5"
40-11HE	19	12.75	11.25			287	176	130	84	36	26		10	1930	1518	1' 8 ¹ / ₈ "	3' 0"	3' 4"
60-11HE	24	14.00	10.625			572	325	262	200	119	111	62	15	3225	2523	1' 11 ¹ / ₈ "	3' 10 ⁷ / ₈ "	4' 3"

(Figures shown in parenthesis are in centimeters.)

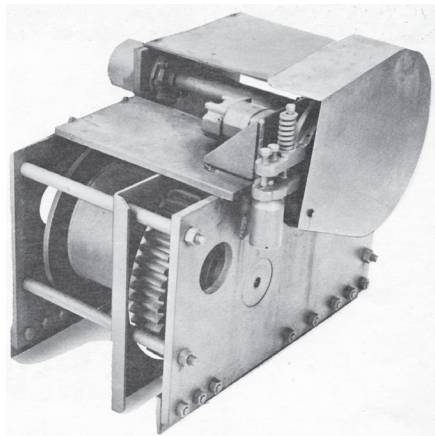
The specifications and details described by drawings or text in this literature are subject to change without notice.
 Winches portrayed in drawings, photographs and copy are not designed for lifting or lowering persons or equipment.

NABRICO's DF-156, a basic hydraulic winch, has the same performance characteristics as our hydra-electric winches. Available in 10, 20, 40 and 60 ton models.

For more information on the complete line of winches and deck fittings produced by Nabrico, write or call.

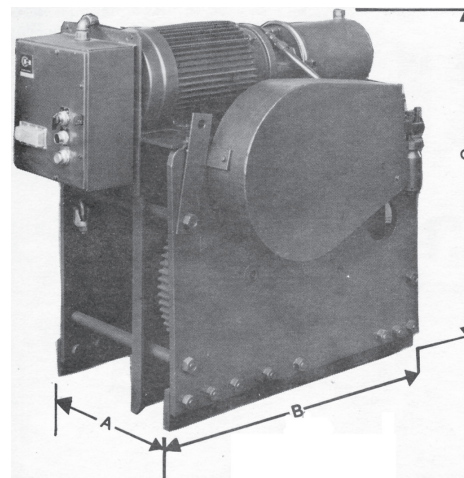
Proven holding capacity certified by independent testing laboratory.

Free wheeling drum feature is standard on all 20, 40, and 60 ton winches to allow faster cable pullout.



FEATURES

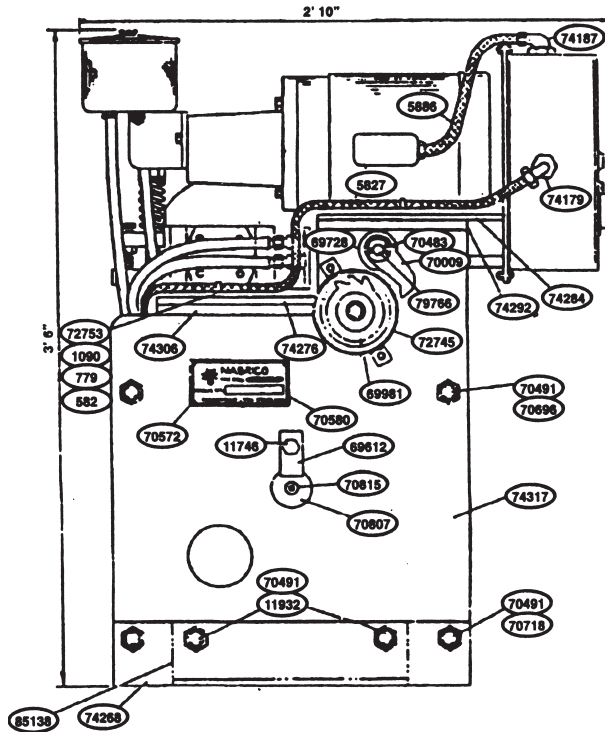
- Manufactured in 10, 20, 40 and 60 ton holding capacities.
- Pilot house and/or deck push button control.
- Self-contained electric-hydraulic package. Quick installation.
- Run electric wire to source. No piping required.
- Automatic brake. Spring loaded, noiseless. Can be released for hand operation.
- Simple instant reversing by hydraulics.
- Standard C Face, 1750 RPM enclosed (T.E.F.C.) electric motor.
- Mechanical holding dog for emergency use. Positive.
- Machine cut gears, more efficient.
- Ball bearings on high speed shaft and large bronze bushings with grease fittings on all other shafts for long life and dependable service.
- Cable guard prevents cable damage from gears.
- Conserves deck space.
- Wider drums on request.
- Quiet operation.
- Provisions for emergency operation, by hand.



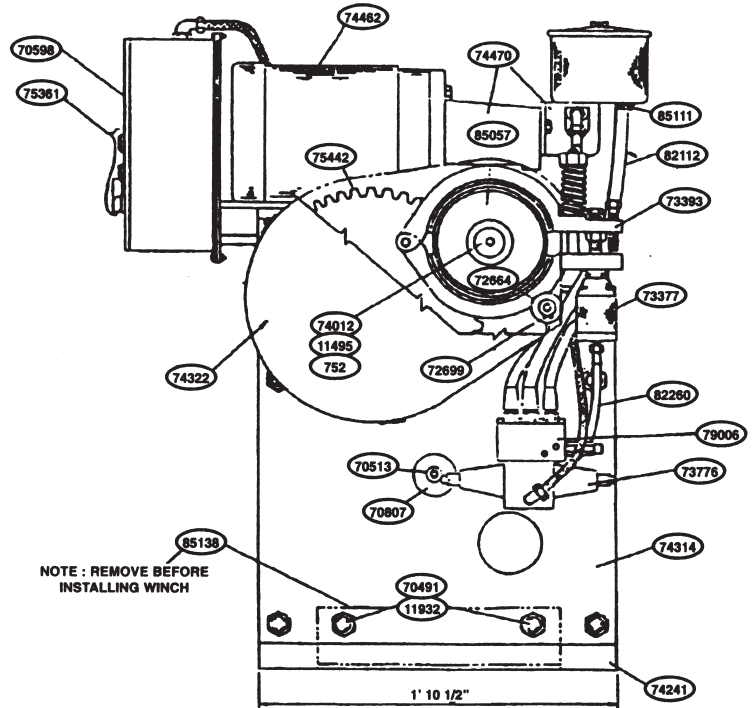
The NABRICO hydra-electric winch, regardless of its capacity, gives you a choice of power, speed and control. Plus, every NABRICO hydra-electric winch uses a standard TEFC 1750 electric motor.

probably from Louisiana if...
 You like your rice and politics dirty.

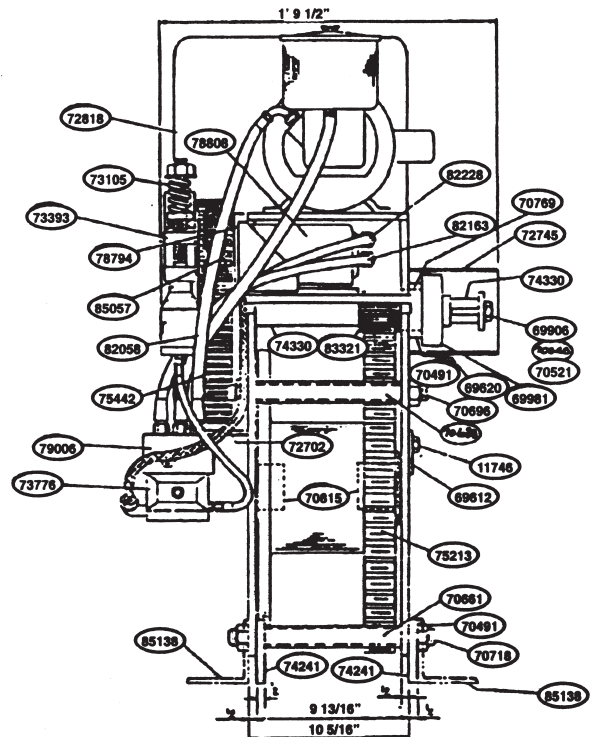
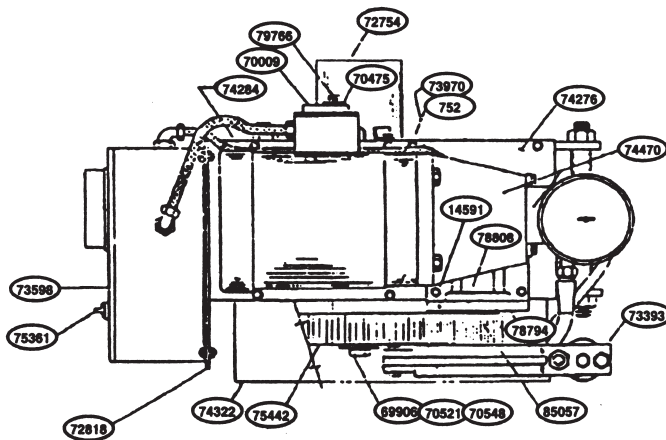
10 TON HYDRA - ELECTRIC WINCH



LEFT SIDE ELEVATION



RIGHT SIDE ELEVATION



FRONT ELEVATION

probably from Louisiana if...

You know when it's appropriate to use "Tony Chachere's" (anytime!!!!)

10 TON HYDRA - ELECTRIC WINCH PARTS LIST**PART QTY. DESCRIPTION**

582	7	1/4" Hex Nut
752	16	3/8" Lockwasher
779	3	1/4" Lockwasher
1090	3	1/4" x 3/4" Lg. R/H Capscrew
5827	9	Lin. Ft. TSGA-3 Marine Cable
5886	41/2	Lin. Ft. TTIB-10-N Marine Cable
9865	2	1/8" PTF Alemite Fitting #1610BL
11495	1	3/8" x 2i" Lg. H/H Machine Bolt
11746	1	5/8" x 1" Lg. H/H Machine Bolt
11932	4	7/8" x 2" Lg. H/H Machine Bolt
14591	8	1/2" x 1 1/2" Lg. H/H Machine Bolt
69612	1	Keeper Plate
69620	2	Bearing Retainer
69728	1	Locking Pawl Spacer
69884	1	Drive Pinion
69906	2	Washer
69981	1	Locking Gear
70009	1	Locking Pawl
70475	1	5/8" Flatwasher
70483	1	1/8" x 1" Lg. Cotter Pin
70491	12	7/8" Hex Nut
70505	2	1/4" Alemite Fitting #1652B
70513	2	1/8" PTF Alemite Fitting
70521	2	1/2" x 1" Lg. H/H Machine Bolt
70548	10	1/2" Lockwasher
70572	4	# 6 x 5/16" Lg. Drive Screw
70580	1	Name Plate
70661	2	Pipe Separator
70688	2	Pipe Separator
70696	2	Pipe Separator Rod
70769	2	Drive Shaft Bearings
70807	1	Drum Shaft
70815	2	Drum Shaft Bearings
72664	1	Brake Post Assembly
72699	1	Retainer Ring
72702	1	4-Way Valve Mounting Plate
72745	1	Drive Shaft Guard Ass'y.
72753	3	Stand Off Bracket
72818	1	Controller Mounting Plate
74322	1	Gear Guard Assembly
73105	1	Winch Brake Spring
73377	1	Hyd. Winch Brake Cylinder
73393	1	Hyd. Winch Brake Assembly
73598	1	C-H Transformer Box
73776	1	4-Way Valve
73970	6	3/8" x 1 1/4" H/H Capscrew
74012	1	Washer
74179	2	1/2" Liquid Tight Fitting

PART QUAN. DESCRIPTION

74187	2	3/4" Liquid Tight Fitting
74241	1	Base Bar
74268	1	Base Bar

PART QTY. DESCRIPTION

74276	1	Hyd. Motor Base Plate
74284	1	Electric Motor Base Plate
74292	2	Upper Cap Bar
74306	2	Lower Cap Bar
74314	2	Side Plate
74330	1	Drive Shaft
74462	1	Lincoln Electric Motor 3 HP
74470	1	Power Pack Assembly
75213	1	Drum Assembly
75361	1	Complete Push Button Ass'y.
75442	1	Drive Gear
78794	1	Hyd. Motor Bracket
78808	1	Hydraulic Motor
79006	1	Modular Aluminum Subplate
79776	1	Locking Pawl Pin
82058	1	Hose Assembly 1 OLP
82112	1	Hose Assembly 1ORLT
82163	1	Hose Assembly 1 OLA
82228	1	Hose Assembly 1 OLB
82260	1	Hose Assembly 1 ORLBL
82309	1	Fitting Kit
85057	1	Motor Pinion & Brake Drum Ass'y.
85111	1	1 " Hose Clamp
85138	2	Base Bar Support Bracket

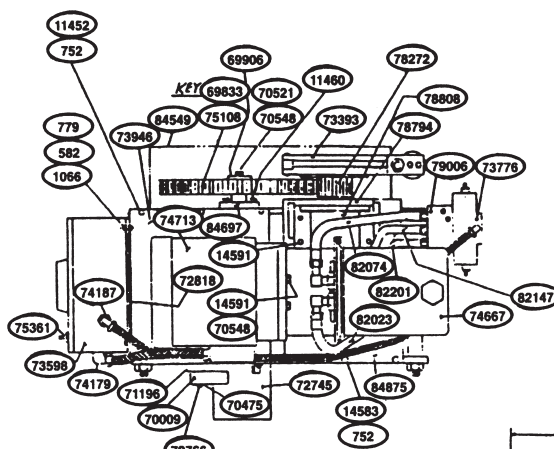
PARTS FOR RIGHT HANDWINCH

72826	1	Gear Guard Assembly
89066	1	Hose Assembly 1 OPP
8211Z	1	Hose Assembly 1ORLT
82171	1	Hose Assembly 1 OR.A
82236	1	Hose Assembly 1 ORB
82260	1	Hose Assembly 1 ORLBL
82309	1	Fitting Kit

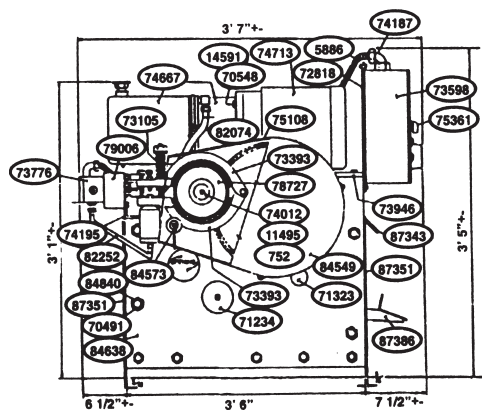
PARTS NOT SHOWN

22022	1	Starter (In Control Box)
69349	1	Key w/#75442
69833	1	Key w/#70793
69868	1	Key w/#69981
69876	1	Key w/#69884
70564	1	Retainer Ring w/#73393
70793	1	Handwheel Assembly
70912	1	Cable Clamp
73008	1	Upper Band w/#73393
73016	1	Lower Bank w/#73393
73040	1	Brake Lining w/#73393
73059	12	Brass Rivet w/#73393
74349	1	Key w/#75442
75353	3	C-H Heater (In Control Box)

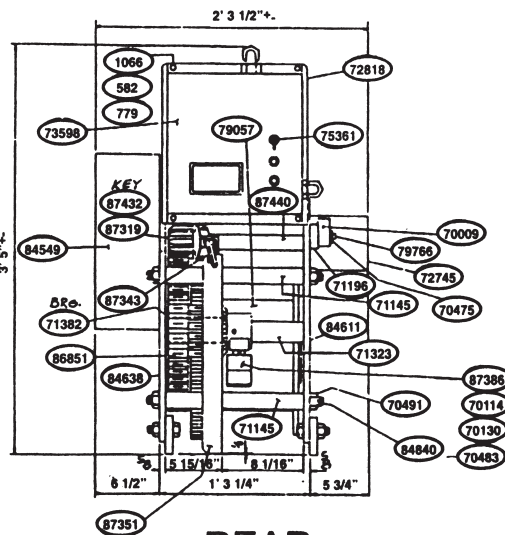
20 TON HYDRA - ELECTRIC WINCH



LEFT SIDE
ELEVATION

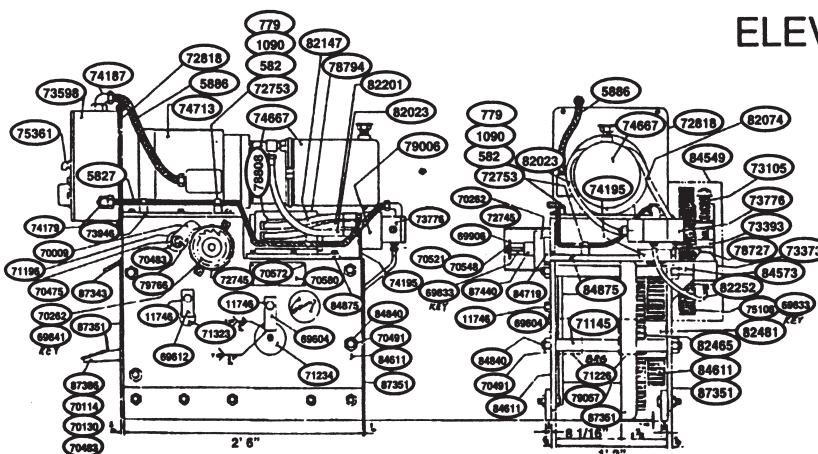


PLAN



REAR
ELEVATION

RIGHT SIDE
ELEVATION



FRONT
ELEVATION

Boudreaux meets a man on his Hawaiian vacation.

Boudreaux goes to Hawaii on vacation.

Down at de pool, a man sits down next to Boudreaux. Boudreaux says. "Hey, how you doing? My name is Boudreaux and I'm here on vacation. My house caught eetself on fire. I got a leettle extra from de insurance company. Dat's how I came here on dis vacation." "Well that's interesting," responded the man "I'm here from California. My house flooded. I used the extra insurance money for this vacation."

"Mais dats good," said Boudreaux "but let me axe you one ting. How de heck did you start de flood?"

20 TON HYDRA - ELECTRIC WINCH PARTS LIST

PART QTY DESCRIPTION

582	7	1/4" Hex Nut
752	17	3/8" Std. Lockwasher
779	14	1/4" Std. Lockwasher
1066	4	1/4" 0 x 3/4" Lg. Hex Head Cap Screw
1090	3	1/4" 0 x 3/4" Lg. Round Head Machine Screw
5827	1	9 Lin. Ft. TSGA-3 Marine Cable
5886	1	6 Lin. Ft. TTIB-10-N Marine Cable
11452	6	3/8" 0 x 1 1/4" Lg. Hex Head Machine Bolt
11460	8	3/8" a x 13/4" Lg. Hex Head Machine Bolt
11495	1	3/8" 0 x 2 1/4" Lg. Hex Head Machine Bolt
11746	2	5/8" 0 x 1" Lg. Hex Head Machine Bolt
14583	3	3/8" 0 x 1 1/2" Lg. Hex Head Machine Bolt
14591	8	1 1/2" 0 x 1 1/2" Lg. Hex Head Machine Bolt
69604	1	Keeper Plate
69612	1	Keeper Plate
69833	2	Key
69841	1	Key
69906	2	Washer
70009	1	Locking Pawl
70114	1	Brake Shoe Pin
70130	1	Brake Mounting Bracket Pin
70262	1	Locking Gear
70475	1	5/8" SAE Flat Washer
70483	2	1/8" 0 x 1" Lg. Cotter Pin
70491	8	7/8" Hex Nut
70521	2	1/2" 0 x 1" Lg. Hex Head Machine Bolt
70548	12	1/2" Std. Lockwasher
70572	4	#6 x 5/16" Lg. Drive Screw
70580	1	Name Plate
71145	4	Pipe Separator
71196	1	Locking Pawl Spacer
71226	2	Bearing
71234	1	Drum Gear Shaft
71323	1	Intermediate Shaft
71382	1	Bearing
72745	1	Drive Shaft Guard Assembly
72753	3	Stand Off Bracket
72818	1	Controller Mounting Plate
73105	1	Brake Assembly Spring
73393	1	Hydraulic Winch Brake Assembly
73598	1	C. H. Transformer Box
73776	1	Parker Hannifin 4-Way Valve
73946	1	Electric Motor Pump Base Plate

PART QTY DESCRIPTION

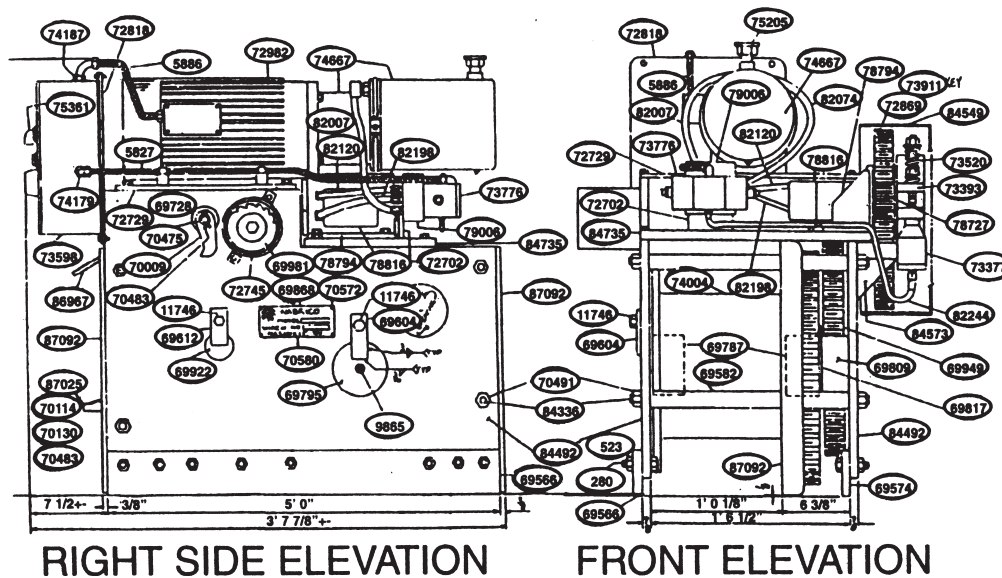
74713	1	Lincoln 7 1/2" H. F Motor
75108	1	Drive Gear
75361	1	C. H. Pushbutton Station
78727	1	Brake Assembly - 16 Teeth
78794	1	Hydraulic Motor Bracket
78808	1	Hydraulic Motor
79006	1	Aluminum Sub-Plate w/Relief Valve
79766	1	Locking Pawl Pin
82023	1	Hose Assembly - 20 RP (R.H.)
82074	1	Hose Assembly - 20 FIT (R.H.)
82147	1	Hose Assembly - 20 RA (R.H.)
82201	1	Hose Assembly - 20 RB (R. H.)
82252	2	Hose Assembly - 20 RLBL (R.H.& L.H.)
79057	1	Drum Assembly
82465	1	Washer
82481	1	Pipe Spacer
84549	1	Gear Guard Assembly (Right Hand)
84573	1	Hydraulic Brake Stub Post Assembly
84611	1	Right Side Plate Assembly
84638	1	Left Side Plate Assembly
84697	2	Sealmaster Ball Bearing
84719	1	Drive Shaft Spacer
84840	4	Pipe Separator Rod
84875	1	Hydraulic Motor Base Plate
86851	1	Drive Gear & Pinion Assembly w/Brake Drum
87319	1	Drive Pinion Hub Assembly
87343	1	Yoke Assembly
87351	1	Cable Guard Plate - Right Hand
87386	1	Foot Brake Assembly
87416	1	Intermediate Shaft Brake Drum
87432	1	Key
87440	1	Drive Shaft
	3	Jiffy 125 Cable Clamps Provided by Electric Shop

FOR LEFT HANDWINCH

82031	1	Hose Assembly - 20 LP (L.H.)
82104	1	Hose Assembly - 20LT (L.H.)
82155	2	Hose Assembly - 20 LAB (L.H.)
84530	1	Gear Guard Assembly (L.H.)
87483	1	Cable Guard Plate (L.H.)

probably from Louisiana if...

The four seasons in your year are: crawfish, shrimp, crab and King Cake.



40 TON HYDRA - ELECTRIC WINCH PARTS LIST

PART QTY.. DESCRIPTION

280	16	3/4" x 2 1/2" Lg. H/H Machine Bolt
523	16	3/4" Hex Nut
582	7	1/4" Hex Nut
752	1	3/8" Lockwasher
779	7	1/4" Lockwasher
1066	4	1/4"x 3/4" Lg. H/H Capscrew
1090	3	1/4"x 3/4" Lg. R/H Capscrew
5827	9	Lin. Ft. TSGA-3 Marine Cable
5886	6	Lin. Ft. TTIB-I O-N Marine Cable
9865	3	1/8" PTF Alemite Fitting
11495	1	3/8" x 2 1/4" Lg. H/H Machine Bolt
11592	8	1/2" x 2" Lg. H/H Machine Bolt
11746	2	5/8" x 1" Lg. H/H Machine Bolt
14591	16	1/2 x 1 1/2" Lg. H/H Machine Bolt
69566	1	Base Bar
69574	1	Base Bar
69582	4	Pipe Separator
69604	1	Keeper Plate
69612	1	Keeper Plate
69728	1	Locking Pawl Spacer
69787	2	Drum Gear Bearing
69795	1	Drum Shaft
69809	1	Pipe Spacer
69833	1	Key w/87009 & 70335
69868	1	Key w/87009 & 69981
69906	2	Washer
69922	1	Intermediate Shaft
69930	1	Intermediate Shaft Collar
69973	1	Drive Gear Pinion Bearing
69981	1	Locking Gear
70009	1	Locking Pawl
70114	1	Brake Shoe Pin
70130	1	Brake Mounting Bracket Pin
70475	1	Flatwasher
70483	3	1/8" x 1" Lg. Cotter Pin
70491	8	7/8" Hex Nut
70521	2	1/2" x 1" Lg. H/H Machine Bolt
70548	20	1/2" Lockwasher
70572	4	#6 x 5/16" Lg. Drive Screw
70580	1	Name Plate
72699	1	Retainer Ring
72702	1	Four Way Valve Mounting Plate
72729	1	Electric Motor Base Plate
72745	1	Drive Shaft Guard
72753	3	Stand Off Bracket
72818	1	Pushbutton & Controller Plate
72869	1	Drive Gear
72982	1	TEFC Electric Motor 10 HP
73377	1	Brake Cylinder
73393	1	Hyd. Winch Brake Assembly
73520	1	Brake Spring
73598	1	Transformer Box
73776	1	Four Way Valve

PART QTY DESCRIPTION

73911	1	Key w/87009 & 72869
74004	1	Drum Assembly
74012	1	Washer
74179	1	1/2" Cable Fitting
74187	1	3/4" Cable Fitting
74667	1	Power Pack Assembly
75205	1	Vent Cap
75361	1	Pushbutton Station
78727	1	Motor Pinion with Brake Drum
78794	1	Hydraulic Motor Bracket
78816	1	Hydraulic Motor
79006	1	Modular Aluminum Subplate
79774	1	Locking Pawl Pin
82007	1	Hose Assembly 40RP
82074	1	Hose Assembly 40RT
82120	1	Hose Assembly 40RA
82198	1	Hose Assembly 40RB
82244	1	Hose Assembly 40RLBL
84336	4	Pipe Separator Rod
84492	2	Side Plate
84549	1	Gear Guard Assembly
84573	1	' Brake Stub Post Assembly
84622	2	Sealmaster SFC-32 Ball Bearing
84700	1	Drive Shaft Spacer
84735	1	Hyd. Motor Base Plate
86878	1	Drive Gear & Pinion Assembly w/Brake Drum
86967	1	Yoke Assembly
87009	1	Drive Shaft
87025	1	Foot Brake Assembly
87092	1	Cable Guard Plate
87130	1	Key w/87149
87149	1	Drive Pinion

PARTS NOT SHOWN

20222	1	Starter (In Transformer Box)
70335	1	Handwheel Assembly
73725	3	Heater (In Transformer Box)
78913	2	Lifting Lug
82295	1	Fitting Kit
85073	1	Drive Shaft Pinion Spacer

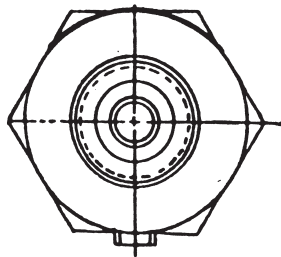
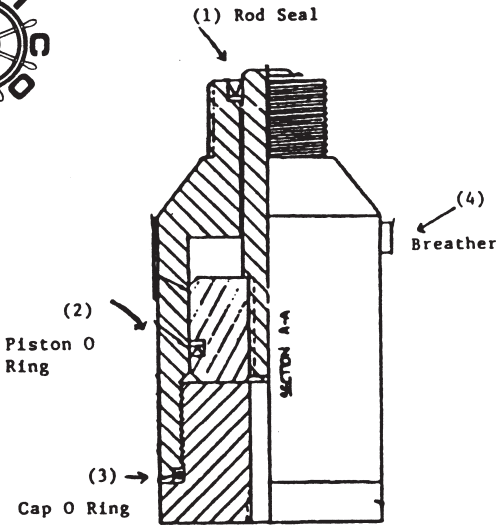
For Left Hand Winch

82015	1	Hose Assembly 40LP
82082	1	Hose Assembly 40LT
82139	2	Hose Assembly 40LAB
84530	1	Gear Guard Assembly
86908	1	Yoke Assembly
87181	1	Cable Guard Plate

HYDRAULIC BRAKE CYLINDER PART NO. 73377

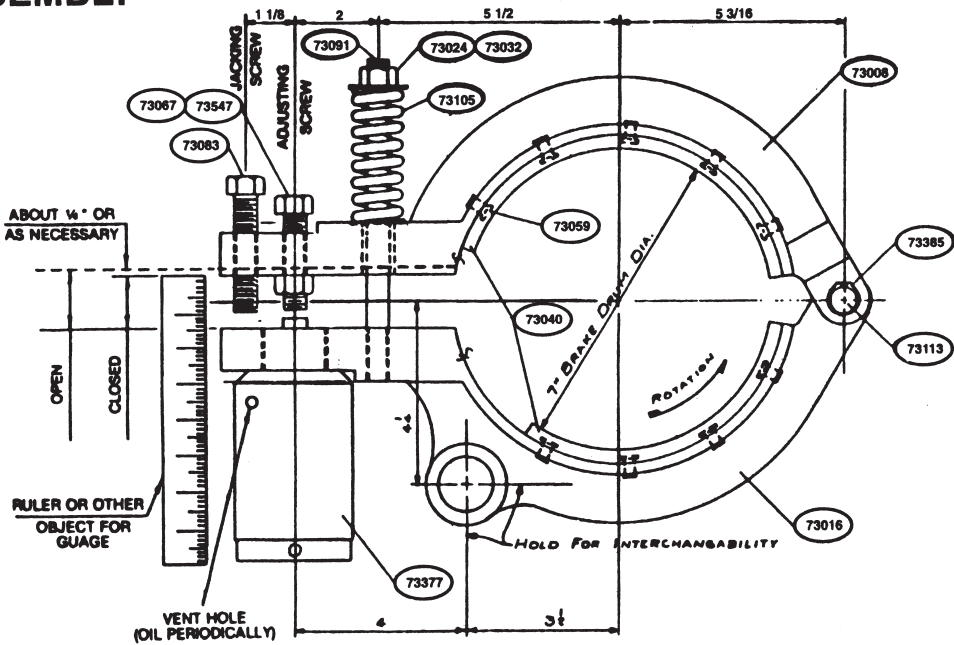


LIST OF MATERIALS		
Part No.	Quan.	Description
73008	1	Upper Band (Mn. Brz.)
73016	1	Lower Band (Mn. Brz.)
73024	1	1/2" O Hex Nut
73032	1	1" o Flat Washer
73040	1 Set	Brake Lining
73059	18	1/4" O x 5/8" Lg. Brass Rivet
73067	1	5/8" O x 2 1/2" Lg. Capscrew
73083	1	5/8" O x 2 3/4" Lg Capscrew
73091	1	1/2" O x 7 1/2" Lg. Stud
73105*	1	3lb. Spring 89111 Max. Working
73113	1	Brake Hinge Pin
73377	1	Hyd. Cylinder Ass'y.
73385	2	Industrial Retaining Ring 3100-67
73547	1	5/8" O Hex Nut



	CYLINDER WITH ROUND BOTTOM	QTY. REQ.	CYLINDER/W HEXAGONAL BOTTOM	QTY. REQ.
	part no.		part no.	
1	20915	1	20915	1
2	2-326	2	20923	1
3	01229	1	20931	1
4	21059	1	21059	1

BRAKE ASSEMBLY

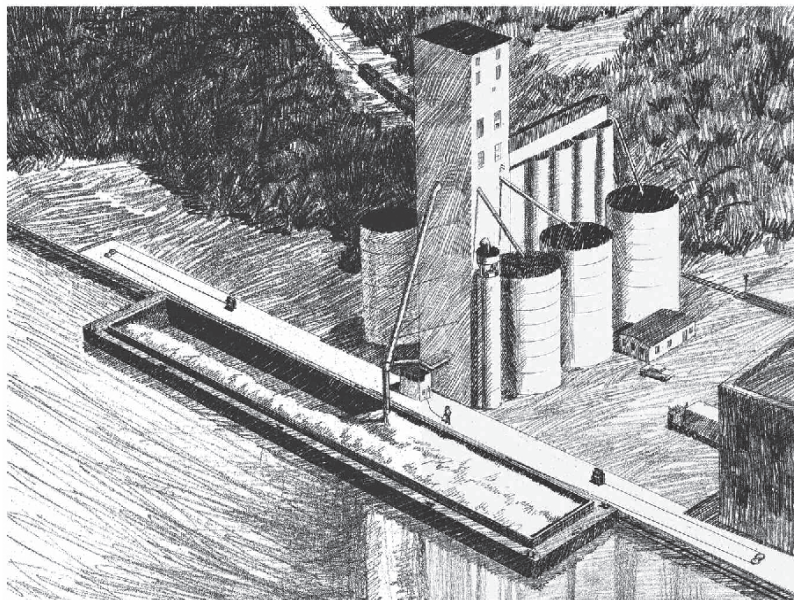


POSITIONING WINCH

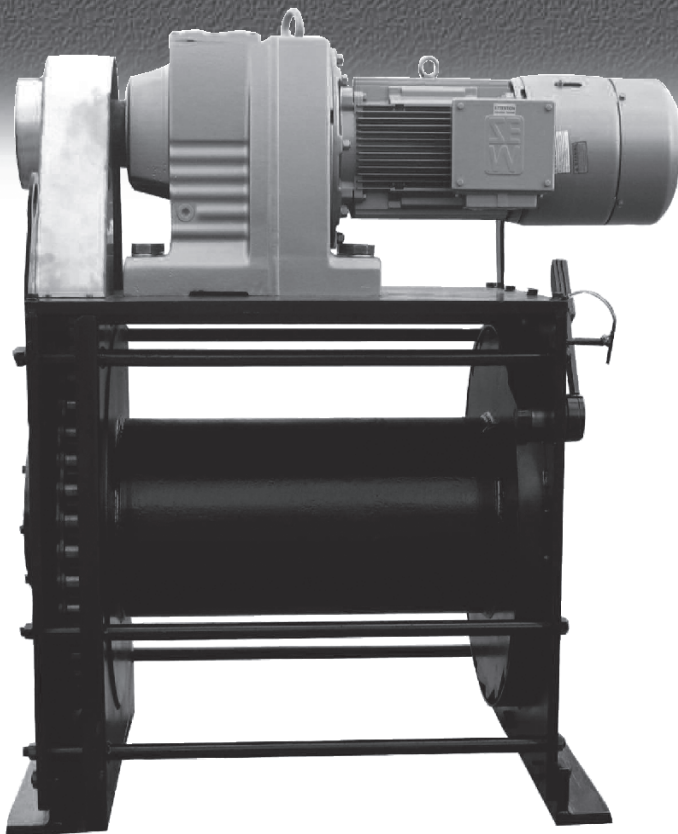
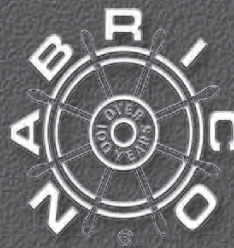
NABRICO's constant tension, all electric positioning winch system consists of two winches, two variable speed drives, variable speed motors, helical bevel gearboxes, failsafe brakes, PLC (programmable logic controls) and a solid state regen unit. These components have been engineered to allow one winch to be in a drive mode, pulling, while the other winch is in a torque mode, holding. When the object being positioned is at rest, both drives are in the torque mode, and the load holds its position on the dock, letting out cable during loading, and taking in cable during unloading. This also allows cable in and out as required during tide movement. The amount of torque/pull and speed on the cable is controlled by two potentiometers mounted on the control panel. The positioning winch system is capable of maintaining the full horsepower load at zero speed indefinitely. If there should be a loss of power or the emergency stop is pressed, the failsafe brakes hold the load.

NABRICO has utilized proven winch designs with the latest drive and touch screen technology. Adjustable ramps have been programmed into the system to minimize the shock on the cable and associated hardware that is a result of starting and stopping.

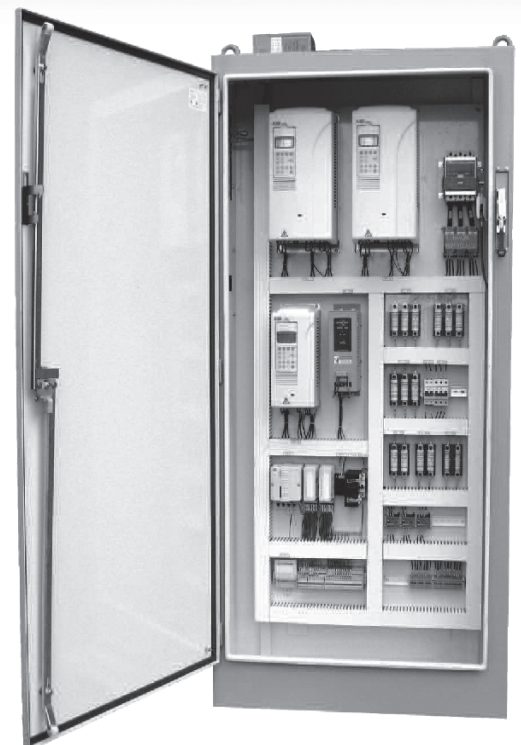
NABRICO pioneered the positioning winch system employing the most recent available technology. In addition to the standard model, the system is available in a larger, 50 horsepower model, and in a smaller 10 horsepower model. Using various motor and gearbox combinations, the line pull and speed can be changed, since the basic engineering in the panel and winch remain the same. The positioning winch has industrial, marine and rail applications.



NABRICO



36" Chain Drive Positioning Winch



Control Cabinet for Winches

NABRICO's most technologically advanced, backed by a tradition of recognizing and meeting the needs of the towing and transportation industries, provides an infinite number of line pulls and line speeds. Our standard model has a starting line pull of 24,000 lbs. with 16,000 lbs. continuous at 30 fpm. Drum capacity is generous, varying from 572 to 1328 feet, depending on the size of the cable. Accessible, clearly marked controls allow for remote or local operation. Wireless operators as an option.

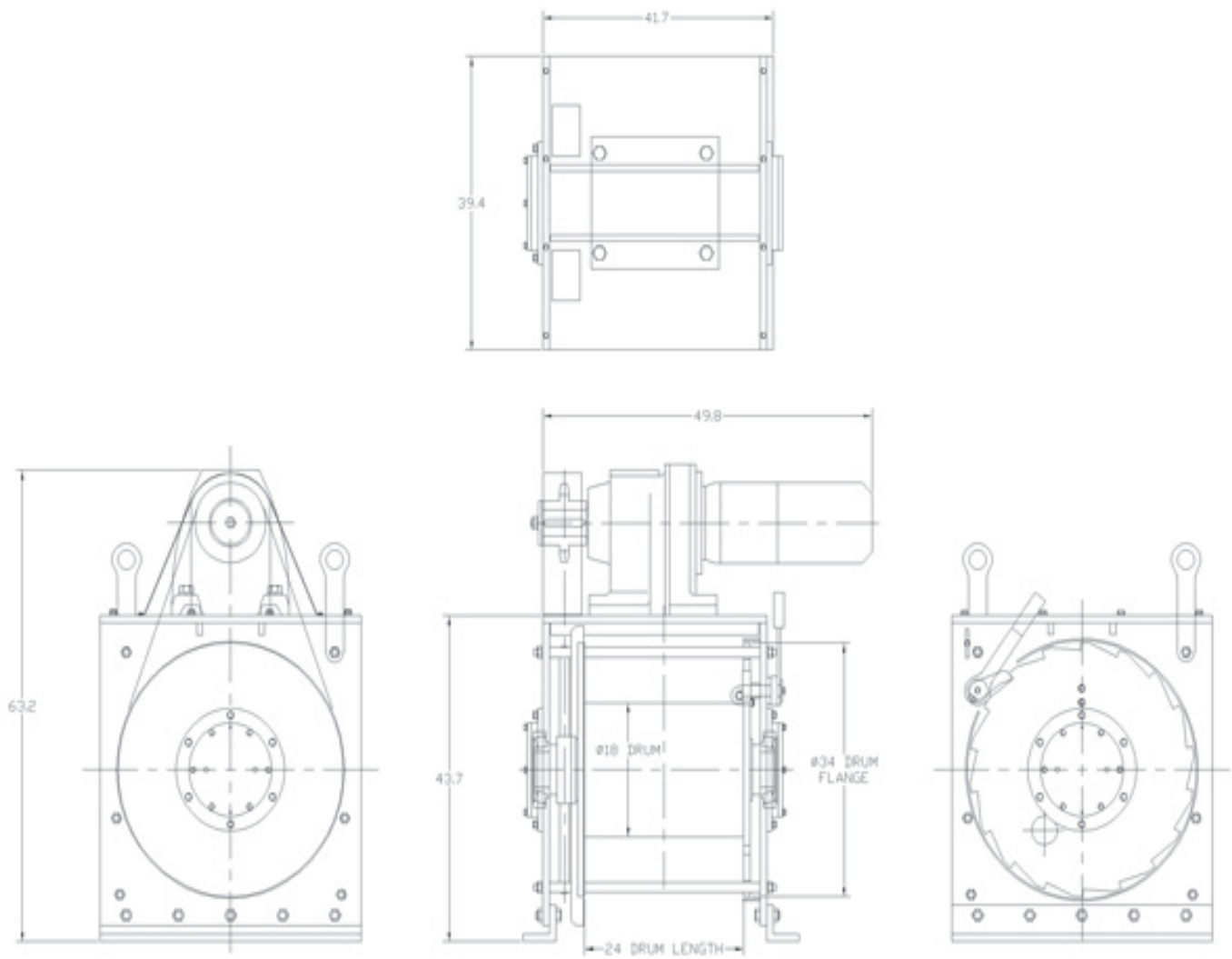


CABLE CAPACITY			LINE SPEED	LINE PULL
CABLE SIZE*	24" DRUM WIDTH	36" DRUM WIDTH		
3/4"	877	1328	Standard: Infinitely variable from 0-30 fpm. Custom application up to 100 fpm.	Standard: Infinitely variable line pull to 48,000 lbs. at motor stall; 24,000 lbs. starting and 16,000 lbs. continuous. Custom applications are available.
7/8"	768	1165		
1"	686	1043		
1 1/8"	623	948		
1 1/4"	572	872		

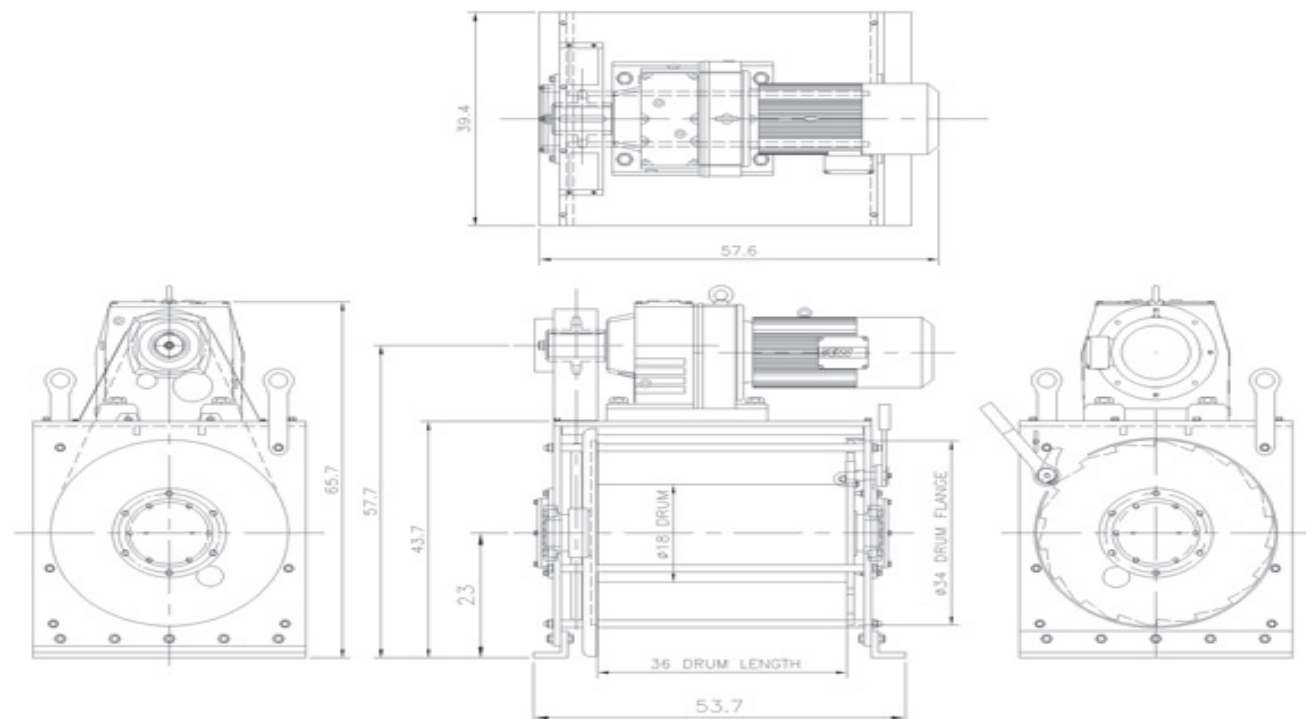
Note: These figures are based on uniform rope winding. The amount of tension applied when spooling the rope will also affect the length.

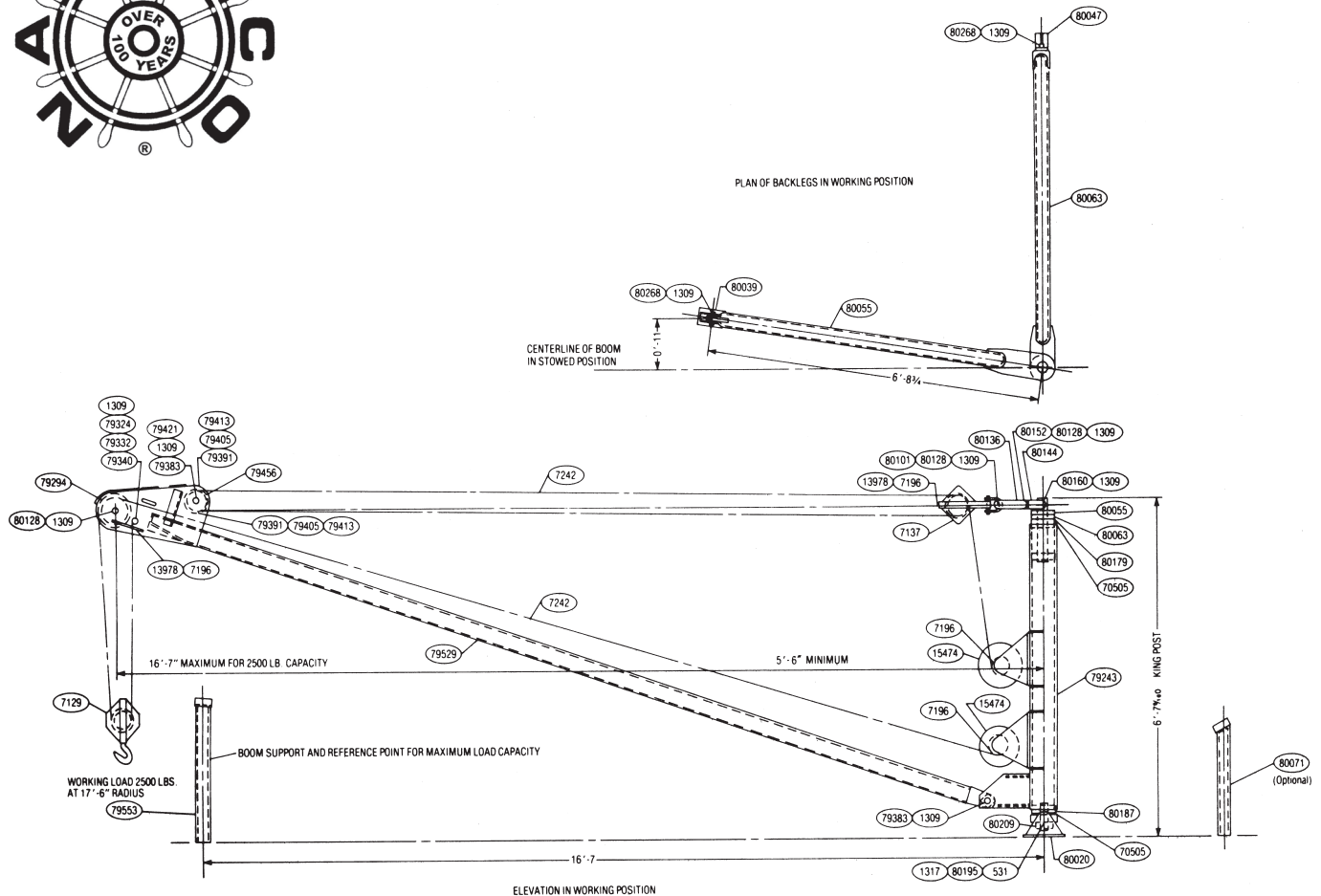
* Cable capacities are @ 5 layers.

NABRICO 24" BARGE MOVING WINCH



NABRICO 36" BARGE MOVING WINCH





NABRICO DF-126 BARGE CRANE

FEATURES

2500 pound non-shock lifting capacity at maximum radius of 16'-7". The barge crane operates equally as well at 5'-6" minimum radius.

270° swing capacity resulting in maximum flexibility for lifting and positioning equipment.

One man boom operation leaving other personnel free to position and secure load. Reduces time required for such tasks as hose connecting, removing pumping equipment for repairs and loading oil drums or miscellaneous equipment.

Low silhouette. By removing backleg pins, the crane king post folds down to height of 3'-10" to minimize low bridge problems.

Quality tested to 150% of non-shock working load.

SPECIFICATIONS

Boom and king post assembly

Plate ASTM A 36

Square Tubing ASTM A 36

Sheaves Cast iron, graphite
impregnated bronze bushing

Pins Cold rolled steel

Pipe ASTM A 53

WINCHES

Hand operated with adjustable handle

4:1 gear ratio for fast take up

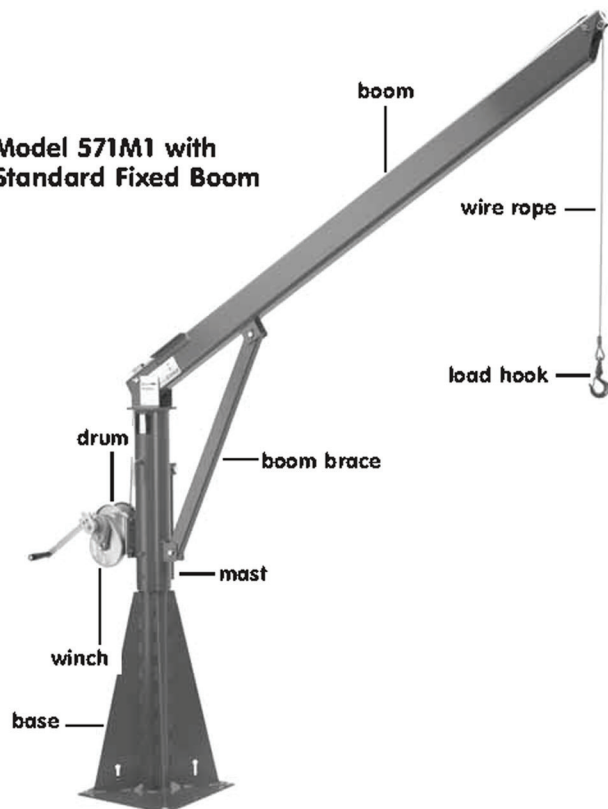
22:1 gear ratio for winching

Cam actuated brake with dual adjustment

Spring loaded holding dog

Oil impregnated bronze bearings

**Model 571M1 with
Standard Fixed Boom**



**Model 571M2 with
Adjustable Boom Option
(screw-jack sold separately)**

Series 571 and 572 Fre Rol Davit Cranes

Hand or Power Winch Operation
Up to 2200 lb capacity

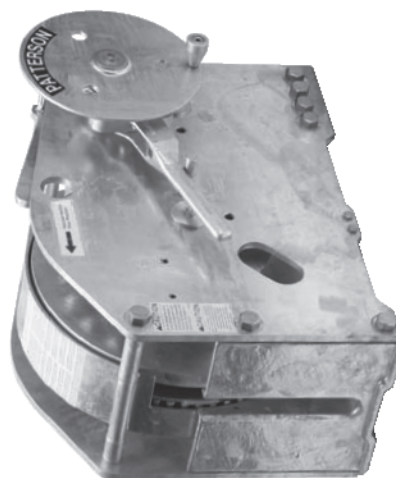
- **Hand Winch Operated Models** include spur gear or worm gear hand winch with brake for load control. Model 571M2 can be drill driven, 400 rpm max.
- **Power Winch Operated Models** include 115 volt 1 phase AC electric winch with pendant control and brake. Other power options available, please contact factory.
- **Fixed Boom** – Boom Position C
- **Adjustable Boom Option** – adjusts between Boom Position A and D – with hand operated ratchet style screw-jack, used to adjust height and reach.
Optional screw-jack sold separately.
- **Mast and Boom Rotate** on tapered roller bearings for smooth 360° load movement. Mast locks in one of four positions with hand tightened lock bolt. Handle on the mast makes rotation easy.
- **Gusset Style Base** for permanent installation and stability under load.
- **Epoxy Finish** available for improved protection against corrosion.
- **Wire Rope Assemblies** sold separately. See tables on following pages.
- **Two-year Limited Warranty**

Series 571 and 572 – Crane Configurations, Bases, and Options – Section 4

model	description	approx. ship wt.
571M1	up to 1500 lb – with M4312PB-K spur gear hand winch	425 lb
571M2	up to 1500 lb – with 4WM2V-K worm gear hand winch	450 lb
571E2	up to 1500 lb – with 4WP2-K electric winch – 115 VAC, 1 phase, 6 ft pendant control	475 lb
571E4	up to 1500 lb – with 4777-K electric winch – 115 VAC, 1 phase, 6 ft pendant control	489 lb
572M1	up to 2200 lb – with M452B-K spur gear hand winch	720 lb
572E3	up to 2000 lb – with 4771-K electric winch – 115 VAC, 1 phase, 6 ft pendant control	750 lb
572E5	up to 2200 lb – with 4WS3M6-K electric winch – 115 VAC, 1 phase, 6 ft pendant control (other configurations available, please contact factory)	1050 lb
SJ1	ratchet style screw-jack for Series 571 (replaces standard boom brace)	37 lb
SJ2	ratchet style screw-jack for Series 572 (replaces standard boom brace)	97 lb

In the 1950s, Patterson began the design and manufacture of towboat and barge winches, used to hold barges in a tow to the towboat and the barges to each other. Having started with just a handful of winch sizes, we now offer 20-ton to 90-ton capacity in manual, electric and hydraulic models. By listening to the needs of industry, design changes over the years have concentrated on making our customers' jobs safer, easier, faster. This is the brand promise we delivered then, and are still delivering today – nearly 60 years later.

BARGE CONNECTORS: The YoYo Winch



At Patterson, we have a single vision – to utilize our experience and expertise to innovatively create products that meet our customers' needs and requirements. The result is our latest patented YoYo winch – designed and proven to alleviate the problems you've been wrestling with for years.

What does that mean for you? It means no more spring coil. No more fouling. And no more problems created by uncontrolled spooling of wire rope on the drum.

Here are 10 reasons why you should be using the YoYo winch right now:

They're Safer:

1. Contained spring coil virtually eliminates injuries due to rope memory
2. Eliminates 'bird nesting' or 'fouling' of wire rope on the winch drum
3. Full gear shroud protects wire rope, gearing and operators

They're Easier:

4. Operation is simple for your crew and requires minimal, if any, guidance
5. Requires little or no re-tightening while the barge is underway
6. Easiest wire rope payout/pull-off in the industry
7. Easier to obtain higher line tension without exerting any additional effort

They're Faster:

8. Intuitive one-man operation
9. Patented double-dog design makes for easy maximum line tensioning
10. Fully open design makes the winch safe, easy and a pleasure to operate

Model Number	WWPYOYO
Ultimate Capacity	80,000 lbs.
Overall Width	22 3/4"
Overall Height	25 7/8"
Overall Length	35 13/16"
Typical Line Tension*	26,000 lbs.
Drum Capacities for:	
1"	25'
Weight – Net (lbs.)	1200
Weight – Shipping (lbs.)	1250

PATTERSON

SAFER. EASIER. FASTER.

BARGE CONNECTORS: The Strap Winch

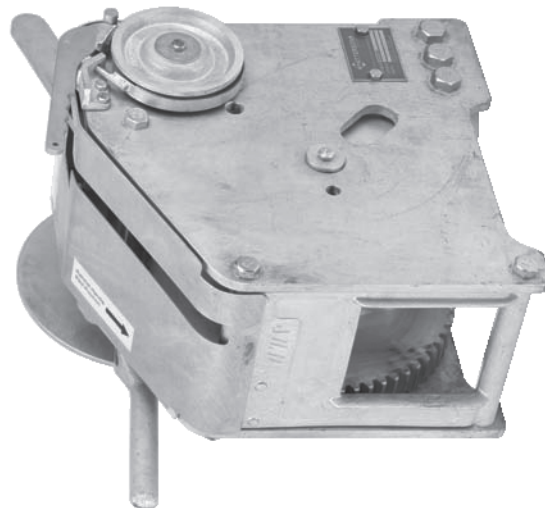


The patented Patterson Strap Winch boasts a fully open design with 360-degree swivel for ease of use and simplicity. Forget the 6- or 8-link chain – with the Patterson Strap Winch, all you need to do is to connect the web to a standard barge wire thimble, put the web into the slot of the drum, use the hand wheel to take up the slack, use the ratchet handle for final tensions, and you're ready to get underway.

Its fully-shrouded gearing is designed to protect the webbing, which is extremely lightweight, doesn't require tools to install, stays flexible in cold or icy weather, and is designed to float. With the Patterson Strap Winch, you won't have to worry about spring coil effect or "fish hooks," wild strands or burns. Our patented design makes your job safer, easier and faster than ever before!

Model Number	WWP40WEB
Ultimate Capacity	80,000 lbs.
Typical Line Tension*	14,000 lbs.
Drum Capacities for:	
6" web	14'
Overall Width	20 3/4"
Overall Height	23 3/4"
Overall Length	23 3/8"
Weight – Net (lbs.)	442
Weight – Shipping (lbs.)	490

BARGE CONNECTORS: The BC-40 Winch

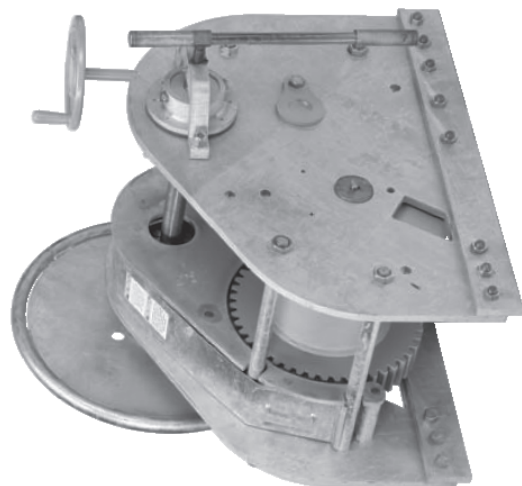


The BC-40 winch is designed for speed, durability and safety. This winch, which enables you to make-up or break-up a tow in half the time of conventional rigging using ratchets, chains, and wires, is designed and manufactured with our top-of-the-line, hot-dipped galvanizing corrosion package.

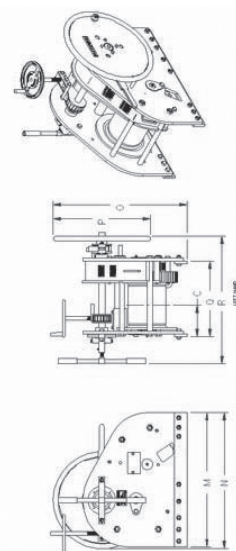
- Patented double dog design for higher line tension
- Patented open bottom design for easy clean-out
- Stud mount allows for 360 degree operation
- Heavy-duty throw-out handle for easy, fast and safe load release
- Hand brake for controlled load release
- Spinner knob on compact hand wheel for fast take-up
- Ratchet handle for final tension
- Fully shrouded
- Also available as a weld down unit

Model Number	WWP40BC
Ultimate Capacity	80,000 lbs.
Typical Line Tension*	10,000 lbs.
Drum Capacities for:	
3/4"	95'
7/8"	85'
1"	70'
Overall Width	19 3/8"
Overall Height	23 3/4"
Overall Length	23 5/16"
Weight – Net (lbs.)	442
Weight – Shipping (lbs.)	490

BARGE CONNECTORS: The Manual Winch Series



Patterson's hand winches are designed to offer top-quality and efficiency. Our winches are available from 20- to 75-ton capacities. Galvanized winches are available for optimal corrosion protection. A saltwater option is also available.

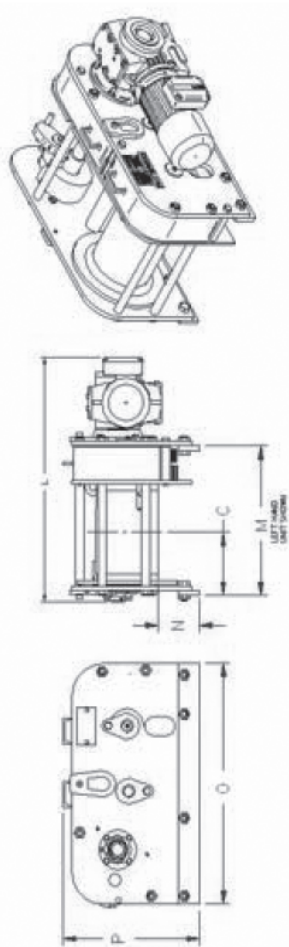


TONNAGE DRUM WIDTH HAND WWP 20 M 10 P R POWER FINISH									
Performance Data* approximate (lbs.)				Drum Capacities* approximate					
	Ultimate Capacity	Break Holding Cap	Max. Line Tension	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"
WWP 20M-6	40,000	40,000	5200	220'	140'	100'	xx	xx	xx
WWP 30M-10	60,000	60,000	6600	xx	120'	85'	65'	xx	xx
WWP 40M-12	80,000	80,000	8,000	xx	xx	180'	130'	100'	xx
WWP 65M-14	130,000	130,000	11,000	xx	xx	xx	230'	180'	150'
WWP 75M-10	150,000	150,000	12,000	xx	xx	xx	xx	190'	150'

	Dimensions* approximate (in.)						(lbs.)	
	Drum Diameter	C	M	N	O	P	Weight Net	Approximate Shipping
WWP 20M-6	8.62	5.81	15	5.5	35	32.75	600	640
WWP 30M-10	10	8.81	19	4.87	35	34.25	750	800
WWP 40M-1	10	9.19	24.5	4	37	3.5	1,105	1,155
WWP 65M-14	14	10.75	25.75	5.5	40	148	1,705	1,755
WWP 75M-10	16	8	22.25	8.25	45	52	2,000	2,080

TONNAGE HP VOLTAGE HAND WWP 40 E - 5.0 - 14 - 230 - G - R POWER DRUM WIDTH FINISH											
Performance Data* approximate (lbs.)							Drum Capacities* approximate				
Dog Holding Capacity	Breke Holding Capacity	Line Pull 1st Wrap	Line Speed 1st Wrap	Stall Pull 1st Wrap	Ult Shock Load		1/2"	5/8"	3/4"	7/8"	1" 1 1/8"
WWP 20E-3.0	40,000	43,000	6987	14.7	20,900	40,000	220'	140'	100'	xx	xx
WWP 30E-3.0	60,000	47,000	7600	13.4	23,000	60,000	xx	120'	85'	75'	xx
WWP 30E-5.0	60,000	33,000	9000	18	33,000	60,000	xx	120'	85'	75'	xx
WWP 40E-5.0	80,000	40,000	9,000	14.5	24,000	80,000	xx	xx	180'	130'	100'
WWP 40E-7.5	80,000	75,000	8,900	18	40,500	80,000	xx	xx	180'	130'	100'
WWP 65E-7.5	130,000	99,000	13,000	14	36,000	130,000	xx	xx	xx	230'	180'
WWP 65E-12.5	130,000	80,000	16,000	24	47,000	130,000	xx	xx	xx	230'	180'
WWP 75E-12.5	150,000	90,000	19,00	21	54,000	150,000	xx	xx	xx	xx	190'
Dimensions* approximate (in.)							(lbs.)				
Drum Diameter	C	M	N	O	P		Weight Net	Approximate Shipping			
WWP 20E-3.0	8.62	5.81	14.75	6.5	35	32.5	830	880			
WWP 30E-3.0	10	8.81	19	5 67/77	35	32 32/33	1,015	1,065			
WWP 30E-5.0	10	8.81	19	5 67/77	35	32 32/33	1,020	1,070			
WWP 40E-5.0	10	9.19	24.5	5.16	37	40.15	1,415	1,465			
WWP 40E-7.5	10	9.19	24.5	5.16	37	40.15	1,430	1,480			
WWP 65E-7.5	14	10.75	25.75	6.5	38	48	2,140	2,190			
WWP 65E-12.5	14	10.75	25.75	6.5	38	48	2,150	2,200			
WWP 75E-12.5	16	8	22.25	8.25	45	52	2,400	2,450			

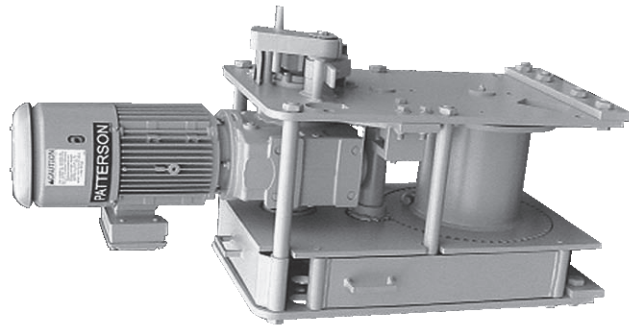
- Manual locking dog for emergency use
- The Low-Profile electric winches provide high-line speed and high-line pull
- This series of winches range from 20-ton through 90-ton capacities
- The Low-Profile winch design has fewer parts creating lower maintenance
- Full rope guard to protect the wire rope from being fouled by the gearing
- Full gear shroud to protect gearing and help provide personal protection
- Units available in right- or left-handed models
- Motor sizes range from 3 HP to 12.5 HP, 208 Volt, 230/460 Volt, 3 phase with thermostat relays
- Galvanized winches for optimal corrosion protection available



TONNAGE										HP		TYPE		FINISH	
WWP 40E - 5.0 - 14 - LP - 230 - G - R															
POWER										DRUM WIDTH		VOLTAGE		HAND	
Performance Data* approximate (lbs.)										Drum Capacities* approximate					
Dog Holding Capacity	Brake Holding Capacity	Line Pull 1st Wrap	Line Speed 1st Wrap	Stall Pull 1st Wrap	Ult Shock Load	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"				
WWP 20E-3.0	40,000	24,500	3,400	27	10,000	40,000	220'	140'	100'	xx	xx				
WWP 30E-5.0	60,000	26,000	7,200	19	18,700	60,000	xx	120'	85'	65'	xx				
WWP 40E-5.0	80,000	22,000	6,000	23	15,800	80,000	xx	xx	180'	130'	100'				
WWP 40E-7.5	80,000	37,800	9,600	26.5	26,600	80,000	xx	xx	180'	130'	100'				
WWP 65E-7.5	130,000	39,000	10,000	25.5	27,600	130,000	xx	xx	xx	230'	180'				
WWP 75E-12.5	150,000	77,000	16,000	24.5	41,000	150,000	xx	xx	xx	xx	190'				
Dimensions* approximate (in.)										(lbs.)					
Drum Diameter	C	M	N	O	L	P	Weight Net	Approximate Shipping							
WWP 20E-3.0	8.62	5.66	13.5	7	35	26.62	22.1	830	830						
WWP 30E-5.0	10	7.5	17.62	6.5	35	31	21.94	1,020	1,020						
WWP 40E-5.0	10	9.72	23	6.66	37	37.5	21.96	1,415	1,415						
WWP 40E-7.5	10	9.72	23	6.66	37	38.02	21.96	1,430	1,430						
WWP 65E-7.5	14	9	23.75	7.25	40	38	30.28	2,140	2,140						
WWP 75E-12.5	16	10	28.75	8	45	51.61	38	2,400	2,400						

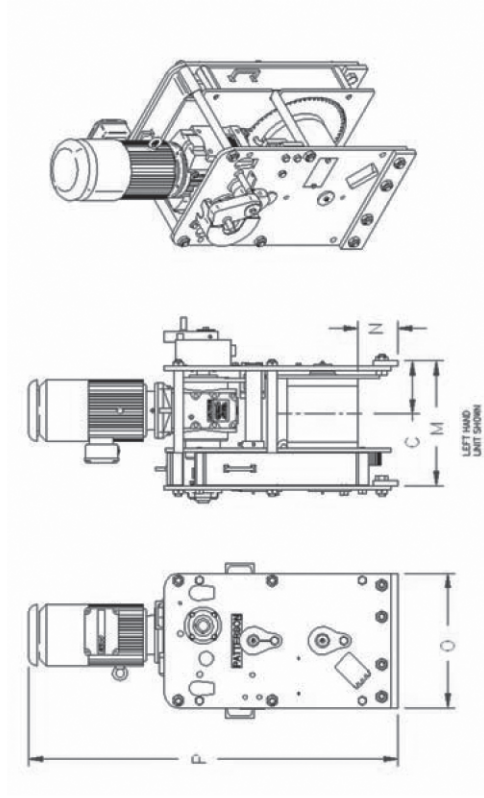
TOWBOAT WINCHES: The Upright Winch

PATTERSON
SAFER. EASIER. FASTER.



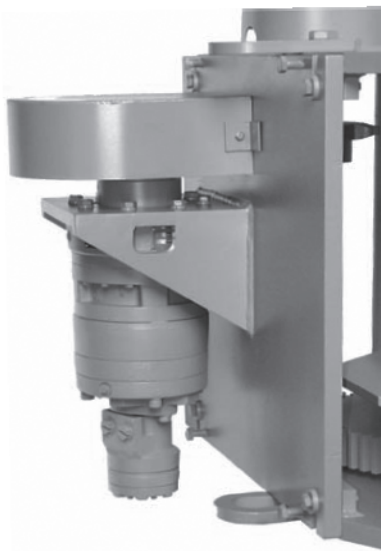
When deck space is limited, the Patterson Upright Winch is your solution.

- Manual locking dog for emergency use
- The Upright electric winches provide high-line speed and high-line pull
- This series of winches range from 20-ton through 90-ton capacities
- The Upright winch design has fewer parts creating lower maintenance
- Full rope guard to protect the wire rope from being fouled by the gearing
- Full gear shroud to protect gearing and help provide personal protection
- Units available in right- or left-handed models
- Motor sizes range from 3 HP to 12.5 HP; 208 Volt, 230/460 Volt, 3 phase with thermostat relays
- Galvanized winches for optimal corrosion protection available



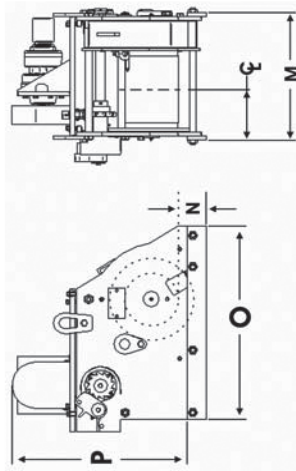
TONNAGE												HP		TYPE				FINISH																					
WWP 30 E												5.4		10				U				230				G				R									
POWER												DRUM WIDTH				VOLTAGE				HAND																			
Performance Data* approximate (lbs.)																Drum Capacities* approximate																							
Dog Holding Capacity				Brake Holding Capacity				Line Pull 1st Wrap				Line Speed 1st Wrap				Stall Pull 1st Wrap				Ult Shock Load				1/2"		5/8"		3/4"		7/8"		1"		1 1/8"					
WWP 30E-5				60,000				46,800				10,800				16				30,300				60,000				xx		120'		85'		65'		xx		xx	
Dimensions* approximate (in.)																(lbs.)																							
Drum Diameter				C				M				N				O				P				Weight Net				Approximate Shipping											
WWP 30E-5				10				7.5				17.62				5.62				19				52.14				640				690							

TOWBOAT WINCHES: The Fully Hydraulic Winch



The Patterson Fully Hydraulic Winch is designed for durability and ease of operation. Our hydraulic winches are available from 20- to 90-ton capacities. Galvanized winches for optimal corrosion protection are also available.

- Optional saltwater-corrosion protection package includes stainless steel shafts, nuts and bolts, hot-dipped galvanized, and anti-seize on all threads or fasteners
- Disc brake is motor-mounted, fully enclosed, spring-applied and hydraulically released
- Manual locking dog for emergency use
- Vary take-up speed simply by varying input flow
- Heavy-duty roller chain and sprockets
- Heavy-duty roller bearings, high-strength phosphor bronze bearings
- Operates from vessel's existing hydraulic system
- High-efficiency planetary gear head
- Bolted keeper plate allows fast, easy shaft removal
- Rope and gear guards protect wire rope and enclose the gearing
- Brake, shuttle valves and controls available upon request



	Performance Data* approximate (lbs.)				Drum Capacities* approximate					
	Brake/Dog Holding Capacity	Line Speed 1st Wrap	Stall Pull 1st Wrap	Hydraulic Supply	1 1/2"	5/8"	3/4"	7/8"	1"	1 1/8"
WWP 20H-6-L/R	40,000	21	15,000	16 GPM at 2,000 psi	220'	140'	100'	xx	xxx	xxx
WWP 30H-10-L/R	60,000	20	19,000	20 GPM at 2,000 psi	xx	120'	85'	65'	xx	xx
WWP 40H-14-L/R	80,000	21	20,000	20 GPM at 2,250 psi	xx	xx	180'	130'	100'	xx
WWP 50H-14-L/R	100,000	22	21,000	20 GPM at 2,250 psi	xx	xx	180'	130'	100'	xx
WWP 65H-14-L/R	130,000	16	27,000	20 GPM at 2,250 psi	xx	xx	xx	230'	180'	150'
WWP 75H-10-L/R	150,000	12	37,000	20 GPM at 2,250 psi	xx	xx	xx	xx	190'	150'

	Dimensions* approximate (in.)							(lbs.)	
	Drum Diameter	Drum Width	C/L	M	N	O	P	Net	Shipping
WWP 20H-6-L/R	8.625	6.875	5.8125	15	5.5	35	32.75	800	850
WWP 30H-10-L/R	10	10	8.8125	19	4.875	35	32.75	1,000	1,050
WWP 40H-14-L/R	10	14.375	9.1875	24.5	4	37	38.5	1,400	1,450
WWP 50H-14-L/R	10	14.375	9.1875	24.5	4	37	40	1,450	1,500
WWP 65H-14-L/R	14	14	10.75	25.75	5.5	40	48	2,125	2,175
WWP 75H-10-L/R	16	10	8	22.25	8.25	45	52	2,375	2,475



Shur-Worm Worm Gear Series 750-3000 lb Capacity

Models W2, W5, W10

Intended for intermittent hand use; not recommended for power operation

- Open worm gear design
- Ductile iron frames
- Cast iron drums
- Cast steel worm gears
- Steel shafts
- Steel lock-on operating handles
- Optional gear cover

Models W100-3, W100-6, and W200-5

Intended for heavy duty hand use; not recommended for power operation

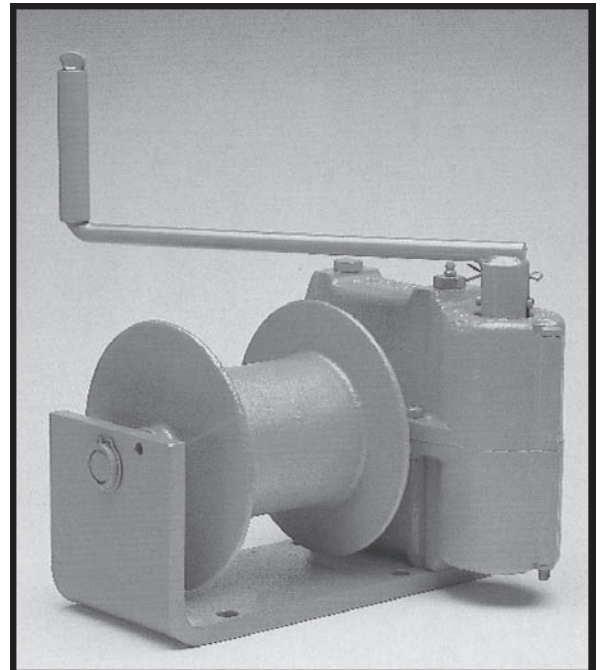
- Fully enclosed worm gearing
- Steel frames
- Precision machine cut steel worm
- Bronze worm gear
- Free spooling

Models W100-3P, W100-6P, and W200-5P

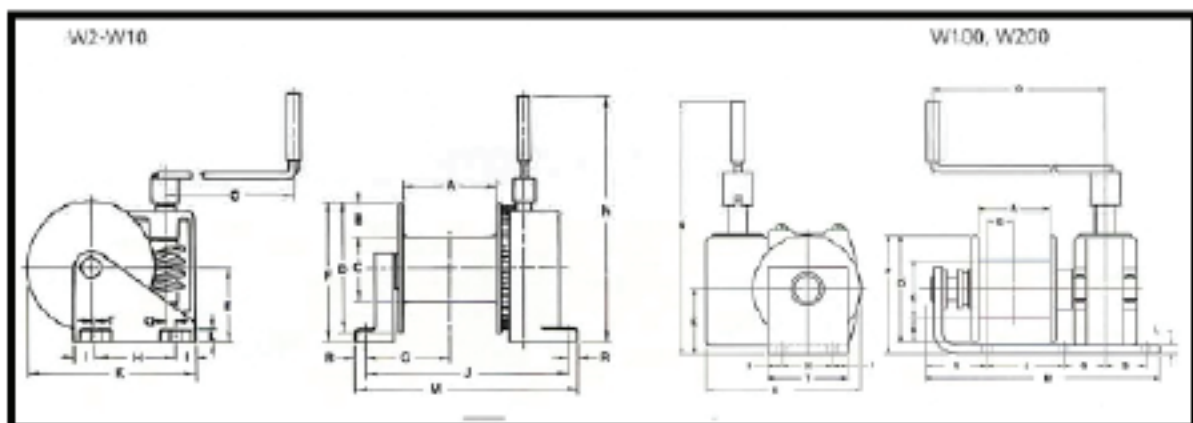
Intended for heavy duty hand use or convertible for intermittent power use

• All the outstanding features of the fully enclosed 100 series hand models plus:

- Anti-friction ball bearings and internal friction device makes models suitable for intermittent power operation
- Unit not furnished with free spooling features



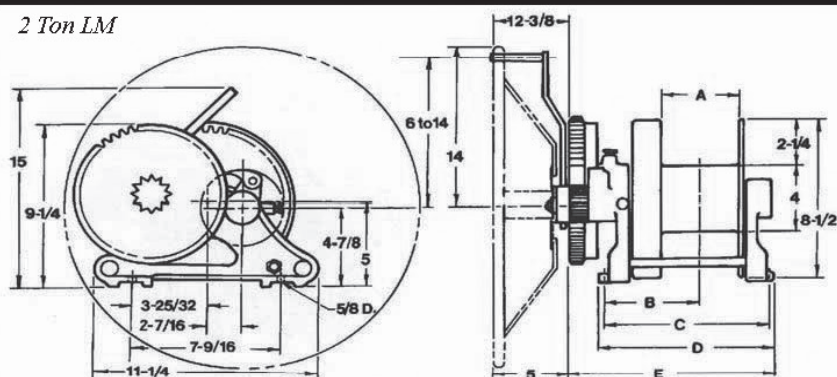
W100-6 Shur-Worm



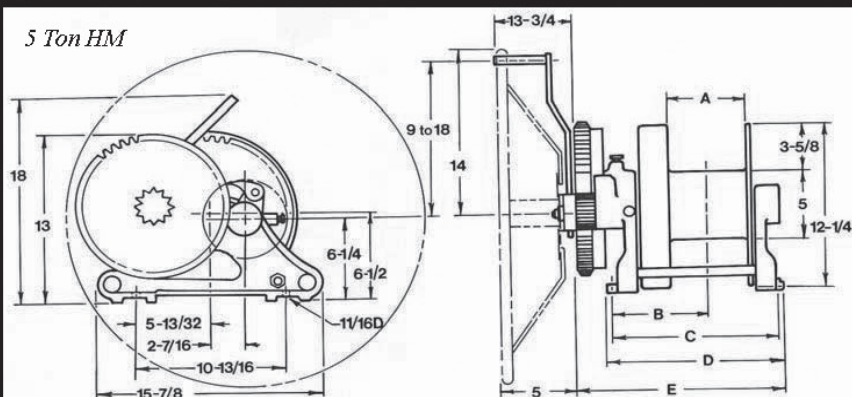
Still think you are having a Bad Day?

A woman came home to find her husband in the kitchen shaking frantically, almost in a dancing frenzy, with some kind of wire running from his waist towards the electric kettle. Intending to jolt him away from the deadly current, she whacked him with a handy plank of wood, breaking his arm two places. Up to that moment, he had been happily listening to his Walkman.

2 Ton LM



5 Ton HM



Spur gear series 2 and 5 Ton Dimensions

Model No.	A In.	B In.	C In.	D In.	E In.
LM6 LM6W	6	5 7/8	10 3/4	12 1/4	14
LM10 LM10W	10	7 3/4	14 5/8	16 1/4	18
LM16 LM16W	16	10 3/4	20 5/8	22 1/4	24
HM8 HM8W	8	7 7/8	13 7/8	15 3/8	17 3/4
HM12 HM12W	12	9 1/4	17 3/4	19 1/4	21 1/4
HM16 HM16W	16	11 1/2	22 1/4	23 3/4	25 3/4
HM24 HM24W	24	16 3/4	30 1/4	31 7/8	33 3/4

**The LM and HM Series
"All Steel" hand winches
are designed for marine duty
and industrial use.**

NOTE: Dimensions are subject to change. Please contact factory for certified prints.

Superior Value - Wintech Reliability / Quality

**OPTIONAL
HAND WHEEL
AVAILABLE**



What? STILL having a Bad Day?

Iraqi terrorist Hay Rahnajet didn't pay enough postage on a letter bomb. It came back with "Return to Sender" stamped on it. Forgetting it was the bomb, he opened it and was blown to bits.

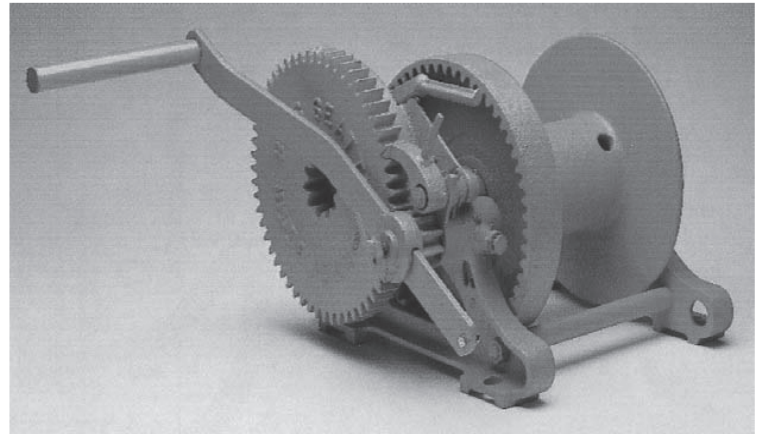
SPUR - GEAR SERIES 2 & 5 TON

Standard Features

Cast steel drum and ring gear
Steel load bearing components, cast steel frames
Replaceable bronze bushings
One piece fully adjustable 14" long steel operating handle with pinion
Spring loaded holding dog with release handle
Hand operated, adjustable holding brake
Easy free spooling
Two speed gear change offers fast cable take up and easier winching

Optional Features

Description	LM	HM
28" diameter hand wheel	1580-2	1580-1
Hand wheel for units with Disc brake handle (SHB)	3628	3628
Extended shaft pinion 17/16" X 12"	2833	991
Power Drive Pinion **	1942	1948
Gear covers	250-B	249
Disc brake handle	3679	3677
Marine 812 top coat		
Reverse dog assembly		
Drum divider flange		



5 Ton HM 12

Optional disc brake handle incorporates a "Weston" style load brake to automatically hold the rated load in lifting applications

Designed for Marine and Industrial Use

Spur gear series 2 and 5 Ton Specifications									
Model No.	Capacity 1st Layer US Tons*	Gear Ratio	Drum Capacities (ft)						Shipping wt y(lbs)
			1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	
LM6 LM6W	2	4:1/24:1	278	182	133	97	66	-	63 69
LM10 LM10W	2	4:1/24:1	464	300	222	161	111	-	77 88
LM16 LM16W	2	4:1/24:1	742	480	355	257	177	-	93 104
HM8 HM8W	5	4:1/24:1	-	-	358	284	220	123	123 135
HM12 HM12W	5	4:1/24:1	-	-	537	425	330	185	131 151
HM16 HM16W	5	4:1/24:1	-	-	716	566	440	247	142 166
HM24 HM24W	5	4:1/24:1	-	-	1075	850	660	371	163 174

Note: Not recommended for power operation.

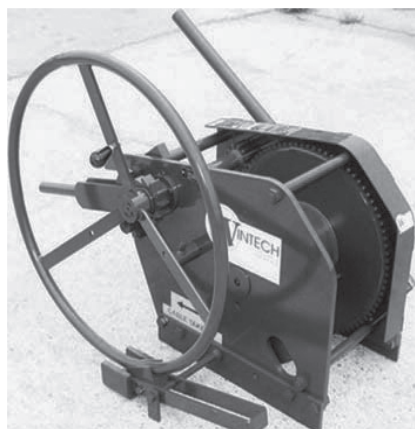
Warning: Accessory drive pinion is intended only for faster cable take-up by user with no load, and should never be used for power driven winch or hoist

Warning: Before installation see maintenance and operations manual for additional warnings and precautions. This equipment is not to be used for lifting, supporting, or transporting people, or lifting or supporting loads over people.

y "W" at the end of the model no. indicates unit is equipped with a hand wheel.

STILL think you're having Bad Day?

Two animal rights defenders were protesting the cruelty of sending pigs to a slaughterhouse in Bonn, Germany. Suddenly, all two thousand pigs broke loose and escaped through a broken fence, stampeding madly. The two helpless protesters were trampled to death.



20 - 90 Ton Holding Capacity

STANDARD FEATURES:

- Additional tightening power from ratchet lever bar.
- Quick release holding dog, automatically disengages when not in use.
- Spinner knob on hand wheel for fast slack line take-up.
- Steel gear guard provides operator protection; prevents slack cable from fouling gears.
- Foot brakes control and prevent overrunning and birdnesting of wire rope.

OPTIONAL FEATURES:

- Wider drums, angle deck brackets, disengaging clutch.
- Wintech Winch Cables

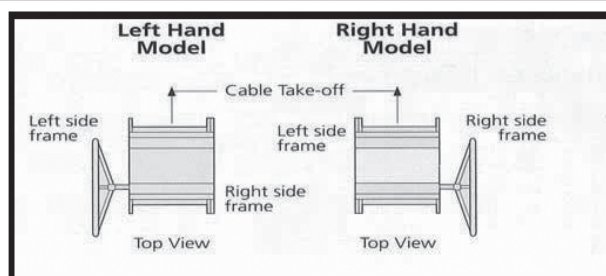
Built To Last Low-Profile to Keep the cable low on the "bitts" and the deck

Low-Profile manual barge winch specifications								Drum Options		
Model No.	Rated capacities (US Tons)			1st Layer	Drum	Shipping Weight (lbs)	Cubic feet	Capacity (US Tons)	Dimensions (Inches)	
	Dog Holding	Tightening		Gear Ratio	Diameter (in.)				Standard Drums	Wider Drums
		Hand	Ratchet							
20HL	20	3	5	7:1	8 5/8	600	18.0	20 ton	10	17, 24, 36, 48
25HL	40	5	10	14:1	10 3/4	650	22.0	40 ton	9	17, 35, 51, 69
50HL	65	7.5	15	20:1	12 3/4	1175	34.0	65 ton	11	20, 41, 61, 82
75HL	90	10	20	31:1	16	1880	37.0	90 ton	10	20, 40, 61, 81

Note: All models are shown with "L" designating left hand models; for right hand models, substitute "R" for "L" in

20HL-8 5/8" Drum diameter					25HL-10 3/4" Drum diameter					50HL-12 3/4" Drum diameter					75HL-16" Drum diameter				
Length (in.)	Drum Capacity (ft)				Length (in.)	Drum Capacity (ft)				Length (in.)	Drum Capacity (ft)				Length (in.)	Drum Capacity (ft)			
	5/8 in.	3/4 in.	7/8 in.	1 in.		5/8 in.	3/4 in.	7/8 in.	1 in.		5/8 in.	3/4 in.	7/8 in.	1 in.		5/8 in.	3/4 in.	7/8 in.	1 in.
10*	380	275	194	132	9*	248	162	142	88	11*	194	174	110	100	10*	119	108	98	56
17	650	470	330	225	17	479	314	277	174	20	377	338	216	197	20	247	225	207	119
24	915	650	460	317	35	975	643	568	359	41	773	694	445	408	40	523	478	441	254
36	1370	975	690	476	51	1472	971	865	544	61	1168	1051	674	619	61	798	731	675	390
48	1830	1300	920	634	69	1969	1299	1151	729	82	1564	1407	903	830	81	1074	983	909	525

*Standard length of drum (drum lengths are rounded to the nearest inch)



Rule of Thumb: Right or left hand models are determined by which side of the winch the handwheel is mounted on. As illustrated right, standing behind the winch, facing the cable take-off direction is the proper orientation for determining right or left hand requirements.

40-TON BARGE CONNECTOR WINCH



Specifications

Performance:

Ultimate Capacity.....80,000 lbs.

Ratchet Tightening Capacity.....10,000 lbs.

Drum Capacity:

3/4"90 feet

7/8"85 feet

1"70 feet

Dimensions and Weight:

Overall Length25-1/2"

Overall Width17"

Overall Height.....21-1/2"

Overall with Deck Pivot Pin.....443 lbs.

The time savings and speed in making up tows with winches instead of ratchets is useless if you have to maintain or repair it with every use. The Model BC-40 Barge Connector has been designed to use, not maintain. The winch features high capacity grease free synthetic bearing and a simple counterweight type ratchet without springs to minimize routine maintenance in the abusive waterways environment. The operation of the winch for both tightening and releasing the loads have been engineered for optimum user ergonomics and safety. From the ideal positioning and engagement of the ratchet lever controlled cable release brake the BC-40 is designed for easy operation.

FEATURES:

- Low Profile Compact Design Saves Deck Space.
- Hand Lever Operated brake for Controlled Load Release.
- Hand Wheel with Spinner Knob for Fast Take-up.
- Ratchet Lever for Final Tensioning.
- Machine Cut Gearing with Protective Guarding.
- High Capacity Synthetic Bearings on Drive and Drum Shafts.
- Connector Pin and Yoke Allows 360 Degree Rotation.
- Unique Pivot Pin Mounting (No D-Ring Required).
- Front Mounted Rope Guard Aligns Cable with Drum

NOTE: Dimensions are subject to change.

Please contact factory for certified prints.





Profile Barge Winch 40 - 90 Ton Holding Capacity

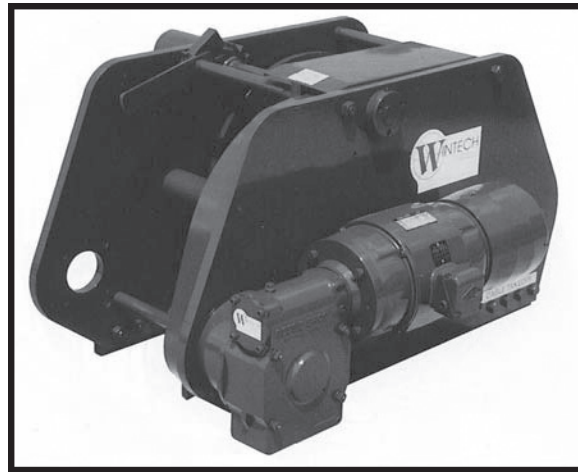
Taking The Winch Industry By Storm

STANDARD FEATURES:

- Totally enclosed, marine grade, fully reversing crane and hoist duty motors in 220, 440, or 575 volts.
- Winch stall pulls from 11,000 to over 50,000 lbs.
- Winch electric brake and worm drive gear holds from 46,000 to 111,000 lbs.
- Flame-cut precision-machined side frames.
- Enclosed drive gearing.
- Steel gear guard prevents slack cable from fouling gears.
- Automatic disc break.
- Simple effective design reduces maintenance cost.

OPTIONAL FEATURES:

- Remote control packages for pilot house control NEMA 1; General purpose enclosure NEMA 4; Watertight -NEMA 1 or 4 magnetic reversing starter.
- NEMA 1 or 4 push button station.
- Wider drums (see wire rope storage chart (bottom left) for optional drum lengths.
- Slip Clutch.



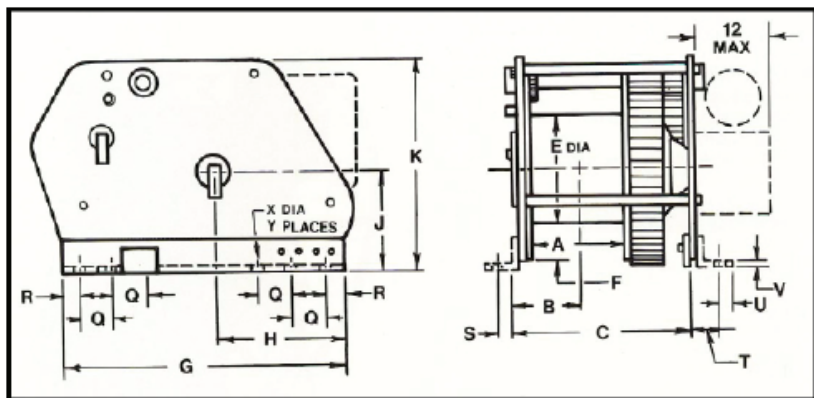
**Lowest profile design available /
Requiring the least amount of
Deck Space**

- Drum divider flange.
- Grooved drums.
- Angle deck brackets.
- Disengaging clutch and hand wheel for emergency power loss operation.
- Dual winch, barge spotting system.
- Special inquires invited for mooring and terminal application.
- Air and hydraulic models upon request.
- Wintech Winch Cables.



Electric Low - Profile Barge Winch 20 - 90 Ton Holding Capacity

Superior Value - Wintech Reliability / Quality



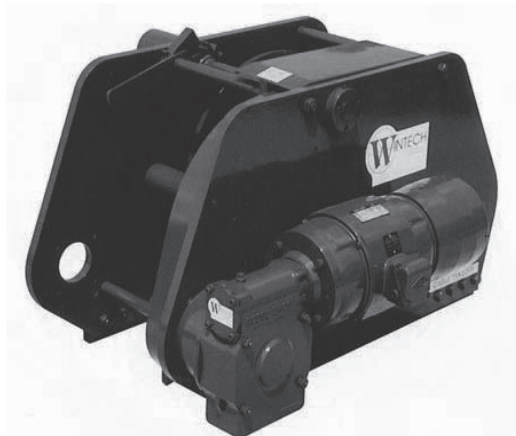
Perspective...

FOR ALL OF YOU WHO THINK YOU ARE HAVING A BAD DAY...

The average cost of rehabilitating a seal after the Exxon Valdez Oil spill in Alaska was \$80,000.00. At a special ceremony, two of the most expensively saved animals were being released back into the wild amid cheers and applause from onlookers.

A minute later, in full view, a killer whale ate them both.

ELECTRIC LOW - PROFILE BARGE WINCH



40 - 90 Ton Holding Capacity

STANDARD FEATURES:

- Totally enclosed, marine grade, fully reversing crane and hoist duty motors in 220, 440, or 575 volts.
- Winch stall pulls from 11,000 to over 50,000 lbs.
- Winch electric brake and worm drive gear holds from 46,000 to 111,000 lbs.
- Flame-cut precision-machined side frames.
- Enclosed drive gearing.
- Steel gear guard prevents slack cable from fouling gears.
- Automatic disc break.
- Simple effective design reduces maintenance cost.

Speed / Power / Durability

Low-Profile electric barge winch specifications											
Model No.	Dog Holding Capacity (tons)	Capacities (lbs)		Holding (lbs)	Line Speed (fpm)			Volts		Weight	
		Rated Pull	Stall* Pull		No Load	Rated Pull	HP	Phase Cycle		Net (lbs)	Cu.ft
25HL-E1	40	4,000	11,000	20,000	34	31	5	230/460-3-60		700	22.0
25HL-E2	40	6,000	16,500	20,000	34	31	7.5	230/460-3-60		750	22.0
25HL-E3	40	8,000	22,000	20,000	34	31	10	230/460-3-60		800	22.0
50HL-E1	65	6,000	16,500	30,000	23	21	5	230/460-3-60		1225	34.0
50HL-E2	65	9,000	24,800	30,000	23	21	7.5	230/460-3-60		1275	34.0
50HL-E3	65	12,000	33,000	30,000	23	21	10	230/460-3-60		1325	34.0
75HL-E1	90	9,300	25,600	40,000	14	13	5	230/460-3-60		1930	37.0
75HL-E2	90	13,900	38,200	40,000	14	13	7.5	230/460-3-60		1980	37.0
75HL-E3	90	18,500	50,900	40,000	14	13	10	230/460-3-60		2030	37.0

Note: All models are shown with "L" designating left hand models; for right hand models, substitute "R" for "L" in model number.

*Stall pull rated at specified voltage with holding dog engaged.

25HL-10 3/4" Drum diameter					20HL-8 5/8" Drum diameter					20HL-8 5/8" Drum diameter				
Length (in.)	Drum Capacity (ft)				Length (in.)	Drum Capacity (ft)				Length (in.)	Drum Capacity (ft)			
	5/8 in.	3/4 in.	7/8 in.	1 in.		5/8 in.	3/4 in.	7/8 in.	1 in.		5/8 in.	3/4 in.	7/8 in.	1 in.
9*	248	162	142	88	11*	194	174	110	100	10*	119	108	98	56
17	479	314	277	174	20	377	338	216	197	19	247	225	207	119
34	975	643	568	359	41	773	694	445	408	40	523	478	441	254
51	1472	971	865	544	61	1168	1051	674	619	60	798	731	675	390
69	1969	1299	1151	729	82	1564	1407	903	830	81	1074	983	909	525

* Standard length of drum (drum lengths are rounded to the nearest inch)

**LOWEST PROFILE
DESIGN AVAILABLE
/ REQUIRING THE
LEAST AMOUNT OF
DECK SPACE**

OPTIONAL FEATURES:

- Remote control packages for pilot house control NEMA 1; General purpose enclosure NEMA 4; Water-tight
- NEMA 1 or 4 magnetic reversing starter.
- NEMA 1 or 4 push button station.
- Wider drums (see wire rope storage chart (bottom left) for optional drum lengths.
- Slip Clutch.
- Drum divider flange.
- Grooved drums.
- Angle deck brackets.
- Disengaging clutch and hand wheel for emergency power loss operation.
- Dual winch, barge spotting system.
- Special inquiries invited for mooring and terminal application.
- Air and hydraulic models upon request
- Wintech Winch Cables

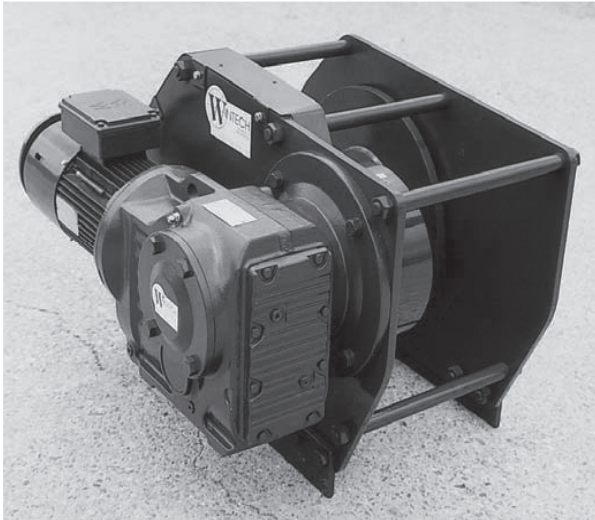
Model 20HL-E1

The Model 20-HL-E1 Barge Winch has been designed specifically for small pushboats and harbor tugs to save time in making up tows.

The winch has a powerful 5 HP motor which results in higher speeds without compromising linepull.

The spring set braking system is capable of holding the 20 ton rated load allowing the operator to attach to the load, tighten and go.

The entire winch is designed with only 3 bushings, resulting in reduced maintenance and more up time.



Speed / Power / Durability

Specifications

Performance:

Brake Holding Capacity.....20 Tons
 Rated Continuous Linepull.....6,000 lbs.
 Rated Stall Linepull.....16,500 lbs.
 Mid Drum Linespeed.....30 FPM

Drum Capacity:

5/8".....380 feet
 3/4"275 feet
 7/8"194 feet
 1"132 feet

Dimensions and Weight:

Overall Length32-1/2"
 Overall Width26-1/2"
 Overall Height.....23-1/2"
 Overall with Deck Pivot Pin.....875lbs.

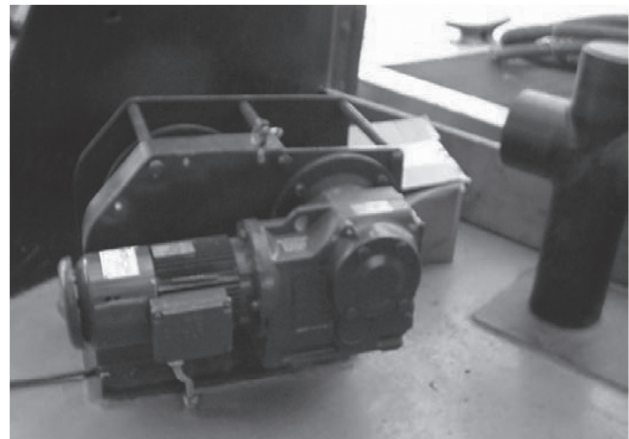


30 TON MODEL ALSO AVAILABLE

FEATURES:

- High Speed operation ideal for Harbor Tug Applications
- 5 Horsepower TEFC Motor and Brake
- 230/460 Volt - 3 phase - 60 Hz. Power
- Spring Set - Electric release holding brake
- Fully enclosed gearbox with open final gear set
- Machine cut gearing with protective guarding
- Brake release and manual crank for emergency operation

NOTE: Dimensions are subject to change. Please contact factory for certified prints.

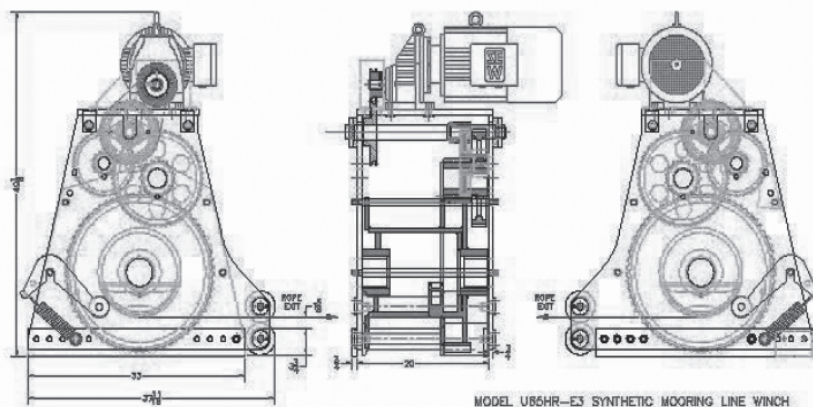




Redesigned Wintech Upright with new style brake. Less Moving Parts. Has a unique anti-fouling pinch roller to prevent bird-nesting and damage to the cable.

**DESIGNED FOR
SYNTHETIC ROPES
SMALL FOOTPRINT
LOW
MAINTENANCE**

Model U65HR-E3 Barge Winch



Can be used for Synthetic or Steel Cables

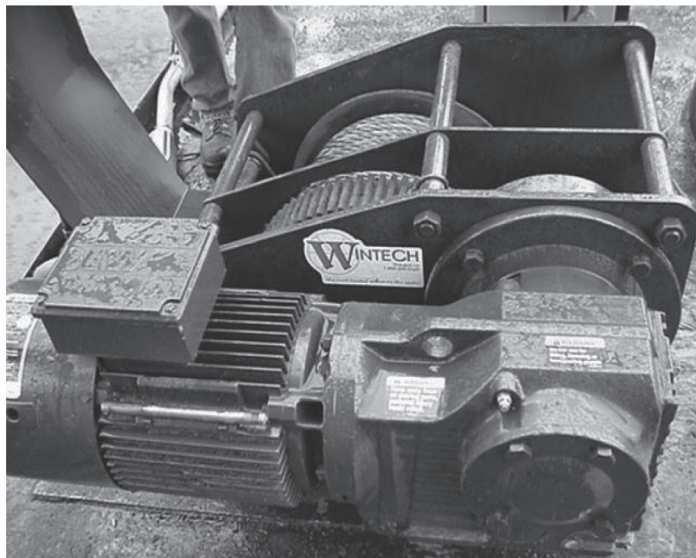
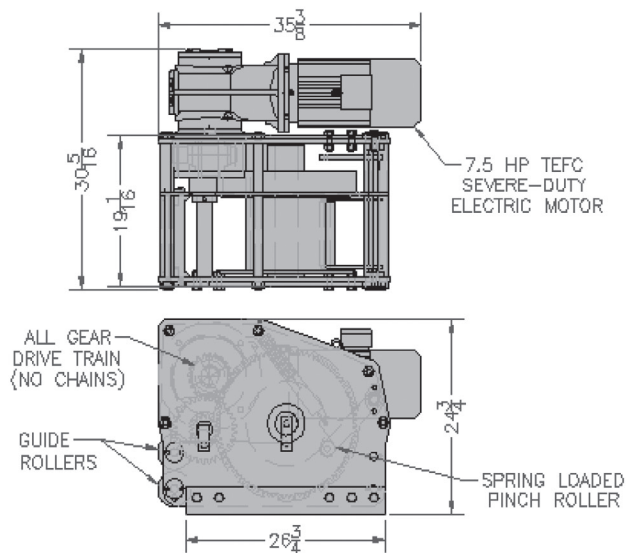
*Other Drum Lengths &
Rope Capacities Available*

Wintech continues its reputation for reliable winches with the introduction of the U65HR-E3 Electric Barge Winch.

- 65 ton Dog Holding Capacity / 35,000 lbs Brake Holding Cap.
- 12,000 lbs Running Line Pull @ 21 fpm on 1st Layer
- Spring-Loaded Pinch Roller System
- Nylatron Guide Rollers reduce rope abrasion
- 10 HP Severe Duty TEFC Electric Motor with Holding Brake
- 12.75" drum core x 11" drum width
- Drum accepts Standard Wedges for Rope Attachment
- Capacity for 240 feet of 3/4" Synthetic Rope
- Left and Right Hand Versions Available

CAN ALSO BE USED WITH STEEL CABLE

40HL - E2



Reduced Cable Fouling—Compact—Low Maintenance—All Gear Driven

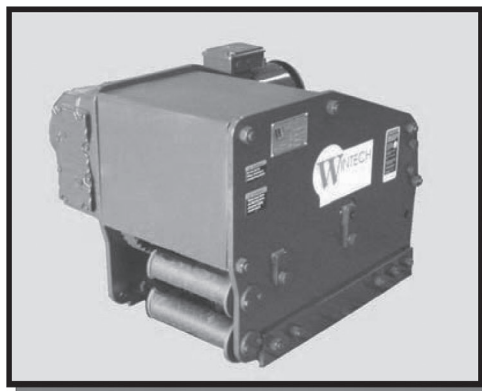
Wintech continues its reputation for reliable winches with the introduction of the 40HL-E2 Electric Deck Winch.

- ♦ 40 Ton Holding Capacity / 13800 lbs Line Pull @18 ft/min
- ♦ Pinch-Roller System Dramatically Reduces Cable Backlash
- ♦ 7.5 HP Severe Duty TEFC Electric Motor with Holding Brake
- ♦ Helical Bevel Gear Reducer with Final Spur Gear Reduction
- ♦ Drum accepts Standard Wedges for Cable Attachment
- ♦ Removable Steel Hood Covers the entire drum
- ♦ Nylatron Guide Rollers Reduce Cable Wear

CABLE CAPACITY (9" LONG DRUM)

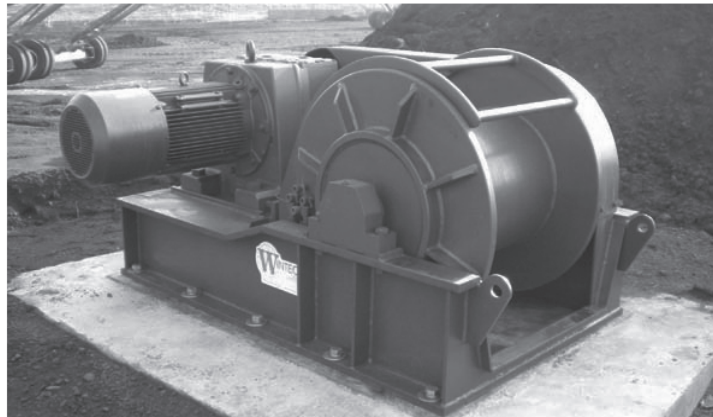
5/8" Cable	3/4" Cable	7/8" Cable	1" Cable
286 ft	196 ft	130 ft	116 ft

Other Drum Lengths / Cable Capacities Are Available



PINCH ROLLER PREVENTS FOULED WINCH WIRES AND BIRD NESTING

HEAVY DUTY CP ELECTRIC WINCHES



GEAR REDUCTION

Jeamar CP Electric Winches have parallel helical gear reducer with a final chain drive.

NEMA DESIGN

There is a totally enclosed fan cooled electric motor with adequate starting torque to overcome the initial inertia of the pulling load.

VOLTAGE

Jeamar CP Electric Winches are available in 230 / 460 / 575 / 3 / 60 voltages.

AUTOMATIC BRAKES

The spring applied, electric release brake activates in the event of power interruption to stop and hold the load securely.

HEAVY DUTY STEEL FRAME

Jeamar CP Electric Winches feature heavy duty welded steel frames and guarding.

OPTIONS

This series of winches can be ordered with starter panels and control packages, marine grade and explosion proof motors. As well, grooved drums, rotary limit switches, adjustable torque limiter disengaging clutches are also available options. **Please call with any requirement you may have.**

Model Number		CP 2000 -15	CP 2000 -25	CP 2000 -40	CP 2000 -70	CP 3000 -20	CP 3000 -50	CP 4000 -40	CP 4000 -70	CP 6000 -20	CP 6000 -45	
Linepull - Starting (1st Layer)	lb	5750	6049	5635	5911	8211	8142	11500	12420	17940	18400	
	kg											
Linepull - Starting (4th Layer)	lb	4370	4600	4255	4485	6440	6440	8740	9200	13570	13800	
	kg											
Linepull - Running (1st Layer)	lb	2500	2630	2450	2570	3570	3540	5000	5400	7800	8000	
	kg											
Linepull - Running (4th Layer)	lb	1900	2000	1850	1950	2800	2800	3800	4000	5900	6000	
	kg											
Line Speed (2nd Layer)	ft/min	15	28	44	71	20	51	37	68	23	46	
	m/min											
Motor	Hp	1	2	3	5	2	5	5	10	5	10	
	kW											
Cable Size	in	3/8	3/8	3/8	3/8	7/16	7/16	1/2	1/2	5/8	5/8	
	mm											
Drum Capacity (2nd Layer)	ft	124	124	124	124	159	159	141	141	161	161	
	m											
Drum Capacity (Full Drum)	ft	446	446	446	446	453	453	408	408	465	465	
	m											
Weight	lb	365	379	395	395	707	723	814	872	1290	1370	
	kg											
DIMENSIONS	A	in	17	17	17	17	20	20	20	20	26	26
		mm										
	B	in	22 1/2	22 1/2	22 1/2	22 1/2	25 1/2	25 1/2	25 1/2	25 1/2	30 3/4	30 3/4
		mm										
	C	in	29	29	29	29	36	36	36	36	44	44
		mm										
	D	in	12	12	12	12	14	14	14	14	16	16
		mm										
	E	in	12	12	12	12	14	14	14	14	18	18
		mm										
	F	in	6 5/8	6 5/8	6 5/8	6 5/8	8 5/8	8 5/8	8 5/8	8 5/8	10 3/4	10 3/4
		mm										
G	in	9	9	9	9	10 1/2	10 1/2	10 1/2	10 1/2	13 1/2	13 1/2	
	mm											

BARGE MOVING SYSTEM The Ultimate in Positioning Control

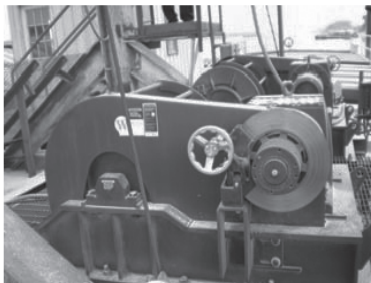
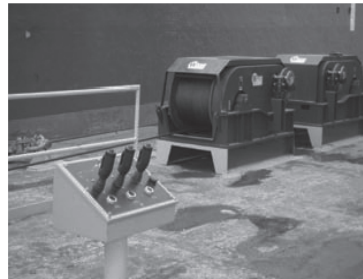
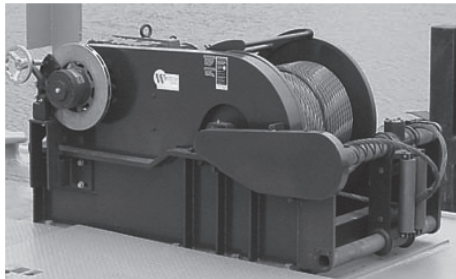
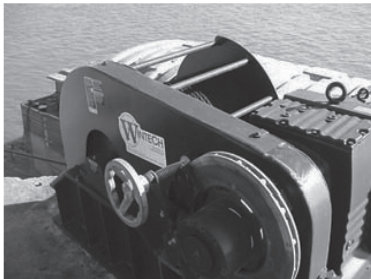


Wintech Barge Moving Systems provide Safe and Efficient Performance

Starting, moving, and stopping 2,000 ton barges with control and safety can be a challenge. Wintech Barge Moving Systems feature the latest in winching technology. Wintech's proven system designs allow for smooth acceleration and deceleration of barge movement. Line speeds are infinitely variable from zero to maximum speed. Ramping up and down of speed reduces shock loading on the winches and rigging, thus minimizing potential for winch damage and cable breakages. A unique mechanical drag brake offers controlled tension on the tailing winch, reducing slack cable. Winches are fully electric with no environmentally unfriendly hydraulic components.

WINCH CONTROLS

Winch controls are simple and easy to understand. Each system comes standard with a single operator control console. For control station flexibility systems can be offered with an additional operator console or with wireless remote controls that can be used by a crane operator or dock personnel. Both hard-wired and radio controls offer the identical control features. All controls are rated for NEMA 4 wash-down proof protection.



WINCHES

Typical winch capacities range from 10,000 lbs through 35,000 lbs continuous linepull, though custom capacities are also available for unique applications. All winches are constructed from extra heavy duty materials, utilize a minimum number of moving parts and are designed for low maintenance and long service life. Standard winch features include greasable tapered roller drum bearings, fabricated steel frame and drum, high efficiency parallel-helical gear reducer, fail-safe spring applied holding brake, and heavy duty mechanical hold-back tensioning brake. Winch frames are equipped with base mounting holes, allowing winches to be either bolted or welded in place.



Similar systems are also available for Rail Car Spotting Applications

BARGE MOVING SYSTEM

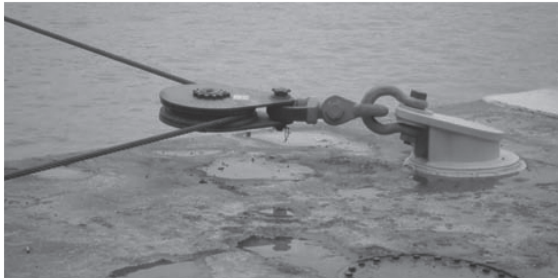
WINCH SYSTEM OPERATION

The Wintech Barge Moving System is the ultimate in barge moving controllability. A typical system consists of two winches, a 36" x 48" NEMA 4 enclosed drive cabinet, and an operator control console. Electrical cabinet and control consoles may be mounted and used indoors or outdoors. Variable Frequency Drive Technology gives the winch system the ability to slowly accelerate to desired movement speed and slowly decelerate to a safe stopping speed. Another feature of the system is a selector switch for Manual and Auto Modes. In Manual Mode the operator can control each winch individually while securing and pre-tensioning rigging. Once the cables are tightened the operator can then switch to Auto Mode. In Auto Mode the operator controls movement of the barge upstream and downstream via a single joystick. A speed control knob allows adjustment of system speed from 0 to the maximum rated system speed via a single control knob. Maximum speeds can be customized to suit specific customer requirements. Each winch is equipped with a bronze disc-type drag brake and manually adjustable caliper for controlled tail tension during pulling operations.



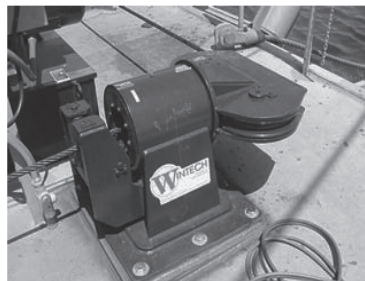
Designed to provide years of reliable operation and dependable service for your barge positioning requirements.

Wintech Barge Moving Systems offer the ultimate in control, safety, and flexibility. From simple, single barge spotting applications to multiple barge, high production loading applications.



SHEAVES, BLOCKS & FAIRLEADS

Wintech offers a wide range of high quality standard and custom designed sheaves, blocks, and fairleads for any barge moving system application.



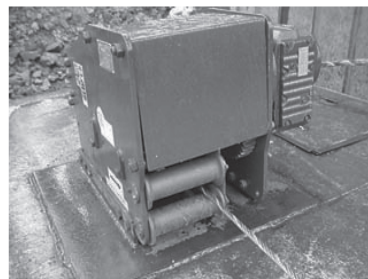
CONTINUED NEXT PAGE



SPECIAL OPTIONS

Wintech can customize a system to meet your specific application needs.

- ◆ Radio Remote Control Packages
- ◆ Automatic Levelwinds
- ◆ Wire Rope Pre-Installed
- ◆ Load Travel Limit Switches
- ◆ Multiple Control Stations
- ◆ Custom Voltages

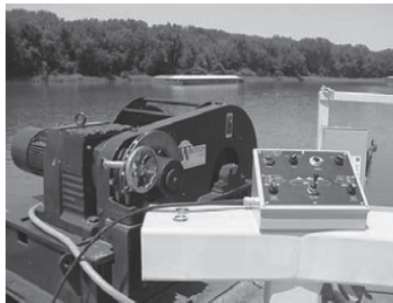
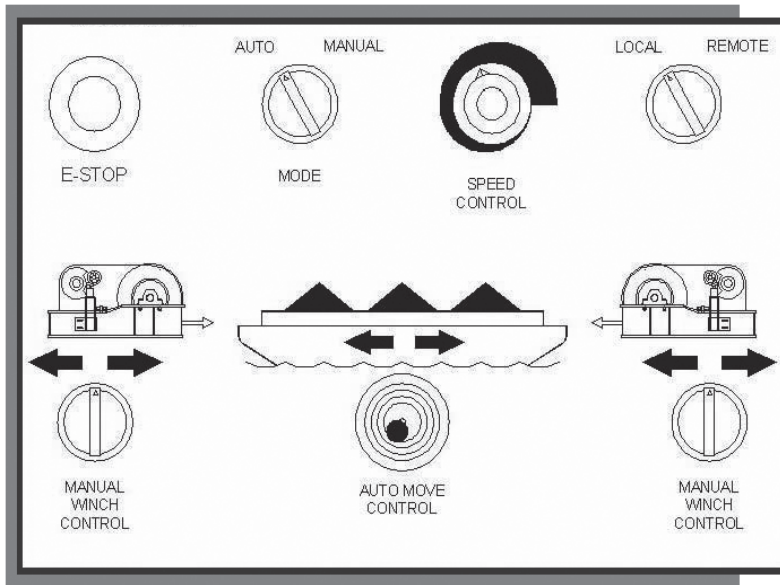


Breasting Winches



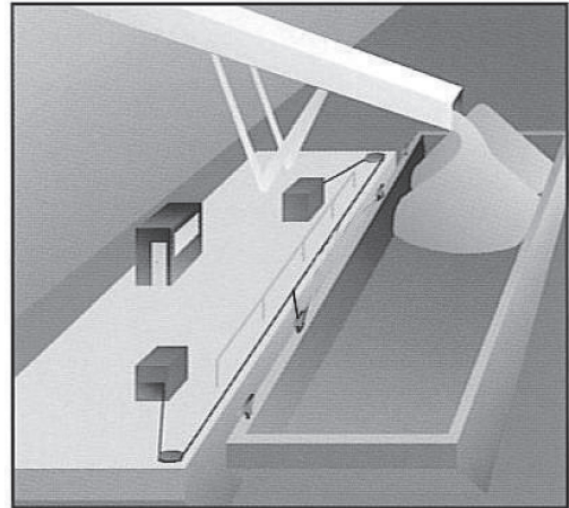
Breasting Capstans

BARGE MOVING SYSTEM

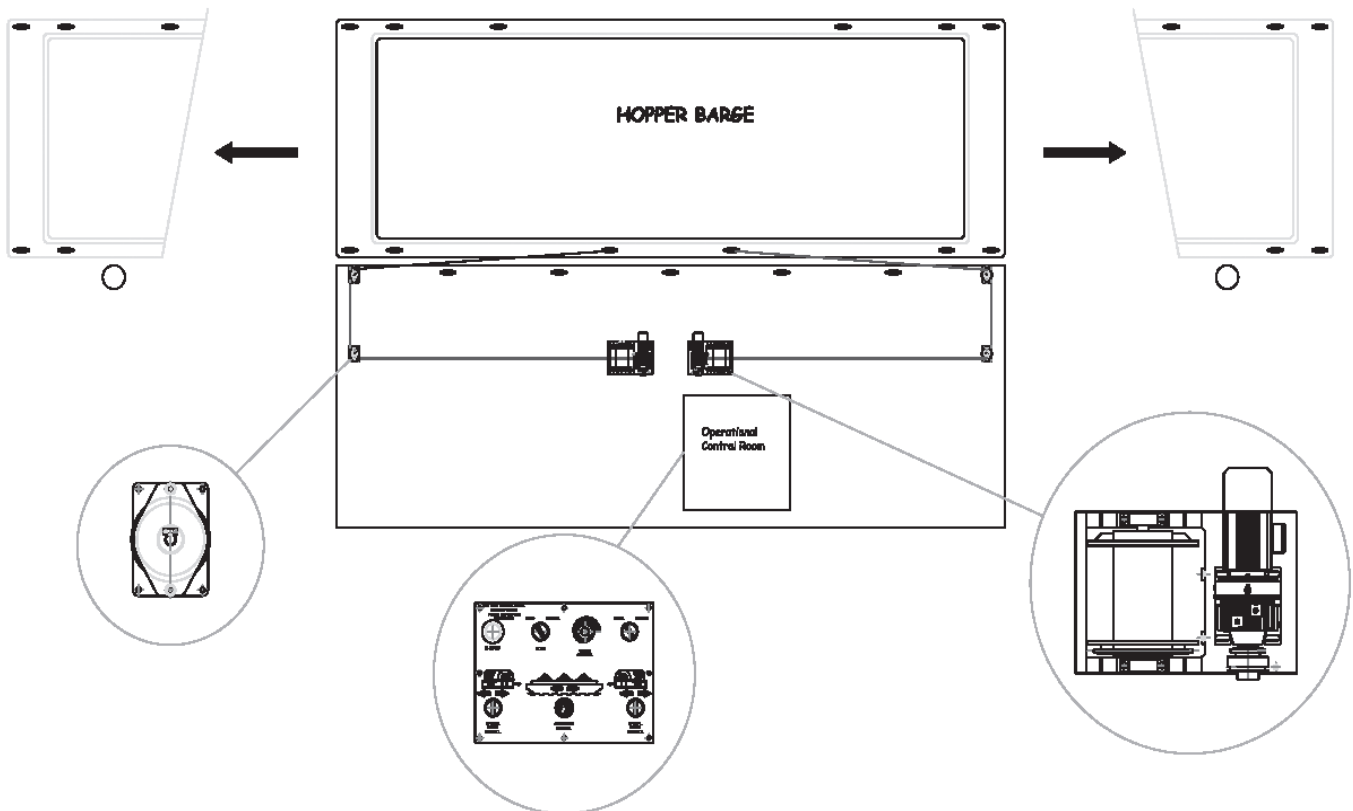


Wintech

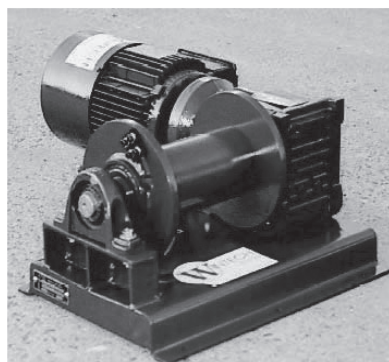
Wintech has been designing and manufacturing Barge Positioning Systems for many years. Companies from all over the United States inland river system, coastal waterways, and other countries rely on the efficiency, safety and dependability of our systems. Chances are there is a system near you. If you would like additional information on Wintech Barge Positioning Systems or if you have an interest in visiting an existing installation to see for yourself we are eager to assist you.



Sample Barge Positioning System Layout



RK SERIES WINCHES 500 - 6,000 LBS. CAPACITY



**PERFECT FOR MANY
INDUSTRIAL,
CONSTRUCTION,
MINING AND OIL
FIELD APPLICATIONS**

Superior Value - Wintech Reliability / Quality

STANDARD FEATURES

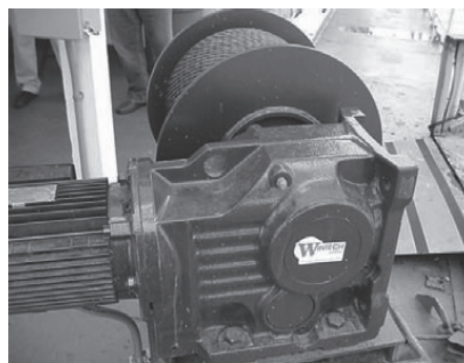
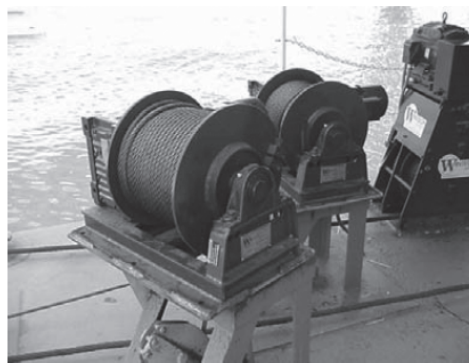
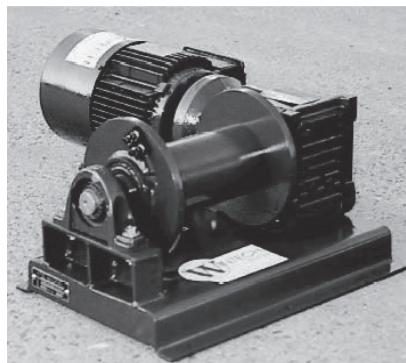
- Direct drive fully enclosed gear reducer with helical-bevel gearing.
- NEMA design "D" totally enclosed fan cooled electric motors with high starting torque to overcome initial inertia of pulling load.
- 230/460/3/60 Voltage.
- Automatic electromagnetic activates in the event of power interruption to brake stop and hold load securely.
- Heavy duty welded steel frame and drum construction with bolt down provision.
- Ball and roller bearing mounted drum for high efficiency.
- Winch is sandblasted, primed and painted.

OPTIONAL FEATURES:

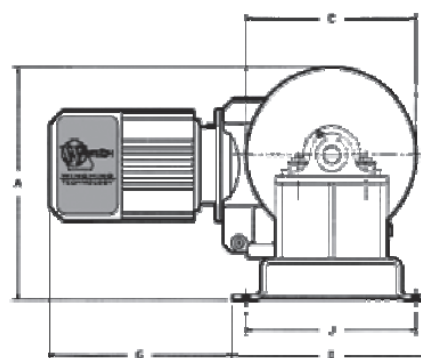
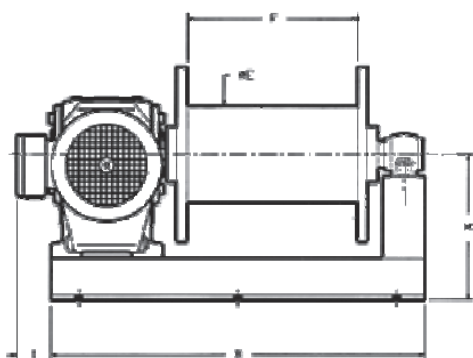
- NEMA 1 and NEMA 4 starter panels and control packages
- Marine grade motor and gear reducer
- Longer or shorter drum lengths
- Adjustable torque limiter disengaging clutch
- Explosion - proof motors
- Rotary limit switch
- Grooved Drums
- Customs designs available

Model	Line Pull (LBS)				Line Speed (FPM) 2nd Layer	H.P.	Cable Size (inch)	Drum Capacity (ft)	
	Starting		Running					2nd Layer	Full Drum
	1st Layer	4th Layer	1st Layer	4th Layer					
RK500-20	1260	960	550	420	22	1/3	1/4	84	300
RK500-50	1260	960	550	420	49	3/4	1/4	84	300
RK800-20	2150	1650	950	720	19	1/2	1/4	84	300
RK800-80	2150	1650	950	720	78	2	1/4	84	300
RK1000-20	2500	1900	1100	840	25	3/4	1/4	84	300
RK1000-50	2500	1900	1100	840	49	1 1/2	1/4	84	300
RK1000-150	2500	1900	1100	840	162	5	1/4	84	300
RK1500-30	3900	3100	1700	1340	32	1 1/2	3/8	124	446
RK1500-60	3700	2900	1600	1260	67	3	3/8	124	446
RK2000-20	6200	4700	2700	2043	20	1 1/2	3/8	124	446
RK2000-40	6200	4700	2700	2043	41	3	3/8	124	446
RK2000-75	5600	4200	2440	1840	75	5	3/8	124	446
RK3000-30	7350	5750	3200	2500	34	3	7/16	136	388
RK3000-80	7700	6000	3350	2600	81	5	7/16	136	388
RK4500-20	12400	9300	5400	4070	20	3	1/2	121	349
RK4500-50	11600	8800	5050	3820	53	7 1/2	1/2	121	349
RK6000-40	14700	11000	6400	4800	43	7 1/2	5/8	161	465
RK6000-75	16500	12500	7200	5450	75	15	5/8	161	465

RK SERIES WINCHES 500 - 6,000 LBS. CAPACITY



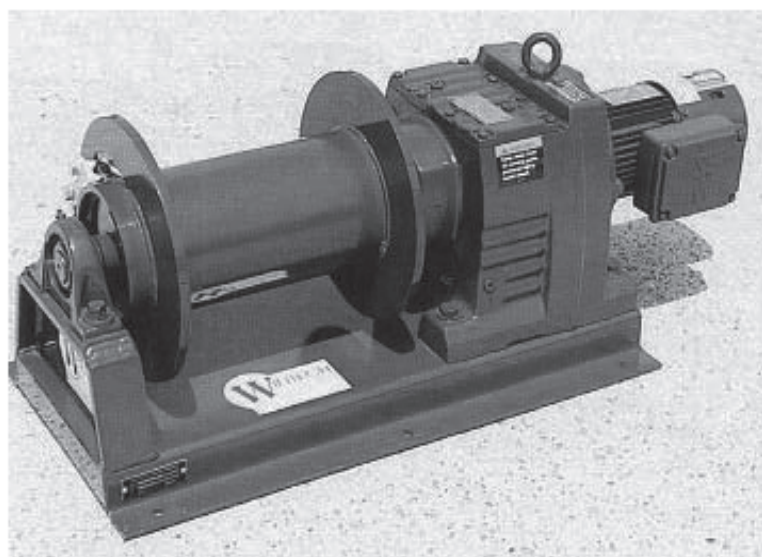
Superior Value - Wintech Reliability / Quality



Model	DEMENSIONS (INCHES)									
	A	B	C	D	E	F	H	I	J	WEIGHT (LBS)
RK500-20	10 1/2	19 3/4	8	11 3/4	4 1/2	8	6 1/2	2 1/2	10 1/4	130
RK500-50	10 1/2	19 3/4	8	11 3/4	4 1/2	8	6 1/2	2 1/2	10 1/4	137
RK800-20	10 1/2	19 3/4	8	11 3/4	4 1/2	8	6 1/2	2 1/2	10 1/4	137
RK800-80	10 1/2	19 3/4	8	11 3/4	4 1/2	8	6 1/2	3 3/4	10 1/4	149
RK1000-20	11 1/2	20 3/4	8	11 3/4	4 1/2	8	7 1/2	2 1/8	10 1/4	150
RK1000-50	11 1/2	20 3/4	8	11 3/4	4 1/2	8	7 1/2	3 1/2	10 1/4	164
RK1000-150	11 1/2	20 3/4	8	11 3/4	4 1/2	8	7 1/2	3 3/4	10 1/4	181
RK1500-30	15 1/8	24 3/4	12	16 1/2	6 7/8	12	9 1/8	2 3/4	14 3/4	234
RK1500-60	15 1/8	24 3/4	12	16 1/2	6 7/8	12	9 1/8	2 7/8	14 3/4	250
RK2000-20	16 3/8	26 1/4	12	16 1/2	6 7/8	12	10 3/8	2 1/8	14 3/4	303
RK2000-40	16 3/8	26 1/4	12	16 1/2	6 7/8	12	10 3/8	2 1/4	14 3/4	322
RK2000-75	16 3/8	26 1/4	12	16 1/2	6 7/8	12	10 3/8	2 1/4	14 3/4	322
RK3000-30	19 3/4	26 3/4	14	19 1/2	8 7/8	12	12 3/4	2 1/2	17 3/4	436
RK3000-80	19 3/4	26 3/4	14	19 1/2	8 7/8	12	12 3/4	3	17 3/4	471
RK4500-20	19 7/8	30 1/4	14	22 3/4	8 7/8	12	12 7/8	1 1/2	17 3/4	662
RK4500-50	19 7/8	30 1/4	14	22 3/4	8 7/8	12	12 7/8	1 1/2	17 3/4	675
RK6000-40	23 1/2	35 3/4	18	23 3/4	10 3/4	16	14 1/2	2 3/4	21 1/4	1061
RK6000-75	23 1/2	35 3/4	18	23 3/4	10 3/4	16	14 1/2	2 2/3	21 1/4	1140

NOTE: Dimensions are subject to change. Please contact factory for certified prints.

BP SERIES WINCHES 500 - 6000 LBS. CAPACITY



PERFECT
FOR MANY
INDUSTRIAL,
CONSTRUCTION,
MINING AND
OIL FIELD
APPLICATIONS



Superior Value - Wintech Reliability / Quality

STANDARD FEATURES

- Direct drive fully enclosed gear reducer with parallel helical gearing.
- NEMA design "D" totally enclosed fan cooled electric motors with high starting torque to overcome initial inertia of pulling load.
- 230/460/3/60 Voltage.
- Automatic electromagnetic activates in the event of power interruption to brake stop and hold load securely.
- Heavy duty welded steel frame and down provision.
- Ball and roller bearing mounted drum for high efficiency.
- Winch is sandblasted, primed and painted

OPTIONAL FEATURES:

- NEMA 1 and NEMA 4 starter panels and control packages
- Marine grade motor and gear reducer
- Longer or shorter drum lengths
- Adjustable torque limiter disengaging clutch
- Explosion - proof motors
- Rotary limit switch
- Grooved Drums
- Customs designs available

Model	Line Pull (LBS)				Line Speed (FPM) 2nd Layer	B.P.	Cable Size (inch)	Drum Capacity (ft)	
	Starting		Running					2nd Layer	Full Drum
	1st Layer	4th Layer	1st Layer	4th Layer					
BP300-2D	1260	960	330	420	22	1/3	1/4	34	300
BP300-4D	1320	990	370	430	48	3/4	1/4	34	300
BP300-3D	2070	1390	900	690	30	3/4	1/4	34	300
BP1000-2D	2330	1930	1110	840	27	3/4	1/4	34	300
BP1000-3D	2620	2060	1140	870	48	1 1/2	3/16	146	620
BP1300-2D	4180	3290	1820	1430	20	3/4	3/8	124	446
BP1300-4D	4180	3290	1820	1430	40	2	3/8	124	446
BP2000-1D	3220	4120	2270	1790	16	1	3/8	124	446
BP2000-4D	3430	4280	2370	1860	47	3	3/8	124	446
BP3000-2D	7960	6190	3460	2690	21	2	7/16	136	388
BP3000-3D	7960	6190	3460	2690	32	3	7/16	136	388
BP3000-8D	7960	6190	3460	2690	78	7 1/2	7/16	136	388
BP4300-2D	11200	8420	4870	3680	23	3	1/2	121	340
BP4300-3D	11340	8330	4930	3710	36	7 1/2	1/2	121	340
BP6000-4D	14700	11040	6390	4800	43	7 1/2	3/8	161	460

HEAVY DUTY CAPSTAN WINCHES



DIRECT DRIVE

A direct-drive design increases the efficiency of the capstan winch and eliminates drive chains or bull gears to maximize power output.

ANY ANGLE

The rope can leave the drum at any angle, enabling the operator to stand in the most appropriate, out of line of sight location. For safety the load line shall be the bottom wrap on the drum, and the lead line going to the operator will be the top wrap on the drum

GEAR REDUCERS

All Jeamar capstan winches utilize high-efficiency worm, helical, helical-worm or helical-bevel reducers plus high-capacity, anti-friction bearings designed for long life, low noise and higher output torque.

HIGH STARTING LOADS

High-starting-torque, 3-phase motors are available in all standard voltages at 50 and 60 Hz. These motors are suited to railcar pulling where momentary overloads occur when a railcar is started in motion. Single phase motors at 115/230 volts at 50 or 60 Hz are available as an option on some models.

LOAD CALCULATIONS

For detail on pulling railcars up grades, send for our free railcar pulling brochure, or see technical notes, page 54.

OPTIONS

CONTROLS

Capstans can be supplied with start/stop, foot-operated controls of the "deadman" variety. If the operator's foot moves off the switch, the capstan will stop. This type of control allows the operator to use two hands on the rope, for optimum control (see page 41).

HYDRAULIC AND AIR-DRIVEN MOTORS

Capstan winches can be supplied with either hydraulic or air motors.

EXPLOSION PROOF

Fully explosion-proof motors and controls are available for applications in hostile or volatile environments.

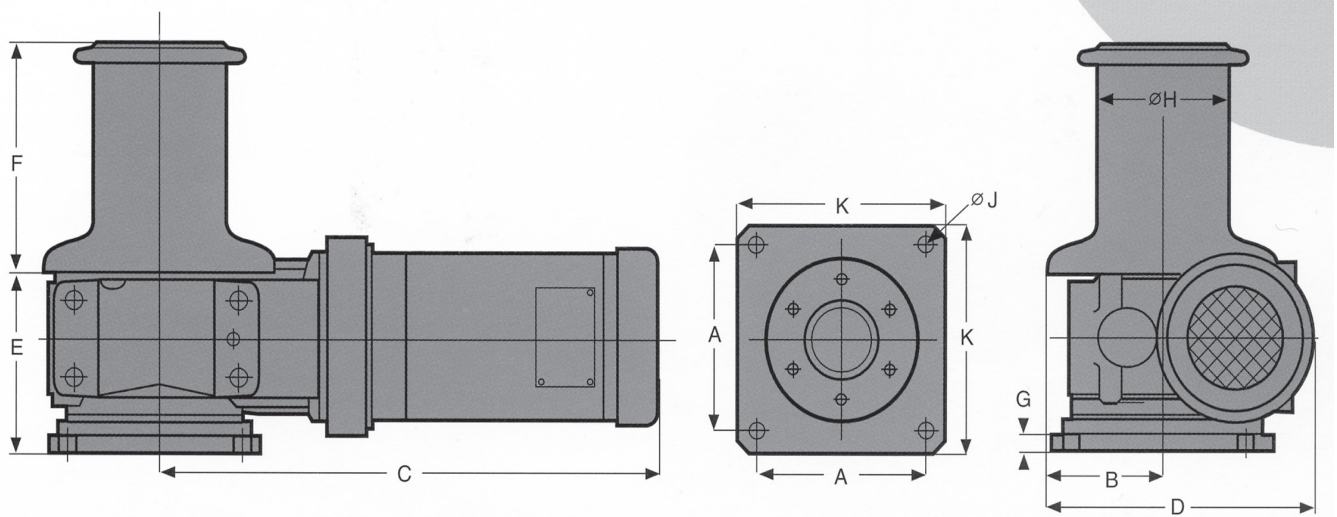
TORQUE LIMITATION

Capstans can be supplied with a variable frequency drive (VFD) package. The VFD controls the amount of current that the motor can draw, limiting the amount of torque that the electric motor can produce (see page 41).

Important: Due to our policy of continuing development, all specifications are subject to change without notice. Users of these products are responsible for ensuring their suitability for the application in which they are being used.

probably from Louisiana if...

You pronounce the largest city in the state as "Newawlins."



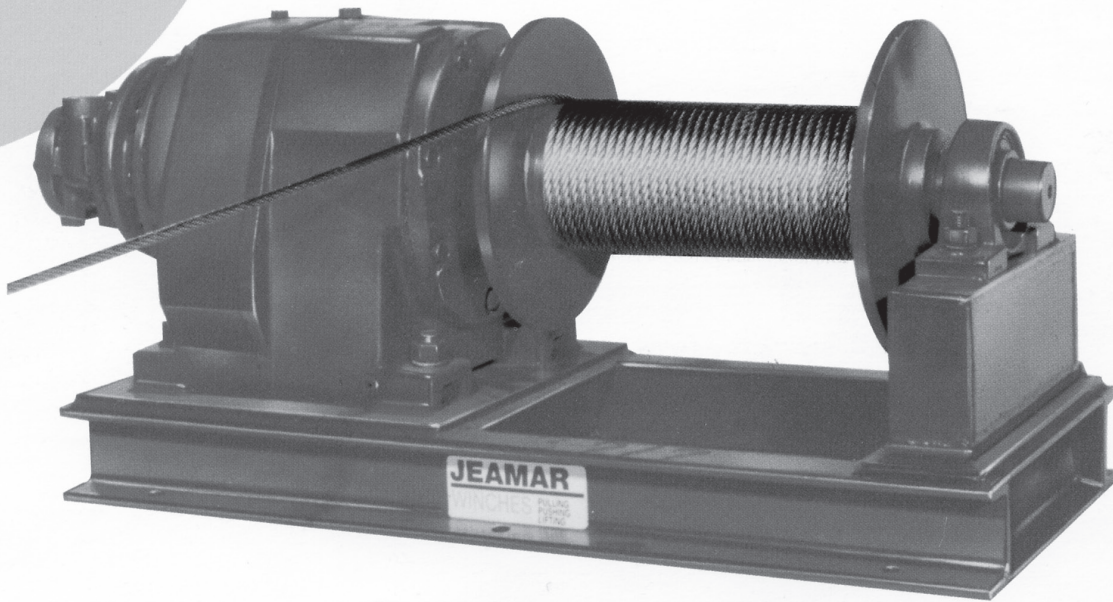
Model Number		VC 2000-26	VC 5000-30	VC 5000-45	VC 8000-13	VC 8000-30	VC 12000-17	VC 15000-13	VC 18000-17	VC 22000-17	
Working Load Limit Starting	lb	2000	5000	5000	8000	8000	12000	15000	18000	22000	
	kg	907	2268	2268	3628	3628	5442	6803	8163	9977	
Working Load Limit Running	lb	1000	2500	2500	4000	4000	6000	7500	9000	11000	
	kg	454	1134	1134	1814	1814	2721	3401	4082	4989	
Rope Speed	ft/min	26	30	45	13	30	17	13	17	17	
	m/min	8	9	14	4	9	5	4	5	5	
Rope Diameter* (Polypropylene)	in	5/8	1-1/8	1-1/8	1-1/2	1-1/2	1-3/4	2	-	-	
	mm	16	29	29	38	38	44	50	-	-	
Rope Diameter* (Spect-Set)	in	5/8	5/8	5/8	3/4	3/4	7/8	1	1-1/4	1-1/4	
	mm	16	16	16	20	20	22	25	32	32	
Motor	Hp	1.5	3	5	3	5	5	5	7.5	7.5	
	kW	1.1	2.3	3.8	2.3	3.8	3.8	3.8	5.7	5.7	
Weight	lb	202	330	355	452	474	660	1124	1162	1379	
	kg	92	150	161	205	215	299	510	527	625	
DIMENSIONS	A	in	9.00	9.00	9.00	14.50	14.50	14.50	17.00	17.00	17.00
		mm	229	229	229	368	368	368	432	432	432
	B	in	5.58	6.00	6.00	8.75	8.75	8.75	10.50	10.50	12.40
		mm	142	152	152	222	222	222	267	267	315
	C	in	14.66	26.39	26.39	27.62	27.62	30.00	32.00	32.66	51.66
		mm	372	670	670	702	702	762	813	830	1312
	D	in	11.83	14.00	14.00	18.00	18.00	19.77	23.69	23.69	22.90
		mm	300	356	356	457	457	502	602	602	582
	E	in	8.95	10.05	10.05	11.81	11.81	13.75	16.09	16.09	11.88
		mm	227	255	255	300	300	349	409	409	302
	F	in	5.25	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
		mm	133	292	292	292	292	292	292	292	292
	G	in	0.75	0.75	0.75	1.00	1.00	1.00	1.25	1.25	1.25
		mm	19	19	19	25	25	25	32	32	32
	H	in	4.00	7.00	7.00	7.00	7.00	9.00	11.00	11.00	11.00
		mm	102	178	178	178	178	229	279	279	279
	J	in	0.81	0.81	0.81	1.06	1.06	1.06	1.31	1.31	1.31
		mm	21	21	21	27	27	27	33	33	33
	K	in	11.00	11.00	11.00	17.50	17.50	17.50	21.00	21.00	21.00
		mm	279	279	279	445	445	445	533	533	533

Important: Due to our policy of continuing development, all specifications are subject to change without notice. Users of these products are responsible for ensuring their suitability for the application in which they are being used.

probably from Louisiana if...

You know those big roaches can fly, but you're able to sleep at night anyway.

HEAVY DUTY AIR TUGGER WINCHES



WINCH DRUMS

Drums are steel fabricated and designed to specific loading capacity. Drums are sized according to ASME B30.7.94 to provide a minimum pitch diameter of 15 times the nominal rope diameter.

DIRECT DRIVE

A simple, direct-drive design increases the efficiency of the winch and eliminates drive chains or bull gears to maximize power output.

ANY POSITION

An open-base design permits mounting in horizontal or vertical positions. Loads can be pulled through the base itself, which is particularly useful in limited-space installations.

BALL & ROLLER BEARINGS THROUGHOUT

Friction load loss is reduced to a minimum through the use of ball and roller bearings. No bushings means higher efficiency and more power for pulling.

POWER IN — POWER OUT

For added safety, all winches are fully reversible. This gives the operator complete control of the winch load in both directions at all times.

HIGH SERVICE FACTORS

Jeamar winches are designed and manufactured for continuous, heavy-duty operation with a minimum service factor of 1 (one).

GEAR REDUCERS

All Jeamar air winches have high-efficiency helical reducers plus high-capacity, anti-friction bearings for long life, low noise and high output torque. Totally enclosed reducers make them weatherproof.

AIR MOTORS

Jeamar air motors are fully reversible vane type. Positive starting and precise control are central features of the motors, which have been designed for long life and low-cost operation. They can be stalled indefinitely under load without harm to the motor.

CONTROL VALVE

Control valves feature proportional flow with spring return to neutral for "deadman" operation. Valves control the winch speed by varying air flow to the motor. With the control released, air flow is cut off, stopping the winch. Controls are supplied loose to allow for mounting that is appropriate to the application.

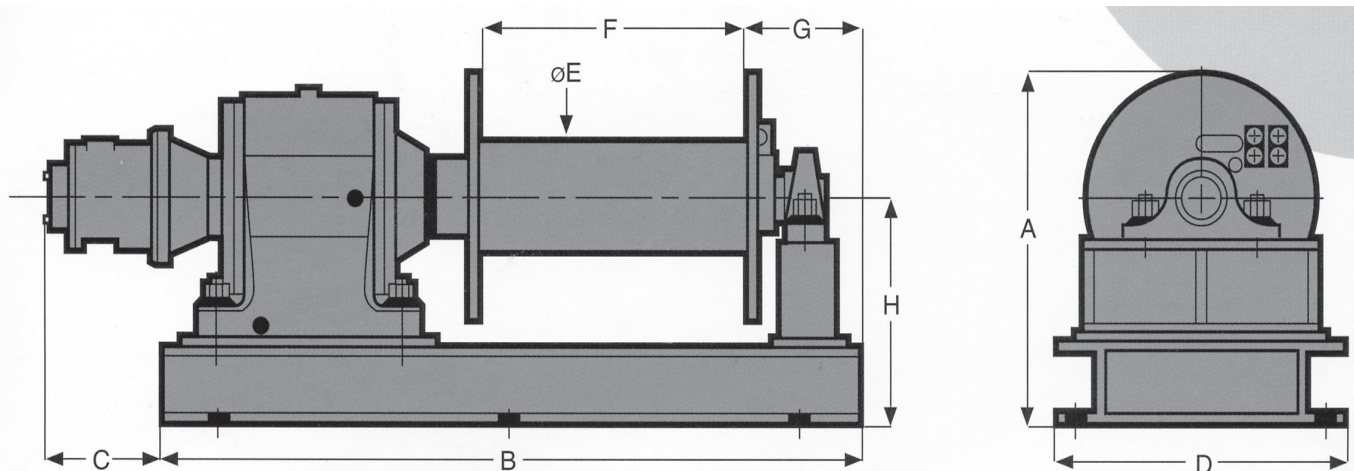
LOAD CALCULATIONS

For detail on pulling railcars or pulling up grades, send for our free railcar pulling brochure and technical notes.

NOTICE

When the Air Tugger winch is used to move loads on an incline, it is essential that a brake be used.

Important: Due to our policy of continuing development, all specifications are subject to change without notice. Users of these products are responsible for ensuring their suitability for the application in which they are being used.



Model Number			NHA 550	NHA 1100	NHA 1900	NHA 2800	NHA 4000	NHA 5800	NHA 7500
Working Load Limit (1st Layer)	lb		550	1100	1900	2800	4000	5800	7500
	kg		249	499	862	1270	1814	2630	3401
Working Load Limit (4th Layer)	lb		412	785	1355	2015	2900	4230	5280
	kg		187	356	615	914	1315	1918	2395
Line Speed (1st Layer)	fpm		25	28	27	21	22	26	23
	m/min		7.6	8.5	8.2	6.4	6.7	7.9	7.0
Line Speed (4th Layer)	fpm		33	39	38	29	30	35	32
	m/min		10.1	11.9	11.6	8.8	9.1	10.7	9.8
Rope Diameter	in		1/8	3/16	1/4	5/16	3/8	7/16	1/2
	mm		3	5	6	8	10	11	13
Rope Capacity (4th Layer)	ft		125	160	215	215	275	290	250
	m		38	49	66	66	84	88	76
Motor Power (at rated line speed)	Hp		0.42	0.96	1.58	2.40	2.70	4.60	5.40
	kw		0.3	0.7	1.2	1.8	2.0	3.4	4.0
Air Consumption	cfm		58	110	110	160	160	260	260
	l/s		26	50	50	75	75	118	118
Weight	lb		92	130	190	415	438	645	808
	kg		42	59	86	189	199	293	367
DIMENSIONS	A	in	9.00	13.00	14.00	13.89	20.00	20.36	21.34
		mm	229	330	356	353	508	517	542
	B	in	18.00	27.50	33.00	32.50	42.50	42.50	45.00
		mm	457	699	838	826	1080	1080	1143
	C	in	6.00	5.00	5.00	8.00	4.00	9.00	9.00
		mm	152	127	127	203	102	229	229
	D	in	10.00	14.00	14.00	14.00	18.00	18.00	19.50
		mm	254	356	356	356	457	457	495
	E	in	1.75	2.62	3.50	4.50	5.56	6.63	6.63
		mm	44	67	89	114	141	168	168
	F	in	6.00	9.00	12.00	12.00	15.00	15.00	15.00
		mm	152	229	305	305	381	381	381
	G	in	4.63	6.63	6.63	7.39	7.25	7.00	7.00
		mm	118	168	168	188	184	178	178
	H	in	5.31	7.94	8.89	8.89	13.36	13.36	14.34
		mm	135	202	226	226	339	339	364

Note: All performance data are based on 90psi (6 Bar) air supply

Important: Due to our policy of continuing development, all specifications are subject to change without notice. Users of these products are responsible for ensuring their suitability for the application in which they are being used.

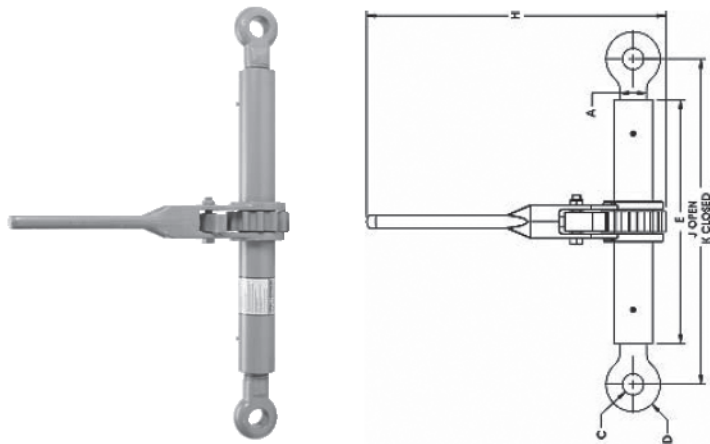
probably from Louisiana if...

You realize the rain forest is less humid than Louisiana.

STANDARD RATCHET TURNBUCKLES: Type D: Eye & Eye Turnbuckle

Specifications For Type D (Eye In Eye) Ratchet Turnbuckles									
Model Number	A in.	E in.	D in.	H in.	C in.	J in.	K in.	Adj. in.	Safe Working Load ** (Tension)
3/4 X 12 Type D	0.75	12	1.88	11.5	1	26.5	16	10.5	4,600
1 X 12 Type D	1	12	2.38	11.5	1.25	26.5	16.5	10	9,000
1 X 18 Type D	1	18	2.38	11.5	1.25	38.5	22.5	16	9,000
1 1/8 X 12 Type D	1.25	12	2.75	11.5	1.38	26.5	16.75	9.75	10,000
1 1/8 X 18 Type D	1.13	18	2.75	11.5	1.38	38.5	22.75	15.75	10,000
1 1/4 X 12 Type D	1.25	12	3	20	1.5	26.5	17	9.5	14,600
1 1/4 X 18 Type D	1.25	18	3	20	1.5	38.5	23	15.5	14,600
1 3/8 X 12 Type D	1.38	12	3.5	20	1.56	26.75	17.5	9.25	17,000
1 3/8 X 18 Type D	1.38	18	3.5	20	1.56	38.75	23.5	15.25	17,000
1 3/8 X 24 Type D	1.38	24	3.5	20	1.56	50.75	29.5	21.25	17,000
1 1/2 X 12 Type D	1.5	12	3.63	20	1.75	26.75	17.75	9	21,400
1 1/2 X 18 Type D	1.5	18	3.63	20	1.75	38.75	23.75	15	21,400
1 1/2 X 24 Type D	1.5	24	3.63	20	1.75	50.75	29.75	21	21,400
1 3/4 X 18 Type D	1.75	18	4.5	20	1.69	38	23.5	14.5	25,000
1 3/4 X 24 Type D	1.75	24	4.5	20	1.69	50	29.5	20.5	25,000
1 3/4 X 30 Type D	1.75	30	4.5	20	1.69	62	35.5	26.5	25,000
2 X 18 Type D	2	18	5	26	2	40.5	26.5	14	30,000
2 X 24 Type D	2	24	5	26	2	52.5	32.5	20	30,000
2 X 30 Type D	2	30	5	26	2	64.5	38.5	26	30,000
2 1/2 X 18 Type D	2.5	18	6	26	3	40	27	13	60,000
2 1/2 X 24 Type D	2.5	24	6	26	3	52	33	19	60,000
2 1/2 X 30 Type D	2.5	30	6	26	3	64	39	25	60,000
2 3/4 X 24 Type D	2.75	24	6.5	26	3	52.5	34	18.5	76,000
2 3/4 X 30 Type D	2.75	30	6.5	26	3	64.5	40	24.5	76,000
3 X 18 Type D	3	18	6.5	26	3.25	40	28	12	100,000
3 X 24 Type D	3	24	6.5	26	3.25	46	34	12	100,000
4 X 24 Type D	4	24	9	26	3.5	44	36	8	200,000
4 X 30 Type D	4	30	9	26	3.5	50	42	8	200,000

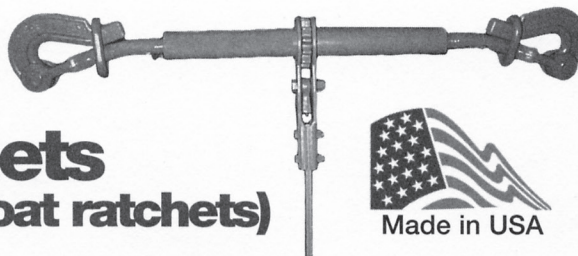
**Safe Working Load, in tension, provides a safety factor of approximately five-to-one.



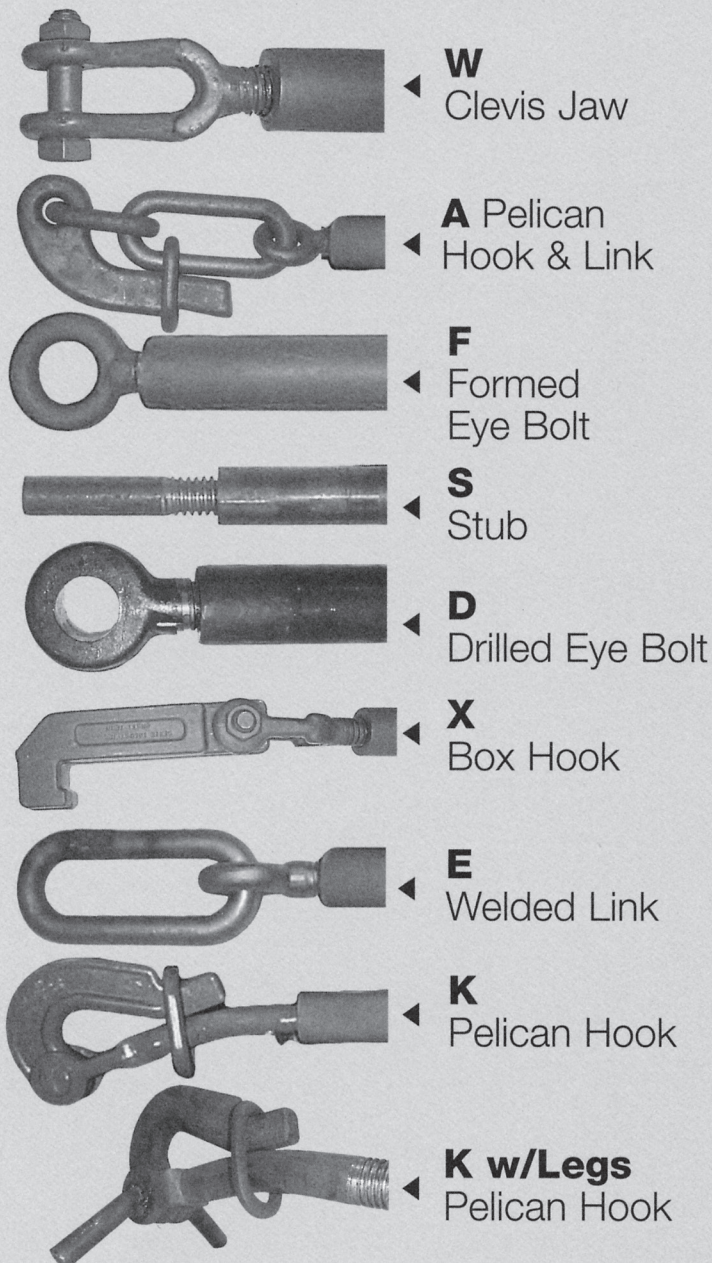
PATTERSON

SAFER.EASIER.FASTER.

River Ratchets (Steamboat ratchets)



End Fitting Choices



Handle Choices: The double acting pawls are spring loaded so that the ratcheting can be done at any angle. The loose pawl design works by gravity and is thus only effective when the handle is in the nearly vertical position.

Specify your river ratchet

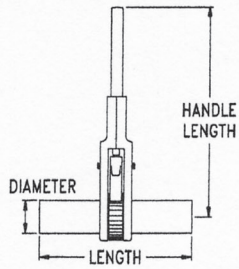
- 1 Choose the screw diameter** to suit your needs. Please apply a minimum 4 to 1 design factor when making your selection. For example, if your design load is 10,000 lbs. maximum, then a 1 " ratchet with a 40,000 lb. MBS would be the minimum strength required.
- 2 Specify the barrel length** as determined by amount of take-up required.
Barrel length = Required take-up plus 2 times the screw diameter. In general 18" to 36" in 6" increments are standard, but other lengths can be supplied upon request.
- 3 Pick the end fittings** for each end (left and right) to best suit your application. Ratchets and end fittings are designed for straight line pull tension applications only.
- 4 Select handle type** (spring loaded or loose pawl). See handle information on this page.

Dimensions All dimensions are inches.



Made in USA

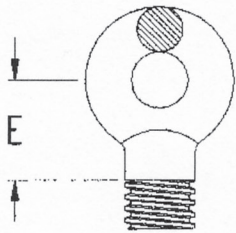
Handles / Barrels



Screw Dia. (Inches)	Barrel Pipe O.D. (Inches)	WLL*	MBS** (Lbs.)	Standard Handles Length (In.)
5/8	1 5/16	2,600	7,800	10 1/2
3/4	1 5/16	5,400	16,200	12 3/8
1	1 1/2	13,000	39,000	14
1 3/8	2 3/8	28,300	85,000	22 /19 LOOSE PAWL
1 3/4	2 7/8	42,000	126,000	22 /19 LOOSE PAWL
2	3 1/2	55,000	165,000	26

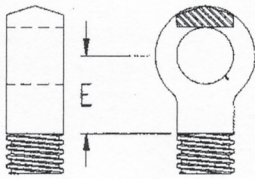
*WLL=Working Load Limit. **MBS=Minimum Breaking Strength. Welded End Fittings will reduce breaking strength. Ratings are for straight tension applications only.
Note: Ratchet located center of barrel unless specified otherwise.

Eyebolts Formed For use with chain or wire rope



Shank Diameter	Thickness	Outside Diameter	Size of Pin that will fit through Eyebolt	Center of Hole to Last Usable Thread (E)
5/8	1/2	1 3/4	1 1/16	1
3/4	9/16	2 1/32	7/8	1 1/2
1	3/4	2 1/2	1 5/16	2
1 3/8	1 1/8	3 1/2	1 1/4	2 1/2
1 3/4	1 1/4	4	1 7/16	2 5/8
2	1 5/16	4 1/4	1 9/16	2 3/4

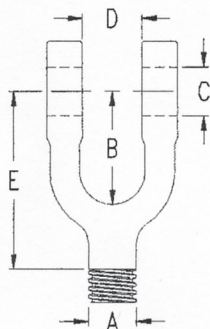
Eyebolts Drilled For use with pins or bolts



Shank Diameter	Thickness	Outside Diameter	Max. Inside Diameter of Drilled Hole	Suggested Inside Dia. of Drilled Hole	Center of Hole to Last Usable Thread (E)
1	1	2 5/16	1 3/16	3/4	1 7/8
1 3/8	1 3/8	3 1/4	1 3/4	1 5/16	2 1/2
1 3/4	1 3/4	3 3/4	2	1 11/16	2 15/16
2	2	4 3/16	2 1/4	2 1/16	2 3/4

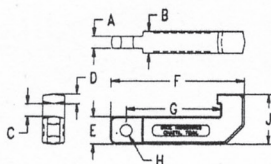
Actual hole size must be specified. If hole is 1" or less increments of 1/16" are acceptable. If the hole size is larger than 1" the standard increment is 1/8".

Clevis Jaws



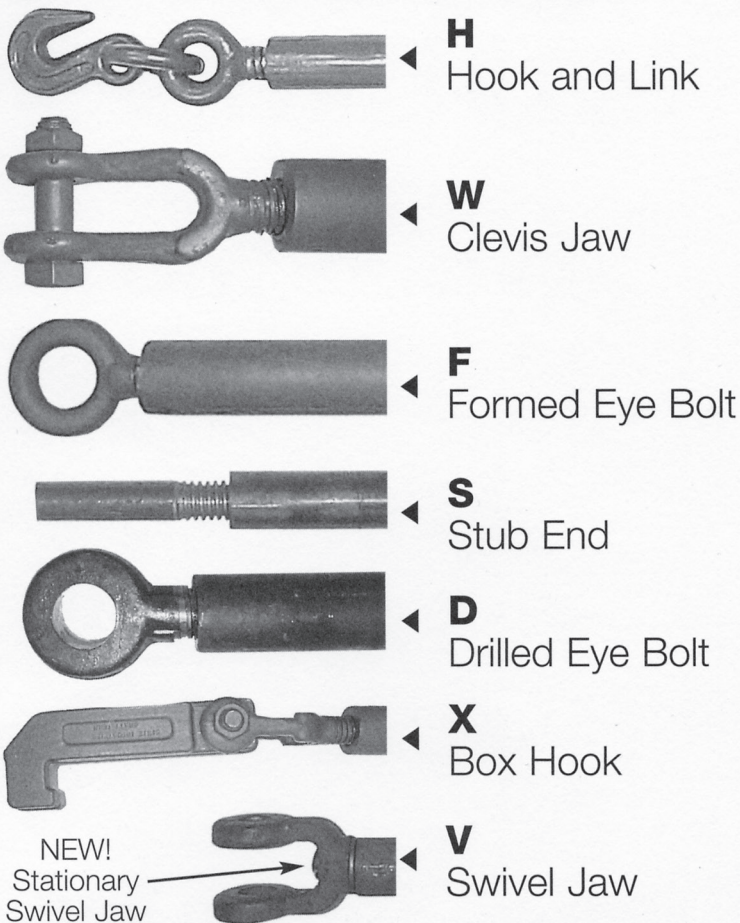
Shank Diameter	Throat To Hole Center	Suggested Bolt Size	Throat Opening	Center of Hole to Last Usable Thread
A	B	C	D	E
1	2 1/2	7/8	1 1/8	4
1 3/8	3 1/2	1	1 1/4	5 1/2
† 1 3/8	1 3/4	1	1 3/8	3 1/4
1 3/4	3 7/8	1 5/8	2 3/8	6 1/2
† 1 3/4	1 7/8	1 5/8	1 1/4	4 1/2
2	4 7/8	2	2 1/2	7 1/2
†† Use w/1" Barrel	1 5/8	7/8	1 1/8	N/A
†=Special Run Item		††=Stationary Swivel Jaw		

Box Hooks

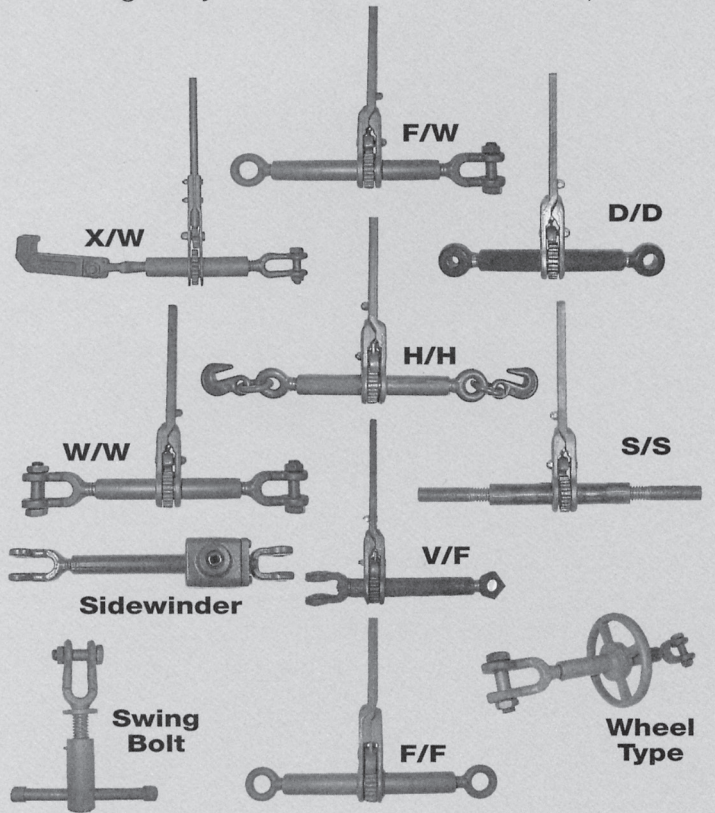


A	B	C	D	E	F	G	H
1 1/8	2.00	1 3/16	1 5/16	2.5	12 3/16	8 5/8	1 1/16

End Fitting Choices



We offer **any** combination of the End Fittings pictured above. Below are a few example configurations. (All end fittings may not be available for all sizes.)



Specify your ratchet...

1 Choose the barrel diameter and screw size to suit your needs based on breaking strengths and dimensions shown on Dimensions page. Apply in straight tension only with a minimum safety factor of 3 to 1.

2 Specify the barrel length as determined by amount of take-up required. Barrel length = Required take-up plus 2 times the screw diameter. (Round final calculated barrel length up to nearest even inch.)

Example: Required Take-up = 8 inches. Screw Diameter = 1 inch.

$8 \text{ inches} + (2 \times 1 \text{ inch}) = 10 \text{ inches.}$

The Barrel Length would be 10 inches.

3 Pick the end fittings for each end (left and right) to best suit your application. Ratchets and end fittings are designed for straight line pull tension applications only.

F273 SOCKET (I.S.O. - FLUSH)

DIMENSIONAL DATA
COMMERCIAL TOLERANCE APPLIES

SPECIFICATIONS

MATERIAL

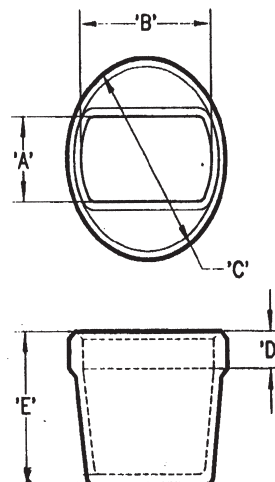
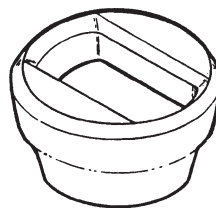
CAST STEEL

STRENGTH: STRENGTH SHOWN IN TONNES

	TENSION	SHEAR	COMPRESSION
SAFE WORKING LOAD:	25	25	75
PROOF LOAD:	37.5	37.5	112.5
MINIMUM BREAK:	50	50	150

FINISH:

SELF COLORED



MODEL NO.	DIM.	'A'	'B'	'C'	'D'	'E'	WEIGHT KGS. (LBS.)
F273-1-OF	MM	64.7	125.4	152.4	28.6	116.0	5.3
	(INCH)	(2.54)	(4.94)	(6.00)	(1.13)	4.57	(11.7)

F476 TWISTLOCK STACKER (FIXED BASE)

DIMENSIONAL DATA
COMMERCIAL TOLERANCE APPLIES

SPECIFICATIONS

MATERIAL:

CONE - FORGED STEEL
BODY-DUCTILE IRON

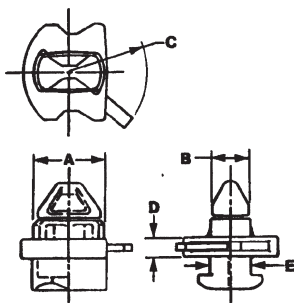
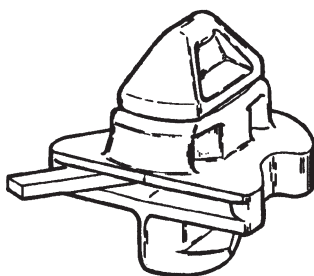
STRENGTH:

TENSION	34 TONNES
SHEAR	48 TONNES
COMPRESSION	150 TONNES

TESTING: TWISTLOCK IS TESTED PER A.B.S.

FINISH:

GALVANIZED



MODEL NO.	DIM	A	B	C	D	E	WT KGS. (LBS.)
F476-R-C	MM	115.9	81.0	146.1	29.3	59.0	8.3
	(INCH)	(4.56)	(2.40)	(5.75)	(1.15)	(2.32)	(13.9)

SPECIFICATIONS

MATERIAL:

D-RING: FORGED STEEL
STRAP: PLATE STEEL

STRENGTH:

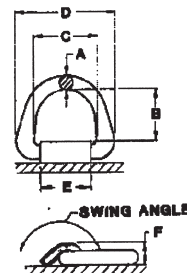
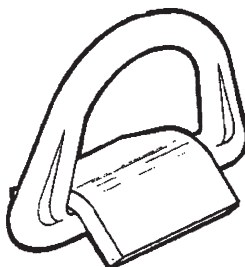
6.6 TONNES M.B.S. PULL AT 45 °

FINISH:

SELF COLORED

F187 D-RING & STRAP

DIMENSIONAL DATA
COMMERCIAL TOLERANCE APPLIES



MODEL NO.	DIM	A	B	C	D	E	F	WT KGS. (LBS.)
F187-20/2	MM	12.7	28.6	60.3	95.2	60.8	22.0	0.5
	(INCH)	(.500)	(1.13)	(2.38)	(3.75)	(2.00)	(0.88)	(1.00)

probably from Louisiana if...

You can list all the ingredients of a gumbo or a jambalaya

F643 'D' - RING & STRAP

SPECIFICATIONS

MATERIAL:

'D'-RING: FORGED STEEL
STRAP: PLATE STEEL

STRENGTH:

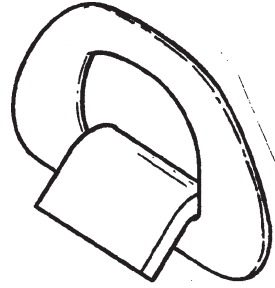
50 TONNES M.B.S. PULL AT 45 °

FINISH:

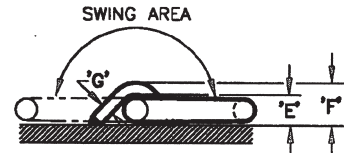
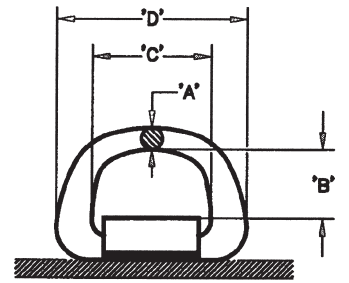
SELF COLORED

WEIGHT:

4.7 KGS. (10.3 LBS.)



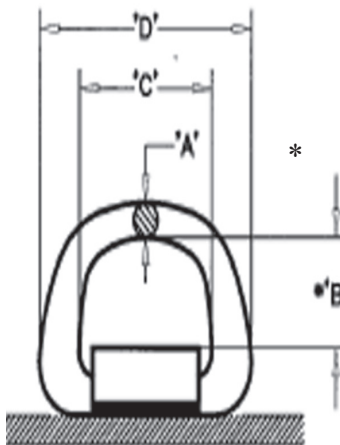
DIMENSIONAL DATA
COMMERCIAL TOLERANCE APPLIES



MODEL NO.	DIM.	'A'	'B'	'C'	'D'	'E'	'F'	'G'
'D'-RING F643-1	MM	25.4	67.2	127.0	222.3	36.0	51.9	15.8
STRAP F643-2	(INCH)	(1.00)	(2.65)	(5.00)	(8.75)	(1.42)	(2.04)	(0.63)

F654 'D' - RING & STRAP

DIMENSIONAL DATA
COMMERCIAL TOLERANCE APPLIES



SPECIFICATIONS

MATERIAL:

'D'-RING: FORGED STEEL STRAP: PLATE STEEL

STRENGTH: PULL AT 45°

SAFE WORKING LOAD 54,000 Lbs.
PROOF LOAD: 60,000 Lbs.
MINIMUM BREAK STRENGTH: 90,000 Lbs.

FINISH:

SELF COLORED

WEIGHT:

3.5 KGS. [7.6 LBS.]

MODEL NO.	DIM.	'A'	*'B'	'C'	'D'	'E'	'F'	'G'
'D'-RING F654-1	MM	23.0	79.4	127.0	203.2	31.8	44.5	12.7
STRAP F654-2	(INCH)	(0.91)	(3.13)	(5.00)	(8.00)	(1.25)	(1.75)	(0.50)

*'B' dimension is with 'D' -Ring in tension

De Deer Hunt

Boudreaux. Thibodeaux. and a bunch of deir buddies waz out on a deer-hunting trip.

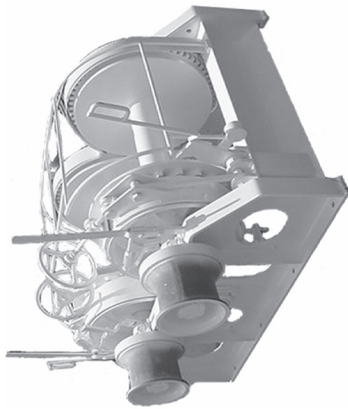
Late one afternoon. Boudreaux walks into camp carrying a huge buck on his back. One of de guys axed.

"Where is Thibodeaux?"

Boudreaux tells him, "He's back dare in de woods a couple of miles. I t'ink he dun had heemself a heart attack or sumt' ing."

De buddies were all shocked dey asks. "Doyo mean dat you carried dat buck back, and lef poor Thibodeaux laying out der in de woods?"

Boudreaux says. "Mais, yeh. it was a tough choice to make. but I figured nobody's gonna steal Thibodeaux!"



SPECIFICATIONS FOR HOISTS

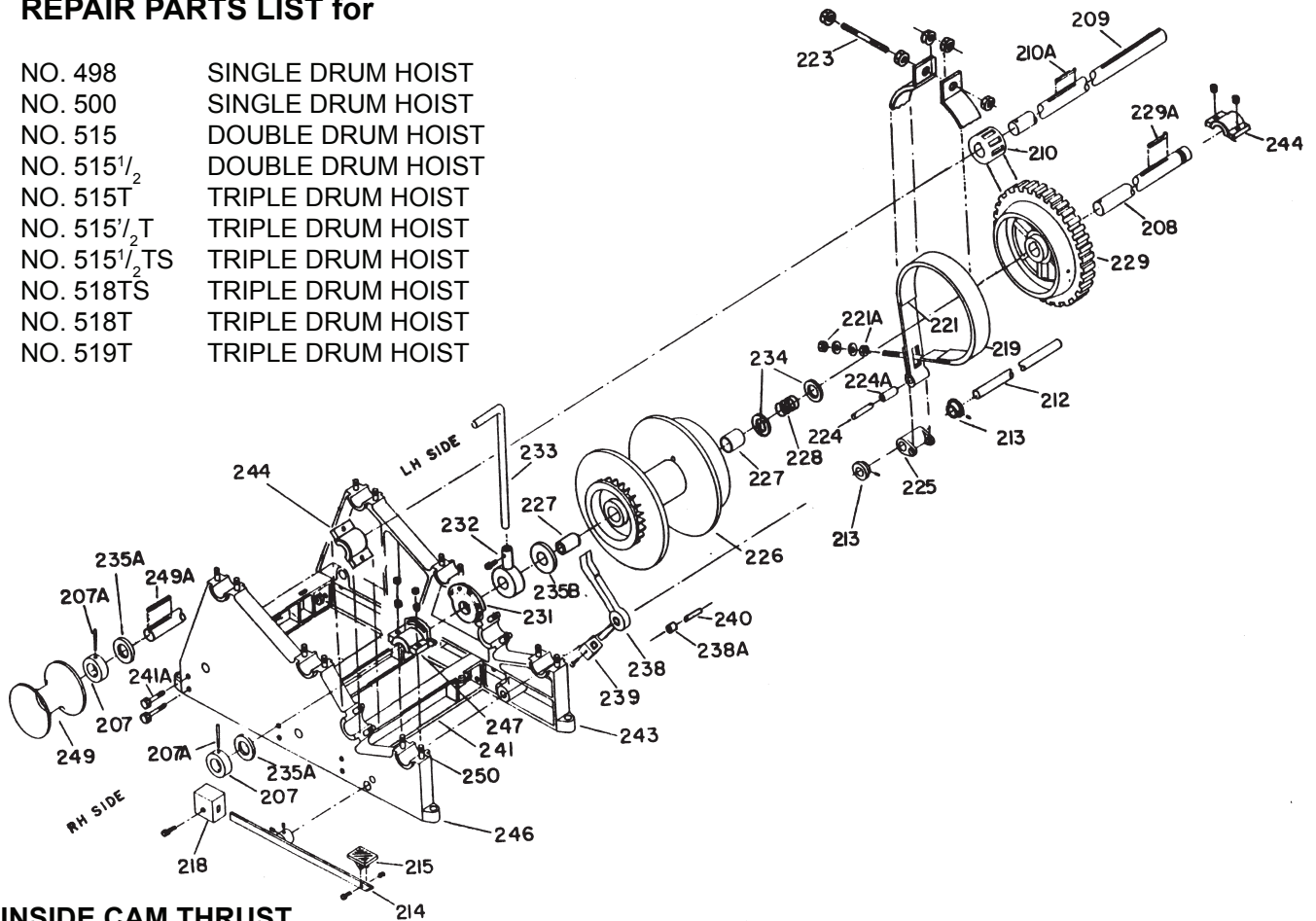
FOR ESTIMATING PURPOSES ONLY:
THE MANUFACTURER RESERVES THE RIGHT TO CHANGE OR MODIFY THE EQUIPMENT SPECIFICATIONS OR THE DESIGN AS HEREIN SET FORTH PRIOR TO CERTIFICATION DATE WITHOUT INCURRING ANY OBLIGATION DUE TO PRIOR OR CURRENT DESIGN PROPOSALS.

* FOR MAIN DRUM WIRE ROPE CAPACITIES SEE DOUBLE DRUM HOIST WIRE ROPE CAPACITIES.

STROUDSBURG HOISTS

REPAIR PARTS LIST for

NO. 498	SINGLE DRUM HOIST
NO. 500	SINGLE DRUM HOIST
NO. 515	DOUBLE DRUM HOIST
NO. 515 ¹ / ₂	DOUBLE DRUM HOIST
NO. 515T	TRIPLE DRUM HOIST
NO. 515 ¹ / ₂ T	TRIPLE DRUM HOIST
NO. 515 ¹ / ₂ TS	TRIPLE DRUM HOIST
NO. 518TS	TRIPLE DRUM HOIST
NO. 518T	TRIPLE DRUM HOIST
NO. 519T	TRIPLE DRUM HOIST

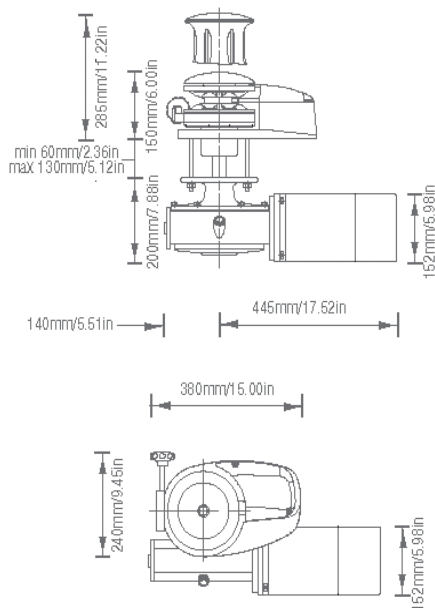


INSIDE CAM THRUST

207	- DRUM SHAFT COLLAR.	231*	- STATIONARY FRICTION CAM.
207A	- DRUM SHAFT COLLAR TAPER PIN.	232*	- MOVABLE FRICTION CAM.
208*	- DRUM SHAFT.	233	- MOVABLE FRICTION CAM LEVER.
209	- PINION SHAFT.	234	- STEEL DRUM SPRING WASHER.
210	- MAIN DRIVE PINION.	235A	- OUTSIDE BRONZE THRUST WASHER.
210A	- MAIN DRIVE PINION KEY.	235B	- INSIDE BRONZE THRUST WASHER.
212*	- BRAKE SHAFT.	238*	- DRUM PAWL WITH BUSHING.
213	- BRAKE SHAFT COLLAR.	238A	- DRUM PAWL BUSHING.
214	- BRAKE LEVER ASSEMBLY LESS WEIGHT, #218.	239*	- DRUM PAWL WEIGHT.
215	- BRAKE LEVER FOOT PAD.	240	- DRUM PAWL PIN.
218	- BRAKE LEVER WEIGHT.	241*	- CROSS BEAM.
219*	- BRAKE BAND COMPLETE WITH LINING.	241A	- CROSS BEAM MOUNTING BOLTS AND NUTS.
221*	- BRAKE LINING.	243	- LEFT HAND SIDE FRAME.
221A	- NUTS AND WASHERS FOR BRAKE END BOLT.	244	- L.H. DRUM SHAFT CAP; R.H. OR L.H. PINION SHAFT CAP.
223	- BRAKE BAND BOLT AND NUTS.	246	- RIGHT HAND SIDE FRAME.
224	- BRAKE BAND TOGGLE PIN.	247*	- DRUM SHAFT CAP FOR R.H. SIDE FRAME.
224A	- BRAKE BAND TOGGLE PIN BUSHING.	249	- WINCH HEAD.
225	- BRAKE BAND TOGGLE.	249A	- WINCH HEAD KEY.
226*	- FRICTION DRUM.	250	- BEARING CAP STUDS WITH NUTS.
227	- FRICTION DRUM BUSHING.	251	- GEAR GUARD ASSEMBLY (NOW SHOWN); SPECIFY MODEL HOIST FOR WHICH GUARD IS REQUIRED.
228	- FRICTION DRUM SPRING.		
229	- FRICTION GEAR.		
229A	- FRICTION GEAR KEY.		
230	- FRICTION GEAR RING (NOT SHOWN) MODEL #498, 515 AND 51ST HOISTS ONLY.		

*SPECIFY FOR WHICH DRUM PART IS REQUIRED; LOWER, MIDDLE OR UPPER.

Vertical electric winlasses in low profile or capstan versions



VERTICAL

LOFRANS WINDLASSES

Project 2000

Vertical all chain windlass for boats from 59'-82'.
The Project 2000 is ideal for larger, bluewater yachts both new and classic. Capstan version handles $\frac{9}{16}$ " - $\frac{3}{4}$ " rope.

Standard Equipment

Two footswitches
Watertight control box
Clutch/manual operation handle
Brake band

FEATURES

Finish	Chrome
Motor	Dual Direction, Series Wound
Gearbox	Stainless Worm Drive Radially Adjustable
Gears	Bronze
Mainshaft	Stainless
Chainpipe	Fixed
Chain Stripper	Stainless
Mounting Hardware	SS Studs, Washers and Nuts
Manual Override	Standard
Rope Capstan	Optional
Extra Deck Clearance	Optional (to 6")

SPECIFICATIONS

Power Supply	24V	24V
Motor Wattage	2000W	2500W
Power Rating (lbs.)	2800	3100
Approx. Amp Draw	90-110	100-120
Max Retrieval Speed (ft./min.)	78	78
Chain Size	$\frac{9}{16}$ " , $\frac{3}{8}$ " , $\frac{1}{2}$ " , $\frac{1}{2}$ "	
Rope Size	$\frac{9}{16}$ " - $\frac{3}{4}$ " (Capstan only)	
Net Weight (lbs.)	159	159

Doya know who dat is?

Boudreaux and Marie were mad at each udder. Dey drove several miles down de road wit'out saying a word after de argument dey had earlier.

Neider one of dem waz gonna give in to de udder an' admit dat dey might be wrong.

As dey passed a barnyard wit a bunch of mules and pigs standin' aroun'. Marie sarcastically axed Boudreaux. "Ees dat relatives of yours?"

Boudreaux answered. "Yep, dats ma in-laws".

Index Section C

ENGINE ROOM

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Private Enterprise vs Government Subsidy

Lessons from History

(adapted from an address by Burt Folsom, author of Myth of the Robber Barons)

We are in the midst of a war of ideas regarding the marketplace and morality in the marketplace. The free market is under attack. Open competition and entrepreneurship are being attacked as to whether they are the best methods for providing economic growth and prosperity to the United States. The competing model, big, invasive government, has been gaining unwarranted support throughout the twentieth century. The big government model rests on three points: (1) the free market is inefficient and therefore we need big government to step in and regulate, (2) most businessmen are “robber barons” and their corruption causes the need for government to intervene and regulate, and (3) government can produce economic development efficiently. We have seen the big government model in the New Deal, the Great Society and the proposed Clinton health plan. This has caused some people, who have not had either time or inclination for reflection, to conclude that if the government model is growing then big government must work better, be more efficient, and perhaps be more moral than capitalism. This would be a very wrong conclusion to draw based upon historical precedents. There have been times in history when the entrepreneurial free market and big government were at work on the same problem simultaneously. Competing head-to-head, the free market has always proved far more efficient than our own government.

Cornelius Vanderbilt vs Collins and Congress

The steamship industry was America's first serious large-scale industry. In the steamship industry we had new technological developments allowing people to cross the ocean in about a two week period. In the 1840's, how would these new possibilities for trade be approached with faster transportation now available? Would private industry step forward to provide the answer? A man named Edward Collins came to Congress with an idea. He said, “If you will give me \$385,000 per year, I believe I can deliver passengers between England and the United States for \$200 each. I can also do freight and mail, charging for those things of course, and if you will just give me a \$385,000 subsidy, I will be glad to undertake this for you. And oh, by the way, could you build four ships for me, too?” It would come to \$3,000,000, but Congress went for the offer and Collins was underway. Collins claimed before the first ship sailed that he would become more efficient and later would require no subsidies. But in each year of his enterprise, Mr. Collins came back to Congress asking for, not for a decrease, but an increase. He was soon up- to six, seven, then eight hundred thousand dollars a year!

Finally, Cornelius Vanderbilt, a steamboat operator on the east coast, went to Congress and said, “Enough of this! It is completely inefficient.” He told Congress, “I don't know what Mr. Collins is going to ask for this year, but whatever it is, I will do it for half.” Congress went into great debate, but eventually granted Collins his subsidy (with increase) because they said they didn't know if Vanderbilt could actually do it. So Vanderbilt decided if that was the way they wanted it, then with no subsidy he would compete against Mr. Collins. The competition was under way between the privately financed ship of Commodore Vanderbilt and the government subsidized Collins Line. Vanderbilt announced his entry into the competition, adding, “...by the way, I intend to charge less- none of this \$200 per passenger!” Vanderbilt created the third class fare, sometimes called the sardine class because they were packed together so closely on board. But for \$30.00 he made it possible for many more people to afford the voyage on his ship. This is the way many immigrants came to this country. He also saved on fuel by going a little slower, and cut his insurance cost. He even commissioned runners to bring people to his ship. After one year, Vanderbilt was flourishing and Collins was in trouble. Collins' response was to go to Congress and request another increase in his subsidy in order to compete with Vanderbilt. So efficient was Vanderbilt that Collins demanded \$900,000 from Congress. It was debated whether to give Collins \$900,000 or go with Vanderbilt, who had promised to do it for nothing. To help Congress make up its mind, Collins invited them on board his ship (paid for by taxpayers) to wine and dine them. Congress came away convinced they needed to remain committed to Mr. Collins, feeling that since they had started with him it would be dishonest to take away his subsidy now. Still, Collins was nervous. The vote had been close. He decided to run his ships a little faster and promote them as being the most efficient means of travel between Liverpool and New York City. The results were one ship sunk, with four hundred people aboard. Another ship, sailing from New York on April 18 of 1856, has yet to arrive (many think it never will). Collins, faced with the humiliation of the loss of half of his fleet and many lives, now had to go back to Congress to request another increase in subsidy and yet another ship so he could compete with Vanderbilt. Had Congress' seen enough?

Congress built him another ship! Unfortunately, it was poorly built and made only one crossing. The ship cost \$1,000,000 to build, and had to be sold at a loss of over \$900,000. Collins was now in the awkward (but now familiar) position of having to go back to Congress. Finally, the “Just Say No” campaign took effect. Congress became furious. Many congressmen believed that there should be no more federal subsidies in the future, and- that matters should be decided by open competition. Collins had his subsidy completely stripped, leaving him to compete head-to-head with Vanderbilt. Within one year the collies Line was bankrupt!

The Great Northern vs Subsidized Railroads

I wish it could be said that Congress had learned its lesson, but within ten years there were people coming to Congress with a great idea to span the nation with transcontinental railroads, linking California with New York. The Union Pacific and the Central Pacific came to Congress requesting a subsidy to build their lines, as did the Northern Pacific and the Atcheson, Topeka and the Sante Fe. Three of the four were transcontinentals, . all received Federal subsidies of either cash, land, or both. In the midst of this was one company that built and operated across the continent with no subsidies: the Great Northern, built by James Hill. The US. had three transcontinentals with subsidies and one without. The three transcontinental railroads that received Federal subsidies all went bankrupt. These railroads had few incentives to build efficiently, only to grab their subsidies and run. The Great Northern did not, and succeeded. The transcontinentals afford us yet another comparison between private enterprise and government-supported enterprise, even before the twentieth century.

Andrew Carnegie vs Federalized Steel Production

Another example comes from the steel industry. This industry was crucial to the United States becoming a world economic power. Carnegie Steel was founded by Andrew Carnegie in 1872. At the time, England was the biggest steel producer in the world. The price of steel rail was about sixty dollars per ton. Carnegie was incredibly innovative. He adopted the Bessemer process, the open hearth, and tried new methods of accounting to make his company more efficient. He applied a merit system that: rewarded employees for good ideas, and put those ideas into practice.. He became so adept at cutting costs that, by 1900, Andrew Carnegie could produce steel rail for eleven dollars per ton, while England was still producing steel at twenty-five dollars per ton. Carnegie Steel, the forerunner of U.S. Steel, was now producing more rail than the entire country of England. We had gone from being second rate to being the dominant producer of steel in the world. Carnegie's was an incredible performance and vindication of the free market. But a Sen. Bill Tillman of South Carolina called the steel companies greedy because of the fortune Carnegie had made in steel. The reasoning was that if there was profit, then there must be oppression there too. President Woodrow Wilson became convinced of the need for a government-run steel mill to compete with the privately run steel mills. After long debate, in 1920 the U.S. finally got its first steel mill run by bureaucrats. The plant, built in Charleston, West Virginia, began by building armor plate. \$17,500,000 later, the first armor plate came off the mill. The cost was about eight hundred dollars per ton! The next president, Warren G. Harding, closed the government's steel mill.

Virtually none of these aforementioned examples can be found in any college level textbook. How can we draw effective conclusions about the proper role of government in our economy if we are unaware of how it has performed in the past. Here is another example:

Smaller Slices of a Growing Pie vs Bigger Slices of a Shrinking Pie

We are all familiar with the Misery Index-a term invented in the 70's-where the percentage of inflation is added to the percentage of unemployment to produce a value that is called the Misery Index. The federal income tax is essential to big government as its largest source of revenue. The federal income tax was enacted in 1913. One of the first things those income tax dollars went for was that government funded steel mill. We have had fifteen presidents since that time. Can you guess which three presidents in that period have had the lowest misery indices? The three lowest indices were during the administrations of. Calvin Coolidge, Ronald Reagan (both terms), and John F Kennedy. And what did these three presidents have in common? Tax Cuts! These presidents were the only three in the last eighty years to cut tax rates. In all three administrations, a decrease in the tax rate produced an increase in government revenues. Investors who had previously sought to avoid punitive tax rates by seeking tax-favored investments, tax exempt municipal bonds and similar investment schemes, brought their money back into the economy, producing "a bigger pie." Seventy percent of nothing is nothing but twenty five percent of something is something, and that is what Coolidge did. The top marginal rate was 73% when Harding/Coolidge took office and was 25% when Coolidge left. The rate on the lowest end was 4% and it dropped to .5%-an eight-fold cut. There was a three-fold cut at the top level and an eight-fold cut at the bottom. These lower rates generated a billion dollars more in 1929 than had been previously generated with the higher rates earlier in the decade. Tax revenues increased by roughly 30% when the marginal rates were reduced. Kennedy and Reagan also found this to be true. In 1980, under Reagan, when the top rate was 70% the Federal government took in approximately 500 billion dollars. In 1990, when the top rate was 28% the Federal government took in one trillion dollars-roughly twice as much because investment comes back into the economy. Unfortunately, the facts of history get lost in the political spin. Capitalism is the most moral, efficient and equitable system of economic exchange in history. But beyond that, it favors the underdog. Entrenched old wealth has no advantage in the free market. The best example that comes to mind is that of Will Kellogg.

The Power of an Idea in a Free Market

The story of Will Kellogg is really the story of two brothers, Will and his eight years older brother. His brother, John Harvey Kellogg, was an “A” student and always the teachers pet. He became a physician, erected his own hospital in Battle Creek, Michigan, and became one of the wealthiest people in the community with an estate that covered an entire city block.

Will Kellogg went through school with this hanging over him. Everyone asked, “Why can’t you do as well as your brother?” Will dropped out at the age of 12. His parents owned a broom factory and thought they would put him to work making brooms. He wasn’t very good, so they put him to work selling them. Unfortunately, his technique wasn’t very good with that either. Will Kellogg was the consummate failure. His parents would put him in business, he would fail, then come back home. Finally, at the age of 20, his parents shoved him out of the house to work for his brother. To get an idea of the work he did for his brother at the hospital, his nickname was “J.H. s Lucky.” He shined his brother’s shoes and was often seen in the morning running behind John’s bicycle taking notes on what he would have him do during the day. He took all sorts of abuse from his brother, and even had to give his brother a shave.

Will worked for his brother 25 years and was never paid more than twenty dollars a week, in spite of the fact that the hospital was grossing over four million dollars. One of Will Kellogg’s jobs was to prepare food and feed patients at the hospital. One of the foods he had to prepare was a moist wheat meal for breakfast. Will would roll this wheat meal out, cut it into squares, and serve it. One night he laid it out, but got distracted and never got around to rolling it. The next morning, fearing John’s wrath if he found the mistake, Will ran the roller over the now dry wheat meal. Instead of wet meal, what came out was a flake. Will took the flakes to his brother and said, “Look what I have done! Let’s serve into the patients,” and John Harvey agreed. The patients liked it and wanted it the next day. The patients even called to see how they could get it after they went home! Will Kellogg had an idea. Why not market these flaked cereals (they had corn, oat and others by now)? John Harvey felt that it was beneath his station to go into business for “filthy lucre” as he called it. He refused again and again, provoking Will to quit. John told him, “Well, if you are going to make this cereal you will have to buy the patents from me!” So Will had to take the life savings he had accumulated on his \$20 per week salary and buy the patents from his brother. Will Kellogg was not a man with an education or a brilliant mind, but he was a man with a good idea, and he was persistent. Will Kellogg was on his own at 46 years old, ready to be an entrepreneur, and a creativity began to appear that no one knew he possessed. He experimented with four color advertisements in magazines-very innovative in the early 1900’s. He had Norman Rockwell design cereal covers for him! He developed test marketing to determine which kinds of cereals people wanted most and how much of each to produce. What he found was that most people preferred corn flakes. But he still hadn’t cracked the New York market. Until he cracked New York he couldn’t play the commercial game. Will Kellogg had an idea about how to sell Corn Flakes in New York. He would have a special promotion called “Wednesday Is Wink Day!” Every Wednesday, if a woman went into her grocer and winked, she got a free box of Kellogg’s Corn Flakes. This was risque stuff in 1910! A wild idea, but in a free market wild ideas get to compete with the more established ones. Will’s idea was so successful that, after this campaign, regular shipments of Corn Flakes to New York City went from 2 train car loads to 30 train car loads. Kellogg had conquered the New York market and had a product he could sell nationally. By 1940, he was one of the wealthiest people in America.

The free market gives everybody a second chance. Big government may still hold appeal in the political arena, but in the real world, it cannot offer each individual hope for personal prosperity, family security and individual liberty.

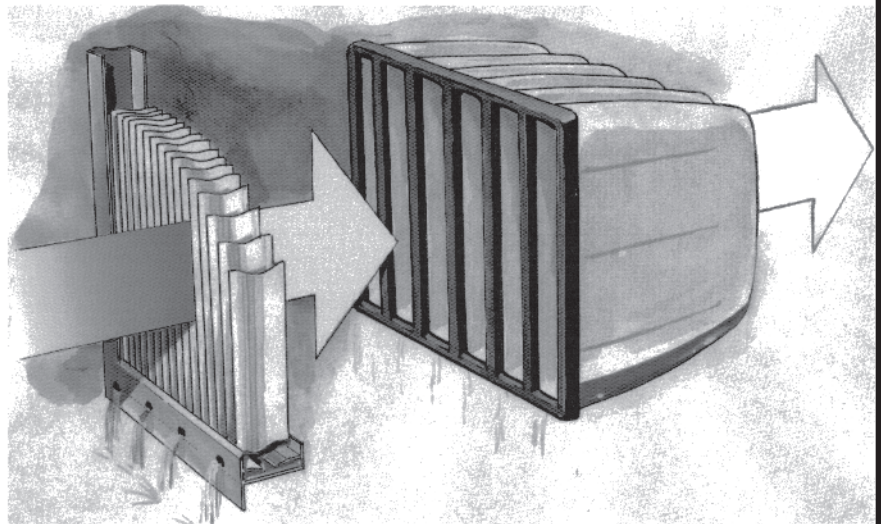
Wide Infinidry: 2-stage Marine Air Intake System

This ultra-compact Marine Air Intake System in a 2 stage configuration is a marked advancement in Air Intake technology. Combining the high-efficiency Wide ME moisture separator with the newly developed and patented Filtrair PTL-DS "Drop-Safe" pocket filter represent a totally re-engineered Marine Air Intake design-philosophy: The Wide IFD (InFiniDry)

The forward-draining, non-reentrainment pocket filter provide highest quality air filtration and water separation in the same stage.

Consequently, the Wide Infinidry 2-stage system outperforms traditional 3 and 4-stage systems on all accounts:

- **Dramatically reduced pressure drop.**
- **No water or salt re-entrainment**
- **Eliminating salt deposit build-up downstream of filter bag**
- **Reduced maintenance cost.**
- **Reduced installation cost.**
- **More compact filter house.**



FIRST STAGE: Moisture separation and coarse filtration.

First stage replaces traditional Louvre/Hood and Pre-Filter with a single stage high efficiency Wide ME moisture separator.

A first stage separator is usually kept very clean by occasional rough weather, requiring minimal additional maintenance.

Coarse dust and soot particles are also separated and then flushed out along with the water.

SECOND STAGE: Fine filtration, coalescing and drainage.

Traditionally, a Marine Filter also served as a coalescer, and the coalesced droplets were separated with another downstream mist separator.

Now, with the patented Filtrair PTL-DS, the very fine droplets entering the filter is not only coalesced, but also accumulated and drained into the water-sealed bottom of the pocket filter. From there the water is drained forward, and never enter the clean side. This completely eliminates the problem of saturated droplets entering the clean side and potentially contaminating clean-side air with salt and other water soluble contaminants.

Comprehensive performance data for system components are available from A.S. Wide.

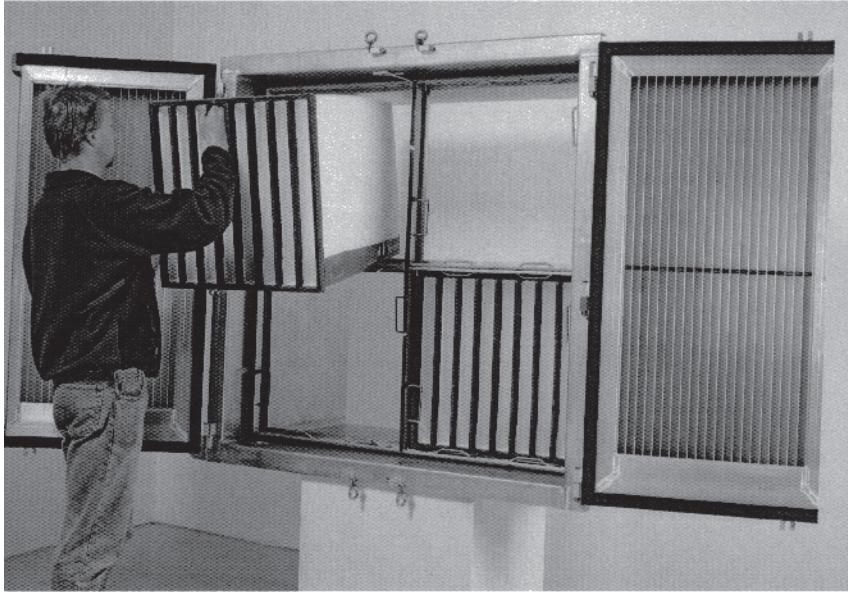
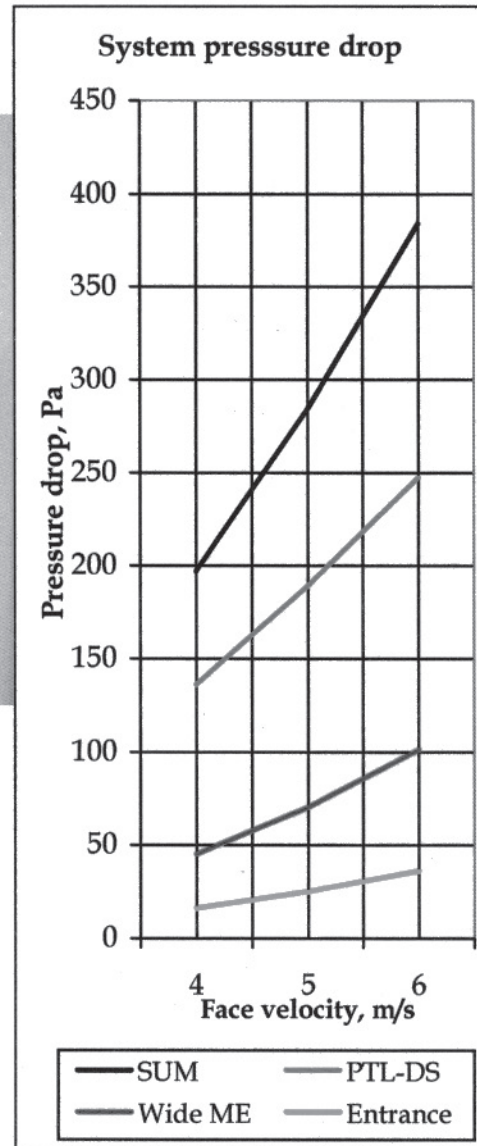
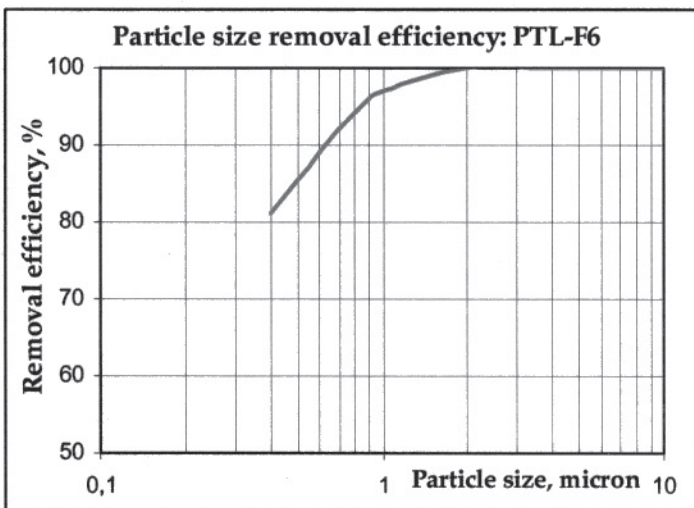


Photo: Four-bag front hinged Wide Infinidry. The Wide Infinidry 2-stage Marine Air Intake System is easily scalable from a single filter unit to large multi-bank systems for hundreds of filter bags.



System pressure drop.
Chart is based on uniform face velocity. Actual face velocity should be calculated for each design to determine correct pressure drop for each stage.



Cincinnati fan

MODEL DDF DIRECT DRIVE RATING TABLES

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

Performance shown is for installation type D-Ducted inlet, Ducted outlet.

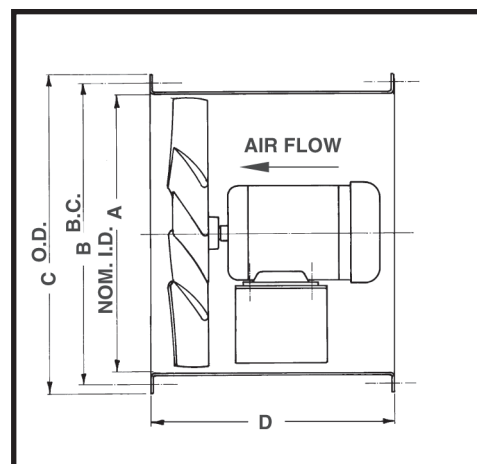
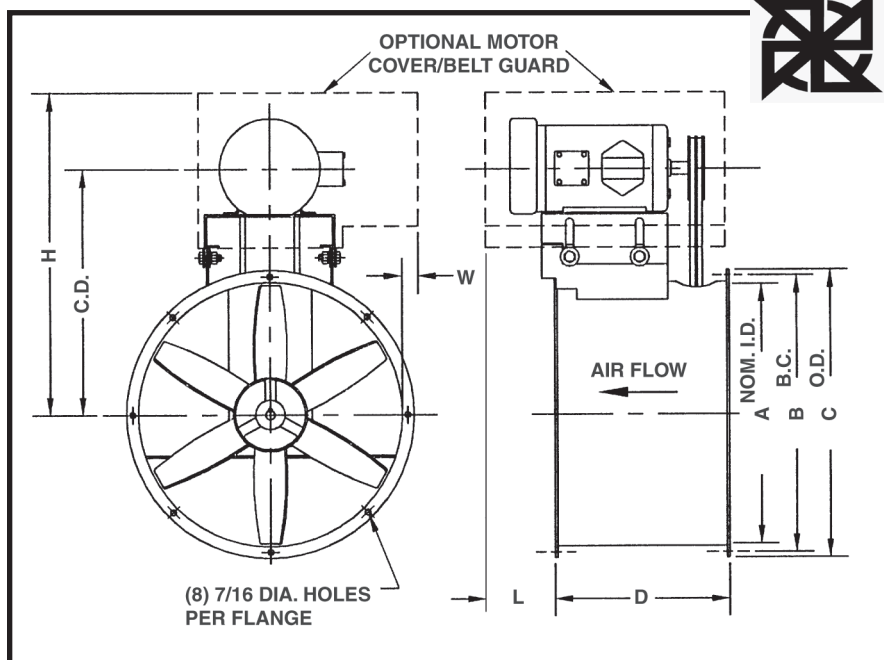
Performance ratings do not include the effects of appurtenances in the airstream.

FAN SIZE	PROP NO.	MOTOR HP	FAN RPM	1/8" SP CFM BHP	1/4" SP CFM BHP	3/8" SP CFM BHP	1/2" SP CFM BHP	5/8" SP CFM BHP	3/4" SP CFM BHP	7/8" SP CFM BHP	1" SP CFM BHP	1 1/8" SP CFM BHP
12"	12-6-24	1/2	3450	2031 .40	1971 .40	1912 .41	1828 .44	1739 .46	1616 .48	1442 .50		
	12-4-30	3/4	3450	2449 .58	2368 .59	2286 .60	2196 .63	2102 .67	2008 .70	1886 .72	1764 .73	
15"	15-6-25	1/3	1750	2028 .17	1851 .18	1587 .20						
	15-6-36	1/3	1750	2369 .21	2147 .23	1794 .25						
	15-6-43	1/2	1750	2870 .48	2640 .49	2330 .49	1962 .39					
	15-6-25	1 1/2	3450	4200 1.22	4130 1.24	4061 1.25	3991 1.26	3922 1.28	3827 1.31	3728 1.35	3628 1.39	3529 1.43
	15-4-30	1 1/2	3450	4619 1.34	4505 1.38	4391 1.42	4277 1.46	4152 1.46	4025 1.46	3898 1.46	3769 1.46	3591 1.43
	15-6-36	2	3450	4967 1.55	4864 1.58	4762 1.61	4660 1.64	4558 1.67	4456 1.70	4331 1.75	4203 1.80	4075 1.85
18"	18-4-22A	1/3	1750	3205 .28	2906 .30	2505 .32						
	18-6-25	1/2	1750	3427 .27	3190 .31	2935 .34	2571 .40					
	18-6-35	1/2	1750	3937 .37	3648 .40	3316 .45	2779 .46					
	18-6-36	3/4	1750	4536 .65	4256 .68	3926 .70						
	18-6-43	1	1750	4977 .76	4747 .78	4457 .82	4130 .87	3705 .88				
24"	24-4-16A	3/4	1750	4870 .53	4560 .53	4015 .55	3280 .56	2515 .56	1880 .56			
	24-4-20A	1	1750	6854 .91	6331 .95	5785 .97	5233 1.02					
	24-6-31	1 1/2	1750	7345 1.12	6805 1.12	5950 1.12	4795 1.07	3300 1.09	2000 1.28			
	24-4-33	2	1750	9178 1.54	8729 1.63	8275 1.69	7821 1.74	7169 1.78	6425 1.78			
	24-6-41	3	1750	10314 2.30	9976 2.36	9637 2.43	9221 2.52	8793 2.62	8246 2.70	7601 2.75		
30"	30-6-22	3/4	1150	8037 .57	6749 .61	3672 .55						
	30-4-41	2	1150	12059 1.51	11241 1.55	10232 1.61	8616 1.71					
	30-7-40	3	1150	12633 1.91	12050 2.00	11257 2.12	10240 2.23					
	30-4-20A	2	1750	12483 1.68	11792 1.71	10974 1.76	10113 1.82	9188 1.89				
	30-6-22	3	1750	13192 1.88	12468 1.98	11700 2.10	10907 2.20	9907 2.12				
	30-4-41	7 1/2	1750	19014 5.24	18511 5.30	18008 5.36	17505 5.42	16863 5.50	16199 5.59	15534 5.67	14550 5.84	13488 6.00
	30-7-40	10	1750	19729 6.54	19346 6.68	18963 6.82	18579 6.96	18194 7.10	17646 7.29	17099 7.49	16552 7.68	15827 7.84
34"	34-6-29	1	1150	11916 1.09	10349 1.14							
	34-6-26	3	1150	15524 1.99	14623 2.09	13628 2.19	12323 2.26	10277 2.12				
	34-6-29	5	1750	19166 3.73	18377 3.81	17478 3.90	16464 3.99	15058 3.99				
	34-6-26	10	1750	24383 6.79	23808 6.95	23234 7.10	22659 7.26	22018 7.41	21364 7.57	20711 7.73	19961 7.86	19008 7.94
36"	36-6-25	1 1/2	1150	13814 1.42	12093 1.47							
	36-6-26	3	1150	18275 2.44	17312 2.58	16353 2.68	15198 2.77	13857 2.80	11818 2.70			
	36-6-25	5	1750	22329 4.85	21358 4.98	20344 5.08	19199 5.16	17924 5.19				
	36-6-26	10	1750	28522 8.28	27982 8.52	27388 8.75	26752 8.98	26104 9.15	25447 9.30	24852 9.47	24280 9.65	23375 9.73
42"	42-6-26	2	850	18525 1.78	16724 1.86	14196 1.86						
	42-6-26	5	1150	26890 4.03	25559 4.20	24210 4.35	22724 4.43	21058 4.48				
48"	48-6-19	2	850	20791 1.61	18327 1.72	15731 1.79	11495 1.78					
	48-6-30	5	850	27881 2.88	26156 3.10	24358 3.36	22027 3.56	18566 3.75	13018 3.95			
	48-6-19	5	1150	29574 3.78	27840 4.01	26032 4.17	24119 4.30	22236 4.41	20044 4.47			
	48-6-30	10	1150	38681 6.81	37518 7.21	36237 7.48	34932 7.84	33608 8.18	32137 8.46	30377 8.74	28246 9.02	25615 9.30

Little Things Mean A Lot

A FEW WASHERS

The **Story:** The \$1.6 billion Hubble Space telescope was launched into orbit on April 24 1990, and immediately needed repairs. Cost of the rescue mission: \$86 million. Cause of the problem: a few 250 washers that technicians used to fill in a gap in an optical testing device. No one noticed they were there ... until they shook loose.



DIMENSIONS IN INCHES±1/8"

FAN SIZE	MOTOR HP	ALL MODELS			D		FAN SHAFT O.D.		FAN SHAFT KEY		OPT. MOTOR/BELT COVER (1)		
		A	B	C	BAF & BAFA only	ALL OTHER MODELS	BAF & BAFA only	TAF, WAF, HTF, WAF/HTF & TAFA	BAF & BAFA only	TAF, WAF, HTF, WAF/HTF & TAFA	H MAX.	W MAX.	L MAX.
12	ALL	12	13 ^{1/8}	14 ^{1/2}	12	20	3/4	1	3/16	1/4	18 ^{9/16}	3 ^{1/16}	8
15	ALL	15	16 ^{1/8}	17 ^{1/2}	12	20	3/4	1	3/16	1/4	20 ^{1/2}	3 ^{3/4}	8
18	ALL	18	19 ^{1/8}	20 ^{1/2}	12	20	3/4	1	3/16	1/4	22 ^{5/16}	2 ^{5/16}	8
24	ALL	24	25 ^{13/16}	27 ^{1/4}	16	21	3/4	1 ^{3/16}	3/16	3/8	25 ^{3/8}	—	8 ^{1/2}
30	ALL	30	31 ^{3/4}	33 ^{1/4}	16	22	1	1 ^{7/16}	1/4	3/8	32 ^{3/16}	—	8 ^{9/16}
34	ALL	34	35 ^{11/16}	37 ^{1/4}	16	26	1	1 ^{7/16}	1/4	3/8	34 ^{3/8}	—	8 ^{9/16}
36	ALL	36	37 ^{7/8}	39 ^{1/4}	16	28	1	1 ^{7/16}	1/4	3/8	35 ^{13/16}	—	8 ^{1/2}
42	ALL	42	43 ^{9/16}	45 ^{1/4}	16	29	1	1 ^{7/16}	1/4	3/8	39 ^{1/16}	—	8 ^{1/2}
48	3-7 ^{1/2}	48	49 ^{5/8}	51	—	31	—	1 ^{7/16}	—	3/8	41 ^{5/8}	—	—
	10-15	48	49 ^{5/8}	51	—	31	—	1 ^{15/16}	—	1/2	42 ^{3/8}	—	—

(1) All models; height, length and width varies with motor frame size. Maximums are shown for each size.
For actual dimensions, consult white prints.

APPROX. SHIPPING WEIGHT LESS MOTOR

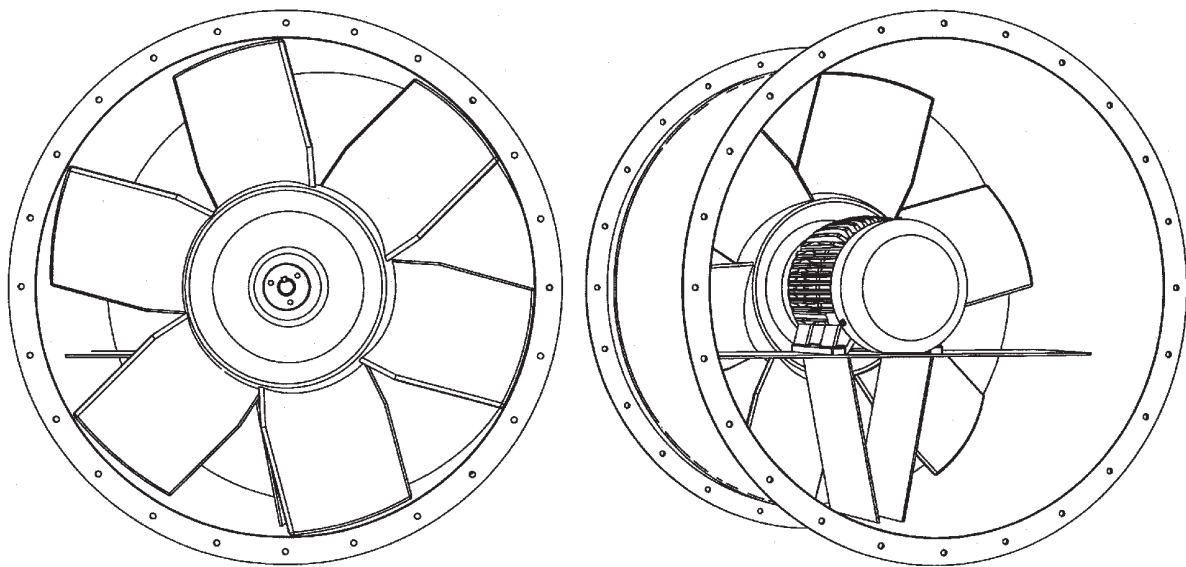
FAN SIZE	MODELS BAF & BAFA	MODELS TAF, WAF, HTF, WAF/HTF, & TAFA	MODEL DDF
12	36	70	30
15	55	75	50
18	68	85	64
24	108	145	80
30	130	180	95
34	180	270	160
36	190	295	180
42	225	410	205
48	—	530	270

Custom Fans available in many different configurations, housing thicknesses, materials, coatings & performances.
CALL FOR PRICING

Little Things Mean A Lot A PAINT SCRAPER

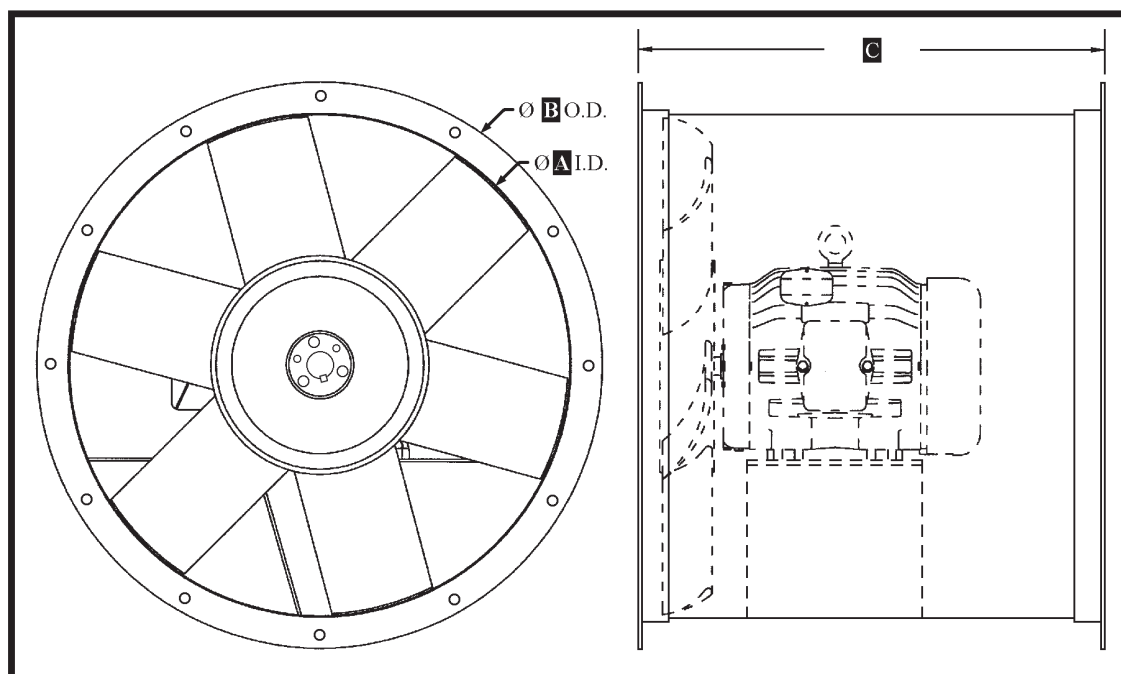
The Story: In September 1978, a sailor accidentally dropped a 75 cent paint scraper into the torpedo launcher of the nuclear sub, U.S.S. *Swordfish*. The sub was forced to scrap its mission so repairs could be performed in drydock. Cost to U.S. taxpayers: \$171,000.

TUBEAXIAL FANS

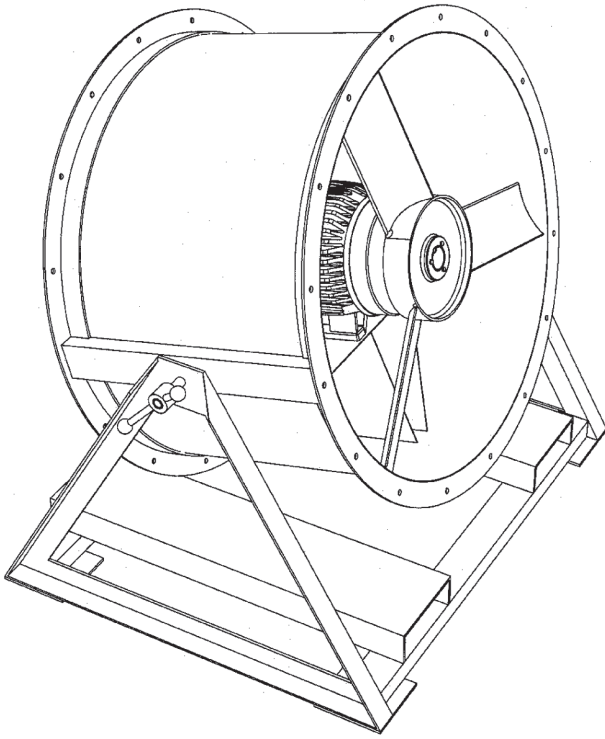


Heavy Duty Marine and Industrial Tube-axial fans featuring Byrne, Rice & Turner one-piece cast aluminum impellers. Our units come with a variety of pitches, hub-to-tip ratios, and a number of blade combinations to fit almost any application. Standard housings are available up to 1/4" thick, and constructed of painted or galvanized steel, stainless steel, or aluminum. Motor mounts fit standard NEMA frame motors. Custom construction is available.

A	B	C
12	15 $\frac{1}{4}$	15
16	18 $\frac{5}{8}$	16
18	21 $\frac{1}{8}$	18
24	27 $\frac{1}{8}$	20
30	34 $\frac{1}{8}$	24
36	40 $\frac{1}{8}$	24
42	47 $\frac{1}{8}$	30
48	53 $\frac{1}{8}$	30

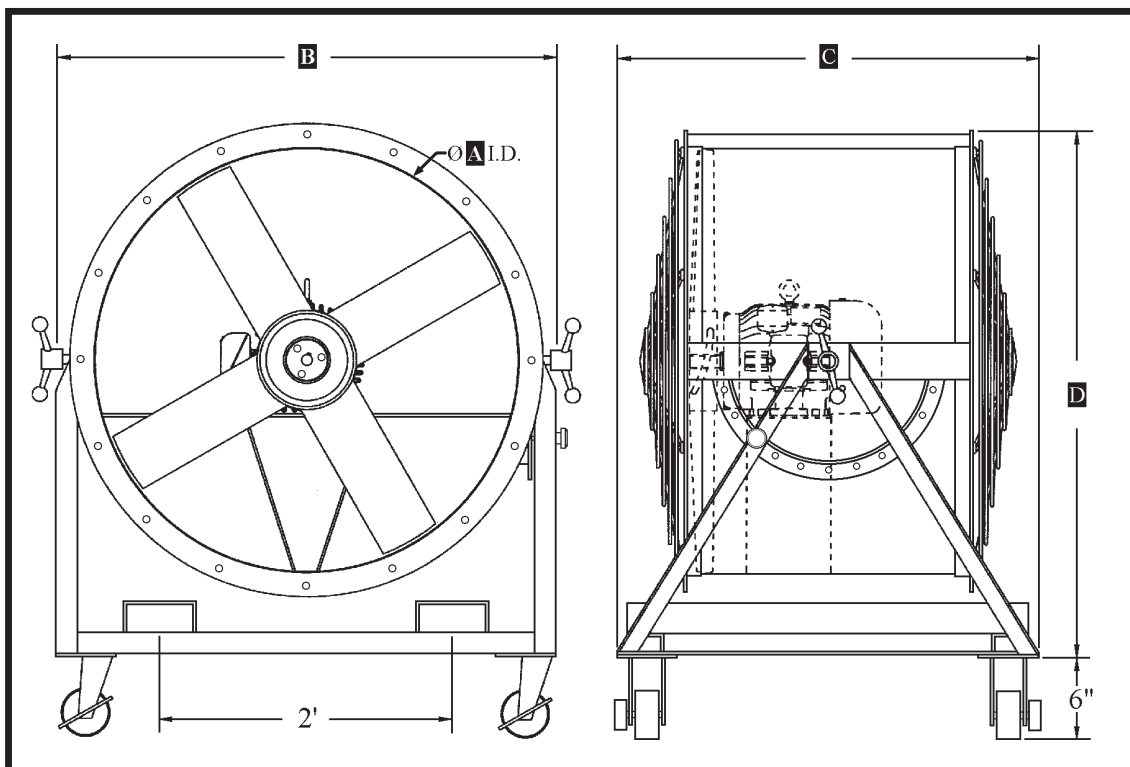


Dimensions and specifications are subject to change.



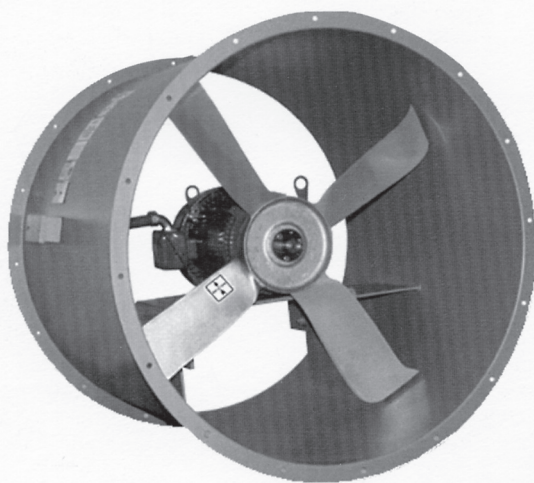
Portable A-Frame and Fixed Column Mounting Man Cooler fans provide heavy-duty air movement for personnel and equipment cooling. These fans feature Byrne, Rice & Turner's cast aluminum impellers in a heavy gauge, continuous welded housing. Portable A-Frame units rotate 270 degrees on their base, and come with an optional lifting lug and heavy duty locking wheels. Column Mounting units tilt and swivel for exact directional airflow. Housings are available in hot dip galvanized and painted steel construction.

A	23	29	35	41	47	53
B	30½	37½	43½	49½	55½	61½
C	29¾	32¾	36¾	41	44½	49
D	34	40	46	53	59	66



Dimensions and specifications are subject to change.

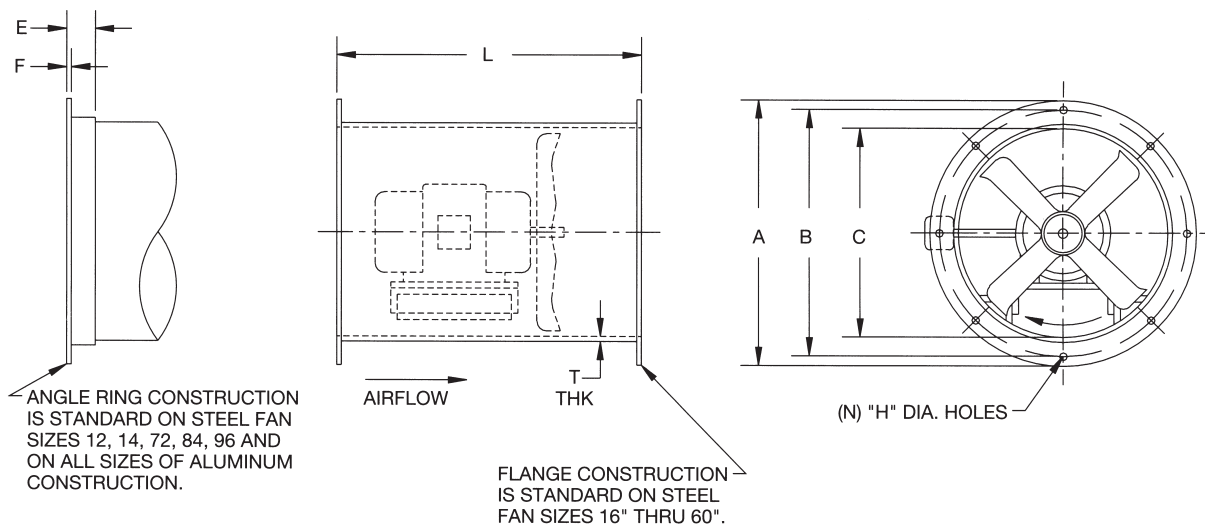
TUBEAXIAL FANS



**Model TA
Direct Drive
Tubeaxial**

Dimensional Data

Model TA Direct Drive Tubeaxial Fan



SIZE	A	B	C	H	L	N	STEEL			STAINLESS STEEL			ALUMINUM			MIN. MTR. FRAME SIZE	MAX. MTR. FRAME SIZE
							E	F	T	E	F	T	E	F	T		
12	14 ⁷ / ₈	13 ³ / ₈	12 ¹ / ₄	1 ¹ / ₃₂	22	8	1 ¹ / ₄	1 ¹ / ₈	.075	1 ¹ / ₄	1 ¹ / ₈	.075	1 ¹ / ₄	1 ¹ / ₈	.125	48	56
14	16 ⁷ / ₈	15 ³ / ₈	14 ¹ / ₄	1 ¹ / ₃₂	22	8	1 ¹ / ₄	1 ¹ / ₈	.075	1 ¹ / ₄	1 ¹ / ₈	.075	1 ¹ / ₄	1 ¹ / ₈	.125	48	56
16	18 ⁷ / ₈	17 ³ / ₈	16 ¹ / ₈	1 ¹ / ₃₂	24	8	FLANGED		.105	FLANGED		.105	1 ¹ / ₄	1 ¹ / ₈	.160	48	145T/U
18	20 ⁷ / ₈	19 ³ / ₈	18 ¹ / ₈	1 ¹ / ₃₂	24	8	FLANGED		.105	FLANGED		.105	1 ¹ / ₄	1 ¹ / ₈	.160	48	145T/U
21	24	22 ⁷ / ₈	21 ¹ / ₄	7 ¹ / ₁₆	24	8	FLANGED		.105	FLANGED		.105	1 ¹ / ₄	1 ¹ / ₈	.160	48	184T/U
24	27	25 ³ / ₈	24 ¹ / ₄	7 ¹ / ₁₆	24	8	FLANGED		.105	FLANGED		.105	1 ¹ / ₄	1 ¹ / ₈	.160	48	184T/U
30	33 ¹ / ₂	32	30 ¹ / ₄	7 ¹ / ₁₆	27	8	FLANGED		.105	FLANGED		.105	1 ¹ / ₂	3 ¹ / ₁₆	.160	56	215T/U
36	40	38 ³ / ₈	36 ³ / ₄	7 ¹ / ₁₆	34	16	FLANGED		.135	FLANGED		.135	1 ¹ / ₂	3 ¹ / ₁₆	.160	182T/U	256T/U
42	46	44 ⁵ / ₈	42 ³ / ₄	9 ¹ / ₁₆	34	16	FLANGED		.135	FLANGED		.135	1 ¹ / ₂	3 ¹ / ₁₆	.160	182T/U	286T/U
48	52	50 ⁵ / ₈	48 ⁵ / ₈	9 ¹ / ₁₆	36	16	FLANGED		.179	FLANGED		.179	1 ¹ / ₂	3 ¹ / ₁₆	.190	182T/U	286T/U
54	59	57 ¹ / ₄	54 ⁵ / ₈	5 ¹ / ₈	36	16	FLANGED		.179	FLANGED		.179	2	1 ¹ / ₄	.190	213T/U	286T/U
60	65	63 ³ / ₄	60 ⁵ / ₈	5 ¹ / ₈	38	16	FLANGED		.179	FLANGED		.179	2	1 ¹ / ₄	.190	254T/U	326T/U
72	77	75 ¹ / ₄	72 ⁵ / ₈	1 ¹ / ₁₆	38	16	2	1 ¹ / ₄	.179	2	1 ¹ / ₄	.179	2	1 ¹ / ₄	1 ¹ / ₄	254T/U	365T/U
84	91	88 ¹ / ₄	84 ⁵ / ₈	1 ¹ / ₁₆	42	16	3	5 ¹ / ₁₆	.179	3	5 ¹ / ₁₆	.179	3	5 ¹ / ₁₆	1 ¹ / ₄	324T/U	365T/U
96	103	100 ¹ / ₄	96 ⁵ / ₈	1 ¹ / ₁₆	48	16	3	5 ¹ / ₁₆	.179	3	5 ¹ / ₁₆	.179	3	5 ¹ / ₁₆	5 ¹ / ₁₆	365T/U	404T/U

Dimensions shown are in inches unless otherwise indicated.

Dimensions are not to be used for construction.

Performance Data



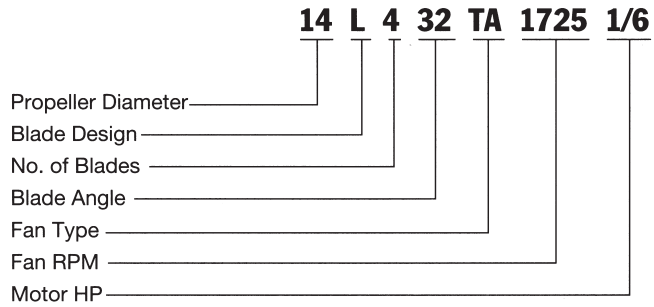
To identify a specific fan for ordering or engineering specification, it is necessary to show the complete catalog number as shown at the right. All performance data is available in curve form upon request.

All capacities shown in the performance tables that follow are for standard air conditions: 70°F at sea level (0.075 lbs./cu.ft. air density).

The tables show a representative sample of the wide range of propellers available.

Performance for belt driven fans begins on page 11.

Catalog Number System



Size 12 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
12M617	TA	1725	1/12	923	.051	761	.055	396	.056												
12M622	TA	3450	1/2	2156	.380	2102	.398	2044	.416	1980	.433	1908	.451	1714	.482						

Size 14 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
14L432	TA	1725	1/6	1980	.123	1732	.135	1396	.144												
14L420	TA	3450	1/2	2808	.493	2720	.510	2624	.524	2520	.534	2403	.537	2101	.534	1478	.534				
14L426	TA	3450	3/4	3484	.739	3364	.734	3241	.735	3115	.740	2990	.755	2706	.783	2238	.786				

Size 16 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
16L432	TA	1160	1/8	1988	.073	1530	.083														
16L432	TA	1725	1/4	2957	.240	2677	.259	2359	.270	1817	.266										
16L420	TA	3450	1	4192	.961	4092	.987	3987	1.01	3874	1.03	3753	1.04	3471	1.04	3100	1.04	2490	1.04		

Size 18 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
18L432	TA	1160	1/8	2777	.109	2270	.120														
18L420	TA	1725	1/6	2962	.139	2620	.156	2206	.179	1468	.177										
18L426	TA	1725	1/4	3629	.241	3282	.256	2905	.277	2398	.273										
18L430	TA	1725	1/3	3886	.313	3576	.334	3239	.350	2749	.359										
18L432	TA	1725	1/2	4130	.359	3806	.381	3457	.392	2987	.401										

Size 21 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
21L432	TA	1160	1/4	4410	.236	3833	.256	2998	.262												
21L424	TA	1725	1/2	5435	.433	5072	.472	4643	.506	4124	.524	3470	.521								
21L430	TA	1725	3/4	6172	.677	5814	.712	5432	.741	5021	.762	4428	.776								
21L432	TA	1725	1	6558	.777	6183	.812	5786	.838	5365	.851	4802	.865								
21S720	TA	1725	1/2	4959	.383	4696	.440	4397	.487	4043	.520	3623	.547								
21S724	TA	1725	3/4	6117	.631	5831	.693	5514	.743	5156	.777	4726	.797								

Performance shown is for installation type D: Ducted inlet, ducted outlet.
 Performance ratings do not include the effects of appurtenances in the airstream.

Performance Data

Size 24 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE															
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1 1/4" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
24L422	TA	1160	1/3	5591	.298	4970	.329	4267	.349	3291	.361								
24L428	TA	1160	1/2	6604	.457	5966	.483	5258	.497	4271	.502								
24L432	TA	1160	3/4	7238	.584	6596	.614	5896	.631	4909	.630								
24L420	TA	1750	1	7808	.863	7410	.913	7001	.957	6589	.991	6136	1.02	4927	1.04				
24L426	TA	1750	1 1/2	9464	1.35	9065	1.40	8634	1.44	8161	1.46	7635	1.47	6399	1.50				
24L432	TA	1750	2	10920	2.00	10504	2.05	10072	2.10	9625	2.13	9166	2.16	8043	2.17				
24S720	TA	1160	1/3	5077	.248	4618	.300	4062	.332	3169	.357								
24S720	TA	1750	1	7660	.852	7369	.937	7057	1.01	6722	1.07	6355	1.12						

Size 30 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE															
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1 1/4" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
30L418	TA	870	1/3	7001	.281	5985	.320	4734	.331										
30L424	TA	870	1/2	8789	.456	7713	.498	6419	.515										
30L432	TA	870	3/4	10604	.752	9525	.794	8304	.815										
30L422	TA	1160	1	10920	.910	10154	.973	9357	1.02	8465	1.06	7322	1.08						
30L428	TA	1160	1 1/2	12898	1.40	12114	1.45	11287	1.49	10396	1.51	9225	1.51						
30L432	TA	1160	2	14138	1.78	13346	1.84	12512	1.89	11634	1.92	10562	1.93						
30L420	TA	1750	3	15251	2.63	14756	2.73	14252	2.83	13740	2.91	13226	2.98	12136	3.10	10795	3.17	9038	3.17
30L428	TA	1750	5	19458	4.79	18947	4.88	18423	4.96	17885	5.03	17334	5.09	16200	5.17	14837	5.21	13159	5.22
30S720	TA	1160	1	10381	.814	9691	.901	8968	.973	8181	1.03	7183	1.08						
30S723	TA	1750	1	17089	3.50	16710	3.67	16312	3.84	15891	3.99	15444	4.14	14437	4.38	13239	4.55		

Size 36 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE															
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1 1/4" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
36L418	TA	870	3/4	12647	.688	11404	.775	10090	.823	8168	.843								
36L422	TA	870	1	14728	.938	13486	1.02	12086	1.08	10428	1.12								
36L428	TA	870	1 1/2	16937	1.44	15670	1.52	14198	1.58	12377	1.62								
36L418	TA	1160	2	16863	1.63	15941	1.76	14994	1.86	14038	1.92	12935	1.97	9290	1.94				
36L424	TA	1160	3	20196	2.53	19236	2.63	18252	2.74	17261	2.83	16209	2.91	13361	3.00				
36L432	TA	1160	5	24554	4.32	23578	4.46	22550	4.58	21464	4.66	20309	4.70	17557	4.73				
36L420	TA	1750	7 1/2	27305	6.65	26730	6.79	26142	6.93	25541	7.06	24924	7.19	23652	7.42	22301	7.62	20761	7.80
36L424	TA	1750	10	30468	8.67	29836	8.84	29197	9.00	28552	9.16	27899	9.31	26584	9.59	25248	9.85	23766	10.08
36S715	TA	1750	5	21298	3.76	20727	3.98	20150	4.19	19565	4.39	18974	4.58	17782	4.92	16488	5.22	15022	5.47
36S719	TA	1750	7 1/2	25823	5.61	25233	5.89	24633	6.15	24024	6.41	23405	6.64	22144	7.07	20820	7.44	19362	7.74
36S724	TA	1750	10	29900	8.70	29437	8.91	28957	9.11	28461	9.31	27944	9.51	26842	9.90	25612	10.28	24225	10.64

Size 42 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE															
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1 1/4" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
42L420	TA	870	2	21524	1.76	20145	1.87	18669	1.96	17038	2.04	14989	2.10						
42L426	TA	870	3	25420	2.67	23944	2.84	22405	2.97	20804	3.05	18785	3.12						
42L420	TA	1160	5	28698	4.18	27679	4.32	26620	4.46	25518	4.59	24380	4.71	21784	4.90	18084	4.98		
42L428	TA	1160	7 1/2	35808	7.35	34741	7.53	33617	7.69	32426	7.84	31154	7.99	28283	8.21	24682	8.27		
42L418	TA	1750	15	40338	12.07	39632	12.40	38920	12.70	38201	12.99	37476	13.25	36006	13.71	34543	14.05	33018	14.31
42S715	TA	870	1 1/2	16788	.995	15434	1.16	14040	1.30	12485	1.41	10453	1.50						
42S719	TA	870	2	20355	1.49	18950	1.70	17481	1.87	15892	2.01	14002	2.11						
42S715	TA	1160	3	22385	2.36	21377	2.59	20349	2.80	19308	2.99	18235	3.16	15753	3.44				
42S719	TA	1160	5	27141	3.52	26097	3.81	25025	4.08	23926	4.31	22804	4.52	20316	4.86	17034	5.12		
42S724	TA	1160	7 1/2	31427	5.46	30602	5.68	29727	5.89	28792	6.10	27780	6.30	25429	6.68	22512	7.08		

Performance shown is for installation type D: Ducted inlet, ducted outlet.
Performance ratings do not include the effects of appurtenances in the airstream.

Only in America do drugstores make the sick walk all the way to the back of the store to get their prescriptions while healthy people can buy cigarettes at the front.

Performance Data



Size 48 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
48L420	TA	695	2	25638	1.75	23651	1.88	21496	1.98	18917	2.07	14790	2.05								
48L426	TA	695	3	30278	2.65	28158	2.85	25945	2.99	23419	3.07	19786	3.10								
48L424	TA	870	5	35810	4.47	34105	4.66	32358	4.84	30597	5.00	28728	5.15	23649	5.30						
48L418	TA	1160	7½	39868	6.84	38647	7.16	37407	7.44	36146	7.68	34882	7.87	32262	8.14	29025	8.35	24190	8.33		
48L422	TA	1160	10	46428	9.33	45231	9.60	43995	9.86	42715	10.10	41386	10.32	38560	10.69	35453	11.01	31731	11.21		
48S719	TA	870	5	30351	2.89	28753	3.21	27096	3.49	25389	3.73	23531	3.93	18638	4.22						
48S719	TA	1160	10	40468	6.86	39280	7.29	38067	7.70	36828	8.08	35568	8.42	32957	9.02	30029	9.49	26392	9.89		
48S724	TA	1160	15	46858	10.63	45922	10.95	44944	11.27	43918	11.58	42836	11.89	40448	12.49	37664	13.06	34422	13.67	28634	13.72

Size 54 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
54L418	TA	695	3	33981	2.65	31667	2.90	29297	3.07	26727	3.18	23347	3.25								
54L426	TA	695	5	43073	4.76	40702	5.06	38231	5.29	35690	5.43	32611	5.56								
54L416	TA	870	5	38923	4.45	36952	4.53	34974	4.65	33035	4.83	30977	5.03	25560	5.31						
54L420	TA	870	7½	45656	6.17	43907	6.40	42084	6.62	40184	6.82	38207	7.00	33544	7.30	25869	7.18				
54L426	TA	870	10	53919	9.34	52039	9.73	50108	10.07	48124	10.35	46131	10.55	41561	10.86	34934	10.91				
54S715	TA	870	5	35611	3.49	33882	3.85	32116	4.18	30331	4.48	28454	4.74	23951	5.16	17575	5.47				
54S719	TA	870	7½	43177	5.21	41388	5.66	39546	6.08	37656	6.45	35711	6.77	31296	7.27	24662	7.59				
54S724	TA	870	10	49995	8.07	48579	8.41	47070	8.75	45445	9.08	43667	9.40	39484	10.01	33712	10.54				

Size 60 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
60L418	TA	580	3	38873	2.60	35784	2.88	32614	3.06	28849	3.17	22835	3.15								
60L426	TA	580	5	49274	4.68	46107	5.02	42805	5.26	39224	5.40	34380	5.50								
60L418	TA	695	5	46580	4.48	44019	4.83	41387	5.10	38729	5.28	35654	5.42	25355	5.30						
60L424	TA	695	7½	55786	6.94	53120	7.24	50387	7.52	47632	7.77	44704	7.99	36693	8.22						
60L414	TA	870	7½	48819	6.52	46797	6.77	44727	7.02	42629	7.26	40496	7.50	35099	7.83	27085	7.58				
60L418	TA	870	10	58309	8.79	56273	9.24	54201	9.64	52091	9.97	49992	10.22	45347	10.58	39018	10.78	26228	9.93		
60L424	TA	870	15	69833	13.61	67712	13.99	65558	14.35	63370	14.70	61169	15.02	56627	15.60	51270	16.08	42350	15.90		
60L428	TA	870	20	78088	18.38	76064	18.75	73948	19.12	71725	19.46	69377	19.78	64205	20.35	58130	20.64	50276	20.66		
60L416	TA	1160	20	71140	17.84	69500	17.96	67856	18.11	66210	18.31	64562	18.54	61317	19.14	58014	19.87	54270	20.65	49911	21.34
60S716	TA	870	10	50206	7.19	48092	7.61	45971	8.03	43851	8.45	41730	8.88	37342	9.68	32167	10.31				
60S715	TA	1160	20	65086	13.97	63655	14.65	62210	15.30	60750	15.93	59275	16.53	56306	17.65	53259	18.65	49936	19.53	46254	20.27

Size 72 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
72L418	TA	580	7½	67102	6.47	63421	6.97	59639	7.37	55818	7.62	51405	7.82	36701	7.66						
72L412	TA	695	7½	61402	7.28	58246	7.59	54947	7.87	51519	8.11	47749	8.29	38428	8.32	25337	7.67				
72L414	TA	695	10	67320	8.25	64280	8.60	61161	8.94	58015	9.28	54722	9.59	45864	9.93	31944	9.27				
72L420	TA	695	15	86303	13.22	83393	13.66	80375	14.08	77239	14.47	74009	14.82	66791	15.43	57156	15.79				
72L424	TA	695	20	96298	17.23	93112	17.76	89871	18.26	86573	18.72	83275	19.16	76233	19.94	67457	20.48				
72L412	TA	870	15	76863	14.28	74361	14.68	71790	15.05	69143	15.39	66438	15.70	60628	16.21	53747	16.44	45544	16.21	34952	15.32
72L414	TA	870	20	84272	16.19	81854	16.62	79398	17.05	76899	17.48	74378	17.90	69245	18.72	62957	19.33	54525	19.38	43732	18.55

Size 84 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
84L412	TA	580	10	80948	9.07	76538	9.48	71918	9.84	67092	10.14	61677	10.36	48179	10.30						
84L414	TA	695	20	106347	17.68	102818	18.23	99223	18.77	95556	19.30	91900	19.84	83956	20.80	73345	21.28	58710	20.55		

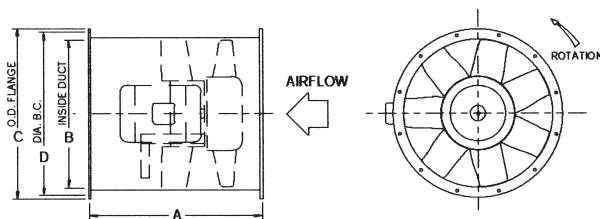
Size 96 TA Direct Drive Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE & HORSEPOWER AT STATIC PRESSURE																	
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
96L412	TA	580	20	120831	17.68	115818	18.30	110624	18.86	105258	19.37	99678	19.81	86681	20.33	70508	20.01	48251	18.53		
96L414	TA	580	25	132478	20.04	127641	20.72	122703	21.39	117672	22.05	112658	22.72	101059	23.82	84424	23.93	61006	22.37		

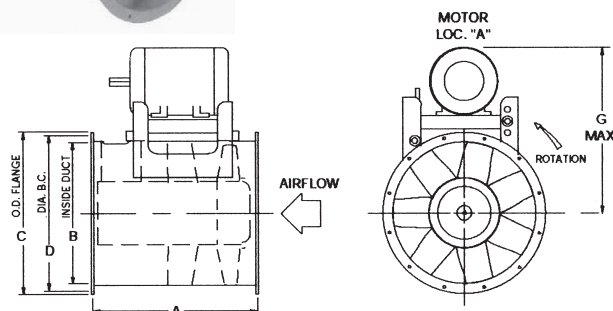
Performance shown is for installation type D: Ducted inlet, ducted outlet.

Performance ratings do not include the effects of appurtenances in the airstream.

AXIFAN® VANEAXIAL FANS TYPE TCVA



ARR. 4 - HORIZONTAL



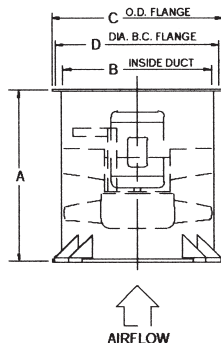
ARR. 9 - HORIZONTAL

HORIZONTAL DISCHARGES

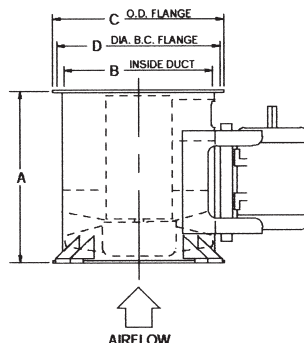
HOR = Horizontal - No Clips or Legs

HCH = Horizontal Ceiling Hung with Suspension Clips

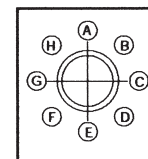
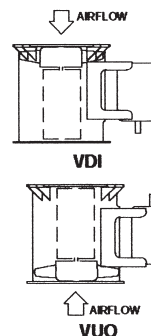
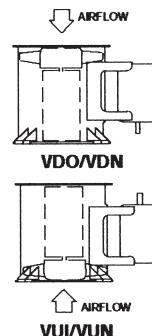
HBM = Horizontal Base Mounted with Support Legs



ARR. 4 - VERTICAL



ARR. 9 - VERTICAL



HORIZONTAL
MOTOR
LOCATIONS
(VIEWED FROM
FAN OUTLET)



VERTICAL DISCHARGES

VDO = Vertical Down Floor Mounted With Legs

VDN = Vertical Down Discharge Without Legs

VDI = Vertical Down Ceiling Hung With Legs

VUI = Vertical Up Floor Mounted With Legs

VUN = Vertical Up Discharge Without Legs

VUO = Vertical Up Ceiling Hung With Legs

FAN SIZE	A				B	C	D	G (MAX.)	MAXIMUM MOTOR FRAME									
	ARR. 9		ARR. 4						APR. 9 - HUB RATIO					APR. 4 - HUB RATIO				
	HUB RATIO		HUB RATIO															
	3-5	6-7	3-5	6-7					3	4	5	6	7	3	4	5	6	7
12	NA	24.50	NA	24.50	12.16	15.16	13.88	19.25	NA	NA	NA	184T	184T	NA	NA	NA	NA	145T
15	22.00	27.00	NA	27.00	15.16	18.16	16.88	20.50	NA	NA	215T	215T	215T	NA	NA	NA	145T	184T
18	24.50	28.00	24.50	28.00	18.16	21.16	19.88	27.50	NA	215T	215T	215T	215T	NA	NA	145T	184T	215T
21	27.00	32.00	27.00	32.00	21.19	24.19	22.88	31.75	NA	256T	256T	256T	256T	NA	145T	184T	215T	215T
24	28.00	36.25	28.00	36.25	24.19	27.19	25.88	34.50	NA	256T	256T	256T	256T	NA	184T	215T	215T	256T
28	32.00	40.25	32.00	40.25	28.25	31.25	30.00	38.25	NA	286T	286T	286T	286T	NA	215T	215T	256T	286T
32	36.25	47.00	36.25	47.00	32.25	35.25	34.00	41.00	NA	286T	286T	286T	286T	NA	215T	256T	286T	365T
36	40.25	53.25	40.25	53.25	36.25	39.25	38.00	45.25	NA	326T	326T	326T	326T	NA	256T	286T	365T	405T
42	47.00	53.25	47.00	53.25	42.38	46.38	44.63	49.50	NA	326T	326T	326T	326T	NA	286T	365T	405T	NA
48	53.25	NA	53.25	NA	48.38	52.38	50.63	53.25	NA	326T	326T	NA	NA	NA	365T	405T	NA	NA
54	53.25	NA	53.25	NA	54.38	58.38	56.63	59.00	365T	365T	NA	NA	NA	365T	405T	NA	NA	NA
60	53.25	NA	53.25	NA	60.38	64.38	63.38	60.25	365T	NA	NA	NA	NA	405T	NA	NA	NA	NA

DIMENSIONS ARE NOT TO BE USED FOR CONSTRUCTION. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.

Little Things Mean A Lot

A DECIMAL POINT

The **Story:** In 1999, Lockheed Martin signed a contract to sell military aircraft to “an international customer” (The company won’t say who). Unfortunately, whoever drew up the contract misplaced a decimal point in the formula for determining the price. The mistake wasn’t discovered until after the contract was signed, and the customer insisted on sticking to the wording of the contract exactly. Cost to Lockheed Martin: \$70 million.

TCVA 12D7

Wheel Dia.: 12"

Outlet Area: 0.807 ft²

Tip Speed: 3.14 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
12D7	1750	1027	0.13	930	0.14	808	0.15																
	3500	2192	0.84	2147	0.90	2101	0.96	2054	1.01	2007	1.05	1959	1.08	1860	1.12	1749	1.17	1617	1.23				

TCVA 15D6, D7

Wheel Dia.: 15"

Outlet Area: 1.254 ft²

Tip Speed: 3.93 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
15D6	1750	2547	0.32	2353	0.36	2121	0.39	1809	0.42														
	3500	5351	2.31	5268	2.39	5182	2.47	5094	2.55	5003	2.63	4908	2.71	4707	2.86	4486	3.00	4243	3.14	3617	3.34		
15D7	1750	2300	0.35	2159	0.39	2007	0.42	1826	0.45														
	3500	4798	2.47	4733	2.58	4667	2.68	4600	2.78	4531	2.88	4462	2.97	4318	3.13	4170	3.25	4013	3.35	3652	3.59		

TCVA sizes 12 and 15 are not licensed to bear the AMCA Seal.

TCVA 18D5, D6, D7

Wheel Dia.: 18"

Outlet Area: 1.799 ft²

Tip Speed: 4.71 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
18D5	1170	2743	0.22	2110	0.25																		
	1750	4463	0.64	4180	0.70	3828	0.77	3412	0.83														
18D6	1170	2834	0.25	2402	0.29																		
	1750	4523	0.75	4297	0.81	4040	0.88	3745	0.94	3403	1.00												
18D7	1170	2671	0.25	2355	0.29	1885	0.32																
	1750	4209	0.74	4038	0.82	3849	0.89	3635	0.95	3390	1.00	3098	1.05										
	3500	8656	5.44	8578	5.60	8498	5.77	8417	5.93	8335	6.09	8250	6.24	8075	6.55	7892	6.84	7698	7.11	7269	7.60	6781	8.04

TCVA 21D4, D5, D6, D7

Wheel Dia.: 21"

Outlet Area: 2.448 ft²

Tip Speed: 5.50 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
21D4	880	2674	0.17																				
	1170	4163	0.36	3333	0.42																		
	1750	6705	1.05	6328	1.18	5852	1.28	5291	1.38	4603	1.43												
21D5	880	3085	0.21																				
	1170	4550	0.44	3945	0.51																		
	1750	7195	1.34	6885	1.44	6532	1.55	6115	1.66	5651	1.76	5074	1.83										
21D6	880	3222	0.22																				
	1170	4623	0.46	4162	0.54	3532	0.60																
	1750	7221	1.40	6976	1.51	6706	1.62	6392	1.74	6027	1.86	5620	1.95										
21D7	880	3089	0.24	2522	0.29																		
	1170	4353	0.51	4024	0.59	3619	0.65	3057	0.69														
	1750	6750	1.56	6558	1.68	6353	1.80	6132	1.91	5889	2.01	5621	2.10	4982	2.26								

TCVA 24D5, D6, D7

Wheel Dia.: 24"

Outlet Area: 3.191 ft²

Tip Speed: 6.28 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
24D4	880	4462	0.33																				
	1170	6513	0.69	5724	0.80	4662	0.87																
	1750	10244	2.08	9844	2.27	9391	2.45	8846	2.60	8237	2.75	7552	2.88										
24D5	880	4866	0.36	3700	0.43																		
	1170	6910	0.75	6306	0.87	5483	0.98																
	1750	10735	2.31	10415	2.48	10062	2.65	9656	2.83	9164	3.02	8621	3.18	7282	3.37								
24D6	880	5025	0.41	4238	0.49																		
	1170	7019	0.88	6567	0.99	5992	1.10	5276	1.19														
	1750	10827	2.74	10564	2.90	10282	3.07	9978	3.23	9639	3.40	9257	3.58	8384	3.87	7200	4.04						
24D7	880	4765	0.45	4207	0.52	3381	0.57																
	1170	6602	0.96	6249	1.08	5842	1.18	5360	1.27	4744	1.34												
	1750	10142	2.97	9927	3.16	9701	3.35	9464	3.53	9212	3.69	8942	3.85	8337	4.12	7623	4.36	6639	4.51				

TCVA 28D4, D5, D6, D7

Wheel Dia.: 28"

Outlet Area: 4.353 ft²

Tip Speed: 7.33 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
28D4	880	7383	0.60	5856	0.72																		
	1170	10393	1.25	9605	1.46	8487	1.62	7107	1.71														
	1750	16076	3.81	15651	4.13	15184	4.43	14656	4.73	14008	5.02	13254	5.27	11562	5.64								
28D5	880	8063	0.72	6968	0.87																		
	1170	11182	1.56	10567	1.74	9768	1.94	8796	2.10	7530	2.18												
	1750	17173	4.91	16814	5.17	16430	5.44	16015	5.71	15558	5.98	15030	6.28	13798	6.83	12360	7.20						
28D6	880	8246	0.82	7430	0.96	6321	1.07																
	1170	11347	1.80	10840	1.98	10248	2.16	9530	2.34	8698	2.48	7562	2.56										
	1750	17357	5.71	17048	5.97	16724	6.23	16382	6.49	16020	6.75	15630	7.02	14731	7.59	13698	8.08	12476	8.44				
28D7	880	7961	0.90	7328	1.03	6529	1.14	5356	1.21														
	1170	10904	1.96	10484	2.15	10019	2.33	9487	2.50	8881	2.65	8176	2.77										
	1750	16634	6.21	16373	6.51	16101	6.79	15819	7.07	15524	7.35	15215	7.62	14541	8.13	13777	8.60	12923	9.02	10495	9.50		

Performance shown is for installation Type B: Free inlet, ducted outlet.

Performance ratings do not include the effects of appurtenances in the airstream.

Only in America do people order double cheeseburgers, large fries, and a diet coke.

TCVA 32D4, D5, D6, D7

Wheel Dia.: 32"

Outlet Area: 5.672 ft²

Tip Speed: 8.38 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
32D4	880	11546	1.13	10135	1.35	8170	1.47																
	1170	15941	2.43	15156	2.73	14147	3.02	12871	3.27	11382	3.43												
32D5	880	12324	1.35	11258	1.56	9803	1.75																
	1170	16886	2.97	16225	3.23	15459	3.51	14494	3.81	13396	4.05	12104	4.22										
	1750	25757	9.45	25354	9.84	24933	10.23	24488	10.63	24016	11.03	23512	11.44	22330	12.31	20924	13.16	19383	13.79				
32D6	880	12560	1.53	11706	1.72	10590	1.93	9184	2.07														
	1170	17129	3.39	16563	3.65	15936	3.91	15208	4.19	14354	4.46	13415	4.69										
	1750	26058	10.86	25706	11.24	25340	11.63	24960	12.01	24563	12.40	24146	12.80	23234	13.60	22167	14.46	20976	15.24	18103	16.31		
32D7	880	11915	1.71	10519	1.92	9626	2.26																
	1170	16184	3.78	15734	4.08	15254	4.36	14737	4.63	14168	4.87	13542	5.08	12061	5.48								
	1750	24563	12.09	24276	12.55	23982	13.00	23680	13.44	23369	13.87	23050	14.29	22378	15.11	21653	15.86	20862	16.55	19053	17.81	16675	18.73

TCVA 36D4, D5, D6, D7

Wheel Dia.: 36"

Outlet Area: 7.166 ft²

Tip Speed: 9.42 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
36D4	880	16908	2.01	15599	2.32	13758	2.59	11408	2.72														
	1170	23101	4.39	22281	4.81	21339	5.23	20147	5.64	18741	6.00	17177	6.27										
36D5	880	17812	2.36	16739	2.65	15304	2.96	13573	3.19														
	1170	24226	5.25	23510	5.63	22719	6.01	21811	6.41	20711	6.83	19494	7.20	16518	7.65								
	1750	36790	16.87	36344	17.43	35881	17.99	35400	18.55	34898	19.12	34373	19.69	33232	20.86	31885	22.11	30324	23.35	26812	25.14		
36D6	880	18039	2.76	17189	3.04	16189	3.33	14978	3.61	13544	3.83												
	1170	24434	6.21	23844	6.58	23212	6.95	22530	7.33	21773	7.71	20919	8.11	18967	8.78	16345	9.17						
	1750	37013	20.09	36638	20.64	36252	21.19	35856	21.75	35448	22.31	35027	22.86	34142	23.98	33184	25.11	32118	26.29	29668	28.51	26746	30.16
36D7	880	16937	3.01	16260	3.32	15513	3.61	14667	3.85	13701	4.08	12550	4.27										
	1170	22887	6.74	22404	7.18	21899	7.59	21368	7.99	20804	8.37	20200	8.72	18847	9.33	17252	9.89	15076	10.23				
	1750	34618	21.75	34307	22.41	33990	23.06	33667	23.71	33337	24.34	33000	24.97	32303	26.18	31571	27.35	30796	28.44	29085	30.39	27127	32.15

TCVA 42D4, D5, D6, D7

Wheel Dia.: 42"

Outlet Area: 9.793 ft²

Tip Speed: 11.00 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
42D4	880	26744	3.91	25325	4.43	23435	4.91	21092	5.30	18321	5.51												
	1170	36280	8.64	35328	9.35	34282	10.05	33100	10.73	31654	11.37	29964	11.94	26183	12.78								
42D5	880	28687	4.93	27528	5.38	26173	5.85	24459	6.36	22520	6.76	20179	7.01										
	1170	38756	11.13	37949	11.72	37088	12.33	36158	12.93	35137	13.56	33958	14.22	31200	15.48	27995	16.32						
42D6	880	29062	5.70	28090	6.14	27015	6.59	25775	7.06	24331	7.53	22727	7.91										
	1170	39168	12.96	38476	13.54	37751	14.12	36986	14.71	36174	15.31	35301	15.91	33289	17.19	30979	18.31	28259	19.14				

TCVA 48D4, D5

Wheel Dia.: 48"

Outlet Area: 12.76 ft²

Tip Speed: 12.57 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
48D4	880	40854	7.65	39370	8.42	37659	9.17	35471	9.89	32915	10.52	30051	10.98										
	1170	55107	17.19	54071	18.22	52968	19.25	51782	20.26	50490	21.25	49016	22.24	45388	24.07	41326	25.49	36478	26.21				
48D5	880	43198	9.41	41930	10.08	40530	10.76	38926	11.47	36985	12.23	34832	12.89	29600	13.70								
	1170	58123	21.43	57221	22.31	56275	23.21	55278	24.10	54221	25.01	53091	25.93	50452	27.90	47305	29.82	43864	31.26				

TCVA 54D3, D4

Wheel Dia.: 54"

Outlet Area: 16.12 ft²

Tip Speed: 14.14 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
54D3	880	55364	11.29	53573	12.61	51547	13.81	49065	14.81	45991	15.55	42671	16.25	35015	16.95								
	1170	74569	25.14	73310	26.96	71977	28.72	70555	30.40	69024	32.00	67340	33.48	63143	35.75	58315	37.66	52894	39.19				
54D4	880	59058	13.90	57481	14.97	55747	16.04	53785	17.09	51385	18.13	48608	19.08	42352	20.44								
	1170	79378	31.56	78255	33.00	77079	34.43	75841	35.85	74531	37.27	73135	38.67	69916	41.45	65914	44.11	61581	46.33	50902	48.57		

TCVA 60D3

Wheel Dia.: 60"

Outlet Area: 19.88 ft²

Tip Speed: 15.71 x RPM

PROP	RPM	0.25" SP		0.5" SP		0.75" SP		1" SP		1.25" SP		1.5" SP		2" SP		2.5" SP		3" SP		4" SP		5" SP	
		CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
60D3	880	76383	18.69	74454	20.52	72341	22.26	69975	23.85	67109	25.15	63696	26.16	56146	27.99								
	1170	102607	41.98	101230	44.50	99790	46.95	98279	49.33	96683	51.63	94988	53.83	91138	57.76	86292	60.71	80962	63.33	68815	67.10		

Performance shown is for installation Type B: Free inlet, ducted outlet.

Performance ratings do not include the effects of appurtenances in the airstream.

Little Things Mean A Lot

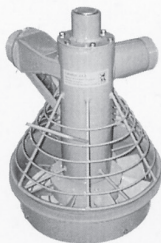
THE WORD 'PLEASE'

The Story: In 1995 Pacific Bell Telephone told its 4,500 directory assistance operators to answer calls with either: "Hi, this is _____, what city?" or "Hi, I'm _____, what city?" According to Pac Bell, these new greetings take 1.2 seconds to say, compared to 1.7 seconds when "please" is used. The phone company calculated that shaving half a second off of each call makes it possible for operators to handle 135,000 more calls per hour.

FANS

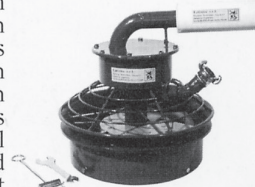
Portable Water Driven Gas Freeing Fan AX 2001-A for tanks

Net Weight: 14 Kg
 Diameter of fan propeller: 309 mm
 Exterior diameter of supporting Ring: 360 mm
 Work pressure: 3 to 14 bars
 Average air flow: 6 bars 8300 m³/h
 11 bars 12000 m³/h
 Water Consumption: 6 bars 30 m³/h
 11 bars 40 m³/h
 Material construction: Stainless Steel
 Material of Fan Blades: Nylon Coated
 Inlet Connection: Dia. 2-1/2 - 7-1/2 tpi



Portable Air Driven Gas Freeing Fan AX 2004 for tanks

Net Weight: 9 Kg
 Diameter of fan propeller: 311 mm
 Exterior diameter of supporting Ring: 360 mm
 Work pressure: 2 to 8 bars
 Average air flow: 4 bars 4770 m³/h
 7 bars 6850 m³/h
 Air Consumption: 6 bars 50 l/s
 Material construction: Stainless Steel
 Material of Fan Blades: Nylon Coated
 Inlet Connection: Anti-Static Epoxy paint 3/4 Female



COMPRESSORS



R-SERIES SPLASH LUBRICATED RECIPROCATING TWO-STAGE AIR COMPRESSORS

SPLASH & PRESSURE LUBRICATED — HORIZONTAL TANK (ELECTRIC)



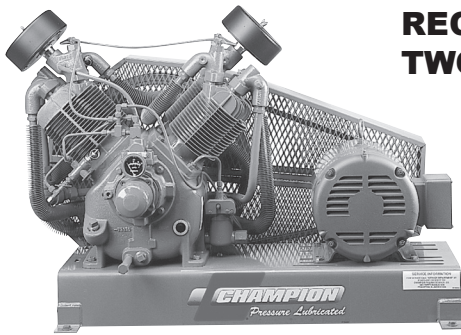
Horizontal Tank								125 PSI Rating*			175 PSI Rating*			250 PSI Rating*		
Motor HP	Tank Cap Gal.	Splash R-Series Model	Pump Comp. Model	Pressure PL-Series Model	Pump Comp. Model	L x W x H Dimensions inches	Aprox. Ship Wt. lbs.	RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y
1 1/2	30	HR1-3	R-10D	—	—	41 1/2 x 21 x 44 3/8	300	575	11.2	6.0	542	10.5	5.3	—	—	—
	60	HR1-6		—		51 1/2 x 22 3/4 x 48 5/8	400									
	80	HR1-8		—		66 1/2 x 22 3/4 x 48 5/8	425									
2	30	HR2-3		—		41 1/2 x 21 x 44 3/8	320	765	14.9	8.3	725	14.1	7.5	—	—	—
	60	HR2-6		—		51 1/2 x 22 3/4 x 48 5/8	425									
	80	HR2-8		—		66 1/2 x 22 3/4 x 48 5/8	455									
3	60	HR3-6	R-15B	HPL3-6	PL-15	51 1/2 x 22 3/4 x 48 5/8	425	485	14.1	10.9	440	12.8	9.7	380	11.0	8.0
	80	HR3-8		HPL3-8		66 1/2 x 22 3/4 x 48 5/8	485									
	120	HR3-12		HPL3-12		72 1/2 x 24 x 55	725									
5	60	HR5-6		HPL5-6		51 1/2 x 22 3/4 x 48 5/8	445	805	23.5	19.1	710	20.7	16.5	640	18.6	13.6
	80	HR5-8		HPL5-8		66 1/2 x 22 3/4 x 48 5/8	535									
	120	HR5-12		HPL5-12		72 1/2 x 24 x 55	765									
7 1/2	80	HR7F-8	R-30D	HPL7F-8	PL-30	66 1/2 x 22 3/4 x 48 5/8	570	1035	29.9	24.6	1035	29.9	23.5	940	27.4	19.4
	120	HR7F-12		HPL7F-12		72 1/2 x 24 x 55	800									
	80	HR7-8		HPL7-8		66 1/2 x 22 1/2 x 49 3/4	665	670	39.6	30.0	575	33.5	25.8	520	30.2	21.3
10	120	HR7-12		HPL7-12		72 1/2 x 24 x 55 1/4	860									
	80	HR10-8		HPL10-8		66 1/2 x 22 1/2 x 49 3/4	675	810	48.5	37.3	740	43.1	34.8	640	37.1	27.5
	120	HR10-12		HPL10-12		72 1/2 x 24 x 55 1/4	890									
15	250	HR10-25		—	—	87 1/2 x 34 1/2 x 61 3/8	1283	1045	63.5	50.2	1045	63.5	49.0	900	52.5	42.6
	80	HR15F-8	R-40A	—	—	66 1/2 x 22 1/2 x 49 3/4	740									
	120	HR15F-12		HPL15F-12	PL-40	72 1/2 x 24 x 55 1/4	960									
20	250	HR15F-25		HPL15F-25		88 1/2 x 31 x 60 3/16	1275									
	120	HRA15-12		HPL15-12		73 1/2 x 27 3/8 x 62 1/2	1110	890	71.1	59.0	770	61.5	53.7	700	55.9	45.8
	250	HRA15-25		HPL15-25		88 1/2 x 31 x 68 3/4	1495									
25	120	HRA20-12	R-70A	HPL20-12	PL-70	73 1/2 x 27 1/2 x 64	1325	770	109.0	91.9	655	93.0	76.7	545	77.4	64.1
	250	HRA20-25		HPL20-25		88 1/2 x 31 x 70 1/4	1790									
	120	HRA25-12		HPL25-12		73 1/2 x 27 1/2 x 64	1365	890	127.8	102.1	770	109.4	90.1	660	93.7	76.8
30	250	HRA25-25		HPL25-25		88 1/2 x 31 x 70 1/4	1735									
	120	HRA30-12		HPL30-12		73 1/2 x 27 1/2 x 64	1404	890	127.8	102.1	890	127.8	101.0	770	109.4	90.0
	250	HRA30-25		HPL30-25		88 1/2 x 31 x 70 1/4	1774									

NOTE: Pressure lubricated units are capable of 250 PSIG operation.

SPLASH & PRESSURE LUBRICATED — VERTICAL TANK (ELECTRIC)

Motor HP	Tank Cap Gal.	Splash R-Series Model	Vertical Tank					125 PSI Rating*			175 PSI Rating*			250 PSI Rating*		
			Pump Comp. Model	Pressure PL-Series Model	Pump Comp. Model	L x W x H Dimensions inches	Aprox. Ship Wt. lbs.	RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y
1.5	60	VR1-6	R-10D	—	—	32½ x 22½ x 76½	400	575	11.2	6.0	542	10.5	5.3	—	—	—
	80	VR1-8				32 x 24 x 77	425									
2	60	VR2-6				32½ x 22½ x 76½	425	765	14.9	8.3	725	14.1	7.5	—	—	—
	80	VR2-8				32 x 24 x 77	455									
3	60	VR3-6	R-15B	VPL3-6	PL-15	32½ x 22½ x 76½	425	485	14.1	10.9	440	12.8	9.7	380	11.0	8.0
	80	VR3-8		VPL3-8		32 x 24 x 77	485									
	120	VR3-12		VPL3-12		42½ x 30 x 80½	725									
5	60	VR5-6		VPL5-6		32½ x 22½ x 76½	455	805	23.5	19.1	710	20.7	16.5	640	18.6	13.6
	80	VR5-8		VPL5-8		33 x 24 x 77	535									
	120	VR5-12		VPL5-12		42½ x 30 x 82	765									
7½	80	VR7F-8		VPL7F-8		33 x 24 x 77	570	1035	29.9	24.6	1035	29.9	23.5	940	27.4	19.4
	120	VR7F-12		VPL7F-12		42½ x 30 x 82	800									
	80	VR7-8	R-30D	VPL7-8	PL-30	42½ x 30 x 82	665	670	39.6	30.0	575	33.5	25.8	520	30.2	21.3
	120	VR7-12	R-15B	VPL7-12		46⅜ x 30 x 82	800									
10	80	VR10-8	R-30D	VPL10-8		42½ x 30 x 66¾	860	810	48.5	37.3	740	43.1	34.8	640	37.1	27.5
	120	VR10-12		VPL10-12		46⅜ x 30 x 80¾	890									
15	120	VR15F-12	PL-40	—	—	46⅜ x 30 x 80¾	890	1045	63.5	50.2	1045	63.5	49.0	900	52.5	42.6

NOTE: Pressure lubricated units are capable of 250 PSIG operation.


R-SERIES SPLASH LUBRICATED RECIPROCATING TWO-STAGE AIR COMPRESSORS

SPLASH & PRESSURE LUBRICATED — BASE MOUNT (ELECTRIC)

Motor HP	Splash R-Series Model	Pump Comp. Model	Pressure PL-Series Model	Pump Comp. Model	L x W x H Dimensions inches	Aprox. Ship Wt. lbs.	125 PSI Rating*			175 PSI Rating*			250 PSI Rating*		
							RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y	RPM	CFM Displ.	CFM Del'y
1½	BR-1	R-10D	—	—	29½ x 21 x 29¼	205	575	11.2	6.0	542	10.5	5.3	—	—	—
2	BR-2		—			205	765	14.9	8.3	725	14.1	7.5	—	—	—
3	BR-3	R-15B	BPL-3	PL-15	30½ x 21 x 29¼	230	485	14.1	10.9	440	12.8	9.7	380	11.0	8.0
5	BR-5		BPL-5			280	805	23.5	19.1	710	20.7	16.5	640	18.6	13.6
7½	BRF-7		BPL-7F			310	1035	29.9	24.6	1035	29.9	23.5	940	27.4	19.4
	BR-7	R-30D	BPL-7	PL-30	42¾ x 22⅞ x 28⅝	430	670	39.6	30.0	575	33.5	25.8	520	30.2	21.3
10	BR-10		BPL-10			540	810	48.5	37.3	740	43.1	34.8	640	37.1	27.5
15	BRF-15		BPL-15F		49½ x 26¼ x 38	550	1045	63.5	50.2	1045	63.5	49.0	900	52.5	42.6
	BRA-15	R-40A	BPL-15	PL-40		730	890	71.1	59.0	770	61.5	53.7	700	55.9	45.8
20	BRA-20	R-70A	BPL-20	PL-70	53 x 27½ x 39½	1000	770	109.0	91.9	655	93.0	76.7	545	77.4	64.1
25	BRA-25		BPL-25			1020	890	127.8	102.1	770	109.4	90.1	660	93.7	76.8
30	BRA-30		BPL-30			1059	890	127.0	102.1	890	127.0	101.1	770	109.4	90.0

PROFESSIONAL AIR COMPRESSORS

Designed for the professional, our single stage air compressors are ideal for most anyone, from the do-it-yourselfer to the professional air compressor user. When performance is defined by maximum operating pressure, increased air flow, and extended duty cycles, Ingersoll-Rand is the product of choice.

- Maximum Air Power! More delivered air(cfm) to do the job right and in less time
- Built to last! Durable Cast Iron Construction
- 100% continuous duty for the toughest applications
- Extended Pump Life! 5,000+ hours, more than double the life of many low cost aluminum compressors

SINGLE STAGE STATIONARY – ELECTRIC

No starter required. Manual thermal overload protection of the motor. 230/1/60 Voltage.

IR Model #	HP	Voltage	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3L3	3	230-1-60	60 Gallon Vertical	11.3/10.3	135
SS5L5	5	230-1-60	60 Gallon Vertical	18.1/15.5	135



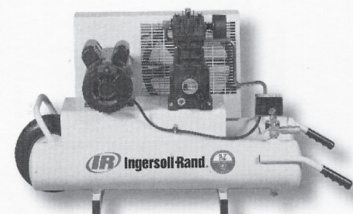
PORTABLE POWER

• SINGLE STAGE WHEELBARROW

Maximum maneuverability on the jobsite! Light weight, low profile design with convenient lifting handles.

GASOLINE ENGINE DRIVEN

IR Model #	HP	Engine	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3J5.5GB-WB	5.5	Briggs & Stratton	8 Gallon Twin	11.8/10.7	135
SS3J5.5GH-WB	5.5	Honda	8 Gallon Twin	11.8/10.7	135



ELECTRIC

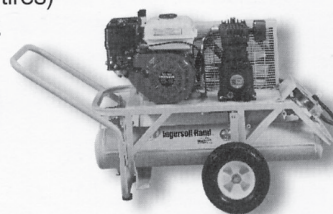
IR Model #	HP	Voltage	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3J2-WB	2	115/230-1-60	8 Gallon Twin	5.7/4.9	135
SS3J3-WB	3	230-1-60	8 Gallon Twin	11.3/10.3	135

• SINGLE STAGE AIR SLED

Ergonomically designed, the Air Sled offers a rugged frame support to meet the rigorous demands of field handling. Available options include cart assembly (lifting handle and semi-pneumatic tires) providing balanced two wheel mobility, regulation panel, hose rack and weatherproof cover.

GASOLINE ENGINE DRIVEN

IR Model #	HP	Engine	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3J5.5GH-AS	5.5	Honda	8 Gallon Twin	11.8/10.7	135



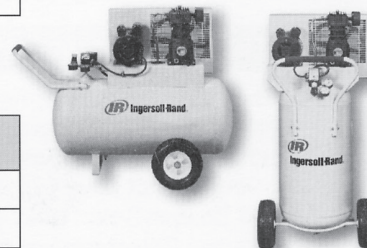
ELECTRIC

IR Model #	HP	Voltage	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3J3-AS	3	230-1-60	8 Gallon Twin	11.3/10.3	135

• SINGLE STAGE GARAGE MATE

Ideal for the home, shop or jobsite.

IR Model #	HP	Voltage	Tank	ACFM@ 90/135 PSIG	Max PSIG
SS3R2-GM	2	115-1-60	24 Gallon Vertical	5.7/4.9	135
SS3F2-GM	2	115-1-60	30 Gallon Horizontal	5.7/4.9	135



Air Power (cfm), not Horsepower, defines Compressor Performance. Not all Horsepower is rated equally! Ingersoll-Rand rates motors at applied load or running HP while many competitors are rated at peak HP (higher HP, but not necessarily more delivered air-cfm.)

PARTS & SERVICING
AVAILABLE

IR Ingersoll-Rand®

INDUSTRIAL AIR COMPRESSORS

PARTS & SERVICING
AVAILABLE

Designed for Heavy Shop Use and Light Industrial applications, our two-stage air compressors offer

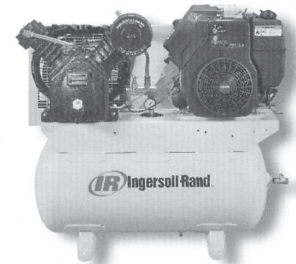
- Superior Air Power – more delivered air (cfm) and higher pressure (psi) to power your air tools
- Durable 100% cast iron construction for the most demanding environment
- Extended pump life! 10,000+ hours

TWO-STAGE GASOLINE ENGINE DRIVEN

Ideal for fleet or field service applications with truck bed mounting design. Idle engine control and electronic ignition for easier starting. Powder coat paint finish to protect against outdoor elements. 30 gallon ASME receiver and OSHA fully enclosed belt

guard for worker safety.

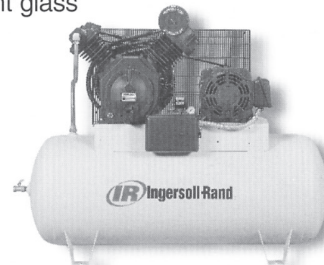
IR Model #	HP	Engine	ACFM @ 175 PSIG	Tank
2475F12.5G	12.5	Kohler	24	30 Gallon Horizontal
2475F11.5GKA	11.5	Kawasaki	25	30 Gallon Horizontal
2475F11GH	11	Honda	19	30 Gallon Horizontal



TWO-STAGE ELECTRIC "VALUE PACKAGES"

Priced right and designed for the most demanding applications where a dependable air supply is required. Each package includes a two-stage cast-iron compressor pump, ODP electric motor, magnetic motor starter (mounted and wired), automatic start and stop pressure switch control, mounted on an ASME rated receiver tank. Available voltages: 230/1/60 (5-7.5 HP), 200/3/60, 230/3/60, 460/3/60. Pressure up to 175 PSIG. Oil sight glass included on 10-15 HP Packages.

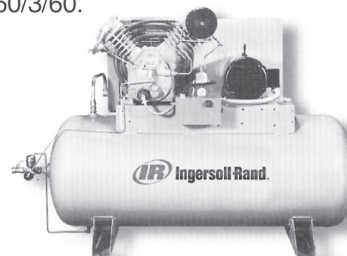
IR Model #	HP	ACFM @ 175 PSIG	Tank
2340L5	5	15	60 Gallon Vertical
2475N5	5	16.8	80 Gallon Vertical
2475N7.5	7.5	24	80 Gallon Vertical
2545E10V	10	35	120 Gallon Horizontal
7100E15V	15	50	120 Gallon Horizontal



TWO-STAGE ELECTRIC "FULLY PACKAGED"

Everything you need for a dependable air supply with minimal maintenance. Fully packaged compressors include magnetic motor starter, aircooled aftercooler and electric drain valve which removes harmful moisture, plus, the added protection of a low oil level shutdown switch. Available voltages: 230/1/60 (5-7.5 HP), 200/3/60, 230/3/60, 460/3/60.

IR Model #	HP	ACFM @ 175 PSIG	Tank
2475N5FP	5	16.8	80 Gallon Vertical
2475N7.5FP	7.5	24	80 Gallon Vertical
2545K10FP	10	35	120 Gallon Vertical
2545E10FP	10	35	120 Gallon Horizontal
7100E15FP	15	50	120 Gallon Horizontal



* Packages available through 30 HP.

INGERSOLL-RAND START-UP MAINTENANCE KITS

All the parts needed to maintain your compressor for a full year, plus the added protection of extended warranty coverage – two very distinct advantages you'll gain with the All Season Select Start Up kit. Kits include All Season Select synthetic pump lubricant and replacement air filter elements. Kits for gasoline engine driven compressors also include engine air filter, oil filter and engine oil.

IR Model #	Compressor HP
32305580	5 & 7.5
32305898	10 & 15
32305906	20, 25 & 30
32305872	12.5 (Kohler)
32498511	11.5 (Kawasaki)
32312936	11 (Honda)



2 YEAR WARRANTY!

Only in America are there handicap parking places in front of a skating rink.

5-30 HP Fully Packaged Air Compressors

Ingersoll-Rand's high performance two-stage, Fully Packaged air compressors are designed for the most demanding applications where a dependable air supply is essential. Each fully packaged air compressor comes complete with pre-installed magnetic motor starter, aircooled aftercooler and electric drain valve to remove harmful moisture, plus, the added protection of a low oil level shutdown switch. Perfect for automotive, heavy duty commercial or industrial applications.

When performance is defined by maximum operating pressure, increased air flow, and extended duty cycles, Ingersoll-Rand is the product of choice.

Powerful...

- Maximum Air Power!
- More delivered air(cfm) providing the power to do the job right and in less time
- 100 % continuous duty for the toughest applications
- 175 psi maximum operating pressure

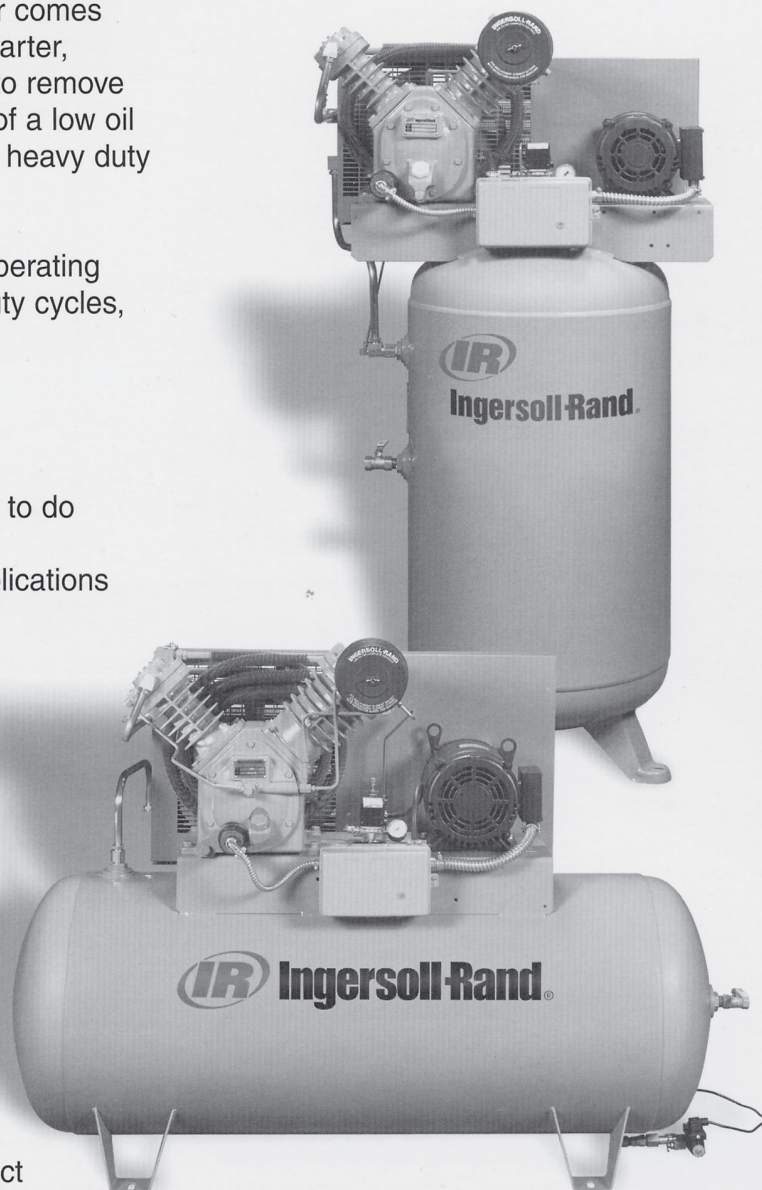
Durable...

- Built to Last! Durable cast iron construction
- Extended Pump Life! 10,000 + hours for years of trouble free service
- Industrial Quality Design

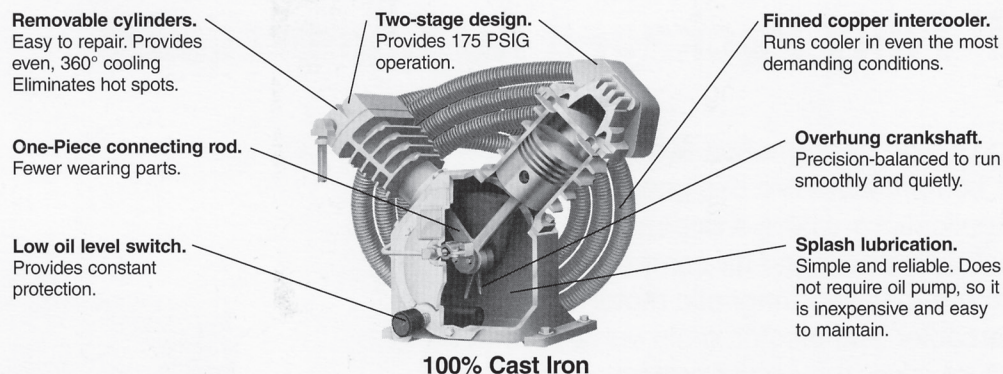
Reliable...

- Designed and produced by Ingersoll-Rand, the world's leader in air compressor manufacturing, sales and service
- Precision engineered quality components
- Extended two year warranty offered with the use of Ingersoll-Rand's All Season Select synthetic lubricant

LEGENDARY PERFORMANCE



Technical Specification Guide



Standard Features

- Durable 100% cast iron construction
- 100% continuous duty cycle
- Factory mounted and wired motor starter
- Air-cooled aftercooler
- Automatic start/stop pressure switch control (5-7.5HP)
- Constant speed control (10-30HP)
- ASME code receiver tank
- Electric drain valve
- Low oil level shutdown switch
- Totally enclosed beltguard
- Splash lubrication
- All units are prewired and thoroughly tested prior to shipment
- Meets OSHA standards
- UL/CSA/ASME compliant

Specifications

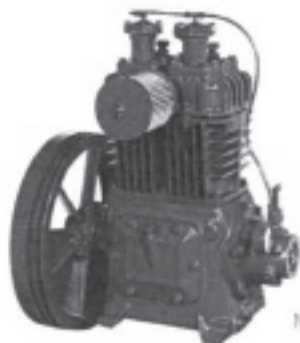
Model	HP	Tank Size (gal.)	Capacity (cfm) @175psi	Maximum Pressure PSI	Package Dimensions L/W/H (in.)	Net Weight (lbs.)
2475N5FP	5	80 Vertical	16.8	175	30"x37"x70"	500
2475N7.5FP	7.5	80 Vertical	24.0	175	30"x37"x70"	500
2545E10FP	10	120 Horizontal	35.0	175	75"x31"x56"	1000
7100E15FP	15	120 Horizontal	50.0	175	78"x30"x56"	1035
3000E20FP	20	120 Horizontal	72.0	175	75"x38"x61"	1410
3000E25FP	25	120 Horizontal	82.0	175	75"x38"x61"	1410
3000E30FP	30	120 Horizontal	100.0	175	75"x38"x61"	1410

SOBER SUE

Background: One afternoon in 1908, the managers of Hammerstein's Victoria Theater on Broadway marched a woman onstage during intermission and offered \$1,000 to anyone in the audience who could make the woman—introduced as "Sober Sue"—laugh. When no one in the audience succeeded in getting Sober Sue to even crack a smile, the theater managers upped the ante by inviting New York's top comedians to try.

Over the next several weeks, just about every headlining comedian in New York City performed their best material in front of Sober Sue, hoping to benefit from the publicity if they were first to get her to laugh. Everyone failed, but Sober Sue became one of Broadway's top theater attractions.

Exposed: It wasn't until after she left town that Sober Sue's secret finally leaked out: Her facial muscles were paralyzed—she couldn't have laughed even if she had wanted to. The Victoria Theater had cooked up the "contest" to trick New York's most famous—and most expensive—comedians into performing their routines for free.



Model 240



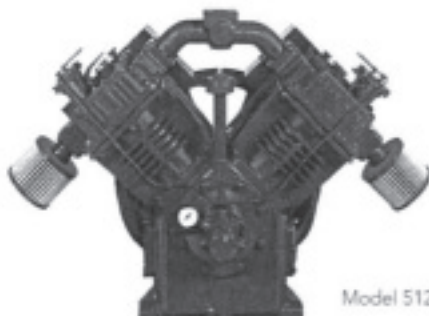
Model 4125

QUINCY QR-25 SINGLE-STAGE BASIC COMPRESSOR

Model	Typical HP Range @100 PSI	Bore (in)	Stroke (in)	No. Cyl.	Min. RPM	ACFM F.A.D. @100 PSIG Min. RPM	Max. RPM	ACFM @100 PSIG Max. RPM	Max. Cont. Pressure (PSIG)	Max. Intermit. Pressure (PSIG)	Approx. Shipping Weight (lb)	LxWxH (in)
210	1-2	2.50	2.00	2	400	2.82	1000	6.34	100	150	71	13x7x15
216	1 1/2-5	3.00	2.50	2	400	4.74	900	10.70	100	100	165	17x13x21
240	3-7 1/2	4.00	3.00	2	400	10.47	900	23.56	100	100	247	23x16x25
270	5-10	4.50	4.00	2	400	15.61	900	35.12	100	100	430	25x20x30
4125	10-20	4.50	4.00	V4	400	31.81	940	71.57	100	100	767	26x38x28



Model 325



Model 5120

QUINCY QR-25 TWO-STAGE BASIC COMPRESSOR

Model	Typical HP Range @175 PSI	Bore L.P. (in)	Bore H.P. (in)	Stroke (in)	No. Cyl.	Min. RPM	ACFM @ 175 PSIG Max. RPM	Max. Cont. Pressure (PSIG)	Max. Intermit. Pressure** (PSIG)	Approx. Shipping Weight (lb)	LxWxH (in)
310	2	3.50	2.00	2.50	2	628	6.30	200	500	175	21x10x21
325	3-5	4.50	2.50	3.00	2	400	18.64	200	500	255	22x17x25
340	5-10	5.25	3.00	3.50	2	400	29.64	200	500	452	27x16x30
350	5-15	6.00	3.25	3.50	2	400	36.60	200	350	480	28x16x31
370	5-15	6.00	3.25	4.00	2	400	49.72	200	250	481	28x16x31
390	7 1/2-20	7.50	4.00	4.00	2	400	69.21	200	250	739	33x16x34
5120	10-25	6.00	3.25	4.00	V4	400	94.97	200	250	904	32x41x31

** High pressure basic required above 250 PSIG

Darwin Award Winner

March 1995, James Burns, 34, Alamo, Michigan was killed as he was trying to repair what police described as a "farm-type truck." Burns got a friend to drive the truck on a highway while Burns hung underneath so that he could ascertain the source of a troubling noise. Burns' clothes caught on something. The man that was driving found Burns "wrapped in the drive shaft."



QUINCY QR-25 SERIES



Model F5120

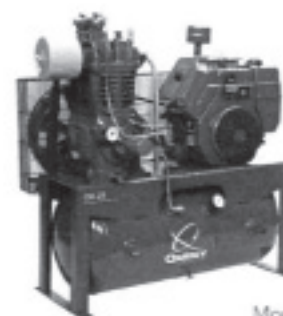
QUINCY QR-25 TANK-MOUNTED INDUSTRIAL COMPRESSOR

Model No.	Horse Power	Bore L.P. (in)	Bore H.P. (in)	Stroke (in)	No. Cyl.	RPM **	CFM Piston Disp.	†ACFM **	Std. Press. Switch Set (PSIG)	Tank Size (Gallons)	Approx. Shipping Weight (lb)	LxWxH (in)
F210*	1	2.50	—	2.00	2	440	5.00	3.30	80-100	30	290	42x16x37
	1 1/2					691	7.90	4.80		60	480	53x22x42
V210*	1	2.50	—	2.00	2	481	5.50	3.30	80-100	30	275	27x10x47
	1 1/2					691	7.90	4.80				
F310	2	3.50	2.00	2.50	2	628	8.70	6.30	135-175	60	560	53x22x48
V310										80	600	31x24x75
F325	3	4.50	2.50	3.00	2	459	13.60	10.40	135-175	60	710	53x26x51
	5					796	22.00	17.40		80	770	68x26x50
										120	975	73x26x56
V325	3	4.50	2.50	3.00	2	492	13.60	10.40	135-175	60	675	36x26x78
	5					796	22.00	17.40		80	775	36x26x78
F340	7 1/2	5.25	3.00	3.50	2	786	34.50	26.00	135-175	80	1095	68x28x56
										120	1120	73x28x61
F350	10	6.00	3.25	3.50	2	859	49.20	33.40	135-175	120	1225	73x30x62
F370	15	6.00	3.25	4.00	2	1060	69.40	49.30	135-175	120	1285	73x30x62
F390	20	7.50	4.00	4.00	2	877	95.80	64.00	135-175	120	1680	73x35x66
										200	2010	77x35x72
F5120	25	6.00	3.25	4.00	V4	951	124.50	87.00	135-175	120	2140	73x34x72
										200	2140	77x34x72

* Single-stage model

** RPM and ACFM shown at 100 PSI for single-stage models, 175 PSI for two-stage models

† All compressor performance data is rated with 230/460, 60Hz, 3ph, EPAAct high efficiency motors.



Model HT325

QUINCY QR-25 TWO-STAGE TANK-MOUNTED MOBILE COMPRESSOR

Model No.	Horse Power	Bore L.P. (in)	Bore H.P. (in)	Stroke (in)	No. Cyl.	RPM **	CFM Piston Disp.	ACFM @ 175 PSI **	Pilot Valve Setting PSI	Tank Size (Gallons)	Approx. Shipping Weight (lb)	LxWxH (in)
HT325	11 Eng.	4.50	2.50	3.00	2	900	24.80	18.70	165-175	30	695	41x27x44
HT325LS-10Y	10 Diesel	4.50	2.50	3.00	2	900	24.80	18.70	165-175	30	530	41x27x44
HT350	18 Eng.	6.00	3.25	3.50	2	900	51.50	34.50	165-175	60	1670	49x31x54

* Single-stage model

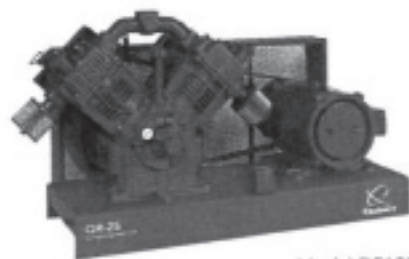
** RPM and ACFM shown at 100 PSI for single-stage models, 175 PSI for two-stage models

† All compressor performance data is rated with 230/460, 60Hz, 3ph, EPAAct high efficiency motors.



QUINCY QR-25 BASE-MOUNTED INDUSTRIAL COMPRESSOR

Model No.	Horse Power	Bore L.P. (in)	Bore H.P. (in)	Stroke (in)	No. Cyl.	RPM **	CFM Piston Disp.	†ACFM **	Approx. Shipping Weight (lb)	LxWxH (in)
D210*	1	2.50	—	2.00	2	440	5.00	3.30	185	27x16x20
	1 1/2					691	7.90	4.80	190	
D310	2	3.50	2.00	2.50	2	628	8.70	6.30	415	34x22x14
D325	3	4.50	2.50	3.00	2	459	13.60	10.40	455	
	5					796	22.00	17.40	510	37x26x31
	10 HP Diesel					900	24.80	18.70	480	41x25x29
	11 ENG.					900	24.80	18.70	455	41x25x29
D340	7-1/2	5.25	3.00	3.50	2	786	34.50	26.00	770	40x28x36
D350	10	6.00	3.25	3.50	2	859	49.20	33.40	980	41x30x37
	18 ENG.					900	51.50	34.50	1065	44x30x37
D370	15	6.00	3.25	4.00	2	1060	69.40	49.30	1045	41x30x37
D390	20	7.50	4.00	4.00	2	877	95.80	64.00	1320	48x35x41
D5120	25	6.00	3.25	4.00	V4	951	124.50	87.00	1530	63x34x38



Model D5120

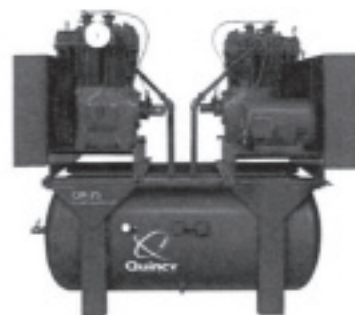
* Single-stage model

** RPM and ACFM shown at 100 PSI for single-stage models, 175 PSI for two-stage models

† All compressor performance data is rated with 230/460, 60Hz, 3ph, EPAAct high efficiency motors.

QUINCY QR-25 DUPLEX TANK-MOUNTED INDUSTRIAL COMPRESSOR

Model No.	Horse Power 2X	Bore L.P. (in)	Bore H.P. (in)	Stroke (in)	No. Cyl.	RPM **	CFM Piston Disp. 2X	†ACFM 2X **	Std. Press. Switch Set (PSIG)	Tank Size (Gallons)	Approx. Shipping Weight (lb)	LxWxH (in)
FF210*	1-1/2	2.50	*	2.00	2	691	7.90	4.80	80-100	60	590	52x29x43
FF310	2	3.50	2.00	2.50	2	628	9.10	6.64	135-175	80	890	70x27x47
FF325	3	4.50	2.50	3.00	2	459	13.60	10.40	135-175	80	1050	72x28x51
	5					796	22.00	17.40		120	1280	77x30x56
FF340	7-1/2	5.25	3.00	3.50	2	786	34.50	26.00	135-175	120	1675	78x30x61
										200	2250	79x30x69
FF350	10	6.00	3.25	3.50	2	859	49.20	33.40	135-175	120	2345	78x30x62
										200	1965	79x30x69
FF370	15	6.00	3.25	4.00	2	1060	69.40	49.30	135-175	200	2430	79x30x69
FF390	20	7.50	4.00	4.00	2	877	95.80	64.00	135-175	240	3300	89x53x53
FF5120	25	6.00	3.25	4.00	V4	951	124.50	87.00	135-175	240	3750	90x75x72



Model FF390

* Single-stage model

** RPM and ACFM shown at 100 PSI for single-stage models, 175 PSI for two-stage models

† All compressor performance data is rated with 230/460, 60Hz, 3ph, EPAAct high efficiency motors.

All performance data meets CAGI/PNEUROP PN2CPTC2 and PN2CPTC3 acceptance test codes for electrically and I.C. engine-driven packaged displacement air compressors.

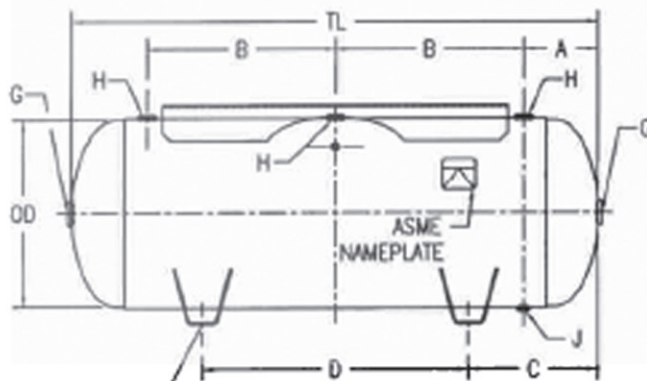
Prodigy

An infant prodigy is a young child whose parents are highly imaginative.

Profit

It is a socialist idea that making profits is a vice; I consider that the real vice is making losses. Winston Churchill

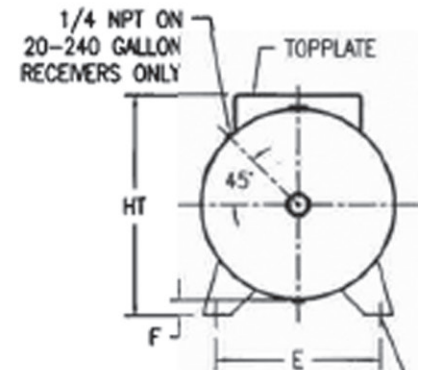
HORIZONTAL AIR RECEIVERS 10-240 GALLONS



7/16" DIA. HOLE (10-15 GALLON)
7/16" X 3/4" SLOT (20-30 GALLON)
9/16" X 1-1/2" SLOT (60-80 GALLON)
11/16" X 1-3/4" SLOT (120 GALLON)
13/16" X 1-1/2" SLOT (200-240 GALLON)



Wing Feet



PRESSED STEEL FEET (10-15 GALLON)
WING FEET (20-120 GALLON)
SADDLES (200-240 GALLON)

10-240 GALLON M-3050

NOM. CAP.		PART NO.	MAWP	TOP PLATE	T.W.	DIMENSIONS IN INCHES										N.P.T. OPENINGS			
GAL.	CU.FT.					OD	TL	HT	A	B	C	D	E	F	G	H	J		
10	1.34	302460	200	NONE	32	10.00	30.00	11.56	5.50	9.50	6.00	18.00	9.25	1.56	3/4	1/2	1/4		
10	1.34	302461	200	.13X9X16	43	10.00	30.00	13.06	5.50	9.50	6.00	18.00	9.25	1.56	3/4	1/2	1/4		
10	1.34	302462	300	.13X9X16	46	10.00	30.00	13.06	5.50	9.50	6.00	18.00	9.25	1.56	3/4	1/2	1/4		
15	2.01	302463	200	NONE	51	12.00	33.00	13.06	5.50	11.00	6.50	20.00	11.00	1.06	3/4	1/2	1/4		
15	2.01	302464	200	.13X9X18	51	12.00	33.00	14.56	5.50	11.00	6.50	20.00	11.00	1.06	3/4	1/2	1/4		
15	2.01	302465	300	.13X9X18	66	12.00	33.00	14.56	5.50	11.00	6.50	20.00	11.00	1.06	3/4	1/2	1/4		
20	2.67	302466	200	NONE	66	14.00	33.00	16.00	5.88	10.63	8.50	16.00	11.69	2.00	1-1/2	1/2	1/2		
20	2.67	302467	200	.13X9X20	79	14.00	33.00	18.00	5.88	10.63	8.50	16.00	11.69	2.00	1-1/2	1/2	1/2		
20	2.67	302468	300	.13X9X20	95	14.00	33.00	18.00	5.88	10.63	8.50	16.00	11.69	2.00	1-1/2	1/2	1/2		
30	4.01	302469	200	NONE	89	16.00	38.00	18.00	5.75	13.25	9.00	20.00	12.81	2.00	1-1/2	3/4	1/2		
30	4.01	302470	200	.18X10X24	111	16.00	38.00	20.63	5.75	13.25	9.00	20.00	12.81	2.00	1-1/2	3/4	1/2		
30	4.01	302471	300	.18X10X24	140	16.00	38.00	20.63	5.75	13.25	9.00	20.00	12.81	2.00	1-1/2	3/4	1/2		
60	8.02	302473	200	NONE	170	20.00	48.00	22.31	7.75	16.25	12.00	24.00	16.50	2.31	2	3/4	1/2		
60	8.02	302474	200	.18X13.5X30	204	20.00	48.00	24.44	7.75	16.25	12.00	24.00	16.50	2.31	2	3/4	1/2		
60	8.02	302475	300	.18X13.5X30	225	20.00	48.00	24.44	7.75	16.25	12.00	24.00	16.50	2.31	2	3/4	1/2		
80	10.70	302476	200	NONE	214	20.00	63.00	22.31	9.00	22.50	15.50	32.00	16.50	2.31	2	1	1/2		
80	10.70	302477	200	.25X15X40	263	20.00	63.00	24.06	9.00	22.50	15.50	32.00	16.50	2.31	2	1	1/2		
80	10.70	302478	300	.25X15X40	350	20.00	63.00	24.06	9.00	22.50	15.50	32.00	16.50	2.31	2	1	1/2		
120	16.04	302479	200	NONE	311	24.00	67.00	26.25	9.50	24.00	16.50	34.00	20.63	2.25	2	1-1/2	3/4		
120	16.04	302480	200	.25X16X44	382	24.00	67.00	27.94	9.50	24.00	16.50	34.00	20.63	2.25	2	1-1/2	3/4		
200	26.74	302482	200	NONE	538	30.00	72.00	33.00	11.63	24.38	17.00	38.00	23.50	3.00	2	2	1		
200	26.74	302483	200	.25X19X48	632	30.00	72.00	35.69	11.63	24.38	17.00	38.00	23.50	3.00	2	2	1		
240	32.09	302484	200	NONE	618	30.00	84.00	33.00	11.63	30.38	20.00	44.00	23.50	3.00	2	2	1		
240	32.09	302485	200	.25X19X48	716	30.00	84.00	35.69	11.63	30.38	20.00	44.00	23.50	3.00	2	2	1		

MARINE MUFFLER FIBERGLASS SYSTEMS

Making the Right Selection

Matching the correct silencer to any given application requires the consideration of many factors. Available space, type of engine, accessibility, location, and the engine manufacturer's recommended maximum back pressure—are but a few of the numerous variables. Therefore, it is vitally important that all factors be considered prior to making a final selection. A special manufacturing feature of all Marine Muffler Corporation exhaust components is that they are engineered to compensate for back pressure requirements. The range of styles and configurations make product selection easy. For convenience, the chart (right) can begin to answer your selection questions.

NOTE: For "V" type cylinder block applications, where two exhaust systems per engine are used (dual exhaust), divide total H.P. by two (2), then select appropriate silencer size. For "V" applications where exhaust is routed to one silencer (single exhaust), use total H.P. to make selection.

For intermediate horsepower applications, use the next larger size silencer.

All Marine Muffler exhaust system components are factory "certified" for use in marine wet exhaust applications.

O.D.	GAS	DIESEL
1 1/2"	35	N/A
2"	50	N/A
2 1/2"	100	25
3"	150	50
3 1/2"	200	75
4"	250	100
5"	350	200
6"	400	300
8"	N/A	500
10"	N/A	700
12"	N/A	1000

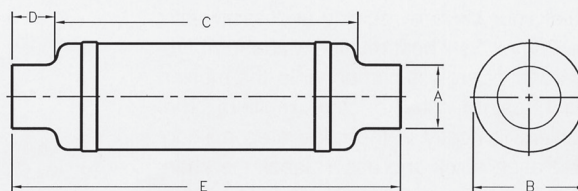
Resin Standards

Resins used in the construction of Marine Muffler Corporation products are carefully selected to meet or exceed the following criteria for heat resistance and fire retardancy.

U.S. NAVY/USCG
U.S. NAVY/USCG
Dept. of Transportation

MIL-R-21607
MIL-R-7575
ASTM-E-162

Primex™ Round Silencers



Primex™ Silencers

PART #	"A"	"B"	"C"	"D"	"E"
MC-015	1 1/2"	6"	15 1/2"	4"	23 1/2"
MC-020	2	6	15 1/2	2	19 1/2
MC-025	2 1/2	6	17	3	23
MC-030	3	6	17	3	23
MC-035	3 1/2	8	19	4	27
MC-040	4	8	19	4	27
MC-045	4 1/2	10	25	5	35
MC-050	5	10	25	5	35
MC-060	6	12	29 1/2	6	41 1/2
MC-080	8	14	43 1/2	6	55 1/2
MC-100	10	18	53	6	71
MC-120	12	24	64	10	84

For over two decades Marine Muffler has been quieting boats with round silencers made from fiberglass composites. Designed-in back pressure compensation and corrosion resistant properties make Marine Muffler products the choice of more OEM's than any other brand. To determine the size you need, refer to the chart on the inside cover. Actual product dimensions are listed above.

MAXIM

OVERVIEW

**Better Chamber Type Silencer:
Expected Attenuation is 20 to 24 dBA**

Use a model M31 in residential areas where background noise is present but not objectionable. In these areas, installation of an M31 on an engine exhaust is intended to bring the noise level down to match the ambient noise levels.

Example: In a quieter residential area off main traffic areas and away from constant noise sources.

TYPICAL APPLICATIONS

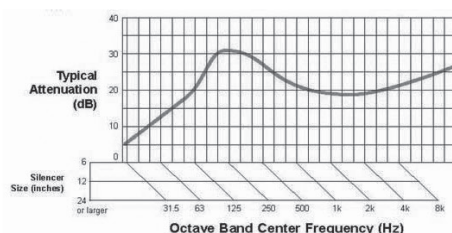
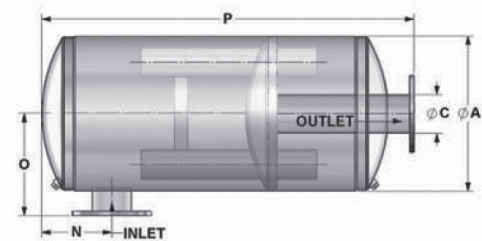
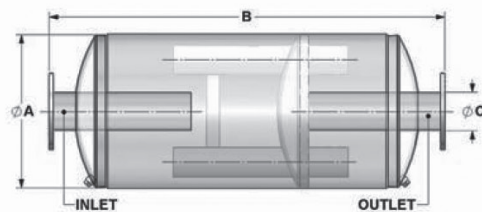
- Internal combustion engine intakes and exhausts
- Blower intakes and discharges
- Vacuum pump discharges

FEATURES

- Advanced acoustical design
- Heavy duty, all welded construction and long service life
- Easily installed in any position
- Prime coated exterior finish

OPTIONAL ACCESSORIES

- Explosion relief cover
- Flexible connectors
- Companion flanges
- Cleanout openings
- Side inlet(s)
- Side outlet
- Horizontal or vertical support arrangements
- Special paint
- Stainless steel construction



Size	A	B	C	N		O	P	Est. Wt.
				Min.	Max.			
4"	14	48	4	5 1/2	22	10	45 3/8	110
5"	16	55	5	6 1/2	25	11	52 3/8	120
6"	18	63	6	7	29 1/2	12	60 3/8	170
8"	22	76	8	8 1/2	36 1/2	14	73 3/8	285
10"	26	91	10	10 1/2	43	16 1/2	88	460
12"	30	109	12	12	53	18 1/2	106 1/8	745
14"	36	102	14	14	48	21 1/2	99 1/4	965
16"	40	119	16	17	56	23 1/2	116 3/8	1340
18"	45	127	18	19	60	26 1/2	124	1850
20"	50	144	20	21	69	29	141 1/4	2175
22"	54	161	22	22	78	31	158 1/4	2650
24"	60	165	24	24	79	34	162 1/4	3400
26"	64	183	26	26	89	36	180 1/2	3850
28"	68	200	28	27	98	38	197 3/4	4840
30"	72	216	30	29	107	40	213 3/4	5150

Note: Dimensions are in inches, weights are in pounds.

MAXIM

**Critical Chamber Type Silencer:
Expected Attenuation is 25 to 32 dBA**

Use a model M32 in residential areas where background noise is present but not objectionable. In these areas, installation of an M32 on an engine exhaust is intended to bring the noise level down to match the ambient noise levels.

Example: In a quieter residential area off main traffic areas and away from constant noise sources.

OVERVIEW

TYPICAL APPLICATIONS

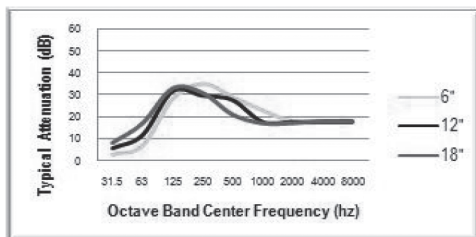
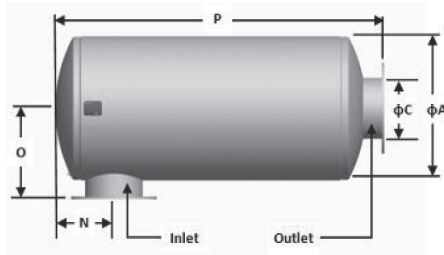
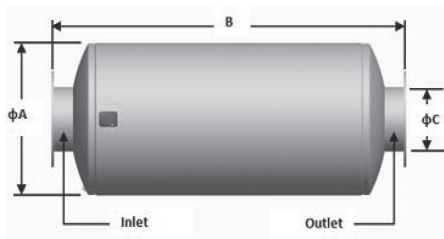
- Internal combustion engine intakes and exhausts
- Blower intakes and discharges
- Vacuum pump discharges

FEATURES

- Advanced acoustical design
- Heavy duty, all welded construction and long service life
- Easily installed in any position
- High heat silicone black finish
- Sizes 1" to 3 1/2" have MNPT connections
- Two chambers
- Drain connections

OPTIONAL ACCESSORIES

- Explosion relief cover
- Flexible connectors
- Companion flanges
- Cleanout openings
- Side inlet
- Dual inlets
- Side outlet
- Horizontal or vertical support arrangements
- Special paint
- Stainless steel construction: 304, 316 & 321
- Complete range of exhaust accessories



Size	A	B	C	N		O	P	Est Wt.
				Min	Max			
1"	6	20	1	3	5	6	17	10
1 1/2"	9	30	1 1/2	4	11	7 1/2	27	23
2"	9	30	2	4 1/2	11	7 1/2	27	24
2 1/2"	10	34	2 1/2	5	12	8	31	33
3"	12	38	3	5 1/2	15	9	35	50
3 1/2"	14	42	3 1/2	6	16	10	39	65
4"	14	48	4	6	17	11	44	75
5"	16	57	5	7	23	12	53	100
6"	18	63	6	8	25	13	59	126
8"	22	74	8	9 1/2	32	15	70	203
10"	26	87	10	11 1/2	39	17	83	352
12"	30	102	12	13	45	19	98	519
14"	36	109	14	15 1/2	46	23	104	674
16"	40	119	16	16 1/2	51	25	114	973
18"	45	127	18	18	56	27 1/2	122	1165
20"	50	137	20	20 1/2	61	30	132	1656
22"	54	149	22	22 1/2	67	32	144	2107
24"	60	162	24	24	74	35	157	2566
26"	64	183	26	25 1/2	85	37	178	3031
28"	68	200	28	26 1/2	93	39	195	3468
30"	72	216	30	28	102	41	211	3992

Note: Dimensions are in inches, weights are in pounds

MAXIM

OVERVIEW

Residential Chamber Type Spark Arresting: Expected Attenuation is 20 to 25 dB

Use a model MSA11 in residential and light industrial areas for spark arresting capability where background noise is relatively high and constant and the need for higher degrees of silencing is minimal.

Example: In residential neighborhoods having high traffic or light industry with relatively constant background noise. Residents in these areas are typically accustomed to the noise or make some efforts to shield themselves from the ever present background noise. Use of an MSA11 can keep engine exhaust noise within existing noise levels.

TYPICAL APPLICATIONS

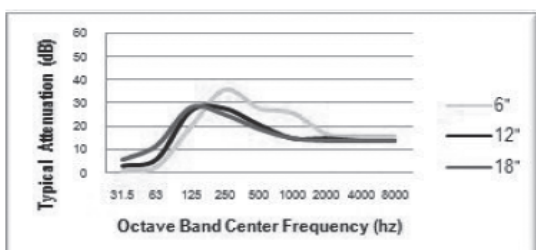
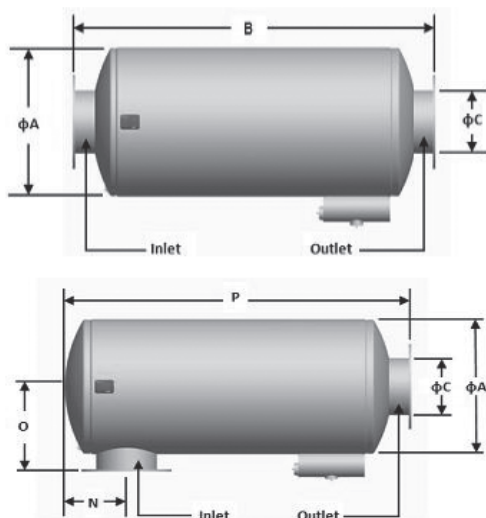
- Internal combustion engine exhausts
- Marine service
- Refineries / Hazardous environments
- Offshore drilling / Production platforms

FEATURES

- Advanced acoustical design
- Heavy duty, all welded construction and long service life
- Easily installed in any position
- High heat silicone black finish
- Sizes 1½" to 3½" have MNPT connections
- Two chambers
- Efficient spark arresting
- Drain connections

OPTIONAL ACCESSORIES

- Explosion relief cover
- Flexible connectors
- Companion flanges
- Cleanout openings
- Side inlet
- Horizontal or vertical support arrangements
- Special paint
- Stainless steel construction: 304, 316 & 321
- Complete range of exhaust accessories
- Spark arresting efficiency certification



Size	A	B	C	N	O	P	Est Wt.
1 ½"	9	20	1 ½	3 ½	7 ½	17	20
2"	9	20	2	4	7 ½	17	21
2 ½"	10	24	2 ½	4 ½	8	21	28
3	12	26	3	5	9	23	41
3 ½"	14	30	3 ½	5 ½	10	27	55
4"	14	36	4	6	11	32	64
5"	16	43	5	7	12	39	88
6"	18	49	6	7 ½	13	45	110
8"	22	59	8	9 ½	15	55	178
10"	26	64	10	11 ½	17	60	280
12"	30	77	12	13	19	73	416
14"	36	83	14	15 ½	23	78	558
16"	40	90	16	16 ½	25	85	793
18"	45	96	18	18	27 ½	91	950
20"	50	109	20	20 ½	30	104	1392
22"	54	119	22	22 ½	32	114	1806
24"	60	125	24	24	35	123	2187
26"	64	140	26	25 ½	37	135	2586
28"	68	155	28	26 ½	39	150	2984
30"	72	166	30	28	41	161	3445

Note: Dimensions are in inches, weights are in pounds



SEPARATOR

SPARES & EQUIPMENT

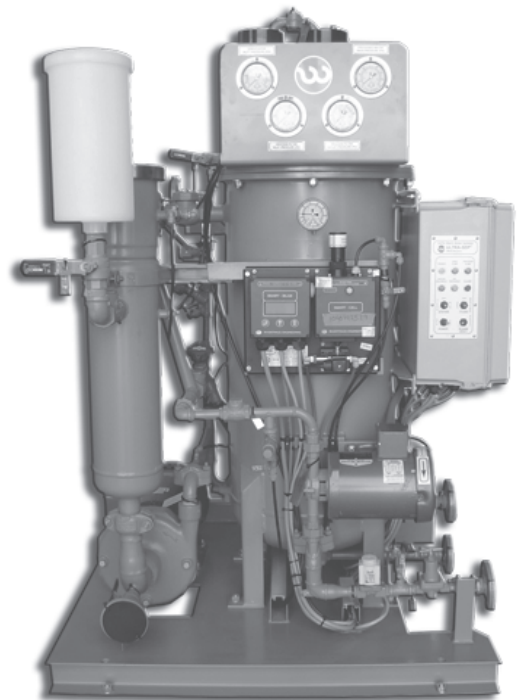
ULTRA-SEP™ Bilge Water Separator

Compact Design

The Compact ULTRA-SEP Bilge Water Separators meets your needs for a small unit with a lower capital cost. Ideal for engine rooms where bilge conditions are lighter and installation space tight. Compact units provide the same positive physical barrier and continuous 5ppm discharge as Coffin World Water Systems larger ULTRA-SEP systems but in a more compact dimension.

Here's the difference:

- Superior separation of emulsions with SPIR-O-LATOR® Membrane Technology. The Positive Physical Barrier to oil reduces risk of accidental overboard discharge.
- Continuously discharge with less than 5ppm oil content. Capable of operating in environmentally sensitive areas.
- ULTRA-SEP has low maintenance, fewer consumables and no waste disposal.
- Small footprint allows easy retrofit installation.
- Manual controls are simple and easy to operate.
- All units are pre-wired and pre-piped to facilitate easy installation and operation. IMO MEPC.107(49) / EC-MED type approved by USCG & ABS and Russian Maritime Register of Shipping.



Dual Membrane ULTRA-SEP 1000-C

Specifications for ULTRA-SEP Compact Bilge Water Separators

Model No.	Capacity	Length	Width	Height	Weight	Oily Water Inlet	Processed Water Outlet Discharge	Processed Water Outlet Recirculate	Power
	m ³ /h GPM	mm IN	mm IN	mm IN	kg LBS	mm IN	mm IN	mm IN	kW
US500-C	0.5 2.2	890 35	760 30	1550 61	350 770	25 1.0	25 1.0	25 1.0	3
US1000-C	1.0 4.4	965 38	890 35	1550 61	390 858	25 1.0	25 1.0	25 1.0	4



SEPARATOR SPARES & EQUIPMENT

JOWA Bilge Water Separator

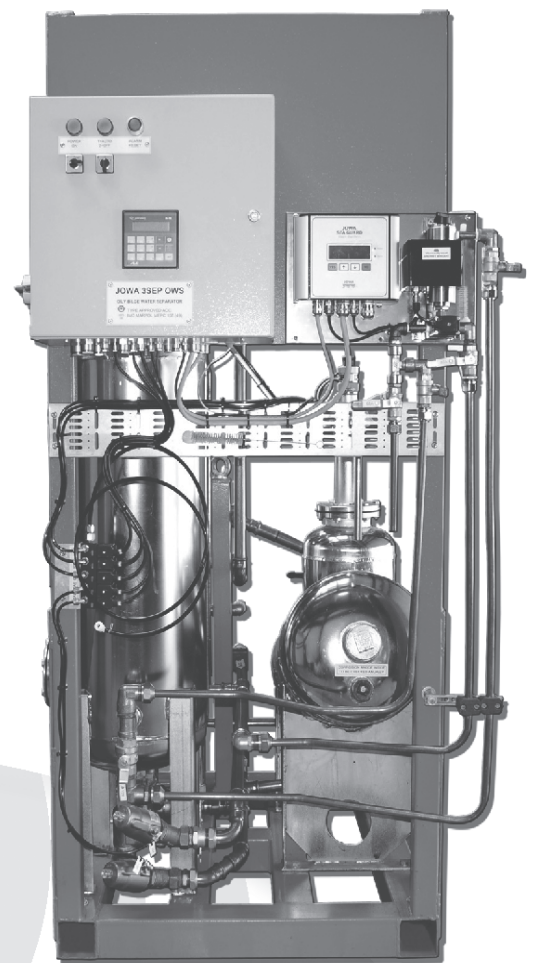
The 3SEP OWS is a dual stage bilge water separation system utilizing differential specific gravity, coalescence plates and filtration to separate and remove free and emulsified oil. The skid layout is optimized so ensure a small footprint, the 1.0m³/h unit shown below as a footprint of 950 x 760mm. The unit is available in five different capacities: 0.5m³/h, 1.0m³/h, 2.5m³/h, 5.0m³/h and 10.0m³/h.

Main features:

- MEPC 107 (49).
- Treated water below 15ppm.
- Separates free and emulsified oil.
- Continuous flow with automatic operation.
- No chemicals required.
- "Plug and play", easy installation.
- Skid design, small footprint.
- High quality materials and parts.
- Tanks made of stainless steel, AISI 316L.
- Can easily be connected to an Emulsion breaking unit for less than 5ppm applications.
- Capacity range 0.5m – 10m³/h.
- Approvals; DNV, CCS, USCG & RMRS.

Additional water treatment and environmental protection systems available from Separator Spares & Equipment, LLC:

- Emulsion breaking unit
- Water discharge monitor
- Fresh water filter
- Silver ion sterilizer
- Hydrophore
- Calorifier
- UV sterilizer
- Fresh water unit
- Sewage treatment plant
- Oil discharge monitor



MORE STRANGE LAWSUITS

THE PLAINTIFF: Larry W. Bryant

THE DEFENDANT: Gov. James Gilmore of Virginia

THE LAWSUIT: In June 2000, Bryant filed suit to get Gilmore to call a grand jury to look into alien abductions, and to make sure the National Guard knew how to deal with alien attacks. Bryant was quoted as saying he was especially concerned about some "dark, silently floating triangles," which Gilmore had done nothing about.

THE VERDICT: Case dismissed



SEPARATOR

SPARES & EQUIPMENT

MAB 103

High Speed Disc Stack Centrifuge

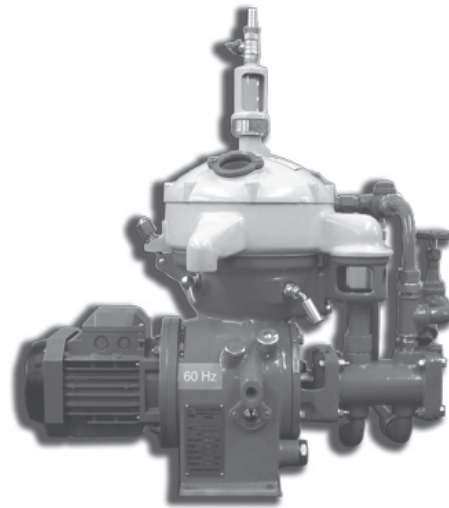
Machine Application

The MAB 103 high speed disc stack centrifuge is designed for purification or clarification of fuel oils, engine oils, lubricating oils, and various mineral oils used on board marine installations and in industrial applications.

Separator Design

The MAB 103 is driven by a horizontal driveshaft, friction clutch, worm wheel gear and vertical drive shaft. This is all housed within the separator frame, the worm wheel gear is situated in an oil bath to ensure smooth running. The brake is situated on the top part of the frame; braking directly onto the bowl.

The bowl is fixed onto the vertical drive shaft situated in the top part of the frame. The frame hood is hinged to enable easy access when cleaning or carrying out maintenance.



MAB 103 with motor and pump

Standard Equipment

- MAB 103 centrifugal separator
- Double pump with fittings
- Motor - 208-230/460 volt, 60 Hz
- Complete set of gravity disks
- Water supply device
- Complete set of tools
- Set of spare parts for extended use
- Set of instruction manuals

Optional Equipment

- 50 Hz motor
- Water seal alarm
- Electric pre-heater
- Control Panel
- Starter
- Skid

Separator Throughputs and Capacities

The MAB 103 is suitable for the separation of marine diesel, biodiesel, distillate, lubricating and hydraulic oils. (Throughputs may vary depending on temperature and viscosity of liquids)

Expected Throughput:

- Marine diesel oil: 238 g/h
- Biodiesel: 238 g/h
- Lubricating oil: 145 g/h
- Distillate: 304 g/h
- Hydraulic oil: 251 g/h

probably from Louisiana if...

When you're in Baton Rouge you know the difference between the old bridge & the new bridge.



SEPARATOR SPARES & EQUIPMENT

SEPARATOR SPARES & EQUIPMENT, LLC.

TECHNICAL DATA SHEET MODEL MAB-103

Weight:

(According to Standard Equipment w/ motor and Complete Bowl)

Approx. 225 lbs

Electric Power Consumption:

Idling: 0.40 kW

Running @ Max Capacity: 0.60 kW

Built-On Inlet Pump:

Suction Lift: 13 feet
(depending on flow and viscosity)

Built-On Outlet Pump:

Delivery Head: 49 - 82 feet
(depending on flow and viscosity)

Dimensions:

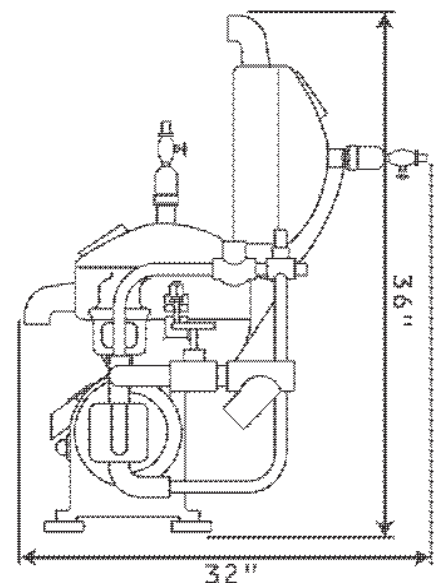
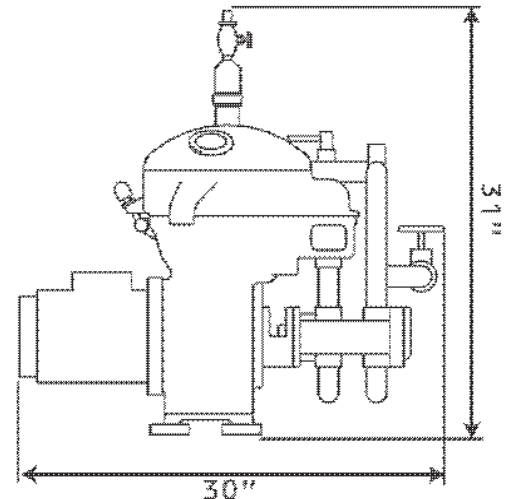
* See Dimensional Drawing for approximate measurements

* Allow additional room for hose connections and machine maintenance

Notes:

* Complete instruction manual and documentation ships with each separator

* Manufacturer can change specifications without notice



MORE STRANGE LAWSUITS

THE PLAINTIFF: S, a California lawyer

THE DEFENDANT: R, his next-door neighbor-also a lawyer THE LAWSUIT: In 1991, R asked S, whose family was playing basketball, to quiet down. S refused ... so R sprayed the family and their basketball court with a hose. S sued, claiming emotional distress. Then R countersued, saying S had reduced the value of his home. And to prove it, he introduced "scientific testimony from acoustical engineers, architects, and real-estate appraisers."

THE VERDICT: At first the court restricted S to six hours of basketball a day ... But an appeals court ruled that R should just close his window.



SEPARATOR

SPARES & EQUIPMENT

MAB 104

High Speed Disc Stack Centrifuge

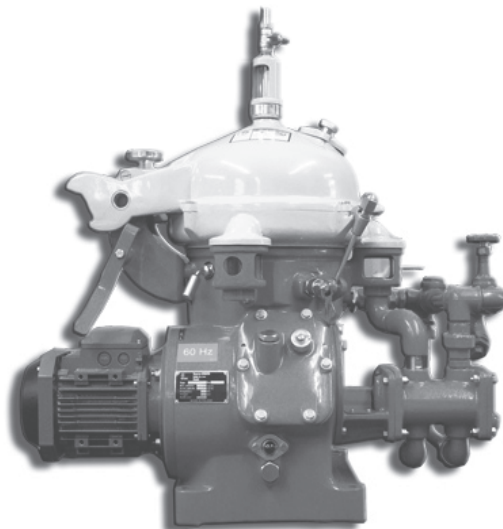
Machine Application

The MAB 104 high speed disc stack centrifuge is designed for purification or clarification of fuel oils, engine oils, lubricating oils, and various mineral oils used on board marine installations and in industrial applications.

Separator Design

The MAB 104 is driven by a horizontal driveshaft, friction clutch, worm wheel gear and vertical drive shaft. This is all housed within the separator frame, the worm wheel gear is situated in an oil bath to ensure smooth running. The brake is situated on the top part of the frame; braking directly onto the bowl.

The bowl is fixed onto the vertical drive shaft situated in the top part of the frame. The frame hood is hinged to enable easy access when cleaning or carrying out maintenance.



MAB 104 with motor and pump

Standard Equipment

- MAB 104 centrifugal separator
- Double pump with fittings
- Motor - 208-230/460 volt, 60 Hz
- Complete set of gravity disks
- Water supply device
- Complete set of tools
- Set of spare parts for extended use
- Set of instruction manuals

Optional Equipment

- 50 Hz motor
- MAWA Water seal alarm
- Electric pre-heater
- Control Panel
- Starter
- Skid

Separator Throughputs and Capacities

The MAB 104 is suitable for the separation of marine diesel, biodiesel, distillate, lubricating and hydraulic oils. (Throughputs may vary depending on temperature and viscosity of liquids)

Expected Throughput:

- Marine diesel oil: 396 g/h
- Biodiesel: 396 g/h
- Lubricating oil: 251 g/h
- Distillate: 515 g/h
- Hydraulic oil: 423 g/h



SEPARATOR

SPARES & EQUIPMENT

SEPARATOR SPARES & EQUIPMENT, LLC.

TECHNICAL DATA SHEET MODEL MAB-104

Weight:

(According to Standard Equipment w/ motor and Complete Bowl)

Approx. 421 lbs

Electric Power Consumption:

Idling: 0.50 kW

Running @ Max Capacity: 1.8 kW

Built-On Inlet Pump:

Suction Lift: 13 feet
(depending on flow and viscosity)

Built-On Outlet Pump:

Delivery Head: 49 - 82 feet
(depending on flow and viscosity)

Dimensions:

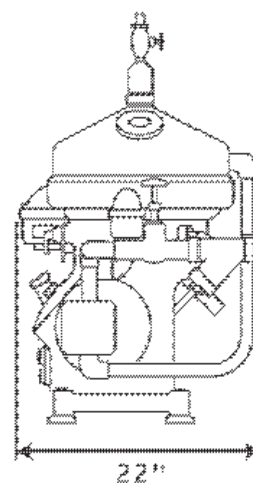
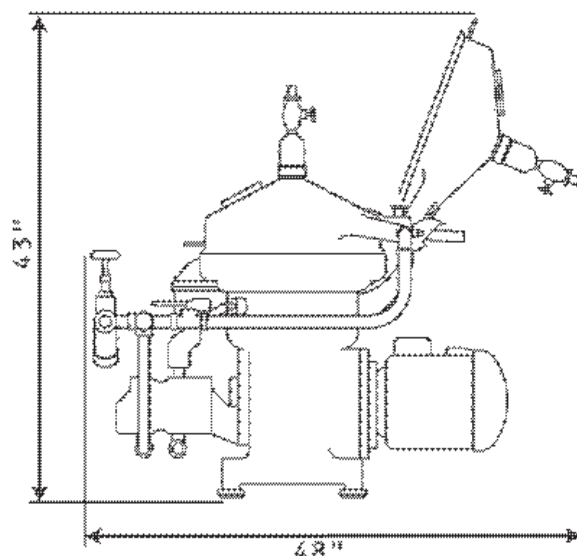
* See Dimensional Drawing for approximate measurements

* Allow additional room for hose connections and machine maintenance

Notes:

* Complete instruction manual and documentation ships with each separator

* Manufacturer can change specifications without notice



Dare are only tree directions in Sout' Louisiana.

When you axe for directions in Sout' Louisiana dare is only tree answers:

1. Down de bayou
2. Up de bayou
3. Cross de bayou

(Dis is specially true in Houma, Louisiana.)



SEPARATOR

SPARES & EQUIPMENT

High Quality Replacement Parts

- MAB 102, 103, 104, 204, 205, 206, 207, 209
- MMB 304, 305
- MAPX 204, 205, 207, 209, 309, 313
- MOPX 205, 207, 209, 210, 213, 306, 309, 310, 313
- FOPX 605, 607, 609, 610, 611, 613, 614
- MSPX 303
- LOPX 705, 707, 709, 710, 713, 714
- MMPX 303, 304, 403, 404
- WHPX 405, 407, 409, 410, 413, 505, 507, 508, 510, 513
- SA/SU 200, 300, 400, 500, 600, 700, 800, 820, 825, 830, 835, 840, 845, 850, 855, 860, 865, 870, 875
- PA/PU 100, 150, 600, 605, 610, 615, 620
- UVPX 507, 510



ALFA-LAVAL

Boudreaux is still sick

A few- days later, Boudreaux goes back to ole Doc Thibodeaux wit a bad cold.

De good Doc gives heem some pills to help relieve de symptoms. mais dev don't do any good. so Boudreaux goes back a couple of days later, still suffering wit' de cold.

Doc Thibodeaux tells him, "Go home. take a hot bath, and den open all de doors and windows. and stand nekked in de draft for about a half hour."

Boudreaux says. "Mais Doe, I'll catch pnewmonia, for sure, if I do dat."

Doc Thibodeaux tells him, "Mais. yeh. mais I know how to cure pnewmonia!"



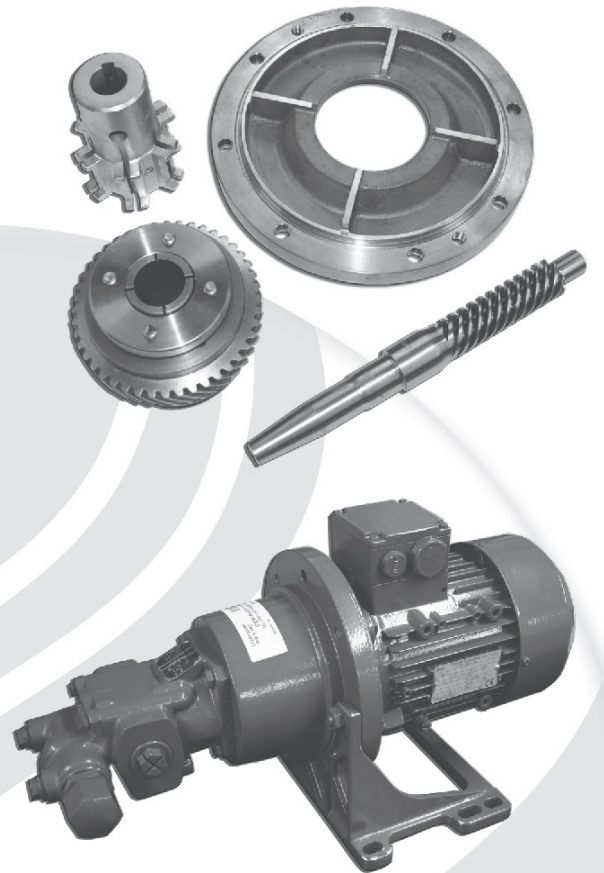
SEPARATOR

SPARES & EQUIPMENT

High Quality Replacement Parts

WESTFALIA

- ON 616, 1516, 2016
- OTA 2, 7, 14, 18
- OTB 1, 2, 3, 9, 18
- OTC 2, 3
- OSA 5, 7, 20, 35
- OSB 20, 30, 35
- OSC 4, 5, 15, 30, 40, 50
- OSD 2, 6, 18, 35, 50, 60



Doya know who dat is?

Boudreaux and Marie were mad at each udder. Dey drove several miles down de road wit'out saying a word after de argument dey had earlier.

Neider one of dem waz gonna give in to de udder an' admit dat dey might be wrong.

As dey passed a barnyard wit a bunch of mules and pigs standin' aroun'. Marie sarcastically axed Boudreaux. "Ees dat relatives of yours?"

Boudreaux answered. "Yep, dats ma in-laws"



SEPARATOR SPARES & EQUIPMENT

PLATE HEAT EXCHANGERS

Whether a traditional plate heat exchanger, brazed plate heat exchanger or a shell and tube heater, Separator Spares & Equipment, LLC can provide a heater to suit your specific project requirements.

SSE offers new and refurbished replacement units for the following brands:

- ALFA LAVAL
- GEA
- SONDEX
- APV
- SWEP
- NIREX
- Many other brands available upon request



Spare Parts:

Plates

SSE offers both new and reconditioned plates in both stainless steel and titanium.

Gaskets

SSE can supply the following materials:

- NBR
- EPDM
- HNBR
- BUTYL
- NEOPRENE

Heat Exchanger Applications:

Marine	Seawater isolation exchanger, central cooling, jacket fresh water cooling, lube oil cooling
Power	Lubrication oil cooling, diesel engine cooling, heat recovery, auxiliary cooling circuit isolation, geothermal applications
Oil & Gas	Sea water coolers, crude oil heat treatment
Refinery	Brine cooling, crude oil/water interchanger, treated/untreated crude oil interchanger



SEPARATOR

SPARES & EQUIPMENT

Plate Heat Exchanger Servicing:

Frame Handling

After shipping your entire heat exchanger assembly to SSE, plates will be removed, cleaned, tested and regasketed. The frame and other components can also be reconditioned. After reassembly, the unit will be hydro-tested. The completed unit can be quickly reinstalled and put into service with the assurance of leak-free operation.

Cleaning

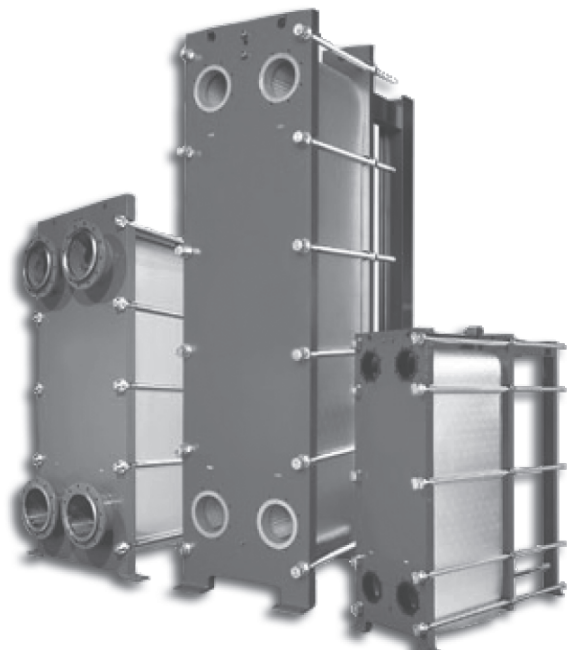
After examining the plates, our engineers will determine the required cleaning and treatment process, this will vary as different cleaning techniques are used. A carefully selected cleaning solution will then be applied to the plates to ensure the quickest and highest quality refurbishment.

Dye Penetrant Testing

Every plate is tested with our dye penetrant system to ensure there are no cracks or pinholes. Early detection of plate defects eliminates cross-contamination concerns and saves you costly down-time later.

Regasketing

The proper adhesives are selected for your gasket and service conditions. Each gasket is cleaned and the plate groove is prepared just prior to bonding.





SEPARATOR

SPARES & EQUIPMENT

High Quality OEM Replacement Parts

- SJ 10F, 15F, 30F, 40F, 50F, 80F, 100F, 120F
- SJ 700, 2000, 3000, 4000, 6000, 8000
- SJ 10T, 11T, 15T, 16T, 20T, 25T, 30T, 40T, 60T (T/P/EH)
- SJ 20G, 30G, 40G, 50G, 80G, 100G
- OP 1000, 3000, 5000



MITSUBISHI

Bad Day?

Two animal rights defenders were protesting the cruelty of sending pigs to a slaughterhouse in Bonn, Germany.

Suddenly, all two thousand pigs broke loose and escaped through a broken fence, stampeding madly.

The two helpless protesters were trampled to death.

Liquid Controls Features

The LC Meter consists of a housing in which three rotors turn in synchronized relationship within three cylindrical bores with no metal-to-metal contact within the meter element. Each rotor is supported on either end by a bearing plate through which the rotor shafts protrude.

The bladed displacement rotors, alternately move through the two half-cylinder bores of the meter element, while the single blocking rotor rotates within its bore in such a way as to produce a continuous capillary seal between the unmetered, upstream product and the metered, downstream product.

At one end of each rotor shaft is a timing gear. The blocking rotor gear, having twice the number of teeth of each of the displacement rotor gears, rotates at half the RPM of the displacement rotors.

Throughout the meter element the mating surfaces are either flat surfaces or cylindrical faces and sections that are most

accurately machined. No oscillating or reciprocating motion within the device permits extremely close and consistent tolerances within the LC meter.

Because the dynamic force exerted by the product flowing through the meter is at right angles to the faces of the displacement rotors, and because the meter is designed so that the rotor shafts are always in horizontal plane, *there is no axial thrust*. Therefore, the rotors automatically seek the center of the stream between the two bearing plates thereby eliminating wear between the ends of the rotors and the bearing plates.

The oversize design of the sleeve bearings, as well as the specially selected materials from which they are made, assure maximum throughput before bearing replacement is required.

As a result the LC Meter provides unequalled accuracy, long operating life and exceptional dependability.

Accuracy/Performance

Mechanical Registration



REPEATABILITY: .05% of reading over entire range and beyond.

LINEARITY: Capable of $\pm 0.125\%$ or better over a 5:1 range from maximum nominal meter capacity.

LINEARITY: Capable of $\pm 0.22\%$ or better over a 10:1 range from maximum nominal meter capacity.

LINEARITY: Capable of $\pm 0.5\%$ or better over a 40:1 range from maximum nominal meter capacity.

Electronic Registration



REPEATABILITY: Capable of .03% of reading over entire range.

LINEARITY: Capable of $\pm 0.10\%$ or better over a 5:1 range from maximum nominal meter capacity.

LINEARITY: Capable of $\pm 0.10\%$ or better over a 10:1 range from maximum nominal meter capacity.

LINEARITY: Capable of $\pm 0.15\%$ or better over a 40:1 range from maximum nominal meter capacity.

Due to the capabilities of multi-point calibration for meters equipped with LectroCount Electronic Registration, superior accuracy (linearity) can be provided as indicated above. For additional details ask for Bulletin #500045.

Note: Accuracy obtainable when all variables remain constant.

Reading/measurements must be equal to a minimum of one minute of flow at selected rate(s).

All accuracy statements based on metering Stoddard Solvent, approximate viscosity 1 CPS.

On higher viscosity products, the average deviation in accuracy will be even less.

- **Superior Accuracy at constant flow:** *With all other conditions being constant*, the LC Meter does not vary more than 0.05% in repeatability over entire range and beyond.
- **Accuracy over the widest range of flow:** The LC Meter has a most ideal combination of minimum seal or slippage area with lowest pressure differential across this seal. This results in better accuracy over a wide range of flow than available in any other commercially produced, positive displacement meter.
- **Sustained accuracy:** There is no metal-to-metal contact within the meter element...and *no contact* means *no wear*...no wear means no increase in clearances...no increase in clearances means no increase in slippage...and *no increase in slippage* means *no deterioration in accuracy*.
- **Accuracy regardless of pressure fluctuations:** Because of the LC Meter's unique dual-case design, the bearing surfaces of the meter element are internally and externally subjected to the same system pressure. Therefore, *the meter element cannot be*

stretched or distorted, causing changes in seal area that would adversely affect accuracy.

- **Accuracy regardless of temperature variation:** Due to the *common coefficients of expansion of the critical parts* of the LC Meter element, products can be metered accurately from -40°F (-40°C) to $+160^{\circ}\text{F}$ ($+71^{\circ}\text{C}$).
- **Accuracy regardless of viscosity:** Due to the minimum area in shear and the smooth flowing characteristics of the LC Meter (no compression or vacuum exerted on the product), the standard LC design has accurately metered product from 150 SSU (25 centipoise) to 1,500,000 SSU (325,000 centipoise) *without calibration change*.
- **Regulatory:** Meets NIST and other international weights & measures accuracy requirements. Meets performance requirements of USA Military Specifications.

Meter Models

Listed in order of Maximum Nominal Flow Rates. Consult LC Publication #195 for product application and material class recommendations. Maximum Non-Shock Working Pressure (PSI) ratings are based on products at temperatures below 160°F (71°C).

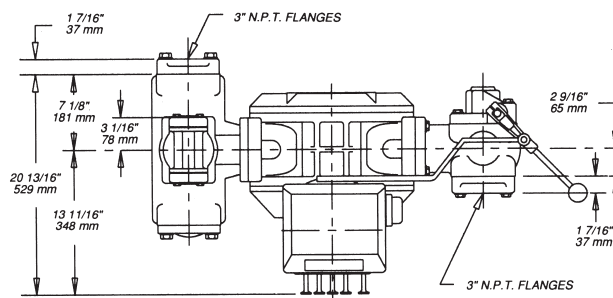
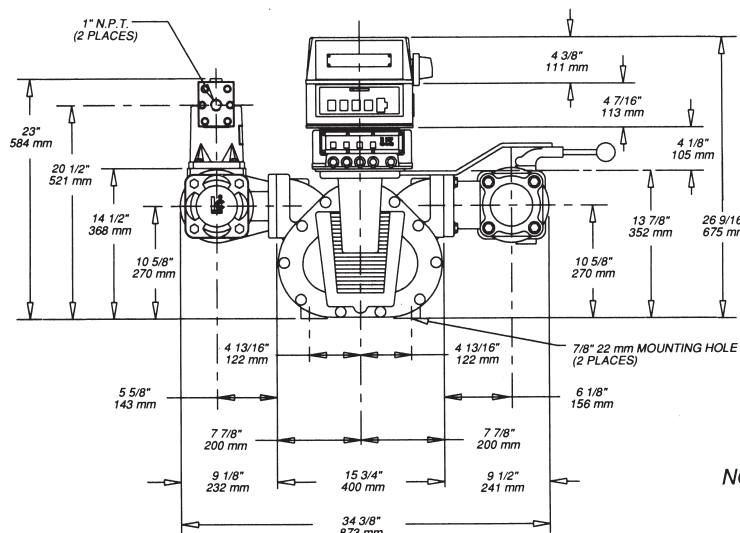
Maximum Nominal Flow Rate	Standard Flange Size*	Primary Material	Material Classes Available	150 PSI 10.5 BAR 1034 kPa	275 PSI 19 BAR 1896 kPa	300 PSI 19 BAR 2068 kPa	350 PSI 21 BAR 2068 kPa	720 PSI 25 BAR 2413 kPa	1,440 PSI 100 BAR 9927 kPa
30 GPM (113 L/min.)	1 1/2" NPT	Aluminum	10				MA-4+		
60 GPM (227 L/min.)	1 1/2"	Aluminum	1, 2, 3, 4, 10, 14, 16, & 30	M-5	M-5**		MA-5+		
	2" Optional	Stainless Steel	8	M-5					
100 GPM (380 L/min.)	2"	Aluminum	1, 2, 3, 4, 10, 14, 15 & 16	M-7	M-7**		MA-7+		
	1 1/2" Optional	Stainless Steel	8	M-7					
		Cast Iron	7, 27 & 37	M-7	M-7**				
	2"	Brass	20	M-7	M-7**				
	2"	Steel	1, 2, 7, 10, 14, 16 & 37	MS-7	MSAA-7	MSA-7		MSB-7	MSC-7
150 GPM (550 L/min.)	2"	Aluminum	1 & 2	M-10	M-10**				
200 GPM (757 L/min.)	3"	Aluminum	1, 2, 3, 4, 10, 14, 15 & 16	M-15	M-15**		MA-15+		
	3"	Steel	1, 2, 10, 14 & 16	MS-15	MSAA-15	MSA-15		MSB-15	MSC-15
	3"	Stainless Steel	8		MSAA-15				
300 GPM (1,136 L/min.)	3"	Aluminum	1 & 2	M-25	M-25**				
350 GPM (1,325 L/min.)	4"								
	3" Optional	Aluminum	1, 2, 3, 4, 14, 15 & 16	M-30					
	3"	Cast Iron	7, 27, 37 & 47	M-30					
	3"	Steel	1, 2, 10, 14 & 16	MS-30	MSAA-30	MSA-30		MSB-30	MSC-30
	3"	Stainless Steel	8		MSAA-30				
450 GPM (1,700 L/min.)	4"	Aluminum	1 & 2	M-40					
	3"	Steel	1 & 2	MS-40					
600 GPM (2,271 L/min.)	4"								
	6" Optional	Aluminum	1, 2, 3, 14 & 15	M-60	M-60**				
700 GPM (2,650 L/min.)	4"	Steel	1, 2, 10 & 14	MS-75	MSAA-75	MSA-75		MSB-75	MSC-75
800 GPM (3,000 L/min.)	6"								
	4" Optional	Aluminum	2	M-80	M-80*				
1,000 GPM (3,785 L/min.)	6"	Steel	1, 2, 10 & 14	MS-120	MSAA-120	MSA-120		MSB-120	MSC-120
	6"	Stainless Steel	8		MSAA-120				

*Flanges: All standard M-Series Meters are supplied with choice of threaded NPT and BSPT companion flanges...or slip-on welding companion flanges.
MA-Series Meters are supplied with threaded NPT companion flanges.

**275 PSI working pressure available for meter only.
All MS-Series steel case Meters are supplied standard with ANSI flanged connections. DIN Optional. Reducing flanges are available for all steel case Meters.

+MA-Series Meters are all UL Listed for LPG.

Meter Dimensions



NOTE: Dimensions are for LC preset. Consult factory if Veeder Root preset is specified.

THE LATE MR. KOTIADIS

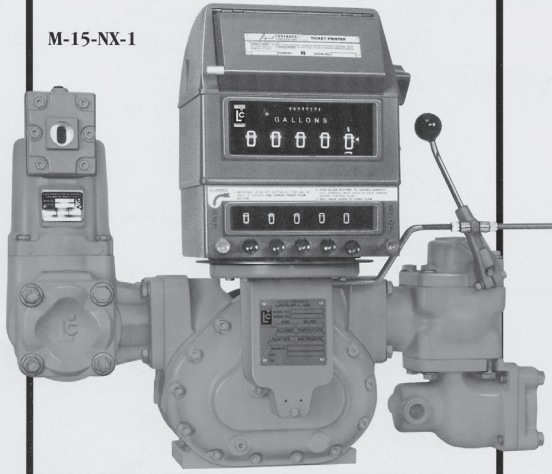
On November 21, 2000, a Greek businessman named Nikita Kotiadis was arrested at Athens airport after phoning in a bomb threat on his own flight. Reason: Kotiadis was running late, and he wanted to delay the flight from taking off until he could get to the airport. He might have gotten away with it if he'd placed the call himself. But he had his secretary call, and she identified him by name before putting him on the line. Kotiadis made his threat and then raced for the airport, where he was arrested on the spot. He was later sentenced to seven months in prison for "obstructing transportation."

M™-Series Meters

M-15™

- Capacity: 200 GPM (760 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 4, 14, 15 and 16 construction.
- Choice of 3" NPT and 3" BSPT connections. Also 3" aluminum or steel welded flanges.

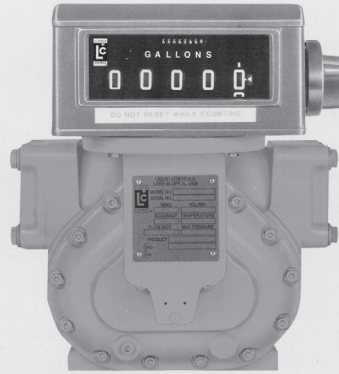
M-15-NX-1



M-25™

- Capacity: 300 GPM (1,135 L/min.)
- Case made of aluminum with meter element components of various materials as required for Class 1 & 2 construction for metering refined petroleum products including aviation fuels.
- Supplied in choice of 3" NPT and 3" BSPT companion flanges. Also 3" aluminum or steel welding flanges.

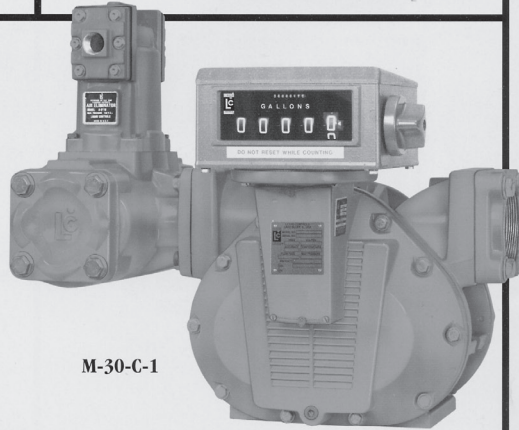
M-25-A-2



M-30™

- Capacity: 350 GPM (1,325 L/min.)
- Case made of aluminum with meter element components of various materials as required for Classes 1, 2, 3, 4, 14, 15 and 16 construction.
- Choice of companion flanges with 4" standard and 3" optional...NPT or BSPT threads...also aluminum or steel welding flanges.
- Case made of cast iron with meter element components of various materials as required for Classes 7, 27, 37 and 47 construction. Meter flanged 3" ANSI FF.

M-30-C-1



Only in America do we leave cars worth thousands of dollars in the driveway and put our useless junk in the garage.
Only in America do we use answering machines to screen calls and then have call waiting so we won't miss a call from someone we didn't want to talk to in the first place.

ORDERING INFORMATION

PRODUCT:

RATES: MAX. _____ NORMAL _____ MIN. _____

OPERATING TEMPERATURES: MAX. _____ NORMAL _____ MIN. _____

MAXIMUM NON-SHOCK OPERATING PRESSURE: _____

MAXIMUM VISCOSITY: _____ @ _____ (TEMP.)

SPECIFIC GRAVITY: _____ @ _____ (TEMP.)

CONSTRUCTION CLASS: _____ (1,2,3, ETC.)

ACCESSORY CONFIGURATION: _____ (A,B,C, ETC.)

SEAL MATERIAL: _____ STANDARD BUNA/VITON _____ ALL VITON _____ ALL TEFLON _____

DIRECTION OF FLOW: _____ L TO R _____ R TO L

READ OUT: _____ (GALLONS, DECALITERS, POUNDS, ETC.)

COUNTER AND PRINTER: _____ ZERO/FACE UP _____ ZERO/FACE DOWN _____ ACCUM.

STRAINER BASKET: _____ 40M _____ 80M _____ OTHER _____

FLANGE SIZE: _____

FLANGE TYPE: _____ NPT _____ BSPT _____ SLIP WELD _____ ANSI _____ DIN _____ OTHER _____

OPTIONS: _____

Roto-Molded Battery Boxes

Moeller's complete line of roto-molded battery boxes come in 6 sizes, and are seamlessly designed to tackle the elements for long-life battery performance.

- Non-corrosive high-strength polyethylene construction resists chemicals and rust.
- Maintains tough properties with nominal 0.185" (4.7mm) wall thickness.
- Complies to industry requirements and meets Coast Guard regulations (E10).



042204 23.87"L x 12.50"W x 13.5"H

07252 606mmL x 317mmW x 342mmH

Holds batteries up to 20.50"L x 9.25"W x 9.50"H / 520mmL x



042212 17.50"L x 12.87"W x 11.25"H

07257 445mmL x 330mmW x 330mmH

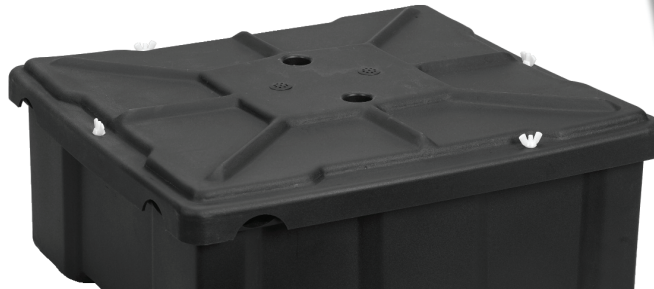
Holds batteries up to 13.75"L x 10.00"W x 8.50"H / 349mmL x



042208 25.00"L x 14.87"W x 11.62"H - Low

07253 635mmL x 377mmW x 295mmH - Low

Holds batteries up to 21.50"L x 11.50"W x 9.62"H / 546mmL x



042210 27.50"L x 24.50"W x 11.62"H - Low

07255 698mmL x 622mmW x 295mmH - Low

Holds batteries up to 24.00"L x 21.00"W x 9.50"H / 609mmL x



042209 24.37"L x 14.50"W x 14.12"H - High

07254 618mmL x 368mmW x 358mmH - High

Holds batteries up to 21.00"L x 11.25"W x 9.75"H / 533mmL x



042211 27.62"L x 24.62"W x 14.00"H - High

07256 701mmL x 625mmW x 355mmH - High

Holds batteries up to 24.25"L x 21.25"W x 9.50"H / 615mmL x

Battery Box Hold Down Kit

- Quick-release buckle
- Corrosion resistant stainless steel fasteners

Part No.	Description
035711-10	07148 Hold Down Kit for Topside Fuel Tank & Battery Box
with	(Kit includes two (2) universal nylon straps
	quick-release buckle, four (4) stainless steel



Only in America do we buy hot dogs in packages of ten and buns in packages of eight.

Microprocessor-Controlled 3-Stage Battery Management System



Exclusive Tri-Power electronics continuously monitor battery charge status AUTOMATICALLY applying the proper charge voltage when needed:

BOOST MODE - for rapid recharge of dead batteries

NORMAL MODE - keeps batteries charged under normal operating conditions

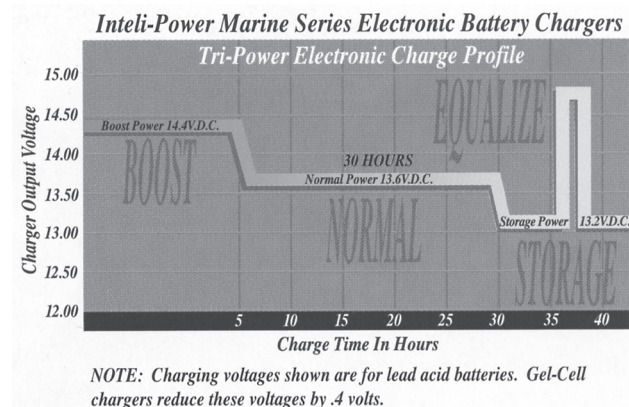
STORAGE MODE - selects a lower charging voltage of 13.2 Volts to prevent battery gassing and water use during storage

Exclusive **EQUALIZATION MODE** - activates automatically every 21 hours for 15 minutes to prevent *electrolyte stratification and the beginning of sulfation* on the battery plates.

- Charge up to three separate battery banks simultaneously
- Gel-Cell models available
- Patented reverse battery protection Intelligent cooling fan
- Regulated output voltage
- Electronic current limiting
- Automatic over temperature shutdown
- Lightweight design offers rugged performance
- Over voltage protection

Made in U.S.A.

Patent numbers: 5,982,643, 5,687,066, 5,600,550, 6,184,649



Select from Lead Acid or Gel-Cell Battery models.

Model: PD2020 20 Amp Converter/Charger for lead acid batteries Input: 105-130 VAC, 50/60 Hz, 350 Watts

Nominal Output: 13.6 VDC, 20 Amps Dimensions: 10.2"(L) x 7.8"(W) x 4.2"(H) Weight: 4.75 lbs.

Model: PD2020G 20 Amp Converter/Charger for Gel-Cell batteries Nominal Output: 13.2 VDC, 20 Amps - All other specifications are the same.

Model: PD2030 30 Amp Converter/Charger for lead acid batteries Input: 105-130 VAC, 50/60 Hz, 550 Watts

Nominal Output: 13.6 VDC, 30 Amps Dimensions: 10.2"(L) x 7.8"(W) x 4.2"(H) Weight: 5 lbs.

Model: PD2030G 30 Amp Converter/Charger for Gel-Cell batteries Nominal Output: 13.2 VDC, 30 Amps - All other specifications are the same.

Model: PD2040 40 Amp Converter/Charger for lead acid batteries Input: 105-130 VAC, 50/60 Hz, 650 Watts

Nominal Output: 13.6 VDC, 40 Amps Dimensions: 10.2"(L) x 7.8"(W) x 4.2"(H) Weight: 5 lbs.

Model: PD2040G 40 Amp Converter/Charger for Gel-Cell batteries Nominal Output: 13.2 VDC, 40 Amps - All other specifications are the same.

Model: PD2050 50 Amp Converter/Charger for lead acid batteries Input: 105-130 VAC, 50/60 Hz, 900 Watts

Nominal Output: 13.6 VDC, 50 Amps Dimensions: 10.2"(L) x 7.8"(W) x 4.2"(H) Weight: 5.25 lbs.

Model: PD2050G 50 Amp Converter/Charger for Gel-Cell batteries Nominal Output: 13.2 VDC, 50 Amps - All other specifications are the same.

BATTERY SELECTOR SWITCHES

FIG. 8603 - HEAVY DUTY BATTERY SELECTOR SWITCH

IGNITION PROTECTED

MAKE BEFORE BREAK DESIGN, FOR USE WITH TWO OR MORE BATTERIES AND SINGLE OR DUAL ENGINES. ALTERNATOR FIELD DISCONNECT TO PREVENT DAMAGE TO ALTERNATOR IF ACCIDENTALLY SWITCHED TO THE "OFF" POSITION WHILE ENGINE IS RUNNING.

FIBER-REINFORCED POLYCARBONATE BODY 1/2 INCH DIAMETER BRASS BATTERY TERMINALS
FOR USE WITH SYSTEMS UNDER 50 VOLTS.

CAPACITY - RATED 380 AMPS CONTINUOUS,
850 AMPS INTERMITTENT (5 MINUTES ON, 5 MINUTES OFF).



Fig. 8603



FIG. 9703 - HEAVY DUTY BATTERY DISCONNECT SWITCH

IGNITION PROTECTED

THIS UNIT IS THE SAME BASIC DESIGN AND CONSTRUCTION AS OUR 8603 SERIES, EXCEPT IT IS OFFERED AS A MAIN DISCONNECT SWITCH WITH A HIGHER CAPACITY RATING.

FOR USE WITH SYSTEMS UNDER 50 VOLTS.

CAPACITY - RATED 450 AMPS CONTINUOUS,
1200 AMPS INTERMITTENT (15 SECONDS ON, 5 MINUTES OFF).



Fig. 9703



ORDERING INFORMATION

Dimensions Face Inches	Depth Inches	Dealer Pkg. - 2 Pkgs. 1 Pc. per Pkg.	Weight Pounds
5-1/4 x 5-1/4	3-3/8	8603 DP	2-1/2

ORDERING INFORMATION

Dimensions Face Inches	Depth Inches	Dealer Pkg. - 2 Pkgs. 1 Pc. per Pkg.	Weight Pounds
5-1/4 x 5-1/4	3-3/8	9703 DP	2-1/2

**MODEL MWTH****Watertight Sound-Powered Telephone**

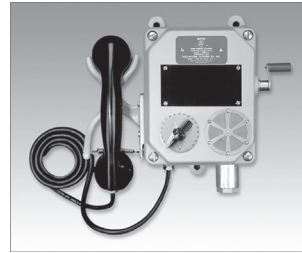
NOTE: Watertight models are housed in a stainless steel enclosure and include all the features of the Backlit System, thus enabling optimal reliability in any marine environment.

STANDARD FEATURES:

- 14 Gauge Stainless Steel
- Grey Baked Enamel Finish
- NEMA 4X Rated Enclosure
- Dimensions: H 14" X W 12" X D 6-5/8"
- Telephone Handset Equipped with a 1'- 6" Retractable Coiled Cord Furnished with 6" watertight Bell (not shown) as Standard Equipment
- Provisions Have Been Made for Mounting the Bell on Top of enclosure or at a Remote Location if Required.
- Internal Heaters
- US Coast Guard Accepted for Use in Outdoor Locations
- ABS Approved

OPTIONS:

Bell Gongs are also Available in 8" & 10" Pedestal Mountings
12, 18, or 25 ft. Extended Length coiled cord

**MODELS 562-01 and 563-01****Intrinsically Safe Sound-Powered Telephones****FEATURES:**

UL Listed, ABS Approved, USCG Accepted for Operation in Class 1 Group D Hazardous Areas
All Models Available With 8, 12, 19, & 24 Stations

DIMENSIONS:**562-01: Surface Mount Indoor**

Height 7.75" H (20.48cm*)
Width 8.0625" W (66.04cm*)
(including handle & handset)
Depth 5.625" D (14.29cm*)

563-01: Surface Mount Outdoor (ext. box dimension)

Height 14.0" (35.56cm)
Width 16.75" (42.55cm*)
Depth 8.25" (20.96cm*)

NOTE:

Intrinsically-Safe Sound-Powered Telephones are not to be used in systems containing the standard (non-intrinsically-safe) sound-powered telephones.

**FEATURES:**

12, 24, 115 VDC
UL listed Class 1, Division 2, Groups A,B,C & D
ABS type approved
6, 8 & 10 inch steel or brass gongs
To order, please specify the type of gong (steel or brass), gong size & voltage.

EXPLOSION PROOF ALARM BELLS**General Alarm Equipment & Accessories****DESCRIPTION:**

The new Hose-McCann **HL Series Explosion Proof Bell** offers both energy efficiency and cost savings. It is UL Listed for use in Class 1, Division 2, Groups A,B,C, and D Hazardous Locations. The **HL Series Bells** are housed in a lightweight, high corrosion-resistant aluminum alloy (Almag-35), and available in three gong sizes: 6, 8, and 10-inch diameters. Gongs are available in steel or brass. A wide selection of voltages is available in direct current. The low drain **HL Series Bell** has been designed to minimize the ampere capacity and physical dimensions of the batteries required to operate the general alarm system. The resulting energy savings will reduce the size and current capacity of the cable required for the ship's general alarm system.

**MODEL SE**

Standard-Model Sound-Powered Telephone

Wall mounted with 6" external bell

Suggested Locations: Moderately Noisy Areas
 USCG Approval: No. 161.005/52/0

Overall Dimensions:

Length	11" (27.94cm)
Width	8.5" (21.59cm)
Depth	7.0" (17.78cm)
Net Weight	10 lb. (4.54kg*)

Mounting Dimensions:

Vertical	7.5" (19.05cm)
Horizontal	4.875" (12.54cm*)

MODEL SW

Standard-Model Sound-Powered Telephone

Wall mounting with 3" internal ringer mounted near the louvered cover. All phones come with a coiled cord (not pictured).

Suggested Locations: Low noise areas
 USCG Approval: No. 161.005/51/0

Overall Dimensions:

Length	11" (27.94cm)
Width	8.5" (21.59cm)
Depth	7.0" (17.78cm)
Net Weight	9.75 lb. (4.42kg*)

Mounting Dimensions:

Vertical	4.875" (12.38cm*)
Horizontal	7.0" (17.78 cm)

**MODEL SE-R**

Standard-Model Sound-Powered Telephone

Wall mounted with 6" external bell and non-latching relay

Suggested Locations: High Noise Areas that are not normally manned
 USCG Approval: No. 161.005/53/0

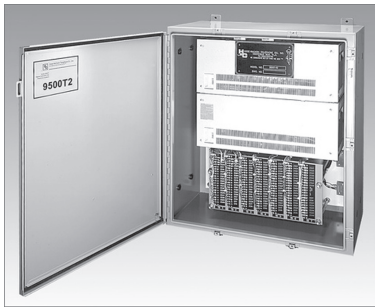
Overall Dimensions:

Length	11" (27.94cm)
Width	8.5" (21.59cm)
Depth	7.5" (19.05cm)
Net Weight	10 lb. (4.54kg*)

Mounting Dimensions:

Vertical	4.875" (12.38cm*)
Horizontal	7.0" (17.78cm)

- Why is it that doctors call what they do "practice"?
- Why is it that to stop Windows 98, you have to click on "Start"?
- Why is lemon juice made with artificial flavor, and dishwashing liquid made with real lemons?
- Why is the man who invests all your money called a broker?
- Why is the time of day with the slowest traffic called rush-hour?
- Why isn't there mouse-flavored cat food?
- When dog food is new and improved tasting, who tests it?
- Why didn't Noah swat those two mosquitoes?
- Why do they sterilize the needle for lethal injections?



9500T2 SWITCHBOARD

Automatic Dial Telephone Switchboard

DESCRIPTION:

Since the 1990's, Hose-McCann has researched and developed a truly rugged and reliable automatic dial telephone system, especially designed for use on board commercial and military ocean going vessels. Hose-McCann now proudly introduces the 9500T2 Automatic Dial Telephone / Public Address System - a telecommunication system designed for the millenium. The 9500T2 is engineered with a clean, controlled, stable power supply which eliminates the possibility of fluctuating electrical power.



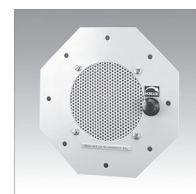
STANDARD FEATURES:

- Digital / Analog port configuration
- Executive-Right-of-Way
- Call forwarding
- Call transfer
- 3-Digit automatic dialing
- Call conferencing
- 8-hour battery back-up
- Satellite communications interface
- Shore-line interface
- Cellular interface through exchange
- Public address interface for Allcall
- Handsfree talkback
- Programmable priority & access levels
- Built-in relays for audio visual indicators
- Toll restriction
- Selective call routing of incoming calls
- Simultaneous conversations unlimited as to the number of stations available
- Remote Diagnostic/Maintenance (Optional)
- Zone paging public address interface (Optional)
- Background music (Optional)



CHARACTERISTICS:

- Self-contained unit with stand-alone capability.
- All telephone connections terminated are clearly marked
- All power input connections are clearly marked.
- All audible and visual alarms that are activated with a telephone call are either terminated at the switchboard, or parallel with the telephone and clearly marked.
- INMARSAT connections are terminated at the switchboard.
- Programming from laptop, PC, satellite or modem is accomplished through an RJ-11 plug in a modular jack clearly marked at the switchboard.
- Programming specific to the customer is supplied in three (3) forms: 1 Within the central processor of the switchboard 2 Within the spare processor (recommended spare part) 3 A 3.5" floppy diskette.
- Data ports (if required) are clearly marked at the switchboard.
- A battery back-up is supplied for the switchboard itself.
- Available with unlimited line capacity through modular architecture





Absorbs vibration, reducing noise. THE DRIVESAVER provides a flexible, non-metallic barrier between your transmission and shaft. This barrier reduces not only drive train vibration, but the transmission of vibration and noise to you, your crew and the water. Both you and your vessel are more efficient in this quieter environment.

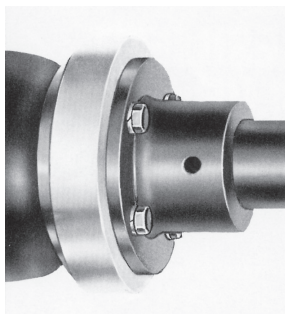
Absorbs shock.

THE DRIVESAVER effectively absorbs thrust and torque from the propeller shaft, as well as excessive shock from changing gears and high speed planing. It also helps control damage and misalignment from torsional engine movement. And it keeps on working, under normal conditions, for the life of the drive train, with no lubrication or maintenance.

Prevents electrolysis.

THE DRIVESAVER provides an impervious barrier that blocks electrical currents from the water. Your engine and transmission are protected from damaging corrosion.

To determine torque rating use this formula:
$$\frac{\text{Engine Horsepower} \times 5252 \times \text{Reduction Ratio}}{\text{Engine R.P.M.}}$$



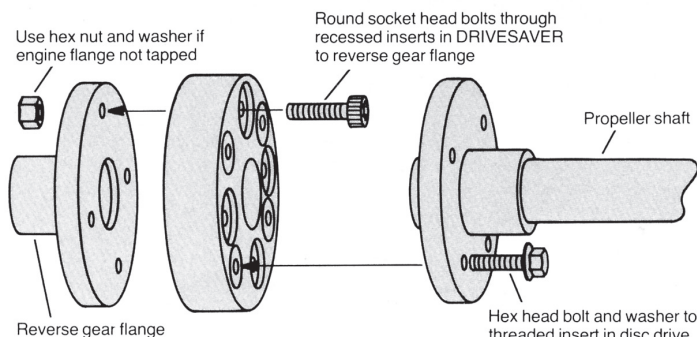
Total Protection For Your Drive Train

Acts as a circuit breaker.

Repeat users of THE DRIVESAVER install new ones not because an old one wore out, but because of a hidden log, line, or rock that destroyed the coupling. That's right, THE DRIVESAVER was destroyed, not the costly transmission and engine. By acting like a circuit breaker, THE DRIVESAVER absorbs the extreme shock and torque of collision, breaks apart, and leaves your transmission and engine intact. You're back in operation faster, at a minimum cost. That's the kind of total protection you can't afford to be without!

Installs easily.

THE DRIVESAVER installs simply and quickly. Without cutting or machining the shaft. And without hauling your boat out of the water. Just separate the drive flanges, insert the coupling, align and bolt.



Globe Barco Resilient Impellers

TRIPLE service life at competitive prices, means less down time and less cost. That's what it's all about.

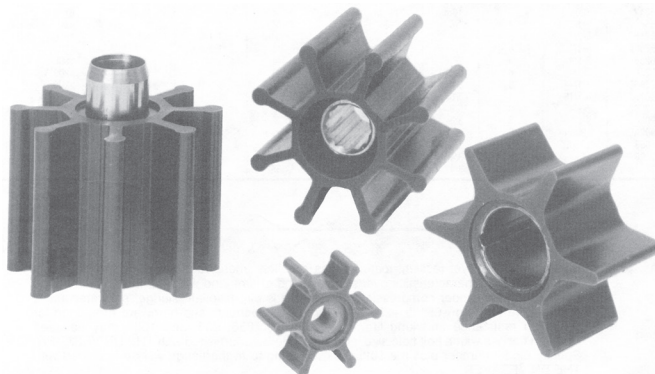
The only impeller in the world guaranteed to **RUN DRY FOR 15 MINUTES!** **GLOBE/BARCO** impellers are made of elastomer compounds, developed for optimum performance and self lubricating for run dry protection.

All **GLOBE/BARCO** impellers are made from elastomers giving them the combined characteristics and multiple properties of rubber, nitrile, viton and neoprene. This compound (NIPRENE) allows them to **PUMP DIESEL FUEL, ENGINE OIL, AND GASOLINE** without swelling.

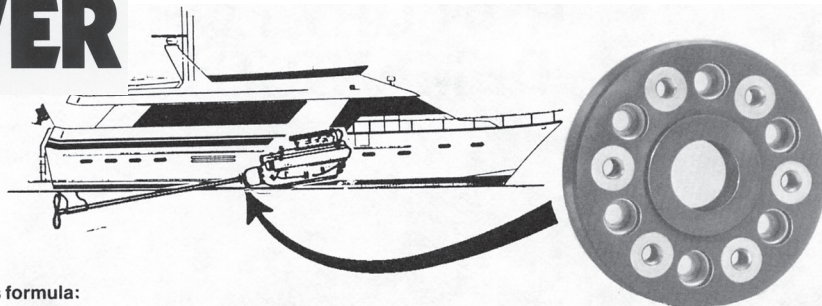
Additionally, **GLOBE/BARCO** impellers have **greater resistance to sand and dirt abrasion.**

GLOBE/BARCO manufactures most popular impellers: JABSCO, JOHNSON PUMPS, CATERPILLAR, CRUSADER, CUMMINS DIESEL, DETROIT DIESEL, KOHLER, MERCURISER, MERLIN, NORTHERN LIGHTS, OBERDORFER, UNIVERSAL, VOLVO, WESTERBEKE, YANMAR and others.

GLOBE/BARCO impellers are used by the United States Navy and Coast Guard.



THE DRIVESAVER



To determine torque rating use this formula:

$$\frac{\text{Engine Horsepower} \times 5252 \times \text{Reduction Ratio}}{\text{Engine R.P.M.}}$$

Tolerances:
 Female Pilot: $\pm .000$ Male Pilot: $\pm .010$
 Other Dimensions: $\pm 1/64$ "

DRIVESAVER SPECIFICATIONS

DRIVESAVER Model	Flange Dia.	Number of Bolts	Bolt Dia.	Bolt Circle	Pilot Dia.	Coupling Dia.	Coupling Thickness	Packaged Weight, Pounds	Torque Rating, Ft. Pounds	"Plus Rated," Ft. Pounds
303	3	3	3/8	2-1/2	1-3/4	4	11/16	1	225	
353	3-1/2	3	3/8	2-3/4	1-7/8	4-5/16	11/16	1-1/4	250	
354	3-1/2	4	8mm	2-15/16	1-9/16	4-1/4	1	1-1/2	300	
404	4	4	3/8	3-1/4	2	5	1	1-3/4	550	
404A	4	4	3/8	3-1/4	2-1/2	5	1	1-3/4	550	
404AC	4	4	3/8	3-1/4	2-5/8	5	1	1-3/4	550	
404V	4	4	10mm	8cm	6cm	5	1	1-3/4	550	
404S	4	4	3/8	9cm	6cm	5-1/4	1	2-1/4	550	
424Y	100mm	4	10mm	78mm	50mm	4-1/4	1	1-3/4	550	
454	4-1/2	4	3/8	3-3/4	2-5/8	5-3/8	1	2-1/4	570	
4756	4-3/4	6	7/16	3-7/8	2-1/2	6	1	2-3/4	675	1600
504	5	4	7/16	4-1/4	2-1/2	6	1	2-1/2	675	1600
504A	5	4	3/8	4-1/8	2-3/4	6	1	2-1/2	675	
504AC	5	4	7/16	4-1/8	2-7/8	6	1	2-1/2	675	
524Y	120mm	4	10mm	100mm	65mm	5-1/4	1	2-1/4	675	
554	5-1/2	4	3/8	4-5/8	3-1/8	6-1/2	1	3	720	
5756	5-3/4	6	1/2	4-3/4	3	6-13/16	1-1/8	4-1/4	1800	3000
5756A	5-3/4	6	1/2	4-3/4	3	6-3/8	1-1/8	4	1800	3000
6256	6-1/4	6	7/16	5-3/8	3-1/4	7-1/4	1-1/16	4-1/4	1900	
7256	7-1/4	6	5/8	6	3-3/4	8-3/8	1-3/16	8	3200	4400
7306Z	7-1/4	6	5/8	6	3-3/4	7-1/4	1-3/16	8	2200	3200
8078Z	8-1/16	8	5/8	6-11/16	5-1/2	8-1/16	1-3/4	7-1/2	3300	4800
7258Z	7-1/4	8	5/8	6"	3-3/4	7-1/4	1-3/16	9	2200	3200
908	9	8	5/8	7-1/2	6	11	1-3/8	12-1/2	3000	4900
908AC	190mm	8	15mm	155mm	100mm	228mm	1	9	3000	4900
1058	10-1/2	8	3/4	8-3/4	5	12-1/2	1-3/4	22	4200	6500
1108	11	8	3/4	9-1/2	6	13-1/4	1-13/16	23-1/2	4200	6500
1108A	11	8	3/4	9	6	11-3/4	1-3/4	17-1/2	3000	4900

Elastomer, a stiff, yet resilient material, has excellent energy absorbing properties. It will retain its design characteristics over a long period of time and will return to original shape even after being under compression. It withstands oil, gasoline, sludge, saltwater and a temperature range of -65° to +225°F. All metal components and hardware are plated for corrosion resistance and long life. Model 5756, 7256, 908, and 1058 may be used between flanges with a bolt hole size larger than the bolts furnished with THE DRIVESAVER. Specify model number plus the suffix "B." Bushing to fit the flange will be furnished with THE DRIVESAVER.

EVER WONDER:

- Why the sun lightens our hair, but darkens our skin?
- Why women can't put on mascara with their mouth closed?
- Why don't you ever see the headline "Psychic Wins Lottery"?
- Why is "abbreviated" such a long word?
- You know that indestructible black box that is used on airplanes? Why don't they make the whole plane out of that stuff?
- Why don't sheep shrink when it rains?
- Why are they called apartments when they are all stuck together?
- If con is the opposite of pro, is Congress the opposite of progress?
- If flying is so safe, why do they call the airport the terminal?



SELECTION GUIDE

Model	Reduction Ratio	DRIVESAVER Model
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ALLISON

M		7256
MH		908B
HYH/HP7700 (9.00)		908A

CAPITOL

5HD, 200		4756
10200, 11200		5756A
10700, 11700		7256
HP500, HP6900		7256
HP7700, HP9400, HP28000		1108
HY6900, HY22000, 4HE-10700		7256
HY24000, HY25000, 4HE-11700		7256
HY7700, HY28000		1108
M105, M125, 2HE/4HE-10200		5756
2HE/4HE-11200		5756

CRUSADER

V DRIVE 4500		404A
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HURTH

HBW5, 10, 20, 50, 100, 125		404A
HBW150, 150A, 150V, 220, 250, 150V		404A
HSW360, 360A, 400, 450		504
HSW600, 630, 630A, 630H, 630V		504
HBW360, 360A, 400, 450, 600, 630		504
HSW800A, 800V		5756

NEWAGE

PRM DELTA		404A
PRM210/160		504
PRM60, 7.25 PRM 601, 601A		7256
PRM602, 602s 5.75"	1.19, 1.5, 2.0, 2.8	5756

PARAGON

HF, HB, RO		404
P200, P300, P13, PV300		404AC
RA, PV400		454
P400		504A
PM, PMB, PL, P15		504AC
RB		554
RC		6256

SABB

G, H		354
HG, 2HG, GG, 2H, 2GRG		404S

LOHMANN/STALTER

GVV200A		908AC
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Model	Reduction Ratio	DRIVESAVER Model
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TWIN DISC

MG502-1, MG502		4756
MF5050, 5050A, 5050V		5756B
5061, 5061A, 5061V	1.1, 1.5, 2.0, 2.5, 3.0	5756B
MG506, 506-1, 506A	1.1, 1.5, 2.0, 2.5, 3.0	5756B
MG507-1, 507A-1, 507-2, 507-A	1.1, 1.5, 2.0	5756B
MG506, 0506-1, 506A	4.0, 4.5	7256B
MG507-1, 507A	2.5, 3.0	7256B
MG509	1.5, 2.0, 3.0	7256B
MG5091SC		7256B
MG5111SC, MG510	1.5, 2.0, 2.5, 3.0	908B
MG510A	1.5, 2.0, 2.5	908B
MG5114CHP, 5101DC, 509, 510	4.0, 4.5	1058B
MG5111DC, 510	4.0, 5.1	1058B
MG516		1108
GM518-1DC		1108A
MG5111 (9" flange)		908BB
MG5111 (10-1/2" flange)		1058B

UNIVERSAL

ATOMIC 4		353
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VOLVO

MB10A, MD38, MD7A, MD11C		404V
MS, MS3, MS4, A		504

WARNER

71C, INLINE, DIRECT DRIVE, 500		404A
1000, 1500, 70C, 1017, 1029, 2301		404A
71C, 72C, IN LINE, DROP		504
CENTER/V DRIVE 5000, 72C, 1004, 1005		504
1013, 1014, 1017, 1018, 2001		504
73C, 1006, 1026, 7000		5756

YANMAR

20M, 20H/G		424Y
30M, 30H/G		524Y

ZF

IRM41A2, 41A3, 504A, 50A3, V2, V3		504
IRM301 A-1, 301P2-2		5756A
IRM310		7306Z
IRM350		8078Z
IRM2201, V, 225A		4756
IRM320		1058B
IRM220A-1		6068Z

- **Only in America** do we buy hot dogs in packages of ten and buns in packages of eight.
- **Only in America** do we use the word 'politics' to describe the process so well: 'Poli' in Latin meaning 'many' and 'tics' meaning 'bloodsucking creatures'.
- **Only in America** do they have drive-up ATM machines with Braille lettering.

General Purpose, Three Phase

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	MULT. SYMB.	NOM. EFF.	F.L. AMPS	WGHT. LBS.	"C" DIM.	FOOT NOTES
1 1/2	3600	200	143T	BALL	E831	143TTTN4003	E1	86.5	4.5	59	10.43	N
	3600	200	143T	BALL	E830	143TTFR4003	E8	82.5	4.6	34	12.87	
	3600	208-230/460	56	BALL	G383	56T34F5331	F1	80.0	4.7-4.6/2.3	34	11.82	20
	3600	208-230/460	143T	BALL	E833★	143TTTN4001	E1	82.5	4.4-4.0/2.0	54	10.43	N,20
	3600	208-230/460	143T	BALL	E832★	143TTFR4001	E8	82.5	4.4-4.0/2.0	34	12.87	20
	3600	230/460	143T	BALL	E351★	143TTTN6001	E9	86.5	4.0/2.0	54	10.43	N,X
	3600	575	56	BALL	G363	56T34F5336	F1	80.0	1.8	30	11.82	
	3600	575	143T	BALL	E834	143TTFR4005	E8	82.5	1.6	34	12.87	
	3600	575	143T	BALL	E835★	143TTTN4005	E1	86.5	1.6	42	10.43	N
	1800	200	145T	BALL	E836	145TTFR4029	E8	84.0	5.1	44	14.37	
	1800	200	145T	BALL	U601	145TTTN4032	E1	84.0	5.1	63	11.43	N
	1800	200-208	145T	BALL	H665★	145TTFR5328	E6	80.0	5.5-5.9	31	12.37	
	1800	208-230/460	56H	BALL	G365★	56T17F5303	F1	80.0	4.8-4.8/2.4	30	12.32	5,20
	1800	230/460	145T	BALL	E352★	145TTTN6026	E9	84.0	4.4/2.2	63	11.43	N,X,20
	1800	208-230/460	145T	BALL	E951★	145TTFR4026	E8	84.0	4.6-4.0/2.2	45	14.37	20
	1800	208-230/460	145T	BALL	E837★	145TTTC4026	E1	84.0	4.6-4.2/2.1	58	11.43	DS,N,20
	1800	575	145T	BALL	E838★	145TTFR4038	E8	84.0	1.8	45	14.37	
	1800	575	145T	BALL	E839	145TTTN4035	E1	84.0	1.8	62	11.43	N
	1800	575	145T	BALL	E301	145TTTN6031	E9	84.0	1.8	63	11.43	N,X
	1200	230/460	182T	BALL	E231★	182TTTS6076	E9	87.5	5.0/2.5	112	12.71	N,X,20
	1200	230/460	182T	BALL	E982★	182TTFR4076	E8	85.5	5.0/2.5	64	14.97	20
	1200	230/460	182T	BALL	E823★	182TTFS4076	E1	85.5	5.0/2.5	89	14.81	20
	900	230/460	184T	BALL	L410★	184TTFS8102	E6	74.0	5.8/2.9	94	15.81	20
2	3600	200	145T	BALL	E840	145TTFR4005	E8	84.0	6.0	31	13.37	
	3600	200	145T	BALL	E841	145TTTN4003	E1	86.5	6.0	68	11.43	N
	3600	208-230/460	56H	BALL	G384	-----	F1	80.0	6.6-6.6/3.3	39	12.32	5,20
	3600	208-230/460	145T	BALL	E994★	145TTFR4001	E8	84.0	5.7-5.2/2.6	35	13.37	20
	3600	230/460	145T	BALL	E353★	145TTTN6001	E9	86.5	5.4/2.7	64	11.43	N,X,20
	3600	208-230/460	145T	BALL	E842★	145TTTN4001	E1	84.0	5.8-5.4/2.7	64	11.43	N,20
	3600	575	56H	BALL	G368	56T34F5337	F1	80.0	2.4	26	12.32	5
	3600	575	145T	BALL	E843	145TTFR4007	E8	84.0	2.1	38	13.37	
	3600	575	145T	BALL	E844	145TTTN4005	E1	86.5	2.1	66	11.43	N
	1800	200	145T	BALL	E845	145TTFR4032	E8	84.0	6.4	46	13.87	
	1800	200	145T	BALL	U606	145TTTN4030	E1	85.5	6.6	67	11.43	N
	1800	200-208	145T	BALL	H666★	145TTFR5330	E6	82.5	6.8-6.8	40	13.87	
	1800	208-230/460	56H	BALL	G369	56T17F5326	F1	82.5	6.0-5.8/2.9	40	13.82	5,20
	1800	208-230/460	145T	BALL	E952★	145TTFR4027	E8	84.0	6.0-5.6/2.8	42	13.87	20
	1800	230/460	145T	BALL	E354★	145TTTN6027	E9	85.5	6.0/3.0	64	11.43	N,X
	1800	208-230/460	145T	BALL	E846★	145TTTC4027	E1	84.0	6.0-5.6/2.8	63	11.43	DS,N,20
	1800	575	145T	BALL	E847★	145TTFR4039	E8	84.0	2.2	42	13.87	
	1800	575	145T	BALL	E848★	145TTTN4040	E1	85.5	2.4	65	11.43	N
	1800	575	145T	BALL	E302★	145TTTN6030	E9	85.5	2.4	64	11.43	N,X
	1200	230/460	184T	BALL	E232★	184TTTS6076	E9	88.5	6.0/3.0	126	13.71	N,X,20
	1200	230/460	184T	BALL	E995★	184TTFR4076	E8	87.5	5.8/2.9	72	15.97	20
	1200	230/460	184T	BALL	E849★	184TTFS4076	E1	86.5	6.0/3.0	98	15.81	20
	900	230/460	213T	BALL	L411★	213TTFS8103	E6	75.5	8.2/4.1	153	18.22	20
3	3600	200	182T	BALL	U600	-----	E8	85.5	8.5	64	14.97	
	3600	208-230/460	56H	BALL	G385	56T34F5338	F1	84.0	8.4-7.6/3.8	51	13.52	5,20
	3600	208-230/460	182T	BALL	U602★	182TTFS4001	E1	85.5	8.6-7.4/3.7	91	14.81	20
	3600	208-230/460	182T	BALL	E967★	182TTFR4001	E8	85.5	8.2-7.4/3.7	65	14.97	20
	3600	230/460	182T	BALL	E216★	182TTTS6001	E9	89.5	7.6/3.8	107	12.71	N,X,20
	3600	575	56H	BALL	G386	-----	F1	84.0	3.1	41	13.52	5
	3600	575	182T	BALL	U603	-----	E8	85.5	3.0	67	14.97	
	3600	575	182T	BALL	U604	182TTFS4005	E1	85.5	3.0	81	14.81	

Blue shaded areas are Cast Iron Frames

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

Footnotes:

DS Dual Source Product: If a Kit is required, contact your Marathon Electric representative for correct kit selection
 N Totally Enclosed, Non-Ventilated
 X XRI, Ultra High Efficiency Design

5 56H, 143T, and 145T Combination Base with 12 mounting holes
 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower

Continued on next page.

General Purpose, Three Phase

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	MULT. SYMB.	NOM. EFF.	F.L. AMPS	WGHT. LBS.	"C" DIM.	FOOT NOTES
3	1800	200	182T	BALL	L633 ★	182TTFR5327	E6	84.0	9.9	51	15.65	
	1800	200	182T	BALL	U605	182TTFR4038	E8	87.5	9.7	77	14.97	
	1800	208-230/460	182T	BALL	H710 ★	182TTFR7726	E6	82.5	9.0-8.4/4.2	79	14.97	C,20
	1800	230/460	56H	BALL	G387	56T17F5327	F1	84.0	8.6/4.3	55	14.82	20
	1800	208-230/460	182T	BALL	E953 ★	182TTFR4026	E8	87.5	8.8-8.0/4.0	77	14.97	20
	1800	230/460	182T	BALL	E201 ★	182TTTS6026	E9	90.2	8.0/4.0	82	12.71	N,X
	1800	208-230/460	182T	BALL	U607 ★	182TTFC4026	E1	87.5	8.2-7.6/3.8	105	14.81	DS,20
	1800	575	182T	BALL	U608 ★	182TTFR4040	E8	87.5	3.4	77	14.97	
	1800	575	182T	BALL	U609 ★	182TTFS4030	E1	87.5	3.4	98	14.81	
	1800	575	182T	BALL	E303 ★	182TTTS6030	E9	90.2	3.2	100	12.71	N,X
	1200	230/460	213T	BALL	U610 ★	213TTFS4076	E1	87.5	8.8/4.4	155	18.20	20
	1200	230/460	213T	BALL	E980 ★	213TTFW4076	E8	87.5	9.2/4.6	106	18.73	20
	1200	230/460	213T	BALL	E233 ★	213TTFS6076	E9	89.5	8.8/4.4	173	18.20	X
	900	230/460	215T	BALL	L421 ★	215TTFS8101	E6	81.5	11.4/5.7	151	19.72	20
5	3600	200	184T	BALL	U611	-----	E8	87.5	14.3	86	15.97	
	3600	208-230/460	184T	BALL	U613 ★	184TTFS4001	E1	87.5	13.0-12.4/6.2	107	15.81	20
	3600	230/460	184T	BALL	E217 ★	184TTFS6001	E9	89.5	11.8/5.9	108	15.81	X
	3600	208-230/460	184T	BALL	E963 ★	184TTFR4001	E8	87.5	13.0-12.4/6.2	81	15.97	20
	3600	575	184T	BALL	U614	184TTFR4005	E8	87.5	5.0	89	15.97	
	3600	575	184T	BALL	U615 ★	184TTFS4005	E1	87.5	5.0	106	15.81	
	1800	200	184T	BALL	U616	184TTFR4038	E8	87.5	14.7	82	15.97	
	1800	200	184T	BALL	H668 ★	184TTFR7727	E6	84.0	15.2	76	16.97	
	1800	208-230/460	184T	BALL	L909 ★	184TTFR9339	E6	84.0	14.8-13.6/6.8	87	16.47	C,20
	1800	208-230/460	184T	BALL	E954 ★	184TTFR4026	E8	87.5	14.0-12.6/6.3	87	15.97	20
	1800	230/460	184T	BALL	E202 ★	184TTFS6026	E9	90.2	12.2/6.1	117	15.81	X
	1800	208-230/460	184T	BALL	U618 ★	184TTFC4026	E1	87.5	14.0-13.0/6.5	112	15.81	DS,20
	1800	575	184T	BALL	U619 ★	184TTFR4040	E8	87.5	5.1	78	15.97	
	1800	575	184T	BALL	U620 ★	184TTFS4030	E1	87.5	5.2	89	15.81	
	1800	575	184T	BALL	E304 ★	184TTFS6030	E9	90.2	5.0	117	15.81	X
	1200	230/460	215T	BALL	E970 ★	215TTFW4076	E8	87.5	14.0/7.0	143	20.23	20
	1200	230/460	215T	BALL	U621 ★	215TTFS4076	E1	88.5	13.8/6.9	175	19.70	20
	1200	230/460	215T	BALL	E234 ★	215TTFS6076	E9	89.5	13.8/6.9	203	19.70	X
	900	230/460	254T	BALL	L412 ★	254TTFPA8102	E6	84.0	17.0/8.5	325	23.69	20
7 1/2	3600	200	213T	BALL	U622	213TTFW4003	E8	89.5	21.2	109	20.23	
	3600	230/460	213T	BALL	E972 ★	213TTFW4001	E8	89.5	18.4/9.2	114	20.23	20
	3600	230/460	213T	BALL	E218 ★	213TTTS6001	E9	91.7	17.8/8.9	192	15.69	N,X
	3600	230/460	213T	BALL	U624 ★	213TTFS4001	E1	88.5	19.0/9.5	149	18.20	20
	3600	575	213T	BALL	U625	213TTFW4005	E8	89.5	7.4	128	20.23	
	3600	575	213T	BALL	U671 ★	213TTFS4005	E1	88.5	7.2	197	18.20	
	1800	200	213T	BALL	U627	213TTFW4028	E8	89.5	23.0	125	18.73	
	1800	200	213T	BALL	H669 ★	213TTFW7028	E8	87.5	22.3	103	18.73	
	1800	230/460	213T	BALL	E203 ★	213TTFS6026	E9	91.7	19.2/9.6	194	18.20	X
	1800	208-230/460	213T	BALL	U629 ★	213TTFC4026	E1	89.5	21.0-19.6/9.8	160	18.20	DS,20
	1800	208-230/460	213T	BALL	E955 ★	213TTFW4026	E8	89.5	21.6-20.0/10.0	112	18.73	20
	1800	208-230/460	213T	BALL	L910 ★	213TTFW7326	E6	86.5	22.0-21.0/10.5	103	18.73	C,20
	1800	575	213T	BALL	U630 ★	213TTFW4030	E8	89.5	8.0	135	18.73	
	1800	575	213T	BALL	U631 ★	213TTFS4030	E1	89.5	8.0	220	18.20	
	1800	575	213T	BALL	E305 ★	213TTFS6030	E9	91.7	7.7	192	19.70	X
	1200	230/460	254T	BALL	U632 ★	254TTFL4076	E8	89.5	22.0/11.0	166	22.99	AL,20
	1200	230/460	254T	BALL	E235 ★	254TTFNA6076	E9	91.0	19.8/9.9	223	23.52	X
	1200	230/460	254T	BALL	U633 ★	254TTFNA4076	E1	89.5	20.4/10.2	300	23.52	A,20
	900	230/460	256T	BALL	L413 ★	256TTFPA8102	E6	85.0	24.0/12.0	415	25.44	20

Blue shaded areas are Cast Iron Frames

★ **Stock Model**

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

Footnotes:

A NEMA Design A
 AL Aluminum Frame Construction
 C NEMA Design C torques
 DS Dual Source Product: If a Kit is required, contact your Marathon Electric representative for correct kit selection

N Totally Enclosed, Non-Ventilated
 X XRI, Ultra High Efficiency Design
 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower

Continued on next page.

General Purpose, Three Phase

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	MULT. SYMB.	NOM. EFF.	F.L. AMPS	WGHT. LBS.	"C" DIM.	FOOT NOTES
10	3600	200	215T	BALL	U634	215TTFW4003	E8	89.5	27.6	152	20.23	
	3600	230/460	215T	BALL	U636★	215TTFS4001	E1	89.5	24.0/12.0	165	19.70	20
	3600	230/460	215T	BALL	E969★	215TTFW4001	E8	89.5	24.0/12.0	128	20.23	20
	3600	230/460	215T	BALL	E219★	215TTFS6001	E9	91.7	23.6/11.8	218	19.70	X
	3600	575	215T	BALL	U637	215TTFS4005	E1	89.5	9.6	184	19.70	
	3600	575	215T	BALL	E821★	215TTFW4005	E8	89.5	9.6	145	20.23	
	1800	200	215T	BALL	H670★	215TTFW7028	E6	88.5	28.8	130	20.23	
	1800	200	215T	BALL	E822	215TTFW4028	E8	89.5	29.9	125	20.23	
	1800	208-230/460	215T	BALL	L911★	215TTFW7326	E6	87.5	29.0-26.0/13.0	123	20.23	C,20
	1800	230/460	215T	BALL	E204★	215TTFS6026	E9	91.7	25.0/12.5	213	19.70	X
	1800	208-230/460	215T	BALL	U639★	215TTFC4026	E1	89.5	28.4-25.6/12.8	180	19.70	DS,20
	1800	208-230/460	215T	BALL	E956★	215TTFW4026	E8	89.5	28.0-26.0/13.0	130	20.23	20
	1800	575	215T	BALL	E306	215TTFS6030	E9	91.7	10.0	213	19.70	X
	1800	575	215T	BALL	U640★	215TTFW4030	E8	89.5	10.4	138	20.23	
	1800	575	215T	BALL	U641★	215TTFS4030	E1	89.5	10.0	197	19.70	
	1200	230/460	256T	BALL	E236★	256TTFNA6076	E9	91.0	26.2/13.1	368	25.27	X
	1200	230/460	256T	BALL	U642★	256TTFNA4076	E1	89.5	26.0/13.0	365	25.27	20
	1200	230/460	256T	BALL	E973★	256TTFL4076	E8	89.5	26.0/13.0	212	26.24	AL,20
	900	230/460	284T	BALL	L414★	284TTFP8102	E6	85.5	31.0/15.5	360	26.26	20
15	3600	200	254T	BALL	U643	-----	E8	91.0	40.3	164	22.99	AL
	3600	230/460	215T	BALL	U670★	215TTFW4007	E8	90.2	36.0/18.0	140	20.23	20
	3600	230/460	254T	BALL	U644★	254TTFPA4001	E1	90.2	36.0/18.0	370	23.69	20
	3600	230/460	254T	BALL	E220★	254TTFNA6001	E9	91.7	35.0/17.5	384	23.52	X
	3600	230/460	254T	BALL	E977★	254TTFL4001	E8	91.0	35.0/17.5	265	22.99	AL,20
	3600	575	254T	BALL	U645	254TTFL4005	E8	91.0	14.0	196	22.99	AL
	3600	575	254T	BALL	U638	254TTFPA4005	E1	90.2	14.4	270	23.69	
	1800	200	254T	BALL	H623★	254TTFL5747	E6	88.5	44.4	178	22.99	AL
	1800	200	254T	BALL	U646	254TTFL4027	E8	91.0	46.0	190	22.99	AL
	1800	208-230/460	254T	BALL	L912★	254TTFL5772	E6	88.5	42.0-39.0/19.5	190	24.74	AL,C,20
	1800	208-230/460	254T	BALL	E996★	254TTFL4026	E8	91.0	42.0-40.0/20.0	178	22.99	AL,20
	1800	230/460	254T	BALL	E205★	254TTFNA6026	E9	92.4	37.6/18.8	322	23.52	X
	1800	208-230/460	254T	BALL	U647★	254TTFC4026	E1	91.0	41.0-38.0/19.0	324	23.69	DS,20
	1800	575	254T	BALL	U648★	254TTFNA4030	E1	91.0	15.6	341	23.52	
	1800	575	254T	BALL	E307★	254TTFNA6030	E9	92.4	15.0	326	23.52	X
	1800	575	254T	BALL	E997★	254TTFL4030	E8	91.0	16.0	198	22.99	AL
	1200	230/460	284T	BALL	E237★	284TTFN6076	E9	91.7	40.8/20.4	483	27.82	X
	1200	230/460	284T	BALL	E978★	284TTFN4076	E1	90.2	40.0/20.0	568	27.88	
	900	230/460	286T	BALL	L415★	286TTFP8102	E6	86.5	45.0/22.5	453	27.76	20
20	3600	230/460	256T	BALL	E221★	256TTFNA6001	E9	92.4	46.8/23.4	385	25.27	X
	3600	230/460	256T	BALL	E974★	256TTFL4001	E8	90.2	47.0/23.5	198	24.74	AL,20
	3600	230/460	256T	BALL	U649★	256TTFNA4001	E1	90.2	47.0/23.5	334	25.27	20
	3600	575	256T	BALL	U650	256TTFNA4005	E1	90.2	18.8	300	25.27	
	1800	200	256T	BALL	U651	256TTFL4027	E8	91.0	58.7	181	26.24	AL
	1800	200	256T	BALL	H274	256TTFL5027	E6	88.5	60.0	190	24.74	AL
	1800	208-230/460	256T	BALL	E965★	256TTFL4026	E8	91.0	55.0-51.0/25.5	178	26.24	AL,20
	1800	208-230/460	256T	BALL	L913★	256TTFL5043	E6	88.5	56.0-52.0/26.0	172	24.74	AL,C,20
	1800	230/460	256T	BALL	E206★	256TTFNA6026	E9	93.0	48.2/24.1	368	25.27	X
	1800	208-230/460	256T	BALL	U652★	256TTFC4026	E1	91.0	55.0-51.0/25.5	376	25.44	DS,20
	1800	575	256T	BALL	E308★	256TTFNA6030	E9	93.0	19.3	368	25.27	X
	1800	575	256T	BALL	E998★	256TTFL4030	E8	91.0	20.4	201	26.24	AL
	1800	575	256T	BALL	U653★	256TTFNA4030	E1	91.0	20.0	341	25.27	
	1200	230/460	286T	BALL	E238★	286TTFN6076	E9	91.7	53.6/26.8	515	27.88	X
	1200	230/460	286T	BALL	E968★	286TTFN4076	E1	90.2	54.0/27.0	425	27.88	20
	900	230/460	324T	BALL	L416★	324TTFP8104	E6	87.5	64.0/32.0	586	28.82	20

Blue shaded areas are Cast Iron Frames

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

Footnotes:

- AL Aluminum Frame Construction
- C NEMA Design C torques
- DS Dual Source Product: If a Kit is required, contact your Marathon Electric representative for correct kit selection
- X XRI, Ultra High Efficiency Design
- 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower

Continued on next page.

LARGER MOTORS AVAILABLE

“The scientific racism of Nazi Germany killed forty million and attempted genocide against Europe’s Jews. The scientific socialism of the Communist countries killed a hundred million (and still counting) people around the globe. As the Soviet dissident Vladimir Bukovsky has noted, people in the West routinely invoke the Spanish Inquisition as an example of religious horror. And they are right to do so. But the Inquisition, in the course of three centuries, and after legal procedures of a sort, killed fewer people- probably around three thousand- than the Soviet Union killed on an average day.”

“We make men without chests and we expect of them virtue and enterprise,” C. S. Lewis writes. “We laugh at honor and we are shocked to find traitors in our midst. We castrate and bid the geldings be fruitful.”

Index Section D

Pumps

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OUR PUMP UNIVERSE

Byrne, Rice & Turner has wide ranging capabilities in the design and construction of pump packages. There are many different types of pumps, materials of construction, configurations, motors and performances available. There literally are thousands of pumps available from us and you will find many of the more popular models represented here. If you don't see what you are looking for in the catalog that doesn't mean that we don't have it or can't get it. Of course, we can help you find the most economical, efficient and reliable solution for your pump needs. Performance characteristics are wide ranging from very small flow rates of less than 10 gpm up to 6000 gpm over a wide variety of discharge pressures for different fluids being pumped. Give us a call and you won't be disappointed at what we can do for you. Here is just one example:

One factory alone of the pump manufacturers we represent offers a full line of water pumping systems to serve a wide variety of water applications.

Applications include:

Residential water wells; Irrigation systems; Commercial; Construction; Municipal; Mining; Water Circulation; Jockey Pumps; Booster Systems; Liquid Transfer; Marine; Engine Driven pumps; Wastewater and more.

They produce over 1000 different pump models which cover a wide range of applications and conditions.

They manufacture submersible pumps ranging from ½ hp thru 200 hp, and capacities from 5 to 1100 gpm, with total head capacity up to 1200ft.

Their centrifugal line ranges from ½ hp thru 200 hp with a wide range of discharge / suction configurations, and up to 6000 gpm with total head capacities up to 490ft. We offer close-coupled, frame mount and SAE type.

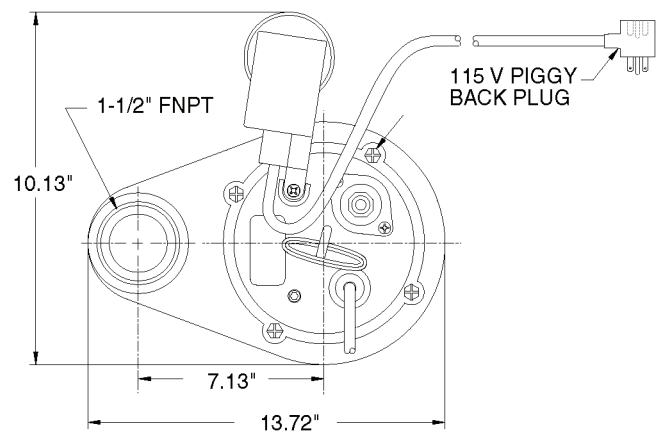
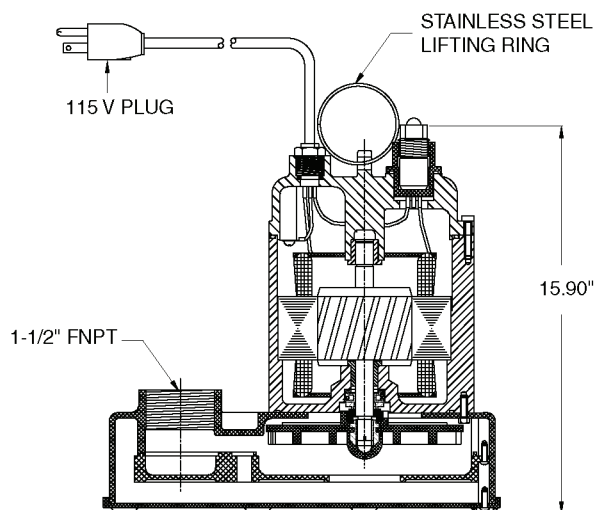
This is just one of our manufacturers but now you get a sense for the pump universe available from the manufacturers we represent.

PE Series Submersible Effluent Pump



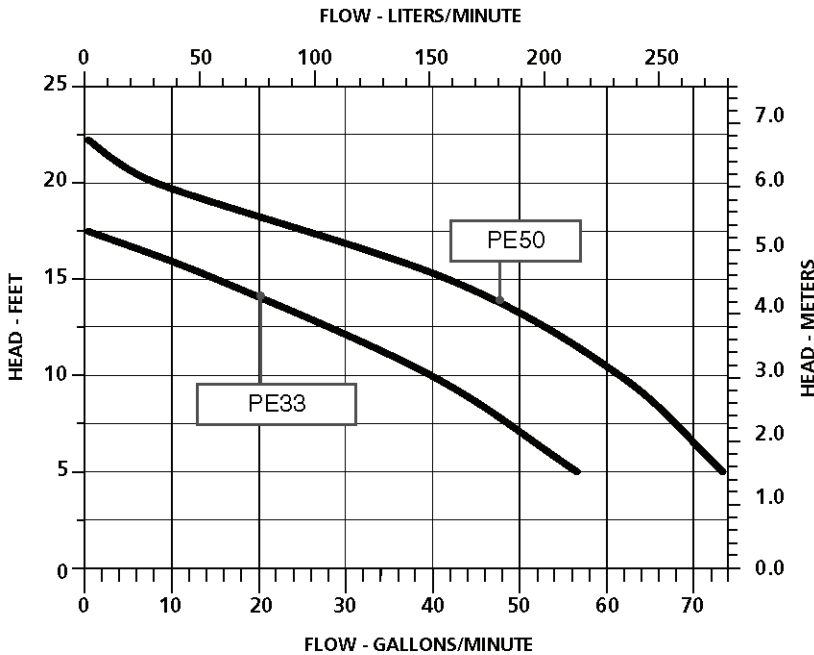
Features

- Heavy-duty high quality cast iron motor housing.
- Non-corrosive thermoplastic case and vortex impeller.
- Efficient oil-filled 115 V motor with thermal overload protection and automatic reset which prevents motor overheating and burnout.
- 20-foot power cord.
- 1.5" NPT side discharge.
- Available with an automatic On-Off mechanical float switch (-A models).
- Will handle up to 1/2" solids.
- All fasteners 300 series stainless steel.



PE Series

Submersible Effluent Pump



Construction

Cover	Polycarbonate
Motor Housing	Epoxy Coated Cast Iron
Impeller Material	Nylon
Impeller Type	Vortex
Power Cord	SJTW-A
Mechanical Shaft Seal	Nitrile Parts, Carbon and Ceramic Faces
Fasteners	Stainless Steel
Shaft	Cold Rolled Steel
Bearings	Sintered Sleeve Bearings

Specifications

MODEL NO.	ITEM NO.	HP	VOLTS	DISCHARGE SIZE	RUNNING AMPS/WATTS	PERFORMANCE (GPM)				SHUT-OFF		CORD LENGTH	WEIGHT (LBS)	RPM
						5'	10'	15'	20'	FEET	PSI			
PE33V-1	506310	1/3	115	1.5" FNPT	9.0/720	57.0	40.0	15.0	-	17.5	7.6	20'	30	1,750
PE33V-1	506311	1/3	115	1.5" FNPT	9.0/720	57.0	40.0	15.0	-	17.5	7.6	30'	31	1,750
PE50V-1	510310	1/2	115	1.5" FNPT	11.5/1005	74.0	62.0	42.0	8.0	22.0	9.5	20'	30	1,750
PE50V-1	510311	1/2	115	1.5" FNPT	11.5/1005	74.0	62.0	42.0	8.0	22.0	9.5	30'	31	1,750

Darwin Award Winner

February 1998, Male, Mammoth, California Matthew and his friends were sliding down a Mammoth Mountain ski run on a foam pad at 3 AM, when he crashed into a lift tower and died. His makeshift sled of yellow foam had been stolen from the legs of a lift tower on Stump Alley. The cushion is meant to protect skiers who hit the tower, and the tower Matthew ran into was the one from which he had created his sled. There is a moral in there somewhere.

SOLIDS Handling SUBMERSIBLE PUMPS

Engineered submersible solids handling wastewater pumps for municipal, industrial, residential & commercial applications. A dependable answer for sewage and waste handling needs.

Proven Performance

Barnes® offers a broad line of engineered submersible solids handling pumps for a wide variety of light to heavy duty wastewater services. Designed specifically for unscreened raw sewage or industrial waste applications, these Barnes® brand pumps are available in 3" through 8" discharge sizes and can handle spherical solids up to 4" in diameter.

With heads to 258' and capacities to 5,400gpm at 104°F continuous media temperature, Barnes® submersible pumps deliver efficient hydraulic coverage. The motors are completely sealed against contaminants, and bearings are lubricated for the life of the pump, significantly reducing maintenance and operating costs.

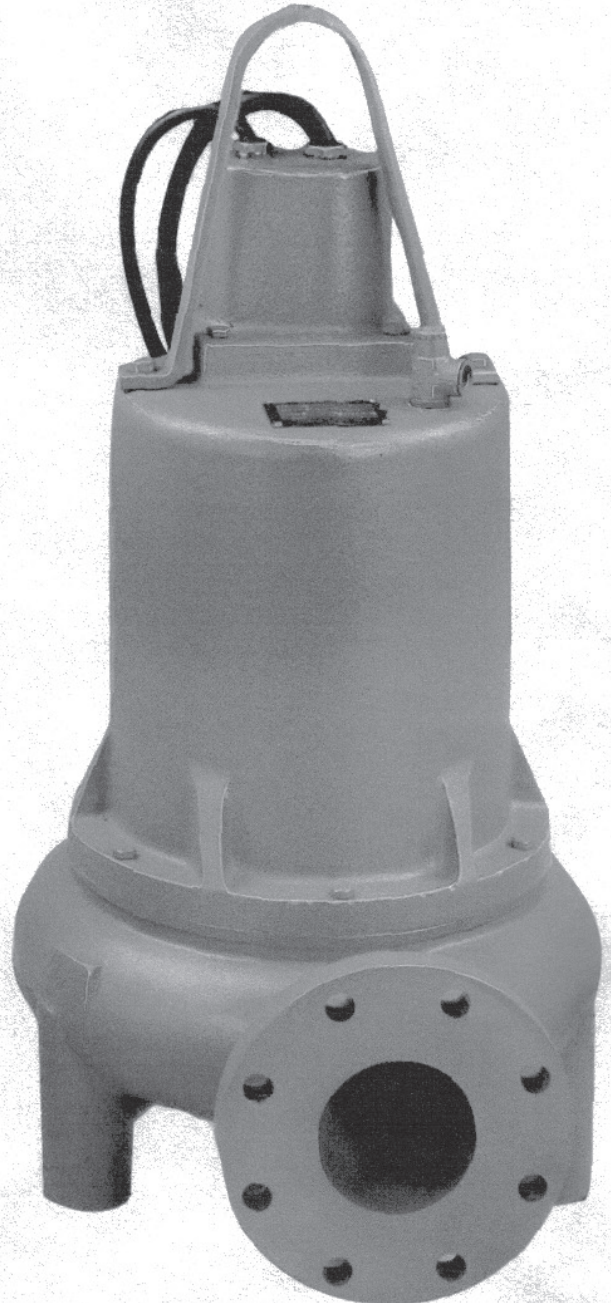
Applications

When wastewater collection is in a below-grade sump or wet well.

Where construction of a building for above-ground pumping equipment is not practical.

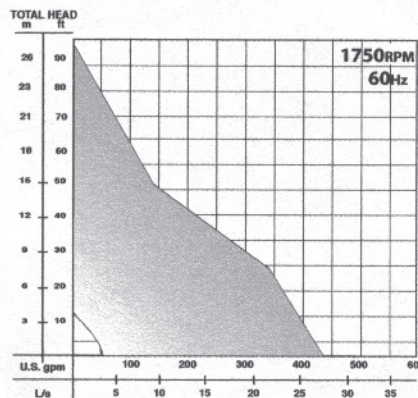
For use in an existing pump station that is subject to frequent flooding due to power failures or leakage.

Where there is limited vertical clearance in an existing station.



3SE, 3XSE

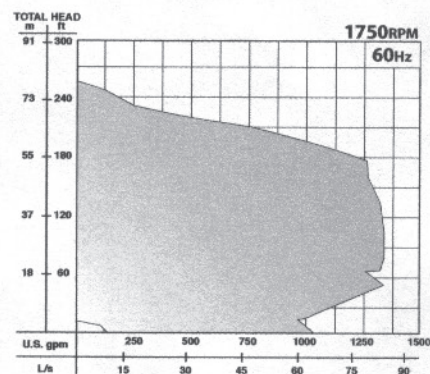
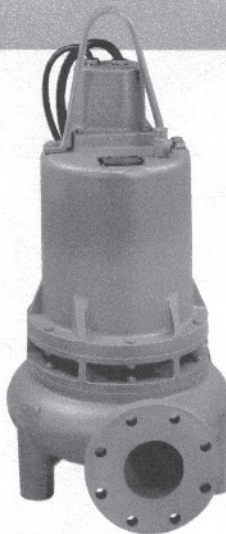
Size	3" horizontal/vertical
Motor	.75hp - 3hp oil or air filled
Head	to 95'
Flow	to 440gpm
Volutes	concentric
Impeller	open & enclosed
Solids	1.5" • 2" • 2.5"



Models with air filled explosion proof motors available.

4SE, 4XSE

Size	4" horizontal
Motor	.9hp - 100hp oil filled or air filled
Head	to 258'
Flow	to 1,265gpm
Volutes	standard concentric high efficiency scroll
Impeller	open & enclosed
Solids	1.5" • 2" • 3"



Models with air filled explosion proof motors available.

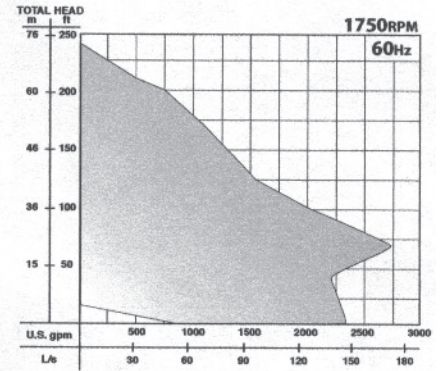
SE SERIES

BARNES®

Solids Handling Submersibles

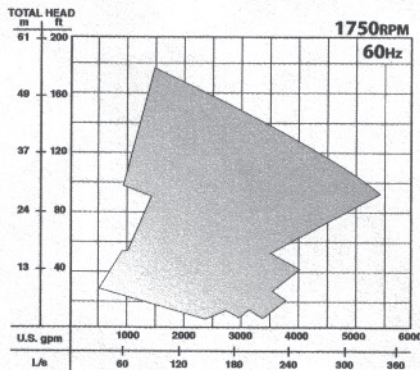
6SE, 6XSE

Size	6" horizontal
Motor	7.5hp - 75hp oil filled or air filled
Head	to 240'
Flow	to 2,650gpm
Volutes	concentric
Impeller	enclosed
Solids	3" • 4"

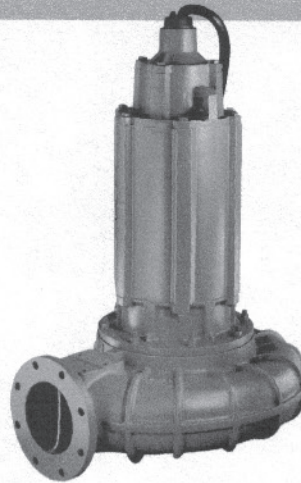


Models with air filled explosion proof motors available.

8SE, 8XSE

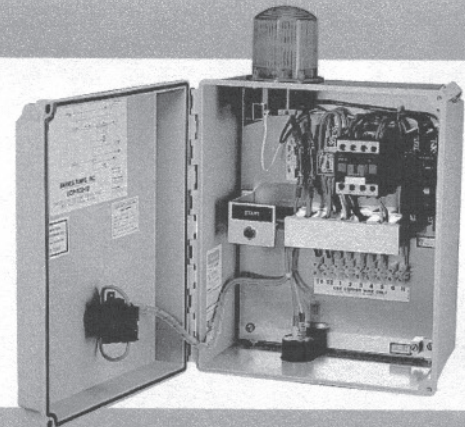


Models with air filled explosion proof motors available.



Size	8" horizontal
Motor	24hp - 200hp oil filled or air filled
Head	to 180'
Flow	to 5,400gpm
Volutes	concentric
Impeller	enclosed
Solids	3"

Control panels are available in NEMA 3R, 4X, and other enclosures for Simplex and Duplex pumping systems. Standard panels include: 120v control transformers, alternators (in Duplex panels), circuit breakers, motor overload protection, Hand-Off-Automatic selector switch, run lights, alarm circuit, magnetic starters, seal fail light, motor high temperature light. Custom panels available.

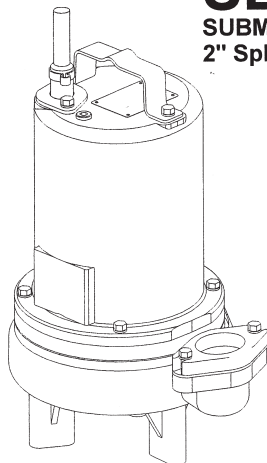


SE SERIES

BARNES®

SE

SUBMERSIBLE NON-CLOG PUMPS
2" Spherical Solids Handling



Series SE 0.5, 0.75 & 1HP
1750 RPM
(SE51 & SE52)

Manual & Automatic



CSA 108 - File No. LR16567
UL 778

NRTL/C

Description:

SUBMERSIBLE NON-CLOG SEWAGE
PUMP DESIGNED FOR TYPICAL RAW
SEWAGE APPLICATIONS.

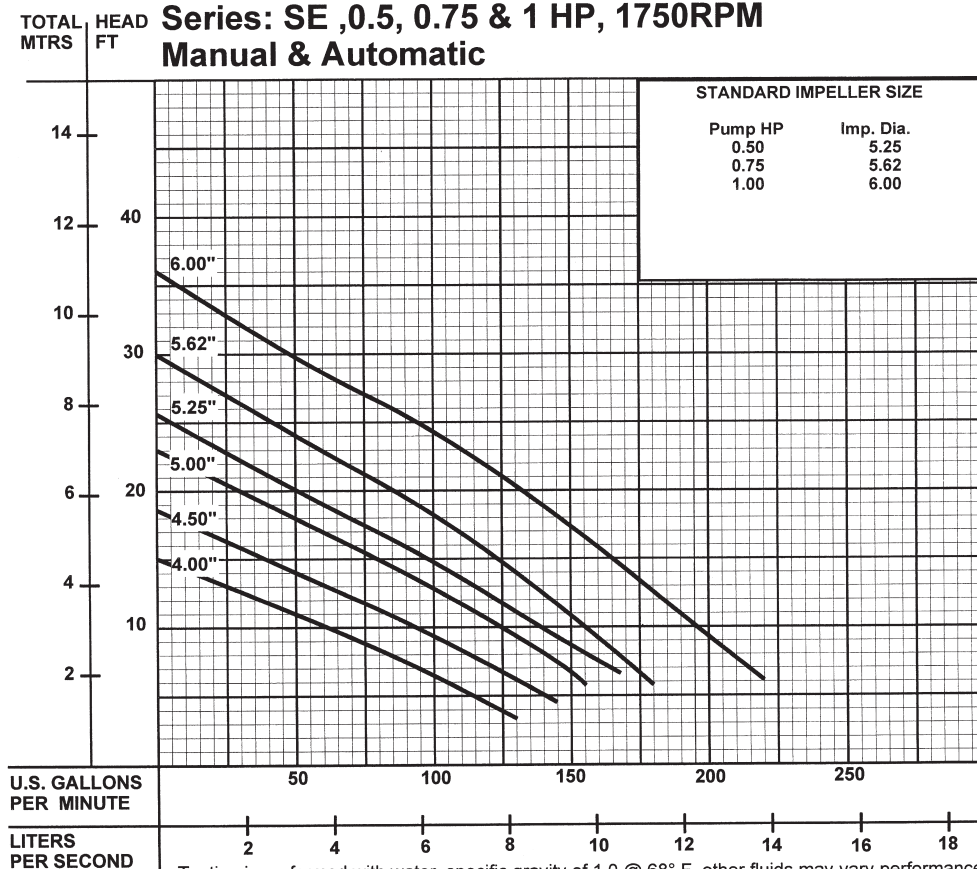
Specifications:

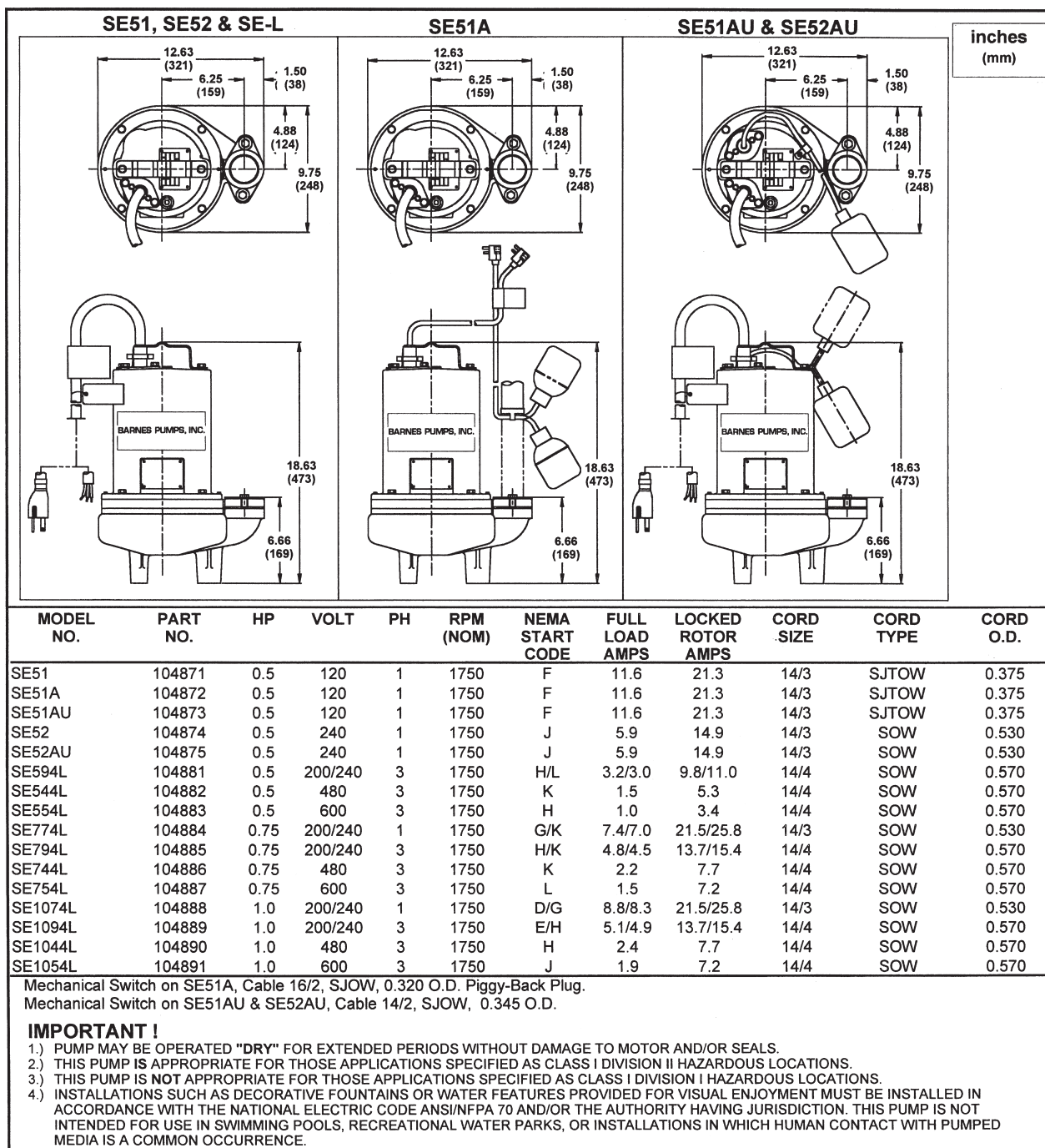
DISCHARGE: 2" NPT, Vertical.
LIQUID TEMPERATURE: 104°F (40°C) Continuous.
VOLUTE: Cast Iron ASTM A-48, Class 30.
MOTOR HOUSING: Cast Iron ASTM A-48, Class 30.
SEAL PLATE: Cast Iron ASTM A-48, Class 30.
IMPELLER: *Design:* 2 Vane, Open, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
Material: Cast Iron ASTM A-48 Class 30.
SHAFT: 416 Stainless Steel
SQUARE RINGS: Buna-N
HARDWARE: 300 Series Stainless Steel
PAINT: Air Dry Enamel.
SEAL: *Design:* Single Mechanical.
Material: Rotating Faces - Carbon
Stationary Faces - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless
CABLE ENTRY: 15 ft. (4.5M) Cord. Plug on 120 Volt & 240 Volt 1 Phase. Quick Connect, Custom Molded for Sealing and Strain Relief.
SPEED: 1750 RPM (Nominal).
UPPER BEARING: *Design:* Single Row, Ball
Lubrication: Oil
Load: Radial
LOWER BEARING: *Design:* Single Row, Ball
Lubrication: Oil
Load: Radial & Thrust
MOTOR: *Design:* NEMA L Torque Curve. Completely Oil-Filled, Squirrel Cage Induction. Class B
Insulation: Permanent Split Capacitor (PSC). Includes Overload Protection In Motor.
SINGLE PHASE: 200-240/480 Tri Voltage motor. 600V.
THREE PHASE: Requires Overload Protection to be Included in Control Panel.
FLOAT, AUTOMATIC MODELS: A - Wide Angle, PVC Mechanical, 15ft (5M) Cable on with Piggy-Back Plug.
AU - Wide Angle, Polypropylene, Mechanical, N/O, Integral to Pump. ON and OFF Points are Adjustable.
OPTIONAL EQUIPMENT: Seal Material, Impeller Trims, Additional Cable, N/C Temperature Sensor with cable for 3 phase pumps (Requires Relay in Control Panel).

PERFORMANCE CURVE

Series: SE ,0.5, 0.75 & 1 HP, 1750RPM

Manual & Automatic





TAX BITES

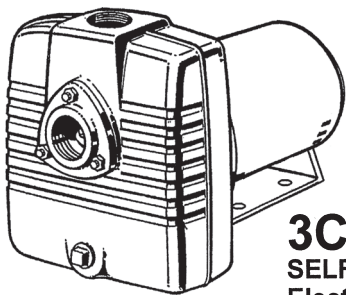
After a year of hard work, the average man or woman is entitled to a little vacation with the family. They may have scrimped and saved all year to be able to spend two weeks at their favorite vacation spot. Of course, their savings are heavily taxed all year. But when they finally go to buy airline tickets, what they probably don't realize is how much they are paying in taxes again.

All airline tickets are subject to a federal excise tax of 7.5 percent. In addition, there is a \$2.50 surcharge to pay for air traffic control services. If you are flying overseas, you are subject to a \$12.40 Arrival Tax, a \$12.40 Departure Tax, and a \$5.00 Customs User Fee. Many airports are also subject to a \$3 Passenger Facilities Charge, which is another tax. (Note: Pending legislation would raise the PFC tax to \$4.50.)

Air travelers are also subject to a \$6.00 Immigration User Fee and a \$2.00 Agricultural Inspection Fee. Consequently, over 10 percent of what you pay for flying is actually going to these taxes.

But that's only the start. Additional taxes paid by the airlines account for about 30 percent of the price of an airline ticket.

BARNES®



3CCE, 4CCE, 5CCE SELF-PRIMING PUMPS Electric Drive

Series: 3CCE 1-1/2HP

RPM: 3450

Series: 4CCE 2HP

RPM: 3450

Series: 5CCE 3HP

 Canadian Standards Association
File No. LR16567

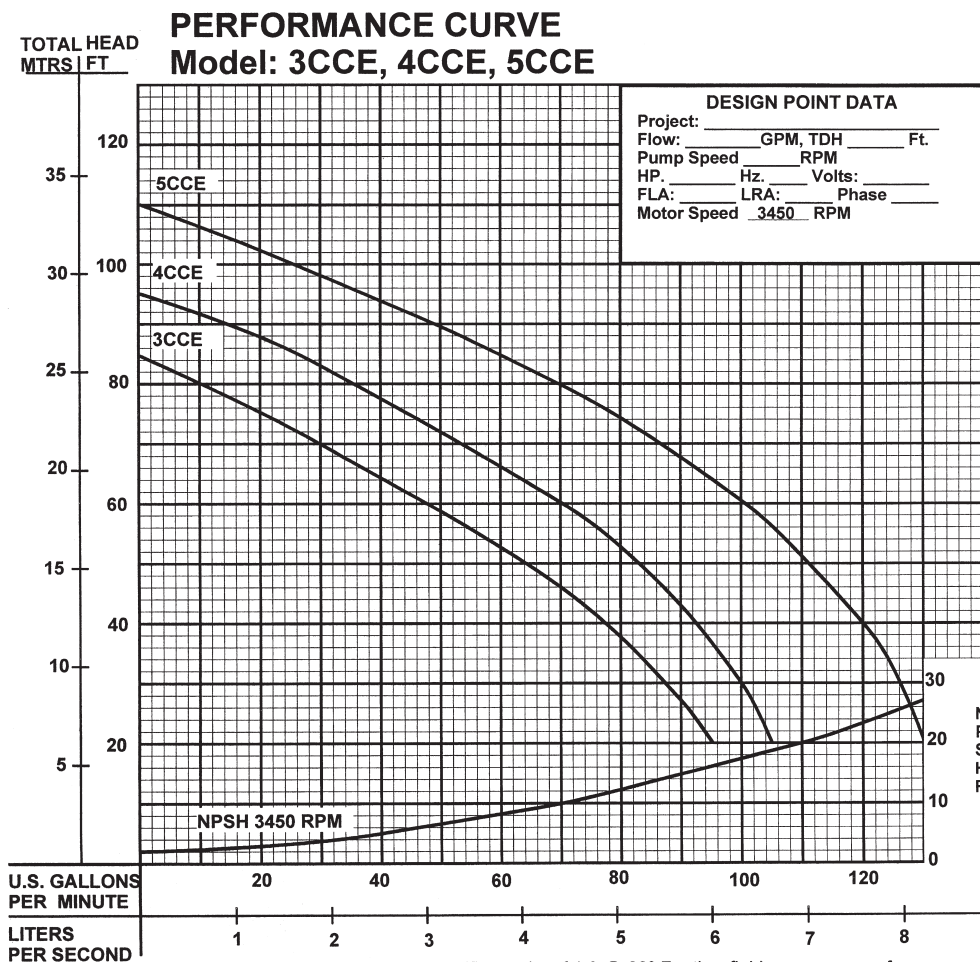
 American Bureau of Shipping
Certificate No.
01-HS238523C/1PDA

Specifications:

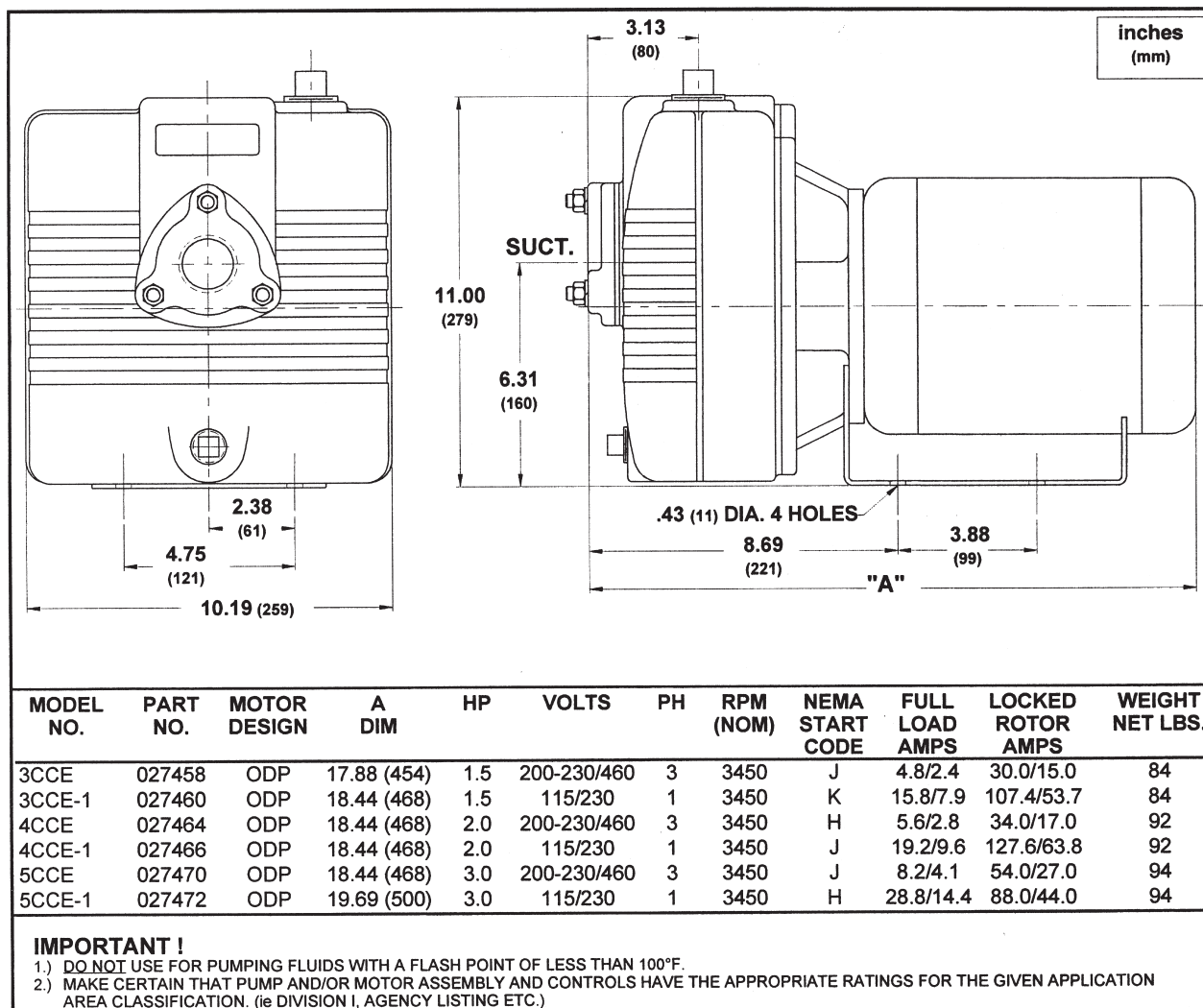
SUCTION/DISCHARGE:	1-1/2" (38mm) x 1-1/2" (38mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
VOLUTE:	Cast Iron ASTM A-48, Class 30.
BODY:	Cast Iron ASTM A-48, Class 30.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	Design: Open, Trash Type. Material: Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3. Stainless Steel
SHAFT:	Buna-N
SQUARE RINGS:	Stainless Steel
HARDWARE:	Air Dry Enamel.
PAINT:	Mechanical
SEAL:	Design: Self-Lubricating Lubrication: Rotating Face - Carbon Material: Stationary Face - Ceramic Elastomer - Buna-N Hardware - 300 Series Stainless
CHECK VALVE:	Material: Valve Flap-Neoprene. Weight-Cast Iron ASTM A-48, Class 30
MOTOR:	Design: ODP, NEMA L-Single Phase, NEMA B-Three Phase Torque Curve C-Face, Footed, Squirrel Cage Insulation: Induction. Class B.
SINGLE PHASE:	Dual Voltage 115/230, Capacitor Start.
THREE PHASE:	Tri-Voltage, 200-230/460.
OPTIONAL EQUIPMENT:	Seal Material, TEFC Motors.

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.



Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.



TAX BITES BREAD

In the process of production from farm to the store, the government imposes about 30 taxes on a loaf of bread.

These include federal income taxes, state income taxes, state and local property taxes, federal payroll taxes, sales taxes, capital gains taxes, unemployment compensation taxes, workmen's compensation taxes, retailers' excise taxes, business license taxes and fees, utility taxes, and state wheat farmer checkoff taxes.

A recent study by Price Waterhouse found that these taxes accounted for 27.2 percent of the price of a loaf of bread, not counting sales taxes paid by the customer.

So out of the average price of a loaf of bread of \$1.09 in 1995, about 30 cents goes for taxes, plus another 5 cents on average for sales taxes.

GAS

When you cruise on over to the gas station to fill up your car's gas tank, you naturally assume that you are paying for gas. What you don't realize is that over half of what you pay goes to the government in taxes rather than for the gas.

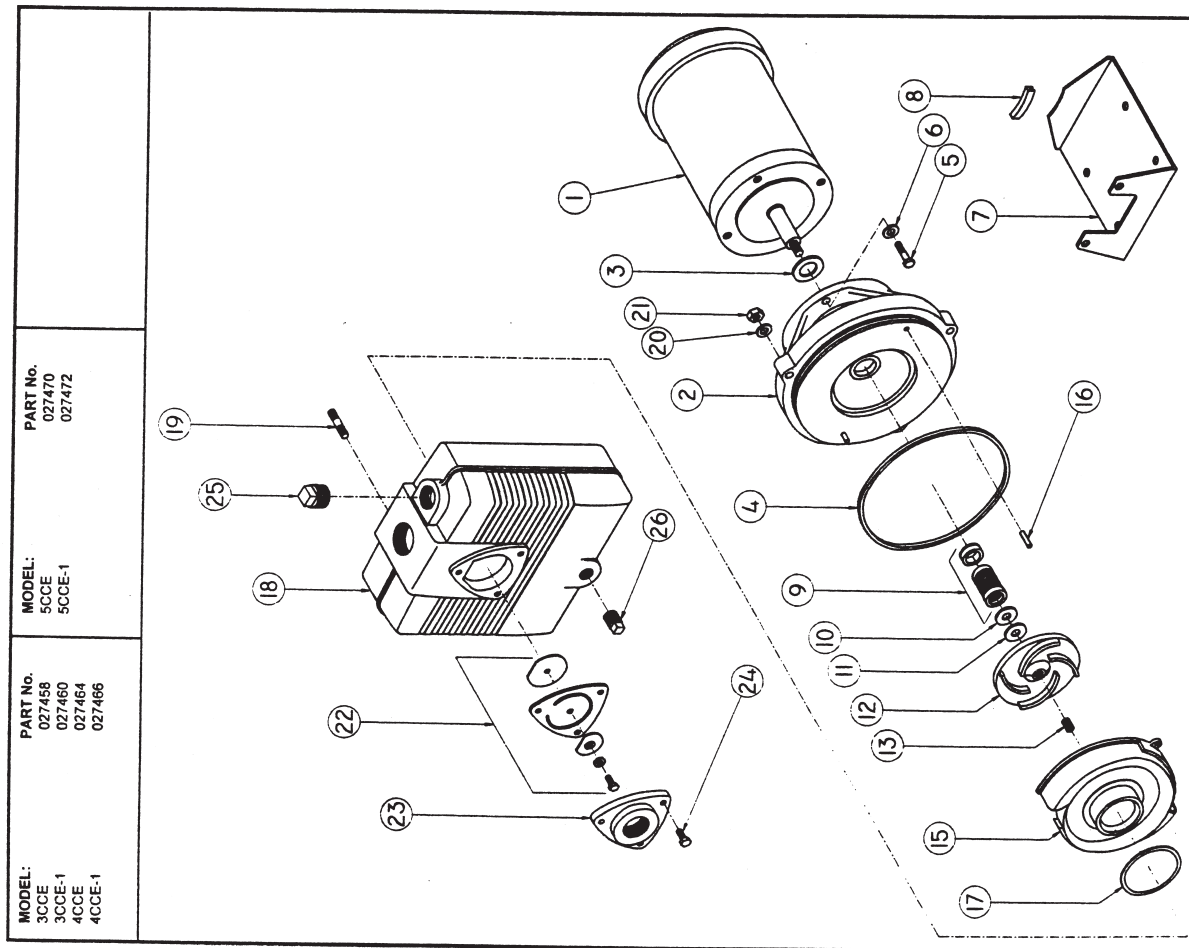
The federal government adds an excise tax of 18.3 cents on every gallon of gas. Each state then adds an additional excise tax now averaging 19.4 cents per gallon. This adds up to a total of 37.7 cents per gallon.

Based on recent price data from the Energy Information Administration of the U.S. Department of Energy, these taxes account for about 28 percent of what you pay for a gallon of gas at the pump.

For a car with a standard 15 gallon gas tank, a tax of 37.7 cents per gallon adds up to \$5.66 per fill-up. The Tax Foundation estimates that the average American household will spend \$422 this year on these taxes alone.

But that is not all. The government imposes 43 different direct and indirect taxes on the production and distribution of gas. The total tax burden amounts to 54 percent of the price of a gallon of gas.

3CCE, 4CCE, 5CCE SELF-PRIMING PUMPS Electric Drive



PARTS KIT

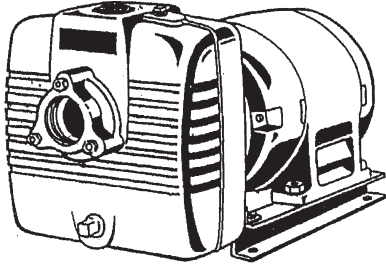
Seal Kit P/N: 021814 (†) 3, 4, 9, 10, 11, 16, 17, 22c

PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Motor - 3CCE	012536
2	1	Motor - 3CCE-1	012256
3	1	Motor - 4CCE	022433
4	1	Motor - 4CCE-1	022432
5	1	Motor - 5CCE	027455
6	1	Motor - 5CCE-1	027456
7	1	Intermediate Coupling	025469
8	1	Slinger	012752
9	1	O-Ring	017713
10	4	Cap Screw, 3CCE, 4CCE, 5CCE	002235
11	4	Cap Screw, 4CCE-1	002234
12	4	Lock Washer	028408
13	1	Base	017432
14	1	Pad	017362
15	1	† Shaft Seal	012703
16	1	† Shim, .010	026707
17	1	† Shim, .005	026153
18	1	Impeller	026153
19	1	Set Screw, 3CCE	026153
20	1	Hex Nut, 4CCE, 5CCE	026154
21	1	Volute	028155
22	1	† Pin, Volute	028153
23	1	† Gasket, Volute	017715
24	1	Body	017714
25	1	Stud	018097
26	1	Lock Washer	018098
27	1	Hex Nut	028408
28	1	Check Valve Assy.	15-23-6
29	1	Weight	017718
30	1	Gasket	001338
31	1	† Lock Washer	001339
32	1	Round Hd Screw	017712
33	1	Suction Flange	022333
34	1	Cap Screw	023469
35	1	Pipe Plug	018099
36	1	Pipe Plug	002218
37	1	Pipe Plug	003206
38	1	Pipe Plug	003204

BARNES®

10CCE & 10CCE-1 SELF-PRIMING PUMPS Electric Drive



**Model: 10CCE & 10CCE-1, 5HP
RPM: 3450**



American Bureau of Shipping
Certificate No.
01-HS238523C/1PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE: 2" (51mm) x 2" (51mm) NPT, Female.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
VOLUTE: Cast Iron ASTM A-48, Class 30.
BODY: Cast Iron ASTM A-48, Class 30.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

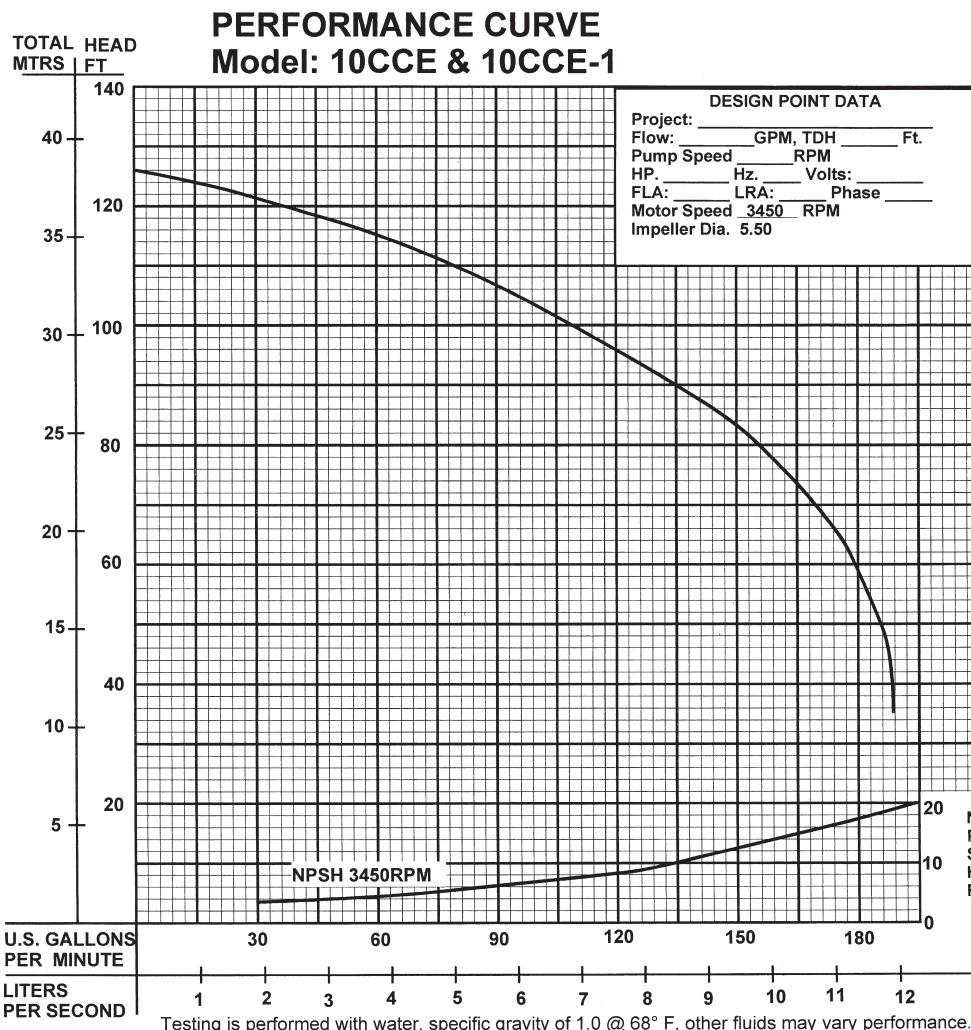
Design: Open, Trash Type.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.
Stainless Steel

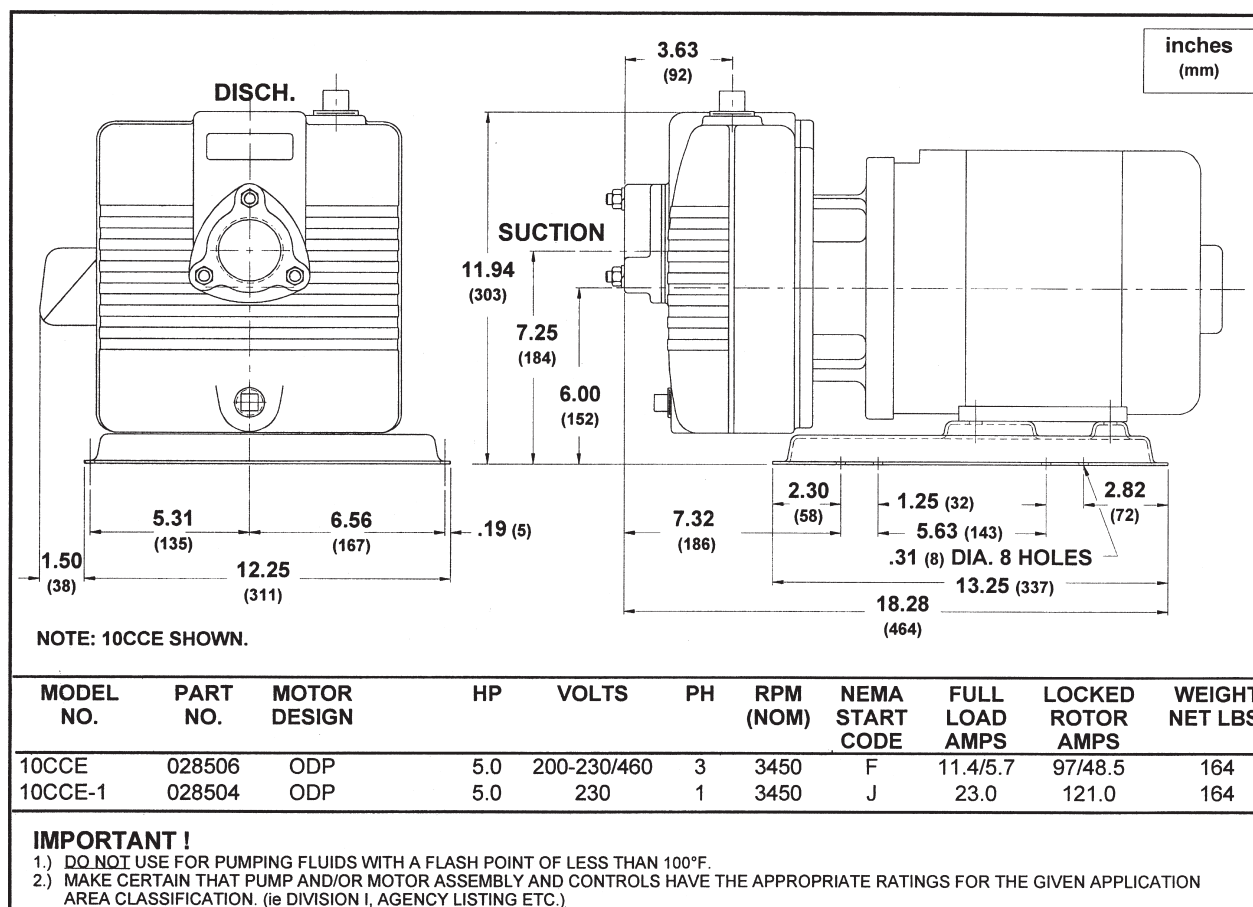
SHAFT: Bronze
SHAFT SLEEVE: Buna-N
SQUARE RINGS: Stainless Steel
HARDWARE: Air Dry Enamel.
PAINT: Mechanical
SEAL: Self-Lubricating
Design: Rotating Face - Carbon
Lubrication: Stationary Face - Ni-Resist
Material: Elastomer - Buna-N
Hardware - 300 Series Stainless

CHECK VALVE:
Material: Valve Flap-Neoprene.
Weight-Cast Iron ASTM A-48,
Class 30

MOTOR: *Design:* ODP, NEMA L-Single Phase
NEMA B - Three Phase Torque Curve,
C-Face, Footed, Squirrel Cage
Induction. Marine Duty Per USCG259
And AIEEE-45, 50°C Ambient
Class B.

Insulation: Single Voltage, 230.
Tri-Voltage, 200-230/460.
SINGLE PHASE: Seal Material., TEFC Motors.
THREE PHASE:
OPTIONAL EQUIPMENT:





TAX BITES

SODA

Although most states require soda consumers to pay sales taxes averaging 6 percent nationally, a number of states impose even higher taxes specifically targeted only at soda. One such state, Arkansas, imposes a 2 cents per 12 ounce soft drink can.

Several states also have "bottle bills" that impose an extra charge on beverage containers to punish people for littering. Sure, you might get your fee back if you turn in your soda cans, but the costs of maintaining the programs is still heaped onto your cost. California's program, for example, costs taxpayers over \$30 million each year just for oversight.

Beyond the costs of the excise taxes and bottle bills, the true cost of taxation includes the producer's federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, local property taxes and any local income taxes.

Depending on where you buy your Diet Coke, the government's share of the cost could run as high as 37.6 percent, or \$.28 for a 75 cent can of soda.

MEALS

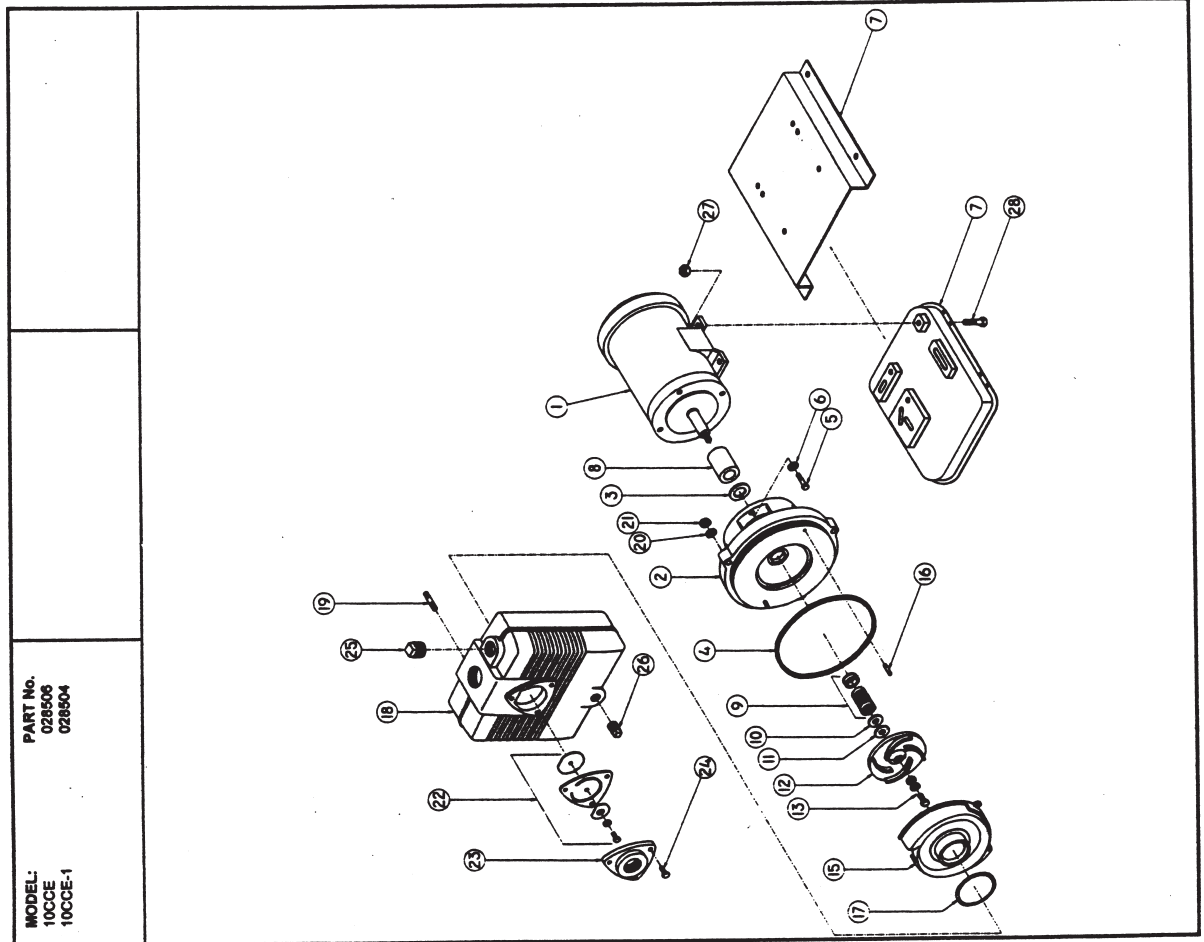
Eating out isn't cheap, but the government doesn't make it any easier to enjoy a meal at your favorite restaurant by imposing extra taxes on it. Because states and municipalities like the idea of taxing tourists, imposing taxes on restaurant meals has most big spenders salivating. In major cities like Chicago, the state and local meals taxes can heap on up to 10.25 percent of your bill.

That is just the first course of taxation. Out of what the consumer pays for the meal, the restaurant must pay federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, state franchise taxes, local property taxes and any local income taxes. Altogether, these taxes can add another \$11.18 onto an average restaurant bill of \$32.32.

This means that in total, a restaurant diner can expect to pay as much as 44.8 percent of the cost of a meal, or \$14.48 to the government.

BARNES®

10CCE & 10CCE-1 SELF-PRIMING PUMPS Electric Drive



PARTS KIT

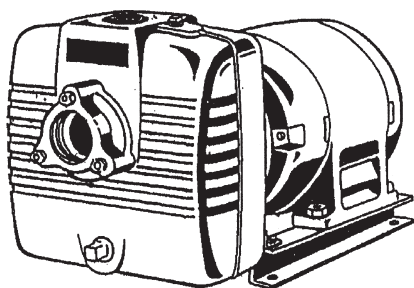
Seal KitP/N: 072920 (†) 3,4,8,9,10,11,16,17,22c

PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Motor - 10CCE	028495
2	1	Motor - 10CCE-1	028494
3	1	Intermediate Coupling	019537
4	1	† Slinger	005163
5	4	† O-Ring	017713
6	4	Cap Screw	002266
7	1	Lock Washer	002808
8	1	Base, 10CCE	073191
9	1	Base, 10CCE-1	027174
10	1	† Shaft Sleeve	018071
11	1	† Shaft Seal	019146
12	A/R	† Shim, .010	001349
13	A/R	† Shim, .031	001348
14	1	Impeller	019775
15	1	Hex Hd Screw	019802
16	2	Washer, Shakerproof	019803
17	1	Volute	019069
18	2	† Pin, Volute	017715
19	1	† Gasket, Volute	019245
20	1	Body	019135
21	3	Stud	016569
22	7	Lock Washer	028408
23	3	Hex Nut	15-23-6
24	1	Check Valve Assy.	017718
25	1	Weight	001338
26	1	1.56" O.D., Cl	001339
27	1	1.56" O.D., Cl	017712
28	1	Neoprene	022333
29	1	1/4" Stainless	023469
30	1	1/4-20 x 625" Lg, Stainless	018100
31	1	Lock Washer	002222
32	1	Round Hd Screw	003208
33	1	Suction Flange	003204
34	3	Cap Screw	15-23-6
35	1	Pipe Plug	002234
36	1	Pipe Plug	
37	4	Hex Nut	
38	4	Hex Hd Screw	

BARNES®

15CCE SELF-PRIMING PUMPS Electric Drive



Model: 15CCE



American Bureau of Shipping
Certificate No.
01-HS238523C/1PDA

Description:

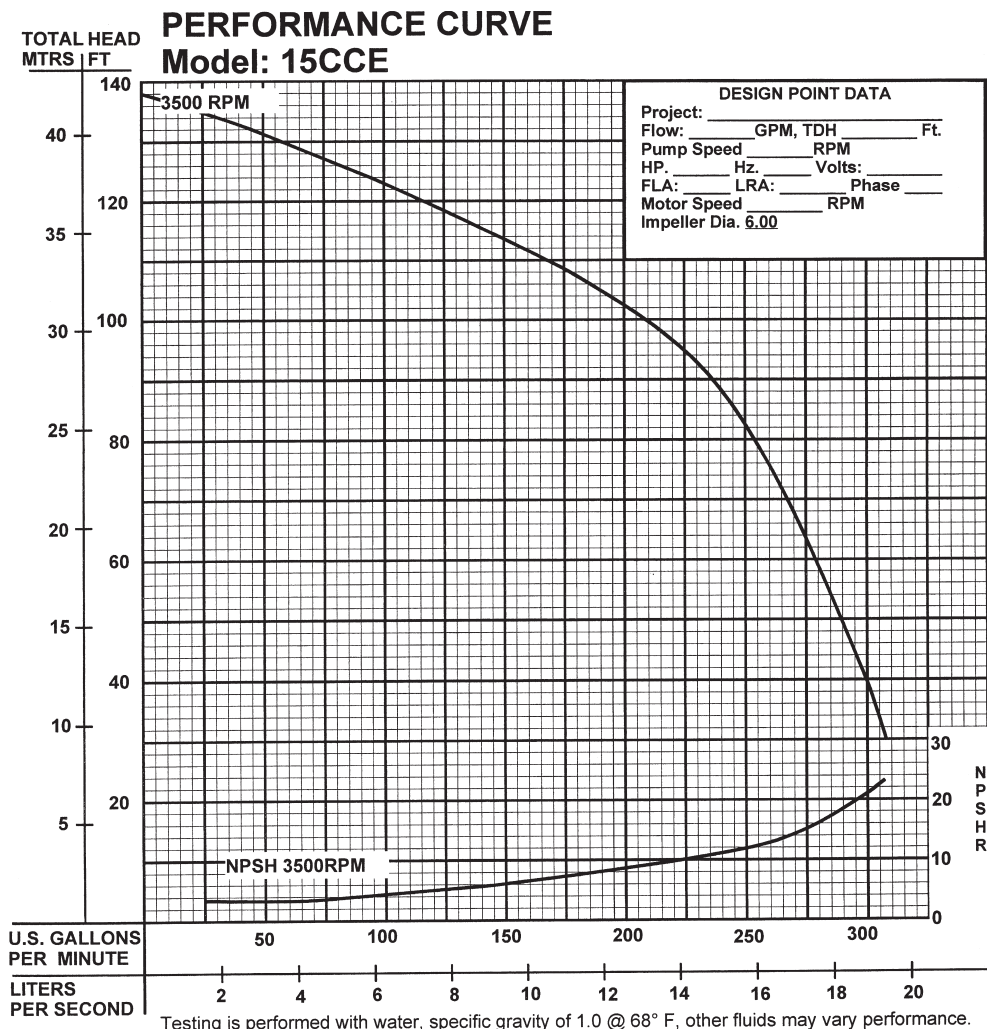
SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

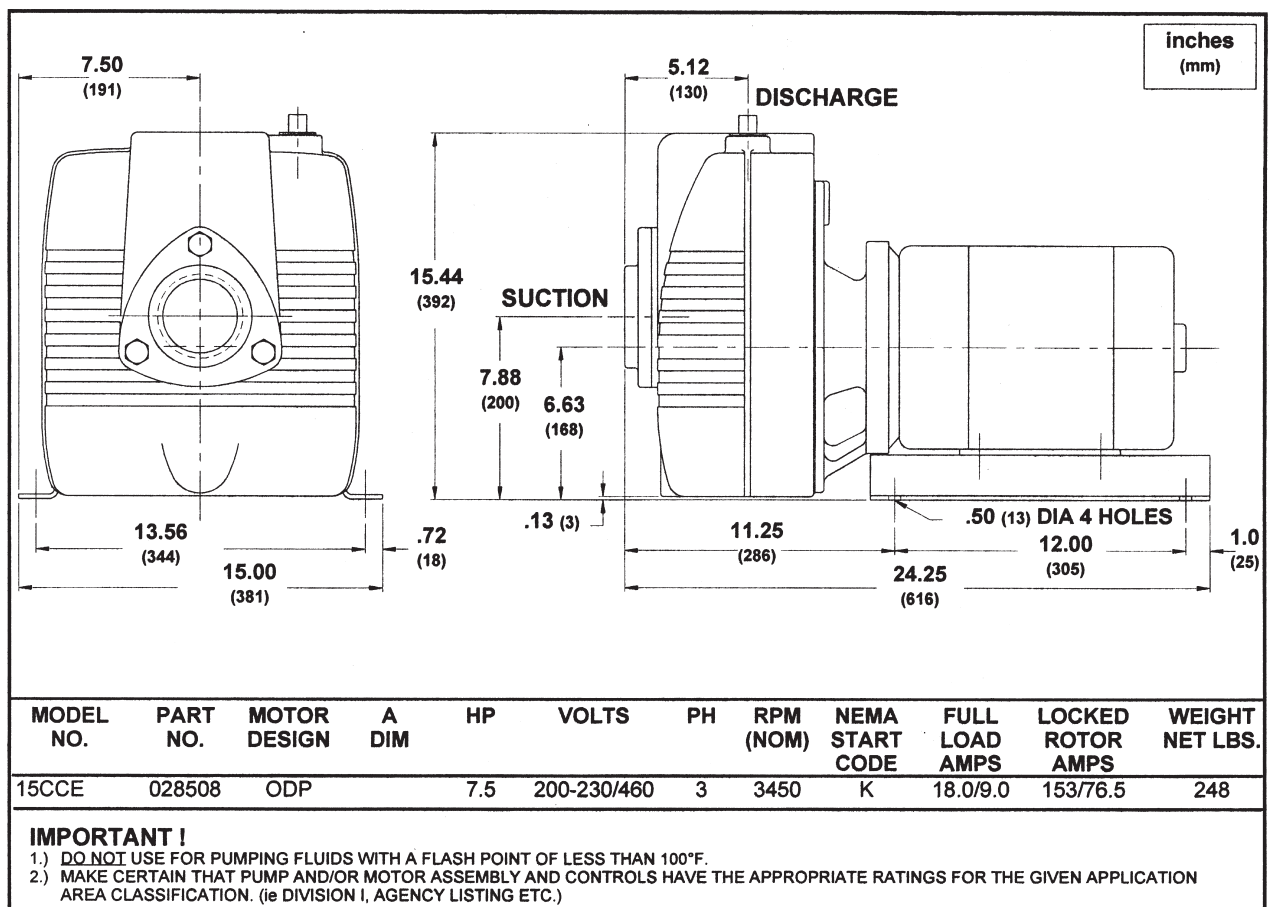
Specifications:

SUCTION/DISCHARGE: 3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
VOLUTE: Cast Iron ASTM A-48, Class 30.
BODY: Cast Iron ASTM A-48, Class 30.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

Design: Open, Trash Type.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.
Stainless Steel
Bronze
Buna-N
Stainless Steel
Air Dry Enamel.
Design: Mechanical
Lubrication: Self-Lubricating
Material: Rotating Face - Carbon
Stationary Face - Ni-Resist
Elastomer - Buna-N
Hardware - 300 Series Stainless

CHECK VALVE: *Material:* Valve Flap-Neoprene.
Weight-Cast Iron ASTM A-48,
Class 30
MOTOR: *Design:* ODP, NEMA B-Three Phase
Torque Curve, C-Face, Footed,
Squirrel Cage Induction.
Marine Duty Per USCG259 And
AIEEE-45, 50°C Ambient
Class B.
Insulation: Tri-Voltage, 200-230/460.
THREE PHASE: Seal Material., TEFC Motors.
OPTIONAL EQUIPMENT:





TAX BITES

TIRES

To pay your taxes, you need to work. To get to work, you need to keep your clunker working. To keep it working, you have to buy some new tires every once in a while. What you don't realize is how much you are paying in taxes when you buy those tires.

Consumers, of course, must pay sales tax on the tires, averaging about 5 percent. They must also pay an additional tax averaging about 1 percent to pay for tire disposal.

Out of what the consumer pays for tires, the producer must pay federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, local property taxes and any local income taxes.

Altogether, these taxes consume about 30 percent of what the consumer pays for a tire. Counting the taxes paid directly by the consumer, this means about 36 percent of the final sales price of a tire goes to the government in taxes.

CARS

Incredibly, the average family pays more in taxes today than for food, clothing and shelter combined. Indeed, you probably don't realize how much you are paying in hidden taxes when you buy such necessities.

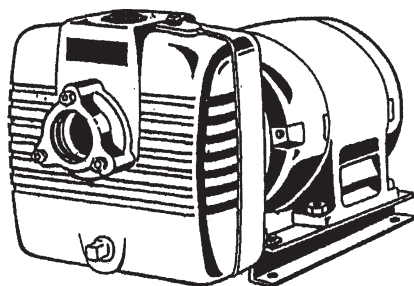
Take the average family car, for example. Cars, of course, are subject to state and local sales tax, averaging 5 percent. Moreover, consumers must also pay a so-called luxury tax of 9 percent on car sales prices over \$34,000.

In addition, after the purchase of a car, in most states the consumer must pay each year a personal property or excise tax, averaging about 3 percent of the annual value of the car. If you keep the car for 5 years, these taxes can amount to 10 percent of what you paid for the car.

Combined with taxes on income, payroll, unemployment insurance, inventory, dealer personal property and other items, total taxes on cars reach 45 percent of the sales price.

BARNES®

20CCE SELF-PRIMING PUMPS Electric Drive



Model: 20CCE



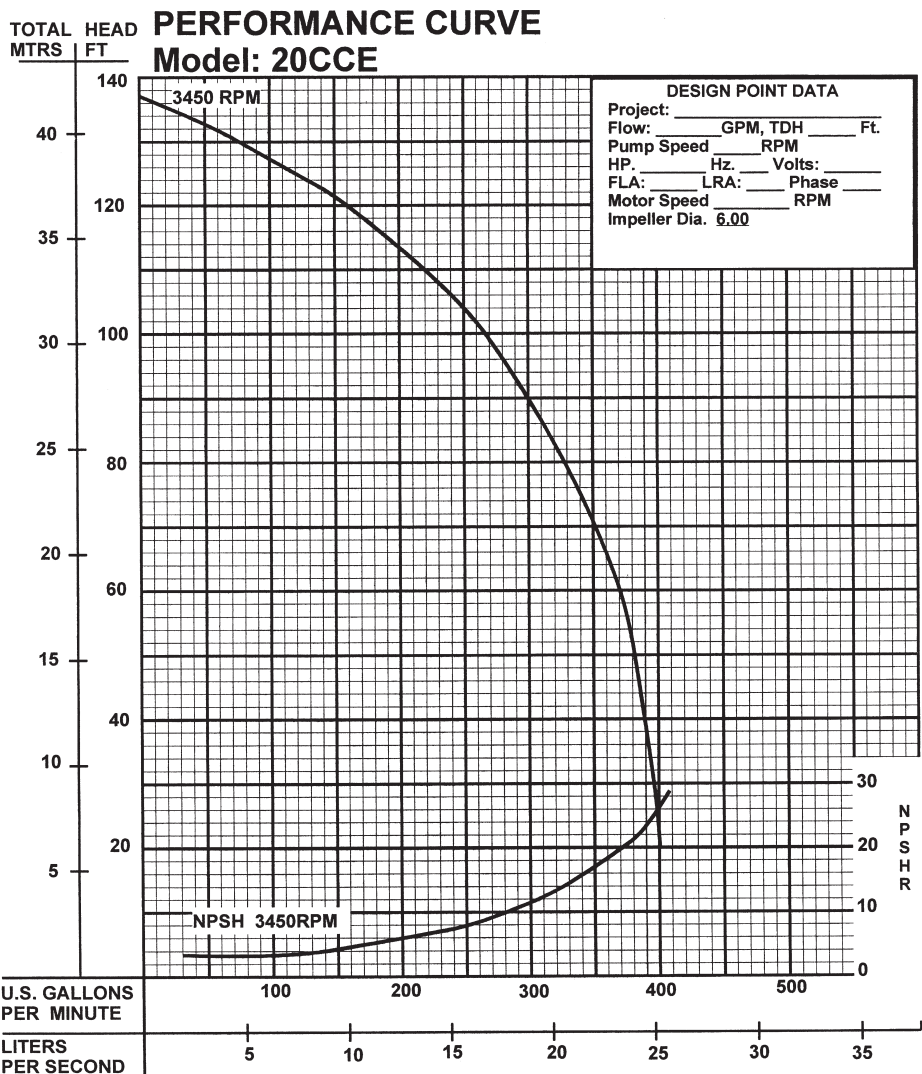
American Bureau of Shipping
Certificate No.
01-HS238523C/1PDA

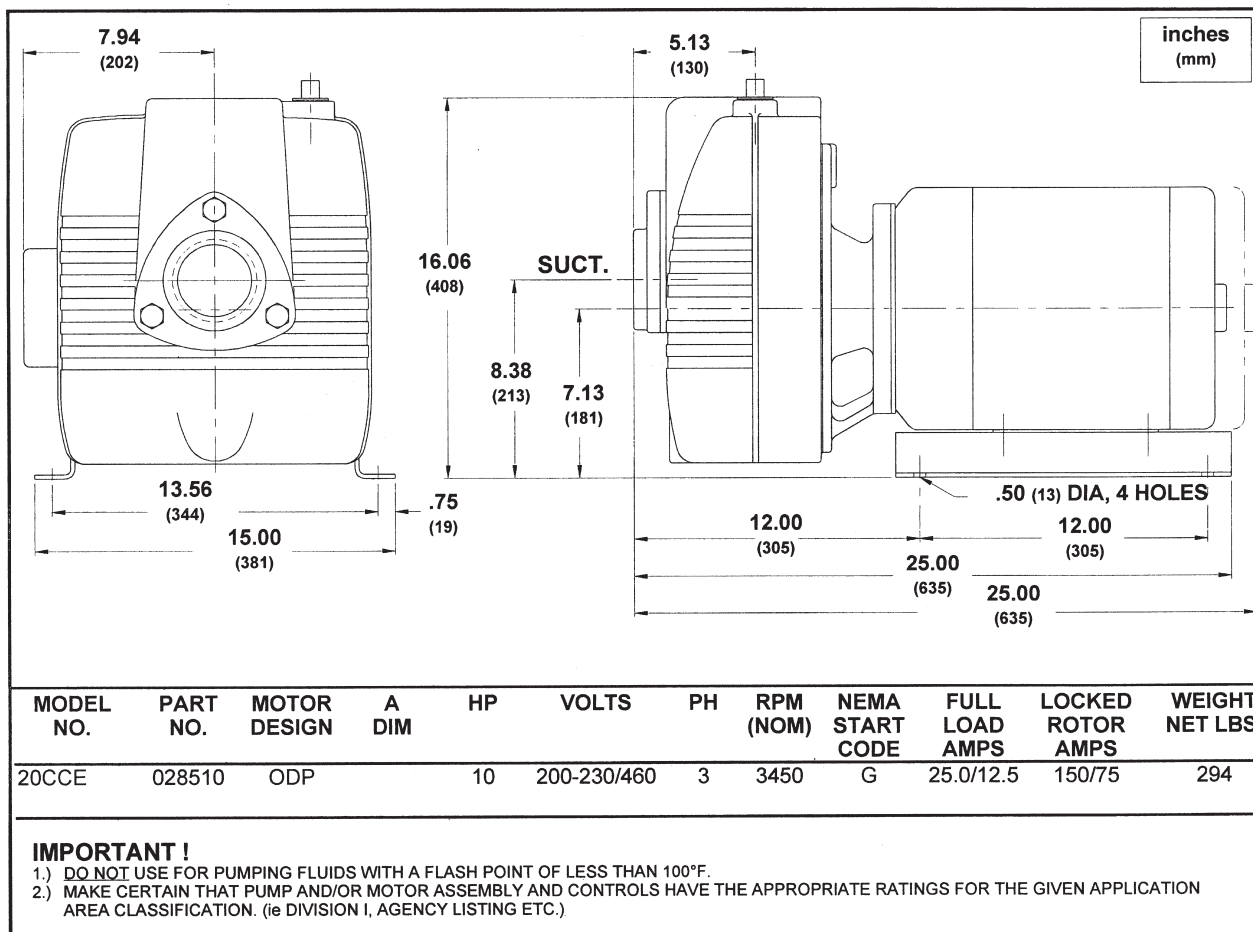
Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

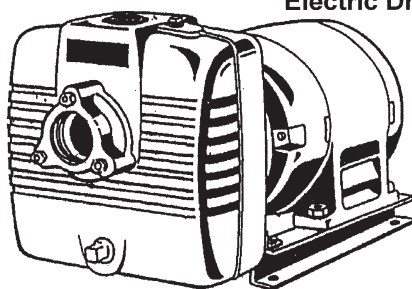
SUCTION/DISCHARGE:	3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
VOLUTE:	Cast Iron ASTM A-48, Class 30.
BODY:	Cast Iron ASTM A-48, Class 30.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	
Design:	Open, Trash Type.
Material:	Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3. Stainless Steel
SHAFT:	Bronze
SHAFT SLEEVE:	Buna-N
SQUARE RINGS:	Stainless Steel
HARDWARE:	Air Dry Enamel.
PAINT:	Mechanical
SEAL:	Design: Self-Lubricating
Lubrication:	Rotating Face - Carbon
Material:	Stationary Face - Ni-Resist Elastomer - Buna-N Hardware - 300 Series Stainless
CHECK VALVE:	
Material:	Valve Flap-Neoprene. Weights-Cast Iron ASTM A-48, Class 30
MOTOR:	Design:
Insulation:	ODP, NEMA B-Three Phase Torque Curve, C-Face, Footed, Squirrel Cage Induction. Marine Duty Per USCG259 And AIEEE-45, 50°C Ambient Class B.
THREE PHASE:	Tri-Voltage, 200-230/460.
OPTIONAL EQUIPMENT:	Seal Material, TEFC Motors.





BARNES®

25CCE SELF-PRIMING PUMPS Electric Drive



Model: 25CCE



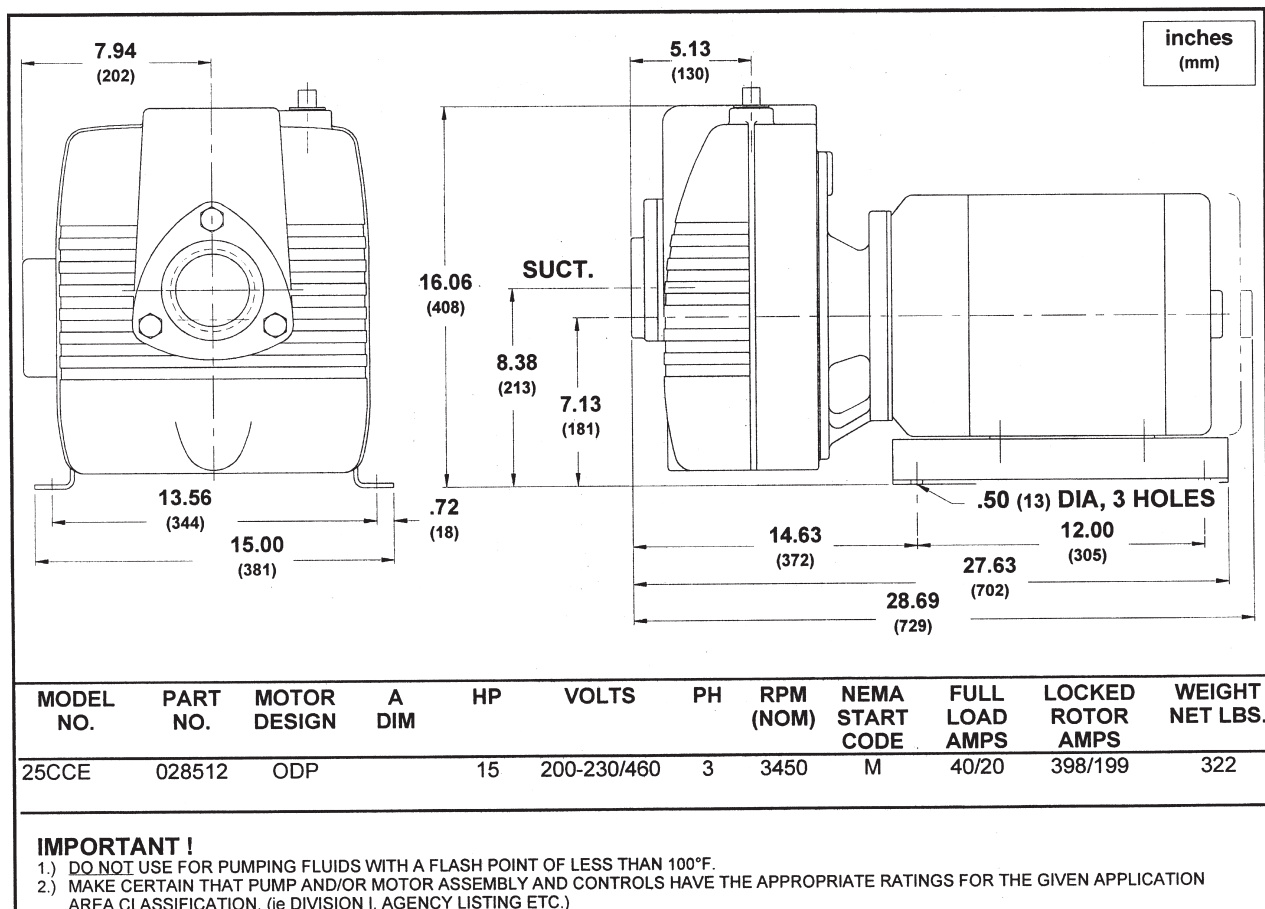
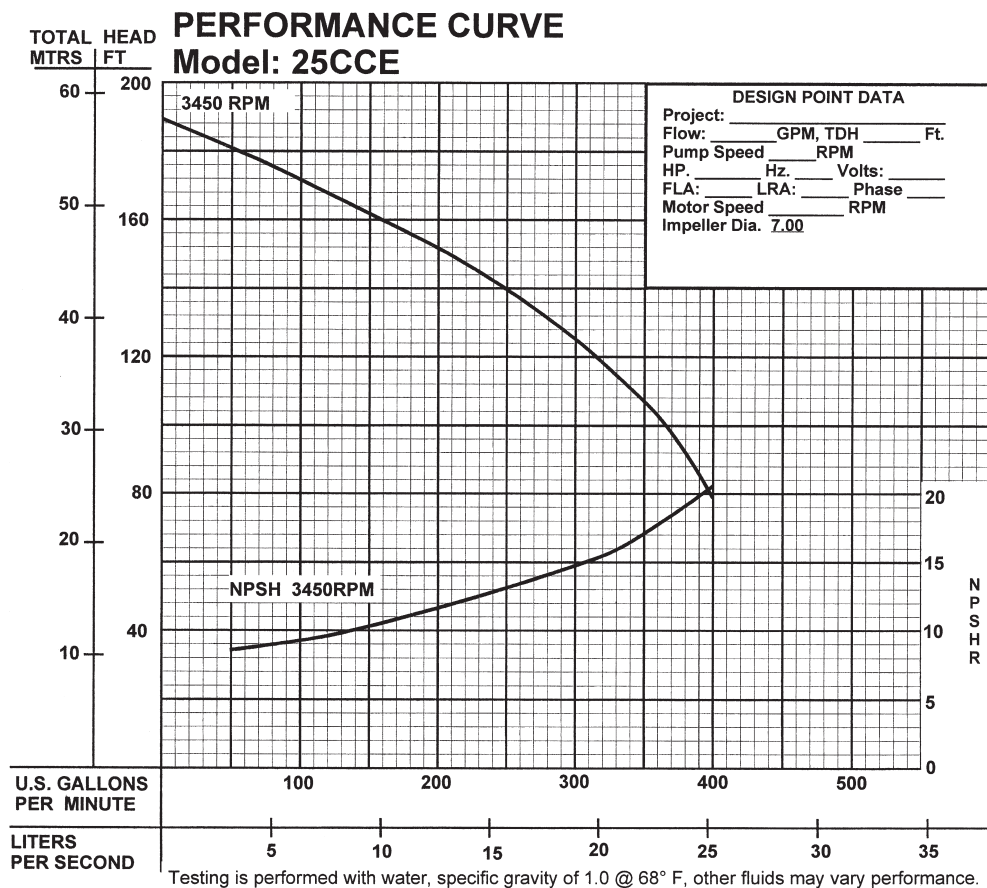
American Bureau of Shipping
 Certificate No.
 01-HS238523C/1PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
 DESIGNED FOR MUNICIPAL AND
 INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE:	3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
VOLUTE:	Cast Iron ASTM A-48, Class 30.
BODY:	Cast Iron ASTM A-48, Class 30.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	
<i>Design:</i>	Open, Trash Type.
<i>Material:</i>	Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3.
SHAFT:	Stainless Steel
SHAFT SLEEVE:	Bronze
SQUARE RINGS:	Buna-N
HARDWARE:	Stainless Steel
PAINT:	Air Dry Enamel.
SEAL:	
<i>Design:</i>	Mechanical
<i>Lubrication:</i>	Self-Lubricating
<i>Material:</i>	Rotating Face - Carbon Stationary Face - Ni-Resist Elastomer - Buna-N Hardware - 300 Series Stainless
CHECK VALVE:	
<i>Material:</i>	Valve Flap-Neoprene. Weights-Cast Iron ASTM A-48, Class 30
MOTOR:	
<i>Design:</i>	ODP, NEMA B-Three Phase Torque Curve, C-Face, Footed, Squirrel Cage Induction. Marine Duty Per USCG259 And AIEEE-45, 50°C Ambient Class B.
<i>Insulation:</i>	
THREE PHASE:	Tri-Voltage, 200-230/460.
OPTIONAL EQUIPMENT:	Seal Material, TEFC Motors.



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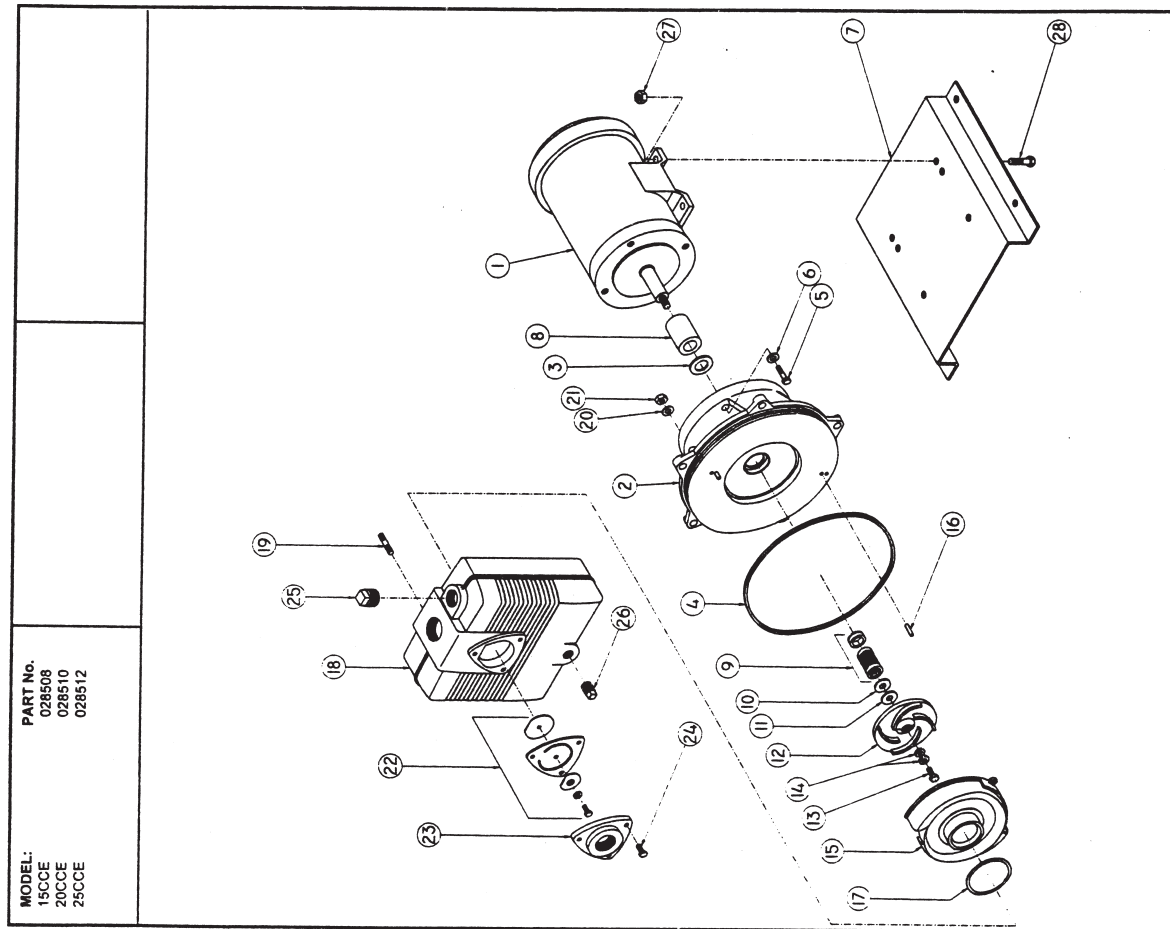
SERIES; 15CCE, 20CCE, 25CCE

PARTS KIT

Seal Kit P/N: 072918 (†) 3,4,8,9,10,11,16,17,22b

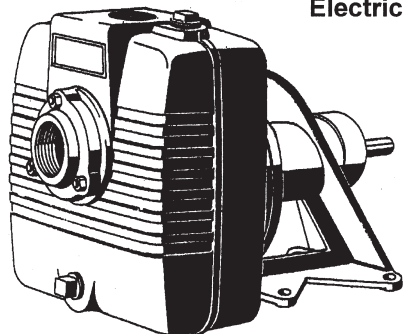
PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Motor - 15CCE	028496
2	1	Motor - 20CCE	028497
3	1	Motor - 25CCE	028498
4	1	Intermediate Coupling	019553
5	1	† Slinger	005163
6	4	† O-Ring	018386
7	4	Cap Screw	002266
8	4	Lock Washer	002608
9	1	Base, 15CCE	027174
10	1	Base, 20CCE, 25CCE	027352
11	1	† Shaft Sleeve	018071
12	1	† Shaft Seal	019146
13	A/R	† Shim, .010	001349
14	A/R	† Shim, .031	001348
15	1	Impeller, 15CCE	090053TB
16	1	Impeller, 20CCE	090050TB
17	1	Impeller, 25CCE	051102
18	1	Hex Hd Screw	019802
19	1	Washer, Shakerproof	019803
20	2	Washer, 25CCE Only	070089
21	1	Volute, 15CCE, 20CCE	018883
22	1	Volute, 25CCE	019102
23	2	† Pin, Volute	018388
24	1	† Gasket, Volute	019042
25	1	Body	016409
26	1	Stud	002608
27	3	Lock Washer	028173
28	3	Hex Nut	018387
29	1	Check Valve Assy.	001588
30	1	Weight	018008
31	1	† Gasket	022333
32	1	Lock Washer	1-7-1
33	1	Hex Hd Screw	15-5-1
34	1	Hex Nut	067500
35	1	Weight	018884
36	1	Suction Flange, 15CCE	Q15-1-E26
37	3	Cap Screw	1.00 NPT
38	1	Pipe Plug	003205
39	1	Pipe Plug	003205
40	4	Hex Nut	15-23-6
41	4	Hex Hd Screw	002234



BARNES®

5CU-1 SELF-PRIMING PUMPS Electric Drive



Model: 5CU-1



American Bureau of Shipping
Certificate No.
01-HS238523E/1-PDA

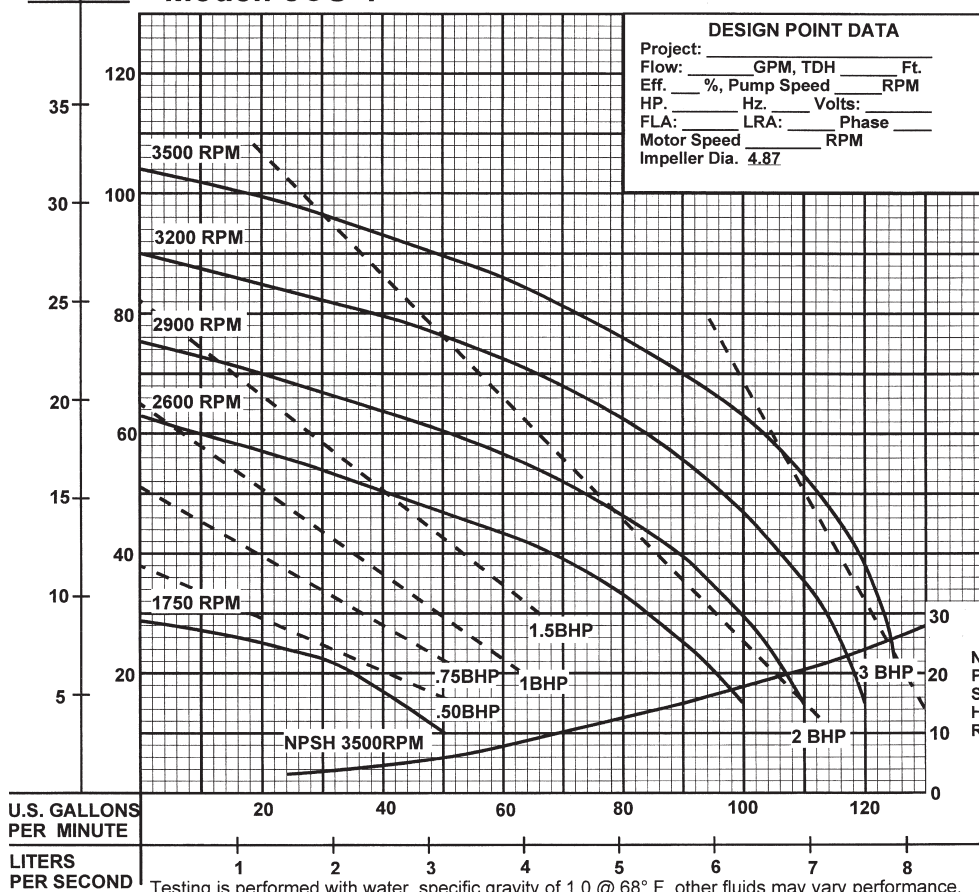
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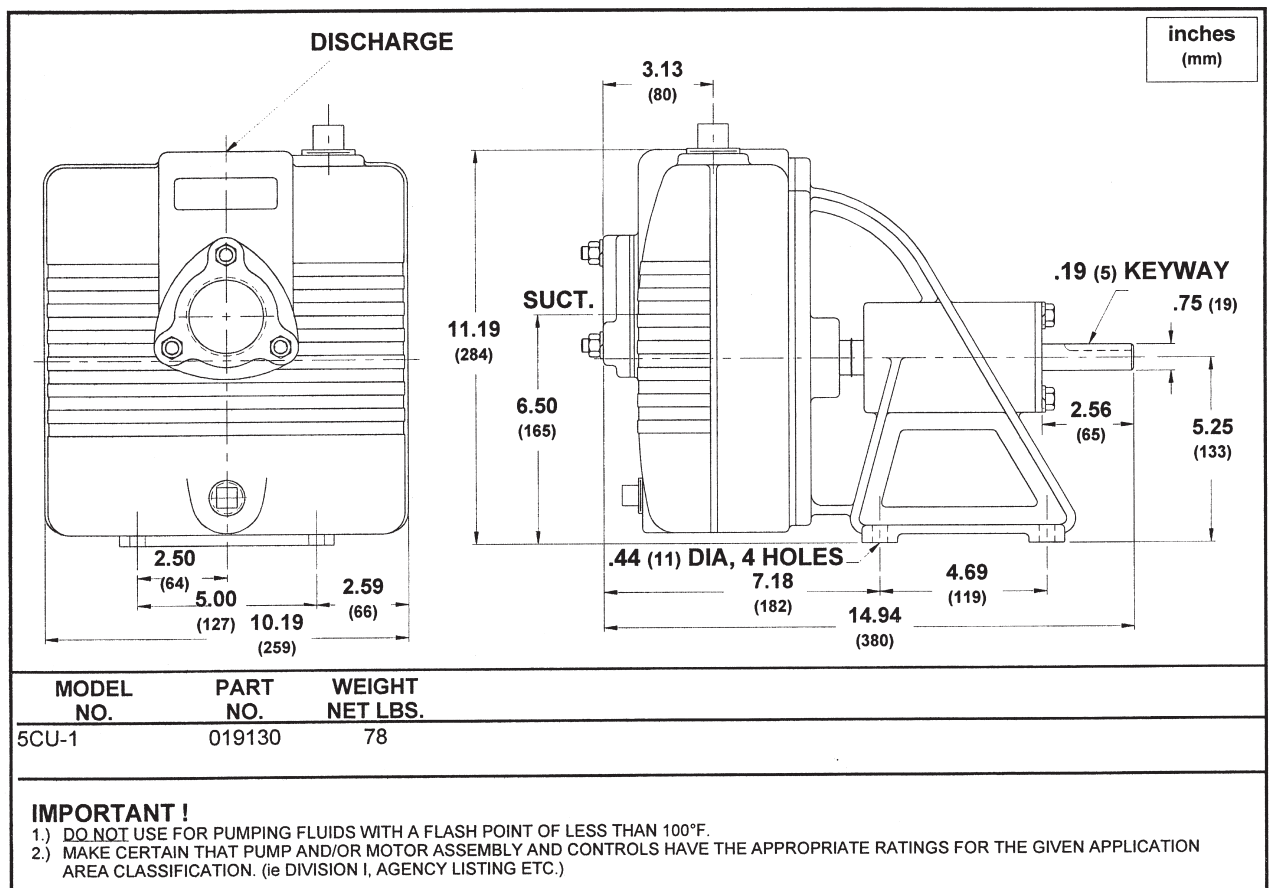
SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE:	1-1/2" (38mm) x 1-1/2" (38mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
VOLUTE:	Cast Iron ASTM A-48, Class 30.
	Removable.
BODY:	Cast Iron ASTM A-48, Class 30.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	Design: Open, Trash Type. Material: Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3.
SHAFT:	Stainless Steel
SQUARE RINGS:	Buna-N
HARDWARE:	Stainless Steel
PAINT:	Air Dry Enamel.
SEAL:	Design: Mechanical Lubrication: Self-Lubricating Material: Rotating Face - Carbon Stationary Face - Ceramic Elastomer - Buna-N
BEARING-PUMP END:	Hardware - 300 Series Stainless Design: Single Row, Ball Lubrication: Grease Load: Radial
BEARING-DRIVE END:	Design: Single Row, Ball Lubrication: Grease Load: Radial
CHECK VALVE:	Material: Valve Flap-Neoprene. Weight-Cast Iron ASTM A-48, Class 30
OPTIONAL EQUIPMENT:	Seal Material; Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor Adjusting Base & OSHA Guard.

PERFORMANCE CURVE Model: 5CU-1





TAX BITES

HOTEL STAYS

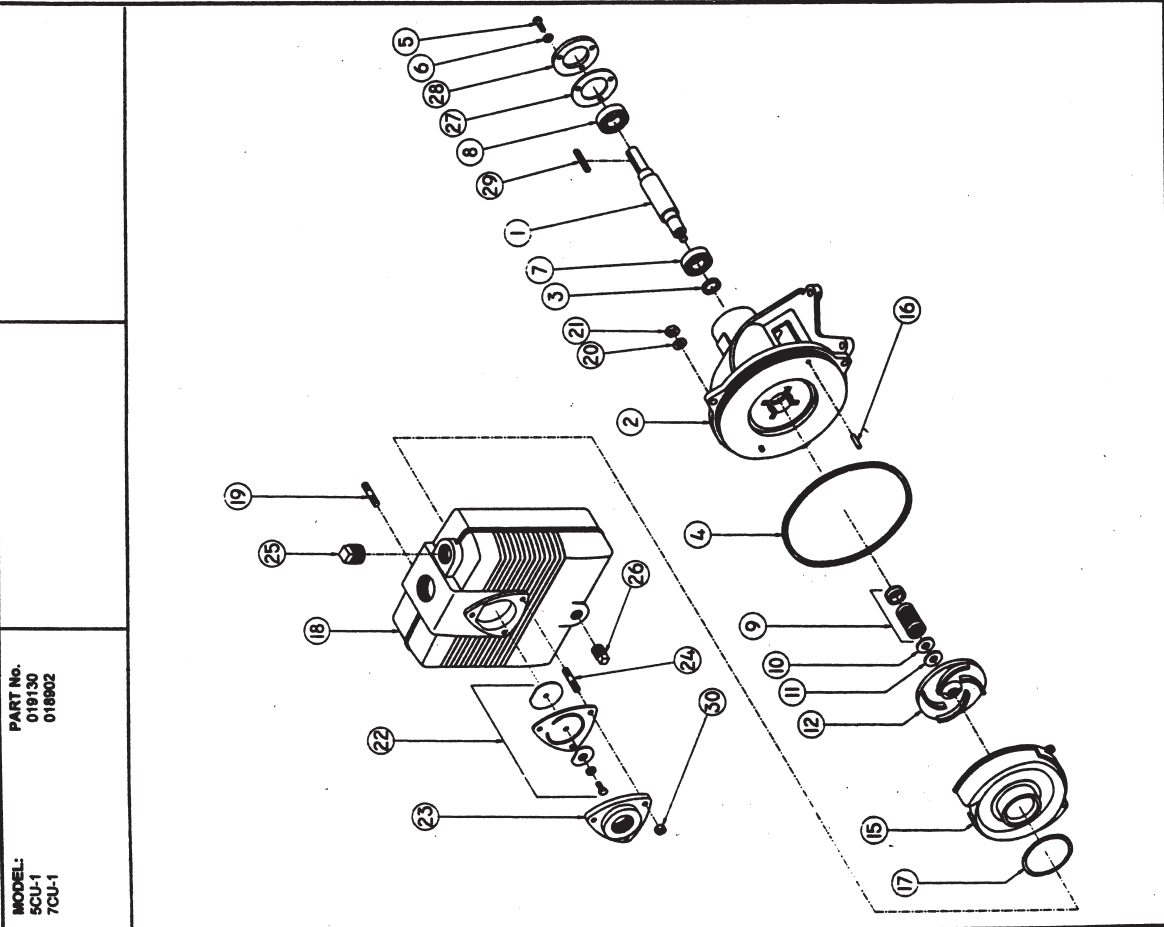
Because Uncle Sam seems to be able to follow you everywhere, it shouldn't surprise you that after paying taxes on the airline ticket that got you to your favorite vacation destination, you'll have to pay more taxes for a room at a hotel.

Your bill when you check out includes not only sales taxes, but also local occupancy taxes that could tack on up to 15.4 percent if you're staying in Chicago. That's about \$15 of an average hotel bill of \$97.06.

But don't forget—hotels pay taxes too. Out of what the consumer pays to the hotel, the hotel must cover costs for federal and state income taxes, federal payroll taxes, sales taxes, capital gains taxes, unemployment insurance taxes, workmen's compensation taxes, business license taxes and fees, utility taxes, local property taxes, and any local income taxes. The hotel must also pay federal and state excise taxes on its telephones. These taxes add another \$33.58 to the average cost of a hotel room.

Nearly half of the cost of a hotel room, or as much as 50 percent, pays for taxes. For an average one night stay costing \$97.06, this means that up to \$48.53 goes straight to the government.

5CU-1 SELF-PRIMING PUMPS Electric Drive



PARTS KIT

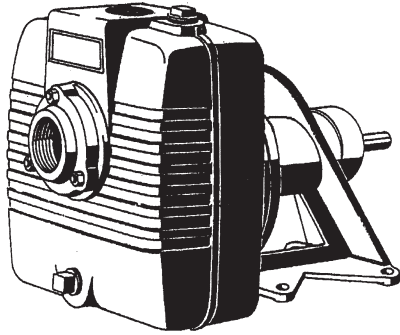
Seal Kit P/N: 021814 (†) 3,4,9,10,11,16,17,22B.

PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Shaft	018874
2	1	Pedestal	017805
3	1	† Slinger	018876
4	1	† O-Ring	017713
5	3	Hex Hd Screw	002201
6	3	Lockwasher	002801
7	1	Bearing	017807
8	1	† Shaft Seal	017807
9	1	† Shim, .010	018873
10	1	† Shim, .005	017084
11	1	†	017109
12	1	Impeller	018094
15	1	Volute	018095
16	2	† Volute Pin	017715
17	1	† Volute Gasket	017714
18	1	Body	018097
19	3	Stud	023723
20	3	Lock washer	018824
21	3	Hex Nut	018826
22	1	Check Valve Assy	15-23-1
22A	1	Weight	017718
22B	1	† Gasket	001338
22C	1	Lock Washer	017712
22D	1	Round Hd Screw	022333
22E	1	Weight	023469
23	1	Suction Flange	1/4-20 x .625" Lg, Stainless
24	3	Stud, 5CU-1	1.58" O.D.
25	1	Stud, 7CU-1	5CU-1
26	1	Pipe Plug	7CU-1
27	3	Pipe Plug	3/8-16 x 1.50" Lg, Stainless
28	1	Shim	3/8", Stainless
29	1	Bearing Cap	3/8-16, Stainless
30	3	Hex Nut	2.50" O.D.

BARNES®

10ICU-1 SELF-PRIMING PUMPS Electric Drive



Model: 10ICU-1



American Bureau of Shipping
Certificate No.
01-HS238523E/1-PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE: 2" (51mm) x 2" (51mm) NPT, Female.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
VOLUTE: Cast Iron ASTM A-48, Class 30.
REMOVABLE: Removable.
BODY: Cast Iron ASTM A-48, Class 30.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

Design: Open, Trash Type.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.

SHAFT: Stainless Steel
SHAFT SLEEVE: Stainless Steel
SQUARE RINGS: Buna-N
HARDWARE: Stainless Steel
PAINT: Air Dry Enamel.

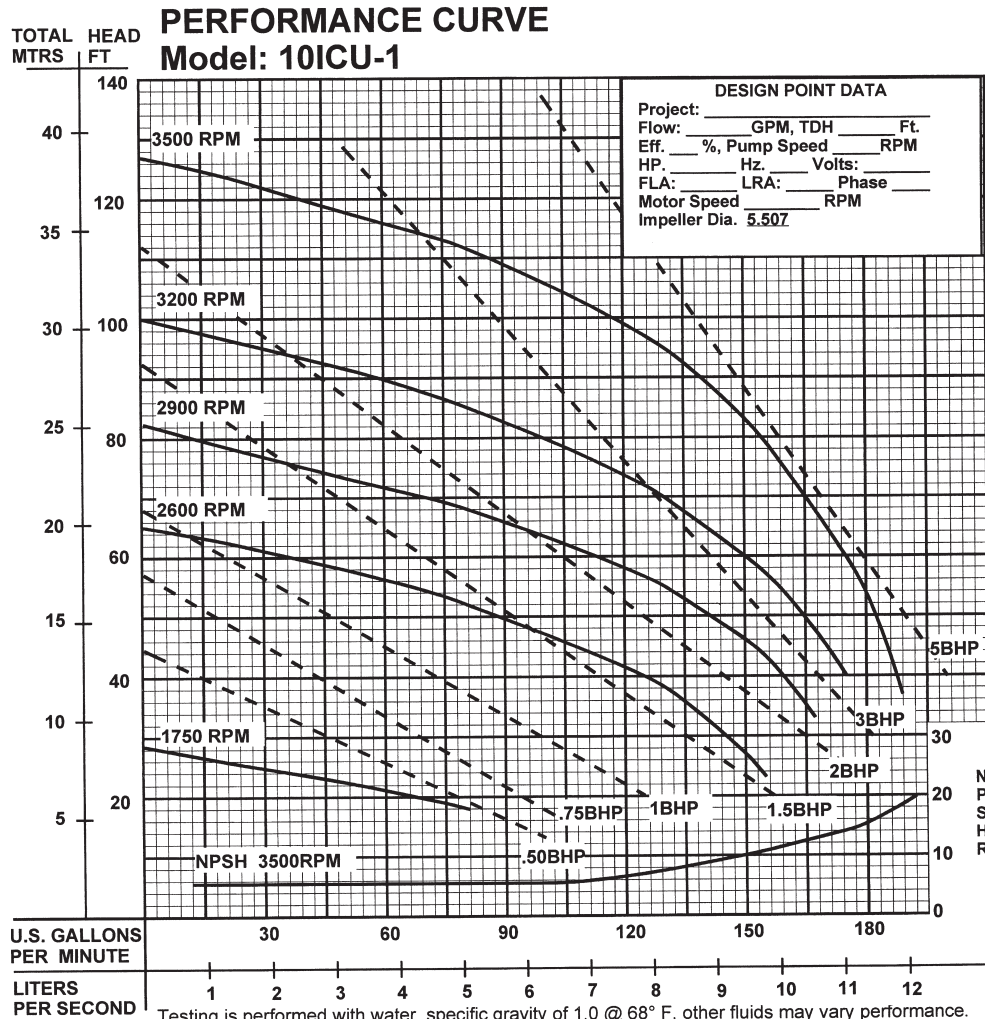
SEAL: *Design:* Single Mechanical with Lip Seal
Lubrication: Grease
Material: Rotating Face - Carbon
Stationary Face - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

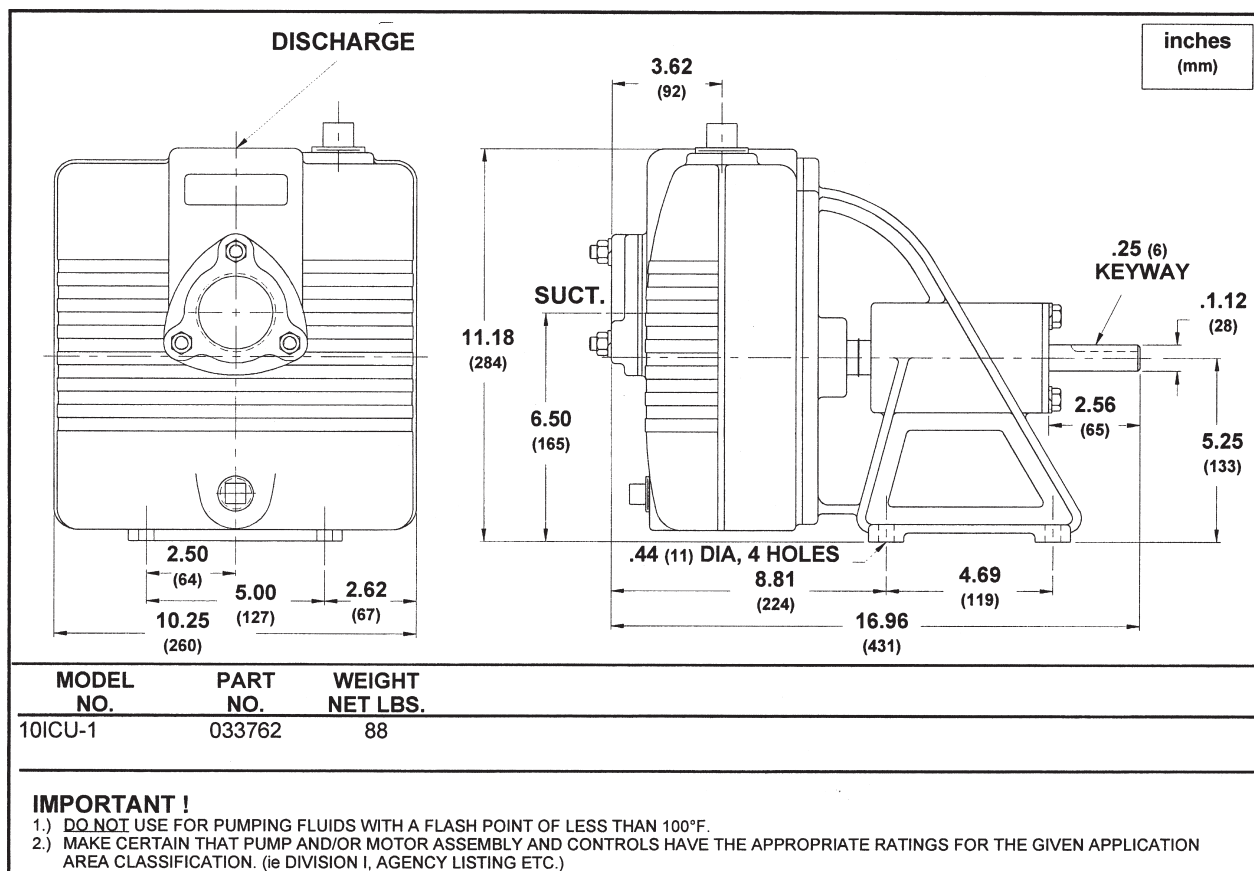
BEARING-PUMP END: *Design:* Single Row, Ball
Lubrication: Grease
Load: Radial

BEARING-DRIVE END: *Design:* Single Row, Ball
Lubrication: Grease
Load: Radial

CHECK VALVE: *Material:* Valve Flap-Neoprene.
Weight-Cast Iron ASTM A-48,
Class 30

OPTIONAL EQUIPMENT: Seal Material, Flex Coupled Assy. with
Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt
Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor
Adjusting Base & OSHA Guard.





TAX BITES ELECTRICITY

Government sees your electric power bill as something you cannot avoid, and they're right, of course. They love to impose taxes on it. In addition to sales taxes, states impose gas import taxes or other surcharges on your bill. As a result, on average 11.2 percent of what you pay for your electric power bill goes to state governments for these taxes alone.

For the average customer, this adds up to about \$206 per year. But that's only the beginning. Of the remaining funds you pay for the utility, roughly another \$266 per year on average goes for taxes as well.

Consequently, about one-fourth of what you pay for your electric bill goes to the government in taxes rather than for the electricity.

For the average customer, this amounts to about \$472 per year. Overall, the government collects almost \$50 billion per year on taxes paid through your electric bill alone.

(Note: If the Senate were to ratify the proposed Global Warming Treaty advocated by former Vice President Al Gore, many experts believe that the above numbers would be more than doubled.)

LANDLINE PHONES

In today's high-tech world, consumers have a wide range of choices for their voice services. Where there used to only be a landline phone, there are now cell phones, Voice over Internet Protocol (VoIP) services, and cable digital voice services. Recently the Beacon Hill Institute of Massachusetts surveyed 59 US cities and came up with average taxes paid for a wide variety of telecommunications services.

According to their study, consumers pay 17.23 percent of their average monthly landline (traditional) phone bill in taxes and fees. With monthly bills estimated at \$49.33, you pay \$8.50 for a landline phone.

These numbers take into account phone-specific taxes like the federal Universal Service Fund, the 911 tax, the city telecom taxes, TDD (deaf tax), and state universal service.

However, what the Beacon Hill study does not take into account are costs for federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, local property taxes and any local income taxes. Altogether, these taxes dial up the actual "bite" to \$25.55 for a landline phone.

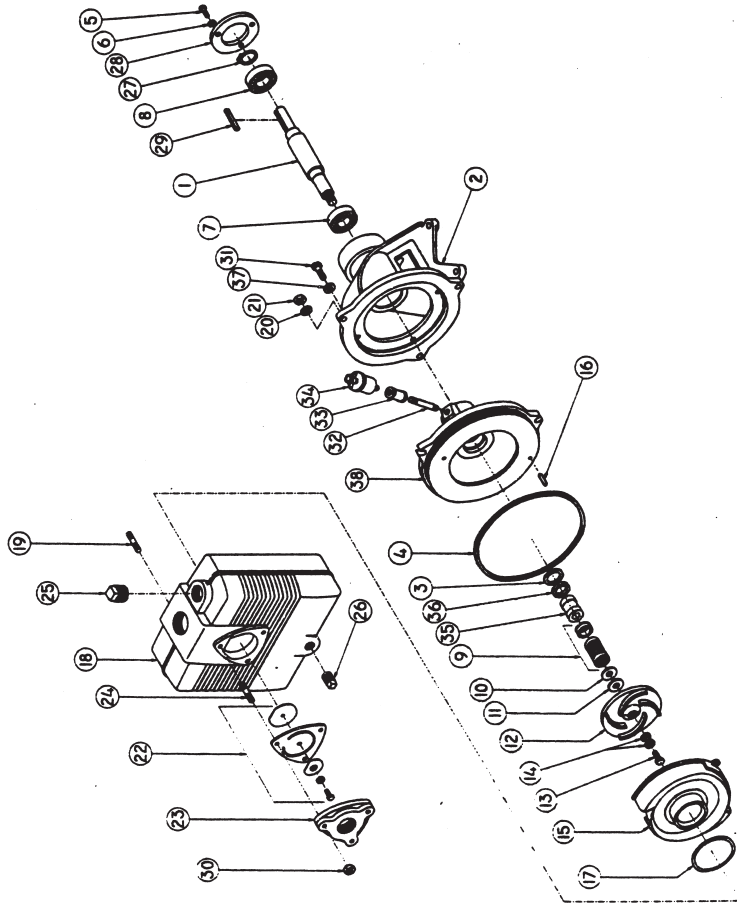
When added to the taxes and fees paid directly by the consumer, a total of 51.8 percent of a traditional phone bill actually pays for government taxes and fees.

BARNES®

10ICU-1 SELF-PRIMING PUMPS Electric Drive

PARTS LIST

ITEM	QTY.	DESCRIPTION		PART No.
1	1	Shaft	Stainless	033756
2	1	Pedestal		019843
3	1	Slinger	Buna-N	005163
4	1	O-Ring		017713
5	3	Hex Hd Screw	10-32 x 50" Lg, Zp	019842
6	3	Lockwasher	#10 Steel	002618
7	1	Bearing		019846
8	1	Bearing		019847
9	1	Shaft Seal	C/CEN	022197
10	1	Shim, .010		001349
11	1	Shim, .031		001348
12	1	Impeller	4.87" Dia	033759
13	1	Hex Hd Screw	1/2-20 x 1.00" Lg, Stainless	019802
14	2	Shakeproof Washer	1/2" Stainless	019803
15	1	Volute		019059
16	2	Volute Pin		017715
17	1	Volute Gasket		019245
18	1	Body		019135
19	3	Stud	3/8-16 x 2.00" Lg, Stainless	033824
20	3	Lock washer	3/8", Stainless	019826
21	3	Hex Nut	3/8-16, Stainless	15-23-1
22	1	Check Valve Assy		017718
22A	1	Weight	2.50" O.D.	001338
22B	1	Gasket	Neoprene	017712
22C	1	Lock Washer	1/4" Stainless	022333
22D	1	Round Hd Screw	1/4-20 x .625" Lg, Stainless	023469
22E	1	Weight	1.56" O.D.	001339
23	1	Suction Flange		019100
24	3	Stud	5/16-18 x 2.25" Lg, Stainless	019825
25	1	Pipe Plug	1.25" NPT	003206
26	1	Pipe Plug	1.75" NPT	019851
27	1	Snap Ring		019851
28	1	Bearing Cap		019845
29	3	Key	1/4 Sq. x 1.25" Lg	021092
30	3	Hex Nut	5/16-18, Stainless	15-19-1
31	4	Hex Hd Screw	5/16-18 x 1.00", Stainless	1-156-1
32	1	Pipe Nipple	.25" NPT	003263
33	1	Coupling	.25" NPT	003226
34	1	Grease Cup		001684
35	1	Shaft Sleeve	Stainless	033757
36	1	Lip Seal		026308
37	4	Lock Washer	5/16 Stainless	026322
38	1	Seal Plate		033727

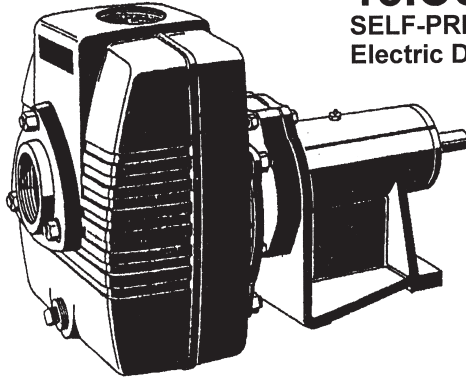


MODEL:
10ICU-1

PART No.
033762

BARNES®

15ICU-1 SELF-PRIMING PUMPS Electric Drive



Models: 15 ICU-1



American Bureau of Shipping
Certificate No.
01-HS238523E/1-PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE: 3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
VOLUTE: Cast Iron ASTM A-48, Class 30.
Removable.

BODY: Cast Iron ASTM A-48, Class 30.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

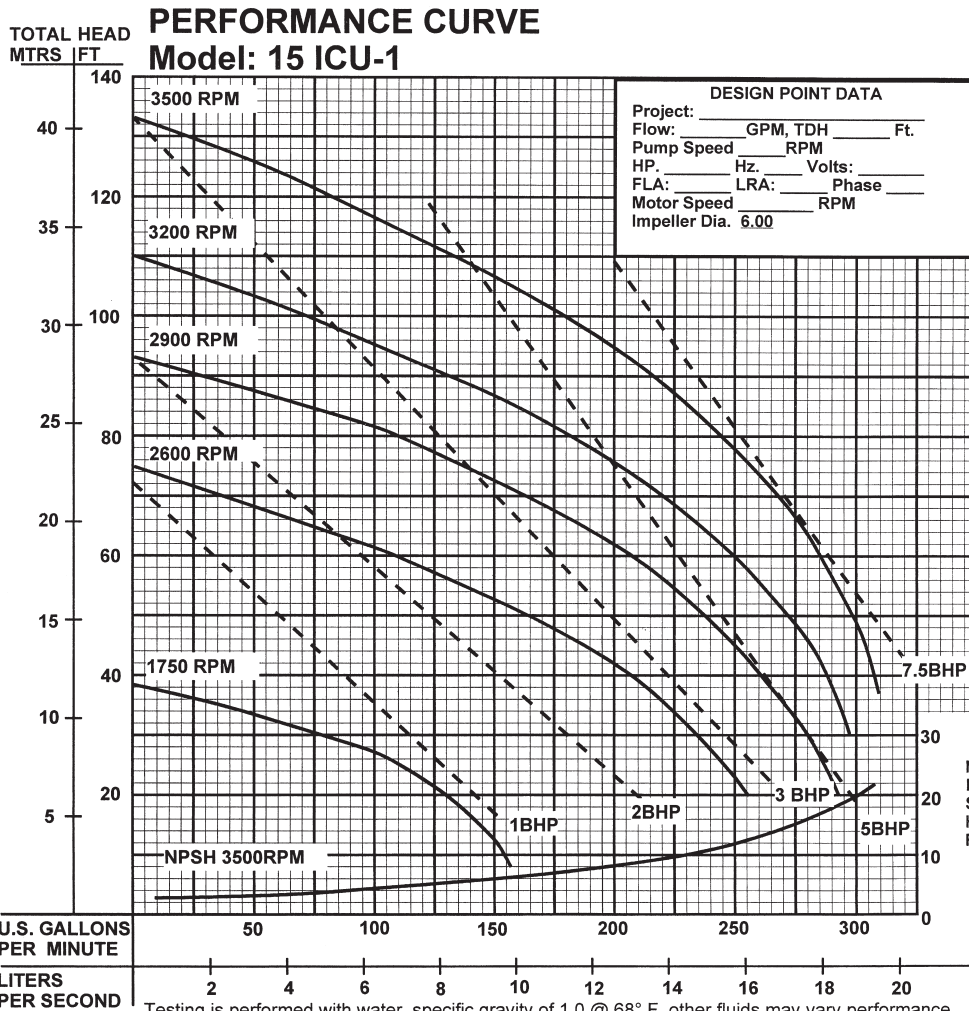
Design: Open, Trash Type.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.
Stainless Steel
Buna-N
Stainless Steel
Air Dry Enamel
Design: Single Mechanical with Lip Seal
Lubrication: Oil
Material: Rotating Face - Carbon
Stationary Face - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

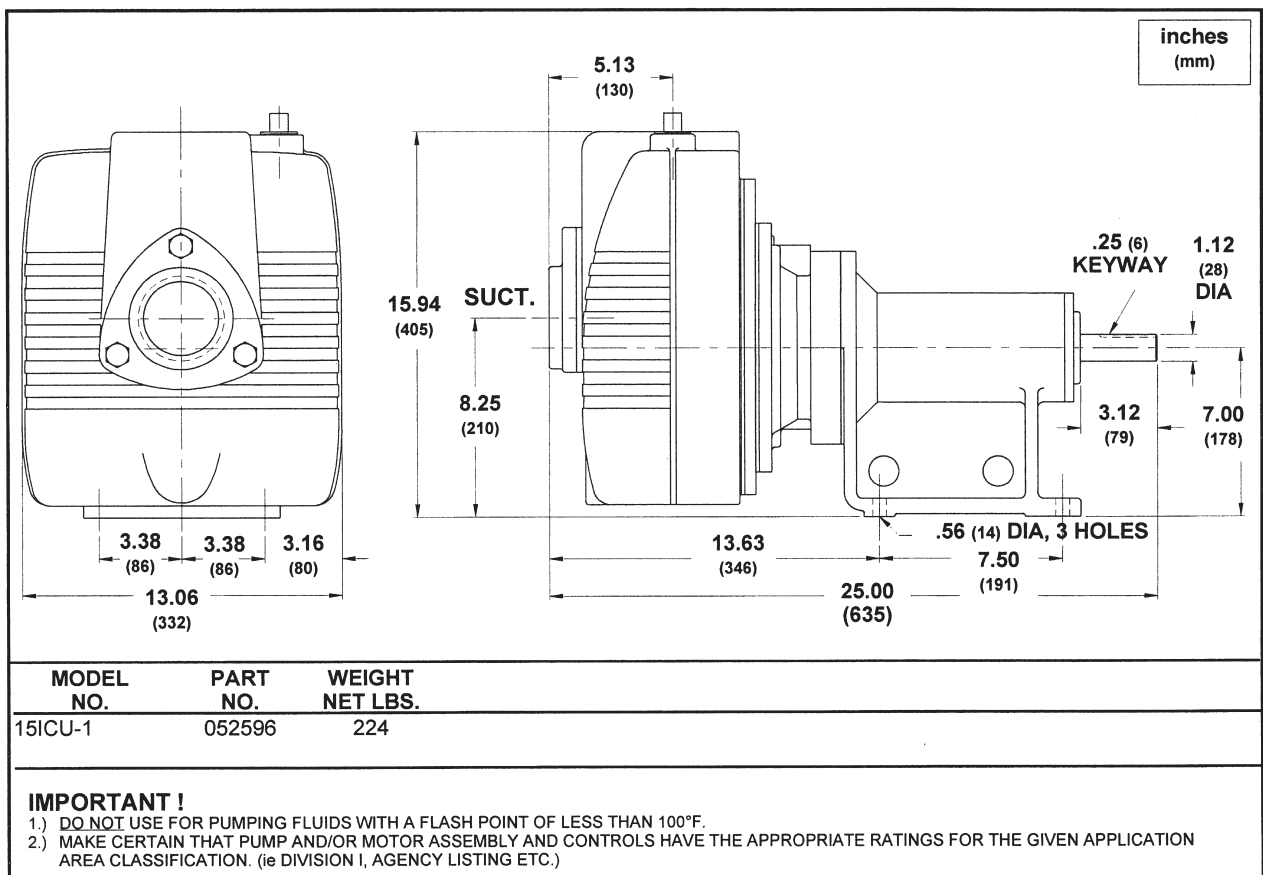
BEARING-PUMP END:
Design: Single Row, Ball
Lubrication: Grease
Load: Radial

BEARING-DRIVE END:
Design: Single Row, Ball
Lubrication: Grease
Load: Radial

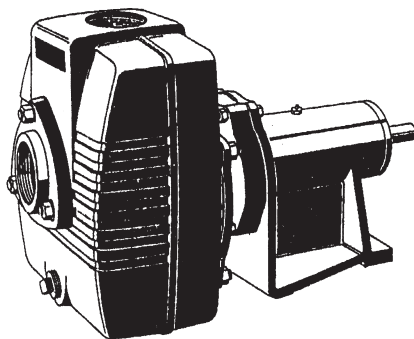
CHECK VALVE:
Material: Valve Flap-Neoprene.
Weight-Cast Iron ASTM A-48,
Class 30

OPTIONAL EQUIPMENT: Seal Material, Flex Coupled Assy. with
Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt
Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor
Adjusting Base & OSHA Guard.





20 ICU-1 SELF-PRIMING PUMPS Universal Drive



Models: 20 ICU-1



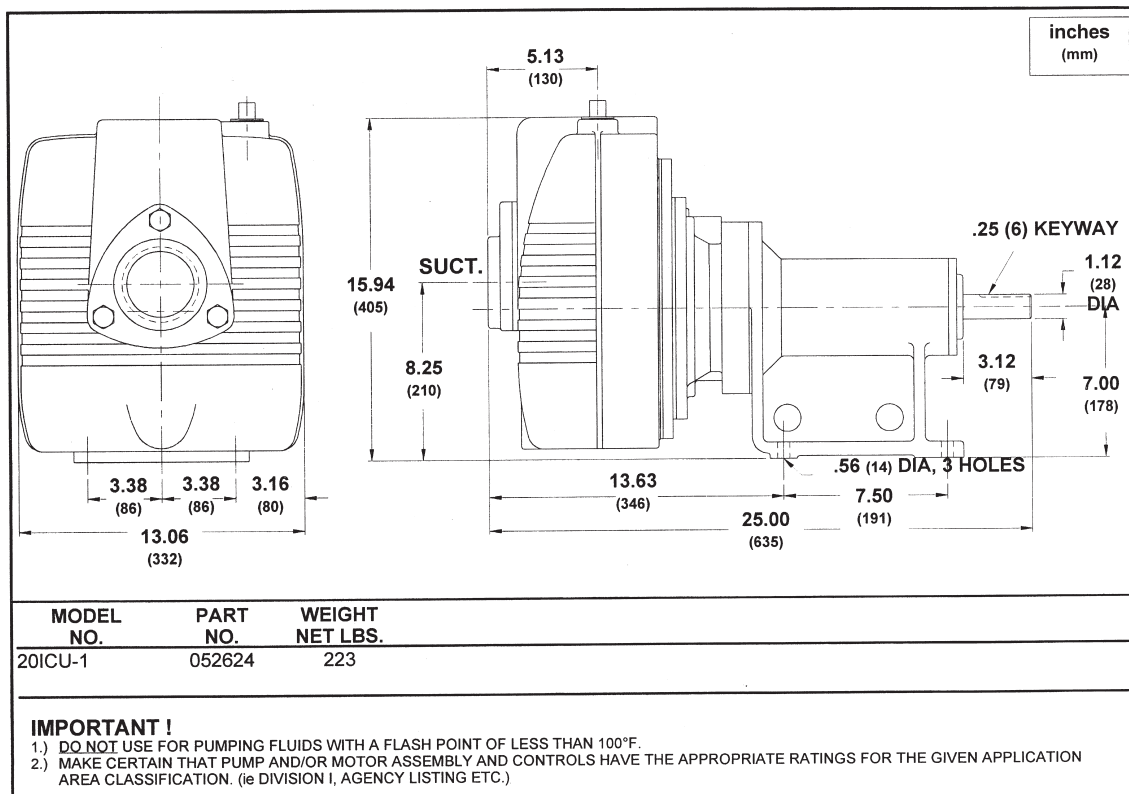
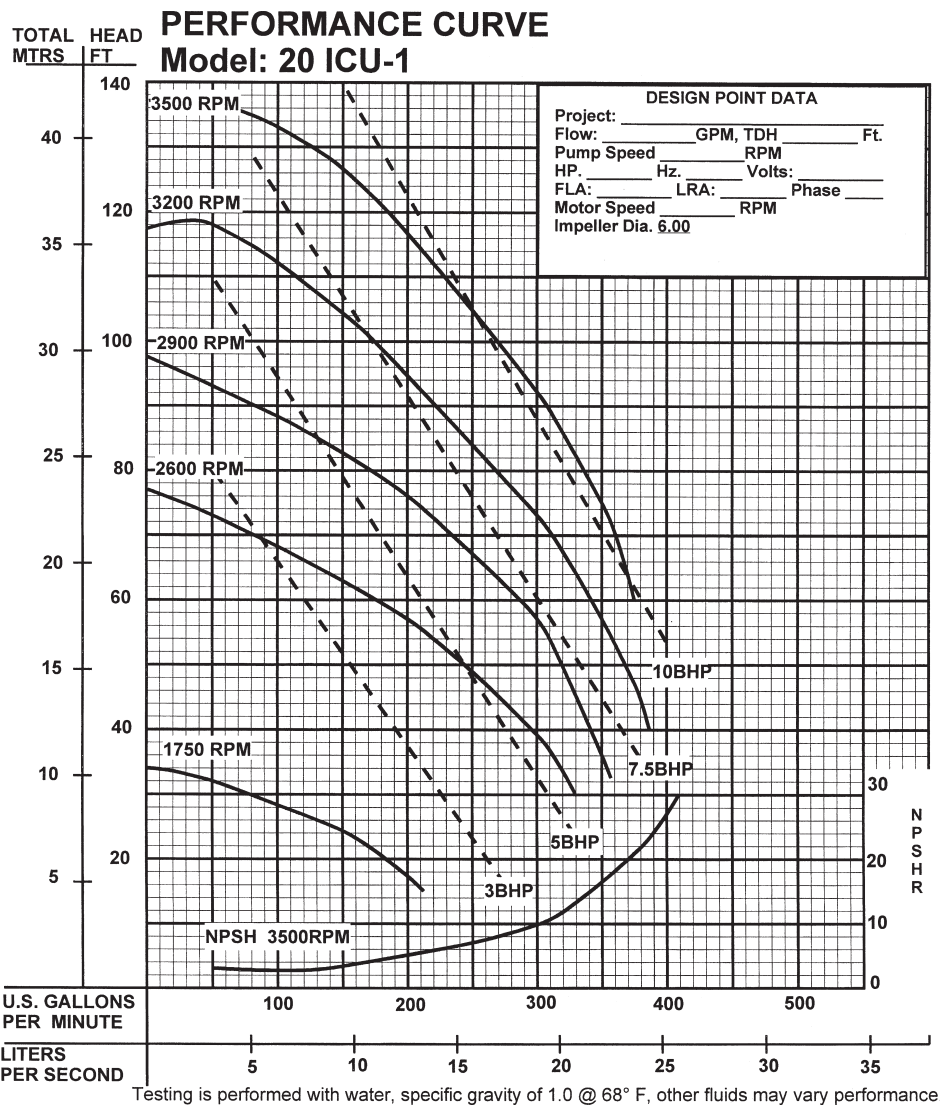
American Bureau of Shipping
Certificate No.
01-HS238523E/1-PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

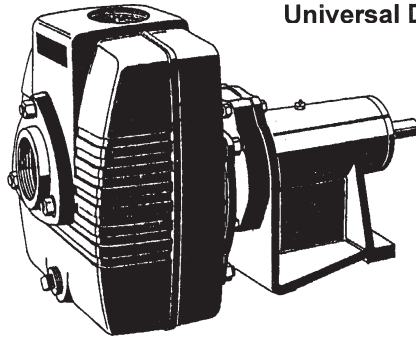
Specifications:

SUCTION/DISCHARGE:	3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
VOLUTE:	Cast Iron ASTM A-48, Class 30. Removable.
BODY:	Cast Iron ASTM A-48, Class 30.
INTERMEDIATE:	Cast Iron ASTM A-48, Class 30.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	
<i>Design:</i>	Open, Trash Type.
<i>Material:</i>	Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3. Stainless Steel
SHAFT:	Buna-N
SQUARE RINGS:	Stainless Steel
HARDWARE:	Air Dry Enamel.
PAINT:	Single Mechanical with Lip Seal
SEAL:	
<i>Design:</i>	Oil
<i>Lubrication:</i>	Rotating Face - Carbon
<i>Material:</i>	Stationary Face - Ceramic Elastomer - Buna-N Hardware - 300 Series Stainless
BEARING-PUMP END:	
<i>Design:</i>	Single Row, Ball
<i>Lubrication:</i>	Grease
<i>Load:</i>	Radial
BEARING-DRIVE END:	
<i>Design:</i>	Single Row, Ball
<i>Lubrication:</i>	Grease
<i>Load:</i>	Radial
CHECK VALVE:	
<i>Material:</i>	Valve Flap-Neoprene. Weight-Cast Iron ASTM A-48, Class 30
OPTIONAL EQUIPMENT:	Seal Material, Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor Adjusting Base & OSHA Guard.



BARNES®

25 ICU-1 SELF-PRIMING PUMPS Universal Drive



Model: 25 ICU-1



American Bureau of Shipping
Certificate No.
01-HS238523E/1-PDA

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MARINE, MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE: 3" (76mm) x 3" (76mm) NPT, Female.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
VOLUTE: Cast Iron ASTM A-48, Class 30.
BODY: Cast Iron ASTM A-48, Class 30.
INTERMEDIATE: Cast Iron ASTM A-48, Class 30.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

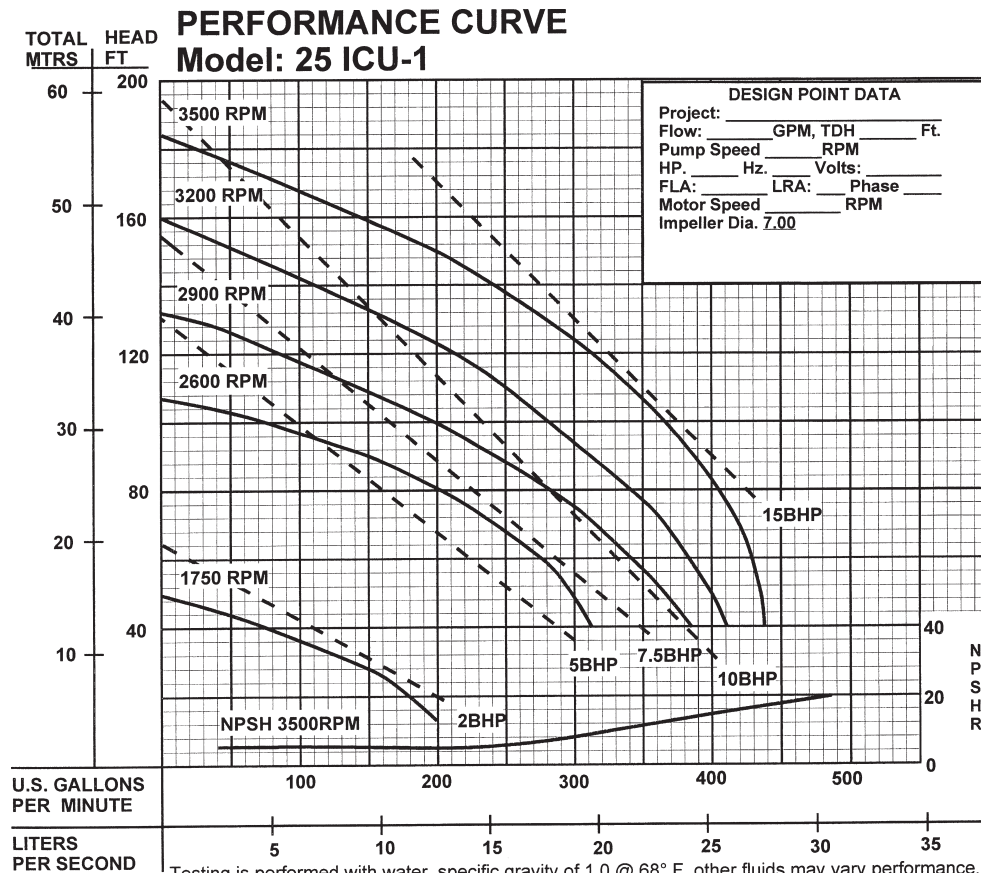
Design: Open, Trash Type.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.
Stainless Steel
Buna-N
Stainless Steel
Air Dry Enamel.
Design: Single Mechanical with Lip Seal
Lubrication: Oil
Material: Rotating Face - Carbon
Stationary Face - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

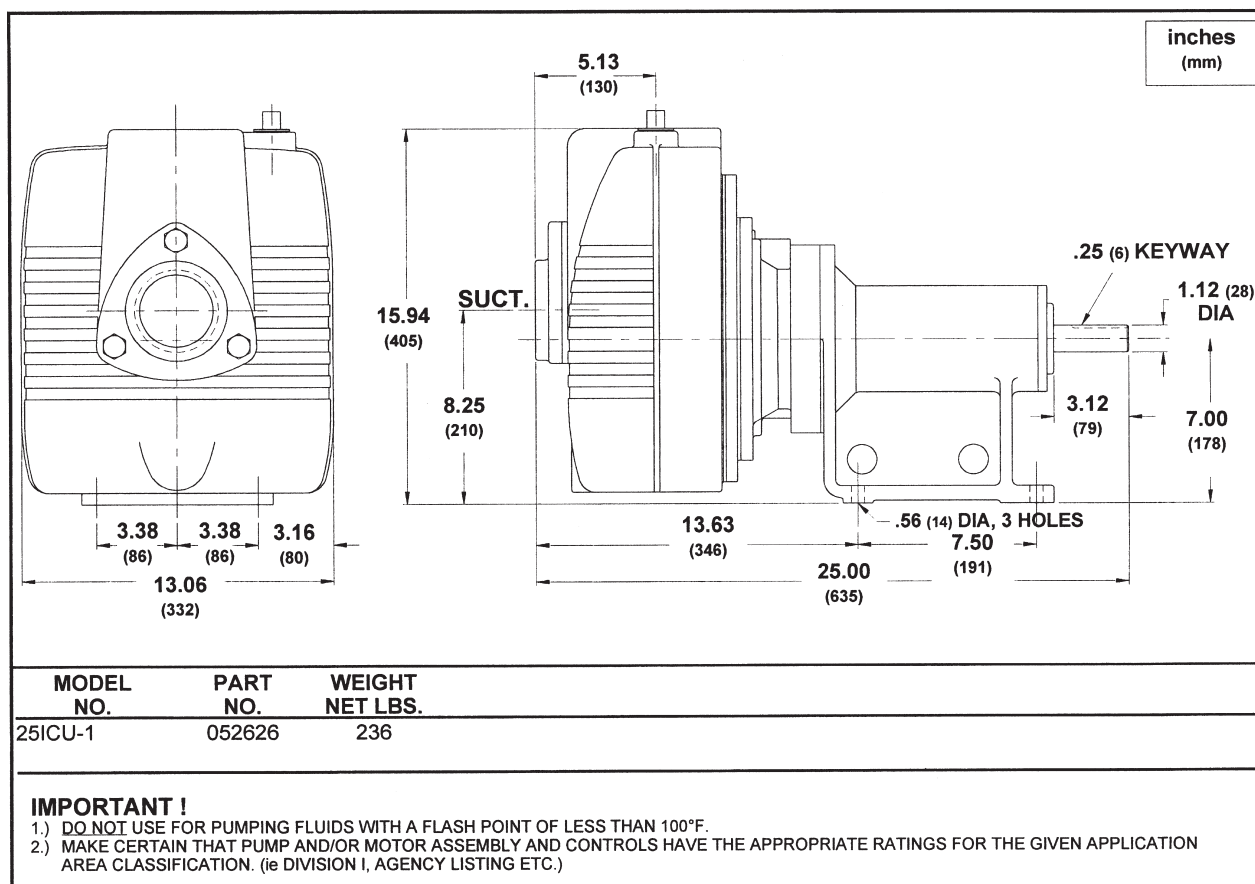
BEARING-PUMP END:
Design: Single Row, Ball
Lubrication: Grease
Load: Radial

BEARING-DRIVE END:
Design: Single Row, Ball
Lubrication: Grease
Load: Radial

CHECK VALVE:
Material: Valve Flap-Neoprene.
Weight-Cast Iron ASTM A-48,
Class 30

OPTIONAL EQUIPMENT: Seal Material, Flex Coupled Assy. with
Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt
Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor
Adjusting Base & OSHA Guard.





TAX BITES

Firearms

Whether for sport or self-protection, many citizens jump through bureaucratic hoops to legally purchase a firearm. Before they can pull the trigger, the government targets their purchases for taxes.

All gun sales are subject to a federal excise tax of up to 11 percent paid directly by the consumer in addition to the state and local sales tax rates. But because other taxes are imposed on the manufacturer, the true amount of the price of a gun that pays for taxes must account for federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, local property taxes and any local income taxes, which are paid by the producer. These taxes add another \$173 onto the final sale of a \$500 firearm.

For a \$500 firearm, the government loads on 45.6 percent of the cost in taxes – collecting \$228 per gun.

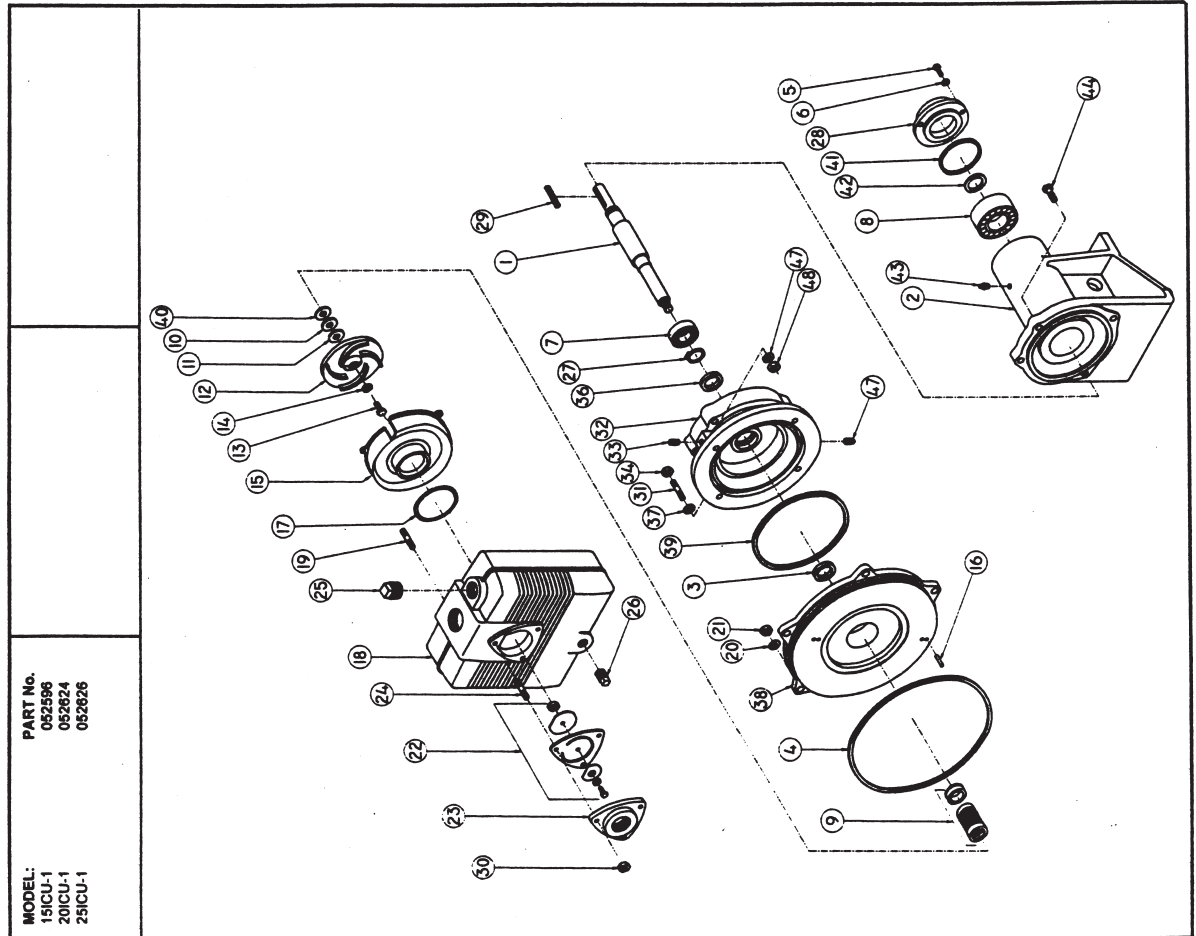
TAXES IMPOSED ON GAS PRODUCTION & SALES:
 On the average cost of a gallon of gas, 51% is taxes

FEDERAL TAXES: Corporate Income Tax
 Individual Income Tax Capital Gains Tax Corporate Environmental Tax FICA Tax FUTA Tax Duties on Imported Crude and Product Customs Ad Valorem User Fee
 Airport and Airway Trust Fund Tax Harbor Maintenance Trust Fund Tax Superfund Crude Oil Tax Oil Spill Liability Trust Fund Tax Highway Trust Fund Tax Aquatic Resources Trust Fund Tax Deficit Reduction Excise Tax Inland Waterways Trust Fund Tax Heavy Truck and Trailer Tax Excise Tax on Tires Federal Telephone Excise Taxes

STATE TAXES: Corporate Income Taxes Individual Income Taxes Franchise Taxes Unemployment Taxes Sales and Use Taxes Motor Fuel Excise Taxes Sales Taxes on Motor Fuels Fuel Use Taxes Superfund Taxes Used Oil Disposal Taxes Waste Disposal Taxes Business Property Taxes Real Property Taxes Pipeline Throughput Taxes Severance Taxes Production Taxes Refinery Throughput Taxes Conservation Taxes Telephone Excise Taxes Environmental Impact Taxes Public Highway Use Taxes Heavy Truck Highway Use Taxes

BARNES®

SERIES: 15ICU-1, 20ICU-1, 25ICU-1



MODEL:
15ICU-1
20ICU-1
25ICU-1

PART No.
052596
052824
052826

PARTS KIT

Seal Kit P/N: 085241 (+) 4,9,10,11,13,14,17,20,21,22B,36,39.

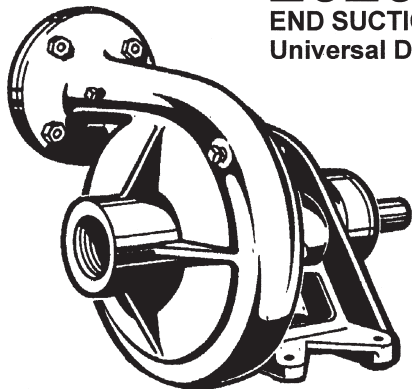
Overhaul Kit . P/N: 085240 (♦) 4,5,6,7,8,9,10,11,13,14,17,20,22B,27,29,30,34,36,37,39,41,42,45,46,49

PARTS LIST

ITEM	QTY.	DESCRIPTION	Material	PART No.
1	1	Shaft	Stainless	077804
2	1	Pedestal		039882
3	1	Slinger	Buna-N	005163
4	1	O-Ring		018398
5	4	Hex Hd Screw	5/16-18 x .875" Lg, Stainless	027113
6	4	Lockwasher	5/16 Stainless	026322
7	1	Bearing		033491
8	1	Seal		039332
9	1	Shaft Seal	C/CEN	052601
10	1	Shim, .010		001349
11	1	Shim, .031		001348
12	1	Impeller, 15ICU-1	5.9" Dia	0900537B
13	1	Impeller, 20ICU-1	5.9" Dia	0900507B
14	2	Hex Hd Screw	7.00" Dia	051102
15	1	Shakeproof Washer, 15 & 20ICU-1	1/2-20 x 1.00" Lg, Stainless	019803
16	1	Washer, 25ICU-1	1/2" Stainless	070089
17	1	Volute, 15 & 20ICU-1		018883
18	2	Volute Pin		019102
19	1	Volute Gasket		039892
20	5	Stud	1/2-13 x 2.00" Lg, Stainless	018398
21	5	Lock Washer	1/2" Stainless	021077
22	1	Hex Nut	1/2-13, Stainless	15-6-1
22A	1	Check Valve Assy		018387
22B	1	Weight	2.75" O.D.	001588
22C	1	Gasket	Neoprene	018008
22D	1	Lock Washer	1/4" Stainless	022333
22E	1	Hex Hd Screw	1/4-20 x 1.00" Lg, Stainless	1-7-1
22F	1	Hex Nut	1/4-20, Stainless	15-5-1
23	1	Weight	4" O.D.	067500
24	3	Suction Flange		018884
25	1	Stud	1/2-13 x 2.00" Lg, Stainless	021078
26	1	Pipe Plug	1.00" NPT	033205
27	1	Pipe Plug	1.00" NPT	033205
28	1	Snap Ring		018851
29	1	Bearing Cap		039956
30	3	Key	1/4 Sq x 2.25" Lg	033771
31	4	Hex Nut	1/2-13, Stainless	15-6-1
32	1	Stud	3/8-16 x 1.75", Stainless	019034
33	1	Coupling Head		051188
34	1	Pipe Plug	3/8 NPT	015000
35	4	Hex Nut	3/8-16, Stainless	15-23-1
36	1	Lip Seal		039465
37	4	Lock Washer	3/8 Stainless	018926
38	1	Seal Plate		039984
39	1	O-Ring		059865
40	1	Shim Seal		026980
41	1	O-Ring		026897
42	1	Lip Seal		026309
43	1	Relief Fitting	.125 NPT	028307
44	4	Hex Hd Screw	7/16-14 x 2.50" Lg, Stainless	027114
45	4	Lock Washer	7/16, Stainless	027115
46	4	Hex Nut	7/16-14, Stainless	027116

BARNES[®]

2020HCU END SUCTION PUMPS Universal Drive



Model: 2020HCU



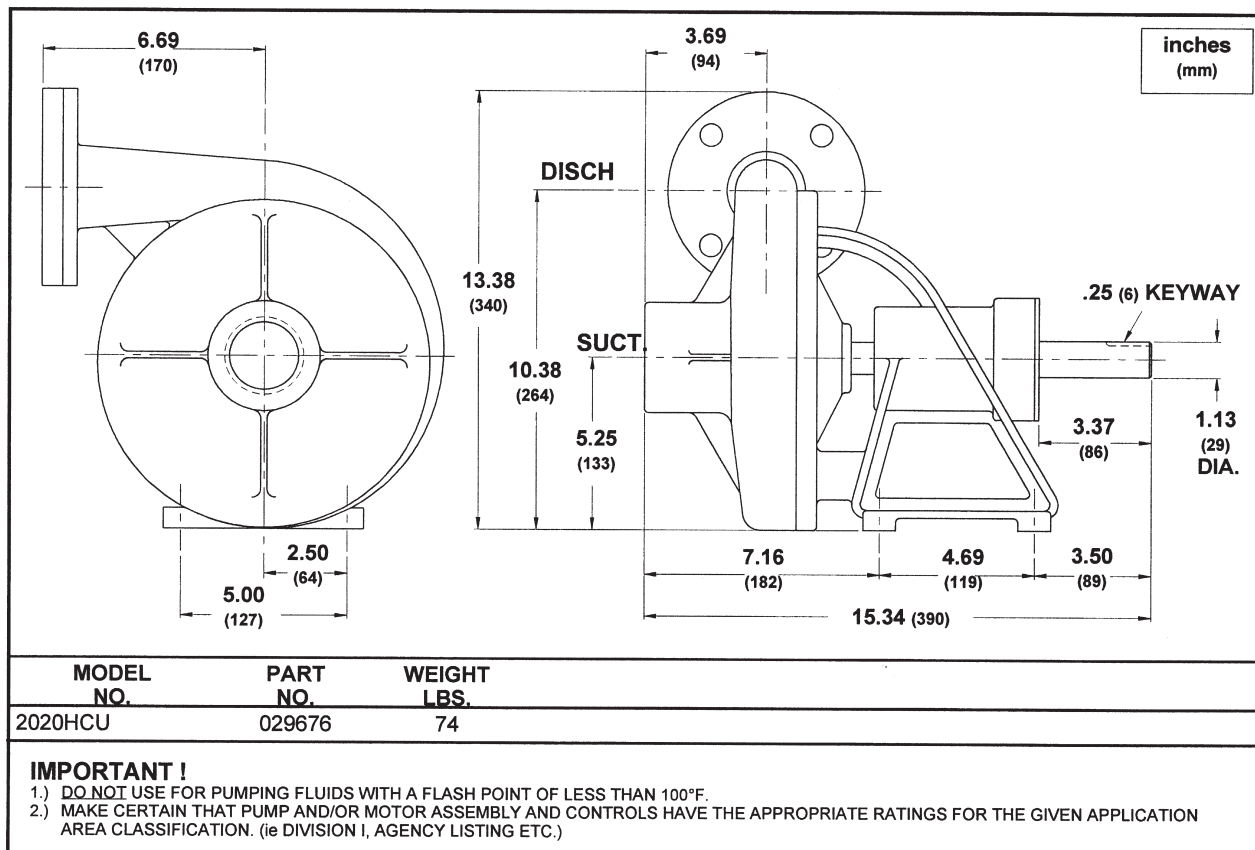
American Bureau of Shipping
Certificate No.
01-HS238523D/1-PDA

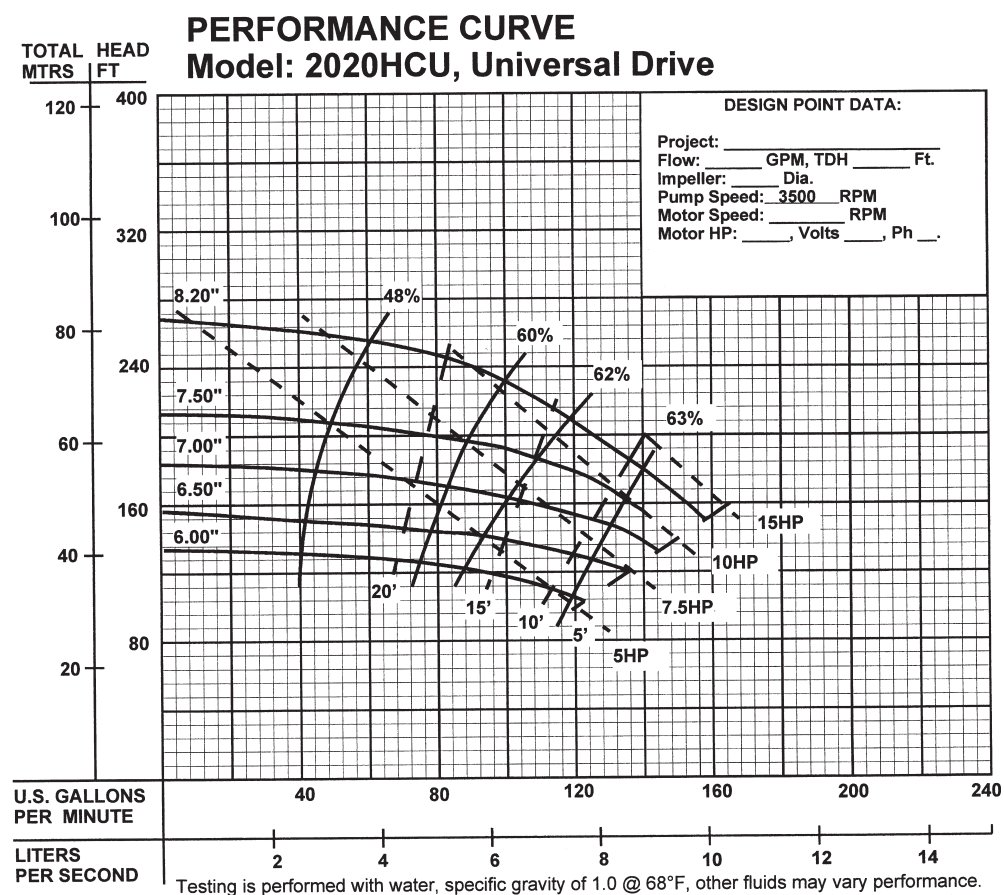
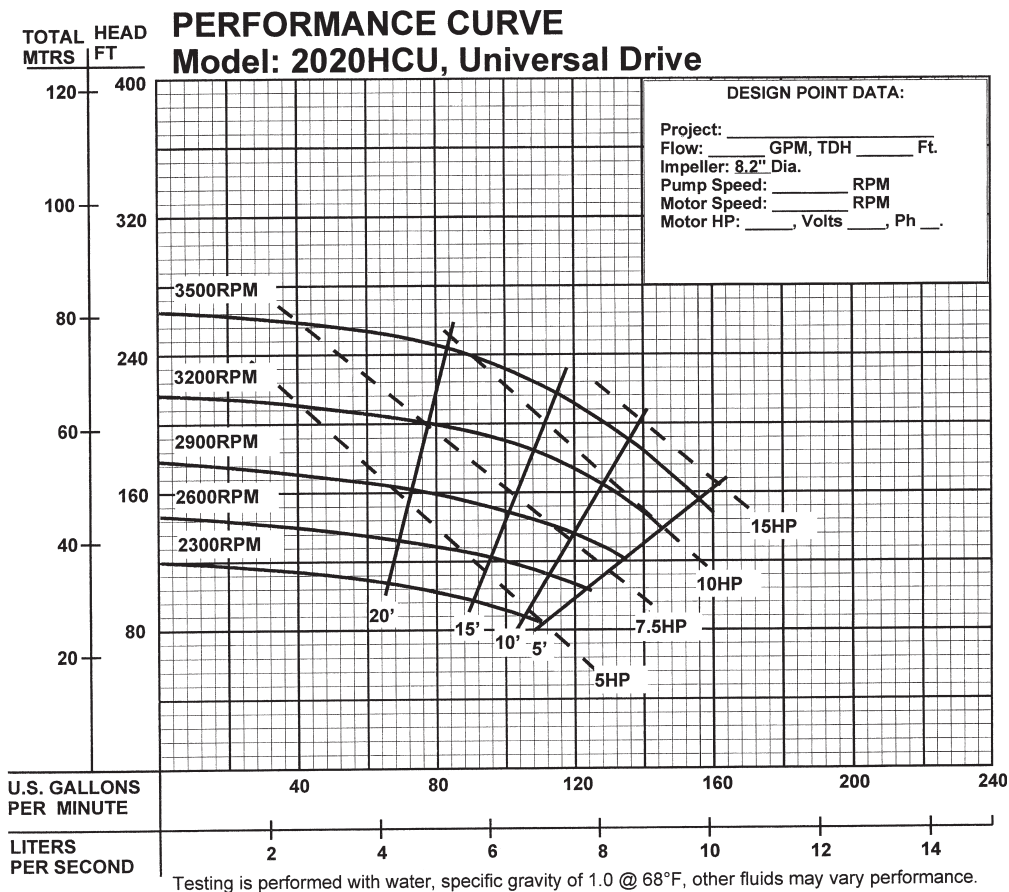
Description:

THESE PUMPS ARE SUITABLE FOR GENERAL INDUSTRIAL USE SUCH AS, LIQUID TRANSFER OR AS BOOSTER PUMPS.

Specifications:

SUCTION/DISCHARGE:	2" (51mm) NPT Suction, 2" (51mm) 125lb Flange Discharge. Discharge can be placed in 8 different locations depending on piping requirements.
LIQUID TEMPERATURE:	180°F (82°C) Continuous.
BODY:	Cast Iron, ASTM Class 30, with Air Vent, Vacuum Pressure and Drain Plugs.
PEDESTAL:	Cast Iron, ASTM Class 30.
IMPELLER:	<i>Design:</i> Enclosed Type, 81-3-7-9 Bronze. <i>Material:</i> Dynamically Balanced, ISO G6.3. Teflon "U" Cup
WEAR RING:	Steel
SHAFT:	Bronze
SHAFT SLEEVE:	Steel
HARDWARE:	Air Dry Enamel.
PAINT:	
SEAL:	<i>Design:</i> Single Mechanical <i>Lubrication:</i> Self Lubricating <i>Material:</i> Rotating Face - Carbon Stationary Face - Ni-Resist Elastomer - Buna-N Hardware - Stainless Steel
BEARING-PUMP END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Grease, Factory Lubrication. <i>Load:</i> Radial & Thrust
BEARING-DRIVE END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Grease, Factory Lubrication. <i>Load:</i> Radial & Thrust
OPTIONAL EQUIPMENT:	Discharge Check Valve, Hand Primer, Base & OSHA Coupling Guard, Flex Coupling, Strainer.





PART No.
029876

MODEL:
2020HCU

PARTS KIT

Seal Kit.....P/N: 083560 (†) 2,4,5,6,7.

PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Body	022026
2	1	† U-Cup	021858
3	1	Impeller	021294
4	1	† Shaft Seal	019146
5	1	† Shaft Sleeve	018071
6	1	† Slinger	005163
7	1	† Square Ring	021297
8	1	Pedestal	029084
9	1	Bearing	019846
10	8	Stud	002410
11	8	Lock Washer	002603
12	8	Hex Nut	002501
13	1	Shaft	021038
14	1	Shaft Key	021082
15	1	Bearing	019847
16	1	Snap Ring	019851
17	1	Bearing Cap	019845
18	3	Lock Washer	002618
19	3	Machine Screw	019842
20	3	Pipe Plug	015000
21	2	Pipe Plug	003217

C/NR/B
Bronze

5/16-18 x 1.75" Lg

5/16
5/16-18

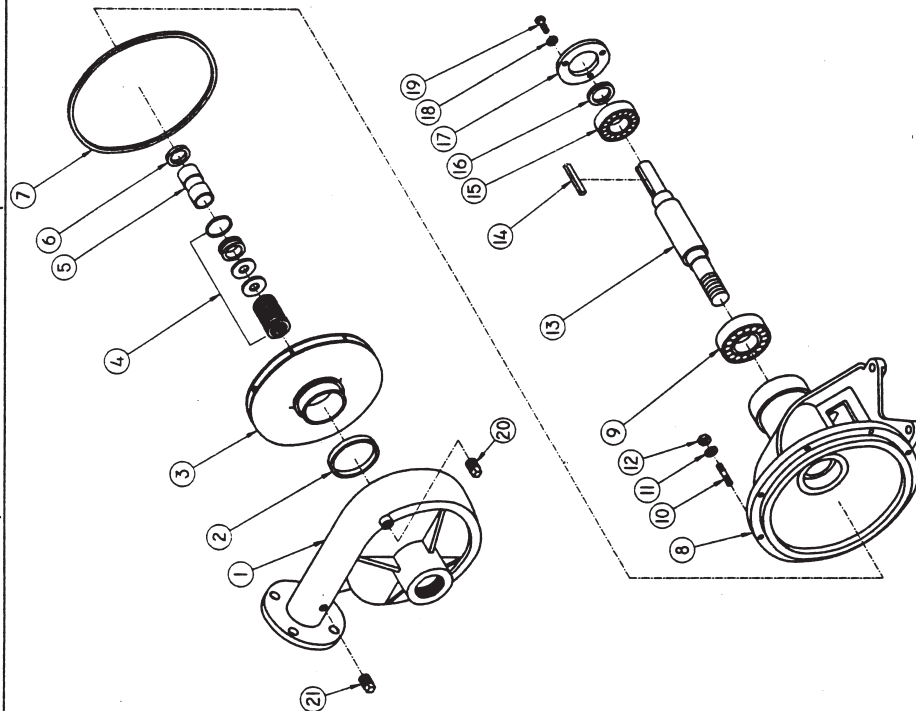
#10

#10-32 x 50" Lg. ZP
.375" NPT
.25" NPT

TAX BITES Distilled Spirits

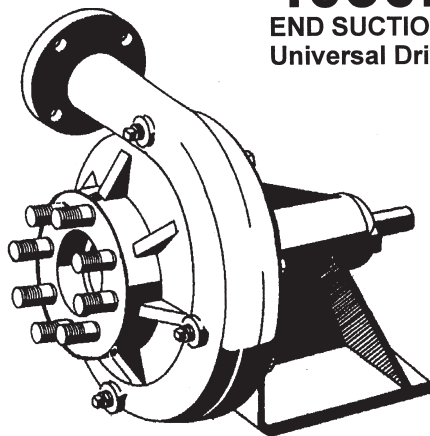
Another target of the "sin tax"- loving legislators is distilled spirits. Taxes on distilled spirits are among the highest taxes imposed on any product. Nearly 80 percent of what you pay for a bottle goes to the government in taxes rather than for the liquor. At an average price of \$13.10 for a 750mL bottle of 80 proof spirits, this amounts to the government stirring in \$10.43 to your total at the register.

The federal excise tax pours \$2.14 into the average cost of a 750 ml bottle, or about 16 percent of the \$13.10. Then the median state excise taxes add another \$3.75 to the same bottle. And because distilled spirits producers must pay federal and state income taxes, federal payroll taxes, property taxes and other taxes, these costs are passed on to consumers. These taxes tack on another \$4.53 to the total price of a bottle of distilled spirits.



BARNES®

4030HCU END SUCTION PUMPS Universal Drive



Model: 4030HCU



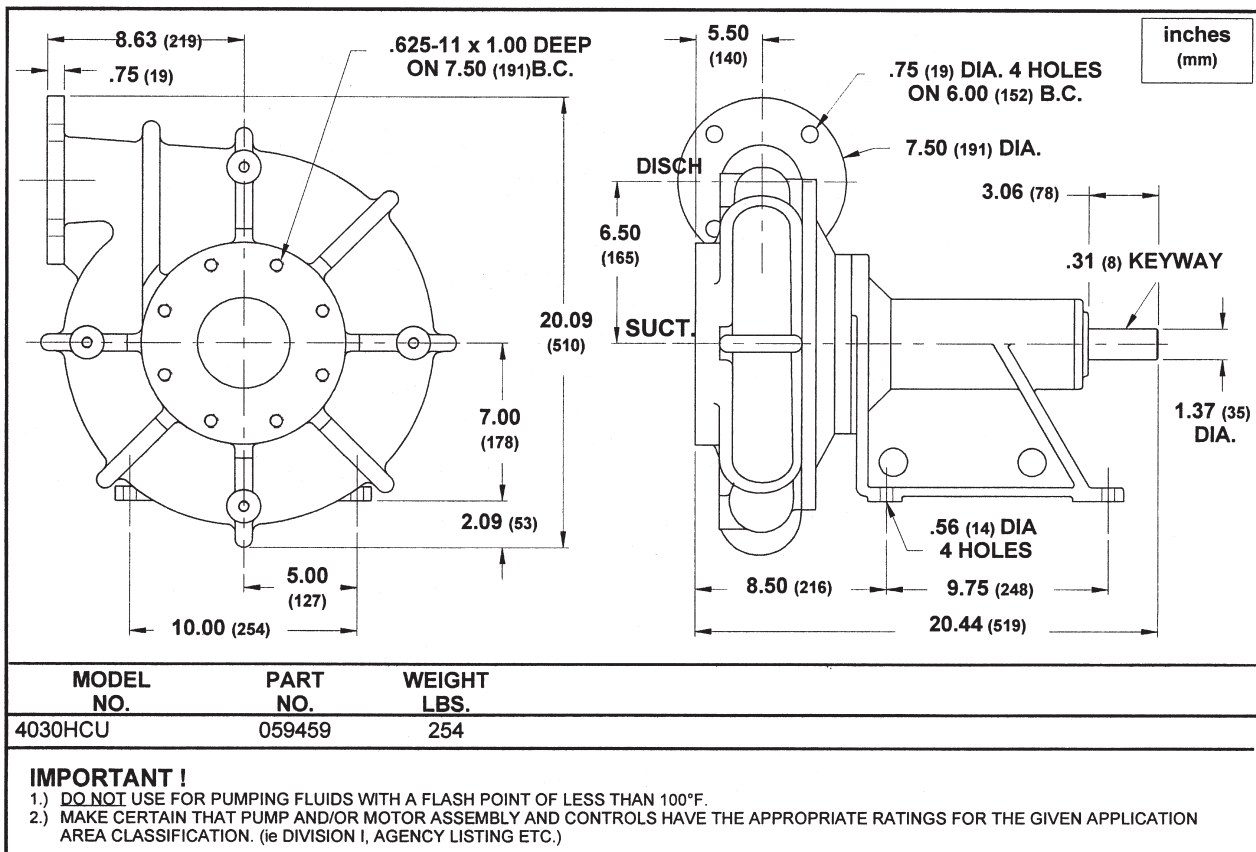
American Bureau of Shipping
Certificate No.
01-HS238523D/1-PDA

Description:

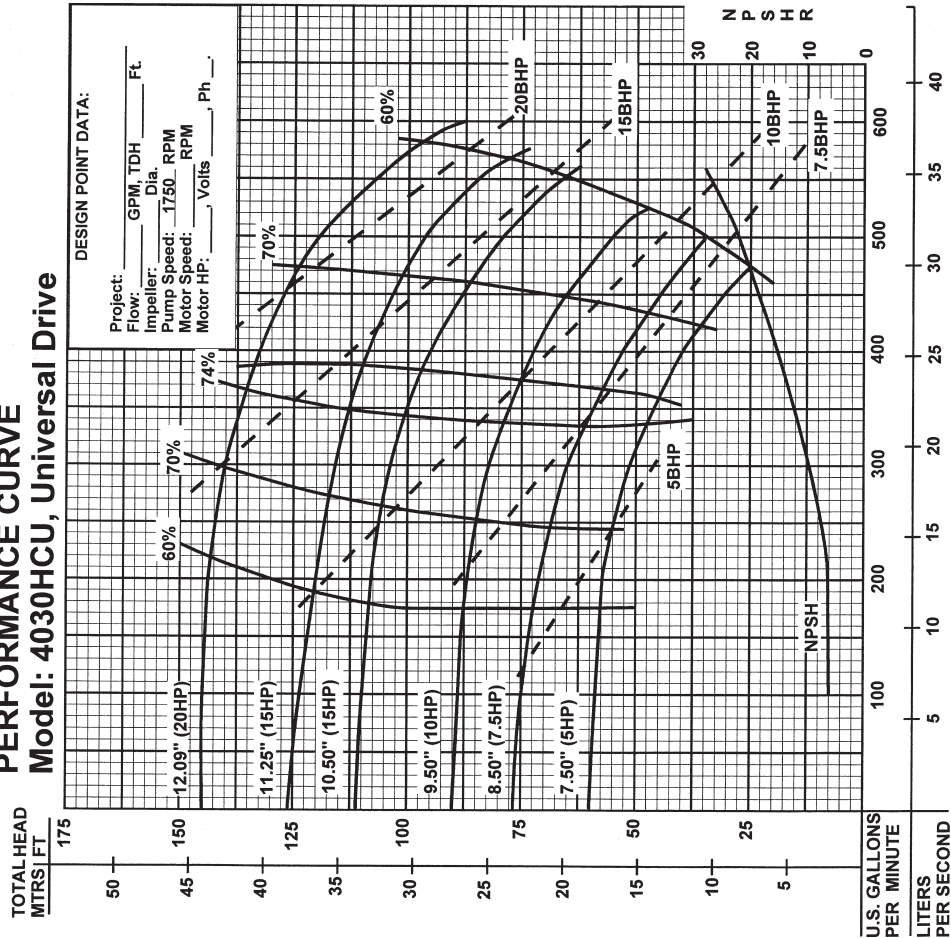
THESE PUMPS ARE SUITABLE FOR GENERAL INDUSTRIAL USE SUCH AS, LIQUID TRANSFER OR AS BOOSTER PUMPS.

Specifications:

SUCTION/DISCHARGE:	4" (102mm) Suction, 3" (76mm) Discharge, 125lb Flange. Discharge can be placed in 8 different locations depending on piping requirements.
LIQUID TEMPERATURE:	180°F (82°C) Continuous.
BODY:	Cast Iron, ASTM Class 30, with Air Vent, Vacuum Pressure and Drain Plugs.
PEDESTAL:	Cast Iron, ASTM Class 30.
IMPELLER:	<i>Design:</i> Enclosed Type, <i>Material:</i> Cast Iron, ASTM Class 30. Dynamically Balanced, ISO G6.3. Bronze
WEAR RING:	Steel
SHAFT:	Bronze
SHAFT SLEEVE:	Steel
HARDWARE:	Air Dry Enamel.
PAINT:	
SEAL:	<i>Design:</i> Single Mechanical <i>Lubrication:</i> Self Lubricating <i>Material:</i> Rotating Face - Carbon Stationary Face - Ni-Resist Elastomer - Buna-N Hardware - Stainless Steel
BEARING-PUMP END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Grease, Factory Lubrication. <i>Load:</i> Radial & Thrust
BEARING-DRIVE END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Grease, Factory Lubrication. <i>Load:</i> Radial & Thrust
OPTIONAL EQUIPMENT:	Discharge Check Valve, Hand Primer, Base & OSHA Coupling Guard, Flex Coupling, Strainer, Bronze Impeller, Companion Flange, Flange Gasket.

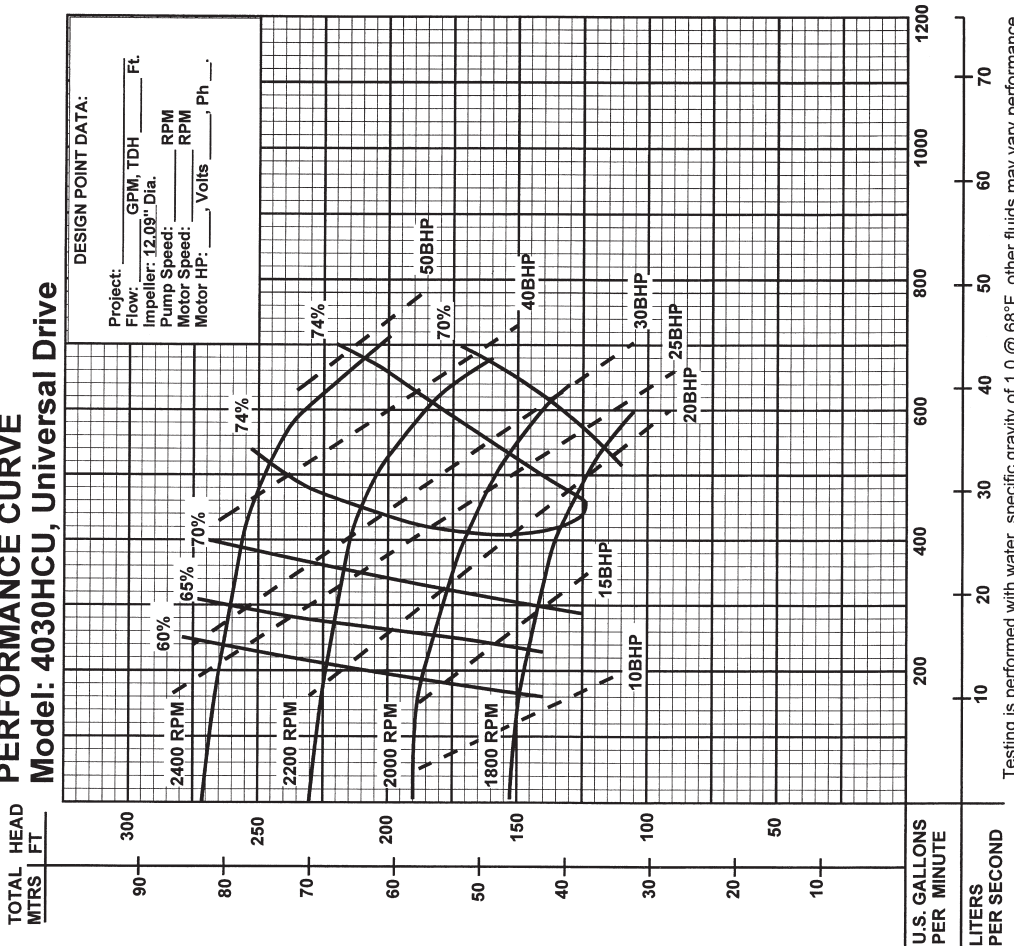


PERFORMANCE CURVE Model: 4030HCU, Universal Drive



Testing is performed with water, specific gravity of 1.0 @ 68°F, other fluids may vary performance.

PERFORMANCE CURVE Model: 4030HCU, Universal Drive

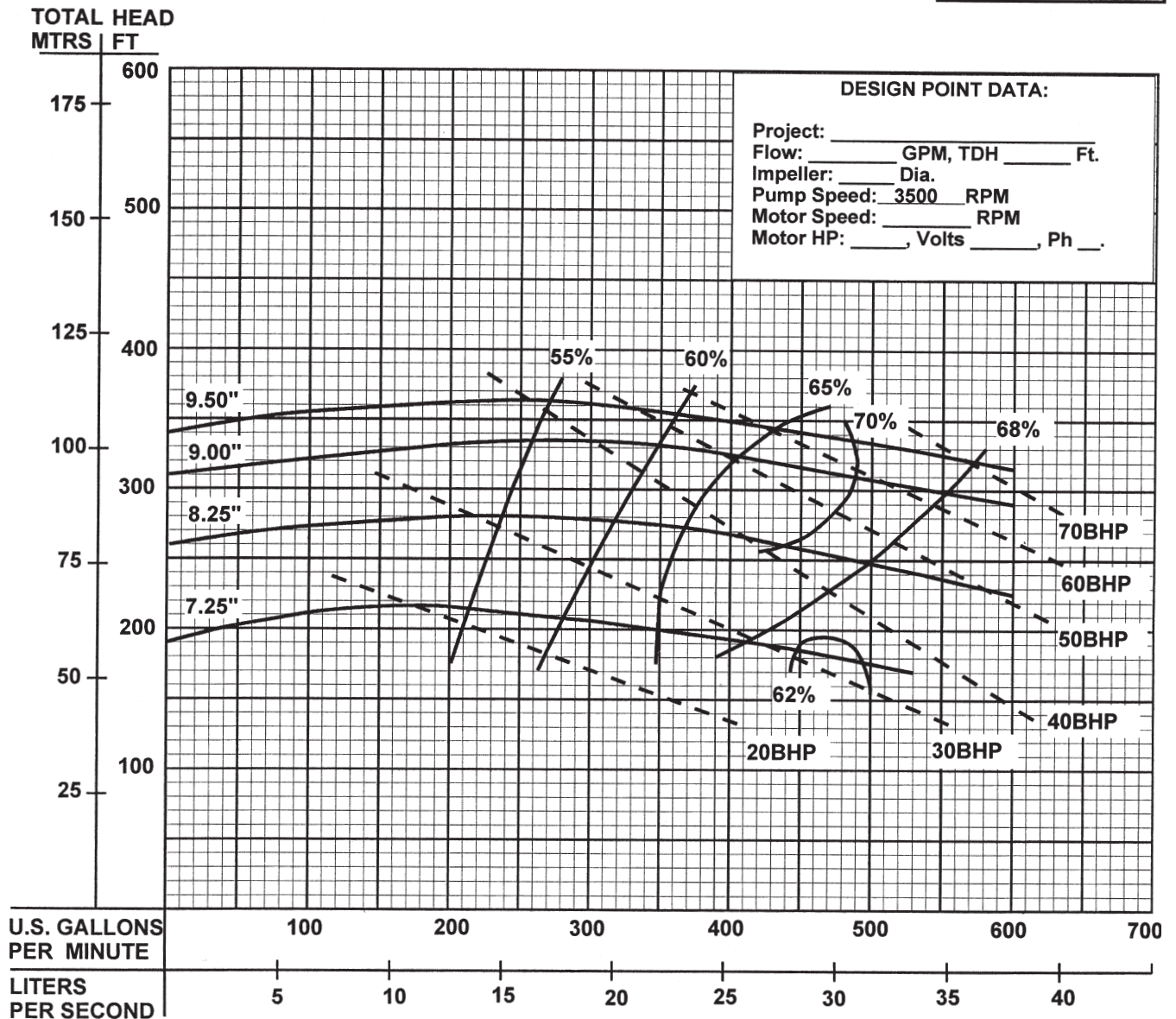


Testing is performed with water, specific gravity of 1.0 @ 68°F, other fluids may vary performance.

PERFORMANCE CURVE

Model: 4030HCU, Universal Drive

SECTION	5B
PAGE	11
DATE	2/97
REPLACES	1/96



TAX BITES CELLULAR PHONES

In today's high-tech world, consumers have a wide range of choices for their voice services. Where there used to only be a landline phone, there are now cell phones, Voice over Internet Protocol (VoIP) services, and cable digital voice services. Recently the Beacon Hill Institute of Massachusetts surveyed 59 US cities and came up with average taxes paid for a wide variety of telecommunications services.

According to their study, consumers pay 11.78 percent of their average monthly wireless bill to the government. With monthly bills estimated at \$49.98, you pay \$5.89 for a wireless.

These numbers take into account phone-specific taxes like the federal Universal Service Fund, the 911 tax, the city telecom taxes, TDD (deaf tax), and state universal service.

However, what the Beacon Hill study does not take into account are costs for federal income taxes, state income taxes, federal payroll taxes, unemployment insurance taxes, workmen's compensation taxes, local property taxes and any local income taxes. Altogether, these taxes dial up the actual "bite" to \$23.19 for a wireless phone. When added to the taxes and fees paid directly by the consumer, a total of 46.4 percent of a wireless bill actually pays for government taxes and fees.

BARNES®

4030HCU

END SUCTION PUMPS

Universal Drive

MODEL:
4030HCU

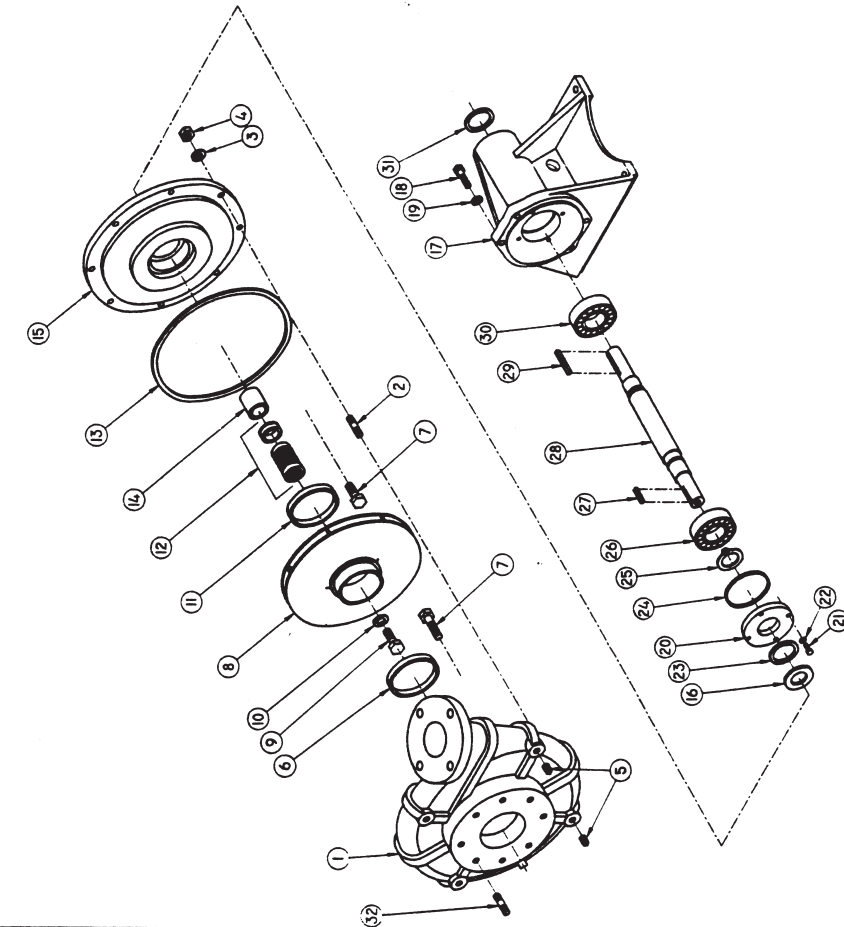
PART No.
059459

PARTS KIT

Seal Kit.....P/N: 083562 (†) 6,12,13,14,16.

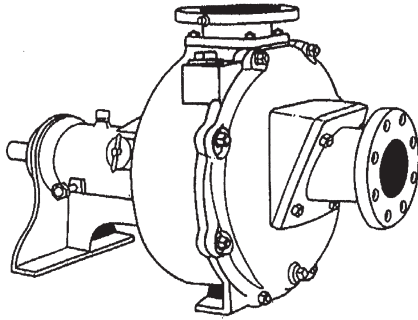
PARTS LIST

ITEM	QTY.	DESCRIPTION	PART No.
1	1	Volute	059452
2	8	Stud	016409
3	8	Lock Washer	002608
4	8	Hex Nut	028173
5	8	Pipe Plug	003217
6	1	† Wear Ring	030645
7	2	Hex Hd Cap Screw	032129
8	1	Impeller	052096
9	1	Cap Screw	1-68-1
10	1	Washer	030657
11	1	Wear Ring	030645
12	1	† Shaft Seal	031000
13	1	† O-Ring	059321
14	1	† Shaft Sleeve	030652
15	1	Seal Plate	052094
16	1	† Slinger	029915
17	1	Pedestal	052279
18	4	Hex Hd Cap Screw	022250
19	4	Lock Washer	002606
20	1	Bearing Cap	030651
21	4	Hex Hd Cap Screw	002218
22	4	Lock Washer	002602
23	1	Grease Seal	024997
24	1	O-Ring	030650
25	1	Snap Ring	052098
26	1	Bearing	031388
27	1	Key	052277
28	1	Shaft	052317
29	1	Key	028998
30	1	Bearing	052097
31	1	Grease Seal	002454
32	8	Stud	



BARNES®

B30 SELF-PRIMING PUMPS Universal Drive



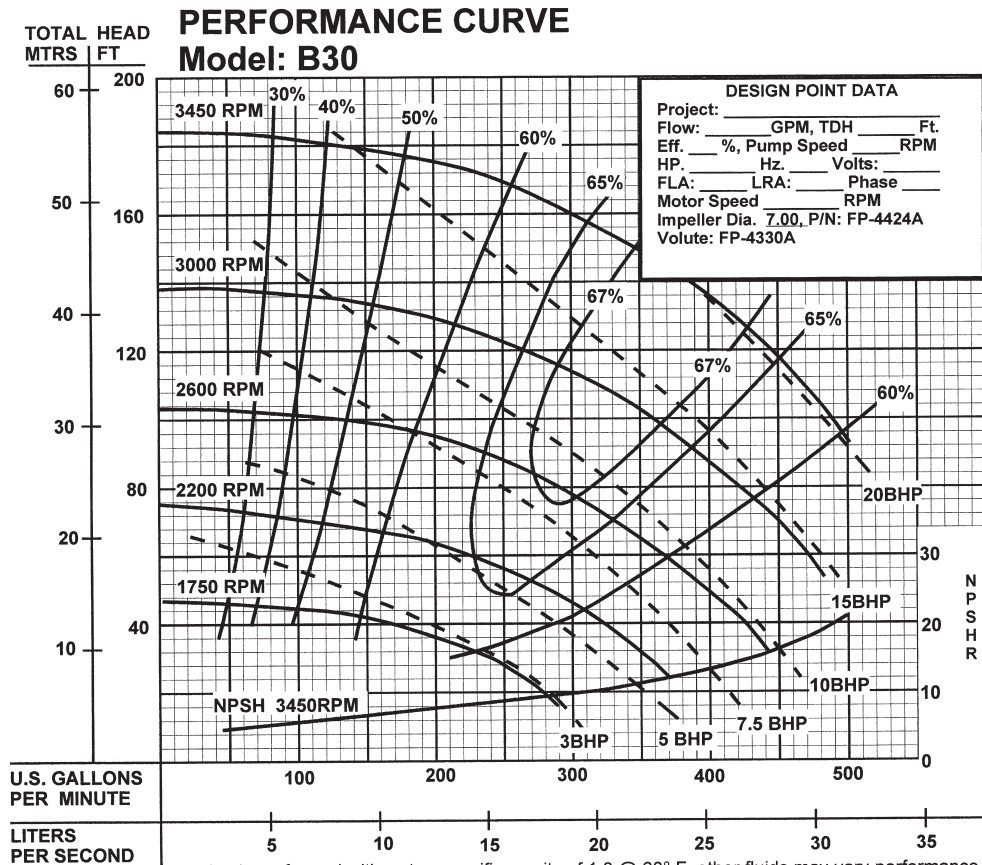
Model: B30

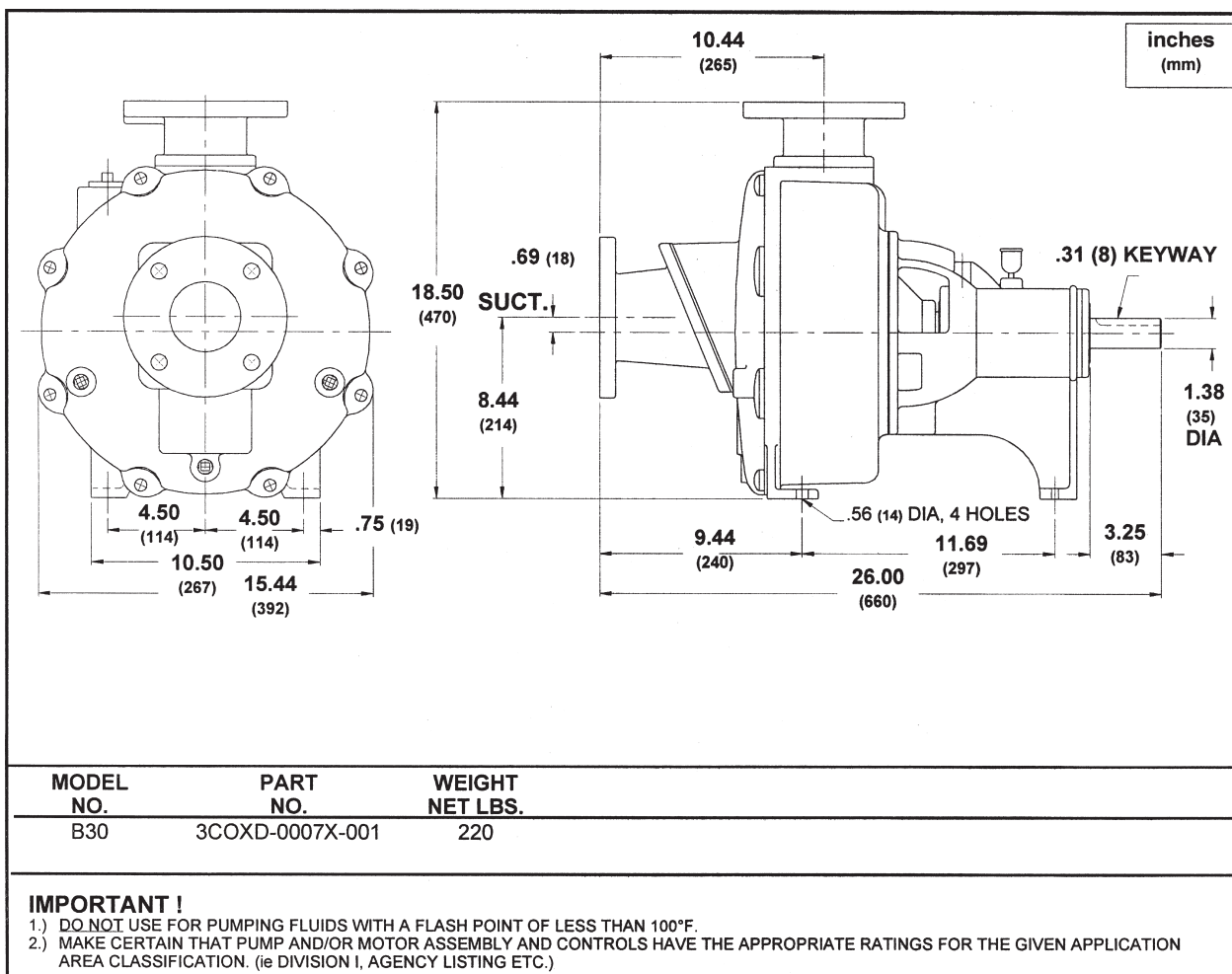
Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE:	3" (76mm) x 3" (76mm) 125lb. Flange.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
VOLUTE/WEARPLATE:	Cast Iron ASTM A-48, Class 30, Replaceable, External Clearance Adjustment.
CASE:	Cast Iron ASTM A-48, Class 30.
END COVER:	Cast Iron ASTM A-48, Class 30.
SEAL PLATE:	Alloy Steel, Replaceable.
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	<i>Design:</i> Semi-Open Type. Passes 3/4" Solids. <i>Material:</i> Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3.
IMPELLER SHAFT:	Steel
SQUARE RINGS:	Buna-N
HARDWARE:	Corrosion Resistant Steel.
PAINT:	Air Dry Enamel.
SEAL:	<i>Design:</i> Single Mechanical <i>Lubrication:</i> Grease, with Self-Feeding Lubricator. <i>Material:</i> Rotating Face - Carbon Stationary Face - Ceramic Elastomer - Buna-N Hardware - 300 Series Stainless
BEARING-PUMP END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Oil <i>Load:</i> Radial & Thrust
BEARING-DRIVE END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Oil <i>Load:</i> Radial & Thrust
CHECK VALVE:	<i>Material:</i> Valve Flap-Neoprene. Weight-Cast Iron ASTM A-48, Class 30
OPTIONAL EQUIPMENT:	Seal Materials, Case Heater; Stainless Hardware; High Temperature Control; Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor Adjusting Base & OSHA Guard.





POLI-TALKS

“The more we remove penalties for being a bum, the more bumism is going to blossom.”

-Sen. Jesse Helms (R-NC), on welfare

“We didn’t send you to Washington to make intelligent decisions. We sent you to represent us.”

-Kent York, a Texas pastor, to Rep. Bill Sarpalius (D-TX)

“President Clinton had a bill, e-i-e-i-o. And in that bill was lots of pork, e-i-e-i-o.”

-Sen. Alfonse D'Amato (R-NY)

“I have orders to be awakened at any time in the case of a national emergency, even if I’m in a cabinet meeting.”

-Ronald Reagan

“The present system may be flawed, but that’s not to say that we in Congress can’t make it worse.”

-Rep. E. Clay Shaw, Jr. (R-FL)

“Is the country still here?” -Calvin Coolidge, waking from a nap

"We've killed health care; now we've got to make sure our fingerprints aren't on it."

-Sen. Bob Packwood (R-OR), in 1994, on the GOP blocking Clinton's health-care reforms

“Ambiguously definitive-or is it definitively ambiguous?”

-Sen. Bill Bradley, on being unclear about his presidential ambitions

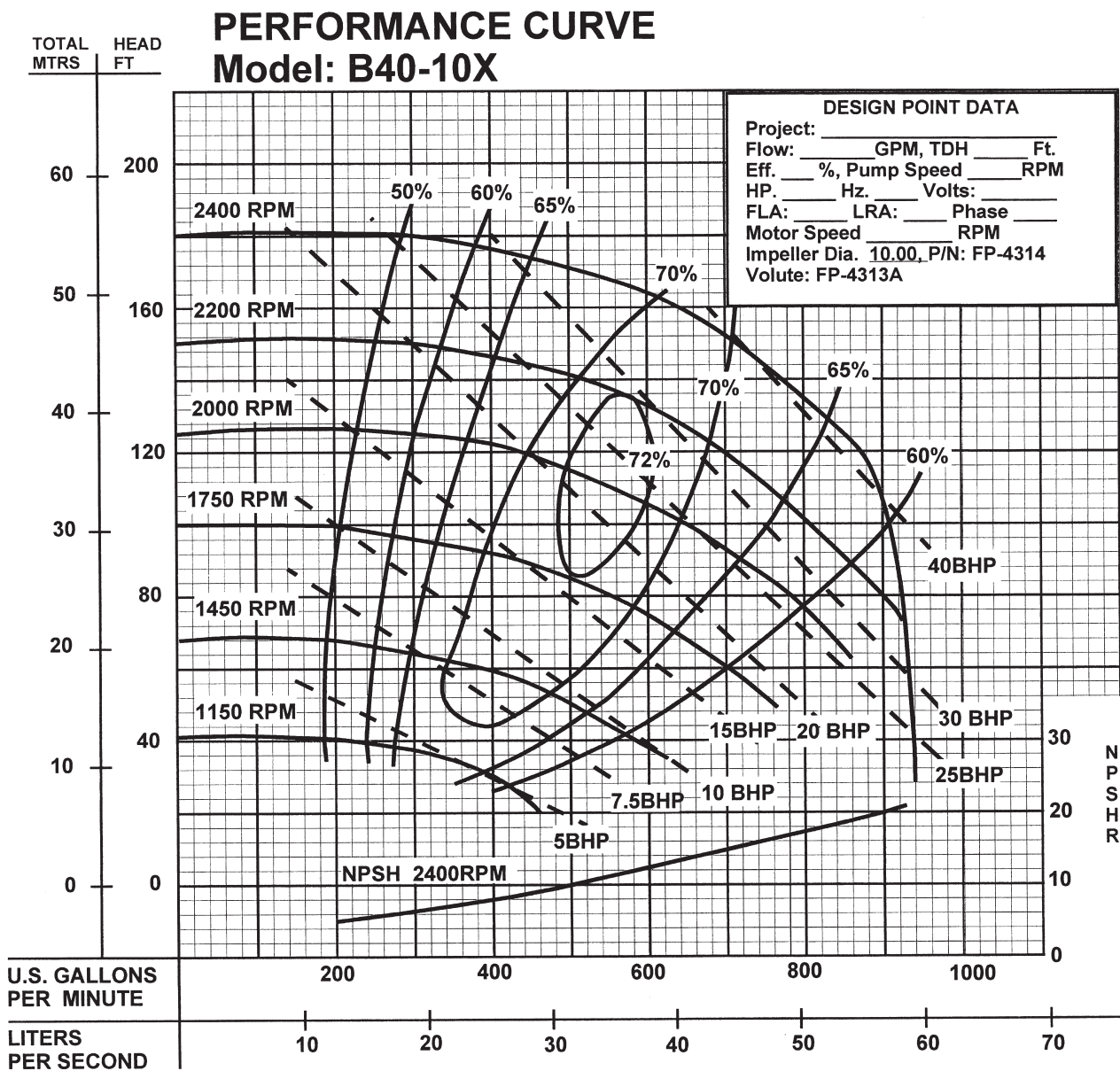
"It's no exaggeration to say that the undecideds could go one way or another." -**George H. W. Bush**

“We didn’t get the pay raise-why work?”

-Bob Dole, in 1989, on the slow pace of Senate activity

“Welcome to President Clinton, Mrs. Clinton, and my fellow astronauts.”

-Al Gore, 1998



MAXIMUM DRY PRIMING LIFT	
PUMP SPEED	10 MIN.
1150RPM	10 Ft.
1450RPM	15 Ft.
1750RPM	25 Ft.
2000RPM	25 Ft.
2200RPM	25 Ft.
2400RPM	25 Ft.

When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is the corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This **net available NPSH** must exceed the **required NPSH** of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the **low** liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the **high** liquid level to the centerline of the impeller.

Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.

It's a Weird, Weird World!

TERRORIST VOGUE

"Carlos the Jackal was one of the world's most notorious and elusive terrorists, accused of 83 deaths worldwide and more than a dozen other charges stemming from a 20-year killing spree.

"After two decades of evading the law, he was arrested in a Sudanese hospital while undergoing liposuction and a tummy tuck." —**San Francisco Chronicle**

NOSING AROUND

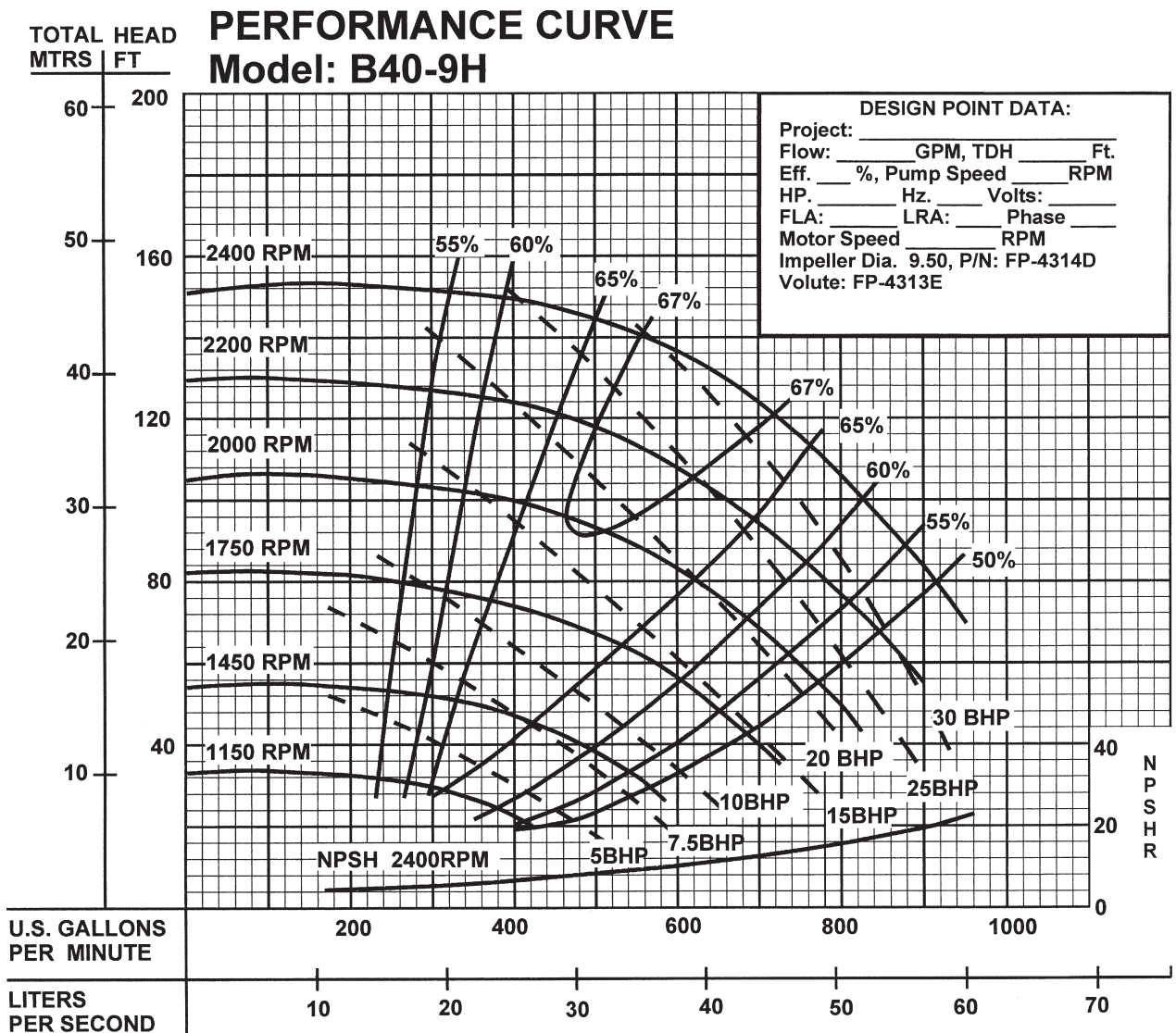
"Ruth Clarke, 23, of London, England, underwent surgery to correct a lifelong breathing problem in 1981. She was presented with a tiddlywink, which doctors had removed from her nose.

"Clarke vaguely recalled losing the disk as a tot, but she didn't dream it was right under her nose all the time."

—**Encyclopedia Brown's Book of Strange Facts**

THE POSTMAN RINGS MORE THAN TWICE

"From 1974 to 1976, a young man in Taiwan wrote 700 love letters to his girlfriend, trying to talk her into marriage. He succeeded—she married the mailman who delivered the letters to her." **Weird News and Strange Stories**



MAXIMUM DRY PRIMING LIFT	
PUMP SPEED	10 MIN.
1150RPM	10 Ft.
1450RPM	15 Ft.
1750RPM	20 Ft.
2000RPM	25 Ft.
2200RPM	25 Ft.
2400RPM	25 Ft.

When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is the corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This net available NPSH must exceed the required NPSH of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the low liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the high liquid level to the centerline of the impeller.

Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.

WORD ORIGINS

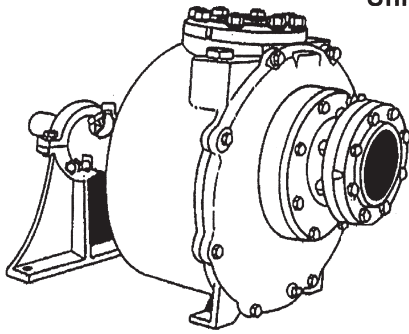
EAVESDROP

Meaning: Secretly listen to someone else's conversation

Origin: "In Anglo-Saxon England, a house had very wide overhanging eaves ... to allow rain to drip safely away from the house's foundation. So the eavesdrip, later the *eavesdrop*, provided a place where one could hide to listen clandestinely to conversation within the house." (From *Morris Dictionary of Word and Phrase Origins*, by William and Mary Morris)

BARNES®

B60 SELF-PRIMING PUMPS Universal Drive



Model: B60-12X
B60-11H
B60-11X
B60-10L

Description:

SELF-PRIMING CENTRIFUGAL PUMPS
DESIGNED FOR MUNICIPAL AND
INDUSTRIAL APPLICATIONS.

Specifications:

SUCTION/DISCHARGE: 6" (152mm) x 6" (152mm) 125lb. Flange.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.
VOLUTE/WEARPLATE: Cast Iron ASTM A-48, Class 30, Replaceable, External Clearance Adjustment.
CASE: Cast Iron ASTM A-48, Class 30.
END COVER: Cast Iron ASTM A-48, Class 30.
SEAL PLATE: Alloy Steel, Replaceable.
PEDESTAL: Cast Iron ASTM A-48, Class 30.
IMPELLER:

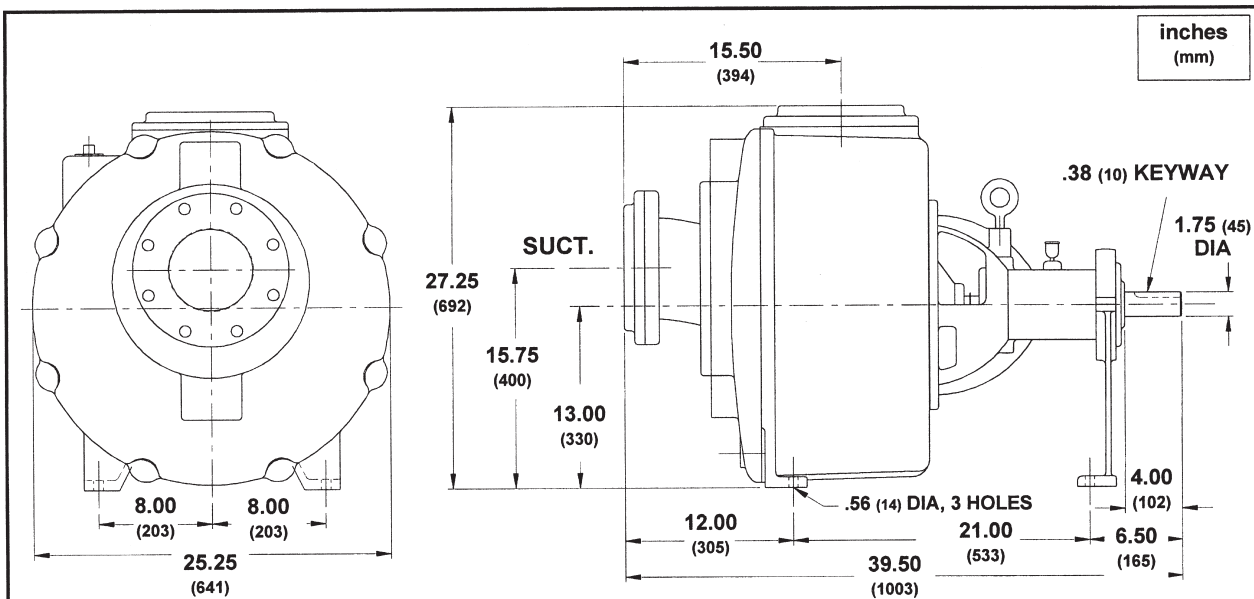
Design: Semi-Open Type, Passes 1-1/2" Solids.
Material: Cast Iron ASTM A-48, Class 30.
Dynamically Balanced, ISO G6.3.
Steel
Buna-N
Corrosion Resistant Steel.
Air Dry Enamel.
Single Mechanical
Grease, with Self-Feeding Lubricator.
Rotating Face - Carbon
Stationary Face - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

BEARING-PUMP END:
Design: Single Row, Ball
Lubrication: Oil
Load: Radial & Thrust

BEARING-DRIVE END:
Design: Single Row, Ball
Lubrication: Oil
Load: Radial & Thrust

CHECK VALVE:
Material: Elbow-Cast Iron ASTM A-48, Class 30
Valve Flap-Neoprene.
Weights-Cast Iron ASTM A-48, Class 30
Seal Materials, Case Heater, Stainless

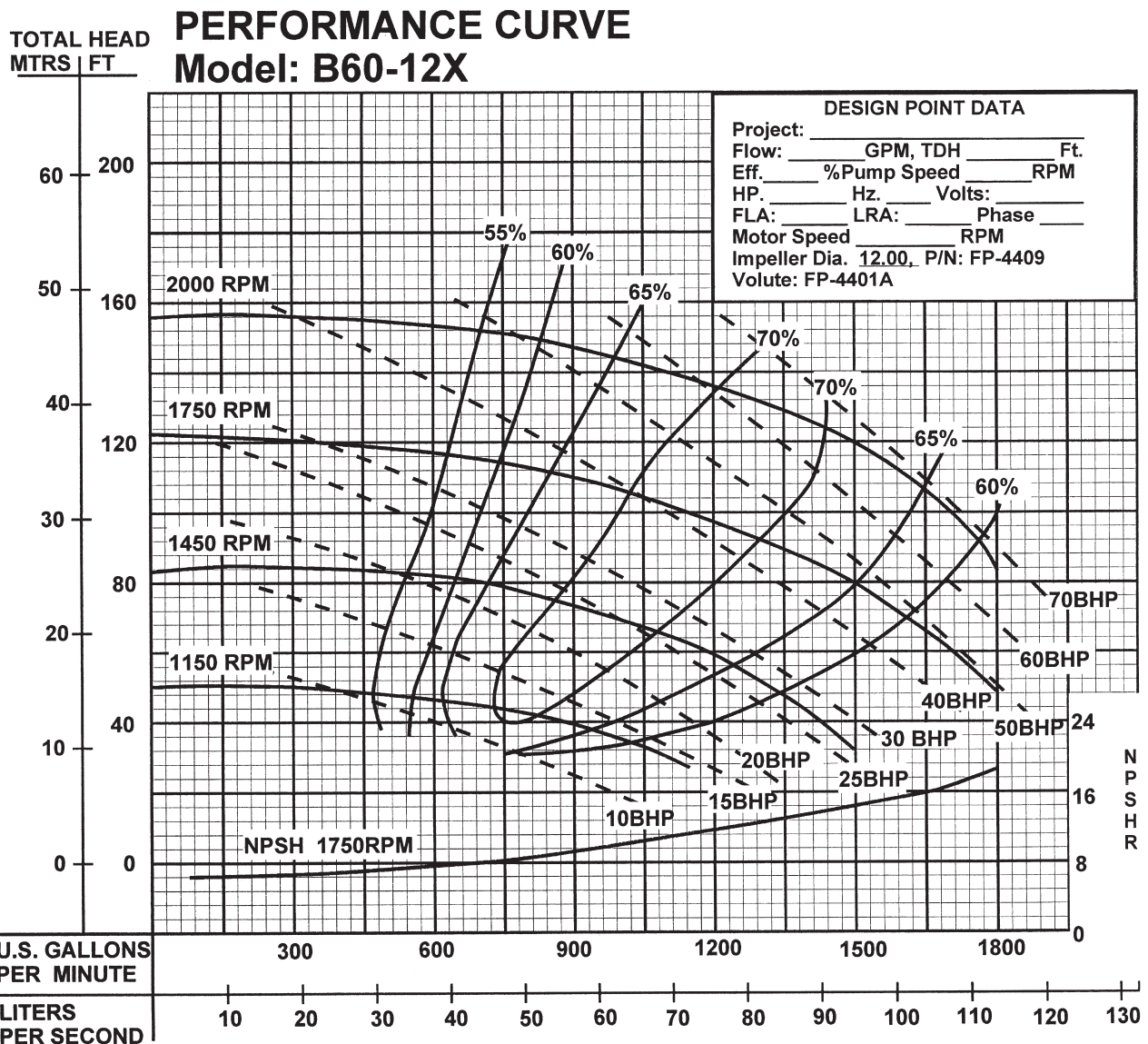
OPTIONAL EQUIPMENT:
Hardware; High Temperature Control; Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor Adjusting Base & OSHA Guard.



MODEL NO.	PART NO.	WEIGHT NET LBS.
B60-12X	6COZD-0012X-001	585
B60-11H	6COZD-0011H-001	585
B60-11X	6COZD-0011X-001	585
B60-10L	6COZD-0010L-001	585

IMPORTANT !

- DO NOT USE FOR PUMPING FLUIDS WITH A FLASH POINT OF LESS THAN 100°F.
- MAKE CERTAIN THAT PUMP AND/OR MOTOR ASSEMBLY AND CONTROLS HAVE THE APPROPRIATE RATINGS FOR THE GIVEN APPLICATION AREA CLASSIFICATION. (ie DIVISION I, AGENCY LISTING ETC.)



MAXIMUM DRY PRIMING LIFT	
PUMP SPEED	10 MIN.
1150RPM	20 Ft.
1450RPM	25 Ft.
1750RPM	25 Ft.
2000RPM	25 Ft.
2250RPM	25 Ft.

When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is the corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This **net available NPSH** must exceed the **required NPSH** of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the **low** liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the **high** liquid level to the centerline of the impeller.

Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.

TAX BITES

Car Rentals

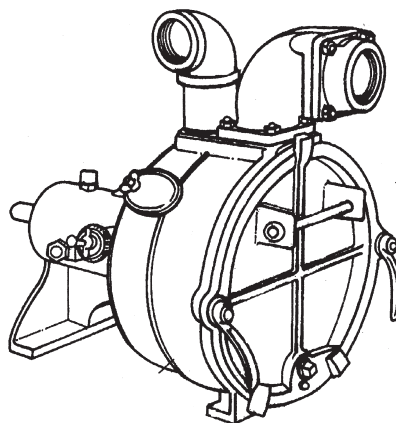
As part of the trend toward exporting a state or local tax burden, car rental taxes are increasingly popular with lawmakers concerned about taxing their voting constituents. Although studies have shown that more than half of cars are rented by local consumers, the notion that taxing rental cars is taxing tourists is pervasive on the state and local level. In fact, the number of car rental excise taxes has nearly doubled in the last decade with taxes in 110 localities in 43 states and Washington, D.C.

Local excise taxes and other charges imposed by states and municipalities have added 26 percent, or \$13.70 to the average \$52.71 rental car bill. However, this doesn't include the full tax burden included in the cost of renting a car. When taking into account taxes including federal and state income taxes, federal payroll taxes, sales taxes, unemployment insurance taxes, workmen's compensation taxes, business license taxes and fees, utility taxes, local property taxes, and any local income taxes, the total cost rises to 60.6 percent of the bill.

All told, whether you are a tourist or a resident, renting that car for \$52.71, will cost you \$31.94 in taxes and fees.

Specifications:

SUCTION/DISCHARGE:	2" (51mm) x 2" (51mm) NPT, Female.
LIQUID TEMPERATURE:	160°F (71°C) Continuous.
VOLUTE/WEARPLATE:	Cast Iron ASTM A-48, Class 30, Replaceable, External Clearance Adjustment.
CASE:	Cast Iron ASTM A-48, Class 30.
END COVER:	Cast Iron ASTM A-48, Class 30. Full Diameter, Removable.
SEAL PLATE:	Alloy Steel; Replaceable
PEDESTAL:	Cast Iron ASTM A-48, Class 30.
IMPELLER:	<i>Design:</i> Two Vane, Open. <i>Material:</i> Cast Iron ASTM A-48, Class 30. Dynamically Balanced, ISO G6.3. High Carbon Steel
SHAFT:	Buna-N
SQUARE RINGS:	Corrosion Resistant Steel.
HARDWARE:	Air Dry Enamel.
PAINT:	Single Mechanical
SEAL:	<i>Design:</i> Grease, with Self-Feeding Lubricator. <i>Lubrication:</i> Rotating Face - Carbon <i>Material:</i> Stationary Face - Ceramic Elastomer - Buna-N Hardware - 300 Series Stainless
BEARING-PUMP END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Oil <i>Load:</i> Radial & Thrust
BEARING-DRIVE END:	<i>Design:</i> Single Row, Ball <i>Lubrication:</i> Oil <i>Load:</i> Radial & Thrust
CHECK VALVE:	<i>Material:</i> Elbow-Cast Iron ASTM A-48, Class 30 Valve Flap-Neoprene. Weight-Cast Iron ASTM A-48, Class 30
OPTIONAL EQUIPMENT:	Seal Materials, Case Heater, Stainless Hardware; High Temperature Control; Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy. and Left Hand V-Belt Drive Assy. with Unit Base, Motor Adjusting Base & OSHA Guard.



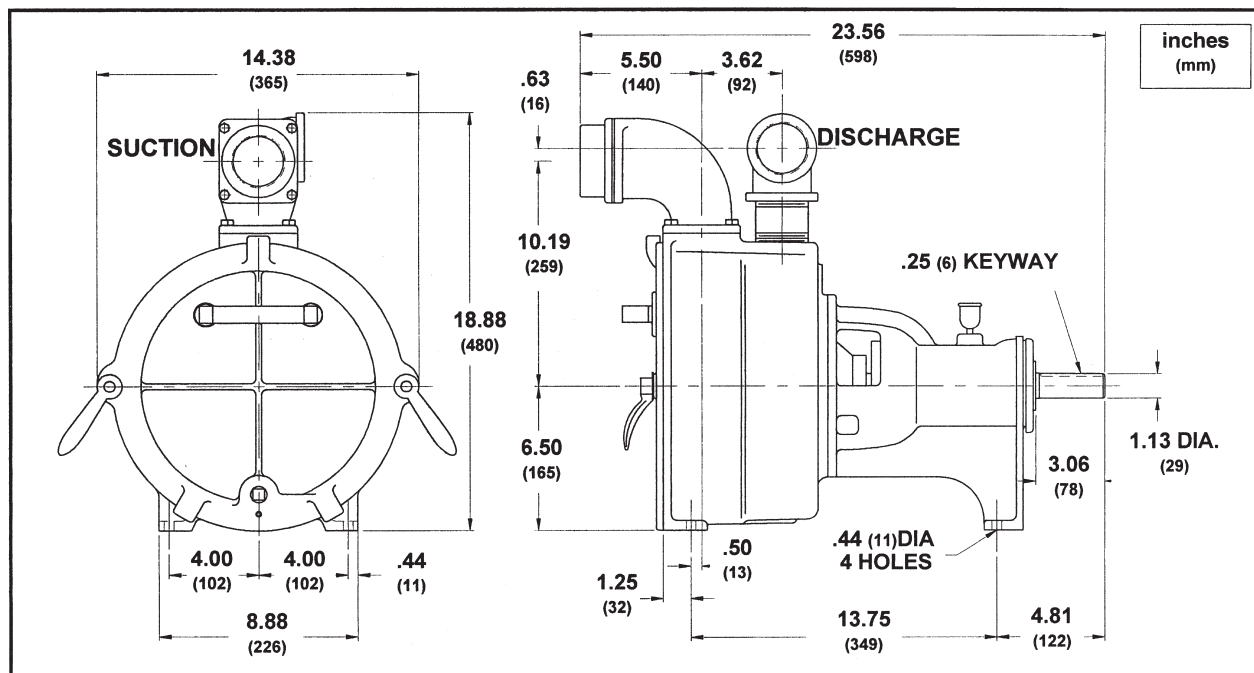
Model: PO2LA-6C



American Bureau of Shipping
Certificate No.
01-HS238523B/1-PDA

Description:

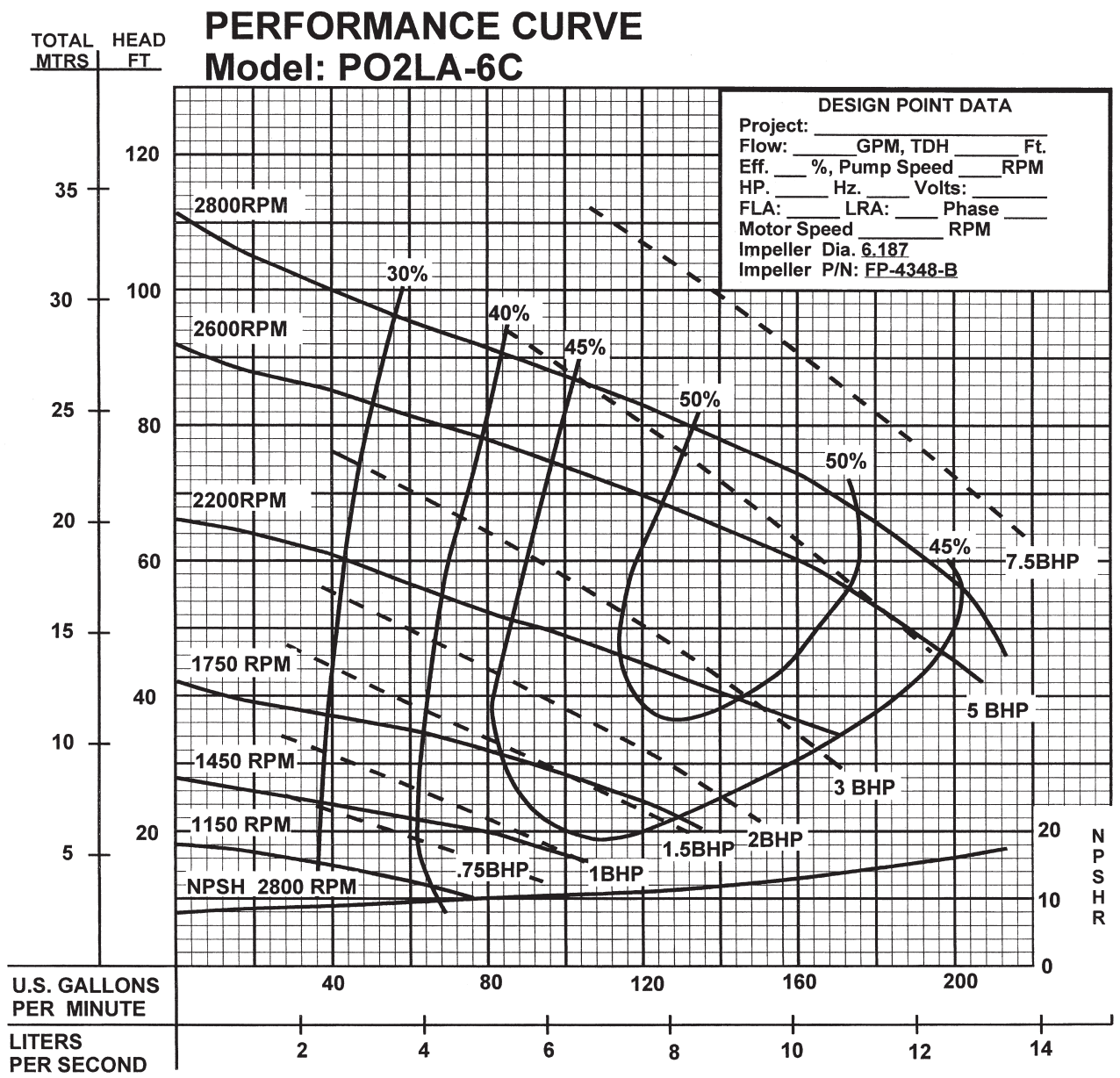
SELF-PRIMING CENTRIFUGAL SOLIDS
HANDLING PUMPS DESIGNED FOR
MUNICIPAL AND INDUSTRIAL
APPLICATIONS.



MODEL NO.	PART NO.	WEIGHT LBS.
PO2LA-6C	2COOD-0006C-001	160 (73kg)

IMPORTANT !

- DO NOT USE FOR PUMPING FLUIDS WITH A FLASH POINT OF LESS THAN 100°F.
- MAKE CERTAIN THAT PUMP AND/OR MOTOR ASSEMBLY AND CONTROLS HAVE THE APPROPRIATE RATINGS FOR THE GIVEN APPLICATION AREA CLASSIFICATION. (ie DIVISION I, AGENCY LISTING ETC.)



PUMP SPEED	MAXIMUM DRY PRIMING LIFT				
	2 Min.	4 Min.	6 Min.	8 Min.	10 Min.
1150RPM	3 Ft	6 Ft	8 Ft	9 Ft	10 Ft
1450RPM	5 Ft	8 Ft	12 Ft	14 Ft	16 Ft
1750RPM	9 Ft	17 Ft	22 Ft	23 Ft	25 Ft
2200RPM	17 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2600RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2800RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft

When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is the corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This **net available NPSH** must exceed the **required NPSH** of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the **low** liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the **high** liquid level to the centerline of the impeller.

Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.

WORD ORIGINS

SNOB

Meaning: A snooty person; someone who puts on airs

Origin: "It seems that Oxford freshmen were required to register 'according to rank.' Those not of noble birth added after their names the phrase *sine nobilitate* which was then abbreviated to 's. nob.', thus creating ... a perfect definition for the commoner who wishes to mingle with the nobles." (From *Dictionary of Word and Phrase Origins, Vol. III* by William and Mary Morris)

BARNES®

PO3LA, PO3LB

SELF-PRIMING PUMPS

Solids Handling Universal Drive

1.5"- 2.5" Spherical Solids Handling

Larger sizes available

Specifications:

SUCTION/DISCHARGE: 3" (76mm) x 3" (76mm) 125lb. Flange.
LIQUID TEMPERATURE: 160°F (71°C) Continuous.

SOLIDS HANDLING:
PO3LA: 1.50" Spherical
PO3LB: 2.50" Spherical
VOLUTE/WEARPLATE: Cast Iron ASTM A-48, Class 30, Replaceable, External Clearance Adjustment.

CASE: Cast Iron ASTM A-48, Class 30.
END COVER: Cast Iron ASTM A-48, Class 30. Full Diameter, Removable.

SEAL PLATE: Alloy Steel; Replaceable
PEDESTAL: Cast Iron ASTM A-48, Class 30.

IMPELLER:
Design: Two Vane, Open.
Material: Ductile Iron ASTM A-395. Dynamically Balanced, ISO G6.3.

SHAFT: High Carbon Steel

SHAFT SLEEVE: 316 Stainless Steel

SQUARE RINGS: Buna-N

HARDWARE: Corrosion Resistant Steel.

PAINT: Air Dry Enamel.

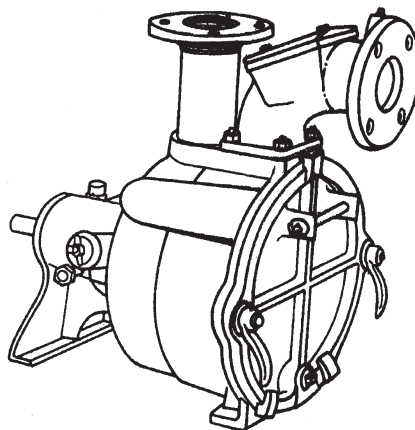
SEAL:
Design: Single Mechanical
Lubrication: Grease, with Self-Feeding Lubricator.
Material: Rotating Face - Carbon
Stationary Face - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

BEARING-PUMP END:
Design: Single Row, Ball
Lubrication: Oil
Load: Radial & Thrust

BEARING-DRIVE END:
Design: Single Row, Ball
Lubrication: Oil
Load: Radial & Thrust

CHECK VALVE:
Material: Elbow-Cast Iron ASTM A-48, Class 30
Valve Flap-Neoprene.

OPTIONAL EQUIPMENT: Weight-Cast Iron ASTM A-48, Class 30
Seal Materials, Case Heater, Stainless Hardware; High Temperature Control; Flex Coupled Assy. with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy. and In-Line Vertical V-Belt Drive Assy. with Base, Motor Adjusting Base & OSHA Guard.



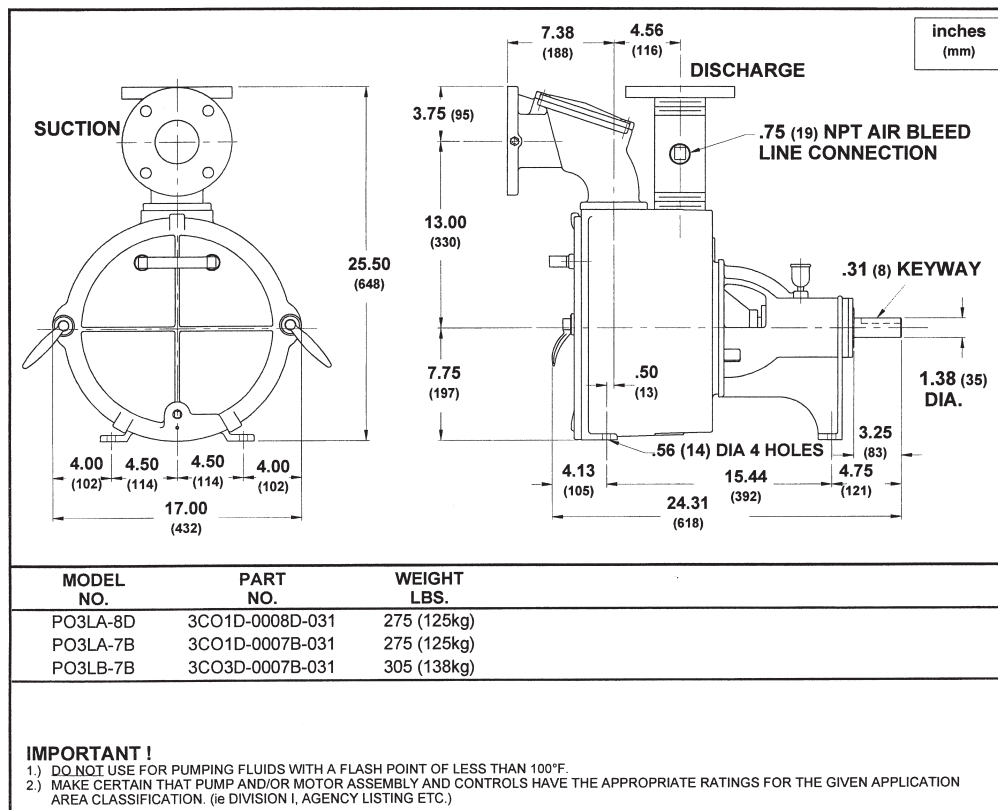
**Models: PO3LA-8D
PO3LA-7B
PO3LB-7B***



American Bureau of Shipping
Certificate No.
01-HS238523B/1-PDA

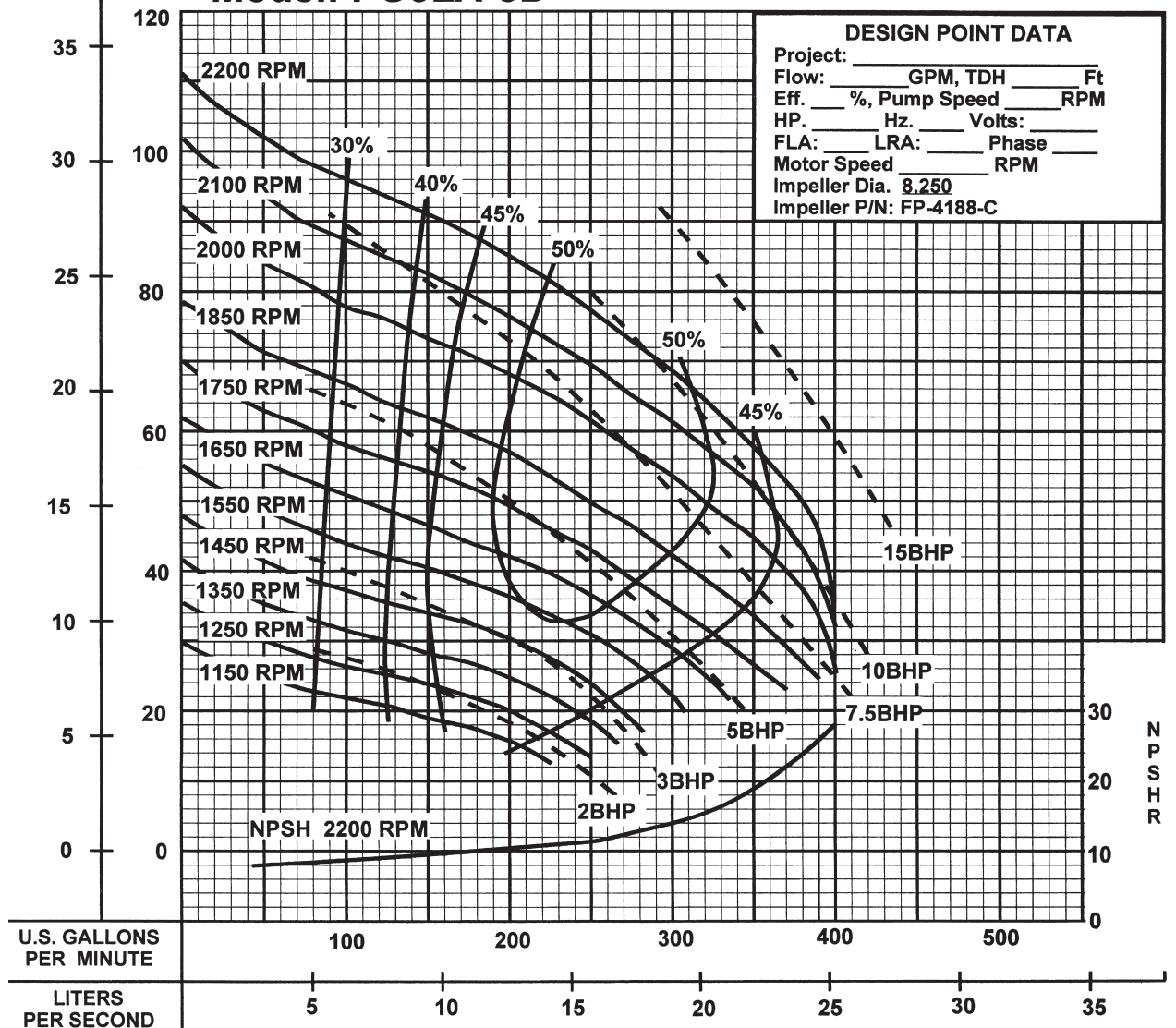
Description:

SELF-PRIMING CENTRIFUGAL SOLIDS HANDLING PUMPS DESIGNED FOR MUNICIPAL AND INDUSTRIAL APPLICATIONS.



TOTAL HEAD
MTRS | FT

PERFORMANCE CURVE Model: PO3LA-8D



DESIGN POINT DATA

Project: _____

Flow: _____ GPM, TDH _____ Ft

Eff. _____ %, Pump Speed _____ RPM

HP. _____ Hz. _____ Volts: _____

FLA: _____ LRA: _____ Phase _____

Motor Speed _____ RPM

Impeller Dia. 8.250

Impeller P/N: FP-4188-C

PUMP SPEED	MAXIMUM DRY PRIMING LIFT				
	2 Min.	4 Min.	6 Min.	8 Min.	10 Min.
1150RPM	8 Ft	14 Ft	17 Ft	18 Ft	19 Ft
1450RPM	14 Ft	20 Ft	22 Ft	23 Ft	25 Ft
1750RPM	22 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2050RPM	24 Ft	25 Ft	25 Ft	25 Ft	25 Ft
2200RPM	25 Ft	25 Ft	25 Ft	25 Ft	25 Ft

When pump is operating, the **SUCTION LIFT** is limited by the available **NPSH** which is the corrected atmospheric pressure minus the dynamic suction lift, vapor pressure loss and 2 foot safety factor. This net available NPSH must exceed the required NPSH of the pump or a reduction of capacity, loss of efficiency, noise, vibration and cavitation will result. Calculate the dynamic suction lift from the low liquid level to the centerline of the impeller. When pump is priming, it is limited by the dry **PRIMING LIFT** which is the vertical distance from the high liquid level to the centerline of the impeller.

Testing is performed with water, specific gravity of 1.0 @ 68° F, other fluids may vary performance.

FAMILIAR PHRASES

WIN HANDS DOWN

Meaning: To win by an enormous margin.

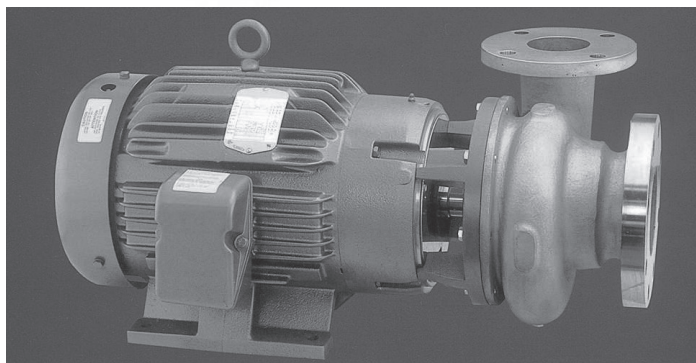
Origin: If a racehorse jockey is so far ahead of the competition that there is no danger he will be passed again, he can drop the reins—and his hands-and let the horse finish the race without spurring it on.

BAKER'S DOZEN

Meaning: Thirteen—one more than a dozen.

Origin: In the Middle Ages, bakers who sold loaves of bread that were lighter than the legal weight were subjected to harsh penalties. To prevent being accused of cheating on the weight, bakers would often give away an extra loaf with every dozen.

Ampco Pumps Company



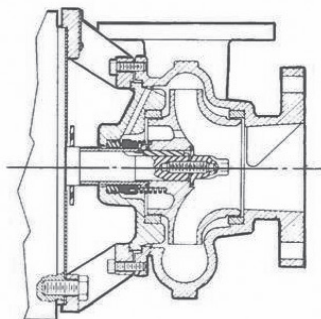
Nickel Aluminum Bronze Pumps For Saltwater Applications

The Ampco line of nickel aluminum bronze centrifugal pumps are ideally suited for saltwater, as well as brackish water, waste water and pollution control applications. The wetted end parts of Ampco pumps are constructed of ASTM-B-148 C958, commonly referred to as CDA958. The overall corrosion/erosion resistance of this alloy to saltwater is superior to stainless steel — and costs less. All of Ampco's nickel aluminum bronze pumps, E, K and Z Series, have ABS (American Bureau of Shipping) type approval.

In addition to exceptional corrosion resistance, nickel aluminum bronze offers these important features:

- Resists erosive wear due to the high velocities developed by the rotating impeller.
- Resists the immense stress incurred during a cavitating condition.
- Resists fouling which can reduce efficiency and promote a severe crevice corrosion attack.
- Even in a "down" state, CDA958 provides better protection against saltwater pitting that is so prevalent in stainless steel pumps.

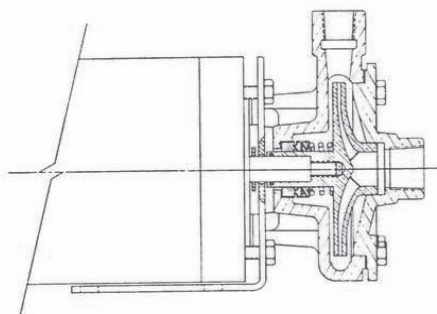
Z SERIES



The non-comprising design of Ampco pumps results in higher efficiencies, longer life and lower energy and maintenance costs. Each series of pumps is available in either close-coupled or frame mounted versions. The Z Series offers multiple sealing options to meet the most demanding applications.

The United States Navy has been using CDA958 (MIL24480) for more than forty years. Commercial saltwater applications include booster pumps and supply pumps on water treatment systems (including reverse osmosis, distillation and desalinization) and multiple uses on board vessels, such as bilge, ballast, engine cooling, condenser cooling, refrigeration, washdown, salt water supply, circulation and fire pumps.

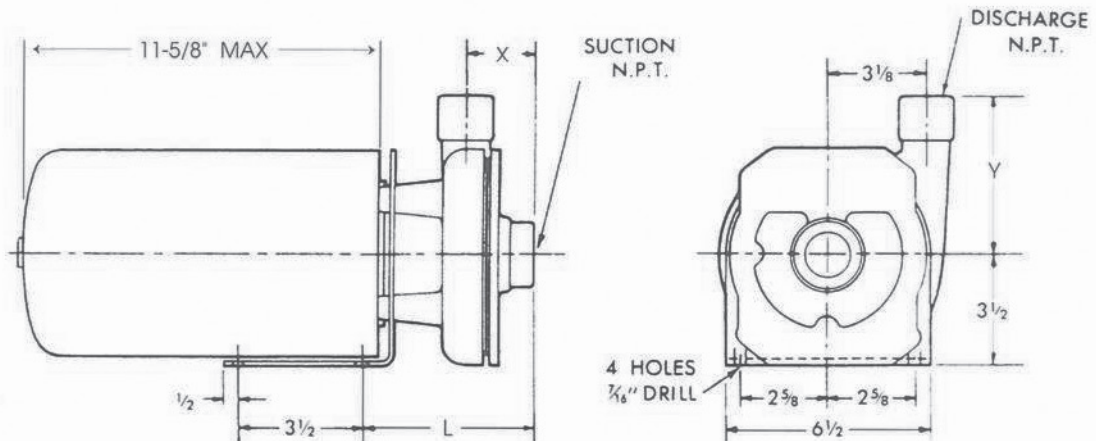
K SERIES



In addition to the K and Z Series, Ampco offers a wide range of centrifugal pumps in both nickel aluminum bronze and stainless steel. Lead time for standard close coupled pumps is one week or less.

Ampco Pumps Company

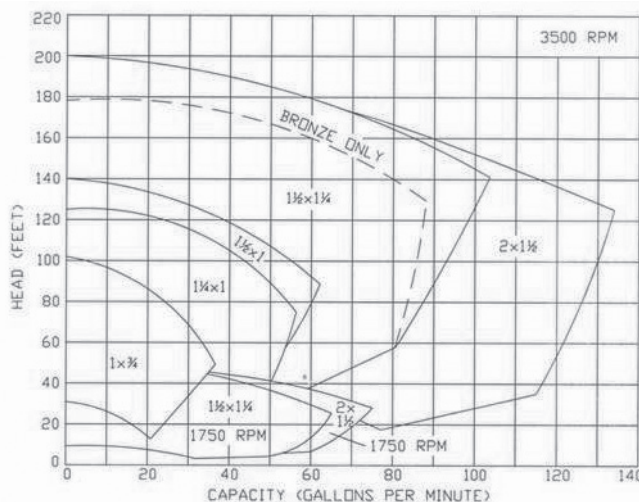
AMPCO K SERIES



Dimensions are approximate, for reference only.

PUMP		MOTOR-TEFC			DIMENSIONS IN INCHES				
TYPE	SIZE	FRAME	H.P.*	RPM	SUCTION	DISCHARGE	L	X	Y
KC2	1 X 3/4	56J	1	3500	1	3/4	6	2 7/8	4 7/8
KC2	1 1/4 X 1	56J	2	3500	1 1/4	1	5 7/8	2 7/32	5
KC2	1 1/2 X 1	56J	3	3500	1 1/2	1	6	2 13/32	5
KC2	1 1/2 X 1 1/4	213JM	7 1/2	3500	1 1/2	1 1/4	12 13/32	2 3/16	6 1/2
KC2	2 X 1 1/2	213JM	7 1/2	3500	2	1 1/2	12 11/32	3 3/4	6 3/4

*The Horsepower listed is typically for a full diameter impeller. Other 56J Frame Motors include 1/2 and 3/4 HP.

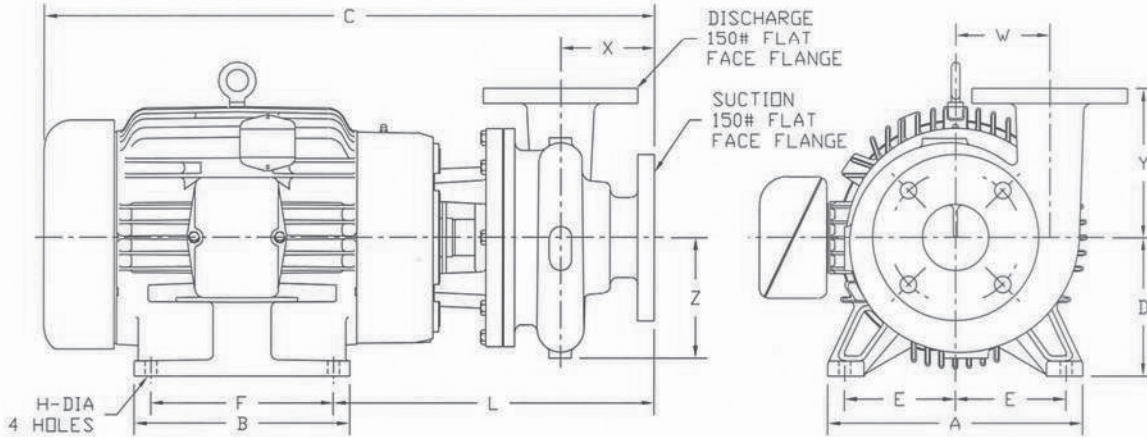


CHARACTERISTICS INCLUDE:

- Allowable Working Pressure — up to 150 psi
- Temperatures to 225°F
- Multiple Sealing Options
- Enclosed Impellers
- Close coupled to Nema Standard Jet Pump Motor, Std. MG1-18.340

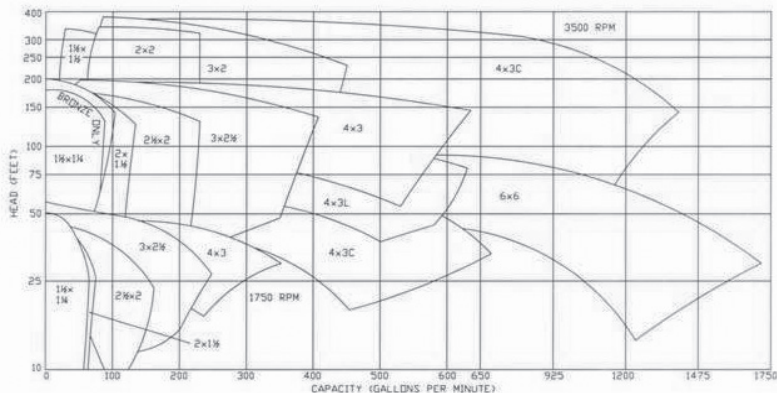
pany

AMPCO Z SERIES



Dimensions are approximate, for reference only.

PUMP		MOTOR-TEFC			DIMENSIONS IN INCHES													
TYPE	SIZE	FRAME	H.P.	RPM	SUCT.	DISCH.	A	B	C	D	E	F	H	L	W	X	Y	Z
ZC2	1½ X 1¼	143JM	1	1750	1½	1¼	7	6	17¾	3½	2¾	4	1⅞	10¾	3⅞	3⅞	6½	4⅞
ZC2	1½ X 1¼	213JM	7½	3500	1½	1¼	10½	7½	21⅝	5¼	4¼	5½	1⅞	12⅞	3⅞	3⅞	6½	4⅞
ZC2	1½ X 1½	182JM	3	1750	1½	1½	8½	6½	21⅞	4½	3¼	4½	1⅞	12	5½	4⅞	6½	6⅞
ZCH2	1½ X 1½	256JM	20	3500	1½	1½	11½	11½	29¾	6¼	5	10	1⅞	14½	5½	4⅞	6½	6⅞
ZC2	2 X 1½	213JM	7½	3500	2	1½	10½	7½	21½	5¼	4¼	5½	1⅞	12⅞	3¾	3¾	6¾	4⅞
ZC2	2½ X 2	215JM	10	3500	2½	2	10½	9	23¾	5¼	4¼	7	1⅞	13⅞	4	4⅞	7⅞	4⅞
ZC2	3 X 2½	183JM	3	1750	3	2½	9	6½	19¾	5½	3¾	4½	1⅞	12⅞	4¼	4¼	6¾	5⅞
ZC2	3 X 2½	215JM	10	3500	3	2½	10½	9	24	5¼	4¼	7	1⅞	13⅞	4¼	4¼	6¾	5⅞
ZCH2	3 X 2½	256JM	20	3500	3	2½	12½	12½	31⅞	6¼	5	10	1⅞	14¾	4¼	4¼	6¾	5⅞
ZC2	4 X 3	213JM	5	1750	4	3	10½	7½	24⅞	5¼	4¼	5½	1⅞	13⅞	4½	5⅞	6½	6
ZC2	4 X 3	215JM	10	3500	4	3	10½	9	25⅞	5¼	4¼	7	1⅞	13⅞	4½	5⅞	6½	6
ZCH2	4 X 3	286JM	30	3500	4	3	14	14	32⅞	7	5½	11	1⅞	15⅞	4½	5⅞	6½	6
ZC2	4 X 3C	215JM	10	1750	4	3	9½	8	24⅞	5¼	4½	7	1⅞	12⅞	—	3⅞	9⅞	7
ZCH2	4 X 3C	326JM	50	3500	4	3	14½	14	34¼	8	6¼	12	2⅞	14⅞	—	3⅞	9⅞	7
ZCH2	4 X 3L	256JM	20	1750	4	3	11½	11½	30½	6¼	5	10	1⅞	15⅞	6	5½	8	7½
ZC2	6 X 6	256JP	20	1750	6	6	11½	11½	30¼	6¼	5	10	1⅞	17⅞	8	2⅞	9	10
ZCH2	2 X 2	286JM	30	3500	2	2	12¾	12¾	32¼	7	5½	11	1⅞	14⅞	5½	3¾	7¾	6½
ZCH2	3 X 2	256JM	20	3500	3	2	11½	11½	29¾	6¼	5	10	1⅞	14⅞	5⅞	4½	7¾	6½

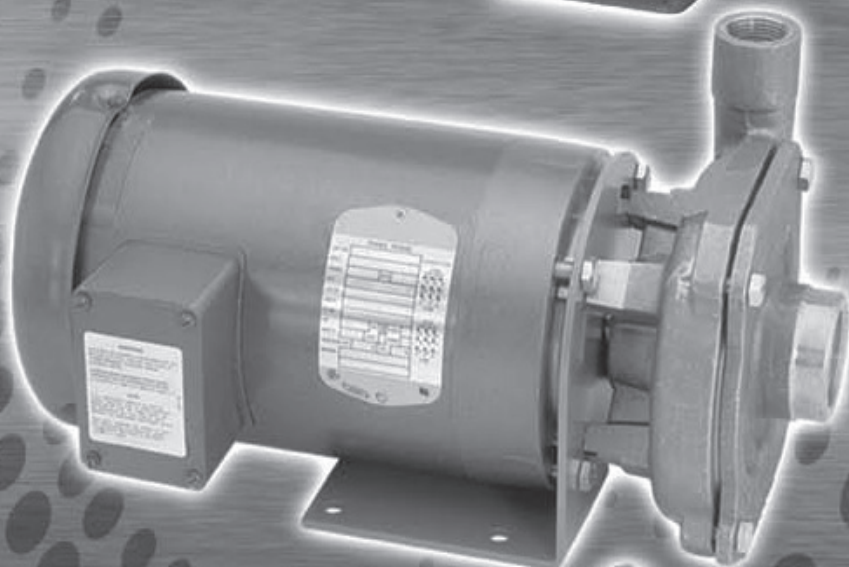
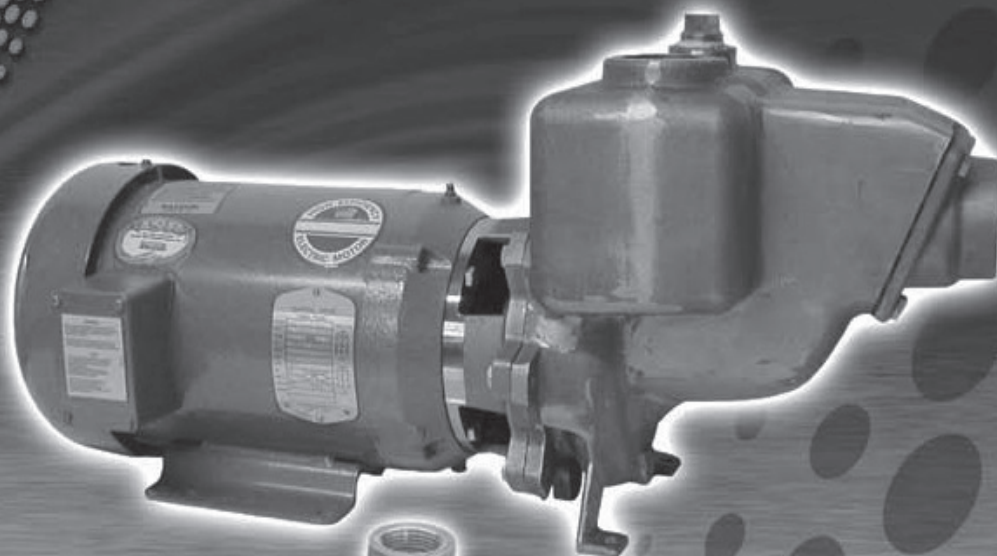


CHARACTERISTICS INCLUDE:

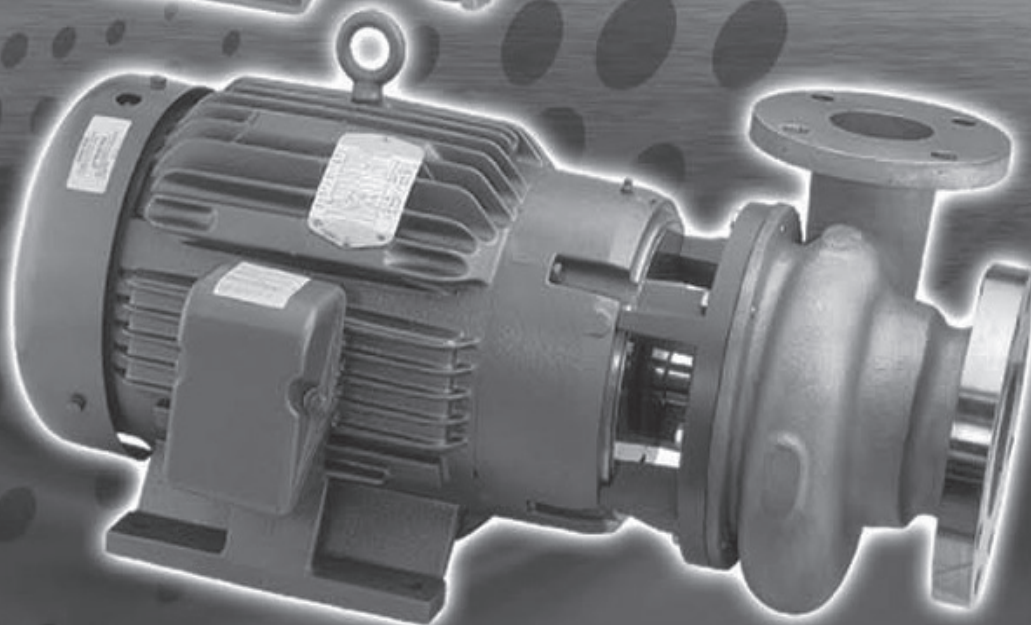
- Allowable Working Pressure — up to 175 psi
- Temperatures to 250°F
- Multiple Sealing Options
- Internal Seal Flush
- Replaceable Wear Rings
- Close coupled to Nema Standard “JM” motors

Ampco Pumps Company

Marine and Industrial CENTRIFUGAL PUMPS



*K, R and Z Series pumps
are available from stock in
nickel aluminum bronze,
316 stainless steel and
duplex 2205 stainless steel*

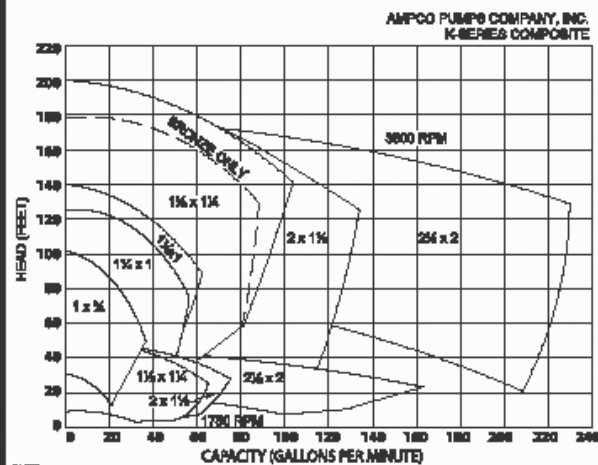


Ampco Pumps Company



K Series

R Series

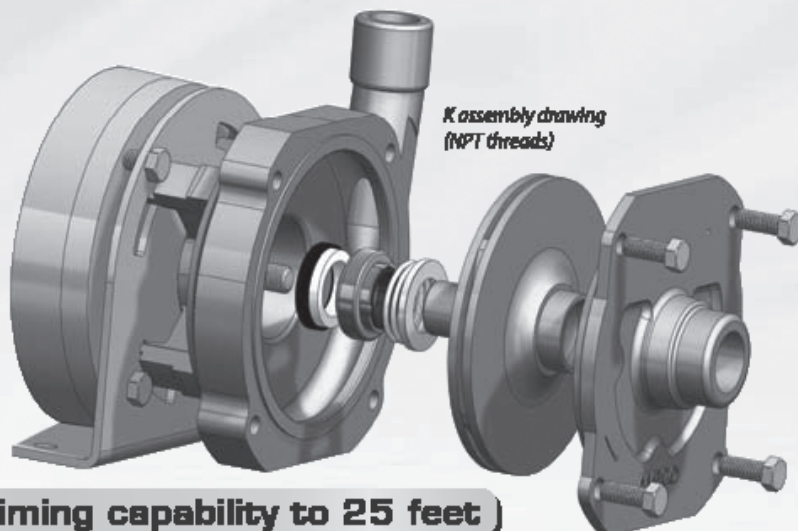




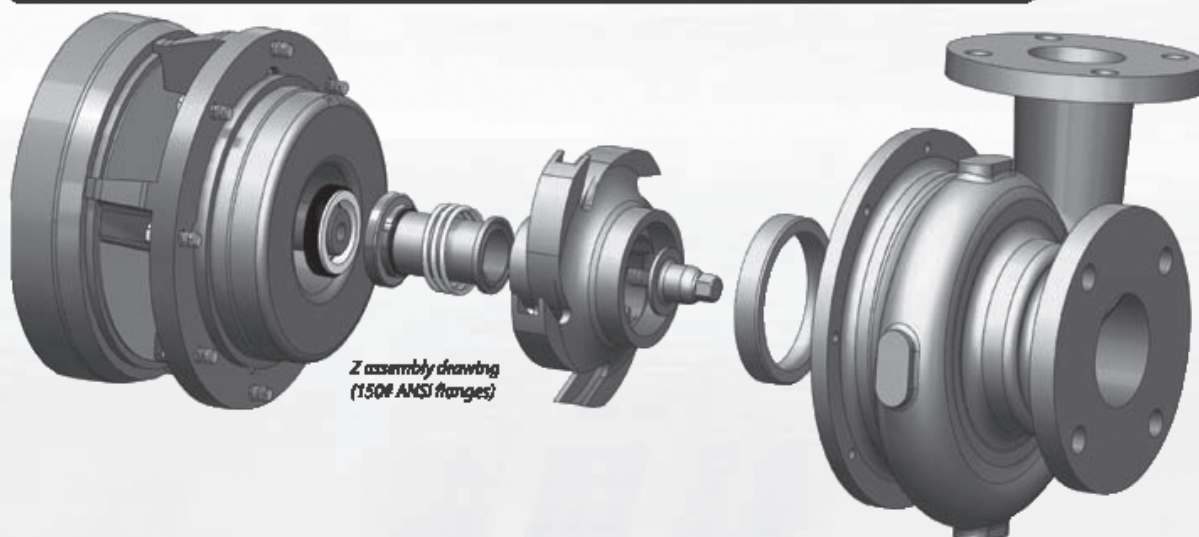
Marine & Industrial PUMPS

All K, R and Z Series pumps share the following characteristics:

- Heavy-wall cast construction with tight manufacturing tolerances
- High efficiency design with fully shrouded impellers
- Dynamically balanced impellers
- Close coupled on JM or 56J frame motors
- ABS (American Bureau of Shipping) type approval
- Every assembled unit is run on our test stand to verify hydraulic, mechanical and electrical performance



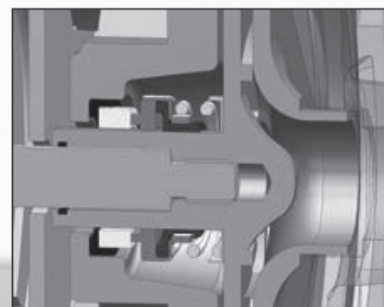
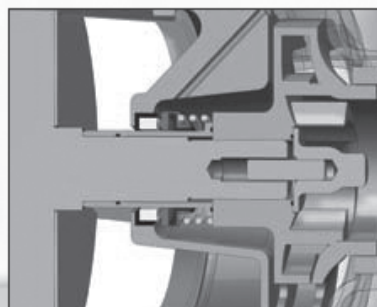
R Series pumps have self-priming capability to 25 feet



The standard mechanical seal for marine and industrial pumps is a Type 21 with ceramic versus carbon seal faces, buna elastomers and 316 SS metallics. Various material options are available, including silicon carbide, tungsten carbide, ni-resist, viton, EPDM, teflon, monel and others. Optional seal choices include Type 1, Type 9, double mechanical seals, packing and cartridge seals.

RC2/ZC2 Type 21 Seals

KC2



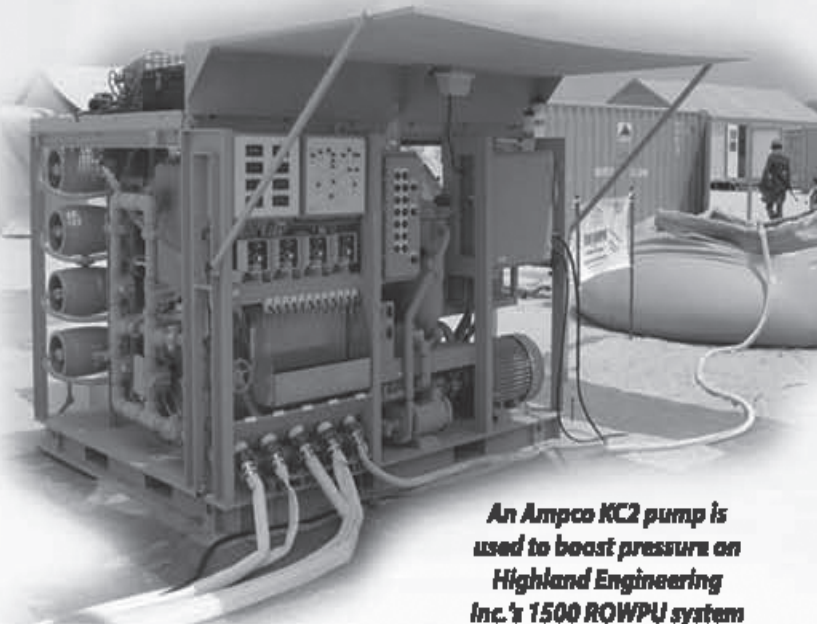


Alloy Selection

Ampco offers the K, R and Z Series pumps in nickel aluminum bronze (CDA958), 316 stainless steel and duplex 2205 stainless steel construction. All three alloys are in stock and normally available for delivery in one week or less. Our application engineers will help select the right alloy for your application.

Nickel aluminum bronze

- A very cost effective material for saltwater, as well as brackish water and waste water
- The overall corrosion / erosion resistance of this alloy to saltwater is far superior to stainless steel or standard bronzes
- The U.S. Navy has been using CDA958 in saltwater applications for over 40 years
- Ampco's K, R and Z Series pumps have been used on most of the U.S. Army's reverse osmosis systems since the 1980's



An Ampco KC2 pump is used to boost pressure on Highland Engineering Inc.'s 1500 ROWPU system

316 stainless steel:

- High resistance to corrosion from many chemical solutions
- The material of choice in food and beverage processing applications

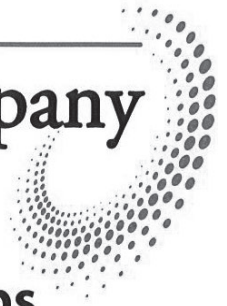


Ampco's AC2 2x2 self-priming pump serves as the raw water supply pump on Highland Engineering Inc.'s 1500 ROWPU system

Duplex 2205:

- Highly recommended for saltwater applications with higher salinity (over 30,000 ppm) and higher temperature
- Also recommended for saltwater applications with a high concentration of hydrogen sulfides (such as pumping from a deep seawater well) which will attack nickel aluminum bronze
- Superior resistance to the effects of cavitation
- Superior resistance to wear from abrasive media such as diatomaceous earth or ethanol

• Please see our website at www.ampcopumps.com for a complete compatibility chart for these alloys. We also manufacture K, R and Z Series pumps in specialty alloys such as Hastalloy C, Alloy 20, 316L stainless steel and others.



Ampco Introduces Duplex 2205 Alloy Pumps

Ampco's standard K,R, and Z Series pumps are now available from stock in Duplex 2205, in addition to 316 SS and nickel-aluminum bronze. Duplex 2205 is highly recommended for seawater reverse osmosis and desalination applications, in addition to other applications that require superior corrosion resistance, superior resistance to the effects of cavitation, or enhanced resistance to particle contamination. Pricing for Duplex 2205 pumps is now available on our website.



Background:

Duplex 2205 is a relatively newer grade of stainless steel alloy that offers a multitude of advantages over 316 & 316L alloys. The "duplex" term refers to the dual-grain structure nature of this alloy – it is 45% ferritic and 55% austenitic. The "2205" refers to the 22% chromium/5% nickel constituents present in the alloy. The wide array of advantages that the duplex alloy provides over 316 & 316L alloys have enabled it to rapidly gain acceptance in a number of industries including marine, oil & gas, petrochem, pulp & paper, wastewater, and desalination. These advantages include:

- Lower coefficient of thermal expansion
- Higher thermal conductivity
- Resistance to chloride stress-cracking
- Superior resistance to pitting & crevice corrosion
- Superior erosion fatigue properties
- High yield strength; \approx twice that of austenitic stainless steels

Additional key points:

- Duplex 2205 is 45% ferritic – as such, it will be far more magnetic than any 304 or 316 alloy that you will encounter
- The term "Super Duplex" refers to duplex alloys such as UR52N+ that incorporate copper into their chemistry. The addition of copper provides dramatically improved corrosion resistance to hot chlorides and strong reducing acids, such as H_2SO_4 . The duplex 2205 alloy used by Ampco may contain a small amount of copper, but can **not** be referred to as a "Super" Duplex.

Compatibilities Rating

A – Excellent B- Good C – Fair/Component life will be limited
NR – Not Recommended



Fluid Media	Metals			Elastomers				Seal Faces			
	Duplex 2205	Cast CF8M S.S.	Bronze CDA958	Buna-N	Viton	EPDM	Teflon	Carbon	Ceramic	Silicon Carbide	Tungsten Carbide
Acetic Acid, <30%	A	A	A	NR	B	A	A	A	A	A	A
Acetic Acid, > 30%, to 70 °F	NR	A	A	NR	B	B	A	A	A	A	NR
Acetone	A	A	A	NR	A	A	A	A	A	A	A
Aluminum Sulphate, <10%	A	B	A	A	A	A	A	A	A	A	NR
Aluminum Sulphate, >10%	B	NR	A	A	A	A	A	A	A	A	NR
Ammonia, Liquid	NR	NR	-	NR	NR	A	A	A	A	A	A
Ammonium Chloride, <10%	B	B	NR	A	A	A	A	A	A	A	NR
Ammonium Hydroxide, <30%	A	A	NR	A	C	A	A	A	A	B	NR
Amyl Acetate	A	A	-	A	NR	C	A	A	NR	A	A
Amyl Alcohol, to 200 °F	A	A	-	B	B	A	A	A	A	A	A
Amyl Chloride, to 150 °F	A	A	A	-	A	NR	A	A		A	A
Anti-Freeze, to 140 °F	A	A	A	C	C	A	A	A	A	A	A
Barium Chloride, <5%	AB	B	A	A	A	A	A	A	A	A	NR
Barium Hydroxide, to 160 °F	A	AB	AB	A	A	A	A	A	A	A	A
Beer	A	AB	A	A	A	A	A	A	A	A	A
Beet Sugar Liquors	A	A	A	A	A	A	A	A	A	A	A
Benzene	A	A	A	A	A	A	A	A	A	A	A
Bisphenol-A	A	A	-	B	A	NR	A	A	A	A	NR
Bleach-Sodium Hypochlorite, <20%	B	B	B	NR	A	A	A	NR	A	B	NR
Bromine	NR	NR	-	NR	A	NR	NR	NR	A	B	NR
Bunker C Fuel Oil	A	A	-	A	A	-	A	A	NR	A	A
Butane, Liquid	A	A	A	A	A	NR	A	A	A	A	A
Calcium Bisulfate	B	B	-	B	B	A	A	A	A	B	NR
Calcium Chlorate	B	B	-	C	C	A	A	A	A	A	NR
Chlorine Water	B	B	NR	NR	A	NR	A	A	A	A	A
Citric Acid	A	AB	NR	A	A	A	A	A	A	A	NR
Corn Oil	A	A	-	A	A	C	A	A	A	A	A
Cutting Oil	A	A	A	A	A	NR	A	A	A	A	A
De-ionized Water	A	A	-	B	B	A	A	A	A	A	NR
Diesel Fuel	A	A	A	A	A	NR	A	A	A	A	A
Dimethyl Ether, <50%	B	B	-	A	B	B	A	A	A	A	A
Dimethyl Formahyde	A	A	-	B	NR	A	A	A	A	A	A
Esters	A	A	A	NR	A	A	A	A	A	A	A
Ethers, to 70 °F	A	A	A	NR	A	C	A	A	-	A	A
Ethyl Alcohol	A	A	-	C	C	A	A	A	A	A	A
Ethyl Chloride, to 140 °F	A		-	A	A	C	A	A	A	A	NR
Ethyl Mercaptin, to 70 °F	A	B	-	NR	A	-	A	A	A	A	NR
Ethylene Chlorohydrin	AB	AB	-	NR	A	B	NR	-	-	-	-
Ethylene Dichloride	AB	-	-	NR	A	C	A	A	A	A	NR
Ethylene Glycol, to 140 °F	A	A	A	A	A	A	A	A	A	A	A
Ferric Chloride	NR	NR	NR	A	A	A	A	A	A	B	NR
Formic Acid	A	NR	AB – 70°F	-	NR	A	A	A	A	B	A
Fruit Juice	A	A	-	A	A	A	A	A		A	A
Furfural	A	A*	A	NR	NR	A	A	A	C	A	NR
Gasoline	A	A	A	A	A	NR	A	A	A	A	NR

The above chart is a guide to the materials used to fabricate the internal "wetted" components in the centrifugal pumps manufactured by Ampco Pumps. The information in this chart is based upon careful examination of available published information and is believed to be accurate. However, since the resistance of metals, polymers, and elastomers can be affected by concentration, temperature, and other factors, this information should be considered as a general guide rather than an unqualified guarantee. The end user of the pump must ultimately decide the suitability of the pump materials with their own system.

Compatibilities Rating

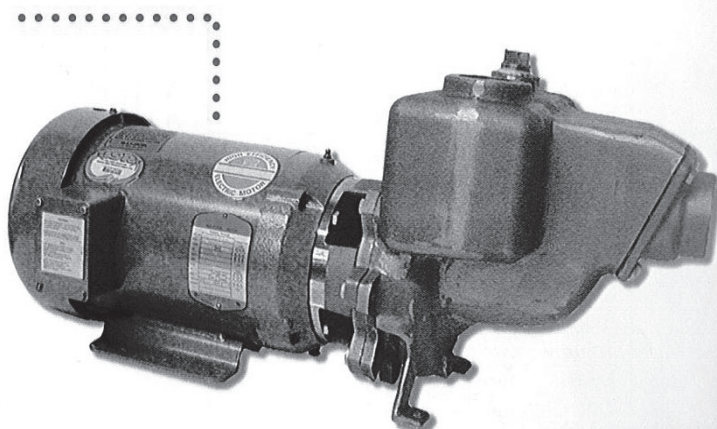
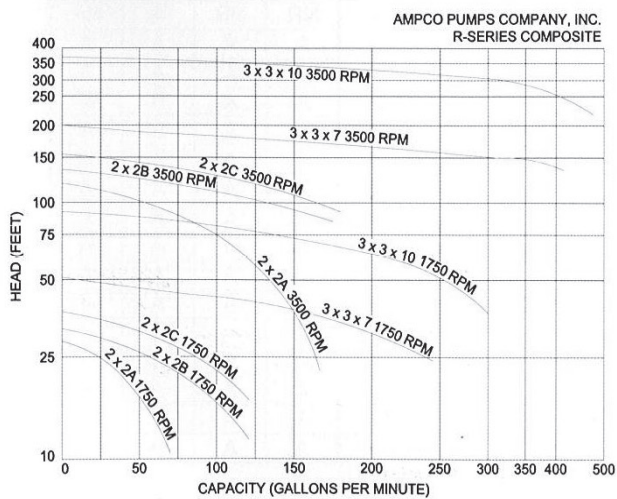
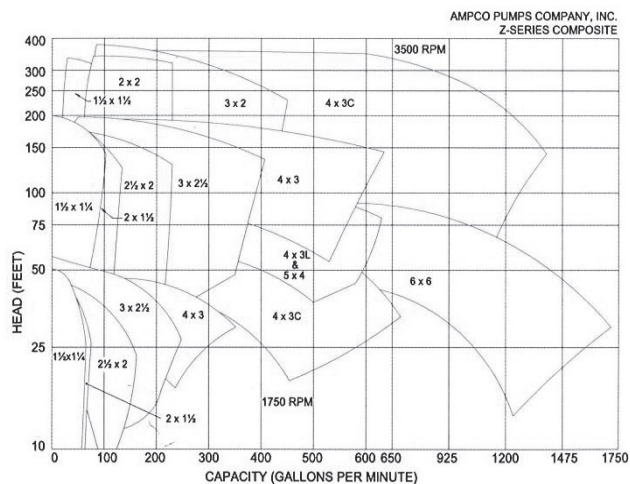
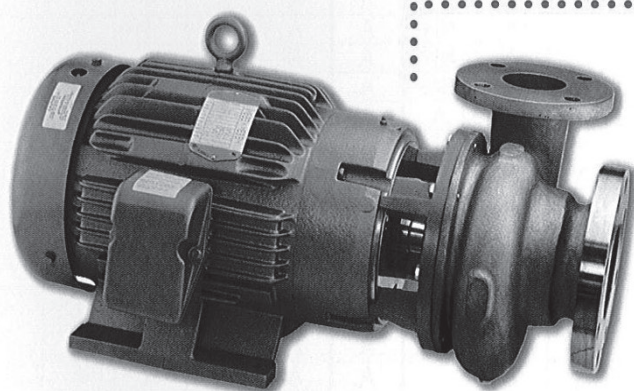
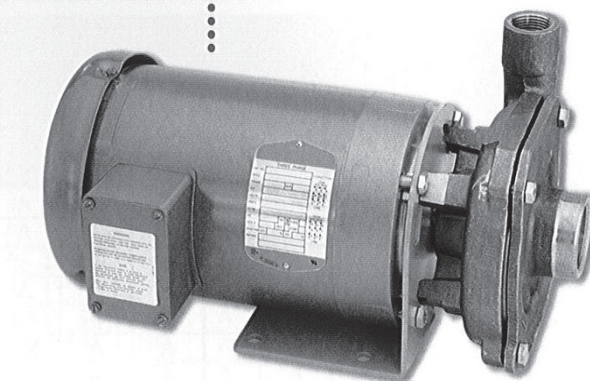
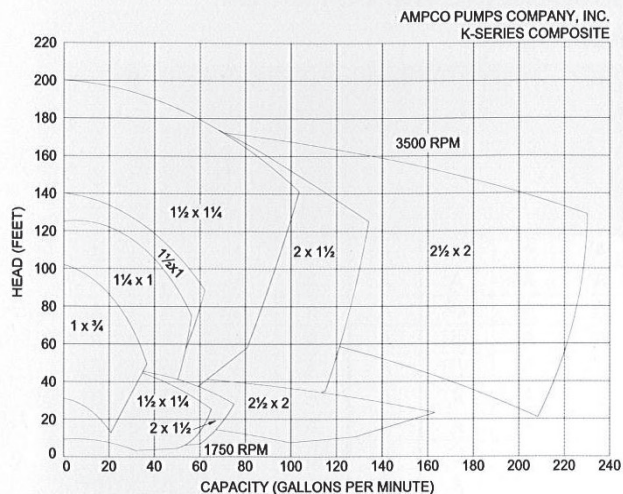
A – Excellent B- Good C – Fair/Component life will be limited
NR – Not Recommended



Fluid Media	Metals			Elastomers				Seal Faces			
	Duplex 2205	Cast CF8M S.S.	Bronze CDA958	Buna-N	Viton	EPDM	Teflon	Carbon	Ceramic	Silicon Carbide	Tungsten Carbide
Glucose	A	A	A	A	A	A	A	A	A	A	A
Glycerine	A	A	A	A	A	A	A	A	A	A	A
Hexane	A	A	-	A	A	NR	A	A	A	A	A
Hydraulic Oil	A	A	A	A	A	NR	A	A	A	A	A
Hydrochloric Acid, <15%	NR	NR	AB	NR	A	NR	A	A	A	NR	NR
Hydrocyanic Acid, <15%	A	A	NR	B	A	A	A	A	A	B	NR
Hydrogen Peroxide, <30%	A	A	NR	B	A	A	A	A	A	A	NR
Hydrogen Peroxide, <85%	A	AB	NR	NR	A	C	A	NR	A	A	NR
Iodine	B	B	NR	B	B	A	A	A	A	A	NR
Isobutane	A	A	A*	A	A	NR	A	A	A	A	A
Isobutyl Alcohol	A	A	-	B	A	A	A	A	A	A	A
Isopropyl Acetate	A	A	-	NR	NR	B	A	A	A	A	A
Isopropyl Ether	A	A	-	B	NR	NR	A	A	A	A	A
Jet Fuel	A	A	-	B	A	NR	A	A	A	A	A
Kerosene	A	A	-	A	A	NR	A	A	A	A	A
Ketones	A	A	B	NR	NR	A	A	A	A	A	A
Lacquer Thinner	A	A	A	NR	NR	NR	A	A		A	A
Linseed Oil	A	A	-	A	A	C	A	A	A	A	A
Liquid Petroleum Gas	A	A	A	A	A	NR	A	A	A	A	A
Magnesium Chloride, <33% to 70 °F	A	A	A	A	A	A	A	A	A	A	A
Magnesium Hydroxide, <10%	AB	AB	A	B	A	A	A	A	A	A	A
Magnesium Sulfate, <40%	A	B	A	A	A	A	A	A	A	A	A
Methanol	A	A	-	NR	NR	A	A	A	A	A	A
Methyl Ethyl Ketone (MEK)	A	A	-	NR	NR	A	A	A	A	A	A
Molasses	A	A	A	A	A	-	A	A	A	A	A
Naptha, Petroleum	A	A	A	B	A	NR	A	A	NR	A	A
Nitric Acid, <50%	A	A	NR	NR	A	B		A	A	NR	A
Nitric Acid, >50%	-	B	NR	NR	C	NR	A	NR	NR	A	NR
Oleic Acid	A	A	A*	C	B	NR	A	A	A	A	NR
Ozone, <12%	A	A	-	NR	A	A	A	NR	NR	A	NR
Palm Oil	A	A	-	A	A	NR	A	A	A	A	A
Palmitic Acid	A	B	B	A	A	B	A	A	A	A	A
Potassium Chloride	A	B	A	A	A	A	A	A	A	B	NR
Potassium Hydroxide	A	B	AB	C	C	A	A	NR	A	B	A
Potassium Nitrate	A	-	B	A	A	A	A	A	A	A	A
Propane	A	A	A	A	A	NR	A	A	A	A	A
Propylene Glycol	A	A	-	C	C	A	A	A	A	A	A
Rapeseed Oil	A	A	-	B	A	A	A	A	A	A	A
Sea Water	A	B	A	A	A	A	A	A	A	A	A
Sodium Chloride	A	AB	A	A	A	A	A	NR	A	A	NR
Sodium Hydroxide, <50%	A	AB	A	B	B	A	A	A	-	NR	NR
Sulphuric Acid, <2%	A	B	A	C	C	A	A	A	A	NR	NR
Toluene	A	A	A	NR	A	NR	A	A	A	A	A
Xylene	A	B	A	NR	A	NR	A	A	A	A	A
Zinc Chloride	A	B	NR	A	A	A	A	A	A	B	NR

The above chart is a guide to the materials used to fabricate the internal "wetted" components in the centrifugal pumps manufactured by Ampco Pumps. The information in this chart is based upon careful examination of available published information and is believed to be accurate. However, since the resistance of metals, polymers, and elastomers can be affected by concentration, temperature, and other factors, this information should be considered as a general guide rather than an unqualified guarantee. The end user of the pump must ultimately decide the suitability of the pump materials with their own system.

Universal Curves



John Wooden

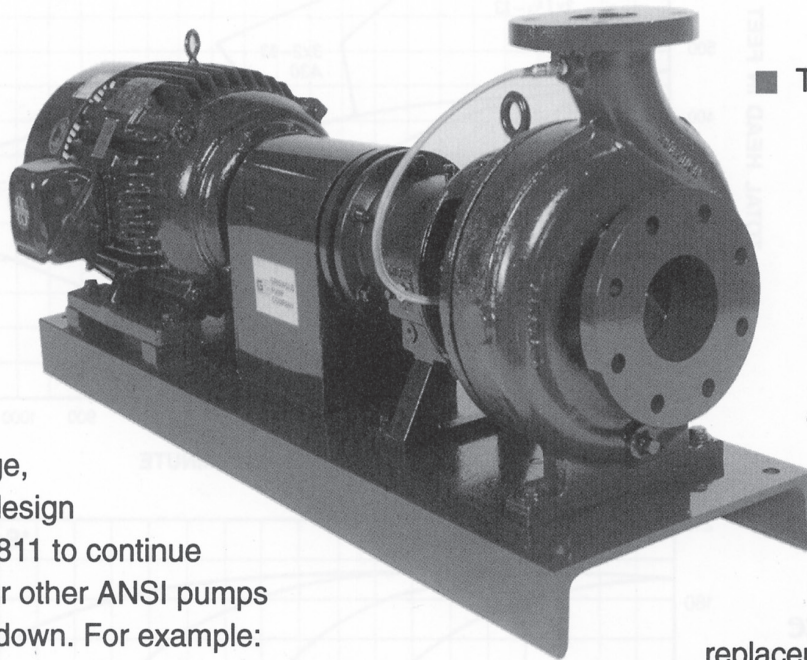
Success is peace of mind which is a direct result of self-satisfaction in knowing you made the effort to become the best of which you are capable.

GRISWOLD 811 ANSI Centrifugal Pumps ...

GRISWOLD's Model 811 meets or exceeds all ANSI standards for the chemical processing industry. The fully open impeller, centerline discharge, and other unique design features allow the 811 to continue operating long after other ANSI pumps wear out or break down. For example:

- A choice of extra-heavy-duty, **stocked, Ductile Iron, Stainless Steel, Alloy 20 and CD4M** pump materials coupled with multiple seal design options allows you to tailor the 811 to virtually any process flow application.

- The fully-open impeller design features large wear areas and back pump-out vanes, making the 811 far superior in handling corrosive and erosive fluids. Open impellers balance hydraulic axial thrust loads, lengthen bearing life, and reduce stuffing box pressure too.



- The self-tightening impeller with O-ring seal eliminates part corrosion, gasket leakage, and all chance of loosening in high temperature environments.

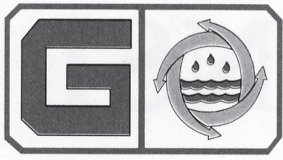
- Replaceable shaft sleeve and adapters allow easy replacement of sealing surface without shaft and bearing disassembly, without bearing contamination.

- Any external clearance adjustments due to wear can easily be made on-site with an ordinary open-end wrench. No shimming is required.

- **Interchangeable components** simplify installation and on-site replacement, reduce the need for spare parts stocking.

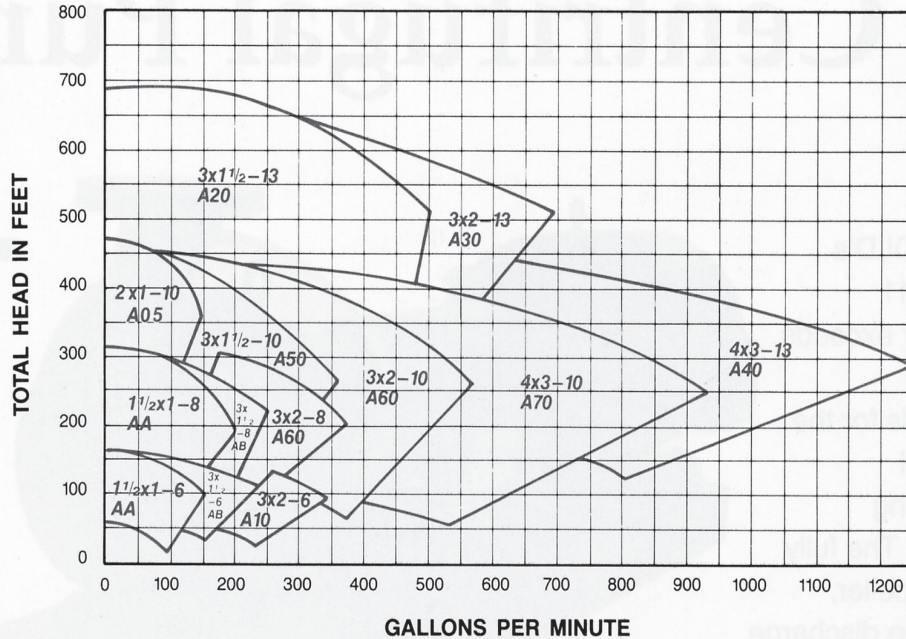
- And best of all, the Model 811 is available in a wide range of sizes and capacities to fit virtually any process fluid application.

... Standard 811's can be **shipped within 36 hours** ... that's our "36-Hour Commitment" to you!

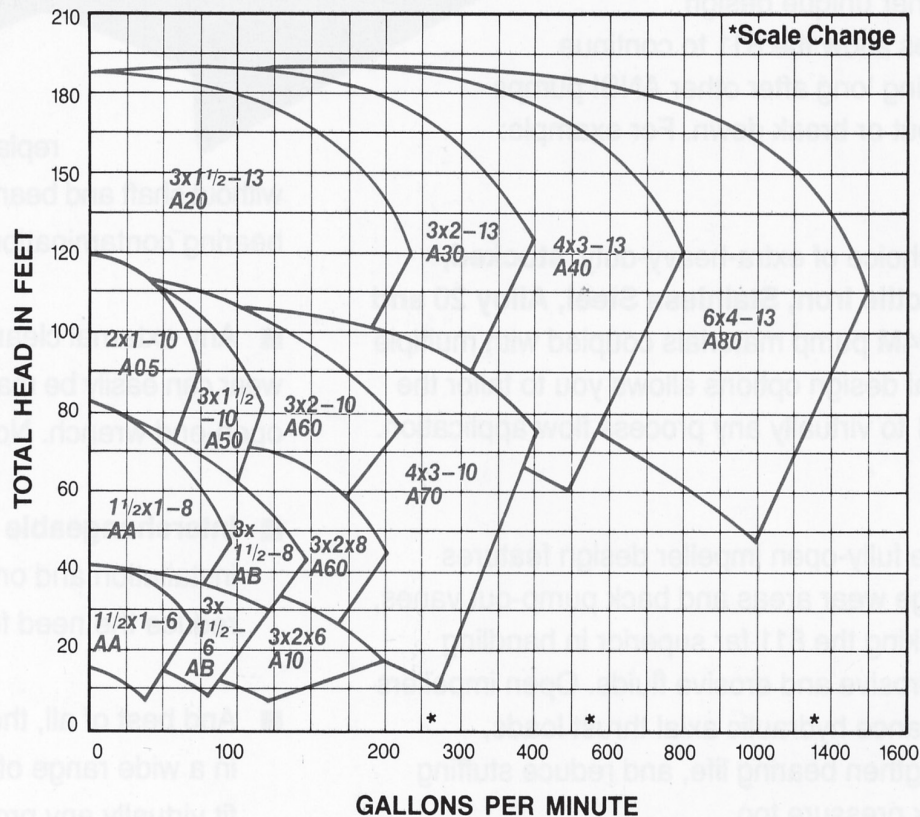


GRISWOLD PUMP COMPANY

3550 RPM Performance Curve



1750 RPM Performance Curve



FAMILIAR PHRASES

BET YOUR BOTTOM DOLLAR

Meaning: It's a sure thing; to bet everything you have.

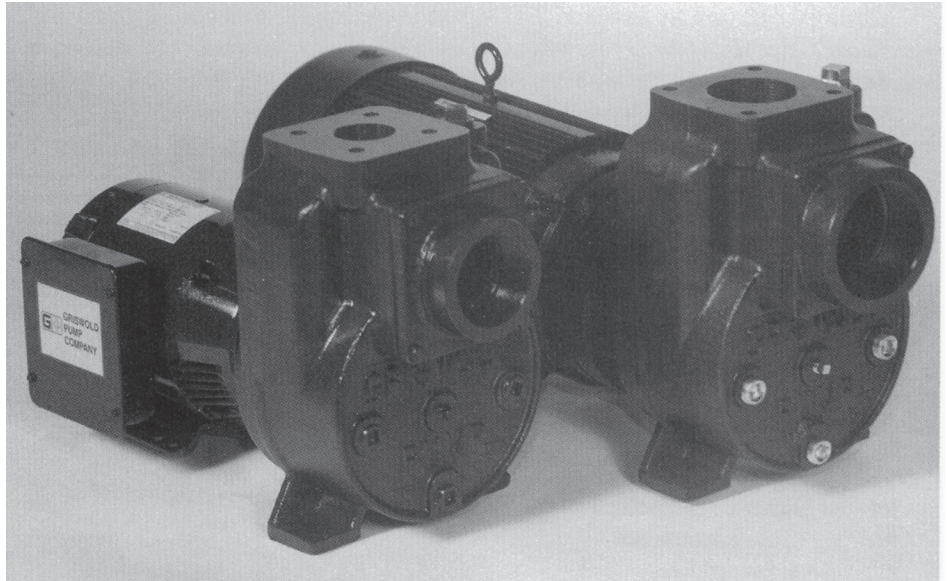
Origin: just as they do today, 19th-century poker players would keep their betting chips-or "dollars"-in high stacks at the table, taking from the top when betting. When a hand was so good that a player wanted to wager the entire stack, they would pick up or push the stack by the bottom chip-literally betting with their bottom dollar.

Griswold H Series, High Head, Self-Priming Pump

Griswold's High Pressure H Series pumps offer performances previously unavailable.

Ideally suited for applications where relatively clean water is needed at higher pressures.

**Pressures up to 110 PSI
(260 Feet)
and flows to 325 GPM...
fire protection, marine,
forestry, irrigation, in-
dustrial and commercial
applications.**



The H Series pumps are designed specifically to lift water (up to a maximum of 25 feet). Unlike standard

end suction centrifugal pumps the Griswold H Series is a true self-priming pump. Able to maintain it's prime even when check valves or foot valves have failed. The suction line being located higher on the pump housing than conventional centrifugal pumps keeps the impeller and mechanical seal covered with water at all times eliminating the need to re-prime the pump and protects the seal from running dry and costly replacements.

The H Series pumps are available in two versions. The HL pumps are designed for higher pressures at lower flows with lower horsepowers. The HH pumps are designed for higher flows at higher pressures requiring higher horsepowers.

Both the HL and the HH pumps are available in your choice of drivers. Close-coupled electric motors, long-coupled frame mounted, or close-coupled engine driven with your choice of gas, diesel or LP fueled air cooled engines. Close-coupled, electric driven pumps are available with ODP or TEFC, JM frame motors.

Pressures up to 110 PSI (260 Feet) and flows to 325 GPM...

Griswold H Series, High Head, Self-Priming Pump

PUMP FEATURES

Casing - Heavy duty cast iron ASTM A48 class 30 case with built-in drain and priming plugs and bolt-on suction flange. The HL and HH also have (3) 3/4" NPT plugged connections on the case for accessories to be installed or auxiliary water outlets. Extra-large priming chamber for fast, trouble-free priming. The HL and HH series offers dual connections. Both pumps can be connected by either NPT threads or ANSI flanges on the discharge and NPT threads or Victaulic® groove connections on the suction.

Suction Flanges - Bolt-on suction flange available in a variety of sizes to accommodate your specific flow and horsepower requirements. The 3" flange is machined for both 3" NPTF threads and 3" Victaulic groove connection. The 4" flange is machined for 4" NPTF threads.

The suction line being located higher on the pump housing than conventional centrifugal pumps keeps the impeller and mechanical seal covered with water at all times eliminating the need to reprime the pump and protects the seal from running dry and costly replacements.

Built-In Check Valve - Prevents siphoning and need for repriming. No external check valve is required. Designed for easy replacement.

Discharge - dual connections. Both pumps can be connected by *either* NPT threads or ANSI flanges.

1" NPT Priming Plug
(Not Shown)

JM Frame Motors

All Brands, All Phases & Voltages
60 or 50 Cycle ODP,
TEFC Explosion
Proof Chew Duty
IEEE45 Marine Duty
Inverter Duty

OR

Frame Mounted

OR

Engine Driven

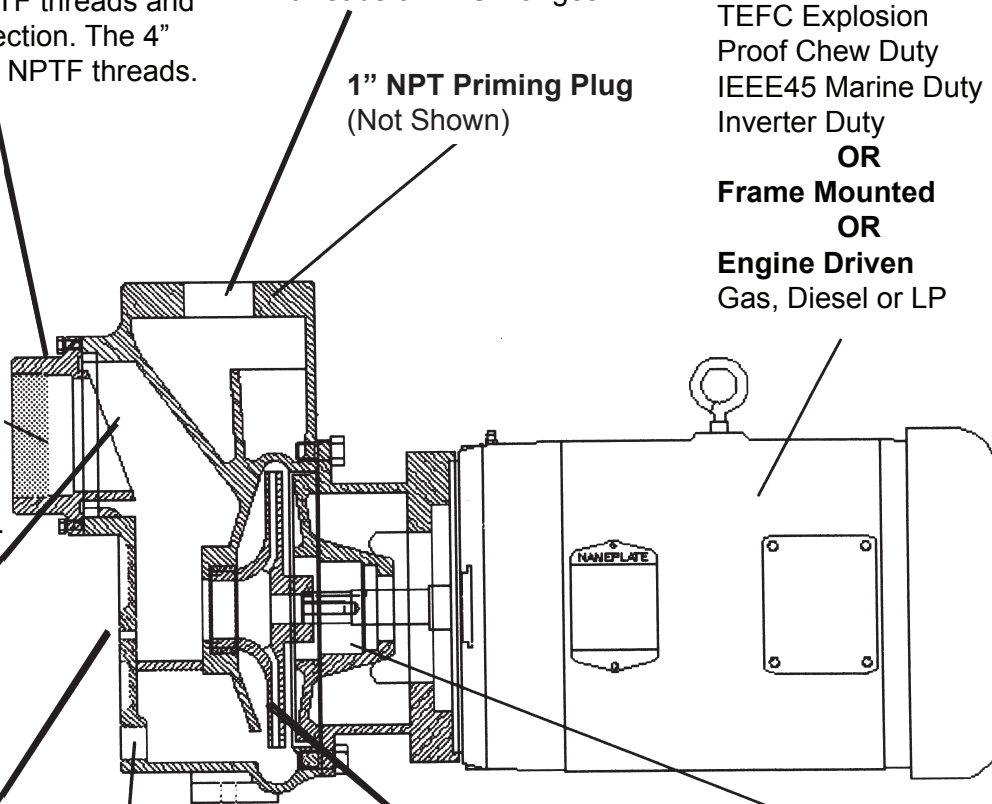
Gas, Diesel or LP

**(3) 3/4" NPT
Accessory Tappings
(Pressure)**

Enclosed Impeller - Bronze. single piece design, balanced and trimmed for a specific operating range.

Choice of Seals - Carbon and ceramic faces, plus stainless steel components eliminate maintenance problems. Other seal options are available.

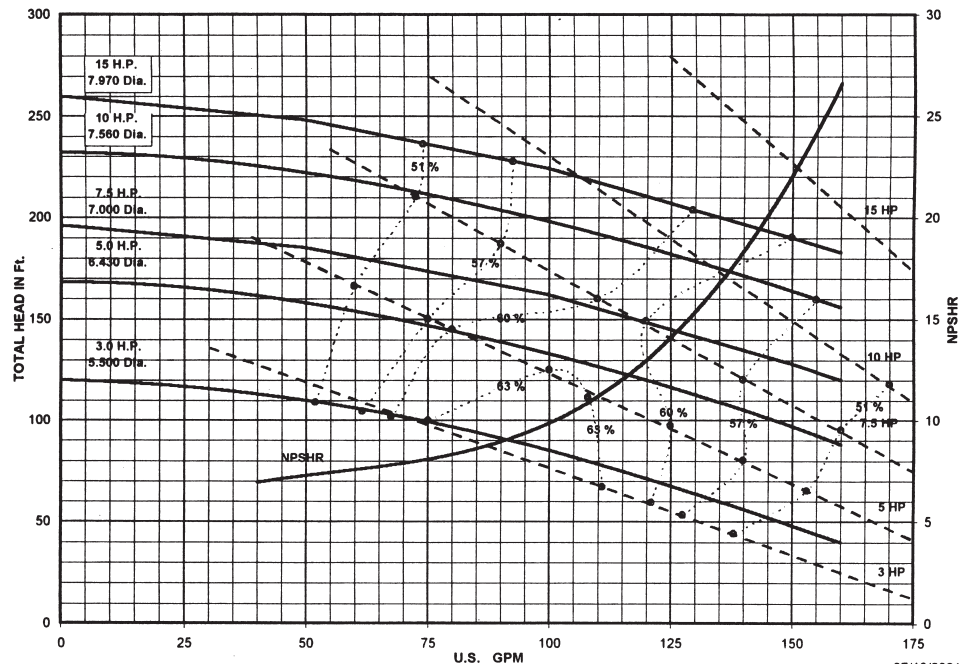
**1/4" NPT
Tapping (Vacuum)**



Griswold H Series, High Head, Self-Priming Pump

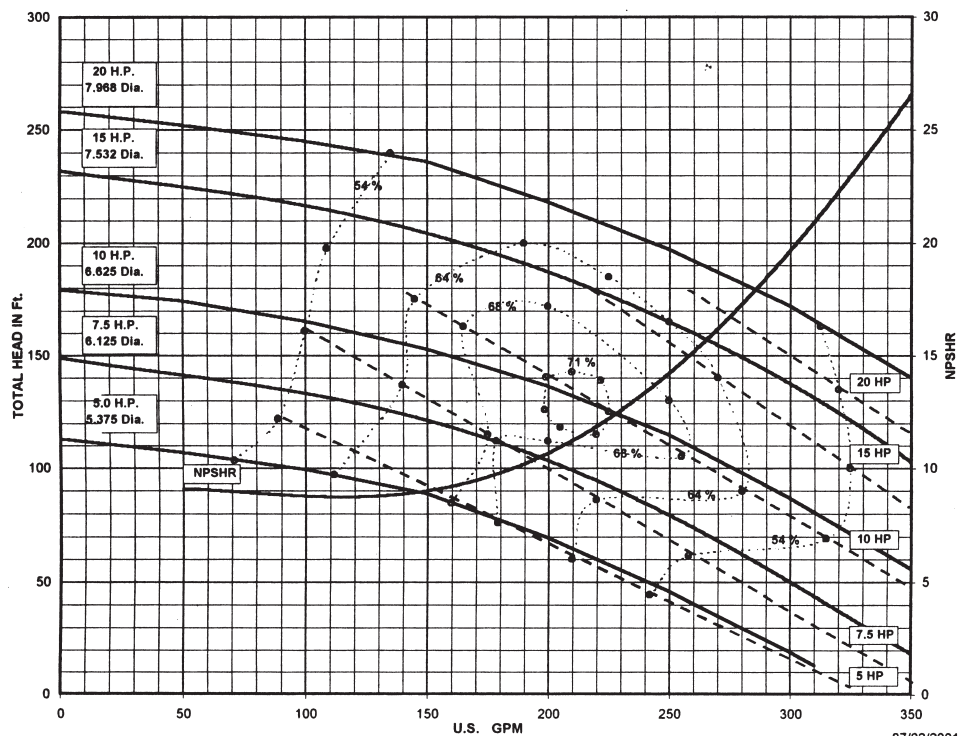
Performance

HL SERIES 3470 RPM



07/10/2001

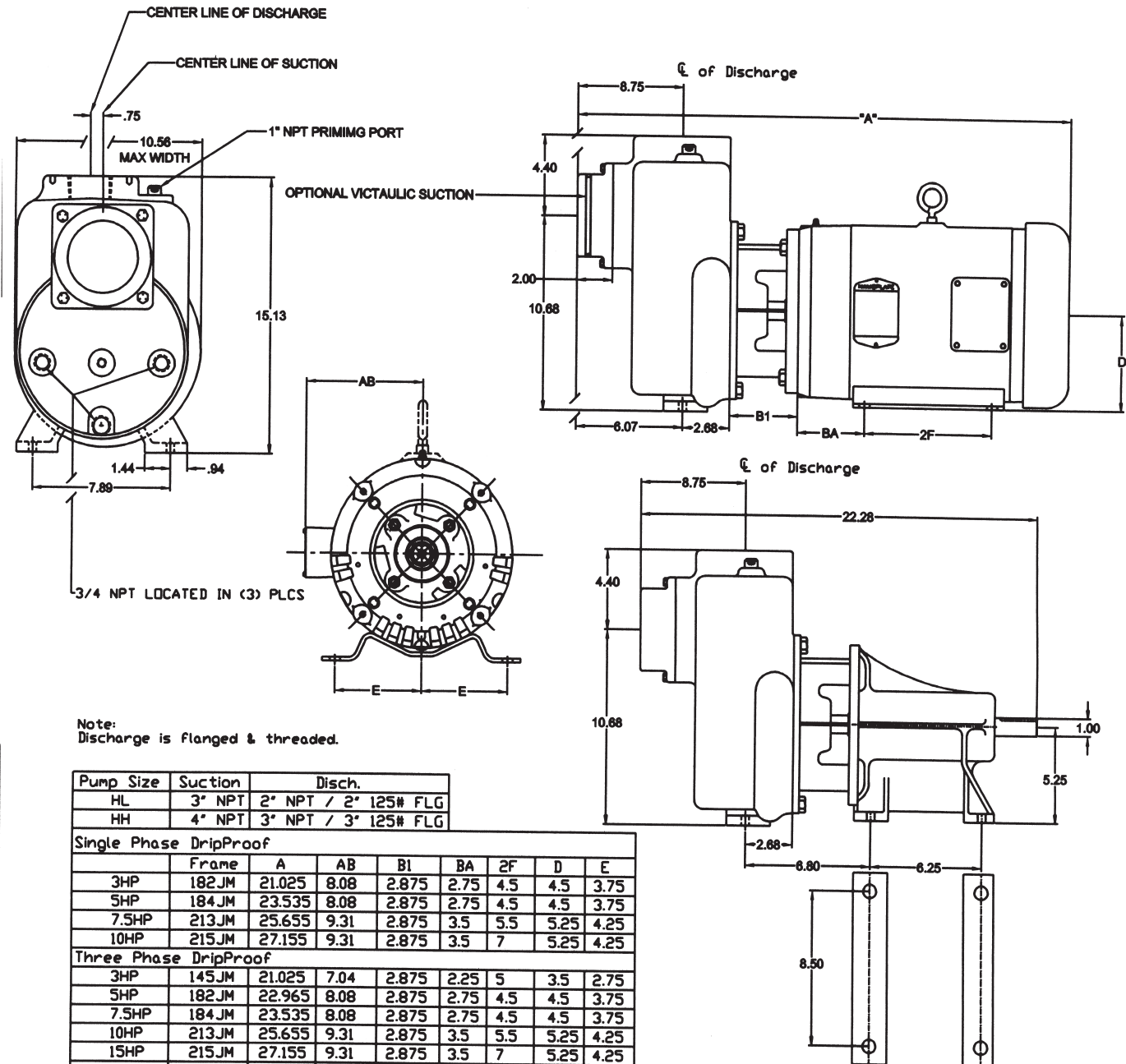
HH SERIES 3470 RPM



07/02/2001

Griswold H Series, High Head, Self-Priming Pump

Dimensions



Pump Size	Suction	Disch.
HL	3" NPT	2" NPT / 2" 125# FLG
HH	4" NPT	3" NPT / 3" 125# FLG

Single Phase DripProof

	Frame	A	AB	B1	BA	2F	D	E
3HP	182JM	21.025	8.08	2.875	2.75	4.5	4.5	3.75
5HP	184JM	23.535	8.08	2.875	2.75	4.5	4.5	3.75
7.5HP	213JM	25.655	9.31	2.875	3.5	5.5	5.25	4.25
10HP	215JM	27.155	9.31	2.875	3.5	7	5.25	4.25

Three Phase DripProof

3HP	145JM	21.025	7.04	2.875	2.25	5	3.5	2.75
5HP	182JM	22.965	8.08	2.875	2.75	4.5	4.5	3.75
7.5HP	184JM	23.535	8.08	2.875	2.75	4.5	4.5	3.75
10HP	213JM	25.655	9.31	2.875	3.5	5.5	5.25	4.25
15HP	215JM	27.155	9.31	2.875	3.5	7	5.25	4.25
20HP	254JM	29.515	10.96	3.625	4.25	8.25	7	5

Three Phase TEFC

5HP	184JM	30.80	8.08	2.875	2.75	5.5	4.5	3.75
7.5HP	184JM	30.80	8.08	2.875	2.75	4.5	4.5	3.75
10HP	215JM	35.21	9.31	2.875	3.5	7	5.25	4.25
15HP	215JM	35.21	9.31	2.875	3.5	7	5.25	4.25
20HP	256JM	41.93	10.96	3.625	4.25	10	7	5

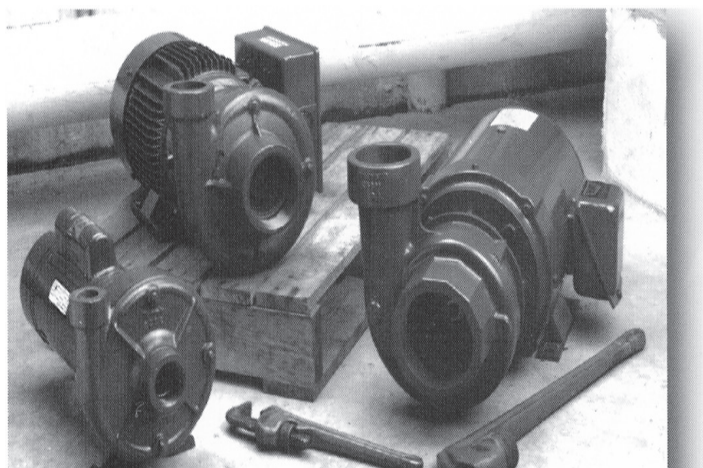
FAMILIAR PHRASES

TO FIGHT FIRE WITH FIRE

Meaning: To respond in like manner; a desperate measure. Origin: In order to extinguish huge prairie and forest fires in the early West, desperate American settlers would sometimes set fire to a strip of land in the path of the advancing fire and then extinguish it, leaving a barren strip with nothing for the approaching fire to feed on. Although effective, this tactic was-and still is extremely dangerous, as the backfire itself can get out of control.

D Series

End Suction Centrifugal Pumps



End Suction Centrifugal Pumps.

For general industrial use, transfer, circulation or booster service. Available in ratings from 1/3HP to 50HP with capacities through 650GPM and heads to 300 feet.

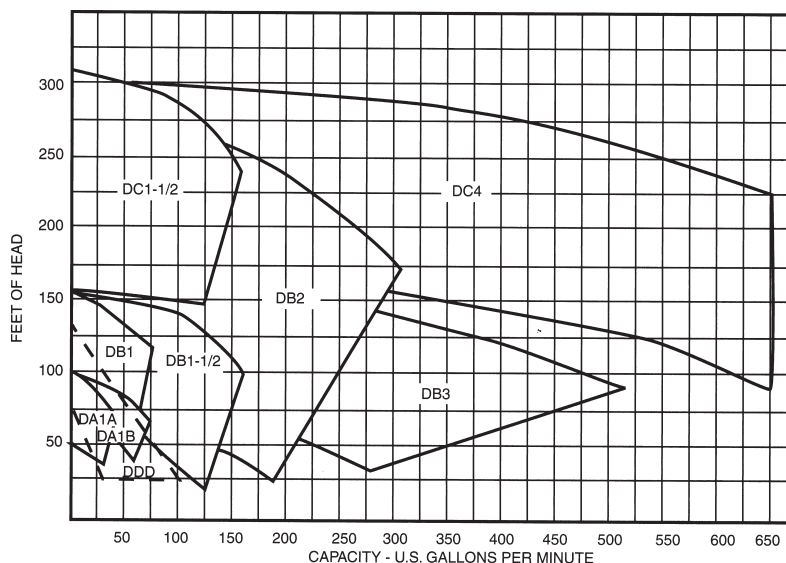
Features:

- ❑ **Heavy-duty cast iron construction** for increased durability.
- ❑ **DDD has glass-filled thermoplastic impeller** for increased efficiency & dependable high temperature operation.
- ❑ **DA1A through DC2 bronze fitted, DB3 and DC4 cast iron fitted.**
- ❑ **Shaft coupling** design on 56C frame units 1/3-3HP for easy removal of pump motor.
- ❑ **Shaft sleeve** with O-ring design in JM frame units 3-50HP give added protection against shaft damage.
- ❑ **Maximum operating temperature** of 212½F on all models except DDD series which handles up to 190½F.
- ❑ **Sealed motor bearings** on all motors to carry radial and thrust loads of pump end.
- ❑ **All units are equipped with open drip-proof motors.**
- ❑ **Max operating pressures 150 PSI.**

D Series

End Suction Centrifugal Pumps Performance

Consult individual curves for complete pump performance.

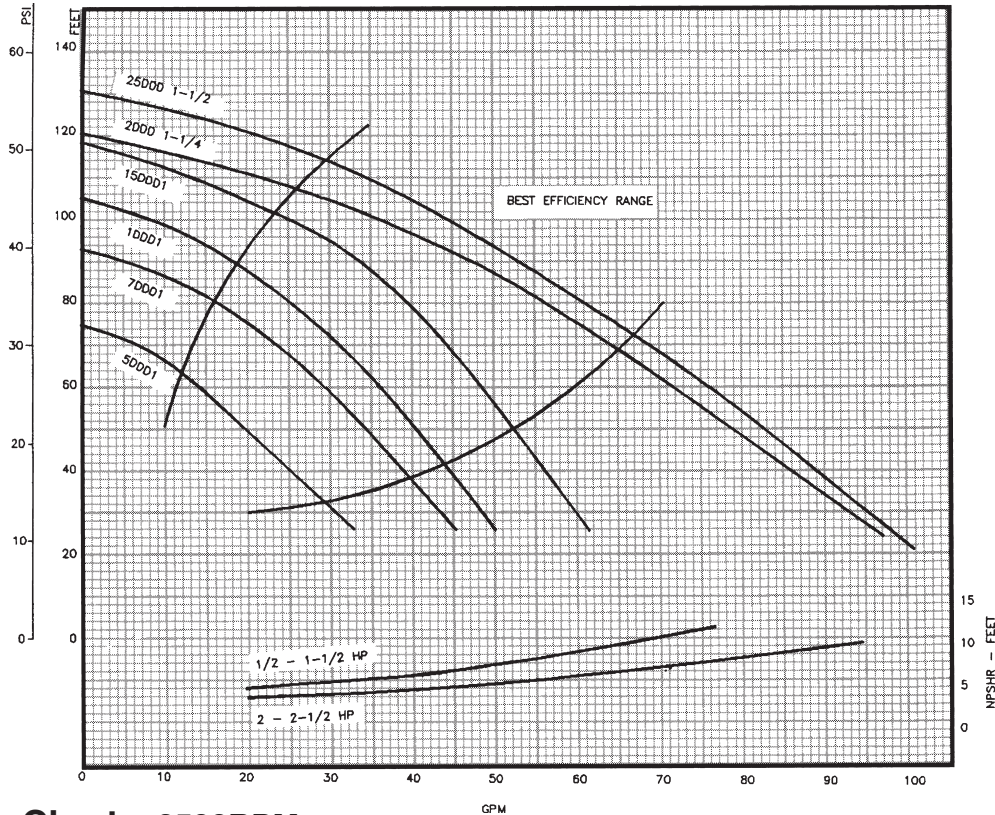




"The Most Trusted Name In Water"™

DDD Series

End Suction Centrifugal Pump Performance



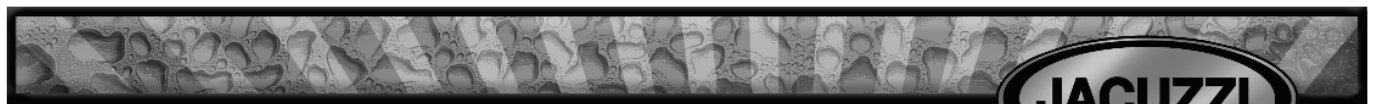
Performance Chart - 3500RPM

DDD		Discharge x Suction	CAPACITIES GPM											Shut Off Head (Feet)
			Total Head in Feet											
Model	HP		30	35	40	45	50	60	70	80	90	100	110	
5DDD1	1/2	1" x 1-1/4"	30	27	25	22	19	14	-	-	-	-	-	74
7DDD1	3/4	1" x 1-1/4"		41	38	36	34	29	23	16	-	-	-	93
1DDD1	1	1" x 1-1/4"				42	40	36	31	25	18	-	-	105
15DDD1	1-1/2	1 x 1-1/4"					52	47	44	39	34	25	-	118
2DDD1-1/4	2	1-1/4" x							64	56	47	36	23	121
25DDD1-1/2	2-1/2	1-1/2"							68	61	53	45	35	131

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION

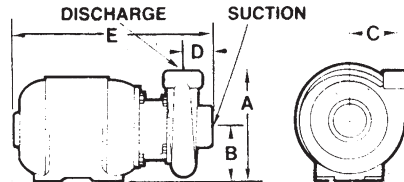
Order No.	Model No.	HP	Mtr. Phase	Voltage	Svc. Fact.	Amps	Weight
9312-6928	5DDD1-S	1/2	1	115/230	1.6	12.0/6.0	27
9312-6936	7DDD1-S	3/4	1	115/230	1.27	14.2/7.1	31
9312-6944	1DDD1-S	1	1	115/230	1.25	14.8/7.4	33
9312-6951	15DDD1-S	1-1/2	1	115/230	1.10	16.4/8.2	38
9312-6969	2DDD1-1/4-S	2	1	115/230	1.10	23.0/11.5	48
9312-6977	25DDD1-1/2-S	2-1/2	1	115/230	1.0	26.0/13.0	46
9312-7991	5DDD1-T	1/2	3	208/230/460	1.9	3.1-3.0/1.5	27
9312-8007	7DDD1-T	3/4	3	208/230/460	1.65	3.7-3.6/1.8	31
9312-8015	1DDD1-T	1	3	208/230/460	1.65	5.0-4.6/2.3	33
9312-8023	15DDD1-T	1-1/2	3	208/230/460	1.50	6.5-6.0/3.0	38
9312-8031	2DDD1- 1/4-T	2-1/2	3	208/230/460	1.30	7.3-7.8/3.9	48



"The Most Trusted Name In Water"SM

D Series

End Suction Centrifugal Pump Dimensions



56Z Frame Motors

Pump Model	HP	Disc. (NPT)	Suct. (NPT)	A	B	C	D	E	F	G	H	K
5DDD1-S	1/2	1	1-1/4	14-11/16"	2-3/8"	5-5/16"	4-7/16"	3-1/2"	4-5/8"	8-3/4"	5-1/2"	11-7/16"
7DDD1-S	3/4	1	1-1/4	14-11/16"	2-3/8"	5-5/16"	4-7/16"	3-1/2"	4-5/8"	8-3/4"	5-1/2"	12-7/16"
1DDD1-S	1	1	1-1/4	14-11/16"	2-3/8"	5-5/16"	4-7/16"	3-1/2"	4-5/8"	8-3/4"	5-1/2"	12-7/16"
15DDD1-S	1-1/2	1	1-1/4	15-13/16"	2-3/8"	5-5/16"	4-7/16"	3-1/2"	4-5/8"	8-3/4"	5-1/2"	12-3/16"
2DDD1-1/4-S	2	1-1/4	1-1/2	16-11/16"	2-13/16"	6-1/8"	5"	3-9/16"	5"	9-1/8"	6-5/16"	13-11/16"
25DDD1-1/2-S	2-1/2	1-1/2	2	16-11/16"	2-13/16"	6-1/8"	5"	3-9/16"	5"	9-1/8"	6-5/16"	13-11/16"

56C Frame Motors

Pump Model	Disch. (NPT)	Suction (NPT)	A	B	C	D	56 Frame Motor Horsepower						
							1/3	1/2	3/4	1	1 1/2	2	3
DA1A	1	1-1/4	7-1/4	3-3/4	3-1/2	1-3/4	13-1/2	14-1/2	14-1/2	15	--	--	--
DA1B	1	1-1/4	7-1/4	3-3/4	3-1/2	1-3/4	--	14-1/2	14-1/2	15	15	16	--
DB1	1	1-1/2	9	5	3-3/4	2-1/4	--	--	15-1/4	15-3/4	15-3/4	16-1/2	17
DB1-1/2	1-1/2	2	9-1/2	5	4	2-1/2	--	--	--	15-3/4	15-3/4	16-1/2	17
DB2	2	3	9-3/4	5	4-1/4	3-3/4	--	--	--	--	17-1/4	18	18-1/2

JM Frame Motors

Pump Model	Disch. (NPT)	Suction (NPT)	A	B	C	D	JM Frame Motor Horsepower					
							3	5	7 1/2	10	15	20
DB1	1	1-1/2	9	5	3-3/4	2-1/4	--	18	--	--	--	--
DB1-1/2	1-1/2	2	9-1/2	5	4	2-1/2	--	18-1/4	19-1/2	--	--	--
DB2	2	3	9-3/4	5	4-1/4	3-3/4	--	19-3/4	21	21	--	--
DB3	3	4	11-5/8-13-3/8	4-1/2-6-1/4	4-1/8	3-1/2	--	20-1/4	21-1/2	21-1/2	23	26-1/2
DC1-1/2	1-1/2	2	9-11	3-1/2-5-1/4	5-3/4	2-1/2	17-1/4	18-1/4	19-1/2	19-1/2	21	--
DC2	2	3	9-3/4-12-1/2	3-1/2-6-1/4	4-3/4	3-3/4	18-3/4	19-3/4	21	21	22-1/2	26

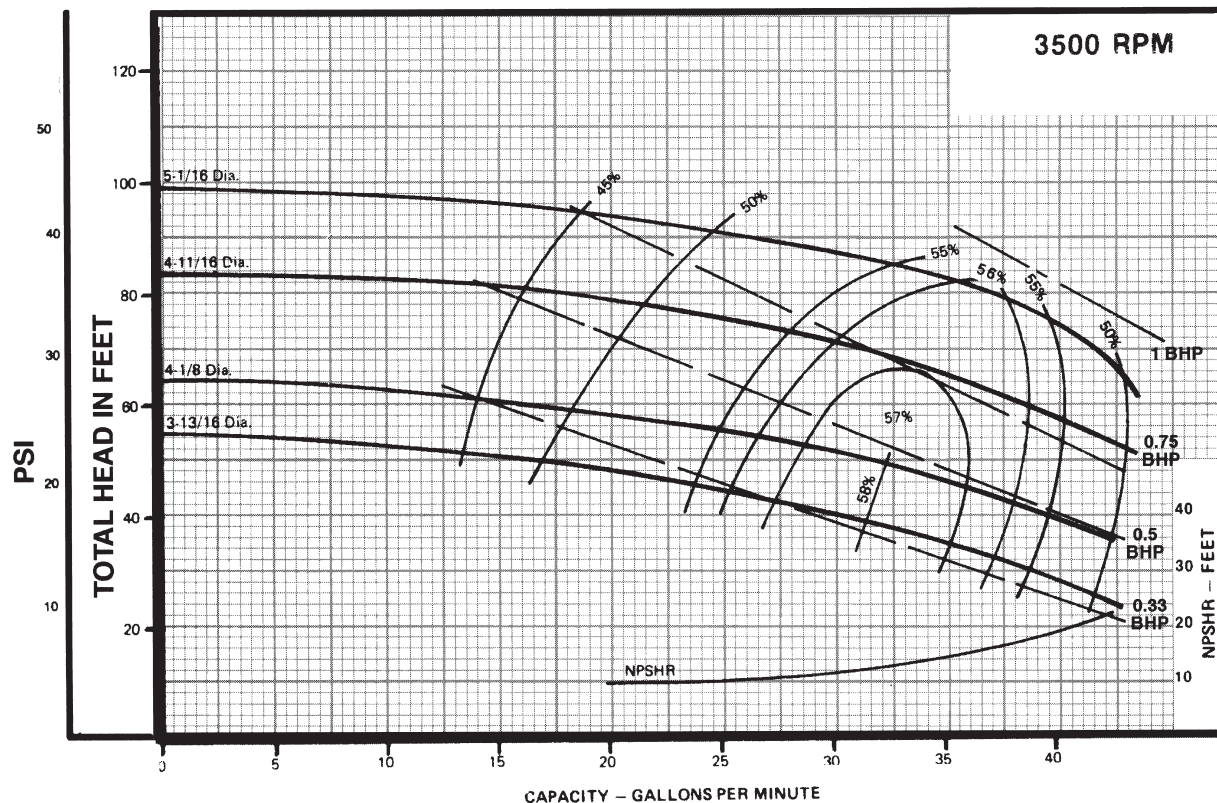
JM Frame Motors

Pump Model	Disch. (NPT)	Suction (NPT)	A	B	C	D	JM Frame Motor Horsepower				
							20	25	30	40	50
DC4 - FNPT	4	4	16-1/2	7-5/8	6-29/64	4-23/32	28-21/32	28-21/32	29-17/32	30	30
DC4 - flanged	4	5	16-1/2	7-5/8	6-29/64	3-13/16	28-21/32	28-21/32	29-17/32	30	30

Notes: 1) Total pump length will vary with motor manufacturer.

Model DA1A Performance

1" Discharge x 1-1/4" Suction



Performance Chart - 3500RPM

DA1A 1" Discharge x 1-1/4" Suction			CAPACITIES GPM									Shut Off Head (Feet)
			Total Head in Feet									
Model	HP	Imp. Dia.	30	35	40	45	50	60	70	80	90	
3DA1A	1/3	3-13/16	38	35	30	24	18					55
5DA1A	1/2	4 -1/8			40	36	32	17				65
7DA1A	3/4	4 -11/16					44	38	32	18		84
1DA1A	1	5 -1/16							43	37	26	100

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DA1A

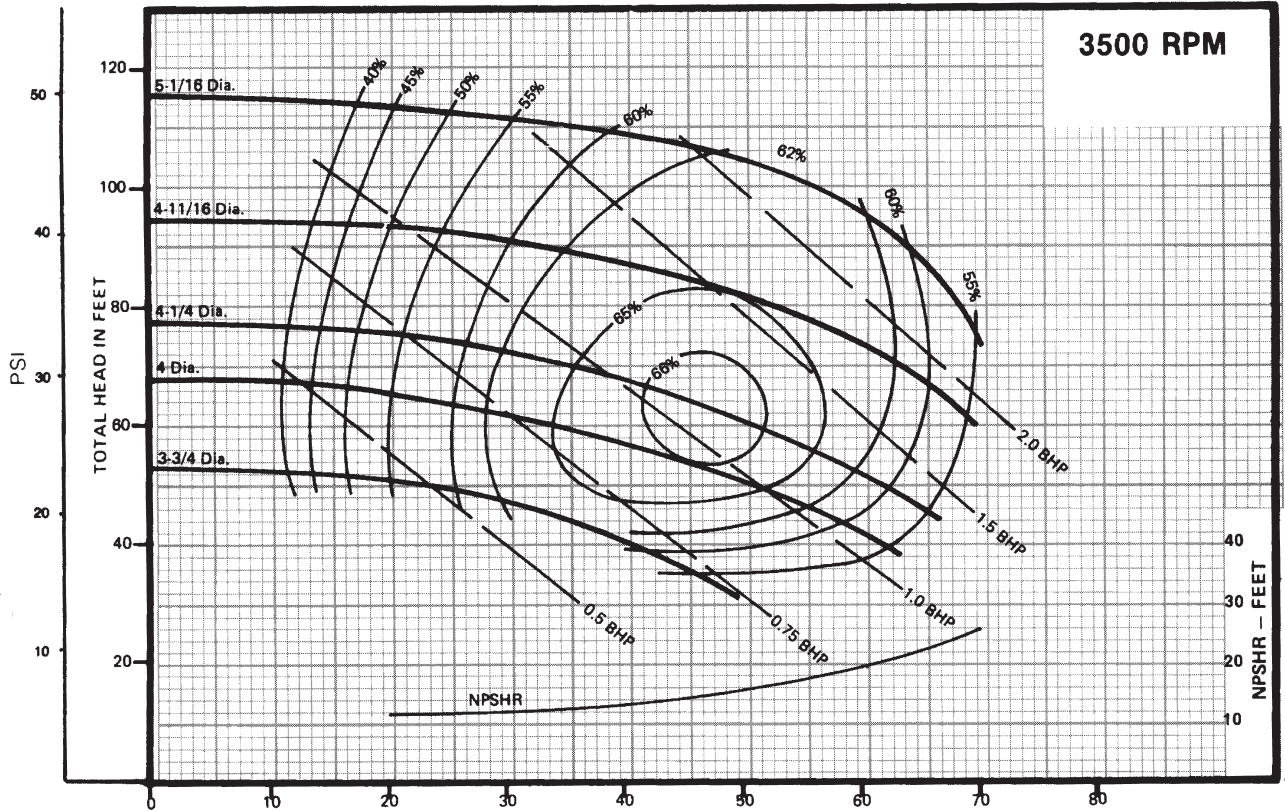
Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0012	3DA1A-S	1/3	1	115/230	9.0/4.5	1.75	32
9312-0020	5DA1A-S	1/2	1	115/230	10.6/5.3	1.60	35
9312-0038	7DA1A-S	3/4	1	115/230	14.8/7.4	1.50	36
9312-0046	1DA1A-S	1	1	115/230	17.0/8.5	1.50	37
9312-0053	3DA1A-T	1/3	3	208-230/460	2.2-2.2/1.1	1.75	31
9312-0061	5DA1A-T	1/2	3	208-230/460	2.9-2.7/1.35	1.60	34
9312-0079	7DA1A-T	3/4	3	208-230/460	3.7-3.4/1.7	1.50	37
9312-0087	1DA1A-T	1	3	208-230/460	4.7-4.4/2.2	1.40	38



"The Most Trusted Name In Water"™

Model DA1B

1" Discharge x 1-1/4" Suction



Performance Chart - 3500RPM

DA1B 1" Discharge x 1-1/4" Suction			CAPACITIES GPM											Shut Off Head (Feet)
			Total Head in Feet											
Model	HP	Imp. Dia.	30	35	40	45	50	60	70	80	90	100	110	
5DA1B	1/2	3-3/4"	50	46	40	34	23							53
7DA1B	3/4	4"			62	57	51	35						68
1DA1B	1	4-1/4"					62	51	35					78
15DA1B	1-1/2	4-11/16"						70	63	53	33			95
2DA1B	2	5-1/16"								69	64	56	38	116

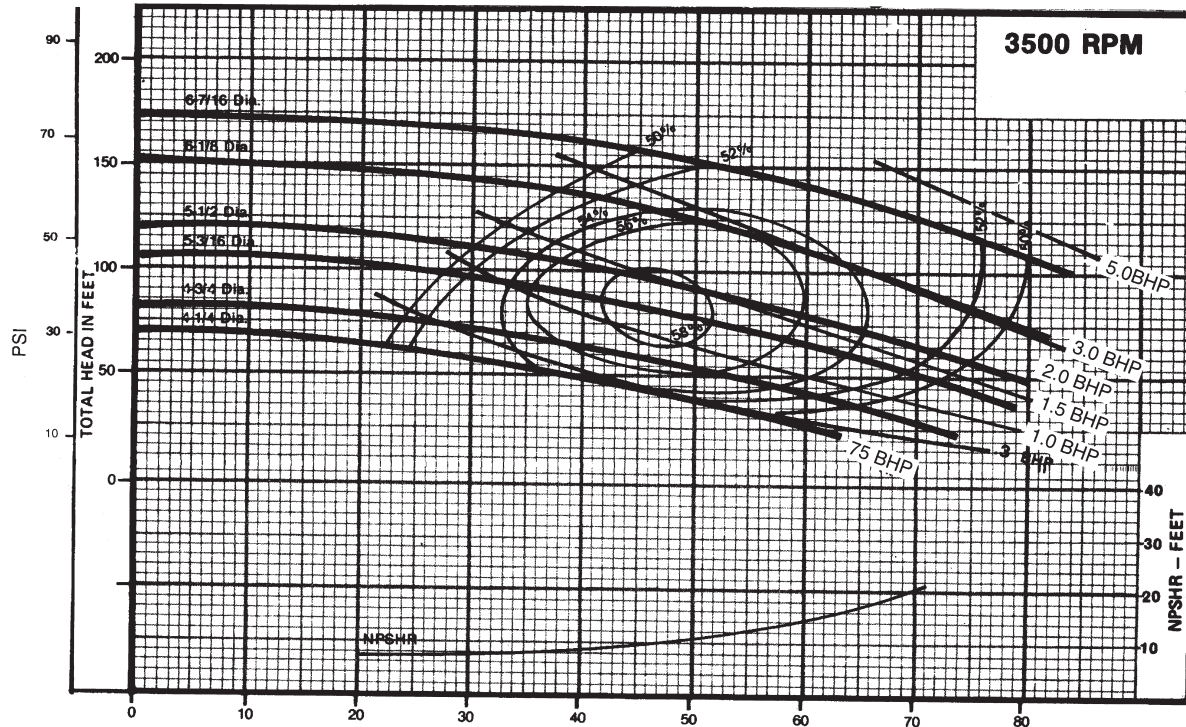
Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DA1B

Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0152	1DA1B-S	1	1	115/230	17.0/8.5	1.50	40
9312-0160	15DA1B-S	1-1/2	1	115/230	19.8/9.9	1.33	46
9312-0178	2DA1B-S	2	1	115/230	22.6/11.3	1.25	49
9312-0202	1DA1B-T	1	3	208/230/460	4.7/4.4/2.2	1.50	35
9312-0210	15DA1B-T	1-1/2	3	208/230/460	6.5/5.7/2.9	1.30	45
9312-0228	2DA1B-T	2	3	208/230/460	7.2/6.5/3.2	1.20	48

Model DB1

1" Discharge x 1-1/2" Suction



Performance Chart - 3500RPM

DB1 1" Discharge x 1-1/2" Suction			CAPACITIES GPM																	Shut Off Head (Feet)
			Total Head in Feet																	
Model	HP	Imp. Dia.	25	30	35	40	45	50	60	70	80	90	100	110	120	130	140	150	160	
7DB1	3/4	4-1/4"	61	58	54	49	46	41	29										72	
1DB1	1	4-3/4"			67	63	59	56	46	36	20								84	
15DB1	1-1/2	5-3/16"						72	65	58	50	39	28						109	
2DB1	2	5-1/2"							74	68	61	53	45	33					122	
3DB1	3	6-1/8"									78	73	67	61	54	46	37		151	
5DB1	5	6-7/16"												80	74	68	62	53	42	174

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DB1

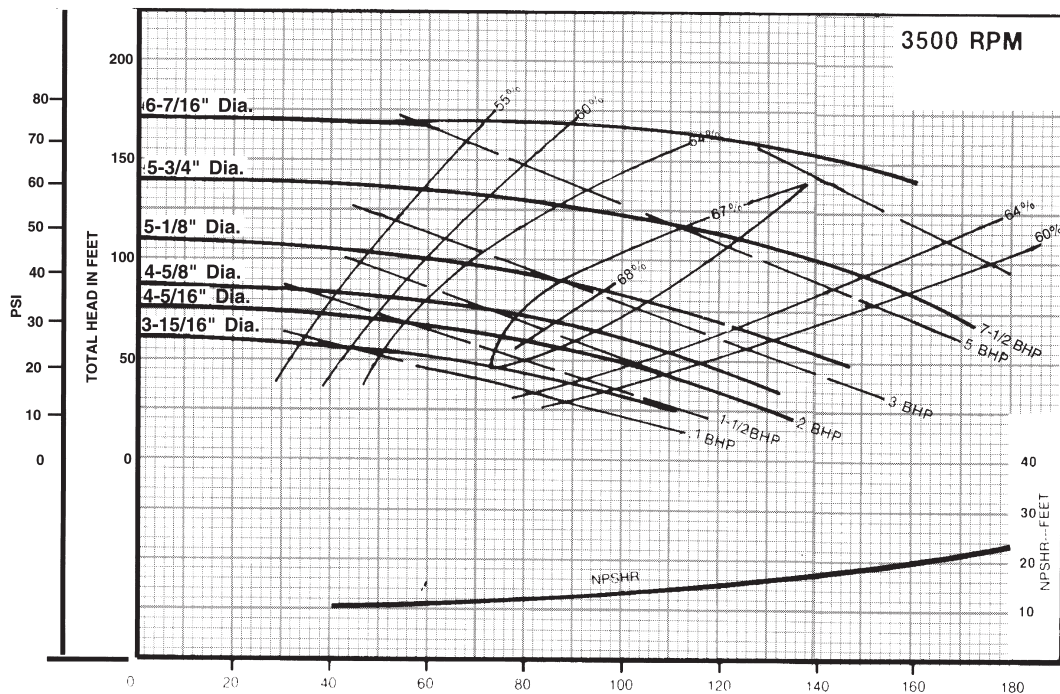
Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0285	7DB1-S	3/4	1	115/230	14.8/7.4	1.50	42
9312-0293	1DB1-S	1	1	115/230	17.0/8.5	1.50	45
9312-0301	15DB1-S	1-1/2	1	115/230	19.8/9.9	1.33	55
9312-0319	2DB1-S	2	1	115/230	22.6/11.3	1.25	53
9312-0327	3DB1-S	3	1	230	14.4	1.15	74
9312-0335	5DB1-S	5	1	230	26	1.15	122
9312-0376	2DB1-T	2	3	208/230/460	7.2/6.5/3.2	1.25	54
9312-0384	3DB1-T	3	3	230/460	5.0/2.5	1.15	64
9312-0392	5DB1-T	5	3	230/460	13.4/5.7	1.15	82



"The Most Trusted Name In Water"

Model DB1-1/2

1-1/2" Discharge x 2" Suction



Performance Chart - 3500RPM

DB1-1/2 1-1/2" Discharge x 2" Suction			CAPACITIES GPM																	Shut Off Head (Feet)
			Total Head in Feet																	
Model	HP	Imp. Dia.	25	30	35	40	45	50	60	70	80	90	100	110	120	130	140	150	160	
1DB1-1/2	1	3-15/16"	125	105	95	86	75	63											60	
15DB1-1/2	1-1/2	4-5/16"		123	118	112	106	95	78	50									75	
2DB1-1/2	2	4-5/8"			130	126	120	115	100	82	52								87	
3DB1-1/2	3	5-1/8"						144	132	118	103	88	62						110	
5DB1-1/2	5	5-3/4"									163	153	141	126	107	78			140	
75DB1-1/2	7-1/2	6-7/16"														170	165	135	130	170

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DB1-1/2

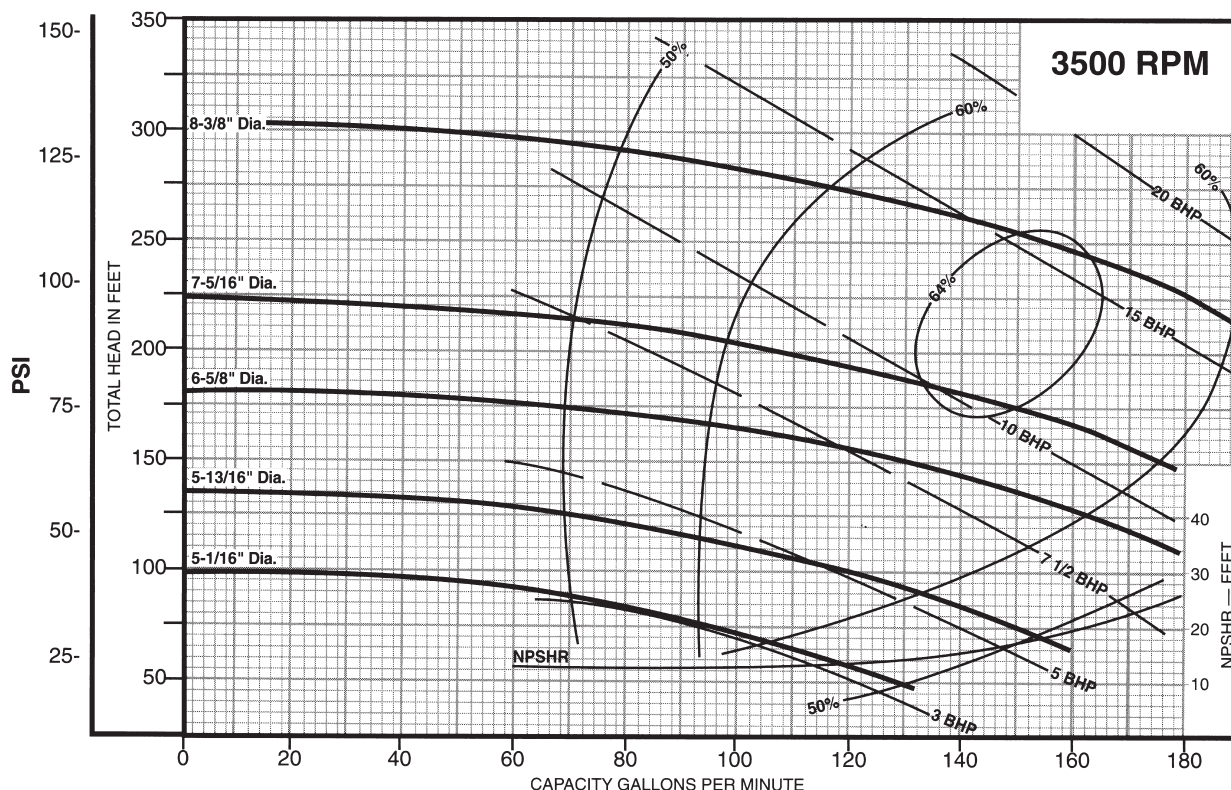
Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0467	1DB1-1/2-S	1	1	115/230	17.0/8.5	1.50	50
9312-0475	15DB1-1/2-S	1-1/2	1	115/230	19.8/9.9	1.33	54
9312-0483	2DB1-1/2-S	2	1	115/230	22.6/11.3	1.25	58
9312-0491	3DB1-1/2-S	3	1	230	14.4	1.15	74
9312-0509	5DB1-1/2-S	5	1	230	26	1.15	122
9312-0517	75DB1-1/2-S	7-1/2	1	230	39	1.15	184
9312-0525	1DB1-1/2-T	1	3	208/230/460	4.7/4.4/2.2	1.50	47
9312-0533	15DB1-1/2-T	1-1/2	3	208/230/460	6.2/5.7/2.9	1.33	52
9312-0541	2DB1-1/2-T	2	3	208/230/460	7.2/6.5/3.2	1.25	55
9312-0558	3DB1-1/2-T	3	3	230/460	5.0/2.5	1.15	63
9312-0566	5DB1-1/2-T	5	3	230/460	13.4/5.7	1.15	102
9312-0574	75DB1-1/2-T	7-1/2	3	230/460	19.6/9.8	1.15	110



"The Most Trusted Name In Water"™

Model DC1-1/2

1-1/2" Discharge x 2" Suction



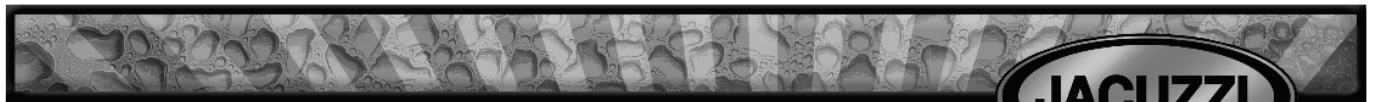
Performance Chart - 3500RPM

DC1 1/2 1 1/2" Discharge x 2" Suction			CAPACITIES GPM																				Shut Off Head (FEET)
			Total Head in Feet																				
Model	HP	Imp. Dia.	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	220	240	260	280	
3DC1-1/2	3	5-1/16"	130	120	108	92	70																100
5DC1-1/2	5	5-13/16"			155	144	132	118	100	84	56												135
75DC1-1/2	7-1/2	6-5/8"							180	170	160	150	130	110	80								180
10DC1-1/2	10	7-5/16"											176	167	156	143	126	106					220
15DC1-1/2	15	8-3/8"																	184	167	140	100	300

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DC1-1/2

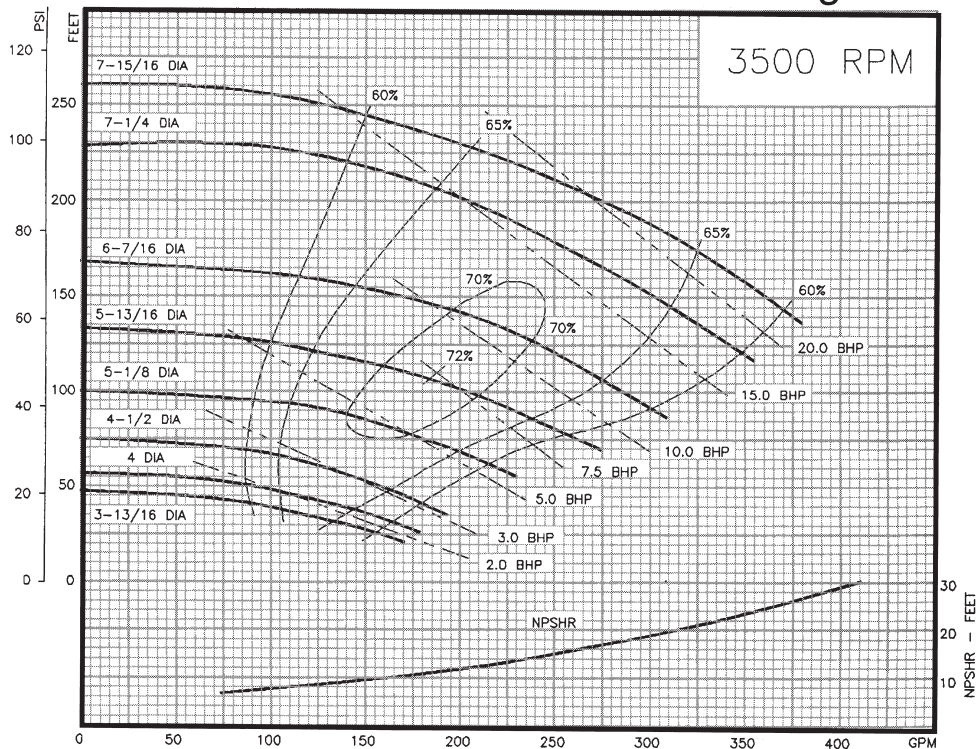
Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0848	5DC1-1/2-S	5	1	230	26	1.15	142
9312-0855	75DC1-1/2-S	7-1/2	1	230	39	1.15	162
9312-1168	10DC1-1/2-S	10	1	230	42.8	1.15	190
9312-0871	5DC1-1/2-T	5	3	230/460	13.4/5.7	1.15	98
9312-0889	75DC1-1/2-T	7-1/2	3	230/460	19.6/9.8	1.15	132
9312-0897	10DC1-1/2-T	10	3	230/460	25/12.5	1.15	171
9312-0905	15DC1-1/2-T	15	3	230/460	40/20	1.15	175



"The Most Trusted Name In Water"

Model DB2

2" Discharge x 3" Suction



Performance Chart - 3500RPM

DB2 2" Discharge x 3" Suction			CAPACITIES GPM																		Shut Off Head (FEET)
			Total Head in Feet																		
Model	HP	Imp. Dia.	20	25	30	35	40	45	50	60	70	80	90	100	110	120	150	200	250		
15DB2	1-1/2	3-3/16"	175	160	145	125	100	65												50	
2DB2	2	4"		185	170	160	145	125	100											58	
3DB2	3	4-1/2"						175	165	140	90									75	
5DB2	5	5-1/8"								235	210	190	160							100	
75DB2	7-1/2	5-13/16"										260	240	225	200	160				135	
10DB2	10	6-7/16"											310	290	275	260	185			170	
15DB2	15	7-1/4"														350	305	205		230	
20DB2	20	7-15/16"															365	275	130	260	

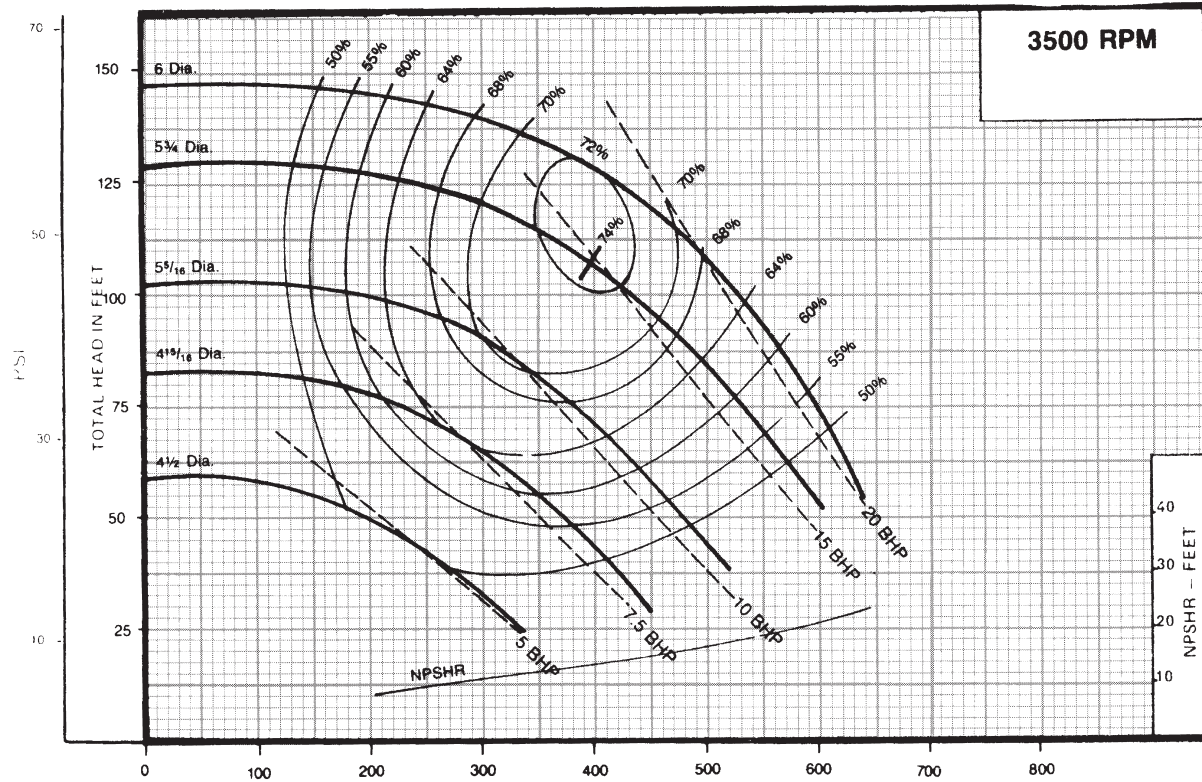
Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DB2

Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-0665	2DB2-S	2	1	115/230	22.6/11.3	1.25	60
9312-0673	3DB2-S	3	1	230	14.4	1.15	80
9312-0681	5DB2-S	5	1	230	26	1.15	119
9312-0699	75DB2-S	7-1/2	1	230	39	1.15	150
9312-1150	10DB2-S	10	1	230	42.8	1.15	171
9312-0715	2DB2-T	2	3	208/230/460	7.2/6.5/3.2	1.25	60
9312-0723	3DB2-T	3	3	230/460	5.0/2.5	1.15	72
9312-0731	5DB2-T	5	3	230/460	13.4/5.7	1.15	110
9312-0749	75DB2-T	7-1/2	3	230/460	19.6/9.8	1.15	116
9312-0756	10DB2-T	10	3	230/460	25/12.5	1.15	146
9312-1051	15DB2-T	15	3	230/460	40/20	1.15	210
9312-1069	20DB2-T	20	3	230/460	50/25	1.15	243

Model DB3

3" Discharge x 4" Suction



Performance Chart - 3500RPM

DB3 3" Discharge x 4" Suction			CAPACITIES GPM																Shut Off Head (FEET)
			Total Head in Feet																
Model	HP	Imp. Dia.	25	30	35	40	45	50	60	70	80	90	100	110	120	130	140	150	
5DB3	5	4-1/2"	335	305	280	250	220	200										60	
75DB3	7-1/2	4-15/16"		440	425	405	385	365	320	260								81	
10DB3	10	5-5/16"				505	490	470	440	400	360	250						101	
15DB3	15	5-3/4"						600	580	550	510	460	430	380	300			128	
20DB3	20	6"							630	610	590	550	530	510	450	380		146	

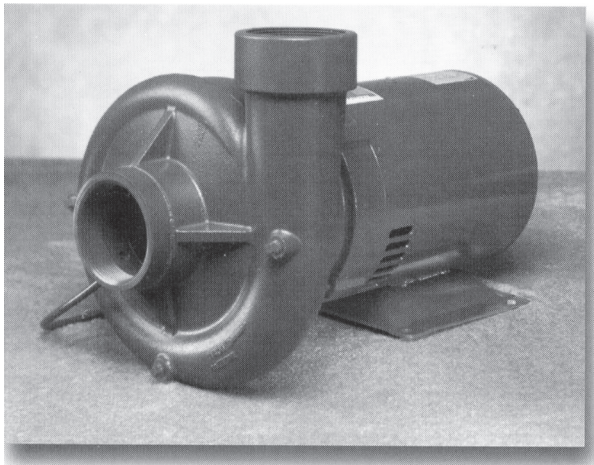
Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DB3

Order No.	Model No.	HP	Mtr. Phase	Volt.	Amps	Svc. Fact.	Weight
9312-7330	5DB3-S	5	1	230	26	1.15	132
9312-7348	75DB3-S	7-1/2	1	230	39	1.15	160
9312-7355	10DB3-S	10	1	230	42.8	1.15	174
9312-7363	5DB3-T	5	3	230/460	13.4/5.7	1.15	95
9312-7371	75DB3-T	7-1/2	3	230/460	19.6/9.8	1.15	120
9312-7389	10DB3-T	10	3	230/460	25/12.5	1.15	180
9312-7397	15DB3-T	15	3	230/460	40/20	1.15	183
9312-7405	20DB3-T	20	3	230/460	50/25	1.15	232



Model DC4



Features:

- ☐ **Epoxy-coated cast iron impeller** for maximum efficiency.
- ☐ Mechanical shaft seal for water temperatures up to 212°F.
- ☐ 4" NPT suction/discharge on 20-30HP units. **Flanged 5" suction/4" discharge** on 40-50HP units.
- ☐ 20-50HP **pump end kits** are available with either NPT suction/discharge or flanged suction/discharge connections. Maximum operating pressure of 150 PSI.

Performance Chart - 3500 RPM

DC4			CAPACITIES GPM																	Shut Off Head Feet
			Total Head in Feet																	
Model	HP	Imp. Dia.	90	100	120	140	150	160	170	180	190	200	210	220	240	260	280	290		
20DC4	20	7-1/32"	650	620	545	430	350	200											165	
25DC4	25	7-15/32"			650	595	550	500	450	350									190	
30DC4	30	7-7/8"					650	620	590	545	500	430	320						215	
40DC4	40	8-7/16"									640	605	560	515	375				260	
50DC4	50	9-1/32"												660	600	515	400	280	300	

Note: All performance data based on rated nameplate voltage.

ORDERING INFORMATION - DC4

Order No.	Model No.	HP	Connection	Mtr. Phase	Voltage	Amps	Svc. Fact.	Weight
9312-7710	20DC4-T	20	Threaded	3	230/460	57.5/28.8	1.15	312
9312-7728	25DC4-T	25	Threaded	3	200-230/460	81-72/36	1.25	325
9312-7736	30DC4-T	30	Threaded	3	200-230/460	88.5-86/43	1.25	389
9312-7744	40DC4-T	40	Flanged	3	200-230/460	122-112/56	1.25	433
9312-7785	50DC4-T	50	Flanged	3	230/460	133.4/66.7	1.15	593

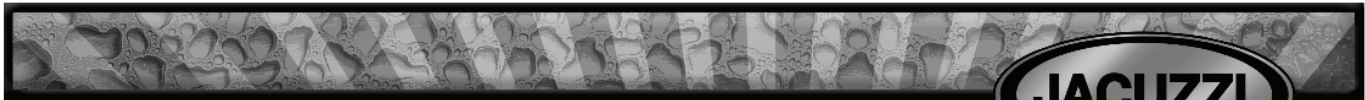
Note: Service factor at 200V on 25, 30, & 40 HP units is 1.15.

FAMILIAR PHRASES

TO GET ONE'S GOAT

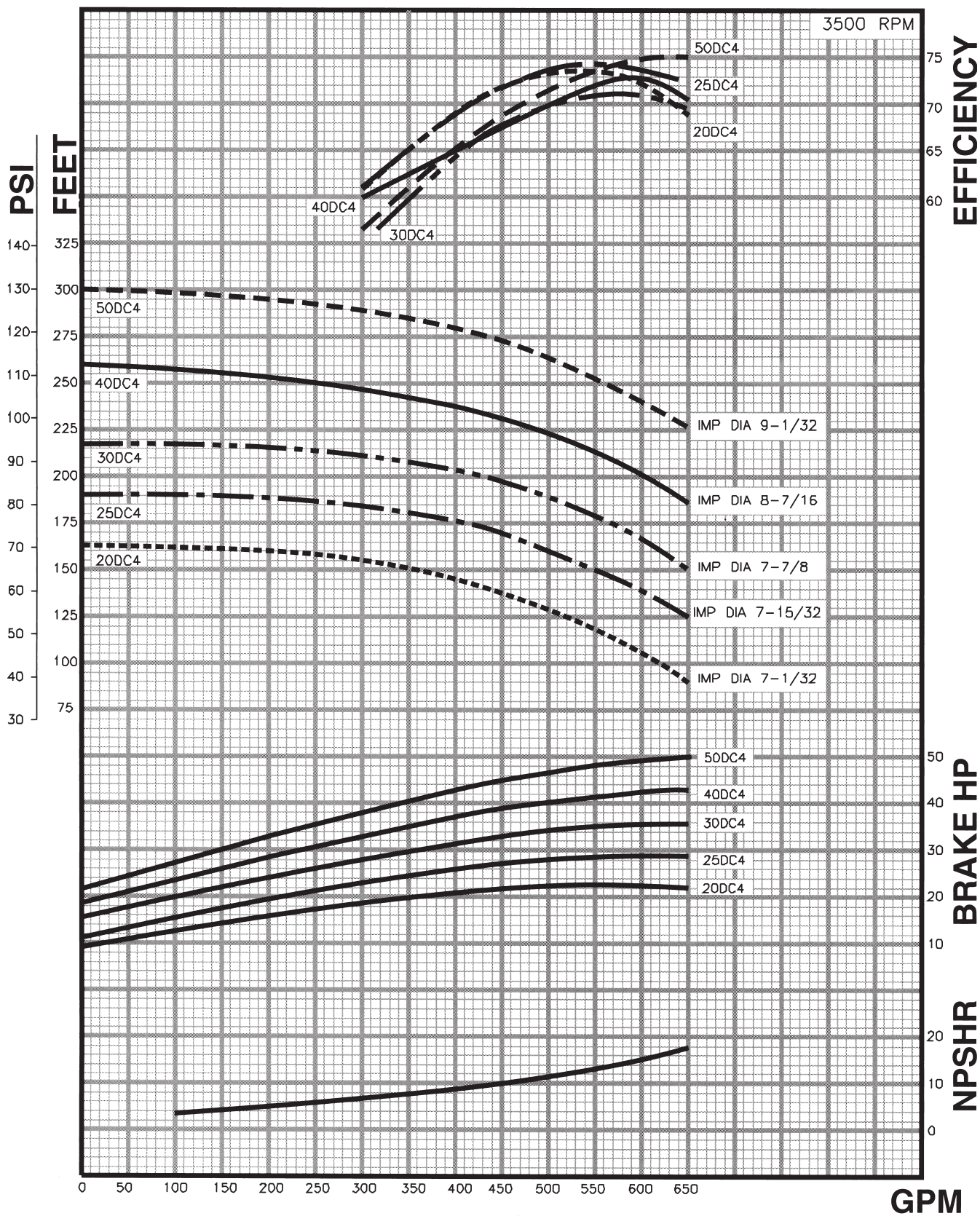
Meaning: To aggravate.

Origin: Hyperactive racehorses were often given goats as stablemates because their presence tended to have a calming effect on the horses. After the horse became attached to the goat, it got very upset when its companion disappeared-making it run poorly on the track. In the 19th century, when a devious gambler wanted a horse to lose, he would get the horse's goat and take it away the night before the race, thus agitating the horse.



"The Most Trusted Name In Water"™

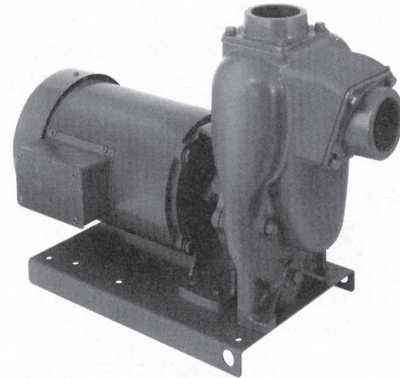
Model DC4



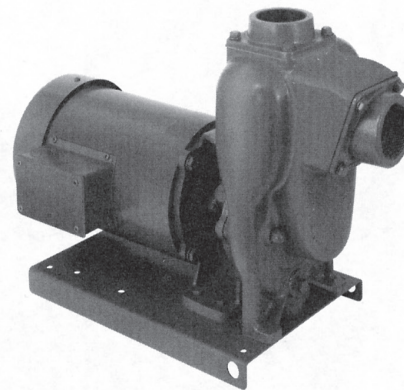
FLOMAX 5 8 10

SELF PRIMING CENTRIFUGAL PUMP FEATURES

- CLOSED COUPLED TO ELECTRIC MOTOR
- PUMPAK ONLY TO MOUNT TO STANDARD NEMA "C" FACE MOTOR
FLOMAX 40 BELT OR DIRECT DRIVE
- FLOWS - 100-750 GPM
- PRESSURES - 100-230 FEET HEAD
- AVAILABLE IN: CAST IRON, BRONZE AND ALUMINUM
FLOMAX 8 STAINLESS STEEL 316 SS
FLOMAX 40 CAST IRON
- WITH OR WITHOUT ELECTRIC MOTOR
- IMPELLER - CAST IRON, BRONZE, ALUMINUM & STAINLESS STEEL
FLOMAX 40 CAST IRON & STAINLESS STEEL
- SHAFT SLEEVE - STAINLESS STEEL
- FASTENERS - STAINLESS STEEL
- SEALS - STANDARD VITON, OPTIONAL SEALS AVAILABLE
- OPTIONS:
 - ENGINE DRIVES
 - PEDESTAL MODELS
 - HYDRAULIC DRIVES AND CLUTCHPAKS



FLOMAX 5



FLOMAX 8

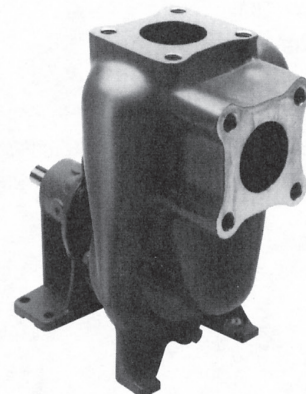
FLOMAX 8: NOW ABS APPROVED

MODEL	Suction	Discharge
FLOMAX 5	1 1/2" NPT	1 1/2" NPT
FLOMAX 8	2" NPT	2" NPT
FLOMAX 10	2" NPT	2" NPT
FLOMAX 15	3" NPT	3" NPT
FLOMAX 30	3" NPT	3" NPT
FLOMAX 40	4" NPT	4" NPT

PROVEN WRONG BY HISTORY:

A collection of ill-conceived comments on the march of technology by people who watched from the sidelines and should have known better

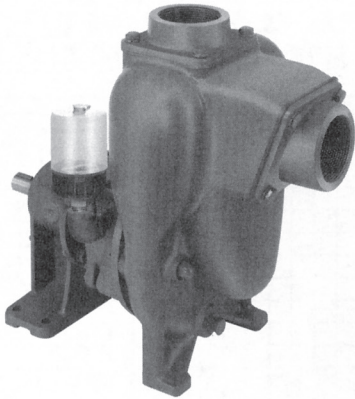
"I think there is a world market for maybe five computers." -Thomas Watson, chairman of IBM, 1943



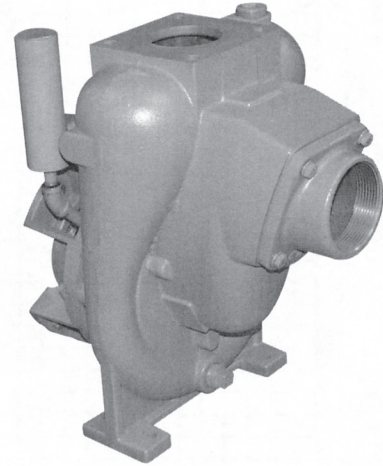
316 SS FLOMAX 8

15 30 40

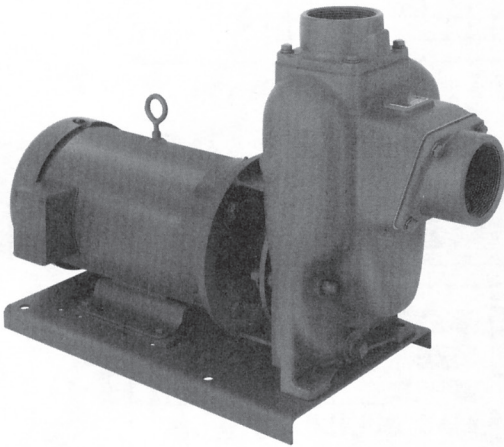
FLOMAX 15 & 40: NOW ABS APPROVED



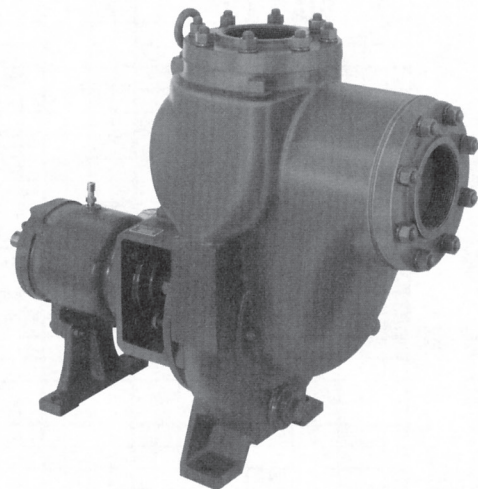
**FLOMAX 5 & 8
DOUBLE SEAL**



**FLOMAX 30
SHORT COUPLED**



FLOMAX 10



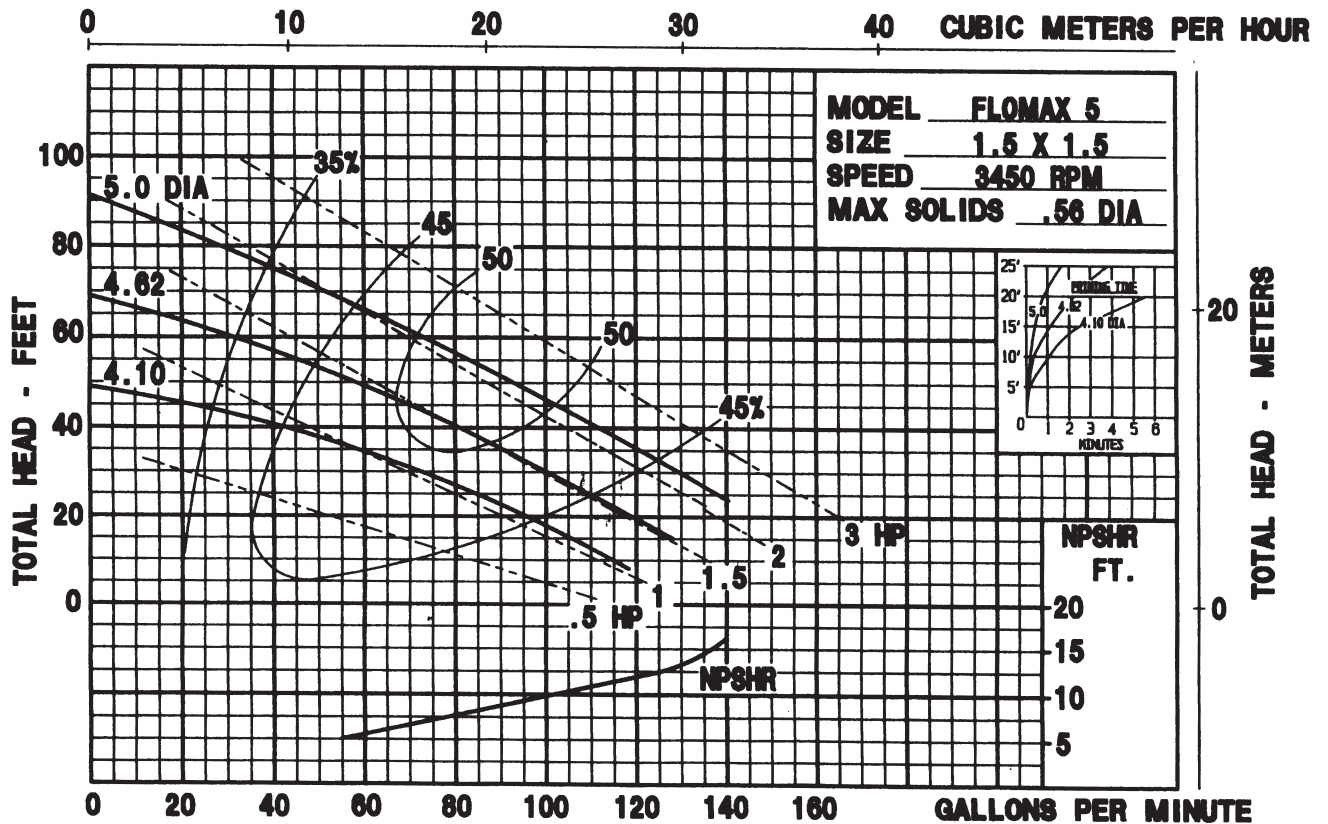
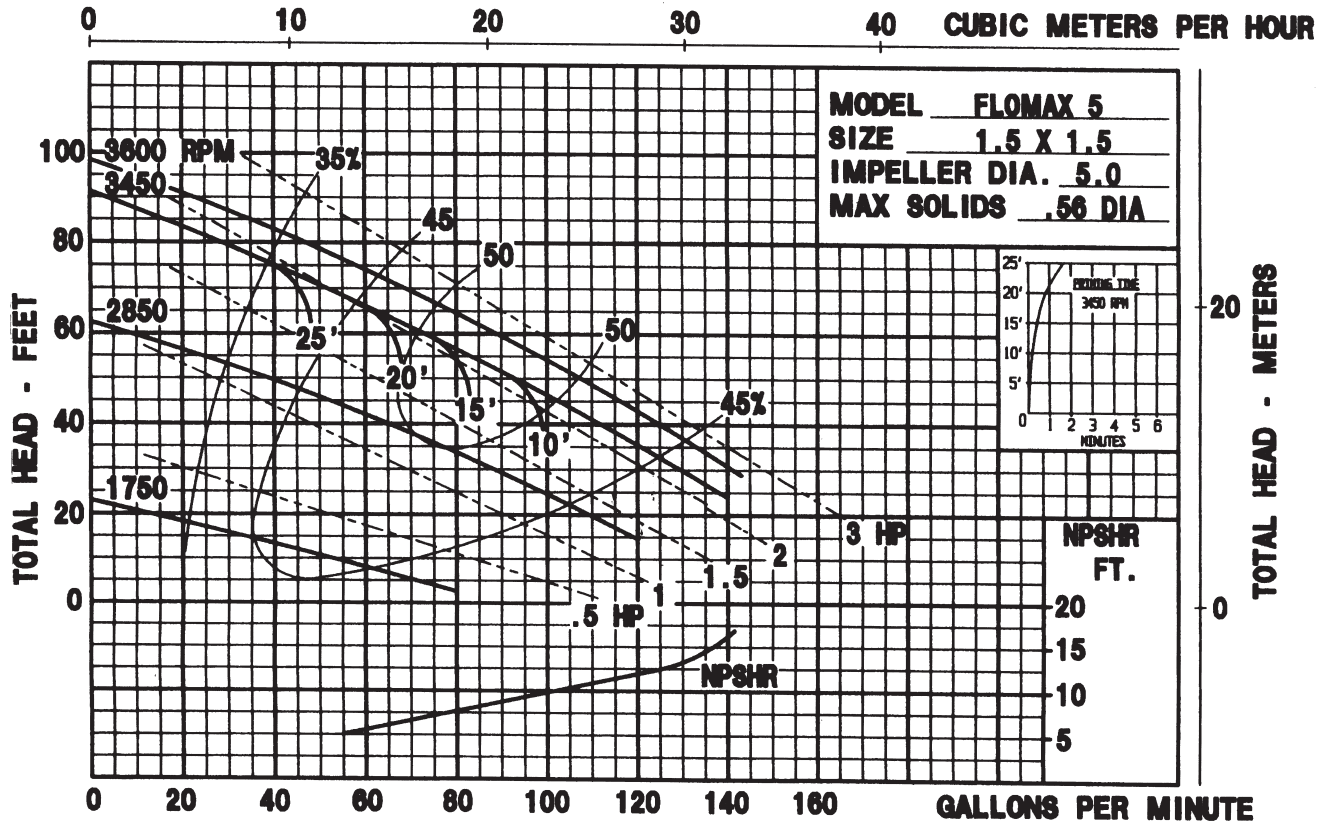
FLOMAX 40

PROVEN WRONG BY HISTORY: (continued)

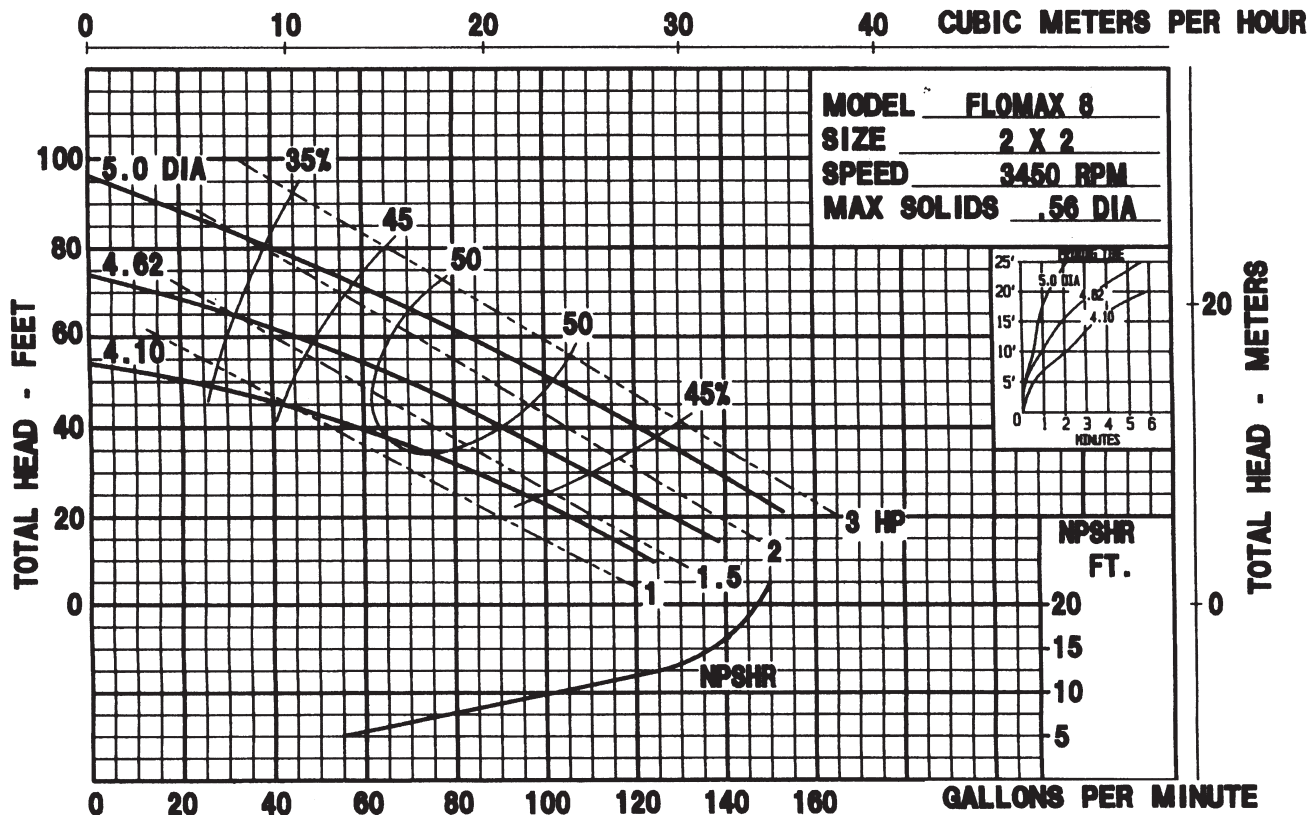
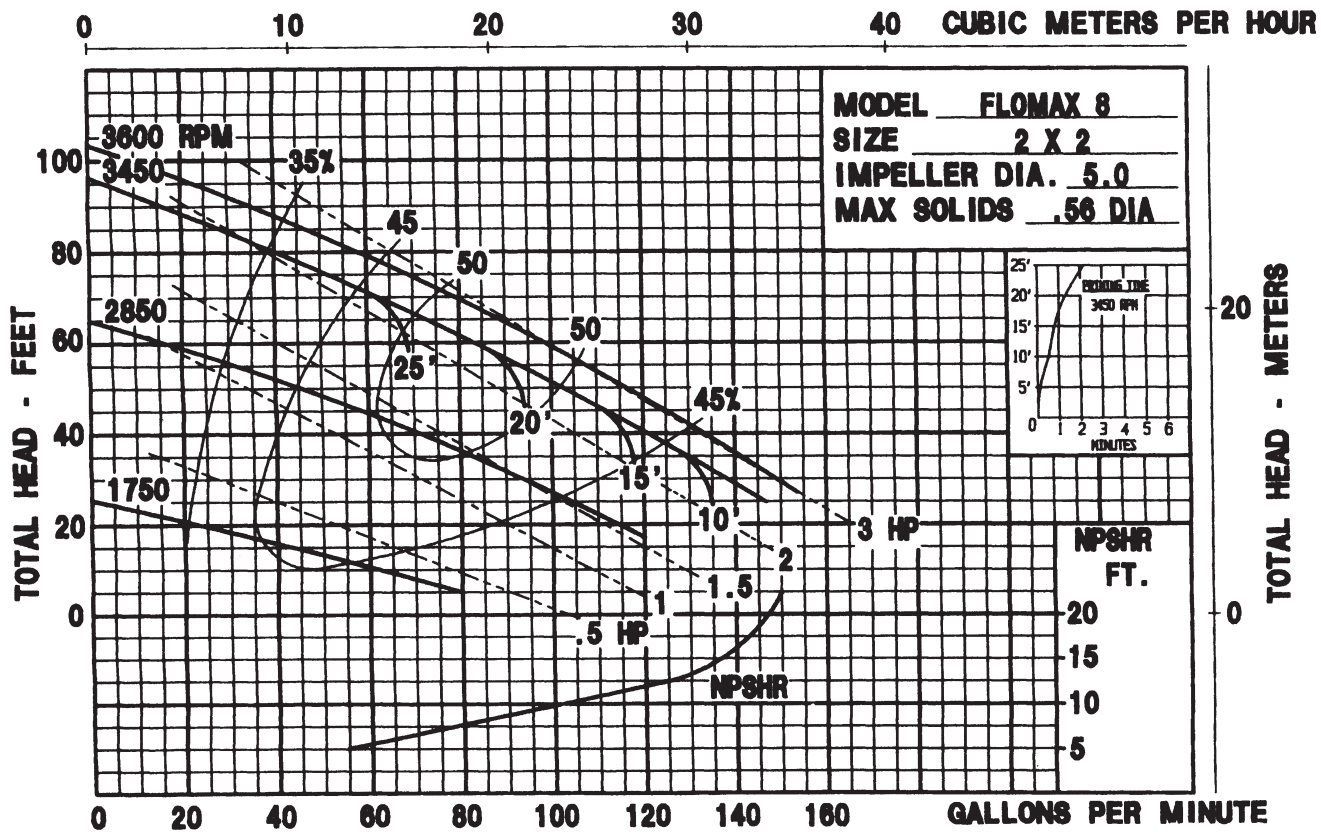
"Computers in the future may weigh no more than 1.5 tons." -*Popular Mechanics*, 1949

FLOMAX 15

Flomax 5 Pump Performance Curves



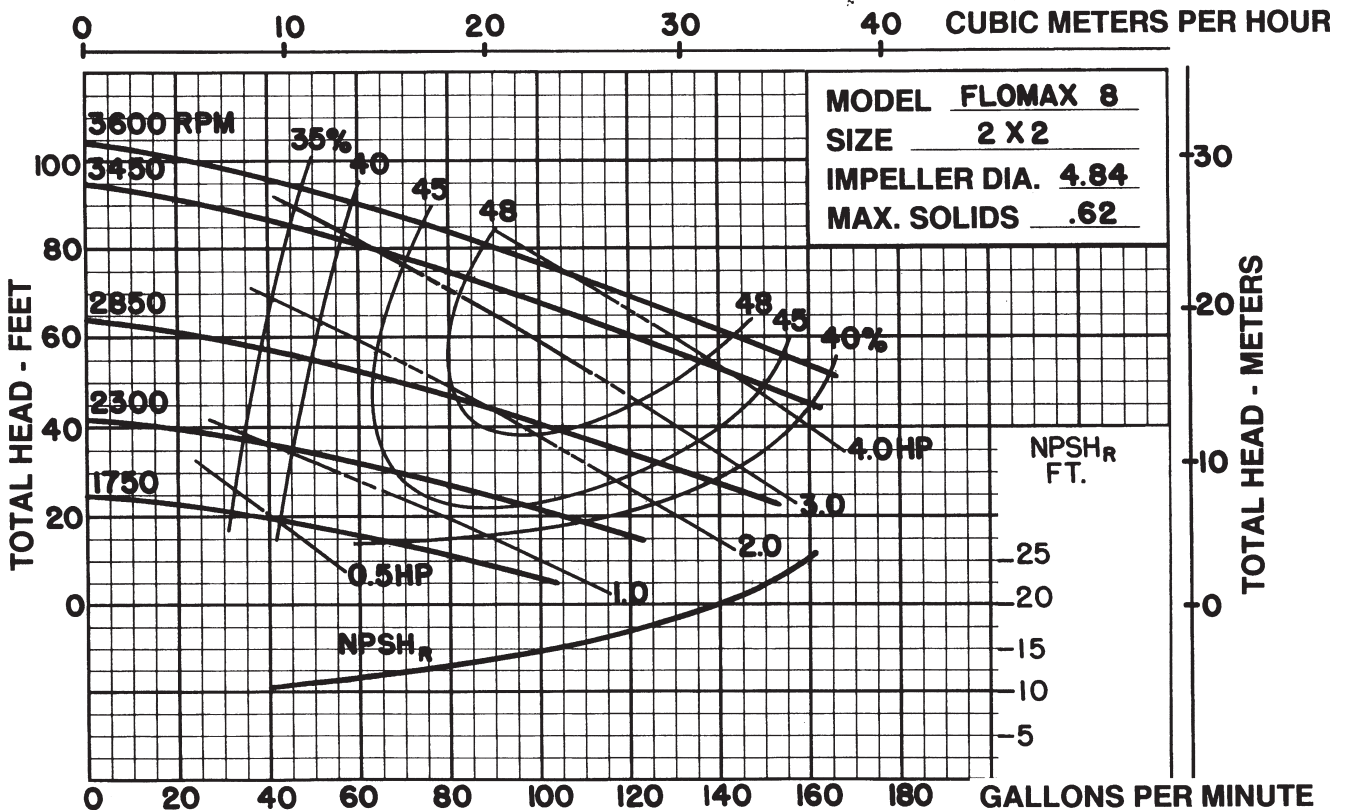
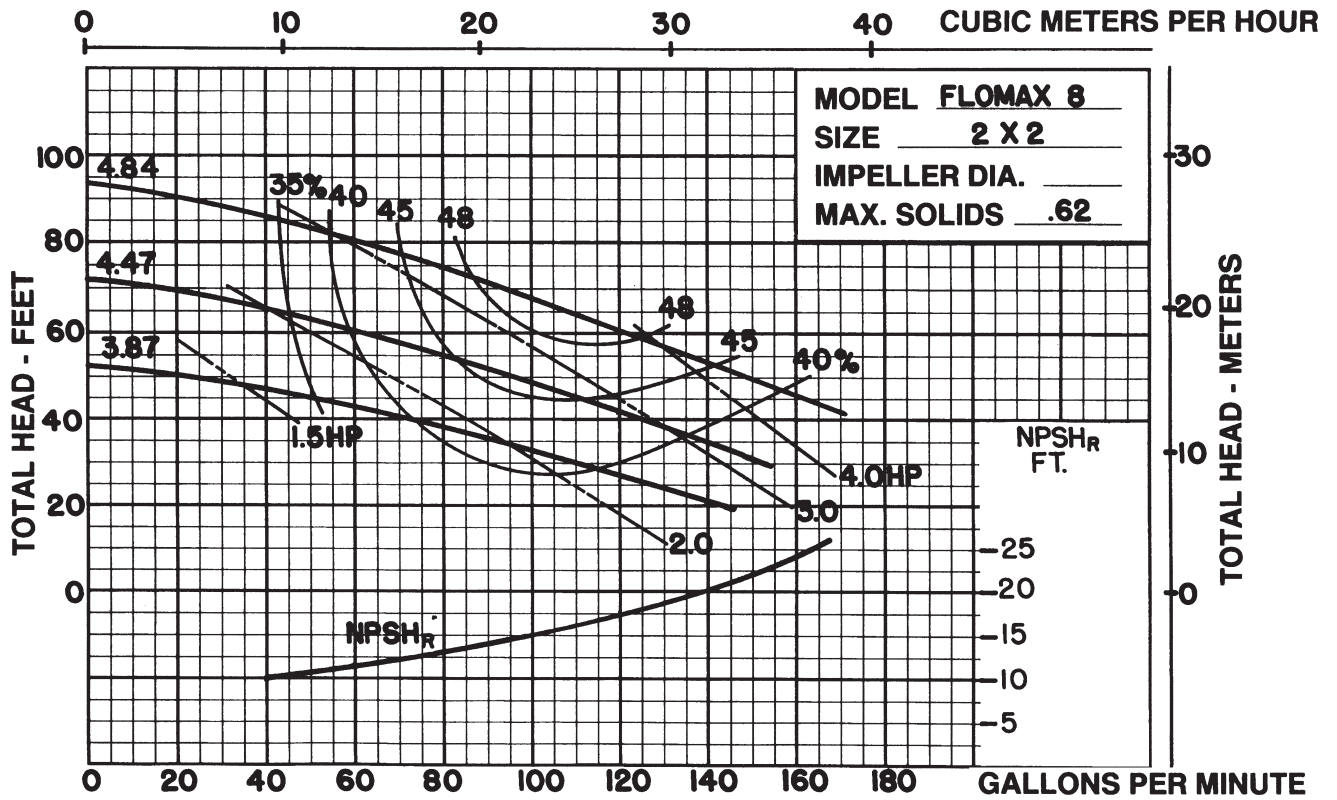
Flomax 8 Pump Performance Curves



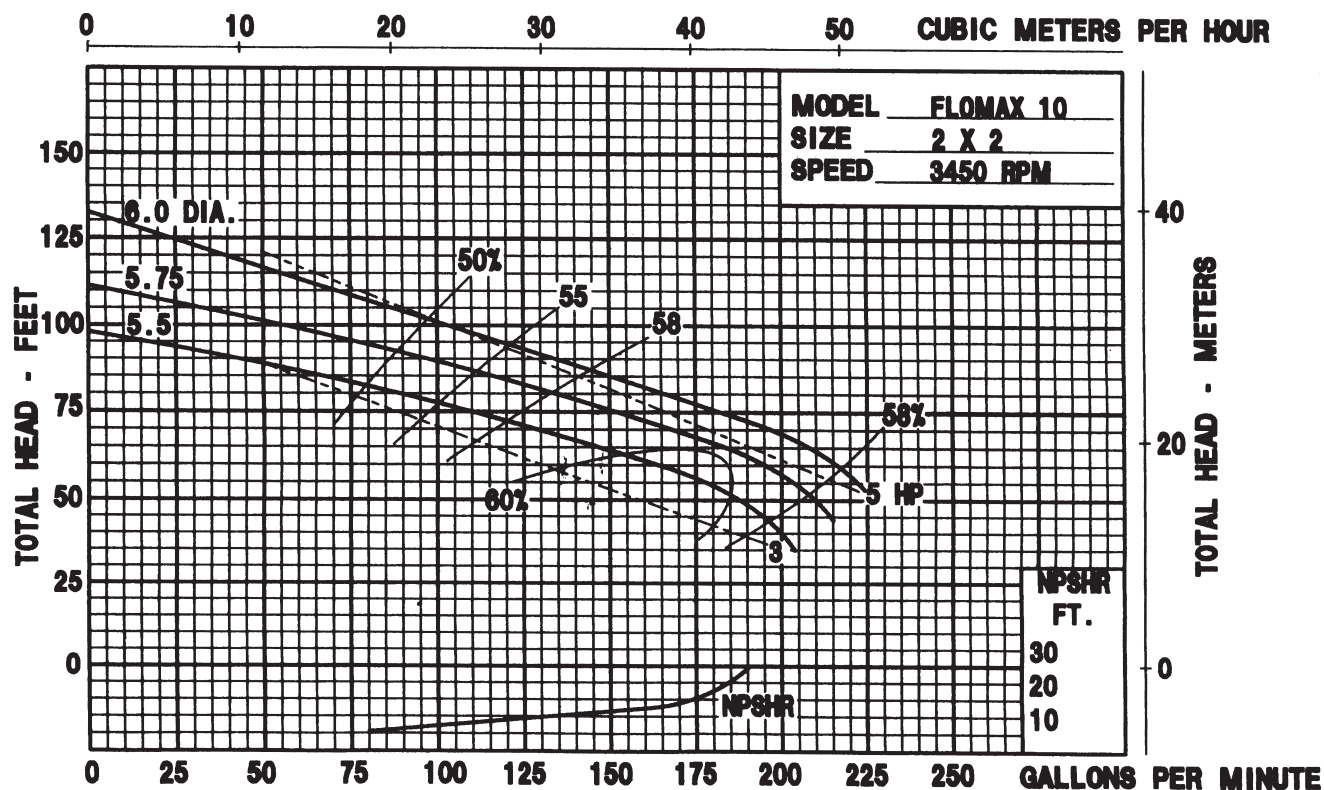
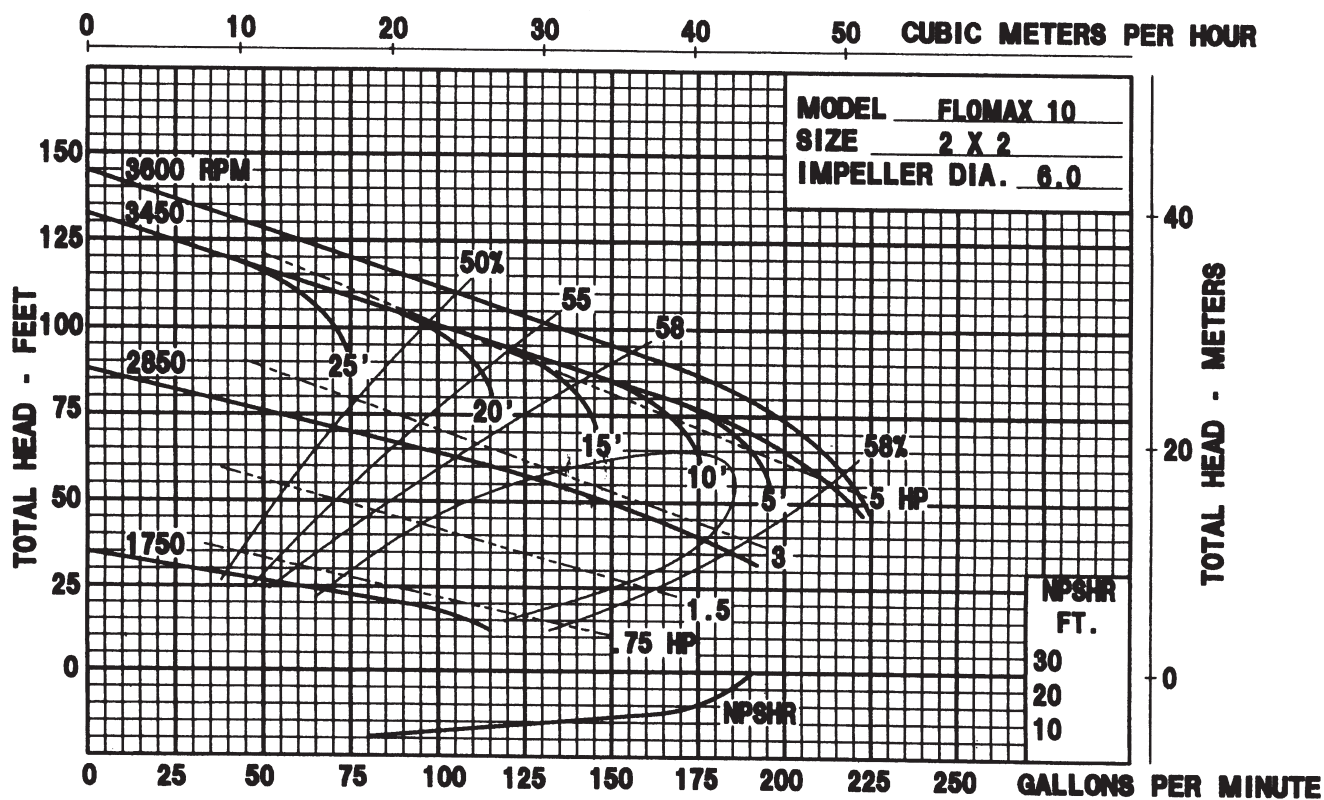
PROVEN WRONG BY HISTORY: (continued)

"But what ... is it good for?" -Engineer at the Advanced Computing Systems Division of IBM, 1968, commenting on the microchip

FLOMAX 5 & 8 Pump Double Seal Performance Curves



Flomax 10 Pump Performance Curves

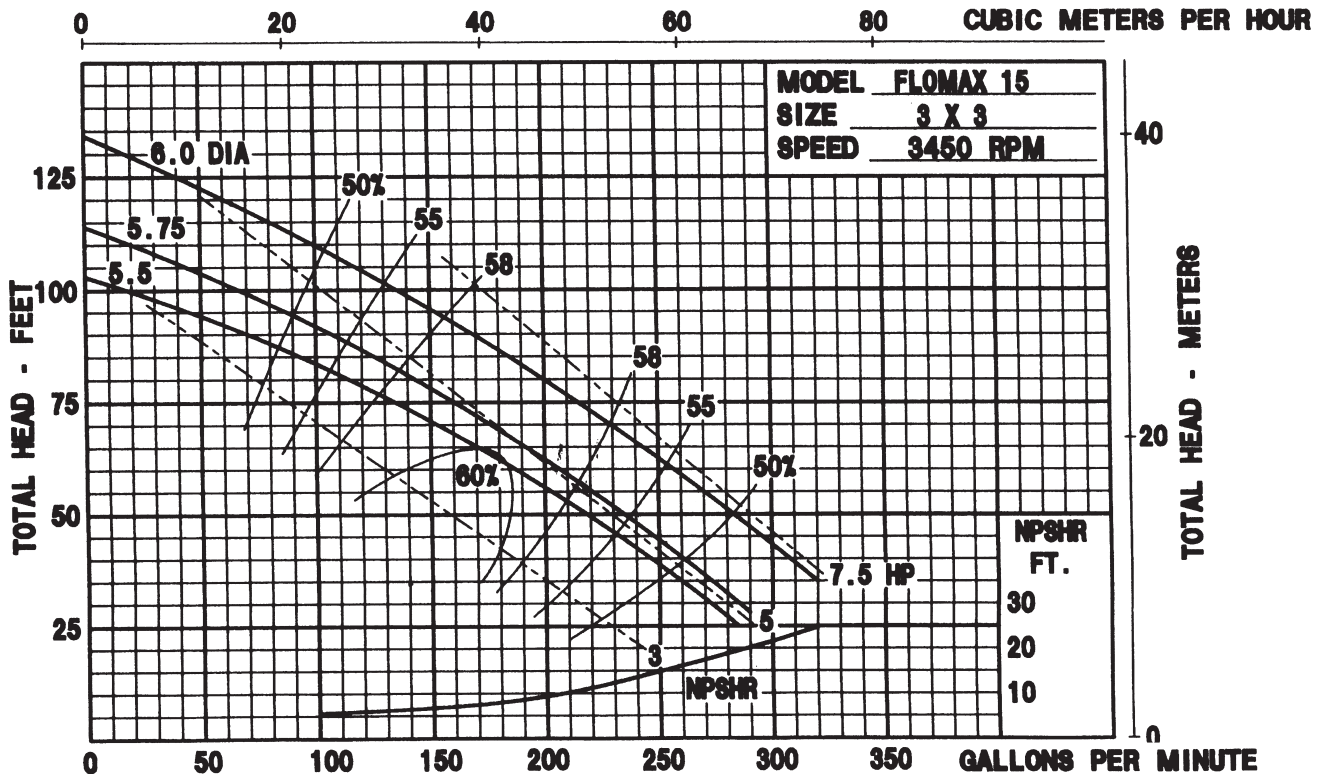
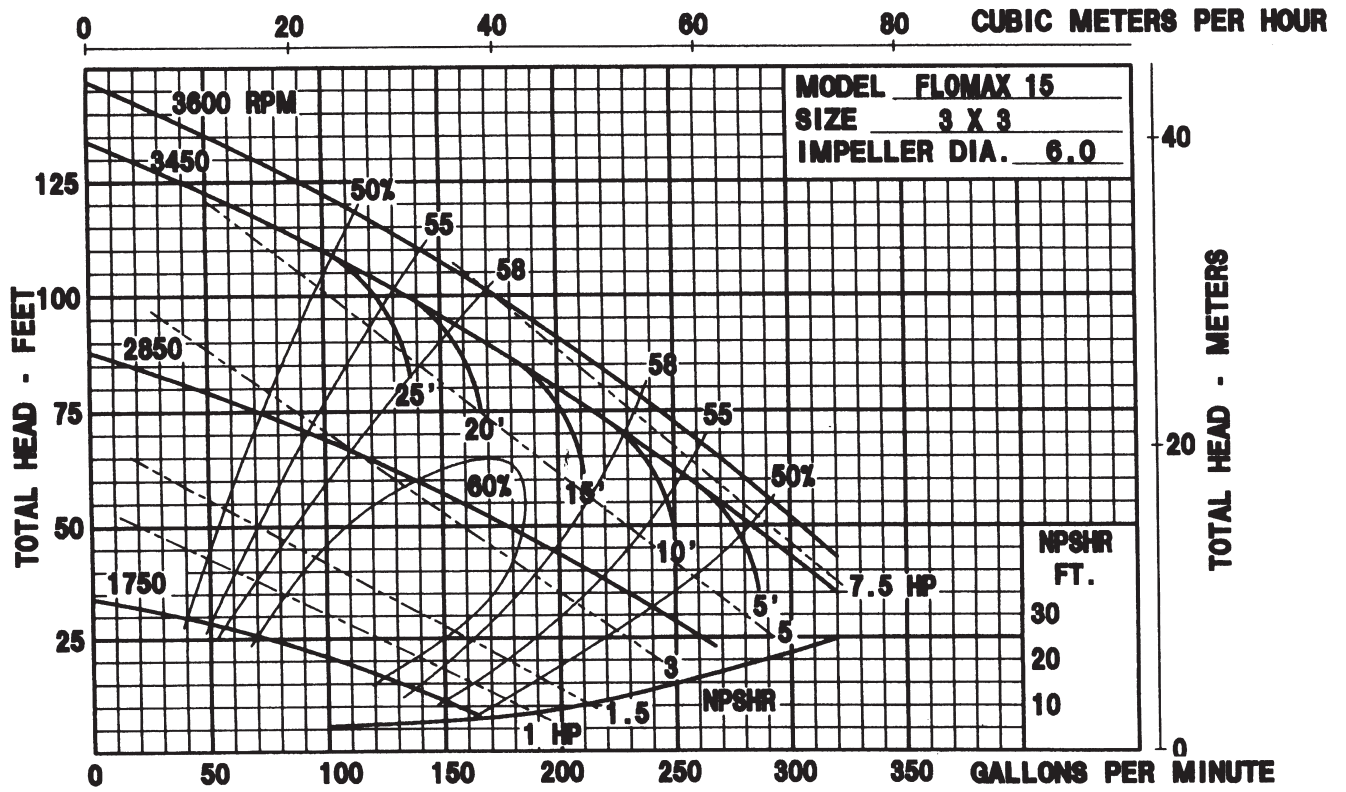


PROVEN WRONG BY HISTORY: (continued)

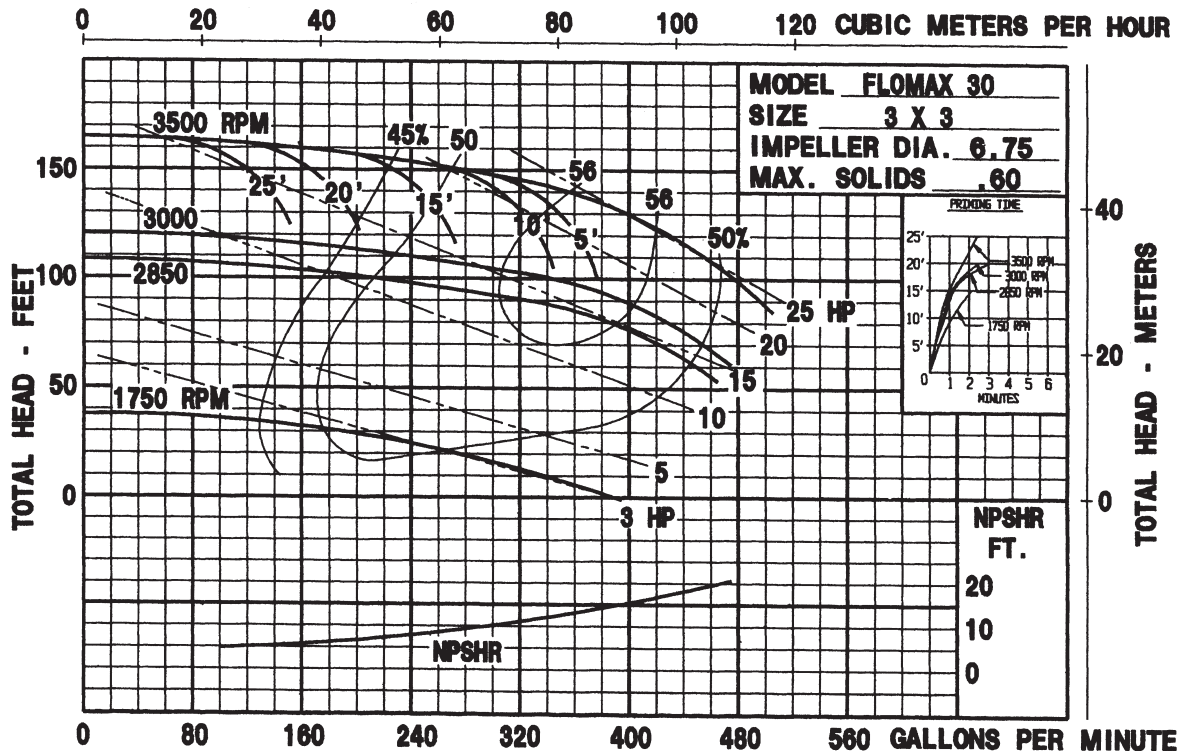
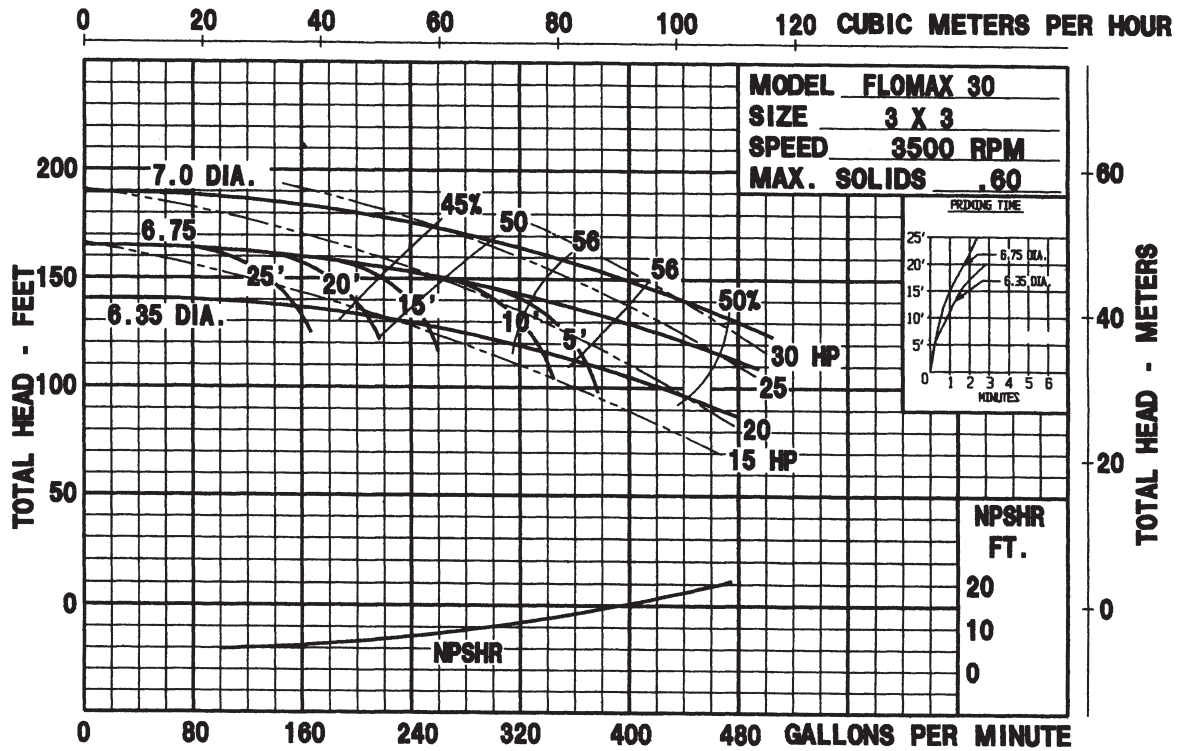
"There is no reason anyone would want a computer in their home."

-Ken Olson, president, chairman, and founder of Digital Equipment Corporation, 1977

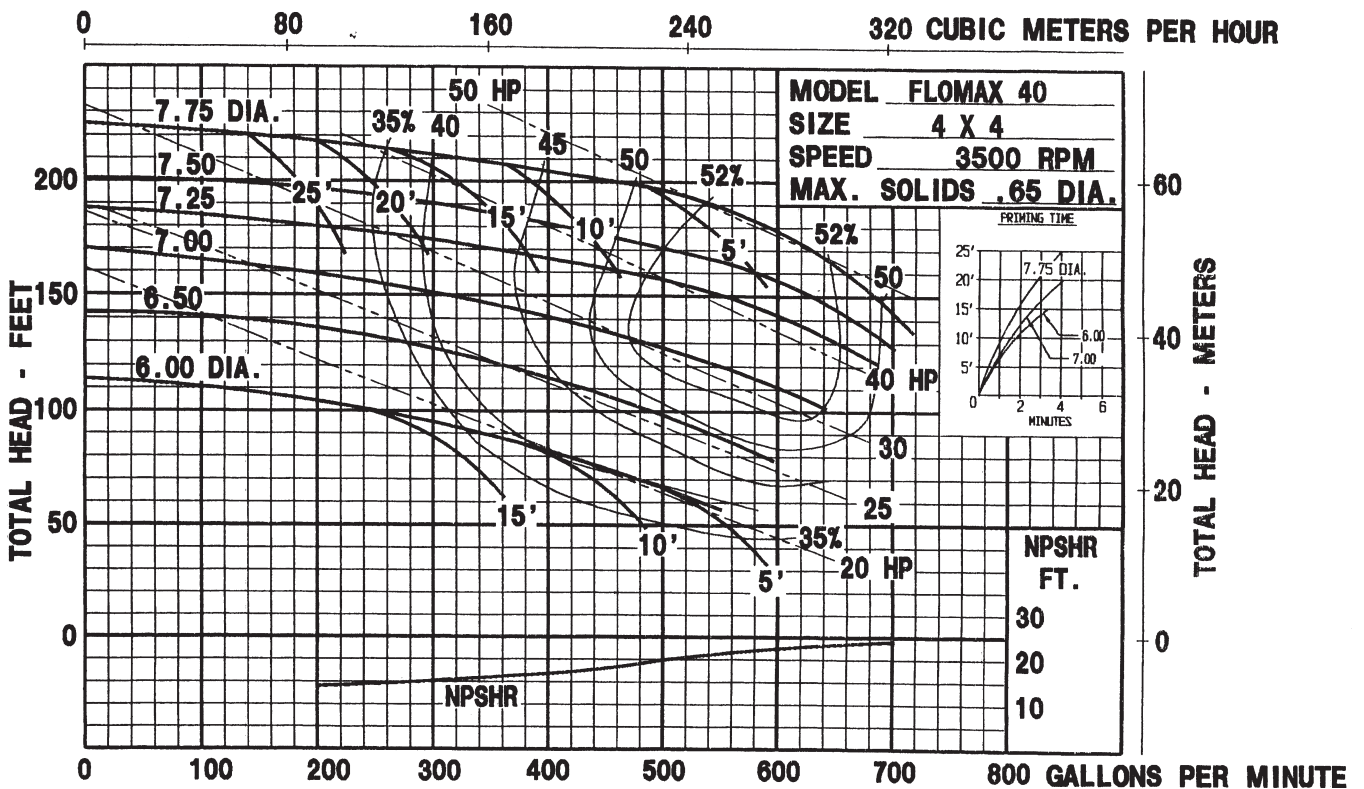
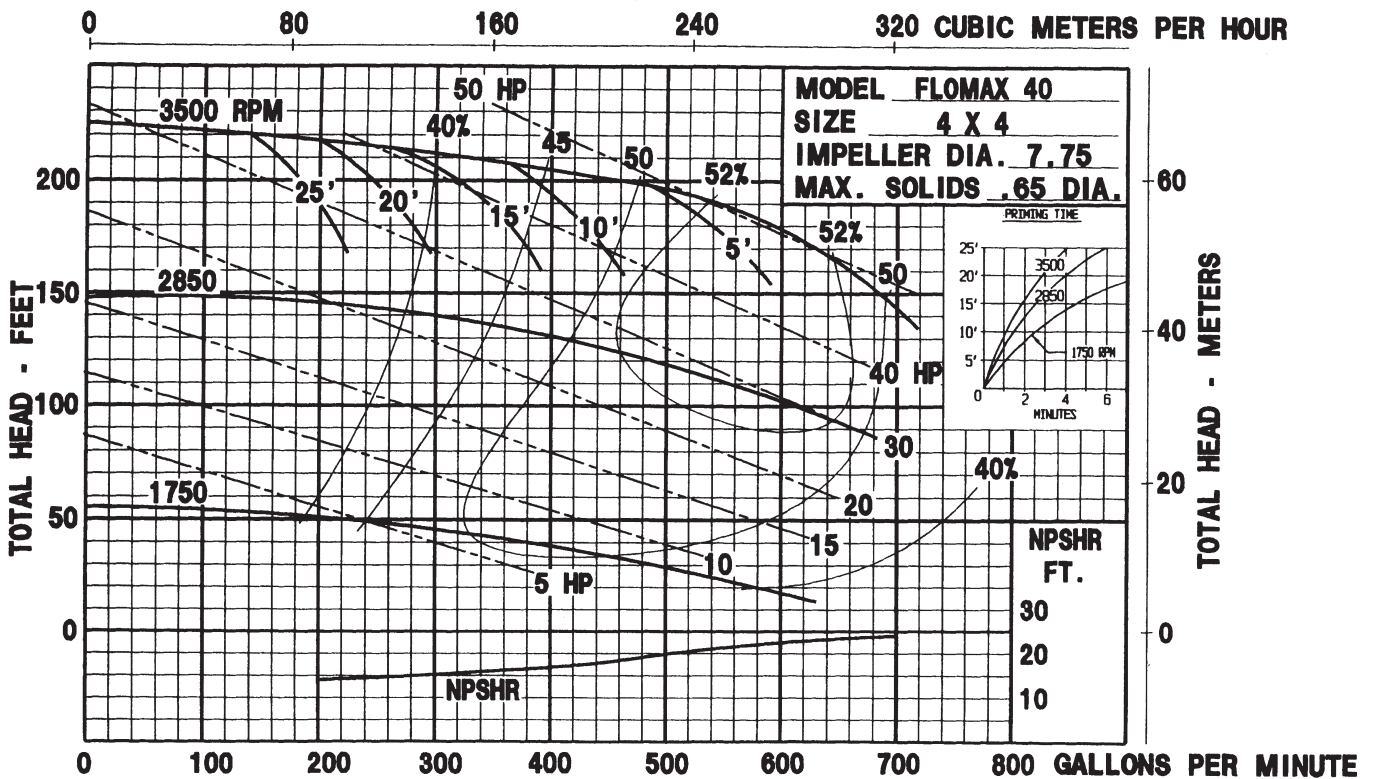
Flomax 15 Pump Performance Curves



Flomax 30 Pump Performance Curves



Flomax 40 Pump Performance Curves

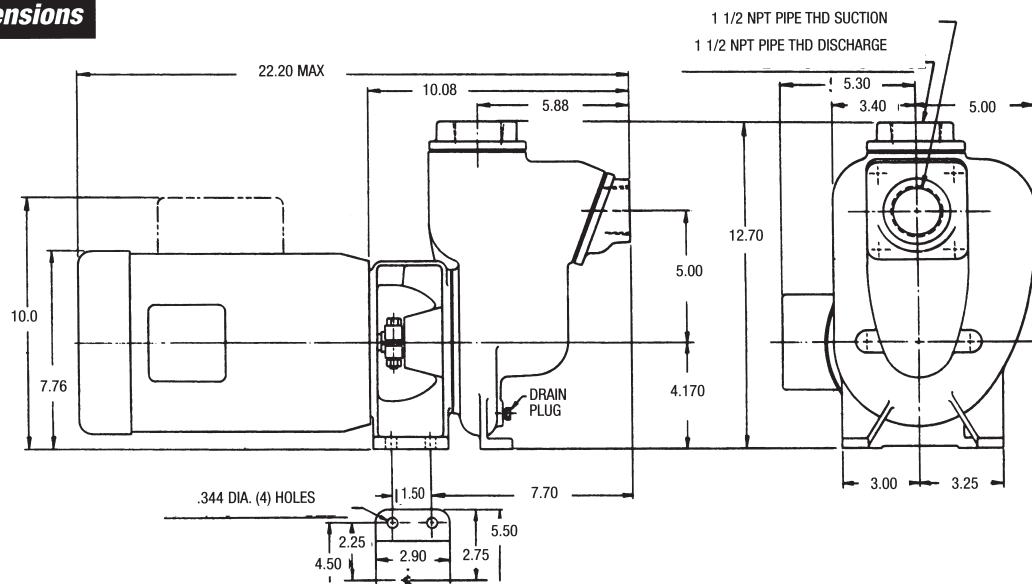


PROVEN WRONG BY HISTORY: (continued)

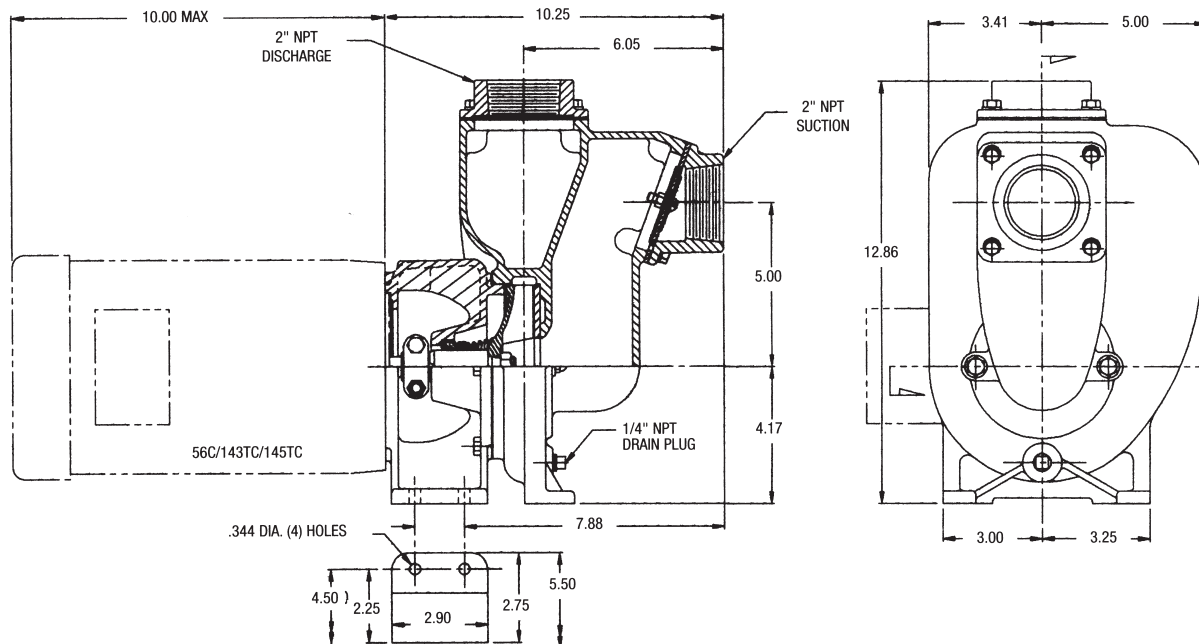
"640K ought to be enough for anybody."

-Bill Gates, 1981

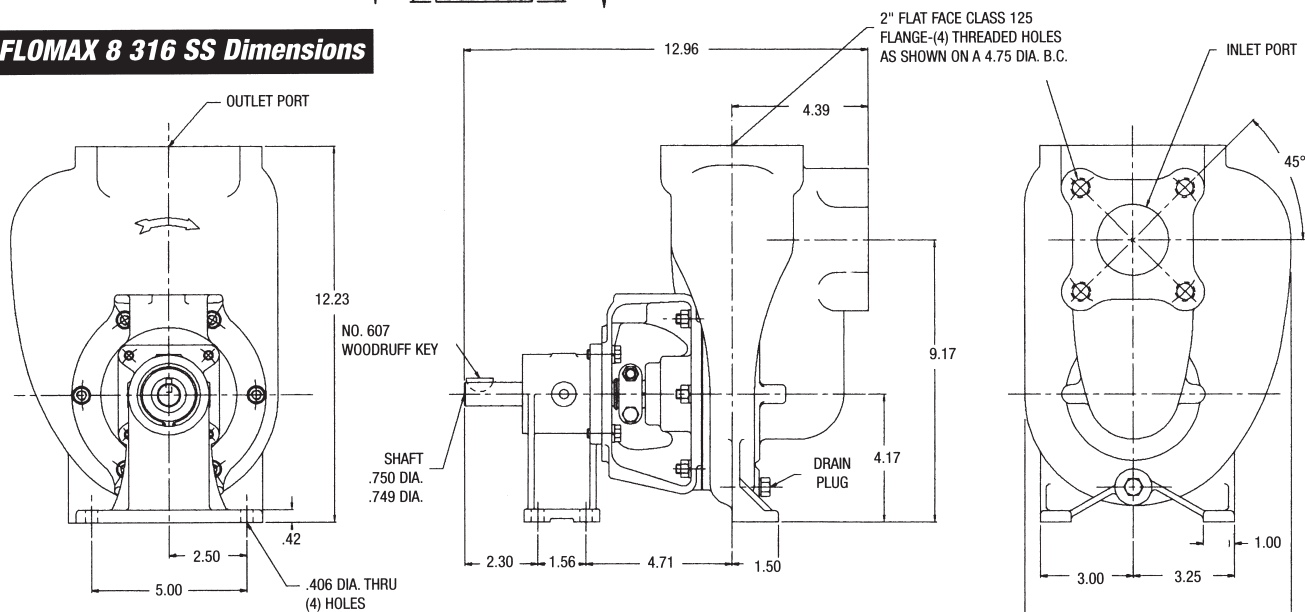
Flomax 5 Dimensions



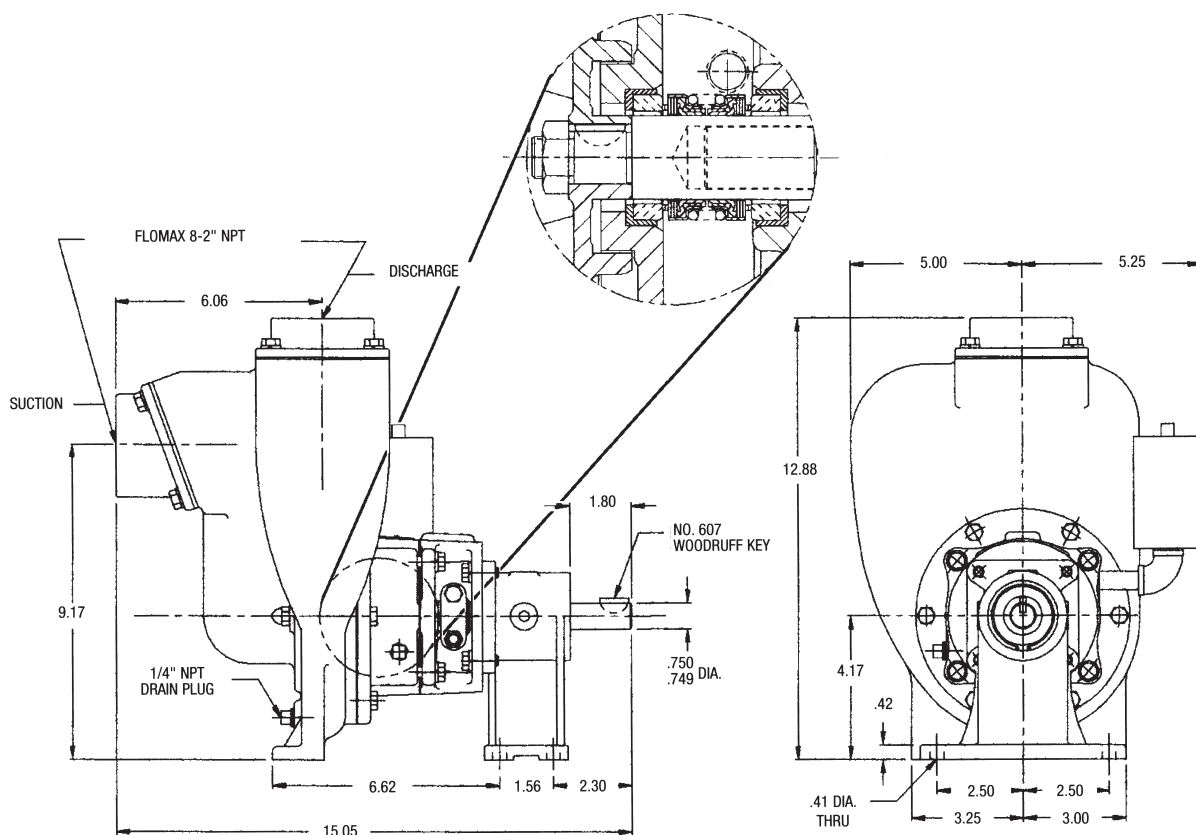
Flomax 8 Dimensions



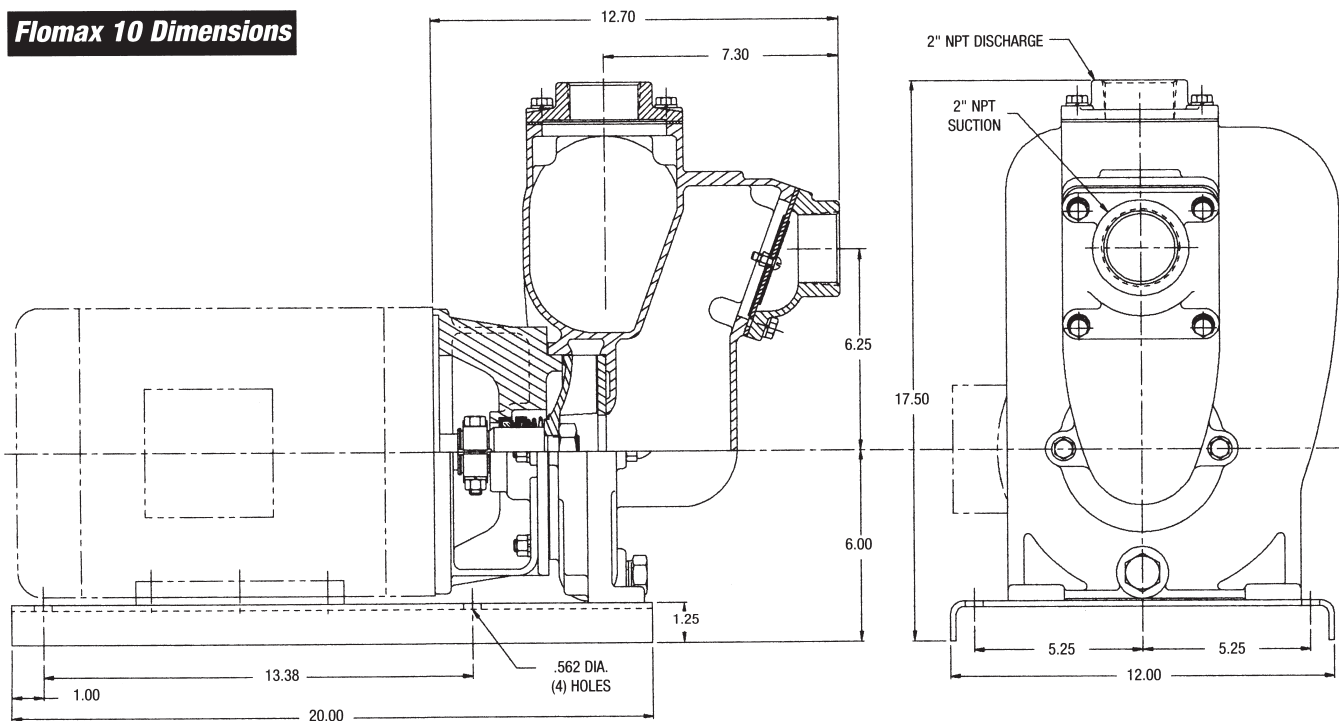
FLOMAX 8 316 SS Dimensions



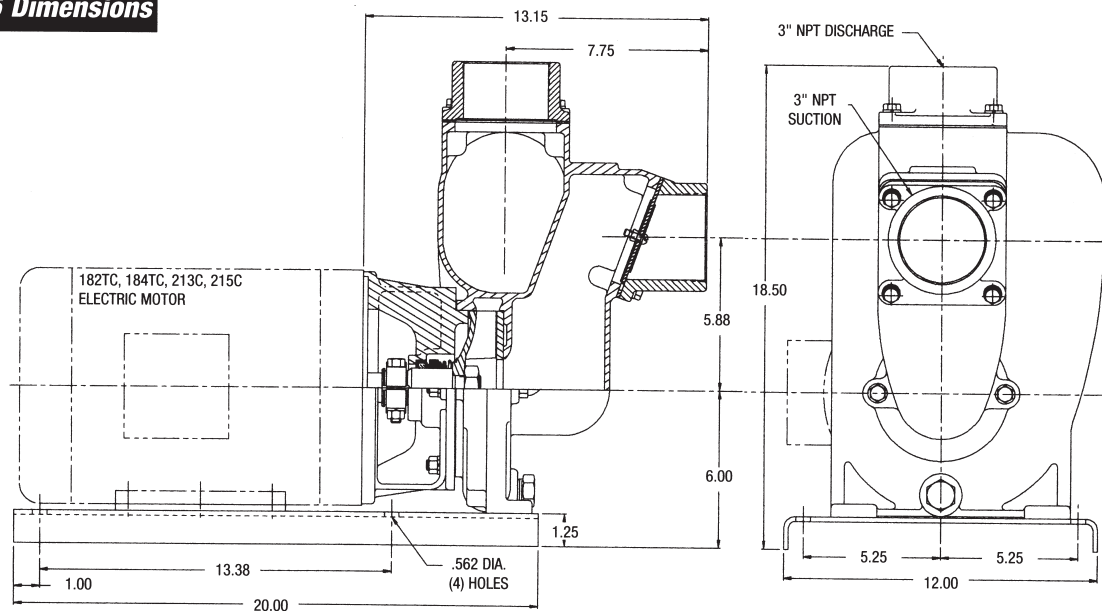
FLOMAX 5 & 8 Dimensions



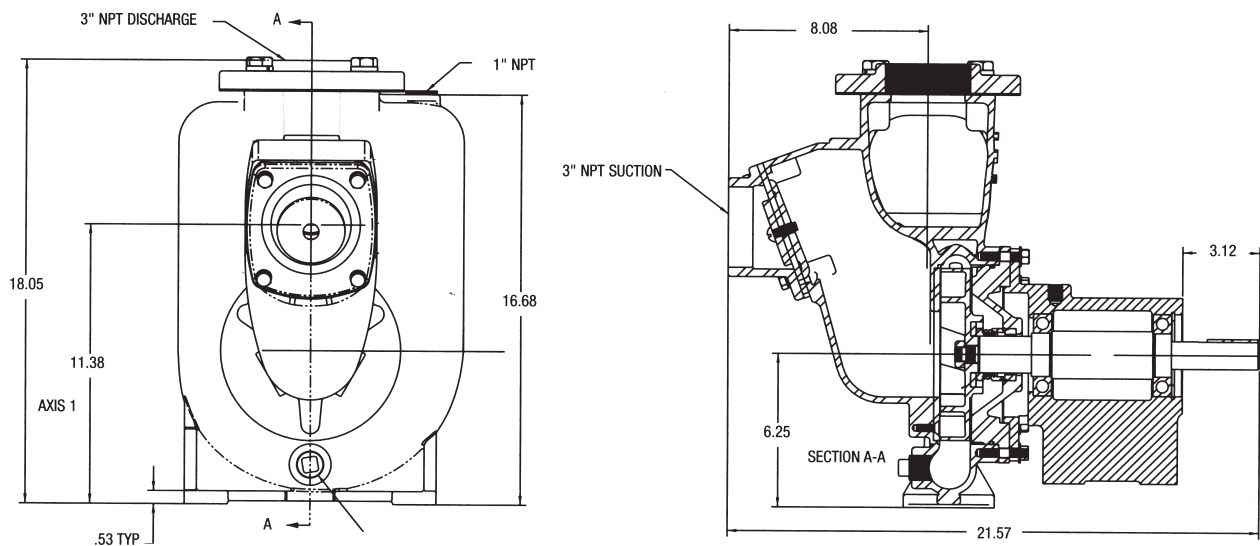
Flomax 10 Dimensions



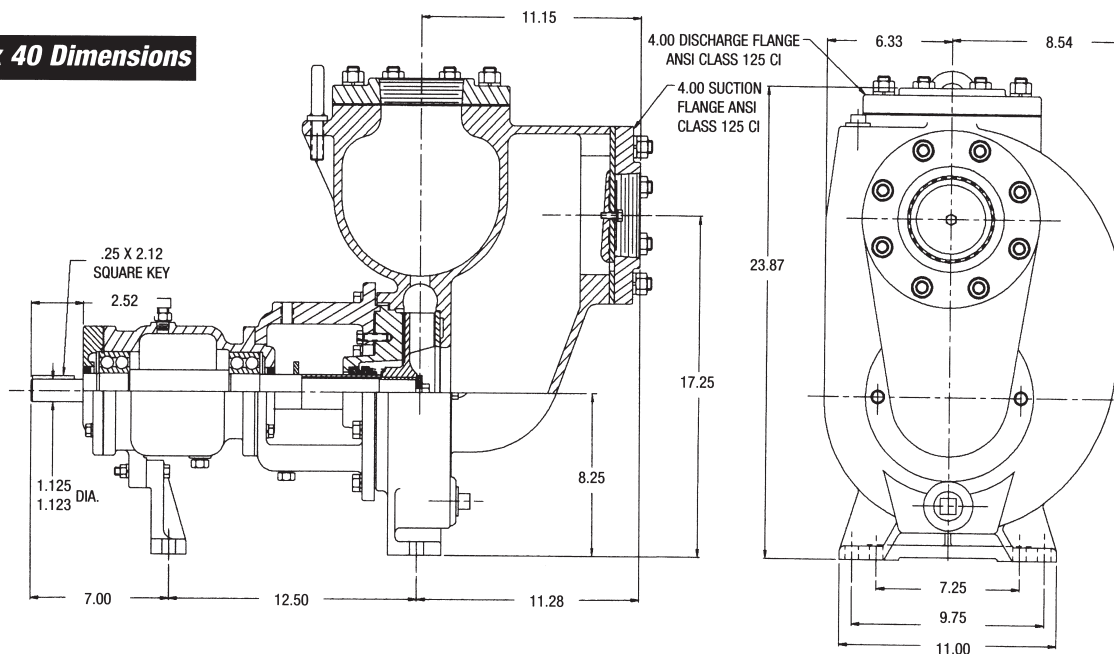
Flomax 15 Dimensions



Flomax 30 Pedestal Mount Dimensions



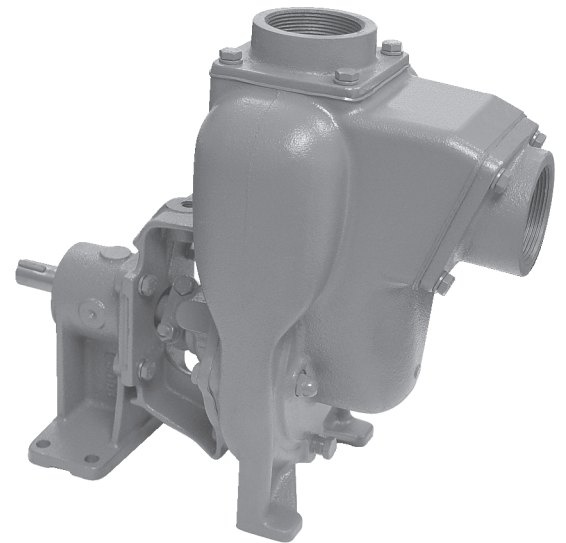
Flomax 40 Dimensions



Model PG Pumps Compatible For Gasoline, Kerosene, Avgas & Jet Fuel



The "PG" model is available in Pedestal mount for flexible coupling or Close Coupled mount to C Face Class I Group D Explosion Proof electric motors. Ductile Iron is the standard construction for the volute and adapter. The open impeller is standard in cast iron construction with aluminum as an optional material. Standard material for the wear plate is aluminum. The standard self-lubricated Type 2 mechanical seal is equipped with a carbon rotating face, viton elastomer and stainless steel spring. The stationary face is silicon carbide.

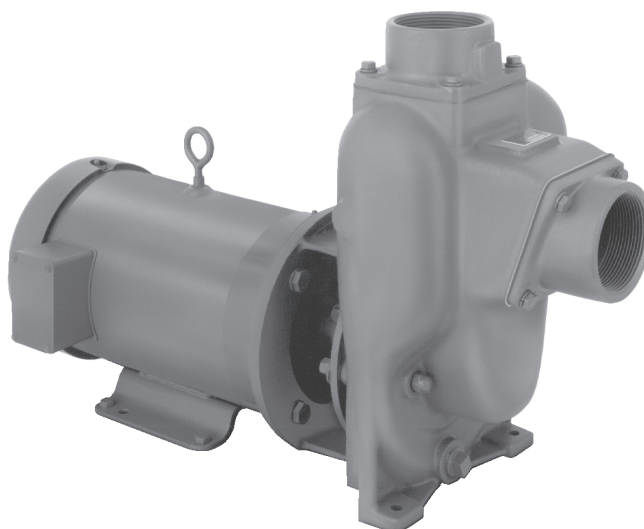


MODEL	SIZE	MOUNTING	STANDARD MATERIALS OF CONSTRUCTION					OPTIONAL MATERIALS		
			VOLUTE	IMPELLER	WEAR PLATE	GASKET	SEAL	VOLUTE	IMPELLER	WEAR PLATE
PG 8	2" X 2"	Explosion Proof	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS	SEE BRT SALES REP	Aluminum	SEE BRT SALES REP
PG 8	2" X 2"	Pedestal	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	
PG 10	2" X 2"	Explosion Proof	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	
PG 15	3" X 3"	Explosion Proof	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	
PG 15	3" X 3"	Pedestal	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	
PG 30	3" X 3"	Pedestal	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	
PG 40	4" X 4"	Pedestal	Ductile Iron	Cast Iron	Aluminum	Cork/Nitrile	Type 2 Viton/Carbon/Sil.Car./SS		Aluminum	

Model PO Pumps Compatible For BioDiesel, Fuel Oil & Diesel



The "PO" model mounting offerings for fuel oil and diesel fuel applications include both Pedestal mount for flexible coupling and Close Coupled mount to C Face, TEFC electric motors. Cast Iron is the standard construction for the volute, adapter and open impeller. Standard material for the wear plate is steel. The volute is also available in ductile iron. The standard self-lubricated Type 21 mechanical seal is equipped with a carbon rotating face, viton elastomer and stainless steel spring. The stationary face is Ni-Resist.

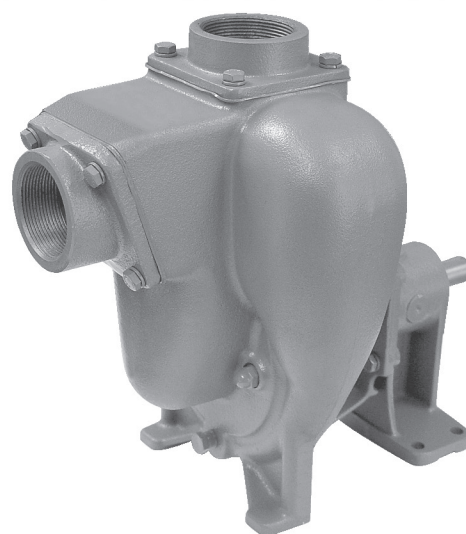


MODEL	SIZE	MOUNTING	STANDARD MATERIALS OF CONSTRUCTION					OPTIONAL MATERIALS		
			VOLUTE	IMPELLER	WEAR PLATE	GASKET	SEAL	VOLUTE	IMPELLER	WEAR PLATE
PO 8	2" X 2"	TEFC	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron	SEE BRT SALES REP	SEE BRT SALES REP
PO 8	2" X 2"	Pedestal	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		
PO 10	2" X 2"	TEFC	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		
PO 15	3" X 3"	TEFC	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		
PO 15	3" X 3"	Pedestal	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		
PO 30	3" X 3"	Pedestal	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		
PO 40	4" X 4"	Pedestal	Cast Iron	Cast Iron	Steel	Cork/Nitrile	Type 21 Viton/Carbon/ NiResist/SS	Ductile Iron		

Model PE Pumps Compatible For Ethanol & E 85



The "PE" model is available in Pedestal mount for flexible coupling or Close Coupled mount to C Face Class I Group D Explosion Proof electric motors. Ductile Iron is the standard construction for the volute and adapter. The open impeller is standard in cast iron construction with 316 SS as an optional material. Standard material for the wear plate is steel. The standard self-lubricated Type 2 mechanical seal is equipped with a carbon rotating face, viton elastomer and stainless steel spring. The stationary face is silicon carbide.



MODEL	SIZE	MOUNTING	STANDARD MATERIALS OF CONSTRUCTION					OPTIONAL MATERIALS		
			VOLUTE	IMPELLER	WEAR PLATE	GASKET	SEAL	VOLUTE	IMPELLER	WEAR PLATE
PE 8	2" X 2"	Explosion Proof	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS	SEE BRT SALES REP	316 SS	SEE BRT SALES REP
PE 8	2" X 2"	Pedestal	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	
PE 10	2" X 2"	Explosion Proof	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	
PE 15	3" X 3"	Explosion Proof	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	
PE 15	3" X 3"	Pedestal	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	
PE 30	3" X 3"	Pedestal	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	
PE 40	4" X 4"	Pedesta	Ductile Iron	Cast Iron	Steel	Cork/Nitrile	Type 2 Viton/Carbon/ Sil.Car./SS		316 SS	

MP Pumps

Self Priming Petroleum Pumps

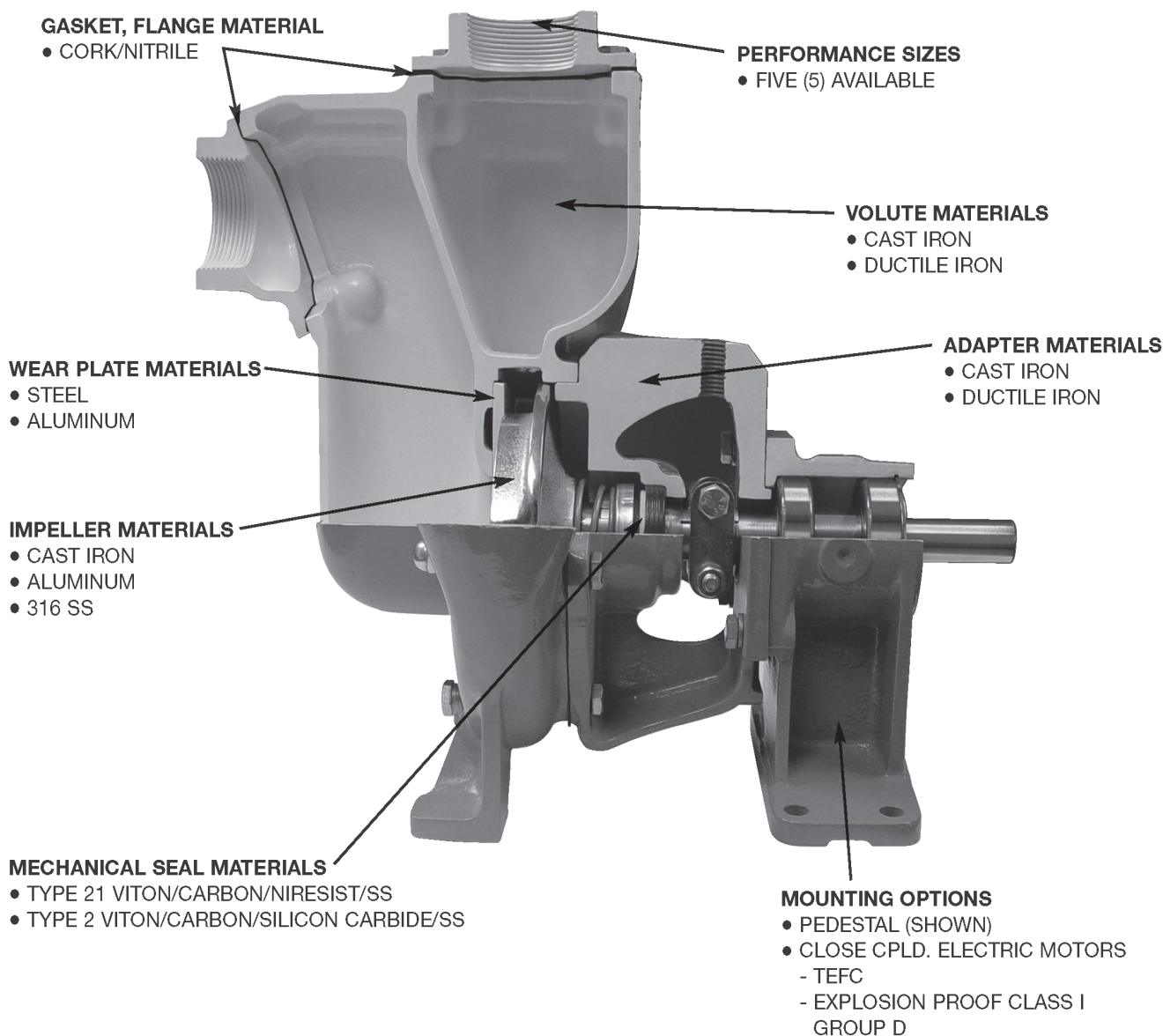
MP Pumps has specifically reengineered its popular Flomax® Self-Priming Series for compatibility with clean, non-abrasive petroleum products.

Transfer and delivery of various fuels such as gasoline, ethanol, biodiesel, and fuel oils are just a few of the petroleum based products the Flomax® Series is suitable for handling.

Long recognized as the leader in self-priming applications, the Flomax® Series addresses today's fuel market by offering:

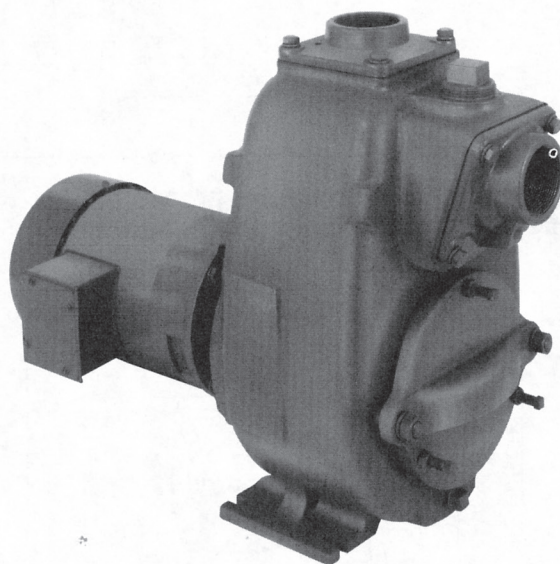
- **Five (5) performance models.**
- **Various drive options.**
- **Specific mechanical seal offerings.**
- **Materials of construction compatible for three (3) distinct fuel classifications.**

By classifying various fuels into three (3) distinct segments, MP Pumps can recommend that its design is capable of handling the specific fuel groups without incurring the additional cost associated with “one pump for all fuels”.



SELF PRIMING TRASH PUMP FEATURES

- CLOSED COUPLED TO ELECTRIC MOTOR OR PEDESTAL FOR STANDARD MOTOR
- FLOW - TO 210 GPM
- PRESSURES - TO 125 FEET HEAD
- CAST IRON CONSTRUCTION
- ELECTRIC MOTOR DRIVE
- IMPELLER - DUCTILE IRON
- SHAFT SLEEVE - 304 STAINLESS STEEL
- SEALS - CARBON/CERAMIC VITON MECHANICAL SEAL
- OPTIONS:
 - ENGINE DRIVES
 - HYDRAULIC DRIVES



2CT

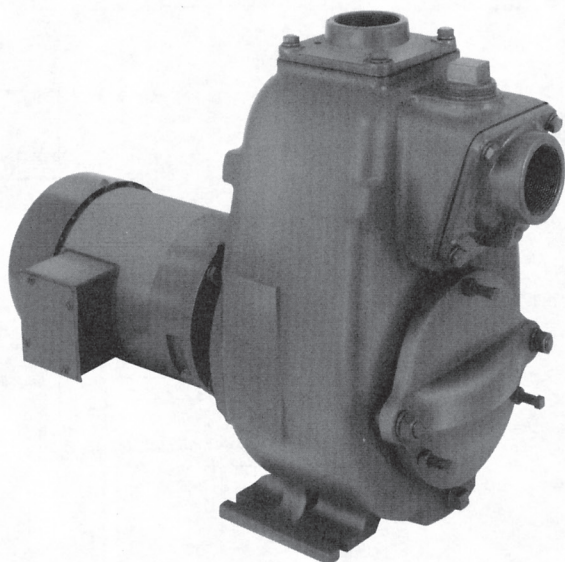
MODEL	Suction	Discharge
2CT	2" NPT	2" NPT

PROVEN WRONG BY HISTORY: (continued)

"So we went to Atari and said, 'Hey, we've got this amazing thing, even built with some of your parts, and what do you think about funding us? Or we'll give it to you. We just want to do it. Pay our salary, we'll come work for you.' And they said, 'No.' So then we went to Hewlett-Packard, and they said, 'Hey, we don't need you. You haven't got through college yet.'"

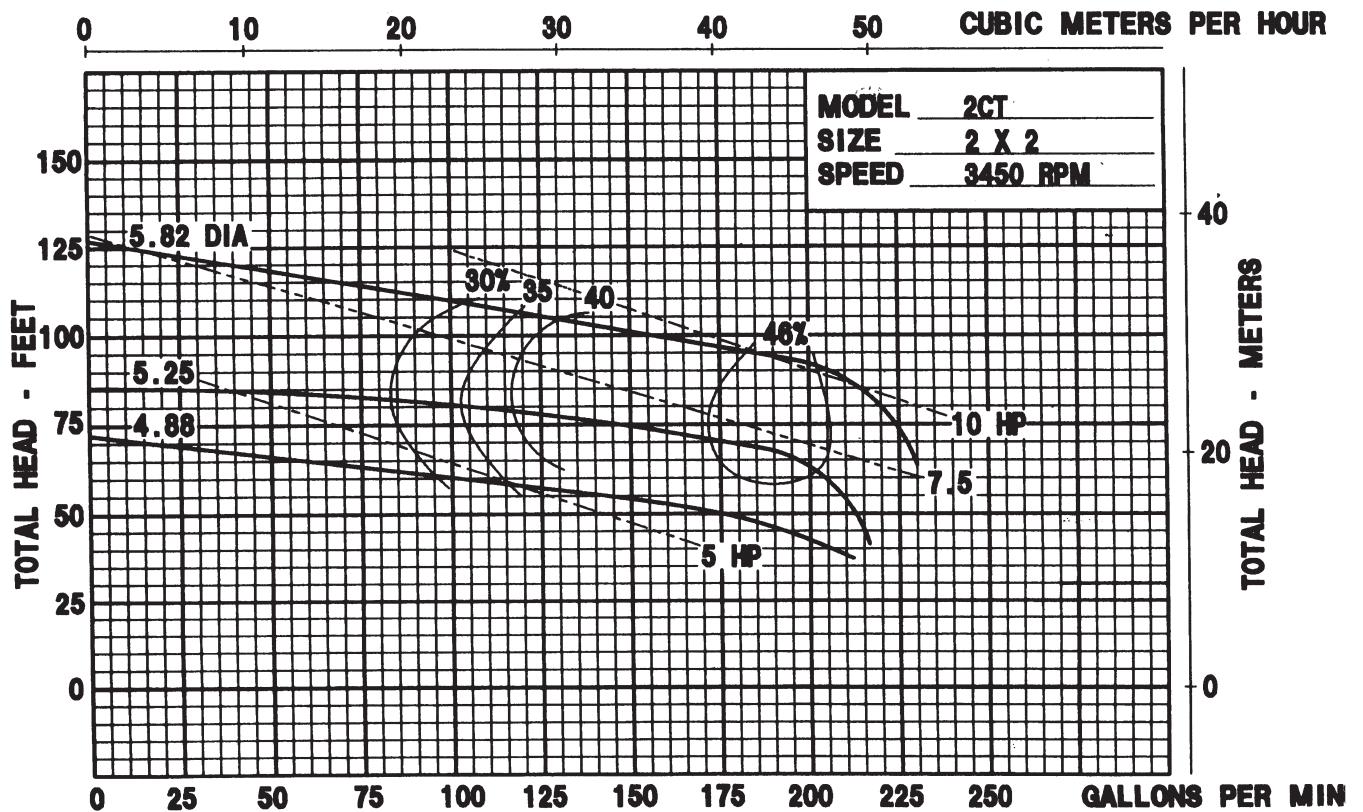
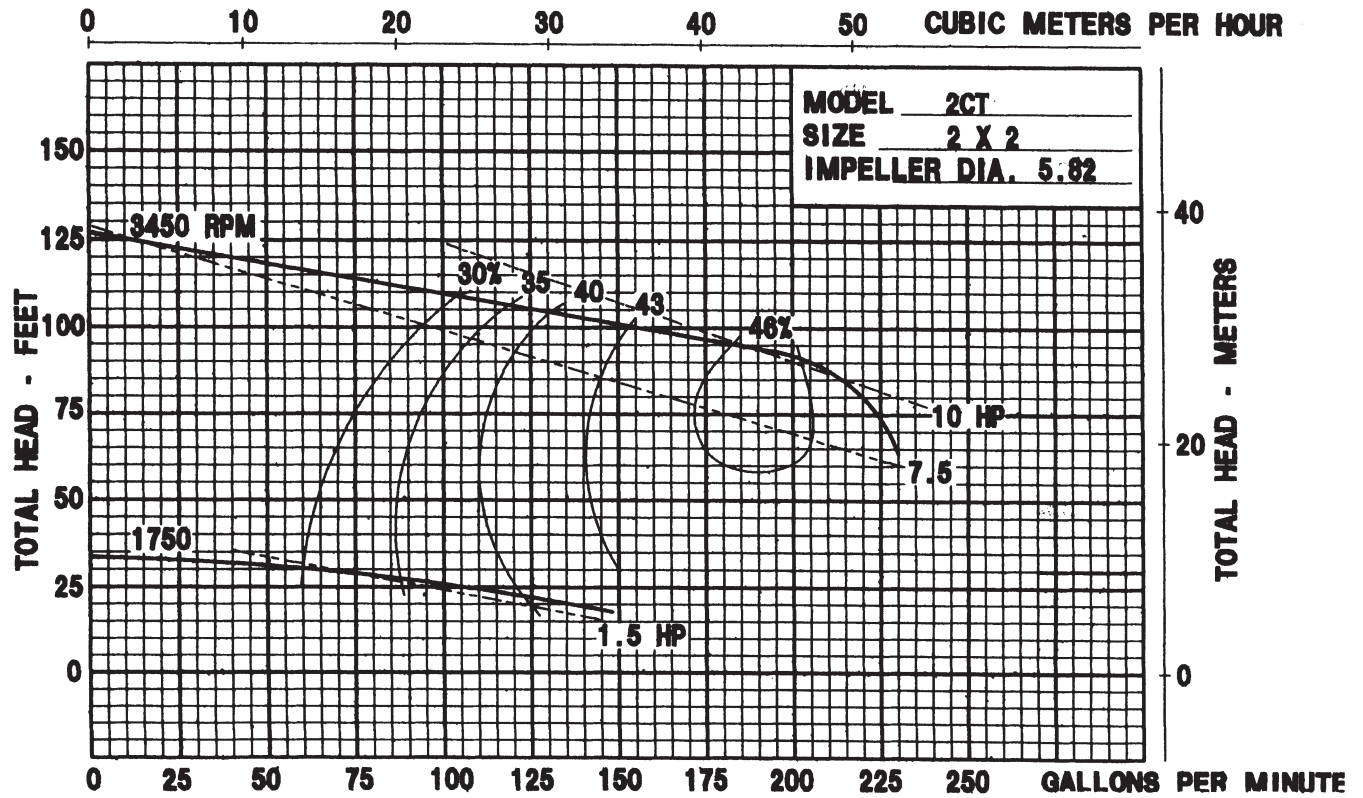
-Apple Computer, Inc., founder Steve Jobs on attempts to get Atari and Hewlett-Packard

interested in the personal computer that he and Steve Wozniak created

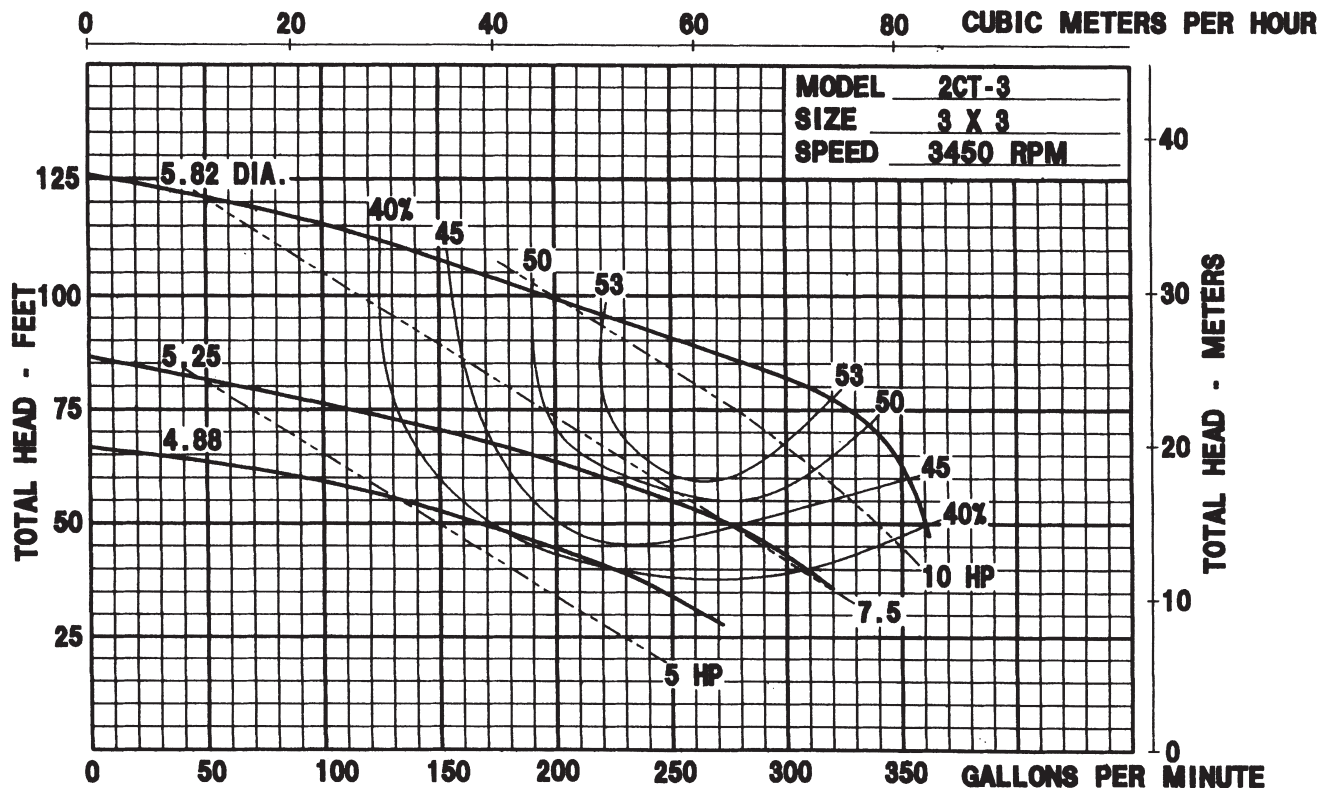
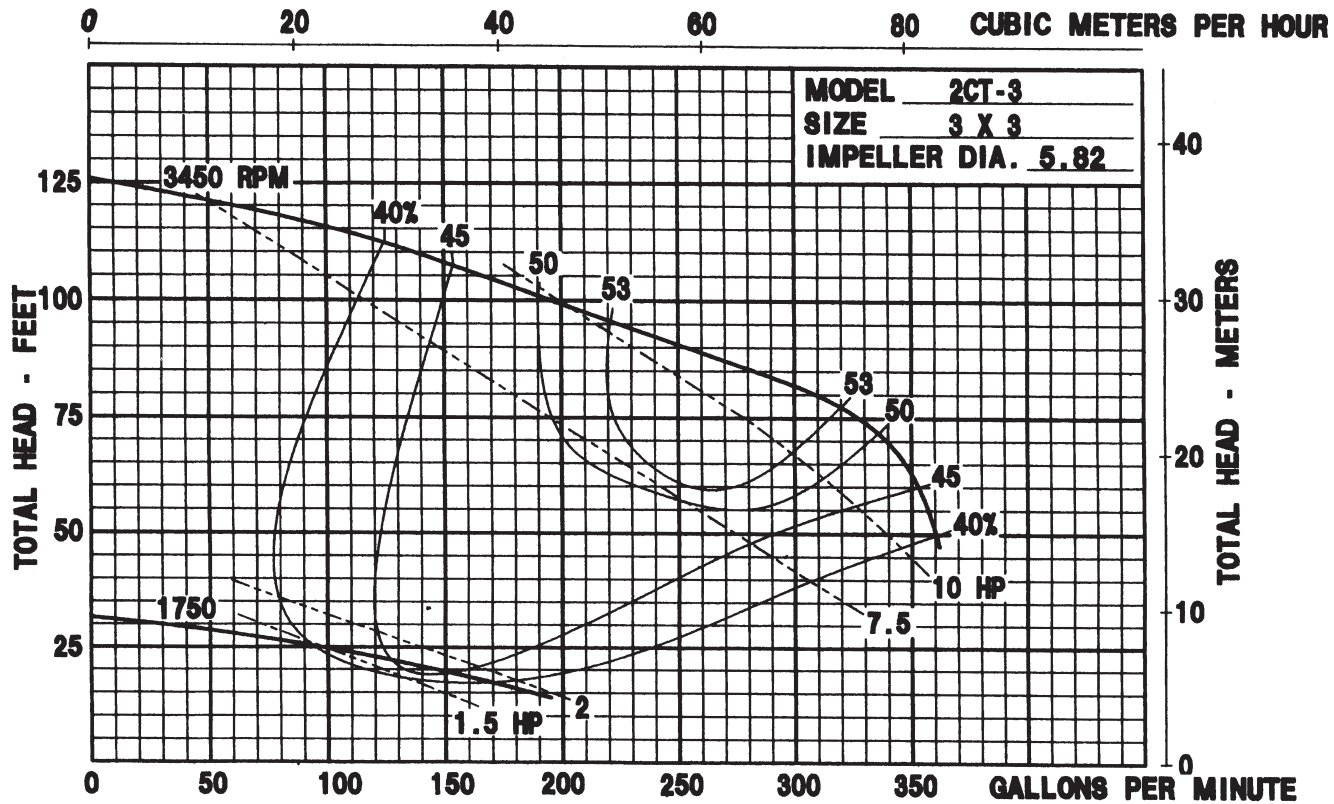


2CT-3

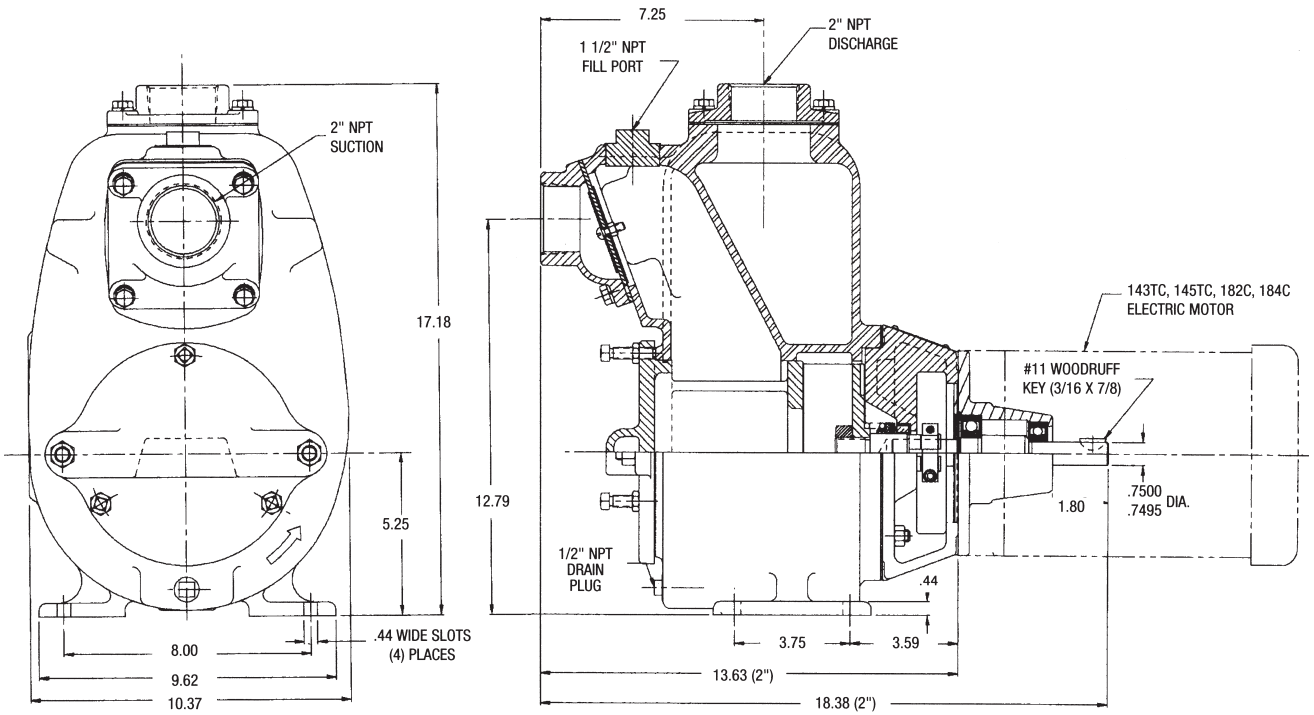
2CT Pump Performance Curves



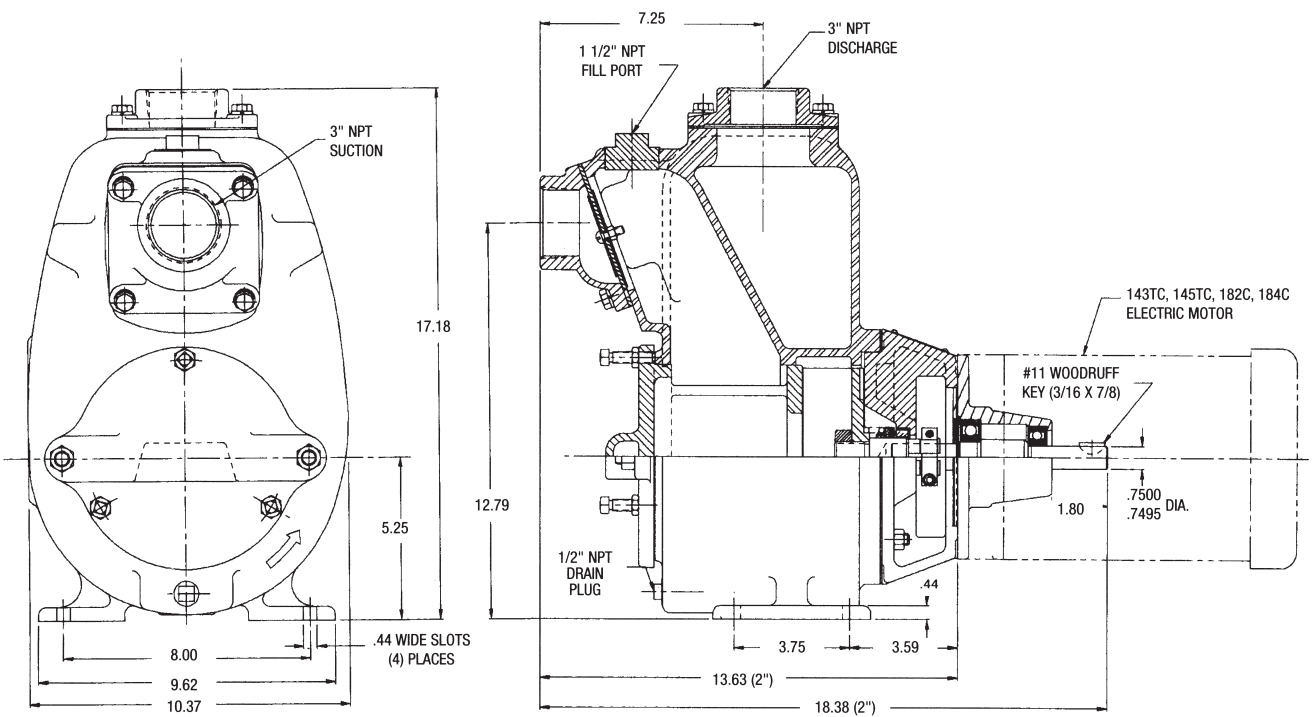
2CT-3 Pump Performance Curves



2CT Dimensions



2CT-3 Dimensions



SERIES 30 60 80 110

END SUCTION CENTRIFUGAL PUMP FEATURES

- SERIES 30, 60, 80, 110, 120, 130, 200, 300 & 700 CLOSED COUPLED TO ELECTRIC MOTOR
- SERIES 300 PEDESTAL PUMP, OR FOOT MOUNTED FOR BELT OR DIRECT DRIVE
- SERIES 700 PEDESTAL ANSI A-40 PUMP FOR BELT OR DIRECT DRIVE

- PUMPAK ONLY TO MOUNT TO STANDARD NEMA "C" FACE MOTOR .3-40 HP

- NEMA JP PUMP MOTOR UP TO 25HP

- FLOWS - 40-800 GPM

- PRESSURES - 40-190 FEET HEAD

AVAILABLE IN:

- SERIES 30 CAST IRON, BRONZE & ALUMINUM CONSTRUCTION
- SERIES 60 CAST IRON
- SERIES 80, 110, 120, 130 & 200 CAST IRON & BRONZE
- SERIES 300 CAST IRON AND CAST IRON STAINLESS STEEL FITTED
- SERIES 700 DUCTILE IRON CONSTRUCTION

- VERTICAL OR HORIZONTAL DISCHARGE

IMPELLER:

- SERIES 30 AVAILABLE IN CAST IRON, BRONZE, ALUMINUM
- SERIES 60, 110, 130 AND 200 AVAILABLE IN CAST IRON & BRONZE
- SERIES 80 & 120 AVAILABLE IN BRONZE (CAST IRON OPTIONAL)
- SERIES 300 & 700 AVAILABLE IN DUCTILE IRON-ENCLOSED

SHAFT SLEEVE:

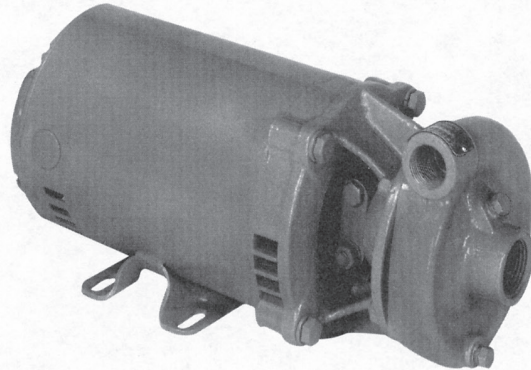
- SERIES 30, 60, 80, 110, 130 & 200 STAINLESS STEEL
- SERIES 300 STEEL
- SERIES 700 STEEL OR STAINLESS STEEL

- FASTENERS - STAINLESS STEEL

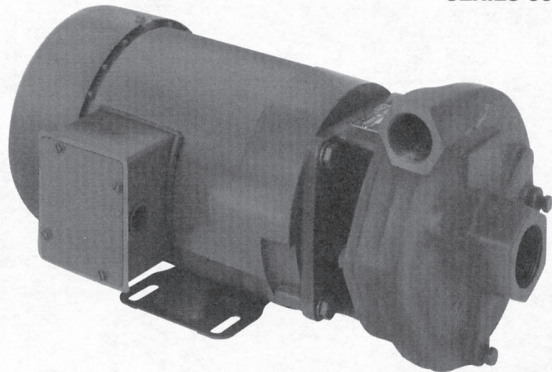
- SEALS - STANDARD VITON, OPTIONAL SEALS AVAILABLE (CONSULT FACTORY)

OPTIONS:

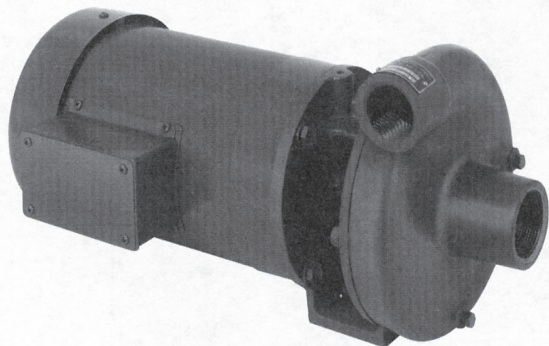
- ENGINE DRIVES
- PEDESTAL MODELS
- HYDRAULIC DRIVES
- CLUTCHPAKS
- MOTOR DRIVES



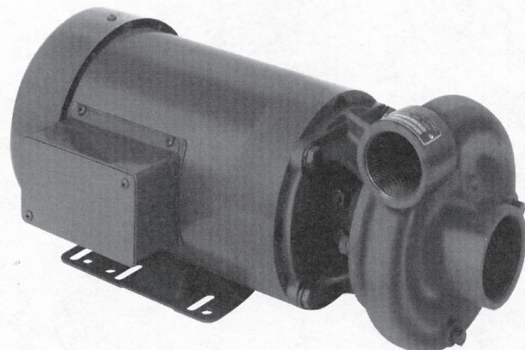
SERIES 30



SERIES 60

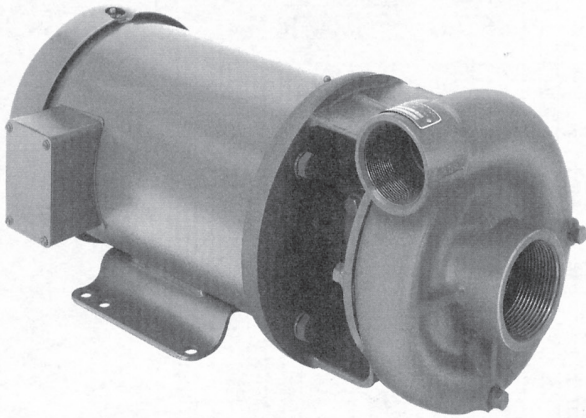


SERIES 80

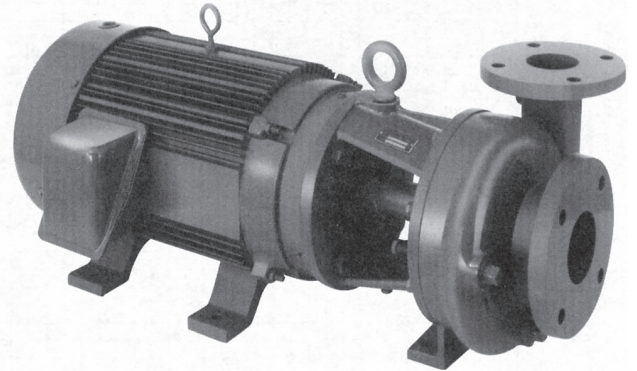


SERIES 110

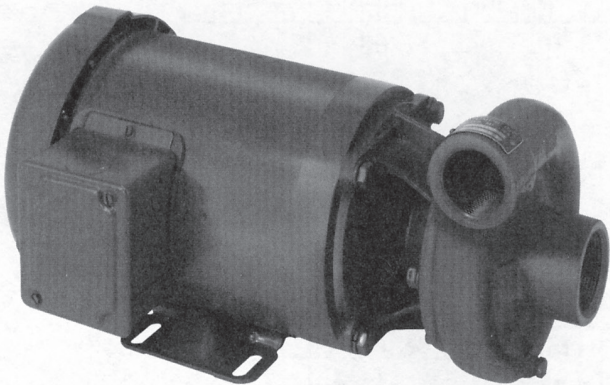
120 130 200 300 700



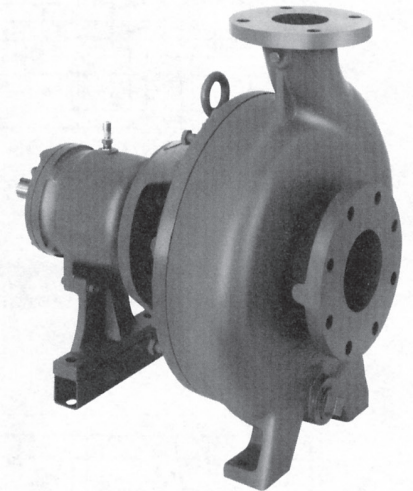
SERIES 120



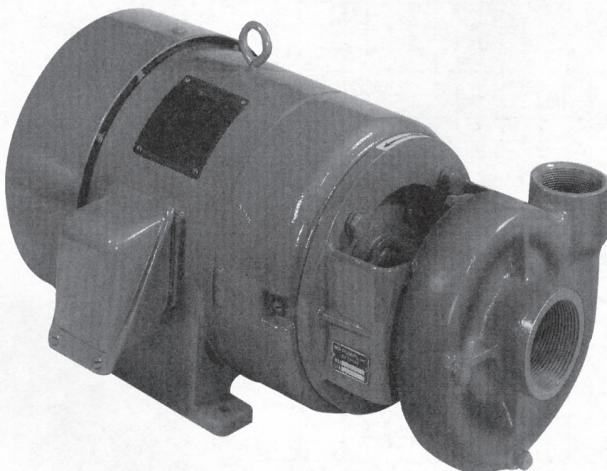
SERIES 300



SERIES 130



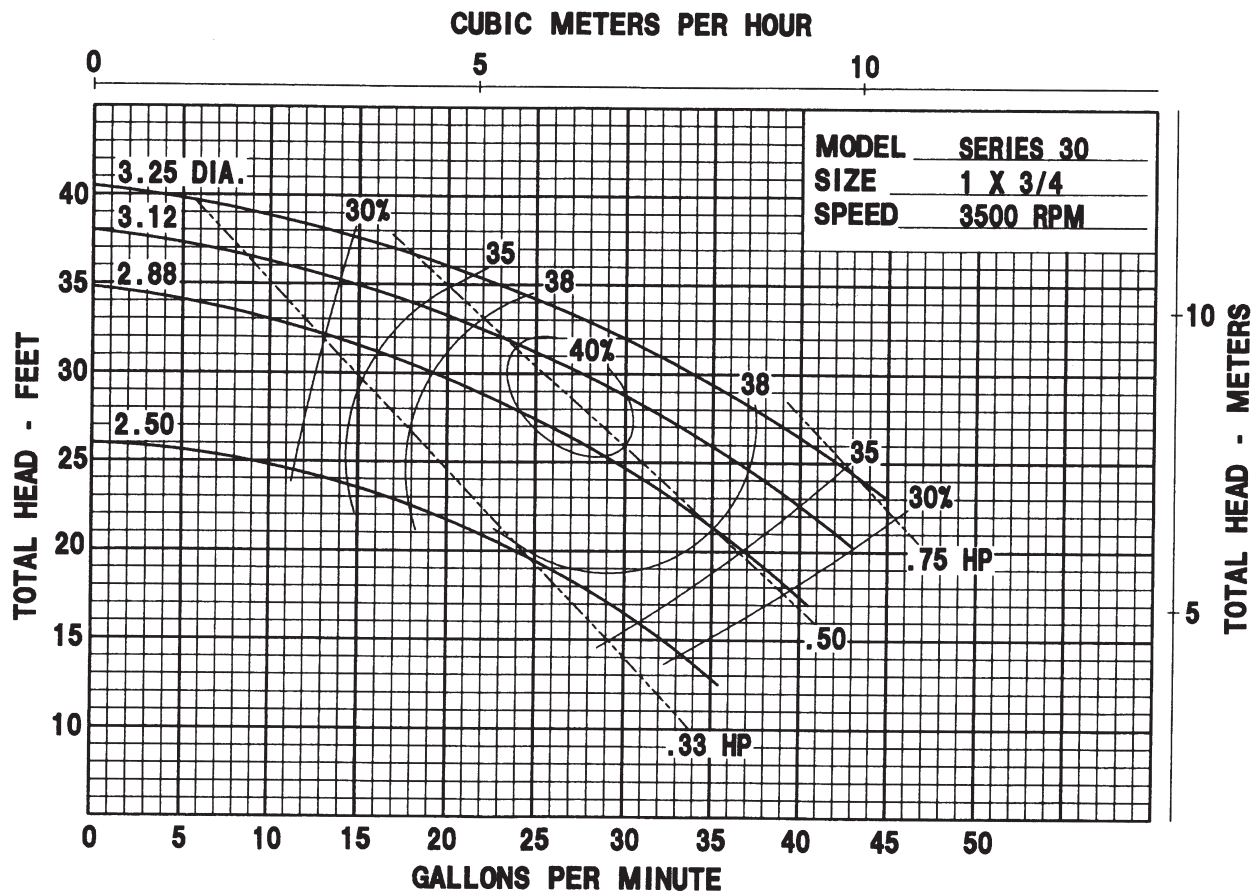
SERIES 700



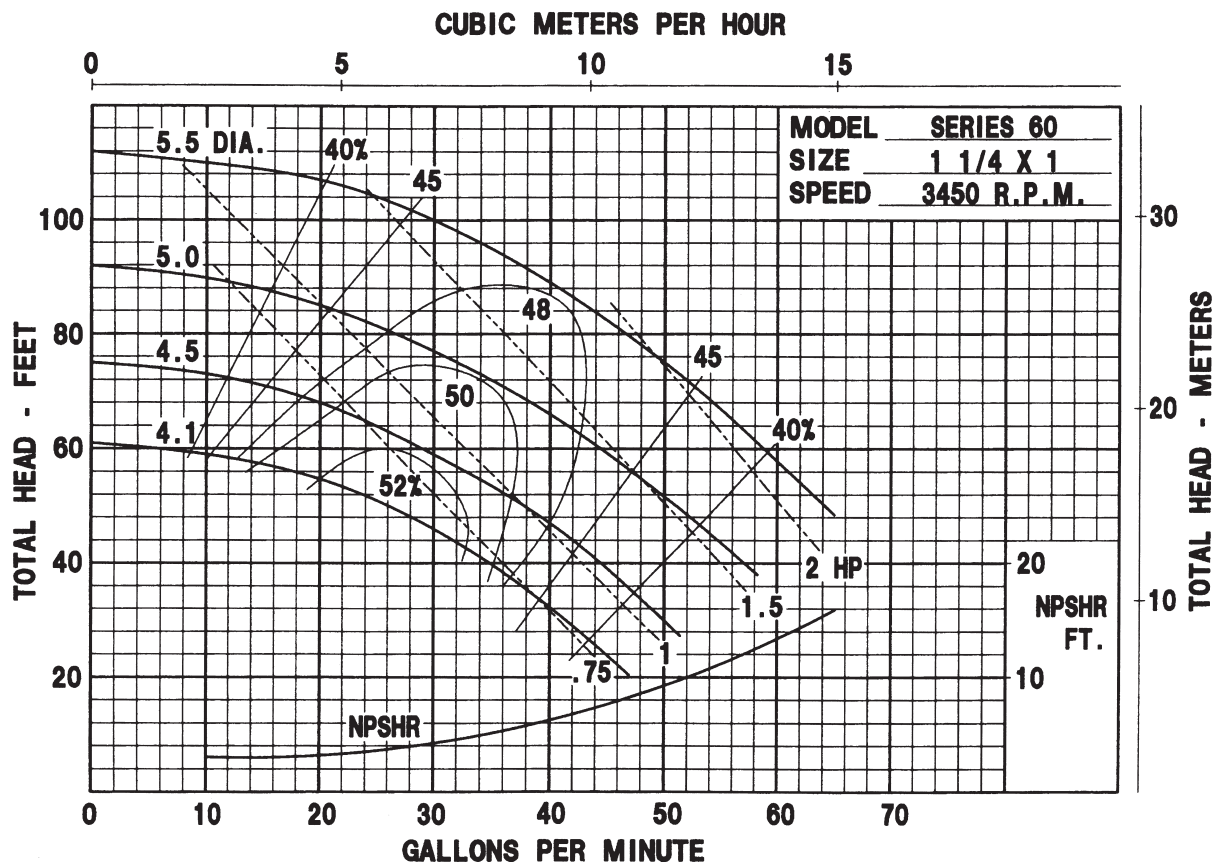
SERIES 200

MODEL	Suction	Discharge
SERIES 30	1" NPT	3/4" NPT
SERIES 60	1 1/4" NPT	1" NPT
SERIES 80	1 1/2" NPT	1 1/4" NPT
SERIES 110	1 1/2" NPT	1 1/4" NPT
SERIES 120	2" NPT	1 1/2" NPT
SERIES 130	2" NPT	1 1/2" NPT
SERIES 200	2 1/2" NPT	2" NPT
SERIES 300	3" NPT	2 1/2" NPT
SERIES 700	4" NPT	3" NPT

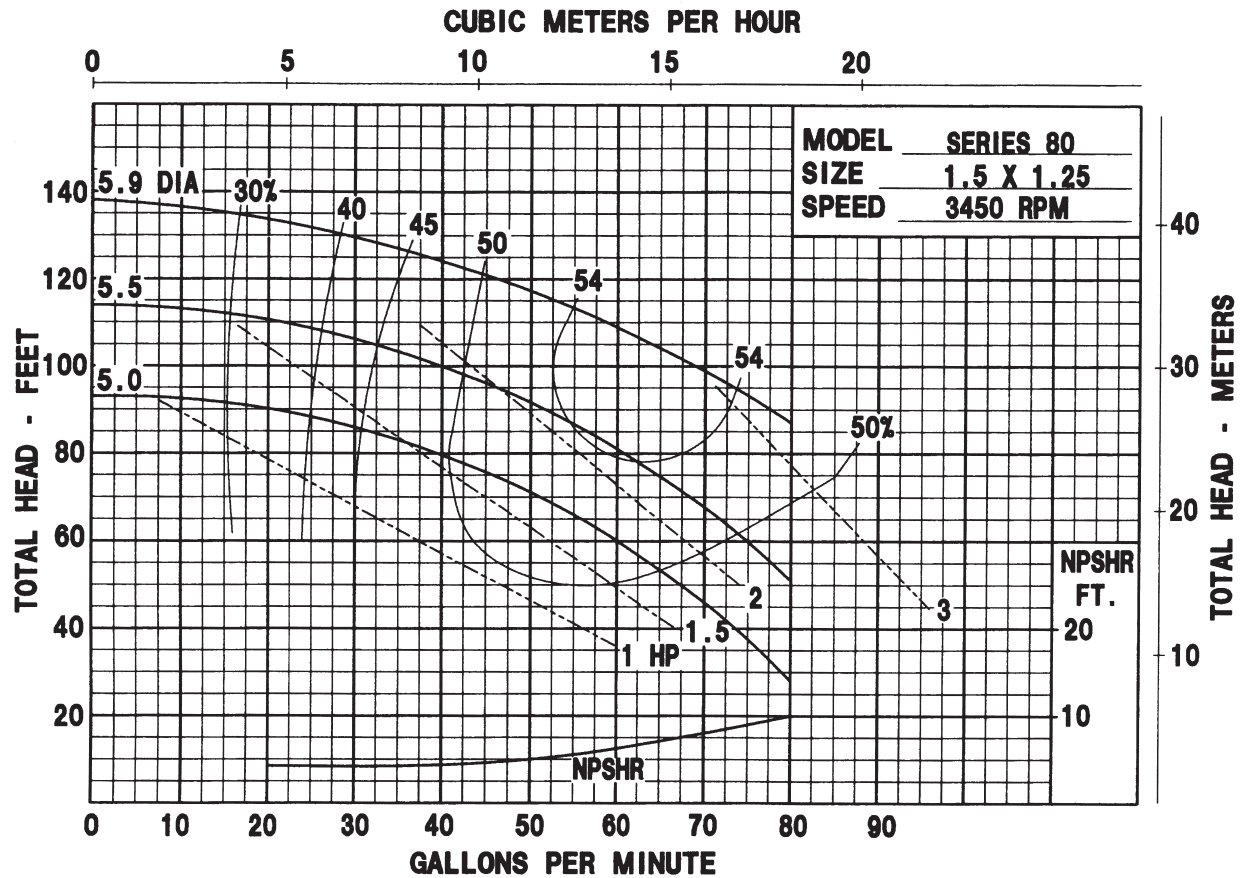
Series 30 Pump Performance Curves



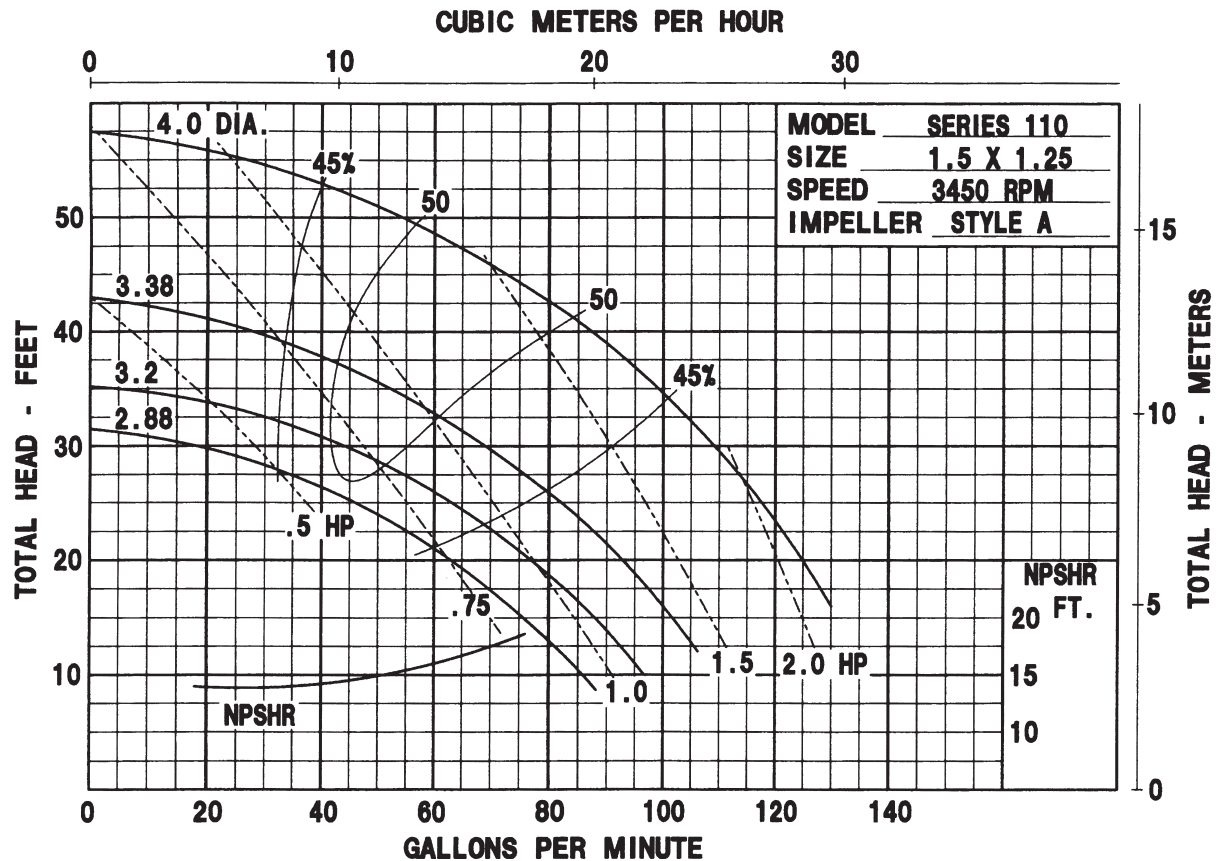
Series 60 Pump Performance Curves



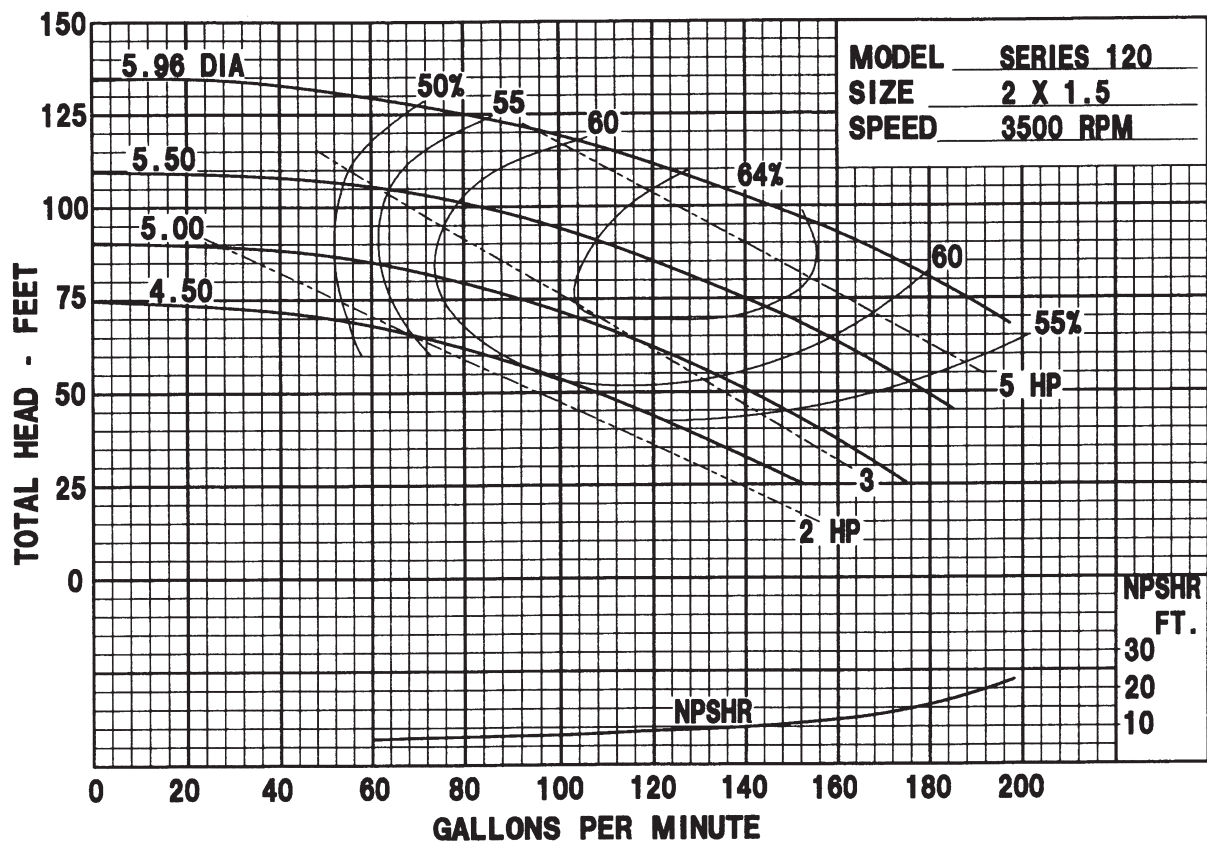
Series 80 Pump Performance Curves



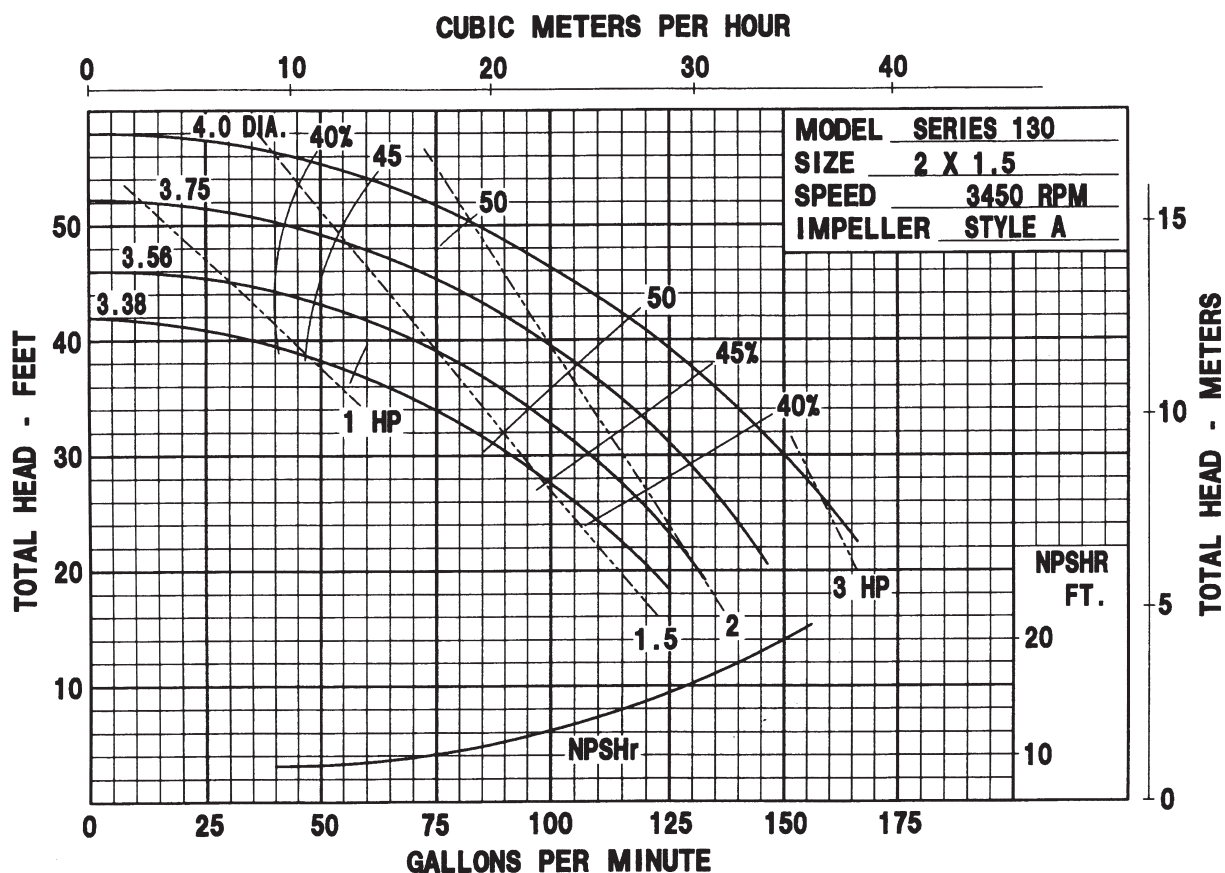
Series 110 Pump Performance Curves



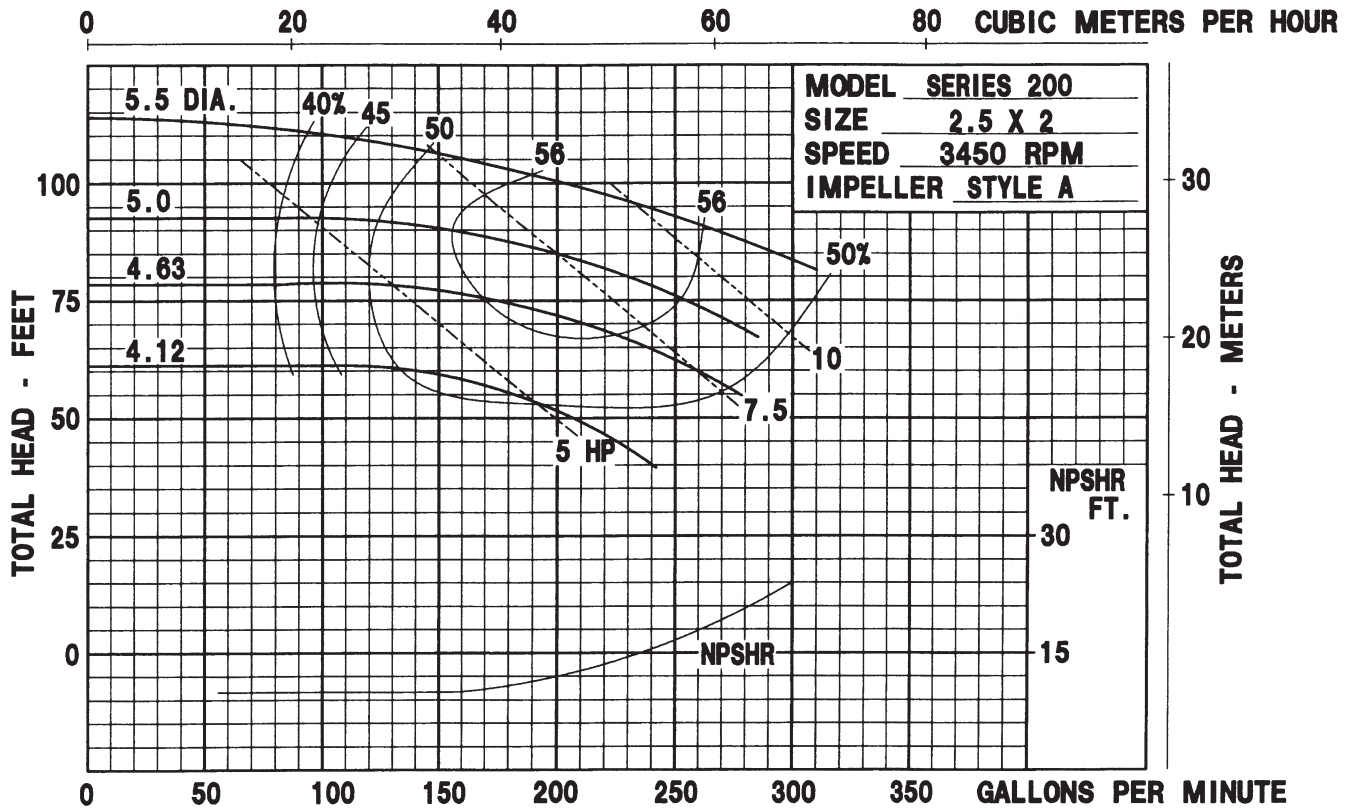
Series 120 Pump Performance Curves



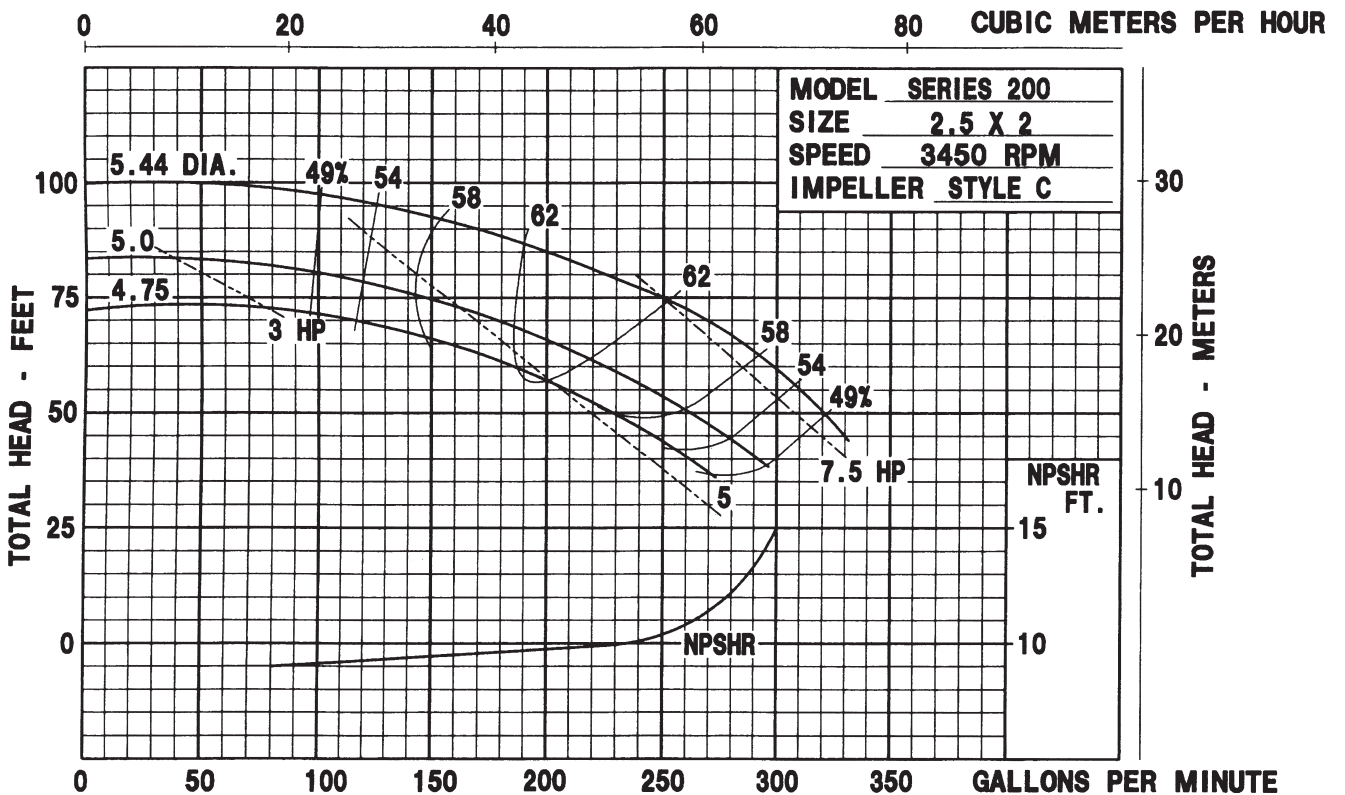
Series 130 Pump Performance Curves



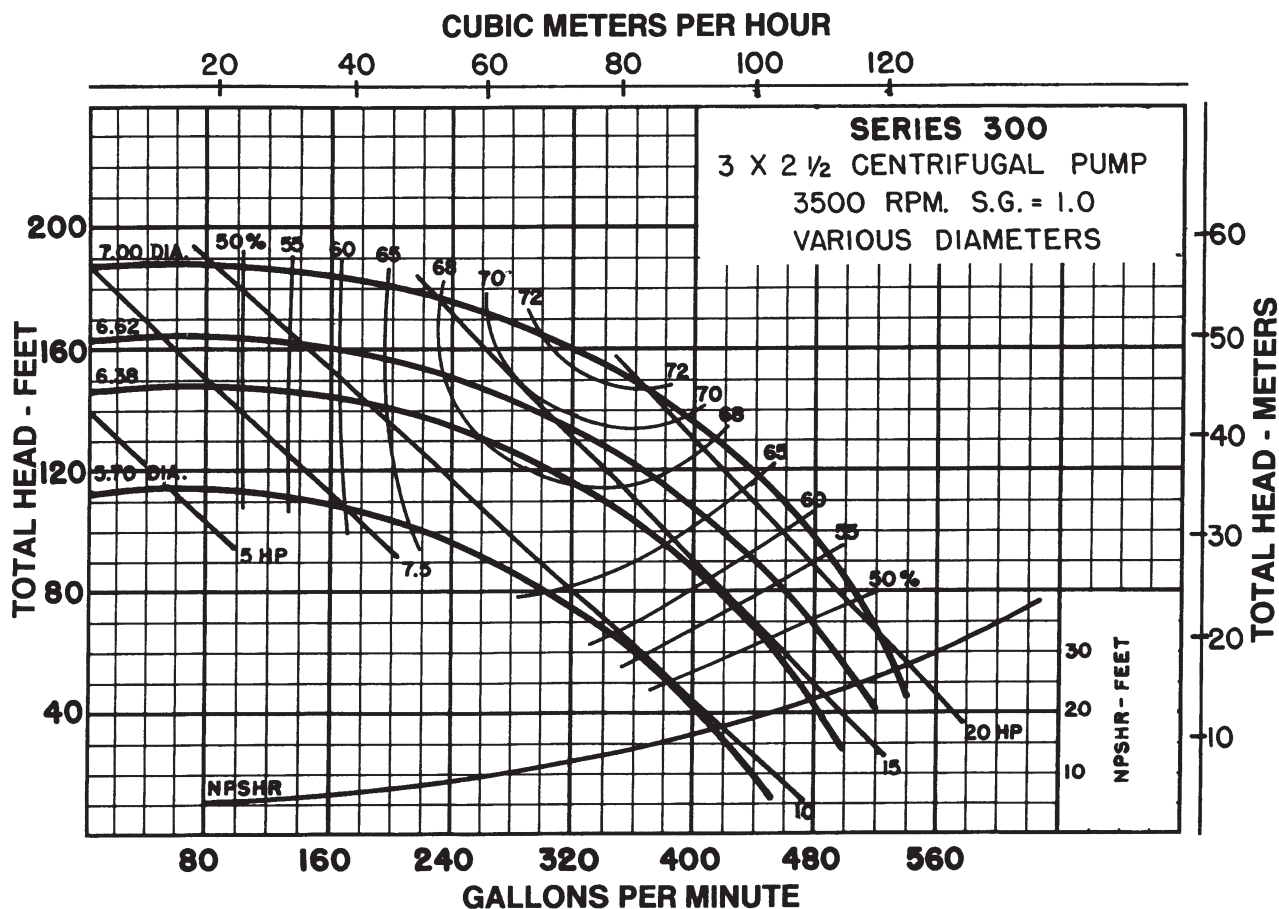
Series 200 Style A Pump Performance Curves



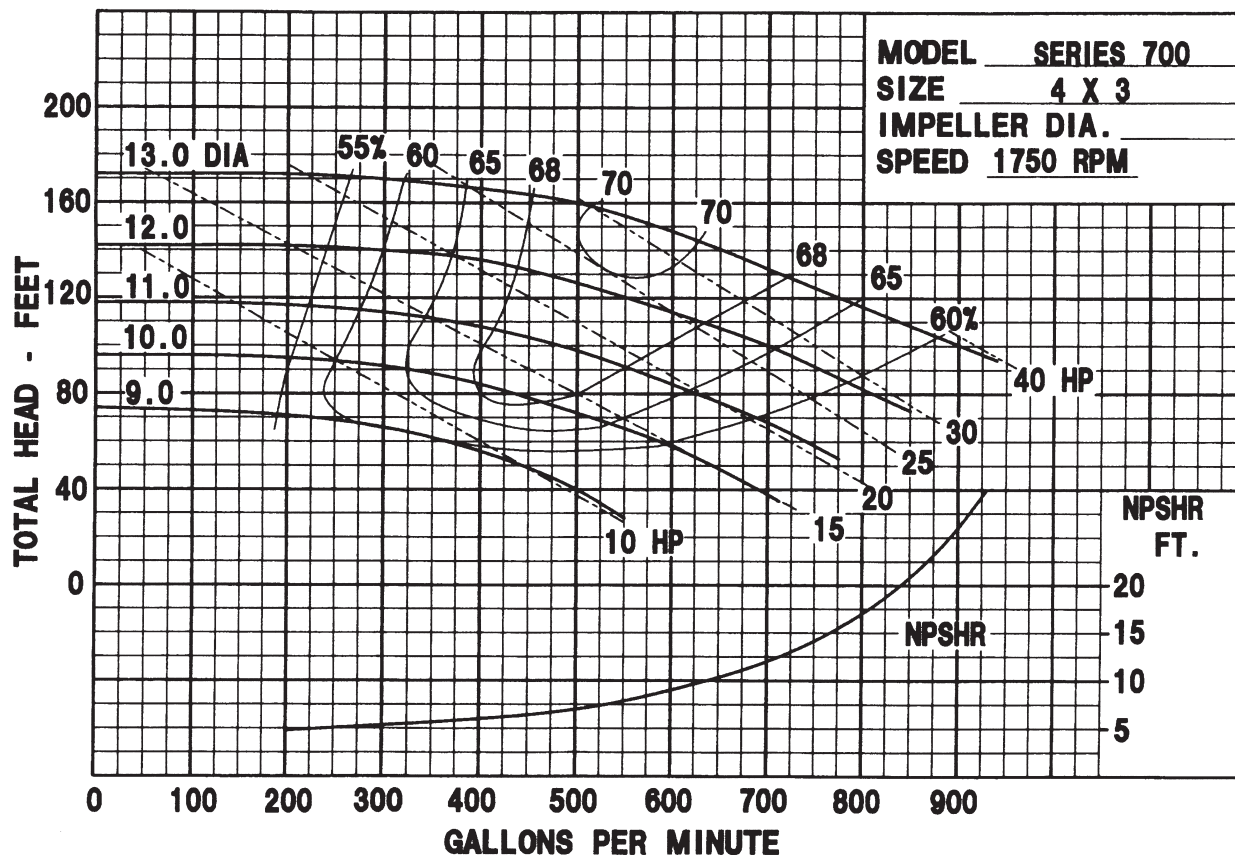
Series 200 Style C Pump Performance Curves



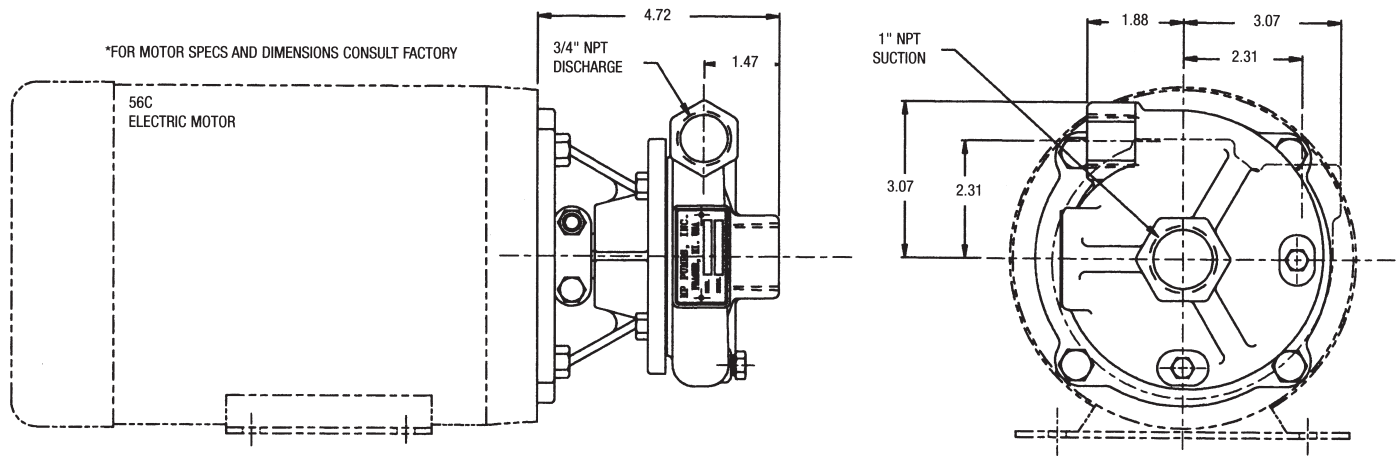
Series 300 Pump Performance Curves



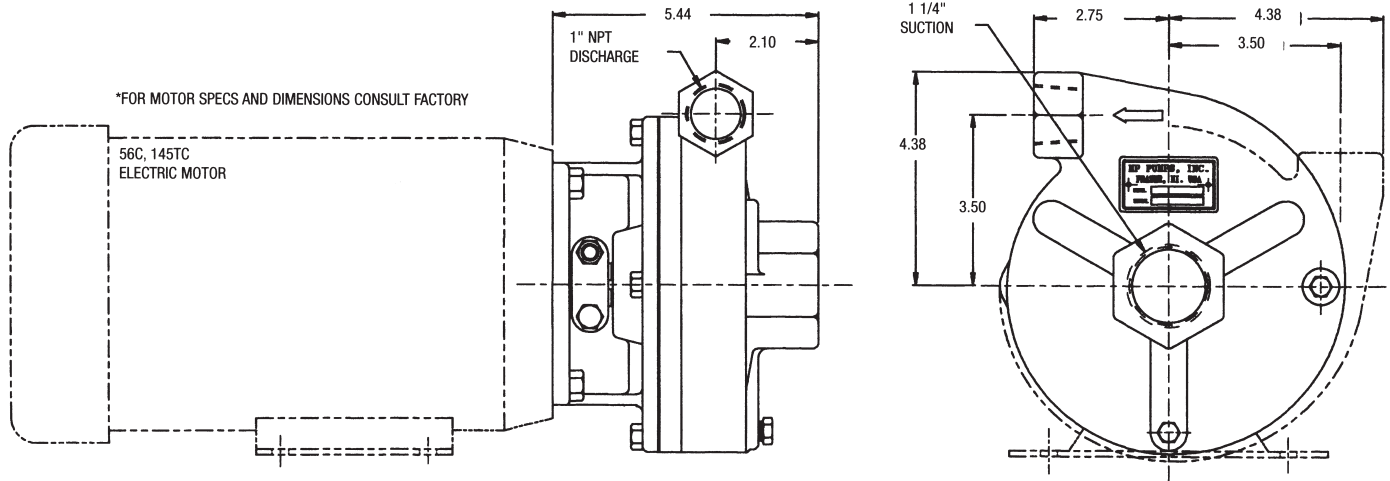
Series 700 Pump Performance Curves



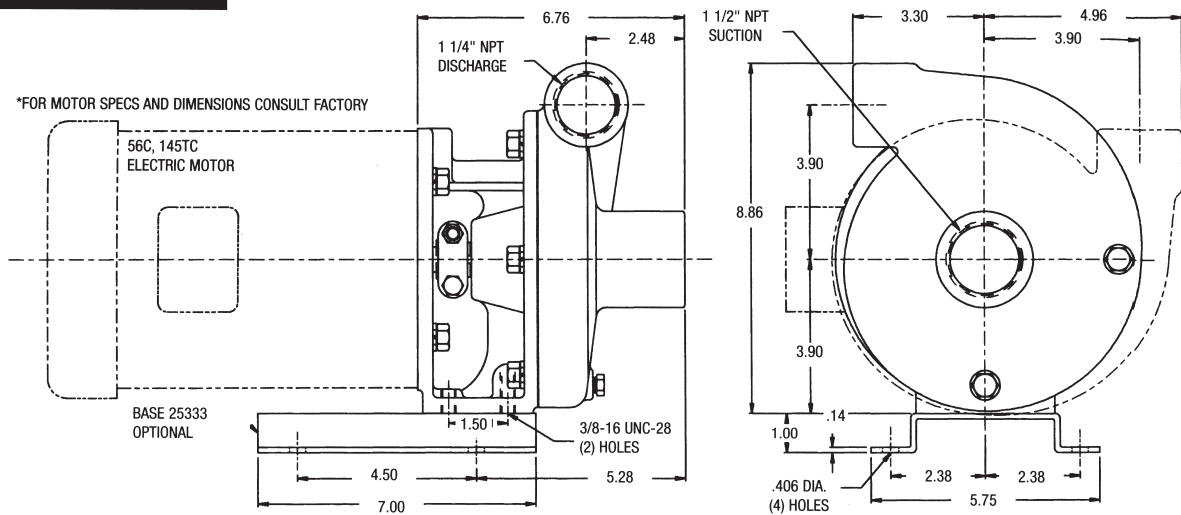
Series 30 Dimensions



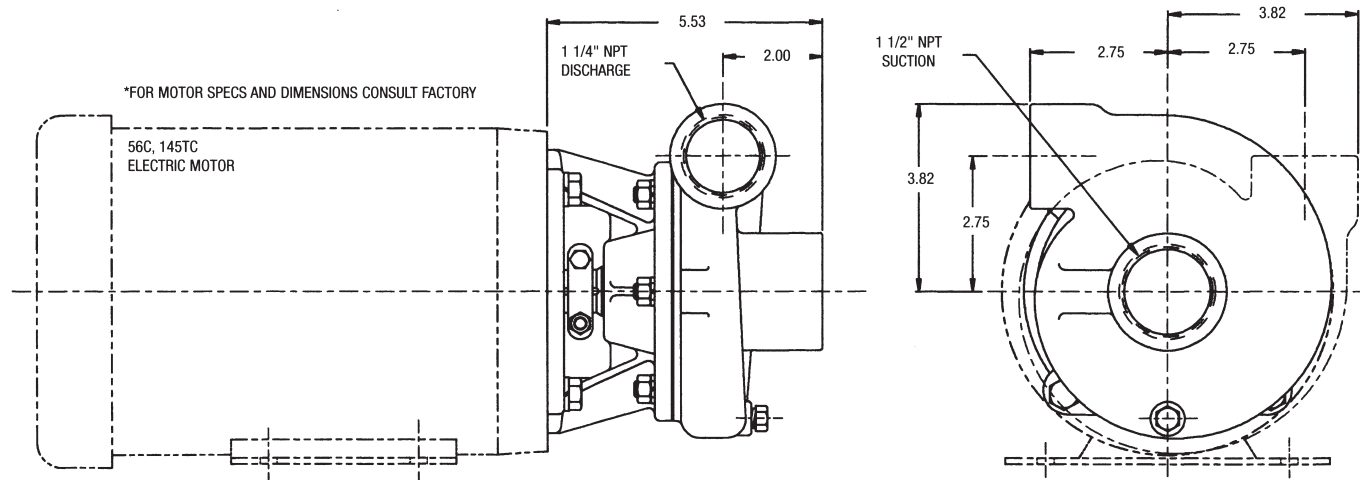
Series 60 Dimensions



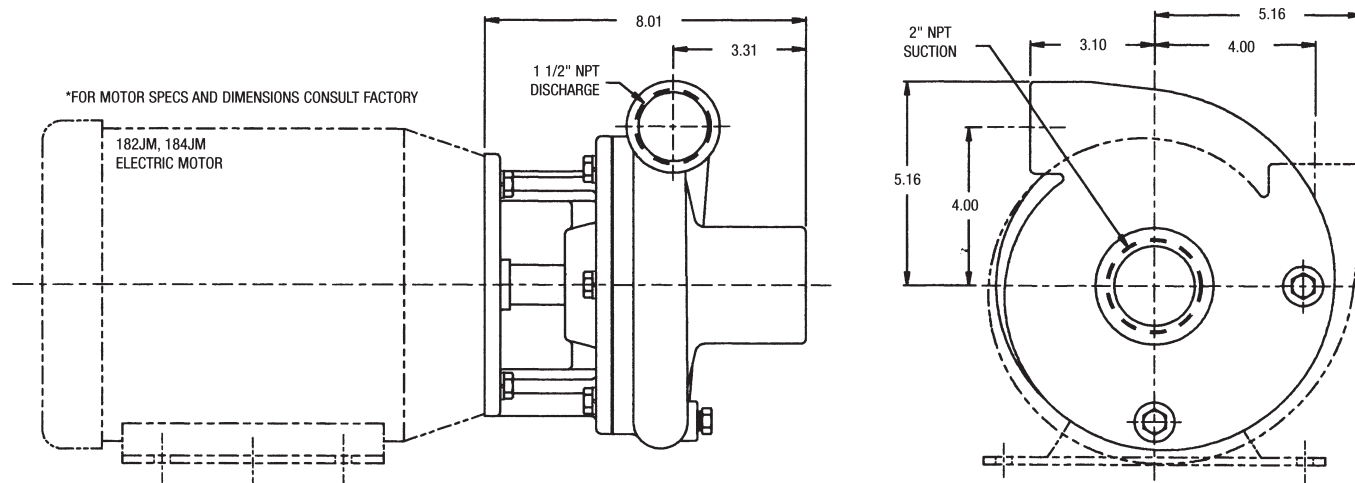
Series 80 Dimensions



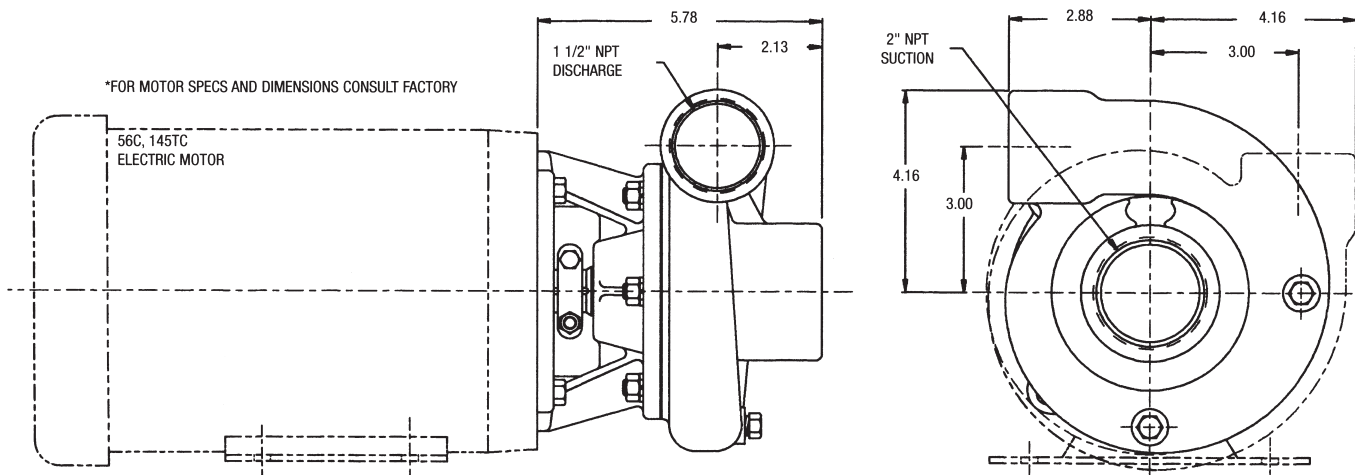
Series 110 Dimensions



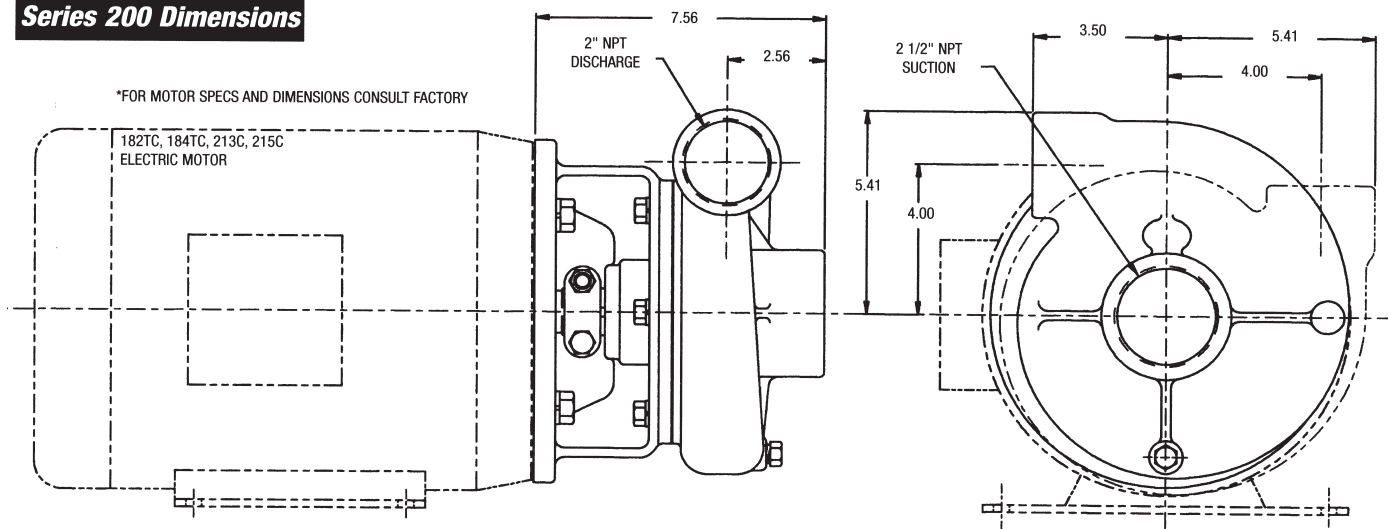
Series 120 Dimensions



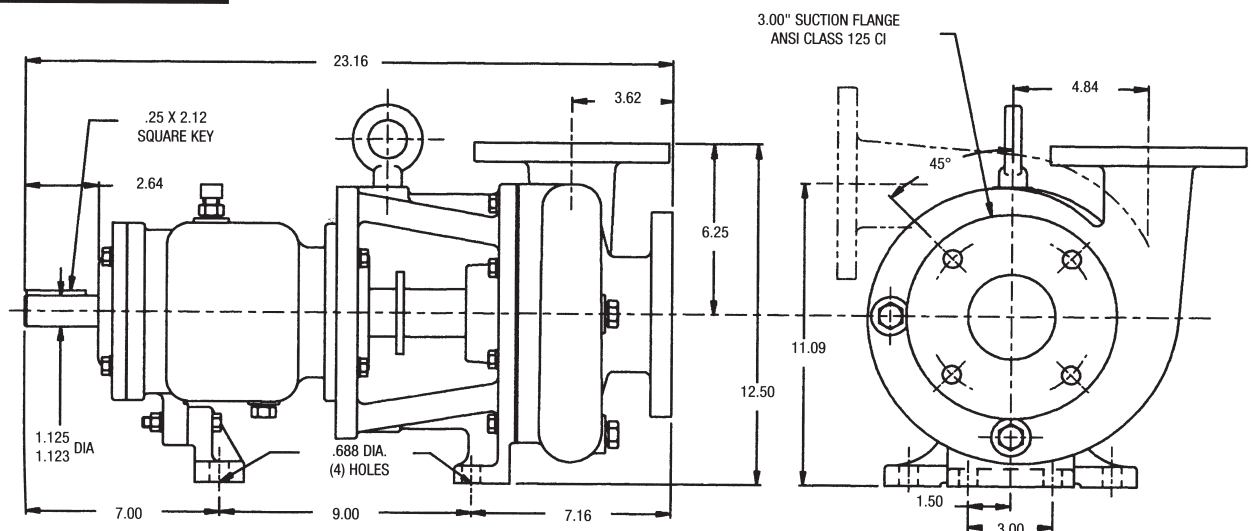
Series 130 Dimensions



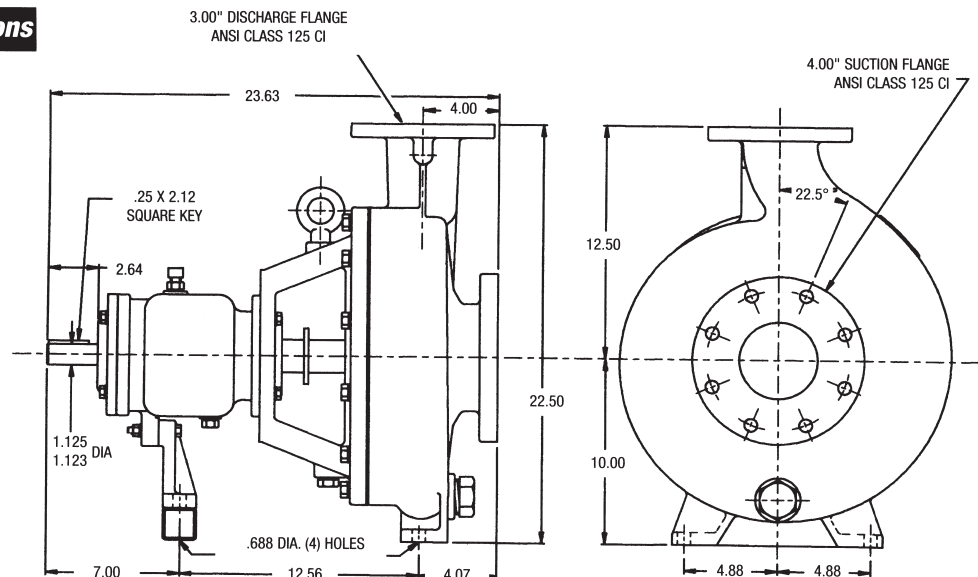
Series 200 Dimensions



Series 300 Dimensions



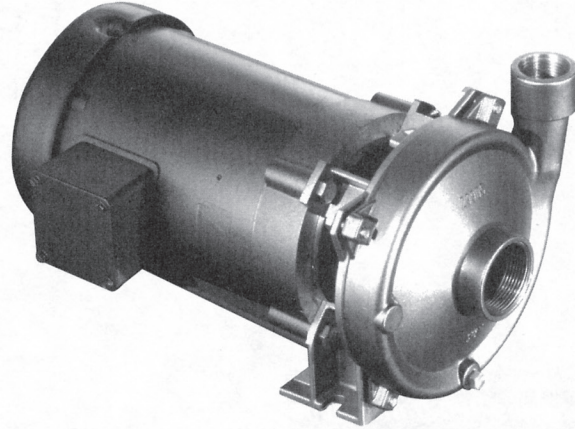
Series 700 Dimensions



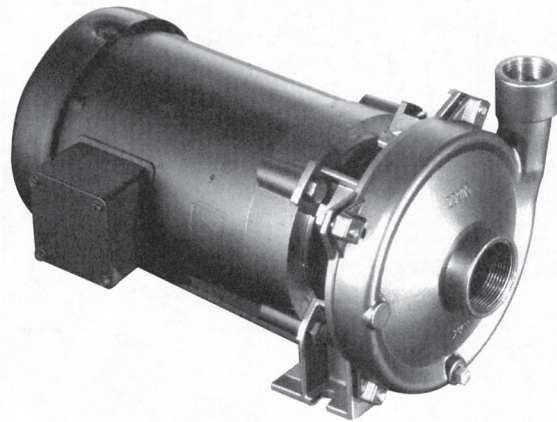
CHEMFLO 1 2 3 4

END SUCTION CENTRIFUGAL PUMP FEATURES

- CHEMFLO 1,2,3 & 4 - INVESTMENT-CAST, 316 STAINLESS STEEL IS STRONGER THAN STAMPED/FORMED 304
CHEMFLO 5,6,7 & 8 - 316 CF8M STAINLESS STEEL HOUSING, SEAL HOUSING & IMPELLER
- PRESSURES - 105-225 FEET HEAD
- FLOWS - 100-450 GPM
- CHEMFLO 1,2,3,4 PUMPAKS FOR 56C FACE ELECTRIC MOTORS
CHEMFLO 6,7 & 8 PUMPAKS FOR
145TC,182TC,184TC,213C,213TC,215C, 215TC ELECTRIC MOTORS
- HORSEPOWER - 1-25 HP
- EXOTIC ELASTOMERS AVAILABLE



CHEMFLO 1 & 2



CHEMFLO 3 & 4

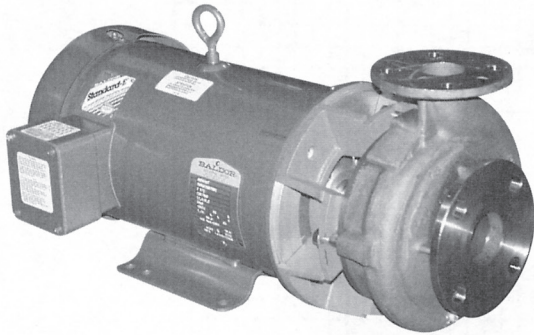
MODEL	Suction	Discharge
CHEMFLO 1 & 2	1 1/2" NPT	1" NPT
CHEMFLO 3 & 4	2" NPT	1 1/2" NPT
CHEMFLO 5	2" ANSI 125 Flange	1 1/2" ANSI 125 Flange
CHEMFLO 6	3" ANSI 125 Flange	2" ANSI 125 Flange
CHEMFLO 7	2" ANSI 125 Flange	1" ANSI 125 Flange
CHEMFLO 8	3" ANSI 125 Flange	1 1/2" ANSI 125 Flange

Ford's Words

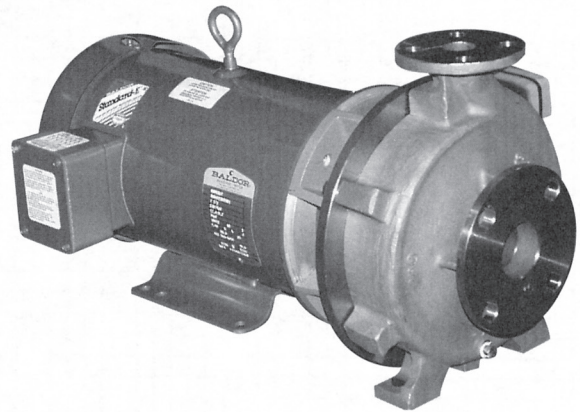
Thoughts and Observations from American Entrepreneur Henry Ford

- "Thinking is the hardest work there is, which is the probable reason so few engage in it."
- "Money is like an arm or a leg--use it or lose it."
- "Failure is the opportunity to begin again, more intelligently."
- "The man who is too set to change is dead already. The funeral is a mere detail."
- "There are two fools in this world. One is the millionaire who thinks that by hoarding money he can accumulate real power, and the other is the penniless reformer who thinks that by taking the money from one class and giving it to another, all the world's ills will be cured."

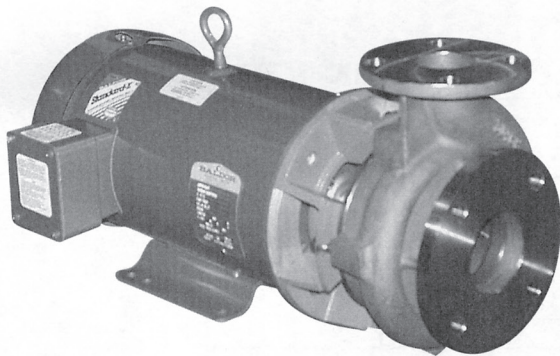
5 6 7 8



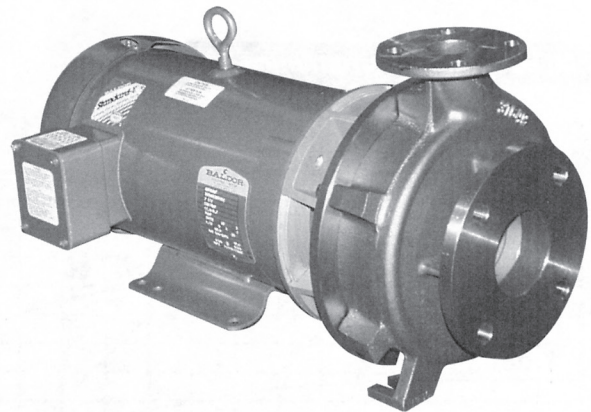
CHEMFLO 5



CHEMFLO 7



CHEMFLO 6

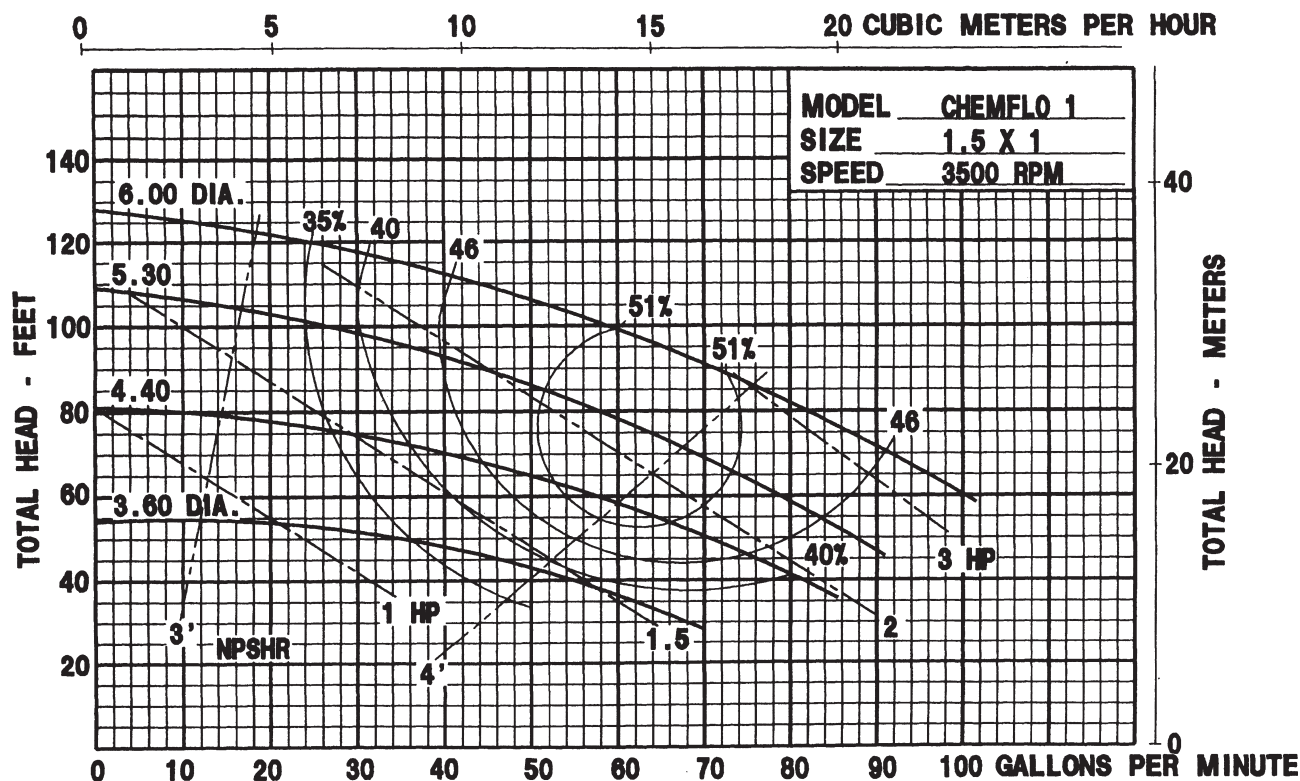


CHEMFLO 8

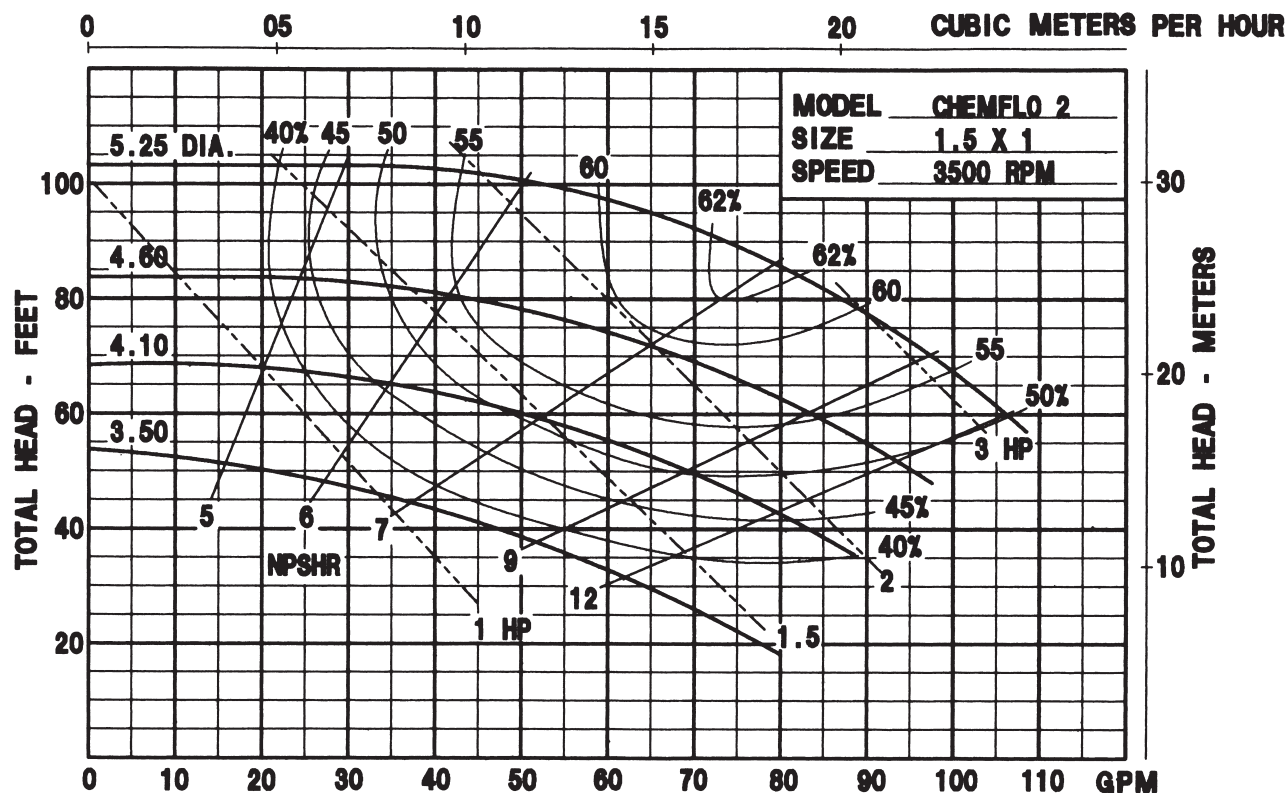
FORD'S WORDS (CONT'D)

- "If you have an idea, that's good. If you also have an idea as to how to work it out, that's better."
- "Before everything else, getting ready is the secret of success."
- "If you take all the experience and judgment of men over 50 out of the world, there wouldn't be enough left to run it."
- "Whether you think you can or whether you think you can't, you're right!"
- "Every piece of work in the shops moves. Save 10 steps a day for each of the 12,000 employees, and you will have saved 50 miles of wasted motion and misspent energy." -On the theory of the assembly line
- "Even a mistake may turn out to be the one thing necessary to a worthwhile achievement."
- "New York is a different country. Maybe it ought to have a separate government. Everybody thinks differently, acts differently. They just don't know what the hell the rest of the United States is."
- "Paying attention to little things that most men neglect makes a few men rich."

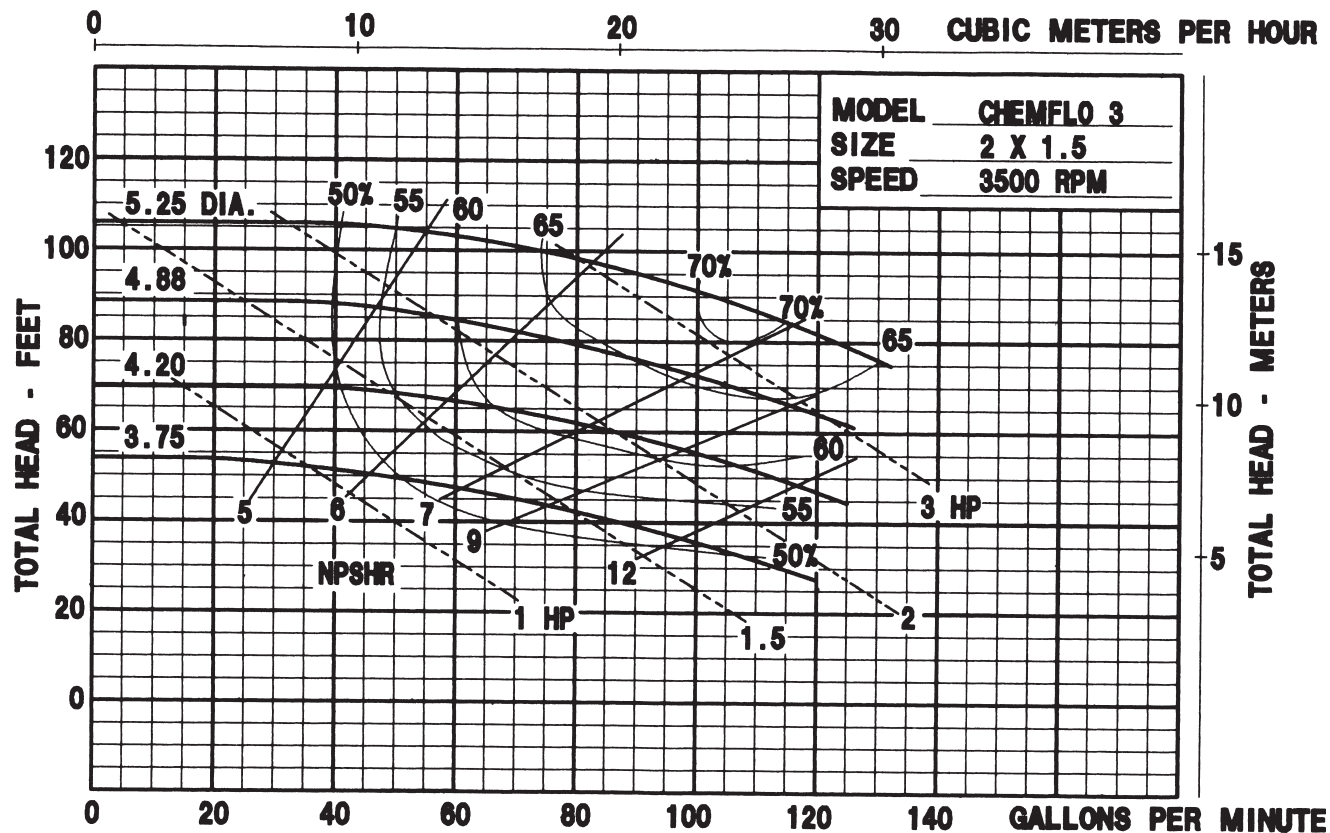
CHEMFLO 1 Pump Performance Curves



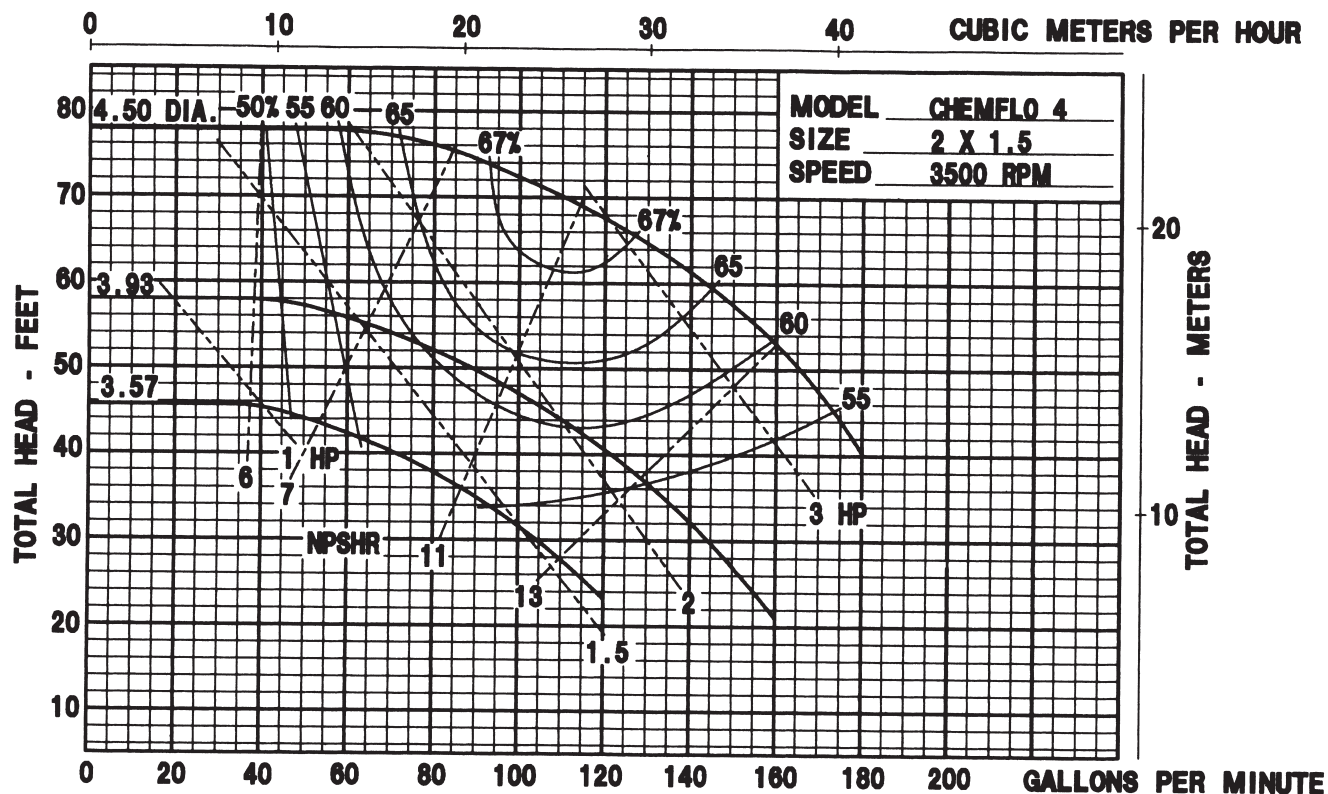
CHEMFLO 2 Pump Performance Curves



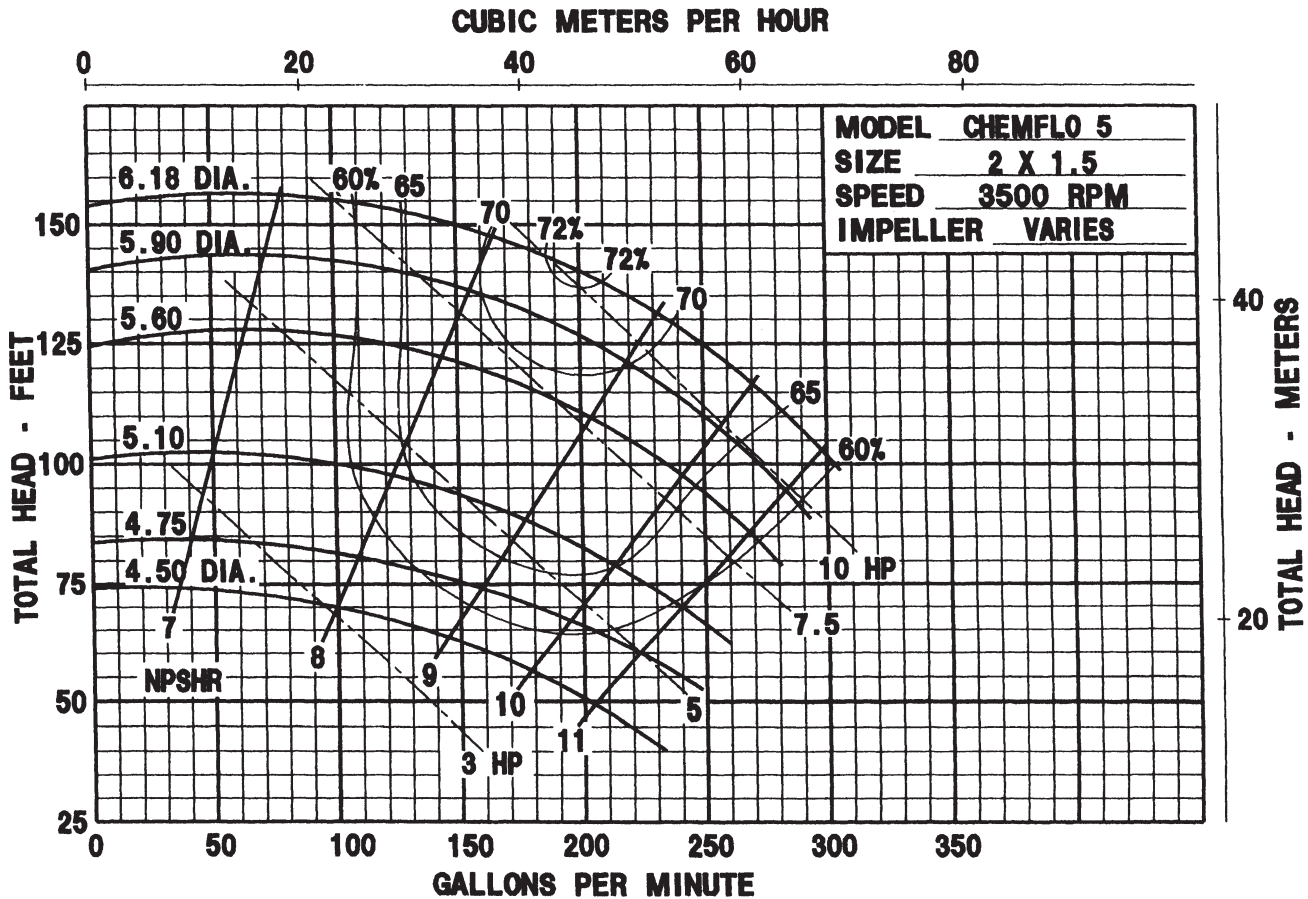
CHEMFLO 3 Pump Performance Curves



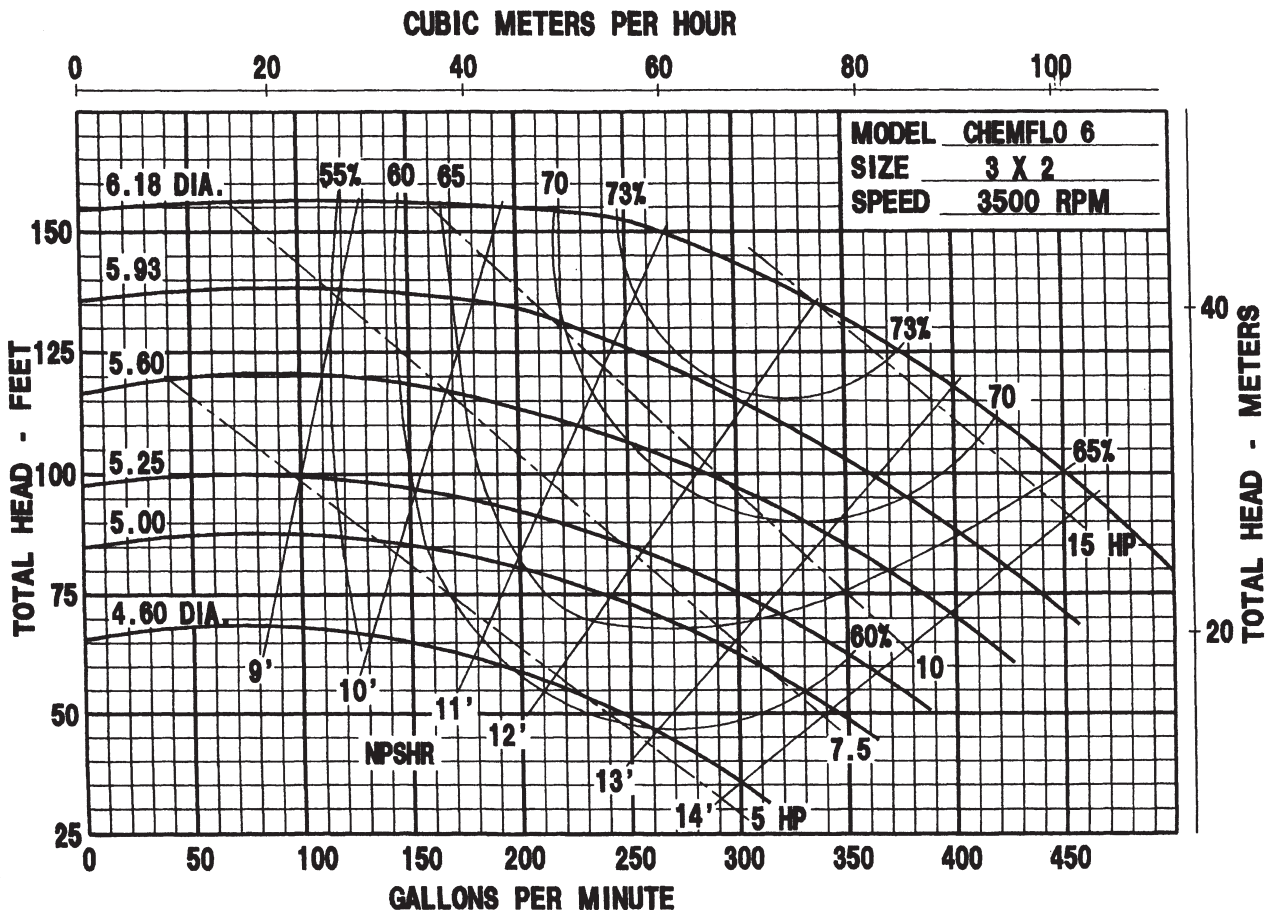
CHEMFLO 4 Pump Performance Curves



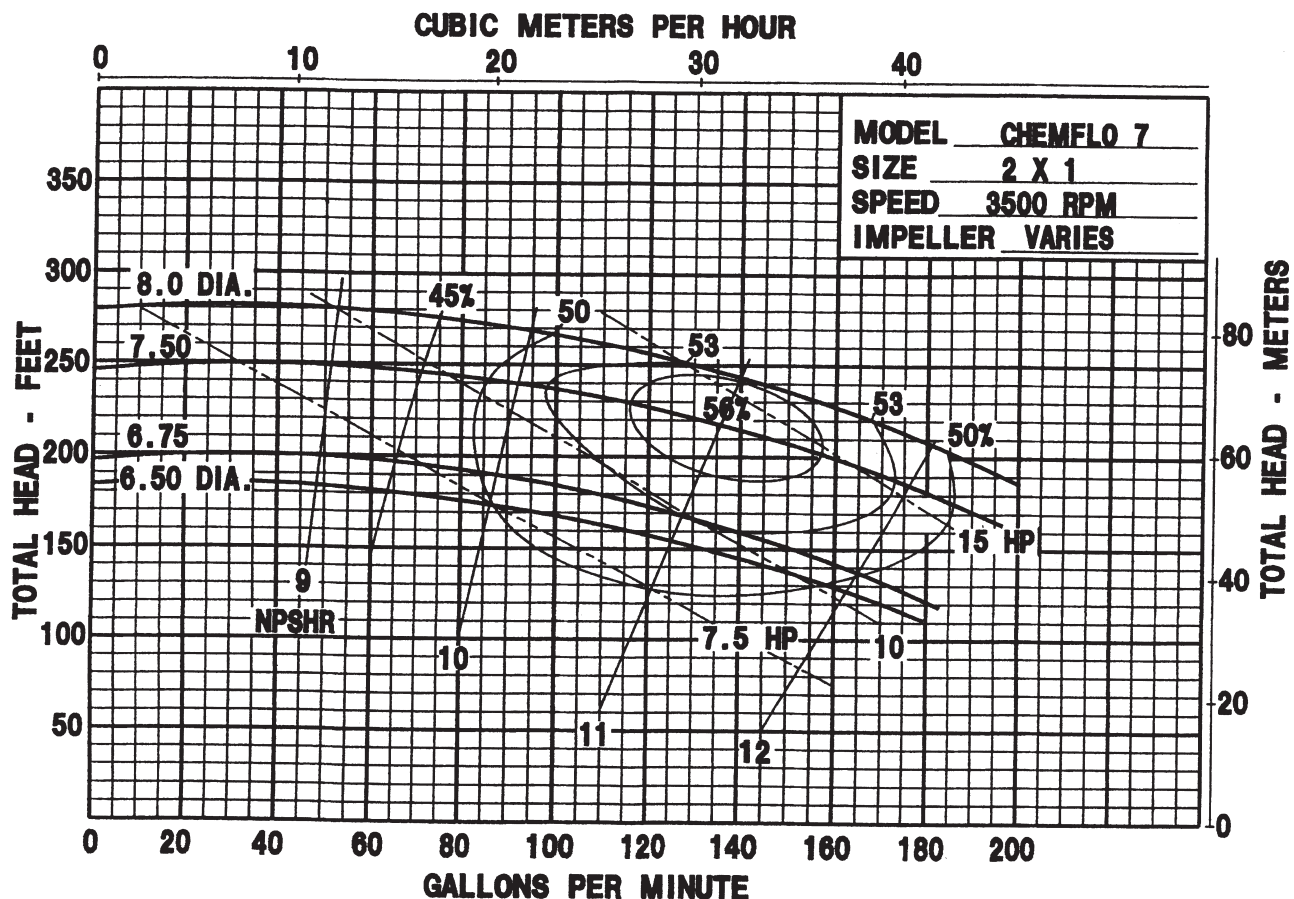
CHEMFLO 5 Pump Performance Curves



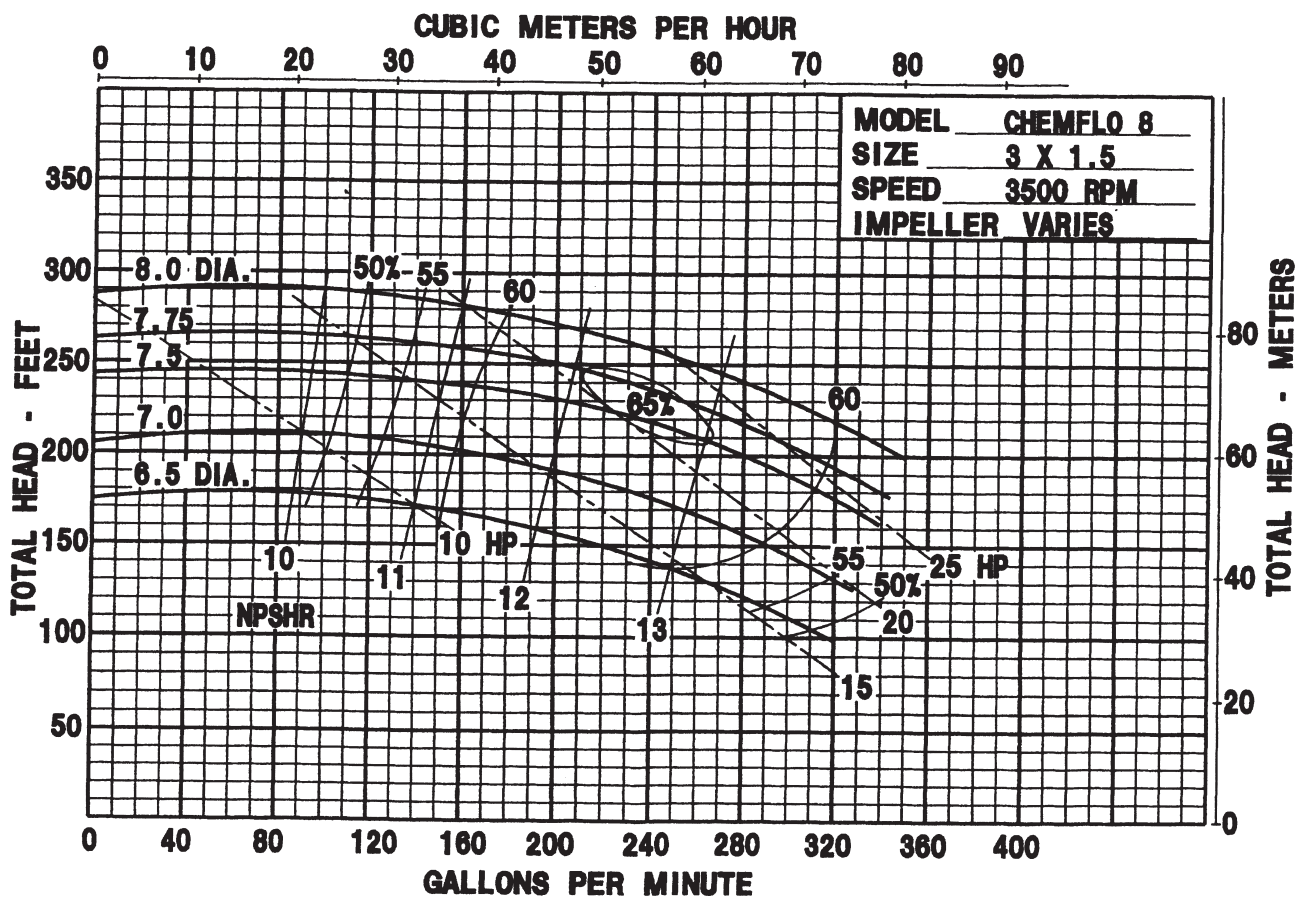
CHEMFLO 6 Pump Performance Curves



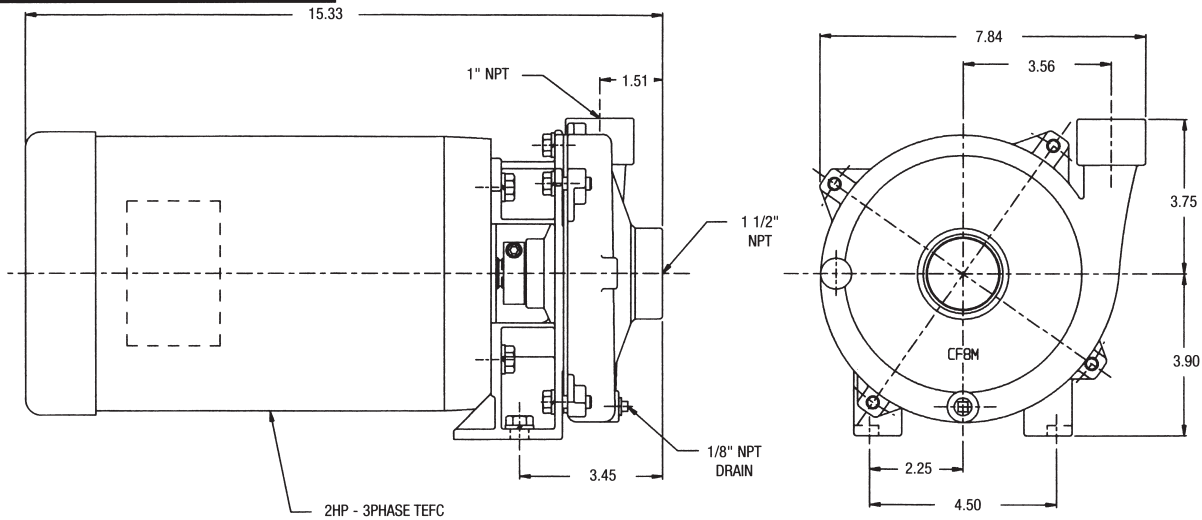
CHEMFLO 7 Pump Performance Curves



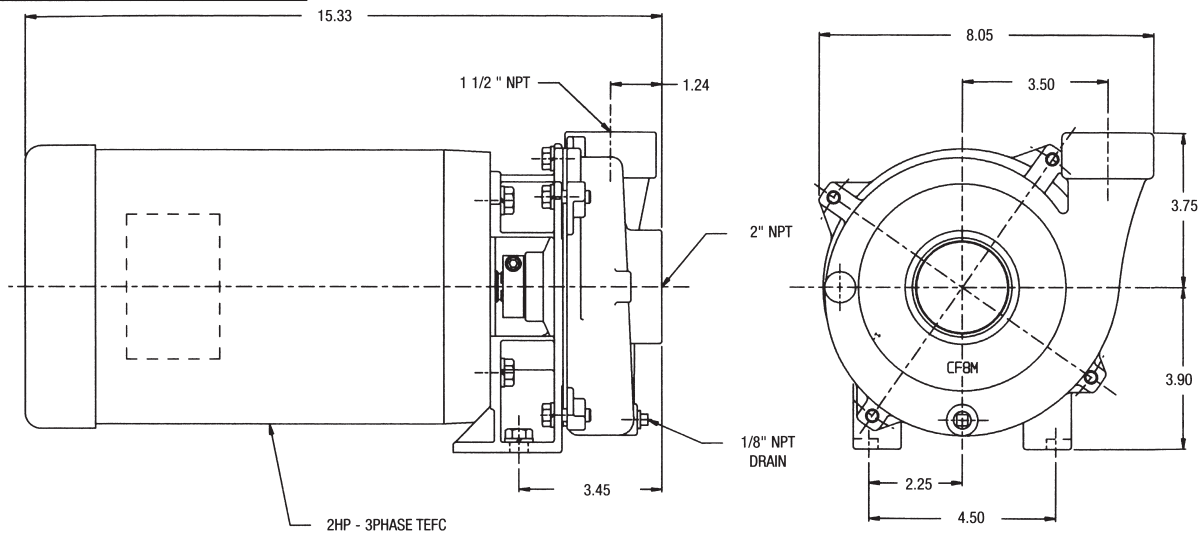
CHEMFLO 8 Pump Performance Curves



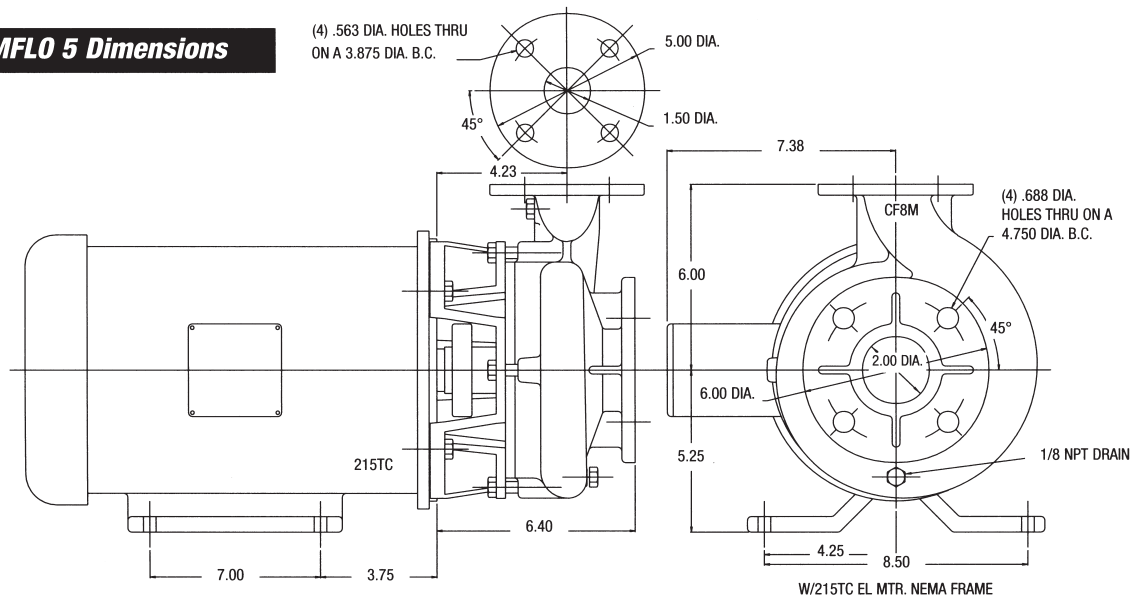
CHEMFLO 1&2 Dimensions



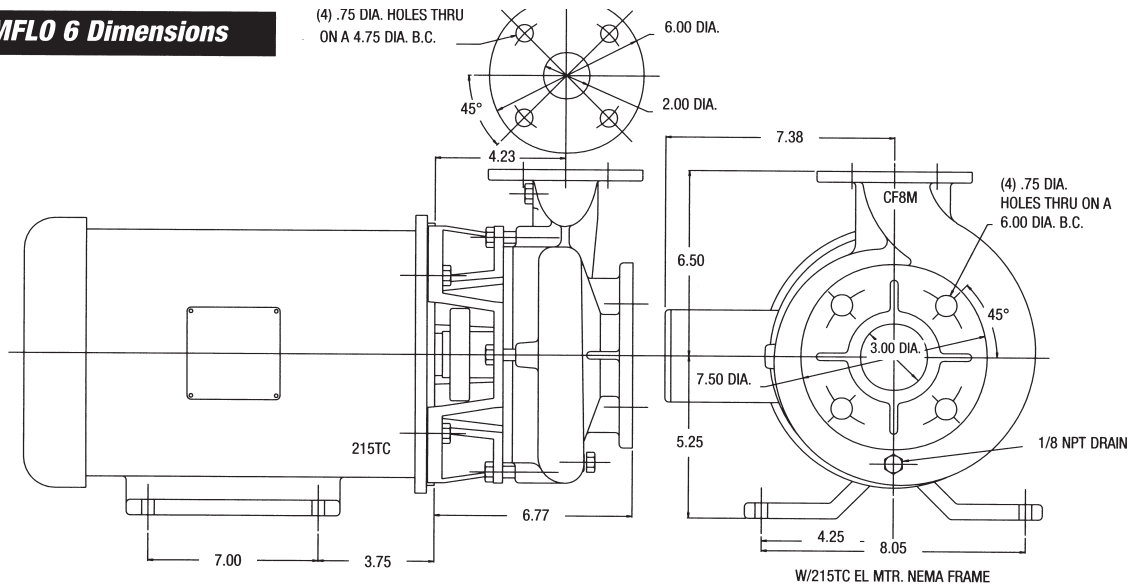
CHEMFLO 3&4 Dimensions



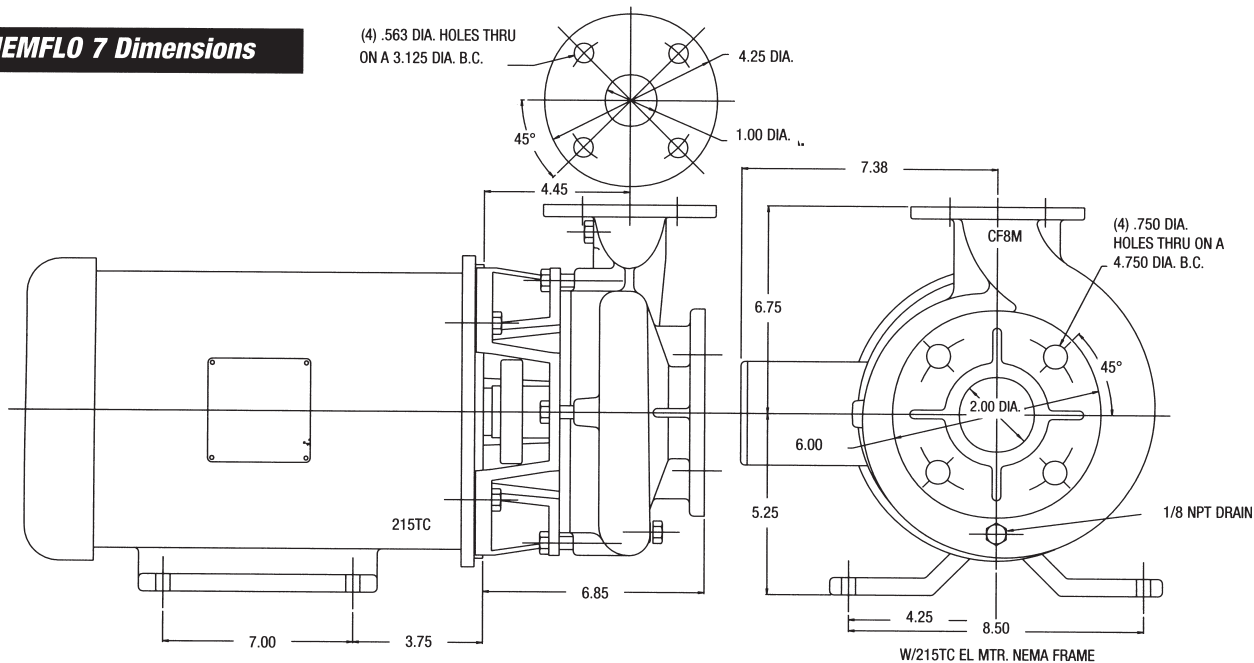
CHEMFLO 5 Dimensions



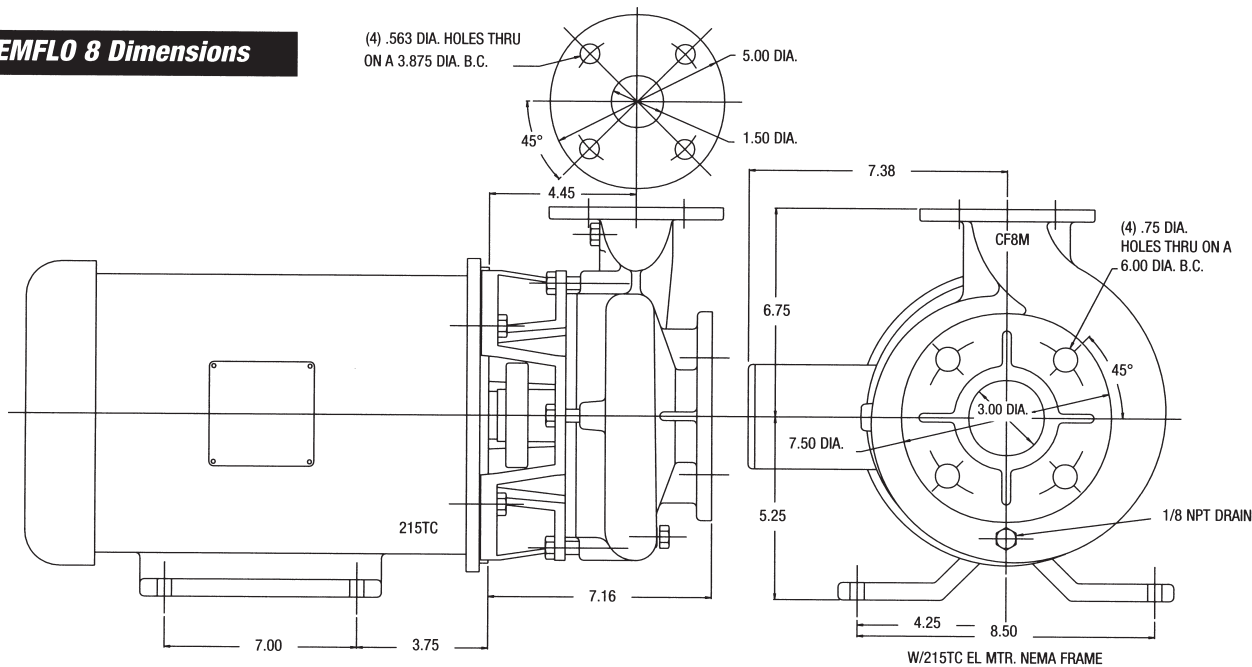
CHEMFLO 6 Dimensions



CHEMFLO 7 Dimensions



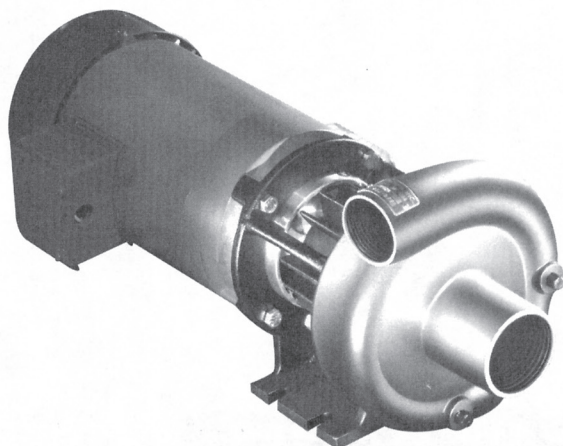
CHEMFLO 8 Dimensions



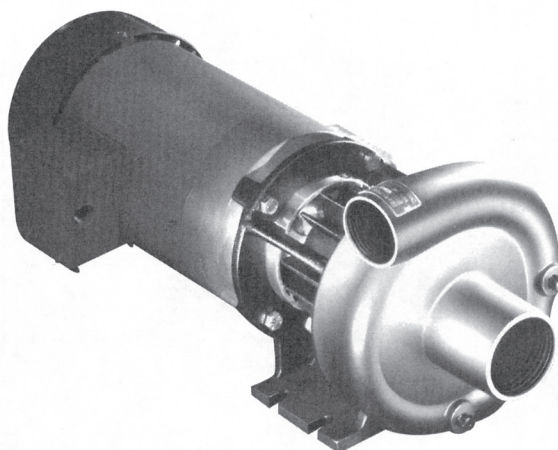
HTO 80 120 300

CENTRIFUGAL HOT OIL PUMP FEATURES

- APPLICATIONS: PLASTICS, CHEMICAL, FOOD, AND PROCESSING INDUSTRIES WHICH REQUIRE PUMPING OF HIGH TEMPERATURE FLUIDS
- UTILIZES AN ISOLATED SEAL CHAMBER, EFFECTIVELY COOLED BY A FAN CLAMP, WHICH COUPLES THE UNIT TO THE SHAFT OF A C-FRAME MOTOR
- STANDARD CARBON/CERAMIC MECHANICAL SEAL WITH VITON ELASTOMERS, STAINLESS STEEL FITTED
- CARBON GRAPHITE ISOLATOR BUSHING SEPARATES MECHANICAL SEAL FROM HIGH TEMPERATURE FLUIDS
- STAINLESS STEEL DRIVE SLEEVE AND ALUMINUM DRIVE CLAMP COUPLES PUMP UNIT TO MOTOR
- VERTICAL & HORIZONTAL DISCHARGE
- WITH OR WITHOUT ELECTRIC MOTOR
- A UNIQUE CENTRIFUGAL PUMP (PATENTED) DESIGNED FOR HIGH TEMPERATURE APPLICATIONS WITHOUT REQUIRING EXTERNAL FLUSHES OR JACKET COOLING
- CAPACITIES - 85-200 GPM
- HEADS - 135-140 FT. TDH.
- TEMPERATURES - TO 650°F



HTO 80



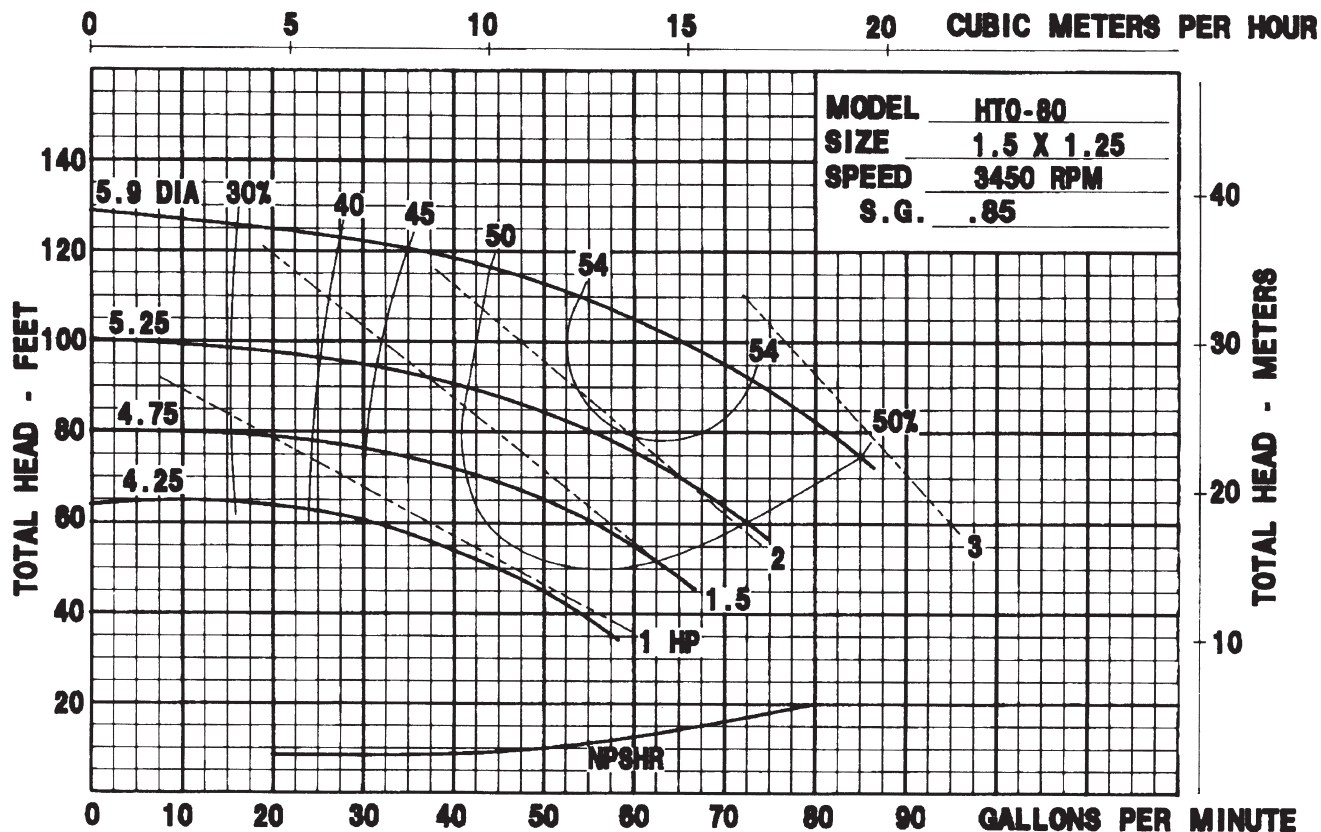
HTO 120



HTO 300

MODEL	Suction	Discharge
HTO 80	1 1/2" NPT (Flange Option)	1 1/4" NPT (Flange Option)
HTO 120	2" NPT (Flange Option)	1 1/2" NPT (Flange Option)
HTO 300	3" ANSI 125 Flange	2 1/2" ANSI 125 Flange

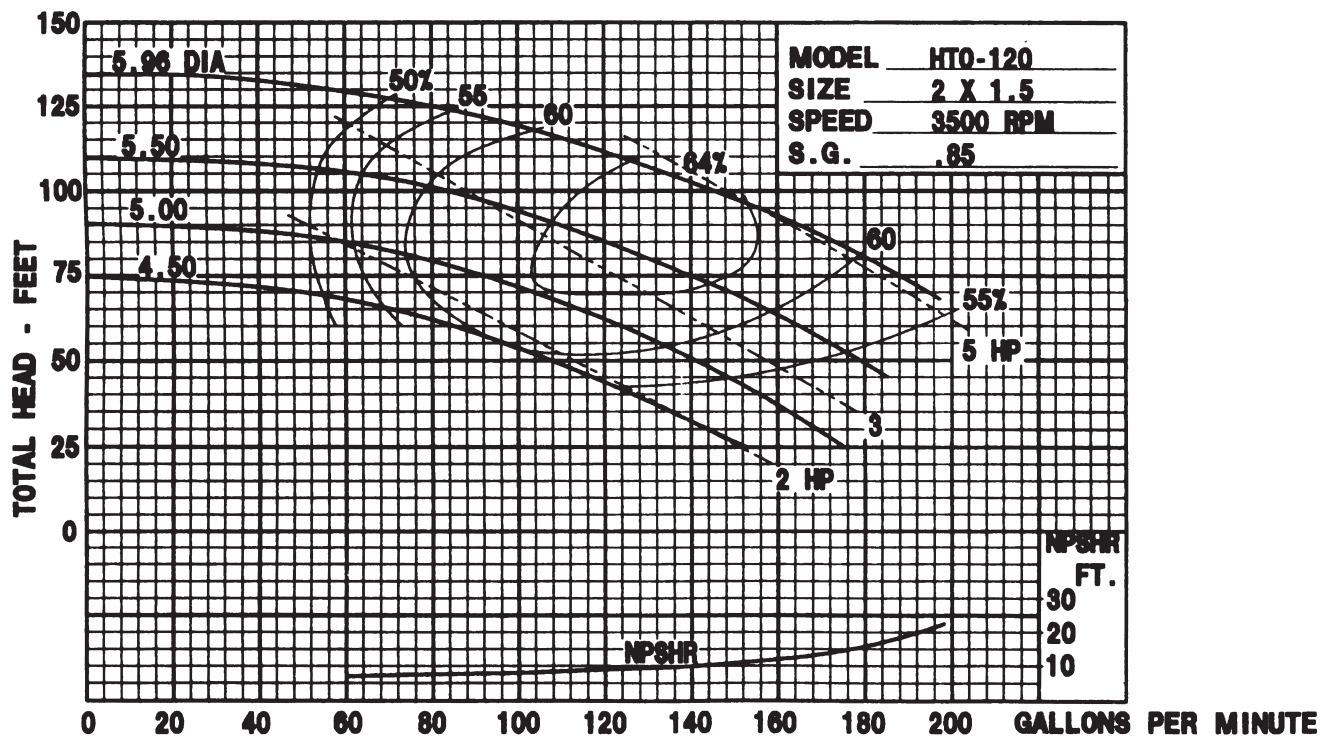
HTO 80 Pump Performance Curves



Horsepower requirements based upon 0.85 specific gravity. Calculations can be applied for fluids of other specific gravities.

Maximum operating temperature is 650°F. Maximum working pressure is 150 PSI.

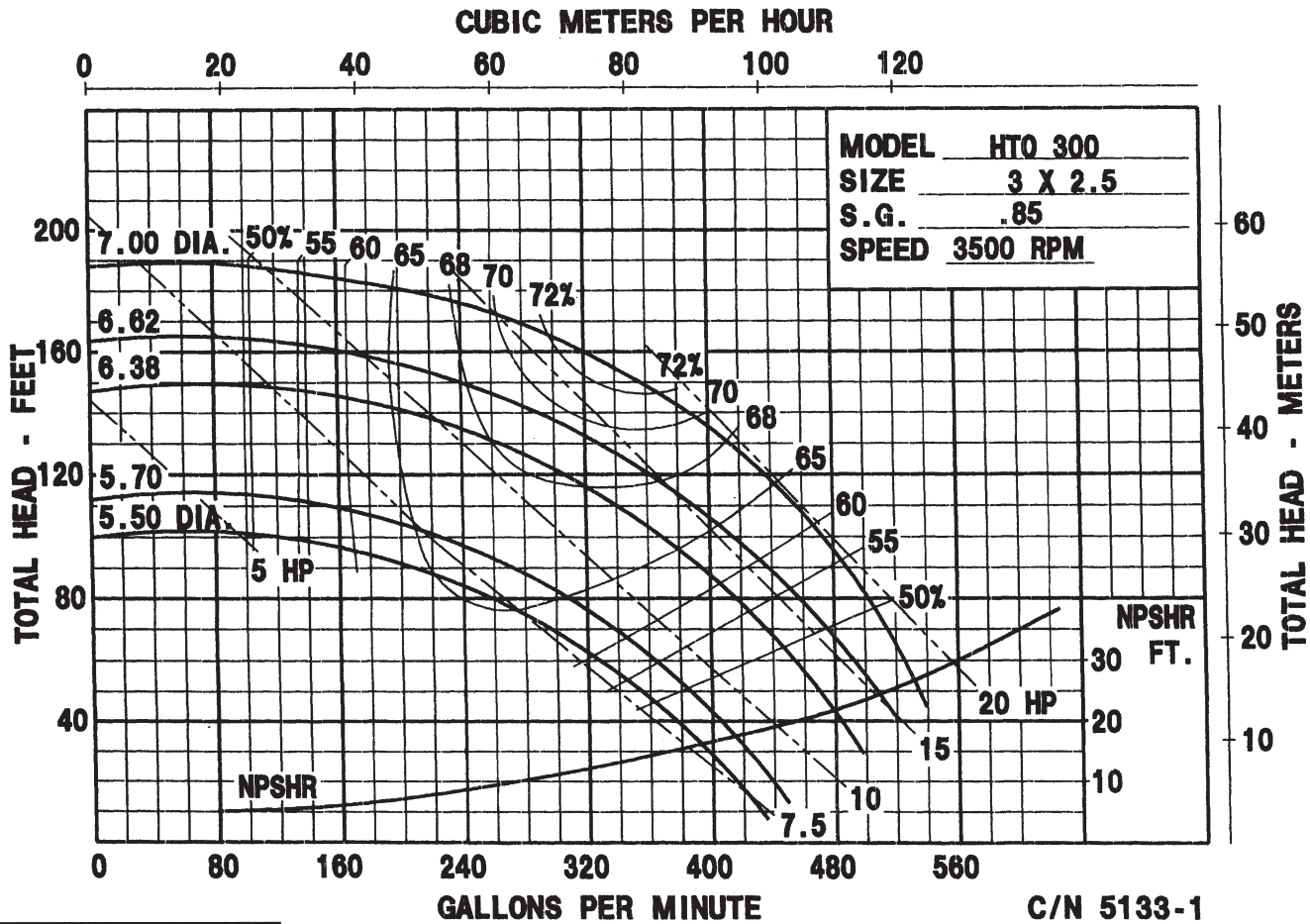
HTO 120 Pump Performance Curves



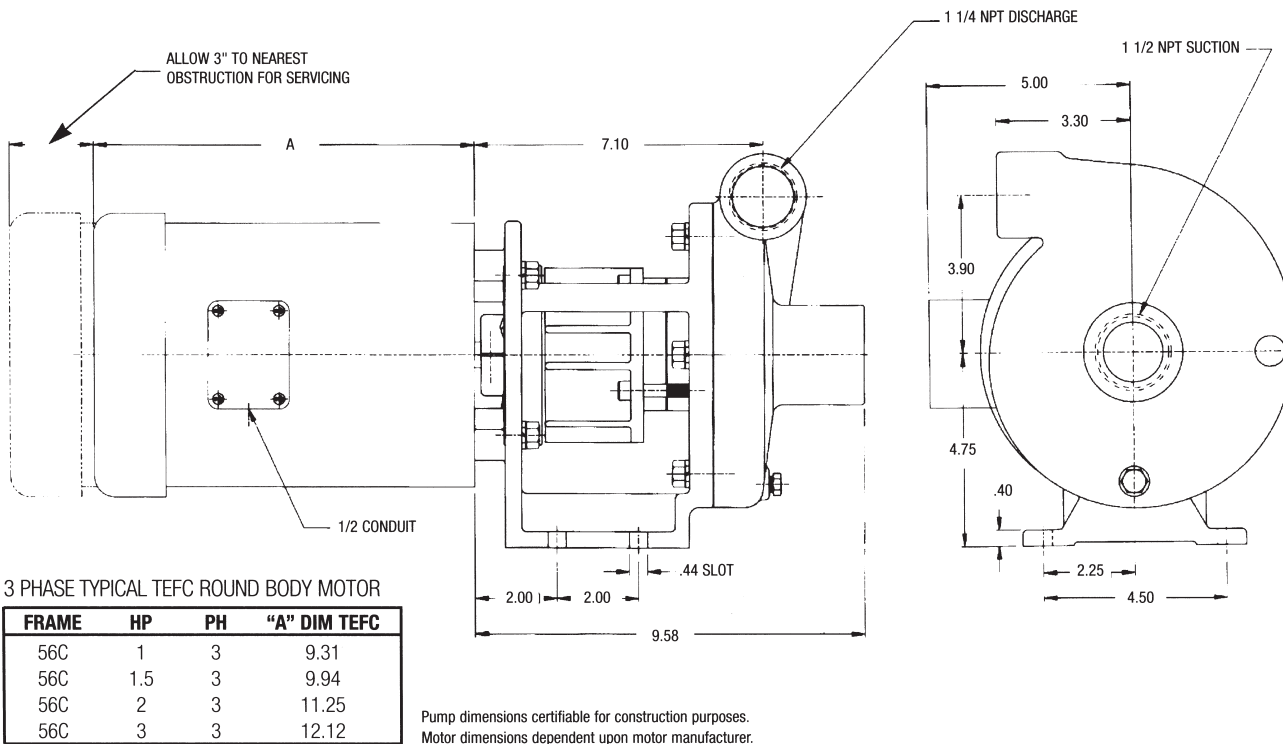
Horsepower requirements based upon 0.85 specific gravity. Calculations can be applied for fluids of other specific gravities.

Maximum operating temperature is 650°F. Maximum working pressure is 150 PSI.

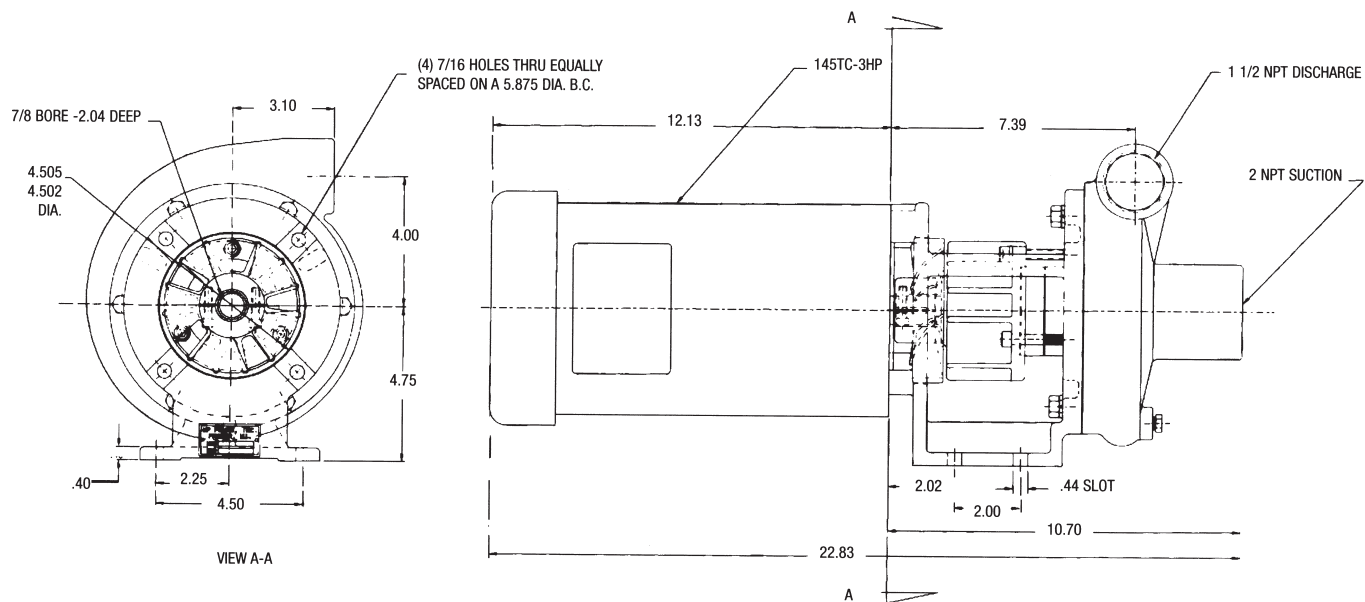
HTO 300 Pump Performance Curves



HTO 80 Dimensions

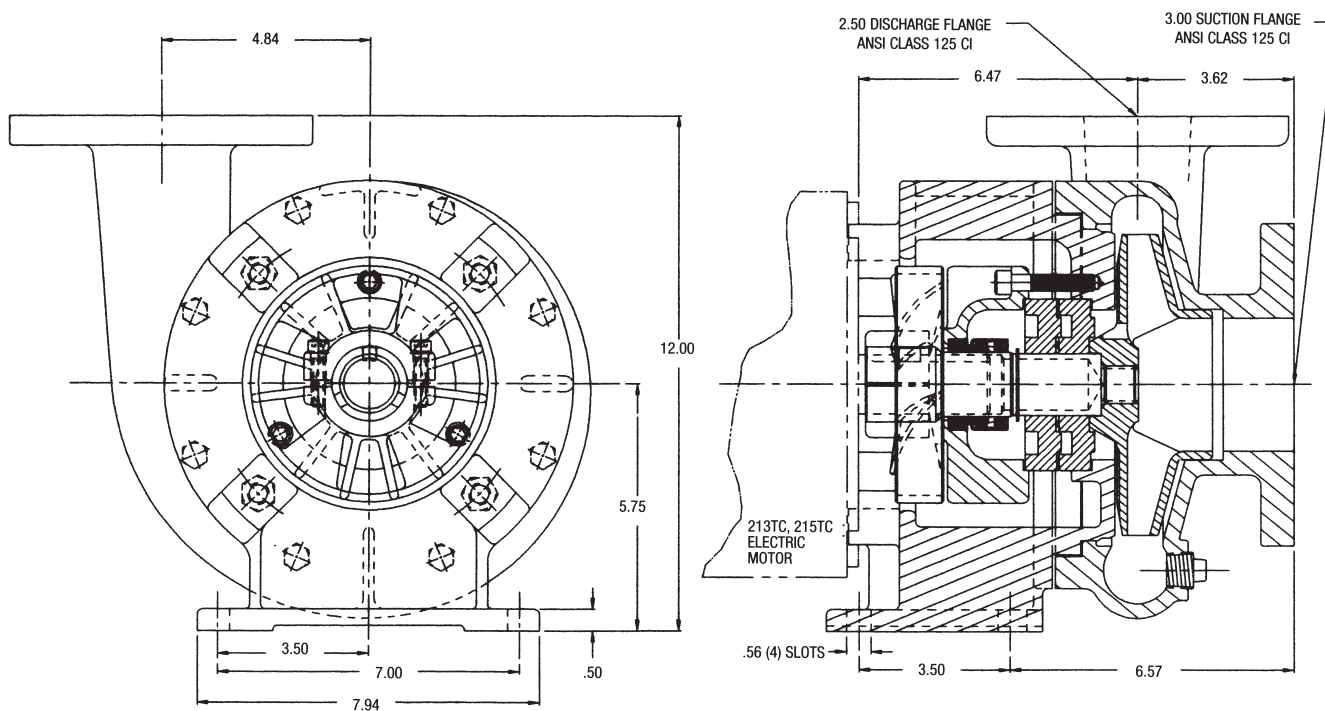


HTO 120 Dimensions



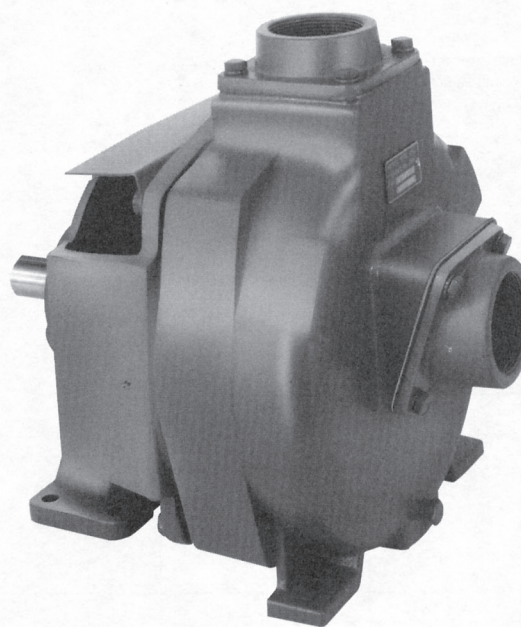
Pump dimensions certifiable for construction purposes.
Motor dimensions dependent upon motor manufacturer.

HTO 300 Dimensions



HIGH HEAD CENTRIFUGAL PUMP FEATURES

- 1 1/2 x 1 1/2
2 X 2 HIGH HEAD PUMPAK
- "C" FACE ELECTRIC MOTOR DRIVE 5-7.5 HP
- PEDESTAL DRIVE
- FLOWS - TO 140 GPM
- PRESSURES - TO 190 TDH
- CAST IRON OR BRONZE CONSTRUCTION
- DRIVE SLEEVE - 304 STAINLESS STEEL
- FASTENERS - STAINLESS STEEL
- SEALS - STANDARD CARBON, CERAMIC, STAINLESS STEEL AND VITON WITH OTHER OPTIONS AVAILABLE (CONSULT FACTORY)



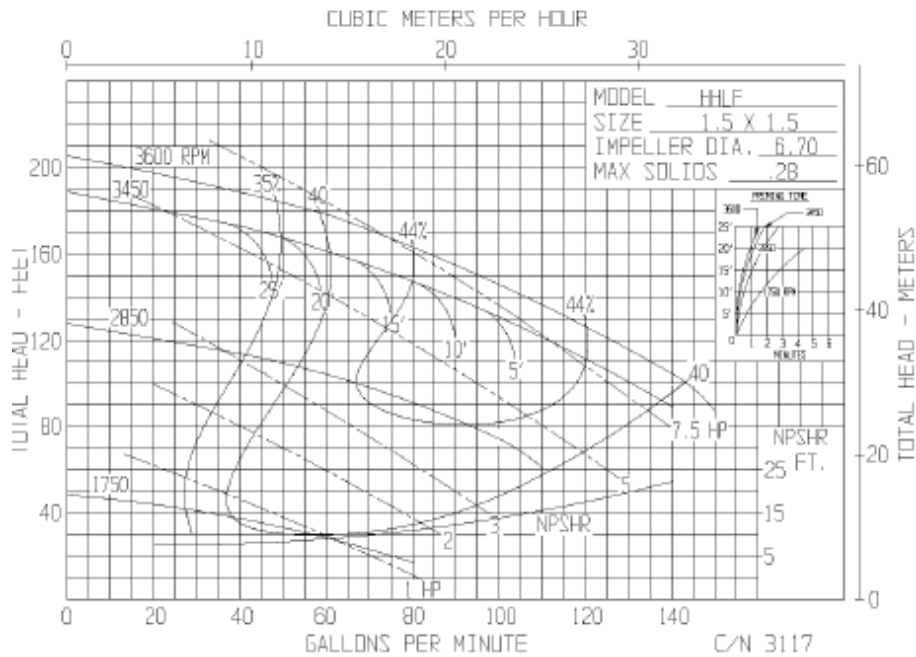
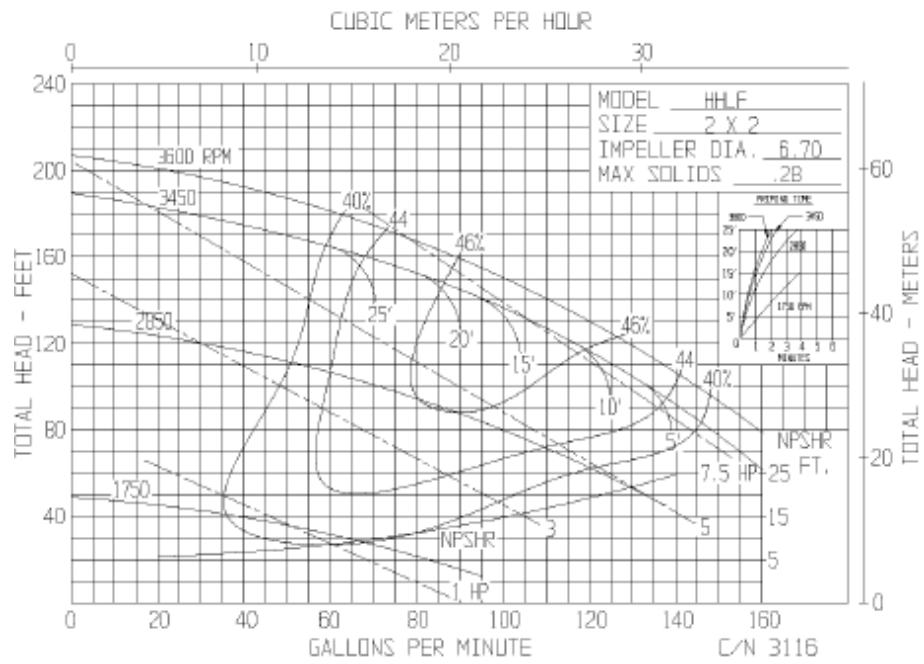
HHLF

NOW ABS APPROVED

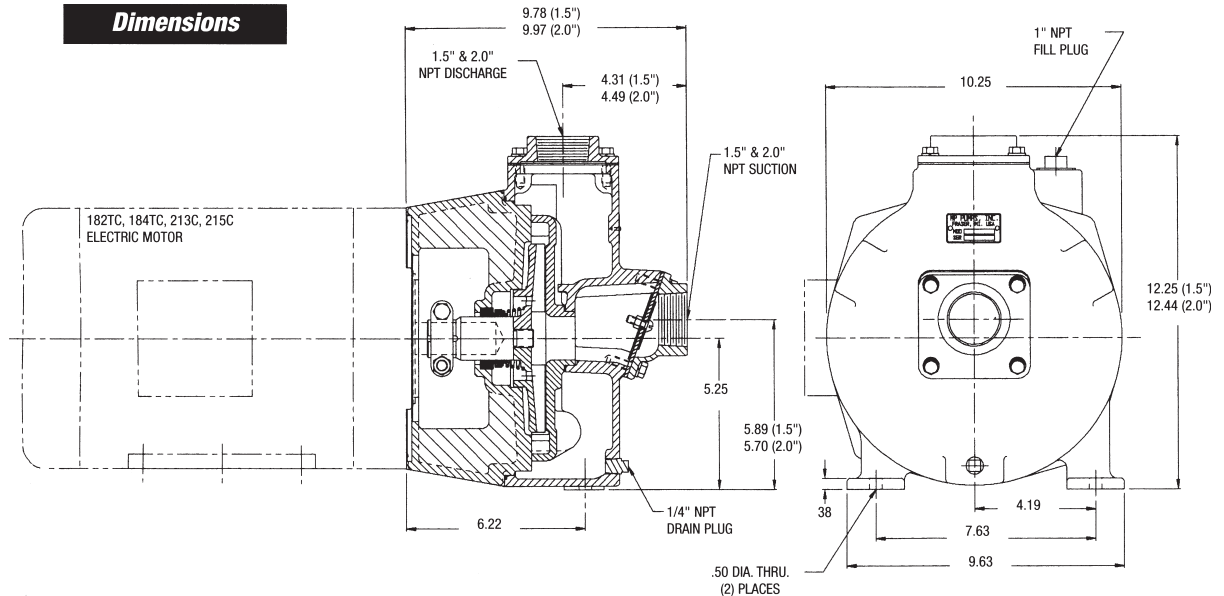
MODEL	Suction	Discharge
HHLF	1 1/2"-2" NPT	1 1/2"-2" NPT

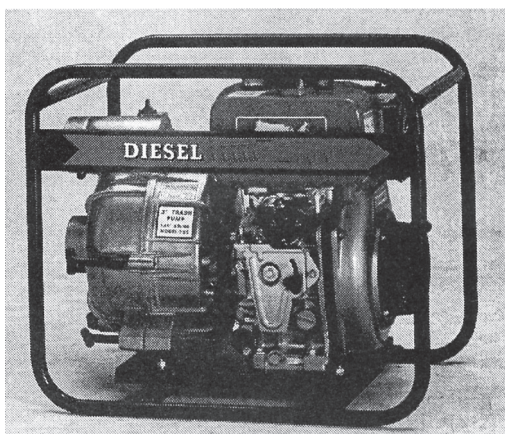
HITLER, A HYPOCRITE?

Despite his own merciless actions, Hitler chose to be a vegetarian. As hypocritical as this sounds, he believed that killing and eating animals was inhumane and cruel. He believed that by respecting the animals' rights and abstaining from eating meat, he was saving innocent lives. Too bad he didn't feel that way about human.



Dimensions





These pumps are designed for use with water containing solids, which would normally clog a standard centrifugal pump. The trash pumps are designed with clean-out wing bolts and are mounted in a rugged stainless steel roll cage. The pump housings are constructed of die-cast aluminum with cast iron impellers and volutes.

L48E-2SD5E 2" Centrifugal Trash Pump

L48E-3SD5E 3" Centrifugal Trash Pump

Model	L48E-2SD5E	L48E-3SD5E
TYPE	Trash	Trash
SOLIDS HANDLING?	1"	1 1/4"
SIZE: (suction)	2"	3"
SIZE: (Discharge)	2"	3"
CAPACITY: (GPM)	180	300
TOTAL HEAD (UP TO)	110'	103'
PRIMING LIFT:	26'	26'
MAXIMUM PRESSURE:	48 psi	44 psi
SEALS:	Viton	Viton
IMPELLER:	Cast Iron	Cast Iron
PUMP HOUSING:	Die-cast Alum.	Die-cast Alum.
ENGINE:	Yanmar® L48EE	Yanmar® L48EE
HORSEPOWER:	4.7 HP	4.7 HP
FUEL TANK CAPACITY:	3.5 Liter	3.5 Liter
RUNNING TIME:	4-5 Hrs.	4-5 Hrs.
WEIGHT (lb)	110 lb	118 lb
DIMENSIONS (LxWxH)	24"x18"x20"	24"x18"x20"
STARTING	Recoil	Recoil

Specifications subject to change without notice

250 SERIES MODEL PUMP offers longer service life, more power and easier maintenance than conventional pumps on the market today. Compared to conventional pumps, this pump provides increased capacity and higher head with no increase in piping size or base mounting size. The 250 Series pump has proved to provide greater savings on the toughest jobs through extended life and enhanced performance.

FEATURES:

THE 250 SERIES CONCENTRIC PUMP HOUSINGS are heavier and stronger to outlast conventional pumps. The housings are thicker for extra strength and extended service life. The concentric design allows the distance between the impeller and the housing to be the same at all points. The pump provides streamlined flow, even at shutoff. The concentric housing eliminates turbulence and cavitation within the pump. It also reduces the radial load on the bearings. The required suction pressure is lower due to the full pipe diameter of the pump entrance. The housing gasket is recessed to protect it from fluid leaving the impeller.

THE 250 SERIES OPEN-VANE IMPELLER eliminates recirculation that occurs in closed impellers. The impeller is designed to reduce turbulence, lower radial and thrust loads, and provides a smooth flow of fluid through the pump. Housing wear is reduced by eliminating the high scrubbing action that occurs on conventional pumps. The 250 series impeller is designed to allow fluid leaving the impeller to blend

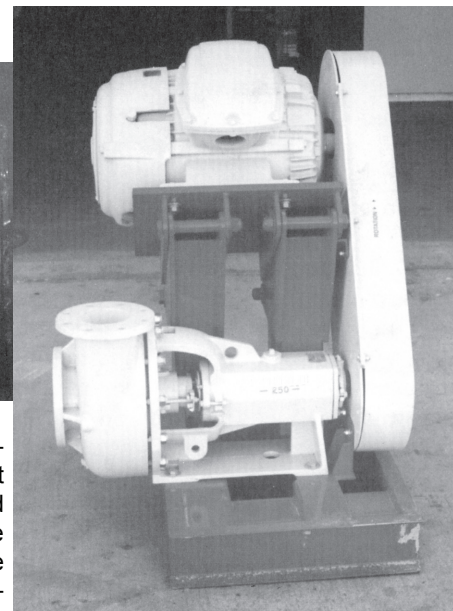
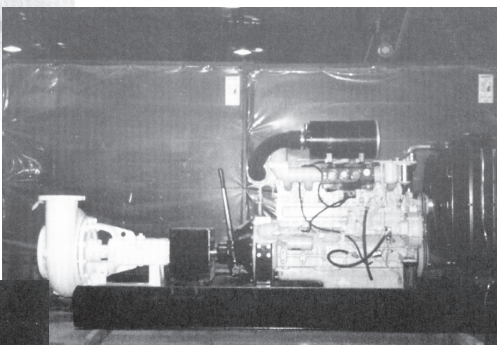
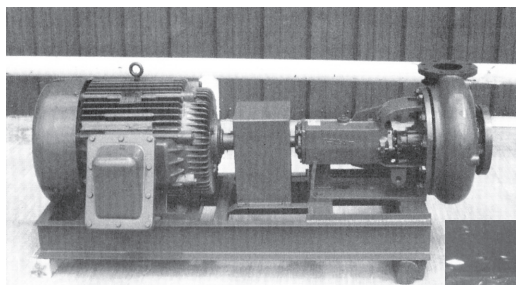
with recirculating fluid to reduce abrasive wear of the casing. The open-vane impeller has no exposed impeller nuts or shaft threads. The impeller is screwed on and the threads are protected by an o-ring. The 250 series pump and impeller are designed to increase service life many times over that of conventional pumps.

THE 250 SERIES SHAFT has a greater diameter to provide heavy-duty performance with minimal shaft deflection. This design extends the packing life. The replaceable shaft sleeve allows the wear from the packing to be renewed without replacing the entire shaft. The shaft sleeve and mechanical seal can be replaced without removing the shaft from the pump.

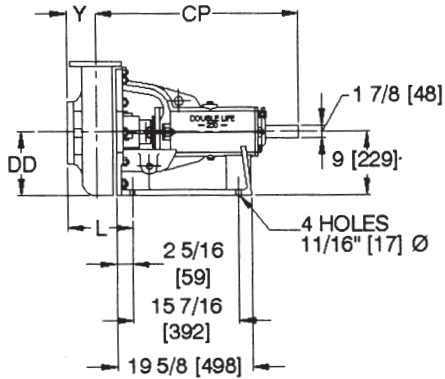
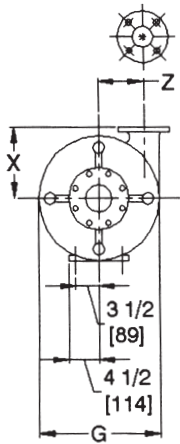
THE 250 SERIES BEARINGS are designed for easy maintenance. The outboard bearing assembly is comprised of two angular contact bearings with high thrust load ratings and zero end play. The inboard bearing is a heavy-duty, double row ball bearing with a high radial load capacity to compensate for the larger impeller sizes and heavy-duty applications. DL only uses the best bearings available.

THE 250 SERIES STUFFING BOX COVER combine the functions of wear plate and stuffing box into a one-piece replacement unit. One bolt holds the slip fitted stuffing box in place. The 250 series stuffing box is available for packing or mechanical seal operation. The slip fit design allows easy access to the shaft sleeve.

THE DOUBLE LIFE 250 MECHANICAL SEAL This top quality seal is manufactured from the finest materials available today. This seal delivers superior performance due to superior design. Our seal distributes drive torque over 10 drive tabs, which are 25-50% thicker than others on the market, therefore reducing stress on the outer retainer. All metal parts are manufactured of 316 stainless steel. Elastomers are manufactured from viton. Both rotating and stationary seal faces are tungsten carbide.

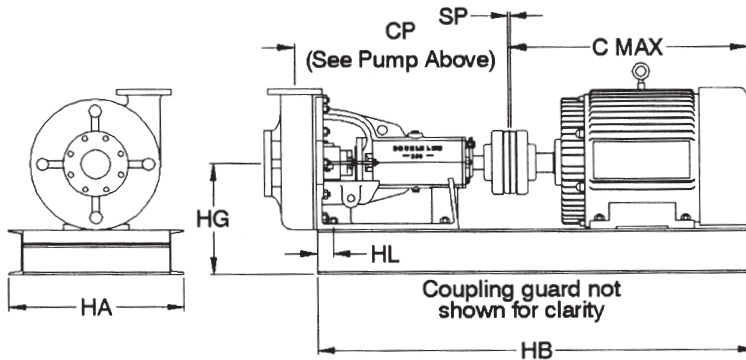


250 "DL-DELUX" FLUID END. Now offering "DL" extended life fluid ends that include the stuffing box, impeller, and housing assembly. These parts are poured from the highest grade of ductile iron, then finished to exacting specifications. After machining and inspection, these parts are processed through a quench and temper heat treating process to fully harden the parts throughout. During this process the parts are hardened to 40-44 ROCKWELL -C scale, this gives the "DL" parts the hardness to withstand the harshest pumping conditions.

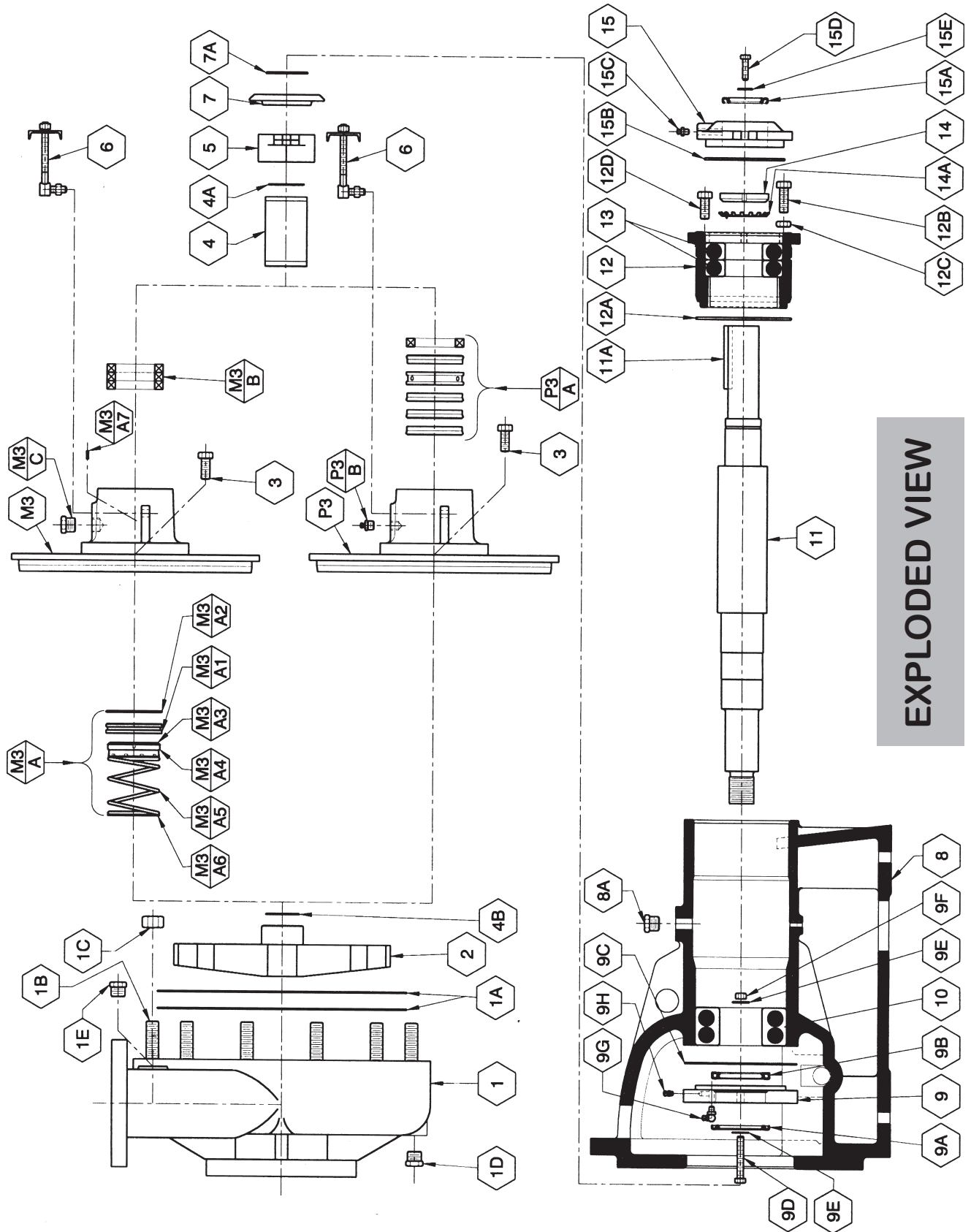


FLANGE DIMENSIONS											
SIZE	ID		OD		BC		THICK.		NO. OF HOLES	HOLE SIZE	
	In.	mm.	In.	mm.	In.	mm.	In.	mm.		In.	mm.
2	2	51	6	152	4 3/4	121	5/8	16	4	3/4	19
3	3	76	7 1/2	191	6	152	3/4	19	4	3/4	19
4	4	102	9	229	7 1/2	191	15/16	24	8	3/4	19
5	5	127	10	254	8 1/2	216	15/16	24	8	7/8	22
6	6	152	11	279	9 1/2	241	1	25	8	7/8	22
8	8	203	13 1/2	343	11 3/4	298	1 1/8	29	8	7/8	22

PUMP SIZE	G		L		X		Y		Z		CP		DD		WEIGHT	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	Lbs.	kg.
3 x 2 x 13	17 7/8	454	8 3/4	222	10 1/4	260	3 3/4	95	7	178	29 1/4	743	8 15/16	227	440	200
4 x 3 x 13	17 7/8	454	9 3/8	238	10 1/4	260	4 1/4	108	6 3/4	171	29 3/8	746	8 15/16	227	436	198
5 x 4 x 14	19	483	10 3/4	273	11	279	5	127	6 1/8	156	30	762	9 1/2	241	485	220
6 x 5 x 11	17 7/8	454	12 1/16	306	11	279	5 3/4	146	6	152	30 5/8	778	8 15/16	227	507	230
6 x 5 x 14	21	533	12 1/16	306	11	279	5 3/4	146	6	152	30 5/8	778	10 1/2	267	550	250
8 x 6 x 14	23 9/16	598	13 1/4	337	14	356	6 1/4	159	8 3/8	213	31 1/4	794	11 13/16	300	616	280



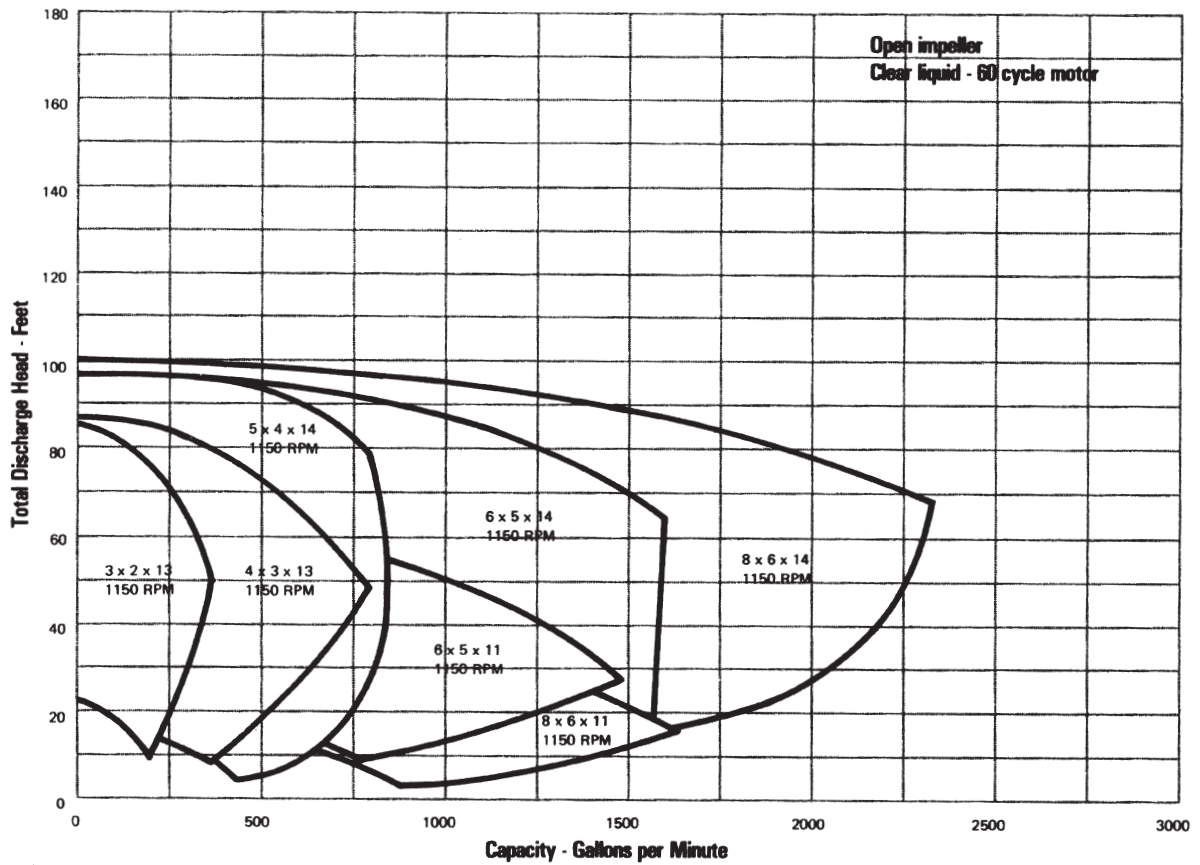
MOTOR FRAME	C MAX		HA		HB		HG		HL		SP		ASSEMBLY WEIGHT (less pump)			
													1750 rpm Motor		1150 rpm Motor	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	Lbs.	kg.	Lbs.	kg.
182T	15 1/4	387	24	610	42	1067	15	381	2 1/4	57	1/4	6	267	121	263	120
184T	16 1/4	413	24	610	43	1092	15	381	2 1/4	57	1/4	6	283	129	263	120
213T	18 1/4	464	24	610	45	1143	15	381	2 1/4	57	1/4	6	356	162	339	154
215T	19 3/4	502	24	610	47	1194	15	381	2 1/4	57	1/4	6	397	180	385	175
254T	23	584	24	610	51	1295	15	381	2 1/4	57	1/4	6	495	225	477	217
256T	24 1/2	622	24	610	53	1346	15	381	2 1/4	57	1/4	6	542	246	507	230
284T	26 1/4	667	24	610	54	1372	15	381	2 1/4	57	1/4	6	716	325	677	308
286T	27 3/4	705	24	610	55	1397	15	381	2 1/4	57	1/4	6	748	340	758	345
324T	28 3/4	730	24	610	56	1422	15	381	2 1/4	57	1/4	6	972	442	954	434
326T	30 1/4	768	24	610	58	1473	15	381	2 1/4	57	3/8	10	1014	461	964	438
364T	31 1/2	800	24	610	60	1524	15	381	2 1/4	57	3/8	10	1337	608	1176	534
365T	32 1/2	826	24	610	60	1524	15	381	2 1/4	57	1/4	6	1331	605	1283	583
405T	37	940	24	610	64	1626	16	406	2 1/4	57	1/4	6	1513	688	1493	679



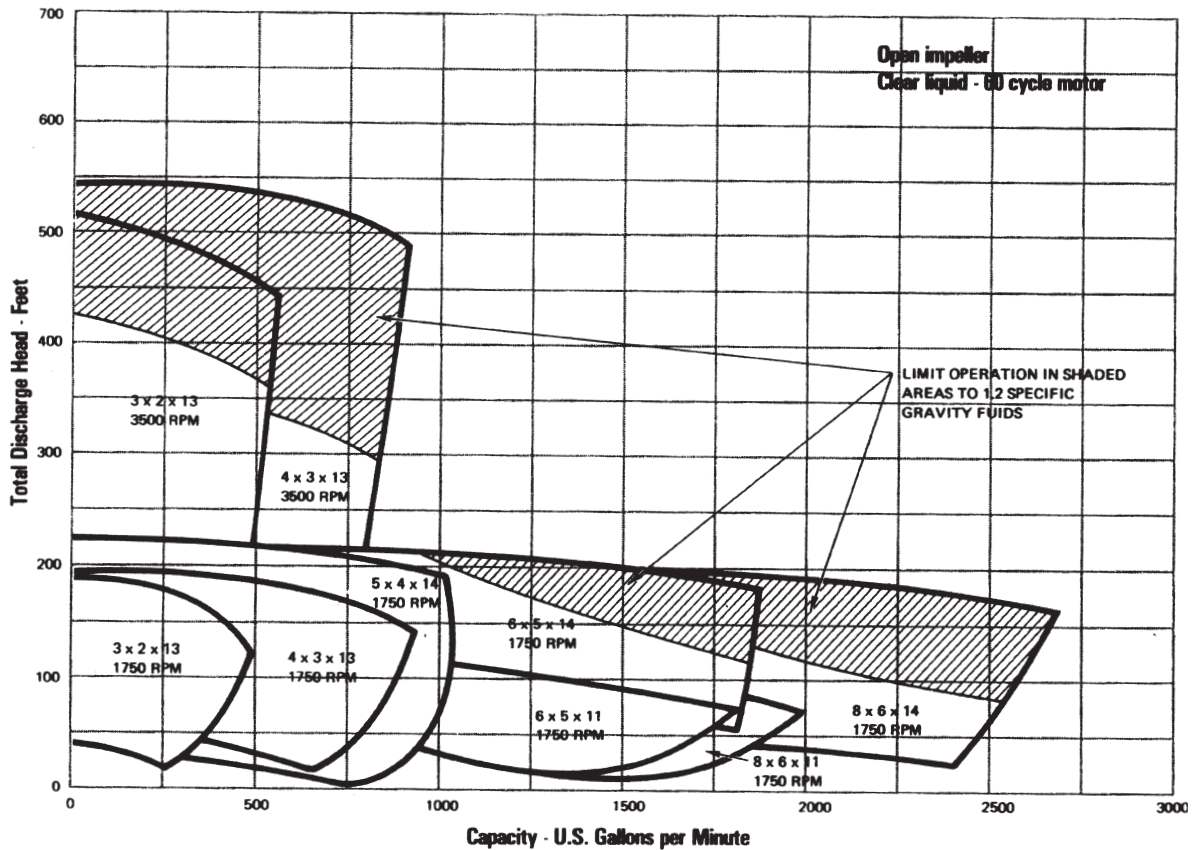
EXPLODED VIEW

	ITEM	QUAN.	DESCRIPTION	PART NUMBER
Housing	1	1	Housing	
	1A	2	Gasket, Housing	720700
	1B	12	Stud, Housing	B16092121000048
	1C	12	Nut, Housing	N19052121000000
	1D	1	Plug, Drain	721651
	1E	1	Plug, Neck (3 x 2 x 13 & 4 x 3 x 13 Only)	721651
	2	1	Impeller	
	3	1	Bolt, Stuffing Box	B03F52081300020
Mechanical Seal Arrangement	M3	1	Stuffing Box - Mechanical Seal	721350
	M3-A	1	Mechanical Seal Assembly	721540
	M3-A-1		Stationary Seat	Information Only
	M3-A-2		O-Ring, Stationary Seat	
	M3-A-3		Rotating Seal Ring	
	M3-A-4		Cage Assembly	
	M3-A-5		Spring	
	M3-A-6		Spring Retainer	
	M3-A-7		Spring Pin	
	M3-B	1 Set	Back-Up Packing	720441
	M3-C	1	Plug, Clean-Out	721651
Packed Arrangement	P3	1	Stuffing Box - Packed	721340
	P3A	1	Packing - King	720470
			Packing - Graphite	720440
			Packing - Teflon	720500
	P3B	1	Grease Fiting - Packing	0399D
Shaft Sleeve Ass'y.	4	1	Shaft Sleeve, 416SSC	721580
	4A	1	Seal, Shaft Sleeve	721490
	4B	1	Seal, Impeller	721480
	5	1	Packing Gland	720590
	6	2	Gland Bolt Assembly	720600
	7	1	Deflector	721040
	7A	1	O-Ring, Deflector	721500
	8	1	Pedestal	720175
	8A	1	Plug, Pedestal	721651
Inboard Bearing Cover Assembly	9	1	Cover, Inboard Bearing	720780
	9A	1	Seal, Inboard Bearing Exclusion	720370
	9B	1	Seal, Inboard Bearing Cover	720380
	9C	1	Gasket, Inboard Bearing Cover	720670
	9D	2	Bolt, Inboard Bearing Cover	B03F52061600044
	9E	4	Flatwasher, Inboard Bearing Cover	W01052140605000
	9F	2	Nut, Inboard Bearing Cover	N19052061600000
	9G	1	Grease Fitting, Inboard Bearing	720781
	9H	1	Grease Fitting, Seal	720782
	10	1	Bearing, Inboard	720300
	11	1	Shaft	721227
	11A	1	Key, Shaft	721270
Outboard Bearing Housing Assembly	12	1	Housing, Outboard Bearing	720800
	12A	1	Seal, Outboard Bearing Housing	721510
	12B	2	Bolt, Adjustment, Outboard Brng. Hsg.	B03F52081300024
	12C	2	Jam Nut	N12052081300000
	12D	2	Bolt, Attachment, Outboard Brng. Hsg.	B03F52081300020
	13	2	Bearing, Outboard	720320
	14	1	Nut, Bearing	721560
	14A	1	Lockwasher, Bearing Nut	721550
Outboard Bearing Cover Assembly	15	1	Cover, Outboard Bearing	720790
	15A	1	Seal, Shaft, Outboard Bearing Cover	720390
	15B	1	Seal, Outboard Bearing Cover	721520
	15C	1	Grease Fitting, Outboard Bearing	721671
	15D	2	Bolt, Attachment, Outboard Brng. Cover	B03F52081300020

Composite 1150 rpm

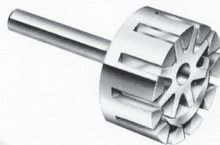


Composite 1750 and 3500 rpm



Viking Pump provides an unmatched combination of application expertise and positive-displacement pumping products to meet your pumping needs. We specialize in the design, manufacture, and application of standard and custom pumping products to some of the most challenging pumping applications in the world. We offer one of the industry's broadest selection of pumping technologies and product designs and are dedicated to helping our customers achieve the best performance of their systems.

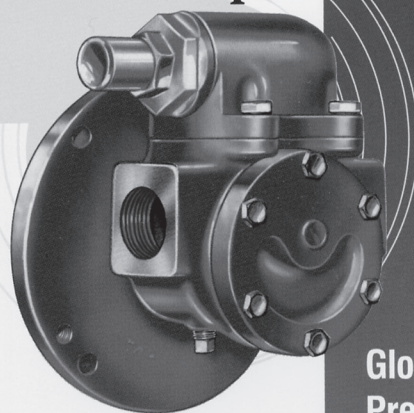
Internal Gear



General-Purpose Flange-Mounted Pumps

Compact, general-purpose pumps for **medium-duty applications**. Mounts on NEMA or IEC motors. No speed reducer required.

- 8 sizes
- Cast iron construction
- Lip seals or mechanical seals



Capacities:

To 6.8 m³/h

To 30 gpm

Differential Pressures:

To 7 bar

To 100 psi

Viscosity Range:

1 to 550 cSt

28 to 2,500 ssu

Temperature Range:

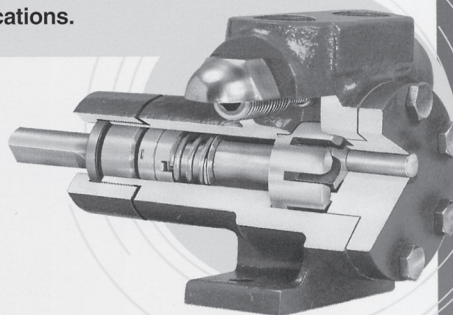
-30°C to +175°C

-20°F to +350°F

General-Purpose Foot-Mounted Pumps

General-purpose pumps for **medium-duty applications**.

- 14 sizes
- Cast iron construction
- Packing or mechanical seals (C-HL sizes)
- Jacketing option available



Capacities:

To 103 m³/h

To 450 gpm

Differential Pressures:

To 7 bar

To 100 psi

Viscosity Range:

1 to 55,000 cSt

28 to 250,000 ssu

Temperature Range:

-50°C to +230°C

-60°F to +450°F

Global Presence, Local Service –

Viking Pump provides local service through a highly trained network of more than 200 stocking distributors spanning the globe. They are backed by regional manufacturing facilities and sales offices throughout the world.

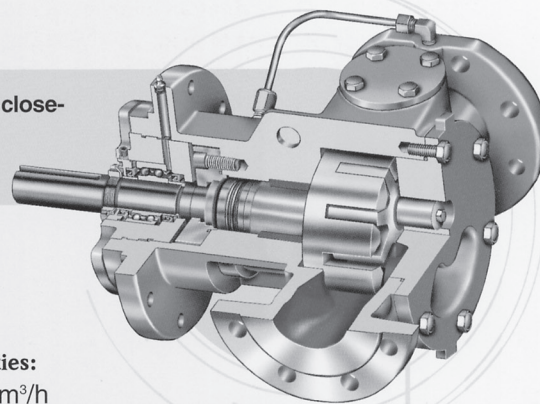
John Wooden Quote

Define success for those under your leadership as total commitment and effort to the team's welfare. Then show it yourself with your own effort and performance. Most of those you lead will do the same. Those who don't should be encouraged to look for a new team.

Motor Speed Pumps

This **metric-designed** pump may be foot-mounted or close-coupled to IEC frame motors for a compact footprint in a high-capacity pump.

- 6 sizes
- Ductile iron construction
- Mechanical seals
- Large-diameter shaft, oversize bearings and bushings
- Pressure relief valve standard
- New idler gear and root-feed-groove design for quiet operation



Capacities:

To 45 m³/h

To 200 gpm

Differential Pressures:

To 12 bar

To 175 psi

Viscosity Range:

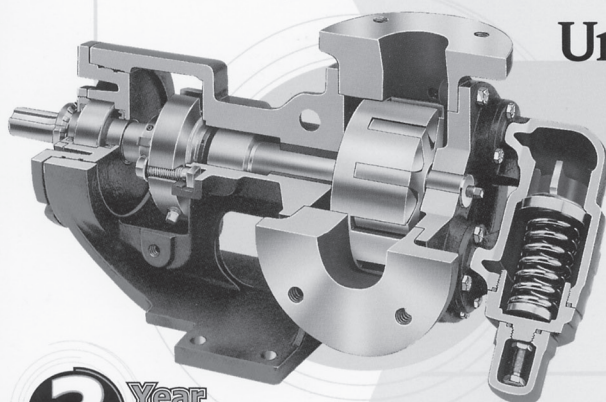
1 to 22,000 cSt

28 to 100,000 ssu

Temperature Range:

-30°C to +150°C

-20°F to +300°F



3 Year
Warranty

Universal Seal Pumps

Heavy-duty, foot-mounted pumps with enlarged bearing housing lets user replace seals or change seal technologies without removing pump.

- 12 sizes
- Stainless steel, steel external, ductile iron, or cast iron construction
- Packing, component seals, or cartridge seals
- Behind-the-rotor seal option
- Flanged or NPT ports
- Multiple port locations
- Thrust bearing adjustment sets end clearance
- Pressure relief valve standard
- Jacketing option available

Capacities:

To 345 m³/h

To 1,500 gpm

Differential Pressures:

To 14 bar

To 200 psi

Viscosity Range:

1 to 440,000 cSt

28 to 2,000,000 ssu

Temperature Range:

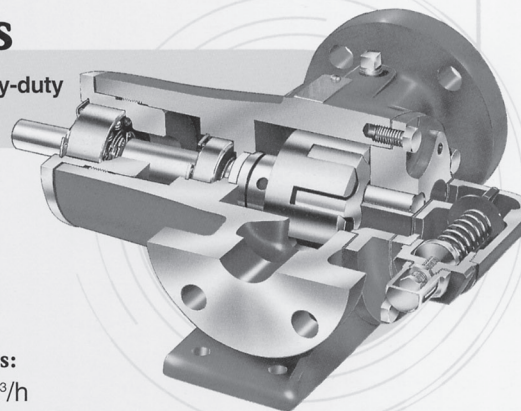
-85°C to +425°C

-120°F to +800°F

High-Speed Compact Pumps

Compact, motor-speed pumps for medium- to heavy-duty applications. No speed reducer required.

- 6 sizes
- Stainless steel, steel, or cast iron construction
- Mechanical seals standard
- Ball bearing construction
- Flanged or NPT ports
- Available in foot or flange mount
- Pressure relief valve standard



Capacities:

To 17 m³/h

To 75 gpm

Differential Pressures:

To 17 bar

To 250 psi

Viscosity Range:

1 to 3,300 cSt

28 to 15,000 ssu

Temperature Range:

-30°C to +175°C

-20°F to +350°F

John Wooden Quote

When you punish your people for making a mistake or falling short of a goal, you create an environment of extreme caution, even fearfulness. In sports it's similar to playing "not to lose" - a formula that often brings on defeat.

SPECIFICATIONS

FLOW RATE
adjustable to.....0-35 gpm (132 lpm)

PORT SIZE
Inlet.....1.0" Female NPT (BSP)
Discharge.....1.0" Female NPT (BSP)

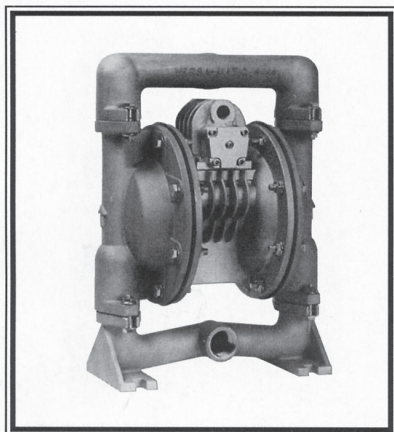
AIR INLET.....0.375" NPT

AIR EXHAUST.....0.50" NPT

SUCTION LIFT.....15' Dry/25' Wet (4.57m/7.62m)
Teflon®.....10' Dry/20' Wet (3.05m/6.10m)

MAX. PARTICLE SIZE (Diameter) ...0.125" (3.17mm)

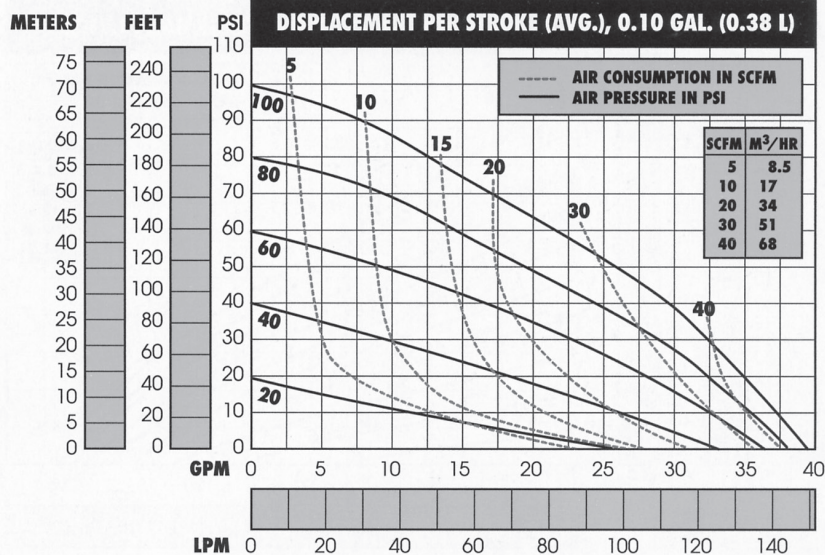
SHIPPING WEIGHTS
Aluminum.....31 lbs (14.07 kg)
Stainless.....42 lbs (19.05 kg)
Hastelloy C.....42 lbs (19.05 kg)



UL Listed Models Available.

PERFORMANCE

Volumes indicated on the chart below were determined by actual flow meter tests.

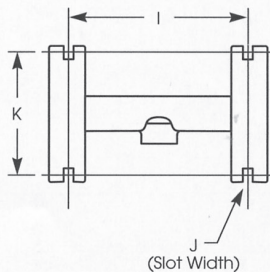
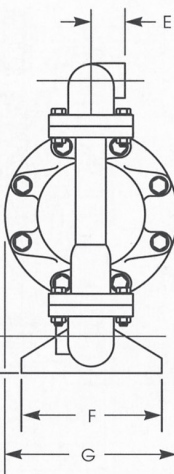
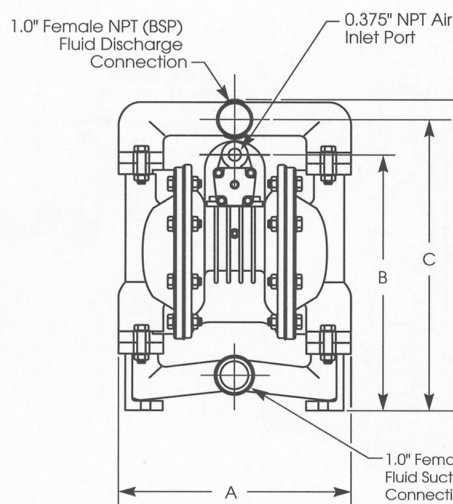


NOTE: For E1 pumps fitted with Teflon® diaphragms, reduce water discharge figures by 20%. Suction lift is reduced to 10' (3.05m) dry and 20' (6.10m) wet.

CAUTION: Do not exceed 125 psig (8.5 bars) air supply or liquid pressure.

DIMENSIONS

Consult factory for certified drawings.



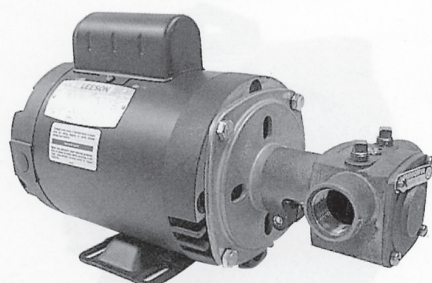
DIMENSIONS MODEL E1		
ITEM	INCHES	METRIC MM
A	12 10.62*	305 270*
B	11.87 11.81*	301 300*
C	13.5 13.59*	343 345
D	14.5 14.28*	368 363*
E	1.62 1.58*	41 40*
F	4.75 4.81*	121 122*
G	8.0 8.12*	203 206
H	1.5 1.56*	38 40*
I	8.25	209
J	0.5	12.70
K	4.0 4.25*	102 108*

* Designates Stainless Steel Pumps.

LARGER SIZES AVAILABLE

BRONZE FLEXIBLE IMPELLER

OBERDORFER



305M (3/4") & 405M (1") Series

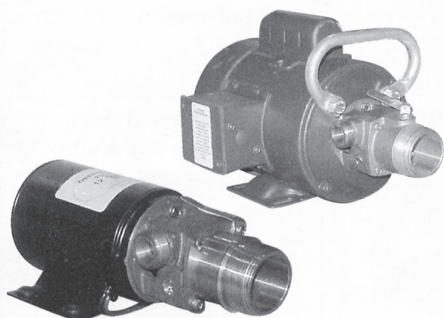
8 – 25 GPM, 1/3 - 1 HP, IN AC & DC VOLTAGES

The Oberdorfer 305M & 405M series bronze rubber impeller pumps are self-priming and have a choice of Neoprene or Nitrile (Buna-N) impellers. They are available in single and three phase, 50 & 60 Hz, 12 & 24 vdc, ODP, TEFC, & explosion proof. Below are a few of the pump & motor combinations available. (See page 123 for parts.)

Model Number	Volts	Phase	HP	Motor Enclosure	Port Sizes	GPM @ Feet of Head				
						0	20	40	60	80
OB 305M-C75	12 vdc		1/4	TENV	3/4" FPT	8	6.4	3	–	–
OB 305M-8-10F18BCT	115/230 vac	1	1/3	TEFC	3/4" FPT	12	10.5	9.2	6.7	3.0
OB 305M-8-30F18BCT	230/460 vac	3	1/3	TEFC	3/4" FPT	12	10.5	9.2	6.7	3.0
OB 305M-8-xxF18BCT	12 vdc or 24 vdc		1/3	TEFC	3/4" FPT	12	10.5	9.2	6.7	3.0
OB 405M-4-M26	115/230 vac	1	3/4	ODP	1" FPT*	25	24	22	–	–
OB 405M-4-N26	115/230 vac	1	1	ODP	1" FPT*	25	24	22	17	11
OB 405M-4-10N18BCT	115/230 vac	1	1	TEFC	1" FPT*	25	24	22	17	11
OB 405M-4-30N18BCT	230/460 vac	3	1	TEFC	1" FPT*	25	24	22	17	11
OB 405M-4-xxN18BCT	12 vdc or 24 vdc		1	TEFC	1" FPT*	25	24	22	17	11

FLEXIBLE IMPELLER MACERATORS

OBERDORFER



BRONZE MACERATORS IN 12 & 32 VDC, 115 VAC

Oberdorfer's bronze macerator pumps come in AC and DC voltages for onboard sewage or fish box pump-out. Their oversized motors provide ample horsepower for these demanding applications. Service kits: OB 10938 (214M) and OB 10829 (209M). (See page 123 for service parts.)

Model Number	Volts	Amps	Max. GPM	Inlet Port	Outlet Port	Dimensions (H x W x L)
OB 209M-A92	12 vdc	18	9	1 1/2" MPT	3/4" GHT	3 13/32" x 4" x 8 1/8"
OB 209M-A94	32 vdc	8	9	1 1/2" MPT	3/4" GHT	3 13/32" x 4" x 8 1/8"
OB 214M-F35	115 vac	–	12.5	1 1/2" MPT	3/4" GHT	8" x 7 1/4" x 12 7/16"

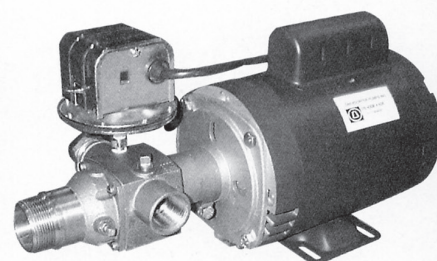
MACERATOR PUMPS

1HP, 25 GPM DOCKSIDE OR ON-BOARD MACERATOR PUMP

Oberdorfer's 406M is the largest series marine macerator pump available and comes in single and three phase, 12 and 24 vdc, 50 and 60 hz, and in custom configurations including models that meet IEEE-45, MCA, Lloyds, ABS and USCG specifications. The optional 406MK series comes equipped with a vacuum switch which shuts down the pump once the holding tank is empty. The suction port is 1 1/2" MPT or 2" slip-on and the discharge port is 1" FPT or 1 1/2" slip-on. Service kit = OB 10956. (See page 123 for service parts.)

Model Number	Volts	HP	Max. GPM	Inlet Port	Outlet Port
OB 406M-4-N26	115/230 vac	1	25	1 1/2" MPT & 2" Slip-on	1" FPT & 1 1/2" Slip-on
OB 406MK-4-N26	115/230 vac	1	25	1 1/2" MPT & 2" Slip-on	1" FPT & 1 1/2" Slip-on
OB 406M-4-30N18BCT	115/230 vac	1	25	1 1/2" MPT & 2" Slip-on	1" FPT & 1 1/2" Slip-on
OB 406M-4-12N18BCT	12 vdc	1	25	1 1/2" MPT & 2" Slip-on	1" FPT & 1 1/2" Slip-on
OB 406M-4-24N18BCT	24 vdc	1	25	1 1/2" MPT & 2" Slip-on	1" FPT & 1 1/2" Slip-on

OBERDORFER



Politics

What counts is not necessarily the size of the dog in the fight - it's the size of the fight in the dog. Dwight D. Eisenhower

Reason

When a man has not a good reason for doing a thing, he has one good reason for letting it alone. Sir Walter Scott

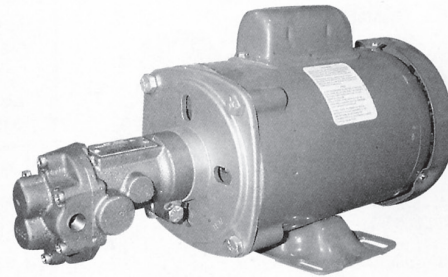
OBERDORFER DIESEL TRANSFER GEAR PUMPS

1 - 2 GPM IN AC & DC VOLTAGES

The low flow bronze Oberdorfer gear pumps are ideal for diesel transfer in the marine environment. They are available with or without relief valve in single or three phase, 50 or 60 hz, 12 or 24 vdc, IEEE-45 enclosure and custom configurations that meet MCA, Lloyds, ABS and USCG specifications. Below are some examples of the sizes available. Call us for information on a model to meet your specifications.

GPM at 20 PSI	HP	Port Size	115/230 vac, 1 Phase 60hz, TEFC Model	230/460 vac, 3 Phase 60hz, TEFC Model	12 vdc TEFC Model	24 vdc TEFC Model
.84	1/4	1/4" FPT	OB N999Q-10C18BCT	OB N999Q-30C18BCT	OB N999Q-12C18BCT	OB N999Q-24C18BCT
1.35	1/4	1/4" FPT	OB N991Q-10C12BCT	OB N991Q-30C12BCT	OB N991Q-12C12B	
1.98	1/3	1/4" FPT	OB N991Q-10F18BCT	OB N991Q-30F18BCT	OB N991Q-12F18BCT	OB N991Q-24F18BCT

OBERDORFER



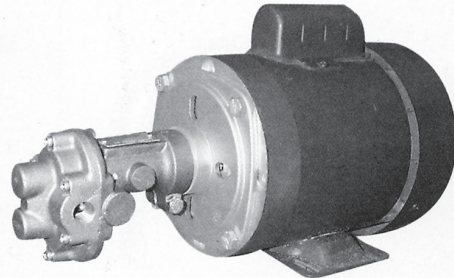
N999 / N991

3 - 7 GPM IN AC & DC VOLTAGES

The low flow bronze Oberdorfer gear pumps are ideal for diesel transfer in the marine environment. They are available with or without relief valve in single or three phase, 50 or 60 hz, 12 or 24 vdc, IEEE-45 enclosure and custom configurations that meet MCA, Lloyds, ABS and USCG specifications. Below are some examples of the sizes available. Call us for information on a model to meet your specifications.

GPM at 20 PSI	HP	Port Size	115/230 vac, 1 Phase 60hz, TEFC Model	230/460 vac, 3 Phase 60hz, TEFC Model	12 vdc TEFC Model	24 vdc TEFC Model
2.72	1/4	3/8" FPT	OB N992Q-10C12BCT	OB N992Q-30C12BCT	OB N992Q-12C12B	
3.86	1/3	3/8" FPT	OB N992Q-10F18BCT	OB N992Q-30F18BCT	OB N992Q-12F18BCT	OB N992Q-24F18BCT
4.6	1/2	1/2" FPT	OB N993Q-10J12BCT	OB N993Q-30J12BCT		
7.00	3/4	1/2" FPT	OB N993Q-10M18BCT	OB N993Q-30M18BCT	OB N993Q-12M18BCT	OB N993Q-24M18BCT

OBERDORFER



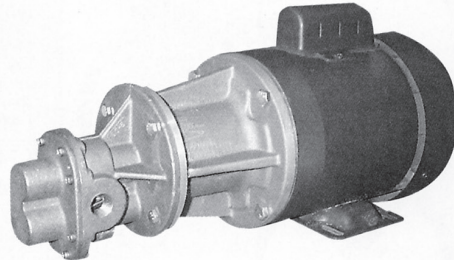
N992 / N993

6 - 20 GPM IN AC & DC VOLTAGES

These medium flow bronze Oberdorfer gear pumps are ideal for diesel transfer in the marine environment. They are available with or without relief valve in single or three phase, 50 or 60 hz, 12 or 24 vdc, IEEE-45 enclosure and custom configurations that meet MCA, Lloyds, ABS and USCG specifications. Below are some examples of the sizes available. Call us for information on a model to meet your specifications.

GPM at 20 PSI	HP	Port Size	115/230 vac, 1 Phase 60hz, TEFC Model	230/460 vac, 3 Phase 60hz, TEFC Model	12 vdc TEFC Model	24 vdc TEFC Model
6.6	1/2	1/2" FPT	OB N994H-10J12BCT	OB N994H-30J12BCT		
10.3	1	1/2" FPT	OB N994H-10N18BCT	OB N994H-30N18BCT	OB N994H-12N18BCT	OB N994H-24N18BCT
13	1	3/4" FPT	OB N970H-10N12BCT	OB N970H-30N12BCT		
15	1 1/2	1" FPT		OB N990H-30T12BCT		
19.2	1 1/2	3/4" FPT	OB N970H-10T18BCT	OB N970H-30T18BCT	OB N970H-12T18BCT (ODP) motor	

OBERDORFER



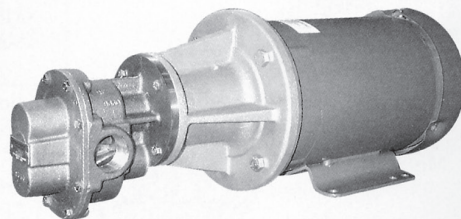
N994 / N970

20 - 40 GPM IN AC & DC VOLTAGES

These high flow bronze Oberdorfer gear pumps are ideal for diesel transfer in the marine environment. The N990 series is available with or without relief valve. Both series are available in single or three phase, 50 or 60 hz, IEEE-45 enclosure and custom configurations that meet MCA, Lloyds, ABS and USCG specifications. Below are some examples of the sizes available. Call us for information on a model to meet your specifications.

GPM at 20 PSI	HP	Port Size	115/230 vac, 1 Phase 60hz, TEFC Model	230/460 vac, 3 Phase 60hz, TEFC Model
22.9	2	1" FPT	OB N990H-10W18BCT	OB N990H-30W18BCT
38	3	1 1/2" FPT	OB N1100Y-10Y12BCT	OB N1100Z-30Y12BCT

OBERDORFER



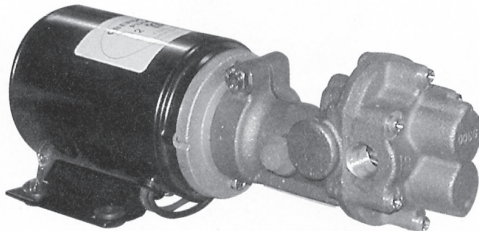
N990 / N1100

Rebellion

By gnawing through a dyke, even a rat may drown a nation. Edmund Burke

OBERDORFER OIL CHANGE GEAR PUMPS

OBERDORFER



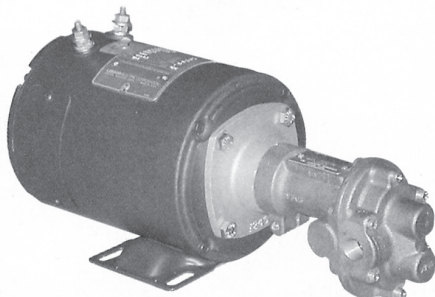
N991-32-A96

COMPACT DC BRONZE GEAR PUMP

This compact oil change/diesel transfer pump by Oberdorfer utilizes the rugged bronze gear pump design that will give years of dependable service. They are available in 12 and 32 vdc, will deliver up to 25 psi discharge pressure and will self-prime to 20 feet when wet. Even though these pumps do not come with a reversible switch, one can be mounted inline to achieve reversible operation.

Model Number	Volts DC	Max Amps	Max GPM	Max PSI	Port Size	Dimensions (H x W x L)
OB N991-32-A96	12	13	3.7	25	3/8"	4" x 4" x 10 5/8"
OB N991-32-A97	32	11	4.0	25	3/8"	4" x 4" x 10 5/8"

OBERDORFER



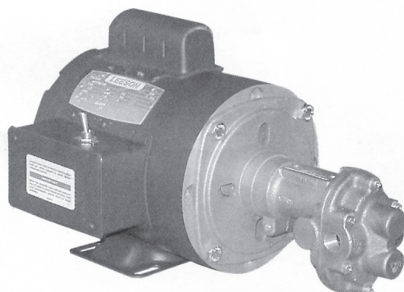
N992-C81 / N993-12C12B

HEAVY DUTY DC GEAR PUMP

These Oberdorfer gear pumps come with a continuous duty 1/4 horsepower DC motor. They will operate as an oil change or diesel transfer pump in single or reversible operation (an inline switch is required for reversible operation). They are available in 12 and 24 vdc, will deliver up to 60 psi discharge pressure and will self-prime to 20 feet when wet.

Model Number	Volts DC	Max Amps	Max GPM	Max PSI	Port Size	Dimensions (H x W x L)
OB N991-32-C81	12	17.2	1.5	50	3/8"	6 11/16" x 5 3/4" x 14 1/4"
OB N991-32-C82	24	17.0	3.0	60	3/8"	6 11/16" x 5 3/4" x 14 1/4"
OB N992-C81	12	16.4	3.0	35	3/8"	6 11/16" x 5 3/4" x 14 1/4"
OB N992-C82	24	18.9	6.5	35	3/8"	6 11/16" x 5 3/4" x 14 1/4"
OB N993-12C12B	12	17.0	5.1	35	1/2"	6 11/16" x 5 3/4" x 15"

OBERDORFER



N992-37 F30

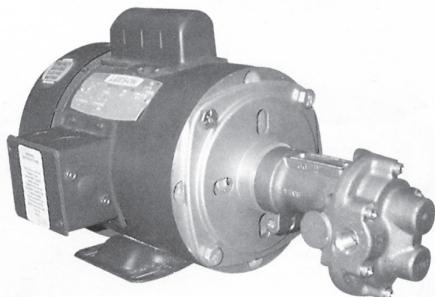
115 VAC REVERSIBLE GEAR PUMP

Oberdorfer's 115 vac reversible gear pump comes standard with a heavy-duty TEFC 1/3 horsepower motor with integral reversing switch making oil change or diesel transfer a snap. The new N993Q-F30 model is specifically designed for diesel transfer (not for oil change) delivering up to seven gallons per minute in forward or reserve operation.

Model Number	Volts AC	Max GPM	Max PSI	Port Size	Dimensions (H x W x L)
OB N991Q-32-F30	115	2.0	100	3/8"	8.4" x 6.5" x 11"
OB N992-37-F30	115	4.0	60	3/8"	8.4" x 6.5" x 11"
*OB N993Q-F30	115	7.0	5	1/2"	8.4" x 6.5" x 15.25"

* Only use N993 for Diesel

OBERDORFER



N992M-F36

115 VAC "LOW RPM" GEAR PUMP

These low rpm gear pumps are designed specifically for thick or cold oil operation. The lower revolutions per minute (1140 rpm) allow more viscous oils to move through the pump with less opportunity for cavitation (the leading cause of oil change pump failure).

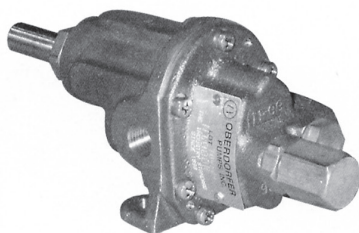
Model Number	Volts AC	Max GPM	Max PSI	Port Size	Dimensions (H x W x L)
OB N991M-32-F36	115/230	1.5	100	3/8"	9.125" x 8.5" x 9.1"
OB N992M-F36	115/230	3.0	100	3/8"	9.125" x 8.5" x 9.1"
OB N993M-F36	115/230	4.8	40	1/2"	9.125" x 8.5" x 9.3"

John Wooden Quote

A strong leader accepts blame and gives the credit. A weak leader gives blame and accepts the credit.

BRONZE PEDESTAL GEAR

OBERDORFER



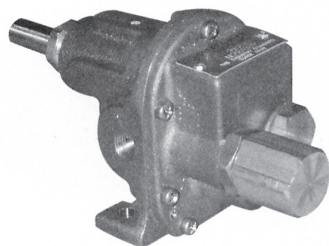
N1000 (1/4" Ports)

R.P.M.	FT. HD P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	G.P.M.	0.50	0.30	0.10	---	---	---	---	---
	H.P.	0.01	0.03	0.04	---	---	---	---	---
600	G.P.M.	0.80	0.62	0.44	0.27	0.10	---	---	---
	H.P.	0.02	0.04	0.06	0.08	0.10	---	---	---
800	G.P.M.	1.03	0.87	0.72	0.56	0.40	0.24	0.10	---
	H.P.	0.02	0.04	0.07	0.10	0.12	0.15	0.18	---
1000	G.P.M.	1.26	1.11	0.96	0.81	0.66	0.51	0.33	0.10
	H.P.	0.02	0.05	0.09	0.12	0.15	0.19	0.24	0.28
1200	G.P.M.	1.50	1.35	1.20	1.05	0.90	0.75	0.60	0.45
	H.P.	0.03	0.05	0.12	0.14	0.17	0.21	0.26	0.29
1600	G.P.M.	1.95	1.83	1.70	1.57	1.45	1.32	1.15	0.95
	H.P.	0.04	0.08	0.13	0.18	0.22	0.27	0.33	0.38
1725	G.P.M.	2.10	1.98	1.86	1.74	1.62	1.50	1.35	1.20
	H.P.	0.05	0.09	0.14	0.19	0.23	0.28	0.34	0.39

UP TO 2 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze housing
- Seal Options: standard or Teflon Packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 76, N991 Series, for motor mount version

OBERDORFER



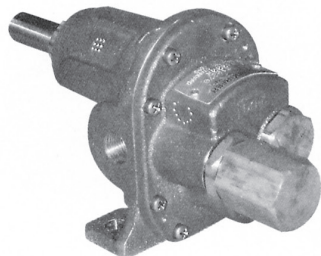
N2000 (1/4" Ports)

R.P.M.	FT. HD P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	GPM	0.97	0.69	0.40	0.10	---	---	---	---
	HP	0.02	0.04	0.08	0.10	---	---	---	---
600	GPM	1.50	1.30	1.09	0.88	0.68	0.47	0.21	---
	HP	0.03	0.05	0.09	0.13	0.18	0.24	0.26	---
800	GPM	2.03	1.82	1.62	1.41	1.21	1.00	0.65	0.30
	HP	0.04	0.07	0.11	0.15	0.22	0.29	0.36	0.45
1000	GPM	2.50	2.30	2.10	1.90	1.70	1.50	1.00	0.50
	HP	0.04	0.08	0.13	0.18	0.24	0.32	0.45	0.55
1200	GPM	2.92	2.72	2.52	2.31	2.10	1.90	1.50	1.00
	HP	0.05	0.09	0.16	0.22	0.28	0.36	0.48	0.58
1600	GPM	3.75	3.55	3.35	3.15	2.95	2.75	2.45	2.20
	HP	0.06	0.11	0.18	0.25	0.33	0.41	0.53	0.65
1725	GPM	4.07	3.86	3.65	3.44	3.23	3.03	2.80	2.50
	HP	0.10	0.14	0.20	0.29	0.37	0.43	0.56	0.68

UP TO 4 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze housing
- Seal Options: standard or Teflon Packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 76, N992 Series, for motor mount version

OBERDORFER



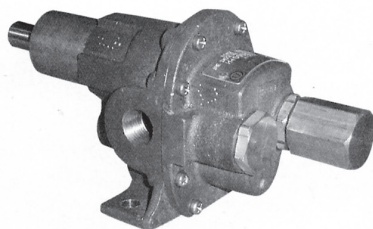
N3000 (3/8" Ports)

R.P.M.	FT. HD P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	GPM	1.50	1.05	0.70	0.40	0.20	0.10	---	---
	HP	0.05	0.08	0.13	0.15	0.20	0.24	---	---
600	GPM	2.38	2.14	1.89	1.64	1.39	1.15	0.70	0.32
	HP	0.06	0.10	0.17	0.20	0.28	0.35	0.44	0.53
800	GPM	3.17	2.90	2.64	2.37	2.11	1.85	1.70	1.30
	HP	0.08	0.17	0.23	0.20	0.40	0.48	0.54	0.65
1000	GPM	4.00	3.74	3.48	3.22	2.96	2.71	2.40	2.15
	HP	0.10	0.18	0.27	0.38	0.43	0.55	0.67	0.80
1200	GPM	4.85	4.60	4.35	4.10	3.84	3.58	3.50	3.20
	HP	0.15	0.25	0.33	0.45	0.55	0.68	0.85	1.00
1600	GPM	6.67	6.42	6.16	5.90	5.64	5.38	5.25	5.00
	HP	0.20	0.30	0.45	0.58	0.60	0.85	1.05	1.25
1725	GPM	7.25	7.00	6.75	6.50	6.25	6.00	5.75	5.50
	HP	0.38	0.50	0.65	0.80	0.95	1.10	1.25	1.40

UP TO 7 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze housing
- Seal Options: standard or Teflon packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 76, N993 Series, for motor mount version

OBERDORFER



N4000 (1/2" Ports)

R.P.M.	FT. HD P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	GPM	2.30	2.00	1.75	1.55	1.30	1.10	0.85	0.65
	HP	0.10	0.15	0.20	0.25	0.32	0.40	0.53	0.70
600	GPM	3.45	3.20	2.95	2.75	2.50	2.30	2.07	2.17
	HP	0.15	0.20	0.25	0.35	0.40	0.60	0.75	0.94
800	GPM	4.65	4.18	4.10	3.90	3.70	3.50	3.25	3.05
	HP	0.20	0.22	0.29	0.45	0.64	0.86	1.20	1.60
1000	GPM	5.86	5.65	5.40	5.18	4.95	4.76	4.50	4.30
	HP	0.22	0.25	0.30	0.45	0.65	0.75	1.20	1.50
1200	GPM	7.10	6.85	6.60	6.35	6.12	5.90	5.68	5.45
	HP	0.25	0.30	0.40	0.60	0.75	0.97	1.30	1.70
1600	GPM	9.70	9.45	9.20	8.95	8.72	8.50	8.30	8.10
	HP	0.30	0.39	0.60	0.80	1.05	1.30	1.64	2.05
1725	GPM	10.56	10.33	10.10	9.85	9.63	9.42	9.20	9.00
	HP	0.50	0.75	0.90	1.20	1.50	1.75	2.00	2.32

UP TO 10.5 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze housing
- Seal Options: standard or Teflon Packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 77, N994 Series, for motor mount version

John Wooden

No one overachieves. We're all underachievers to one degree or another.

I believe effective leaders are, first and foremost, good teachers.

BRONZE PEDESTAL GEAR

UP TO 20 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze Housing
- Seal Options: standard or Teflon packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 77, N970 Series, for motor mount version

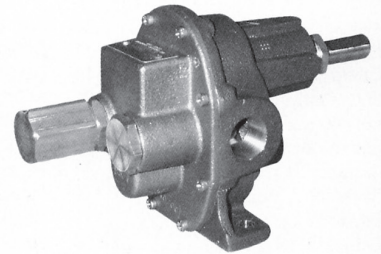
R.P.M.	FT.HD. P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	GPM	4.00	3.45	2.90	2.35	1.50	1.30	1.20	1.00
	HP	0.20	0.23	0.30	0.39	0.55	0.65	0.70	0.90
600	GPM	6.30	5.78	5.26	4.74	4.22	3.95	3.50	3.10
	HP	0.25	0.30	0.40	0.65	0.75	0.95	1.15	1.40
800	GPM	8.58	8.18	7.78	7.38	6.98	6.57	6.40	6.20
	HP	0.30	0.40	0.58	0.85	0.93	1.15	1.40	1.70
1000	GPM	10.90	10.51	10.12	9.72	9.33	8.93	8.00	7.90
	HP	0.40	0.60	0.70	0.90	1.10	1.38	1.60	1.92
1200	GPM	13.33	12.94	12.55	12.16	11.76	11.37	11.20	11.10
	HP	0.50	0.70	0.85	1.08	1.35	1.65	1.90	2.20
1600	GPM	18.17	17.79	17.41	17.03	16.65	16.28	16.10	16.00
	HP	0.70	0.91	1.20	1.50	1.80	2.14	2.50	2.90
1725	GPM	19.85	19.48	19.11	18.74	18.37	18.00	17.70	17.40
	HP	0.80	1.10	1.42	1.85	2.18	2.65	3.00	3.60

UP TO 23 GPM, 100 PSI (150 PSI Intermittent)

- Temperatures to 400° F
- Bronze Housing
- Seal Options: standard or Teflon packing, Buna or Viton lip seal, Buna, Viton or Teflon mechanical seal
- Optional relief valve
- See page 77, N990 Series, for motor mount version

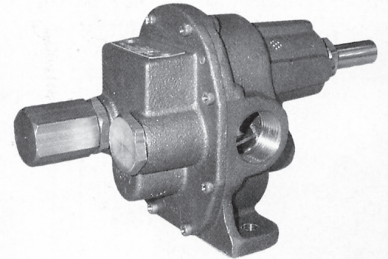
R.P.M.	FT.HD. P.S.I.	0	46	92	138	184	231	290	346
		0	20	40	60	80	100	125*	150*
400	GPM	5.00	4.49	3.99	3.48	2.98	2.48	2.05	1.60
	HP	0.25	0.33	0.40	0.50	0.65	0.75	1.00	1.25
600	GPM	7.50	7.08	6.65	6.23	5.80	5.38	4.90	4.05
	HP	0.35	0.40	0.55	0.75	0.90	1.10	1.32	1.60
800	GPM	10.17	9.82	9.47	9.12	8.77	8.41	7.80	7.30
	HP	0.40	0.60	0.70	1.00	1.15	1.40	1.75	2.05
1000	GPM	13.00	12.65	12.30	11.94	11.58	11.22	10.40	9.90
	HP	0.50	0.70	0.90	1.20	1.45	1.72	2.10	2.50
1200	GPM	16.00	15.67	15.34	15.00	14.67	14.33	13.60	13.00
	HP	0.60	0.80	1.14	1.45	1.85	2.20	2.70	3.20
1600	GPM	21.50	21.12	20.74	20.35	19.97	19.58	18.70	18.00
	HP	0.80	1.70	1.38	1.70	2.03	2.41	2.90	3.40
1725	GPM	23.33	22.93	22.52	22.11	21.71	21.30	20.50	20.10
	HP	0.90	1.19	1.53	1.92	2.25	2.70	3.15	3.70

OBERDORFER



N7000 (3/4" Ports)

OBERDORFER



N9000 (1" Ports)

CIVIL SERVANT

“One of the lesser-known figures of American history is Wilmer McLean, a Virginia farmer who took little interest in politics.

“In 1861, most of the Rebel army marched onto McLean’s land. The Union forces attempted to bar their way, and the first full-scale battle of the Civil War (Battle of Bull Run), got underway-right on his farm. Thirteen months later, it happened again. The second battle at Bull Run destroyed McLean’s land. McLean had had enough. He packed his wagons and moved two hundred miles away from the war.

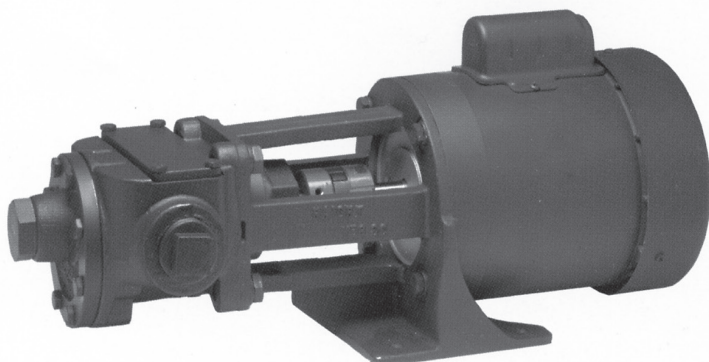
“Three years later, in a weird twist of fate, two men confronted each other in Wilmer McLean’s parlor. These two men talked and signed a document on McLean’s best table; for he had moved to a little village called Appomattox Court House-where Robert E. Lee and Ulysses S. Grant negotiated the end of the Civil War.” **-Ripley’s Believe It or Not**

Haight Pumps

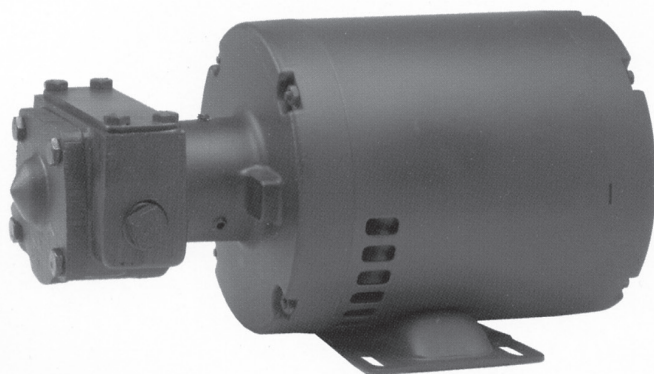
WHY HAIGHT?



Close-Coupled, Footed Motor



Close Coupled, Footed Bracket



Hub Mount

Haight Pump is proud to introduce our newest generation of *Pumps that Perform*, continuing our 70 year old tradition, of supplying our customers with Rugged, Reliable, and Innovative Pumps. We have coupled the best features of our proven Series D and DR pump models with a new robust, and flexible housing design. The Series U pumps incorporate our innovative UniverSeal shaft seal design, and a bolt-on Relief Valve into a single housing. Combining these two design concepts establishes a modular pump design, which offers pump users the ability to easily and effectively adapt their pumping equipment to meet the changing requirements of their process system.

Both rotating parts are hydraulically balanced along the shaft axes, eliminating the need to adjust end plates. The gear within a gear design doesn't subject the rotating members to overhung load problems, allows for fluid feed on both sides of the gears, and functions as an internal gear reducer slowing down the larger rotating gear. These features result in reduced wear, less maintenance, compact size and lower noise.

PUMPS THAT PERFORM. PUMPS THAT FIT.

Today's complex processing environment demands greater integration of equipment and application. Haight is recognized as a leading manufacturer of high quality rotary gear, positive displacement pumps for use in a broad variety applications. As a member of the Baker Manufacturing family, our customers benefit from our:

- metallurgical expertise
- high tech foundry
- premier research and development capabilities
- our extensive technical knowledge of pump applications.

Now, more than ever, we can offer you a customized response to both:

- your operational needs
- cost requirements.

Haight's heavy-duty, positive displacement rotary gear pumps are truly "pumps that perform." All of our engineering, manufacturing, and application skills are focused on the development, production, and sales of dependable, versatile, and quiet products designed to meet the needs of our customers. The most reliable of today's rotary gear pumps are built on the "gear within the gear" principle that Haight pioneered.

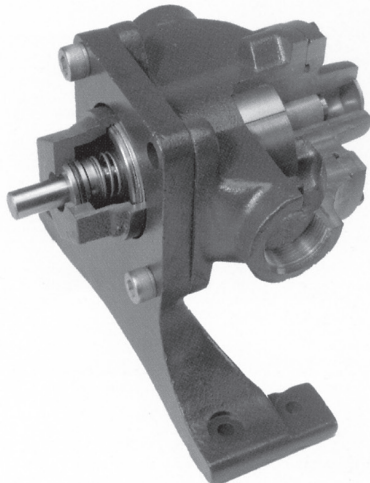
Series U - Universal Pumps

The Universal Pump Design combines the innovation of our UniverSeal shaft seal, the rugged simplicity of Haight's proven "gear within a gear" internal gear configuration, with the flexibility of a bolt-on, integral Relief Valve assembly. This combination of pump features offers pump users unsurpassed flexibility to adapt their pumps to changing system requirements.

Universal Relief Valve - the relief valve assembly can be added at any time, in the field, with no special tools. The valve can function in either the return to suction mode, or return to tank mode. Available with three different tension springs, the relief valve operates smoothly and effectively over a broad range of setting values.

"Gear within a gear" Internal gear design - For nearly seventy years, this design has demonstrated its effectiveness in handling a broad range of applications while operating at standard motor speeds, and reducing wear. Both of these operating characteristics play an important role in minimizing overall capital investment, and operating expenses.

Our UniverSeal shaft seal configuration represents a significant advance in gear pump design. The UniverSeal incorporates standard, easily available seal components with a readily adaptable pump geometry. The pump can be easily converted in the field from Lip to Mechanical to Packed Gland shaft seal type without even disconnecting the piping. Flow direction in the pump can also be changed without disrupting the attached piping, or special tools.



UniverSeal Pump with H182S bracket

All UniverSeal Shaft Seal Pumps features:

- reduce maintenance expenses - simple, quick seal changes
- less production disruption and downtime - perform maintenance in place rather than in the shop
- reduce maintenance inventory - one pump can be adapted to meet many application requirements
- provide future adaptability - easily change the pump as your needs change
- reduce replacement parts costs, no special custom design parts
- interchangeable with existing Haight pumps without modification
- pumps specified with an integral relief valve can be quickly and easily changed to perform in either suction return, or tank return mode. The relief valve can be readily changed to operate in either clockwise or counterclockwise flow direction.

*Simple ideas . . .
. . . Great results*

**NEW STANDARD MATERIAL OF
CONSTRUCTION IS NOW DUCTILE
IRON**

Haight Pumps

HAIGHT FITS THESE APPLICATIONS TO COMPLETE SOLUTIONS

	Industries & Applications	Liquids Pumped (2)	Features
Standard Iron	Petroleum Products • Machine Manufacturing • Machine Tools • Crane • Speed Reducers • Hydraulic Equipment • Lubrication Systems • Diesel Engines • Food Processing • Restaurant Equipment • Misc. Chemical, Glue & Ink • Soap and Detergent Products • Drug • Building & Highway Contractors • Paper Products • Automotive • Shipbuilding • Beverage • Aircraft • Mining • Misc. Manufacturers • Primary Metal • Electrical Equipment & Supplies.	Fuel oils*, hydrocarbons, lube oils, syrups, diesel fuel, coolants, cooking oils*, wire drawing compounds, hydraulic fluids, quench oils, heat transfer oils*, tar*, ethylene glycol, varnish*, wax*, vegetable oils, detergents, lacquer*, soaps, calibration fluids, glycerin, adhesives*, molasses, transformer oil, ammonia, anhydrous ammonia.	Normal use: Cast iron casing and cover components: steel shaft and pinion gear; high tensile iron rotor; self-lubricating iron bearings; Buna-N lip seals.
Hardened Iron	Building & Highway Contractors • Textile Mill Products • Misc. Converted Paper Products • Printing and Publishing • Chemical • Plastics and Synthetics • Drug—Pharmaceuticals • Paint & Allied Products (Mfg. of paints, varnishes, lacquers & enamels) • Misc. Chemical, Glue & Ink • Soaps & Cleaners • Machine Manufacturing • Beverage.	Acetone*, turpentine*, alcohols (most grades), paints*, asphalt*, jet fuels, asphalt emulsions*, EDM oils, brines*, kerosene, caustics (sodium hydroxide)*, methyl ethyl ketone*, benzene*, latex*, methanol, gasoline, mineral spirits (naphthas), heptane, solvents*, hexane, styrene*, printer's ink*, xylene*, isopropyl acetate*, ethylene acetate*, paper coatings*, toluene*.	Wear resistant: (1) All metal parts in contact with the liquid are hardened by a superior new nitriding process that makes metals tougher. Seals and bearings are the same as standard iron construction.
Corrosion Resistant	Food processing • Chemical • Pharmaceutical • Textile • Plastic • Paint • Tanning • Soap • Rubber • Photographic • Synthetic fibre • Plating.	Acids—concentrated sulfuric, nitric, diluted phosphoric, chromic aqueous, citric aqueous, acetic. Essential oils, syrups, chemicals, vegetable oils, ammonium sulphate, corrosive wax, brines, sodium bicarbonate, sodium hydroxide, plating solutions.	Note: Please see HP500 - FF Pump brochure for information on stainless steel design.

*Although standard or Hatrided iron construction is used for these liquids, we normally recommend alternate seals or bearings due to temperature extremes or liquid compatibility. See listing of alternative seals and bearings on page three.

(1) Normally recommended for abrasive applications or for liquid with little or no lubricity.

(2) Liquids listed above do not include all of those that Haight pumps have been used for, rather, it is a selection of liquids taken from various applications where such pumps are normally used.

John Wooden Quote

Peaks and valleys belong in the Alps, not in the temperament - the emotions - of a leader.

APPLICATION SOLUTIONS BY TYPES OF SYSTEMS

Application Category	Typical Applications	Application Specific Adaptations
Refrigeration Systems	<ul style="list-style-type: none"> • High pressure compressor lubrication • Liquefied refrigerant circulation 	<ul style="list-style-type: none"> • Custom mounting • Contaminated lubricants • High inlet pressures • High pressure/thin fluid conditions • Custom seal configurations
Lubrication Systems	<ul style="list-style-type: none"> • Shipboard systems • Power transmission systems • Conveyor systems • Generator systems • Compressors • CNC machinery • Forming machinery • Lubricant cooling systems 	<ul style="list-style-type: none"> • Corrosion resistant designs • Custom mounting • Special direct drive designs • Double pump designs
Filtration Systems	<ul style="list-style-type: none"> • Electric transformers • Cooking oil • Fuels • Hydraulic fluids • Lubrication products • Machine tool coolants • Process stream by-products 	<ul style="list-style-type: none"> • High inlet vacuum designs • Special seals • Hardened and corrosion resistant construction • High temperature designs • Special pump designs
Fueling	<ul style="list-style-type: none"> • Aircraft refueling systems • Portable refueling systems • Engine or remote mounted fuel systems 	<ul style="list-style-type: none"> • Direct drive • DC drive • Pneumatic drive • Hydraulic drive • Custom mounting • Special sealing designs
Injection Systems	<ul style="list-style-type: none"> • Expandable foams • Resins • Adhesives • Hot tar • Thin film lubrication for metal forming • Agricultural chemicals • Animal feed supplements 	<ul style="list-style-type: none"> • Custom mounting designs • Hardened and corrosion resistant designs • High temperature conditions • Tractor and truck mounted PTO drives
Marine	<ul style="list-style-type: none"> • Main engine and drive train lubrication • Loading and unloading fuel & lubrication products • Salt water wash-down systems • Winch lubrication • Fish processing waste • Bilge scavenging pumps • Aircraft/helicopter refueling systems 	<ul style="list-style-type: none"> • Custom mounting and drive designs • Corrosion resistant materials • Spark resistant construction
Power Transmissions	<ul style="list-style-type: none"> • Gear box bearing and gear lubrication • Transmission lubrication • Drive shaft bearing lubrication • Lubricant cooling systems • Lubricant filtration 	<ul style="list-style-type: none"> • Custom mounting and drive designs
Thermal Processing	<ul style="list-style-type: none"> • High temperature circulation • High temperature filtration 	<ul style="list-style-type: none"> • Special construction features for elevated temperature operations
API Type Application	<ul style="list-style-type: none"> • Tank battery circulation • Sampling systems • LAC systems • Intermediate pressure pipeline transfer 	

Haight Pumps

Distinguishing Pump Characteristics

Standard Pump Attributes

Haight pumps are self-priming and will develop up to 27" of vacuum. NOTE: depending upon actual application conditions, it is sound engineering practice to keep vacuum to a minimum.

Although suction conditions are a factor in determining pump speed, normally for liquids with viscosity's over 2000 SSU, reduced speeds and larger line sizes are recommended to avoid cavitation and diminished pump capacity.

Capacity Range	1 GPM to 80 GPM
Viscosity Range	32 SSU to 500,000 SSU
Pressure Range:	
Non Lubricating	100 PSI
Lubricating	650 PSI*
Temperature Range	-80°F to 620°F*

HAIGHT PUMP - STANDARD OPTIONS

Bearings: Grammix iron bearings are standard. **Following are optional:**

DU - Used mainly for higher pressures (above 100 psi.) or where little lubrication is available.

Carbon Graphite - Standard bearings in corrosion resistant pumps. Used in standard construction for higher temperatures, solvents, or acid pumping when standard bearings aren't compatible.

Bronze - Cost effective self-lubricating material for pressures below 150 PSI.

Seals: Buna-N lip seal is standard.

Following are optional:

Viton Lip Seal - Suitable for temperatures to 400°F and some solvents and acids.

Teflon Packing - Used for higher temperatures and liquids which are not compatible with either Viton or Buna N.

Grafoil Packing - Suitable for use with heat transfer fluids to 585°F.

Mechanical Seals - John Crane type 21 with Buna-N, Viton, EPR, or neoprene elastomers. John Crane type 9 available with Teflon or Kalraz sealing elements for high temperature. Type 2 or Type 2B available for pressures exceeding 250 PSI.*

Mounting Configurations:

bedplate, close-coupled, and hub mount are standard configurations. Special designs available upon request.

Outboard Ball Bearing - Used to provide extra stability for beltdrive or PTO assemblies.

Rotor Gears: Cast iron rotor is standard. **Following is optional:**

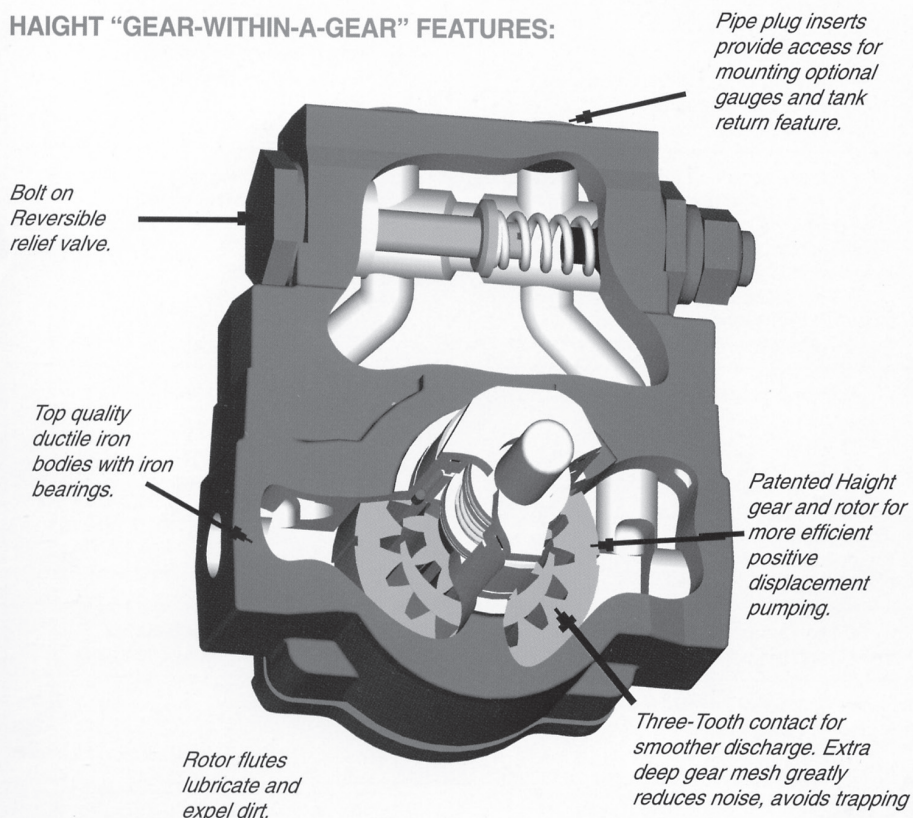
Delrin - Used with non-lubricating liquids, where noise reduction is desirable, or with abrasive fluids as a sacrificial member.

Teflon - Alternative material for highly corrosive liquids which are not compatible with Delrin.

Ni-Resist #2 - Used in standard construction with mildly corrosive liquids.

*High temperature/high pressure applications - require substantially more documentation than normal applications (400°F and/or 150psi). Haight has a number of possible solutions available to meet your specific requirements, which can be easily added to our Universal pump design.

HAIGHT "GEAR-WITHIN-A-GEAR" FEATURES:



Series U - Round Hub

Sizes 1, 3 & 5 gpm Models

Haight offers three sizes of pumps in the round hub U-Series. All sizes are available with an optional bolt-on relief valve which can function in either the return to suction, or return to tank mode.

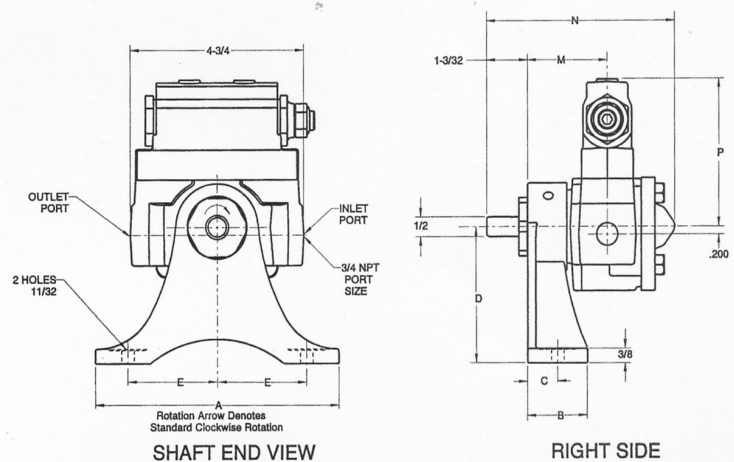
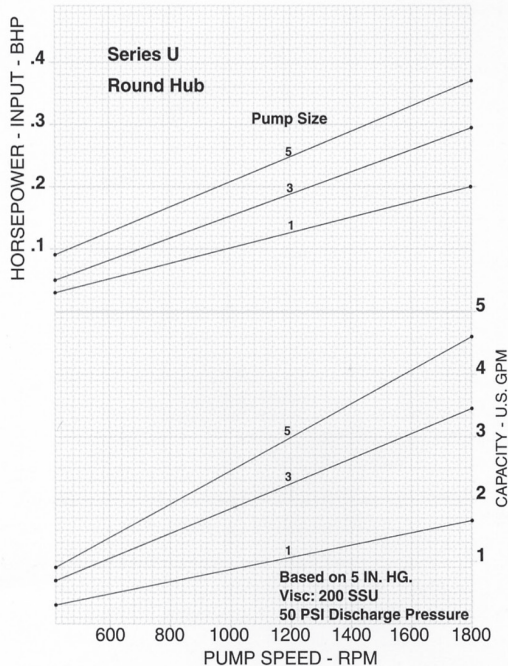
Compact rugged, and easy to maintain, these pumps are ideally suited to close-coupled mounting, or direct mounting to the motor (See pages 13 and 14 for complete dimensional information).

All Series U Round Hub Pumps feature:

- operate at standard motor speeds, eliminating the need for pulleys/gear reducers
- involute gear design offers excellent suction characteristics, minimizes noise and reduces internal bypassing
- self-lubricating gramix iron bearings
- easy to maintain Buna-N lip seals. Installed in the UniverSeal design for simple and quick replacement, or change to alternate seal style.
- optional mounting brackets which are designed for in-line mounting with standard NEMA frame size motors or bedplate mounting.
- optional bearing, rotor and seal materials which allow effective operation up to 620°F and 600 psi.



5U pump with motor



		A	B	C	D	E	M	N	P
Brackets	W48	3 ¹ / ₈	1 ⁷ / ₁₆	2 ³ / ₃₂	3	1			
	E56	6 ¹ / ₂	1 ⁵ / ₈	1 ³ / ₁₆	3 ¹ / ₂	2 ⁷ / ₁₆			
Pumps w/relief valve	1-3U						2 ¹ / ₄	5 ¹ / ₈	3 ³ / ₄
	5U						2 ¹ / ₄	5 ¹ / ₈	3 ³ / ₄
	6U						2 ³ / ₁₆	5 ³ / ₄	4 ¹ / ₁₆
	8U						2 ³ / ₁₆	5 ¹⁵ / ₁₆	4 ¹ / ₁₆

Haight Pumps

Series U - Round Hub

Sizes 6 & 8 gpm Models

Haight offers two additional sizes in our round hub U Series. Both models are available with a bolt-on Relief Valve which can function in either a return to suction, or return to tank mode. Both of these new sizes are interchangeable with the round hub U Series and earlier D & DR Series pumps.

Compact rugged, and easy to maintain, these pumps are ideally suited for close-coupled mounting, or direct mounting to the motor (See pages 13 and 14 for complete dimensional information).

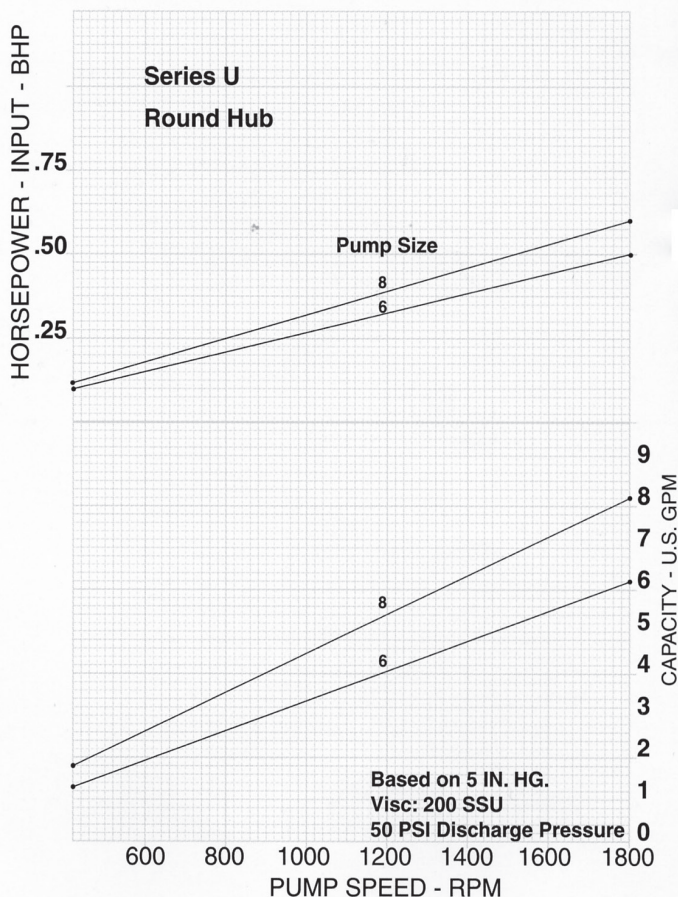
All Series U Round Hub Pumps feature:

- operate at standard motor speeds, eliminating the need for pulleys/gear reducers
- gerotor gear design which offers excellent suction characteristics, and minimizes internal bypassing
- self-lubricating grammix iron bearings
- easy to maintain, buna lip seal installed in the UniverSeal design for simple and quick replacements, or change to an alternate shaft seal type

- optional mounting brackets designed for inline mounting with NEMA frame motors, no shimming or alignment required
- optional bearings, and seal types/materials which allow effective operation up to 620°F and 600 PSI.



6 GPM Pump with round hub mount and motor.
See Page 7 for bracket dimensions.



John Wooden Quote

Adversity is the state in which man mostly easily becomes acquainted with himself, being especially free of admirers then.

Series U - Square Flange

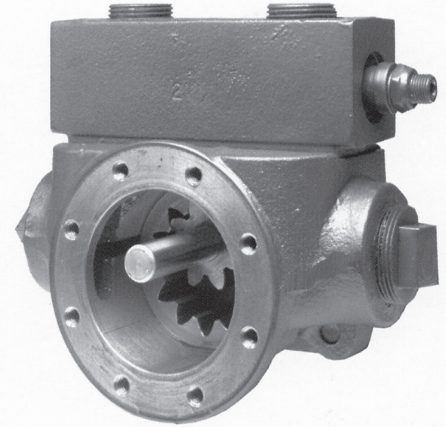
Size 10, 15, 20, 24, 30, & 40 gpm Models

Haight offers six sizes of pumps in the square flange U-Series. All sizes are available with a bolt-on Relief Valve which can function in either a return to suction, or return to tank mode. All U-Series pumps are interchangeable with earlier D & DR Series pumps

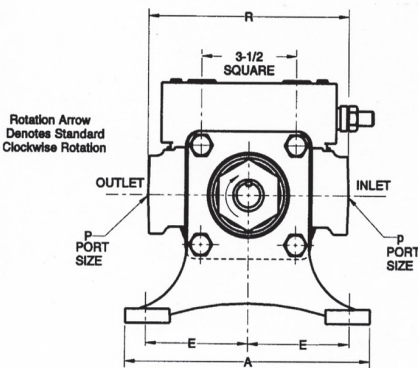
Compact, rugged, and easy to maintain, these pumps are ideally suited to close-coupled mounting to the motor or footed mounting. Haight Pumps bolt-on footed brackets match standard NEMA motor height eliminating pump or motor shim-ming. Each bracket size is designed to align the pump and motor shaft heights without shim blocks. (See pages 8 and 9 for complete dimensional information).

All Series D Square Flange Pumps feature

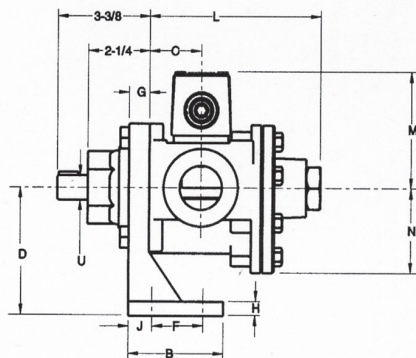
- standard motor speeds, eliminating the need for pulleys or gear reducers.
- involute gear design to minimize noise.
- self-lubricating gramix iron bearings.
- easy to maintain Buna-N lip seals, installed in the UniverSeal design for simple and quick replacements or change to an alternate shaft seal type.
- optional mounting brackets which are designed for in-line mounting with standard NEMA frame size motors.
- optional bearing and seal materials which allow effective operation up to 625° F and 600 psi.
- simple field conversion on relief valve models to tank return mode.
- field reversible seal vent.



24U pump shown with relief valve



SHAFT END VIEW



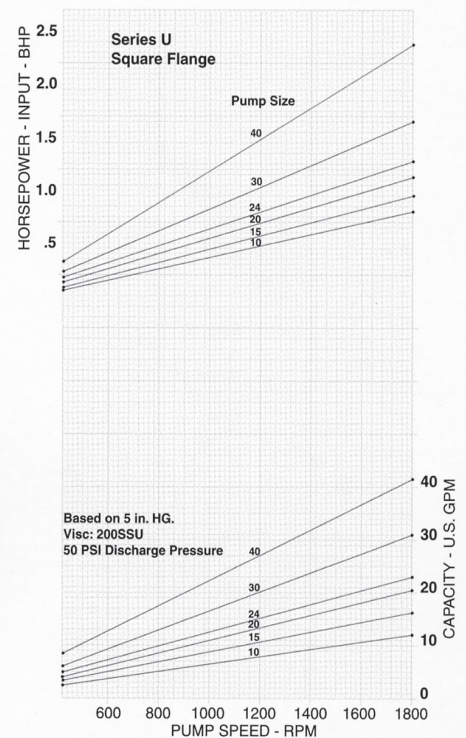
RIGHT SIDE VIEW

Pump

With R.V.	W/O R.V.	P NPT	R	U	C	L	M with R.V.	M w/o R.V.	N
10U	10U	1	7	5/8	1 ¹⁵ / ₁₆	6 ³ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	2 ³ / ₄
15U	15U	1 ¹ / ₄	7	5/8	1 ¹⁵ / ₁₆	6 ³ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	2 ³ / ₄
20U	20U	1 ¹ / ₄	7	5/8	1 ¹⁵ / ₁₆	6 ³ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	2 ³ / ₄
24U	24U	1 ¹ / ₂	7 ³ / ₈	7/8	1 ²⁹ / ₃₂	6 ⁵ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	3
30U	30U	1 ¹ / ₂	7 ³ / ₈	7/8	1 ²⁹ / ₃₂	6 ⁵ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	3
40U	40U	1 ¹ / ₂	7 ³ / ₈	7/8	1 ²⁹ / ₃₂	6 ⁵ / ₁₆	4 ¹ / ₁₆	2 ¹ / ₄	3

Bracket

Size	D	A	B	E	F	H	G	J
H140	3 ¹ / ₂	7	2 ¹ / ₈	2 ³ / ₄	0	1/2	5/8	1 ¹ / ₂
H182	4 ¹ / ₂	9	3 ¹ / ₂	3 ³ / ₄	1 ⁷ / ₈	1/2	3/4	7/8
H213	5 ¹ / ₄	10	3 ¹ / ₂	4 ¹ / ₄	1 ⁷ / ₈	1/2	3/4	7/8
H254	6 ¹ / ₄	12 ¹ / ₈	4 ⁵ / ₈	5	1 ¹ / ₂	1 ¹ / ₁₆	3/4	1 ¹ / ₁₆



Haight Pumps

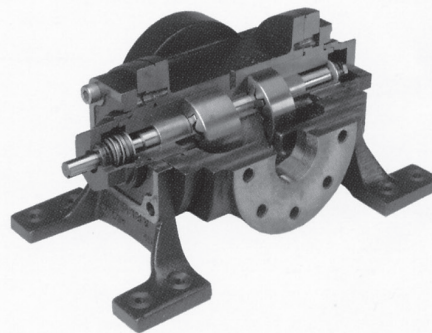
Series D - Double Pumps

Size 44, 54, 60, 70 & 80 gpm Models

Haight offers five sizes of pumps in the Double pump series. Available with a variety of optional seal, bearing and rotor materials. The Double Series offers exceptionally compact design, plus low shear and noise characteristics. Compact, rugged and simple, these pumps are ideally suited for close-coupled mounting, which eliminates the need for expensive gear boxes, and prevents coupling alignment problems.

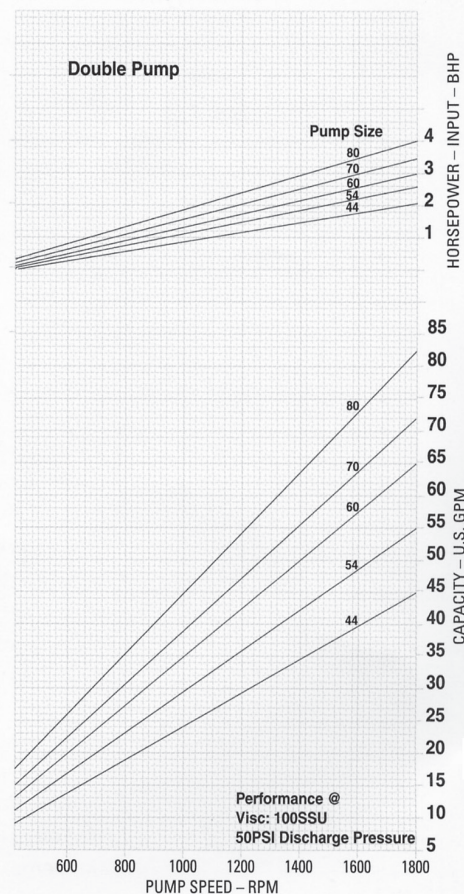
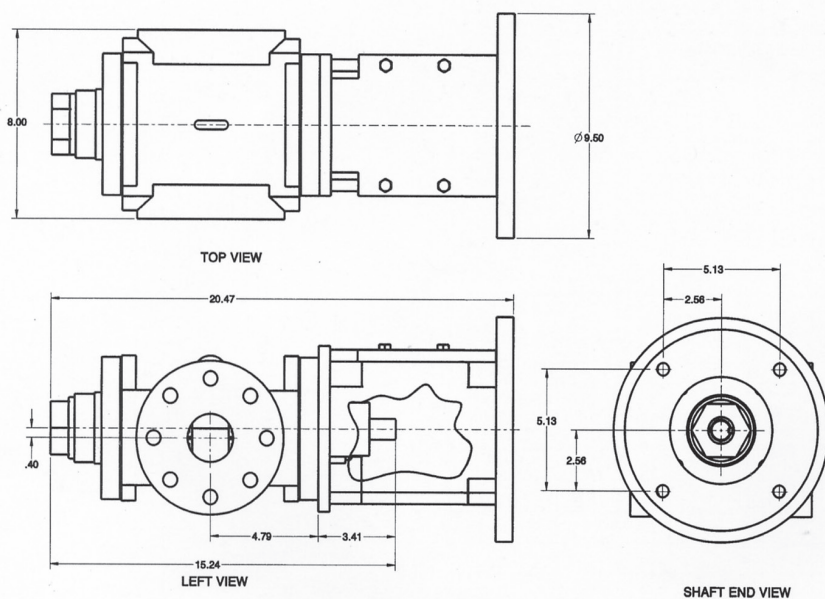
All Series D, Double Pumps feature

- standard motor speeds, eliminating the need for pulleys and gear reducers.
- involute gear design to reduce noise.
- standard UniverSeal shaft design for excellent flexibility.
- close-coupled mounting to eliminate motor and pump difficulty.
- 300# ANSI flange and NPT inlet/outlet connection.
- reversible flow, plus field convertible seal venting.

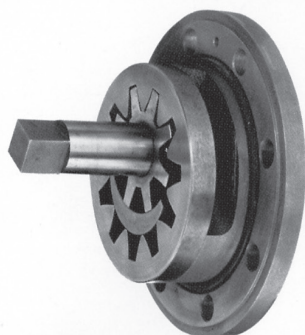


54D Double Pump with a H182 bracket

Haight Double Pump with Z213D Bracket



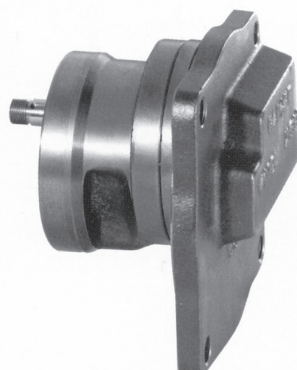
Unique Pump Configurations Developed for OEM Customer Applications



• Series X Skeleton Pumps:

These custom-designed pumps are ideal for built-in lubrication applications on air compressors, gear boxes, engines, and other rotating equipment. Series X pumps feature compactness, positive displacement, through drive and no casing is required.

The Series X Skeleton pump shown is an example of the Haight Pump Division's ability to meet a customer's job specifications and production requirements. Haight engineers will meet with you to determine your specific needs for a non-standard design. They will then translate your needs into a positive displacement pump to meet your requirements.



• Flange Mounted Pumps:

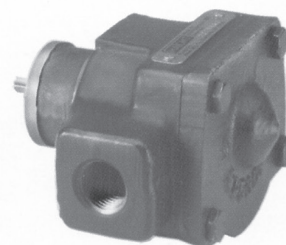
Ideal for use on diesel engines, fuel oil boosters, gear reducers, or for lubricating oil pumps on engines and compressors. Flange mounted pumps are compact, light-weight and designed to mount directly on your equipment.

The flange mounted pump shown was developed for us with a gear reducer. Haight engineers later applied this design principle to fit other customer requirements. When your project plans call for a custom-built positive displacement pump, Haight can analyze your needs and design a pump to meet them.



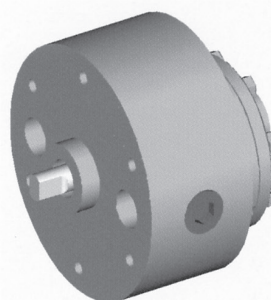
• G - Series:

The G - Series pumps are an affordable, high performance design series which utilizes the dynamic crescent, Gerotor gear configuration. This internal gear configuration offers exceptional suction capability, and compact size at a competitive price. Currently available in two sizes, with limited options, these pumps are physically interchangeable with existing D and E series pumps.



• E - Series:

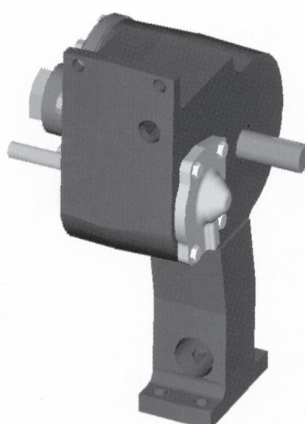
The E - Series pumps are an economical, high performance modification of our proven D-Series model. These pumps are particularly well suited for use in direct drive, hub mounted configurations where size, weight, and cost are crucial performance criteria in an application. The rugged simplicity of the E - Series is proven thousands of times every year in high temperature applications throughout the world. Available with limited option selection, contact your local Distributor for additional information.



3D CAD rendered drawing

•Dual Pumps:

Dual Pumps on a common shaft are available in 15 possible flow combinations, up to 8gpm flow capacity, for each pump. Dual pump designs save valuable space and cost for system designers.



•Dual Drive, Dual Flow Pumps:

Designed to be an integral part of the system it supports, this lubrication pump combines both the pre-lube, and primary lube pump in a single housing. Dual drive shafts, and dual gear sets function on a common inlet and discharge channel, reducing space requirements, simplifying the system piping arrangement, and eliminating alignment problems.

• Encased, Flange Mounted, Reversible Pumps:

These custom pumps provide an enclosed gear set coupled with flange mounted, direct drive design features. System designers save space, weight, and cost by incorporating the pump into their system. The durable and simple internal gear design has been proven to be a reliable system component for nearly 70 years.



3D CAD rendered drawing

Haight Pumps

Working Together To Create Solutions That Exceed Expectations

HOT OIL PUMPS

Are these difficult operating standards for your pump?

- High temperatures
- possible solidification of the fluid at ambient temperatures
- exceptional reliability
- economical price.

They're not difficult standards for Haight Pumps!

We have decades of experience developing and evolving pump and motor combinations that not only survive, but thrive in these difficult applications.

Haight Pumps:

- Reduce time required for either manufacturing or maintenance with simplified pump/piping alignment feature
- Speed up routine inspection procedures with easy cover removal design
- Improve reliability with 100% factory inspection and testing at operating temperature
- Use less valuable equipment space with the compact hub mount design
- Increase employee comfort by reducing ambient noise levels during pump operation
- Improve operating reliability with motors especially designed for this demanding application
- Extend service life and eliminate external piping for continuous operation with an optional internal seal flush design.

PUMPS FOR FILTRATION SYSTEMS

Are contaminated fluids, poor suction conditions, intermittent remote operation, severe usage, and difficult operating environments a problem? Haight Pumps personnel have worked "hand-in-hand" with customers for decades to design, and build pumps that thrive in these challenging conditions.

Haight Pumps:

- Increase pump service life in abrasive applications with optional "Hatrided" or "extra hard" design
- Reduce assembly problems associated with mounting and alignment with our close-coupled mounting design
- Reduce time required for either manufacturing or maintenance with simplified pump/piping feature
- Improve flexibility and versatility with the optional, externally adjustable, internal relief valve.
- Extend service life and eliminate external piping for continuous operation with an optional internal seal flush design
- Reduce maintenance time for seal adjustment and replacement with a screw-on seal casing

Testimonials

"Haight Pump provides us the design flexibility and features we need to meet our customers application demands. They consistently meet our demanding lead-time and delivery requirements."

Harvey R. Schade, President
Como Industrial Equipment, Inc.

"We have been able to develop a product partnership with Haight Pump that truly enhances our ability to compete in the market."

Ted Bethke, Purchasing Manager
Prince Castle, Inc.

"When we needed a completely new pump design Haight Pump delivered! They were able to move from concept development to first prototype in just four weeks. Haight Pump really delivers on their service promise."

Peter Wiegers, Project Engineer
Vilter Manufacturing Corporation

"Haight Pump has been our strategic partner since we started business. They really deliver quality products and superior service."

Mike Pierson, Vice President
General Sales Manager
Beckwith & Kuffel, Inc.

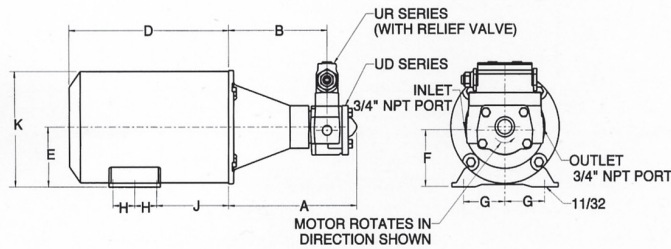
"We rely on the staff at Haight Pump to work closely with our engineering group to develop successful pumping solutions for the extreme applications we regularly encounter."

George McMahon, Director of Engineering
Pitco Frialator, Inc.

Close Coupled Mounting Dimensions

Description: Designed for compactness, these Closed Coupled pumps require less space and have lower overall height. This permits their use in designs where space is at a premium. All Haight Series D Round Hub pumps (described on Pages 7 & 8) and Square Flange Pumps (described on Page 9) are available for close coupling.

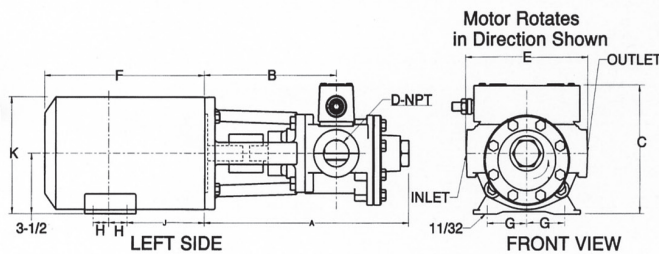
Haight Close Coupled pumps may be used with all NEMA "C" faced motors as shown in the drawings and charts below, "Z" brackets utilize footed motors, "Y" brackets utilize footless motors. Pump, bracket, coupling and electric motor can be furnished. Drip-proof, totally enclosed, wash down duty and explosion-proof motor enclosures are available.



Z56RO Bracket For 1 - 8 gpm Pumps - 56-145 frame footed motor

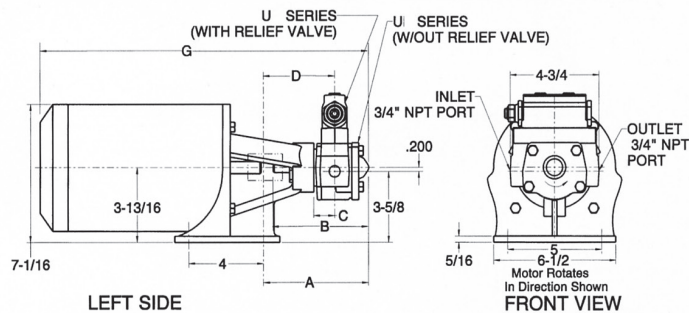
	A	B	D	E	F	G	H	J	K
Model	1U	7 ¹³ / ₁₆	5 ¹⁵ / ₁₆						
	3U	7 ¹³ / ₁₆	5 ¹⁵ / ₁₆						
	5U	8	5 ¹⁵ / ₁₆						
	6U	8 ⁵ / ₁₆	6						
	8U	8 ⁷ / ₁₆	6						
Frame	48		9 ³ / ₈	3	2 ¹³ / ₁₆	2 ¹ / ₈	1 ³ / ₈	2 ⁵ / ₁₆	5 ¹³ / ₁₆
	56		9 ³ / ₄	3 ¹ / ₂	3 ⁵ / ₁₆	2 ⁷ / ₁₆	1 ¹ / ₂	2 ⁹ / ₁₆	6 ³ / ₄

"D" Dimension will vary with motor enclosure



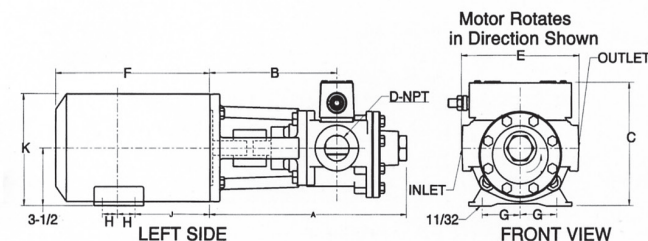
Z56SO Bracket For 10 - 40 gpm Pumps - footed motor

	A	B	C	D	E	F	G	H	J	K
Model	10U	12 ⁵ / ₁₆	8 ¹ / ₈	7 ¹³ / ₃₂	1	7				
	15U	12 ⁵ / ₁₆	8 ¹ / ₈	7 ¹³ / ₃₂	1 ¹ / ₄	7				
	20U	12 ⁵ / ₁₆	8 ¹ / ₈	7 ¹³ / ₃₂	1 ¹ / ₄	7				
	24U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈				
	30U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈				
	40U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈				
Frame	56					9 ³ / ₄	2 ⁷ / ₁₆	1 ¹ / ₂	2 ⁹ / ₁₆	6 ³ / ₄
	143					10	2 ³ / ₄	2	2 ³ / ₄	6 ¹³ / ₁₆
	145					10	2 ³ / ₄	2 ¹ / ₂	2 ³ / ₄	6 ¹³ / ₁₆



Y56R Bracket For 1 - 8 gpm Pumps - 56-145 frame unfooted motor

Model	A	B	C	D	G	
					Motor Frame	
					48	56
1U	5 ⁵ / ₈	5 ¹ / ₈	1 ³ / ₁₆	3 ⁷ / ₈	17 ³ / ₁₆	17 ⁹ / ₁₆
3U	5 ⁵ / ₈	5 ¹ / ₈	1 ³ / ₁₆	3 ⁷ / ₈	17 ³ / ₁₆	17 ⁹ / ₁₆
5U	5 ¹³ / ₁₆	5 ⁵ / ₁₆	1 ³ / ₁₆	3 ⁷ / ₈	17 ³ / ₈	17 ⁷ / ₁₆
6U	6 ¹ / ₄	5 ³ / ₄	1 ¹ / ₈	3 ¹³ / ₁₆	18 ³ / ₁₆	18 ³ / ₁₆
8U	6 ⁷ / ₁₆	5 ¹⁵ / ₁₆	1 ¹ / ₈	3 ¹³ / ₁₆	18	18 ³ / ₈



Y56S Bracket For 10 - 40 gpm Pumps - 56-143 frame unfooted motor

Model	A	B	C	D	E	F	G	H	J	K
10U	12 ⁵ / ₁₆	8 ¹ / ₁₆	7 ¹³ / ₃₂	1	7					
15U	12 ⁵ / ₁₆	8 ¹ / ₁₆	7 ¹³ / ₃₂	1 ¹ / ₄	7					
20U	12 ⁵ / ₁₆	8 ¹ / ₁₆	7 ¹³ / ₃₂	1 ¹ / ₄	7					
24U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈					
30U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈					
40U	12 ⁷ / ₁₆	8 ¹ / ₃₂	7 ¹³ / ₃₂	1 ¹ / ₂	7 ³ / ₈					
Frame										
56						9 ³ / ₄	2 ⁷ / ₁₆	1 ¹ / ₂	2 ⁹ / ₁₆	6 ³ / ₄
143						10	2 ³ / ₄	2	2 ³ / ₄	6 ¹³ / ₁₆
145						10	2 ³ / ₄	2 ¹ / ₂	2 ³ / ₄	6 ¹³ / ₁₆

Haight Pumps

Close Coupled Mounting Dimensions (continued)

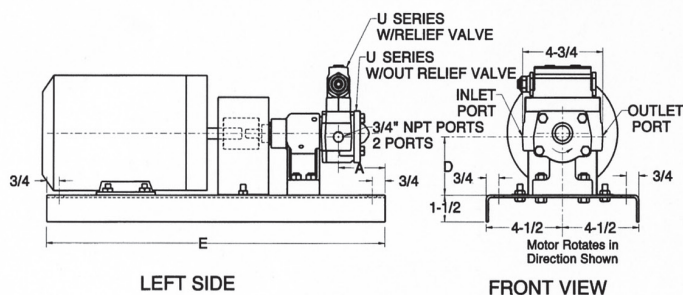
Z182S Bracket - 10-40 gpm Pumps for 182/184 frame footed motors

	A	B	C	L	M	D	G	H	J	K
Model	10U	12 ^{7/8}	8 ^{19/32}	8 ^{7/16}	1	7				
	15U	12 ^{7/8}	8 ^{19/32}	8 ^{7/16}	1 ^{1/4}	7				
	20U	12 ^{7/8}	8 ^{19/32}	8 ^{7/16}	1 ^{1/4}	7				
	24U	13	8 ^{9/16}	8 ^{7/16}	1 ^{1/2}	7 ^{3/8}				
	30U	13	8 ^{9/16}	8 ^{7/16}	1 ^{1/2}	7 ^{3/8}				
	40U	13	8 ^{9/16}	8 ^{7/16}	1 ^{1/2}	7 ^{3/8}				
Frame*	182					*	3 ^{3/4}	2 ^{1/4}	3 ^{1/2}	8 ^{3/4}
	184					*	3 ^{3/4}	2 ^{3/4}	3 ^{1/2}	8 ^{3/4}

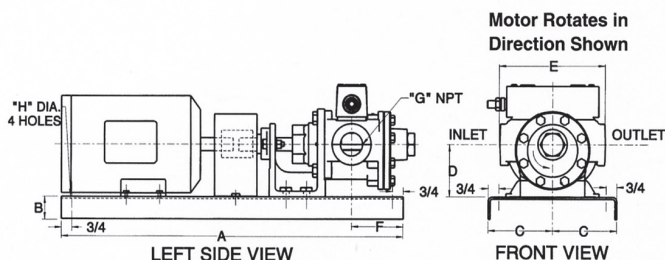
*D Varies with Frame Used

Designed specifically for mounting on bedplate or machinery plate. Motor height brackets eliminate the need for mounting blocks. These pumps are coupled to the motor with flexible couplings. In addition to the flexible coupling, bedplate assemblies include mounting bracket, coupling guard, and rigid steel bedplate. These mountings are available to meet a wide variety of requirements utilizing the Haight pumps described on pages 7, 8, and 9.

Bed Plate Assemblies



Model	Bedplate	Frame	A	D	E
1-5U			2 ^{13/16}		
6 & 8U			2 ^{3/4}		
	S56B	48		3	20
		56, 143		3 ^{1/2}	
		145			
	S140B	182		3 ^{1/2}	24
		184			



Model 10U									
Bedplate	Frame	A	B	C	D	E	F	G	H
S140B	56, 143	24	1 ^{1/2}	4 ^{1/2}	3 ^{1/2}	7	3 ^{7/8}	1	1 ^{7/32}
	145								
S180B	182, 184	26	1 ^{5/8}	5 ^{1/2}	4 ^{1/2}	7	3 ^{7/8}	1	2 ^{1/32}
S213B	213, 215	30	1 ^{5/8}	5 ^{1/2}	5 ^{1/4}	7	3 ^{7/8}	1	2 ^{1/32}

Model 15U - 20U									
Bedplate	Frame	A	B	C	D	E	F	G	H
S140B	56, 143	24	1 ^{1/2}	4 ^{1/2}	3 ^{1/2}	7	3 ^{7/8}	1 ^{1/4}	1 ^{7/32}
	145								
S180B	182, 184	26	1 ^{5/8}	5 ^{1/2}	4 ^{1/2}	7	3 ^{7/8}	1 ^{1/4}	2 ^{1/32}
S213B	213, 215	30	1 ^{5/8}	5 ^{1/2}	5 ^{1/4}	7	3 ^{7/8}	1 ^{1/4}	2 ^{1/32}

Model 24U - 40U									
Bedplate	Frame	A	B	C	D	E	F	G	H
S140B	56, 143	24	1 ^{1/2}	4 ^{1/2}	3 ^{1/2}	7 ^{3/8}	3 ^{5/8}	1 ^{1/2}	1 ^{7/32}
	145								
S180B	182, 184	26	1 ^{5/8}	5 ^{1/2}	4 ^{1/2}	7 ^{3/8}	3 ^{5/8}	1 ^{1/2}	2 ^{1/32}
S213B	213, 215	30	1 ^{5/8}	5 ^{1/2}	5 ^{1/4}	7 ^{3/8}	3 ^{5/8}	1 ^{1/2}	2 ^{1/32}

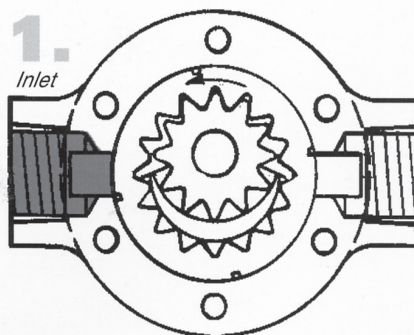
HAIGHT'S UNIQUE "GEAR WITHIN A GEAR" PUMPING PRINCIPLE

The most reliable of today's internal gear pumps are based on the "gear within a gear" principle pioneered Haight Pumps, nearly seventy years ago. While the differences may seem insignificant at first glance, the benefits for the end user are substantial.

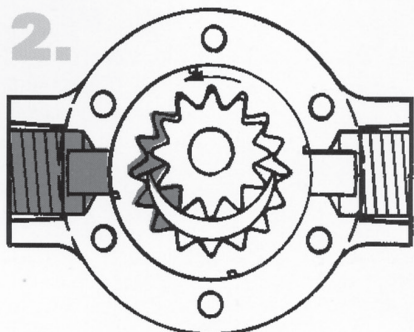
The smaller, inner drive gear (pinion), and shaft assembly are supported by bearings on *both* sides of the pinion to resist movement, unlike other designs. The larger gear (rotor) is hydraulically balanced within the pump housing, finding its optimal position, naturally. The user benefits in several important ways:

- Lower initial investment, Haight pumps operate at standard motor speeds, thus eliminating the need for expensive gear boxes, even for heavier fluids
- Fewer parts and adjustments means less maintenance time, no thrust bearings and end plates to maintain
- Close-coupled motor mounting eliminates pump and motor alignment problems, bedplate installation costs, and they use less space than conventional gear pumps designs
- Because the rotor is rotating at a fraction of the motor speed, wear and noise are reduced, and fluid flow into the gears is more effective. This keeps the pump head size and resulting cost, to a minimum while simultaneously extending the service life of the pump.
- True, three tooth engagement between the rotor and pinion provides superior flow characteristics
- Greater freedom to select the best rotor, pinion, and shaft materials for the individual customer application, without extravagant cost.

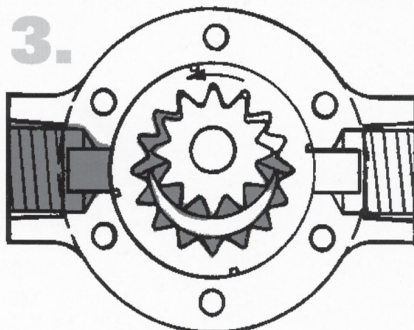
Simple idea, great results!



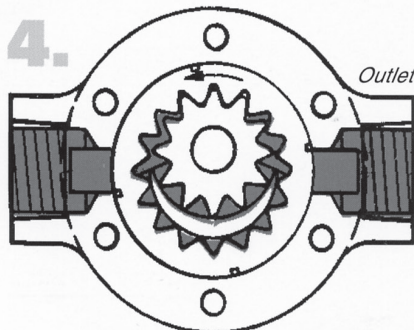
The liquid being pumped (dark blue) enters the pump through the inlet (suction) port. In this example, the inlet (suction) port is on the left.



As the inner (pinion) and outer (rotor) gears rotate, the liquid flows around both sides of the rotor into the gears. The crescent divides this flow and serves as a positive seal between the inlet (suction) and outlet (discharge) ports.



In this illustration, the pump is almost completely filled with the liquid which is about to be discharged through the outlet (discharge) port on the right. Note that the exclusive Haight three-tooth gear contact assures smooth discharge flow.



The pump is now completely filled. The liquid being pumped flows in through the inlet (suction) port, moves through the pump, and leaves through the outlet (discharge) port in a continuous flow.

Super Flow From Superior Pumps

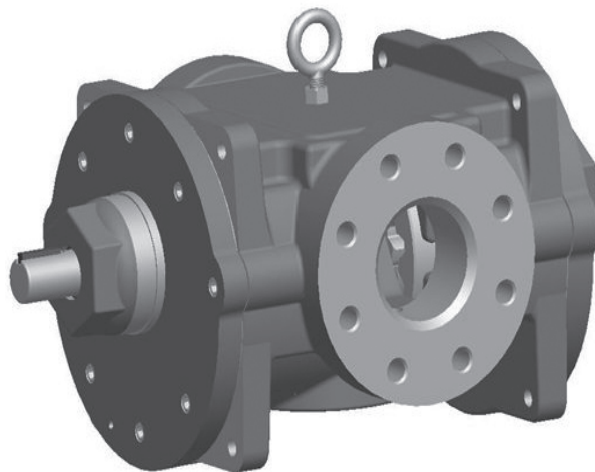
Haight Pump is proud to introduce our newest addition. The “Universeal” design has been extended to handle flow rates from 120 gpm to 400 gpm! Flexible, quick, and incredibly reliable- Haight’s Ductile Iron Unniversal Series Pumps are superior to the rest!

10 sizes ranging from
120gpm to 400 gpm

UniverSeal built in
shaft seal flexibility

Broad range of field
changeable seals

Close coupled design
eliminates shaft
misalignment related
failures



3 inch NPT ports in 120-
240 gpm

4 inch NPT ports in
250-400 gpm

Only two moving parts
reduces wear

“Gear within a Gear”
design for quiet
operation

Standard construction features a ductile iron housing, steel shaft and pinion gears, iron rotor and bearings, with a Buna N lip seal and elastomers. Alternate shaft seal and elastomer options include Neoprene, Silicone, and Teflon.

Application possibilities include: Petroleum products, Lubrication systems, Food processing, Soap and detergent products, Paper products, Shipbuilding, and Mining, among many others.

HAIGHT® PUMPS
DIVISION OF: BAKER MANUFACTURING CO., LLC

*Large
Pumps that Perform*

“The Great Depression, like most other periods of severe unemployment, was produced by government mismanagement rather than by any inherent instability of the private economy.”

“I am favor of cutting taxes under any circumstances and for any excuse, for any reason, whenever it’s possible.”

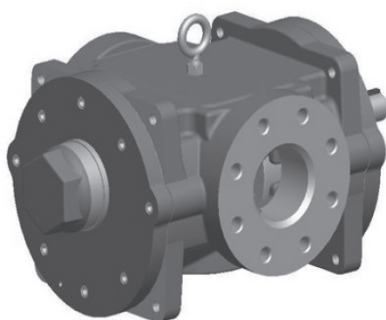
“Most of the energy of political work is devoted to correcting the effects of mismanagement of government.”

— Milton Friedman

**DIU SERIES 120-240 GPM
ROTARY GEAR PUMPS**

The First Release of the New Large Flow DIU Series Pumps

Haight Pump is proud to announce the new large flow DIU series pumps. The "Universal" design has been extended to handle flow rates from 120-240 gpm! Flexible, quick, and incredibly reliable; everything you have come to expect from Haight Pump.



Standard Construction Features:

- Ductile Iron Housing
- Steel Shaft and Pinion Gears
- Iron Rotor and Bearings
- Buna N Lip Seals and Elastomers

Options:

- Alternate Shaft Seal and O-ring Elastomer Materials
– Neoprene, Silicone, Teflon or Viton
- Lip seals
- Type 21, 2B, and 2 mechanical seals
- Venting options include: clockwise, counter-clockwise, and bi-rotational
- Optional Relief Valve

Applications:

- Petroleum Products (fuel transfer/bulk transfer)
- Lubrication Systems • Food Processing • Soap
- Detergent Products • Paper Products • Ship building
- Mining

Key Features:

- ☐ 3 sizes ranging from 120 gpm to 240 gpm
- ☐ Built in Shaft Seal Flexibility
- ☐ Less moving Parts reduces Maintenance and Wear
- ☐ Close Coupled design eliminates shaft mis-alignment and related failures
- ☐ 250 PSI Discharge Pressure Capability
- ☐ 300# ANSI Flange; Inlet & Outlet Ports
- ☐ "Gear within a Gear" design for quiet operation
- ☐ Direct Drive - speeds to 1800 RPM

**NEW Sizes
Now Available**

120 GPM
180 GPM
240 GPM

**Other Sizes
Available**

1 GPM	10 GPM	44 GPM
3 GPM	15 GPM	54 GPM
5 GPM	20 GPM	60 GPM
7 GPM	24 GPM	70 GPM
8 GPM	30 GPM	80 GPM
9 GPM	40 GPM	

APPLICATION SOLUTIONS BY TYPES OF SYSTEMS

Application Category	Typical Applications	Application Specific Adaptations
Refrigeration Systems	<ul style="list-style-type: none"> • High pressure compressor lubrication • Liquefied refrigerant circulation 	<ul style="list-style-type: none"> • Custom mounting • Contaminated lubricants • High inlet pressures • High pressure/thin fluid conditions • Custom seal configurations
Lubrication Systems	<ul style="list-style-type: none"> • Shipboard systems • Power transmission systems • Conveyor systems • Generator systems • Compressors • CNC machinery • Forming machinery • Lubricant cooling systems 	<ul style="list-style-type: none"> • Corrosion resistant designs • Custom mounting • Special direct drive designs • Double pump designs
Filtration Systems	<ul style="list-style-type: none"> • Electric transformers • Cooking oil • Fuels • Hydraulic fluids • Lubrication products • Machine tool coolants • Process stream by-products 	<ul style="list-style-type: none"> • High inlet vacuum designs • Special seals • Hardened and corrosion resistant construction • High temperature designs • Special pump designs
Fueling	<ul style="list-style-type: none"> • Aircraft refueling systems • Portable refueling systems • Engine or remote mounted fuel systems 	<ul style="list-style-type: none"> • Direct drive • DC drive • Pneumatic drive • Hydraulic drive • Custom mounting • Special sealing designs
Injection Systems	<ul style="list-style-type: none"> • Expandable foams • Resins • Adhesives • Hot tar • Thin film lubrication for metal forming • Agricultural chemicals • Animal feed supplements 	<ul style="list-style-type: none"> • Custom mounting designs • Hardened and corrosion resistant designs • High temperature conditions • Tractor and truck mounted PTO drives
Marine	<ul style="list-style-type: none"> • Main engine and drive train lubrication • Loading and unloading fuel & lubrication products • Salt water wash-down systems • Winch lubrication • Fish processing waste • Bilge scavenging pumps • Aircraft/helicopter refueling systems 	<ul style="list-style-type: none"> • Custom mounting and drive designs • Corrosion resistant materials • Spark resistant construction
Power Transmissions	<ul style="list-style-type: none"> • Gear box bearing and gear lubrication • Transmission lubrication • Drive shaft bearing lubrication • Lubricant cooling systems • Lubricant filtration 	<ul style="list-style-type: none"> • Custom mounting and drive designs
Thermal Processing	<ul style="list-style-type: none"> • High temperature circulation • High temperature filtration 	<ul style="list-style-type: none"> • Special construction features for elevated temperature operations
API Type Application	<ul style="list-style-type: none"> • Tank battery circulation • Sampling systems • LAC systems • Intermediate pressure pipeline transfer 	



"The Most Trusted Name In Water"SM

AQ80

The Aqua Genie Constant Pressure Valve



The original residential well, constant pressure valve. When installed in conjunction with any pump & pressure tank, AquaGenie provides constant, steady pressure for your shower, sprinklers, and any other household fixture or appliance that uses water. **AquaGenie eliminates the pressure fluctuations** that are typically associated with pressure tank systems and makes your private well feel like "city water". It is easily retrofittable to existing pump/tank systems.

Features:

- ☐ **Constant pressure** at flow rates of **1/2 GPM or higher**, eliminating the annoying pressure fluctuations common with pump/tank systems.
- ☐ **Pump runs continuously** while service is needed, **eliminating short cycling**, the major cause of motor wear and failure.
- ☐ Handles **flow rates up to 20 gpm**. For flow rates above 20 gpm, AquaGenies may be connected in parallel to handle each 20 gpm increment.
- ☐ **Retrofittable** to any existing pump & pressure tank system.

AQ80

Works at any flow rate **above 1/2 GPM**. **Provides constant pressure** at each specific flow rate delivered by the pump. (Pressure will be slightly different for each flow rate.) A pressure tank is recommended for optimum performance. **Maximum operating pressure: 80 PSI**. (If installed with a submersible pump that develops more than 80 PSI at the inlet of the AQ80, use a pressure regulator to protect the AquaGenie from excessive pressure.)

Ordering Information

Ordering #	Model #	Weight
9198-7321	AQ80	2 lbs.



"The Most Trusted Name In Water"™

AquaGenie 400

Constant Pressure Valve

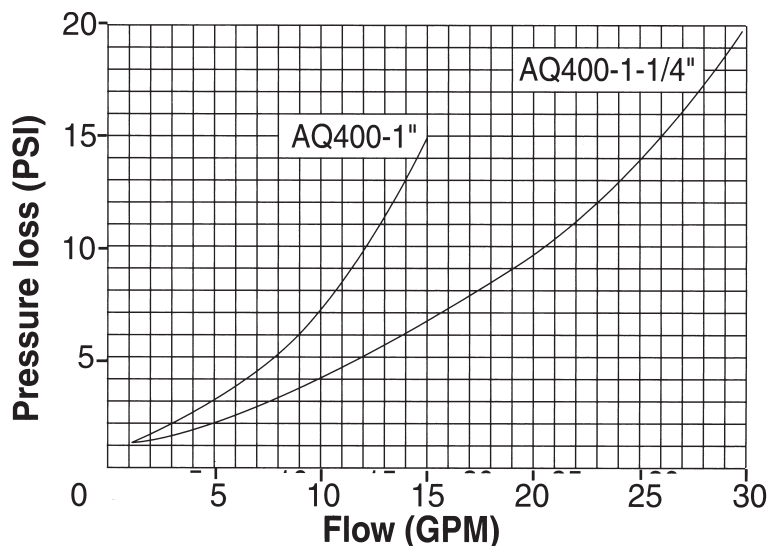


Features:

- ❑ A 5 Year Warranty on the Aqua Genie 400 and newly installed Jacuzzi Water Systems equipment, including the Sandhandler submersible pump, the Sandcatcher sediment filter, and the Aqua-P.O.D.² pressure tank.
- ❑ Constant "City-Like" Water Pressure.
- ❑ Eliminates pressure fluctuations.
- ❑ Easy installation into most new and existing pump/tank systems.
- ❑ Reduces pump cycling and extends motor life.

ORDERING INFORMATION

ORDER NO.	MODEL NO.	INLET	OUTLET	TANK CONN	Max. Inlet Press.	Preset Outlet Press.	Min./ Max. Press.	Min. Flow (GPM)	Max Flow (GPM)
9198-4007	AQ400-1	1" NPT	1" NPT	3/4" NPT	400psi	50psi	30-75psi	3/4	15
9198-4010	AQ400-1-1/4	1-1/4" NPT	1-1/4" NPT	1" NPT	400psi	50psi	30-75psi	3/4	30



The Aqua Genie, Aqua Genie Kits, and Systems

AQ 80 & AQ 200



AQ80

Provides constant pressure at any given flow rate above 1/2 GPM. As flow rate changes, the pressure changes with the pump curve and then holds constant at new flow rate. Maximum incoming pressure of 80 PSI. Small storage tank required. AQ80/AP-6i includes storage tank and pressure switch. Important: AQ80 is recommended for jet pump applications.

Ordering No.	Model No.	Weight
9198-7032	AQ80/AP-6i	10
9198-7041	AQ200/AP-6i	13
9198-7321	AQ80	2
9198-1431	A0200	5
9102-5218	A080/5CY/AP-6i	
9102-5526	A0200/5RP2/AP-6i	

The original constant pressure home water system device. The Aqua-Genie is an ideal system for providing fresh water reliably and under constant pressure. The AquaGenie operates on demand of 112 GPM or higher, making it economical while providing consistent service pressure that is comparable to municipal water supplies.

FEATURES

- **Less costly** than typical tank system.
- **Constant pressure at flow rates** of 1/2 gpm or higher.
- **Starts pump on demand and runs continuously as long as service is needed**, eliminating short cycling which is the major cause of motor wear and failure.
- **Provides fresh water at all times**, eliminating flat, stale-tasting water that may occur with large tank systems.
- **Small size** allows for installation in tight areas.
- **Systems** include AquaGenie valve, tank, and jet pump.

A0200

Provides constant pressure at all flow rates above 1/2 GPM. As flow rate changes, the pressure remains constant. Maximum incoming pressure of 200 PSI. Installed system must be capable of at least 75 PSI shut-off pressure. Small storage tank required. **AQ200** consists of constant pressure device AND a pressure regulator. AQ200 is factory set at 50 PSI service pressure and is adjustable between 30 and 60 PSI.

Important: AQ200 is recommended for submersible applications. AQ200/AP-6i kit includes storage tank.

NOTE: AquaGenies can be connected in parallel to handle flow rates above 20GPM.

FLEXCON QUALITY AND PERFORMANCE AT A **COMPETITIVE** PRICE.

[**NOW AVAILABLE IN ALMOND AND TRADITIONAL BLUE**]

©2009 Flexcon Industries

16 gauge solid steel tank, finished with highest quality urethane paint.

Water chamber is independent of tank walls, allowing diaphragms to be sized properly for each tank.

Steel clench ring regulates movement and prevents diaphragm from rubbing against tank wall.

Condensation reducing design virtually eliminates external corrosion.

Patented, welded, steel water connection has separate air and water seals.



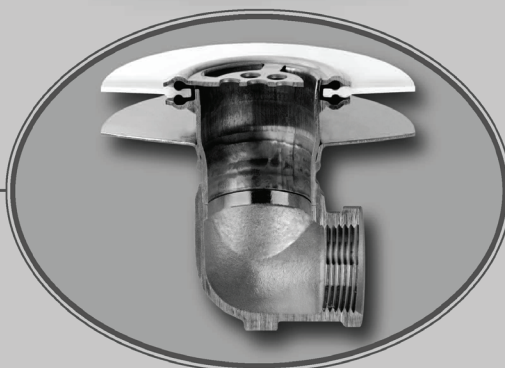
Engineered with contractors' needs in mind, the Challenger water tank delivers CAD technology (Flexcon's famous controlled action diaphragm system) at a very affordable price. In short, you get superior air and water separation and unmatched performance.

Our patented manufacturing technique allows Flexcon to properly size the diaphragm in

**CONTROLLED
ACTION
DIAPHRAGM
MAXIMIZES
DRAWDOWN &
ELIMINATES
ABRASION**

a full range of sizes from 14 to 119 gallons. Every Challenger tank undergoes a seam-weld test, high-pressure test, and is subjected to our famous helium test. Before leaving the factory, a final air charge check insures each tank arrives at the job site with the correct pre-charge.

Flexcon stands behind every Challenger tank with a five-year warranty. Just what you would expect from Flexcon: quality and performance, guaranteed!

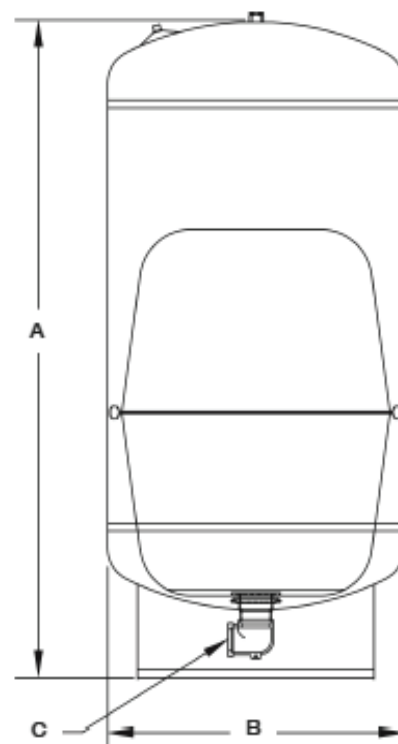


**FLEXCON
INDUSTRIES**
The Reliable Source®



MATERIALS OF CONSTRUCTION

- **Tank:** 16 gauge cold rolled steel
- **Finish:** Appliance quality paint for indoor or outdoor installation
- **Water chambers:** Top chamber is 100% butyl rubber, lower water chamber is copolymer polypropylene
- **Connection:** Welded steel NPT thread
- **Testing:** High pressure, seam weld, helium, final precharge check
- **Air valve:** Brass valve with o-ring seal
- **Warranty:** Five year



DIMENSIONS & CAPACITIES

Model [PC-TRADITIONAL BLUE] [PCA-ALMOND]	Total Tank Volume		A Height		B Diameter		C Connection	Total Weight	
	gal	liters	in	cm	in	cm		lbs	kilos
PC/PCA 44	14	60	22	55.88	16	40.64	1" NPT	28.0	12.7
PC/PCA 66	20	80	29	73.66	16	40.64	1" NPT	36.0	16.3
PC/PCA 88	26	100	34.5	87.63	16	40.64	1" NPT	41.0	18.6
PC/PCA 111	32	120	27.75	70.48	21	53.34	1 1/4" NPT	54.0	24.5
PC/PCA 122	33.4	130	42.75	108.58	16	40.64	1" NPT	49.0	22.2
PC/PCA 144	44	170	36.25	92.07	21	53.34	1 1/4" NPT	67.0	30.4
PC/PCA 211	62	240	48	121.92	21	53.34	1 1/4" NPT	82.0	37.2
PC/PCA 244	81	310	62	157.48	21	53.34	1 1/4" NPT	99.0	44.9
PC/PCA 266	85	325	44.5	113.03	26	66.04	1 1/4" NPT	121.0	54.9
PC/PCA 366	119	450	59.75	150.49	26	66.04	1 1/4" NPT	153.0	69.5

Maximum working pressure 125 psig. Maximum working temperature, internal & external 140° F. Tank pre-charge 38 psig.

QUICK SIZING CHART

Model [PC-TRADITIONAL BLUE] [PCA-ALMOND]	Total Tank Volume		Total Drawdown*					
	gal	liters	20/40		30/50		40/60	
	gal	liters	gal	liters	gal	liters	gal	liters
PC/PCA 44	14	60	5.6	21.4	4.8	18.1	4.1	15.6
PC/PCA 66	20	80	8.1	30.5	6.8	25.8	5.9	22.3
PC/PCA 88	26	100	10.5	39.7	8.9	33.6	7.7	29.0
PC/PCA 111	32	120	12.9	48.8	10.9	41.3	9.4	35.7
PC/PCA 122	33.4	130	13.3	50.3	11.3	42.6	9.7	36.8
PC/PCA 144	44	170	17.7	67.1	15.0	56.8	13.0	49.1
PC/PCA 211	62	240	25.0	94.6	21.1	80.0	18.3	69.2
PC/PCA 244	81	310	32.6	123.6	27.6	104.5	23.9	90.4
PC/PCA 266	85	325	34.3	129.7	29.0	109.7	25.1	94.9
PC/PCA 366	119	450	48.0	181.5	40.6	153.6	35.1	132.9

*Total drawdown assumes tank pre-charge set at 2 psi below cut-in pressure. Drawdown can be affected by many factors, including temperature, pressure, and elevation.





Jet Rite 2 Series

Big Performance in a Small Package!

- Stainless Steel Water Connection
- Virgin Polypropylene Liner
- 100% Butyl Diaphragm
- Appliance Quality Paint Finish
- Brass Air Stem
- Comprehensive Testing

Jet Rite 2 tanks are ideally suited for irrigation applications, booster systems, shallow jet pumps and centrifugal pump configurations. The Jet Rite 2 series is constructed with a single butyl diaphragm and polypropylene liner assembly that completely contains drawdown water. The diaphragm is constructed with an FDA approved, high-grade butyl rubber compound.

Jet Rite 2 tanks are made with a stainless steel system connection, are available in vertical and horizontal models and are finished with an appliance quality paint especially suited for outdoor installations.

Jet Rite 2 tanks are quality tested at several stages on the production line to insure the structural integrity of every tank.





Specifications

Jet-Rite 2 Series - Inline Models

Model #'s	Diameter		Dimensions Height/Length		System Connect.	Volume		Shipping (Box) Volume		Shipping (Box) Weight	
	in.	cm.	in.	cm.		gal.	liter	cu. ft.	cu. m.	lbs.	kilos
PJR-6	8.0	20	12.0	30	3/4"	2.1	8	0.50	0.02	5.0	2.3
PJR-15	11.0	28	14.5	37	3/4"	4.8	18	1.10	0.03	10.0	4.6
PJR-25	12.5	32	20.0	51	3/4"	8.5	32	2.50	0.07	13.0	6.9
PJR-44IL	15.3	39	19.75	50	1"	14.0	53	3.03	0.09	23.3	10.6

Jet-Rite 2 Series - Horizontal Models

Model #'s	Diameter		Dimensions Height/Length		System Connect.	Volume		Shipping (Box) Volume		Shipping (Box) Weight	
	in.	cm.	in.	cm.		gal.	liter	cu. ft.	cu. m.	lbs.	kilos
PJR-20S	11.4	28.9	17.5	44.4	3/4"	5.3	20	1.5	0.04	13.3	6.0
PJR-25S	12.5	31.7	17.0	43.2	3/4"	8.5	32	2.5	0.07	13.0	6.9
PJR-44S	16.3	41.4	20.8	52.8	1"	14.0	53	3.9	0.11	27.0	12.3
PJR-66S	16.3	41.4	28.5	72.4	1"	20.0	80	4.5	0.13	38.0	17.2

All Models: 28 psi/1.9 bar pre-charge
 Maximum working pressure: All models – 125psi/8.5 bar
 Maximum working temperature: All models – 140°F/60°Celsius

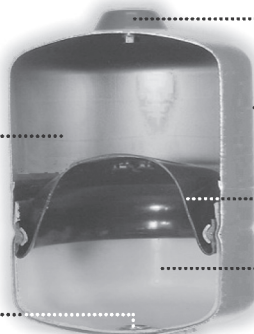
Quick Sizing Chart

Model #'s	Total Tank Volume		Drawdown					
			@20/40		@30/50		@40/60	
	gal.	liters	gal.	liters	gal.	liters	gal.	liters
PJR-6	2.1	8	0.8	2.9	0.7	2.5	0.6	2.1
PJR-15	4.8	18	1.7	6.6	1.5	5.6	1.3	4.8
PJR-20S	5.3	20	1.9	7.3	1.6	6.2	1.4	5.4
PJR-25 (S)	8.5	32	3.1	11.7	2.6	9.8	2.3	8.7
PJR-44 (S)	14.0	53	5.1	19.3	4.3	16.4	3.8	14.2
PJR-60S	20.0	80	7.6	28.8	6.5	24.8	5.5	20.8
PJR-44IL	14.0	53	5.1	19.3	4.3	16.4	3.8	14.2



Deep Drawn Steel
Dome Construction

Stainless Steel
Water
Connection



..... Brass Air Stem with
Corrosion-Resistant Cap

..... Appliance Quality Paint Finish
Suitable for Outdoor
Installations

..... High Grade Butyl Diaphragm

..... Polypropylene liner
water chamber



Non-Submersible Pumps



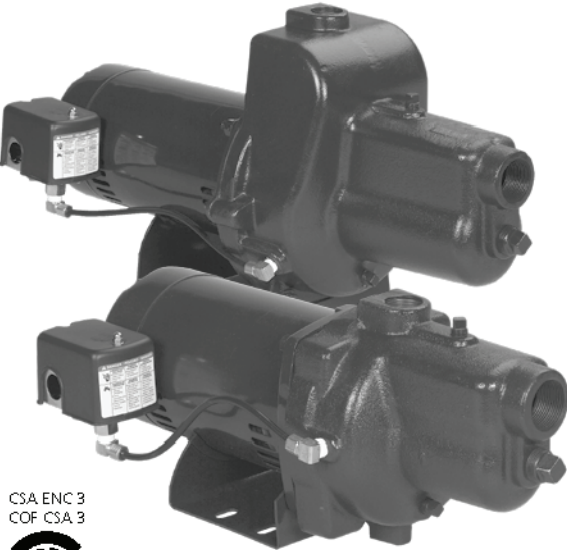
Jet Pumps - Shallow Well VersaJet

J-CLASS VersaJet

Features:

- Impeller with stainless steel insert, diffuser, jet nozzle and venturi are all molded with Noryl®. Noryl® thermoplastic is a proven dependable material known for its properties to increase efficiency and hydraulic performance.
- Heavy-duty cast iron case ensures optimum durability and long life
- Floating stainless steel eye seal for maximum performance and efficiency
- Powered by a high quality, industry proven, UL778 approved indoor/outdoor motor from A.O. Smith
- Revolutionary Patent Pending "Quick-Change" jet nozzle replacement system allows easy customization of the pump. Performance can be changed quickly from a high pressure to a high flow set-up without removing the plumbing or opening the case.
- Dual voltage motor can be set to run at either 115V or 230V
- Pressure switch is installed and set at 30/50 psi
- Built-in drain plug for easy winterizing and servicing
- Handles water temperatures up to 120 °F/49 °C and shut-off pressures up to 90 psi
- 1" NPT discharge, 1-1/4" NPT suction
- UL778 approved for indoor or outdoor use

Noryl® is a registered trademark of G.E.



CSA ENC 3
COF CSA 3



*Revolutionary Patent Pending
"Quick-Change" Jet Nozzle*

Ordering Information:

MODEL	HP	SUCTION x DISCHARGE	VOLTAGE	PUMP UNIT	
				ORDER NO.	WT.
JVJ05CI	1/2	1-1/4" x 1"	115/230	91160005	31
JVJ07CI	3/4	1-1/4" x 1"	115/230	91160007	34
JVJ1CI	1	1-1/4" x 1"	115/230	91160010	51
JVJ15CI	1.5	1-1/4" x 1"	115/230	91160015	56

Note: All weights in pounds.

Non-Submersible Pumps

Jet Pumps - Shallow Well VersaJet



Performance Chart:

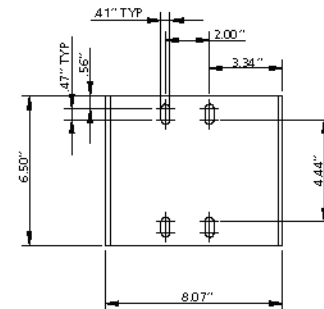
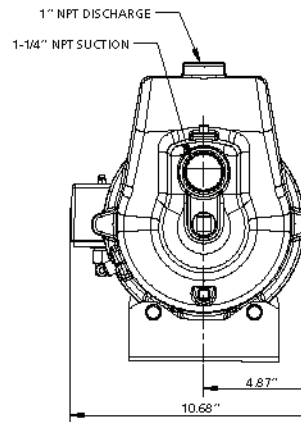
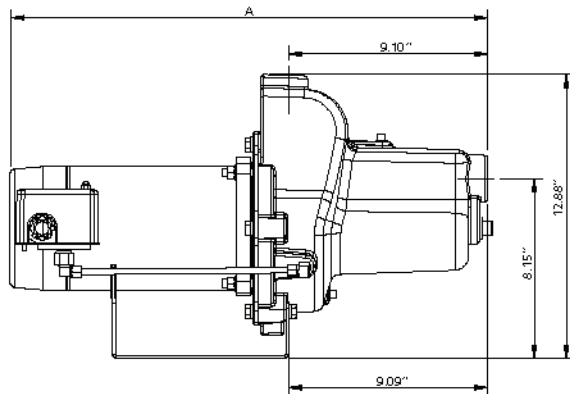
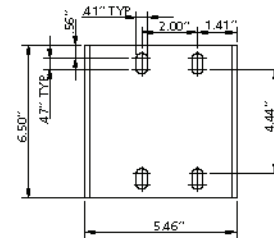
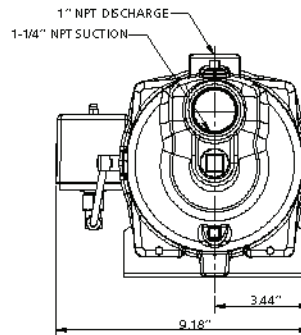
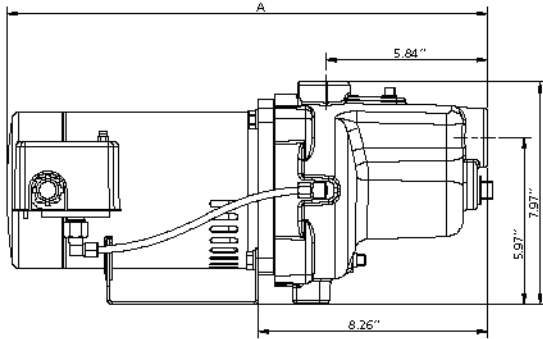
VJ 1.25" SUCTION 1" DISCHARGE			DISCHARGE PRESSURE - PSI						SHUT-OFF PRESSURE PSI
			10	20	30	40	50	60	
MODEL	NOZZLE	TOTAL SUCTION LIFT FT.	GALLONS PER MINUTE						
JVJ05CI	Nozzle B (Standard)	5	10.8	10.5	10.1	8.5	4.9	2.1	70
		10	9.4	9.1	8.7	7.5	4.1	1.6	
		15	8.0	7.7	7.4	6.5	3.4	1.1	
		20	6.2	6.0	5.7	5.3	2.6	0.5	
		25	4.4	4.3	4.1	4.0	1.8	-	
	Nozzle C (High Pressure)	5	9.8	8.9	8.3	7.6	6.3	4.0	86
		10	8.3	7.5	7.1	6.6	5.7	3.5	
		15	6.8	6.2	5.9	5.7	5.1	3.0	
		20	5.3	5.0	4.8	4.6	4.3	2.6	
		25	3.8	3.8	3.7	3.6	3.5	2.2	
	Nozzle A (High Flow)	5	12.8	12.5	12.1	5.2	-	-	47
		10	11.4	11.1	10.8	3.6	-	-	
		15	10.0	9.8	9.6	1.9	-	-	
		20	8.0	7.7	6.8	1.0	-	-	
		25	6.0	5.7	4.1	-	-	-	
	JVJ07CI	Nozzle C (Standard)	5	16.3	15.6	15.1	14.1	9.0	3.8
10			14.2	13.6	13.1	12.5	7.8	2.9	
15			12.1	11.6	11.2	10.8	6.5	2.0	
20			9.5	9.1	8.9	8.7	5.0	1.0	
25			7.0	6.7	6.7	6.6	3.5	-	
Nozzle D (High Pressure)		5	15.8	15.2	14.7	14.1	9.6	4.8	73
		10	13.9	13.2	12.8	12.4	8.5	3.9	
		15	11.9	11.1	10.8	10.6	7.5	3.0	
		20	9.2	8.8	8.6	8.5	6.2	1.8	
		25	6.5	6.5	6.4	6.4	4.8	0.6	
Nozzle A (High Flow)		5	18.9	18.7	18.4	11.6	-	-	47
		10	16.8	16.6	16.3	8.0	-	-	
		15	14.8	14.5	14.2	4.4	-	-	
		20	11.8	11.6	11.2	2.2	-	-	
		25	8.8	8.7	8.1	-	-	-	
JVJ1CI		Nozzle B (Standard)	5	21.5	21.0	20.7	20.4	12.8	3.9
	10		19.2	18.8	18.5	18.2	11.3	2.0	
	15		16.9	16.6	16.3	16.0	9.7	-	
	20		13.6	13.4	13.2	13.0	7.4	-	
	25		10.4	10.3	10.1	10.0	5.0	-	
	Nozzle C (High Pressure)	5	20.4	19.8	19.4	19.1	14.6	7.7	71
		10	18.1	17.6	17.3	17.1	13.6	6.5	
		15	15.9	15.4	15.2	15.0	12.6	5.2	
		20	12.7	12.4	12.2	12.1	10.8	3.3	
		25	9.5	9.3	9.2	9.1	9.0	1.4	
	Nozzle A (High Flow)	5	23.3	23.0	22.7	20.2	7.6	-	54
		10	20.7	20.3	20.0	17.4	3.8	-	
		15	18.1	17.7	17.3	14.6	-	-	
		20	14.8	14.5	14.2	10.8	-	-	
		25	11.5	11.3	11.1	7.0	-	-	
	JVJ15CI	Nozzle B (Standard)	5	29.0	28.6	28.2	27.8	24.0	11.6
10			25.5	25.0	24.8	24.5	21.2	7.7	
15			21.9	21.5	21.3	21.1	18.5	3.8	
20			17.6	17.2	16.9	16.7	13.8	1.9	
25			13.2	12.9	12.6	12.3	9.2	-	
Nozzle C (High Pressure)		5	28.7	28.2	27.9	27.6	26.8	15.5	72
		10	25.3	24.8	24.4	24.0	23.4	13.3	
		15	21.9	21.4	20.9	20.5	20.1	11.2	
		20	17.4	17.1	16.8	16.6	16.3	7.0	
		25	13.0	12.9	12.7	12.6	12.5	2.8	
Nozzle A (High Flow)		5	30.3	29.9	29.5	29.2	19.5	-	59
		10	26.9	26.6	26.2	25.9	15.9	-	
		15	23.6	23.3	22.9	22.6	12.4	-	
		20	19.0	18.8	18.5	17.9	6.2	-	
		25	14.5	14.3	14.1	13.2	-	-	

Non-Submersible Pumps



Jet Pumps - Shallow Well VersaJet

Dimensions:



VERSAJET PRO DIMENSIONS	
HP	A
1/2	18.00"
3/4	21.78"
1	22.66"

VERSAJET DIMENSIONS	
HP	A
1/2	17.25"
3/4	18.00"
1	21.78"
1.5	22.66"

Note: Dimensions will vary according to motor manufacturer.

Quotes From Milton Friedman

"I think that nothing is so important for freedom as recognizing in the law each individual's natural right to property, and giving individuals a sense that they own something that they're responsible for, that they have control over, and that they can dispose of."

"The Great Depression, like most other periods of severe unemployment, was produced by government mismanagement rather than by any inherent instability of the private economy."

"Nothing is so permanent as a temporary government program."

Non-Submersible Pumps

Jet Pumps - Shallow Well Cyclone Series



J-CLASS

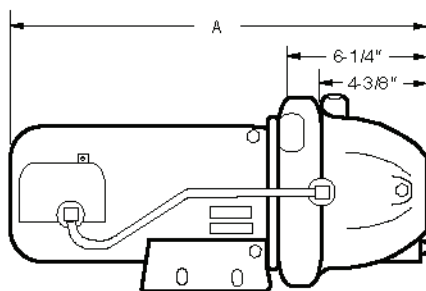
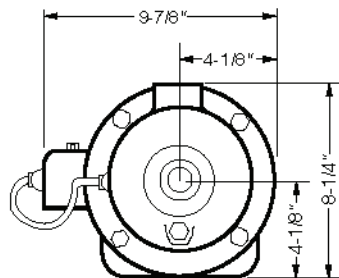
Cyclone Series



NRTL/C
CSA 108
UL 778

Features:

- Available in non-corrosive thermoplastic
- Replaceable in-line nozzle/venturi design for maximum hydraulic efficiency and ease of service
- Self cleaning, anti-clogging injector screen
- Thermoplastic impeller and diffuser ensure increased hydraulic performance
- Floating stainless steel eye seal for maximum performance and efficiency
- Square-flange mounting provides easy serviceability without disturbing the plumbing
- Built-in drain plug for easy winterizing and servicing
- Mechanical shaft seal allows positive protection against leaking
- Order pressure gauge separately
- Pressure switch is installed and set at 30/50 psi
- Handles water temperatures up to 120 °F/49 °C and working pressure up to 75 psi
- Connections:
1" NPT discharge
1-1/4" NPT suction



Dimensions:

MODEL NO.	HP	A
JCY05P	1/2	17-5/8"
JCY07P	3/4	18-1/4"

Note: Dimensions will vary according to motor manufacturer.

More Quotes From Milton Friedman

"Governments never learn. Only people learn."

Non-Submersible Pumps



Jet Pumps - Shallow Well Cyclone Series

Ordering Information:

PLASTIC PUMP BODY					
MODEL NO.	HP	SUCTION X DISCHARGE	VOLTAGE	PUMP UNIT	
				ORDER NO.	WT.
JCY05P	1/2	1-1/4" x 1"	115/230	91020050	23
JCY07P	3/4	1-1/4" x 1"	115/230	91020075	31

Note: All weights in pounds.

Performance Chart:

DISCHARGE PRESSURE - PSI										SHUT-OFF PRESSURE PSI
HP	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	60	65	
		GALLONS PER MINUTE								
1/2	5	12.0	10.7	9.1	7.2	4.9	2.8	0.9	-	62
	10	-	10.0	8.4	6.3	3.9	1.9	-	-	60
	15	-	-	7.7	5.3	3.0	0.9	-	-	57
	20	-	-	6.4	4.3	2.2	0.2	-	-	55
	25	-	-	5.0	3.3	1.4	-	-	-	53
3/4	5	-	16.0	14.4	12.6	10.6	8.3	5.0	1.8	68
	10	-	-	13.5	11.8	9.7	6.9	3.6	0.2	65
	15	-	-	-	11.0	8.8	5.4	2.2	-	63
	20	-	-	-	9.0	7.2	3.9	0.8	-	60
	25	-	-	-	-	5.6	2.3	-	-	58

More Quotes From Milton Friedman

"Most of the energy of political work is devoted to correcting the effects of mismanagement of government."

"Hell hath no fury like a bureaucrat scorned."

"There's no such thing as a free lunch."

"With some notable exceptions, businessmen favor free enterprise in general but are opposed to it when it comes to themselves."

"There's no such thing as a free lunch."

"If you put the federal government in charge of the Sahara Desert, in five years there'd be a shortage of sand."

Only government can take perfectly good paper, cover it with perfectly good ink and make the combination worthless.

Jet Pumps - Convertible RM2 Series



J-CLASS

RM2 Series



NRTL/C
CSA 108
UL 778

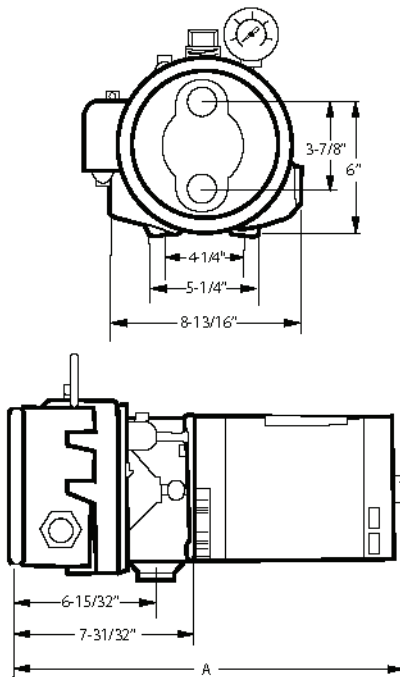
Features:

- Heavy-duty cast iron case and bronze impeller ensure optimum durability
- Thermoplastic diffuser is molded for efficiency and dependability
- Screw-in injector for easy conversion from shallow to deep well installation
- Shaft coupling designed for easy removal of pump motor
- Mechanical shaft seal ensures leakproof fit and continuous water lubrication
- High service factor 56C-frame motor for maximum performance
- Hardware kit allows for versatility of installation and includes pressure gauge, plugs, shallow well injector and bypass plug
- Adjustable pressure switch is factory-installed at 30/50 psi
- Connections:
 - 1-1/4" NPT suction
 - 1" NPT discharge
 - 1" NPT drive line
- Maximum temperature of 140 °F/60 °C

Dimensions:

MODEL NO.	HP	A
JRM05CI-C	1/2	18.65"
JRM07CI-C	3/4	19.15"
JRM1CI-C	1	19.65"

Note: Dimensions will vary according to motor manufacturer.



Non-Submersible Pumps



Jet Pumps - Convertible RM2 Series

Ordering Information:

MODEL NO.	HP	SUCTION X DISCHARGE	VOLTAGE	PUMP UNIT		DEEP WELL INJECTOR		
				ORDER NO.	WT.	SUCTION LIFT	ORDER NO.	WT.
JRM05CI-C	1/2	1-1/4" x 1"	115/230	91110874	48	30 - 60 ft	147E1120	7
						50 - 100 ft	147E0915	7
JRM07CI-C	3/4	1-1/4" x 1"	115/230	91110882	51	30 - 60 ft	147E1023	7
						50 - 100 ft	147E1118	7
JRM1CI-C	1	1-1/4" x 1"	115/230	91110890	53	30 - 60 ft	147E1125	7
						50 - 100 ft	147E1120	7

Note: 1. Order deep well injector separately.
2. Minimum inside well diameter requirement of 4" for deep well injectors.
3. All weights in pounds.

OPTIONAL INJECTOR FOR HIGH HEAD PERFORMANCE		
INJECTOR ORDERING NO.	MODEL NO.	HP
18-1278-03-R	JRM1CI-C	1

PRESSURE GAUGE	
ORDERING NO.	PRESSURE READING
9193-4018	0-100 psi

Required for Deep Well Installations:



Parallel Pipe Injectors

More Quotes From Milton Friedman

The government solution to a problem is usually as bad as the problem.

The most important single central fact about a free market is that no exchange takes place unless both parties benefit.

The most important ways in which I think the Internet will affect the big issue is that it will make it more difficult for government to collect taxes.

The Great Depression, like most other periods of severe unemployment, was produced by government mismanagement rather than by any inherent instability of the private economy.

Non-Submersible Pumps

Jet Pumps - Convertible RM2 Series



Shallow Well Performance:

RM2 1-1/4" SUCTION 1" DISCHARGE			DISCHARGE PRESSURE - PSI									SHUT-OFF PRESSURE PSI
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	60	65	70	
			GALLONS PER MINUTE									
JRM05CI-C 1/2 hp	18-1278-03-R	5	15.5	13.5	11	8.5	6	4	2			65
		10	13.5	12.5	10	7.5	5	3	1			63
		15	11.5	10.5	8.5	6	4	2				60
		20	9.5	9	7.5	5	3	1				58
		25	7	7	6	4	2					55
JRM07CI-C 3/4 hp	18-1279-02-R	5	19	18.5	18	16	12.5	9.5	6.5	3.5		70
		10	16.5	16	15.5	14	10	8	4.5	1.5		68
		15	14.5	14	13.5	12.5	9.5	6.5	3.5			66
		20		11.5	11	10	8	5	2			63
		25			8.5	8	6.5	3.5	1			61
JRM1CI-C 1 hp	18-1280-09-R	5	23	22.5	22	21.5	20	17.5	14	10.5	7	81
		10		19.5	19	18.5	17.5	15.5	12.5	9	5.5	78
		15		16.5	16	15.5	15	13.5	11	7.5	4.5	76
		20			13.5	13	12.5	11.5	9.5	6	2.5	74
		25				10	10	9.5	7.5	4.5	1	71

MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	DISCHARGE PRESSURE - PSI									SHUT-OFF PRESSURE PSI
			50	55	60	65	70	75	80	85	90	
			GALLONS PER MINUTE									
JRM1CI-C High Head 1 hp	18-1278-03-R	5			11	10	7.5	5.5	3.5	1.5		90
		10			10	8.5	6.5	4.5	2.5			88
		15			9	7.5	5.5	3.5	1.5			84
		20			8	6	4	2				81
		25			7	5	3	1				78

- Note:** 1. Pressure switch pre-set 30-50 psi.
 2. The appropriate injector is included with the units.
 3. Maximum pump working pressure is 150 psi.
 4. All the above discharge pressures were measured using 1.25" PVC suction pipe and 1.25" foot valve.

More Quotes From Milton Friedman

The greatest advances of civilization, whether in architecture or painting, in science and literature, in industry or agriculture, have never come from centralized government.

Milton Friedman

The most important single central fact about a free market is that no exchange takes place unless both parties benefit.

The most important ways in which I think the Internet will affect the big issue is that it will make it more difficult for government to collect taxes.

Non-Submersible Pumps



Jet Pumps - Convertible RM2 Series

Deep Well Performance:

RM2 1-1/4" SUCTION 1" DISCHARGE 1" DRIVE PIPE			DISCHARGE PRESSURE - PSI									SHUT-OFF PRESSURE PSI	INJ. MIN. OPERATING PRESSURE
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT	30	35	40	45	50	55	60	65	70		
			GALLONS PER MINUTE										
JRM05CI-C 1/2 hp	147E-1120	30	9	7	5.5	4	2.5	1.5				65	18
		40	7.5	6	4	3	1.5					59	
		50	6	4.5	3	2	1					56	
		60	5	3.5	2	1						52	
	147E-0915	50	6	5	4	3	2.5	2	1			74	23
		60	5	4	3.5	2.5	2	1				70	
		70	4	3.5	2.5	2	1.5					65	
		80	3.5	3	2	1.5	1					61	
		90	3	2	1.5	1						57	
		100	2.5	1.5	1							52	
JRM07CI-C 3/4 hp	147E-1023	30	15.5	13.5	11	8.5	6.5	4	2			66	18
		40	13.5	11.5	9	7	4.5	2.4				61	
		50	11	9.5	7	5	3					57	
		60	9	7.5	5	3	1					53	
	147E-1118	50	9	8	7	6	4.5	3.5	3	2	1	80	23
		60	8	7	6	4.5	4	3	2	1.5		77	
		70	6.5	5.5	4.5	3.5	3	2	1			72	
		80	6	5	4	3	2	1.5				67	
		90	5	4	3	2	1.5					63	
		100	4	3	2.5	1.5	1					30	
JRM1CI-C 1 hp	147E-1125	30	19.5	17	14.5	12	9.5	7	5			72	30
		40	17.5	15	12.5	10	7.5	5	3			67	
		50	15.5	13	10.5	8	5.5	3.5	1			63	
		60	13	10.5	8.5	6	3.5	1.5				59	
	147E-1120	50		11	9.5	8	6.5	5	4	3	2	82	36
		60		10	8	7	5.5	4	3	2	1	78	
		70		8	7	6	4.5	3	2	1		73	
		80		7	6	4.5	3.5	2	1.5			70	
		90		6	5	3.5	2.5	1.5				65	
		100		5	4	3	1.5					61	

Note: 1. Pressure switch pre-set 30-50 psi.
2. Maximum pump working pressure is 150 psi.
3. All the above discharge pressures were measured using 1.25" PVC suction pipe and 1.25" foot valve and 1" drive pipe.

More Quotes From Milton Friedman

The only relevant test of the validity of a hypothesis is comparison of prediction with experience.

The only way that has ever been discovered to have a lot of people cooperate together voluntarily is through the free market. And that's why it's so essential to preserving individual freedom.



J-CLASS

RP2 Series

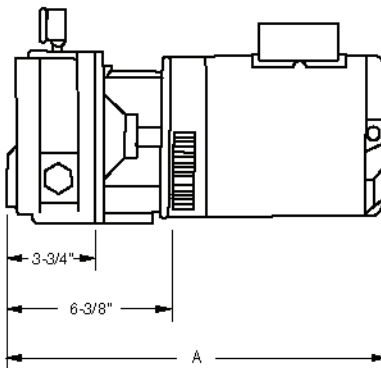
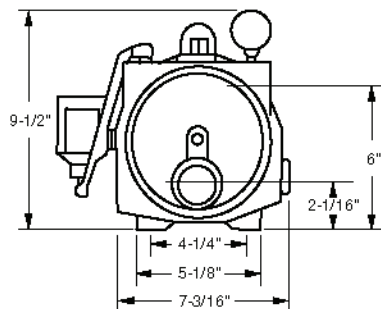
Features:

- Heavy-duty cast iron construction for long life
- Thermoplastic impeller and diffuser for increased efficiency
- Cast-iron case will handle booster pump applications up to 150 psi
- Shaft coupling designed for easy removal of pump motor
- Mechanical shaft seal ensures leakproof fit
- High service factor 56C-frame motors for maximum performance
- "Convertible" hardware includes pressure gauge, plugs, bypass plug and shallow well injector (screw-in injector allows easy conversion from shallow to deep well installation.)
- Adjustable pressure switch is factory-installed at 20/40 psi
- Connections:
1-1/4" NPT suction
1" NPT discharge
1" NPT drive line
- Maximum temperature of 140 °F/60 °C
For pressure gauges, see page 103.

Dimensions:

MODEL NO.	HP	A
JRP05CI-C	1/2	14-3/8"
JRP07CI-C	3/4	15-3/8"

Note: Dimensions will vary according to motor manufacturer.



Non-Submersible Pumps



Jet Pumps - Convertible RP2 Series

Ordering Information:

MODEL NO.	HP	SUCTION X DISCHARGE	VOLTAGE	PUMP UNIT		DEEP WELL INJECTOR		
				ORDER NO.	WT.	SUCTION LIFT	ORDER NO.	WT.
JRP05CI-C	1/2	1-1/4" x 1"	115/230	91021626	40	30 - 60 ft	147E0919	7
						60 - 90 ft	147E1018	7
JRP07CI-C	3/4	1-1/4" x 1"	115/230	91021634	42	30 - 60 ft	147E1123	7
						60 - 90 ft	147E1118	7

Note: 1. Order deep well injector separately.
2. Minimum inside well diameter requirement of 4" for deep well injectors.
3. All weights in pounds.

OPTIONAL INJECTOR FOR HIGH HEAD PERFORMANCE		
INJECTOR ORDERING NO.	MODEL NO.	HP
18-1247-01-R	JRP07CI-C	3/4

PRESSURE GAUGE	
ORDERING NO.	PRESSURE READING
9193-4018	0-100 psi

Non-Submersible Pumps

Jet Pumps - Convertible RP2 Series

Shallow Well Performance:

RP2 1-1/4" SUCTION 1" DISCHARGE			DISCHARGE PRESSURE - PSI									SHUT-OFF PRESSURE PSI
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	60	65	70	
			GALLONS PER MINUTE									
JRP05CI-C 1/2 hp	18-1247-01-R	5	13	12.5	11.5	10	7.5	5.5	3.5	1.5		69
		10	11.5	11	10	8.5	6.5	4.5	2.5			67
		15	10	9.5	9	7.5	5.5	3.5	1.5			64
		20	8	8	7.5	6.5	4.5	2.5				62
		25	6	6	5.5	5	3.5	1.5				59
JRP07CI-C 3/4 hp	18-1248-00-R	5	20	18.5	16	12.5	8	1.5				56
		10	17.5	16.5	14	10	4					52
		15	16	15	12	8						50
		20	13	12	10	4						47
		25		9.5	7							43
JRP07CI-C High Head 3/4 hp	18-1247-01-R	5		12	12	12	11	9	7	5	2.5	76
		10		11	10.5	10.5	10	8	6	4	1.5	74
		15		9.5	9	9	9	7	5	3		71
		20		8	8	7.5	7.5	6	4	2		69
		25		6.5	6.5	6	6	5	3	1		67

Note: 1. The appropriate injector is included with the units.
2. All the above discharge pressures were measured using 1.25" PVC suction pipe and 1.25" foot valve.



Deep Well Performance:

RP2 1-1/4" SUCTION 1" DISCHARGE 1" DRIVE PIPE			DISCHARGE PRESSURE - PSI								SHUT-OFF PRESSURE PSI	INJ. MIN. OPERATING PRESSURE
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	60	65		
			GALLONS PER MINUTE									
JRP05CI-C 1/2 hp	147E-0919	30	8.5	7	5.5	4.5	3	2	1		66	20
		40	7	6	4.5	3.5	2	1			62	
		50	6	5	3.5	2	1				57	
		60	5	3.5	2.5	1.5					53	
JRP05CI-C 1/2 hp	147E-1018	60	6	5	4	3	2	1			66	23
		70	5	4	3	2	1.5				62	
		80	4	3	2	1.5					56	
		90	3	2	1.5						51	
JRP07CI-C 3/4 hp	147E-1123	30	12	10	8.5	6.5	5	3			62	28
		40	10	8.5	7	5	3	1			58	
		50	8.5	7	5	3	1				54	
		60	6.5	5	3	1.5					49	
JRP07CI-C 3/4 hp	147E-1118	60	7.5	6.5	6	5	4	3	2.5	1.5	75	30
		70	7	6	5	4	3	2	1		69	
		80	5.5	4	3.5	2.5	2	1			64	
		90	4.5	3.5	2.5	2	1				57	

Note: 1. Deep well injectors must be ordered separately.

2. All the above discharge pressures were measured using 1.25" PVC suction pipe and 1.25" foot valve and 1" drive pipe.

The prize doesn't always go to the most deserving....

Irena Sendler

There recently was a death of a 98 year-old lady named Irena. During WWII, Irena, got permission to work in the Warsaw Ghetto, as a Plumbing/Sewer specialist. She had an 'ulterior motive' ... She KNEW what the Nazi's plans were for the Jews, (being German.) Irena smuggled infants out in the bottom of the tool box she carried and she carried in the back of her truck a burlap sack, (for larger kids..) She also had a dog in the back that she trained to bark when the Nazi soldiers let her in and out of the ghetto. The soldiers of course wanted nothing to do with the dog and the barking covered the kids/infants noises.. During her time of doing this, she managed to smuggle out and save 2500 kids/infants. She was caught, and the Nazi's broke both her legs, arms and beat her severely. Irena kept a record of the names of all the kids she smuggled out and kept them in a glass jar, buried under a tree in her back yard. After the war, she tried to locate any parents that may have survived it and reunited the family.

Most had been gassed. Those kids she helped got placed into foster family homes or adopted.

Recently, Irena was up for the Nobel Peace Prize ... She was not selected.

However, Al Gore won, for a slide show on Global Warming and Barack Obama won for a speech on peace.

Non-Submersible Pumps

Jet Pumps - Convertible SRP3 Series



J-CLASS

SRP3 Series

Features:

- Thermoplastic impeller assures increased hydraulic efficiency
- Thermoplastic diffuser is molded for efficiency and dependability
- Cast-iron case for maximum durability
- Square-flange motor with threaded shaft for direct mounting of impeller
- Mechanical shaft seal ensures leakproof fit
- Pressure switch is factory installed at 20/40 psi
- "Convertible" hardware includes plugs, bypass plug and shallow well injector. (Screw-in injector allows for easy conversion from shallow to deep well installation)
- Pressure gauge can be ordered separately
- Connections:
 - 1-1/4" NPT suction
 - 1" NPT discharge
 - 1" NPT drive line
- Maximum temperature of 140 °F/60 °C

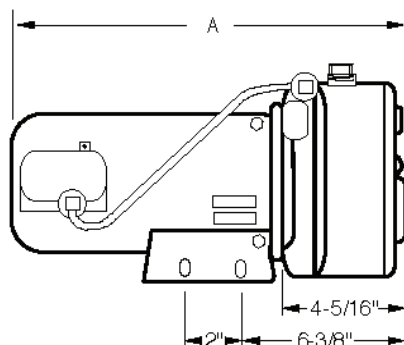
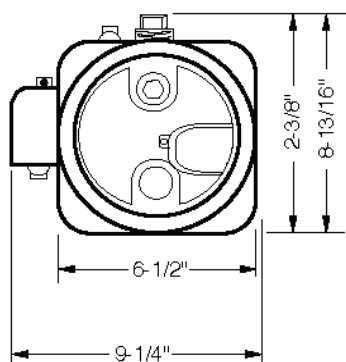
Dimensions:

MODEL NO.	HP	A
JSRP05CI-C	1/2	15-3/16"
JSRP07CI-C	3/4	16-5/16"
JSRP1CI-C	1	16-3/16"

Note: Dimensions will vary according to motor manufacturer.



NRTL/C
CSA 108
UL 778



Non-Submersible Pumps



Jet Pumps - Convertible SRP3 Series

Ordering Information:

MODEL NO.	HP	SUCTION X DISCHARGE	VOLTAGE	PUMP UNIT		DEEP WELL INJECTOR		
				ORDER NO.	WT.	SUCTION LIFT	ORDER NO.	WT.
JSRP05CI-C	1/2	1-1/4" x 1"	115/230	91021592	36	30 - 60 ft	147E1118	7
						60 - 90 ft	147E1115	7
JSRP07CI-C	3/4	1-1/4" x 1"	115/230	91021600	38	30 - 60 ft	147E1123	7
						60 - 90 ft	147E1118	7
JSRP1CI-C	1	1-1/4" x 1"	115/230	91021618	41	30 - 60 ft	147E1123	7
						60 - 90 ft	147E1118	7
JSRPH05CI-C	1/2	1-1/4" x 1"	115/230	91021758	36	High head configuration JSRPH pumps are for shallow well application only.		
JSRPH07CI-C	3/4	1-1/4" x 1"	115/230	91021766	38			
JSRPH1CI-C	1	1-1/4" x 1"	115/230	91021774	41			

Note: 1. Order deep well injector separately.
2. Minimum inside well diameter requirement of 4" for deep well injectors.
3. All weights in pounds.

OPTIONAL INJECTOR FOR HIGH HEAD PERFORMANCE		
INJECTOR ORDERING NO.	MODEL NO.	HP
18-1200-12-R	JSRPH05CI-C	1/2
18-1247-01-R	JSRPH07CI-C	3/4
18-1247-01-R	JSRPH1CI-C	1

PRESSURE GAUGE	
ORDERING NO.	PRESSURE READING
9193-4018	0-100 psi

Required for Deep Well Installations:



Parallel Pipe Injectors

More Quotes From Milton Friedman

The power to do good is also the power to do harm.

The problem of social organization is how to set up an arrangement under which greed will do the least harm, capitalism is that kind of a system.

Non-Submersible Pumps

Jet Pumps - Convertible

SRP3 Series



Shallow Well Performance:

MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	DISCHARGE PRESSURE - PSI									SHUT-OFF PRESSURE PSI
			30	35	40	45	50	55	60	65	70	
			GALLONS PER MINUTE									
JSRP05CI-C 1/2 hp	18-1247-01-R	5	12	10	7.5	5	2					55
		10	11	9	6	3.5						53
		15	10	8	5	2						51
		20	9.5	6.5	4	1						49
		25	8	5	2							47
JSRP07CI-C 3/4 hp	18-1248-00-R	5	21.5	19.5	15.5	10.5	5					53
		10	21	18	13.5	8						51
		15	20	16.5	11	6.5						49
		20	18	14	9	2						47
		25	16	12	6							45
JSRP1CI-C 1 hp	18-1701-00-R	5	19.8	18.8	16.6	14	10.3	5.5				60
		10	18.1	17.5	15.6	12.6	8.6	3.5				58
		15	15	14.5	14.2	10.8	6.6	1.3				56
		20	12.6	12.5	12.7	8.8	4.1					54
		25	10	9.8	9.3	6.8	1.6					52
JSRPH05CI-C High Head 1/2 hp	18-1200-12-R	5	6	5.6	5	4.3	3.5	2.6	1.6	0.6		68
		10	5.3	4.9	4.6	4	3	1.9	0.9			65
		15	4.9	4.6	4.2	3.5	2.5	1.5	0.6			63
		20	4.4	4.2	3.9	3	2.1	1.1	0.3			61
		25	3.4	3.2	3	2.3	1.4	0.6				58
JSRPH07CI-C High Head 3/4 hp	18-1247-01-R	5			11.5	10.8	10	8.6	7	4.5	2	69
		10				10.1	9	7	5	2.8	0.5	66
		15				9.2	8	6.2	4.2	2		64
		20				8.2	7	5.4	3	0.5		61
		25				5.9	5	3.5	1.5			58
JSRPH1CI-C High Head 1 hp	18-1247-01-R	5		12	12	12	11	9	7	5	2.5	76
		10		11	10.5	10.5	10	8	6	4	1.5	74
		15		9.5	9	9	9	7	5	3		71
		20		8	8	7.5	7.5	6	4	2		69
		25		6.5	6.5	6	6	5	3	1		67

Note: 1. The appropriate shallow well injector is included with the units.
2. All the above discharge pressures were measured using 1.25" PVC suction pipe and 1.25" foot valve.

STRANGE LAWSUITS

THE PLAINTIFF: Lorenzo Grier

THE DEFENDANT: The United States of America

THE LAWSUIT: In 1995, Grier sued the government for fraud, breach of contract, and discrimination. The basis for his suit? "Appellant alleged that former President Ronald Reagan did not respond when Appellant invented the multiplication tables and sent them to the White House, but instead stole Appellant's invention and implemented it in the public schools." Grier asked for \$900 billion in damages.

THE VERDICT: Case dismissed



Deep Well Performance:

SRP3 1-1/4" SUCTION 1" DISCHARGE 1" DRIVE PIPE			DISCHARGE PRESSURE - PSI								SHUT-OFF PRESSURE PSI
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	60	65	
			GALLONS PER MINUTE								
JSRP05CI-C 1/2 hp	Cast Iron 147E-1118	30	6.0	4.6	3.6	2.7	1.8	0.9	0.1		61
		40	4.8	3.6	2.7	1.8	1.0	0.2			57
		50	4.0	2.8	2.0	1.1	0.3				52
		60	3.0	1.9	1.1	0.3					47
	Cast Iron 147E-1115	60	2.6	2.0	1.5	0.9	0.4				54
		70	2.1	1.6	1.1	0.5					51
		80	1.6	1.1	0.6	0.1					46
		90	1.1	0.6	0.1						42
JSRP07CI-C 3/4 hp	Cast Iron 147E-1123	30	12.5	10.3	8.1	6.0	3.8	1.9	0.1		61
		40	10.8	8.5	6.4	4.2	2.2	0.4			56
		50	9.0	6.6	4.5	2.4	0.6				52
		60	7.0	4.8	2.9	1.0					48
	Cast Iron 147E-1118	60	6.9	5.7	4.5	3.5	2.5	1.6	0.8	0.1	66
		70	5.8	4.7	3.6	2.7	1.9	1.0	0.3		63
		80	4.8	3.7	2.7	2.0	1.1	0.3			58
		90	3.7	2.9	2.1	1.3	0.5				54
JSRP1CI-C 1 hp	Cast Iron 147E-1123	30	13.6	11.3	9.5	7.3	5.3	3.2	1.6		65
		40	11.3	9.5	7.3	5.3	3.5	1.6			60
		50	9.0	7.5	5.6	3.7	1.9	0.1			56
		60	7.0	6.0	4.2	2.3	0.5				52
	Cast Iron 147E-1118	60	7.4	6.1	5.1	4.1	3.3	2.4	1.6	0.8	70
		70	6.5	5.4	4.5	3.5	2.6	1.8	1.0	0.3	67
		80	5.4	4.4	3.5	2.6	1.8	1.0	0.3		62
		90	4.4	3.5	2.8	1.9	1.1	0.3			57

Note: 1. Deep well injectors must be ordered separately.

2. All the above discharge pressures were measured using 1.25" PVC suction pipe, 1.25" foot valve and 1" drive pipe.

More Quotes From Milton Friedman

There's no such thing as a free lunch.

Underlying most arguments against the free market is a lack of belief in freedom itself.

Universities exist to transmit knowledge and understanding of ideas and values to students not to provide entertainment for spectators or employment for athletes.

We have a system that increasingly taxes work and subsidizes nonwork.

J-CLASS

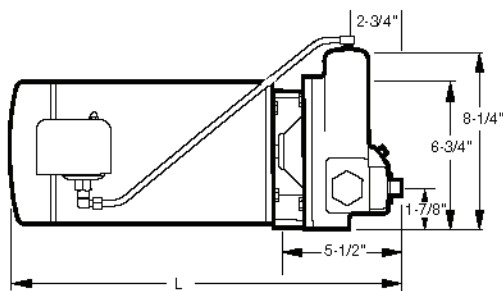
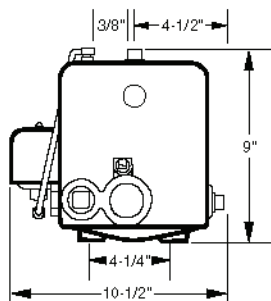
C Series

Single Stage Convertible Jet Pump:

Available in 1/3, 1/2 or 3/4 hp models. The C Series is equipped with a stainless steel impeller for high performance and longevity. The C Series delivers up to 16 gallons per minute from either shallow well or deep well installations.

Features:

- Heavy-duty iron construction for long life
- Stainless steel impeller for high performance
- Thermoplastic diffuser is molded for efficiency and dependability
- Screw-in injector for easy conversion from shallow to deep well installation
- Motor with stainless steel shaft for direct mounting on the impeller
- Mechanical shaft seal ensures leakproof fit and continuous lubrication
- Factory assembled as shallow well unit
- Hardware kit allows for versatility of installation. Includes pressure gauge and plugs
- Deep well injector must be ordered separately
- Connections:
 - 1-1/4" NPT suction
 - 3/4" NPT discharge
 - 1" NPT pressure (applies to deep well installations)



Dimensions:

MODEL	HP	L
JC03CI-C	1/3	16.88"
JC05CI-C	1/2	17.13"
JC07CI-C	3/4	17.75"

Note: Dimensions will vary according to motor manufacturer.



Ordering Information:

MODEL NO.	HP	SUCTION X DISCHARGE	VOLTAGE	PUMP UNIT		DEEP WELL INJECTOR		
				ORDER NO.	WT.	SUCTION LIFT	ORDER NO.	WT.
JC03CI-C	1/3	1-1/4" x 1"	115/230	91060012	45	20 - 60 ft	147E0916	7
						60 - 90 ft	147E0914	7
JC05CI-C	1/2	1-1/4" x 1"	115/230	91060020	45	20 - 60 ft	147E1018	7
						60 - 90 ft	147E1117	7
						60 - 90 ft	147E1115	7
JC07CI-C	3/4	1-1/4" x 1"	115/230	91060053	50	20 - 60 ft	147E1124	7
						50 - 90 ft	147E1019	7
						80-120 ft	147E0914	7

Note: 1. Order deep well injector separately.
2. Minimum inside well diameter requirement of 4" for deep well injectors.
3. All weights in pounds.

PRESSURE GAUGE	
ORDERING NO.	PRESSURE READING
9193-4018	0-100 psi

Required for Deep Well Installations:



Parallel Pipe Injectors

MORE STRANGE LAWSUITS

THE PLAINTIFF: Edna Hobbs

THE DEFENDANT: The Joseph Company, makers of The Clapper (a device that activates appliances when someone claps)

THE LAWSUIT: Hobbs filed suit because she had to clap so hard, she injured her hands trying to get the appliances to go on. In fact, she was in so much pain, she said, "I couldn't peel potatoes," adding: "I never ate so many baked potatoes in my life."

THE VERDICT: Case dismissed. The judge ruled that Hobbs "had merely failed to adjust the sensitivity controls."

Non-Submersible Pumps

Jet Pumps - Convertible C Series



C Series Performance - Shallow Well Self-Priming:

C SERIES			DISCHARGE PRESSURE - PSI						SHUT-OFF PRESSURE PSI
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	55	
			US GALLONS PER MINUTE						
JC03CI-C 1/3 hp	18-1705-06-R Code 1018	5	8.1	6.5	4.8	3.5	2.4	1.4	62
		10	7.4	5.8	4.2	3.0	2.0	1.0	60
		15	6.7	5.1	3.7	2.5	1.5	0.6	58
		20	6.0	4.4	3.2	2.1	1.2	-	56
		25	5.3	3.8	2.7	1.7	0.7	-	54
JC05CI-C 1/2 hp	18-1706-05-R Code 1021	5	10.2	8.9	6.6	4.8	3.3	1.8	61
		10	9.3	7.8	5.8	4.1	2.7	1.2	59
		15	8.4	6.9	5.0	3.5	2.0	0.6	57
		20	7.6	6.0	4.3	2.8	1.4	-	55
		25	6.6	5.3	3.6	2.2	0.8	-	53
JC07CI-C 3/4 hp	18-1707-04-R Code 1027	5	15.8	15.7	14.1	10.7	7.5	4.0	61
		10	15.0	14.9	12.8	9.2	6.0	2.5	59
		15	14.0	13.9	11.3	7.9	4.5	1.0	57
		20	12.5	12.4	9.6	6.4	3.0	-	54
		25	10.5	10.4	8.3	4.9	1.5	-	52

Note: 1. The appropriate shallow well injector is included with each model.
2. Pressure switch pre-set 30-50 psi.
3. Maximum pump working pressure is 150 psi.

How old is this Earth?

The rotation of the earth is gradually slowing due to the gravitational drag forces of the sun, moon and other factors. If we extrapolate backwards for several billion years the centrifugal force would have been so great that the overall shape of the earth would have resembled a flat pancake. Hmmm... now, how old is this earth?

Petroleum and natural gas are contained at high pressures in underground cap rock. In many cases the pressures are extremely high. Calculations based upon the measured permeability of the cap rock reveal that the oil and gas pressures could not be maintained much longer than 10,000 years in many instances. Hmmm... now, how old is this earth?

The strength of the earth's magnetic field has been continuously weakening. This magnetic field has been measured for over a century. Dr. Thomas G. Barnes has shown the earth's magnetic field has actually been decaying exponentially at a rate corresponding to a half-life of 1,400 years. If one extrapolates backwards as far as 10,000 years the earth would have had a magnetic field as strong as that of a magnetic star! Hmmm... now, how old is this earth?

(Continued Next Page)



Deep Well Performance - with Parallel Pipe Injector (4" min. i.d. well):

C SERIES			DISCHARGE PRESSURE - PSI					SHUT-OFF PRESSURE PSI
MODEL NO.	INJECTOR ORDER NO.	TOTAL SUCTION LIFT FT.	30	35	40	45	50	
			US GALLONS PER MINUTE					
JC03CI-C 1/3 hp	147E-0916	20	6	5	4	3	2	62
		30	5	4	3	2.5	2	60
		40	4	3	2.5	2	1	58
		50	3.5	2.5	2	1	-	56
		60	2.5	2	1.5	-	-	54
	147E-0914	60	3	2.5	2	1.5	1.5	63
		70	2.5	2	1.5	1	1	61
		80	2	2	1	1	-	59
		90	1.5	1	1	-	-	57
JC05CI-C 1/2 hp	147E-1018	20	10.5	8.5	7	6	4.5	61
		30	8.5	7	5.5	4	3.5	59
		40	7	5.5	4.5	3.5	2.5	57
		50	5.5	4.5	4	3	2	55
		60	4.5	3.5	3	2	1	53
	147E-1117	60	5	4	3.5	3	2.5	70
		70	4	3.5	3	2.5	2	66
		80	3.5	3	2.5	2	1.5	61
		90	3	2.5	2	1.5	1	56
	147E-1115	90	3	2.5	2	1.5	1	64
		100	2.5	2	1.5	1	0.5	60
		110	2	1.5	1	0.5	-	56
		120	1.5	1	0.5	-	-	52
JC07CI-C 3/4 hp	147E-1124	20	16	14	12	10	8	69
		30	14	12	10	8	6	64
		40	11.5	10	7.5	6	4	59
		50	10	8	6	4	2	55
		60	7.5	6	4	2	-	50
	147E-1019	50	9.5	8.5	7.5	6.5	5.5	74
		60	8	7	6	5	4	70
		70	7	6	5	4	3	66
		80	6	5	4	3	2	61
		90	4.5	3.5	2.5	2	1	56
	147E-0914	80	6	4	3.5	3	3	87
		90	4	3.5	3.5	3	2.5	83
		100	3.5	3.5	3	2.5	2	80
		110	3.5	3	2.5	2	2	76
		120	2.5	2.5	2	2	1.5	72

(From Previous Page)

The small amount of helium in our atmosphere has been produced from the natural radioactive decay processes of uranium and thorium. However, there is no known mechanism for helium escaping the earth's atmosphere as hydrogen does. Recent data indicates that helium is actually entering the earth's atmosphere from the sun's corona. Realistic scientific calculations indicate that the amount of observed helium could have accumulated in approximately 10,000 years. Hmmm... now, how old is this earth?

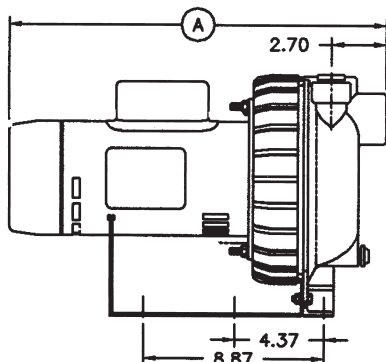
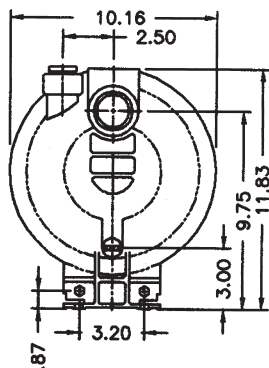
typhoon - Thermoplastic

Self-priming Centrifugal/Lawn Sprinkler Pumps



Dimensions

Model	Frame	A
7TY, S10TY	48	18-1/4"
10TY, S15TY	48	18-1/2"
15TY, S20TY	48	18-3/8"
20TY, S25TY	56	19-7/8"



The **Typhoon** is the latest in high-tech pump design, featuring Jacuzzi RingLok access, the highly successful "tool-less" entry to all internal parts that Jacuzzi has proven for over 10 years with its non-corrosive Magnum pump. Service and cleaning with a simple twist. **Self-priming**, the typhoon is ideal as a lawn sprinkler pump, for general recirculation, or as a booster pump.

Features:

- Exclusive RingLok design allows quick "tool-less" access for easy service and cleaning.
- Self-priming with large 1" priming port. Non-corrosive thermoplastic case with engineered-flow, high-efficiency, low-noise design.
- All-new, high-performance, thermoplastic hydraulics, including floating eye seal and stainless steel impeller wear ring.
- 1-1/2" FNPT threaded suction and discharge. Built-in drain plug to facilitate servicing/ winterizing.
- Square-flange motor design.
- Easy toggle switch changes from 230V to 115V without rewiring. (Not available on 20TY S25TY)
- Available in 3/4, 1, 1-1/2, and 2 HP full rate and unity service factor models.
- Handles water temperatures up to 120°F and working pressure up to 75 PSI.

Also available in Cast Iron

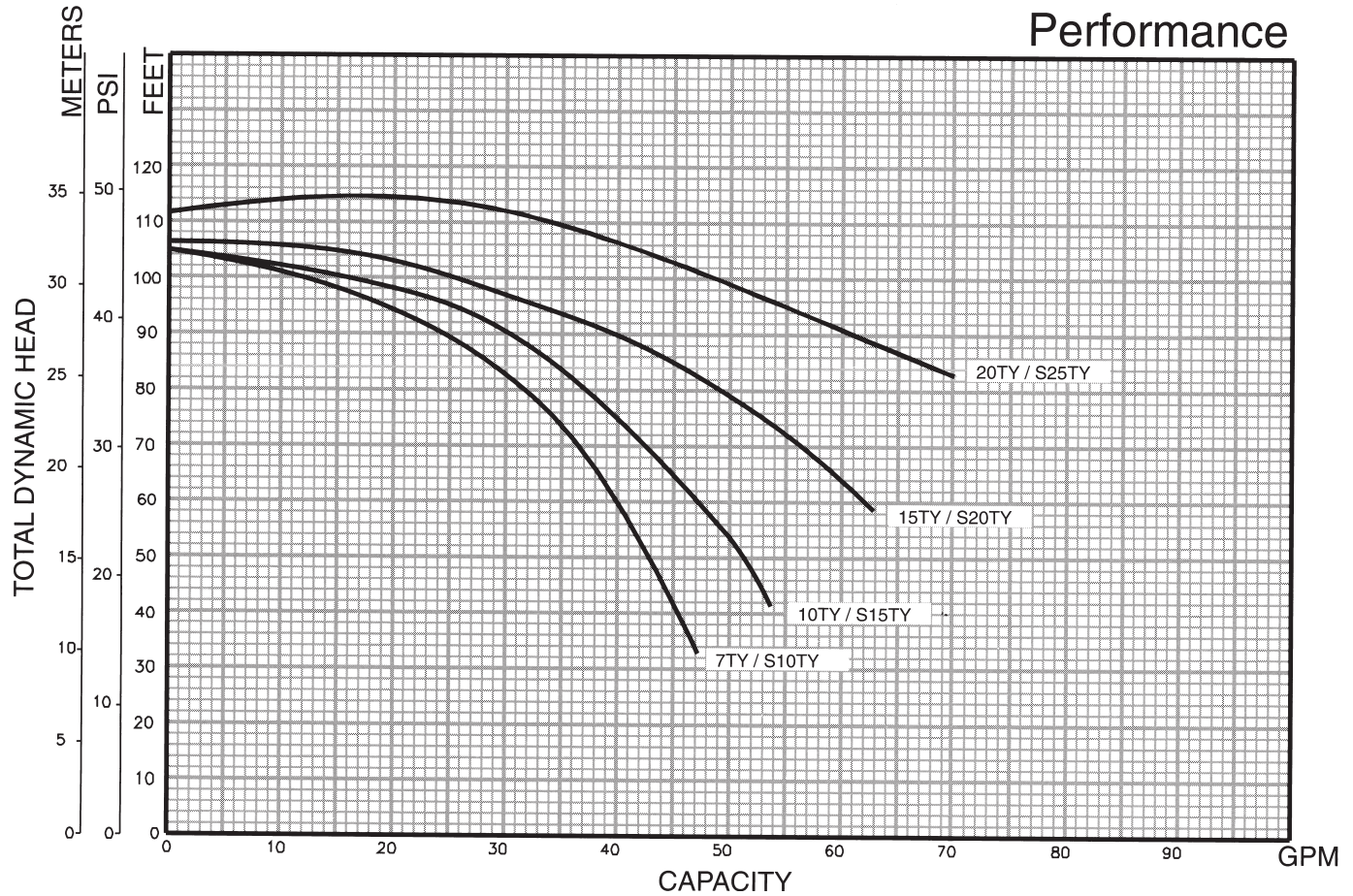
ORDERING INFORMATION

Order No.	Model No.	HP	Voltage	S.F.	Wt.
FULL RATE SERVICE FACTOR					
9331-2007	7TY	3/4	115/230	1.27	37
9331-2010	10TY	1	115/230	1.25	38
9331-2015	15TY	1-1/2	115/230	1.10	40
9331-2020	20TY	2	115/230	1.10	43
UNITY SERVICE FACTOR					
9331-1010	S10TY	1	115/230	1.00	37
9331-1015	S15TY	1-1/2	115/230	1.00	38
9331-1020	S20TY	2	115/230	1.00	40
9331-1025	S25TY	2-1/2	115/230	1.00	43



"The Most Trusted Name In Water"SM

Performance



Typhoon Performance Chart

Pump Model	Total Suction Lift in feet	Discharge PSI					Shut off Pressure (PSI)
		20	25	30	35	40	
		Capacity in GPM					
7TY S10TY	5	43	39	35	28	16	42
	10	41	37	32	23	—	40
	15	39	35	29	18	—	38
	20	38	33	25	—	—	35
10TY S15TY	5	50	45	40	33	21	43
	10	49	44	37	29	7	41
	15	46	41	35	24	—	39
	20	44	39	31	12	—	36
15TY S20TY	5	65	60	54	44	30	44
	10	64	57	50	38	21	42
	15	61	54	46	31	7	40
	20	58	50	41	23	—	37
20TY S25TY	5	79	76	72	65	52	46
	10	78	74	69	59	45	44
	15	76	72	67	54	38	42
	20	74	70	63	47	20	39

Extra Heavy Duty Electro- Magnetic Clutch Pump

F7B-5000 – 1"

Pump body: Bronze

Connection for vacuum switch

Impeller: 09-1028B (neoprene)

Shaft: Stainless steel

Seal: Mechanical seal

Cam: Full or reduced

Pedestal: Cast iron with permanently lubricated double ball bearings

Connection: 1" NPT

Clutch: Electro-magnetic 12/24 V DC

Pulley: 2xA or 1xB-groove

Dimensions and Weight

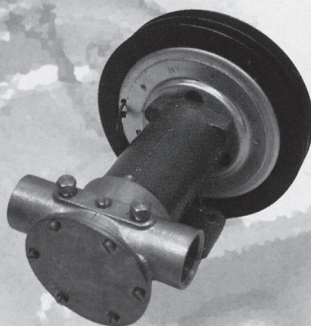
Length: 8.90"

Width: 4.72" (excl. pulley)

Height: 3.66" (excl. pulley)

Pulley dia: ø7.00"

Weight: 15 lbs



Order No.

10-24116-98 Neoprene impeller, full cam, without clutch

F8B-5000-VF – 1.1/2"

Pump body: Bronze

Connection for vacuum switch

Impeller: 09-819B (neoprene)

Shaft: Stainless steel

Seal: Mechanical seal

Cam: Full or reduced

Pedestal: Cast iron with permanently lubricated double ball bearings

Connection: Flange

Port adaptor kit 1.1/2" NPT available as accessory

Clutch: Electro-magnetic 12/24 V DC

Pulley: 2xA or 1xB-groove

Dimensions and Weight

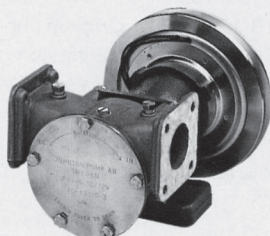
Length: 10.43"

Width: 5.98" (excl. pulley)

Height: 6.00" (excl. pulley)

Pulley dia: ø7.00"

Weight: 26 lbs



Order No.

10-13025-99 Neoprene impeller, full cam, without clutch

F8B-5000-TSS – 1.1/2"

Technical data:

see F8B-5000 VF – 1.1/2"

Dimensions and Weight

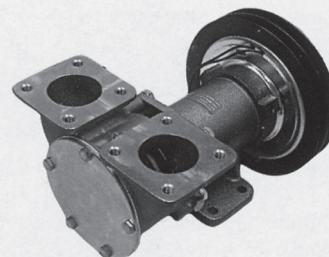
Length: 10.43"

Width: 7.79" (excl. pulley)

Height: 5.94" (excl. pulley)

Pulley dia: ø7.00"

Weight: 26 lbs



Order No.

10-13176-99 Neoprene impeller, full cam, without clutch

Choice of Clutch

05-32-1 electro-magnetic clutch, 12 V 2xA pulley

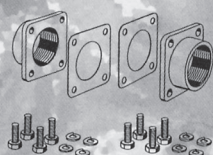
05-32-2 electro-magnetic clutch, 24 V 2xA pulley

05-32-3 electro-magnetic clutch, 12 V 1xB pulley

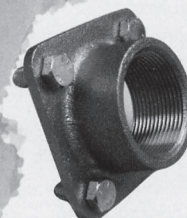
05-32-4 electro-magnetic clutch, 24 V 1xB pulley

Port adaptor kit

1.1/2" NPT

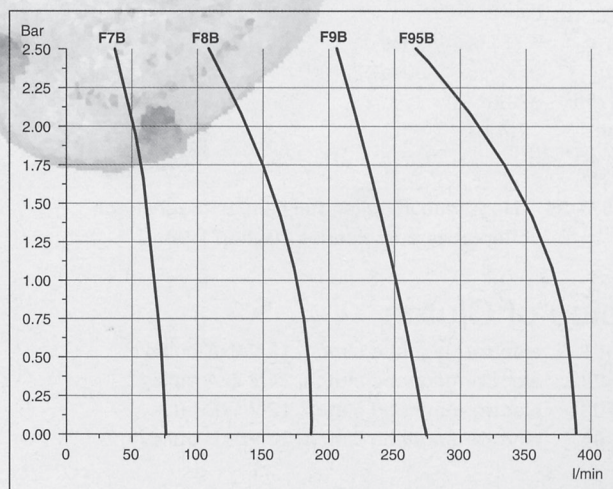


Order No. 09-45562 NPT



Capacity range

Neoprene impeller – 1400 rpm – Full cam – Water at 20°C



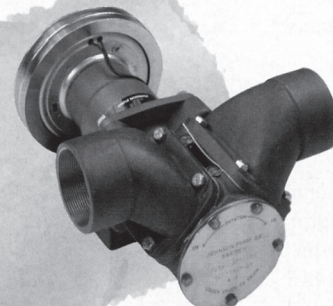
Extra Heavy Duty, High Flow, Electro-Magnetic Clutch Pump

F95B-5000 – 2.1/2"

Pump body: Bronze
Impeller: 09-820B (neoprene)
Shaft: Stainless steel
Seal: Mechanical seal
Cam: Full or reduced
Pedestal: Cast iron with permanently lubricated double ball bearings
Connection: Flange with 2.1/2" NPT port adaptors
The port adaptors can be fitted either vertically or horizontally
Clutch: Electro-magnetic 12/24 V DC
Pulley: 2xA or 1xB-groove

Dimensions and Weight

Length: 14.09"
Width: 9.68", vertical ports (excl. pulley)
11.61", horizontal ports (excl. pulley)
Height: 8.89", vertical ports (excl. pulley)
7.91", horizontal ports (excl. pulley)
Pulley dia: ø7.00" mm
Weight: 46 lbs



Order No.
10-13143-98 Neoprene impeller, full cam, without clutch

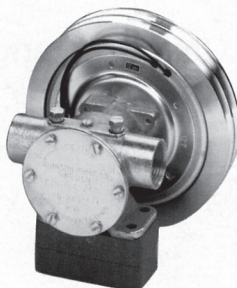
Heavy Duty Electro-Magnetic Clutch Pump

F7B-5001 – 1"

Pump body: Bronze
Connection for vacuum switch
Impeller: 09-1028B (neoprene)
Shaft: Stainless steel
The shaft is mounted with permanently lubricated double ball bearings
Seal: Mechanical seal
Cam: Full or reduced
Connection: 1" NPT
Clutch: Electro-magnetic 12/24 V DC
Pulley: 2xA or 1xB-groove

Dimensions and Weight

Length: 6.14"
Width: 4.72" (excl. pulley)
Height: 3.66" (excl. pulley)
Pulley dia: ø7.00"
Weight: 12.7 lbs



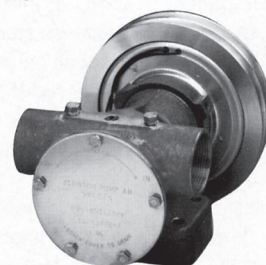
Order No.
10-24577-98 Neoprene impeller, full cam, without clutch
Replaces pump series 10-24071-98

F8B-5001 – 1.1/2"

Pump body: Bronze
Connection for vacuum switch
Impeller: 09-819B (neoprene)
Shaft: Stainless steel
The shaft is mounted with permanently lubricated double ball bearings
Seal: Mechanical seal
Cam: Full or reduced
Connection: 1.1/2" NPT
Clutch: Electro-magnetic 12 /24 V DC
Pulley: 2xA or 1xB-groove

Dimensions and Weight

Length: 8.85"
Width: 6.29" (excl. pulley)
Height: 4.88" (excl. pulley)
Pulley dia: ø7.00" mm
Weight: 22 lbs



Order No.
10-13022-98 Original Johnson Pump style 1 1/2" ports
10-13022-95 US version 1 1/4" ports*
10-13022-96 US version 1 1/2" ports**

Choice of Clutch

05-32-01 electro-magnetic clutch, 12 V 2xA pulley
05-32-02 electro-magnetic clutch, 24 V 2xA pulley
05-32-03 electro-magnetic clutch, 12 V 1xB pulley
05-32-04 electro-magnetic clutch, 24 V 1xB pulley

*replaces Jabsco series 11870

**replaces Jabsco series 50200



Extra Heavy Duty Electro-Magnetic Clutch Pump

F9B-5600 – 2"

Pump body: Bronze. Connection for vacuum switch

Impeller: 09-814B (neoprene, high pressure),
09-802B (neoprene)

Shaft: Stainless steel

Seal: Mechanical seal

Cam: Full or reduced

Pedestal: Cast iron with permanently lubricated
double ball bearings

Connection: 2" NPT

Clutch: Electro-magnetic 12/24 V DC

Pulley: 2xA or 1xB-groove

Dimensions and Weight

Length: 11.42"

Width: 7.56" (excl. pulley)

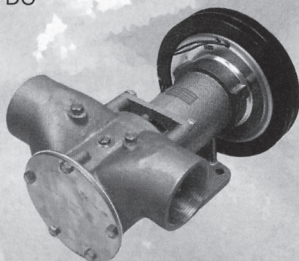
Height: 6.18" (excl. pulley)

Pulley dia: \varnothing 7.00"

Weight: 29 lbs

Order No.

10-13027-98 Neoprene impeller, full cam, without clutch



F9B-5600-VF– 2"

Technical data: see F9B-5600 – 2"

Dimensions and Weight

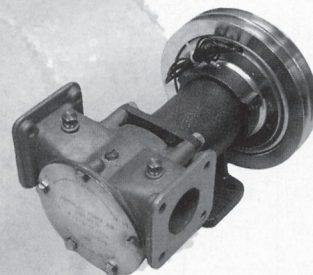
Length: 11.4" mm

Width: 5.98" (excl. pulley)

Height: 6.88" (excl. pulley)

Pulley dia: \varnothing 7.00"

Weight: 27 lbs



Order No.

10-13226-99 Neoprene impeller, full cam, without clutch

Choice of Clutch

05-32-01 electro-magnetic clutch, 12 V 2xA pulley

05-32-02 electro-magnetic clutch, 24 V 2xA pulley

05-32-03 electro-magnetic clutch, 12 V 1xB pulley

05-32-04 electro-magnetic clutch, 24 V 1xB pulley

Extra Heavy Duty Electro-Magnetic Clutch Pump

F9B-5600-TSS – 2"

Technical data: see F9B-5600 – 2"

Dimensions and Weight

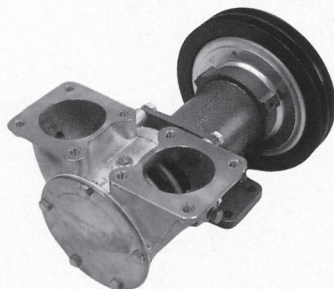
Length: 11.4"

Width: 7.87" (excl. pulley)

Height: 5.94" (excl. pulley)

Pulley dia: \varnothing 7.00"

Weight: 27 lbs



Order No.

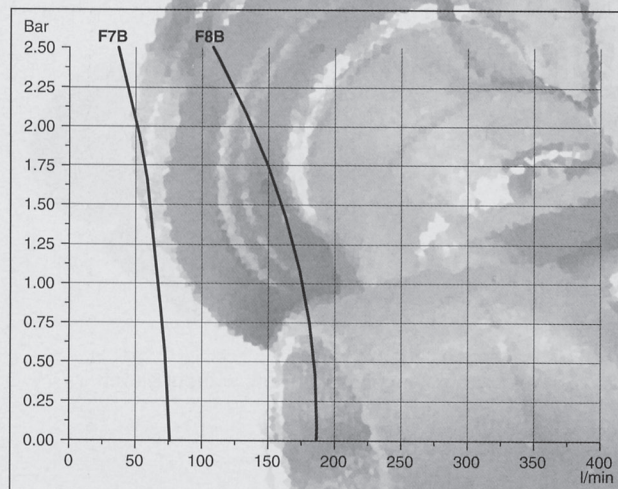
10-13178-99 Neoprene impeller, full cam, without clutch



Heavy Duty Manually Operated Clutch Pump

Capacity range for -5001 and 5001 MC

Neoprene impeller – 1400 rpm – Full cam – Water at 20°C



F7B-5001-MC – 1"

Pump body: Bronze

Impeller: 09-1028B (neoprene)

Shaft: Stainless steel

The shaft is mounted with permanently lubricated double ball bearings

Seal: Mechanical seal

Cam: Full

Connection: 1" BSP (NPTF available on request)

Clutch: Manual

Pulley: 1xA-groove

Dimensions and Weight

Length: 8.07"

Width: 4.72" (excl. pulley)

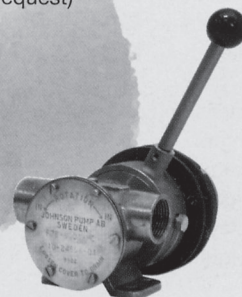
Height: 4.33" (excl. pulley)

Pulley dia: ø 4.33"

Weight: 12 lbs

Order No.

10-24578-03 Neoprene impeller, full cam, including clutch



F8B-5001-MC – 1.1/2"

Pump body: Bronze

Impeller: 09-819B (neoprene)

Shaft: Stainless steel

The shaft is mounted with permanently lubricated double ball bearings

Seal: Mechanical seal

Cam: Full

Connection: 1.1/2" BSP (NPTF available on request)

Clutch: Manual

Pulley: 1xA-groove

Dimensions and Weight

Length: 10.55"

Width: 6.26" (excl. pulley)

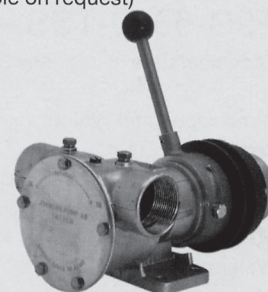
Height: 4.88" (excl. pulley)

Pulley dia: ø 4.33"

Weight: 21 lbs

Order No.

10-24559-01 Neoprene impeller, full cam, including clutch



SELF-PRIMING ALLROUND FLEXIBLE IMPELLER BRONZE PUMPS

Whenever you need greater strength or service from a pump, use a Johnson Pump extra heavy duty flexible impeller pump with separate bearing housing and mechanical seal for less wear and longer life.

These pumps cover the entire range of marine applications and may be used as cooling water pumps, bilge pumps, deckwash pumps, emergency and fire fighting pumps, etc.

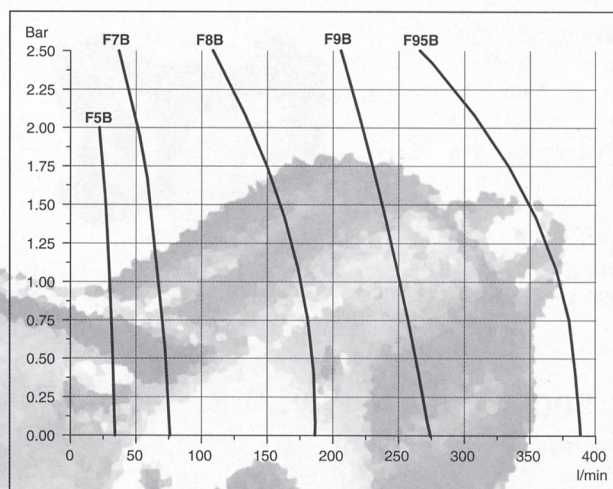
Available in sizes from 3/4" to 2 1/2" (3.5GPM - 168GPM).

Wearing parts are easily replaceable and service kits are available for all standard models. (See our Spare part list JP207R.)

Vacuum switch as extra accessory

Capacity range

Neoprene impeller - 1400 rpm - Full cam - Water at 20°C



Extra Heavy Duty Impeller Pump

F5B-3000 - 3/4"

Pump body: Bronze

Impeller: 09-1027B (neoprene)
09-1027B-9 (nitrile)

Shaft: Stainless steel

Seal: Mechanical seal

Cam: Full or reduced

Pedestal: Cast iron with permanently lubricated double ball bearings

Connection: 3/4" NPT

Dimensions and Weight

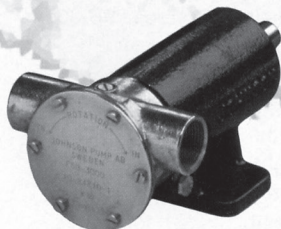
Length: 7.68"

Width: 4.17"

Height: 3.46"

Drive shaft dia: ø17 mm

Weight: 6.5 lbs



Order No.

10-24210-5

Neoprene impeller, full cam

On request: Nitrile impeller, reduced cam

F7B-3000 - 1"

Pump body: Bronze

Impeller: 09-1028B (neoprene)
09-1028B-9 (nitrile)

Shaft: Stainless steel

Seal: Mechanical seal

Cam: Full or reduced

Pedestal: Cast iron with permanently lubricated double ball bearings

Connection: 1" NPT

Dimensions and Weight

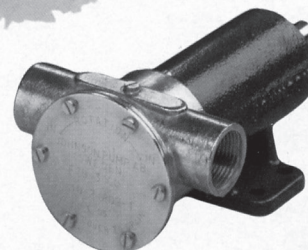
Length: 8.38"

Width: 4.72"

Height: 3.66"

Drive shaft dia: ø17 mm

Weight: 6.9 lbs



Order No.

10-24209-7

Neoprene impeller, full cam

On request: Nitrile impeller, reduced cam



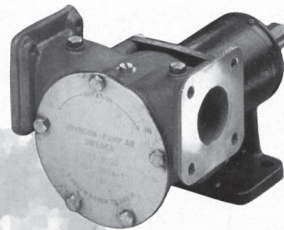
Extra Heavy Duty Impeller Pump

F8B-3000-VF – 1.1/2"

Pump body: Bronze. Connection for vacuum switch
 Impeller: 09-819B (neoprene)
 09-819B-9 (nitrile)
 Shaft: Stainless steel
 Seal: Mechanical seal
 Cam: Full or reduced
 Pedestal: Cast iron with permanently lubricated double ball bearings
 Connection: Flange. Port adaptor kit 1.1/2" NPT available as accessory.

Dimensions and Weight

Length: 10.04"
 Width: 5.98"
 Height: 6.06"
 Drive shaft dia: ø24 mm
 Weight: 16.5 lbs



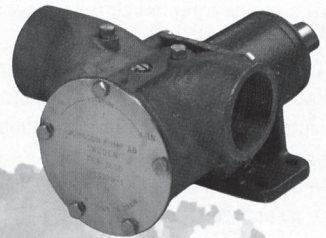
Order No.
 10-13024-1 Neoprene impeller, full cam
 On request: Nitrile impeller, reduced cam

F9B-3000 – 2"

Pump body: Bronze. Connection for vacuum switch
 Impeller: 09-802B (neoprene)
 09-814B (neoprene, high pressure)
 Shaft: Stainless steel
 Seal: Mechanical seal
 Cam: Full or reduced
 Pedestal: Cast iron with permanently lubricated double ball bearings
 Connection: 2" NPT

Dimensions and Weight

Length: 11.10"
 Width: 7.56"
 Height: 6.18"
 Drive shaft dia: ø24 mm
 Weight: 21 lbs



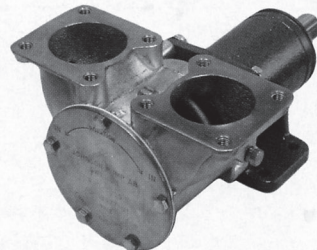
Order No.
 10-13026-7 Neoprene impeller, full cam
 On request: High pressure neoprene impeller, reduced cam

F8B-3000-TSS – 1.1/2"

Technical data: see F8B-3000- VF – 1.1/2"

Dimensions and Weight

Length: 10.04"
 Width: 7.79"
 Height: 5.94"
 Drive shaft dia: ø24 mm
 Weight: 16.5 lbs



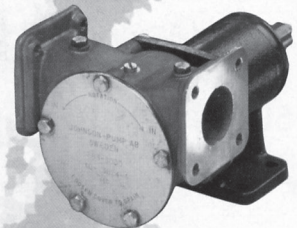
Order No.
 10-13175-01 Neoprene impeller, full cam
 On request: Nitrile impeller, reduced cam

F9B-3000-VF – 2"

Technical data: see F9B-3000 – 2"

Dimensions and Weight

Length: 11.10"
 Width: 5.98"
 Height: 6.89"
 Drive shaft dia: ø24 mm
 Weight: 21 lbs

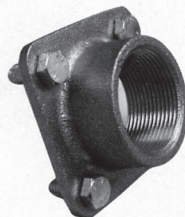
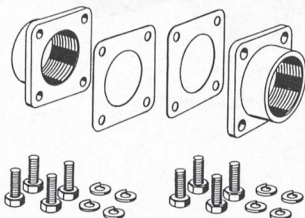


Order No.
 10-13225-01 Neoprene impeller, full cam
 On request: High pressure neoprene impeller, reduced cam

Port adaptor kit

1.1/2" NPT
 Order No. 09-45562

2" BSP for F9B-3000-VF and F9B-3000-TSS
 (NPTF available on request)
 Order No. 09-46557-01

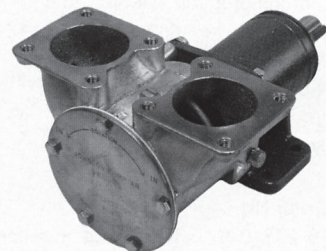


F9B-3000-TSS – 2"

Technical data: see F9B-3000 – 2"

Dimensions and Weight

Length: 11.10"
 Width: 7.87"
 Height: 5.94"
 Drive shaft dia: ø24 mm
 Weight: 21 lbs



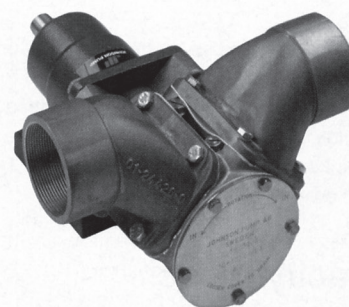
Order No.
 10-13177-01 Neoprene impeller, full cam
 On request: High pressure neoprene impeller, reduced cam



Extra Heavy Duty, High Flow, Impeller Pump

F95B-3000 – 2.1/2"

Pump body: Bronze
Impeller: 09-820B (neoprene)
Shaft: Stainless steel
Seal: Mechanical seal
Cam: Full or reduced
Pedestal: Cast iron with permanently lubricated double ball bearings
Connection: Flange with 2.1/2" NPT port adaptors
The port adaptors can be fitted either vertically or horizontally



Dimensions and Weight

Length: 13.93"
Width: 9.68" (vertical ports)
11.61" (horizontal ports)
Height: 8.89" (vertical ports)
7.91" (horizontal ports)

Drive shaft dia: ø24 mm

Weight: 38 lbs

Order No.

10-13121-04 Neoprene impeller, full cam
On request: Reduced cam

HANDICAP? WHAT HANDICAP?

A listing of famous people in history who didn't let their handicaps stand in the way of accomplishment.

Ludwig von Beethoven, 1770-1827

Went completely deaf during his thirties, yet continued to write some of the world's greatest music.

Elizabeth Barrett Browning, 1806-1861

Incapacitated as a result of a childhood spinal injury and lung ailment. Became a renowned poet, political thinker, and feminist.

Thomas Edison, 1847-1931

Developed hearing problems early in life that became progressively worse as he grew older. Edison was one of the greatest and most productive inventors of his time.

Albert Einstein, 1879-1955

Unable to speak until the age of three, Einstein was thought to be "simple-minded" until it was realized that he learned by visualization rather than by the use of language.

Joan of Arc, 1412-1431

Though she suffered from narcolepsy—an uncontrollable urge to sleep—this visionary French peasant led the French armies to victory over the English at Orleans in 1429.

General Philip Kearney, 1814-1862

A famous American general who lost an arm during the war with Mexico and went on to distinguish himself in the Civil War.

Helen Keller, 1880-1968

Born blind, deaf, and mute, but graduated cum laude from Radcliffe in 1904. She mastered five languages and wrote six books.

Dorothea Lange, 1895-1965

Walked with a limp due to a bout with polio at the age of seven. Lange spent her life traveling the world photographing the disenfranchised. She is most famous for her documentary images of American rural life during the Great Depression.

Lord Horatio Nelson, 1758-1805

Lost an eye and one arm, but went on to become an admiral and the hero of the battle of Trafalgar, where he destroyed the combined French and Spanish fleets.

John Milton, 1608-1674

Became blind at age 43, but went on to create his most famous epic, Paradise Lost. Considered by many to be the greatest English poet after Shakespeare.

Alexander Pope, 1688-1744

A hunchback who was the first English poet to enjoy contemporary fame throughout the European continent and to see translations of his poems into modern as well as ancient languages.

Wiley Post, 1899-1935

Despite the loss of one eye, he became one of the most colorful figures of the early years of U.S. aviation and made the first solo flight around the world in 1933.

Charles Steinmetz, 1865-1923

A hunchback, this German-born American electrical engineer developed a practical method of making calculations of alternating current, thus revolutionizing electrical engineering.

Heavy Duty Impeller Pump

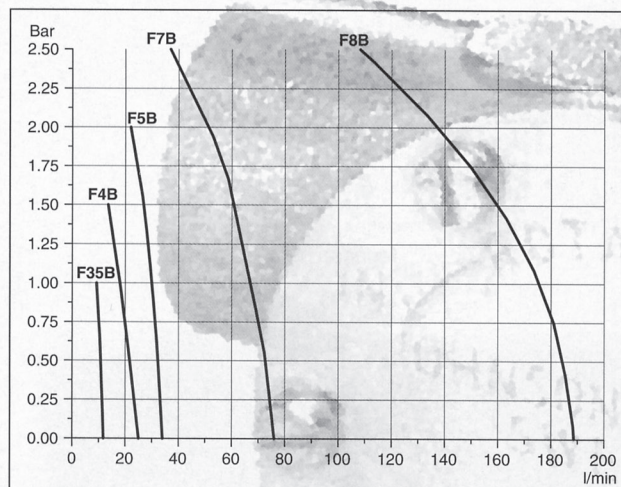
A range of multipurpose bronze pumps. Compact design, raw water resistant pumps at an attractive price – with the renowned Johnson Pump quality. These pumps are designed for a number of applications on board.

With excellent self-priming capability, these pumps are ideal as cooling water pumps for marine engines, bilge pumps, deckwash pumps, fresh water pumps, fuel transfer pumps and other applications. Also ideally suited on shore to empty septic tanks, to flush clean and to fill water tanks. Available in sizes from $\frac{3}{8}$ " to $1\frac{1}{2}$ " (1GPM - 75GPM).

Vacuum switch as extra accessory

Capacity range

Neoprene impeller – 1400 rpm – Full cam – Water at 20°C



F4B-8 – $\frac{3}{8}$ "

Pump body: Bronze

Impeller: 09-810B (neoprene)

09-810B-9 (nitrile)

Shaft: Stainless steel

The shaft is mounted with permanently lubricated double ball bearings

Seal: Mechanical seal alt. lip seal.

Cam: Full or reduced

Connection: $\frac{3}{8}$ " NPT

Dimensions and Weight

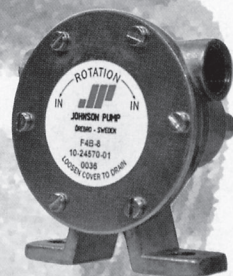
Length: 4.37"

Width: 3.15"

Height: 1.97"

Drive shaft dia: $\phi \frac{3}{8}$ "

Weight: 1.8 lbs



Order No.

10-24570-52 Lipseal, neoprene impeller, full cam

On request: Nitrile impeller, reduced cam

*10-24570-51 Mechanical seal, neoprene impeller, full cam

F35B-8 – $\frac{3}{8}$ "

Pump body: Bronze

Impeller: 09-808B (neoprene)

Shaft: Stainless steel

The shaft is mounted with permanently lubricated double ball bearings

Seal: Mechanical seal alt. lip seal.

Cam: Full or reduced

Connection: $\frac{3}{8}$ " NPT

Dimensions and Weight

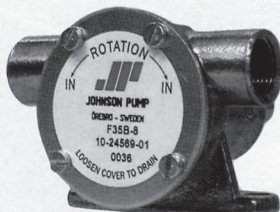
Length: 4.29"

Width: 3.14"

Height: 1.18"

Drive shaft dia: $\phi \frac{3}{8}$ "

Weight: 1.2 lbs



Order No.

10-24569-52 Lipseal, neoprene impeller, full cam

On request: Reduced cam

*10-24569-51 Mechanical seal, neoprene impeller, full cam

F5B-8 – $\frac{3}{4}$ "

Pump body: Bronze

Impeller: 09-1027B (neoprene)

09-1027B-9 (nitrile)

Shaft: Stainless steel

The shaft is mounted with permanently lubricated double ball bearings

Seal: Mechanical seal alt. lip seal.

Cam: Full or reduced

Connection: $\frac{3}{4}$ " NPT

Dimensions and Weight

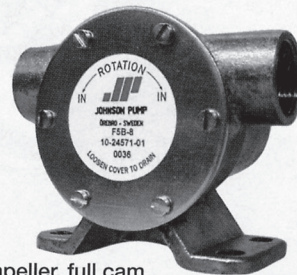
Length: 5.95"

Width: 4.17"

Height: 1.97"

Drive shaft dia: $\phi \frac{5}{8}$ "

Weight: 3.5 lbs



Order No.

10-24571-52 Lipseal, neoprene impeller, full cam

On request: Nitrile impeller, reduced cam

*10-24571-51 Mechanical seal, neoprene impeller, full cam

* Mechanical seal version available on request

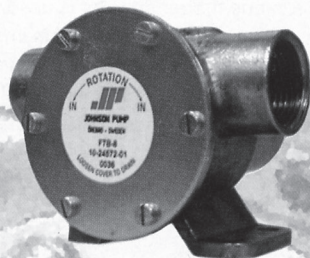


F7B-8 – 1"

Pump body: Bronze
Impeller: 09-1028B (neoprene)
Shaft: Stainless steel
The shaft is mounted with permanently lubricated double ball bearings
Seal: Mechanical seal alt. lip seal.
Cam: Full or reduced
Connection: 1" NPT

Dimensions and Weight

Length: 6.69"
Width: 4.72"
Height: 1.97"
Drive shaft dia: $\phi \frac{5}{8}$ "
Weight: 4.0 lbs



Order No.

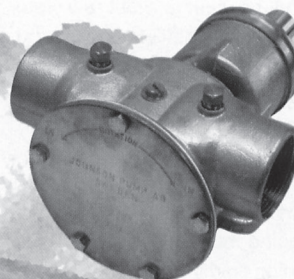
10-24572-51 Mechanical seal, neoprene impeller, full cam
Replaces series 10-24070

F8B-8 – 1.1/2"

Pump body: Bronze
Impeller: 09-819B (neoprene)
09-819B-9 (nitrile)
Shaft: Stainless steel
The shaft is mounted with permanently lubricated double ball bearings
Seal: Mechanical seal
Cam: Full or reduced
Connection: 1.1/2" NPT

Dimensions and Weight

Length: 217 mm
Width: 160 mm
Height: 65 mm
Drive shaft dia: $\phi 24 \times 8$ mm
Weight: 5.9 kg



Order No.

10-13021-9 Original Johnson Pump Style
24 mm shaft
*10-13021-95 US version 1 1/4" ports, 1" shaft keyed
10-13021-96 US version 1 1/2" ports, 1" shaft keyed

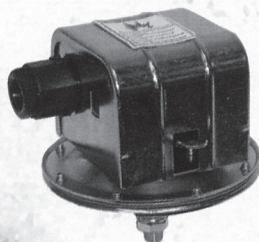
*replaces Jabsco series 6400

Vacuum Switch

for automatic shut off operation
to prevent pump damage

The vacuum switch works with all self-priming impeller pumps and should be used for e.g. bilge pumping/emptying of tanks to prevent the pump from dry running.

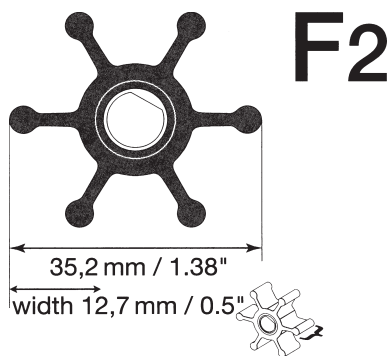
The vacuum switch automatically shuts the pump off when the bilge/tank is dry. With the switch fitted, you can start the pump by remote push button or manually by depressing lever on the switch.



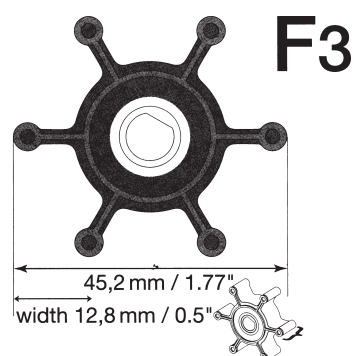
Order No.

09-45053

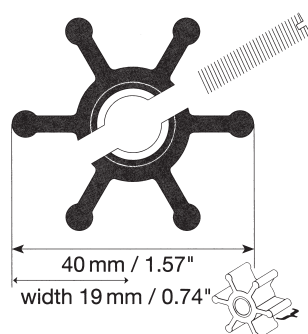




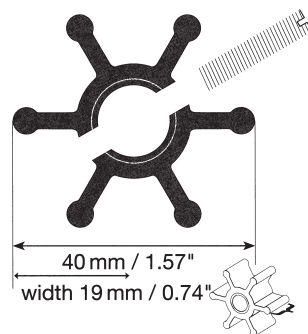
Impeller article number **09-1077B-9**
Nitrile (oil resistant)



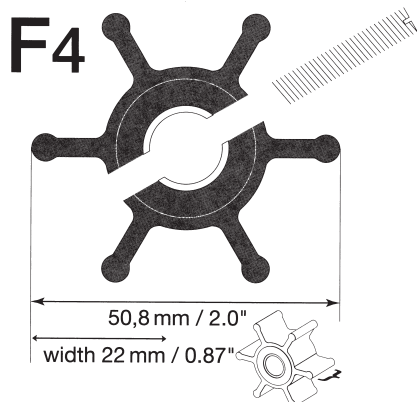
Impeller article number **09-1052S-9**
Nitrile (oil resistant)



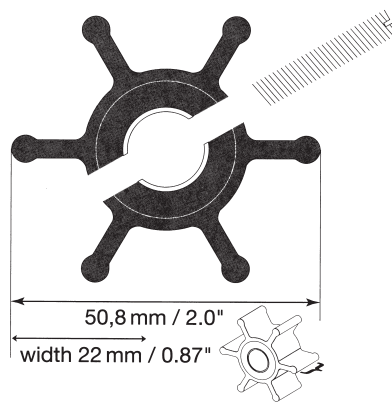
Impeller article number **09-806B**
Neoprene (for cooling)
replaces Jabsco 4528-0001 Europe & USA
inner diameter 9,5 mm



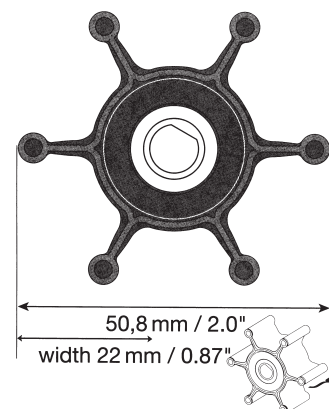
Impeller article number **09-808B**
Neoprene (for cooling)
replaces Jabsco 22405-0001 Europe & USA
inner diameter 12 mm



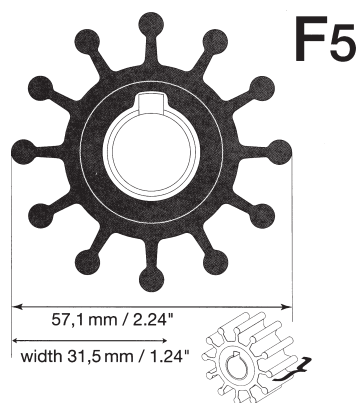
Impeller article number **09-810B**
Neoprene (for cooling)
replaces Jabsco 18653-0001 Europe & USA
Impeller article number **09-810B-9**
Nitrile (oil resistant)
inner diameter 12 mm



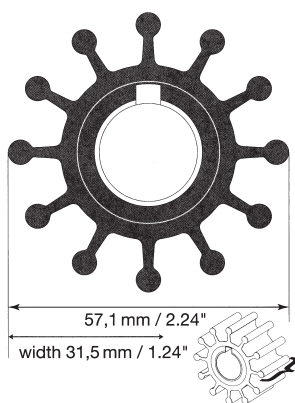
Impeller article number **09-1026B**
Neoprene (for cooling)
replaces Jabsco 673-0001 Europe & USA
Impeller article number **09-1026B-9**
Nitrile (oil resistant)
replaces Jabsco 673-0003 Europe & USA
inner diameter 12,7 mm



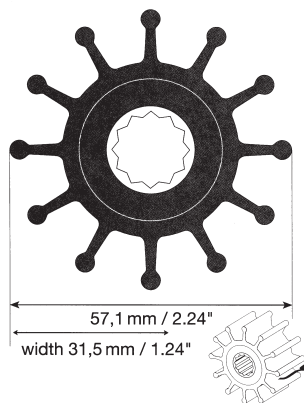
Impeller article number **09-824P-9**
Nitrile (oil resistant)
replaces Jabsco 6303-0003 Europe & USA



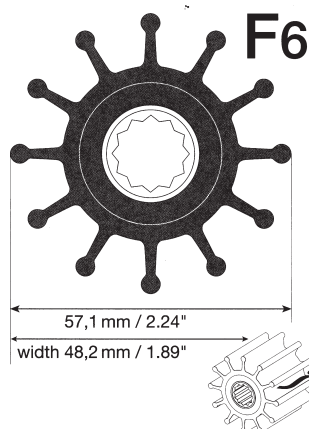
Impeller article number 09-801B
Neoprene (for cooling)
replaces Jabsco 4568-0001 Europe & USA
inner diameter 15,9 mm/key



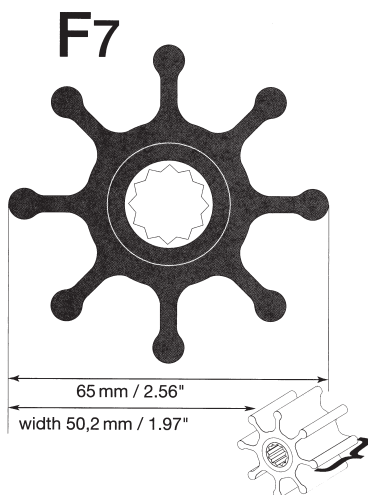
Impeller article number 09-804B-9
Nitrile (oil resistant)
inner diameter 20 mm/key



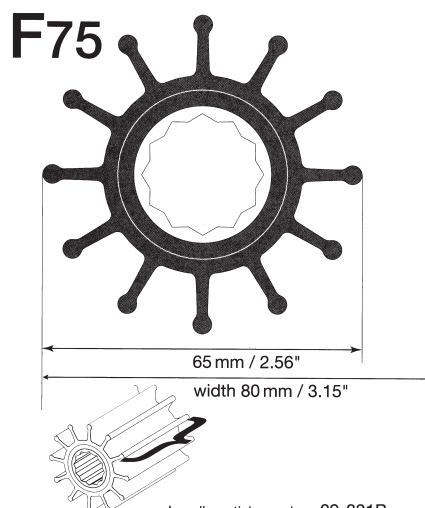
Impeller article number 09-1027B
Neoprene (for cooling)
replaces Jabsco 1210-0001 Europe & USA
Impeller article number 09-1027B-9
Nitrile (oil resistant)
replaces Jabsco 1210-0003 Europe & USA



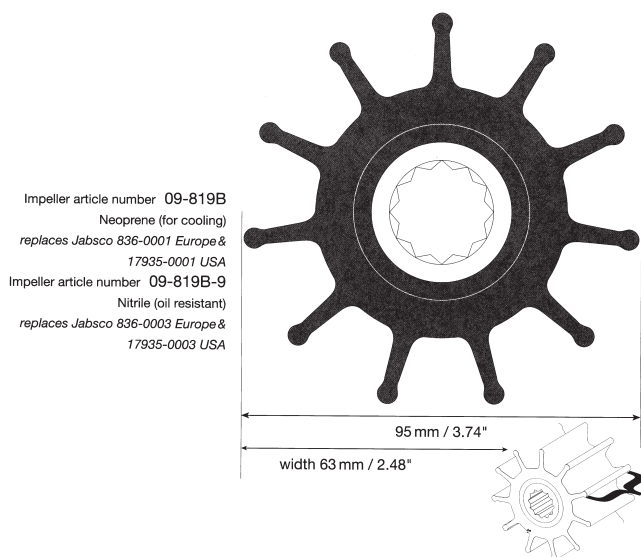
Impeller article number 09-812B
Neoprene (for cooling)
replaces Jabsco 13554-0001 USA



Impeller article number 09-1028B
Neoprene (for cooling)
replaces Jabsco 17937-0001 Europe & USA
Impeller article number 09-1028B-9
Nitrile (oil resistant)
replaces Jabsco 17937-0003 Europe & USA



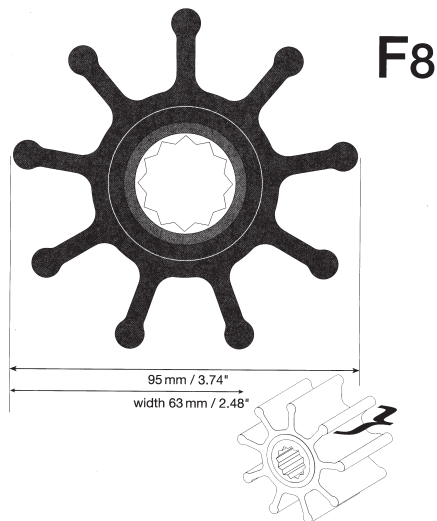
Impeller article number 09-821B
Neoprene (for cooling)



Impeller article number 09-819B
Neoprene (for cooling)
replaces Jabsco 836-0001 Europe &
17935-0001 USA
Impeller article number 09-819B-9
Nitrile (oil resistant)
replaces Jabsco 836-0003 Europe &
17935-0003 USA

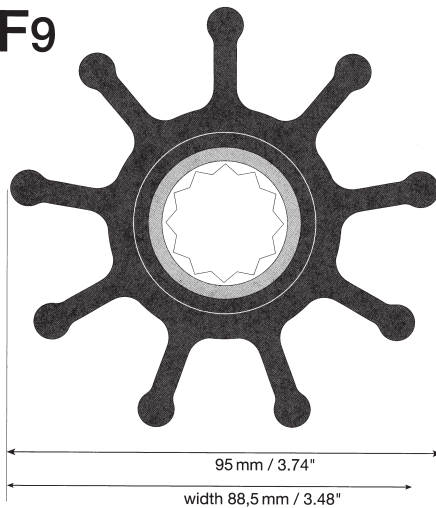
F8

Impeller article number 09-1029B
Neoprene (for cooling)
replaces Jabsco 836-0001 Europe &
17935-001 USA
Impeller article number 09-1029B-9
Nitrile (oil resistant)
replaces Jabsco 836-0003 Europe &
17935-003 USA



F8

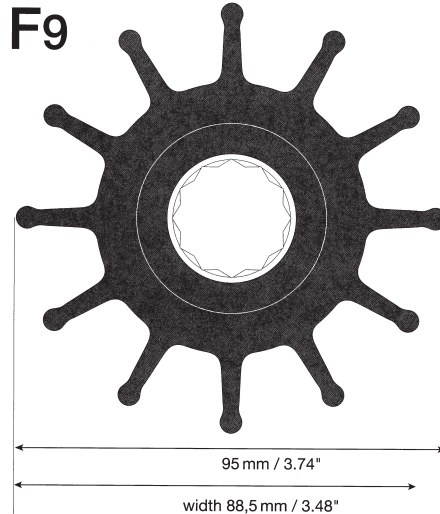
F9



Impeller article number 09-802B
Neoprene (for cooling)
replaces Jabsco 6760-0001 Europe & USA



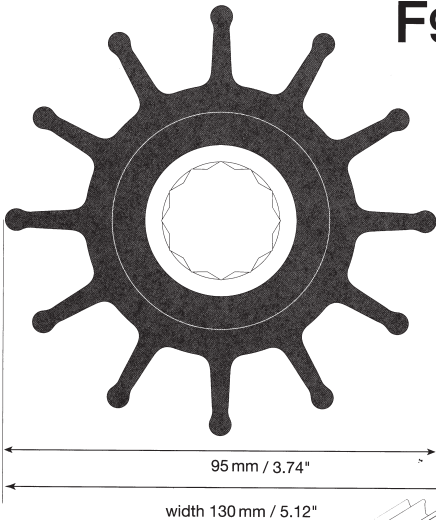
F9



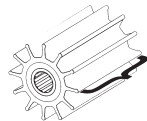
Impeller article number 09-814B
Neoprene (for cooling)
replaces Jabsco 21676-0001 Europe &
17936-0001 USA



F95



Impeller article number 09-820B
Neoprene (for cooling)



NEG	FRI	FRI	THU	WED	TUE	MON
8	7	6	5	4	3	2
16	15	14	13	12	11	9
23	22	21	20	19	18	17
31	30	29	28	27	26	25
38	37	36	35	34	33	32

RUSH JOB CALENDAR

1. Every job is in a rush. Everyone wants his job yesterday. With this calendar, a customer can order his work on the **7th** and have it delivered on the **3rd**
2. All customers want their jobs on **Friday** so there are two **Fridays** in every week. ,
3. There are seven days at the end of the month for those end-of-the-month jobs
4. There will be no first-of-the-month bills to be paid, as there isn't any "first. " The "tenth" and "twenty-fifth" have also been omitted in case you have been asked to pay them one of those days
5. There are no bothersome non productive Saturdays and Sundays No time-and-a-half or doubletime to pay.
6. There's a new day each week called **Negotiation Day**.

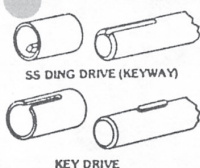
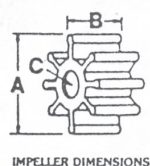
GLOBE/BARCO IMPELLER DIMENSIONS

SILHOUETTE NUMBER	GLOBE/BARCO MODEL NUMBERS	IMPELLER DIMENSIONS		SHAFT DIAMETER	BLADES
		"A"	"B"	"C"	
I	321	1 1/4	15/32	5/16SF	6
II	421	1 9/16	3/4	3/8PD	6
II	014	1 9/16	3/4	5/16 SF	6
III	1112	1 9/16	3/4	1/2PD	6
III	032SS	2	7/8	1/2SS	6
III	219	2	7/8	5/16PD	6
III	418	2	7/8	1/2K	6
III	815	2	7/8	1/2SF	6
III	912	2	7/8	5/16	6
III	6541	2	7/8	1/2PD	6
IV	025	2	7/8	5/16SF	6
V	050DF	2	7/8	5/8DF	10
V	419	2	7/8	1/2DF	10
V	223	2	7/8	5/8K	10
VI	1016	1 19/32	3/4	5/16SF	10
VI	050SS	2 1/4	1 1/4	1/2SS	12
VII	075	2 1/4	1 1/4	5/8	12
VII	100V	2 1/4	2	5/8	12
VII	1101	2 1/4	1 1/4	5/8K	12
VII	1130	2 1/4	25/32	1/2K	12
VII	6862	2 1/4	1 1/4	5/8DF	10
VIII	090	2 9/16	1 7/16	5/8	8
VIII	100	2 9/16	2	5/8	8
VIII	100DF	2 9/16	2	5/8DF	8
VIII	100SS	2 9/16	2	5/8SS	8
VIII	1111	2 9/16	3	5/8	8
VIII	1114	2 9/16	2	5/8K	8
VIII	1115	2 9/16	2	5/8K	8
VIII	2000	2 9/16	2	3/4K	8
IX	610	2 7/16	7/8	5/8K	12
IX	620	2 7/16	1 1/4	5/8K	12
X	625	2 9/16	1 5/8	5/8K	12
X	757	2 9/16	1 1/4	5/8K	12
XI	1015	2 1/4	3/4	3/8SF	6
XII	630	3 1/4	2 7/8	20MM	12
XIII	726	3 7/16	3/4	1 17/32	6
XIV	200DF	3 3/4	3 1/2	1DF	12
XIV	1019	3 3/4	2 1/2	1DF	12
XIV	1113	3 3/4	2 1/2	1	12
XIV	1213	3 3/4	3 1/2	1	12
XV	125	3 3/4	2 1/2	1	9
XV	200	3 3/4	3 1/2	1	9
XV	723	3 3/4	2 1/2	1K	9
XV	1127	3 3/4	2 1/2	1DF	10
XVI	318	2 1/4	1 1/4	5/8DF	12
XVI	616	2 1/4	1 1/4	5/8	10
XVII	110	2 9/16	2	5/8	10
XVII	110SS	2 9/16	2	5/8SS	10
XVII	845	2 9/16	2 21/32	5/8	10
XVIII	456	4 5/8	3 1/2	1DF	9
XIX	1000	2 11/64	1 19/64	7/8	6

OTHER PUMP REPLACEMENT PARTS

188	PUMP	613	CAM
188WP	WEAR PLATE	772	GASKET
188EC	END COVER	773	GASKET
188PH	PUMPHEAD	774	GASKET
457	CAM	775	GASKET
463	CAM	970	IMPELLER
464	CAM	6408	SEAL
465	CAM	92700	SEAL

* All GLOBE/BARCO impellers have a 12 point spline drive unless otherwise noted under shaft diameter



GLOBE/BARCO PUMP REPLACEMENT PARTS

Cross Reference By Manufacturer Or Engine Company Part Number

MODEL NUMBERS		GLOBE/BARCO MODEL NUMBERS
JABSCO		
331-0001	thru 8	125
673-0001	thru 8	6541
702-0001	thru 8	100
790-0001	thru 8	125
807-0001	thru 8	125
816-0000		772
834-0001		464
836-0001	thru 8	125
890-0000		773
920-0001		100
934-0000		463
964-0001	thru 8	100
1111-0001	thru 8	100
1133-0001	thru 8	6541
1210-0001	thru 8	075
1414-0001	thru 8	321
1427-0001	thru 8	1101
2173-0001	thru 8	1114
2820-0001	thru 8	1114
2877-0001	thru 8	1101
3085-0001	thru 8	616
3255-0000		463
3605-0001	thru 8	6541
4527-0001	thru 8	219
4528-0001	thru 8	421
4568-0001	thru 8	1101
4598-0001	thru 8	1115
5243-0010		014
5616-0001	thru 8	032SS
5915-0001	thru 8	100
5929-0001	thru 8	050SS
6056-0001	thru 8	100SS
6056-NITRILE		110SS
6050 SERIES		188
6303-0001	thru 8	025
6407-0010		6408
6760-0001	thru 8	200
6988-0000		465
7273-0001	thru 8	912
7614-0001	thru 8	6862
8444-0001	thru 8	318
8566-0001	thru 8	6862
8840-0001	thru 8	100DF
8980-0001	thru 8	318
8981-0001	thru 8	100DF
8983-0001	thru 8	1127
8984-0001	thru 15	456
9200-0001	thru 8	1016
11979-0001	thru 8	090
12222-0001	thru 8	125
12326-0001	thru 8	100SS
12516-0001	thru 8	912
12946-0001	thru 8	6862
12977-0001	thru 8	1014
14281-0001	thru 8	318
14282-0001	thru 8	100DF
14346-0001	thru 8	1019
14544-0001	thru 8	6862
14545-0001	thru 8	318
14549-0001	thru 8	100DF
14556-0001	thru 8	100DF
14600-0001	thru 8	6862
14601-0001	thru 8	318

MODEL NUMBERS		GLOBE/BARCO MODEL NUMBERS
14602-0001	thru 8	100DF
14603-0001	thru 8	100DF
14604-0001	thru 8	125
14605-0001	thru 8	1127
14750-0001	thru 8	321
14792-0001	thru 8	321
14806-0001	thru 8	318
14874-0001	thru 8	050DF
17018-0001	thru 8	1111
17222-0001	thru 8	1019
17370-0001	thru 8	200DF
17374-0001	thru 8	613
17935-0001	thru 8	1113
17936-0001	thru 8	1213
17937-0001	thru 8	110
17992-0001	thru 8	100
18018-0001	thru 8	125
18021-0001	thru 8	125
18785-0000	thru 8	457
18786-0001	thru 8	456
18838-0001	thru 8	620
18948-0001	thru 8	625
22120-0001	thru 8	100V
92700-0080		92700
114868-0001	thru 8	100

BEARCAT/HOMELITE

90354-A	223
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CATERPILLAR

1L4774	125
3N1906	100
3N4859	200DF
3N4860	613
3N5895	1111
3N9009	100
4L8470	200
4N6582	1111
5N9360	1113
6L8792	6408
7E0321	630
PP1027	456
PP1028	457

CRUSADER

20300	625
1003026	620

CUMMINS DIESEL

B10615	625
21601R	125
136519	6408
166758	125
177543	773
556540	125
650607	100
3008503	200DF
3008505	613
3908220	620
3916852	630

DETROIT DIESEL

5193553	125
5193562	773
5193602	100
5193603	772
5196168	200

Continued....

Cross Reference By Manufacturer Or Engine Company Part Number

MODEL NUMBERS	GLOBE/BARCO MODEL NUMBERS
DETROIT DIESEL	
Continued	
5198419	6408
5198550	200
8924838	1113
8924839	1213
8927570	200DF
8927571	613
23502086	456
23502089	457
FORD LEHMAN	
920	100
1210	075
HINO/KASHIYAMA	
16131-1300	845
ISUZU	
N5-2623-60-06-0	845
JOHNSON PUMP	
01-42424F8/F9	773
01-42445F7	772
08-804B-9	050SS
08-810B	6541
08-812B	100V
08-1026S	025
08-1029B	125
09-801B	1101
09-802B	200
09-806B	421
09-808B	1112
09-814B	1213
09-1026B	6541
09-1027B	075
09-1028B	100
MERCRUISER	
47-59362	2000
47-89984	1000
NORTHERN LIGHTS	
23-11031	100V
25-12002	075
145116140	075
145116180	419
OBERDORFER	
B6593	815
B6603	1114
B6620	1101
B86617	025
C7054	125
C7441	100
ONAN	
131-0160	1014
131-0386	1015
131-02189 KIT	1014
132-0117	620
132-0162	075
132-0316	815
132-0317	620
132B59	421
PERKINS	
0460027	125
0460038	075
24880031	100
NA900010	620
NA900012	625

INSTRUCTIONS FOR CHANGING GLOBE/BARCO IMPELLERS DISASSEMBLY

1. Remove screws that hold end cover.
2. Remove end cover.
3. Remove gasket. We recommend replacing gasket each time pump is disassembled.
4. Using a good pair of pliers, the impeller can be removed by placing a firm grip on the hub of the impeller and pulling outward.
5. The seal can now be removed if necessary. Observe which direction the seal is seated, so that it can be properly replaced.

MODEL NUMBERS	GLOBE/BARCO MODEL NUMBERS
PLEASURE CRAFT	
RO 061003	075
RO 61003E	100
RO 61015	620
RO 61017	625
PROVEN	
T100-4	757
T100-8	100
T100-12	723
RARITAN	
CH13	025
CH119D1	726
G13	025
SHERWOOD	
9000	610
9959	620
10077	1130
10187	1114
10615	625
11843	625
12336	1130
12337	620
12338	1114
17000	630
TEEL	
1R215	1130
1R216	620
1R217	1114
UNIVERSAL	
287439	1130
295628	815
302571	075
302875	610
VOLVO	
825941	100
834794	100V
835512	620
835874	625
844683	1213
875575	1101
875583	1112
875593	100
875660	125
875697	1213
875807	421
875808	6541
875811	075
WESTERBEKE	
11418	620
11764	1130
11907	620
18184	032SS
32620	1112
33100	1130
344407	6541
YANMAR	
104211-42072	421
124223-42091	418
128170-42070	321
145410-46090	1101

ASSEMBLY

1. Reassemble seal in pump. Make sure it has a good tight seal.
2. Start new impeller on the shaft and into the pump with a rotating motion in intended direction until proper alignment is made (whether spline, flat, pin, key or ding drive).
3. Replace gasket and align with the holes on the pump housing.
4. Replace end cover and screws.

Start-up note: IT IS NOT NECESSARY TO LUBRICATE YOUR NEW GLOBE/BARCO IMPELLER.

GLOBE/BARCO IMPELLERS

Engine and Generator Cross Reference

Engine	Globe/Barco Impeller
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CATERPILLAR

3208T, TA w/ Sherwood	630
3208T w/ Jabsco	100
3208TA w/ Jabsco	1113
3406, 353	200DF
3412	456

CHRIS CRAFT

Series K (95-120HP)	075
Series M (131-158HP)	075
Series F (283-327HP)	625
A-16, M-10263G	620
M-10264G, 630-2	620
D-05, S-11095G, G-45-1	625
M10261G, M10095G	1130
M10200G, N10360G	1130
N10200G	1130

CHRYSLER MARINE

M-80 (CW), E5913M, M-80	620
(CCW) E5839M, Slant 6	620
M225X, M273X, LM318X (double)	620
LM340X, LM318X (Single)	625
M383X, M413E, M440X	620 & 625
360	625
P10560G, P10710G, P10610G	620
A03, Q10855G, D75, R10935G	620
D60, N10390G, D65	620
P10550G, D55 (9959)	620
P10550G, D55 (10615)	625
C03, G5, G51, F10, G50, G7	625

CRUSADER

270HP	620
300HP, 350HP (#454)	625
H10, M10270G, M10280G, Q10755G	620
10765G, M10210G, N10410G	620
P10700G, F15	620
S11040G, B04, E35	625
E20	1130

CUMMINS

504M	100
VT903, 555	125 or 1113
4B210, 250B	625
4BT250, 6BT300, 6BT400, 300B	630

DETROIT DIESEL

4-53, 8.2	100
6-71, 6V53	1113
6-92, 8V92	456
8V71, 12V71, J & T 6-71	1213

JABSCO

9900, 2620	6541
6400, 6590, 7420, 11870	125
2300, 5330, 11860, 12280	100
3270, 1673, 10190, 5850	075
3380, 3890, 14210, 11850	075
18830, 18840	075
12050, 10190	616
4530, 2760, 4540, 17120	421
5320	032SS
11810	050SS
6850, 6050	100SS
6360, 6370, 6380	025 Water Puppy
18690	025

Engine	Globe/Barco Impeller
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JOHNSON & TOWERS

6-71 All	1213
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JOHNSON PUMPS

F5B5007, F5B8007, F5B8907	075
F5B3007, F5B3907, F5B3927	075
F5B3927, F5B30007, F5B39007	075
F5B30207, F5B39207, F5B1907	075
F7B5007, F7B50017, F7B8007	100
F7B8907, F7B8037, F7B8937	100
F7B3007, F7B3907, F7B3037	100
F7B3937, F7B30007, F7B39007	100
F7B30307, F7B39307, F7B30207	100
F7B39207	100
F8B5000, F8B50017, F8B8007	125
F8B8907, F8B8037, F8B3000	125
F8B3900, F8B3030, F8B3930	125
F9B5007, F9B3007, F9B3037	200
F9B3027	200
F9B5607, F9B3607, F8B3637	1213
F9B3627	1213
F35B8027	1112
F4B8007, F4B8027, F4B8907	6541
F4B8927, F4B8037, F4B8937	6541
F3B1907	025
TA3P1019 Macerator 12/24/32V	025

LEHMAN

85-135HP	075
200HP and up	100

MACERATOR PUMPS

ALL	025
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MERCURISERS

Inboards 1981 to Present (Belt)	2000
Stern Drives, Outboards 80 HP+	1000
Alpha Drive	1000

OVERDORFER

201DA88, 201DA89, 201DA90	025
201M, 202M	815
211MF34, 214MF34	815
209MA92, 209MA94	025
301M, 305MC75, 305MF77	1101
401M2	100
405M4M26, 405M4N26, M405MK4M26	1114
405MK4N26, M405M475	1114
501M	125

OMC

G422, G46, H85, G45-2	625
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ONAN

4.0kw	421
6.5kw	1014
8.0kw	815
10-12kw	075
20kw, RPGC, K75	620
L10	625

PATHFINDER

J90	625
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Engine	Globe/Barco Impeller
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PERKINS

RPBC	625
654	100
4107, 4108-Jabsco	075
4108-Sherwood	620
H5, B06G65	620

PLEASURE CRAFT

302 C.I. (225HP)	620
351 C.I. (#270)	620
454 CI	625

UNIVERSAL

G903	610
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Engine	Globe/Barco Impeller
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VOLVO

MD1, MD26, MD2B, MD10	421
MD6A	421
AQD21A, AQ200-225	075
AQ260-280	075
MD328, TAMD40, TND70	100
AQ200, 225, 250, 270, 290	100V
AQ220A, B, C, AQ225A, B, C	620
AQ255A	620
AQADA40A (TAMD40A)	125

WESTERBEKE

F85, R10870G	620
F95	625
A20, R30G1, H70	1130

YAMAHA

R991	620
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POLI-TALKS

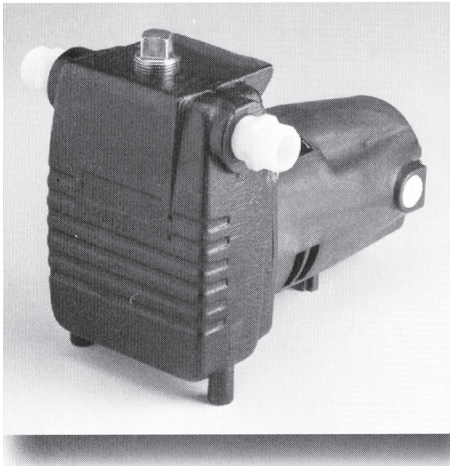
More quotes from (and about) our revered politicians.

- "I think it's about time we voted for senators with breasts. After all, we've been voting for boobs long enough." -Claire Sargent, Arizona senate candidate in 1992, on women candidates
- "They told me to go for the jugular-so I did. It was mine." —Bob Dole, on the 1976 failure of the Ford-Dole ticket
- "Politics is show business for ugly people."-Paul Begala, Clinton's campaign adviser
- "Washington is Salem. If we're not lynching somebody 24 hours a day in this wretched town, we're not happy." -Tom Korologos, Washington lobbyist
- "That's a good question. Let me try to evade you." -Paul Tsongas, presidential candidate, in 1992
- "Look, half the time when I see the evening news, I wouldn't be for me, either." -Bill Clinton, in 1995
- "Democracy is the process by which people choose the man who'll get the blame." -Bertrand Russell
- "Unlike the president, I inhaled. And then I threw up." -Christine Todd Whitman, governor of New Jersey
- "If hypocrisy were gold, the Capitol would be Fort Knox." -Sen. John McCain

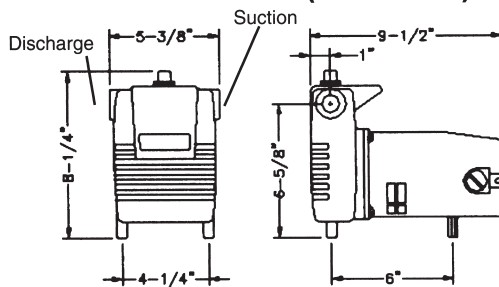


"The Most Trusted Name In Water"SM

5PHP Series Portable Hose Pump



Dimensions (In Inches)



Applications:

Home: Basement flood dewatering; liquid fertilizing of lawn, trees, shrubs; boosting pressure for car washing; emptying of pleasure boat bilges; use as a standby pump.

Farm: Filling stock tanks; spreading liquid fertilizer; dewatering low spots; draining pits; washing car, truck and farm machinery.

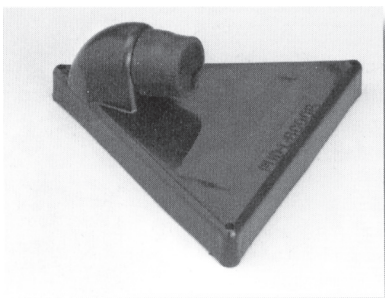
PHP Pump delivers up to 1200 GPH for fast drainage.

Industry: Pit draining; filling and draining tanks and drums; circulation of liquids; circulating soluble cutting fluids; boosting pressure for equipment cleaning.

Features:

- ☐ **Rugged cast iron body** plus motor weighs just 15 pounds – easily moved from job to job.
- ☐ **High-powered motor** – 1/2 HP, 7500 RPM, 115 Volt, 9 Amp electric double ball bearing motor.
- ☐ **Compact** – just 9-1/2" long
- ☐ **High-efficiency, molded open-type impeller**
- ☐ **Equipped with 10 feet of 3-conductor electric cord** with molded plug on double insulated motor (grounding pin not required).
- ☐ 3/4" FNPT suction, 3/4" FNPT discharge
- ☐ **Maximum temperature 150½F.**
- ☐ **Up to 25' lift.**

Note: Pump must always be primed before operation. If run dry, damage will occur.



ORDERING INFORMATION

Order No.	Model No.	HP	Description
9172-0279	5PHP	1/2	Portable Centrifugal

Pud-L-Scoop

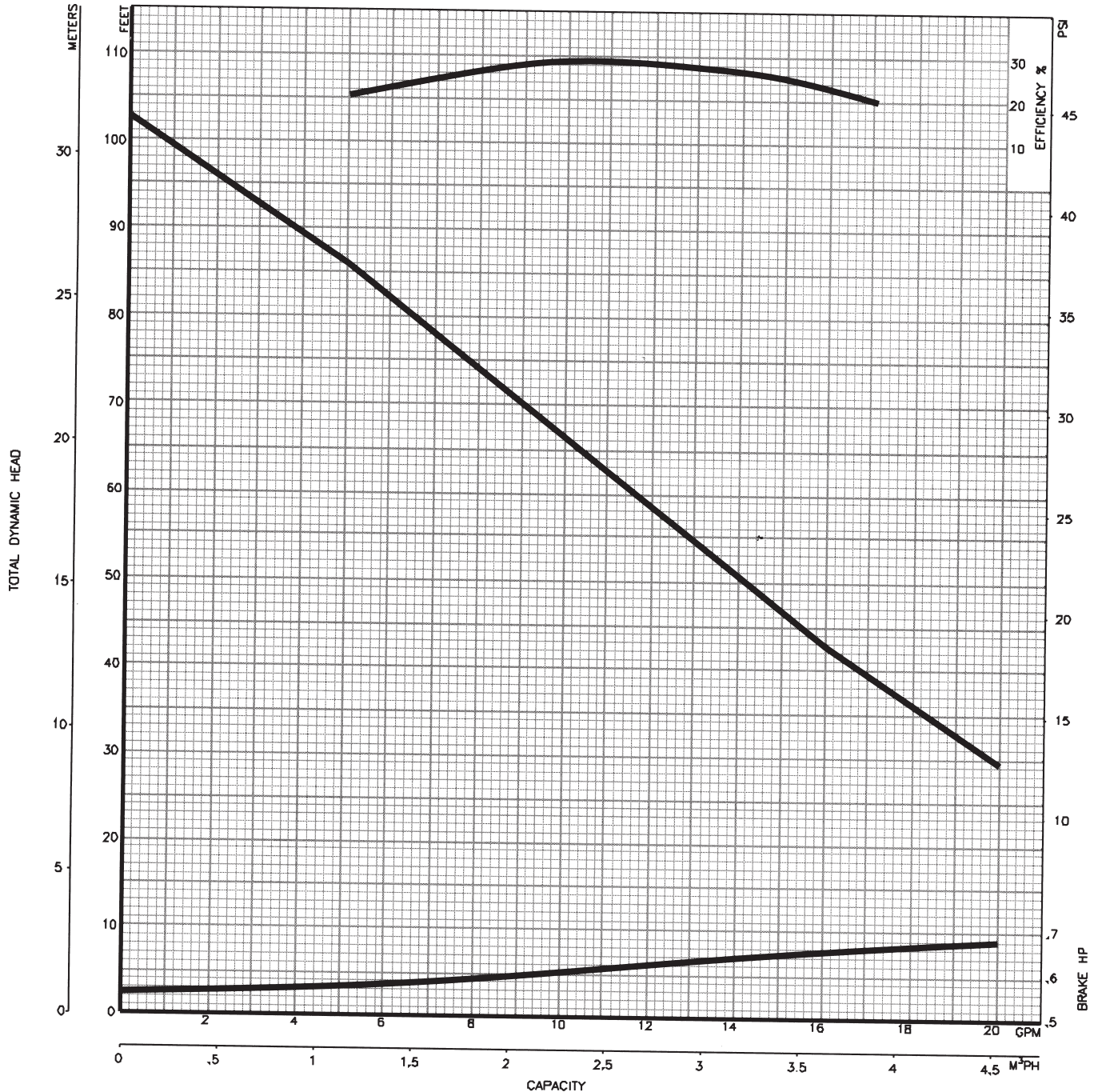
ORDERING INFORMATION

Order No.	Model No	Description	Weight
90151	PUD-L-SCOOP	Vacuum Head	1



"The Most Trusted Name In Water"SM

5PHP Series Performance



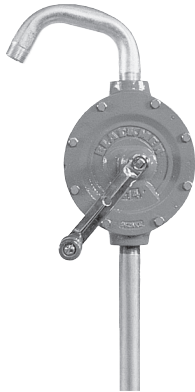
Performance Chart

Total PSI	44	41	39	35	32	29	25	22	19	15	13
Head Feet	103	96	89	82	74	66	58	50	43	36	29
GPM	0	2	4	6	8	10	12	14	16	18	20
GPH	0	120	240	360	480	600	720	840	960	1080	1200

WARNING: Use Non-Collapsible Suction Hose only.

blackmer

HAND OPERATED PUMPS



APPLICATIONS

Liquid dispensing: Pumping petroleum products, solvents, coolants or curing agents from barrels or drums into smaller containers for convenient handling, sales, or small quantity use.

Liquid transfer: Moving fuels, solvents, commercial and process liquids from drums to other large tanks with a hose and nozzle, as in refueling diesel or gasoline powered vehicles or equipment.

In-line systems applications: Transfer of fuels, solvents, and other liquids from one large container to another by means of a permanently piped, fixed system with the pump as an integral part of a transfer line. Often used to move liquids from central or nearby outside storage to in-plant drums or tanks.

Flammable liquids handling: FM Approved models meet OSHA safety guidelines and regulations for handling Class I and Class II flammable and combustible liquids like gasoline, naphtha, solvents and thinners.

OEM applications: With pumps mounted directly on agricultural or off-road equipment for standby fueling or pre-lubricating of bearing surfaces on large diesel engines before start-up.

SELECTION DATA

PUMP MODEL	LIQUID SERVICE	CAPACITY GAL @ 115 REV (LITS. @ 115 REV)	PORT SIZE NPT	MAXIMUM VISCOSITY SSU (Cs)	MAXIMUM PRESSURE PSI (kPa)	MAXIMUM TEMPERATURE °F (°C)
210A	General Transfer	10 (38)	3/4"	2000 (420)	10 (0.7)	300 (149)
F210A	Flammable/Combustible Fluids	10 (38)	3/4"	2000 (420)	10 (0.7)	300 (149)
414B	Heavy-Duty Transfer	14 (53)	1 1/4"	10,000 (2,200)	20 (1.4)	300 (149)
807B	Heavy-Duty Viscous Fluid Transfer	7 (26)	1 1/4"	30,000 (6,300)	40 (2.8)	300 (149)
828B	Heavy-Duty High Volume Transfer	28 (106)	1 1/4"	5,000 (1,050)	10 (0.7)	300 (149)

STANDARD MATERIALS OF CONSTRUCTION – AT MODELS

PUMP CASING	ROTOR	VANES	SPRINGS	SPOUT/ SUCTION PIPE	SUCTION PIPE O-RING
Cast Iron	Cast Iron	Carbon	Stainless Steel	Galvanized Steel	Buna-N

Invention

Great discoveries and improvements invariably involve the cooperation of many minds. I may be given credit for the subsequent developments I feel the credit is due to others rather than to myself. Alexander Graham Bell

Investment

The best investment is in the tools of one's own trade. Benjamin Franklin

The three great philosophical questions that all philosophers concern themselves with are these:

Where did I come from (the question of origin)?

Why am I here (the question of purpose)?

Where am I going (the question of destiny)?

Origins

Swiss scientist Charles Guye calculated the possibility of even one protein (not 239) with an average amino-acid chain getting lined up in the proper sequence as 1 in 10 to the 321st power (10 with 321 zeros behind it). To give you an idea of how outrageous number that is, the total number of fundamental particles in the universe is 10 to the 134 power (10 with 134 zeros behind it). That means there aren't enough fundamental particles in the entire universe to illustrate the odds of even a single protein molecule.

Dr. Guye also claimed that the time required to run the optional combinations would be 10 to the 234 power billion years. Even if one assumes the earth is 4.5 billion years old, 4.5 billion years is only 10 to the 18 power in seconds. Putting both of these concepts together, there aren't enough particles in the universe to illustrate the impossible odds, nor is there enough time to even begin to run the potential options. And remember, we're talking about only one protein, not 239. If we take the same principles of probability and apply them to a single cell, the odds become 1 in 10 to the 137,915.28 power. No wonder biologist Edwin Conklin said, "The probability of life origination from accident is comparable to the probability of the unabridged dictionary resulting from an explosion in a printing shop." Sir Frederic Hoyle of Cambridge University said, "The chance that higher life forms might have emerged in this way is comparable with the chance that a tornado sweeping through a junkyard might assemble a Boeing 747 from the materials therein." Clearly, it didn't happen by chance.

>From Five Lies of the Century by David Moore

Index Section E

PLUMBING

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The Illusion of Scarcity

The fundamental idea of ecological scarcity belies everything we know about this planet of ours, about economics, supply and demand, price and technological innovation over time. This notion that there are absolute limits-that we are going to run out of everything we have today-rests on mindless linear extrapolation. Take a trend 5% a year, compound it into the future, and you get an absurd result. This is due to the law of compounding. It only takes ten years to double if something is compounding at a 7% rate, and once you start doubling things you can very easily get to absurd results.

The best way to deal with current apocalyptic predictions based on linear extrapolation is to look at some predictions from the past. Look at the forecast about U.S. crop land from 1910. We had 400 million acres of crop-land in this country. We were using one fourth of that simply to produce fodder for the horses necessary to work the land, to produce the crops, to feed the population using the remaining 75% of land. It was predicted that by 1978, given the projected growth of the population and the economy (the projected rates of both were accurate) he calculated the rate of food consumption to dollars of personal income. He then applied the food requirements of our society to the 400 million acres of crop land and found it would take 500 million acres of crop land to produce the fodder to feed the animals needed to produce the food. By using this type of extrapolation one would and did come to the conclusion that we would need more land to feed the animals than we had for growing our entire food supply!

The next example is from the solid fuels planning division in 1918. This division was worried about our basic supply of coal at the time. Coal was approximately 75% of our energy consumption at that time. These planners noted that in 1918 we used 650 million tons of coal. They further noted that the growth rate of coal consumption was 5.4% for the last twenty years, and so they extrapolated forward to 1978 and found that the coal requirements would then be ten billion tons-which was fifteen times . more than was used in 1978. Furthermore, it would require 10 million men in the mines (about 50 times more than were actually working the mines in 1978), resulting in acres of coal-carrying railcars all over the country, and everything covered with soot. Now, that linear extrapolation model didn't take into account the technological possibilities in the interim, just as happened the case of farming. For example, with farming we don't need horses much anymore because the entire industry has been mechanized. In the case of the solid fuels planner, he could not foresee the increases in efficiency, technology, and other energy sources, with the net result that in 1978 we actually used less coal than we used in 1918. The same has happened to oil field projections. North Sea oil fields that were projected just twenty years ago to be drying up today, are today producing more barrels per day than when the projections were made!

Any planner in 1920 worth his salt would have predicted that by the year 1950 we would have suffered a complete shortage of iron ore. It was all there in the numbers-the available reserves, the rate we were using them, and so forth. But what couldn't be seen was that some major technological changes, driven by price, changed supply and demand relationships. We found we could get the iron ore we need out of taconite, which has a 75% lower iron ore content than the ore bodies we were using in 1920. The predicted scarcity was averted because linear forecasters cannot predict the effect technology, substitution or the impact of prices has on people, driving their ingenuity and their innovative capacity to find solutions to problems that are anticipated. These examples are used to urge caution about such projections today. The problems projected can most often be overcome by technological advances, recycling, etc. The average production of corn in 1910 was 20 bushels an acre. In 1978, 450 bushels were being produced per acre. The fish catch in the world appeared to, level out at 70 million tons in 1970, and on the basis of linear forecasting you would expect we would have a growing protein shortage in the world. But we don't and the reason is U.S. soybean production, which has doubled in fifteen years.

The basic conclusion is that ecological scarcity is a state of mind rather than an assured reality. If we are to halt the gradual drift into statism developing in this country today (which follows inexorably from the logic of scarcity), and the subsequent loss of economic welfare, national wealth, liberties and national living standards that would go with it, then the basic idea of absolute limits and ecologically-based scarcity needs to be questioned, discredited and finally purged from those in government.

TYPE II MARINE SANITATION DEVICES

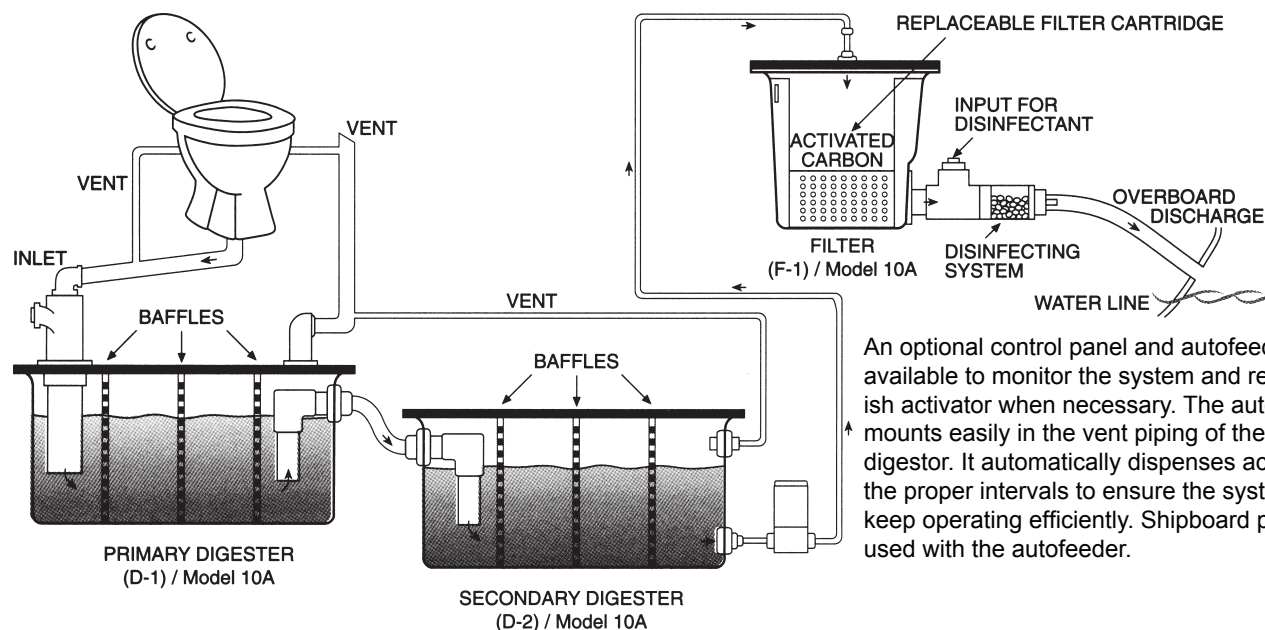
Every engineer appreciates that design is a process of choices. For some, choices mean tradeoffs—a little more strength, but added weight. Smart choices produce advantages. As you look at some of the choices made in the design of The HUMPHREY, consider how each choice saves money for you:

- **FLEXIBLE** - By choosing to use a modular design instead of large, bulky, all-in-one units, we give you ease of installation with greater flexibility in placement. HUMPHREY units can be stacked for compactness, or installed remotely from each other. The system is flexible, so you don't have to take your boat apart. Most systems can be installed in a matter of hours, depending on your particular application.
- **WORKABLE** - HUMPHREY components are usually small enough to pass through existing passageways—facilitating easy installation and minimizing costly down time.
- **LIGHTWEIGHT** - If weight is a critical constraint in your application, The HUMPHREY offers you the best solution. Our weight-to-performance ratio is outstanding any way you figure it.
- **NON-CORROSIVE** - By choosing to use non-corrosive materials (including a special space-age polymer yielding strength and durability), we offer you an MSD truly compatible with the harsh marine environment, instead of another source of rust to deal with below decks.

- **COST-EFFECTIVE** - HUMPHREY systems effectively treat waste for pennies a day per person. And with few moving parts, there are fewer opportunities for maintenance problems. Nevertheless, replacement parts are readily available and very inexpensive.
- **CUSTOMER-FRIENDLY** - By choosing to go with field-proven technologies from the start, we have been able to concentrate on how the product works for our customer. From listening to our customers, we have upgraded, refined and expanded the product into today's user-friendly model line which exceeds USCG requirements for effluent quality.

Now if you think the choices made in The HUMPHREY are to your advantage, please call us and let us provide whatever information you need... to make your own SMART CHOICE.

Sewage flows from the head(s) directly into the Primary digester (D1), a Secondary digester (D2), and a Filter (F1). As the sewage makes it way through a series of baffles in each digester, it is broken down and dissolved by natural bacterial action. The resulting effluent is then pumped through the filter when the float switch in the final compartment of the secondary digester is activated. Here the effluent is further purified and deodorized before passing through the disinfecting system, where final purification takes place. Periodically, a biodegradable activator is introduced into the head. Humphrey Activator consists of a yeast compound to stimulate bacteria growth and an enzyme compound to liquify solids. Activated carbon filters may be washed, reused and eventually replaced after service life has expired.

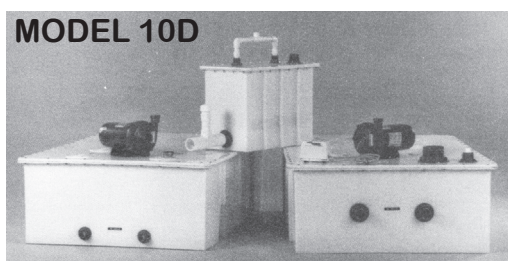
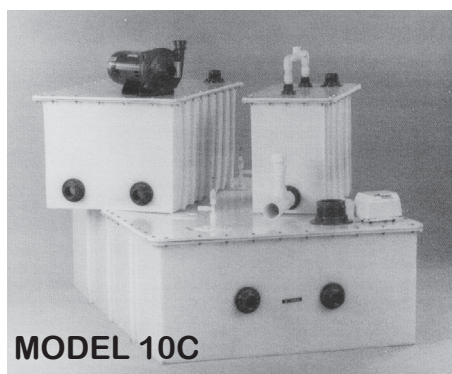
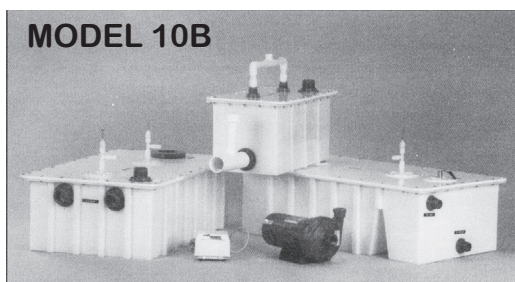
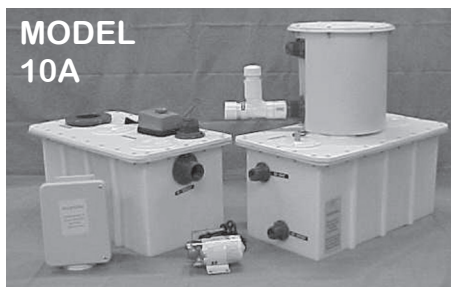


An optional control panel and autofeeder are available to monitor the system and replenish activator when necessary. The autofeeder mounts easily in the vent piping of the primary digester. It automatically dispenses activator in the proper intervals to ensure the system will keep operating efficiently. Shipboard power is used with the autofeeder.

The Humphrey Type II MSD's are fully certified by the USCG and are IMO* approved. Each Humphrey unit exceeds the effluent standard set by Pollution Act Federal Water (33 CFR 159) and carries our Certification Number to ensure absolute compliance with Federal laws. Because of the possibility of future changes in the law, The Humphrey is designed to yield effluent actually higher in quality than currently required by the USCG.

* The Model 12, designed for use by camp and small boat owners, was never submitted for IMO approval.

All Humphrey Sewage Treatment Systems start with field-proven technologies. The product that will serve you is the result of continuous upgrading and refinement. We will be eager to hear how The Humphrey is performing in your particular environment. It is by listening to customers like you that we have developed and refined a user-friendly model line fully prepared to meet water quality requirements in the 21st Century.



HUMPHREY - THIS IS THE WAY WE CHOOSE TO DO IT!

- **I.M.O. */ USCG approved** (No. 159.015/5403/0) meets or exceeds Federal standards (33 CFR 159)
- **Outstanding size-to-performance ratio** you can fit several Humphreys **inside** other Type II designs
- **Modular design creates flexible installation options** stack or separate components, creating space where you need it.
- **True marine-construction, using non-corrosive materials** Do you really want another source of rust below decks?
- **Low maintenance** periodic flush of activator & a spot check; uses fresh or salt water
- **Significant weight savings** equal or superior performance from smaller, lightweight units
- All add up to **reduced total operating costs!**



*** NOTE:**
Certified by the USCG, the Model 12 was designed for use by camp and small boat owners, and thus was not submitted for IMO approval. It is favored by camp owners in Louisiana as an ideal solution for compliance with new state regulations.

SEWAGE TREATMENT FOR ALL CAPACITIES

TYPE	FLOW RATE		COMPONENT SIZES			WT. in lbs.		POWER DRAW per 6 second flush	
	GPD	CREW	D-1	D-2	FILTER	DRY	WET	12VDC	110VAC
Model 12	2,770	3 man	n/a	27L x 15W x 12H	24L x 15W x 12H	40#	115#	6 amp	6 amp
Model 10A	5,760	8 man	27L x 15W x 12H	27L x 15W x 12H	24L x 15W x 12H	66#	225#	6 amp	6 amp
Model IOAB	5,780	15 man	42L x 25W x 12H	27L x 15W x 12H	24L x 15W x 12H	84#	336#	6 amp	6 amp
Model IOB	7,200	30 man	42L x 25W x 12H	42L x 25W x 12H	27L x 15W x 12H	158#	750#	n/a	11.2 amp
Model 10C	9,000	50 man	60L x 40W x 18H	42L x 25W x 18H	24L x 15W x 18H	208#	3000#	n/a	11.2 amp
Model 10D	11,160	75 man	60L x 40W x 18H	60L x 40W x 18H	42L x 25W x 18H	414#	4000#	n/a	11.2 amp

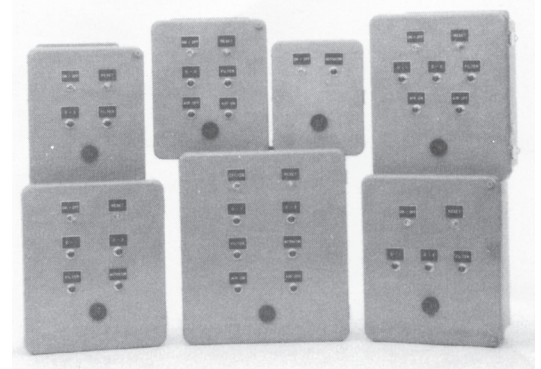


model 12
model 10A
model 10B

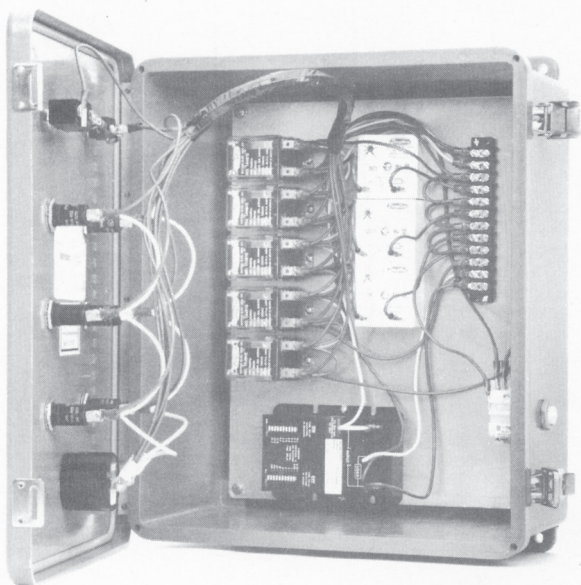
MORE IMPROVEMENTS FROM HUMPHREY MARINE!

Humphrey Marine has been a recognized leader in the field of sewage treatment for years. Now in keeping with a tradition of providing economical and dependable service Humphrey Marine introduces a line of monitor panels and automatic feeders for Humphrey sewage treatment systems.

The Humphrey Monitor Panel provides you with an early warning alarm of any blockage problems associated with your Humphrey Marine Sanitation Device. Both visual and audible alarms are used so you can find a problem before it gets out of hand. Humphrey Marine believes in the old adage an ounce of prevention is worth a pound of cure. Your crew will be happier, if there is a problem, when you have on board diagnostics with the Humphrey Monitor Panel. The monitor panel can save your crew from a potentially unpleasant cleanup situation and in some instances can save your company the expense of a service call. The monitor alarm will not be triggered by the normal wave action that your vessel would encounter. The enclosure is UL listed and made of fiberglass to eliminate rust and corrosion. It is simple to install and can be mounted in a remote location such as the engine room, helm, or any location where someone is normally on duty. Many models are available to fit your specific needs. Just one more effort by Humphrey Marine to provide the most affordable, reliable and user friendly marine sanitation devices available today!



The Humphrey Autofeeder uses a simple design that mounts easily in the vent piping of the primary digester. The Humphrey Autofeeder will automatically dispense the Humphrey activator in the proper intervals to ensure that your system will keep operating at peak efficiency. Shipboard power is used with the autofeeder and in the event of a power failure the autofeeder will automatically dose the system to make sure that it did not miss a scheduled cycle. The autofeeder will resume the normal cycle after initially dosing the system when power is restored. Your crew has enough to worry about in the operation of your vessel - let the Humphrey Autofeeder take care of this task for you. The Autofeeder can also be used with the Humphrey Monitor Panel to sound an alarm when the Activator level is too low and needs replenishing. Let Humphrey Marine monitor your system for you!





Marine Application Systems

The Seahorse "Mariner Series" Marine Sanitation Device is a self-contained biological treatment system that is sized to fit almost any application.

The Seahorse MSD's can meet any crew requirements for USCG, IMO, International, Local and State regulations. Units can also be custom designed to fit in many tight spaces.

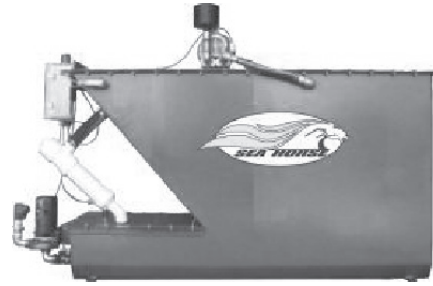
The Mariner Series comes complete with NEMA 4 waterproof enclosures with high level alarm, and discharge pump.

Seahorse also provides a complete line of products to help you maintain your system properly.

Features & Benefits:

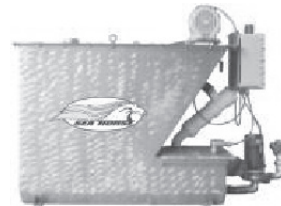
- USCG /IMO Certified Type II MSD
- Low Maintenance - few moving parts and no special tools required
- Crew sizes from 1 to 450+
- Certified to treat up 8500 GPD per single system
- Meets or exceeds all EPA, State or International requirements
- Standard Configurations and customs designs
- Operates in Fresh and Saltwater
- Carbon Steel, Stainless Steel, and Aluminum Construction
- Standard carbon steel unit

MARINER SERIES



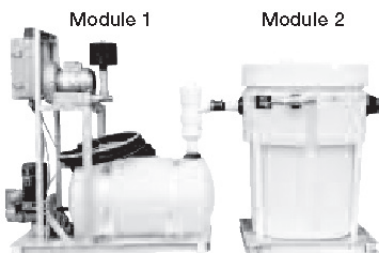
Model #	Crew Size	H	L	W
100 Compact	3	4'	5'-6"	2'
100	3	5'	5'-6"	1'-10"
200	6	5'	7'	2'
300	12	5'	7'	2'-6"
400	18	5'-6"	9'-6"	2'-6"
500	23	7'	9'-6"	

Larger Models,
Stainless Steel and
Aluminum Units
Available



RETROFIT SERIES

MODEL 200 RT

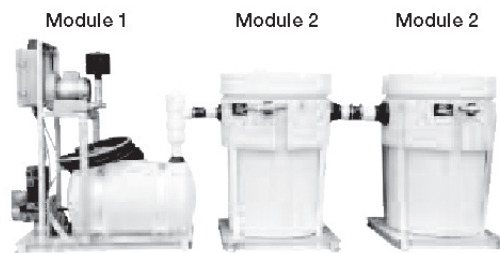


Modular construction design allows for ease of installation and configuration.

SPECIFICATIONS

Crew Size: 6 (Black water only. 1.6 gpf)
Module 1 - H 41" x L 48" x W 29"
Module 2 - H 46" x L 36.5" x W 31"

MODEL 300RT



SPECIFICATIONS

Crew Size: 12 (Black water only. 1.6 gpf)
Module 1 - H 41" x L 48" x W 29"
Module 2 - H 46" x L 36.5" x W 31"
Module 2 - H 46" x L 36.5" x W 31"

PATENTED - PROVEN - U.S.C.G. CERTIFIED TYPE II MSD

The OWENS KLEEN TANK is a self-contained "extended aeration" biological system that is ready for operation when site electrical and mechanical connections are in place. The KLEEN TANK small boat models can be designed to fit small, hard to fit areas and have a capacity range from 33 GPD to thousands of gallons per day. Easy maintenance, long lasting reliability and optimum effluent compliance make the KLEEN TANK the educated choice for marine sanitation devices.

CONSTRUCTION

- Constructed of Carbon Steel or Stainless
- Seam Welded
- Sandblasted to near white metal
- Corrosion Protected
- Coal Tar Epoxy inside
- 3-Part Polyurethane Paint System outside
- Stainless Steel weir basket - self cleaning
- Regenerative Blower TEFC - quiet (optional)
- Float Controlled Effluent Pump (optional)
- Patented Floating Skimmer
- Upflow Filter w/ Backwash System
- Easy Access Covers
- Easy Access / Non-Corrosive Valve Controls
- Low Maintenance Disinfection System
- Alarm System (optional)
- Nationwide Single Source Supplier for Repair Parts
- Exterior Mounted Filter Cleaning Valve

SIZED TO DO THE JOB

Model (small boat)	Crew Size	Dimensions			Empty Wt.	Full Wt.
		L	W	H		
A	3	4'-6"	2'-0"	4'-6"	400	950
A* lowboy	3	4'-6"	2'-5"	3'-6"	400	950
B	6	5'-10"	2' 5"	4'-6"	500	1465
C	10	6'-8"	3'-1"	4'-6"	990	2015
D	16	8'-9"	3'-1"	5' 8"	1105	3090
E	20	9'-2"	3'-1"	5'-8"	1317	3682
F	32	9'-9"	4'-0"	5'-8"	1550	5100
575	50	9'-0"	5'-0"	7' 1"	3500	9571
750	65	10'-0"	5'-0"	7'-1"	4000	12613
1125	100	13'-4"	5' 0"	7'-1"	4600	16,225

All unit application sizing (Crew Size) is based on:
 1. Low Flush Toilets. 1-1/2 gallon/flush
 2. 24 Hour Occupancy
 3. Blackwater only. For other Applications Consult Factory.

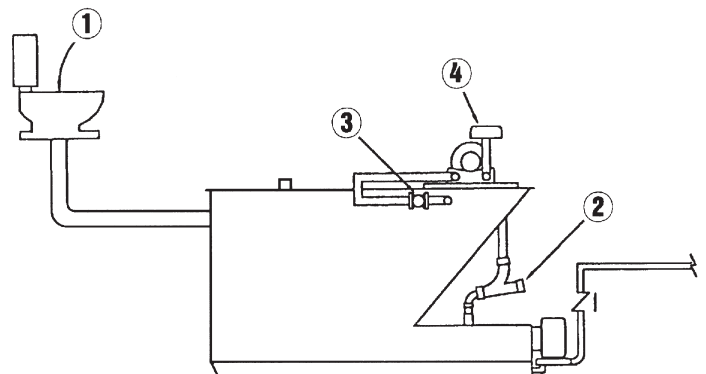
- Modified size for easy placement on vessels. Models C and larger are skid mounted. Add 4" to height and 6" to length for overall dimensions.

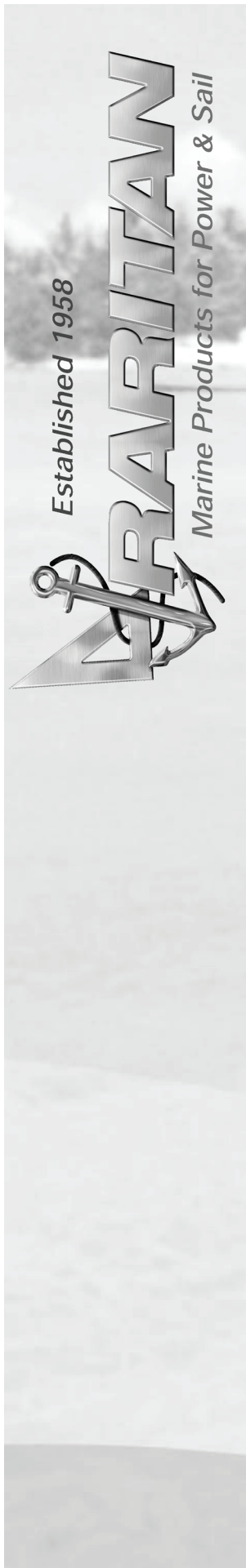
NOTES

1. Standard units are constructed of carbon steel plate. Stainless Steel or aluminum plants are also available, consult factory for prices.
2. Explosion proof or 3 phase equipment available on special order, consult factory.
3. Larger & Special units are available by Special Order. Designs to fit most small and hard to fit areas are also available upon request.
4. U.S.C.G. certified as Type 11 MSD/33CFR 159.15 Under OWENS KLEEN TANK, Certification #159.1038/5/11

KLEEN TANK 4-POINT EASY MAINTENANCE PLAN

1. Every two weeks - add Formula 101 to toilet
2. Every two weeks - add chlorine as required
3. Once a month - clean external up-flow filter
4. by opening the external fluffer valve for 5 minutes
5. Every six months - replace inlet air filter





LECTRA/SAN[®]

LST/MC[™]



Smallest, most popular U.S. Coast Guard certified Type I Marine Sanitation Device for environmentally friendly treatment of waste and legal overboard discharge on inspected and uninspected vessels up to 65 feet.

Benefits

- Microprocessor control (MC) monitors conditions inside the treatment unit and automatically informs users of changes in water conditions
- One-step activation with toilet switch or LST/MC[™] touch pad automatically activates toilet and treatment system
- Light sequence on the Control Indicator Panel indicates system functions and changes in salt and voltage conditions
- Generates its own natural disinfectant from salt water
- Coated electrodes use salt water to kill bacteria and viruses without adding harmful chemicals to the sea
- Discharges with treatment levels that are safe for environmentally sensitive areas
- Eliminates the need for bulky holding tanks in areas that have not been declared No Discharge Zones by the U.S. EPA
- Treats each flush as waste is generated
- Can be used with two marine toilets
- Easy to install
- Can be used with both manual and electric toilets
- Each unit is assembled by hand, individually tested and backed by Raritan's one-year Limited Warranty and legendary technical support team

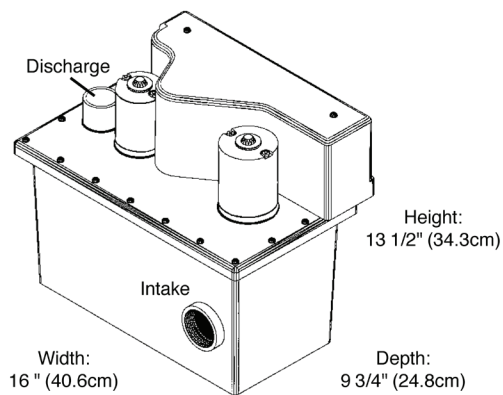
Options

- Available for 12, 24 and 32V DC
- Optional toilet sensor starts treatment unit when manual toilet is flushed
- Optional control available for use with two toilets
- Optional salt feed systems available when using fresh or brackish water

Raritan manufactures equipment for pleasure boats throughout the world. Products include marine toilets, waste treatment systems, icemakers and water heaters.

Committed to the environment and preserving sea life, Raritan designs products to help maintain an environmental balance and ensure the quality of marine waters. In addition, the company has achieved ISO 9001:2000 certification for quality.

Innovation Through Experience



Approximate Shipping Weight: 20 lbs (9 kg)

The LST/MC utilizes improved electrodes which temporarily convert salt water into a powerful bactericide. The treated waste water then safely and conveniently reverts back to its original state of salt and water. No unnatural or harmful chemicals enter our environment.

The design of the treatment tank optimizes the thoroughness of treatment by forcing the bactericide and bacteria into direct contact, effectively killing viruses and bacteria.

The Lectra/San can be installed with one or two marine toilets to form a complete sanitation system. Pressing the "PUSH TO FLUSH" touch pad activates the treatment cycle. The toilet(s) can be interfaced with the LST/MC to provide one touch toilet flushing and treatment activation. The Control Indicator Panel provides visual monitoring of a variety of diagnostics.

Operation

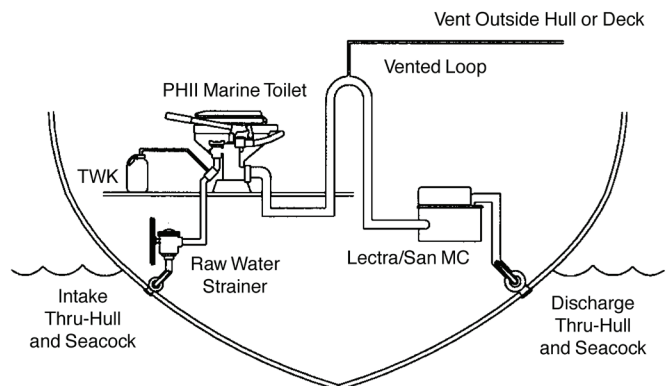
The flushing action of the toilet discharges waste into the first chamber of the Treatment Tank. Here the waste is macerated and receives its first treatment. Specially coated electrode plates create an electrical field and convert salt water into hypochlorous acid, a powerful bactericide. Once the treatment solution reacts with bacteria and waste, it reverts back to salt and water.

The next time the toilet is flushed and new untreated discharge water enters the first chamber, some of the treated discharge enters the second chamber. While the new waste is being treated in the first chamber, the contents of the second chamber are stirred and treated again. Each successive flush moves the previous toilet discharge through the Lectra/San and eventually overboard or into a holding tank. When the discharge enters the marine environment, virtually all bacteria and viruses have been eliminated.

USCG TYPE I MSD CERTIFICATION

#159.015/107/1

Sample Installation



Lectra/San MC with Vented Loop (Above Waterline)

"One of the great mistakes is to judge policies and programs by their intentions rather than their results."

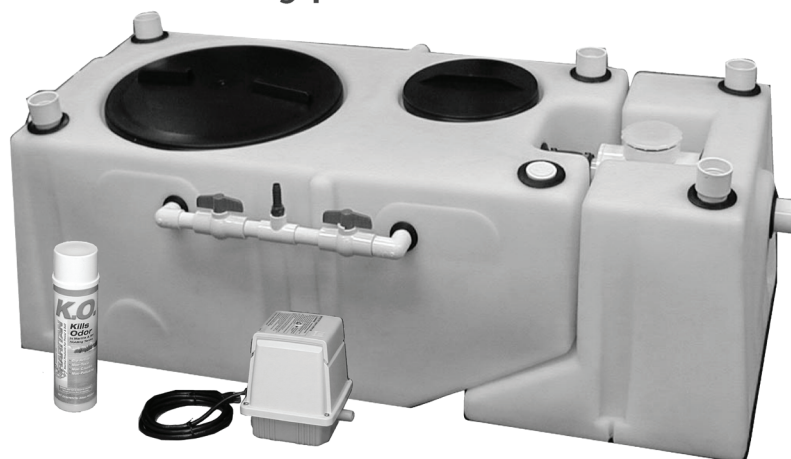
— Milton Friedman

"A society that puts equality before freedom will get neither. A society that puts freedom before equality will get a high degree of both."

— Milton Friedman

MANAGERM

Type II MSD



Effective reliable treatment of onboard sewage for up to 12 persons per day. The Managerm is an aerobic biological sewage treatment system. The System uses air, water and the natural occurring bacteria to biologically convert waste to water and carbon dioxide (a harmless odorless gas)

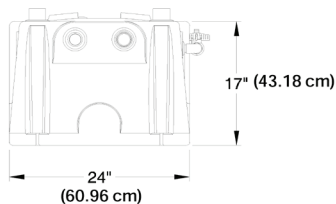
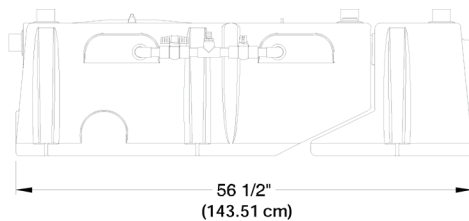
- USCG Certified Type II Marine Sanitation Device also compliant with IMO Resolution MEPC2(VI)
- Tank constructed of lightweight corrosion resistant polyethylene
- Easy installation - Simple maintenance
- No foul odors
- No moving parts in contact with sewage
- Quiet, durable aeration pump included
- Low cost
- Uses very little electricity
- Operates with fresh, brackish and salt water
- No special tools are required for installation
- For use on inspected and uninspected vessels
- Works best with macerating toilets

Raritan manufactures equipment for pleasure boats throughout the world. Products include marine toilets, waste treatment systems, icemakers and water heaters.

Committed to the environment and preserving sea life, Raritan designs products to help maintain an environmental balance and ensure the quality of marine waters. In addition, the company has achieved ISO 9001:2000 certification for quality.

Innovation Through Experience

MANAGERM



Specifications

MODEL # 6400121

Capacity -

12 persons/day

Weight -

Dry - 100 lbs. (45.36 Kg)

Wet - 575 lbs. (260.8 Kg)

Water -

Salt, Fresh or Brackish.

(Salt content must not exceed 4%)

Ambient Temperature Operating range -

Min. 40°F (4.5°C)

Max. 120°F (49°C)

Electrical -

Aeration pump - 120 VAC 1 amp. 50/60 HZ

Operation

The ManaGerM is a flow through system for black water only. It is an extended aeration bioreactor with a secondary disinfecting tank.

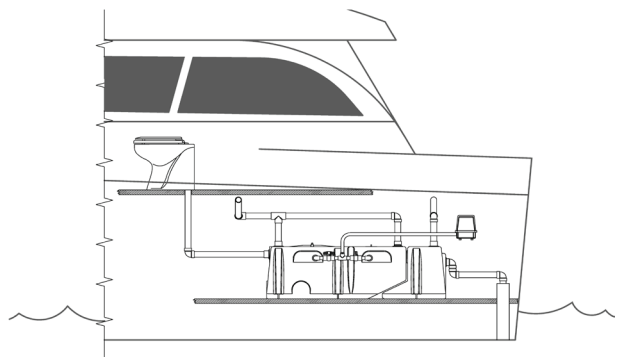
The ManaGerM has two tanks. The first tank has two chambers - the first chamber converts waste into water (H₂O) and carbon dioxide (CO₂) - the second chamber allows solids to settle and clarified water to pass on to the secondary tank,

Water displaced from the first tank moves through the tablet dispenser and into the secondary tank where disinfection takes place.

The ManaGerM works best with macerating and eductor (jet-type) toilets.

Sample Installation

The ManaGerM is intended for installations at or above the waterline of the boat. The outlet of tank is designed to drain, not pump upward.



Random Science Trivia

- If you could tap the energy released by an average-sized hurricane, it would be enough to satisfy all U.S. energy needs for six months.
- In any given year, about 26,000 meteorites land on the Earth's surface, the vast majority dropping into the oceans. Only seven people in recorded history have been hit by one.
- When glass breaks, the cracks travel faster than 3,000 mph.
- Gold is so rare that all of the pure gold produced in the last 500 years would fit inside a 50-foot cube.
- At least 100,000 separate chemical reactions occur in the human brain every second.
- About 70% of Earth is covered with water, yet just 1% of it is drinkable.
- Sound travels through steel 15 times faster than it travels through air.
- To escape the Earth's gravitational pull, a spacecraft has to move faster than seven miles per second-a speed that would take you from New York to Philadelphia in under 20 seconds.
- Rain contains vitamin B12.
- According to a University of Michigan study, men are six times more likely to be struck by lightning than women are.
- If you could capture a comet's entire 10,000-mile vapor trail in a container, the condensed vapor would occupy less than one cubic inch of space.
- Earth moves through space at a speed of 660,000 mph eight times faster than the speed of a bullet.



crown head™ II

Crown head dependability, quiet design reduces noise.

Diaphragm intake pump will not be damaged by running dry.

Crown Head II a reliable, mid-priced electric macerating toilet.

Freshwater Solenoid Model (C2F*)

- Whisper Flushsm design for quiet operation
- Less maintenance and odors than raw water models

Remote Intake Pump Model (C2R12 or C2R12)

- Diaphragm intake pump can be run dry without damage
- Reduces noise levels
- Easier access to intake pump

All Crown Head II Models

- Suitable for the most demanding boaters in any size vessel
- Proven, dependable design (same efficiency as the crown head)
- Efficient flushing action – includes powerful centrifugal macerating pump
- Simple and flexible installation for mounting above or below waterline
- Easy to clean and maintain
- Pump cover that neatly hides components
- Remanufactured pump exchange program available
- Can be used with on-board treatment systems (such as the Lectra/San[®]) and/or holding tanks
- Each unit is assembled by hand, individually tested and backed by Raritan's one-year Limited Warranty and legendary technical support team

Options

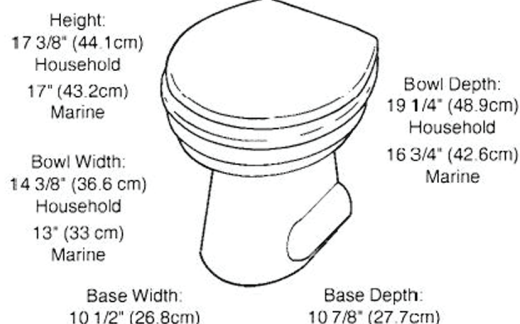
- Available for 12, 24, 32V DC or 120/240V AC
- Choice of full-size household-style bowl or marine-size bowl
- Available in white or bone

Raritan products are chosen by powerboat, sailboat, houseboat, and RV owners and manufacturers the world over for their dependability, environmental responsibility, simplicity of installation, operation, and maintenance. The product line includes house-hold style toilets, marine toilets, marine sanitation devices and systems, cleaning products, icemakers, water heaters, and rudder angle indicators.

To view our complete line, to obtain installation and servicing guides, visit raritaneng.com.

THE MOST DEPENDABLE NAME ON THE WATER

crown head™ II

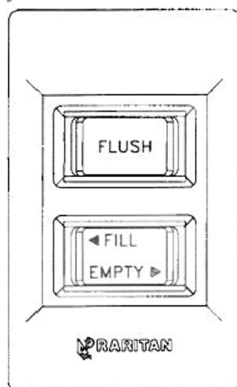


The advanced crown head II was designed without compromising the high level of efficiency of the crown head. This was accomplished by redesigning the way water is delivered to the bowl. The raw water model uses a remote-mounted pump, while the on-board pressurized freshwater model is connected to the pressurized water system. As a result, the boater benefits from the same level of performance with quieter operation.

A newly designed pump cover blends with the porcelain bowl, creating a streamlined one-piece look. This cover neatly hides all the components while at the same time allows immediate access to the macerator and discharge pump.

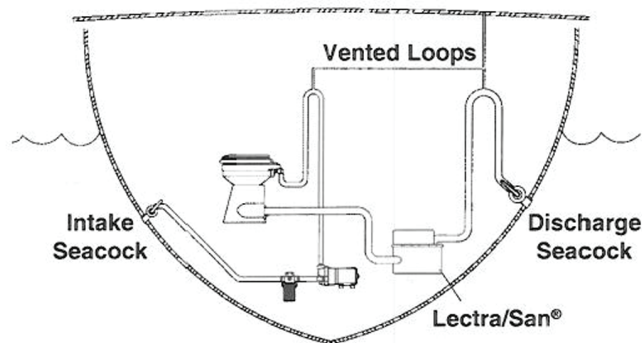
The crown head II is built of the highest quality materials, is reliable and easy to maintain.

Optional Control



The crown head II optional control allows for selection of momentary operation or independent operation of incoming water and macerator.

Crown Head II Using Sea Water and Connected to a Lectra/San



Specifications

Units Voltage	Intake pump Models	Freshwater Solenoid Model
	Amp draw @ nominal voltage	Amp draw @ nominal voltage
12 VDC	20	19
24 VDC	14	9.5
32 VDC	11	7.5

Additional parts required: Fuses or circuit breakers, wire terminal ends, four stainless steel mounting bolts (minimum 1/4" [6mm]) or lag screws and washers, 1 1/2" (38mm) I.D. sanitation hose, and 3/4" (19mm) I.D. sanitation hose and hose clamps. For pressurized fresh water flushing, a manual ball valve (3/4" IPS) is also recommended.

Approximate Shipping Weight: 60 lbs (27 kg)

Product Models

C2 Crown head II	Straight Discharge (standard)	Bowl Color	Remote Intake pump (standard)	Specify Voltage
9	90° Discharge	A White bowl, marine-size (standard)	F Freshwater Solenoid	12
		W Bone bowl, household-style		24
				32
				24T 120/240

To order the correct unit for your installation make one selection from each column above.

Model samples:

C2912 - Crown Head II, white bowl marine size, 90° discharge 12V

C2WF12 - Crown Head II, white bowl household-style, freshwater solenoid, 12V

Additional models are available. Call Raritan Technical Support for assistance in ordering the model that best suits your application.



THE MOST DEPENDABLE NAME ON THE WATER

ATLANTES FREEDOM™



NEW 8/05

Powerful bronze cutting blades designed to “shred” most objects

Two bowl sizes: standard household or elongated

Freedom from clogged toilets and marine size bowls, excellent performance even in commercial applications.

Standard Features

- One piece china bowl
- Anti-clog “power shred” discharge system

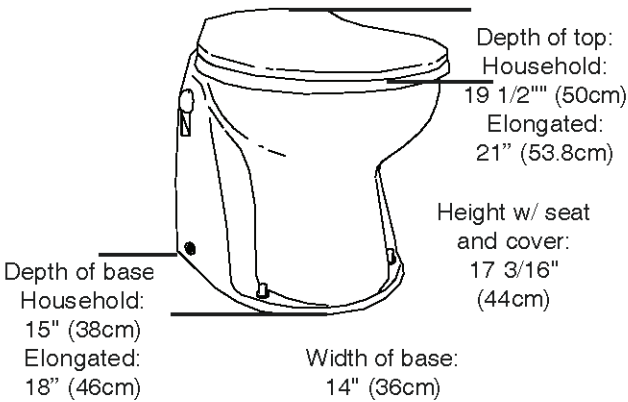
Benefits

- Quiet “whisper flush” models available
- Simple flexible installation
- Heavy duty attractive stainless steel flush handle
- Low power consumption
- Three modes of operation - Fill, dry flush or fill and flush
- Handle with timer operation has “fail-safe” mode
- Easy to clean and maintain
- Diaphragm intake pump can be run dry
- Pressurized freshwater or raw water intake models
- Microprocessor control and solid state circuit breaker
- No fuses or relays inside the unit

Options

- Available in 12, 24, 32V DC 120/240 VAC
- Elongated (white and bisque) or Household size (white, bone and black) bowls
- Wall switch and timer control models available

ATLANTES FREEDOM™



Three basic models, all are available in Remote, Integral or Pressurized Freshwater:

- A7 - Momentary operation activated by the sturdy stainless steel handle.
- A8 - Timed operation activated by the sturdy stainless steel handle. Equipped with a "fail-safe" mode if timer fails.
- A9 - Timed operation activated by a wall touch pad. Allows for water saver feature using as little as 1 quart of water per flush.

Product Models

A	Bowl Style		Bowl Color	Pump style	
	Household (standard)	L Elongated Bowl			
			7 Stainless Handle	Integral pump (standard)	12 Specify
			8 Stainless Handle with Toilet Control (for timed operation)	R Remote Sea water Pump	24 Voltage
			9 Wall Switch with Water Saver Feature	F Freshwater Solenoid	32
					24T 120/240

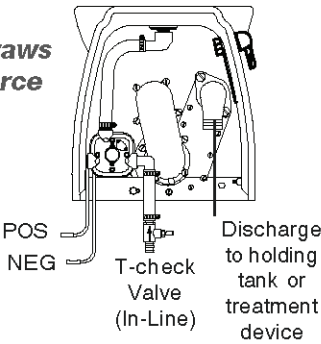
To order the correct unit for your installation make one selection from each column above.

Model samples:

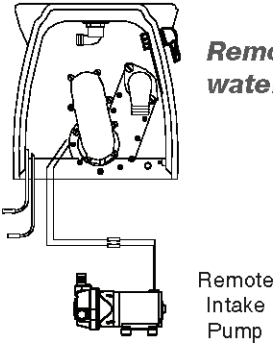
- A712 - Atlantes, Stainless Handle, white bowl, integral intake pump, 12V
- AL9AR24 - Atlantes, Elongated Bowl, Wall Switch, Bisque, remote intake pump, 24V

Simple Installation in all applications

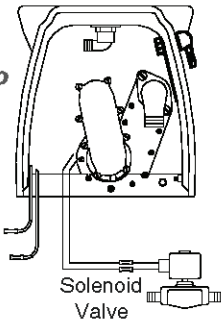
Integral Intake pump draws water from outside source



Remote Intake pump draws water from outside source



Freshwater Solenoid connects to onboard water pressure system



Specifications

Units Voltage	Intake pump Models	Freshwater Solenoid Model
	Amp. draw @ nominal voltage	Amp. draw @ nominal voltage
12 VDC	20	11
24 VDC	10	5.5
32 VDC	8	4.5

8600 Series MasterFlush Toilets

Bringing style, quality and versatility together.



Model 8679
MasterFlush Toilet

Rarely does one marine toilet fit a wide array of floor plans with equal ease. With the choice of heights, colors, flush controls and discharge plumbing, the 8600 series of MasterFlush™ toilets from Dometic now allows boatbuilders to install a fixture of unparalleled performance in virtually any bath.

The contemporary shape features a flat back to accommodate installation against interior walls. 8600 series toilets come in low-profile and standard-height units. Discriminating owners may choose from additional options: toilet or toilet/bidet combination units (available late 2010); white or bone colors.

Dometic 8600 series macerator toilets offer two flush settings to help manage water use. The "Normal" flush setting consumes 0.85 gal. (3.2 liters) of water and adds a small amount of water to the bowl after every flush, and "Dry Bowl" flushing uses only 0.45 gal. (1.7 liters) per flush and does not add water to the bowl.

The ceramic styling of the Dometic 8600 series matches that of Dometic's 4600 series VacuFlush® toilets. This advantage provides boat designers the added ability to offer choices in toilet technology across boat model lines without altering the decor or floor plans of the baths.

Key Benefits

- Powerful macerator flush.
- Flat back-style ceramic fixture – fits nicely against interior walls.
- Standard and low-profile heights.
- Ultra-quiet – integral water trap reduces macerator sound (tall models only).
- Through-the-floor and through-the-wall discharge fittings.
- "Soft close" seat action.
- "Normal" or "Dry Bowl" flush options.
- Standard Dometic electronic touchpad or popular Vimar and Gewiss switch options.
- 12 V DC or 24 V DC operation.

Sealand®
by Dometic GROUP

Gossip
A gossip always get caught in their own mouth-trap.

A closed mouth gathers no foot.

Technical Specifications for 8600 Series MasterFlush™ Toilets

Model	Description	Voltage
8639	Low-profile macerator toilet	12 V DC
8630	Low-profile macerator toilet	24 V DC
8679	Standard-height macerator toilet	12 V DC
8670	Standard-height macerator toilet	24 V DC

Available in white and bone colors.
Specifications subject to change without notice.

Minimum System Requirements

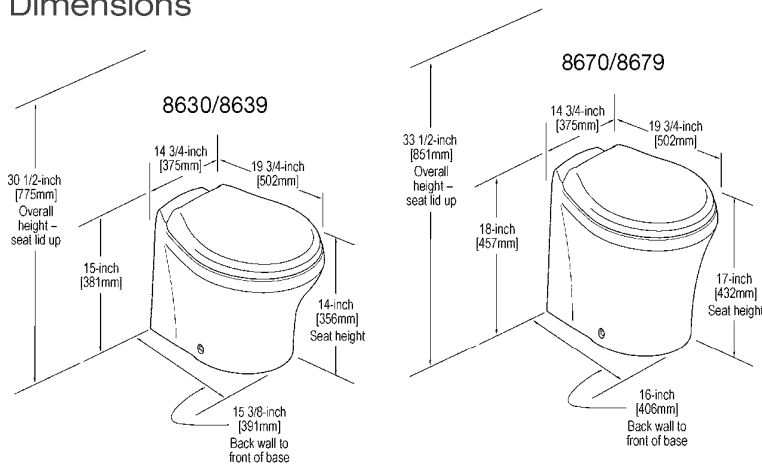
Electrical	Circuit breaker	20 amps/12 V DC; 15 amps/24 V DC
	Wiring	12 ga. (up to 20 ft./6.1 m from breaker)
Water Supply	Fitting	0.5 in. NPT
	Flow rate	2.0 gpm/7.6 lpm min. at toilet
Discharge	ID	1.5 in./38 mm or 1 in./25 mm minimum
	Horizontal run*	98 ft./30 m maximum
	Vertical run*	9.8 ft./3 m maximum
	Tank capacity	30 gal./114 liters recommended
Required Components	Electric flush switch**	Dometic, Vimar or Gewiss

* Horizontal and vertical run distances are not cumulative. Check for adequate discharge flow if installation nears one of these limits.

** Purchased separately.

Specifications subject to change without notice.

Dimensions



Flush Settings

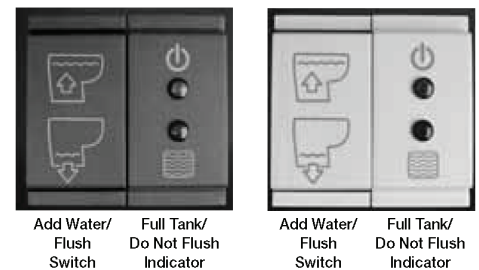
Change from “Normal” to “Dry Bowl” flush option by pressing “flush” switch for about five seconds. When “power on” light begins flashing, release “flush” switch. Flush setting has been changed. Change back to “Normal” setting in the same manner.

Dometic Touchpad



Standard Dometic panel includes “add water” and “flush” functions, “power on” and “full tank” indicator lights. Also available in white.

Vimar Switches, Indicators



Gewiss Switches, Indicators



Available in black only.

Sealand
by Dometic GROUP



Attitude

Growl all day and you'll feel dog tired at night.

The people who get on in this world are the people who get up and look for the circumstances they want and, if they can't find them, make them. George Bernard Shaw

THETFORD

- Large and convenient single-pedal flush.
- Attractive styling that's easy to clean.
- Pulsating flush provides superior, near instantaneous, full-bowl washdown.
- The worthy successor to Aqua-Magic Galaxy/Starlite!
- Many features make it the easiest RV toilet ever to install and service, including front shroud that pulls off for easy access to mounting bolts and pedal mechanism.
- Taller for a built-in higher comfort level.
- Easy-off Seat and Cover Pod for easy cleaning and service.
- 3-Year Warranty if bought after Jan. 1, 2001.

Bravura



High Profile Dimensions

Length - 20 3/16 in.(51.3 cm)

Width - 16 9/16 in.(42.1 cm)

Height - 17 7/8 in.(45.4 cm)

Low Profile Dimensions

Length - 20 3/16 in.(51.3 cm).

Width - 16 9/16 in.(42.1 cm)

Height - 14 in.(35.6 cm)

BABIES KEEP FALLING ON MY HEAD

"Joseph Figlock was passing an apartment block in Detroit in 1915 when he was knocked unconscious. A baby had fallen fourteen stories and landed on him. Both survived. One year later, Figlock was passing the same apartment block-and once again he was hit by a falling child ... and survived!"

-One in a Million

How smart are you really?

This Test has been used for over 50 years and has has pretty much done it with great accuracy. If you don't score high, remember, you can always improve. It has been said Bill Gates once took this test and scored a 3 on it. Share your score with friends! Good Luck!

1. Do they have a 4th of July in England?
2. How many birthdays does the average man have?
3. Some months have 31 days; how many have 28?
4. How many outs are there in an inning?
5. Is it legal for a man in California to marry his widow's sister?
6. Divide 30 by 1/2 and add 10. What is the answer?
7. If there are 3 apples and you take away 2, how many do you have?
8. A doctor gives you three pills telling you to take one every half hour. How many minutes would the pills last?
9. A farmer has 17 sheep, and all but 9 die. How many are left?
10. How many animals of each sex did Moses take on the ark?
11. How many two cent stamps are there in a dozen?

ANSWERS

1.) Yes, 2.) 1 3.) 12 4.) 6 5.) How could he if he's dead 6.) 70 7.) 2 8.) 60 minutes 9.) 9 10.) 0, Moses wasn't on the Ark 11.) 12

Traveler® China Toilets

Traveler china toilets provide all the comforts of home in a gravity discharge toilet for houseboats and commercial vessels.

- **Efficient.** Effective rim flush action uses about a pint (.5 liter) of fresh water per flush from on-board demand system. Integral anti-siphon vacuum breaker protects potable water supply. Requires no electricity.
- **Fresh, clean.** Freshwater operation means there are none of the nasty odors common to saltwater flushing toilets. Our exclusive self-cleaning flush ball with Teflon® seal locks out holding tank odors.
- **Proven reliability.** By eliminating the accumulation of impurities and saltwater residue, overall life of system components is extended.
- **Easy to install.** Designed to mount over a 4-bolt 3" (76mm) closet flange. Water connection is 1/2" (13mm) MPT.

Traveler 510 Plus

Just like home.

New styling features improved rim wash, a deeper bowl, increased seat height and a household-size seat for enhanced comfort. Available in five exciting colors!

Model	Item Number	Color
510+	651001	White
510+	651003	Bone
510+	651006	Platinum
510+	651008	Ebony
510+	651011	Teal

Also available in a low-profile model.

Traveler 2010

European styling with full-size comfort.

Featuring a deep bowl with an adult-sized seat, the model 2010 toilet is comfortable as well as stylish.

Model	Item Number	Color
2010	421001	White
2010	421003	Bone
2010	421008	Ebony

Also available in a low-profile model.

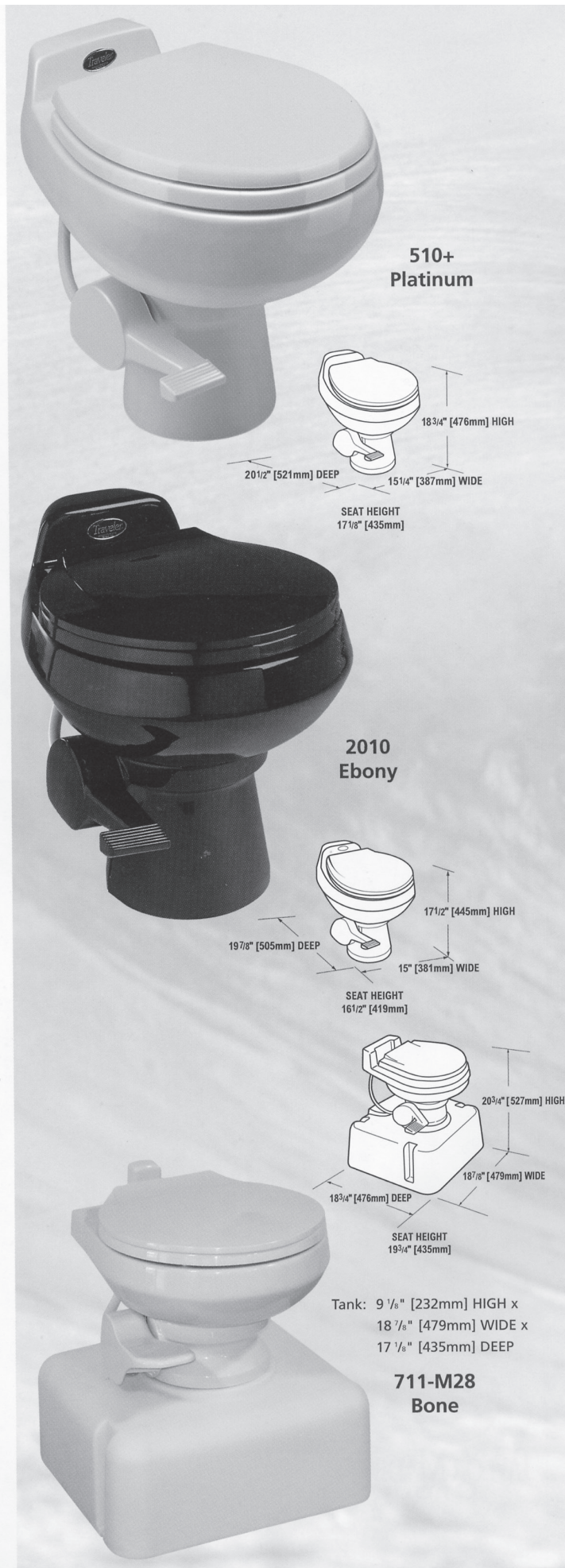
Traveler® 711-M28 Marine Sanitation System

Complete self-contained freshwater system.

- **Freshwater operation eliminates odors.** China bowl is rinsed with fresh water from on-board demand system, so there are none of the unpleasant odors associated with a saltwater flushing toilet. Integral anti-siphon vacuum breaker protects potable water supply.
- **Efficient.** Effective rim flush action uses about a pint (.5 liter) of fresh water per flush. Requires no electricity.
- **Ideal replacement for recirculating toilets.** No recirculating chemical smell!
- **Easy to use.** Water level and flushing action controlled by single pedal control.
- **Proven reliability.** Teflon® seal keeps tank odors in tank. Holding tank is molded of durable linear low density polyethylene with 9.5 gallon (36 liters) capacity. Discharge connection is 1 1/2" (38mm) hose insert. Vent connection is for 5/8" (16mm) hose. Water connection is 1/2" (13mm) MPT.

Model	Item Number	Color
711-M28	371103	Bone

China product dimensions may vary $\pm 3/8"$ [10mm].



AQUA MATIC



Compact

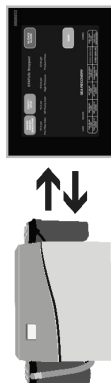


Modular

The revolutionary Aqua Matic is engineered to be easier to use and more reliable than conventional watermakers. Featuring the latest technology, the Aqua Matic is able to regulate and monitor functions without the need of an operator. With one touch, the Aqua Matic will start and finish water production automatically, allowing boaters more time to relax and enjoy their cruise.

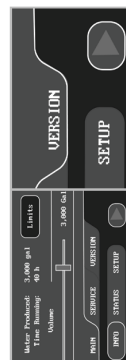
The **Aqua Matic Compact** is a horizontal one-piece frame configuration with external Booster Pump and Sea Strainer, for easy installation into tight spaces. All components within the frame are readily accessible for ease of maintenance.

The **Aqua Matic Modular** is designed for separate system component placement if there is insufficient space for the Compact system.



2000 Remote Compatibility

The new Aqua Matic is NMEA 2000 compliant, giving you the power to monitor and communicate with your system through any NMEA compatible display.



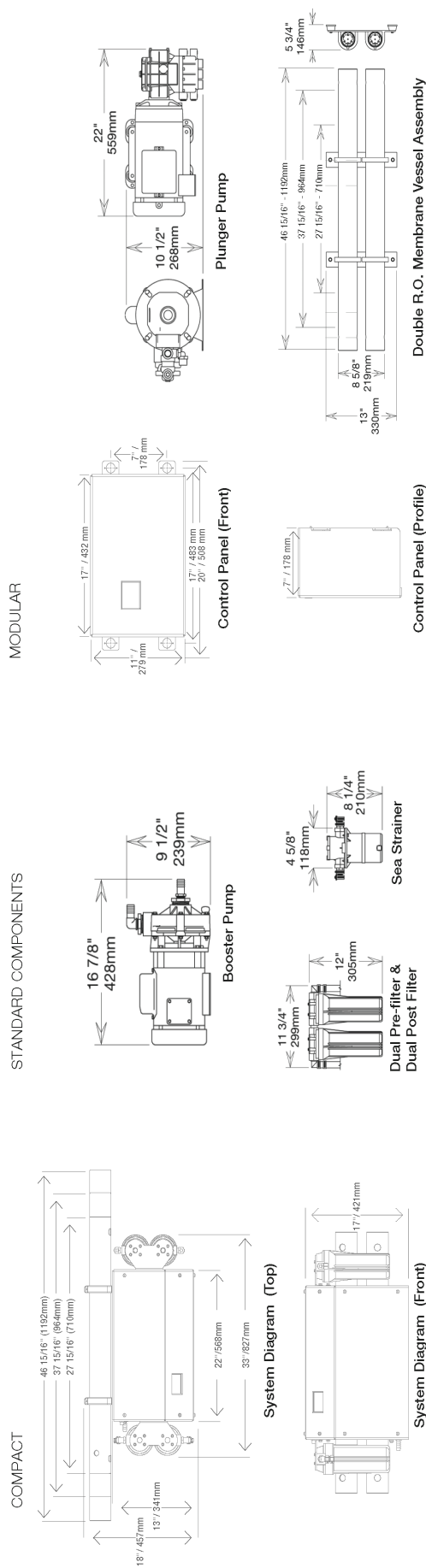
One touch operation & full color touch screen
Equipped with an automated pressure regulating system and Fresh Water Flush, the Aqua Matic can fully operate and perform self maintenance functions without the need of an operator.



Oil free high pressure pump (optional)

The Aqua Matic's Super Duplex Radial Axial Pump is water lubricated and requires no oil changes. It has a maintenance schedule every 8,000 hours, saving you time and money.

Dimensional Drawings



Specifications

	Model #	Production/hr.	Production/24hrs.	Aqua Matic compact*	Aqua Matic modular*
PRODUCTION & WEIGHT	450-1	19 Gal / 71 L	450 Gal / 1,703 L	153 lbs / 69 kg	149 lbs / 68 kg
	700-1	29 Gal / 110 L	700 Gal / 2,650 L	156 lbs / 71 kg	152 lbs / 69 kg
	900-1	38 Gal / 142 L	900 Gal / 3,407 L	158 lbs / 72 kg	154 lbs / 70 kg
	900-2	38 Gal / 142 L	900 Gal / 3,407 L	165 lbs / 75 kg	161 lbs / 73 kg
	1400-2	58 Gal / 221 L	1,400 Gal / 5,300 L	171 lbs / 76 kg	167 lbs / 76 kg
	1800-2	75 Gal / 284 L	1,800 Gal / 6,814 L	176 lbs / 80 kg	172 lbs / 78 kg

* Weights based on single phase motor. For three phase motors subtract 9 lbs.

ELECTRICAL	Phase	Pump Motor	Voltage VAC	Hz	Normal Operating Amps	Start Up Current
Plunger Pump Radial Axial Pump	Single	HP / Booster	110-115 / 220 -230	50 / 60	110 / 220	110 / 220
	Single	HP / Booster	110-115 / 220 -230	50 / 60	30 / 15	90 / 45
Plunger Pump / Radial Axial Pump	Three	HP / Booster	220-230 / 380-460	50 / 60	35 / 17.5	95 / 48
					220 / 380 - 440	220 / 380 - 460
					11 / 5.5	30 / 15

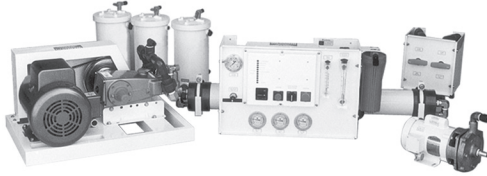
* HP: High Pressure

Circuit Breaker Size	Operating AC Voltage	Phase	Recommended circuit breaker
Plunger Pump Radial Axial Pump	110-115 / 220-230	Single	40 Ampere / 20 Ampere
	110-115 / 220-230	Single	45 Ampere / 25 Ampere
Plunger Pump / Radial Axial Pump	220 / 380 / 460	Three	15 Ampere / 10 Ampere / 10 Ampere

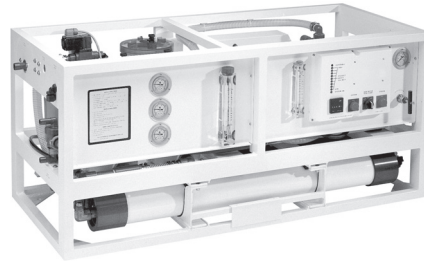


Commercial & Industrial Series Coral Sea Series

1,395 to 4,190 U.S. Gallons Per Day
5,280 to 15,860 Litres Per Day



SRC Coral Sea - Six Piece Modular



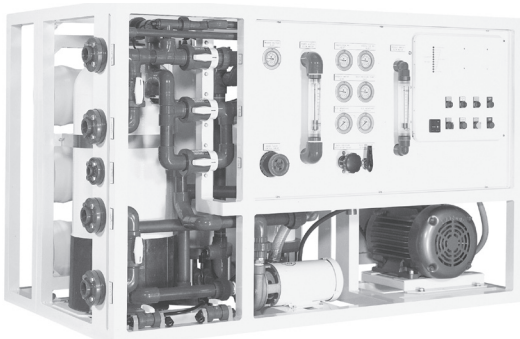
SRC Coral Sea - Two Piece Horizontal



SRC Coral Sea - Three Piece Vertical

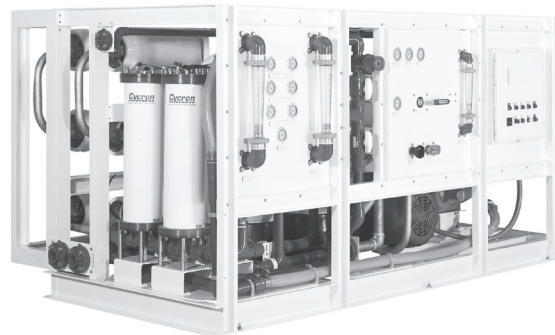
Tasman Sea Series

4,700 to 17,500 U.S. Gallons Per Day
17,791 to 66,245 Litres Per Day



North Sea Series

10,000 to 44,000 U.S. Gallons Per Day
37,854 to 166,558 Litres Per Day



Aqua Whisper™ 170

7 Gallons Per Hour / 170 Gallons Per Day
26 Litres Per Hour / 644 Litres Per Day



Specifications: Aqua Whisper 170
(Please specify voltage, cycles, and phase upon ordering)

ELECTRICAL POWER REQUIREMENTS:
(FLA = Full Load Amperes at nominal voltage)
High Pressure Pump / Electric Motor (1/3 Horse Power):
DC Amperage Draw: 12 Volt DC - FLA 27 or 24 Volt DC - FLA 13.4
AC Amperage Draw: 110 Volt AC - FLA 7.2 or 220 Volt AC - FLA 2.8

Model No:
SRC AW 170 12 VDC
SRC AW 170 24 VDC
SRC AW 170 110 AC
SRC AW 170 220 AC

Dimensions:
26"Lx11"Hx13.75"D



Installation Kit
Shown w/optional UV
Sterilizer, Charcoal
Filter, and Sea Strainer



Remote Control
(Optional)

Engineered at the leading edge of new technology, the Aqua Whisper 170 contains features not found on any other watermaker in the world. Engineered with a low maintenance design for easy use, the Aqua Whisper 170 is the perfect watermaker for low volume applications. All boaters can now enjoy the convenience of fresh water anytime, anywhere, at an affordable price. Designed to fit in any boat, sail and power, the Aqua Whisper 170 produces up to a 170 U.S. gallons (644 litres) per day or 7 U.S. gallons (27 litres) per hour of pure, clean drinkable water. The compact design, multiple configurations, and low amperage (12 or 24 VDC and 110 or 220 VAC) power requirements are just the beginning.

... Water For Any Need!



With watermaking capacities from 1,395 to 4,190 U.S. gallons (5,280 to 15,860 litres) per day, commercial fishing vessels, small work boats, charter boats as well as onshore facilities such as private residences, villas, and small hotels, make use of Sea Recovery's compact commercial reverse osmosis desalinators.

Constructed of a lightweight, epoxy-coated frame, both the three-piece vertical and two-piece horizontal "Coral Sea" Series units utilize only the highest quality marine-grade materials and components. All models are covered by a one-year warranty.

Upgrading a model to a higher watermaking capacity is done by simply installing additional reverse osmosis membranes to the desalination system. Sea Recovery delivers complete R.O. systems, ready to produce water immediately after installation. All plumbing for onboard use is also included.

Small hotels, large villas, oil platforms and small cruise ships can now produce from 4,700 to 17,500 U.S. gallons (17,791 to 66,245 litres) of fresh water per day. Sold as a complete package, Sea Recovery offers the "Tasman Sea" Series to satisfy these watermaking requirements.

Found throughout the world, these easily maintained reverse osmosis desalinators produce large quantities of fresh water with unsurpassed reliability. The reason can be traced to Sea Recovery's unique engineering abilities and total commitment to high quality products.

Tasman Sea offers the following features:

- *State-of-the-Art Spiral Wound Membranes*
- *Solid State Salinity Controller*
- *Booster Pump*
- *Membrane Cleaning System*
- *Two-Stage Filtration*
- *Multi-Media Filter*
- *Flow Meters*
- *UV Sterilizer (Optional)*

Where there is a need for a commercial reverse osmosis desalinator with tremendous watermaking capacity, Sea Recovery recommends the "North Sea" Series. Producing fresh drinking water at a rate of 10,000 to 44,000 U.S. gallons (37,854 to 166,558 litres) per day. Large hotels, cruise ships, and villages rely on Sea Recovery's largest commercial series desalinators. Sold as complete packages, these systems are among the most dependable and easily maintained reverse osmosis desalinators in the world. Constructed with a lightweight, epoxy-coated frame, the unit utilizes only the highest quality marine-grade materials and components.

North Sea offers the following features:

- *State-of-the-Art Spiral Wound Membranes*
- *Solid State Salinity Controller*
- *Booster Pump*
- *Membrane Cleaning System*
- *Two-Stage Filtration*
- *Multi-Media Filter*
- *Flow Meters*
- *UV Sterilizer (Optional)*

"IT'S NOT A WORD... IT'S A SENTENCE"

A page by people who know the true meaning of "wedded bliss."

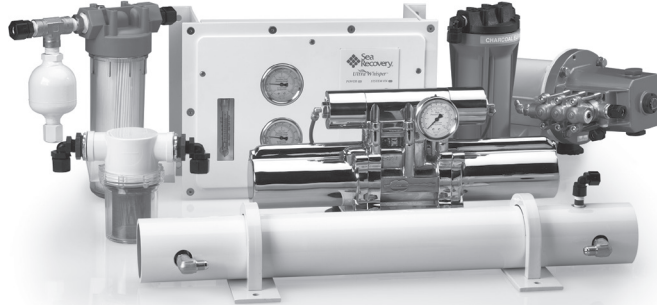
- "Bigamy is having one husband too many. Monogamy is the same." -Erica Jong
- "Marriage is the triumph of imagination over intelligence. Second marriage is the triumph of hope over experience." -Anonymous
- "Marriage is really tough because you have to deal with feelings and lawyers." -Richard Pryor
- "Marriage is a three-ring circus: engagement ring, wedding ring, and suffer-ring." -Anonymous
- "A man in love is incomplete until he has married. Then he's finished." -Zsa Zsa Gabor
- "Love is blind, but marriage restores the sight." —Georg Lichtenberg
- "Politics doesn't make strange bedfellows-marriage does." -Groucho Marx



UltraWhisper™ Modular

8, 13, 17, 21, 25 Gallons Per Hour | 32, 47, 63, 79, 95
Litres Per Hour

The Ultra Whisper Modular (UWM) Desalinator is ideal for sail and power boats with limited onboard power—and even less onboard space. It easily adapts to virtually any boat design and installation location. The components needed for R.O. desalination are custom installed by placing them in any available space onboard, such as under berths and settees, and in closets and engine rooms. Everything that's needed to install the UWM system is included in one complete package. The flexibility of this modular system provides a quiet, efficient water making system that can fit any boat perfectly.



Model No:

SRC UWM 200-1
SRC UWM 300-1
SRC UWM 400-1
SRC UWM 500-1
SRC UWM 600-1

UltraWhisper™ Compact

8, 13, 17, 21, 25 Gallons Per Hour | 32, 47, 63, 79, 95
Litres Per Hour

The Ultra Whisper Compact (UWC) Desalinator allows for easy installation in boats that previously didn't have room for a conventional R.O. system. Now, installation sites can include spaces under berths and settees, and in closets and engine room compartments. And, an open designed frame allows easy access to the system's internal components during regularly scheduled maintenance. Now, small and midsize power or sail boats have a new option for providing fresh, clean water onboard.



Model No:

SRC UWC 200-1
SRC UWC 300-1
SRC UWC 400-1
SRC UWC 500-1
SRC UWC 600-1

"I think that nothing is so important for freedom as recognizing in the law each individual's natural right to property, and giving individuals a sense that they own something that they're responsible for, that they have control over, and that they can dispose of."

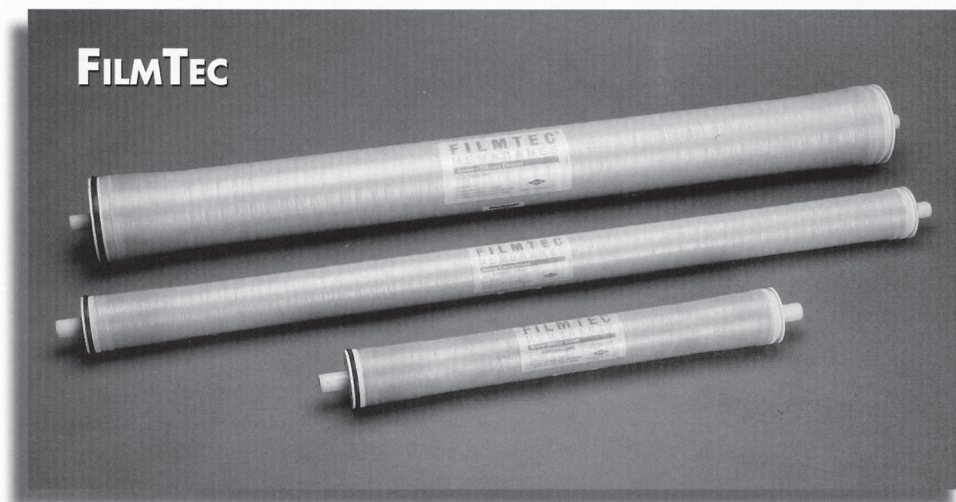
— Milton Friedman

"Underlying most arguments against the free market is a lack of belief in freedom itself."

— Milton Friedman

Of the desalination processes currently available, membrane types offer the most economic advantages in the treatment of drinking water because of their low energy consumption. The largest single consumable cost factor in Reverse Osmosis after power cost is membrane replacement cost. Matrix understands the importance of lowering operating cost and will work

with their customers to increase the life span of their RO membranes with proper pretreatment recommendations. However, in some circumstances membrane replacement may be necessary. Matrix offers three quality brands of membranes: FilmTec, Fluid Systems, and Hydraunautics at a low cost to their Customer's.



FILMTEC

Matrix Item #	Manufacturer Part Number	Size (D x L)	Water Type	Flow Rate (GPD)	Rejection (Minimum)
2876	BW-30-4040	4" x 40"	Brackish	1800	98%
4965	BW30HP-4040	4" x 40"	Brackish	2800	97%
2877	BW30-330	8" x 40"	Brackish	7500	98%
2864	SW30-2514	2.5" x 14"	Seawater	100	98.6%
2870	SW30HR-2514	2.5" x 14"	Seawater	65	99.2%
2865	SW30-2521	2.5" x 21"	Seawater	200	98.6%
2871	SW30-2521HR	2.5" x 21"	Seawater	130	99.2%
2866	SW30-2540	2.5" x 40"	Seawater	540	98.6%
2872	SW30-2540HR	2.5" x 40"	Seawater	320	99.2%
2867	SW30-4021	4" x 21"	Seawater	600	98.6%
2873	SW30-4021HR	4" x 21"	Seawater	400	99.2%
2868	SW30-4040	4" x 40"	Seawater	1500	98.6%
2874	SW30HR-4040	4" x 40"	Seawater	1000	99.2%
2869	SW30-8040	8" x 40"	Seawater	6000	98.6%
2875	SW30-8040HR	8" x 40"	Seawater	5000	99.2%
8242	SW30HR-380	8" x 40"	Seawater	6000	99.4%

THRU-HULL CONNECTIONS

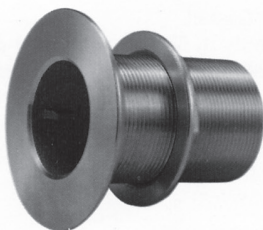


FIG. 331

FIG. 331 - FLUSH MOUNT THRU-HULL CONNECTION

CAST BRONZE - FOR USE WITH PIPE

THE EXTERIOR SURFACE OF THE FLANGE IS MACHINED FLAT AND DESIGNED TO BE COUNTERSUNK INTO THE HULL, RESULTING IN A SMOOTH EXTERNAL FIT WITH NO RAISED PORTION TO INCREASE DRAG.

ORDERING INFORMATION

Pipe Size Inches	Max. Hull Thickness Inches	O.D. Flange Inches	Dealer Pkg. 5 Pcs	OEM Bulk Package	OEM Bulk Pkg. Qty	Weight Pounds
1/2	2-3/16	1-11/16	331 DP4 PLB	331 004 PLB	10	3/8
3/4	2-3/8	2	331 DP5 PLB	331 005 PLB	10	1/2
1	2-9/16	2-1/4	331 DP6 PLB	331 006 PLB	10	3/4
1-1/4	2-15/16	2-7/8	331 DP7 PLB	331 007 PLB	10	1-1/4
1-1/2	3-1/16	2-31/32	331 DP8 PLB	331 008 PLB	10	1-3/8
2	3-3/8	3-7/8	———	331 009 PLB	1	2-1/4

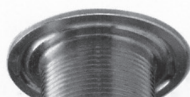


ILLUSTRATION OF
BEDDING GROOVE

FIG. 348 - EXTRA LONG THRU-HULL CONNECTION

CAST BRONZE - FOR USE WITH PIPE

FLANGE IS MACHINED TO FIT HULL AND GROOVED TO RETAIN BEDDING COMPOUND.
NECK IS THREADED TO APPROXIMATELY 3/8 INCH FROM FLANGE.

ORDERING INFORMATION

Pipe Size Inches	Max. Hull Thickness Inches	O.D. Flange Inches	Dealer Pkg. 5 Pcs.	OEM Bulk Package	OEM Bulk Pkg. Qty	Weight Pounds
3/4	5	1-7/8	348 DP5 PLB	348 005 PLB	25	7/8
1	4-7/8	2-1/4	348 DP6 PLB	348 006 PLB	10	1
1-1/4	4-5/8	2-3/4	348 DP7 PLB	348 007 PLB	10	1-3/4
1-1/2	4-5/8	3	348 DP8 PLB	348 008 PLB	10	2-1/4
2	4-1/2	3-5/8	———	348 009 PLB	1	2-7/8
2-1/2	4-1/4	4-5/16	———	348 010 PLB	1	3-1/2

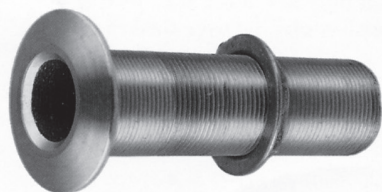


FIG. 348



ILLUSTRATION OF
BEDDING GROOVE

FIG. 322 - THRU-HULL CONNECTION

CAST BRONZE-FOR USE WITH PIPE

FLANGE IS MACHINED TO FIT HULL AND GROOVED TO RETAIN BEDDING COMPOUND.
NECK IS THREADED TO APPROXIMATELY 3/8 INCH FROM FLANGE.

ORDERING INFORMATION

Pipe Size Inches Pounds	Max. Hull Thickness Inches	O.D. Flange Inches	Dealer Pkg. 5 Cards	Std. Pkg. 1 Pc.	OEM Bulk Pkg. 25 Pcs.	Weight
3/8	1-3/4	1-7/16	322 DP3 PLB	———	322 003 PLB	1/4
1/2	1-3/8	1-1/2	322 DP4 PLB	———	322 004 PLB	3/8
3/4	1-1/2	1-7/8	322 DP5 PLB	———	322 005 PLB	3/8
1	1-7/8	2-3/16	322 DP6 PLB	———	322 006 PLB	3/4
1-1/4	2	2-3/4	322 DP7 PLB	———	322 007 PLB	1
1-1/2	2-1/4	3	322 DP8 PLB	———	*322 008 PLB	1-1/2
2	2-3/8	3-5/8	———	322 009 PLB	*322 009 PLB	2
2-1/2	2-5/8	4-1/2	———	322 010 PLB	———	2-7/8
3	2-3/4	5	———	322 011 PLB	———	4-5/8

* O.E.M. Bulk Pkg. - 10 pcs

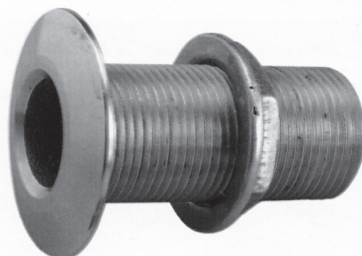


FIG. 322



THRU HULL CONNECTIONS

Cast Bronze - Plain - Polished - Chrome

TYPE	PLAIN	PART NUMBER		N.P.S. SIZE	SHANK LENGTH	FLANGE DIAMETER	WEIGHT, EACH
		POLISHED	CHROME				
A	00TH38	01TH38	02TH38	3/8"	2 1/4"	1 3/8"	0.35 lbs
A	00TH50	01TH50	02TH50	1/2"	2 5/8"	1 13/16"	0.37 lbs
A	00TH50L	01TH50L	02TH50L	1/2"	3"	1 13/16"	0.43 lbs
A	00TH75	01TH75	02TH75	3/4"	2 3/8"	2 1/8"	0.50 lbs
A	00TH75L	01TH75L	02TH75L	3/4"	4"	2 1/8"	0.70 lbs
A	00TH100	01TH100	02TH100	1"	2 3/4"	2 3/8"	0.69 lbs
A	00TH125	01TH125	02TH125	1 1/4"	3 3/4"	3 1/8"	1.60 lbs
A	00TH125L	01TH125L	02TH125L	1 1/4"	4"	3 1/8"	1.70 lbs
A	00TH150	01TH150	02TH150	1 1/2"	3 1/2"	3 3/8"	2.25 lbs
A	00TH200	01TH200	02TH200	2"	4"	3 5/8"	2.75 lbs
A	00TH250	01TH250	02TH250	2 1/2"	4"	4 1/32"	3.25 lbs
A	00TH300	01TH300	02TH300	3"	5"	4 11/16"	5.00 lbs
A	00TH400	01TH400	02TH400	4"	5 1/4"	5 3/4"	13.70 lbs

Completely machined deeper caulking area.

THRU HULL CONNECTIONS –

with Hose Ends

Cast Bronze - Plain - Polished - Chrome

TYPE	PLAIN	PART NUMBER		N.P.S. SIZE	HOSE I.D.	SHANK LENGTH	FLANGE DIAMETER	WEIGHT, EACH
		POLISHED	CHROME					
B	00THH62	01THH62	02THH62	1/2"	5/8"	3 3/8"	1 3/4"	0.51 lbs
B	00THH75	01THH75	02THH75	3/4"	3/4"	3 1/4"	2 1/16"	0.62 lbs
B	00THH100	01THH100	02THH100	1"	1"	3 3/4"	2 3/8"	0.82 lbs
B	00THH1125	01THH1125	02THH1125	1"	1 1/8"	3 3/8"	2 3/8"	0.91 lbs
B	00THH150	01THH150	02THH150	1 1/2"	1 1/2"	3 1/8"	3 5/32"	2.00 lbs
B	00THH150L	00THH150L	02THH150L	1 1/2"	1 1/2"	5 1/4"	3 3/8"	3.70 lbs
B	NA	NA	02THH162	1 5/8"	1 5/8"	3 3/4"	3 3/8"	2.45 lbs
B	00THH200	01THH200	02THH200	2"	2"	3 1/4"	3 1/4"	2.50 lbs
B	00THH250	01THH250	02THH250	2 1/2"	2 1/2"	4 3/8"	4"	5.00 lbs
B	00THH300	01THH300	02THH300	3"	3"	5 1/2"	4 3/4"	8.60 lbs
B	00THH400	01THH400	02THH400	4"	4"	6"	5 3/4"	13.00 lbs

Completely machined deeper caulking area.

THRU HULL CONNECTIONS – Flush Type

Cast Bronze - w/Nut - Plain - Polished - Chrome Plated

PLAIN	PART NUMBER		N.P.T. SIZE	SHANK LENGTH	FLANGE DIA./ THICKNESS	FLANGE ANGLE	WEIGHT, EACH
	POLISHED	CHROME					
00TH50F	01TH50F	02TH50F	1/2"	2 5/16"	2 1/2"	3/8"	0.63 lbs
00TH75F	01TH75F	02TH75F	3/4"	2 5/16"	2 1/2"	3/8"	0.82 lbs
00TH100F	01TH100F	02TH100F	1"	2 1/2"	3"	3/8"	1.07 lbs
00TH125F	01TH125F	02TH125F	1 1/4"	3 3/8"	3"	3/8"	1.50 lbs
00TH150F	01TH150F	02TH150F	1 1/2"	3 3/8"	3 1/4"	3/8"	1.75 lbs

THRU HULL CONNECTION – FLUSH TYPE w/PERFORATED SCREEN
Cast Bronze - w/Nut - Plain - Polished - Chrome Plated

PLAIN	PART NUMBER		N.P.T. SIZE	SHANK LENGTH	FLANGE DIA./ THICKNESS	FLANGE ANGLE	WEIGHT, EACH
	POLISHED	CHROME					
00TH50FS	01TH50FS	02TH50FS	1/2"	2 5/16"	2 1/2"	3/8"	0.63 lbs
00TH75FS	01TH75FS	02TH75FS	3/4"	2 5/16"	2 1/2"	3/8"	0.82 lbs
00TH100FS	01TH100FS	02TH100FS	1"	2 1/2"	3"	3/8"	1.07 lbs
00TH125FS	01TH125FS	02TH125FS	1 1/4"	3 3/8"	3"	3/8"	1.50 lbs
00TH150FS	01TH150FS	02TH150FS	1 1/2"	3 3/8"	3 1/4"	3/8"	1.75 lbs

THRU HULL CONNECTION – w/HOSE END AND SHIELD
Cast Bronze - w/Nut - Plain - Polished - Chrome Plated

PLAIN	PART NUMBER		PIPE THD SIZE	FITS HOSE I.D.	SHANK LENGTH	FLANGE DIA.	WEIGHT, EACH
	POLISHED	CHROME					
00THH125S	01THH125S	02THH125S	1 1/4"	1 1/2"	3 3/8"	2 7/8"	1.75 lbs

Can also be used for a Gas Tank Vent.



THRU HULL – NUTS ONLY
Cast Bronze

PART NUMBER	THREAD SIZE	DIA. OF HEX FLAT TO FLAT	WEIGHT, EACH
00THN38	3/8 - 18 NPSM	1"	0.09 lbs
00THN50	1/2 - 14 NPSM	1 1/8"	0.11 lbs
00THN75	3/4 - 14 NPSM	1 5/16"	0.13 lbs
00THN100	1 - 11 1/2 NPSM	1 1/2"	0.19 lbs
00THN125	1 1/4 - 11 1/2 NPSM	1 15/16"	0.34 lbs
00THN150	1 1/2 - 11 1/2 NPSM	2 3/16"	0.46 lbs
00THN200	2 - 11 1/2 NPSM	2 13/16"	0.50 lbs
00THN250	2 1/2 - 8 NPSM	3 5/16"	0.56 lbs
00THN300	3 1/16 - 8 UN2B	4"	0.84 lbs
00THN400	4 - 8 NPSM	5 1/4" Oct.	1.9 lbs

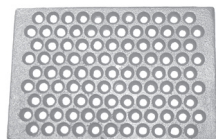
NAVY PUMP STRAINERS – STRAINERS ONLY Bronze

PART NUMBER	DIMENSIONS	FITS STRAINER	WEIGHT, EACH
00NPS100C	2 1/8 x 4 1/2"	00NPS100, 00NPS125	0.400 lbs
00NPS150C	3 3/8 x 5"	00NPS150, 00NPS200	0.902 lbs
00NPS63HC*	1 1/2 x 2 1/2"	00NPS63H	0.102 lbs

* Stainless Steel

Aluminum

PART NUMBER	DIMENSIONS	WEIGHT, EACH
20NPSB100C	2 1/2 x 4 1/2"	0.15 lbs
20NPSB125C	2 1/2 x 4 1/2"	0.15 lbs
20NPSB150C	3 1/2 x 5"	0.19 lbs
20NPSB200C	3 1/2 x 5"	0.19 lbs



A



B

INTAKE STRAINERS

Cast Bronze - With Nut

TYPE	PART NUMBER	I.P.T. SIZE	STEM LENGTH	BASE SIZE	WEIGHT, EACH
A	00IS50	1/2"	2 1/2"	2 3/4 x 3 3/4"	0.81 lbs
A	00IS75	3/4"	2 1/2"	2 3/4 x 3 3/4"	0.94 lbs
A	00IS100	1"	2 1/2"	2 3/4 x 3 3/4"	1.03 lbs
B	00IS100L	1"	3 1/2"	3 1/4 x 4 1/4"	1.20 lbs
B	00IS125	1 1/4"	3"	3 3/8 x 5 3/4"	2.34 lbs
B	00IS150	1 1/2"	3 1/2"	3 3/8 x 5 3/4"	2.80 lbs
B	00IS200	2"	3 1/2"	4 x 6"	3.70 lbs

INTAKE STRAINERS

w/Hose End and Nut

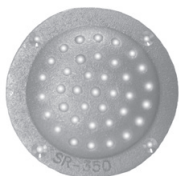
PART NUMBER	I.P.T. SIZE	STEM LENGTH	BASE SIZE	WEIGHT, EACH
00IS100H	1"	2 3/8"	2 3/4 x 3 3/4"	1.03 lbs



ROUND STRAINER

Cast Bronze

PART NUMBER	DIAMETER	COVERS THRU HULL	WEIGHT, EACH
00SR350	3 1/2"	1"	0.38 lbs
00SR400	4"	1"	0.56 lbs
00SR500	5"	1 1/2"	0.67 lbs
00SR600	6"	2 1/2"	1.00 lbs
00SR800	8"	3"	2.37 lbs



INTAKE WATER STRAINERS

Cast Bronze

PART NUMBER	HOSE SIZE	TAPPED N.P.T.	OVERALL HEIGHT	DIA.	WEIGHT, EACH
00IWS1215	1 1/4" & 1 1/2"	3/4"	4 1/2"	6"	6.56 lbs
00IWS150	1 1/2"	1"	4 1/2"	6"	6.40 lbs

INTAKE WATER STRAINERS – PARTS LIST

PART NUMBER	DESCRIPTION	MATERIAL	WEIGHT, EACH
COIWS12150	O Ring Only	Buena	0.02 oz
7AIWS1215S	Spacer Only	Stainless	0.06 oz
COIWS1215G	Gasket Only	Rubber	0.05 oz
00IWS1215C	Body Only	Bronze	5.50 oz
DOIWS1215T	Top Only	Plexi-glass	0.94 oz
70IWS1215W	Wing Bolt Only	Stainless	0.44 oz
00IWS1215X	Washer Only	Brass	0.03 oz
70IWS1215R	Screen Only	Stainless	0.04 oz

SCOOP STRAINERS

Cast Bronze - Plain Finish

PART NUMBER	OUTSIDE DIAMETER	FITS THRU HULL	WEIGHT, EACH
00SS450	4 1/4 x 3"	3/8 - 1/2"	0.65 lbs
00SS500	5 x 3 3/4"	3/4"	0.75 lbs
00SS600	6 x 4"	1"	1.00 lbs
00SS650	6 1/2 x 4 1/4"	1 1/4"	1.44 lbs
00SS850	8 1/2 x 5 1/2"	1 1/2"	2.80 lbs
00SS1100	11 x 7 1/2"	2 - 3"	4.60 lbs



INVERTED VENT CHECK VALVES

PART NUMBER			OUTSIDE SIZE/NPT	OVERALL DIAMETER	LENGTH
ALUMINUM	CAST IRON	BRONZE			
20ACV150	53ICV150	00BCV150	1½"	3 ⁷ / ₁₆ "	5¼"
20ACV200	53ICV200	00BCV200	2"	4 ¹ / ₈ "	6"
20ACV250	53ICV250	00BCV250	2½"	4 ⁷ / ₈ "	7"
20ACV300	53ICV300	00BCV300	3"	5½"	8 ³ / ₈ "
20ACV400	53ICV400	00BCV400	4"	7 ¹ / ₈ "	9½"
20ACV500	53ICV500	00BCV500	5"	8 ³ / ₄ "	10 ⁵ / ₈ "
20ACV600	53ICV600	00BCV600	6"	10 ¹ / ₈ "	11 ³ / ₈ "



Venting improves the efficiency of loading and unloading cargo by eliminating dangerous pressure or vacuum buildup. Inverted Vent Check Valves add a measure of security, preventing deck wash, deck fire and debris from traveling through the vent.

STANDARD COMPONENTS

FLOAT:
Spun Copper standard, other float
material priced on request

FLOAT STOP:
Precision cast to locate the ball

FIRE SCREEN:
Stainless Steel fine mesh

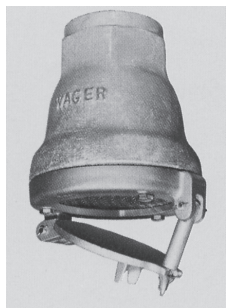
GALVANIZED DEBRIS SCREEN:
Rugged coarse openings

SIZE	MATERIAL	PART NUMBERS				
		FLOAT	FLOAT STOP	FIRE SCREEN	DEBRIS SCREEN	RETAINING RING
1½"	BRONZE	00CV150CF	00BCV150FS	70CV150FS	3BCV150SDS	00BCV150RR
2"	BRONZE	00CV200CF	00BCV200FS	70CV200FS	3BCV200SDS	00BCV200RR
2½"	BRONZE	00CV250CF	00BCV250FS	70CV250FS	3BCV250SDS	00BCV250RR
3"	BRONZE	00CV300CF	00BCV300FS	70CV300FS	3BCV300SDS	00BCV300RR
4"	BRONZE	00CV400CF	00BCV400FS	70CV400FS	3BCV400SDS	00BCV400RR
5"	BRONZE	00CV500CF	00BCV500FS	70CV500FS	3BCV500SDS	00BCV500RR
6"	BRONZE	00CV600CF	00BCV600FS	70CV600FS	3BCV600SDS	00BCV600RR
1½"	IRON	00CV150CF	53 ICV150FS	70CV150FS	3BCV150SDS	53 ICV150RR
2"	IRON	00CV200CF	53 ICV200FS	70CV200FS	3BCV200SDS	53 ICV200RR
2½"	IRON	00CV250CF	53 ICV250FS	70CV250FS	3BCV250SDS	53 ICV250RR
3"	IRON	00CV300CF	53 ICV300FS	70CV300FS	3BCV300SDS	53 ICV300RR
4"	IRON	00CV400CF	53 ICV400FS	70CV400FS	3BCV400SDS	53 ICV400RR
5"	IRON	00CV500CF	53 ICV500FS	70CV500FS	3BCV500SDS	53 ICV500RR
6"	IRON	00CV600CF	53 ICV600FS	70CV600FS	3BCV600SDS	53 ICV600RR
1½"	ALUMINUM	70ACV150SF	20ACV150FS	70CV150FS	70CV150SDS	70ACV150RR
2"	ALUMINUM	70ACV200SF	20ACV200FS	70CV200FS	70CV200SDS	70ACV200RR
2½"	ALUMINUM	70ACV250SF	20ACV250FS	70CV250FS	70CV250SDS	70ACV250RR
3"	ALUMINUM	70ACV300SF	20ACV300FS	70CV300FS	70CV300SDS	70ACV300RR
4"	ALUMINUM	70ACV400SF	20ACV400FS	70CV400FS	70CV400SDS	70ACV400RR
5"	ALUMINUM	70ACV500SF	20ACV500FS	70CV500FS	70CV500SDS	70ACV500RR
6"	ALUMINUM	70ACV600SF	20ACV600FS	70CV600FS	70CV600SDS	70ACV600RR



Inverted Vent Check Valve

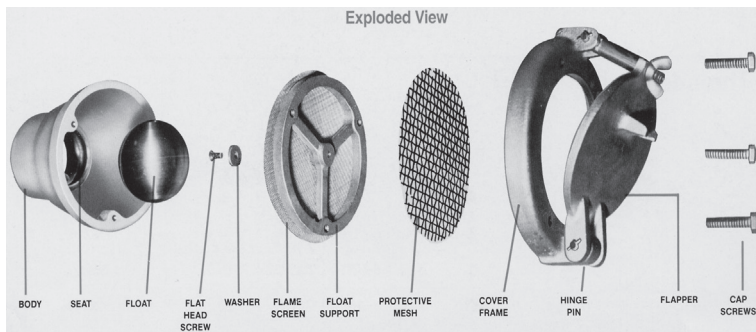
Model 1750



Description: Model 1750 Wager Inverted Vent Check Valves consist of a body, (Steel, Stainless Steel, Cast Iron, Bronze or Aluminum), ball float, valve seat, fine flame screen and heavy protective mesh and cover. Connections are either screwed I PS, flanged ASA, or weld type as required.

The general design utilizes a ball float which in the normally open position rests at the bottom of the assembly on the float support ring. A wash or submerging of the valve will float the ball upwards, positioned by the guides to seat in a machined insert seat at top of body which closes the valve during the period of submergence, after which it automatically falls to the open position.

Exploded View

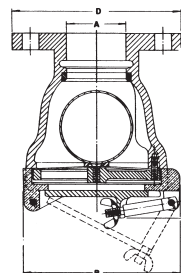


Function: Wager Inverted Vent Check Valves protect tanks and bulkheads from vacuum and pressure build-up during loading and unloading of liquid or dry cargo and assures maximum efficiency during pumping operations. The ball float prevents contamination of tank fluids or dry cargo by sea water during heavy seas. The fine stainless steel flame screen protects tank fluids or dry cargo dust from igniting when subject to deck fires. The protective mesh covers the fine flame screen and prevents any mechanical damage from floating objects in the sea water.

Features:

- 1- OPEN AREA RATIO: Meets latest requirements of ABS, USMA, USCG, and NAVY.
- 2-ACCESSIBILITY OF PARTS: Removal of four or six cap screws (depending on size) facilitates cleaning, inspection and/or replacement.
- 3-POSITIVE SEALING: Machined seat assures positive seal when float is in top position.
- 4 - FLOAT: Copper standard, monel, stainless steel, high density polyethylene available.
- 5 - FLOAT SUPPORT: Assures centering of float in open position. Prevents wear on float and screen assembly.
- 6-COVER: Held open and closed with one toggle bolt.
- 7-BODY MATERIAL: Steel, Cast Iron, Bronze, Stainless Steel, or Aluminum.

Flanged Type 1750-F



A	1-1/2	2	2-1/2	3	3-1/2	4
B	4-11/16	5-11/32	6-1/4	7-1/8	7-13/16	7-13/16
C	6	6-15/16	7-13/32	8-3/8	9-5/8	9-5/8
D	5	6	7	7-1/2	8-1/2	9
Wt.	10	16	21	28	35	36

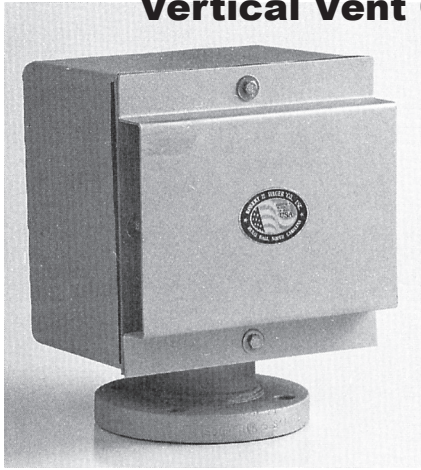
Weld Type 1750-W

A	1-1/2	2	2-1/2	3	3-1/2	4
B	4-11/16	5-11/32	6-1/4	7-1/8	7-13/16	7-13/16
C	6	6-15/16	7-13/32	8-3/8	11-1/4	9-5/8
Wt.	7	10	13	20	25	25

Threaded Type 1750-T

A	1-1/2	2	2-1/2	3	3-1/2	4
B	4-11/16	5-11/32	6-1/4	7-1/8	—	7-13/16
C	6	6-15/16	7-13/32	8-3/8	—	9-5/8
Wt.	7	10	13	20	—	25

Vertical Vent Check Valve



Vertical Vent Check Valve (closed)



Function

The Vertical Vent Check Valve is a “normally open” check valve. In heavy seas, any deck washover will push the float to the closed position, stopping water from entering the lower bulkheads.

To prevent a spark from igniting tank fluids or dry cargo dust, the fine stainless steel flame screen arrests flames from crossing through this barrier. The ball float prevents contamination of tank cargo by sea water during heavy seas.

Purpose

The WAGER Vertical Vent Check Valve is used to protect tanks and bulkheads from vacuum pressure buildup during loading and unloading of liquid and dry cargo.

Description

The Vertical Vent Check Valve was designed to eliminate the need for a “goose neck” on deck for each valve. It is composed of an inner and outer valve body (cold galvanized), float (available in a variety of materials), stainless steel flame screen, and a steel cover.

Special Feature

The component design allows for easy disassembly, to allow cleaning of the venting chamber.

Features

Float (Standard) -
High Density Polyethylene

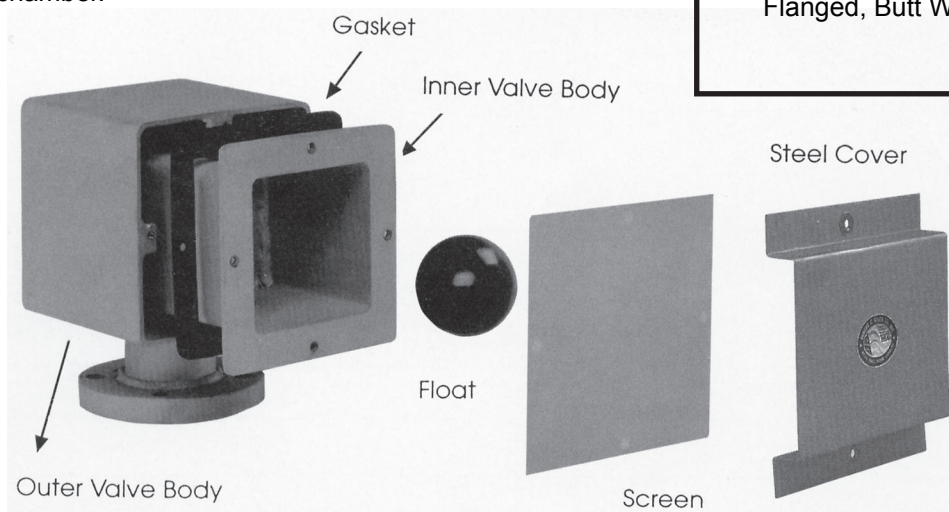
Float (Optional) -
Copper, Stainless Steel, Monel

Body Material - Steel
Optional — Stainless Steel

Cold Galvanized - Standard
Hot-Dip Galvanizing
(upon request)

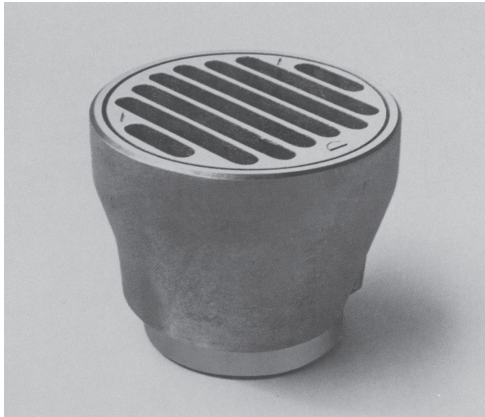
Standard Sizes Available -
2, 2½, 3, 4, 5, 6, 8, 10 inches
(custom sizes available on request)

Connections -
Flanged, Butt Weld, Threaded



Deck Drains

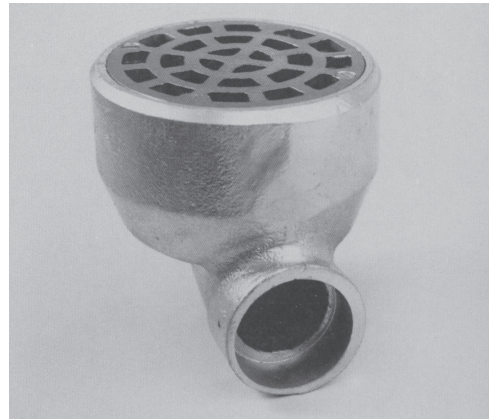
Model 134 Series



Description: Wager Deck Drains are of economical commercial grade, consisting of a galvanized steel body and a bronze strainer plate that is removable, secured by three stainless steel flat head screws. The strainer plate has full openings to provide the desired drainage with pipe of minimum size.

Heavy Wall Deck Drains

Cast steel body with cast bronze strainer and baffle. All Drains have a Ratio of 2:1 area through strainer to pipe size area.



“IT’S NOT A WORD... IT’S A SENTENCE” (CONTINUED)

- “Before marriage, a man yearns for the woman he loves. After marriage, the ‘Y’ becomes silent.” -Anonymous
- “The poor wish to be rich, the rich wish to be happy, the single wish to be married, and the married wish to be dead.” -Ann Landers
- “Marriage teaches you loyalty, forbearance, self-restraint, meekness, and a great many other things you wouldn’t need if you had stayed single.” -Jimmy Townsend
- “Love is an ideal thing, marriage a real thing; a confusion of the real with the ideal never goes unpunished.” -Johann von Goethe
- “It’s a bit dangerous out there, and I guess men have to choose between marriage and death. I guess they figure that with marriage at least they get meals. But then they get married and find out we don’t cook anymore.” -Rita Rudner

DUPLEX INTAKE WATER STRAINER

**NEW
Item**
**Available by
Oct. 2010**

Figs. 0594 - Duplex Intake Water Strainer

Duplex strainers permit continuous engine operation by permitting strainer clean-out while the engine is running. Properly sized, a single side of the strainer will allow adequate flow for cooling. Using an integral valve, either side can be closed and cleaned without affecting coolant flow to the engine through the other side.

CONSTRUCTION:

- Cast Bronze
- 4-Position Control Valve (All Off/Side 1 On/Side 2 On/Both On)
- Many Replacement Parts in Common with Other Perko Strainers (Fig. 0493)

PERKO Duplex Water Strainers are Designed for Easy Installation and Cleaning. Features Include Mounting Lugs Cast into Both Sides to Assure Universal Mounting, 8 Outside Tie Rods and two 316 Stainless Steel Strainer Basket to Minimize Electrolysis. The diameter of the screen holes is 0.079" providing 47% open area, among the highest in the industry for cylindrical strainer baskets. Lugs for the Cast Bronze Covers Permit Easy Removal and Cleaning of the Strainer Baskets. Drain Plugs in the Bottom Castings are Provided for Easily Removing Sediment and Draining for Winterizing.

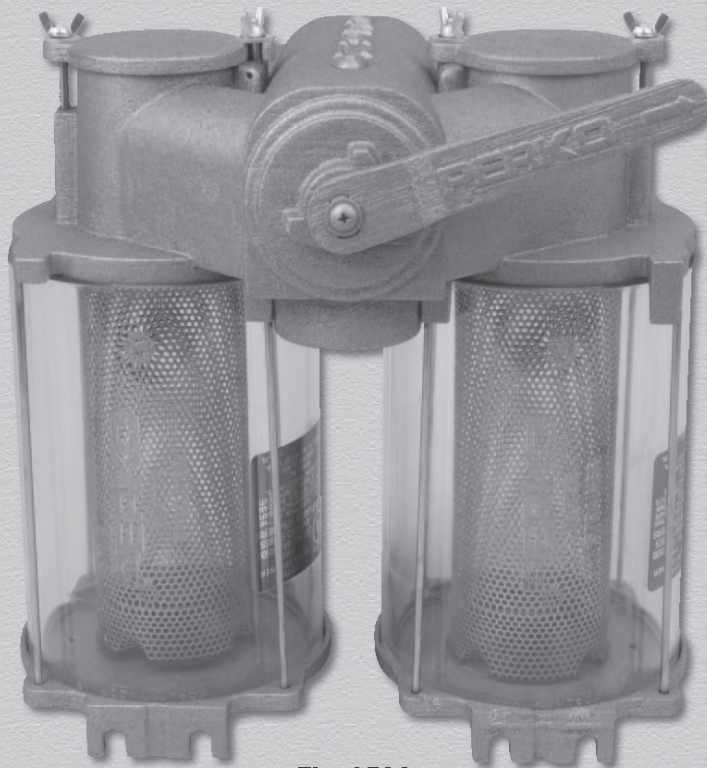
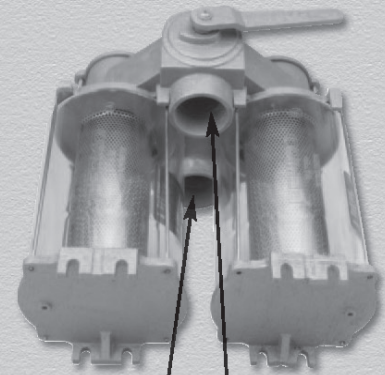


Fig. 0594



Pipe Connections

ORDERING & TECH INFO

Pipe Size Inches	Standard Pkg. - 1 Pc.	Height Overall Inches	Width Overall Inches	Depth Overall Inches	Dimensions Cylinder Inches O.D. x L	Open Area Dimensions Basket Inches	Each Side Open Area Ratio	Ship Wt. Carton Lbs. Std. Pkg.	Spare Gasket Kit* Dealer Pkg. - 5 Kts. 1 Kit. per Bag
1-1/2	0594008PLB	12	16	8-1/2	6 x 8	3-5/16 8-7/16	17:1	61	0594DP899R
2	0594009PLB	16	16	8-1/2	6 x 12	3-5/16 x 12-1/4	13:1	63	0594DP899R
2-1/2	0594010PLB	16	16	8-1/2	6 x 12	3-5/16 x 12-1/4	10:1	63	0594DP899R

DUPLEX INTAKE WATER STRAINER SPARE PARTS ORDERING INFORMATION

For Spare Part No. Insert a Spare Part Code Listed Below in Place of the "PLB" in the Strainer's Catalog Number (i.e., 059400699A, Top Casting for 1-1/2" (#8) Strainer).

Description	Spare Part Code	Sample Part Number	Package	Spare Part Description	Code	Sample Part Number	Package
Top Casting	.99A	059400899A	Boxed	Wing Nuts & Bolts for Cover	.99L	0493DP899L	Bag
Transparent Cylinder	.99C	049300899C	Boxed	Rubber Gasket Kit Consists of:			
Basket Strainer Size 8	.99D	059400899D	Boxed	2 Cover Gaskets & 4 Body Gaskets	99R*	0594DP899R	Bag
Basket Strainer Sizes 9 & 10	.99D	049300999D	Boxed	Tie Rods			
Cover with Gasket	.99E	0049300899E	Boxed	Consists of (4 Each for)	.99P	0493DP899P	Bag

LIGHTWEIGHT INTAKE WATER STRAINER WITH CLEAR BODY

Fig. 0443 - Lightweight Intake Water Strainer

CONSTRUCTION:

- Cast Bronze with Clear Polymer Body
- Our Lightest Weight Strainer
- Many Replacement Parts in Common with Other Perko Strainers (Fig. 0493)

**NEW
Item**

Available by
Oct. 2010

PERKO Water Strainers are Designed for Easy Installation and Cleaning. Features Include Mounting Lugs Cast into Both Sides to Assure Universal Mounting and a 316 Stainless Steel Strainer Basket to Minimize Electrolysis. The diameter of the screen holes is 0.079" providing 47% open area, among the highest in the industry for cylindrical strainer baskets. Hinged Lugs for the Cast Bronze Cover Permit Easy Removal and Cleaning of the Strainer Basket. A Drain Plug in the Bottom Casting is Provided for Easily Removing Sediment and Draining for Winterizing.

FIG. 0443 - DIFFERENTIAL PRESSURE GRAPH

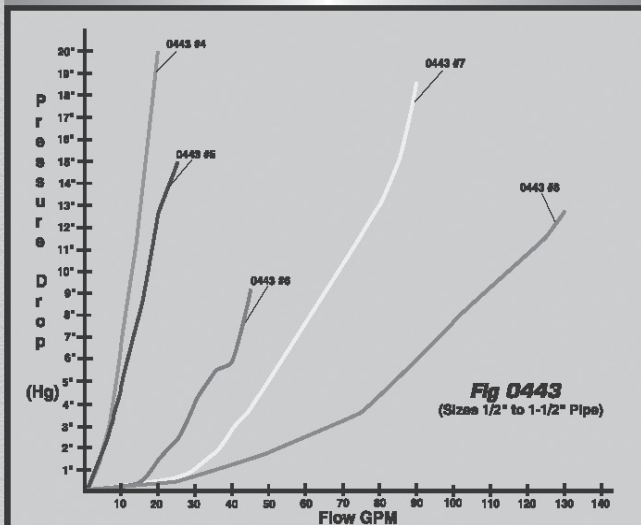


Fig. 0443

ORDERING & TECH INFO

Pipe Size Inches	Standard Pkg. - 1 Pc.	Height Overall Inches	Width Overall Inches	Dimensions Cylinder Inches O.D. x L	Dimensions Basket Inches	Open Area To Pipe Size Ratio	Ship Wt. Carton Lbs. Std. Pkg.	Spare Gasket Kit* Dealer Pkg. - 5 Kts. 1 Kit. per Bag
1/2	0443004PLB	6-1/4	4-1/2	3-1/2 x 4-1/4	1-13/16 x 4-3/8	30:1	3.9	0443DP599R
3/4	0443005PLB	8-5/8	4-1/2	3-1/2 x 6-5/8	1-13/16 x 6-1/4	25:1	4.0	0443DP599R
1	0443006PLB	8-3/4	5-1/2	4-1/2 x 6	2-5/8 x 5-7/8	20:1	6.7	0443DP799R
1-1/4	0443007PLB	9-5/16	5-1/2	4-1/2 x 6-9/16	2-5/8 x 6-1/4	13:1	6.5	0443DP799R
1-1/2	0443008PLB	11-3/4	7-1/4	6 x 8-5/8	3-5/16 x 8-7/16	17:1	11.1	0443DP999R

CLEAR BODY INTAKE WATER STRAINER SPARE PARTS ORDERING INFORMATION

For Spare Part No. Insert a Spare Part Code Listed Below in Place of the "PLB" in the Strainer's Catalog Number (i.e., 049300699A, Top Casting for 1" (#6) Strainer).

Description	Spare Part Code	Sample Part Number	Package	Description	Spare Part Code	Sample Part Number	Package
Top Casting	.99A	049300499A	Boxed	Hinged Bolt for Cover			
Transparent Cylinder Body	.99C	044300499C	Boxed	With Pin, Nut and Washer	.99L	0493DP599L	Bag
Basket Strainer	.99D	049300499D	Boxed	Rubber Gasket Kit Consists of:			
Cover with Gasket	.99E	049300499E	Boxed	1 Cover Gasket & 1 Body Gasket	.99R*	0443DP599R	Bag
				Nuts and Washers Consists of:			
				4 Each for 0443 Series	.99F	0443DP499F	Bag

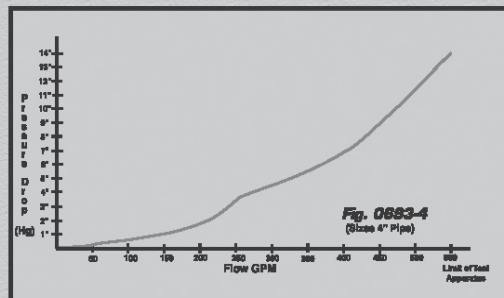
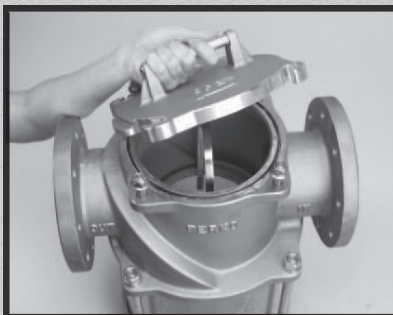
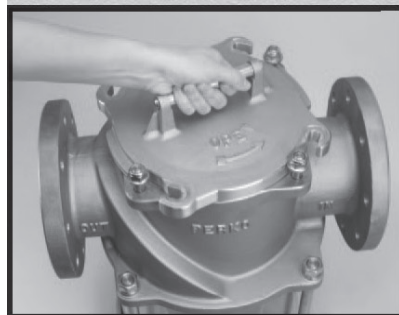
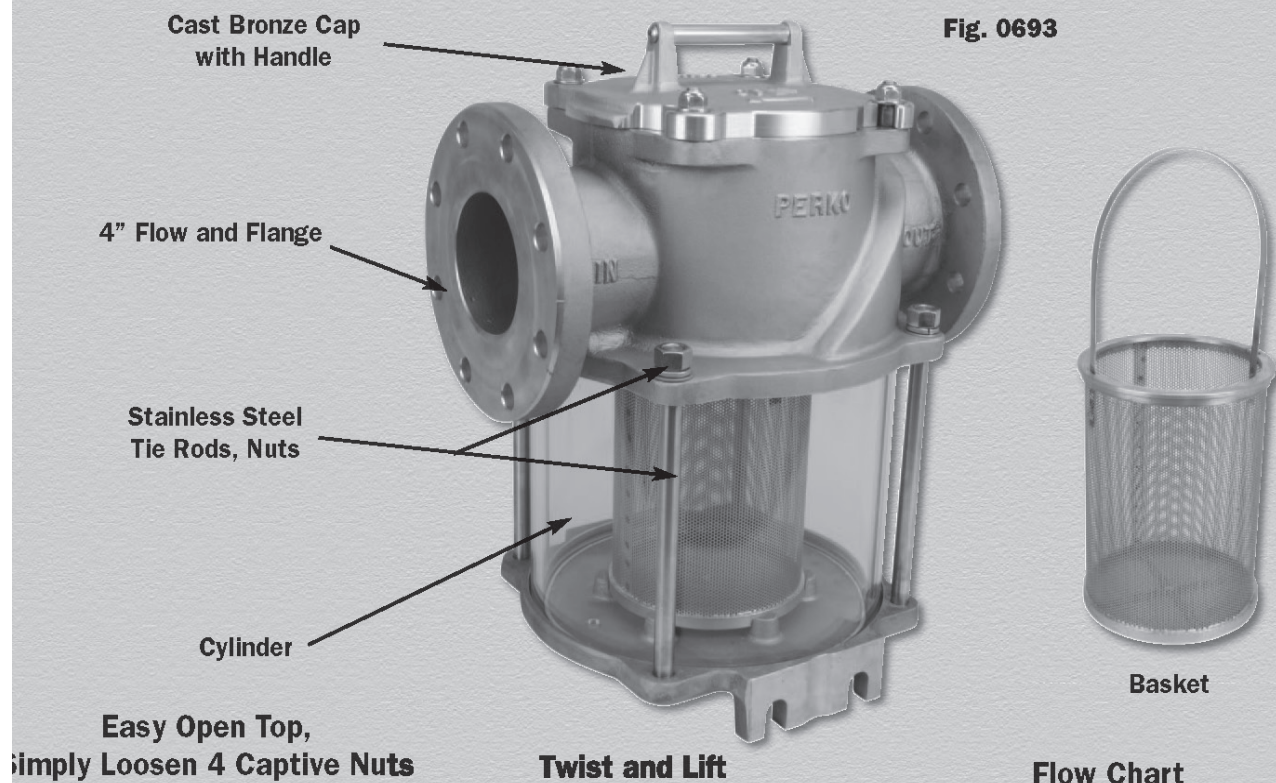
PERKO® HEAVY DUTY 4" INTAKE WATER STRAINER

NEW
Item

Fig. 0693 - Intake Water Strainer
CONSTRUCTION:

- Cast Bronze

The new Perko Large Boat Strainer Line is designed for easy installation, cleaning and maintenance. Aircraft style mounting nuts hold fast without lock washers. They are held captive by the body and can't be dropped or lost. Once the mounting nuts are loosened, a convenient handle on the top cover allows it to be easily rotated and removed providing quick access to the strainer basket. Four 316 stainless steel tie rods and strainer basket minimize electrolysis. The diameter of the screen holes is 0.079" providing 47% open area, among the highest in the industry for cylindrical strainer baskets. A drain plug in the bottom casting is provided for easy sediment removal or to drain when winterizing. A transparent cylinder provides a visual check for debris.


ORDERING & TECH INFO

Pipe Size Inches	Height Overall Inches	Width Overall Inches	Std. Pkg. 1 Pc.	Dimensions Cylinder Inches	Dimensions Basket Inches	Open Area To Pipe Size Ratio	Ship Wt. Carton Lbs. Std. Pkg.	Spare Gasket Kit* Std. Pkg. 1 Kit
4	17-1/2	16-1/2	0693012PLB	12 O.D. x 8-3/4	6-3/4 x 8-5/8	10:1	135.0	069301299R

*Spare Gasket Kit Consists of: 1 O-Ring for Cover and 2 Cylinder Gaskets



www.brtmarine.com

PERKO®

INTAKE WATER STRAINERS

PERKO Water Strainers are Designed for Easy Installation and Cleaning. Features Include Mounting Lugs Cast into Both Sides to Assure Universal Mounting, Four Outside Tie Rods and a 316 Stainless Steel Strainer Basket to Minimize Electrolysis. The diameter of the screen holes is 0.079" providing 47% open area, among the highest in the industry for cylindrical strainer baskets. Hinged Lugs for the Cast Bronze Cover Permit Easy Removal and Cleaning of the Strainer Basket. A Drain Plug in the Bottom Casting is Provided for Easily Removing Sediment and Draining for Winterizing. For Applications Requiring Higher Capacity, Use Fig. 0500.

Figs. 0493 & 0500 Intake Water Strainers CONSTRUCTION:

- Cast Bronze

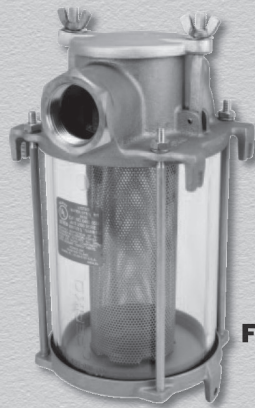


Fig. 0493



Fig. 0500



ORDERING & TECH INFO

Pipe Size Inches	Height Overall Inches	Width Overall Inches	Standard Pkg. - 1 Pc.	Dimensions Cylinder Inches O.D. x Height	Dimensions Basket Inches O.D. x Height	Open Area To Pipe Size Ratio	Ship Wt. Carton Lbs. Standard Pkg.	Spare Gasket Kit* Dealer Pkg. - 5 Kts. 1 Kit. per Bag
1/2	5-3/4	4-1/2	0493004PLB	3-1/2 x 4	1-13/16 x 4-3/8	30:1	4.9	0493DP599M (or) 99R
3/4	8-3/8	4-1/2	0493005PLB	3-1/2 x 6	1-13/16 x 6-1/4	25:1	5.0	0493DP599M (or) 99R
1	9-1/2	5-1/2	0493006PLB	4-1/2 x 5-1/2	2-5/8 x 5-7/8	20:1	8.1	0493DP799M (or) 99R
1-1/4	10	5-1/2	0493007PLB	4-1/2 x 6	2-5/8 x 6-1/4	13:1	7.9	0493DP799M (or) 99R
1-1/2	11-1/2	7-1/4	0493008PLB	6 x 8	3-5/16 x 8-7/16	17:1	13.7	0493DP999M (or) 99R
2	16	7-1/2	0493009PLB	6 x 12	3-5/16 x 12-1/4	13:1	19.5	0493DP999M (or) 99R
2-1/2	16	7-1/2	0493010PLB	6 x 12	3-5/16 x 12-1/2	10:1	18.0	0493DP999M (or) 99R

ORDERING & TECH INFO

Pipe Size Inches	Height Overall Inches	Width Overall Inches	Standard Pkg. - 1 Pc.	Dimensions Cylinder Inches O.D. x Height	Dimensions Basket Inches O.D. x Height	Open Area To Pipe Size Ratio	Ship Wt. Carton Lbs. Standard Pkg.	Spare Gasket Kit* Standard Pkg. - 1 Kit
2	14-1/2	9	0500009PLB	8 x 10	3-7/8 x 10-1/4	20:1	36.0	0500DP999M (or) 99R
2-1/2	16-1/2	9	0500010PLB	8 x 12	3-7/8 x 12-1/4	18:1	33.5	0500DP999M (or) 99R
3	18-1/2	9	0500011PLB	8 x 14	3-7/8 x 14-1/4	14:1	34.0	0500DP999M (or) 99R

*Spare Gasket Kit Consists of: 1 Cover Gasket and 2 Cylinder Gaskets

INTAKE WATER STRAINER & FLUSHING STRAINER SPARE PARTS ORDERING INFORMATION

For Spare Part No. Insert a Spare Part Code Listed Below in Place of the "PLB" in the Strainer's Catalog Number (i.e., 049300699A, Top Casting for 1" (#6) Strainer).

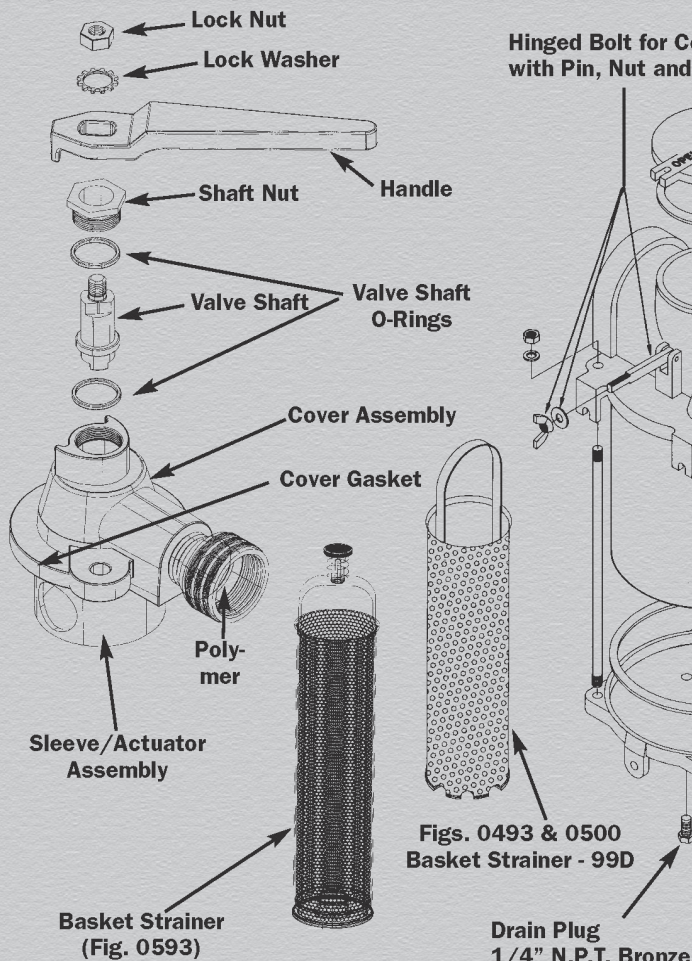
Description	Spare Part Code	Sample Part Number	Package	Description	Spare Part Code	Sample Part Number	Package
Top Casting	.99A	049300499A	Boxed	Cork Gasket Kit Consists of:			
Bottom Casting	.99B	049300499B	Boxed	1- Cover Gasket and			
Transparent Cylinder	.99C	049300499C	Boxed	2- Cork Cylinder Gaskets	.99M*	0493DP599M	Bag
Basket Strainer	.99D	049300499D	Boxed	Rubber Gasket Kit Consists of:			
Cover with Gasket	.99E	049300499E	Boxed	1- Cover Gasket and			
Hinged Bolt for Cover				2- Rubber Cylinder Gaskets	.99R*	0493DP599R	Bag
With Pin, Nut and Washer	.99L	0493DP599L	Bag	Tie Rods, Nuts and Washers			
Cork Cover Gasket Kit (Set of 2)	.99N	0493DP599N	Bag	Consists of (4 Each for 0493 Series)			
				(1 Each for 0500 Series)	.99P	0493DP499P	Bag

* Note: Older model strainers utilizing cork cylinder gaskets must order 99M Cork Gasket Kit and newer model strainers must order 99R Rubber Gasket Kit.

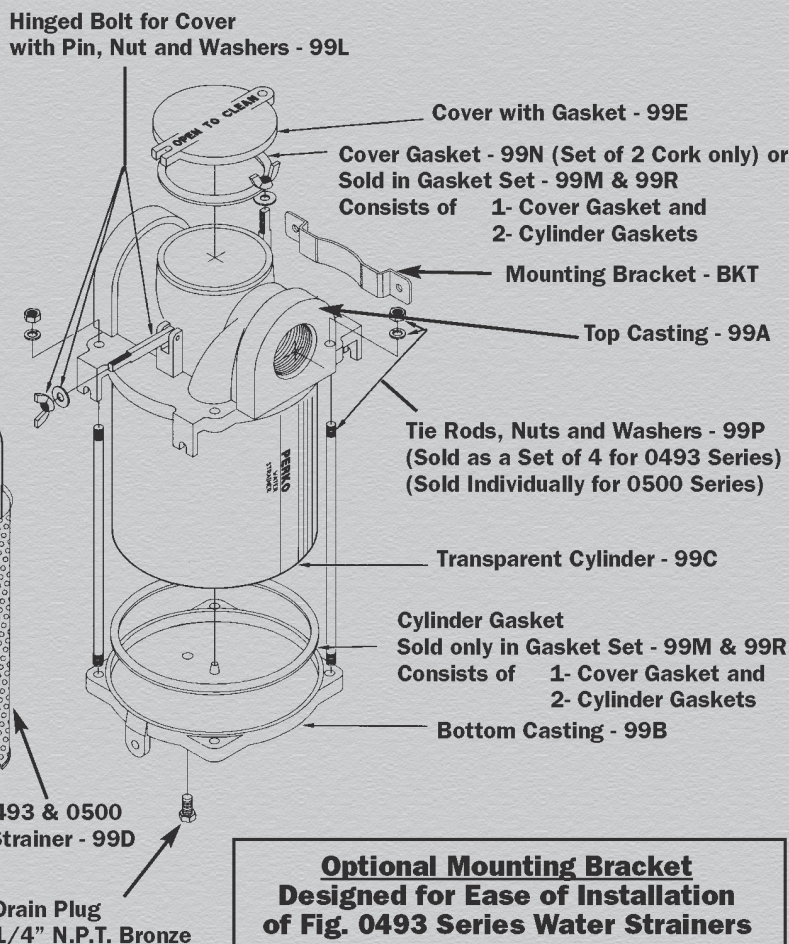
INTAKE & FLUSHING WATER STRAINERS SPARE PARTS

Figs. 0493 & 0500 - Intake Water Strainers and Fig. 0593 Flushing Strainer Spare Parts Ordering Information

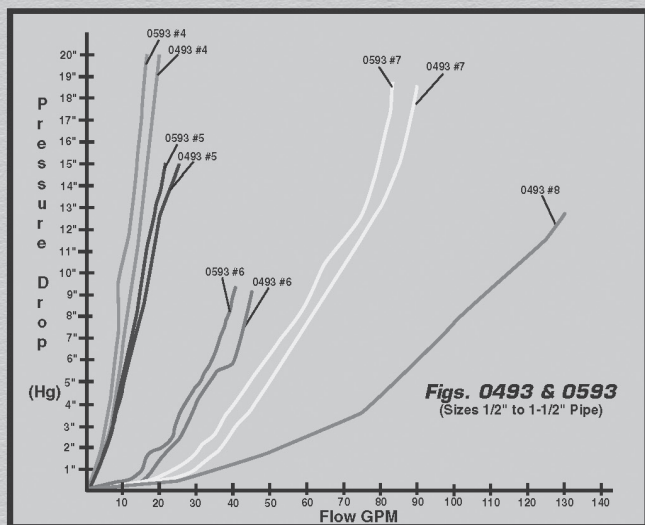
Fig. 0593 Flushing Strainer



Figs. 0493 & 0500 Intake Strainer



FIGS. 0493 & 0593 - DIFFERENTIAL PRESSURE GRAPHS

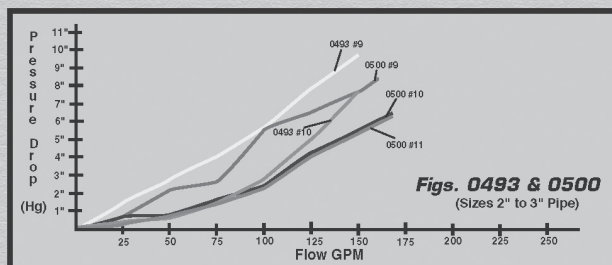


Optional Mounting Bracket Designed for Ease of Installation of Fig. 0493 Series Water Strainers



Part Number	Fits Strainer Size
0493045BKT	4 & 5
0493067BKT	6 & 7
0493089BKT	8 & 9

FIGS. 0493 & 0500 - DIFFERENTIAL PRESSURE GRAPHS



PERKO® FLUSHING STRAINER

PERKO Flushing Strainers are Designed for Easy Installation and Cleaning. Features Include Mounting Lugs Cast into Both Sides to Assure Universal Mounting, Four Outside Tie Rods and a 316 Stainless Steel Strainer Basket to Minimize Electrolysis. The diameter of the screen holes is 0.079" providing 47% open area, among the highest in the industry for cylindrical strainer baskets. Hinged Lugs for the Cast Bronze Cover Permit Easy Removal and Cleaning of the Strainer Basket. A Drain Plug in the Bottom Casting is Provided for Easily Removing Sediment and Draining for Winterizing.

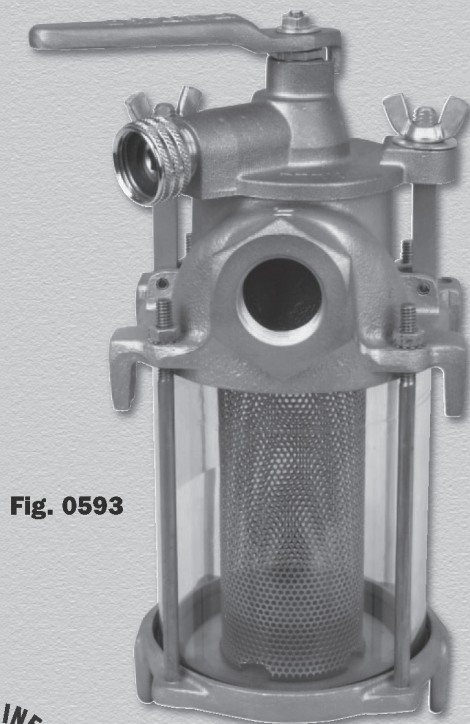


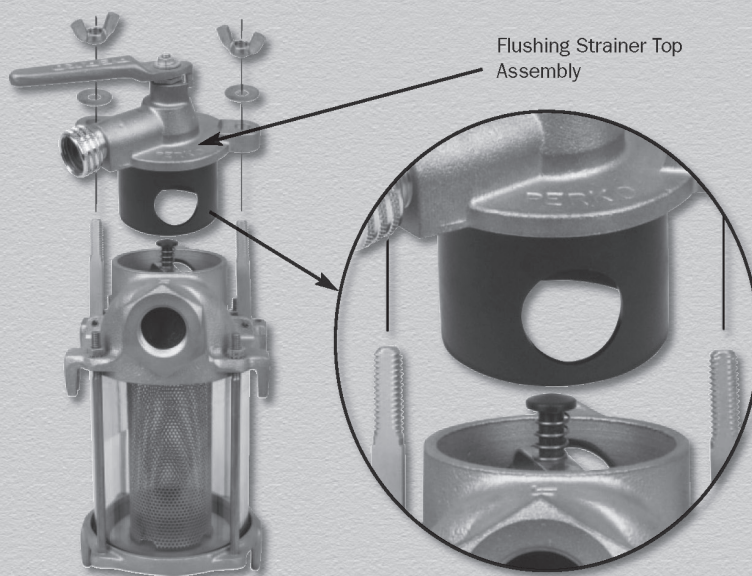
Fig. 0593



Fig. 0593 - Flushing Strainer Fresh Water Flushes your Inboard or Generator Simply and Easily

CONSTRUCTION:

- Cast Bronze
- Available in 1/2", 3/4", 1", or 1-1/4" Pipe Sizes
- Uses Standard Perko Strainer Replacement Parts (Gaskets, Cylinders, Nuts and Tie Rods)
 - Handle Indicates Flow Direction
- Top Casting Removes Easily for Basket Cleaning
 - Reversible Bulkhead Mounting Option
 - Smooth Acting, Low Torque Ball Valve
- Internal Cam Seals Fresh Water Intake During Normal (Through Strainer) Operation
- Can Act as an Emergency Bilge Pump



ORDERING & TECH INFO

Pipe Size Inches	Height Overall Inches	Width Overall Inches	Standard Pkg. - 1 Pc.	Dimensions Cylinder Inches	Dimensions Basket Inches	Open Area To Pipe Size Ratio	Weight Pounds	Spare Gasket Kit* Dealer Pkg. - 5 Kts. 1 Kit per Bag
1/2	5-3/4	4-1/2	0593004PLB	3-1/2 x 4	1-13/16 x 4-3/8	30:1	5.9	0493DP599R
3/4	8-3/8	4-1/2	0593005PLB	3-1/2 x 6	1-13/16 x 6-1/4	25:1	6.2	0493DP599R
1	9-1/2	5-1/2	0593006PLB	4-1/2 x 5-1/2	2-5/8 x 5-7/8	20:1	9.1	0493DP799R
1-1/4	10	5-1/2	0593007PLB	4-1/2 x 6	2-5/8 x 6-1/4	13:1	9.1	0493DP799R

Flushing Strainer Spare Parts Ordering Information

Description	Spare Part Code	Sample Part Number	Package	Description	Spare Part Code	Sample Part Number	Package
Handle (Fig. 0805)	99D	080500599D**	Boxed	Sleeve Assy.	99B	059300499B	Boxed
Valve Shaft	99A	059300499A	Boxed	Cover Assy.	99C	059300499C	Boxed

See Pages 146-147 For Additional Spare Parts Ordering Information and Differential Pressure Graphs.

*Spare Gasket Kit Consists of: 1 Cover Gasket and 2 Cylinder Gaskets.

** For Complete Handle Part Numbers See Fig. 0805 on page 154.

INTAKE, SCOOP & PUMP STRAINERS



FIG. 65 - INTAKE STRAINER

CAST BRONZE WITH MACHINED SLOTS

ORDERING INFORMATION

Pipe Size Inches	Max. Hull Thickness Inches	Dimensions Strainer Inches	Dealer Pkg. 5 Pcs	OEM Bulk Pkg. 10 Pcs.	Weight Pounds
1/2	2-1/4	3 x 4	65 DP4 PLB	65 004 PLB	3/4
3/4	2-3/16	3 x 4	65 DP5 PLB	65 005 PLB	1
1	2-1/2	3 x 4	65 DP6 PLB	65 006 PLB	1-1/4
1-1/4	3	3-1/4 x 4-1/4	65 DP7 PLB	65 007 PLB	1-5/8

Screw Size #8.



FIG. 65

FIG. 66 - SCOOP STRAINER

CAST BRONZE WITH MACHINED SLOTS

ORDERING INFORMATION

For Thru-Hull Sizes Inches	Dimensions Strainer Inches	Dealer Pkg. 5 Pcs	Standard Package - 5 Pc.	Weight Pounds
3/8 & 1/2	3-1/2 x 2-1/2	66 DP1 PLB	66 001 PLB	3/8
3/4 & 1	5 x 3-1/4	66 DP2 PLB	66 002 PLB	7/8
1-1/4 & 1-1/2	6-1/4 x 4-1/4	66 DP3 PLB	66 003 PLB	1-1/4
2	8 x 5-1/8	66 DP4 PLB	66 004 PLB	2

Screw Size #8.



FIG. 66

FIG. 709 - PUMP STRAINER

CAST BRONZE

ORDERING INFORMATION

Hose Size Inches	Length Overall Inches	Width Overall Inches	Dealer Pkg. 5 Pcs.	Weight Ounces
5/8	3-5/8	1-3/4	709 DP PLB	8-3/4

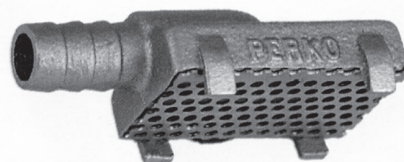


FIG. 709

FIGS. 721 & 722 - PUMP STRAINERS

CAST BRONZE

ORDERING INFORMATION

Pipe Size Inches	Length Overall Inches	Width Overall Inches	Standard Package - 1 Pc.	Weight Pounds
1-1/4	4-3/4	2-3/4	721 000 PLB	1-5/8
1-1/4	4-1/2	2-3/4	722 000 PLB	1-3/8

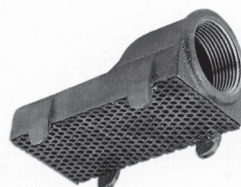


FIG. 721

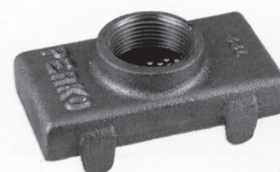


FIG. 722

SEACOCKS



Fig. 834

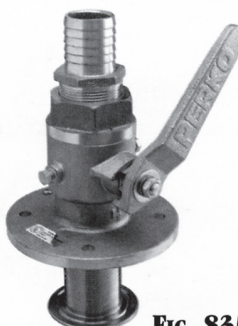


Fig. 835

FIGS. 834 & 835 SEACOCKS - BALL VALVE DESIGN

CAST BRONZE

Fig. 834 - With 90° Curved Hose Adapter

Fig. 835 - With Straight Hose Adapter

INCLUDES THRU-HULL, HOSE ADAPTER, DRAIN PLUG, FOUR PRE-DRILLED MOUNTING HOLES AND BONDING SCREW. PERKO SEACOCKS INCORPORATE A PLASTIC BALL AND SEAT ASSURING A TIGHT SEAL AND EASE OF OPERATION. DRAIN PLUGS FOR WINTERIZING. HANDLES ARE EASILY REMOVED.

ORDERING INFORMATION

Hose Size Inches	Pipe Size Inches	Flange Diameter Inches	Fig. 834 Overall Height*	Fig. 834 Standard Package - 1 Pc.	Fig. 835 Overall Height*	Fig. 835 Standard Package - 1 Pc.	OEM Bulk Pkg.	Bolt Size	Weight Pounds
3/4	3/4	3-1/4	5-7/8	834 005 PLB	5	835 005 PLB	5	5/16	3
1	1	4-3/8	6-3/8	834 006 PLB	5-3/8	835 006 PLB	—	3/8	5-1/8
1-1/4	1-1/4	4-7/8	7-5/8	834 007 PLB	6-1/4	835 007 PLB	5	3/8	8-1/4
1-1/2	1-1/2	5-1/2	8-3/8	834 008 PLB	6-5/8	835 008 PLB	5	3/8	10
2	2	5-3/4	10-3/8	834 009 PLB	7-7/8	835 009 PLB	—	3/8	22
2-1/2	2-1/2	7-1/4	12-1/2	834 010 PLB	10-3/8	835 010 PLB	—	1/2	25
3	3	8	14-3/8	834 011 PLB	12	835 011 PLB	—	1/2	32

* Overall Height is measured from the top of the hose adapter to the bottom of the flange.



Fig. 805

FIG. 805 SEACOCK BODY

CAST BRONZE - BALL VALVE DESIGN

THESE VALVE BODIES ARE OFFERED TO MEET THE NEEDS OF APPLICATIONS THAT REQUIRE EXTRA LONG, SCOOP OR FLUSH TYPE THRU-HULLS.

ORDERING INFORMATION

Pipe Size Inches	Fig. 805 Standard Package - 1 Pc.	OEM Bulk Pkg.	Weight Pounds
3/4	805 005 PLB	5	2-1/2
1	805 006 PLB	5	3-7/8
1-1/4	805 007 PLB	5	5-1/4
1-1/2	805 008 PLB	5	6-3/8
2	805 009 PLB	---	11
2-1/2	805 010 PLB	---	19-3/8
3	805 011 PLB	---	21-1/4

Fig. 805 - SPARE PARTS ORDERING INFORMATION

The Repair Kits Listed Below Consist of: 1 Ball, 2 Ball Seats and 2 O-Rings for the Valve Stem.

Pipe Size Inches	Repair Kit	Pipe Size Inches	Repair Kit	Pipe Size Inches	Repair Kit
3/4	805 005 99B	1-1/2	805 008 99B	3	805 011 99B
1	805 006 99B	2	805 009 99B		
1-1/4	805 007 99B	2-1/2	805 010 99B		

Mueller Steam Specialty

Models 125, 125B

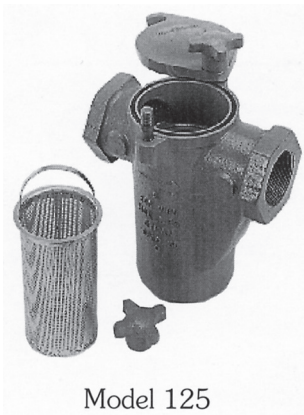
WORKING PRESSURES - NON-SHOCK

125	ANSI 125 lb. Class	200 PSI @ 150° F Knob 150 PSI @ 250° F Buna-N - Bolted
125B	ANSI 125 lb. Class	200 PSI @ 150° F 150 PSI @ 250° F Buna-N - Bolted

Max. temp. can be limited by O-ring material. Consult factory. 100% Hydrostatically Tested.

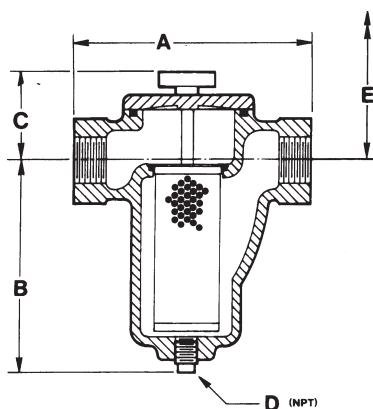
All units rated 200 PSI WOG with knob type closure.

Cast Iron or Cast Bronze Screwed End Simplex Basket Strainer



Model 125

125 Class 125
125B Class 125



Model 125

SERVICE RECOMMENDATIONS

These strainers are used to strain foreign matter from pipe lines and provide inexpensive protection for costly pumps, meters, valves, and similar mechanical equipment. They are available in a variety of materials other than those listed below. In the appropriate material, the Model 125 can be specified for drinking water, cooling water, hot water systems, sea water, etc. Just a few of the applications in the chemical process industry are: brine, paint, heat exchangers, condensers, fuel oil, organic and inorganic chemicals.

FEATURES

These strainers have been designed for applications where easy maintenance and large capacity straining are needed. Service time is minimal because the cover is secured with quick opening, non-yoke type knobs. Both the cover and basket use O-ring seals, eliminating the need to replace gaskets each time the strainer is serviced. This, combined with the machined basket seat, eliminates particle bypass. With the appropriate wire mesh, these strainers can be used to strain particles as small as 5 microns.

CONSTRUCTION

Quick release knob cover is standard, complete with o-ring seal. Swing clamp covers are available for all sizes; consult factory. A plugged NPT connection is provided at location "D" (see page D-7). The standard basket is 304 Stainless Steel with .062 perforations. Standard o-ring material is Buna-N for carbon steel units, Viton for stainless steel units. See chart on D-2 for pressure drop figures.

CAPACITY Minimum 6 to 1 ratio.

GALVANIZING Available on cast iron models. Other coatings are available on application.

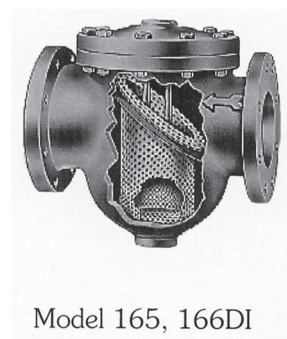
MATERIALS: Body/Cover Cast Iron ASTM A126B
Bronze ASTM B62 (type 85-5-5-5)
O-ring Buna N, Viton Standard for Stainless Steel
For stainless steel, pickling and passivation available upon request. Consult Factory.

SIZE	in mm	3/8 10	1/2 15	3/4 20	1 25	1-1/4 32	1-1/2 40	2 50	2-1/2 65	3 80
A	in	4-9/16	4-9/16	4-9/16	5-5/16	6-5/16	6-5/16	8-1/4	9-5/8	11-1/4
	mm	116	116	116	135	160	160	210	244	286
B	in	4	4	4	4-11/16	6-1/2	6-1/2	7-7/8	8-3/4	11-3/8
	mm	102	102	102	119	165	165	200	222	289
C	in	2-1/2	2-1/2	2-1/2	2-3/4	3	3	3-5/8	4	4-1/2
	mm	64	64	64	70	76	76	92	102	114
D	NPT	3/8	3/8	3/8	3/8	1/2	1/2	3/4	1	1
E	screen in	4-13/16	4-13/16	4-13/16	5-7/8	8-1/8	8-1/8	10-1/8	11-7/16	14-13/16
	removal mm	106	106	106	149	206	206	257	590	376
WEIGHTS										
Cast Iron	lb	4.75	4.75	4	6	10	10	19.5	28.5	47
	kg	2.1	2.1	1.8	2.7	4.6	4.6	8	12	21
Bronze	lb	5.25	5.25	5.25	7.75	12.5	12.5	24.5	36.5	55.5
	kg	2.3	2.3	2.3	3.5	5	5	11	16	25

Approximate Dimensions and Weights. Apply For Certified Drawings.

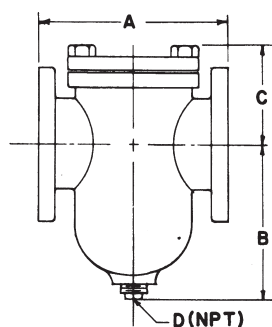
Mueller Steam Specialty

Models: 165, 166DI



Model 165, 166DI

165 Class 125
166DI Class 300



Model 165, 166DI

WORKING PRESSURES - NON-SHOCK			
165	to 12"	ANSI 125 lb. Class	200 PSI @ 150° F 125 PSI @ 406° F
	14"-24"	ANSI 125 lb. Class	150 PSI @ 150° F 100 PSI @ 353° F
166DI	to 16"	ANSI 300 lb. Class	640 PSI @ 100° F 450 PSI @ 650° F

Max. temp. can be limited by gasket material. Consult factory.
100% Hydrostatically Tested.

SIZE		1-1/4" 30	1-1/2" 35	2" 50	2-1/2" 65	3" 80
A	165	6-3/8	6-1/2	8-5/8	7-9/16	8-3/4
	166DI	162	165	219	189	222
B	165	-	-	8-5/8	8-3/8	9-6/16
	166DI	-	-	219	213	243
C	165	4-1/8	4-1/8	5-7/8	5-7/16	5-1/4
	166DI	105	105	149	138	133
D	165	3-5/8	3-5/8	4-3/8	3-3/4	5-1/8
	166DI	92	92	111	95	130
D (NPT)		1/2	1/2	1/2	3/4	3/4

WEIGHTS		1-1/4" 30	1-1/2" 35	2" 50	2-1/2" 65	3" 80
165	lb	-	-	32	28	37
	kg	-	-	14	12	16
166DI	lb	-	-	40	30	52
	kg	-	-	18	13	23

SIZE		3-1/2" 90	4" 100	5" 125	6" 150	8" 200	10" 250	12" 300	14" 350	16" 400	18" 450	20" 500	24" 600
A	165	9	11-3/16	12-1/4	14	17-1/8	22	25-1/4	29-5/8	31-17/8	34	36-5/8	41-1/2
	166DI	229	284	311	356	435	559	645	756	810	964	930	1054
B	165	10-5/8	11-1/2	13-1/4	15-1/2	18-1/8	23-1/4	26-1/2	31-1/4	33-1/2	-	-	-
	166DI	270	292	337	394	460	591	673	793	851	-	-	-
C	165	6-7/8	7-7/8	10-1/4	10-3/8	15-1/2	16	23-3/4	26-3/4	29-1/2	36	40-7/8	46-1/4
	166DI	175	200	260	270	394	406	603	679	749	914	1038	1174
D	165	5-1/4	5-3/8	5	5-5/8	7	9-1/4	11-5/8	12-1/4	13-3/16	16-1/4	17	19-1/8
	166DI	133	143	127	143	178	235	295	311	335	412	432	486
D (NPT)		3/4	1	1	1-1/4	1-1/2	1-1/2	2	2	2	2	2	2

WEIGHTS		3-1/2" 90	4" 100	5" 125	6" 150	8" 200	10" 250	12" 300	14" 350	16" 400	18" 450	20" 500	24" 600
165	lb	53	63	98	122	198	350	716	1010	1320	1916	2468	4550
	kg	24	28	44	55	90	159	325	459	600	870	1121	2068
166DI	lb	67	85	121	212	228	437	811	1122	1463	-	-	-
	kg	30	38	54	96	103	198	367	508	663	-	-	-
166DI	lb	71	90	128	224	240	460	854	1182	1540	-	-	-
	kg	32	40	58	101	109	209	388	537	700	-	-	-

Approximate Dimensions and Weights. Apply For Certified Drawings.
LARGER SIZES AVAILABLE

Cast Iron and Ductile Iron
Flanged End Basket Type Strainer

SERVICE RECOMMENDATIONS

These strainers offer complete protection to pumps, meters, traps, valves, and similar equipment. Installation of a strainer before any mechanical equipment will ensure trouble free service and avoid costly shutdowns, repairs or replacement often caused by the introduction of foreign matter in pipes.

BASKETS

Heavy gauge perforated stainless steel baskets with spot welded seams and handles are normally furnished. Recommended perforations shown below:

STEAM: To 8" 3/64" (.045)
10" up Consult factory
LIQUID: To 4" 1/16" (.062)
5" up 1/8" (.125)

Also available are 5/32", 3/16", and 1/4" perforations as well as a large variety of brass and monel baskets. For finer straining (down to five microns), see Model 125 basket type strainer.

CONSTRUCTION

These strainers are well designed for medium or coarse straining. The angular cutaway design of the baskets allows a straight through flow and results in extremely low pressure loss. All sizes feature the flanged top cover connection and easy basket removal. Bodies can be supplied with tappings for pressure gauges. Tapped and plugged NPT drain connection sizes shown on next page. See chart on page D-3 for pressure drop figures.

SELF CLEANING

In strainers with open bottom baskets, merely open the valve or plug connected to the blowoff outlet to flush off accumulated sediment.

CAPACITY

Generously proportioned bodies with baskets that have an open area many times greater than the corresponding pipe size ensure low pressure loss.

GALVANIZING

Available from stock in all sizes.

MATERIALS: Body

165 Cast Iron ASTM A126-B 2"-24"
166DI Ductile Iron ASTM395 2"-16"
Cover A516-70 Plate
Gasket Non-asbestos

*Note: Also available in Bronze

Model:	690
--------	-----

WORKING PRESSURES - NON-SHOCK	
Steam	WOG
Not Recommended	50 PSI @ 150°F (3.4 bar @ 66°C)

100% Hydrostatically Tested.

Marine Bronze Duplex Strainer

SERVICE RECOMMENDATIONS

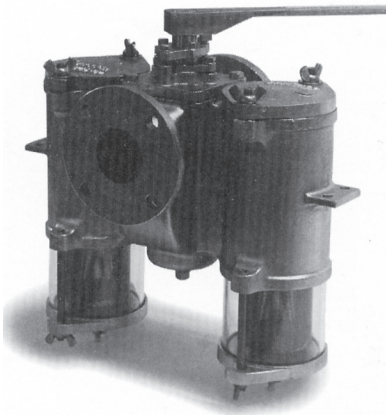
These sight glass duplex strainers are designed to remove debris which can clog and damage engine cooling water systems, both sea water and heat exchanger types, where flow cannot be shut down for gasket cleaning. When equipped with fine mesh lined baskets these strainers can be used to clarify potable water supplies.

FEATURES

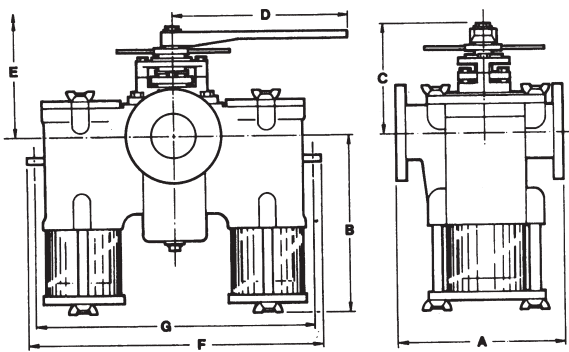
The basket chambers of these duplex strainers are clear acrylic to allow direct visual inspection of the fluid passing through the chamber. The single, tapered plug diverter valve opens the ports to one chamber while simultaneously closing the ports of the other chamber. An adjusting nut lifts the tapered plug off its seat slightly to allow easy manual rotation through a 90° swing and also allows accurate reseating of the plug for a metal-to-metal seal. Both the basket and sight glass chambers are easily accessible by removing two wing nuts for quick cleaning, inspection and replacement. Basket chamber seals are Buna-N O-rings and do not have to be replaced every time the covers are opened.

MATERIAL

Body, Plug Covers	ASTM B-62 Bronze
Sight glass chambers	Acrylic plastic
Cap screws	Silicon bronze
Baskets	Monel
Seals	Buna-N
Stem packing	PTFE



690 Class 125



Model 690

Size <small>in mm</small>		A	B	C	D	E <small>SCREEN REMOVAL</small>	F	G	WEIGHTS
3	in	11-1/16	12-1/2	19-1/2	12	15-7/8	20-5/8	19-1/2	155
80	mm	281	318	495	305	403	524	495	70.4

Approximate Dimensions and Weights. Apply For Certified Drawings.

Mueller Steam Specialty

Model: 691MFA, 692MFB, 692MFD, 692MFH

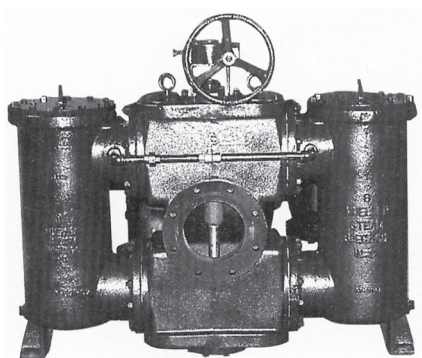
Large Duplex Strainer

WORKING PRESSURES NON-SHOCK WITH CLAMPED COVERS		
691MFA	8" - 16"	WOG 150 PSI @ 150°F (10.3 bar @ 38°C)
692MFB	8" - 16"	WOG 150 PSI @ 150°F (10.3bar @ 38°C)
692MFD	8" - 16"	WOG 150 PSI @ 150°F (10.3bar @ 38°C)
692MFH	8" - 16"	WOG 150 PSI @ 150°F (10.3 bar @ 38°C)

WORKING PRESSURES - NON-SHOCK WITH BOLTED COVERS		
691MFA	8"-12" WOG 150 PSI @ 150°F (10.3 bar @ 38°C) Buna-N 150 PSI @ 250°F	14"-16" WOG 150 PSI @ 150°F (10.3 bar @ 38°C) Buna-N 150 PSI @ 250°F
692MFB	8"-12" WOG 200 PSI @ 150°F (15.5 bar @ 38°C) Buna-N 175 PSI @ 250°F	14"-16" WOG 150 PSI @ 150°F (10.3 bar @ 38°C) Buna-N 150 PSI @ 250°F
692MFD	8"-12" WOG 200 PSI @ 100°F (19.6bar @ 38°C) Buna-N 175 PSI @ 250°F	14"-16" WOG 150 PSI @ 150°F (10.3 bar @ 38°C) Buna-N 150 PSI @ 250°F
692MFH	8"-12" WOG 200 PSI @ 100°F (19 bar @ 38°C) Viton - O-rings 80 PSI @ 400°F (Bolted)	14"-16" WOG 150 PSI @ 150°F (10.3 bar @ 38°C) Viton - O-rings 150 PSI @ 250°F (Bolted)

* Max. temp. can be limited by gasket material.
Consult factory. 100% Hydrostatically Tested.

691M Class 125
692M Class 150



SERVICE RECOMMENDATIONS

These duplex strainers are designed for use in fluid handling systems where the flow cannot be shut down for basket cleaning such as cooling water, pumps, compressors, condensers, fire lines, fuel lines, lubricating systems, salt and fresh water systems, chemical process systems and positive suction head service.

FEATURES

These duplex strainers feature a single shaft drive to operate the flow diverter valves. Quick flow transfer requires less than 90° handle rotation; an automatic actuator is also available. There are no external linkages, sprockets, chains, cranks or wheels. The drive mechanism is completely enclosed, protected from line fluid erosion and corrosion. Valve discs, disc seals and seats are field replaceable. There is absolutely no leakage into the off duty chamber. Baskets are gasketed and securely positioned to prevent particle bypass. The large capacity baskets provide generous open area ratio. The single basket design is easily and quickly cleaned. See page E-3 for pressure drop information.

BASKETS

WATER: 8" UP 1/8" (.125)

CONSTRUCTION

All body parts are cast metal (see materials below). All shafts are supplied in stainless steel. Valve seats are bronze. Standard basket material is stainless steel. Special materials and baskets are available on application. Covers are normally bolted. Clamped covers (limited to 150 PSI @ 100° F) are also available.

MATERIAL

Body	691 M FA	Cast Iron ASTM A126 Grade B
	692MFB	Bronze ASTM B62 (type 85-5-5-5)
	692MFD	Carbon Steel ASTM A216 Grade WCB
	692MFH	Stainless Steel ASTM A351 Grade CF8M

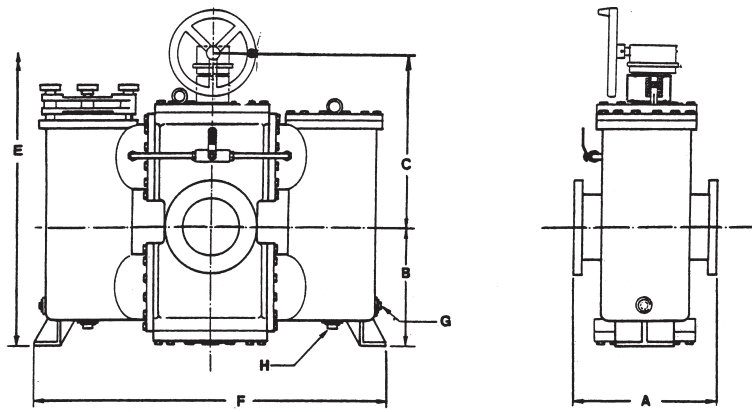
Cover Matches body

O-rings Buna-N

For stainless steel, pickling and passivation available upon request. Consult Factory.

Mueller Steam Specialty

Model: 691MFA, 692MFB, 692MFD, 692MFH

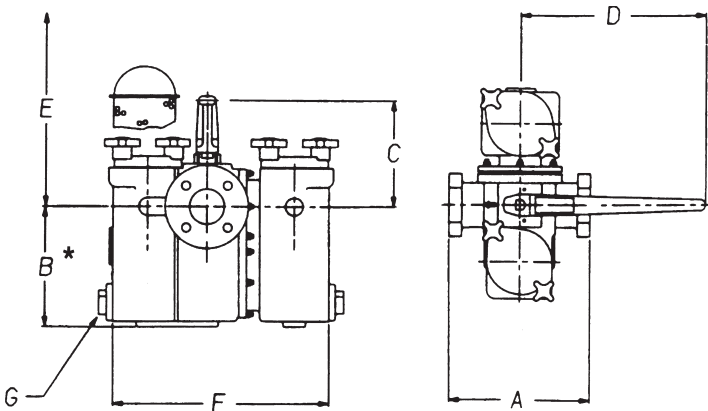


Model 691MFA, 692MFB, 692MFD, 692MFH

Size		in mm	8 200	10 250	12 300	14 350	16 400
A		in	20	24	30	32	36-3/4
		mm	508	610	762	813	933
B		in	19	20-1/2	25-1/2	27-7/8	32
		mm	483	521	648	708	813
C		in	24-9/16	28-3/4	30-3/4	30-1/8	34-3/4
		mm	623	730	781	765	883
D	HANDLE	in	18	18	18	18	18
		mm	457	457	457	457	457
E	SCREEN REMOVAL	in	62	72-1/2	87-1/2	95-1/2	80-1/2
		mm	1575	1842	2223	2426	2045
F		in	54-3/4	61	65-7/8	71	80-1/2
		mm	1391	1549	1673	1803	2045
G	NPT	in	1"	1"	1"	1"	1-1/2
		mm	25	25	25	25	40
H	NPT	in	2"	2"	2"	2"	2"
		mm	50	50	50	50	50
WEIGHTS		lb	1365	1970	2800	3300	4400
		kg	620	894	1272	1500	2000

Approximate Dimensions and Weights. Apply For Certified Drawings.

Model: 791FA



* "B" dimension includes the floor supports when applicable.

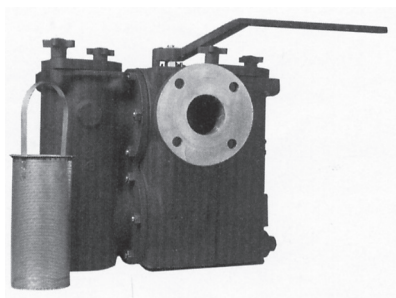
Model 791FA

Mueller Steam Specialty

Model: 791FA

Ball-Plex Cast Iron Duplex Strainer

791FA Class 125



WORKING PRESSURES - NON-SHOCK

ANSI 125 lb. Class	200 PSI @ 150°F 175 PSI @ 250°F Buna-N – O-rings
--------------------	--

* Max. temp. can be limited by gasket and seat material. Consult factory. 100% Hydrostatically Tested.

SERVICE RECOMMENDATIONS

Mueller Steam Specialty Ball-Plex Duplex Strainers are designed for use in fluid handling systems where the flow cannot be shut down for basket cleaning such as cooling water, compressors, condensers, fire lines, fuel lines, lubrication systems, salt and fresh water systems, chemical process systems and pump suction service.

FEATURES

The Mueller Steam Specialty Ball-Plex Duplex Strainers use 3-way balls as diverter valves. This design, with its PTFE seats, provides drop-tight shut-off, eliminating the costly and potentially dangerous leakage into the chamber not in use. The two part body casting allows true-in-line maintainability. All parts of the valve are accessible after removing the basket chamber without removing the strainer from the line. A gear operator is standard on the 4", 5" and 6" units allowing for very easy change over. On models with a handle, the chamber in use is covered by the handle preventing accidental opening of the pressurized chamber and allowing easy access to the side to be serviced.

BASKETS

The large open area ratio of the basket ensures a minimum pressure drop across the unit. Perforated stainless steel baskets are standard on all models unless otherwise specified. Two baskets per chamber are standard on the 5" and 6" units. See page E-3 for pressure drop figures.

WATER: Thru 4" 1/16"(.062)
5" up 1/8" (.125)

MATERIAL

Body Cast Iron ASTM A126-B
Cover Cast Iron ASTM A126-B Seats PTFE
O-rings Buna N

Size		in mm	3/4 19	1 25	1-1/4 32	1-1/2 40	2 50	2-1/2 65	3 80	4†† 100	5†† 125	6†† 150
A		in	6-7/8	6-7/8	9-3/8	9-3/8	10-5/8	13-1/2	13-1/2	16	22	22
		mm	175	175	238	238	270	343	343	406	559	559
B		in	4-15/16	4-15/16	6-3/4	6-3/4	8-3/16	12	12	16-13/16	18-5/8	18-5/8
		mm	125	125	171	171	208	305	305	427	473	473
C		in	4-5/8	4-5/8	4-3/8	4-3/8	7-1/8	8-1/16	8-1/16	15-1/2	17-1/4	17-1/4
		mm	118	118	111	111	181	205	205	394	438	438
D		in	10	10	10	10	20	20	20	14+	14+	14+
		mm	254	254	254	254	508	508	508	356	356	356
E	SCREEN REMOVAL	in	7-3/4	7-3/4	10-3/8	10-3/8	12-5/8	17-21/32	17-21/32	23-1/2	25-11/16	25-11/16
		mm	197	197	264	264	321	448	448	597	653	653
F		in	10-3/16	10-3/16	12-3/4	12-3/4	16-3/8	20-3/8	20-3/8	24-1/2	26-1/4	26-1/4
		mm	259	259	324	324	416	518	518	622	667	667
G	NPT	in	3/4	3/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
		mm	20	20	32	32	40	40	40	40	40	40
WEIGHTS		lb	34	34	65	65	113	218	218	432	786	786
		kg	15.4	15.4	29.4	29.4	51.2	98.8	98.8	195.9	356.4	356.4

Approximate Dimensions and Weights. Apply For Certified Drawings.

+ 4", 5" and 6" units are standard with a gear operator. The handwheel dimension is 10".

†† 4", 5" and 6" units are standard with floor supports. Dimension "B" reflects this standard in those sizes.

Mueller Steam Specialty

Models: 351M, 352M, 358S*, 352-1/2

* 358S supersedes model 353-1/2M, Consult factory.

WORKING PRESSURES - NON-SHOCK		
	STEAM	WOG
351M	150 PSI @ 350°F	200 PSI @ 150°F
352M	300 PSI @ 350°F	400 PSI @ 150°F
358S		400 PSI @ 100°F
352-1/2	250 SWP @ 425°F	

Cast Bronze Screwed, Solder and Sil-Braze End "Y" Type Strainer

351M (Screwed) Class 125
 358S (Solder) Class 125
 352 (Screwed) Class 250



Models 351M Screwed ends (shown)
 352M Screwed ends



Model 358S Solder Joint



Model 352-1/2 Sil-Braze ends

SERVICE RECOMMENDATIONS

These compact strainers can be used extensively to strain foreign matter from pipelines and provide inexpensive protection for costly pumps, meters, valves and similar equipment.

SCREENS

Models 351 M and 352M are furnished with .033" (.84mm) perforated stainless steel screens for steam service; 20 mesh [1/ 32" (.80mm) openings] for water service.

CONSTRUCTION

All models have machined screen seats in the body and cap to assure perfect screen alignment and easy reassembly when servicing is required. Military strainers are furnished in ASTM B-61 bronze; commercial strainers in ASTM B-62 bronze. All sizes feature a straight threaded, gasketed cap.

SELF CLEANING

Self cleaning is accomplished by opening the valve or plug connected to the blowoff outlet.

FEATURES

In addition to the usual commercial applications the 352-1/2 is in complete accordance with Military specifications and conforms to the latest revision of BuShip Drawing 80064-810841499. Unless otherwise specified all sizes of Model 352-1/2 are furnished grooved, less rings.

BLOWOFF OUTLETS

Unplugged, NPT blowoff connections are provided for commercial strainers. BuShip Drawings 80064-810-841499 strainers are supplied without blowoff connections. See chart on next page for blowoff plug sizes in inches.

PRESSURE DROP: Consult Factory.

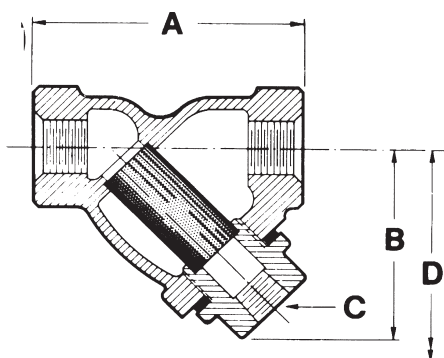
MATERIAL: 351M, 352M, 352-1/2, 358S

(commercial)	
Body and Cap	Bronze ASTM B62
Screen	304 SS ASTM A240
Gasket	Non-asbestos
352-1/2 (military)	
Body and Cap	Bronze ASTM B61
Screen	304 SS ASTM A240
Gasket	Copper

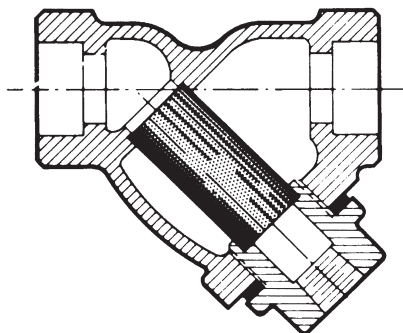
*ANSI B 16.18 states that the maximum operating pressure of 95-5 Tin-Antimony solder sweat connections. 358S rating, 175 PSI Q 250°F & 400 PSI @ 100°F

Mueller Steam Specialty

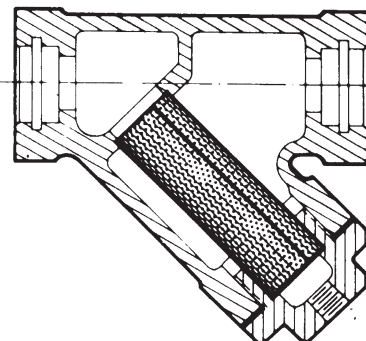
Models: 351M, 352M, 358S*, 352-1/2



Model 351M, 352M



Model 358S



Model 352-1/2

SIZE		in	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
		mm	6	10	15	20	25	32	40	50	65	80	100
A	351M, 352M	in	2-3/4	2-3/4	2-3/4	3	3-3/4	4-7/16	4-15/16	6-1/8	8-1/4	9	
		mm	70	70	70	76	95	113	125	156	210	229	
	358S	in	3	3	3	3-11/16	4-3/4	5-7/16	5-15/16	7-9/16	9-3/4	10-3/8	
		mm	76	76	76	93	120	138	150	192	248	264	
B	352-1/2	in	2-9/16	2-9/16	2-15/16	3-3/8	4-1/8	4-13/16	5-3/8	6-5/8	7-7/8	11-3/4	15-3/16
		mm	65	65	75	86	105	122	137	168	200	298	386
	351M, 352M	in	2-1/4	2-1/4	2-1/4	2-9/16	2-3/4	3-5/8	3-7/8	5-1/8	6	6-3/4	
		mm	57	57	57	65	70	81	98	130	152	171	
C	358S	in	2-1/4	2-1/4	2-1/4	2-9/16	2-3/4	3-5/8	3-7/8	5-1/8	6	6-3/4	
		mm	57	57	57	65	70	81	98	130	152	171	
	352-1/2	in	1-7/8	1-7/8	2-1/8	2-9/16	3-1/8	3-1/8	4-3/16	5-3/8	6-1/2	7	11-3/8
		mm	48	48	54	65	79	90	122	137	165	178	289
D	351M, 352M	in	1/4	1/4	1/4	3/8	3/8	3/4	3/4	1	1-1/4	1-1/2	
		mm	6	6	6	10	10	20	20	25	32	38	
	358S	in	1/4	1/4	1/4	3/8	3/8	3/4	3/4	1	1-1/4	1-1/2	
		mm	6	6	6	10	10	20	20	25	32	38	
E	352-1/2	in	1/8	1/8	1/8	1/4	1/4	3/8	1/2	3/4	1	1	Blind Cover
		mm	3	3	3	6	6	10	15	20	25	25	-
	351M, 352M	in	2-1/2	2-1/2	2-1/2	2-5/8	3-3/8	4-5/8	5	6-7/8	8-3/4	9-3/4	
		mm	64	64	64	67	86	117	127	175	222	248	
F	358S	in	2-1/2	2-1/2	2-1/2	2-5/8	3-3/8	4-5/8	5	6-7/8	8-3/4	9-3/4	
		mm	64	64	64	67	86	117	127	175	222	248	
	352-1/2	in	2-3/4	2-3/4	3	4	4-1/2	5-1/2	6-1/2	8-1/4	10	10-1/2	16
		mm	70	70	76	102	114	140	165	210	254	267	406
WEIGHTS													
	351M, 352M, 358S	lb	.75	.75	.75	1.38	2.13	3.13	4.5	7	12.5	18	
		kg	.34	.34	.34	.62	.96	1.4	2	3.1	5.6	8	
	352-1/2	lb	.75	.75	1	1.75	2.5	4.25	5.5	8.25	15.5	36	
		kg	.34	.34	.45	.79	1.1	1.9	2.5	3.7	7	16	

Approximate Dimensions and Weights. Apply For Certified Drawings.

Darwin Award Winners

1996, Stefan Macko, 55, Mississauga, Ontario

A man falls 23 floors to his death while he was cleaning a bird feeder on his balcony. Inspector D'Arcy Honer of the Peel regional police said, "No foul play is suspected." Macko was standing on a wheeled chair. "It appears the chair moved and he went over the balcony".

TECHNICAL INSTALLATION INFORMATION FOR S.S. WHITE[®] HEAVY DUTY FLEXIBLE REACH RODS

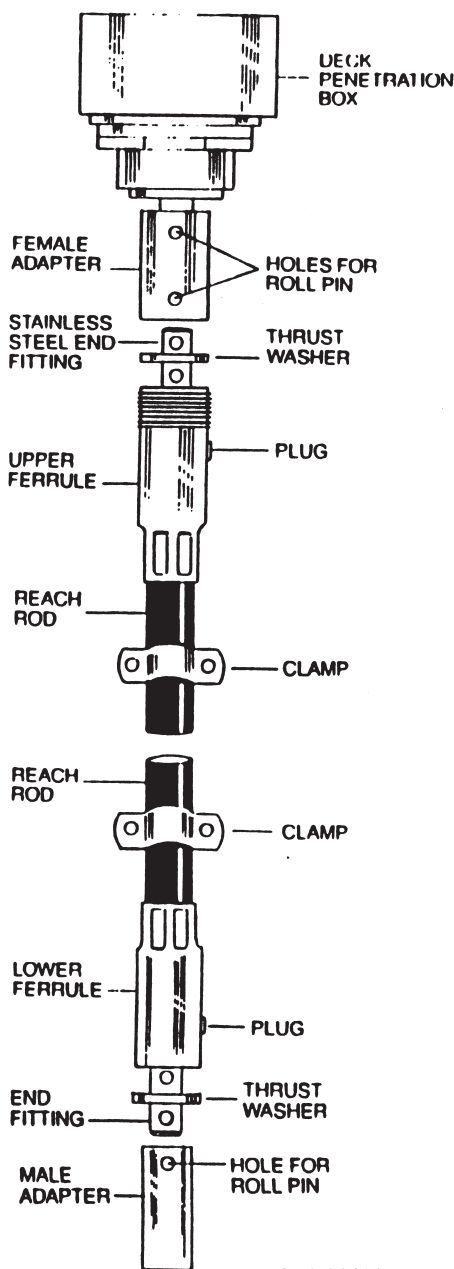
- 1** Consider the following factors before deciding what type flexible reach rod is required for a particular application.

- A. Valve type—gate, globe, butterfly, ball, etc.
- B. Valve size.
- C. Valve operating and breakaway torque.
- D. General condition of valve.

- 2** Apply known factors to chart located in the reach rod brochure and in the original Technical & Installation Data, Revision "C". (Available upon request)

NOTE: As the length of the flexible reach rod increases, the amount of transmitted torque decreases.
Example: 30' heavy duty flexible reach rod produces approximately 70% of input torque at the output end. This includes normal routing with a total (not to exceed) 110 degrees of bends.

NOTE: By using an "in line" gear box multiplier (4:1 ratio) the torque loss is eliminated along with a torsional load increase estimate of 3½ times the original input load. Locate the "in line" gear box directly over the valve stem somewhere between 1 to 4 feet. Use a solid shaft to span the distance between the output shaft of the gear box to the valve handle coupling device. Gear box to be securely held in place by welding support struts from a nearby bulkhead or beam to the gear box mounting plate, drill and bolt.



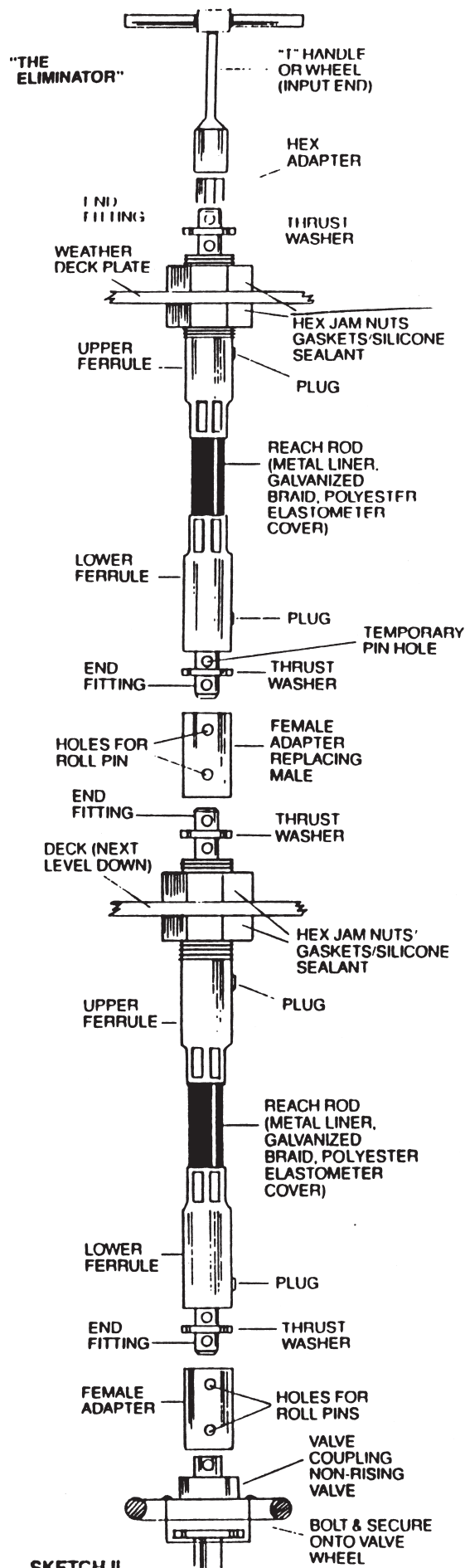
- 3** Determine length of flexible reach rod by measuring the distance between the bottom of the deck penetration box (extended shaft) to the top of the valve stem.

- A. The easiest way to determine the length of flexible reach rod needed is to route a section of heavy duty garden hose through the intended path you wish to take. Then mark and measure.
- B. Consider generous radii for routing.
- C. After you have determined the length of reach rod required, round off the measurement to the nearest shorter foot (do not use inches) and make up the difference with a solid rod extension between the output end of the flexible reach rod and the valve coupling. Example: if your measurement is 13 feet 9 inches, order a 13 foot reach rod.
- D. The end adapters on all reach rods are attached to the end fitting of the shaft with a transverse stainless steel roll pin and all adapters for a particular reach rod size are interchangeable. The end adapters may be removed from the reach rod by driving out the roll pin. They can then be attached to the valve coupling using several methods such as: welding, mating using the "pin" method or whatever is appropriate for a particular attachment application.

- 4** The input end of the reach rod is attached to the output shaft of the deck penetration box by attaching a female adapter to the input end of the reach rod and securing the deck penetration box output shaft to the female adapter by cross-drilling and pinning. (Refer to Sketch I)

NOTE: Use adequate support bracketing to take the weight or *Hanging Load* off the reach rod.

- A. Recommend using bulkhead or standoff clamps to support the reach rod every four (4) feet.



SKETCH II

IMPORTANT: Before hanging the flexible reach rod and adding supporting hardware, it is recommended that a temporary pin be installed through the cross-drilled hole specifically designed for this purpose in the end fitting between the thrust washer and the end adapter at the output end.

Reason: This temporary pin will eliminate normal retraction of the end fitting into the reach rod casing.

NOTE: Remove pin as soon as connection is completed between reach rod and valve coupling.

- 5 When installing a flexible reach rod through a deck or bulkhead in a compartment, there are several ways to accomplish this without destroying the compartment's watertight integrity.

- A. The *super economizer*, better known as the "Eliminator, (Refer to Sketch II)" using only flexible reach rods eliminates deck penetration boxes, bulkhead and deck piercing couplers, right angle gear boxes, universal joints, etc. Using this cost efficient method produces savings several times the price of the flexible reach rods.
- B. Valves located beneath the engine room deck grating occasionally require on-site control along with remote control from above. Simply connect a solid rod to the valve hand wheel coupler and extend upward through the deck grating an extra 3 to 4 feet. Weld a "T" onto the solid rod for on-site control and couple the flexible reach rod above this control point.

6 INSTRUCTIONS

- A. Cut a hole in the deck approximately 1/8 of an inch larger than the threaded upper ferrule at the input end of the reach rod.
NOTE: Occasionally a deck cup with a cap is used when a *flush deck* installation is necessary.
- B. Remove the upper hex jam nut and insert the reach rod from beneath the deck being penetrated. Use a protective gasket material and a waterproof sealant on both sides of the deck penetration. Attach upper hex jam nut and tighten. This will produce a waterproof pressure seal.
- C. Route heavy duty flexible reach rod through the compartment to the next lower deck level. Be sure to support reach rod every four feet.
- D. Cut a hole through the lower deck using same method as described above in 6A.
- E. Follow instructions as described in 6B and 6C.
- F. Route this lower reach rod directly to the valve stem for attachment. Be sure to support reach rod every four feet.

NOTE: If additional deck levels must be penetrated, follow instructions described in 6A, 6B, and 6C.

A Field Guide to the Use of Pipe

1. All pipes are to be made of a long hole surrounded by metal or plastic, centered around the hole.
2. All pipes are to be hollow throughout the entire length; do not use holes of lengths different to the pipe.
3. The inside diameter of all pipes must not exceed the outside diameter, otherwise the hole will be on the outside.
4. All pipes are to be supplied with nothing in the hole, so that water, steam, or other elements can be put inside at a later date.
5. All pipes should be supplied without rust; this can be more effectively applied at the job site. **NOTE:** Some vendors are now able to supply prerusted pipe. If it's available in your area, this new product is recommended as it will save a great deal of time at the job site.
6. All pipes over 500 feet (153 metres) in length should have the words "LONG PIPE" painted on them, so that the drilling crew will not mistake it for a short pipe.
7. Pipes over 2 miles (3.2 kilometres) in length must also have the words "LONG PIPE" painted in the middle, so that the drilling crew will not have to walk the entire length of the pipe to determine whether it's a long or short pipe.
8. All pipes over 6 inches (152 millimetres) in diameter must have the words "LARGE PIPE" painted on them so that the drilling crew will not mistake it for a small pipe.
9. When ordering 90 degree, 45 degree, or 30 degree elbows, be sure to specify right or left hand, otherwise you will end up going in the wrong direction.
10. Be sure to specify to your vendor whether you want level, uphill, or downhill piping. If you use downhill pipes for going uphill, the water will flow the wrong way.

Index Section F

GALLEY

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The Hero of Gettysburg

JOHN BURNS was a village character, a sometime constable and cobbler who said he was descended from the Scottish poet, Bobbie; a hard-drinking old man who had fought in the War of 1812 and the Mexican War. If the Rebels came as far as Gettysburg, he told the townspeople, he'd show them how an old soldier could fight.

John was past seventy in July of '63, and no one could take seriously his talk of fighting. He had been too long the butt of village jokes.

He had once walked the ten miles from his home in Bendersville, saying that he'd heard there would be an eclipse of the moon, and that he had come to town in order to see it.

He had been baited by friends because he grumbled about "secret societies," and when he hurled insults at a meeting of Odd Fellows, the conspirators feigned anger and chased him wildly down a street.

Yet Burns had tried to volunteer at the first call to arms in this war, and when refused had gone to West Chester to enlist in the reserves. When he was again turned away, he went to Washington and served for a time as a driver in the wagon service.

On the morning of July 1, when the sounds of opening battle crackled in Gettysburg, Old John put on his Sunday best, a swallow-tailed blue coat with gilt buttons and a tall bell-crowned hat. Deaf to the scolding of his wife he left his home and fell in the ranks of a passing regiment, the 150th Pennsylvania Volunteers. He took a musket from a wounded man at the roadside and hurried toward the front.

Colonel Langhorne Wister of the 150th stared when Burns asked if he could join the fight.

"Can you shoot?"

"Give me a chance and I'll show you who can shoot."

Wister sent Burns from his position in the open to a woodland where part of the Iron Brigade was in line. One of the soldiers left a memory of it:

"We joshed him unmercifully. Some of the boys called him 'Daddy' and laughed at him, but he took it well. Then when he started firing we seen that this here old man knew how to handle a gun."

One of Burns's shots appeared to have knocked a Confederate officer from his horse, and troops of the 7th Wisconsin cheered; some of them gave Burns a silver-chased rifle they had captured from the Rebs, as a trophy.

The old man was struck by a bullet on his belt buckle; the fierce blow doubled him up, and he disappeared from the view of the front-line men of the Iron Brigade. He got two slight wounds, one a painful cut on an ankle which disabled him. As Confederate infantry approached him, John buried his rifle, or scurried away from it, and crawled onto the door of a cellar in the village.

A Rebel doctor treated his wounds. By one tradition, still a favorite with some Park historians, John hailed a passerby: "Tell my old woman to fetch the wagon and get me home. I can't move."

The wife's reported reply: "Devil take him. The old fool, going off to fight, as old, as he is, getting holes in his best clothes. And he won't be able to work for two months. Let him stay."

Suddenly, John was a celebrity. General Abner Doubleday, "the baseball man," praised him in his report of the battle and the old soldier became known as "The Hero of Gettysburg." This was a distant fame, however, and his stature at home was little changed. A few poets set him to rhyme, including Bret Harte, who immortalized him in caricature.

Four months later when Lincoln came to town for the most famous of his addresses, the master politician asked to see John Burns. The bewildered townspeople were treated to the sight of the long-legged Lincoln arm in arm with the stubby Burns, who trotted to keep the pace along Chambersburg Street, around the Square and out Baltimore Street to the Presbyterian Church, a strange destination for Burns.

He later became a member of the church, and today is celebrated by a bronze plaque there. John drew his Civil War and other pensions for a few years and died in February, 1872. He left an estate of \$13.25 in personal effects, a value of \$1,518 in his forty-six acres of land, and a box of books, in which was found twenty-five cents.

He is buried in Evergreen Cemetery at Gettysburg, beneath a statue depicting him facing the Rebels with a musket. His wife lies at his side.

Galley Seating



1500-921
(with optional 505 Footrest)

Features

Classic fountain stool, upholstered seat and back chrome finish
Shown with optional footrest.
1500-530 stool shown without footrest

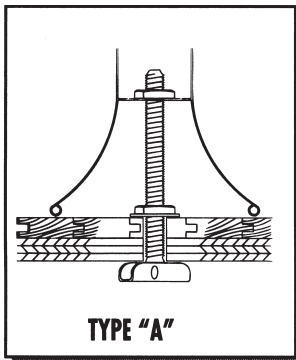
Product Specifications:

Shipping Class: head:50 base:70
Seat Height: 18", 24" & 30"
Seat Diameter: 15"
Packed Weight: 25lb
Items Per Carton: 1
COM: 12/3 yd -price @ grade 2



505 Footrest

505 Footrest offers a triangular, contoured cast version to the 1500 Series Fountain Stool.



TYPE "A"

Type "A" Floor Attachment is utilized to secure the 1500-1700 Series Fountain Stool or H-Series Table Base through a wooden* floor by means of a toggle bolt.

*floor not to exceed 5" in thickness.



1500-242

Features

Classic fountain stool, upholstered seat and back chrome finish
Model 1500-340 shown with optional 404 footrest.

Product Specifications:

Shipping Class: head:50 base:70
Seat Height: 18", 24" & 30"
Seat Diameter: 16"
Packed Weight: 33lb
Items Per Carton: 1
COM: 12/3 yd -price @ grade 2



The Pioneers of RV Air Conditioning

Owners acclaim Brisk Air's reliability, economy, performance and long life. For any RV, from travel van to the largest motorhome, Brisk Air offers the widest range of capacities of all rooftop air conditioners on the market. Ruggedly designed for long life, the Brisk Air's aerodynamically contoured shroud is made of super-durable, UV resistant high-impact polystyrene. The roof unit installs easily in the standard vent opening in any thickness of roof.

Duo-Therm Brisk Air

*Rugged and
dependable ...
America's favorite
cooling machine*

- 7,100, 11,000, 13,500 and 15,000 BTUH
- High-Efficiency models available
- Quiet, three-speed blower
- Compact interior airbox with recessed dial controls and one-piece rotating air deflection louvers for infinite adjustability
- Ergonomic control panel has bold, bright legends, large knobs and is angled for easy read and reach; recessed for safety
- Classically-styled interior air distribution box (ADB) is a compact 2-1/2" thick.
- A permanent rinse-and-reuse filter traps dust and pollen to help keep the RV interior clean and fresh.



Comfort Control Center

The Duo-Therm Comfort Control Center overcomes the limitations and problems associated with heating and cooling multi-room and multi-level RV floor plans. It is capable of controlling as many as four zones in the coach; each at a different temperature, if desired.

Operates...

- Rooftop Air Conditioners
- Single and Dual Basement Air
- All Heat Pump Systems
- Gas Furnaces
- Electric Heat Strips
- ...in any combination!

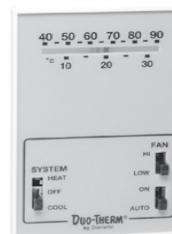


An optional heat strip kit can be added to your Penguin or Brisk Air to take away the morning or evening chill without having to change your air distribution box.



Bi-Metal Thermostat

This electromechanical, residential-style wall unit controls both the air conditioning and the vehicle's gas furnace—lets you select high, low or automatic fan settings.





DESIGN

Typical of the Cospolich standard for equipment, our Fire Rated Cold Storage Doors are worthy of the distinction of top quality. With consideration of the potential for hazards that the door system may be exposed to, it is necessary that our equipment not only meet, but exceed the national Code Standard. Performance testing has provided us with the distinction of being the only manufacturer with United States Coast Guard Approval for "A-60" Fire Rating of cold storage doors. Visit our website for other Cospolich products.

CONSTRUCTION

While aesthetically appealing, our Fire Rated Door System conforms to the rigorous requirements of hazardous application equipment. Using components such as steel, refractory insulation, high temperature resistant hardware, and specialty intumescent, the Cospolich door system is formidable. All of this, along with durability, corrosion resistance, and heavy gauge type 304 stainless steel make for second to none construction. Design, craftsmanship, and select materials all combine to produce a superior product.

FEATURES

- 304 Stainless Steel door & casing
- Mild Steel channel frame construction
- Fire rated to A-60 standards

OPTIONS

- Custom sizing
- Hinge side (door swing)
- Voltage

ORDERING INFORMATION

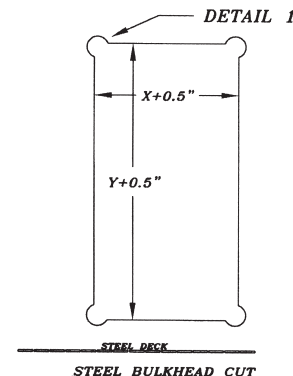
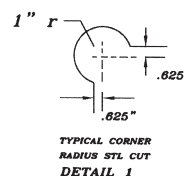
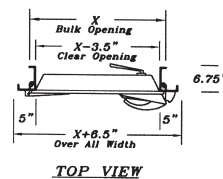
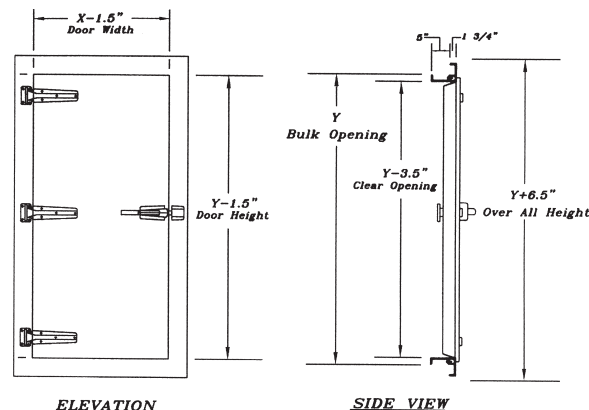
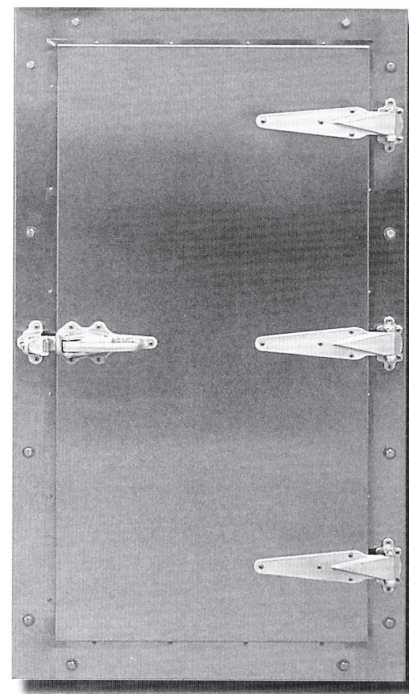
- Determine dimensions of X&Y
- Pick door hinge side
- Cooler or Freezer application Voltage
- Options



LISTED BY:
Southwest Research Institute
San Antonio, Texas
SwRI is accepted as an independent
laboratory and production control
agency for fire resistant products by the
United States Coast Guard.

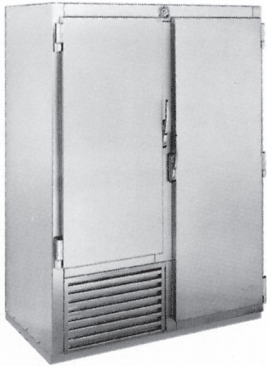
SwRI ID No. 06060-0[-01
Fire Rated Marine Walk-in Cooler Door
This door has obtained an A-60 Class
Rating for an "A" Class Division steel
bulkhead per IMO Resolution A.764(18).
See Authority Having
Jurisdiction's Type Approval for details.

Fire-Rated Door & Frame



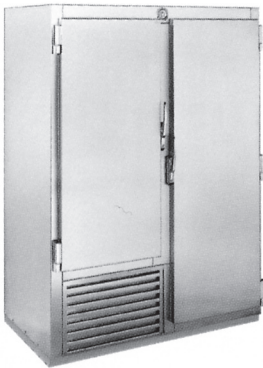
**Standard Construction
(hinge left shown)**

REFRIDGERATORS



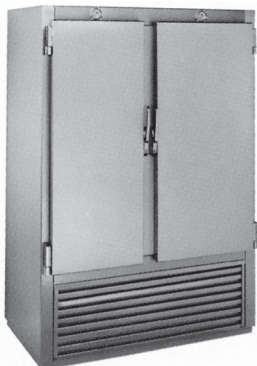
MODEL	STORAGE CAPACITY (cf)	DIMENSIONS W x D x H (in inches)
R4-2M-S	4	24 x 26 x 34
R10-2M-S	10	30 x 24 x 58
R18-2M-S	17.6	32 x 28 x 72
R20-2M-S	20.7	32 x 32 x 72
R22-2M-S	20	36 x 28 x 72
R25-2M-S	28	48 x 28 x 72
R30-2M-S	33	48 x 32 x 72
R41-2M-S	40.5	51 x 32 x 72
R50-2M-S	52.9	65 x 32 x 72
R65-2M-S	65	76 x 32 x 72
R75-2M-S	79	95 x 32 x 72

FREEZERS



MODEL	STORAGE CAPACITY (cf)	DIMENSIONS W x D x H (in inches)
F4-2M-ADS	4	24 x 26 x 34
F10-2M-ADS	10	30 x 24 x 58
F18-2M-ADS	17.6	32 x 28 x 72
F20-2M-ADS	20.7	32 x 32 x 72
F22-2M-ADS	20	36 x 28 x 72
F25-2M-ADS	28	48 x 28 x 72
F30-2M-ADS	33	48 x 32 x 72
F41-2M-ADS	40.5	51 x 32 x 72
F50-2M-ADS	52.9	65 x 32 x 72
F65-2M-ADS	65	76 x 32 x 72

REFRIDGERATORS/FREEZERS



MODEL	STORAGE CAPACITY (cf)		DIMENSIONS W x D x H (in inches)
	Refrigerator	Freezer	
R6F3-2M-ADS	6	4	30 x 24 x 58
R9F9-2M-ADS	8.4	8.4	32 x 28 x 72
R14F6-2M-ADS	9.8	7	32 x 28 x 72
R10F10-2M-ADS	10	10	32 x 32 x 72
R12F12-2M-ADS	13	13	48 x 28 x 72
R17F13-2M-ADS	17	14	48 x 32 x 72
R13F17-2M-ADS	14	17	48 x 32 x 72
R20F20-2M-ADS	19.3	19.3	58 x 32 x 72
R45F30-2M-ADS	58	21	95 x 32 x 72



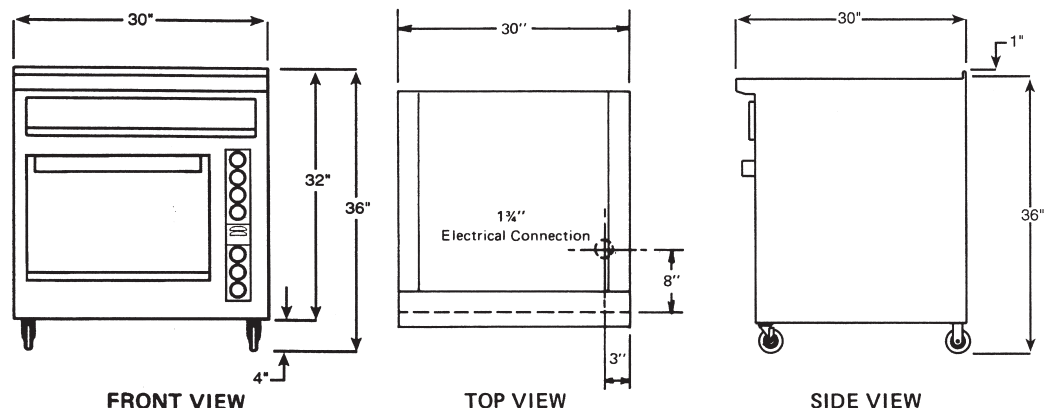
32S SERIES RANGE

30" Wide - 30" Deep

- Heavy-duty Range with all-purpose bake/roast oven fits in tight spaces.
- Choice of cook top arrangements include combinations of Hot Tops, Griddles, and Solid Speed Units. Total cook surface - 24" wide, 24" deep.
- Hot Tops are 12"W x 24"D, 3/4" thick steel with a three-way switch for each 12" wide section.
- Griddle tops are available in 24" width, 1/2" thick; options include 12" wide griddle plate, and 1 " thick smooth or grooved plates. One-piece splashguard is welded continuously on three sides of griddle plate to prevent leakage. Each 12" of griddle is controlled by separate thermostat.
- Two Solid Speed Units per 12" section, each with an independent 6-heat switch.
- Standard exterior finish is stainless steel.
- All 208-volt, 240-volt, and 480-volt ranges are equipped with hydraulicmagnetic circuit breakers.
- The 32S Series Range is one-piece construction as standard. Two-piece construction is available as an optional extra.
- The 32S Series Range is U.L. listed and N.S.F. certified.
- Standard warranty covers parts and labor for one full year.



Lang ranges available in many different top configurations. (Similar to those found on page 524)



FRONT VIEW

TOP VIEW

SIDE VIEW

PARTS AVAILABLE PLEASE CALL

INSIDE OVEN DIMENSIONS

Width 19"
Depth 21"
Height 12"

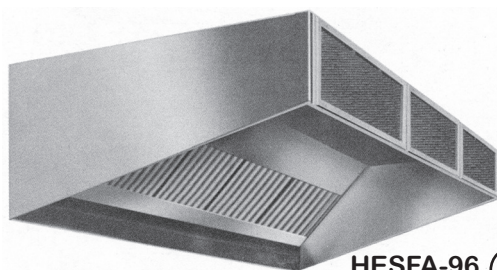
SPACING REQUIREMENTS

3" at sides and back
from combustible surfaces

ELECTRICAL DATA FOR 32S SERIES RANGES															SHIPPING WEIGHT	
MODEL NO.	THREE PHASE LOADING			TOTAL K.W. EACH CONN.	NOMINAL AMPS PER LINE AT EACH CONNECTION POINT											
					THREE PHASE									SINGLE PHASE		
	K.W. PER PHASE				208 VOLTS			240 VOLTS			480 VOLTS			208 V		240 V
	L1-L2	L2-L3	L3-L1		L1	L2	L3	L1	L2	L3	L1	L2	L3			
32S	5.0	4.0	5.0	14.0	41.7	37.5	37.5	36.1	32.5	32.5	18.1	16.3	16.3	67.3	58.3	370 lbs.

SpecAIR™

VENTILATION HOODS



HESFA-96 ○

For use in commercial cooking including restaurant, kitchen, fast food, and deli.

All hoods are 51" (1295mm) deep and 24" (610mm) height.

Note: Prices do not include the following: Installation supplies and materials, hanging of ventilator, exhaust and supply fans, curbs, ductwork, transitions, penetrating and sealing of roof or ceiling, trim, flashing, permits, fire protection system or tests, air balancing, electrical of any nature or any special requirements from local authorities.

STANDARD FEATURES INCLUDE:

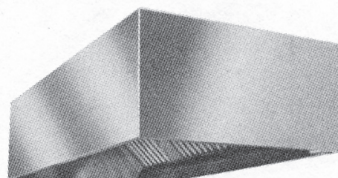
- Hood surfaces are constructed of 18 gauge type 304 stainless steel. Unexposed surfaces are 18 gauge stainless steel. Seams of the canopy are continuously welded liquid-tight.
- U.L. Listed vapor-proof incandescent light fixtures are mounted and provided with a junction box mounted on top of the hood.
- U.L. Classified filters are aluminum, non-clogging, baffle-type, and easily removable for cleaning.
- Full-length stainless steel grease trough is pitched to drain grease from filters and exhaust plenum.
- Grease drains from trough into a removable grease container for disposal.
- 3" (76mm) airspace at rear of exhaust hood.
- Exhaust and supply collar(s).
- Supply collar(s) with fire damper(s) on internal make-up air models.
- Front and rear full length hanging brackets.

EXHAUST-ONLY HOODS, HES & HEB SERIES (NSF) NFPA-96

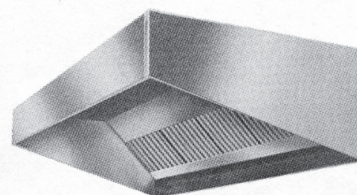
Designed for use where make-up air is supplied by other vent systems. Regular and short front models (for low ceilings) available.

Freight class is 70.0.

length		weight		cubic feet	REGULAR		SHORT FRONT	
in.	mm	lbs.	kg		model #	list	model #	list
48"	1219	275	124.7	69.5	HEB96-48	\$3159	HES96-48	\$2780
54"	1372	309	140.2	76.9	HEB96-54	3518	HES96-54	3133
60"	1524	344	156.0	84.0	HEB96-60	3868	HES96-60	3477
66"	1676	378	171.5	91.5	HEB96-66	4218	HES96-66	4145
72"	1829	412	186.9	98.5	HEB96-72	4609	HES96-72	4176
78"	1981	481	218.2	112.9	HEB96-78	4960	HES96-78	4519
84"	2134	550	249.5	127.5	HEB96-84	5351	HES96-84	4873
90"	2286	567	257.2	131.0	HEB96-90	5702	HES96-90	5217
96"	2438	584	264.9	134.5	HEB96-96	6093	HES96-96	5570
102"	2591	601	272.6	138.1	HEB96-102	6443	HES96-102	5918
108"	2743	618	280.3	141.7	HEB96-108	6793	HES96-108	6259
114"	2896	653	296.2	148.9	HEB96-114	7185	HES96-114	6613
120"	3048	687	311.6	156.0	HEB96-120	7535	HES96-120	6957
126"	3200	721	327.0	163.5	HEB96-126	7927	HES96-126	7292
132"	3353	756	342.9	170.5	HEB96-132	8277	HES96-132	7655
138"	3505	790	358.3	177.7	HEB96-138	8669	HES96-138	7986
144"	3658	825	374.2	184.9	HEB96-144	9019	HES96-144	8334



exhaust-only hood...

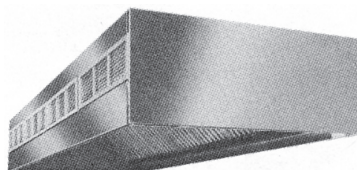


...with short front fascia

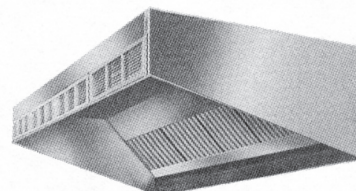
FRONT DISCHARGE MAKE-UP AIR EXHAUST HOODS, HEF & HESFA SERIES (NSF) NFPA-96

Supplies make-up air through the hood, independent of other ventilation systems, at ceiling level. Regular and short front models (for low ceilings) available. Freight class is 70.0.

length		weight		cubic feet	REGULAR		SHORT FRONT	
in.	mm	lbs.	kg		model #	list	model #	list
48"	1219	302	137.0	69.5	HEF96-48	\$4557	HESFA96-48	\$4365
54"	1372	339	153.8	76.9	HEF96-54	4568	HESFA96-54	4377
60"	1524	378	171.5	84.0	HEF96-60	6724	HESFA96-60	5409
66"	1676	415	188.2	91.5	HEF96-66	6728	HESFA96-66	5412
72"	1829	453	205.5	98.5	HEF96-72	7815	HESFA96-72	6452
78"	1981	491	222.7	112.9	HEF96-78	7818	HESFA96-78	6455
84"	2134	529	240.0	127.5	HEF96-84	8906	HESFA96-84	7496
90"	2286	567	257.2	131.0	HEF96-90	8774	HESFA96-90	7499
96"	2438	605	274.4	134.5	HEF96-96	8850	HESFA96-96	8467
102"	2591	642	291.2	138.1	HEF96-102	9835	HESFA96-102	8542
108"	2743	679	308.0	141.7	HEF96-108	9963	HESFA96-108	9574
114"	2896	718	325.7	148.9	HEF96-114	10016	HESFA96-114	9586
120"	3048	755	342.5	156.0	HEF96-120	11096	HESFA96-120	10617
126"	3200	793	359.7	163.5	HEF96-126	11107	HESFA96-126	10628
132"	3353	831	376.9	170.5	HEF96-132	12352	HESFA96-132	11660
138"	3505	869	394.2	177.7	HEF96-138	12198	HESFA96-138	11672
144"	3658	907	411.4	184.9	HEF96-144	13278	HESFA96-144	12704



front discharge make-up air
exhaust hood...



...with short front fascia

HEAVY-DUTY 36" ELECTRIC RANGES

- *Stainless steel front, sides & top*
- *Includes 3 oven racks with convection oven*
1 oven rack with standard oven
- *Stainless steel oven and door liners (convection)*
- *Aluminized steel oven liners (standard)*
- *Stainless steel door liners (standard)*
- *Vented, air-cooled motor (convection only)*
- *Hatchable to pass thru 26" opening*
- *Includes 6" NSF-listed legs*
- *Front serviceable*
- *36" cooking height*
- *Carrier class 85*
(except RH36C4 = 77.5)
- *EXCLUSIVE 24/7/365 ON-SITE WARRANTY*



RH36C1



RH36D4

36" Range with Convection Oven Base

RH36C1



Three thermostat-controlled 12" x 24" hotplates

RH36C3



36" x 24" thermostat-controlled griddle 1/2" thick

RH36C6



24" x 24" griddle & two 9" round hotplates

RH36C2



Two thermostat-controlled 12" x 24" hotplates & two round hotplates

RH36C4



Six 9" solid, round hotplates with four position controls

RH36C7



24" x 24" griddle & one thermostat-controlled 12" x 24" hotplate

36" Range with Standard Oven Base

RH36D1



Three thermostat-controlled 12" x 24" hotplates

RH36D3



36" x 24" thermostat-controlled griddle 1/2" thick

RH36D6



24" x 24" griddle & two 9" round hotplates

RH36D2



Two thermostat-controlled 12" x 24" hotplates & two round hotplates

RH36D4



Six 9" solid, round hotplates with four position controls

RH36D7



24" x 24" griddle & one thermostat-controlled 12" x 24" hotplate

PARTS AVAILABLE PLEASE CALL

36" RANGES—SPECIFICATIONS

Oven Type	Convection					
Model Number	RH36C1	RH36C2	RH36C3	RH36C4	RH36C6	RH36C7
Phase	3	3	3	3	3	3
Hz	50/60	50/60	50/60	50/60	50/60	50/60
Total kW @ 208	22.5	22.4	23.1	22.2	22.4	22.5
Total kW @ 240	22.5	22.4	23.1	22.2	22.4	22.5
Width	36"	36"	36"	36"	36"	36"
Depth	38 1/2"	38 1/2"	38 1/2"	38 1/2"	38 1/2"	38 1/2"
Height	38 1/4"	38 1/4"	38 1/4"	38 1/4"	38 1/4"	38 1/4"
Ship wt. (lbs.)	610	570	610	485	570	570

	Standard					
	RH36D1	RH36D2	RH36D3	RH36D4	RH36D6	RH36D7
Phase	3	3	3	3	3	3
Hz	50/60	50/60	50/60	50/60	50/60	50/60
Total kW @ 208	21.9	21.8	22.5	21.6	21.8	21.9
Total kW @ 240	21.9	21.8	22.5	21.6	21.8	21.9
Width	36"	36"	36"	36"	36"	36"
Depth	38 1/2"	38 1/2"	38 1/2"	38 1/2"	38 1/2"	38 1/2"
Height	38 1/4"	38 1/4"	38 1/4"	38 1/4"	38 1/4"	38 1/4"
Ship wt. (lbs.)	634	580	652	562	580	580

MARINE KITS

Accessory kits to provide shipboard stability to RH models, including bolt-down legs, door latch, grab rails, sea racks (Kits A & B), grease trays with latches and stainless steel backs. (Field assembly required)

MH36KITA	Marine Kit, tops 1, 2, and 4	20 lbs.
MH36KITB	Marine Kit, tops 6 & 7	20 lbs.
MH36KITC	Marine Kit, top 3	20 lbs.

Aerohot Steamtables - Electric Hot Food - Exposed Elements

- All stainless steel bodies, undershelves, legs & adjustable plastic feet
- Infinite switch heat controls
- 1/2" thick poly carving board on stainless steel support shelf



E303



EP303



Spillage pan - for wet use
#676 Stainless Steel \$90
#576 Aluminum \$44



ELECTRICAL SPECIFICATIONS - single phase * Call for Discount

Model	Model	120 Volt, 500 Watt			208 Volt, 750 Watt			240 Volt, 750 Watt				
		Stationary	Portable	Watts	Amps	NEMA	Watts	Amps	NEMA	Watts	Amps	NEMA
E302	EP302			1000	8.3	5-15	1500	7.2	6-20	1500	6.3	6-20
E303	EP303			1500	12.5	5-15	2250	10.8	6-20	2250	9.4	6-20
E304	EP304			2000	16.7	L5-30	3000	14.4	6-20	3000	12.5	6-20
E305	EP305			2500	20.8	L5-30	3750	18.0	L6-30	3750	15.6	6-20

NOTE: For all Aerohot Electric Food Warmers, 1 Phase.

STAINLESS STEEL ELECTRIC HOT FOOD UNITS - with exposed elements

Model	Unit Size Length in / cm	Top Openings	Cube Crated Feet	Crated Ship Wt. lbs / kg
All units are all 22-7/16in (57.1cm) wide by 34in (86.4cm) high.				
Electric - Stationary On Legs				
E302	30-3/8 / 77.2	2	23.4	81 / 36.8
E303	44-3/8 / 112.8	3	32.5	107 / 48.6
E304	58-3/8 / 148.3	4	41.5	138 / 62.7
E305	72-3/8 / 183.9	5	50.5	165 / 75.0
Electric - Portable				
EP302	30-3/8 / 77.2	2	23.4	90 / 40.9
EP303	44-3/8 / 112.8	3	32.5	114 / 51.8
EP304	58-3/8 / 148.3	4	41.5	144 / 65.5
EP305	72-3/8 / 183.9	5	50.5	172 / 78.2

NOTE: When Lighted Shelf is added to unit shelf is not wired to unit. Prices include heavy duty cord and plug. NO DEDUCTION for No Pusher Bar. Specify Voltage and Phase. New York City only: M.E.A. No. 308-84.

OPTIONS:

For 3 phase wiring

For 1000 watt elements (Not available on 5-section, 120V).

FMOD-SS-LINER

For stainless steel liner in lieu of galvanized.

PER SECTION

PER SECTION



"Your Solutions Partner"

* Call for Discount



24-Hour Shipping

For Aerohot Steamtables Accessories, See pages 14 - 21.

F.O.B. Sedalia, MO 65301

Freight Class - 85

JET-TECH



SPECIFICATION TABLE

FEATURE MODEL	WIDTH	DEPTH	HEIGHT	WEIGHT	VOLTAGE AMPS	BOOSTER HEAT	TANK HEAT	H.P.	WATER PER CYCLE (US gal)	RACKS/HR. RACK SIZE
727	19.75"	19.75"	32.25"	116 lbs	208-220 15.0	2400 W	2000 W	0.75	0.66	30 15.75"
737	23.75"	23.75"	33.50"	160 lbs	208-220 22.0	4000 W	2800 W	0.75	0.78	30 19.75"
747	27.50"	28.40"	58.50"	342 lbs	208-220 27.0-3Ph 46.0-1Ph	9000 W	4000 W	1.50	1.0	52 19.75"
F-16	20.00"	20.00"	29.50"	105 lbs	208-220 14.5	2400 W	2000 W	0.50	0.50	30 15.75"
F-18	23.75"	23.75"	33.50"	160 lbs	208-220 22.0	4000 W	2800 W	0.75	0.78	24 19.75"
F-20	24.50"	24.00"	52.00"	190 lbs	208-220 34.0	6000 W	4000 W	1.25	0.78	30 19.75"
F-22	27.95"	28.40"	60.00"	342 lbs	208-220 27.0-3Ph 46.0-1Ph	9000 W	4000 W	1.25	1.0	52 19.75"
PIPER	19.80"	18.50"	20.40"	64 lbs	110 13.6	1400 W	1400 W	0.25	0.5	20 13.75"
CHALLENGER	24.00"	24.00"	39.00"	200 lbs	110/220 25.0	N/A	4000 W	0.25	N/A	N/A
STEALTH	60.00"	24.00"	39.00"	350 lbs	110/220 25.0	N/A	4000 W	0.50	N/A	N/A

ELKAY® NO LEAD WATER COOLERS

Wall Models

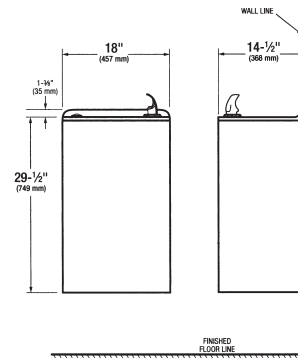
WALL MODELS

Practical and appropriate in any setting. Models **EWHA8** and **EWHA14** include hot water dispenser.

Standard Features

- **No Lead Design**—Water system free of lead-containing brass parts.
- Uses **HFC-134a** refrigerant.
- Cascade basin.
- **Flexi-Guard** safety bubbler.
- Non-pressurized cooling tank.
- Removable front panel.
- Complete with mounting hanger.

EWA4



**LWAE8, EWA4, 8, 14,
16 & 20, EWHA8 & 14**

Colors — Gray Beige is standard unless color option is specified
See page 4.

Feature Options (at additional cost)

- Glass Filler, requires factory preparation. See page 55 for ordering information.



Model #	G.P.H.* Capacity	Full Load Amps	Rated Watts	Non-Pressurized Cooling Tank	Pre- Cooler	Hot &* Cold	Glass Filler†	Optional Color(s)	Ship. Wt. Lbs.
EWA4	4.0	3.3	300	Yes	No	No	Yes	Most	66
EWA8	8.0	5.5	420	Yes	No	No	Yes	Most	69
EWHA8	8.0	9.5	920	Yes	No	Yes	Yes	Most	82
EWA14	13.5	8.0	600	Yes	No	No	Yes	Most	72
EWHA14	13.5	12.0	1100	Yes	No	Yes	Yes	Most	85
EWA16[‡]	15.5	5.6	480	Yes	Yes	No	Yes	Most	76
EWA20[‡]	19.5	7.2	600	Yes	Yes	No	Yes	Most	74
EWDA	Cabinet only. Refrigeration unit not included.			—	—	—	—	Most	44

*Based on 80° F inlet water temperature, 90° F room temperature, 50° F drinking water temperature. †Glass Fillers LK1110, LK1114 sold separate.

‡This water cooler complies only with the lead-free definition of ANSI/NSF 61, Section 9-1997b.

SPACE-ETTE FLOOR MODELS

Trim, space-saving units perfect for new and replacement installations.

Standard Features

- **No Lead Design**—Water system free of lead-containing brass parts.
- Uses **HFC-134a** refrigerant.
- Space-ette basin has integral vandal-resistant strainer.
- **Flexi-Guard** safety bubbler.
- Non-pressurized cooling tank.
- Removable front panel.

Colors — Sandalwood is standard. Stainless Steel available at additional cost. See page 4.

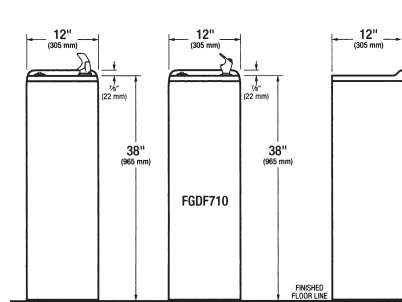
Feature Options (at additional cost)

- Glass Filler, requires factory preparation. See page 55 for ordering information.

Government specification Space-ette Floor Models FGDF7105 and FGDF71010.
Please write for specifications.



FD7003



LFDE8, FD, FHD & FGDF SERIES

Model #	G.P.H.* Capacity	Full Load Amps	Rated Watts	Non-Pressurized Cooling Tank	Pre- Cooler	Foot Pedal	Hot & Cold	Glass Filler†	Optional Color(s)	Ship. Wt. Lbs.
FD7001	1.0	2.3	200	Yes	No	No	No	Yes	Stainless	55
FD7003	2.8	2.3	200	Yes	No	No	No	Yes	Stainless	63
FD7005	5.0	3.5	250	Yes	No	No	No	Yes	Stainless	63
FD7008	8.0	5.0	350	Yes	No	No	No	Yes	Stainless	63
FD70010	9.8	6.8	500	Yes	No	No	No	Yes	Stainless	64

*Based on 80° F inlet water temperature, 90° F room temperature, 50° F drinking water temperature. †Glass Fillers LK1110, LK1114 sold separate.

Index Section G

QUARTERS

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Definition

Cost of Government Day is the date of the calendar year on which the average American worker has earned enough gross income to pay off his or her share of spending and regulatory burdens imposed by all levels of government, federal, state and local.

Methodology

Cost of Government Day is the total cost of government as a percentage of national income. The percentage is then multiplied by 365 days to determine the number of days worked to pay for the total cost of government.

Federal expenditures are derived from the latest Congressional Budget Office forecast. State and local expenditures are derived from the National Income and Product Accounts (NIPA) produced by the Bureau of Economic Affairs at the U.S. Department of Commerce.

For national income, we used the estimate of Net National Product (NNP) produced by the Bureau of Economic Affairs in NIPA. NNP is equal to Gross Domestic Product (GDP), plus the balance of international transfers, less depreciation. NNP is a widely accepted measure of income. We derived this estimate of national income from NIPA and from projections of federal budget trends produced by the Congressional Budget Office.

Estimates of federal, state and local regulatory burdens were derived from the best academic sources available. W. Mark Crain, Professor of Economics at George Mason University, and Thomas D. Hopkins, Dean of the College of Business at the Rochester Institute of Technology, produced a new comprehensive study on the cost of federal regulation in 2000 The U.S. Small Business Administration commissioned the study. This study served as the foundation for our estimate of the cost of regulation.

OVERVIEW OF RESULTS

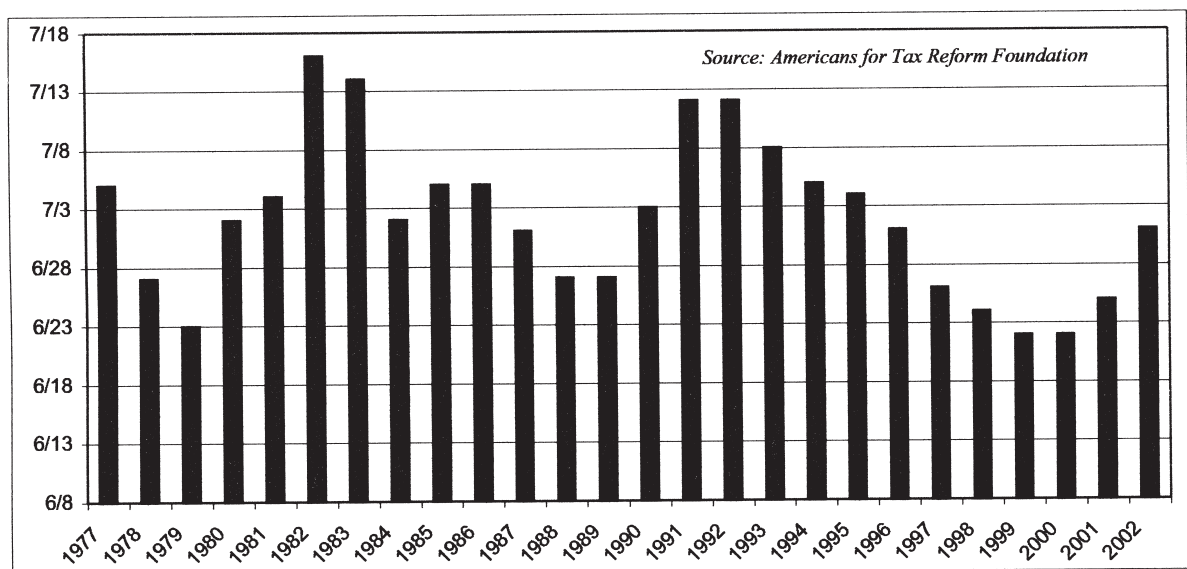
Cost of Government Day 2002

Cost of Government Day for 2002 is July 1. This is six days later than the 2001 Cost of Government Day of June 25. As a result, working people must toil on average 181 days out of the year just to meet all the costs imposed by government. In other words, the Cost of Government consumes nearly 50 percent of national income.

Cost of Government: Trends and Components

Cost of Government Day is six days later in 2002 than it was last year and it is now at its highest level since 1996. This was primarily due to the recession (which slowed the growth of national income) while total government spending continues to increase in an unprecedented manner. Federal regulations also increased due to the War on Terrorism, new corporate regulations, and the Microsoft regulations.

Cost of Government Day 1977 – 2002



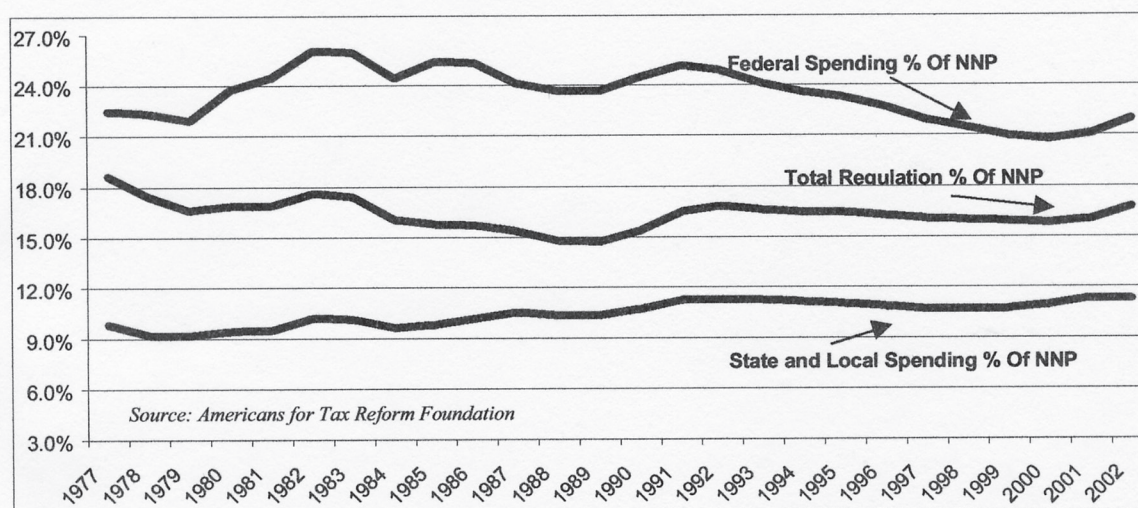
The increase could even be greater this year once the final numbers come in for spending on the War on Terrorism. While fighting the War on Terrorism is important, many members of Congress have also used this opportunity to load spending bills with unnecessary pork barrel spending disguised as homeland security. Policymakers should not be using the War on Terrorism to fund unnecessary programs and they absolutely must focus on reducing the cost of government substantially once that conflict is over. The data also shows the need to focus on tax reform to reduce the needlessly high cost of tax compliance.

Why is a lower Cost of Government desirable? First, because a lower Cost of Government means more of the money produced by workers, investors and entrepreneurs is left in their hands. That expands the economic freedom of everyone in the economy to choose how to consume, save and invest what they produce. It increases personal choice and control. Moreover, expanding the freedom and control of all Americans over what they produce follows sound notions of economic justice.²

Secondly, a lower Cost of Government increases the incentives for work, savings, investment and entrepreneurship. That is because with less taken in taxes and regulatory costs, the reward for all these economic activities increases. That in turn will mean more work, savings, investment and entrepreneurship. The end result would be expanded economic growth and opportunity, with more jobs, higher wages and increased personal income overall.

Restraining federal government spending as a percentage of national income fueled the downward trend in the Cost of Government Day over the past decade. Now, however, federal spending has been increasing much faster than the growth of national income and is projected to increase even more in the next year. Furthermore, regulatory costs have increased slightly while state and local governments also spent their accelerating tax revenue gains from the latter half of the last decade. These three variables have combined to increase the Cost of Government for the past two years.

Components of the Cost of Government 1977 –2001 (as percentage of NNP)



While federal spending tends to overwhelm regulatory and state and local spending, both state and local revenues, and the cost regulation, should not be considered insignificant. On the contrary, state/local taxes and regulation contribute approximately 56 percent to the Cost of Government. In fact, as the federal government restrained spending in the latter half of the last decade, state/local government spending and regulatory costs increased as a percentage of the Cost of Government.

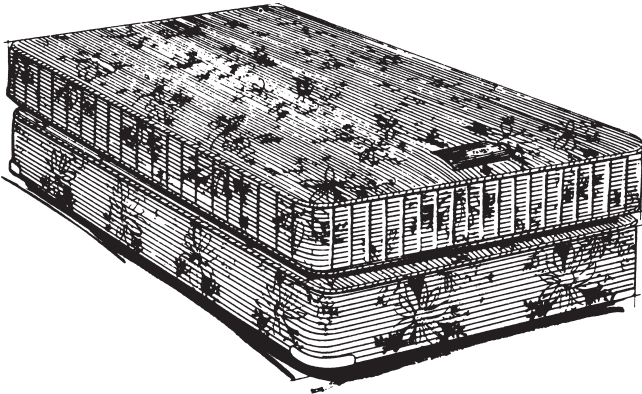
Throughout the past decade, state governments were flush with tax revenues and spent those tax revenues on new programs. This spending outpaced growth of national income and clearly was excessive. When the economy cooled and revenues dipped, state governments were faced with budget shortfalls and spending commitments they could not afford. Yet state governments have refused to make the tough decisions and cut this excess spending. Instead, state policymakers have decided to raise taxes on working American families to pay for their mismanagement and maintain current levels of spending.

² Robert Nozick, *Anarchy, State and Utopia*, (New York: Basic Books, 1978).

Bedding

Custom Mattresses

Each custom sized to fit your needs.

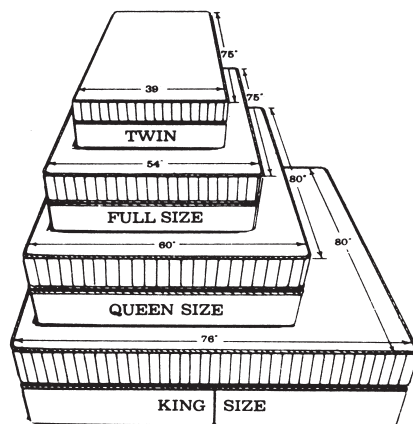
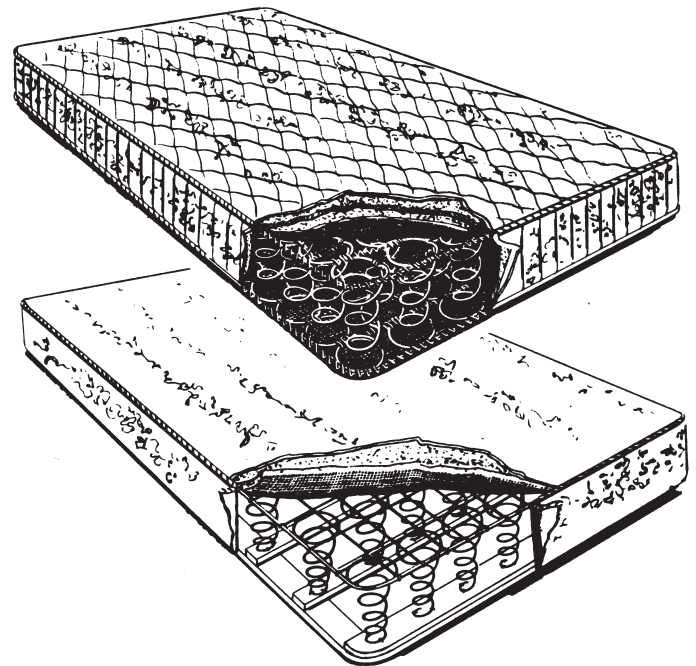


#1

This mattress contains high quality pure 1.2 density urethane foam where cost is the major factor. Provides firm support and comfort.

#2

This innerspring mattress is premium quality coil steel construction with heavy insulation batts and foam for comfort. Long life and quality feel are the factors here.



Size	Width	Length
Twin	39"	75"
Full	54"	75"
Queen	60"	80"
King	76"	80"

HERE LIES...

Funny how a turn of phrase like "Here lies" can catch on. Here lies a bunch of Uncle John's favorite epitaphs. All real, as far as we know.

Here lies the Body of Edward Hyde.
We laid him here because he died.

DELUXE METAL BUNK BEDS



NO. 900 SERIES BUNK BED

Our finest heavy-duty bunk. Panels constructed of 20-ga. cold rolled furniture steel. Popular, too, because of easy conversion of double bunks to single beds with the optional conversion kit. Rigidity is assured through the use of double throated hooks to lock in Dura-Flex springs. Available in two lengths, 76" and 80⁷/₈".

Overall widths: 36¹/₈" and 39¹/₈"

Overall lengths: 79" and 83⁷/₈"

Distance from floor to bottom spring:

Distance between springs:

Overall height:

Height of head or foot sections:

	"Double" Two Tier	"Triple" Three Tier
	14 ³ / ₈ "	12"
	34"	27"
	62 ³ / ₈ "	78"
	27 ¹ / ₈ "	78"

Cross brace of square tubing: 1" x 1" x 18-gauge
Dura-Flex spring—sinuous wire type—1" round

16-gauge stretcher tubes

Steel angle side rails: 2" x 1¹/₂" x 5⁵/₃₂"

Steel posts: 1¹/₂" x 1¹/₂" x 18-gauge tubing

Baked enamel finish

Individually cartoned ends with all parts in carton
for easy assembly on location.

Optional Accessories

No. 5 Tubular steel ladder

No. 6 Tubular steel guard rail

No. 9 Steel deck socket kit

Optional conversion kit available to convert double
bunk to single bed

Steel Drawer

HERE LIES...(cont'd.)

Here lies old Rastus Sominy

Died a-eating hominy

In 1859 anno domini.

10500/LYO
BuyLine 4449

STANDARD LOCKERS

For Quality and Value For suggested applications see page 3.



Single Tier Quiet Lockers

are widely used to provide ample storage for full length garments with shelf space for books, hats, lunches and other articles.



Double Tier Quiet Lockers

are designed for short period use, or where short coats and jackets are worn.



Triple Tier Quiet Lockers

save valuable floor space and are often used in combination with single tier lockers to make gym class lockers.



Multiple Tier Lockers

allow a wide variety of space saving applications. Often used with Lyon single tier and double tier lockers to make gymnasium lockers. Available four, five, and six tiers high.

Locker Sizes (per opening)

W" x D" x H"	W" x D" x H"
9 x 12 x 60	9 x 12 x 72
9 x 15 x 60	9 x 15 x 72
9 x 18 x 60	9 x 18 x 72
9 x 21 x 60	9 x 21 x 72
9 x 24 x 60	9 x 24 x 72
12 x 12 x 60	12 x 12 x 72
12 x 15 x 60	12 x 15 x 72
12 x 18 x 60	12 x 18 x 72
12 x 21 x 60	12 x 21 x 72
12 x 24 x 60	12 x 24 x 72
15 x 12 x 60	15 x 12 x 72
15 x 15 x 60	15 x 15 x 72
15 x 18 x 60	15 x 18 x 72
15 x 21 x 60	15 x 21 x 72
15 x 24 x 60	15 x 24 x 72
18 x 12 x 60	18 x 12 x 72
18 x 15 x 60	18 x 15 x 72
18 x 18 x 60	18 x 18 x 72
18 x 21 x 60	18 x 21 x 72
18 x 24 x 60	18 x 24 x 72
12 x 12 x 37	12 x 12 x 48
12 x 15 x 37	12 x 15 x 48
12 x 18 x 37	12 x 18 x 48
15 x 15 x 37	15 x 15 x 48
15 x 18 x 37	15 x 18 x 48

• Actual height of 37" high = 37½"; 48" high = 48¾"

Locker Sizes (per opening)

W" x D" x H"	W" x D" x H"
9 x 12 x 30	9 x 12 x 36
9 x 15 x 30	9 x 15 x 36
9 x 18 x 30	9 x 18 x 36
9 x 21 x 30	9 x 21 x 36
9 x 24 x 30	9 x 24 x 36
12 x 12 x 30	12 x 12 x 36
12 x 15 x 30	12 x 15 x 36
12 x 18 x 30	12 x 18 x 36
12 x 21 x 30	12 x 21 x 36
12 x 24 x 30	12 x 24 x 36
15 x 12 x 30	15 x 12 x 36
15 x 15 x 30	15 x 15 x 36
15 x 18 x 30	15 x 18 x 36
15 x 21 x 30	15 x 21 x 36
15 x 24 x 30	15 x 24 x 36
18 x 12 x 30	18 x 12 x 36
18 x 15 x 30	18 x 15 x 36
18 x 18 x 30	18 x 18 x 36
18 x 21 x 30	18 x 21 x 36
18 x 24 x 30	18 x 24 x 36

• For overall height, multiply number of openings by height listed.

• Add 6" to height for legs when desired.

Locker Sizes (per opening)

W" x D" x H"	W" x D" x H"
9 x 12 x 20	9 x 12 x 24
9 x 15 x 20	9 x 15 x 24
9 x 18 x 20	9 x 18 x 24
9 x 21 x 20	9 x 21 x 24
12 x 12 x 20	12 x 12 x 24
12 x 15 x 20	12 x 15 x 24
12 x 18 x 20	12 x 18 x 24
12 x 21 x 20	12 x 21 x 24
15 x 12 x 20	15 x 12 x 24
15 x 15 x 20	15 x 15 x 24
15 x 18 x 20	15 x 18 x 24
15 x 21 x 20	15 x 21 x 24

NOTE: Highlighted locker sizes are available for shipment from stock with 6" legs in Dove Gray and Putty.

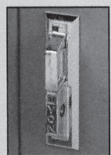
Locker Sizes (per opening)

W" x D" x H"	W" x D" x H"
Four Tier	
12 x 12 x 15	12 x 12 x 12
12 x 15 x 15	12 x 15 x 12
12 x 18 x 15	12 x 18 x 12
12 x 21 x 15	12 x 21 x 12
15 x 12 x 15	15 x 12 x 12
15 x 15 x 15	15 x 15 x 12
15 x 18 x 15	15 x 18 x 12
15 x 21 x 15	15 x 21 x 12
Six Tier	
12 x 12 x 18	12 x 12 x 12
12 x 15 x 18	12 x 15 x 12
12 x 18 x 18	12 x 18 x 12
12 x 21 x 18	12 x 21 x 12
15 x 12 x 18	15 x 12 x 12
15 x 15 x 18	15 x 15 x 12
15 x 18 x 18	15 x 18 x 12
15 x 21 x 18	15 x 21 x 12

Handle Types



Single Point Latching System operates with no moving parts. May be subject to additional charge. Optional on single, double, and triple tier lockers. Not available on 9" wide lockers.



Tampor Guard Handles have built in padlock loop. Standard on single, double, triple tier lockers.

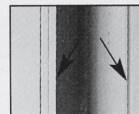


Recessed Handles with finger lift offer added safety and security, clean flush front appearance. Optional on single, double, and triple tier lockers.

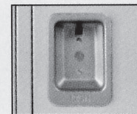


Multiple tier lockers have 1 1/2 gauge steel door strikes on all lockers for strength and security.

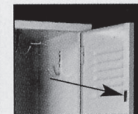
Lyon Quality Features



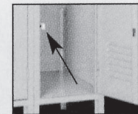
One piece, top to bottom double 1 1/2 gauge steel door strikes on all lockers for strength and security.



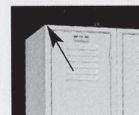
Nickel Plated, Zinc die cast recessed handles, available on single, double, triple tier and two-person lockers offer more safety and security.



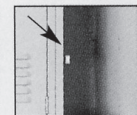
Quieting nylon coated lock bar latches hush door operations on all Lyon lockers with lock bars.



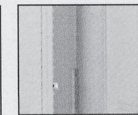
Big, soft rubber cushion secured through jamb and upright reduces noise of door slams.



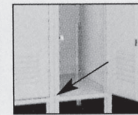
All door frame corners are lapped and welded to form a strong, rigid assembly.



Three door jambs on single tier 48" or higher, and two on double and triple tier lockers feature safety-reverse nose.



All one piece locker door construction from prime, high grade Class I steel for extra strength and durability. Optional galvanized steel available.



Tangs at each end of bottom cross member fit into rear flange of upright to prevent twisting, and maintain overall alignment.



Standard Locker Specifications

10500/LYO
BuyLine 4449

Material—Prime, high grade Class I mild annealed, coldrolled steel free from surface imperfections. A.S.T.M.-366. Galvanized Steel available for high humidity atmospheres. A.S.T.M.-525. Bolts to be zinc plated or subjected to other rustretardant treatment.

Body—24 gauge steel, flanged to give double thickness of metal at back vertical corners.

Door Frame—16 gauge formed steel channels. Vertical members shall have an additional flange to form continuous door strike. Corners shall be lapped and welded into a rigid assembly. In addition, bottom cross members shall have tang at each end that fits through slot in rear flange of upright frame member to prevent twisting out of alignment. Top and bottom cross members shall provide support for front edge of locker top and locker bottom.

Door—One-piece, 16 gauge steel on single, double and triple tier with both vertical edges formed into channelshaped formation; top and bottom shall be flanged at 90° angle. On multiple tier lockers, hinge side shall be formed into channel shaped formation with other three sides flanged at 90° angle.

NOTE: Coat compartment doors of two person and duplex lockers and box locker doors up to and including 15" wide by 15" high shall be 18 gauge unless specified otherwise.

Ventilation—Louvers shall be provided as follows:

Locker Styles

Single/Double tier lockers—9"w
Single tier lockers—Over 9"w
Double tier lockers—Over 9"w
Triple tier lockers—9"w
Triple tier lockers—Over 9"w
Multiple tier lockers

Louvers

Six 3½" louvers top and bottom.
Six 6" louvers top and bottom.
Six 6" louvers top and bottom.
Two 3½" louvers top and bottom.
Two 6" louvers top and bottom
Three 3½" louvers per door for
12" and 15" wide lockers. Four 6"
louvers per door for lockers 18"
wide and over.

Door Jamb—48" and higher Single tier lockers shall have three door jambs; double tier and triple tier lockers shall have two jambs welded to side of door frames to engage locking device. Design and gauge of jamb shall prevent freeing of locking device by prying. Each jamb shall have safety reverse nose to eliminate hazard of sharp-pointed edges protruding into the locker. Each jamb shall have easily replaceable soft rubber bumper.

Hinges—Shall be not less than 2" high. They feature .050" steel 5 knuckle, full loop forming double thickness on each leaf. Hinges to be set in slot in door and frame and projection welded to frame and securely attached to door; hinge pin to be spun over at ends to resist removal. Single tier lockers 48", 60" and 72" high to have three hinges. All other tiers to have two hinges—all on right hand side of door.

Quiet Locking Device—Single tier locking device shall engage frame at three points; double tier and triple tier at two points. Channel shaped locking device shall be a quiet design with nylon coated metal latches to eliminate any metal to metal contact. Lock bar shall be enclosed on three sides and operate within the channel formation of the door. Locking device shall be prelocking so mechanism can be locked in open position—door locking automatically when closed. An optional single point latch shall be available except on 9" wide lockers. Box lockers shall

have one point locking device with a 14 gauge lock clip for attaching padlock. Doors also to be provided with lock hole filler to permit use of built in key or combination lock.

Handles—On single, double and triple tier lockers, all parts shall be chrome plated, die-cast zinc alloy with a tensile strength of not less than 40,000 psi. No moving parts are to operate against outside surface of locker. Padlock attachment to be integral part of lift which shall be attached directly to locking bar and protected by fixed handle housing. Handle to provide built in padlock strike. Multiple tier lockers shall be equipped with a 16 gauge door pull with padlock attachment when not used with built in locks. An optional recessed handle shall be available at no extra charge on single tier, double tier, triple tier and two person lockers. The recessed handle shall be 4⅞" w x 6½" h x 1¼" d and constructed of die cast zinc alloy, nickel plated, with a minimum tensile strength of 40,000 psi.

Hat Shelves—Single tier lockers shall have one 24 gauge hat shelf approximately 9" below top. Flanged on all four sides for strength with the front flange turned 45° for safety and attached at no less than two points through each side flange. Only single tier lockers have shelves.

Coat Hooks—Single tier, double tier and triple tier lockers shall have one double prong (ceiling) hook and three single prong wall hooks. ⅝" diameter coat rods are standard in 18" and 21" deep knocked down single tier lockers, replacing ceiling hook. All hooks to be zinc plated or subjected to a comparable rust retardant treatment and attached with two bolts.

Number Plates—Optional aluminum number plates with etched figures at least ⅝" high. All lockers shall have number plates attached near top of door.

Standard Finish—Exposed steel parts shall be thoroughly cleaned, given a bonding and rust inhibitive phosphate treatment and then electrostatically sprayed with a heavy coat of high quality enamel.

NOTE: Lyon recommends application of a corrosion resistant primer finish or galvanized steel on lockers used in high humidity atmospheres. Contact Lyon for finish capability with any chemicals.

Anchoring—To prevent tipping or injury, Lyon strongly recommends that lockers be floor and/or wall anchored.

Free Standing Lockers—Lockers shall be furnished with 6" legs. Optional front and end closed bases available.

Recess Trim—End and top recess trim for lockers to be placed in wall recesses shall be 18 gauge formed steel with a 2¾" wide face and shall be bolted to locker frames.

Top recess trim to be in approximately 5'0" lengths with a formed splice cap to cover joints and to hold top recess trim in alignment. End recess trim to be 2¾" higher than lockers and will lap over ends of top recess trim for a neat joint at top of corners.

NOTE: There are certain sizes and/or types of lockers that are available in minimum quantity production runs only. Contact your Lyon factory representative for complete details.

Lyon Lockers

Eliminating metal to metal contact, all Lyon locker doors are fitted with nylon coated metal latches to reduce clanging and provide smoother, **quieter operation**.

In addition to quieter lock bars, **Lyon Quiet-Plus** locker doors have no louvers and include a viscoelastic sound deadening panel. The resulting combination minimizes noise levels caused by opening and closing locker doors.



Stronger by Design.

The Lyon hinge actually provides better strength than larger hinges by its unique full loop construction. Strength is maximized by extending the hinge through slots in the door and frame and then projection welded and riveted.

FIGS. 918 & 919 - RIM LOCK SET

CHROME PLATED ZINC ALLOY

For Door Thickness 5/8 to 1-3/8 Inches

FIG. 918 - REGULAR BEVEL WITH BOX STRIKE

FIG. 919 - REVERSE BEVEL WITH FLUSH STRIKE

Locks by Turn Button from Inside or Key from Outside

ORDERING INFORMATION

Door Bevel/Strike Type	Dimensions Case Inches	Dimensions Escutcheon Inches	Dealer Pkg. 5 Sets 1 Set per Card	OEM Bulk Pkg. 10 Sets	Screw Size	Weight Pounds
Regular w/Box	3-7/8 x 2	4-3/8 x 1-1/4	918 DP CHR	918 000 CHR	6	1-3/8
Reverse w/Flush	3-7/8 x 2	4-3/8 x 1-1/4	919 DP CHR	919 000 CHR	6	1-3/8

Spare Box Strike, Cat. No. 918 000 99A.

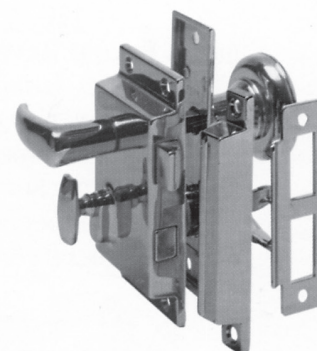
Spare Flush Strike, Cat. No. 913 DP CHR.

Spare Knob and Handle Assembly, Cat. No. 962 000 CHR.

Spare Escutcheon Plate with Keys, Cat. No. 953 000 CHR.

Spare Regular Bevel with Cam, Cat. No. 984 000 CHR.

Spare Reverse Bevel with Cam, Cat. No. 920 DP CHR.



**FIG. 918
SHOWN
ASSEMBLED**

FIGS. 927 - MORTISE LOCK SET

CHROME PLATED ZINC ALLOY

Locks by Turn Button from Inside or Key from Outside

Bevel can be Reversed During Installation

ORDERING INFORMATION

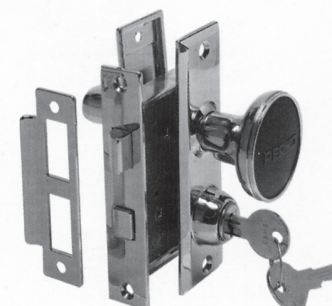
For Door Thickness Inches	Dimensions Case Inches	Dimensions Escutcheon Inches	Dealer Pkg. 5 Sets 1 Set per Card	OEM Bulk Pkg. 10 Sets	Screw Size	Weight Pounds
1 to 1-3/8	2-3/4 x 2	4-3/8 x 1-1/4	927 DP CHR	927 000 CHR	6	1-3/8

Spare Flush Strike, Cat. No. 913 DP CHR.

Spare Knob and Handle Assy, Cat. No. 962 000 CHR.

Spare Bevel with Cam, Cat. No. 920 DP CHR.

Spare Escutcheon Plate with Keys, Cat. No. 927 000 99B.



**FIG. 927
SHOWN
ASSEMBLED**

FIG. 567 - TUBULAR LATCH SET

CHROME PLATED ZINC ALLOY

Sliding Lock Button

ORDERING INFORMATION

For Door Thickness Inches	Dimensions Escutcheon Inches	O.D. Tube Inches	Dealer Pkg. 5 Cards 1 Set per Card	OEM Bulk Pkg. 10 Sets	Screw Size	Weight Pounds
1 to 1-3/8	4-3/8 x 1-1/4	3/4	567 DP CHR	567 000 CHR	6	7/8

Spare Flush Strike, Cat. No. 912 DP CHR.

Spare Knob and Handle Assembly, Cat. No. 962 000 CHR.



**FIG. 567
SHOWN
ASSEMBLED**

PRIVACY LATCH SETS

PRIVACY LATCH SETS FOR INTERIOR CABINS AND HEAD ENCLOSURES

FIG. 710

CHROME PLATED BRASS AND ZINC ALLOY

TWO TONE ESCUTCHEON PLATES
 PLASTIC BEVEL FOR QUIET OPERATION
 NEW CONTEMPORARY STYLING
 LOCKS BY TURN BUTTON FROM INSIDE
 SAFETY UNLOCK FROM OUTSIDE
 FOR DOOR THICKNESS 3/4 TO 1-1/2 INCHES

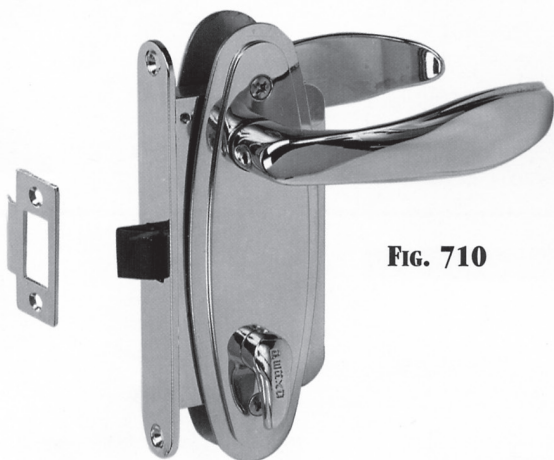


Fig. 710

FIG. 711

CHROME PLATED BRASS AND ZINC ALLOY

PLASTIC BEVEL FOR QUIET OPERATION
 NEW CONTEMPORARY STYLING
 LOCKS BY TURN BUTTON FROM INSIDE
 SAFETY UNLOCK FROM OUTSIDE
 FOR DOOR THICKNESS 1/2 TO 3/4 INCHES

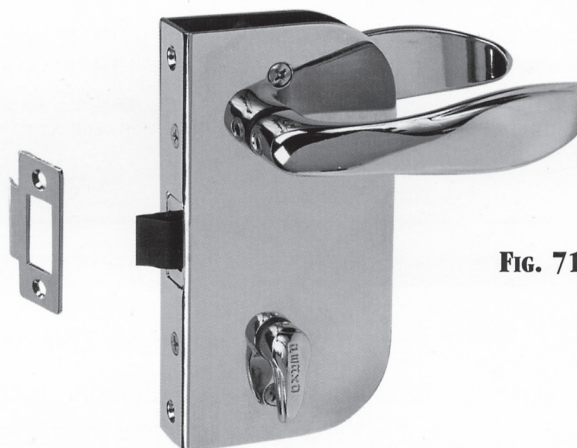
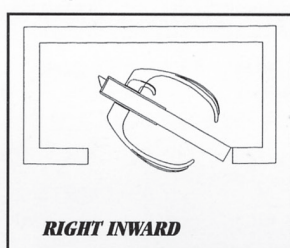
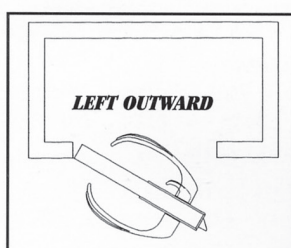
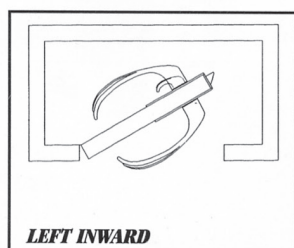


Fig. 711

Determining the hand of the latch set.



ORDERING INFORMATION

FIG. 710

Latch Set	Type of Latch	For Door Thickness Inches	OEM Bulk Pkg. 5 Sets
Mortise	Left Inward or Right Outward	3/4 to 1	710 001 LIC
Mortise	Right Inward or Left Outward	3/4 to 1	710 001 RIC
Mortise	Left Inward or Right Outward	1 to 1-1/4	710 002 LIC
Mortise	Right Inward or Left Outward	1 to 1-1/4	710 002 RIC
Mortise	Left Inward or Right Outward	1-1/4 to 1-1/2	710 003 LIC
Mortise	Right Inward or Left Outward	1-1/4 to 1-1/2	710 003 RIC

FIG. 711

Latch Set	Type of Latch	For Door Thickness Inches	OEM Bulk Pkg. 5 Sets
Flush	Left Inward	1/2	711 001 LIC
Flush	Left Outward	1/2	711 001 LOC
Flush	Right Inward	1/2	711 001 RIC
Flush	Right Outward	1/2	711 001 ROC
Flush	Left Inward	5/8	711 002 LIC
Flush	Left Outward	5/8	711 002 LOC
Flush	Right Inward	5/8	711 002 RIC
Flush	Right Outward	5/8	711 002 ROC
Flush	Left Inward	3/4	711 003 LIC
Flush	Left Outward	3/4	711 003 LOC
Flush	Right Inward	3/4	711 003 RIC
Flush	Right Outward	3/4	711 003 ROC

Note: Left Inward/Right Outward are Interchangeable.
 Right Inward/Left Outward are Interchangeable.

BARREL BOLT & CABIN DOOR HOOK

FIG. 947 - BARREL BOLT

CHROME PLATED BRONZE

SUPPLIED WITH FRICTION PAD TO ELIMINATE
RATTLE AND PROVIDE SMOOTH OPERATION.

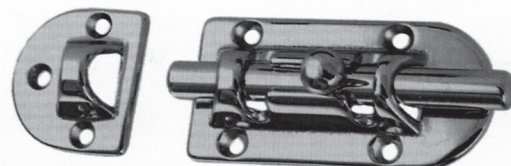


FIG. 947

ORDERING INFORMATION

Dimensions Overall Inches	Chrome Plated Bronze Dealer Pkg. - 5 Cards 1 Pc. per Card	Chrome Plated Bronze OEM Bulk Pkg. 25 Pcs.	Screw Size	Weight Ounces
3-7/16 x 1-7/16	947 DP1 CHR	947 001 CHR	6	4-1/2
4-5/16 x 1-7/16	947 DP2 CHR	947 002 CHR	6	5-7/8
5-1/4 x 1-7/16	947 DP3 CHR	947 003 CHR	6	6-3/4

FIG. 956 - CABIN DOOR HOOK

CAST BRONZE, PLAIN OR CHROME PLATED



FIG. 956

ORDERING INFORMATION

Length Hook Inches	Chrome Plated Bronze Dealer Pkg. - 5 Cards 1 Pc. per Card	Chrome Plated Bronze OEM Bulk Pkg. 50 Pcs.	Plain Bronze Standard Pkg. - 5 Pcs.	Weight Ounces
1-1/2	956 DP1 CHR	956 001 CHR	956 001 PLB	2
2	956 DP2 CHR	956 002 CHR	956 002 PLB	2-1/8
2-1/2	956 DP3 CHR	956 003 CHR	956 003 PLB	2-1/8
3	956 DP4 CHR	956 004 CHR	956 004 PLB	2-1/2
3-1/2	956 DP5 CHR	—	956 005 PLB	2-5/8
4	956 DP6 CHR	—	956 006 PLB	2-7/8
5	956 DP7 CHR	—	956 007 PLB	3-1/4
6	956 DP8 CHR	*956 008 CHR	956 008 PLB	4

*O.E.M. Bulk Pkg. - 25 pcs.

Screw Size #6.

Spare Plain Keepers, (2 per card), Cat. No. 959 DP PLB.

Spare Chrome Keepers, (2 per card), Cat. No. 959 DP CHR

Spare Chrome Keepers, O.E.M Bulk (100 pcs.) Cat. No. 959 000 CHR

**FIG. 959
SPARE KEEPER**



HASP & HOLD DOWN CLAMPS



FIG. 998

FIG. 998 - HASP

CHROME PLATED BRONZE

ORDERING INFORMATION

<u>Length Closed Inches</u>	<u>Width Overall Inches</u>	<u>Padlock Clearance Inches</u>	<u>Dealer Pkg. 10 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 25 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
2	1	9/32	998 DP1 CHR	998 001 CHR	6	2-3/8
3	1	9/32	998 DP2 CHR	998 002 CHR	6	3

Spare Chrome Keepers (2 per card), Cat. No. 959 DP CHR.



FIG. 1108

FIG. 1108 - LOCKABLE HOLD DOWN CLAMP

CHROME PLATED BRONZE

ORDERING INFORMATION

<u>Dimensions Base Inches</u>	<u>Clearance Padlock Inches</u>	<u>Dealer Pkg. 5 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 25 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
2-3/4 x 1-3/4	1/4	1108 DP CHR	1108 000 CHR	6	6-3/4



FIG. 1112

CHROME PLATED BRONZE

FIG. 1112 FLAT MOUNTING

FIG. 1113 RIGHT ANGLE MOUNTING



FIG. 1113

ORDERING INFORMATION

<u>Length Inches</u>	<u>Width Inches</u>	<u>Dealer Pkg. - 5 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 25 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
3	1-1/2	1112 DP CHR	1112 000 CHR	8	5-1/2
2-1/2	1-1/2	1113 DP CHR	1113 000 CHR	8	5-5/8

FIG. 491 - GRAB RAIL

CHROME PLATED ZINC ALLOY END POSTS

POLISHED 18-8 STAINLESS STEEL TUBE

ORDERING INFORMATION

Length Overall Inches	Length Inside Inches	Height Inside Inches	Dealer Pkg. - 5 Cards 1 pc. per Card	Screw Size	Weight Pounds
9-1/2	7	3/4	491 DP1 CHR	6	3/4
15-5/8	13	3/4	491 DP2 CHR	6	7/8



Fig. 491

FIGS. 380 & 380A - GRAB RAIL POSTS

CHROME PLATED BRONZE

Fig. 380 - END POST

Fig. 380A - CENTER POST

HOLLOW, FOR 3/4 INCH O.D. TUBING

ORDERING INFORMATION

Height Overall Inches	O.D. Base Inches	Fig. 380 Standard Pkg. - 1 Pc.	Fig. 380A Standard Pkg. - 1 Pc.	Screw Size	Weight Ounces
3-3/8	2-1/2	380 000 CHR	380 A00 CHR	8	11-1/2



Fig. 380
END POST



Fig. 380A
CENTER POST

FIG. 325 - AXE BRACKETS

STAINLESS STEEL

ORDERING INFORMATION

For Blade Width Inches	Standard Pkg. - 10 sets	Socket Screw Size	Bracket Screw Size	Weight per Set Ounces
6	325 000 STS	10 R.H.	6	5

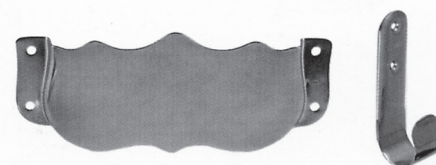


Fig. 325

HERE LIES...(cont'd.)

Here lies the body
Of Margaret Bent
She kicked up her heels
And away she went.

Here lieth W.W.
Who never more will
Trouble you, trouble you.

Here lies
Johnny Yeast.
Pardon me
For not rising.

Here lies the body of
Jonathan Blake
Stepped on the gas
Instead of the brake.

Here lays Butch,
We planted him raw.
He was quick on the trigger,
But slow on the draw.

Here lies the body of our Anna
Done to death by a banana.
It wasn't the fruit that laid her low
But the skin of the thing that made her go.

Here lies an Atheist
All dressed up
And no place to go.

Here lies
Lester Moore
four slugs from a 44
No Less
no more.

UTILITY HOOKS

FIG. 1106 - UTILITY HOOK



FIG. 1106

CHROME PLATED ZINC ALLOY

ORDERING INFORMATION

<u>Projection Inches</u>	<u>Width Base Inches</u>	<u>Dealer Pkg. - 10 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 50 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
3/4	1	1106 DP CHR	1106 000 CHR	6	7/8

FIG. 975 - UTILITY HOOK



FIG. 975

CHROME PLATED ZINC ALLOY

ORDERING INFORMATION

<u>Projection Inches</u>	<u>Width Base Inches</u>	<u>Dealer Pkg. - 10 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 50 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
2	1-1/8	975 DP1 CHR	975 001 CHR	6	1
3	1-1/4	975 DP2 CHR	975 002 CHR	6	1-1/2

FIG. 610 - UTILITY HOOK



FIG. 610

CHROME PLATED ZINC ALLOY

ORDERING INFORMATION

<u>Projection Inches</u>	<u>Width Base Inches</u>	<u>Dealer Pkg. - 10 Cards 1 Pc. per Card</u>	<u>OEM Bulk Pkg. 50 Pcs.</u>	<u>Screw Size</u>	<u>Weight Ounces</u>
1-3/8	1-1/8	610 DP CHR	610 000 CHR	6	5/8

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“The Moral Foundations of Society”

excerpted from a 1994 speech by former Prime Minister of Great Britain,
Lady Margaret Thatcher

For over two centuries, Americans have held fast to their belief in freedom for all men—a belief that springs from their spiritual heritage. John Adams, second president of the United States, wrote in 1789, “Our Constitution was designed only for a moral and religious people. It is wholly inadequate for the government of any other.” That was an astonishing thing to say, but it was true.

With enormous courage, the first American colonists set out on a perilous journey to an unknown land—without government subsidies and not in order to amass fortunes but to fulfill their faith. ...the faith of America’s founders affirmed the sanctity of each individual. Every human life—man or woman, child or adult, commoner or aristocrat, rich or poor—was equal in the eyes of the Lord. It also affirmed the responsibility of each individual.

This was not a faith that allowed people to do whatever they wished, regardless of the consequences. The Ten Commandments, the injunction of Moses (“Look after your neighbor as yourself”, the Sermon on the Mount, and the Golden Rule made Americans feel precious—and also accountable—for the way in which they used their God-given talents. Thus they shared a deep sense of obligation to one another. And, as the years passed, they not only formed strong communities but devised laws that would protect individual freedom—laws that would eventually be enshrined in the Declaration of Independence and the U. S. Constitution.

In the pre-Christian era, ... the ancient philosophers like Plato and Aristotle had much to contribute to our understanding of such concepts as truth, goodness, and virtue. They knew full well that responsibility was the price of freedom. Yet it is doubtful whether truth, goodness, and virtue founded on reason alone would have endured in the same way as they did in the West, where they were based upon a Biblical ethic.

Sir Edward Gibbon (1737-1794), author of *The Decline and Fall of the Roman Empire*, wrote tellingly of the collapse of Athens, which was the birthplace of democracy. He judged that, in the end, more than they wanted freedom, the Athenians wanted security. Yet they lost everything—security, comfort, and freedom. This was because they wanted not to give to society, but for society to give to them. The freedom they were seeking was freedom from responsibility. It is no wonder, then, that they ceased to be free. In the modern world, we should recall the Athenians’ dire fate whenever we confront demands for increased state paternalism.

Communism denied all that the Judeo-Christian tradition taught about individual worth, human dignity, and moral responsibility. It was not surprising that it collapsed after a relatively brief existence. It could not survive more than a few generations because it de-

nied human nature, which is fundamentally moral and spiritual.

It is important to understand that the moral foundations of a society do not extend only to its political system; they must extend to its economic system as well. America’s commitment to capitalism is unquestionably the best example of this principle. Capitalism is not, contrary to what those on the Left have tried to argue, an amoral system based on selfishness, greed, and exploitation. It is a moral system based on a Biblical ethic. There is no other comparable system that has raised the standard of living of millions of people, created vast new wealth and resources, or inspired so many beneficial innovations and technologies.

The wonderful thing about capitalism is that it does not discriminate against the poor, as has been so often charged; indeed, it is the only economic system that raises the poor out of poverty. Capitalism also allows nations that are not rich in natural resources to prosper. If resources were the key to wealth, the richest country in the world would be Russia, because it has abundant supplies of everything from oil, gas, platinum, gold, silver, aluminum, and copper to timber, water, wildlife, and fertile soil. Why isn’t Russia the wealthiest country in the world? Why aren’t other resource-rich countries in the Third World at the top of the list? It is because their governments deny citizens the liberty to use their God-given talents.

In his recent encyclical, *Centesimus Annus*, Pope John Paul II ... acknowledged that capitalism encourages important virtues, like diligence, industriousness, prudence, reliability, fidelity, conscientiousness, and a tendency to save in order to invest in the future. It is not material goods but all of these great virtues, exhibited by individuals working together, that constitute what we call the “marketplace.”

Free societies demand more care and devotion than any others. They are, moreover, the only societies with moral foundations, and those foundations are evident in their political, economic, legal, cultural, and, most importantly, spiritual life.

We who are living in the West today are fortunate. Freedom has been bequeathed to us. We have not had to carve it out of nothing; we have not had to pay for it with our lives. Others before us have done so. But it would be a grave mistake to think that freedom requires nothing of us. Each of us has to earn freedom anew in order to possess it. We do so not just for our own sake, but for the sake of our children, so that they may build a better future that will sustain over the wider world the responsibilities and blessings of freedom.

What Happened To Our Founding Fathers

Have you ever wondered what happened to the 56 men who signed the Declaration of Independence?

Five signers were captured by the British as traitors, and tortured before they died. Twelve had their homes ransacked and burned. Two lost their sons in the Revolutionary Army, another had two sons captured. Nine of the 56 fought and died from wounds or hardships of the Revolutionary War.

They signed and they pledged their lives, their fortunes, and their sacred honor.

What kind of men were they? Twenty-four were lawyers and jurists. Eleven were merchants, nine were farmers and large plantation owners; men of means, well educated. But they signed the Declaration of Independence knowing full well that the penalty would be death if they were captured.

Carter Braxton of Virginia, a wealthy planter and trader, saw his ships swept from the seas by the British Navy. He sold his home and properties to pay his debts, and died in rags.

Thomas McKeam was so hounded by the British that he was forced to move his family almost constantly. He served in the Congress without pay, and his family was kept in hiding. His possessions were taken from him, and poverty was his reward.

Vandals or soldiers looted the properties of Dillery, Hall, Clymer, Walton, Gwinnett, Heyward, Rutledge, and Middleton.

At the battle of Yorktown, Thomas Nelson, Jr., noted that the British General Cornwallis had taken over the Nelson home for his headquarters. He quietly urged General George Washington to open fire. The home was destroyed, and Nelson died bankrupt.

Francis Lewis had his home and properties destroyed. The enemy jailed his wife, and she died within a few months.

John Hart was driven from his wife's bedside as she was dying. Their 13 children fled for their lives. His fields and his gristmill were laid to waste. For more than a year he lived in forests and caves, returning home to find his wife dead and his children vanished. A few weeks later he died from exhaustion and a broken heart. Norris and Livingston suffered similar fates.

Such were the stories and sacrifices of the American Revolution. These were not wild eyed, rabble-rousing ruffians. They were soft-spoken men of means and education. They had security, but they valued liberty more. Standing tall, straight, and unwavering, they pledged: "For the support of this declaration, with firm reliance on the protection of the divine providence, we mutually pledge to each other, our lives, our fortunes, and our sacred honor."

The Bill of Rights

Amendment I

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

Amendment II

A well regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed.

Amendment III

No soldier shall, in time of peace be quartered in any house, without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

Amendment IV

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Amendment V

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases, arising in the land or naval forces, or in the militia, when in actual service in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

Amendment VI

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

Amendment VII

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reexamined in any court of the United States, than according to the rules of the common law.

Amendment VIII

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Amendment IX

The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

Amendment X

The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people.

TYPE III PFDs: Commercial Marine SURVIVAL WITH THE FITTEST.®

2200 CAPTAIN'S VEST

Revere Part Number	63-2200-001-SM (Made in China) 63-2200-001-LX (Made in China) 63-2200-001-23 (Made in China)
Sizing	User Weight: More than 90 lbs. (>41 kg.) Small/Medium 32" – 39" (81cm.- 99cm.) Large/XLarge 40" – 50" (102cm.- 127cm.) XXL/XXXL 50" – 60" (127cm – 152cm.)
Approval	USCG Type III Approval # 160.064/4566/0 CFR 160.064 compliant Marine Buoyant Device - Flotation Aid
Buoyancy	15.5 lbs. (7 kg.) 69 Newtons
Product details	<ul style="list-style-type: none"> •Color: International Safety Orange •Foam: PE (Polyethylene) •Closure: Two 1 ½" encircling body belts and a heavy duty zipper •Reflective stripping (front & back) •Two Side Adjustments •Two gusseted pockets •One D-ring for gear attachment •Best combination of lightweight comfort and industrial utility



- Lightweight and durable mesh shoulders and back
- Contoured foam panels for ease of movement

2210 COMMANDER'S MESH VEST

Revere Part Number	63-2210-001-SM (S/M) 63-2210-001-LX (L/XL) 63-2210-001-23 (2XL/3XL)
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2230 ADMIRAL'S VEST

Revere Part Number	63-2230-001-SM (Made in China) 63-2230-001-LX (Made in China) 63-2230-001-23 (Made in China)
Sizing	User Weight: More than 90 lbs. (>41 kg.) Small/Medium 32" – 39" (81cm.- 99cm.) Large/XLarge 40" – 50" (102cm.- 127cm.) XXL/XXXL 50" – 60" (127cm – 152cm.)
Approval	USCG Type III Approval # 160.064/4566/0 CFR 160.064 compliant Marine Buoyant Device - Flotation Aid
Buoyancy	15.5 lbs. (7 kg.) 69 Newtons
Product details	<ul style="list-style-type: none"> •Color: International Safety Orange •Foam: PE (Polyethylene) •Closure: Two 1 ½" encircling belts and one 1 ½" chest strap and a heavy duty zipper •Reflective stripping (front & back) •Flotation-filled Comfort Collar •Two gusseted pockets •Two D-rings



- Best combination of lightweight comfort and industrial utility
- Lightweight and durable mesh shoulders and back
- Contoured foam panels for ease of movement

TYPE III PFDs: Commercial Marine

SURVIVAL WITH THE FITTEST.®

321RT4-01-03 Economy Industrial Vest with 4 pockets

Revere Part Number

63-321RT4-01-03 (Made in CHINA)

Sizing

Small/Medium
User Weight: More than 90 lbs. (>41 kg.)
Chest Size: 32"-42" chest (81 cm. to 107 cm)

Approval

USCG Type III
Approval # 160.064/3250/0
CFR 160.064 compliant
Marine Buoyant Device - Flotation Aid

Buoyancy

15.5 lbs. (7 kg.)
69 Newtons

Product details

- Economical Industrial Vest 4 gusseted front pockets
- Color: International Safety Orange Foam: PE (Polyethylene)
- Closure: Heavy duty Zipper SOLAS-grade reflective tape (33.75 sq. in.) in front panels and on pocket flaps
- Strength Tested at 50 mph (22.4 m/s)
- No body belts make it perfect for snag-hazard environments
- Large armholes and open sides
- Side adjustment tabs



321RT Economy Industrial Vest

Revere Part Number

63-321RT4-01-03 (Made in CHINA)

Sizing

Small/Medium
User Weight: More than 90 lbs. (>41 kg.)
Chest Size: 32"-42" chest (81 cm. to 107 cm)

Approval

USCG Type III
Approval # 160.064/3250/0
CFR 160.064 compliant
Marine Buoyant Device-Flotation Aid

Buoyancy

15.5 lbs. (7 kg.)
69 Newtons

Product details

- Economical Industrial Vest
- Color: International Safety Orange
- Foam: PE (Polyethylene)
- Closure: Heavy duty Zipper
- SOLAS-grade reflective tape (33.75 sq. in.) in front panels
- Strength Tested at 50 mph (22.4 m/s)
- No body belts make it perfect for snag-hazard environments
- Large armholes and open sides
- Side adjustment tabs



TYPE III PFDs: Commercial Marine

SURVIVAL WITH THE FITTEST.®

778RT GENERAL PURPOSE VEST

Revere Part Number	65-778RT-001-AM (Made in USA)
Sizing	Adult X-Large User Weight: More than 90 lbs. (>41 kg.) Chest Size: 48"-65" chest (122 cm. to 165 cm)
Approval	USCG Type III Approval # 160.064/3606/0
Buoyancy	15.5 lbs. (7 kg.) 69 Newtons
Product details	<ul style="list-style-type: none"> • General Purpose Industrial Vest • Color: International Safety Orange • Foam: PE (Polyethylene) • Closure: Two encircling 1 1/2" body belts and one 1" chest strap with snag resistant buckles • Reflective stripping (20 sq. in.) in front panels • 200 Denier polyester shell resists oil and deterioration • Large armholes and open sides for maximum comfort • Reflective stripping • Strength Tested at 50 mph (22.4 m/s)



REVERE COMMERCIAL INFLATABLE PFD

Revere Part Number	45-61018-105BK MANUAL BLACK 45-61018-105SO MANUAL ORANGE 45-61018-107BK MANUAL BLACK W/ FLAP 45-61018-107SO MANUAL ORANGE W/ FLAP (All models made in USA)	45-61019-105BK AUTO BLACK 45-61019-105SO AUTO SAFETY ORANGE 45-61019-107BK AUTO BLACK W/ FLAP 45-61019-107SO AUTO ORANGE W/ FLAP
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Approval	<ul style="list-style-type: none"> • Manual: USCG Approved Type V 160.076/3016/0 • Auto: USCG Approved Type V 160.076/2008/0
-----------------	--

Buoyancy	38 lbs. (169 Newtons)
-----------------	-----------------------

Product Details	<ul style="list-style-type: none"> • USCG approved for persons at least 16 years of age weighing 80 lbs. and above with a chest size between 30" and 52" • Dual waist belt stainless steel adjusters. Provides for easy adjustment with both hands and a more custom fit • Exterior inflation system access flap. Allows for clear, direct access to the CO2 cylinder for rearming. CO2 cylinder can be replaced without opening and unfolding the entire PFD • Waist strap and back strap attachment points fully connected and reinforced from inside for added strength • Heavy duty 420 denier nylon packcloth outer cover • Twin 2" wide back straps for comfort and security • Includes USCG compliant whistle and SOLAS Grade retro-reflective tape panels on inflatable bladder • OSHA Compliant
------------------------	--



Orange without Harness



CO2 Inflation System Detail (manual)



Black without Harness

TYPE V PFDs: Commercial Marine

SURVIVAL WITH THE FITTEST.®

280RT VINYL-DIPPED WORKVEST

Revere Part Number 65-280RT-001 (Made in China)
65-280RT-USA (Made in Mexico)

Sizing Adult Universal
User Weight: More than 90 lbs. (>41 kg.)
Chest Size: 32" to 54" (81 cm. to 137 cm)

Approval USCG Type V
Approval # 160.053/115/0

Buoyancy 17.5 lbs. (8 kg.)
78 Newtons

Product details

- Color: International Safety Orange
- Foam: Polyvinyl Chloride (PVC) Unicellular – Closed Cell
- Closure: Delrin Plastic Buckles
- One 1" encircling belt and one 1" chest strap
- SOLAS-grade reflective tape (17.5 sq. in.) located on front and rear pads
- Adjustable chest and shoulder straps
- Rugged and durable vinyl-dipped work vest for all industrial applications.

- Acrylic layer sealant over PVC coating resists deterioration and is easy to clean.
- Flotation foam retains buoyancy even when punctured.
- Open slot on back accommodates most safety harnesses.
- Contoured foam panels for greater range of movement
- USCG Approved/ OSHA compliant Adult Work-vest



Also Available 285RT VINYL-DIPPED WORKVEST
Revere Part Number 65-285RT-001 (Made in Mexico)

290RT RIGGER I

Revere Part Number 65-290RT-001 (Made in China)

Sizing Adult Universal
Chest Size: 32" to 54" (81 cm. to 137 cm)

Approval USCG Type V
Approval # 160.053/90/0
OSHA compliant Adult Work-vest

Buoyancy 17.5 lbs. (8 kg.)
78 Newtons

Product details

- Color: International Safety Orange
- Foam: PE (Polyethylene)
- Closure: One encircling adjustable belt (bottom) and one chest strap (top) with snag-resistant buckles
- Two adjustable shoulder straps
- SOLAS-grade reflective tape (23.6 sq. in.) located on front and rear pads.
- Soft cotton twill covering draws heat and sweat away from the worker
- Lightweight and economical work vests for a variety of industrial applications



TYPE I PFDs: Commercial Marine

SURVIVAL WITH THE FITTEST.®

160RT FERRY BOAT PFD

Revere Part Number	61-160RT-001 (Made in China) 61-160RT-USA (Made in USA)
Sizing	Adult Universal User Weight: More than 90 lbs. (>41 kg.)
Approval	USCG Type I Approval # 160.055/196/0
Buoyancy	22 lbs. (10 kg.) 98 Newtons
Product details	<ul style="list-style-type: none"> •Yoke-style flotation device •Color: International Safety Orange •Foam: PE (Polyethylene) •Closure: 1" Stainless Steel Snaphook & D-ring on a 1" encircling strap •110 square inches of SOLAS-grade reflective tape •Reversible design for quick donning •Weather and fade resistant polyester •Light loop and whistle attachment •Stackable for easy storage



198RT OFFSHORE PFD

Revere Part Number	61-198RT-001 (Made in China) 61-198RT-USA (Made in USA)
Sizing	Adult Universal User Weight: More than 90 lbs. (>41 kg.)
Approval	USCG Type I Approval # 160.055/153/0
Buoyancy	24 lbs. 107 Newtons
Product details	<ul style="list-style-type: none"> •Color: International Safety Orange •Foam: PE (Polyethylene) •Closure: 1" Stainless Steel Snaphook & D-ring •Two 1" Encircling straps and One 1" neck strap •126 square inches of SOLAS-grade reflective tape •Reversible Design •Weather and fade resistant polyester •Light loop and whistle attachment over shoulder



1600 BOMBER JACKET

Revere Part Number

23-1600-OR-S Orange Small
23-1600-OR-M Orange Medium
23-1600-OR-L Orange Large
23-1600-OR-XL Orange X-Large
23-1600-OR-2XL Orange 2X-Large
23-1600-OR-3XL Orange 3X-Large
(All models made in China)

23-1600-BL-S Blue Small
23-1600-BL-M Blue Medium
23-1600-BL-L Blue Large
23-1600-BL-XL Blue X-Large
23-1600-BL-2XL Blue 2X-Large
23-1600-BL-3XL Blue 3X-Large

Approval

USCG Approved
• Small: USCG Approval #: 160.064/0003825/0
• Medium: USCG Approval #: 160.064/0003826/0
• Large: USCG Approval #: 160.064/0003827/0
• X-Large: USCG Approval #: 160.064/0003828/0
• 2X-Large: USCG Approval #: 160.064/0003829/0
• 3X-Large: USCG Approval #: 160.064/0003830/0

Buoyancy

Product Details

- Waterproof Nylon to prevent Leaks
- Elastic at waist for warmth
- Waterproof Nylon prevents leaks
- Neoprene Adjustable cuffs
- Detachable Hood
- 5 exterior Pockets
- D-Ring



1650 TITAN FLOAT COAT

Revere Part Number

23-1650-OR-S Orange Small
23-1650-OR-M Orange Medium
23-1650-OR-L Orange Large
23-1650-OR-XL Orange X-Large
23-1650-OR-2XL Orange 2X-Large
23-1650-OR-3XL Orange 3X-Large
(All models made in China)

23-1650-BL-S Blue Small
23-1650-BL-M Blue Medium
23-1650-BL-L Blue Large
23-1650-BL-XL Blue X-Large
23-1650-BL-2XL Blue 2X-Large
23-1650-BL-3XL Blue 3X-Large

Approval

USCG Approved
• Small: USCG Approval #:
• Medium: USCG Approval #:
• Large: USCG Approval #:
• X-Large: USCG Approval #:
• 2X-Large: USCG Approval #:
• 3X-Large: USCG Approval #:

Buoyancy

Product Details

- Waterproof Nylon to prevent Leaks
- Elastic at waist for warmth
- Waterproof Nylon prevents leaks
- Neoprene Adjustable cuffs
- Detachable Hood
- 5 exterior Pockets
- D-Ring



RESCUE™ 406 EPIRB

The #1 selling EPIRB worldwide!

- U.S.C.G. & FCC approved
- Long life SIX YEAR battery (12 year useful life - from date of manufacture)
- Once activated operates up to 60 HOURS (48 hours minimum requirement)
- - 40°C Battery
- 121.5MHz homing signal up to 40 Mile range
- Rapidly transmits your location via satellite to rescue services
- Total global coverage via the COSPAS/SARSAT satellite SAR system
- Meets latest GMDSS and IMO regulations
- Built-in self-test and diagnostic check capabilities
- High intensity Xenon strobe
- One of the Smallest, lightest & most powerful 406 EPIRBs available Weight 1.6 lbs., Height 8.25
- Comes with its own mounting bracket making it easy to fit
- Available in Category 1 (Automatic) or Category 2 (Manual) deployment
- 5-year limited warrant



PRECISION™ 406 EPIRB WITH BUILT-IN GPS



The smallest, lightest, most powerful 406MHz GPS EPIRB on the face of the planet!

- U.S.C.G. & FCC approved
- Built-in 12 channel GPS receiver
- Transmits on the NEW clearer 406.028 MHz frequency
- Long life SIX YEAR battery (12 year useful life - from date of manufacture)
- Pinpoints global position to within 100 feet
- Updates accurate latitude/longitude position every 20 minutes
- Built-in self-test & diagnostic check capabilities
- Smallest, lightest & most powerful GPS EPIRB available. Weight 1.6 lbs., Height 8.25
- Once activated operates up to 60 hours (48 hours minimum requirement)
- Available in Category 1 (Automatic) or Category 2 (Manual) deployment
- 5-year limited

SART



- U.S.C.G. & FCC approved
- Approved to IEC 1097-1
- Small and lightweight
- Ship or survival craft applications
- 5-year long life user replaceable battery pack
- Maintenance free
- Audio/visual alarm
- Built-in test facility
- Mounting options - internal/external

BreaktHRU Hydro EPIRB KIT



- USCG & SOLAS approved
- Includes Hydro release and bolts

FASTFIND™ 406 PLB

The Fastfind standard 406MHz Personal Locator Beacon has all the features of the Fastfind Plus but without GPS. The 406MHz frequency provides an alert signal rescue services in as little as 45 minutes, depending on satellite passes and gives a positional accuracy within 3 miles. Once in the vicinity the 121.5MHz transmitter provides signal for the rescue services to home-in on enabling them to find the individual in distress.

- Waterproof to 15' and it floats
- FCC Approved
- Weighs just 11 oz.
- Global alert to Cospas-Sarsat satellites
- 406MHz transmitter
- 121.5MHz homing in frequency
- Response time in as little as 45 minutes

- Positional accuracy to within 3 miles
- Compact and stylish
- Complete with Kevlar lanyard and designer carry case
- User replaceable battery packs (-4°F or -40°F)
- User replaceable battery



FASTFIND PLUS™ 406 PLB with built-in GPS

The FastFind Plus is a revolutionary hand-held Personal Locator Beacon that features a built-in 12 channel GPS (Global Positioning System) receiver combined with a powerful 5 Watt 406MHz transmitter and 121.5MHz homing beacon transmitter. In the event of an emergency, an alert signal is transmitted to Cospas-Sarsat satellites and forwarded to a rescue coordination center within typically 3 minutes. The built-in GPS receiver will provide latitude and longitude coordinates to give a position typically within 98 feet anywhere in the world. The Fastfind Plus comes complete with lanyard and designer carrying case to enable users to keep the PLB safely with them at all times.

- FCC Approved
- Built-in GPS receiver
- Weighs just 11 oz.
- Global alert to Cospas-Sarsat satellites
- 406MHz transmitter
- 121.5MHz homing frequency
- Alert time within typically 3 minutes
- Positional accuracy to typically 98 feet
- Positional updates every 20 minutes

- Compact and stylish
- Complete with lanyard and designer carry case
- User replaceable battery packs (-4°F or -40°F)
- Waterproof to 15' and it floats



EMERGENCY RECEIVER

Features:

- 2 reception modes
- Dual frequency reception (121.5MHz emergency & 121.65MHz training)
- 8 level signal strength indicator
- Built-in alarm
- Auto squelch on/off
- Alarm reset function
- Relay contact output (I.E. GPS or contacts)
- Continuous self-diagnostic fault indicator
- 12/24 VDC power input



DIVE CANISTER

- Built to hold Fastfind and Fastfind Plus
- Waterproof to 492 feet
- Adds one pound positive buoyancy



RED HAND FLARE

- For day and night use to pinpoint position
- Visible over 5 miles
- Easy to operate even with cold, wet hands
- Award winning-pull twist-strike firing mechanism
- Burns for 60 seconds at 15,000 candela
- Approved to the latest SOLAS and U.S.C.G. specifications
- Weighs 9.70 oz. Dimensions - 9.44 x 1.34 (L x W)



PIN POINT HAND FLARE

- 20 times brighter than U.S.C.G. requirements
- Burns for 60 seconds at 10,000 candela
- For day and night use
- Visible over 5 miles
- Easy to operate, pull-twist strike firing mechanism
- High quality corrosive resistant steel tube, not cardboard casing
- Virtually no slag - safe to use in inflatable boats and liferafts
- U.S.C.G. approved Weighs 9.70 oz. LLIDimensions - 9.44 x 1.34 (L x W)



WHITE COLLISION HAND FLARE

- For collision warn-off situations
- Can be used to illuminate small areas
- Easy to operate even with cold hands
- Award winning pull-twist-strike firing mechanism
- Burns for 40 seconds at 10,000 candela
- Weighs 9.70 oz. Dimensions - 9.44 x 1.34 (L x W)



DAY/NIGHT

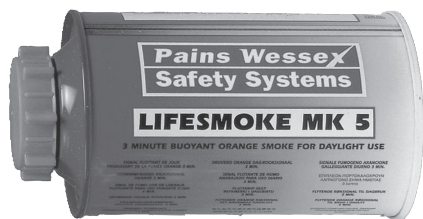
- Combined smoke and flare
- Personal survival signal
- For day and night use
- Ideal for divers
- Waterproof to 100 feet
- CAA/FAA accepted for aviation use
- Red flare burns for 20 seconds at 10,000 candela, smoke burns for 18 seconds minimum
- Weighs .98 oz. Dimensions - 5.47 x 1.67 (L x W)



MINIFLARE KIT

- Compact personal distress signal ideal for yachts and dinghies
- For day and night use
- Easy to operate
- Visible for up to 5 miles (increasing to 10 miles at night)
- 8 red aerial stars eject at 197 ft.
- Stars burn for 6 seconds at 3,000 candela
- FAA accepted for aviation use
- U.S.C.G. approved for marine use
- Weighs 9.48 oz. Dimensions - 5.91 x 2.61 x 7.40 (L x W x H)





- Buoyant orange smoke for daylight use
- Produces dense bright orange smoke for 3 minutes
- Safe to use on petrol or oil covered water
- Easy to operate
- Indicates wind speed and direction
- USCG & SOLAS approved
- Weighs 1.2 lbs, Dimensions - 5.9 x 3.2 dia.



PINPOINT ORANGE HAND SMOKE

- Daylight distress signaling
- Particularly suitable for recreational boaters
- Produces dense orange smoke for 60 seconds, minimum
- U.S.C.G. approved
- Weighs 7.58 oz Dimensions - 9.76 x 1.69 dia.

MANOVERBOARD 360



- Provides 15 minutes of dense orange smoke
- Far exceeds SOLAS requirements for light output and duration
- Safe to use on petrol or oil covered water
- Lithium battery sealed for life- no annual replacement
- Automatic or manual deployment
- Universal stainless steel mounting bracket
- Tested to survive a 164 ft drop into water (SOLAS 98 ft)
- Ideal for use on ships or rigs with high freeboard
- SOLAS approved
- Weighs 7.66 lbs. Dimensions - 13.39 x 17.13 (H x D)

BUOYSMOKE

- Provides 15 minutes of dense orange smoke
- Far exceeds SOLAS requirements for light output and duration
- Approved to the latest SOLAS standards
- Safe to use on petrol or oil covered water
- Universal stainless steel mounting bracket
- Tested to survive a 164 ft drop into water (SOLAS requirement is 98 ft)
- Ideal for use on ships or rigs with high freeboard
- Automatic or manual deployment
- High impact plastic and steel case designed to withstand exposure to UV rays, oil or sea water
- Registered Design No. 2 087 240
- U.S.C.G. approved
- Weighs 7.66 lbs. Dimensions - 13.39 x 17.13 (H x D)



PARA RED

- Long range parachute distress signal
- For day and night use
- Easy to operate
- Visible up to 30 miles
- Burns for 40 seconds at 30,000 candela at a height of 984 ft.
- Approved to latest U.S.C.G. and SOLAS specifications



SPEEDLINE 250

- For ship to ship and ship to shore rescue operations
- Self contained and handheld
- Powerful rocket propels a 4mm line up to 275m
- Designed for easy stowage onboard
- Approved to the latest SOLAS Specifications
- Weighs 8.6 lbs, Dimensions - 13.2 x 11.6 x 7.5



POLY BOTTLE

- Ideal for storing pyrotechnics
- 12 Liter container
- Heavy duty
- Buoyant
- Waterproof
- Wide mouth container
- Robust screw top
- Carry handle



SOS GRAB BAG

- Convenient way to hold your safety products and personal items.
- Will float and is splashproof
- Bright yellow for easy identification
- Size: 23.6 x 11.8 (H x W) Material: Polyurethane Nylon



SURVIVOR™ DITCH BAG

- Made of 100% waterproof PVC fabric
- 100% waterproof welded seams
- Single YKK water resistant zipper
- Internal pockets for pyrotechnics and other survival gear
- External pouch for EPIRB
- Over 40 lbs of buoyancy
- Size: 15.5 x 9.5 x 12 (L x D x H)



3-50 MILE



Contains:

- 3 - U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 6 - U.S.C.G. approved Red Hand Distress Flares
- 3 - U.S.C.G. approved Orange Hand Smoke Signals
- 1 - Water tight metal container



50+ MILE



Contains:

- 3 - U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 6 - U.S.C.G. and SOLAS approved Red Hand Distress Flares
- 3 - U.S.C.G. and SOLAS approved 3-minute Floating Orange Smoke Signals
- 1 - Water tight metal container



RORC



Contains:

- 4 - U.S.C.G. and SOLAS approved Red Hand Distress Flares
- 4 - U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 4 - White Collision Hand Flares
- 2 - U.S.C.G. and SOLAS approved 3-minute Floating Orange Smoke Signals
- 1- Poly Bottle



SHIP'S BRIDGE



Contains:

- 12 - U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 1- Poly Bottle



SHIP'S LIFEBOAT



Contains:

- 4 -U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 6 -U.S.C.G. and SOLAS approved Red Hand Distress Flares
- 2 - U.S.C.G. and SOLAS approved 3-minute Floating Orange Smoke Signals
- 1- Poly Bottle



OFFSHORE DISTRESS



Contains:

- 4 - U.S.C.G. and SOLAS approved Red Hand Distress Flares
- 4 - U.S.C.G. and SOLAS approved Red Hand Held Parachute Flares
- 2 - U.S.C.G. and SOLAS approved 3-Minute Floating Orange Smoke Signals
- 1- Poly Bottle



L6

- U.S.C.G. & SOLAS Approved
- Operating life exceeds 8 hours
- Flashes 50-70 times per minute
- Intense incandescent light visible for up to 2 miles in clear conditions
- Waterproof, corrosion and temperature resistant case
- Simple pull-ring operation even with gloved hands or in adverse conditions
- Easy to install on most types of lifejackets, saving labor costs
- Small size - 2.5 x 1.5 for easy stowage of lifejackets
- Weight: 2.5 oz
- Modern, aesthetically and ergonomically styled



WAB-MXB

- Dependable water-activated light works in both fresh water and seawater
- Fully approved to 1999 SOLAS amendments - IMO Resolution 81(70)
- USCG approval no. 161.112/36/0
- EC Type Approval and MED ("Ship's Wheel" mark) approval from Lloyd's Register
- Russian Maritime Register of Shipping approval no. 00.089.010
- Safe and environmentally friendly - magnesium-cuprous chloride battery



L120

- Meets SOLAS and IMO specifications
- Fit and forget for five years! - No annual replacement needed
- Remarkably cost-effective
- Tamper, impact and corrosion resistant design
- Incorporates lithium battery



L41



- Meets SOLAS and IMO specifications
- Tamper, impact and corrosion resistant design
- Designed specifically to be highly resistant to accidental damage onboard



DUAL LIGHT SAVER™

- Flashlight & Strobe Light on opposite sides
- Separate AA battery compartments for Flashlight (2) and Strobe (1)
- Waterproof to 330 feet
- Combined burn time (Strobe & Flashlight) up to 8 hours
- Comes with adjustable lanyard and velcro strap
- Light weight - 4 oz.
- Batteries not included



SIGNAL MIRROR LIFERAFT

- Specially treated and plated steel mirrors with high reflection
- Includes instruction card with soft wiping cloth packed in a heat sealed vapor proof barrier flexible pouch manufactured in accordance with military specification MIL-B-131F

- Includes a recessed hole for sighting
- U.S.C.G. Approval #160.020/2/2
- 1 mirror per set (liferaft type)



SIGNAL MIRROR LIFEBOAT

- Specially treated and plated steel mirrors with high reflection
- Includes instruction card with soft wiping cloth packed in a heat sealed vapor proof barrier flexible pouch manufactured in accordance with military specification MIL-B-131F

- Includes a recessed hole for sighting
- U.S.C.G. Approval #160.020/2/2
- 2 mirrors per set (lifeboat type)



FIRST AID KIT LIFERAFT

- Contains 14 packages
- Each package is individually packed in a heat sealed plastic bag
- All packages placed in a watertight zip lock reclosable plastic bag
- Zip lock bag tested by the Underwriters Laboratory for weathering and water tightness under adverse salt water conditions
- U.S.C.G. Approval #160.054/9/1



FIRST AID KIT LIFEBOAT

- Jackknife, can opener, and springs manufactured from high grade stainless steel to resist corrosion
- Lining made of brass
- Handles are extremely tough delrin plastic
- U.S.C.G. Approval #160.043/4/0



JACKKNIFE

- Jackknife, can opener, and springs manufactured from high grade stainless steel to resist corrosion
- Lining made of brass
- Handles are extremely tough delrin plastic
- U.S.C.G. Approval #160.043/4/0



FLOATING KNIFE

- Floating knife is 100% buoyant
- Razor sharp blade with dull rounded edge
- 48 lanyard attached
- Neon yellow handle



THERMAL PROTECTIVE AID

- Designed to keep people warm and protected against rain, wind and cold by preserving body heat
- U.S.C.G. and EU approved, meeting the latest SOLAS specifications
- Uses a strong superior laminate material which meets strict U.S.C.G. specs.
- All seams are heat welded seams (not sewn) which makes bag impermeable to water leakage
- Has a long zipper for easier donning
- Sized large enough to accommodate a person wearing a lifejacket
- U.S.C.G. Approval #160.174/A3/0



FISHING KIT

- Contains: Hooks, Lines, Flies, Spoons, Spinner, Fishing Instructions, etc.
- Packed in a vapor-proof barrier flexible pouch manufactured in accordance with Military Specification MIL-B-131F
- U.S.C.G. Approval #160.061/4/2



SEASICK TABLETS

- Packaged in individual cellophane strip packs
- 12 pills per strip pack
- Heat sealed with instructions in a plastic bag
- Each package individually dated as required by the US Food and Drug Administration



HAMMER H20

- Hydrostatic Release Unit fits liferafts of all shapes and sizes
- Made of glassfibre reinforced nylon preventing rust
- 2 Year usable life from date of installation



Jim Buoy's Man Overboard Light

- Toughest construction yet relatively small and lightweight.
- Made from injection molded plastic that is almost indestructible.
- Merely pick it up and point, it starts automatically.
- When thrown overboard, the light automatically commences to flash a bright flashing strobe light visible for miles.
- Not only a great aid for the searcher, but aids the person overboard to find a life ring or horse-shoe buoy.
- Features the most solid state circuitry available today to provide years of reliable service.
- Extensively tested to withstand 90 ft. drops into the ocean.
- Uses 4 alkaline "D" cell batteries available everywhere (batteries not included).
- Boxed individually in a 6 pack master carton, shipping weight: 13 lb.



Model #1820
Automatic water light

- Stainless steel mounting rack pictured with #1820 light.
- Ideal for handy light storage at a minimal cost.
- When ordered with light, packed together or sold as separate unit, 6 per carton, shipping weight: 6 lbs.



Jim-Buoy Lights! No. 9000, No. 9000-X and No. 9000-XSB

The all new Jim Buoy No. 9000 Light is a handy, long lasting lighting system that is totally waterproof and visible for up to 1 mile! It may be special ordered for almost all Jim Buoy Channel Markers, River Buoys, Mooring Buoys and Rope Floats and even retrofitted at a low cost (see details below). It requires little or no maintenance under normal use and its rugged plastic construction is impervious to the most severe weather conditions and saltwater corrosion. The batteries (2 Alkaline D-Cell, with exception to the white light which requires 3 D-Cell, not included) and bulb are even **GUARANTEED 1 FULL YEAR** from date of purchase to **NEVER** need replacement! An almost unbelievable accomplishment, but true!



Bright, Bright Lights No. 9000-X and No. 9000-XSB

IN ANSWER TO MANY REQUESTS - Jim Buoy is now providing the all-new No. 9000-X Series Light with three times the distance of visibility as that of the popular No. 9000 Light. The all-new Model No. 9000-X flashes 30 times per minute and lasts up to one year without a battery change. The Model No. 9000-XSB maintains a steady burn for up to 1-1/2 months of continuous battery use. Both models electronically shutoff during daylight hours and automatically turn on at darkness and are powered by 3 Alkaline "D" cell batteries (not included). They feature the same heavy-duty construction as Jim Buoy's Model No. 9000 Light (see above) utilizing an almost indestructible polycarbonate lens and are completely watertight and submersible.



RETROFIT ORDERING INFORMATION CHANNEL

MARKERS: Order 9000 Lite for 427. You will receive a 4-1/2" diameter disk. With the light foamed in place, remove the old disk (3 screws). Replace with the new disk containing the light.

All other Channel markers have a 4-3/8" diameter disk - specify disk size or Mode number and proceed as above.

MOORING BUOYS: Drill a 1-5/8" diameter hole, 5" deep near top eye - mix and pour the urethane foam as instructed, (included in the retrofit kit). You must now anchor at the bottom of the Mooring Buoy.

Note: Factory produced Mooring Buoys with lights will have an offset eye.

- COMMERCIAL FISHING - Long-Liner's, Crab Pots, Lobster Traps etc.
- Aquaculture Ponds- Amber preferred.
- MARINE INDUSTRY / BOATING - Buoys of almost all sizes and types, Barrier Systems, Rope Floats etc.
- HIGHWAY MAINTENANCE & SAFETY - Street Barricades, Traffic Cones, Bridges and Overpasses etc.
- HOME, FARM & AUTO - Roadway and Path Guide Lights, Garden Areas, Out-buildings, and Emergency, Flare/Signal Devices, etc.
- LANDING STRIP LIGHTS - Ideal for private and small commercial runways.



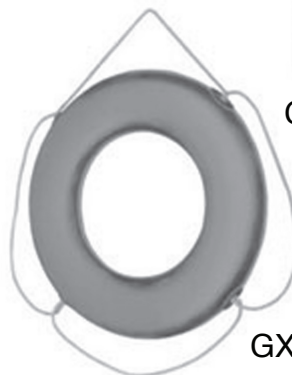
HOW IT WORKS - All functions are electronically controlled, remaining OFF during daylight and automatically turning ON at night. The bright, pulsating light flashes 40 milliseconds per flash and 30 flashes per minute and is visible for up to 1 mile. With its great longevity, convenient size and LOW cost, it is now possible to place lights in many areas that in past might have been impractical. Here's just a few ideas we have...

Life Rings

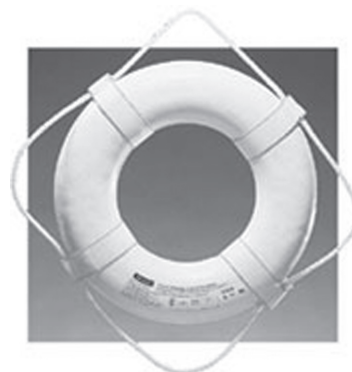
G Series

- Solid closed cell foam throughout
- Soft and resilient to the touch
- Resists weather and temperature extremes
- Will not rot or mildew
- Two styles available - with straps ("G" models) with ropes molded into core ("GX" models)

Model Number	Outside Diameter	Color	Pack Per Case	Weight Per Case (lbs.)	USCG Approval Number
GW-30	30"	White	6	33	160.050/107/1
GW-30	30"	Orange	6	33	160.050/107/1
GW-X-30	30"	White	6	33	160.050/104/1
GO-X-30	30"	Orange	6	33	160.050/107/1



GX style with rope molded into core.



G Style webbing straps

Hard Shell Series

- Features orange, rock hard, cross-linked polyethylene outer shell
- Molded-in rope holes
- Black 3/8" polypropylene rope can be easily replaced
- Will not rot or mildew
- Unaffected by harsh weather extremes
- Available in Solas and USCG approved models
- 30 inch diameter size only

Model Number	Outside Diameter	Color	Pack Per Case	Weight Per Case (lbs.)	USCG Approval Number
HS-30	30"	Orange	6	35	160.050/154/0
HSO-30	30"	Orange	6	35	160.050/155/0 160.150/11/0



JB Series (with beackets)



JBO-30 Orange Model

- Nylon vinyl skin
- Urethane foam core
- 6 per case
- Case weight - 33 lbs.
- 30 inch outside diameter
- USCG Approval Number 160.050/138/0

Model Number	Outside Diameter	Color	Pack Per Case	Weight Per Case (lbs.)	USCG Approval Number
JBSO-30	30"	Orange	6	35	160.050/135/0 160.150/6/0
JBSOH-30	30"	Orange	6	35	160.050/136/0 160.150/7/0

JB SOLAS Series

- JBSO-30 for general application
- JBSOH-30 (Approx. 9 lbs. or 4 kg.) for use with quick release for self-activated lights and smoke signals
- Vinyl coated nylon covered rigid urethane foam construction
- Case weight - 33 lbs.
- Rope nut makes rope changes easy



JIM-BUOY®

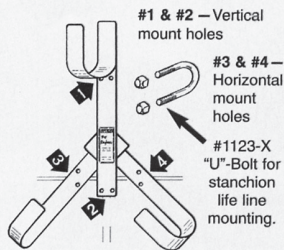
JIM-BUOY PREMIUM
LIFE RING RACK

The Roughneck

COMMERCIAL QUALITY—Features heavy-duty, welded stainless steel construction throughout for a life-time of maintenance-free use. Its rugged beauty will enhance any installation. Available in three standard sizes with pre-drilled holes for stanchion and life line mounting (see sketch), as well as cabin wall installations.



The **ROUGHNECK** offers both vertical and horizontal mounting!



#1123-20—20" dia., ship. wt. 4 lbs., 1/ctn.
#1123-24—24" dia., ship. wt. 10 lbs., 2/ctn.
#1123-30—30" dia., ship. wt. 14 lbs., 2/ctn.

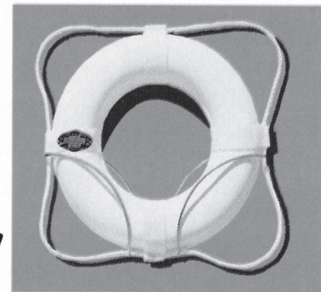
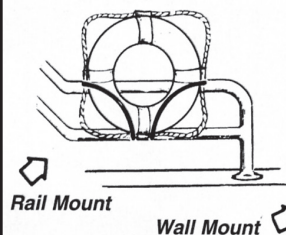
ORDER #1123-X STAINLESS STEEL "U"-BOLTS BELOW FOR STANCHION LINE MOUNTING:

Model #1123-X—Stainless steel U Bolts and nuts for stanchion and life line mounting. 4 per skin pkg. card, 10 per master ctn., ship. wt. 1 lb.

JIM-BUOY

Ring Buoy Hangers

ALWAYS READY IN AN EMERGENCY!



Jim Buoy's latest design in durable stainless steel

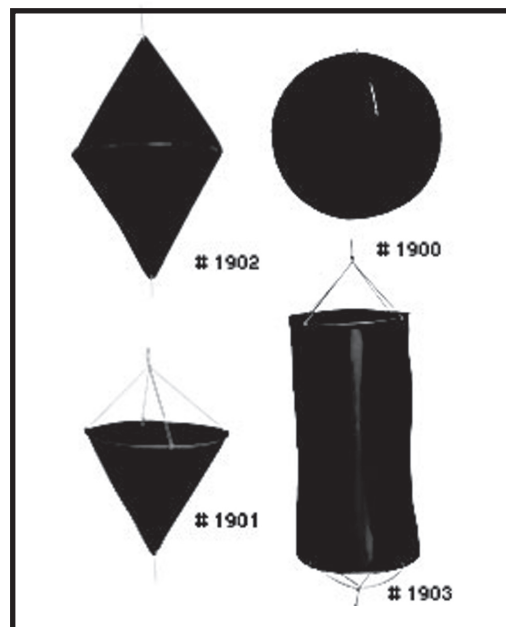
We believe these are the finest stainless steel ring buoy mounts available anywhere. Beautiful, graceful design adds permanent safety and stylish good looks to any ship. No wash away-easy access design. Readily mounts to safety rail, stanchion or cabin wall.

Model #804—12 pair per carton, shipping wt. 8 lbs.

Day Mark Signals

All units manufactured from heavy-duty vinyl coated nylon fabric with stainless steel or galvanized framing. Fully collapsible when stored. Simplicity of design offers rapid and rigid display when required.

- Model #1900 - Ball shape, 24" dia., 6/pack, ship. wt. 9 lbs.
- Model#1901 - Cone shape, 24" x 24", 6/pack, ship. wt. 9 lbs.
- Model#1902 - Double cone shape, 24" x 48", 6/pack, ship. wt. 9 lbs.
- Model#1903 - Cylinder shape, 24" x 48", 6/pack, ship. wt. 9 lbs.
- All models available in Black only.



BRAINTEASER

You have two hourglassesa 4-minute glass and a 7-minute glass. You want to measure 9 minutes. How do you do it?

Start both hourglasses. When the 4-minute glass runs out, turn it over (4 minutes have elapsed). When the 7-minute glass runs out, turn it over (7 minutes have elapsed). When the 4-minute glass runs out this time (8 minutes have now elapsed), the 7-minute glass has been running for 1 minute. Turn it over once again. When it stops, 9 minutes have elapsed.

ANSWER

Industrial Floats and Buoys

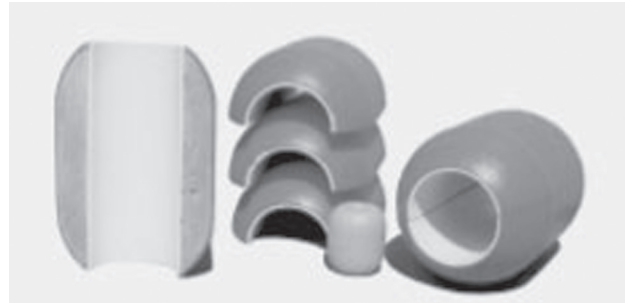
JIM-BUOY®



All models may be furnished with either stainless steel or hot-dipped galvanized steel in 1/2" to 1" diameter thru-holes or may be furnished with drop-forged swivels if required. They may also be ordered with PVC or steel tubing instead of eye and swivel hardware. All sizes are available in white or orange molded-in color. Please specify color and hardware requirement with order.

Model No.	Size Diam./Lgth	Buoyancy Approx.	Per Case Qty.	Ship Wt. (lbs.)
4418	12" x 18"	60 lbs.	1	10
429	18" x 30"	Orange	1	30
449	24" x 36"	White	1	42
445	24" x 45"	380 lbs.	1	60
548	30" x 48"	Orange	1	92

JIM BUOY'S TOUGHEST, MAINTENANCE-FREE CONSTRUCTION!
Jim Buoy's Industrial Floats and Buoys are a rugged, top quality product available in 6 sizes and suitable for a wide range of applications. They are currently being used in many parts of the world functioning as mooring buoys, rope floats and marker buoys. All models are rectangular in shape to permit conversion to split-hose floats to facilitate strapping the floats in place during use. Built for continuous duty and long life, the shell is constructed of HDP .060 - 180 thickness to withstand severe punishment and is bonded over high density USCG Approved grade polyurethane foam.



All of the above buoys are acceptable as Hose Floats - -Simply cut in two to allow attachment without end entry. They may be fitted to any size hose.



COMPLIES WITH U.S.C.G.
REQUIREMENTS EFF. 9/20/83
Contact your local U.S.C.G. office
for complete information

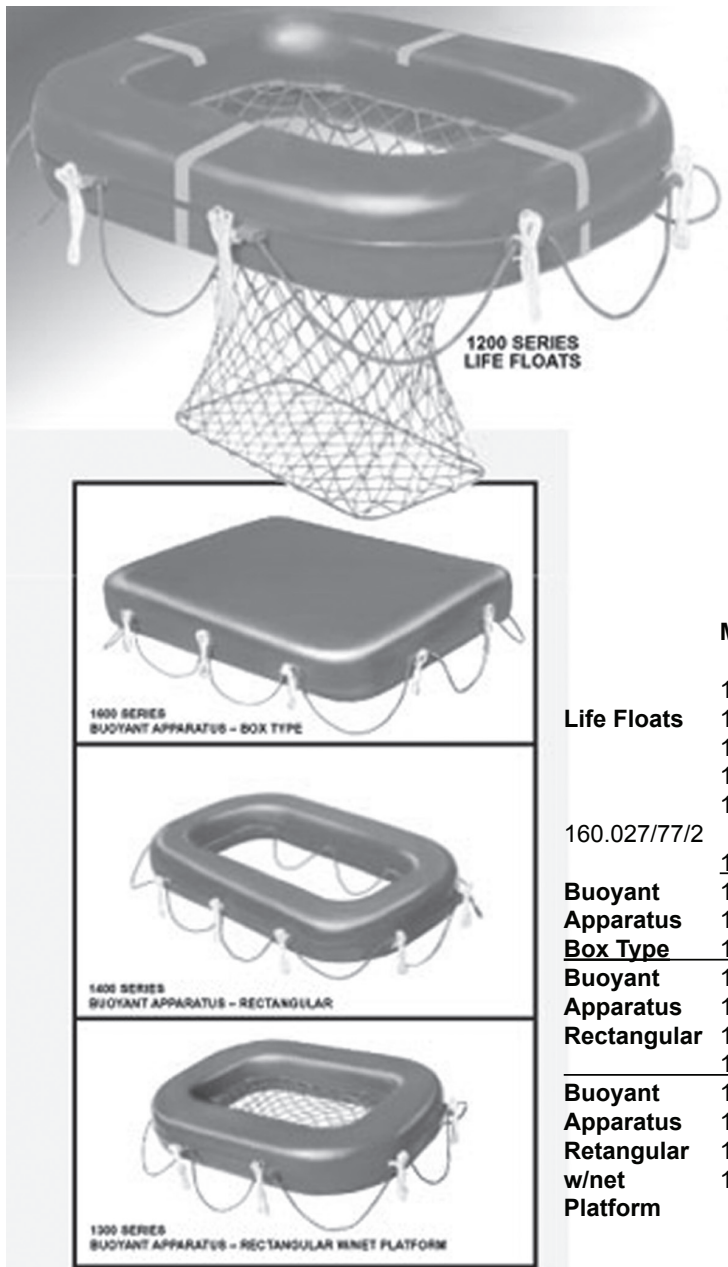
Float-Free Link, Painter Cage

Model #501 - Available in 6-10 man, 11-20 man and 21 or more man size. Each unit contains 1 stainless steel cage, 100 ft. of black 5/16" polypropylene rope (1,600 lb. test) and wire link. All wire links tagged to identify raft size it is legal for. Rope ends tagged as to their use. When ordering, specify sizes: 6-10 man, 11-20 man, or 21 or more man.

Model #504 - Fits any stack of four rafts or any stack which equals a capacity of 21 man or more. Each unit contains 1 stainless steel cage, 100 ft. of black 7/16" polypropylene rope (3,000 lb. test) and 1 wire link.

Model #501 - 12 per case, ship. wt. 38 lbs. UPS OK

Model #504 - 6 per case, ship. wt. 38 lbs. UPS OK



Life Floats and Buoyant Apparatuses, The World's Finest - U.S. Coast Guard Approved

- Tough resilient vinyl surface - easily boarded, comfortable in the water - no hard surfaces.
- Light weight yet easily exceed the most severe USCG tests. Ease of handling is one of our most valued features.
- No exposed metal hardware - all beackets secured inside the float body.
- Double webbing, sunlight or weather never reaches the supporting beackets.
- Solid closed-cell plastic throughout; bullet holes would have only minimal effect on buoyancy. Will not rot or mildew.

	Model	Person Cap.	App. Lnth	App. Wdth	Sec. Diam.	Ship Wt.	U.S.C.G. Approval No.
Life Floats	1206	6	50.5"	36.5"	8.5"	23	160.027/79/2
	1208	8	51"	37"	9"	25	160.027/75/2
	1210	10	63"	37"	9"	30	160.027/76/2
	1212	12	78"	37"	9"	38	160.027/80/2
	1215	15	64"	48"	12.5"	50	
	160.027/77/2						
Buoyant Apparatus Box Type	1222	22	100"	48"	12.5"	70	160.027/78/2
	1612	12	48"	48"	9"	35	160.010/70/2
	1618	18	62"	48"	9"	45	160.010/71/2
	1620	20	84"	48"	9"	55	160.010/72/2
	1410	10	51"	37"	9"	23	160.010/73/2
Buoyant Apparatus Rectangular	1412	12	63"	37"	9"	28	160.010/74/2
	1418	18	64"	48"	12.5"	48	160.010/75/2
	1422	22	100"	48"	12.5"	68	160.010/76/2
	1308	8	51"	37"	9"	23	160.010/77/2
	1310	10	63"	37"	9"	28	160.010/78/2
Buoyant Apparatus Rectangular w/net Platform	1315	15	64"	48"	12.5"	48	160.010/79/2
	1322	22	100"	48"	12.5"	68	160.010/80/2

BRAINTEASERS

- 1 If you were to put a coin into an empty bottle and then insert a cork into the neck, how could you remove the coin without taking out the cork or breaking the bottle?
- 2 What is the easiest way to throw a ball, and have it stop and completely reverse direction after traveling a short distance without hitting anything?
- 3 Two boxers are in a boxing match (regular boxing, not kick boxing). The fight is scheduled for 12 rounds but ends after 6 rounds, after one boxer knocks out the other boxer. Yet no man throws a punch. How is this possible?
- 4 I dig out tiny caves, and store gold and silver in them. I also build bridges of silver and make crowns of gold. Sooner or later everybody needs my help, yet many people are afraid to let me help them. Who am I?

- ANSWERS
- 1 Just push the cork into the bottle and shake the coin out.
 - 2 Throw the ball straight up.
 - 3 They're female boxers.
 - 4 A dentist.

USCG/SOLAS OCEANMASTER

Revere Part Number

50-R/R-4M-O - OceanMaster 4 Low Pro. (non-SOLAS)	50-R/R-10M-A - OceanMaster 10
50-R/R-6M-A-L - OceanMaster 6 Low Profile	50-R/R-12M-A - OceanMaster 12
50-R/R-6M-A-R - OceanMaster 6 Round	50-R/R-16M-A - OceanMaster 16
50-R/R-8M-A-L - OceanMaster 8 Low Profile	50-R/R-20M-A - OceanMaster 20
50-R/R-8M-A-R - OceanMaster 8 Round	50-R/R-25M-A - OceanMaster 25

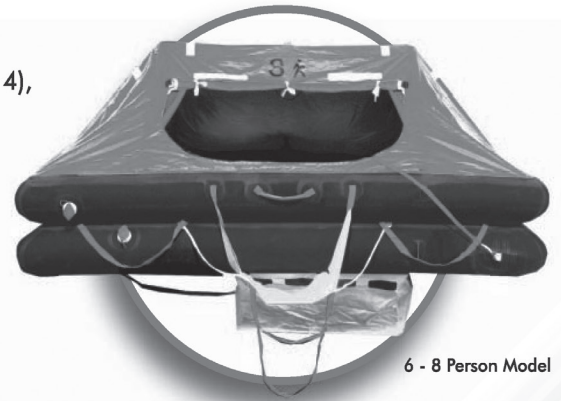
Features

- All Oceanmaster Liferrafts are A-Pack, SOLAS/USCG Approved (except for OceanMaster 4), and include cradle and hydrostatic releases.
- Oceanmaster Liferrafts are available in high-drop and davit-launched models.

SOLAS "A" PACK INCLUDES:

- | | |
|---------------------------------|----------------------------------|
| • 2 USCG/SOLAS Smoke Signals | • 1 Drinking Cup |
| • 6 USCG/SOLAS Hand Flares | • 36 Seasick Tablets |
| • 1 Bail bucket | • 1 Flashlight |
| • 2 Paddles | • 2 Extra batteries |
| • 1 Topping-Up Air Pump | • 1 Flashlight Bulb |
| • 1 Sea Anchor with SS swivel | • 1 Signal Mirror |
| • 1 Spare sea Anchor | • First Aid Kit |
| • 2 Sponges | • Fishing Kit |
| • 4 USCG/SOLAS Parachute Flares | • 1 Can Opener |
| • Repair Kit | • 6 Sea Sickness Bags |
| • Signal whistle | • Thermal Protective Aids |
| • 6 - 1000 Cal. Food Bars | • 1 Floating Knife |
| • 72 - 4.2 oz. water packs | • 1 Lock back knife |
| • 2 - 6" & 3" Repair clamps | • Survival Instructions |
| | • Throwing quoit w/ 100 ft. line |

SOLAS "B" PACK same as SOLAS "A" except no food or water and only half the number of flares and smoke signals.



6 - 8 Person Model



6 - 8 Person Model

Capacities/Dimensions

CAPACITY	ROUND CONTAINER DIMENSIONS(R)	LOW PROFILE DIMENSIONS(LP)	SOLAS A-PACK (WEIGHT)	SOLAS B-PACK (WEIGHT)
4	N/A	34 x 25 x 13.5	119	96
6*	50 x 21 x 19	38 x 26.5 x 16.5	162(LP), 166 (R)	131(LP), 135 (R)
8*	50 x 21 x 19	38 x 26.5 x 16.5	174(LP), 178 (R)	132(LP), 136 (R)
10	55 x 23 x 21	N/A	217	167
12	55 x 23 x 21	N/A	230	170
12DL	55 x 23 x 21	N/A	250	190
16	61 x 23 x 21	N/A	286	208
16DL	61 x 23 x 21	N/A	308	230
20	64 x 24.5 x 23	N/A	328	232
20DL	64 x 24.5 x 23	N/A	354	258
25	64 x 24.5 x 23	N/A	370	250
25DL	64 x 24.5 x 23	N/A	399	279

*Available in either container types.

UPC #:	50-R/R-25M-A-R	856347000643	50-R/R-8M-A-L	856347000537
	50-R/R-20M-A-R	856347000629	50-R/R-6M-A-R	856347000483
	50-R/R-16M-A-R	856347000605	50-R/R-6M-A-L	856347000490
	50-R/R-12M-A-R	856347000582	50-R/R-4M-O	856347000476
	50-R/R-10M-A-R	856347000568		
	50-R/R-8M-A-R	856347000520		

USCG SEAMASTER

Revere Part Number

50-R/R-4M-C-L - SeaMaster 4 Container
 50-R/R-4M-C-V - SeaMaster 4 Valise
 50-R/R-6M-C-L - SeaMaster 6 Container
 50-R/R-6M-C-V - SeaMaster 6 Valise

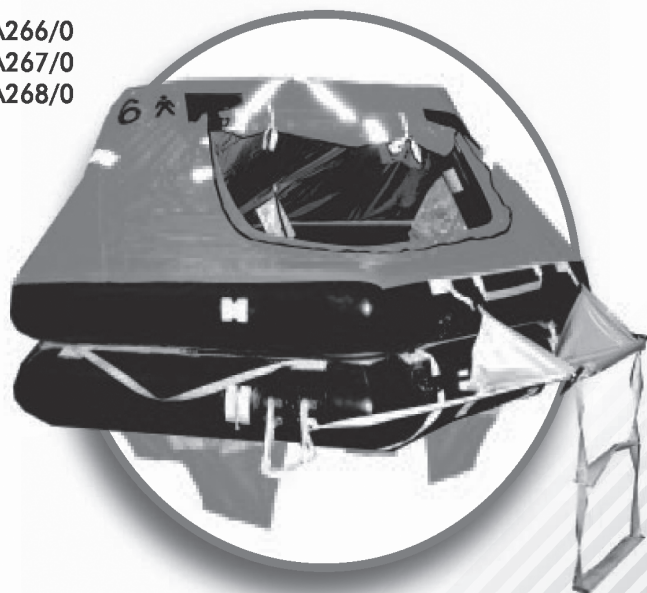
50-R/R-8M-C-L - SeaMaster 8 Container
 50-R/R-8M-C-V - SeaMaster 8 Valise

Features

- Seamaster 4 USCG Approval #160.051/A266/0
- Seamaster 6 USCG Approval #160.051/A267/0
- Seamaster 8 USCG Approval #160.051/A268/0
- Double buoyancy polyurathane chambers
- Welded seams
- Boarding Ramp

EQUIPMENT PACK INCLUDES:

- Water Sachets
- 2 Rubber Plugs
- 4 Person: 4
- 6 Person: 6
- 8 Person: 6
- 1 First Aid Kit
- Equipment Bag
- 1 Hand Pump
- 1 Repair Kit
- 1 Can opener
- 1 Bailer
- 1 tube of Anti-Seasick tablets
- 1 Torch
- 3 Leak stoppers
- 1 Graduated Cup
- 1 signals code card
- 2 Parachute Flares
- 3 Hand Flares
- 1 Whistle



Capacities/Dimensions

CAPACITY	PACK TYPE	WEIGHT(LBS.)	PACKED DIMENSIONS L" x W" x H"	INFLATED DIMENSIONS (Square Feet)	FLOOR AREA
4	Container	80	34 x 20 x 11.5	79 x 44 x 69	16
4	Valise	69	31 x 18 x 13	79 x 44 x 69	16
6	Container	104	34 x 21 x 13.5	94 x 44 x 82	24
6	Valise	90	31 x 20 x 15	94 x 44 x 82	24
8	Container	106	34 x 21.5 x 13.5	108 x 48 x 93	32
8	Valise	92	31 x 20 x 15	108 x 48 x 93	32

UPC #: 50-R/R-4M-C-V 856347000575
 50-R/R-4M-C-L 856347000315
 50-R/R-6M-C-V 856347000322
 50-R/R-CM-C-L 856347000339
 50-R/R-8M-C-V 856347000346
 50-R/R-8M-C-L 856347000353

We are a Revere Commercial Liferaft Servicing Station

LIFE RAFT SERVICING & REPAIRS

Life rafts actually being serviced at our facility



Our company has Coast Guard and manufacturer certified technicians in house to perform service and repair of inflatable life rafts. The servicing facility has an average turnaround time of 48 hours or sooner for routine annual inspections. Annual inspections and various required test, as listed below, can all be done at our facility. In addition, we are able to make minor repairs to raft containers. Our commitment to you is to replace only those items that require replacement and to perform only those tests required by the factory. Repairs will be made in accordance with factory specifications. Each raft will be treated as if our own lives depend on the proper servicing and repair. Remember that proper servicing will help extend the life expectancy of your life raft.

Tests Performed

Gas Inflation
Necessary additional pressure
Floor seam test
Suspension Overload
Hydro and Refill
Refill only

Checklist of Dated Items:

Hand Flares – 3 years
Parachute Flare – 3 years
Signals, smoke – 3 years
Repair cement – 1 year
Batteries, flashlight – 1 yr
First Aid Kit
Food Rations – 5 years
Drinking water – 5 years

BRAINTEASERS

A train enters a tunnel at 7 o'clock. Another train enters the exact same tunnel, also at 7 o'clock, on the same day. The tunnel has only one track, no passing places, and no other means for the trains to pass, around, under, or over. However, both trains make it to the other end of the tunnel, untouched. How did they do it?

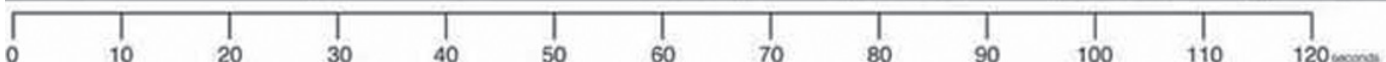
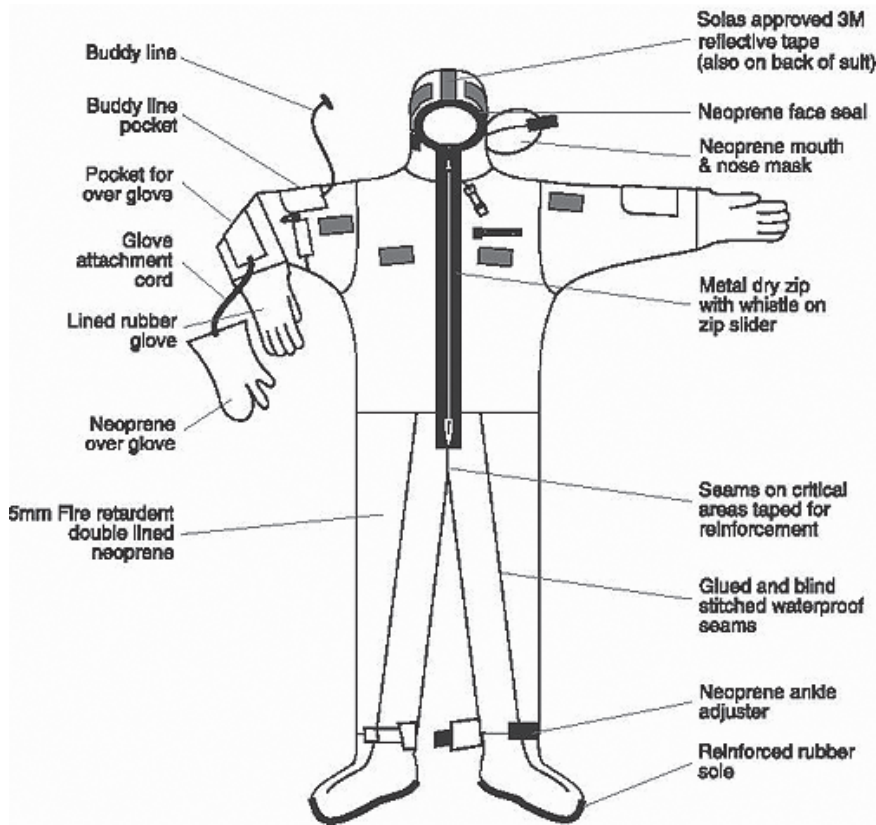
ANSWER

One train entered the tunnel at 7 a.m., the other entered at 7 p.m.

ThermoMax™

The Revere Survival Products ThermoMax™ Immersion Suit offers the ultimate solution to cold water survival. The ThermoMax™ is approved by the MCA (UK) to SOLAS requirements as an abandonment/immersion suit. It

is also approved to the relevant European standards and is CE marked. Manufactured from fire retardant 5mm neoprene, each suit is tested to ensure that it is watertight before leaving our factory. Each suit is supplied in its own bag printed with donning instructions. A separate instruction card is provided with each suit. An optional strop with stainless steel fittings can also be supplied. Three sizes are available, Small Adult, Universal Adult and Large.





Classic Flotation Bomber ★

MJ6214 T1

- Relaxed fit for mobility and comfort
- Full-length storm flap and an internal waist belt reduces ride-up
- Warm, fleece-lined front pockets
- SOLAS reflective tape on chest, sleeves & back
- Attachable hood can be purchased separately (MA7136 & MA7112)

SIZES: S - XXXL

APPROVAL: USCG TYPE III

COLORS: RED, NAVY, OLIVE,
ORANGE / BLACK



Coverall / Worksuit

Deluxe Anti-Exposure Coverall & Worksuit ★

MS2175

Our rugged worksuits are constructed of Mustang Airsoft® closed cell foam for greatest mobility. Provides protection from foul weather and offer emergency flotation and insulation in the event of accidental immersion.

- Insulated hood
- Velcro™ closures at wrists & ankles
- SOLAS reflective tape
- Neoprene wrist closures
- Inflatable Head Pillow
- Extra Chest Pockets
- Immersed Clo 0.420

SIZES: XS - XXXL

APPROVAL: USCG TYPE V WORKSUIT & TYPE II PFD WHEN WORN

COLORS: ORANGE, ORANGE / BLACK



IMMERSION SUITES ALSO AVAILABLE



Billy Pugh Co. Personnel Nets are manufactured under the ABS equipment type approval program. ABS certification can be requested at additional cost.

Specifications:

- API specification 2C Third Edition, March 1983, Section 5.4 (d). S.W.L. R250OLGS with design factor of 10.
- Lifting ring - 7/8" forged steel
- Hand spliced eyes (no swages)
- Safety load line (optional: add "DC" to model number)
- Stabilizer unit covered with plastic impregnated fabric
- Netting lines 3/4", 9950 lbs. test each
- Top ring 30" padded
- Bottom ring overall dimensions 72" with padding
- Padding is shock absorbing, synthetic flotation material
- 9 feet from bottom to top ring
- Four entrances to net
- Bottom of net - 5 rubber chafe pads
- ABS equipment type approval program
- Provides safe, sure transfer of personnel
- Tested and approved by safety engineers worldwide
- Used offshore by major oil producers
- Premium quality materials
- Recognized as safe transfer device
- Proven stabilizing system
- Collapsible design for easy storage
- All materials certified and approved
- American Bureau of Shipping (ABS)
- Certified on request

Accept no substitutes - there is a difference



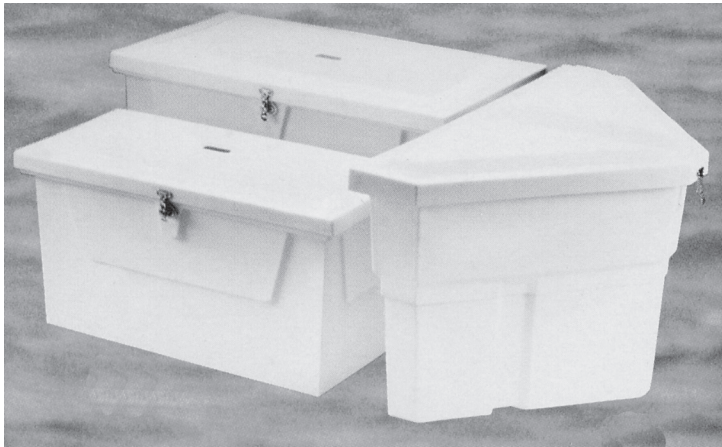
BRAINTEASERS

- 1 What belongs to you alone, but is mostly used by others?
- 2 Two French diplomats who have never seen each other meet at the French embassy in New York and decide to have a drink together in a nearby bar. Incidentally, one is the father of the other one's son. How is this possible?
- 3 You're at a cocktail party with your date. Strangely enough, there's something in the room that everybody can touch-and so can you, but only with your left hand. What is it?
- 4 What word is always spelled incorrectly?

4 | n-c-o-r-r-e-c-t-l-y.
3 Your right elbow.
2 The French diplomats are husband and wife, both blind from birth.
1 Your name.

ANSWERS

Dock Boxes

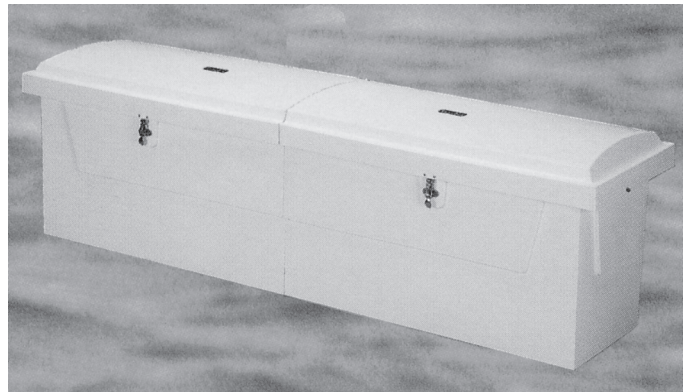


Medium Dock Box (92-1244)
 Outside: 40"W, 19 5/8"D, 21 3/4"H;
 Inside: 34 1/2"W, 15"D, 19 1/2"H
 Large Dock Box (92-1245)
 Outside: 46"W, 26"D, 27"H;
 Inside: 39"W, 20"D, 24 1/2"H
 Triangular Dock Box (92-1246)
 Outside: 48 1/2"W, 26"D, 27 1/2"H;
 Inside: 40"W, 20"D, 26 3/4"H

TODD Dock Boxes

Molded of rugged UV stabilized white polyethylene that resists corrosion from salt water, fuel, oil and add. Includes stainless steel hardware with a latch that will accept a padlock. All Todd Dock Boxes can be shipped via UPS. Some assembly required.

Available in four sizes:



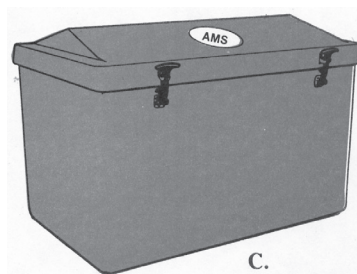
6' Dock Box (94-1247) comes in 2 sections shipped in one box.

Outside: 76"W, 19 5/8"D, 22 3/4"H;

Inside: 72"W, 18"D, 19"H

Life Jacket Storage Boxes

Fiberglass construction, international orange (blue interior), stainless steel hinge, brass safety chain on lid, stainless steel and rubber "T" latches. (Other colors available on request.)



Dimensions <small>(In Inches)</small>						
	CAPACITY	DEPTH	X	WIDTH	X	HEIGHT
A.	5	24	x	22	x	28
B.	10	24	x	20	x	36
C.	15	40	x	24	x	24
D.	25	40	x	25	x	36

BRAINTEASER

You threw away the outside and cooked the inside. Then you ate the outside and threw away the inside.

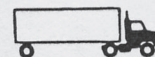
What did you eat?

ANSWER
 An ear of corn.

FIBERGLASS DOCK BOXES

Follansbee™ Fiberglass Dock Boxes are manufactured from heavy duty, high density, white fiberglass laminate for added rigidity. All boxes have a 20-mil layer of gel-coat protection for durability and long lasting beauty. The smooth, glass-like, gel-coated outer finish and tinted interior combine to make a clean, great looking Dock Box. The extra-tough sandwich core lid construction, unlike the weaker plastic models, allow safe, adult seating. We use only the finest marine grade hardware including front mounted hasps that incorporate locking rings. Optional hydraulic lifts are available on some models. Dock Box codes ending in "T" must be shipped via common carrier.

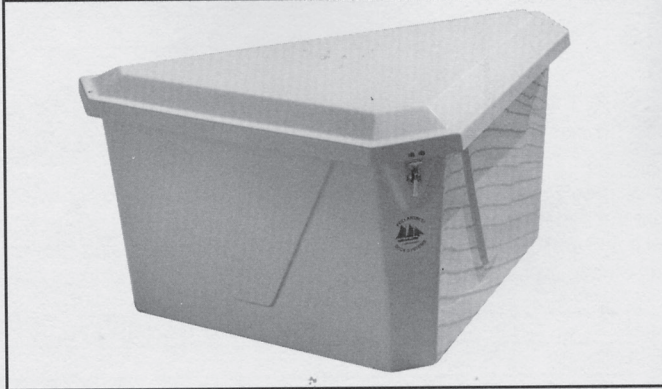
For more information phone toll-free 1-800-223-3444.



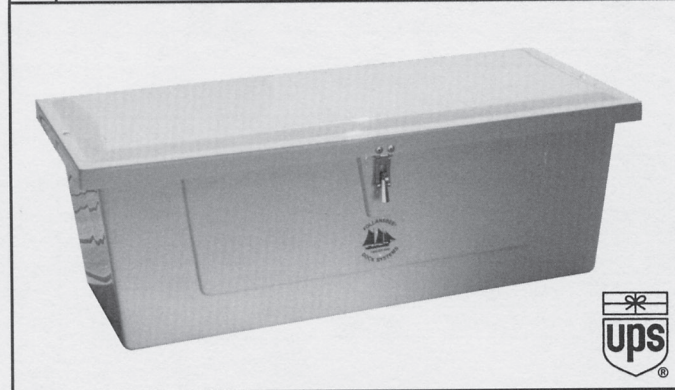
1. FDB-32 39 1/2" x 19 1/4" x 21 1/2" 55#



4. FDB-43T 54 1/2" x 32 1/2" x 29 1/2" 77#



2. FDB-41 48" x 20" x 18" 52#



5. FDB-50T 50" x 28 1/2" x 28 1/2" 158#



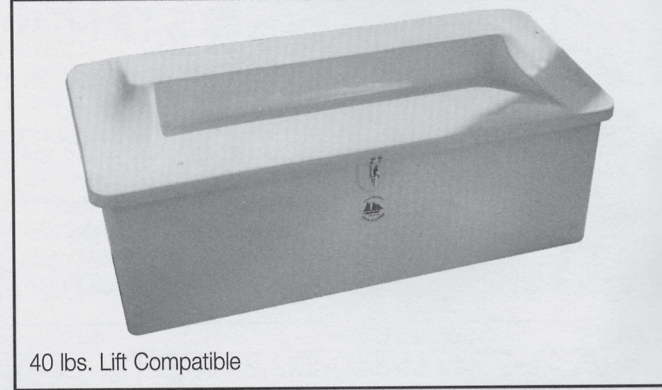
40 lbs. Lift Compatible

3. FDB-42T 44 1/4" x 26 1/2" x 27 1/2" 65#



28 lbs. Lift Compatible

6. FDB-60T 72" x 29" x 29" 156#



40 lbs. Lift Compatible

FOLLANSBEE® – *For All Your Docking Needs*

BRAINTEASER

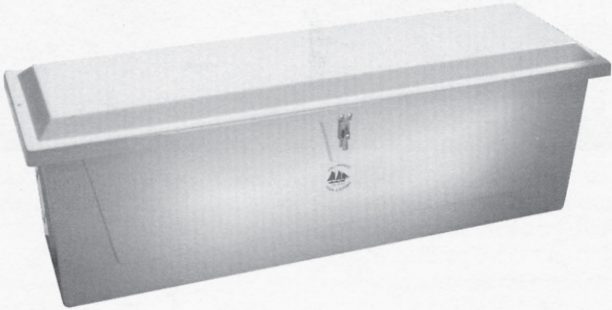
In 1990 a person is 15 years old. In 1995 that same person is 10 years old.

How is this possible?

The dates are 1990 B.C. and 1995 B.C.

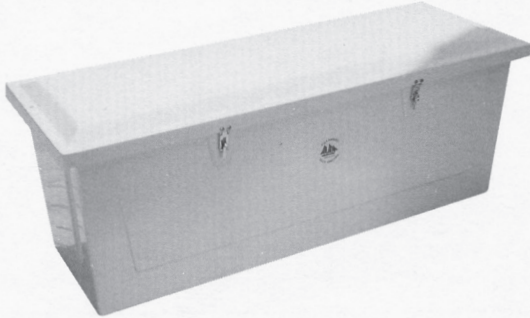
ANSWER

7.	FDB-62T	71" x 22" x 24 1/4"	87#
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24 lbs. Lift Compatible

8.	FDB-70T	72" x 26 1/2" x 27 1/2"	108#
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40 lbs. Lift Compatible

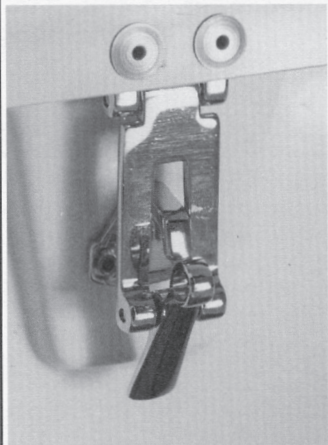

9.	FDB-71T	85" x 20" x 18"	80#
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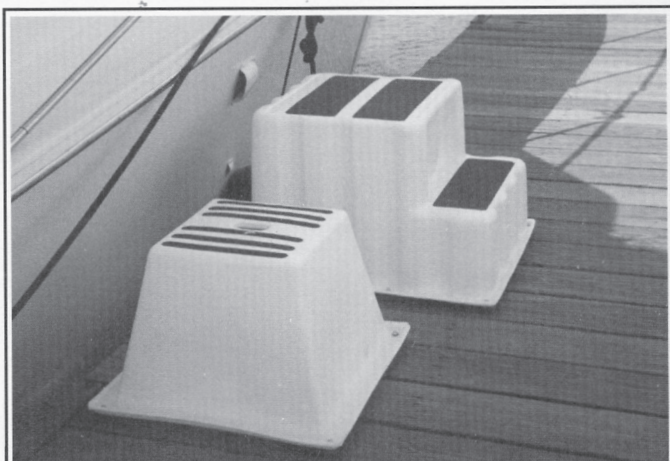
24 lbs. Lift Compatible

BRAINTEASER
 If 2 hours ago it was as long after 1 o'clock in the afternoon as it was before 1 o'clock in the morning, what time is it now?

ANSWER
 Nine o'clock. Since there are 12 hours between the two times, and half of that time is six, then the halfway mark would have to be 7 o'clock. If it were 7 o'clock, two hours ago, the time would now be 9 o'clock.

FDB-FMH	HASP	FDB-HL24	24 LB. LIFT	2#
		FDB-HL40	40 LB. LIFT	2#
				
SELECTED MODELS				

CODE	WT/LBS.	SHIP VIA
FDB-32	55	UPS
FDB-41	52	UPS
FDB-42T	65	TRUCK ONLY
FDB-43T	77	TRUCK ONLY
FDB-50T	158	TRUCK ONLY
FDB-60T	156	TRUCK ONLY
FDB-62T	87	TRUCK ONLY
FDB-70T	108	TRUCK ONLY
FDB-71T	80	TRUCK ONLY
PBS-1	10	UPS
PBS-2	20	UPS



Getting in and out of your boat has never been easier. These heavy duty, high density, high molecular weight, white polyethylene boarding steps provide safe and stable access to your boat. The non-skid strips on the surface and rubber bumpers on the bottom insure positive gripping and stability.

CODE	DESCRIPTION	WT/LBS.
PBS-1	SINGLE STEP 24" L x 24" W x 15 1/2" H	10
PBS-2	TWO STEP 32" L x 26" W x 20" H	20



ABC MULTI-PURPOSE STORED PRESSURE FIRE EXTINGUISHERS



- **IDEAL USES:** Homes, office buildings, warehouses, farms and woodworking areas. (NOTE - Not recommended for use on expensive delicate equipment or computers.)
- **MONOAMMONIUM PHOSPHATE** based dry chemical agent capable of fighting Class "A," "B" and "C" type fires.
- This agent provides the widest and most practical range of extinguisher fire protection coverage.
- Manufactured to ANSI/UL 299 and ANSI/UL 711 Standards.

SPECIFICATIONS	100PSI/690 kPa OPERATING PRESSURE				195PSI/1340 kPa OPERATING PRESSURE					
SIZE/MODEL	2.5 ABC	2.5 ABC V/B	4 ABC	4 ABC V/B	5 ABC	5 ABC V/B	10 ABC TALL	10 ABC SHORT	20 ABC	30 ABC
Part No. Alum. Valve	10315	13315	10705	13705	10914	25614	11340	11310	12120	—
Part No. Brass Valve	—	—	—	—	10915	25615	11341	—	12121	12905
Capacity (lbs./kg)	2½ • 1.13	2½ • 1.13	4 • 1.81	4 • 1.81	5 • 2.27	5 • 2.27	10 • 4.54	10 • 4.54	20 • 9.07	30 • 13.60
U.L. Rating	1A:10B:C	1A:10B:C	2A:10B:C	2A:10B:C	3A:40B:C	3A:40B:C	4A:80B:C	4A:60B:C	20A:120B:C	20A:160B:C
Ship Wt. Alum. Valve (lbs./kg)	5¼ • 2.38	5½ • 2.49	6½ • 2.9	6¾ • 3.1	9½ • 4.3	9¾ • 4.4	17¾ • 8.1	17¾ • 8.1	33 • 15.0	—
Ship Wt. Brass Valve (lbs./kg)	—	—	—	—	10.4.5	10¼ • 4.7	18¼ • 8.3	—	33½ • 15.2	52¼ • 23.7
Height (in./cm)	14¾ • 37.5	14¾ • 37.5	16½ • 41.9	16½ • 41.9	16¾ • 41.6	16¾ • 41.6	21 • 53.3	16¾ • 42.5	21¾ • 53.8	27¾ • 69.4
Width (in./cm)	4⅞ • 12.4	4⅞ • 12.4	6¼ • 15.9	6¼ • 15.9	7¼ • 18.4	7¼ • 18.4	7¾ • 19.7	8¼ • 21.0	8¼ • 22.2	8¼ • 22.2
Diameter (in./cm)	3⅞ • 8.6	3⅞ • 8.6	3½ • 8.9	3½ • 8.9	4¼ • 10.8	4¼ • 10.8	5⅞ • 13.0	6 • 15.2	7½ • 19.1	7½ • 19.1
Bracket	Wall	Veh/Mar	Wall	Veh/Mar	Wall	Veh/Mar	Wall	Wall	Wall	Wall
Range (feet/meters)	9-15 • 2.7-4.6	9-15 • 2.7-4.6	9-15 • 2.7-4.6	9-15 • 2.7-4.6	12-18 • 3.7-5.5	12-18 • 3.7-5.5	15-21 • 4.6-6.4	15-21 • 4.6-6.4	15-21 • 4.6-6.4	25-30 • 7.6-9.1
Discharge Times (seconds)	9	9	14	14	14	14	22	18	26	32
Cylinder	Steel	Steel	Aluminum	Aluminum	Steel	Steel	Steel	Steel	Steel	Steel
USCG Approved – Yes	Type B:C Size I				Type A Size II Type B:C Size I		Type A Size II Type B:C Size II		Type A Size II Type B:C Size III	Type A Size II Type B:C Size IV

CARBON DIOXIDE STORED PRESSURE FIRE EXTINGUISHERS

SPECIFICATIONS	PORTABLE UNITS			
SIZE/MODEL	5CD	10CD	15CD	20CD
PART NO. ALUM. VALVE	45100	45600	46100	46600
VALVE	CHROME PLATED BRASS			
CAPACITY lbs./kg)	5 • 2.27	10 • 4.54	15 • 6.80	20 • 9.07
U.L. Rating	5B:C	10B:C	10B:C	10B:C
Cylinder	ALUMINUM			
Ship wt. (lbs./kg)	13¾ • 6.3	27¾ • 12.6	37¾ • 17.1	49 • 22.2
Height (in./cm)	17¾ • 44.1	19¾ • 50.2	26¾ • 67.0	26¾ • 68.2
Width (in./cm)	8¼ • 21.0	12 • 30.5	12 • 30.5	13 • 33.0
Diameter (in./cm)	5¼ • 13.3	6½ • 17.6	6¾ • 17.5	8 • 20.3
Bracket	Wall	Wall	Wall	Wall
Range (feet/meters)	4-8/1.2-2.4	4-8/1.2-2.4	4-8/1.2-2.4	4-8/1.2-2.4
Discharge time (seconds)	8	10	15	20
USCG Approved	Type B:C Size I		Type B:C Size II	



- **Carbon Dioxide**, a gaseous agent for class B and C fires.
- **Ideal Uses:** Chemical and manufacturing plants, oil rigs, rail yards, warehouses, construction sites, parking garages, airport ramps, boat docks and large laboratories.
- Manufactured to ANSI/UL 154 and ANSI/UL 711 standards.

COAST GUARD SHIPBOARD VARI-NOZZLES

A combination fog and straight stream nozzle designed for more efficiency with AFFF or water on board ships.

- Brass construction
- Low friction ball and dual seats for smoother operation
- Double row of molded teeth
- Rubber-like bumper and handle
- Constant gallonage in all fog and straight stream patterns
- Flush without shutting down
- 95 gpm (360 lpm) only

3020 1 1/2" Shipboard Vari-Nozzle with Pistol Grip

- 1 1/2" NH thread only
- Approval no. 162.027/15/0

3022 1 1/2" Shipboard Vari-Nozzle

- 1 1/2" NH thread only
- Approval no. 162.027/16/0

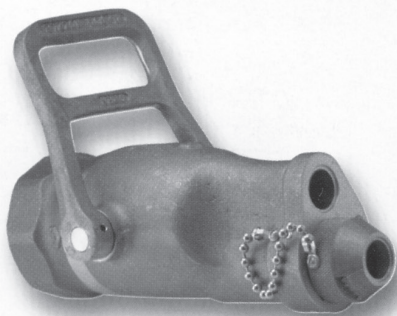
COAST GUARD NOZZLES WITH FOG TIPS

2032 1 1/2" CG-15 Nozzle

- 1 1/2" NH thread only
- Approval no. 162.027/09/0 for nozzle and Style 2415 or 2015 Applicator
- Includes Style 2033 1 1/2" Fog Tip with Chain

2046 2 1/2" CG-25 Nozzle

- 2 1/2" NH thread only
- Approval No. 162.027/10/0 for nozzle and Style 2225 2 1/2" x 12' applicator
- Includes Style 2047 2 1/2" Fog Tip with Chain



STYLE 2046

Including Style 2047 Fog Tip and Chain.

COAST GUARD FOG TIPS

2033 1 1/2" Fog Tip with Chain

- Fits Style 2032 1 1/2" CG-15 Nozzle

2047 2 1/2" Fog Tip with Chain

- Fits Style 2046 2 1/2" CG-25 Nozzle

COAST GUARD APPLICATORS WITH FOG HEADS

Applicators with stainless steel tubing to Coast Guard specifications. Improved head and end connectors for increased strength and durability.

2415 1 1/2" Applicator

- 4' long, 60° bend
- Approval No. 162.027/09/0
- Includes Style 1034 Fog Head

2015 1 1/2" Applicator

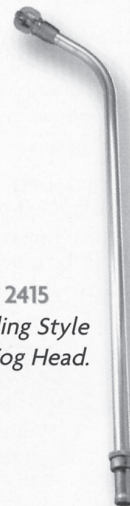
- 10' long, 90° bend
- Approval No. 162.027/09/0
- Includes Style 1034 Fog Head

2225 2 1/2" Applicator

- 2 1/2", 90° bend
- 3 lengths available: 6', 10', & 12'
- Approval No. 162.027/10/0 (12' only)
- Includes Style 1048 Fog Head

STYLE 2415

Including Style 1034 Fog Head.



COAST GUARD FOG HEADS

1034 1 1/2" Fog Head

- Fits Style 2415 and 2015 Applicators

1048 2 1/2" Fog Head

- Fits Style 2225 Applicator and Style 2055 Fog Applicator



STYLE 3022

COAST GUARD NOZZLES

STYLE	LENGTH	WEIGHT LBS.	INLET SIZE	STRAIGHT STREAM ORIFICE	FOG HEAD/ TIP	BEND	FLOW	
							GPM	LPM
2015	10'	9 1/4	1 1/2"	-	1034	90°	54	204
2032	10 1/4"	9	1 1/2"	5/8"	2033	-	* 55	* 208
2046	11 1/2"	14 1/2	2 1/2"	15/16"	2047	-	* 106	* 401
2225	6', 10', 12'	† 15 3/4	2 1/2"	-	1048	90°	108	408
2415	4'	5	1 1/2"	-	1034	60°	54	204
3020	8 5/8"	7 3/4	1 1/2"	-	-	-	95	360
3022	8 5/8"	7 1/8	1 1/2"	-	-	-	95	360

* Fog flow only, † 12' length

BRAINTEASER

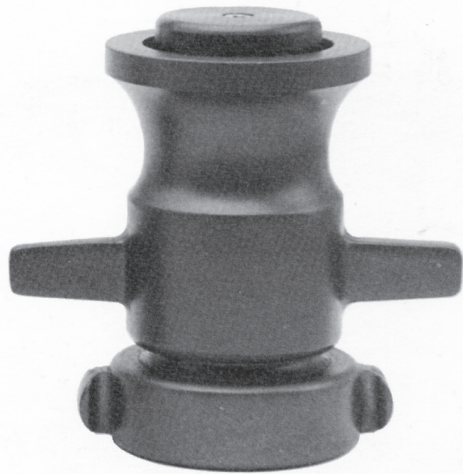
The person who made it had no use for it; the person who bought it didn't want it; and the one who finally ended up with it, never even knew about it. What was it?

ANSWER
A coffin.

MASTER STREAM NOZZLES

"HOMBRE" FEATURES

- Combination fog and straight stream.
- Aluminum or red brass castings.
- Twist shut-off on 500A/500B
- Zerk fitting for lubrication.
- Ideal for both municipal and industrial applications.



#500A

#500B

The "HOMBRE" Master Stream series combination fog/straight stream nozzles were designed for use with deck pipes and station monitors.

Bodies are available in heavy aluminum or brass castings for rugged use in caustic or salt water environments.

Precision machining insures ease of operation while changing patterns at all pressure ranges. Patterns range from a strong impinging straight stream for greater distance and maximum effective reach to a full 180° fog curtain.

Standard features include a zerk fitting for field lubrication to increase service life, and a complete twist shutoff, on the 500A & 500B styles.

350 OR 500 GPM

#500A Cast aluminum body with 6061-T6 aluminum deflector, and Delrin deflector seat for shutoff. A heavy rugged casting built for a long service life - available in 350 or 500 GPM settings. Gray hard anodized finish.

#500B Cast brass body with brass deflector and Delrin deflector seat. Same performance features as the 500A.

#500B-CP Optional polished and chrome plated finish. Same performance features as 500A and 500B.

#500 A/B-T Optional "teeth" for the 500A and 500B.

1000 GPM

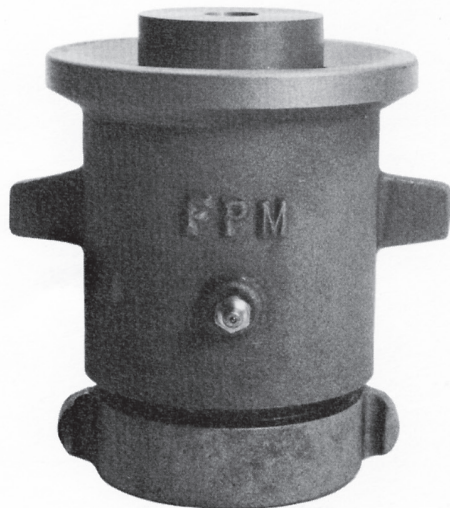
1000A Cast aluminum body with aluminum deflector. A heavy rugged casting for a long service life, preset at 1000 GPM with optional 500, 750 and 1250 GPM flows. Featuring a straight stream to fog "quick throw" pattern change, constant flow.

1000B Cast brass body with same options and performance features as the 1000A.

1000B-CP Optional polished and chrome plate finish. Same performance features as 1000A and B.

2000 GPM

FP2000 2000-GPM fog nozzle with 4" NH base that can also be pre-set at 1500, 1750 or 2500 GPM. Cast aluminum w/gray hard anodized finish. Also auxiliary cast brass body.



1000ACG

1000BCG

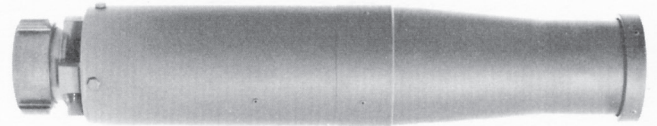
STYLE #	SIZE/THREAD	FLOW/G.P.M.	MATERIAL/FINISH	LENGTH	WEIGHT
500A	2 1/2" N.H.	350 or 500	Aluminum/hard anodized	6 1/2"	4 1/2 lbs.
500B	2 1/2" N.H.	350 or 500	Brass/cast	6 1/2"	9 lbs.
1000ACG	2 1/2" N.H.	500-750-1000-1250	Aluminum/hard anodized	6 3/4"	4 1/2 lbs.
1000BCG	2 1/2" N.H.	500-750 1000-1250	Brass/cast	6 3/4"	9 lbs.
FP2000	4" N.H.	1500-1750-2000-2500	Aluminum or Brass	7"	11 lbs.

FOAM SHAPER TUBES STRAIGHT BORE & STACKED TIPS

Aspirating Foam Shaper Tubes designed for monitor use.

Inlet base and "jaws" machined from aluminum castings, with a aluminum tubular body. Preset at 500 GPM, can be specified to flow from 250 GPM - 800 GPM at various pressures.

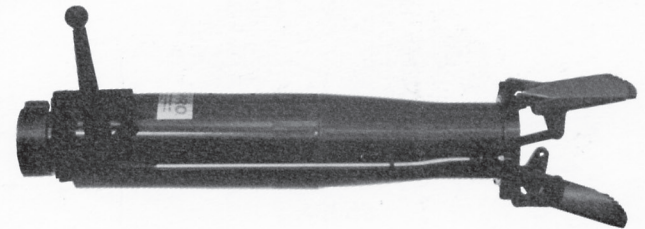
Equipped with 2 1/2" N.H. aluminum swivel inlet with gray hard anodized finish. Red epoxy finish inside and out with stainless steel threaded rod for jaws linkage control.



FPFS-500M

FPFS-500M - "MINI," 25" length aspirating foam shaper tube with aluminum body and reinforced discharge ring, complete with inner flow water tube shaper and aeration screens. Preset at 500 GPM, can accommodate flow ranges and various pressure ranges to flow from 250 GPM up to 800 GPM.

FPFS-500MJ - "MINI," 31" length with "jaws" and adjustable linkage for pattern control. Same features and flow ranges as the FPFS-500M.



FPFS-500MJ

FPFS-500S - "Standard," 38" length for longer distance requirements - same flow/pressure ranges as the FPFS-500M.

FPFS-500SJ - "Standard," 44" length with "jaws" and adjustable linkage for pattern control. Same performance features as the FPFS-500S.

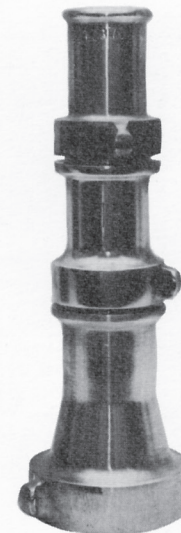
Straight bore and stacked tips - cast brass both polished and chrome plate finish for use on monitors - fixed, portable and elevated. Ideal for higher flow ranges and where greater distances are required.

#3200 - Cast brass polished straight bore tip with 2 1/2" NH female base and 1" discharge bore.

#3210 - Polished brass straight bore tip with 2 1/2" NH female base and 1 1/2" discharge bore.

#3220 - Chrome plate stacked tip with 2 1/2" NH female base by 1 3/4" x 1 1/2" x 1 3/8".

#3230 - Chrome plate stacked tip with 2 1/2" NH female base by 2" x 1 3/4" x 1 1/2".



**3220
3230**

STYLE #	BASE SIZE	TIP FLOW/GPM	LENGTH	WEIGHT/LBS.
FPFS-500M	2 1/2"	250 - 800	25"	6
FPFS-500MJ	2 1/2"	" "	31"	7
FPFS-500S	2 1/2"	" "	38"	7 1/2"
FPFS-500SJ	2 1/2"	" "	44"	8 1/2"
#3200	2 1/2" - 1"	300	10"	4
#3210	2 1/2" - 1 1/2"	650	10"	4
#3220	2 1/2 x 1 3/8 x 1 1/2 x 1 3/4"	750	11"	8
#3230	2 1/2 x 1 1/2 x 1 3/4 x 2"	1000	14"	8

STATION MONITORS

1 1/2" & 2 1/2" WATERWAY

125/350 GPM - 1 1/2" MONITOR

FP1-125 - 1 1/2" ASA 150# raised face flange with full flow 1 1/2" waterway. Built w/standard long radius weld fittings w/1 1/2" NH stainless steel discharge thread and red epoxy finish inside and out. Capable of flows up to 350GPM available with optional 1 1/2" N.P.T. female or male base. Height 18", width 11", weight 20 lbs.



FP1-125

**LARGER MONITORS
AVAILABLE**



FP3-750

FLOW DATA FP3-750

Using a 500A - 500 GPM Combination Fog Straight Stream Nozzle*

PSI	FULL FOG	3/4 FOG	1/2 FOG	1/4 FOG	STRAIGHT STREAM
60	19	38	45	61	103
80	21	41	50	64	124
100	24	45	56	66	140
120	25	51	61	80	151
140	26	55	65	88	162

* Based on "effective" reach (in feet) — optimum distance with continued effective extinguishing capability, conducted at 25° above horizontal with minimal wind conditions (0-5 M.P.H.).

750 GPM - 2 1/2" MONITOR FEATURES

- Seamless 2 1/2" monitor - rated at 750 GPM
- Carbon steel construction
- Stainless steel - discharge thread/ball bearings.
- Zerk fittings for lubrication
- 140° vertical travel/360° horizontal travel
- Operates easily at all pressure ranges - low friction loss
- Red epoxy finish - standard

Fire Pro™ Station Monitors were specifically designed to meet all requirements of municipal and petrochemical applications. The full flow single waterway configuration reduces friction loss, improving streams and distance. A 150# ASA raised face 2 1/2", 3" or 4" flange is standard, also available with NPT female or male bases with companion flange optional.

The balanced flow single waterway design configuration and precision machining on swivel joints insures ease of operation at all pressure/flow ranges.

An electrostatic coating process using epoxy powder permanently fuses the red epoxy particles to the steel surface (prepared by sandblasting). Coated inside and out for effective corrosion resistance.

Standard features include swivel joints with stainless steel ball bearings, Buna-N "O" rings, and zerk fittings for lubrication. Lock knobs are 3" diameter "fluted" black phenolic with molded-in stainless steel studs.

The permanent mount tiller bar is standard. Optional adjustable "C" clamp and detachable tiller bars with locking pin are available.

FP2-750 - 2 1/2" ASA 150 # raised face flange base with full seamless 2 1/2" waterway and 2 1/2" NH male stainless steel discharge thread. Rated at 750 GPM at 100 PSI with standard red epoxy finish inside and out. Height 22", (plus 14" tiller bar handle) width 13", weight 45 lbs.

FP3-750 - 3" ASA 150 # raised face flange with same features as FP2-750.

FP4-750 - 4" ASA 150 # raised face flange with same features as FP2-750.

FP2F-750 - 2 1/2" female N.P.T. base with same features as FP2-750. Use with #3529 Hydrant Mount.

FP3F-750 - 3" female N.P.T. base with same features as FP2-750.

FP2M-750 - 2 1/2" male N.P.T. base with same features as FP2-750.

FP3M-750 - 3" male N.P.T. base with same features as FP2-750.

FP3WF-750 - "THE ORIGINAL" - 3" 150 lbs. ASA flange base built with standard long radius weld fittings. Standard 2 1/2" NH male stainless steel discharge thread and red epoxy finish inside and out.

FP4WF-750 - Same as above with 4" 150 lbs. ASA raised face flange.

STATION MONITORS

3", 4" & 6" WATERWAY

1200GPM - 3" MONITOR FEATURES

- Greater flow capability
- Less friction loss
- Carbon steel construction
- Single waterway - Balanced flow design
- 90° vertical travel
- 360° horizontal travel

FP3-1200 w/#3526



FP3-1200 - 3" ASA 150 # raised face flange base with 3" waterway reducing to a 2 1/2" NH stainless steel male thread. Rated at 1200 GPM at 100 PSI with standard red epoxy finish inside and out. Height 28", (plus 14" tiller bar handle), width 16", weight 52 lbs..

FP4-1200 - 4" ASA 150 # raised face flange base with same features as the FP3-1200.

FP3F-1200 - Female N.P.T. base

FP3M-1200 - Male N.P.T. base

Fire Pro™ 4" and 6" diameter waterways were designed for applications that require large volumes of water with minimal manpower.

Large volume streams are ideally suited for breaking through thermal updrafts on tank fires, covering large areas quickly for vapor recovery and for fireboat applications.

Monitors can also be furnished with manifolds - custom built for specific requirements with Storz Quick Connect couplings 4", 5", or 6" as required.



FP4-2000

2000GPM - 4" Monitor

FP4-2000 - 4" ASA 150 # raised face flange base with full 4" waterway and 4" NH male stainless steel discharge thread. Standard features include a vertical blade lock control for safety with the larger flow capabilities and "detachable" tiller bar handle with "hitch" pin. Vertical travel limited to 90°. Full 360° horizontal travel. Large diameter full flow waterway minimizes friction loss, maximizing effective distance and reach at all flow ranges. Standard red epoxy finish inside and out. Height 32", width 22", weight 135 lbs.

4000GPM - 6" Monitor

FP6-4000 - 6" ASA 150 # raised face flange with 6" waterway with 4" NH stainless steel male threaded discharge tip. Optional 5" and 6" discharge tips available. Balanced flow with vertical blade lock for safety and "detachable" tiller bar handle with "hitch" pin. Standard red epoxy finish inside and out. Height 44", width 37", weight 270 lbs.

FP6-4000-CM - 6" monitor including manifold - custom fabricated as required by customer specifications. P.O.A.



FP6-4000

**U.S. NAVY LANTERNS
NAVY SYM 101.2
Relay Operated
Emergency Lantern**

- Meets Requirements of Mil-F 16377
- 2-6 Volt Dry Cell Batteries*
- 11 SVAC Relay
- Qualified To Mil-S-901 Shock, & Mil-STD-167-1 Vibration Testing
- Molded of High Impact Glass Filled Polyester Resins

**RECHARGEABLE LANTERNS
Roflan Type 1504
Rechargeable Relay Operated
Emergency Lantern**

- 11 SVAC Relay
- Built In Battery Charger
- 6 Volt 4 Amp Rechargeable Battery
- Automatic Battery Shut-off
- Molded of High Impact Glass Filled Polyester Resins




**NAVY SYM 100.2
Hand Held Emergency Lantern**

- Portable
- 2-6 Volt Dry Cell Batteries*
- Meets Requirements of Mil-F-16377
- Qualified To Mil-S 901, Shock, & Mil-STD-167-1 Vibration Testing
- Molded From High Impact Glass Filled
- Polyester Resins.

* Batteries Not Included

**Roflan Type 1505
Hand Held Rechargeable
Lantern**

- Portable
- Built In Battery Charger
- 6 Volt 4 Amp Rechargeable Battery
- Automatic Battery Shut-off
- Molded of High Impact Glass Filled Polyester Resins
- 11 5VAC Plug provided for Recharging in any Outlet

 Listed U.S. Patent
3514588

ADONIC I EMBARKATION LADDER

Adonic I Embarkation Ladder equivalent to chain. Approved by the U.S.C.G. with the No: 160.017/61/0. Meets and exceeds Solas standards.

Tested by Underwriters Laboratories, Inc. with a drop test of 150 ft. maximum length. Each step tested 2,000 lbs.

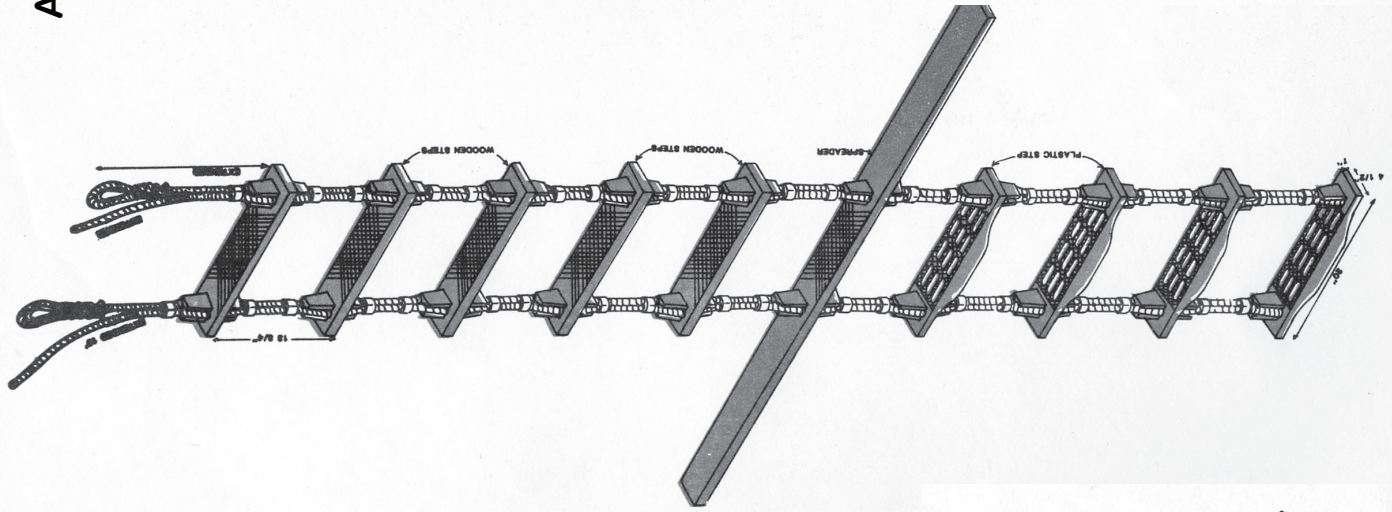
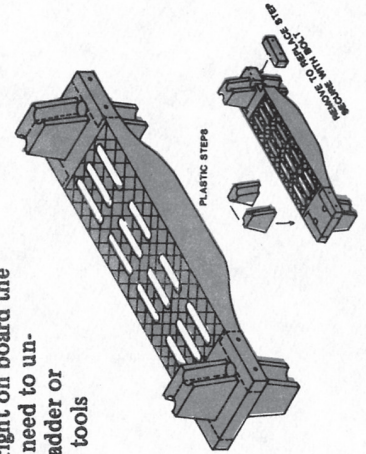
The steps are International Orange molded polyurethane made by Rubber Millers Inc. Rope suspension members are polypropylene white outer jacket an orange inner core for safety. Clamp - 6063 Alloy Aluminum.

PILOT LADDER CLASSIFIED BY UNDERWRITERS LABORATORIES INC.® IN ACCORDANCE WITH USCG REGULATION TITLE 46 CHAPTER 1 PART 163.003



REPLACEMENT STEP

It is designed to be replaced quickly and easily right on board the vessel. No need to unstring the ladder or any special tools required.



ADONIC II PILOT LADDER

Marking Details:

- Date of Manufacture in the following format: DD/MM/YY
- USCG approved pilot ladder 163.003/12/0 Pilot ladder meets Solas 1974, Chapter V, Regulation 17.

Description:

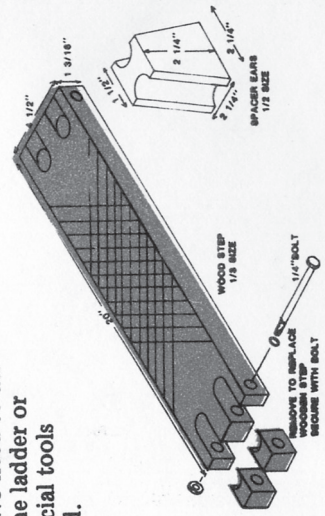
- Steps - Wood Oak, each step and spreader
- Spreaders - Wood Oak, have a diamond shape groove, a non-skid grit surface and painted a bright orange.
- Clamp - 6063 alloy aluminum.
- Rope suspension members - Synflex 3/4" Poly-Plus

PILOT LADDER CLASSIFIED BY UNDERWRITERS LABORATORIES INC.® IN ACCORDANCE WITH USCG REGULATION TITLE 46 CHAPTER 1 PART 163.003



REPLACEMENT STEP

It is designed to be replaced quickly and easily right on board the vessel. No need to unstring the ladder or any special tools required.



ADONIC I PILOT LADDER

Adonic I is approved by the U.S.C.G. with the No: 163.003/19/0. Meets and exceeds Solas standards.

Tested by Underwriters Laboratories, Inc. with a drop test of 150 ft. maximum length. Each step tested 2,000 lbs.

The steps are International Orange molded polyurethane made by Rubber Millers Inc.

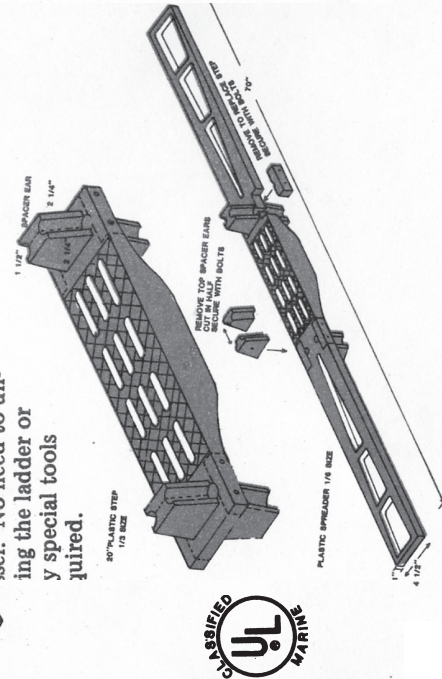
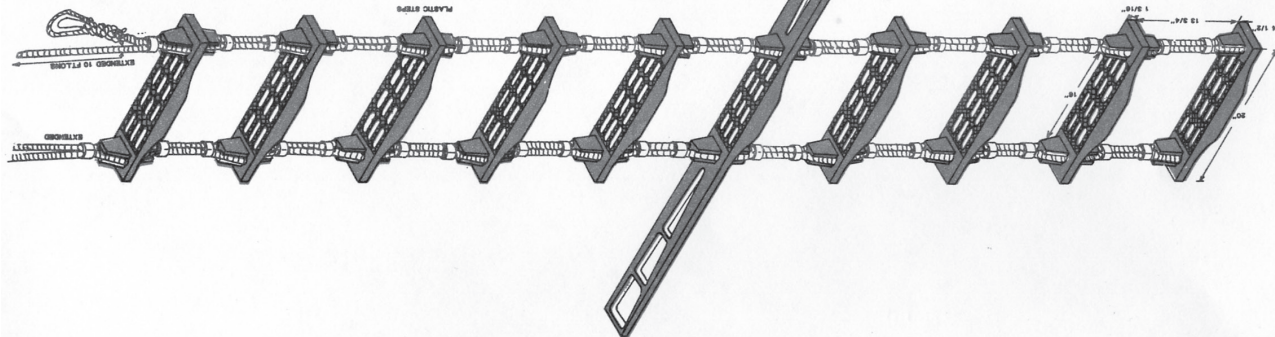
Rope suspension members are polypropylene white outer jacket an orange inner core for safety.

Clamp - 6063 Alloy Aluminum.

PILOT LADDER CLASSIFIED BY UNDERWRITERS LABORATORIES INC.® IN ACCORDANCE WITH USCG REGULATION TITLE 46 CHAPTER 1 PART 163.003

REPLACEMENT STEP

is designed to be replaced quickly and easily right on board the vessel. No need to unrig the ladder or any special tools required.



EMBARKATION-DEBARKATION EQUIVALENT TO CHAIN LADDER

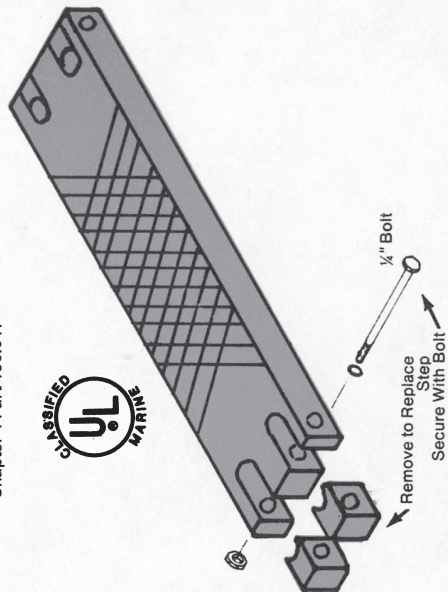
Marking Details:

- Adonic II
- Date of Manufacture in the following format: DD/MM/YY
- USCG Approval Number 160.017/58/0
- USCG approved embarkation-debarkation equivalent to chain ladder meets Solas 1974, Chapter V Regulation 17.

Description:

- Steps - Wood (Oak) have a diamond shaped grooves, non-skid grit surface and painted a bright marine orange. 4-1/2" wide, 1-3/16" thick, 20" long.
- 13-3/4" centers.
- Clamps - 6063 alloy aluminum.
- Rope suspension members - Synflex 3/4" Poly-Plus. Tested to 2,000 lbs.

Embarkation-Debarkation Equivalent to chain ladder classified by Underwriters Laboratories, Inc. in accordance with USCG Regulation Title 46 Chapter 1 Part 160.017





SCBA's.

Draeger offers two lines of high-performance self-contained breathing apparatus. The ProAir® SCBA is designed specifically to protect industrial workers. The AirBoss® offers protection for firefighters. Both systems are:

- Dependable. Over 120,000 of Draeger's latest SCBA's are presently in use.
- Warranted. Draeger SCBA's have the lowest cost of ownership and a "bumper-to-bumper" warranty.



Facepieces and masks.

Draeger's full facepieces and masks fit any air purifying or supplied air requirement.

Each full facepiece is one size fits all, due to the double-seal frame.

The Panorama Nova with wide vision range is available as a negative pressure or a positive pressure model.

The innovative Futura offers a changeable connector that lets the wearer use the mask for cartridge applications or for supplied air applications.

Combitox Nova Cartridge.

The half mask has a latex free silicone soft body that forms a smooth, comfortable seal on the wearer's face. A one-piece harness allows for quick donning and adjustment.

Dräger

Draeger Safety

Full Line of Respiration Protection and Gas Detection Products



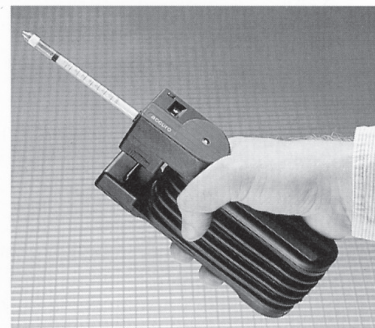
Pac III.

Offers the loudest alarm, brightest alarm light and largest backlit graphic display of any single gas monitor. Tough and tamper-proof, Pac III's ABS housing provides protection against radio frequency interference. Plug-in sensors store gas specific information on EEPROM chips. Datalogger function allows information to be downloaded to a PC for through analysis.



Dräger CMS.

Chip Measurement System for gas and vapor spot measurement, combines the advantages of chemistry and electronics to provide accurate and reliable results. The system consists of two components – a substance-specific chip, and an analyzer.



The proven bellows pump.

Three decades of extensive field use have proven that Draeger's bellows pump concept provides the best volume and flow characteristics for accurate, repeatable results.

- Scissors mechanism
- Tube opener
- Built-in stroke counter
- End-of-stroke indicator
- Designed to fit the hand.

Diffusion tubes. The Draeger Tube System measures more than 350 gases, vapors and aerosols on-the-spot.



Multiwarn II.

Multigas instrument that can be configured from 1 to 5 gases to include 1 IR and/or 1 catalytic, and any combination of 3 interchangeable electrochemical smart sensors for O₂ and 11 different toxic gases. Features include an internal pump for remote sampling, intelligent plug-in sensors and datalogger.

BRAINTEASERS

- 1) You have to get to the hospital. At a fork in the road you meet Joe and Moe, a pair of identical twin boys. You can't tell them apart, but you know that Joe always tells the truth and Moe always lies. You can ask one of them only one question. What question will guarantee that you take the correct fork... and which twin do you ask?
- 2) If you went to bed at 8 o'clock at night and wound your alarm clock to go off at 9:00 the next morning, how much sleep would you get?
- 3) Why can't a man living in North Carolina be buried in South Carolina?
- 4) If you had only one match and you entered a room in which there was a kerosene lamp, an oil heater, and a wood-burning stove, which would you light first?

ANSWERS

- 1) You ask either of them, "If I asked your twin which road to take to get to the hospital, which way would he tell me to go?" And then you would take the other road. Why? If the truth-telling twin tells you what his twin would say, it would be a lie, so the direction indicated would be wrong. The lying twin would lie about what his twin would say, which would be the truth, so the lying twin would also indicate the wrong path.
- 2) One hour. Windup clocks don't have A.M./P.M. settings.
- 3) He could, but he would be pretty uncomfortable being buried alive.
- 4) The match.

In case you needed further proof that the human race is doomed through stupidity, here are some actual label instructions on consumer goods:

- On a Sears hairdryer: Do not use while sleeping. (and that's the only time I have to work on my hair).
- On a bag of Fritos: You could be a winner! No purchase necessary details inside. (the shoplifter specia?)
- On a bar of Dial soap: "Directions: Use like regular soap."(and that would be how???....)
- On some Swanson frozen dinners: "Serving suggestion:Defrost." (but, its "just" a suggestion).
- On Tesco's Tiramisu dessert (printed on bottom): "Do not turn upside down. "(well ...duh, a bit late, huh!)
- On Marks & Spencer Bread Pudding: "Product will be hot after heating" (...and you thought????...)
- On packaging for a Rowenta iron: "Do not iron clothes on body" (but wouldn't this save me more time?)
- On Boot's Children Cough Medicine: "Do not drive a car or operate machinery after taking this medication." (We could do a lot to reduce the rate of construction accidents if we could just get those 5-year olds with head-colds off those forklifts.)
- On Nytol Sleep Aid: "Warning: May cause drowsiness."(and ... I'm taking this because????....)
- On most brands of Christmas lights: "For indoor or outdoor use only." (as opposed to ... what?)
- On a Japanese food processor: "Not to be used for the other use" (now, somebody out there, help me on this. I'm a bit curious.)
- On Sunbury's peanuts: "Warning: contains nuts." (talk about a news flash)
- On an American Airlines packet of nuts: "Instructions: Open packet, eat nuts." (Step 3: maybe, uh...fly Delta?)
- On a child's superman costume: "Wearing of this garment does not enable you to fly"

Index Section I

PILOT HOUSE

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Bill of Rights

Amendment 1. Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof, or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

Joseph Story, Congressman and Professor of Law at Harvard, was appointed to the Supreme Court in 1811 by James Madison, the Father of the U.S. Constitution. He served on the Court for 34 years. Story's great work, Commentaries on the Constitution of the United States, is considered a classic of American jurisprudence. He was instrumental in establishing the illegality of the slave trade. He also convincingly argued that the United States of America was built on the principles of Christianity. In a speech at Harvard, Story stated bluntly:

There never has been a period of history, in which the Common Law did not recognize Christianity as lying at its foundation.

In his work, A Familiar Exposition of the Constitution of the United States, Justice Story had this to say about the purpose of the First Amendment:

We are not to attribute this prohibition of a national religious establishment [in the First Amendment] to an indifference to religion in general, and especially to Christianity (which none could hold in more reverence than the framers of the Constitution)...

Probably, at the time of the adoption of the Constitution, and of the Amendment to it now under consideration, the general; if not the universal, sentiment in America was, that Christianity ought to receive encouragement from the State so far as was not incompatible with the private rights of conscience and the freedom of religious worship.

Any attempt to level all religions, and to make it a matter of state policy to hold all in utter indifference, would have created universal disapprobation, if not universal indignation.

In other words, the purpose of the First Amendment was to protect a religious people from the government-not to protect the government from a religious people. It is perfectly all right, under the First Amendment, for the Government of the United States to favor Christianity over other faiths-so long as other faiths are not persecuted by the government, and so long as the national government does not attempt to set up a national church, such as the Anglican Church in England. In his Commentaries on the Constitution, Justice Story stated:

It yet remains a problem to be solved in human affairs, whether any free government can be permanent where the public worship of God, and the support of religion, constitute no part of the policy or duty of the state in any assignable shape.

In fact, in his commentary on the purpose of the First Amendment, Justice Story stated:
The real object of the First Amendment was not to countenance much less to advance Mohammedanism, or Judaism, or infidelity, by prostrating Christianity, but to exclude all rivalry among Christian sect [denominations] and to prevent any national ecclesiastical patronage of the national government.



PILOT RECLINER

SC-100 PILOT RECLINER

FEATURES:

Powder coated steel frame with recliner mechanism
Molded foam seat cushion
Molded foam arm rests
Molded foam adjustable headrest
Morbern Alante vinyl upholstery

OPTIONS:

Stainless steel powder coated frame Power lumbar system
Electric seat heating system Towel bar slide tracks
Seat bottom skirts
Rockwell 6-way power seat adjuster

Leather Upholstery Options:

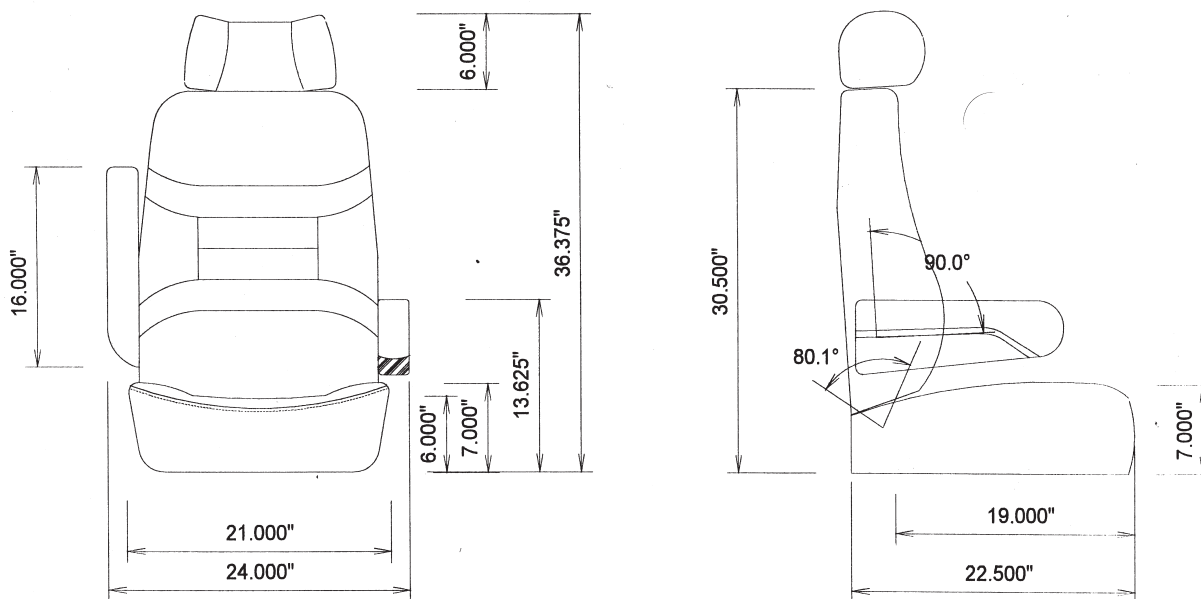
Full face leather with matching vinyl
Perforated leather accents

Exotic Skin Options:

Full quill South African ostrich accents
North American alligator skin accents



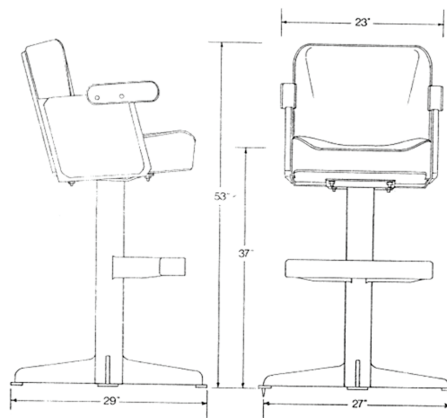
SC-100 PILOT RECLINER



STANDARD OFFSHORE PILOT CHAIR

NO. EMS-2037

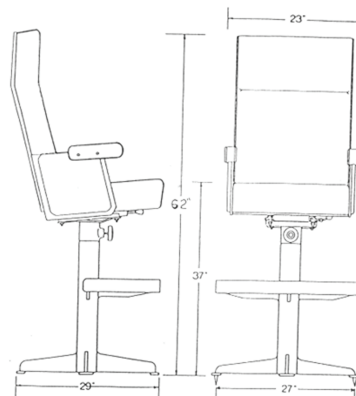
- An exceptional offering for the captain
- Not the usual helmsman seat, but an operator's chair: comfortable, custom designed
- Constructed of the finest materials available to withstand rugged offshore service
- Padding is highly resilient, fire retardant foam
- Upholstered in fire and mildew retardant 40 oz. marine grade vinyl of the finest quality
- Sturdy, all welded, corrosion resistant frames of marine grade aluminum alloy
- 31/2" fore and aft traverse adjustment
- Years of comfortable riding are built into this unit
- Safety belts optional at additional cost
- Boat seating of distinction



DELUXE OFFSHORE PILOT CHAIR

EMS-2037D

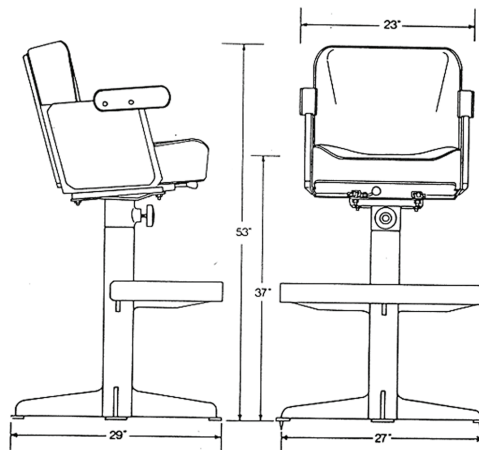
- Years of comfortable riding are built into this unit
- A luxurious offering for the captain
- Constructed of the finest materials available to withstand rugged offshore service
- Sturdy, all welded corrosion resistant frames of marine grade aluminum alloy
- 3-1/2" fore and aft traverse adjustments
- 360 swivel with positive lock
- More than the usual pilot house chair, this is for an operator: custom designed for comfort and ruggedness
- Padding is highly resilient, fire retardant foam With lumbar support for added comfort
- Upholstered in fire and mildew retardant 40 oz. marine grade vinyl of the finest quality
- Styling and comfort endorsed and used by many of today's workboat owners
- Safety belts optional at additional cost
- Boat seating of distinction



STANDARD OFFSHORE PILOT CHAIR/ SWIVEL

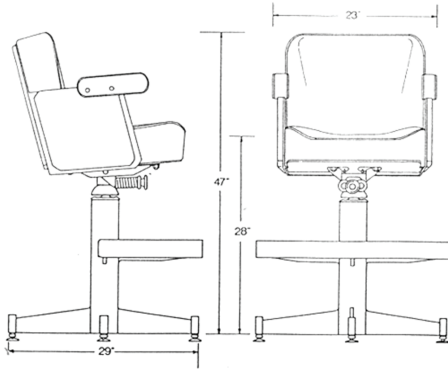
NO. EMS-2037S

- A versatile chair for the captain
- Constructed of the finest materials
- Sturdy, all welded, corrosion resistant frames of marine grade aluminum alloy
- 3-1/2" fore and aft traverse adjustment
- 360° swivel with a positive lock
- Not the usual helmsmen seat, but an operator's chair, custom designed to withstand rugged offshore service
- Padding is highly resilient, fire retardant foam
- Upholstered in fire and mildew retardant 40 oz. marine grade vinyl of the highest quality
- Safety belts optional at additional cost
- Boat seating of distinction



INLAND PILOT CHAIR

NO. EMS-2028



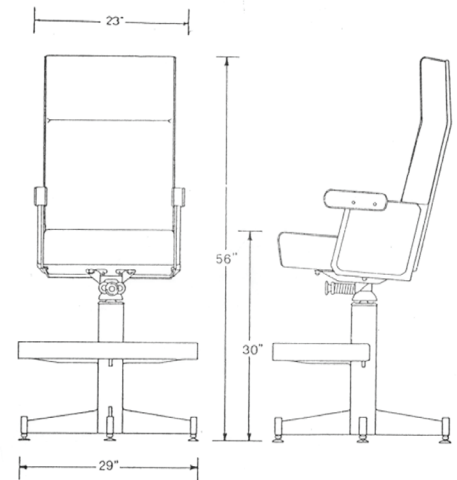
- Specialized for inland use
- A luxurious chair for the captain
- Constructed of the finest materials available
- Padding is highly resilient, fire retardant foam
- Upholstered in fire and mildew retardant 40 oz. marine grade vinyl of the finest quality
- Sturdy, all welded, corrosion resistant frames of marine grade aluminum alloy
- 360° swivel and rocking mechanism
- Floor glides are adjustable for accurate installation
- swivel casters optional at additional cost
- boat seating of distinction



DELUXE HIGHBACK INLAND PILOT CHAIR

NO.EMS-2028D

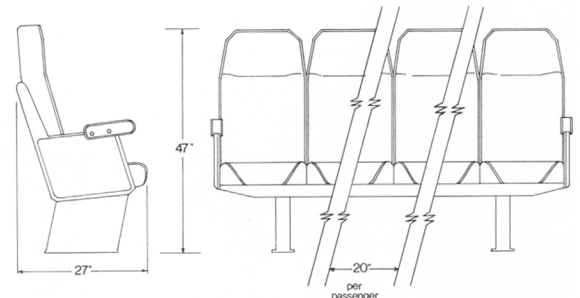
- Luxurious offering for the captain
- More than the usual pilot chair, this is for an operator: custom designed for comfort and ruggedness
- Years of comfortable riding are built into this unit
- Constructed of the finest materials available to withstand rugged inland service
- Sturdy, all welded, corrosion resistant frames of marine grade aluminum alloy
- Upholstered in fire and mildew retardant 40 oz. marine grade vinyl of the finest quality
- Padding is highly resilient, fire retardant foam with lumbar support for added comfort
- 360° swivel
- Styling and comfort endorsed and used by many of today's workboat owners
- Boat seating of distinction



DELUXE PASSENGER SEATING

NO. EMS-D3

- Streamline seating, well suited for marine industry, excursion boats and public transportation
- Headrest allows extra support and safety, features that show you care about your passengers
- Sturdy, all welded, corrosion resistant frames of marine grade aluminum
- Padding is highly resilient, fire retardant foam
- Upholstered in fire and mildew retardant 40 oz. Marine grade vinyl of the finest quality
- Provides years of spacious and restful travel
- Styling and comfort endorsed by many of today's workboat owners
- Units available in singles, doubles, triples or Quads to fit space requirements
- Armrest optional at additional cost
- Boat seating of distinction

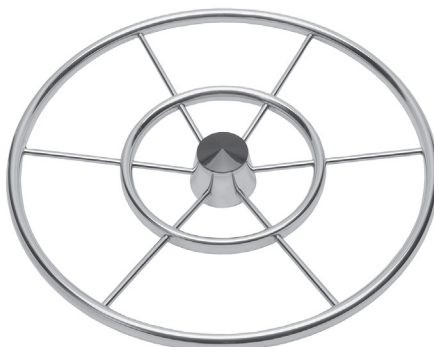


Schmitt

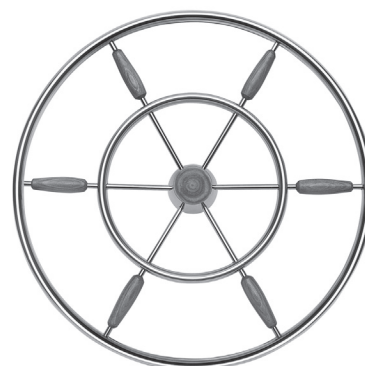
MARINE STEERING WHEELS

DESTROYER STYLE WHEELS

MODEL 110			
DOUBLE RING DESTROYER — BLACK CENTER CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
24"	3/8"	10	112-24-1-1



MODEL 120			
DOUBLE RING DESTROYER W/PAKKAWOOD GRIPS AND CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
24"	3/8"	10	122-24-1-1



6 SPOKE DESTROYER STYLE WHEELS



MODEL 150			
DESTROYER 6 SPOKE — BLACK CENTER CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
11"	3/8"	10	152-11-1-1
15 1/2"	3/8"	10	152-16-1-1
15 1/2"	3/8"	22	152-16-2-1
18"	3/8"	10	152-18-1-1
20"	3/8"	10	152-20-1-1
22"	3/8"	10	152-22-1-1
24"	3/8"	10	152-24-1-1
28"	1/2"	10	153-28-1-1
30"	1/2"	10	153-30-1-1

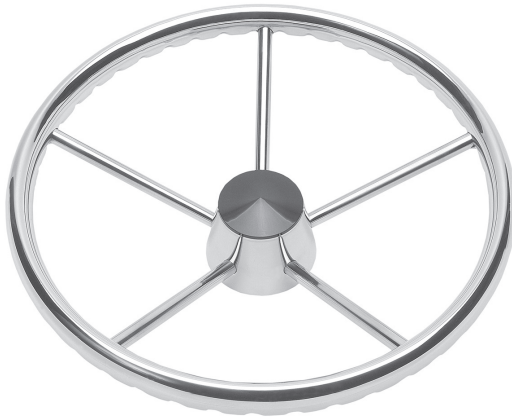
MODEL 150 — SPECIAL HUB REQUIREMENTS			
DESTROYER 6 SPOKE - BLACK CENTER CAP			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
11"	3/8"	10	152-11-1-X
15 1/2"	3/8"	10	152-16-1-X
15 1/2"	3/8"	22	152-16-2-X
18"	3/8"	10	152-18-1-X
20"	1/2"	10	153-20-1-X
22"	1/2"	10	153-22-1-X
24"	1/2"	10	153-24-1-X
28"	1/2"	10	153-28-1-X
30"	1/2"	10	153-30-1-X



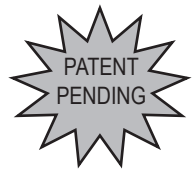
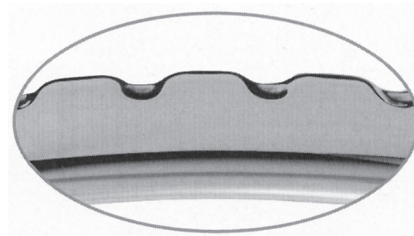
Schmitt

MARINE STEERING WHEELS

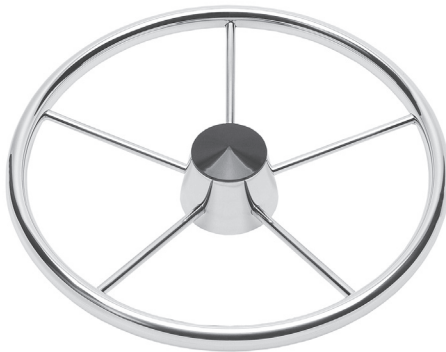
5 SPOKE DESTROYER STYLE WHEELS



MODEL 170 FINGER GRIP			
DESTROYER 5 SPOKE — FINGER GRIPS — BLACK CENTER CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
13 1/2"	1/2"	22	173-13-2-1-FG
15 1/2"	1/2"	22	173-15-2-1-FG



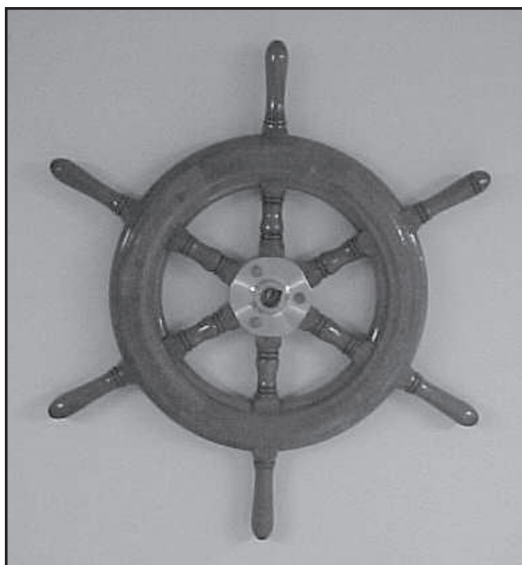
MODEL 170 FOAM GRIP			
DESTROYER 5 SPOKE — BLACK FOAM RIM — BLACK CENTER CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
13 1/2"	3/8"	22	172-13-2-1-F2
14"	3/8"	22	172-14-2-1-F2
15 1/2"	3/8"	22	172-15-2-1-F2



MODEL 170			
DESTROYER 5 SPOKE—STANDARD POLISHED RIM— BLACK CENTER CAP HUB SIZE: 1"/FT TAPER (3/4" SHAFT)			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
13 1/2"	3/8"	22	172-13-2-1
14"	3/8"	22	172-14-2-1
15 1/2"	3/8"	10	172-15-1-1
15 1/2"	3/8"	22	172-15-2-1
MODEL 170 — SPECIAL HUB REQUIREMENTS			
DESTROYER 5 SPOKE — BLACK CENTER CAP			
WHEEL DIAMETER	SPOKE SIZE	DEGREE OF DISH	PART NUMBER
15 1/2"	3/8"	10	172-15-1-X
15 1/2"	3/8"	22	172-15-2-X

Mahogany Steering Wheel

Available in 24, 36 & 42 inch diameter
24" has a 1" straight bore
36" & 42" have 1 1/2" straight bore



Think You're Having A Bad Day.... Check out these actual cases compiled from news headlines over the years.

- Fire authorities in California found a corpse in a burned-out section of forest while assessing the damage done by a forest fire. The deceased male was dressed in a full wet suit, complete with scuba tanks on his back, flippers, and face mask. A post-mortem test revealed that the man did not die from burns, but from massive internal injuries. Dental records provided a positive identification. Investigators then set about to determine how a fully-clad diver ended up in the middle of a forest fire. It was revealed that on the day of the fire, the man went diving off the coast, some 20 miles from the forest. The fire fighters, seeking to control the fire as quickly as possible, had called in a fleet of helicopters with very large dip buckets. Water was dipped from the ocean and emptied at the site of the forest fire. You guessed it. One minute our diver was making like Flipper in the Pacific, the next, he was doing the breast stroke in a fire dip bucket 300 feet in the air. Some days it just doesn't pay to get out of bed.
- **Still think you're having a bad day?** A man was working on his motorcycle on the patio, his wife nearby in the kitchen. While racing the engine, the motorcycle accidentally slipped into gear. The man, still holding onto the handlebars, was dragged along as it burst through the glass patio doors. His wife, hearing the crash, ran in the room to find her husband cut and bleeding, the motorcycle, and the shattered patio door. She called for an ambulance and, because the house sat on a fairly large hill, went down the several flights of stairs to meet the paramedics and escort them to her husband. While the attendants were loading her husband, the wife managed to right the motorcycle and push it outside. She also quickly blotted up the spilled gasoline with some paper towels and tossed them into the toilet. After being treated and released, the man returned home, looked at the shattered patio door and the damage done to his motorcycle. He went into the bathroom and consoled himself with a cigarette while attending to his business. About to stand, he flipped the butt between his legs. The wife, who was in the kitchen, heard a loud explosion and her husband screaming. Finding him lying on the bathroom floor with his trousers blown away and burns on his buttocks, legs and groin, she once again phoned for an ambulance. The same paramedic crew was dispatched. As the paramedics carried the man down the stairs to the ambulance they asked the wife how he had come to burn himself. She told them. They started laughing so hard, one slipped, dropping the stretcher and dumping the husband out. He fell down the remaining stairs, breaking his arm.
- **Still having a bad day?** Just remember, it could be worse... The average cost of rehabilitating a seal after the Exxon Valdez oil spill in Alaska was \$80,000. At a special ceremony, two of the most expensively saved animals were being released back into the wild amid cheers and applause from onlookers. A minute later, in full view, a killer whale ate them both.
- **Still think you are having a bad day?** A woman came home to find her husband in the kitchen shaking frantically, almost in a dancing frenzy, with some kind of wire running from his waist towards the electric kettle. Intending to jolt him away from the deadly current, she whacked him with a handy plank of wood, breaking his arm in two places. Up to that moment, he had been happily listening to his walkman.
- **Still think you're having a bad day?** Two animal rights protesters were protesting at the cruelty of sending pigs to a slaughterhouse in Bonn, Germany. Suddenly, all two thousand pigs broke loose and escaped through a broken fence, stampeding madly. The two hopeless protesters were trampled to death.
- What? STILL having a bad day?? Iraqi terrorist Khay Rahnajet didn't pay enough postage on a letter bomb. It came back with "return to sender" stamped on it. Forgetting it was the bomb, he opened it and was blown to bits.

SUGGESTIONS AND WARNINGS WHEN SELECTING A MECHANICAL STEERING SYSTEM

Selection of the appropriate mechanical steering system is an important factor for the safety and functionality of your boat.

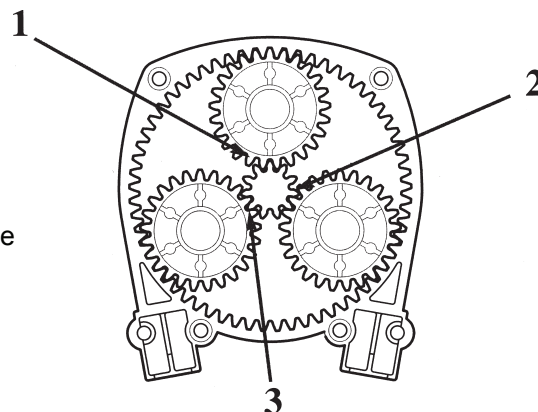
The combination of engine power, hull type and boat speed influence the correct selection of the steering system. The load on the steering system increases with the boat speed and engine power; the torque generated by the propeller rotation in high power outboard applications can make it hard to steer.

Big boats with displacement hulls and inboard or stern drive engines, can generate high rudder loads: in these cases a mechanical steering system will be inadequate and we suggest the use of a Hydraflex hydraulic steering system.

We always recommend consulting qualified personnel when selecting, installing and maintaining a steering system for your boat.

ADVANTAGES OF A PLANETARY GEAR DESIGN

Ultraflex mechanical steering helms T71FC, T73NR FC as well as the dual cable versions and tilt wheel versions use a Planetary Gear Design. A Planetary Gear Design has three satellite gears that rotate on their axis and at the same time rotate around the central helm axis. This allows for equal distribution of engine torque over three points of the central gear, dividing and balancing the system loads. The benefits of this special design are increased system longevity, increased efficiency and less engine feedback compared to single pinion gear helms.



THE IMPORTANCE OF A NON REVERSIBLE STEERING SYSTEM FOR INCREASED SAFETY

The steering system of a boat is the mechanism that determines the boat direction when the steering wheel is turned.

If, for any circumstance, the driver does not hold the wheel, it may occur a situation of danger caused by a sudden change of direction of the boat due to external forces (waves, currents, etc.) or internal forces such as the rotation of the outboard or stern drive engine originated by the way of rotation of the propeller.

Engine torque usually generates a load on the steering system that must be continually compensated for by the driver even when the boat is going straight. The additional effort by the driver to maintain a true course can often cause fatigue.

With **Ultraflex Non-Reversible steering** helms T73NR FC, T74NR FC, T83NR FC, T84NR FC the loads applied to the steering system are no longer a problem.

A special patented device allows the helm shaft to lock until turned by the driver, maintaining the boat direction and neutralizing the feedback loads on the steering cable.

This mechanism is engaged when the driver is not turning the wheel and is automatically disengaged as soon as the driver applies pressure on the wheel to change direction of the boat.

The Ultraflex **Non-Reversible** mechanism designed for mechanical steering systems makes driving a boat safer and easier.

USE AND MAINTENANCE




The steering cable must be installed avoiding excessive and/or tight bends. This will provide the driver with easy handling at all speeds; reduce system inefficiency, and excess play in the system.

Marine corrosion may cause the materials to deteriorate affecting manoeuvring efficiency and in the worst case, system failure. By following the engine manufacturer specifications, the steering cable end fittings and the engine cable support must be cleaned and greased periodically; these simple operations minimize wear and corrosion in the system.

The steering cable must be regularly inspected. If steering becomes hard, inconsistent, cuts on the conduit surface are noticed, or any other component found damaged, the cable must be replaced immediately.

When storing your boat for an extended period of time we recommend removing the steering cable end fitting from its engine side support and cleaning it adequately.

SELECTION OF STEERING SYSTEM AND CABLE LENGTH MEASUREMENT

APPLICATION	BOAT LENGTH	STEERING SYSTEM
OUTBOARD	up to 30' (9m)	T71FC - T81FC T73NR FC
		twin cable T72FC T82FC T74NR FC - T84NR FC
INBOARD	up to 35' (10.5m)	T71FC - T81FC T73NR FC - T83NR FC
		twin cable T72FC T82FC - T74NR FC T84NR FC
STERNDRIVE	up to 35' (10.5m)	T71FC - T81FC - T73NR FC - T83NR FC
		twin cable T72FC - T82FC - T74NR FC T84NR FC

Twin cable system are recommended for boats that exceed 50 mph. Always follow engine manufacturer's instructions.

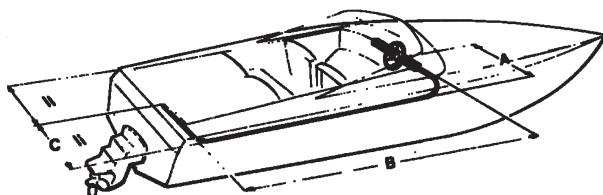
NOTE: sterndrive engines not equipped with power steering can create very high steering loads. Hydraflex hydraulic steering system is recommended for these type of boats.

- Speed, hull, horsepower, engine type, displacement and size are major factors in boat performance and handling characteristics. The above selection guide should be used as a general reference only.
- One of the major factors in selecting a steering system is proper cable length. Due to specific routing in each boat, these

approximate lengths will vary. Final selection should be made with the assistance of a qualified technician.

- Ultraflex mechanical steering systems should not be used on boats equipped with engines that exceed the maximum horsepower rating of the boat.

HOW TO MEASURE FOR NEW STEERING CABLE INSTALLATION



Add. A + B + C and subtract 10 cm for each 90° bend in the cable.
For installation through the engine tilt tube, add 30,5 cm (1 ft) to the measure calculated above.
To order in foot length, divide for 30,5 and round off to next whole foot.

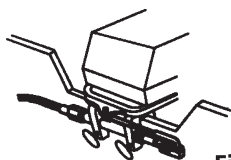


Fig. 1

TILT TUBE MOUNTING - Fig. 1
Example (dimensions in cm):
 $A (50) + B (250) + C (80) = 380$
 $20 \text{ for two } 90^\circ \text{ bends} = 360 + 30.5$
for a thru-tube installation = 12.8 ft round off to 13 ft.

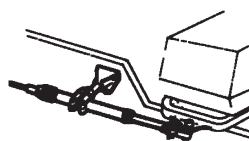


Fig. 2

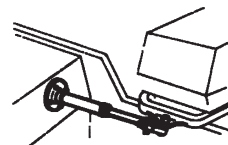
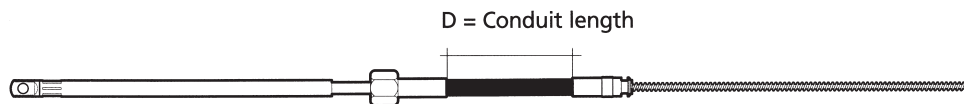


Fig. 3




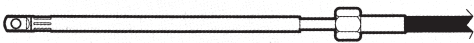


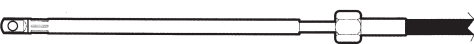



TRANSOM SUPPORT OR SPLASHWELL MOUNTING - Fig. 2-3
Example (dimensions in cm):
 $A (50) + B (250) + C (80) = 380 - 20 \text{ for two } 90^\circ \text{ bends} = 360$
 $30.5 = 11.8 \text{ ft round off to } 12 \text{ ft.}$

HOW TO MEASURE FOR REPLACEMENT STEERING CABLES



ORDER LENGTH: "D" dimension + 22" and round up to the next whole foot
Example: $D = 120" + 22" = 142" (11'8")$. Round up to 12 ft.

**REPLACEMENT
STEERING
CABLES**

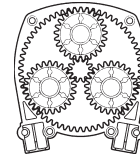
ULTRAFLEX REPLACEMENT CABLE	STEERING HELM	ADAPTOR REQUIRED
M55  	P15 - P22 Teleflex® ATB RACK - SSC122	none M55 AD
M66  	T71FC - T72FC T73NR FC - T74NR FC T81FC - T82FC T83NR FC - T84NR FC Safe - TQC®/NFB® Teleflex® - D290 Morse® Ultraflex year 2001 and prior: T71 - T72 - T73NR T74NR - T81 - T82 T83NR - T84NR	none K66 - 38432Q 
M47  	Ultraflex year 2001 and prior: T71 - T72 - T73NR T74NR - T81 - T82 T83NR - T84NR T71FC - T72FC T73NR FC - T74NR FC T81FC - T82FC T83NR FC - T84NR FC D290 Morse®	none K46-35679L 
M86 	UNIVERSAL RACK CABLE replaces Morse® Command 200 and Teleflex® "THE RACK" SSC-124 steering cables NOTE: Will not work with dual cable helms	none
M48 + M47D 	Dual station steering systems: T71 Safe - T® Big-T® Teleflex®	none

Part numbers for ordering:

M55 XLL	LL = Length of cable
M66 XLL	LL = Length of cable
M47 XLL	LL = Length of cable
M86 XLL	LL = Length of cable
M48 XLL	LL = Length of cable
M47D XLL	LL = Length of cable

ROTECH AND ACCURA PACKAGED STEERING SYSTEMS

FEATURING
PLANETARY GEAR
DESIGN



ULTRAFLEX ROTARY STEERING SYSTEM PACKAGED IN A BOX

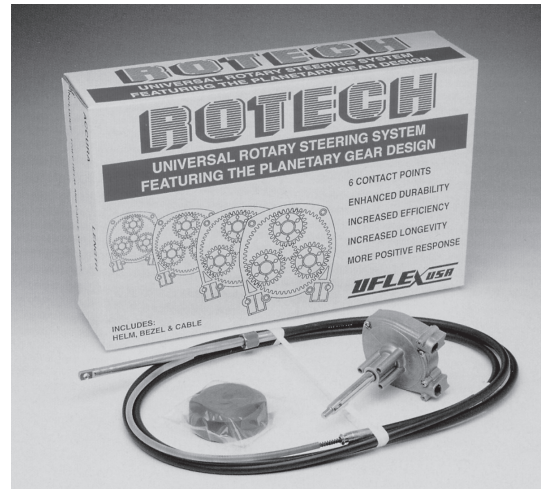
A convenient kit form, especially suitable as replacement steering, that includes helm, bezel and cable. The cable is available in 1-ft increments from 8 to 20 feet (specify cable length when ordering)

The wheel is not included

ROTECH

ROTECH - I XLL - LL= Length
T 71FC - helm
X 34 - 90° bezel
M 66 - steering cable

ROTECH - II XLL - LL= Length
T72FC - helm-dual
X 34 - 90° bezel
M 66 - 2 steering cables



ACCURA

ACCURA - I XLL - LL= Length
T73NR FC - helm
X34 - 90° bezel
M66 - steering cable

ACCURA - II XLL - LL= Length
T74NR FC - helm - dual
X34 - 90° bezel
M66 - steering cable

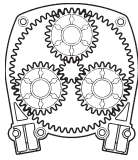


BRAINTEASERS

- 1 Two men were playing checkers. Each played five games and each won the same number of games. No draws. How can this be?
- 2 You have two coins in your hands equaling 55 cents. One of them is not a nickel. What are the coins?
- 3 It is a scientific fact that a person eats over an inch of dirt at every meal. How is this possible?
- 4 Jeff bought a word processor small enough to fit in his pocket. It can add, multiply, subtract, divide, and write in all languages. It has a delete device that will correct any error, and no electricity is required to operate it. Amazingly, it costs only 12 cents. How can it be so cheap?

4 His new computer/word processor is a pencil.
3 The Earth is always under you, so you are eating over dirt?
2 A 50-cent piece and a nickel. (Only one of them is not a nickel).
1 They've got different partners.

ANSWERS



FEATURING PLANETARY GEAR DESIGN

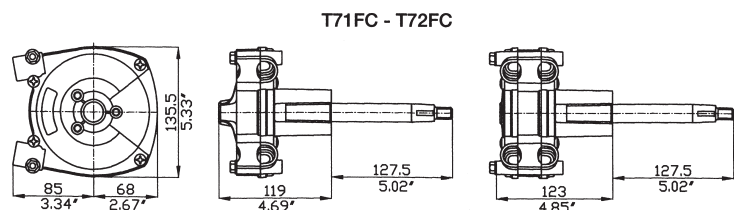
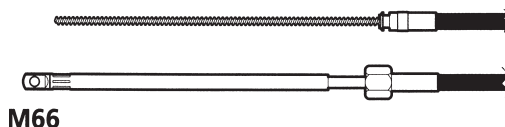
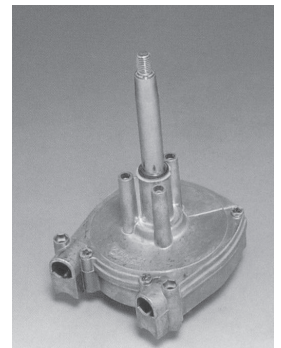
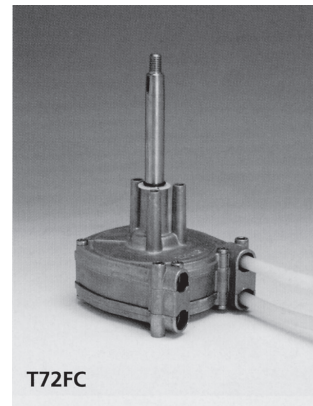
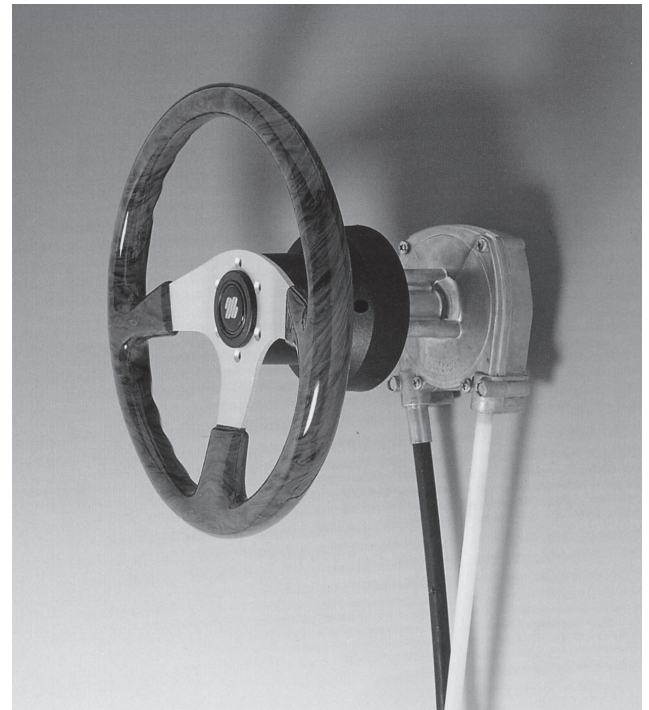
T71FC AND T72FC ROTARY STEERING SYSTEMS

A COMPLETE STEERING SYSTEM CONSISTS OF:

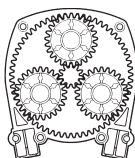
- Steering helm:
T71FC - 38867 H - single cable steering helm
T72FC - 38868 K - dual cable steering helm
- Mounting bezel:
X34 - 36654 B - 90° mounting
X35 - 36655 C - 20° mounting
- Steering cable: M66 (Note: two M66 are needed with the T72FC system)
- Optional steering wheel
- Engine connection kits

FEATURES AND TECHNICAL SPECIFICATIONS

- New fast connect system
- Corrosion resistant materials
- Particularly suitable where clearance is limited
- Optional 90° or 20° installation
- Lock-to-lock steering wheel turns: approx. 3.8
- Stroke: 9" (228 mm)
- Maximum allowable steering wheel diameter: 16" (406 mm)
- Minimum steering cable bend radius: 7.9" (200 mm)
- Minimal feedback
- Compact for mounting
- Available in package with Rotech (see prev. page)
- Exceeds EN 28848 safety standards
- Exceeds ABYC P17 safety standards
- T71FC and T72FC steering systems should not be used on boats equipped with engines that exceed the maximum horsepower rating of the boat
- For boats faster than 50 mph the twin cable steering system T72FC is recommended



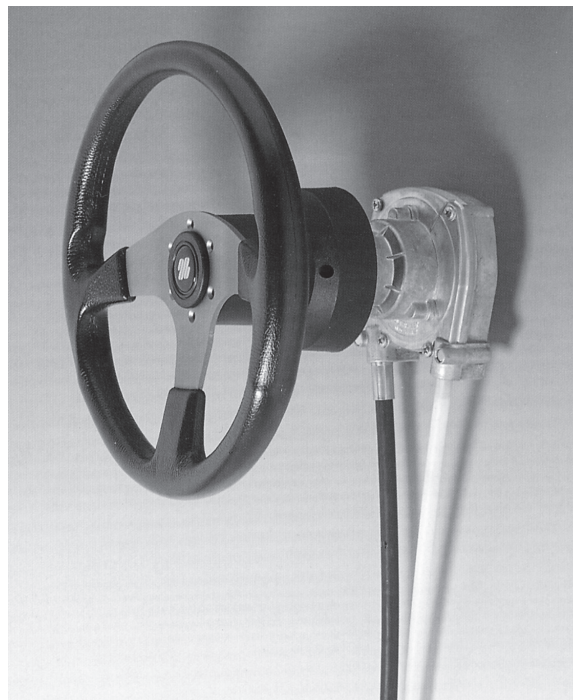
FEATURING
PLANETARY GEAR
DESIGN



T73NR FC AND T74NR FC NON-RE-VERSIBLE STEERING SYSTEMS

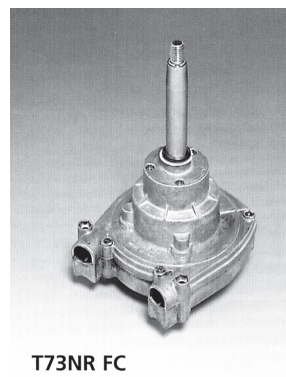
A COMPLETE STEERING SYSTEM CONSISTS OF:

- Steering helm:
T73NR FC - 38869 M - single cable steering helm
T74NR FC - 38870 W - dual cable steering helm
- Mounting bezel:
X34 - 36654 B - 90° mounting
X35 - 36655 C - 20° mounting
- Steering cable: M66 (Note: two M66 are needed with the T74NR FC system)
- Optional steering wheel
- Engine connection kits

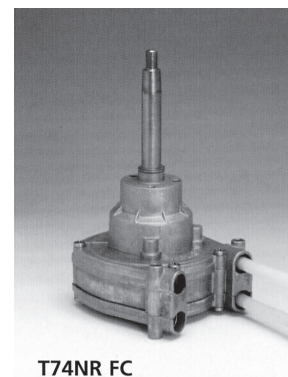


- Fast connect system
- Patented non-reversible mechanism: it eliminates the continuous load on the operator caused by the propeller torque making steering easy and safe.
- Ideal for larger outboards and surfacing propellers.
- Compact rotary helm unit: the central location of the steering shaft makes these systems the most compact in their class. Most suitable where clearance is limited. Standard 3/4" tapered shaft.
- Made exclusively in corrosion resistant materials.
- Lock-to-lock steering wheel turns: approx 3.8
- Maximum allowable steering wheel diameter: 16" (406 mm)
- Minimum steering cable bend radius: 7.9" (200 mm)
- Available in package with Accura (see page 8)
- Exceeds ABYC P17 safety standards
- T73NR FC and T74NR FC steering systems should not be used on boats equipped with engines that exceed the maximum horsepower rating of the boat.

For boats faster than 50 mph the twin cable steering system T74NR FC is recommended



T73NR FC



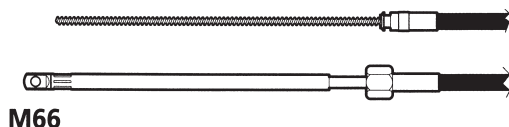
T74NR FC



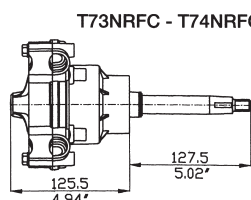
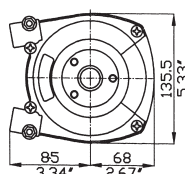
X34



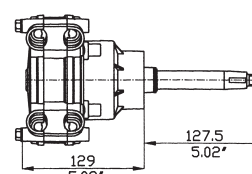
X35



M66



T73NRFC - T74NRFC



SINGLE LEVER TOP MOUNT CONTROLS

Single lever / dual action control to operate both throttle and shift.

Suitable for any type of boats with outboard, inboard or I/O power plants.

FEATURES

- Enables easy and safe shifting by preventing accidental gear engagement unless engine is idling
- Made of chrome plated marine aluminum
- Pull-out handle disengages shift for warm-up
- Neutral safety switch **X43** - 38160 L prevents in-gear starting
- Built-in friction to avoid throttle creep
- For use with Ultraflex C2, C8, Czero and all 33C style engine control cables
- Exceeds EN 11547 standards when X43 safety switch is installed

MODELS

B103 - 37923 K

Single lever control for one engine

B104 - 37924 L

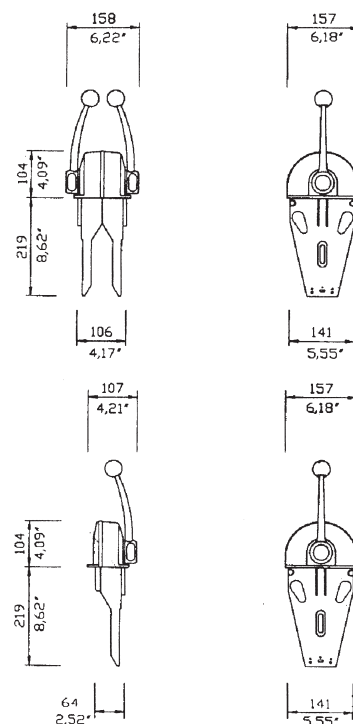
Single lever control for two engines

B1035 - 39354 G

Single lever control for one engine - Silver knob

B104S - 39355 J

Single lever control for two engines - Silver knobs



The Bum

A bum, who obviously is down on his luck, approaches a well-dressed gentleman on the street. "Hey, Buddy, can you spare \$2.00?" The welldressed gentleman responds, "You're not going to spend it on liquor, are you?" "No, sir, I don't drink," retorts the bum. You're not going to throw it away in some craps game, are you?" asks the gentleman. "No, way, I don't gamble," answers the bum. "You wouldn't waste the money at a golf course for greens fees, would yon?" asks the man. "Never," says the bum, "I don't play golf." The man asks the bum if he would like to come home with him for a home cooked meal. The bum accepts eagerly. While they are heading for the gentleman's home, the bum's curiosity gets the better of him. "Isn't your wife going to be angry when she sees a guy like me at your table?" "Probably," says the man, "but it will be worth it. I want her to see what happens to a guy who doesn't drink, gamble or play golf!"

SINGLE LEVER TOP MOUNT CONTROLS

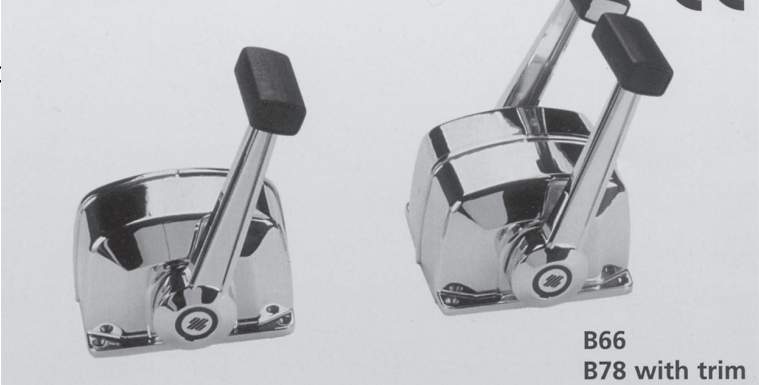
Single lever / dual action control to operate both throttle and shift.

Suitable for any type of boats with outboard, inboard or I/O power plants.

FEATURES

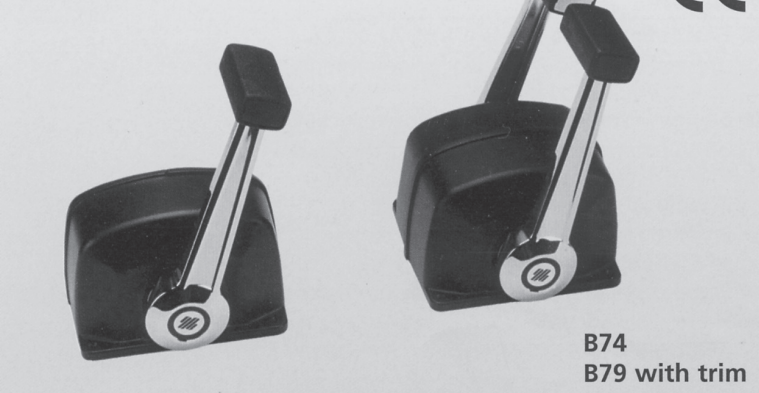
- Enables easy and safe shifting by preventing accidental gear engagement unless engine is idling
- Made of marine aluminum, chrome plated or powder coat finish
- Pull-out handle disengages shift for warmup
- Neutral safety switch X12 - 34543 Q prevents in-gear starting
- Power trim switch conveniently located in the handle grip enables for easy tilting of the engine
- For use with:
 - All Ultraflex control cables except C22 and C4
 - Mercury® \ current OMC® \ Yamaha® \ Suzuki® Honda® \ Volvo® style cables
 - 33C style cables
- Ultraflex C5, C16 and Mercury® cables require K35 kit - 34730 U
- Exceeds EN 11547 standard when X12 safety switch is installed

B65
B76 with trim



B66
B78 with trim

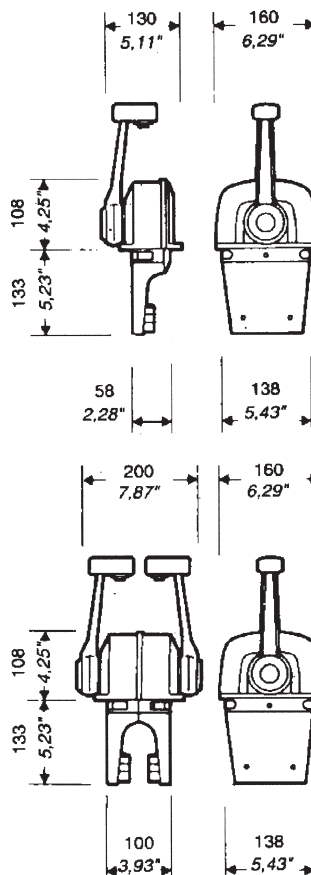
B73
B77 with trim



B74
B79 with trim

MODELS

- | | |
|---------------|---|
| B65 - 34731 V | Single lever control for one engine, chrome plated |
| B76 - 35312 E | Single lever control for one engine, chrome plated, with trim. |
| B66 - 34732 W | Single lever control for two engines, chrome plated |
| B78 - 35314 G | Single lever control for two engines, chrome plated, with trim. |
| B73 - 35007 T | Single lever control for one engine, black dome, chrome plated lever. |
| B77 - 35313 F | Single lever control for one engine, black dome, chrome plated lever, with trim |
| B74 - 35008 B | Single lever control for two engines, black dome, chrome plated lever. |
| B79 - 35315 H | Single lever control for two engines, black dome, chrome plated lever, with trim. |



Handle with trim

SINGLE LEVER **SIDE MOUNT CONTROLS**

Single lever / dual action control to operate both throttle and shift.

Suitable for any type of boats with outboard, inboard or I/O power plants.

FEATURES

- Enables easy and safe shifting by preventing accidental gear engagement unless engine is idling
- Can be installed horizontally or vertically, on the starboard or port side of the boat The lever assembly is made of painted marine aluminum
- Provided with a brake tension release system adjustable from outside
- Pull-out handle disengages shift for warm-up Neutral safety switch **X12** - 34543 Q or X50 - 38817 S (for B184M) prevents in-gear starting
- All models are provided with positive lockin neutral to prevent accidental gear engagement
- B184 model is provided with a power trim conveniently located in the handle grip that enables for easy tilting of the engine
- For use with:
 - All Ultraflex control cables except C22 and C4 - Mercury® \ current OMC® \ Yamaha® \ Suzuki® Honda® \ Volvo® style cables
 - 33C style cables
- Ultraflex C5 and C16 and Mercury® cables require **K35** - 34730 U connection kit Exceeds EN 11547 standards when X12 or X50 safety switch is installed

MODELS

B183 - 38945 B

Provided with a positive lock-in neutral B184 - 38946 D

Provided with a positive lock-in neutral and trim switch

B85 - 35682 I

Standard model, smooth design for use on sailboats. Provided with a positive lock-in neutral.

B184Merc - 38816 P

For MERCURY® or MERCURUISER® engines. It includes **X50** - 38817 S neutral safety switch for trim and tilt functions and **K35** - 34730 U connection kit for Mercury® cables.



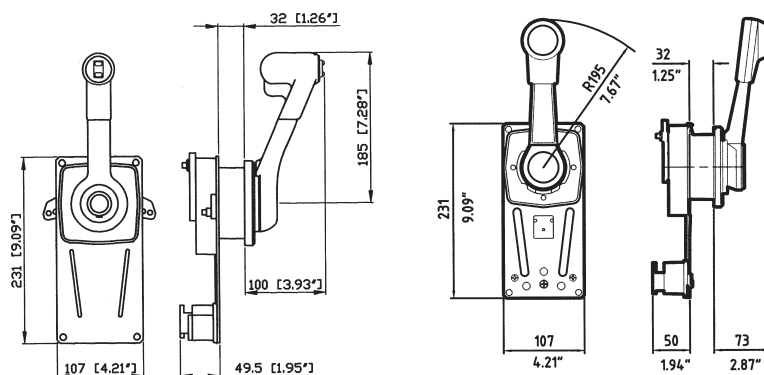
B183



B184



B85



B183
B184/B184Merc

B85

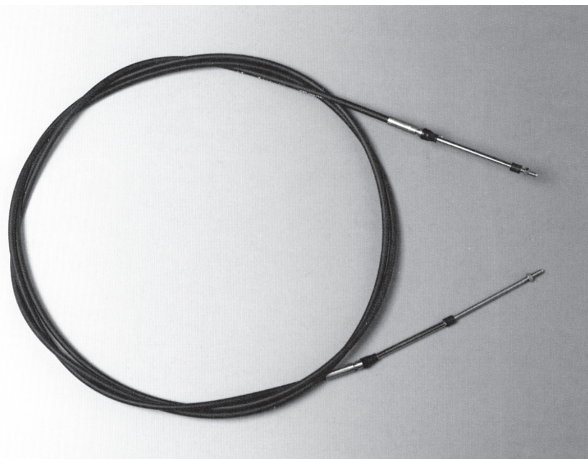
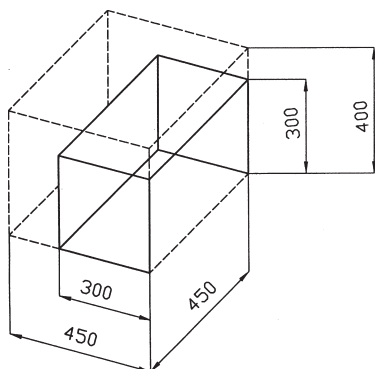
CZERO HIGH EFFICIENCY AND FLEXIBILITY ENGINE CONTROL CABLE

UFLEX^{USA}

FEATURES AND PERFORMANCE

- Suitable for outboard - inboard and stern-drive engines and all the Ultraflex controls.
- High efficiency for smooth operation.
- High flexibility for reduced bend radius. Ideal for long complex cable routings.
- Maintenance free.
- Stainless steel cable end fittings 10/32 UNF
- High resistance blue outer jacket against abrasion, UV and chemicals.

- Reduced dimension of the packaging (50% reduced volume compared to standard cables).



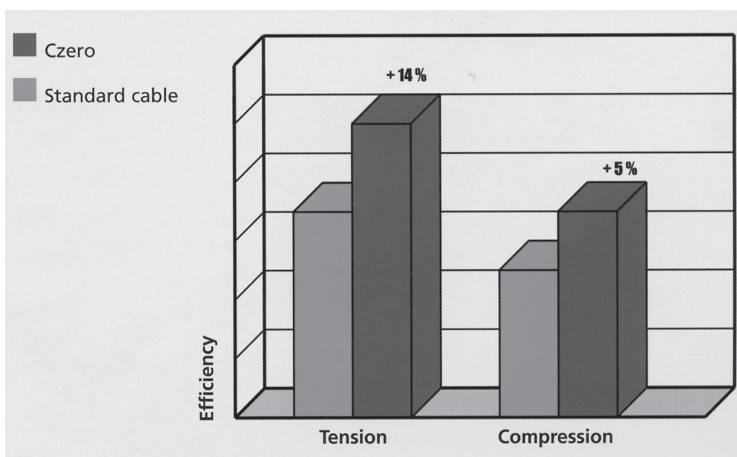
CZERO
ZERO FRICTION CONTROL CABLE



CZERO - EFFICIENCY COMPARISON TESTS

Tests configuration:
3 bends at 90° - 110 N load

NOTE: standard cable figures refer to average values obtained from samples bought from aftermarket sources.



ENGINE CONTROL CABLES

FOR NEW INSTALLATION, measure A + B distance from the control along an unobstructed cable routing to clutch and / or throttle connection. Round this dimension off to the next whole foot: you will have your cable length.

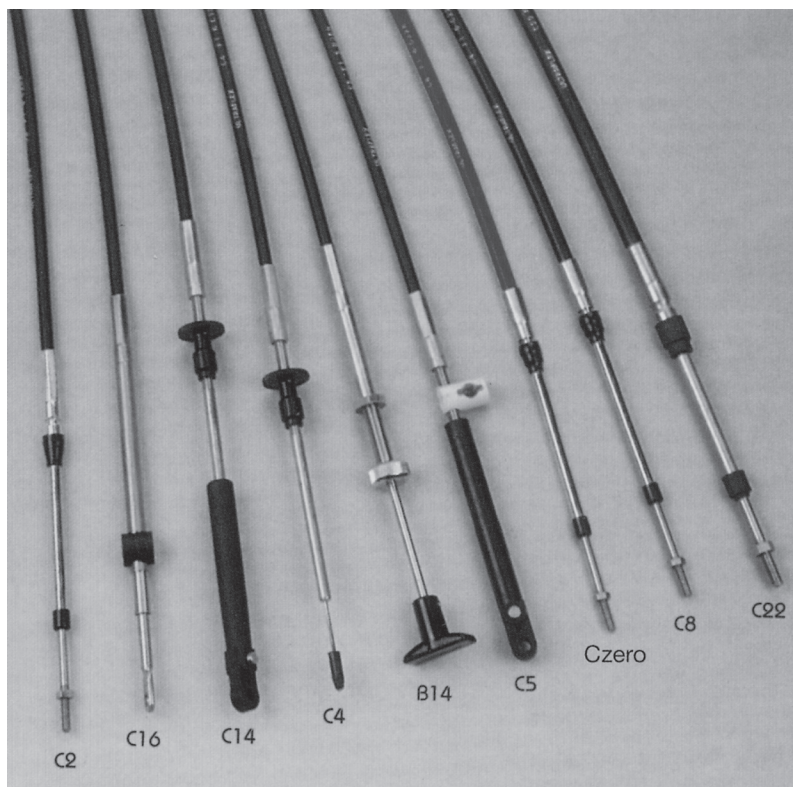
We recommend that the cable bends have a minimum radius of about 8" (200 mm).

For outboard engine installations, it is necessary to add three feet to the obtained length, in order to allow the engine movement.

To determine the needed length of the REPLACEMENT CABLE, measure it from tip to tip.

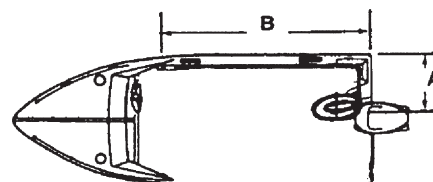
When ordering, specify the cable length in feet, rounding the dimension off to the next whole value.

If any kit is required to complete the cable connection, consult the appropriate section in this catalog.



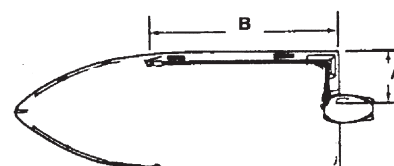
OUTBOARD

$$A + B + 3' (90 \text{ cm}) = L$$



INBOARD/STERNDRIVE

$$A + B = L$$



CONTROL CABLE CROSS REFERENCE

ULTRAFLEX	TELEFLEX® PART#	MORSE® PART#	APPLICATION
C2	UNIVERSAL CABLE CC172		YAMAHA®, SUZUKI®, HONDA®, NISSAN®, TOHATSU®, SELVA®
C8	MIRACABLE CC330 PREMIUM CC199	33C RED JACKET 32377-003	YAMAHA®, SUZUKI®, HONDA®, NISSAN®, TOHATSU®, SELVA®
CZERO	TFXTREME CC223	33C SUPREME 301947-003	YAMAHA®, SUZUKI®, HONDA®, NISSAN®, TOHATSU®, SELVA®
C5	600A CC179	TYPE KM 637323	MERCURY®, MERCRUISER®, MARINER® OVER 50 HP
C4	400 TYPE CC170	TYPE O 48296	PRE 1979 OMC®, EVINRUDE®, JOHNSON®
C14	479 TYPE CC205	TYPE OS 302029	1979 TO DATE OMC®, JOHNSON®, EVINRUDE®
C16	630 TYPE CC210		MARINER® UP TO 50 HP
C25	CC214	TYPE OC 310048	VOLVO® WITH OMC® CONTROLS
C22	STANDARD 4300 TYPE CC193	43C REDLINE 65835-003	HEAVY DUTY APPLICATIONS INBOARDS AND JETS
C23 BC	BULKHEAD 4300 TYPE CC192	43BC REDLINE 46348-003	HEAVY DUTY APPLICATIONS INBOARDS AND JETS

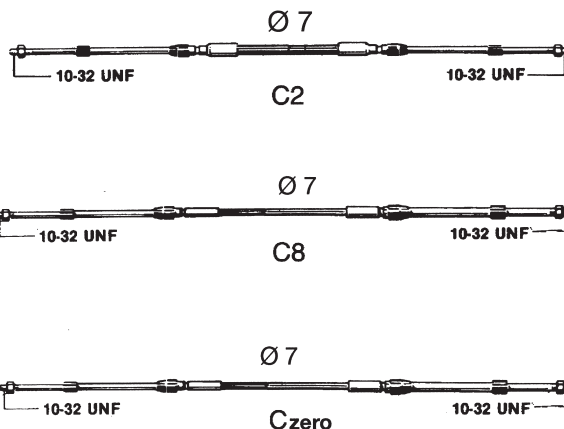
ENGINE CONTROL CABLES

- C2** Stroke: 3.4" (87 mm)
For use with inboard, sterndrive and outboard engines with appropriate accessories.
- C8** Stroke: 3.4" (87 mm)
For inboard, sterndrive, outboard engines, with appropriate accessories.
- Czero** Stroke: 3.4" (87 mm)
For inboard outboards, inboards and outboards.
Ideal for high performance applications and long cable runs and complex routings. Blue colour jacket.
- C4** Stroke: 3.1" (80 mm)
For Johnson®, Evinrude®, OMC® engines manufactured before 1979.
- C14** Stroke: 3" (75 mm)
For Johnson®, Evinrude®, OMC® engines manufactured after 1979.
- C5** Stroke: 3.75" (95 mm)
For Mercury® and Mercruiser® engines and 1993 to date Force Mariner®.
- C16** Stroke: 3.1" (80 mm)
For Mariner engines up to 37 kW (50hp) **C25** Stroke: 3.1" (80 mm)
For Volvo® engines using OMC® top mount controls.
- C22** Stroke: 3.1" (80 mm) Stainless steel clamp fittings. Recommended for heavy duty applications.
- C23BC** Stroke: 3.1" (80 mm)
Bulkhead mount 4300 type cable
Stainless steel clamp fitting and bulkhead fitting recommended for heavy duty applications.
- B14** Stroke: 2.8" (70 mm)
Designed for throttle, fuel shut-off and other applications. Supplied with L13 and L14 clamp and shim.

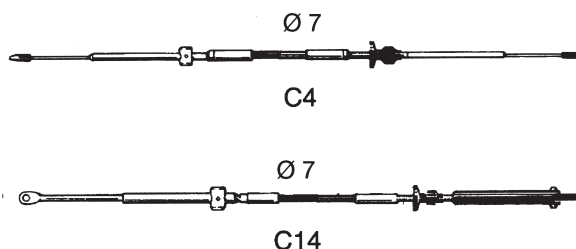
Part number for ordering:

Example: C2 XLL - LL = Length

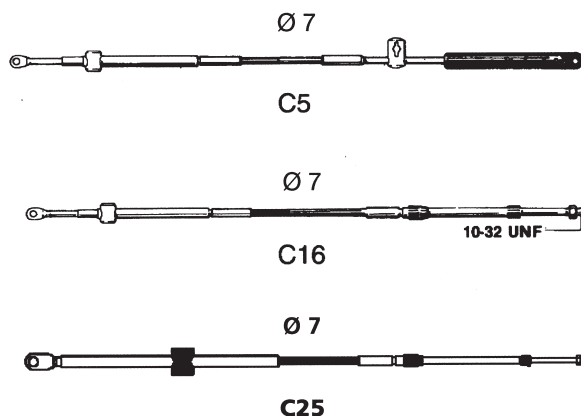
UNIVERSAL 3300 STYLE CABLES



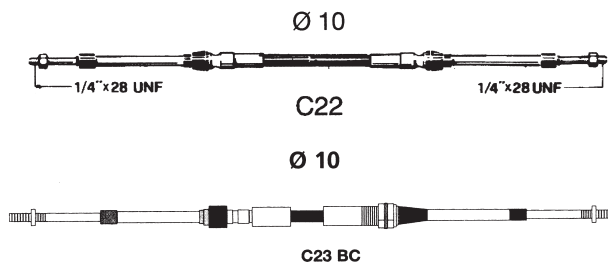
OMC® - JOHNSON® - EVINRUDE® CABLES



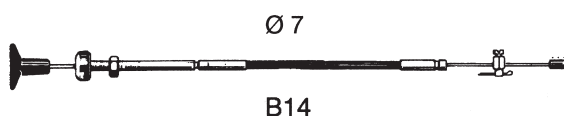
MERCURY® - MERCUISER® - MARINER® - VOLVO® CABLES



UNIVERSAL 4300 STYLE CABLES



ENGINE STOP CABLE



TWO LEVER TOP MOUNT CONTROLS

L2 - 30324 D

Cable clamp block

L3 - 30325 E

Shim and clamp block.

Fits C2, C8, Czero and all 33C style cables.

L7 - 38078 U

Ball joint 10-32 UNF.

Stainless steel, fits C2, C8, Czero and all 33C style cables.

L12 - 30334 F Cable end fitting. Fits C2, C8, Czero and all 33C style cables.

L13 - 30335 G

Stop collar. Fits C4 and B14 cables.

L14 - 30336 H

Cable clamp block.

Fits C2, C8, Czero and all 33C style cables.

L25 - 31906 D

Clevis 10-32 UNF.

Fits C2, C8, Czero and all 33C style cables.

L26 - 33517 N

Clevis 1/4" x 28 threaded. Fits C22 and 4300 series cables.

K56 - 39237 C

Adapts C2, C8, Czero and all 33C style cables for use with Mercury engines.

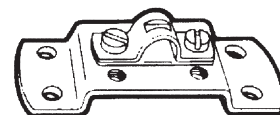
K57 - 39238 E

Adapts C2, C8, Czero and all 33C style cables for use with Johnson® / Evinrude® engines.

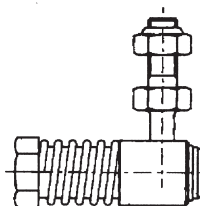
L2



L3



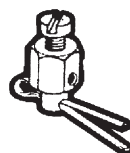
L7



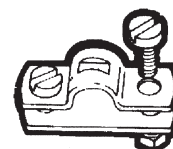
L12



L13



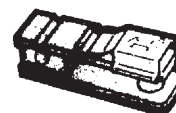
L14



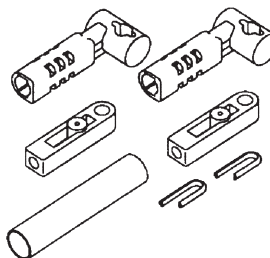
L25



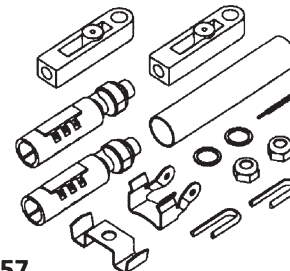
L26



K56



K57



GRAVE MATTERS

If you're dead, you're history. Here are some not-very-grave epitaphs from around the world.

Beneath this stone, a lump of clay,
Lies Uncle Peter Dan'els,
Who, early in the month of May,
Took off his winter flannels.

She always said her feet were killing her,
but nobody believed her.

Once I wasn't
Then I was
Now I ain't again.
Looked up the elevator shaft to see if the car

was on the way down. It was.

He valued only what the world held cheap
(Refused to work, from laziness and
pride)

Dreams were his refuge and he wel-
comed sleep
(He failed in business, took to drink and
died).

STEEL & COMMERCIAL BOAT COMPASSES



HB-845

BRACKET MOUNT, 3 $\frac{3}{4}$ " DIAL
steel and commercial vessels larger than 20 feet
HELMSMAN™ HB-845 WITH STEEL BOAT
QUADRANTAL CORRECTORS

Dial Size/Design 3 $\frac{3}{4}$ " (57mm)/Flat-Card Dial
Night Lighting 12V Green/24V or 32V by order
Overall Dimensions 12" x 6 $\frac{1}{8}$ " (305mm x 157mm)
Base 4 $\frac{3}{8}$ " (111mm)
Warranty 5-Year
Approx. Shipping Wt. 6 lb. (2.72kg)
Protective Cover Model No. H-741-C



B-200P

BINNACLE MOUNT, 4 $\frac{1}{2}$ " DIAL
steel and commercial vessels larger than 20 feet
NAVIGATOR™ B-200P WITH STEEL BOAT
QUADRANTAL CORRECTORS

Dial Size/Design 4 $\frac{1}{2}$ " (114mm)/Flat-Card Dial
Night Lighting 12V Green/24V or 32V by order
Overall Dimensions 17 $\frac{1}{4}$ " x 6 $\frac{1}{8}$ " (438mm x 157mm)
Base 7 $\frac{1}{4}$ " (184mm)
Warranty 5-Year
Approx. Shipping Wt. 10 lb. (4.5kg)
Protective Cover Model No. N-203-C



D-5-S

BINNACLE MOUNT, 5" & 6" DIAL
steel and commercial vessels larger than 20 feet
GLOBEMASTER® D-5-S & D-6-S WITH STEEL
BOAT QUADRANTAL CORRECTORS

	D-5-S	D-6-S
Dial Size/Design	5" (127mm)	6" (152mm)
Night Lighting	12V Green/24V or 32V by order	
Overall Dimensions	22" x 8 $\frac{3}{4}$ " (556mm x 223mm)	23 $\frac{3}{4}$ " x 10 $\frac{1}{4}$ " (603mm x 260mm)
Base	7 $\frac{1}{8}$ " (181mm)	8 $\frac{3}{16}$ " (209mm)
Warranty	5-Year	5-Year
Approx. Shipping Wt.	23 lb. (10.44kg)	29 lb. (13.15kg)



1. 2° Dial Model No. G-2 (5" only)
2. 2° Dial w/points Model No.
G-2-P (5" and 6")
3. 5° Dial Model No. G-5 (5" and 6")

IMPORTANT ORDERING INFORMATION

All Steel and Commercial Boat Compasses are individually custom assembled to order, and there are many options to consider. All models are available with your choice of 12, 24, or 32-volt night lighting. In addition, Globemaster Models are available for either sail or powerboats with a choice of dial sizes and dial degree graduations. The Globemaster Traditional Binnacle Models are also available in Polished Brass (X), Chrome Plated Brass (C) or Black (B) finish. Please ask your dealer or boat builder for complete specifications, options and ordering information

STEEL & COMMERCIAL BOAT COMPASSES



YB-500

YOKE MOUNT, 5" & 6" DIAL
steel and commercial vessels larger than 20 feet
GLOBEMASTER® YB-500 & YB-600 WITH STEEL
BOAT QUADRANTAL CORRECTORS

	YB-500	YB-600
Dial Size/Design	5" (127mm)	6" (152mm)
Night Lighting	12V Green/24V or 32V by order	
Overall Dimensions	19" x 8 1/4" (483mm x 210mm)	20 1/4" x 9 7/8" (514mm x 245mm)
Base	6 7/8" (175mm)	8" (203mm)
Warranty	5-Year	5-Year
Approx. Shipping Wt.	18 lb. (8.16kg)	26 lb. (11.90kg)

GLOBEMASTER SHOCK MOUNT COMPASSES

feature a special anti-vibration mount. Isolates Dial to protect Pivot and Jewel.



B-453

SHOCK MOUNT, 5" & 6" DIAL
steel and commercial vessels larger than 20 feet
GLOBEMASTER™ B-453 & B-463 WITH
STEEL BOAT QUADRANTAL CORRECTORS

	B-453	B-463
Dial Size/Design	5" (127mm)	6" (152mm)
Night Lighting	12V Green/24V or 32V by order	
Overall Dimensions	19" x 8 1/4" (463mm x 210mm)	20 1/2" x 10 1/4" (521mm x 260mm)
Base	7 1/4" (111mm)	9 1/2" (241mm)
Warranty	5-Year	5-Year
Approx. Shipping Wt.	10 lb. (4.5kg)	24 lb. (10.89kg)



C-453

SHOCK MOUNT, 5" & 6" DIAL
commercial vessels larger than 20 feet
GLOBEMASTER™ C-453 & C-463 WITH
SHOCK MOUNT BINNACLE

	C-453	C-463
Dial Size/Design	5" (127mm)	6" (152mm)
Night Lighting	12V Green/24V or 32V by order	
Overall Dimensions	8 1/2" x 8 1/4" (216mm x 210mm)	9 1/2" x 10 1/4" (241mm x 260mm)
Base	8 1/16" (214mm)	9 1/2" (241mm)
Warranty	5-Year	5-Year
Approx. Shipping Wt.	7 lb. (3.52kg)	12 lb. (5.44kg)

Chelsea®

Forged brass. Available with mahogany bases and matching barometers.

Similar to our Ships Bell Clock. Shipstrike Clocks use the finest German movements designed for mass production. Their faces are aluminum. The clock strikes the traditional ships bells - one bell for each half hour on a four hour watch at sea. After eight bells, at four, eight and twelve o' clock, the sequence repeats itself beginning with one bell. A uniquely satisfying way to mark the passage of time.

Single bellows. Barometer can be selected individually or matched as a set with the Shipstrike Clock.



4 1/2" DIAL

SHIPSTRIKE QUARTZ CLOCK
NEEDS NO WINDING
MOUNT ON WALL OR BASE

Screw on Bezel 40033

MAHOGANY BASE:

23368 SINGLE	(as shown)
24355 SINGLE	(Key Wind)
24356 DOUBLE	(left)

MATCHING ANEROID BAROMETER

40017 4 1/2" Dial

40027 6" Dial

MAHOGANY BASE (top photo)



The Nautical Clock

4 1/2" DIAL. Mount on wall or base. The Nautical Clock played a supporting role in the movie "**Clear and Present Danger**". For those who prefer the nautical look but without the Ship's Bell sound, this forged brass clock with screw on bezel is an excellent choice. The rich contrast of polished brass and mahogany evokes the seafaring tradition.

40069 NAUTICAL CLOCK
MAHOGANY BASE: 24355 (shown)

40071 MATCHING ANEROID BAROMETER, MAHOGANY BASE (see above).

For forecasting change in weather, this instrument is calibrated in inches, centimeters and millibars. Barometers can be selected individually or matched as a set with the Nautical Clock.



Chelsea®

40110 WEATHER STATION 12"W, 5"H

Clock. Barometer, Thermometer/Hygrometer set on a hardwood plaque for wall mounting. Beautifully hand polished brass case with curved glass crystal. Engraving plate included.



THE MARITIME SERIES

A selection of nautical instruments guaranteed to please every armchair sailor. There is a 12/24 hour "Watch Keeping" clock. A Tide/Time clock that displays the time and the hours and minutes before high tide and low tide in your local area (east coast of North America only). Matching aneroid barometer for forecasting change in the weather. For wall mounting in beautifully hand polished brass with curved glass crystal. 4" dial.

40127 WATCH KEEPING CLOCK

40124 TIDE/TIME CLOCK

40123 BAROMETER



GRAVE MATTERS

If you're dead, you're history. Here are some not-very-grave epitaphs from around the world.

36-33-01-24-17

Honey you don't know what you did for me,
always playing the lottery.

The numbers you picked came in to play,
two days after you passed away.

For this, a huge monument I do erect,
for now I get a yearly check.

How I wish you were alive,
for now we are worth \$8.5.

Jonathan Fiddle
Went out of tune.

Been here:
Now gone:
Had a good time.

"I told you I was sick!"

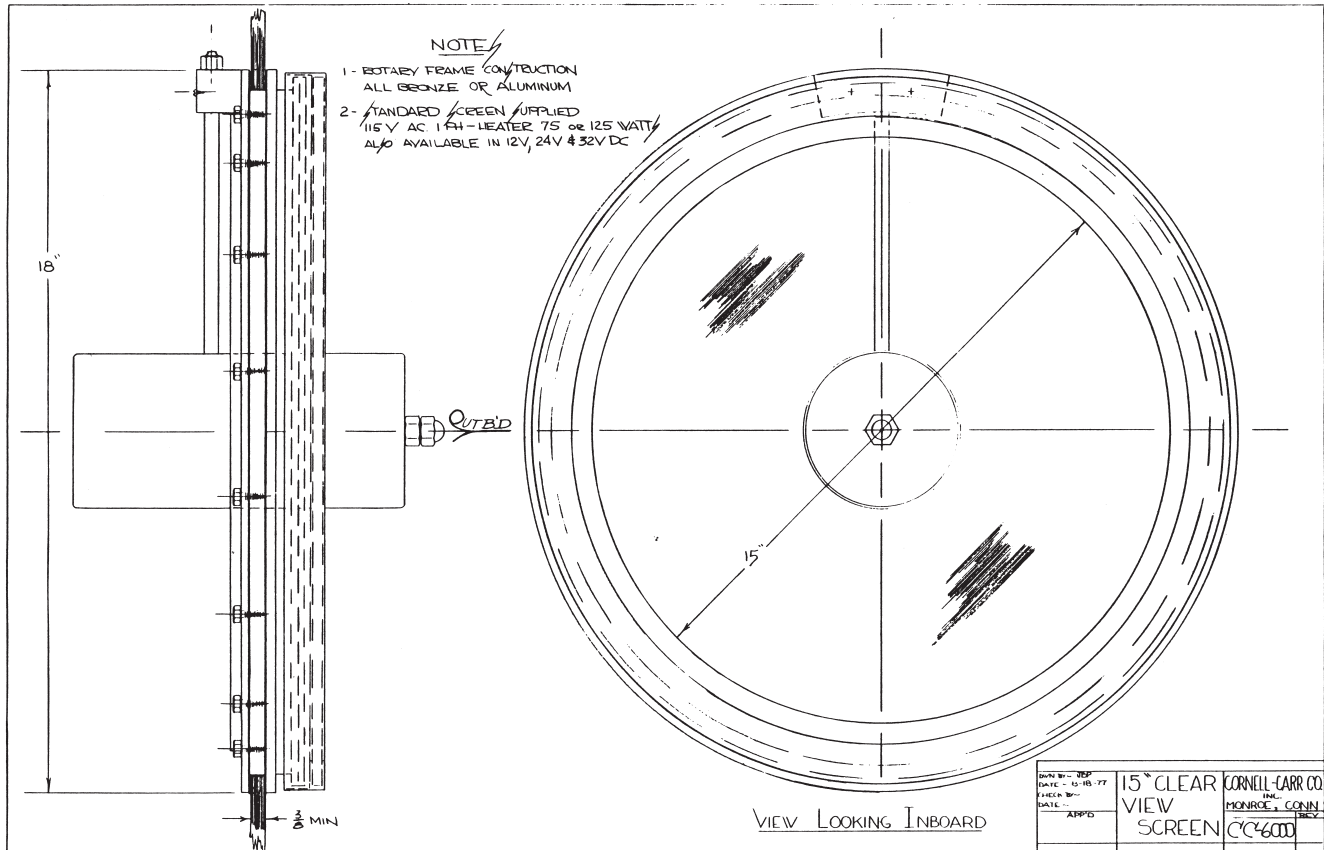
On the 22nd of June

ROTARY CLEAR VIEW SCREEN

Available through Cornell-Carr Company is the 12" & 14" Speich or the Kent Clearview Screen. Also available is the Cornell-Carr Co. 15" CVS (Mfg. by C.C.C.)

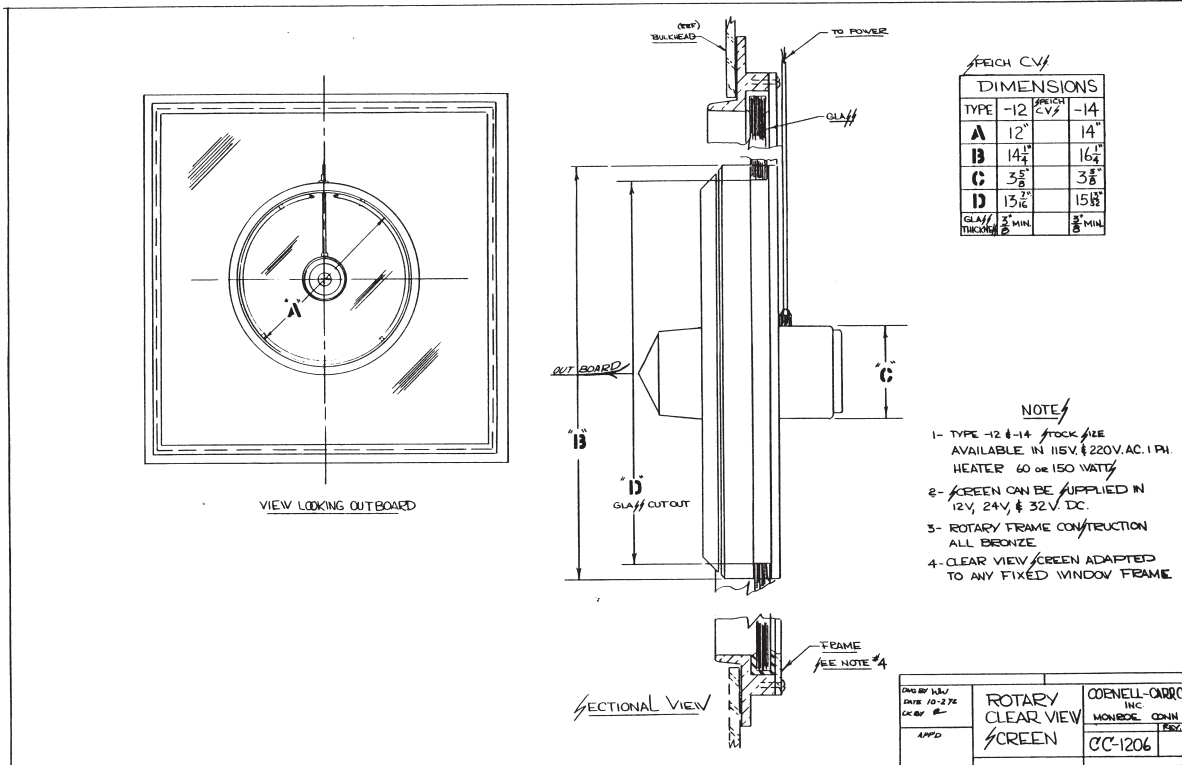
Designed for mounting in a hole cut out in a ships window. The screen is double glazed, a fixed glass carrying the drive motor and a rotating glass fitted directly onto its shaft. A heating element is fitted between the rotating glass and motor support glass to eliminate any condensation and ice during extreme weather conditions.

Careful balancing of the rotating glass and lifelong lubrication of bearings insure silent operation and make routine maintenance unnecessary. Best quality armoured glass, optically ground and true, is used throughout and all metal parts are solid bronze.



15" CLEAR VIEW SCREEN

CC 6000



CC 1206

ROTARY CLEAR VIEW SCREEN

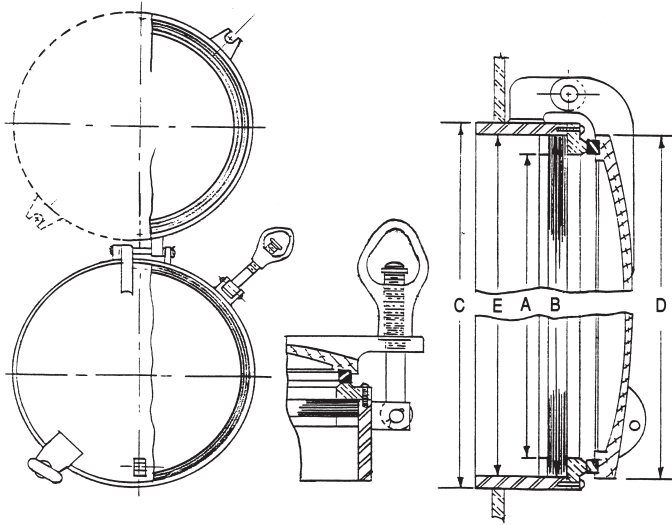
CC-7137 • WELD-IN FIXED PORTLIGHT

DIMENSIONS

A	B	C	D	E
12	13	14	13-1/8	13-1/4
14	15	16	15-1/8	15-1/4
16	17	18	17-1/8	17-1/4
18	19	20	19-1/8	19-1/4

NOTES

1. Main frame to be steel or stainless steel.
2. Retainer ring to be bronze.
3. 3/4" tempered clear glass standard.
4. Fixed ports are available with or without deadlight cover. Can be aluminum or steel.



DRAWN
DATE
CHECKED
DATE
APPD

WELD-IN FIXED
PORTLIGHT

CORNELL-CARR CO., INC
MONROE, CONN.
CC DRWG NO.
CC-7137
REV.
CC JOB NO.

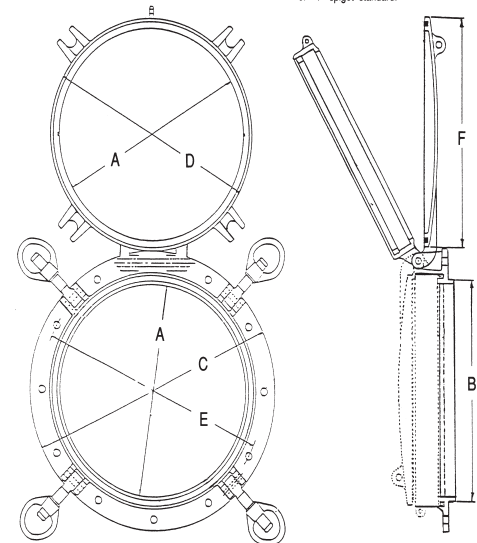
CC-7136 • BOLT-IN AIRPORT

DIMENSIONS

A	B	C	D	E	F
10	10-1/2	14-1/2	11-1/8	12-7/8	10-7/8
12	12-1/2	16-1/2	13-1/8	14-7/8	12-7/8
14	14-1/2	18-1/2	15-1/8	16-7/8	14-7/8
16	16-1/2	20-1/2	17-1/8	18-7/8	16-7/8
18	18-1/2	22-1/2	19-1/8	20-7/8	18-7/8

NOTES

1. Airports are available in bronze or aluminum.
2. 3/4" tempered clear glass standard.
3. Airports are available with or without aluminum deadlight covers.
4. Insect screens are available in stainless.
5. Standard mounting holes 1/2" diameter. Other sizes upon request.
6. 1" spigot standard.



DRAWN
DATE
CHECKED
DATE
APPD

BOLT-IN
AIRPORT

CORNELL-CARR CO., INC
MONROE, CONN.
CC DRWG NO.
CC-7136
REV.
CC JOB NO.

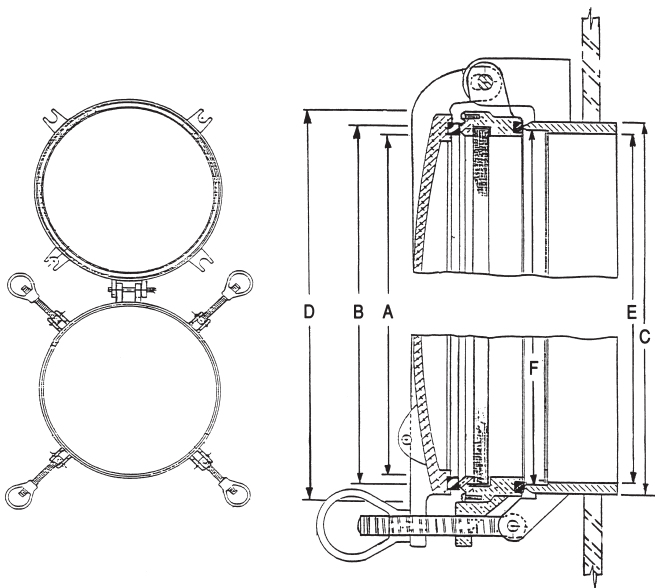
CC-7135 • WELD-IN AIRPORT

DIMENSIONS

A	B	C	D	E	F
12	12-1/2	13	13-1/8	12-1/4	12-7/16
14	14-1/2	15	15-1/8	14-1/4	14-7/16
16	16-1/2	17	17-1/8	16-1/4	16-7/16
18	18-1/2	19	19-1/8	18-1/4	18-7/16

NOTES

1. Main frame to be steel or stainless steel.
2. Lens frame to be aluminum or bronze.
3. 3/4" tempered clear glass standard.
4. Airports are available with or without covers. Can be aluminum or steel.
5. Insect screens are available in stainless.



DRAWN
DATE
CHECKED
DATE
APPD

WELD-IN
AIRPORT

CORNELL-CARR CO., INC
MONROE, CONN.
CC DRWG NO.
CC-7135
REV.
CC JOB NO.

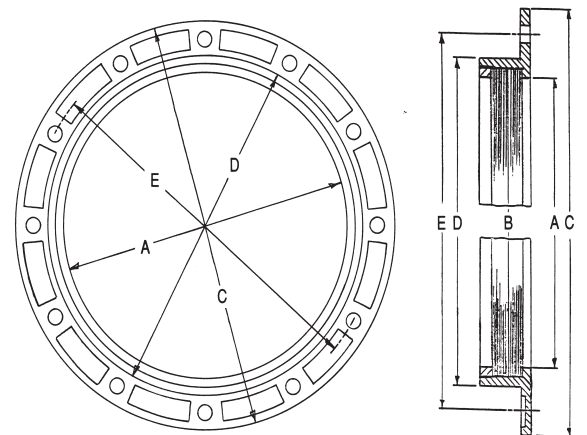
CC-7138 • BOLT-IN FIXED PORTLIGHT FLUSH MOUNTING

DIMENSIONS

A	B	C	D	E
4	4-1/2	7	5-1/4	6
6	6-1/2	9	7-1/4	8
8	8-1/2	11	9-1/4	10
10	10-1/2	14	11-1/4	12-1/2
12	12-1/2	16	13-1/4	14-1/2
14	14-1/2	18	15-1/4	16-1/2
15	15-1/2	19	16-1/4	17-1/2
16	16-1/2	20	17-1/4	18-1/2
18	18-1/2	22	19-1/4	20-1/2
20	20-1/2	24	21-1/4	22-1/2
24	24-1/2	28	25-1/4	26-1/2

NOTES

1. Fixed portlights are available in bronze or aluminum.
2. 1/2" or 3/4" tempered clear glass standard (depending on size of portlight).
3. All mounting holes to be 1/2" diameter. Other sizes available upon request.



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DATE
CHECKED
DATE
APPD

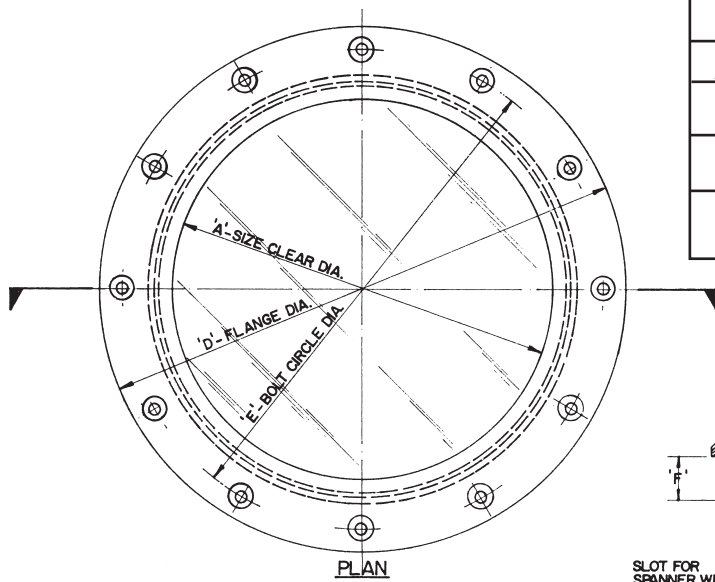
BOLT-IN FIXED
PORTLIGHT
FLUSH MOUNTING

CORNELL-CARR CO., INC
MONROE, CONN.
CC DRWG NO.
CC-7138
REV.
CC JOB NO.

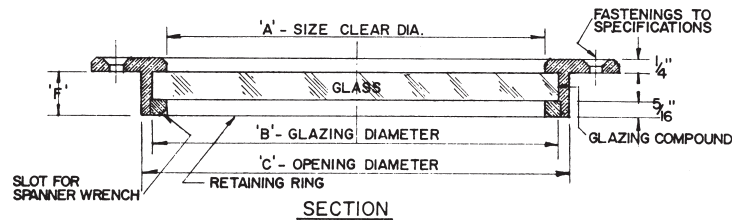
BRASS OR ALUMINUM PLAIN FIXED LIGHT

(Also available in Stainless Steel)

Drawing No. 500



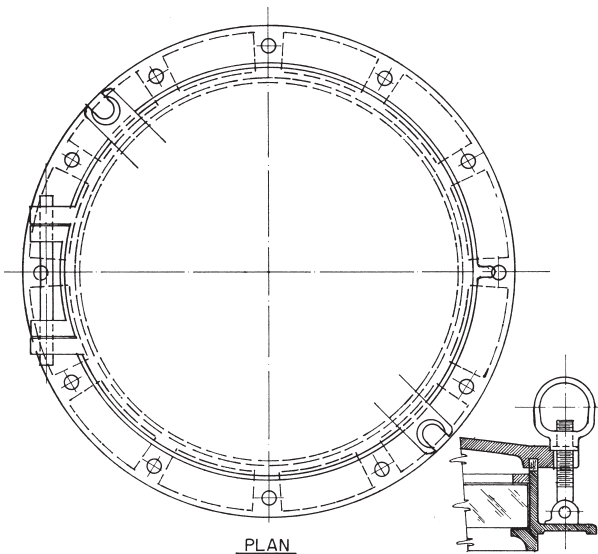
DWG 500 DIMENSION SCHEDULE					
A	B	C	D	E	F
10"	10 1/2"	11 1/6"	13 1/4"	12 1/4"	1 1/16"
12"	12 1/2"	13"	15 3/16"	14 3/16"	1 1/4"
16"	16 1/2"	17"	19 1/2"	18 1/2"	1 3/8"



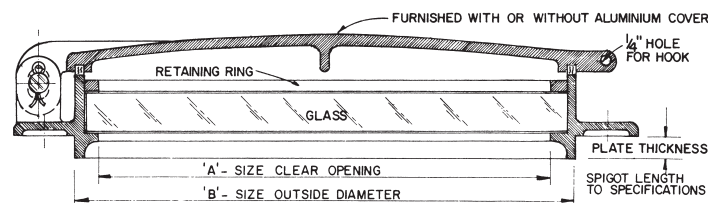
BRASS OR ALUMINUM REVERSED FIXED LIGHT

(Also available in Stainless Steel)

Drawing No. 600



DWG 600 DIMENSION SCHEDULE				
A	B	C	D	E
10"	0-1/2"	11"	13 5/8"	5/16"
12"	0-1/2"	13 1/8"	15 7/8"	3/8"
16"	0-1/2"	17 1/4"	20 3/8"	1/2"

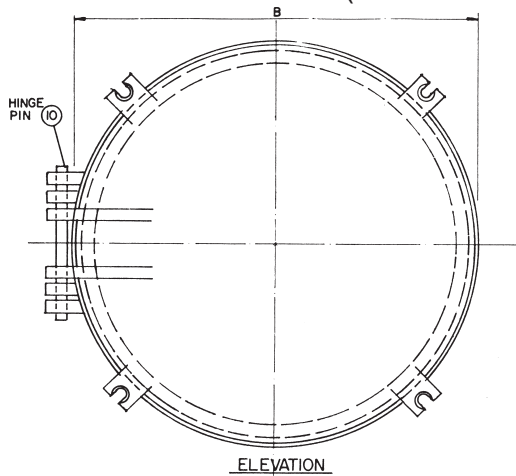


PORTLIGHT

STEEL BACK-WELD IN

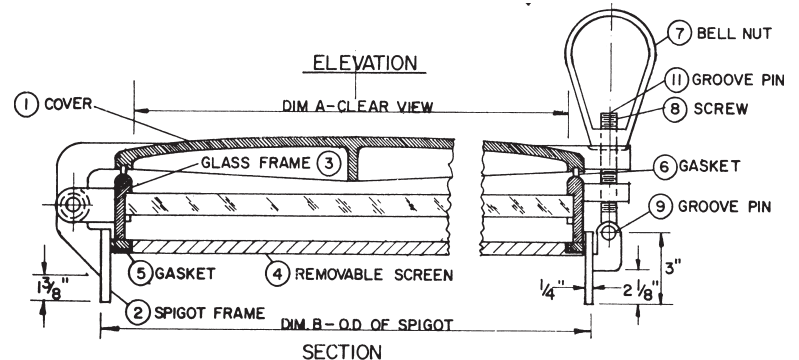
(Also available in Stainless Steel)

Drawing No. 700



DWG 700 DIMENSION SCHEDULE

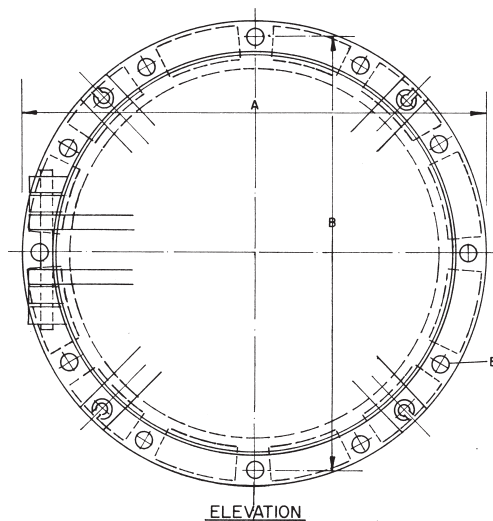
SIZE	A	B
12	12"	13 1/2"
14	14"	15 1/2"
16	16"	17 1/2"
18	18"	19 1/2"



PORTLIGHT

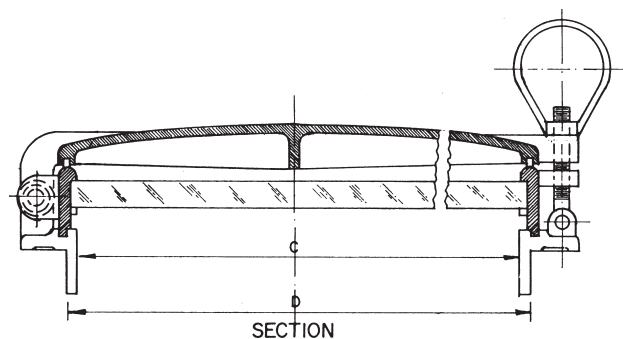
BRASS OR ALUMINUM BOLT ON

Drawing No. 800



DWG 800 DIMENSION SCHEDULE

SIZE	A	B	C	D	E
10	14 1/4"	12 3/4"	10"	10 3/8"	1/2"
12	16"	14 3/4"	12"	12 3/8"	1/2"
14	18"	17"	14"	14 3/8"	1/2"
16	20 3/8"	18 7/8"	16"	16 1/2"	1/2"
18	22 3/4"	21 1/8"	18"	18 1/2"	1/2"





SHIP WINDOWS

Aluminum and bronze are easily fabricated into windows. By the use of extrusions and castings, the desired shapes are easily attained. However, their physical qualities are limited and certain chemical conditions affect the appearance and operation of these windows. Stainless steel, on the other hand, withstands all conditions and meets the requirements of modern shipping today. This metal must be formed into the required shapes by use of a braking mechanism along with other skilled manufacturing procedures. In the past only the larger passenger and U. S. Navy vessels could bear the additional cost of stainless steel windows. Our experience in metal fabrication enables our organization to offer stainless steel windows at a cost almost comparable to windows made of aluminum and bronze by our competitors.

In most cases a weathertight window sufficiently fulfills the requirements of vessels today. The definition of a weathertight window is one that will take almost any degree of gale driven spray or rain without permitting water to get into protected spaces. A weather tight window has been found to be very satisfactory for ordinary wheelhouse and stateroom use which allows a slight degree of leakage when closed. This type of window is so designed to collect such leakage and dispose of it. Weathertight windows are constructed to meet the hose test requirements of the Maritime Administration (30 lbs. pressure through a 1/2" nozzle at a distance of 25 feet). Under this test slight leaking is allowed, which of course is disposed of by drain pans or scuppers as explained above.

The CORNELL - CARR COMPANY will manufacture windows of almost every description with glass either counterbalanced or mechanically controlled, dropping into pockets, horizontal sliding windows, promenade deck windows of all descriptions, and public space windows.

REQUEST FOR QUOTATION SHEET WINDOWS

TYPE - (DWG. No.)

DESCRIPTION -

SIZE - w & dim. or plate cut out

QUANTITY -

MATERIAL - Bronze, aluminum or St. St.

GLASS - Clear or Tinted

GLASS - Thickness

GLASS - Type

INSTALLATION - Flat or Radius blk.

MOUNTING HOLE - Not drilled unless specified

SPECIAL REQUIREMENTS:

GLASS

To meet the necessary conditions required in the manufacture of marine windows, it is important to select the proper type of glass. Following is a description of the various types used:

POLISHED PLATE GLASS is made by grinding and polishing the two surfaces of a glass blank to make them flat and parallel and to provide clear vision with a minimum of distortion.

It is available in the following thicknesses: 1/4", 3/8", 1/2", and 1". The allowable tolerances are one-half of the difference between the size above or below, i.e., unless especially selected a 1/4" light may range from 3/16" to 5/16".

HEAT TREATED GLASS is plate glass which has undergone a special process of reheating and rapid cooling resulting in a glass that is 3 to 5 times stronger than plate glass in sustaining loads or resisting strain, about 5 to 7 times more resistant to ordinary impact, and disintegrates into small crystals instead of breaking into jagged pieces which plate glass would do.

Heat treated glass is widely used in windows, airports, frameless glass doors, and other installations where strength and high resistance to temperature changes are required. It is often referred to as "tempered" or "armourplate", and is available under the trade names of Tuflex, Securit, or Herculite.

WIRE GLASS. According to U. S. Coast Guard regulations, wire glass is to be used in all passenger ship windows which lead from an enclosed space to areas that are used as passages. For instance, lounge windows leading to a promenade deck enclosure, etc.

Ordinary polished plate wire glass (chicken-wire type) is ordinarily available in thicknesses from 1/4" to 3/8". The manufacture of thicknesses above 3/8" has been practically discontinued because of its unpleasant appearance.

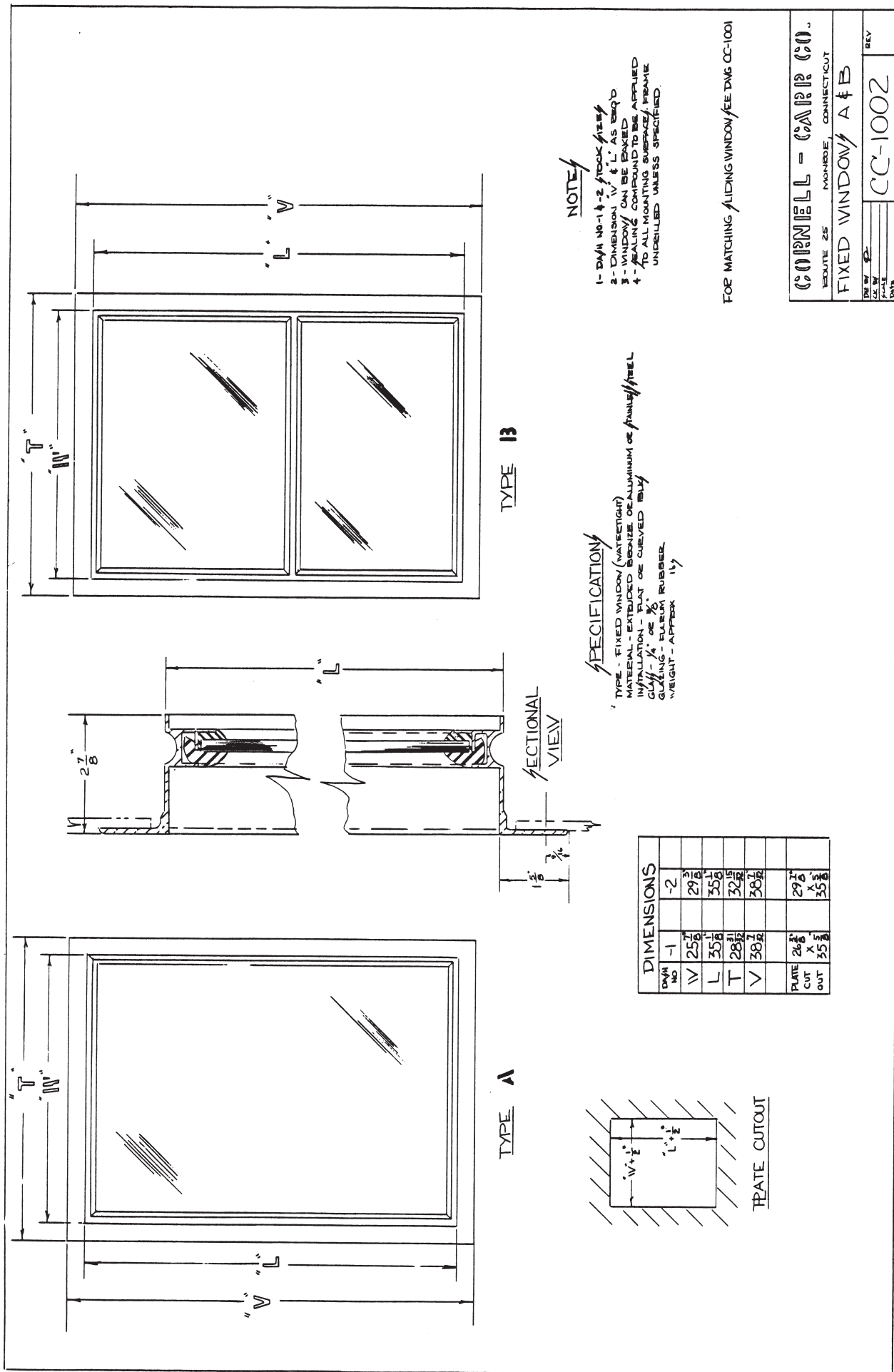
For use in windows in protected spaces, we recommend the use of "Misco" or "Nu-weld." In this type of glass the wire is in a diamond shape, 3/4" to a side, with the wires electrically welded where they cross. This glass has the approval of the Fire Underwriters and is available only in 1/4" thickness. No wire glass can be tempered.

TINTED GLASS is a glass of special chemical composition, pale bluish green in color. It absorbs most of the infra-red rays of the sun and reduces sun glare. Some of this absorbed heat is transmitted to the interior, but a considerable portion is given off to the exterior, thereby reducing the solar heat entering through the glass. Tinted glass produces a cooler inside temperature. (Also known as Coolite, Solex, Easyeye, or heat-absorbing glass.)

LAMINATED GLASS is composed of two lights of glass that have been laminated with an interlayer of transparent plastic by a process involving heat and pressure. When fractured, the particles of glass have a tendency to adhere to the plastic, thereby giving more protection against flying glass fragments. Its use is indicated in areas where breakage and collapse of glass would cause damage or injury. (Sometimes referred to as "shatterproof" or "safety glass".) Laminated glass will fracture under lighter loads than plate glass of the same thickness. Delamination and consequent discoloration are to be considered as possibilities.

THERMOPANE OR TWINDOW is a factory-fabricated insulating glass unit composed of two or more panes of glass separated by 1/4" or 1/2" of dehydrated captive air, hermetically sealed at the edges in the factory with a metal-to-glass bond.

The co-efficient of heat transmission is reduced, thereby increasing the room side surface temperature. The result is a promotion of radiant comfort, a lowering of the dew point, and to some degree a deadening of sound transmission. The thickest light used in the construction of "Thermopane" or "Twindow" determines the strength of the window.



CONNELL - CARP CO.
 ROUTE 25 MONROE, CONNECTICUT
 FIXED WINDOW A & B
 DWG NO. CC-1002
 DATE
 REV

INSTALLATION - FLAT OR BULK HEAD
GLAZING - RUBBER & FELT

140	-1								
DM	2130								
W	24								
L	30								
R	35								
S	68								
T	28								
V	53								
RAVE CUT	2143								

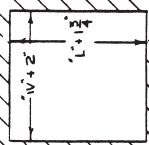
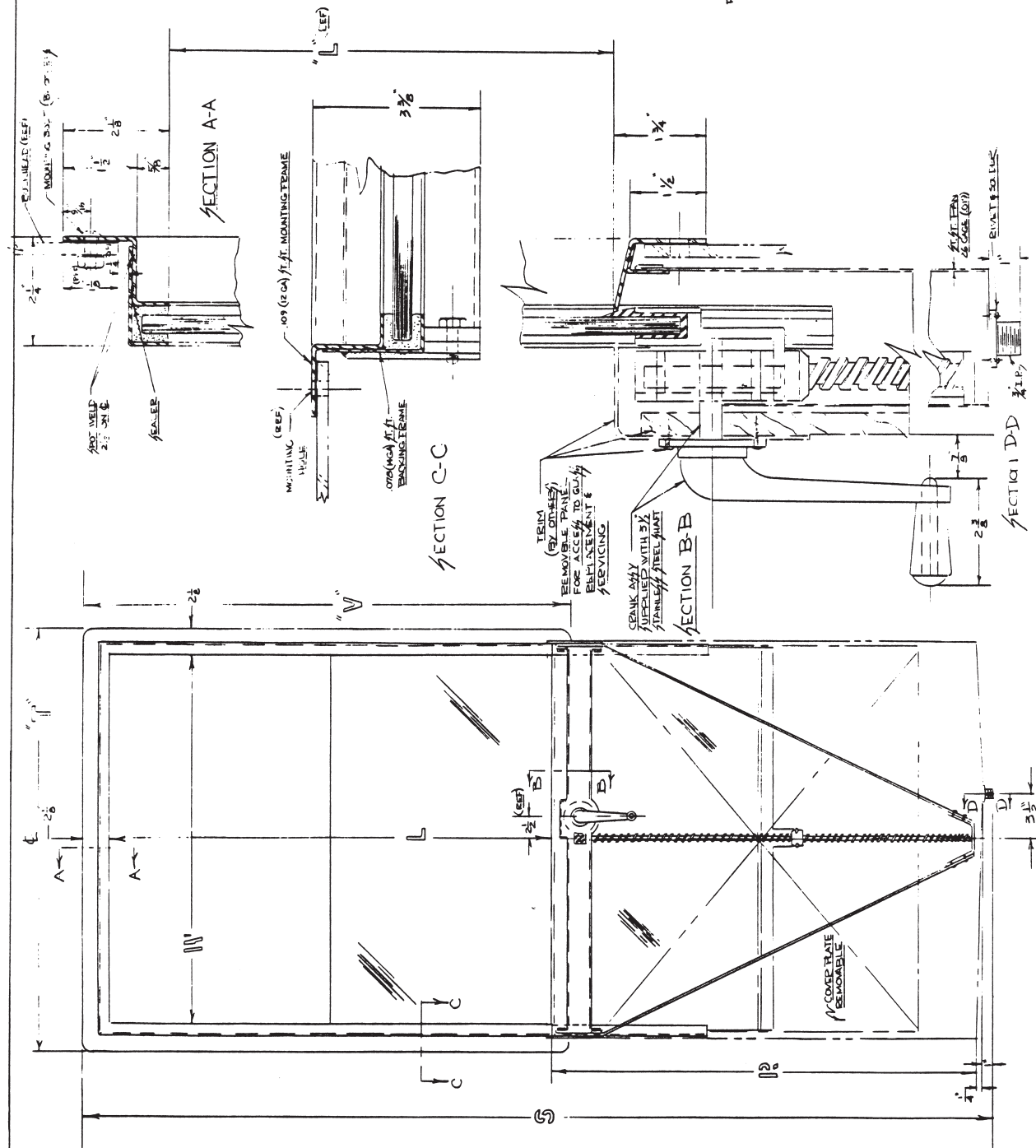


PLATE CUTOFF

NOTE

- 1-DIMENSION "1" & "1" AS REQ'D
2-HEALING COMPOUND TO BE APPLIED TO ALL MOUNTING SURFACES, FRAME UNLESS SPECIFIED

FOR MATCHING FIXED WINDOW / SEE DWG CC-1005



CONFIDENTIAL - (S)

BOULEVARD 25 MONROE, CONNECTICUT

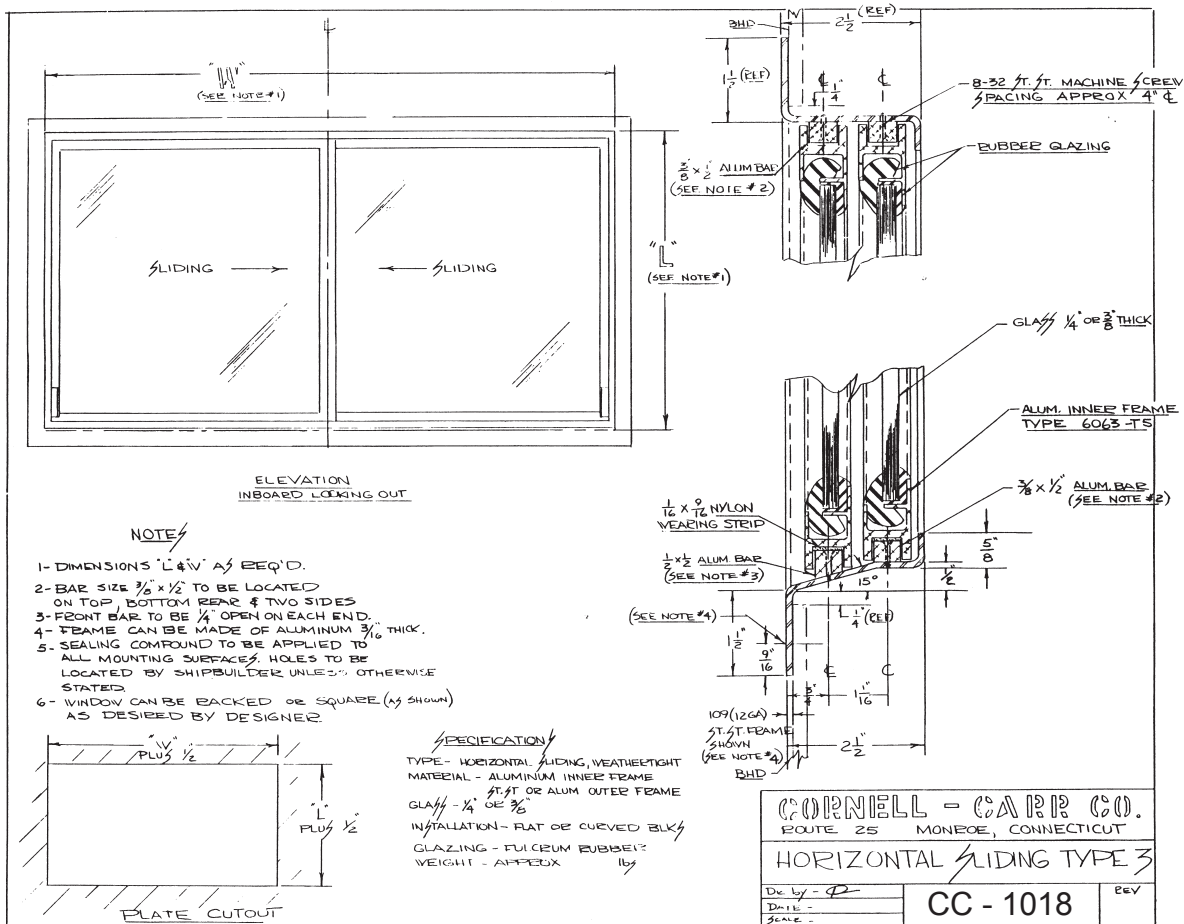
VERTICAL SLIDING WINDOW, STAINLESS
STEEL CONST. - CRANK OPERATED

REV.	
C	
C	
C	
C	
P	
BY	

CC-1010

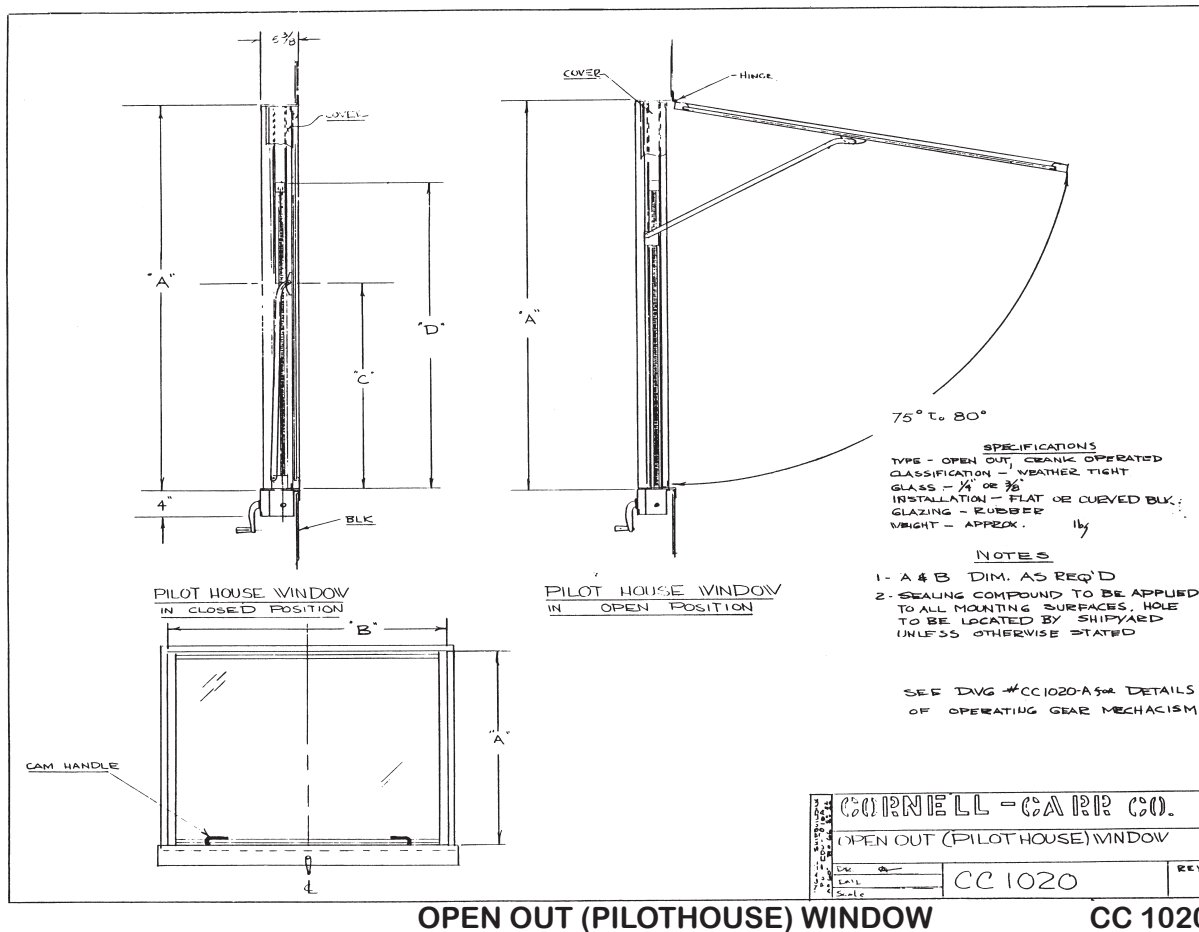
VERTICAL SLIDING WINDOW - STAINLESS STEEL CONSTRUCTION - CRANK OPERATED

CC 1010



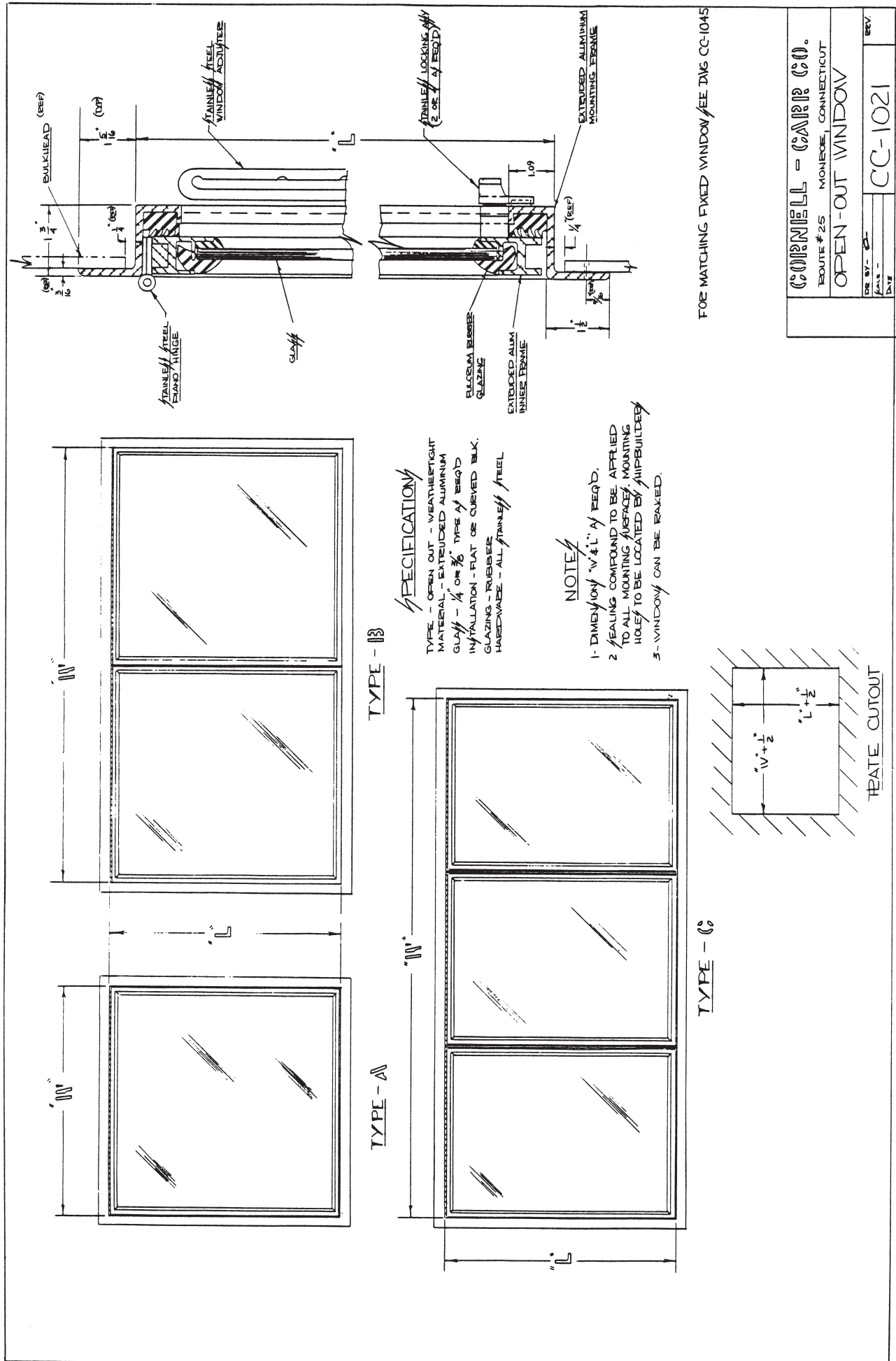
HORIZONTAL SLIDING TYPE 3

CC 1018



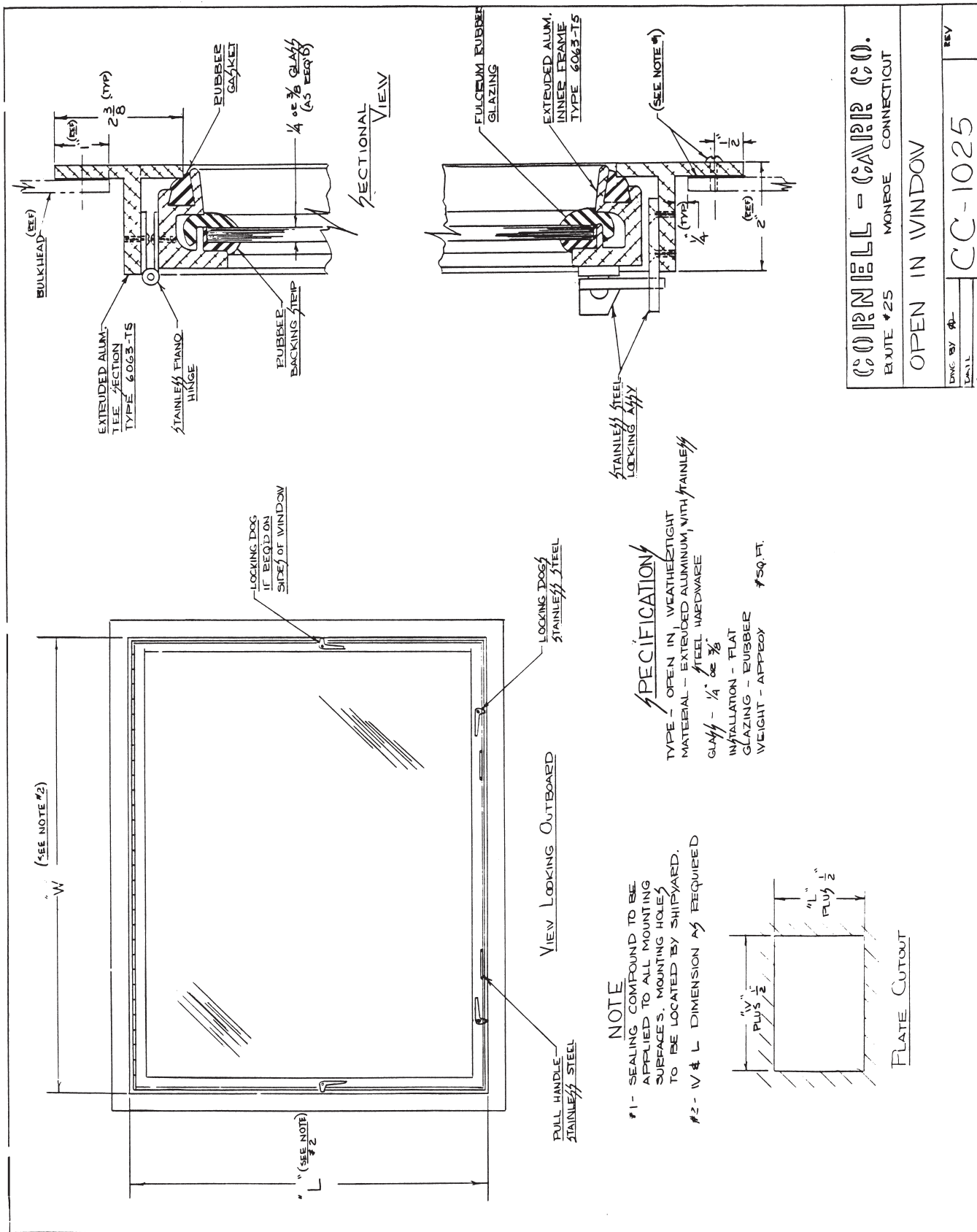
OPEN OUT (PILOTHOUSE) WINDOW

CC 1020

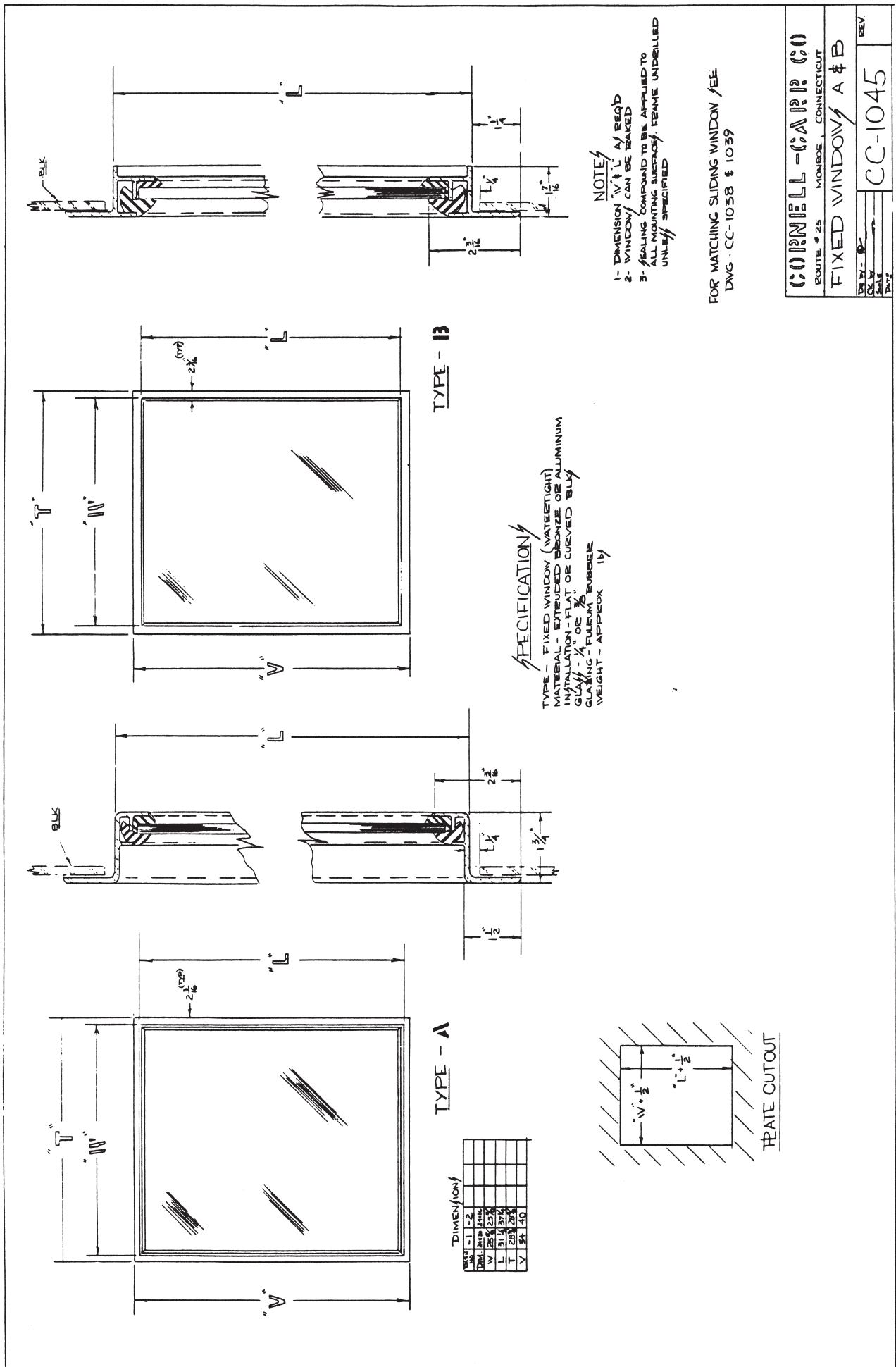


OPEN OUT WINDOW

CC 1021

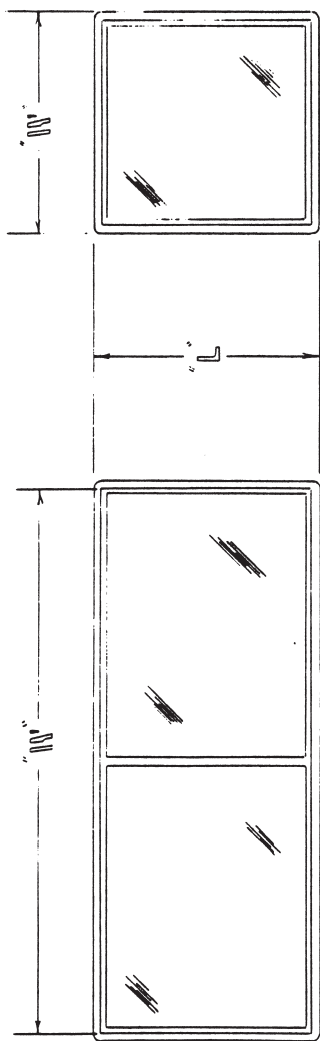


BYRNE RICE & TURNER	
EXUTE #25	MONROE CONNECTICUT
OPEN IN WINDOW	
DWG BY #2	REV
DRAWN BY	
SCALE	
CC-1025	



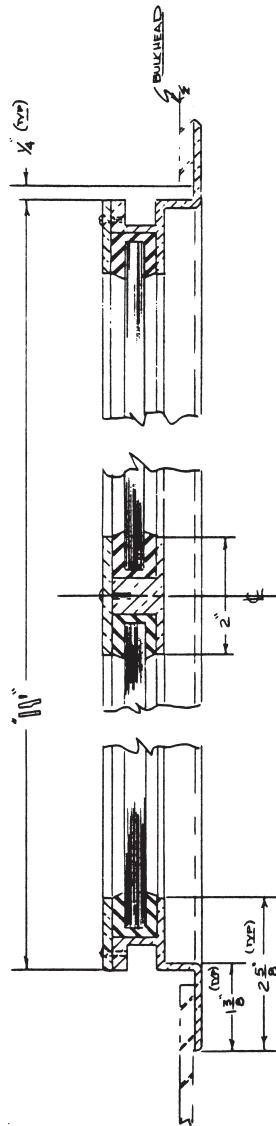
OPEN OUT - FIXED WINDOWS A & B

CC 1045



TYPE - A

TYPE - B



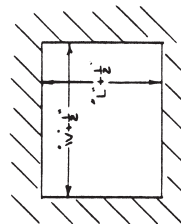
SPECIFICATION

TYPE - FIXED WINDOW, WATERIGHT
 MATERIAL - EXTRUDED BRONZE OR ALUM
 GLASS - 1/4" OR 3/8" OF 1/2" OF 1/2" OF 1/2"
 INSULATION (1/2" FLAT OR CURVED BULK)
 GLAZING - RUBBER
 WEIGHT - APPROX 150

NOTE

- 1-DIM. 10" 1/2" AT BRD'D
- 2-WINDOW CAN BE BAKED
- 3-WINDOW CAN BE MADE IN 3 OR MORE SECTIONS (1/2" SECTION SHOWN)
- 4-SEALING COMPUND TO BE APPLIED TO ALL MOUNTING SURFACE, FRAME UNDEILLED UNLESS SPECIFIED.

PLATE CUTOUT



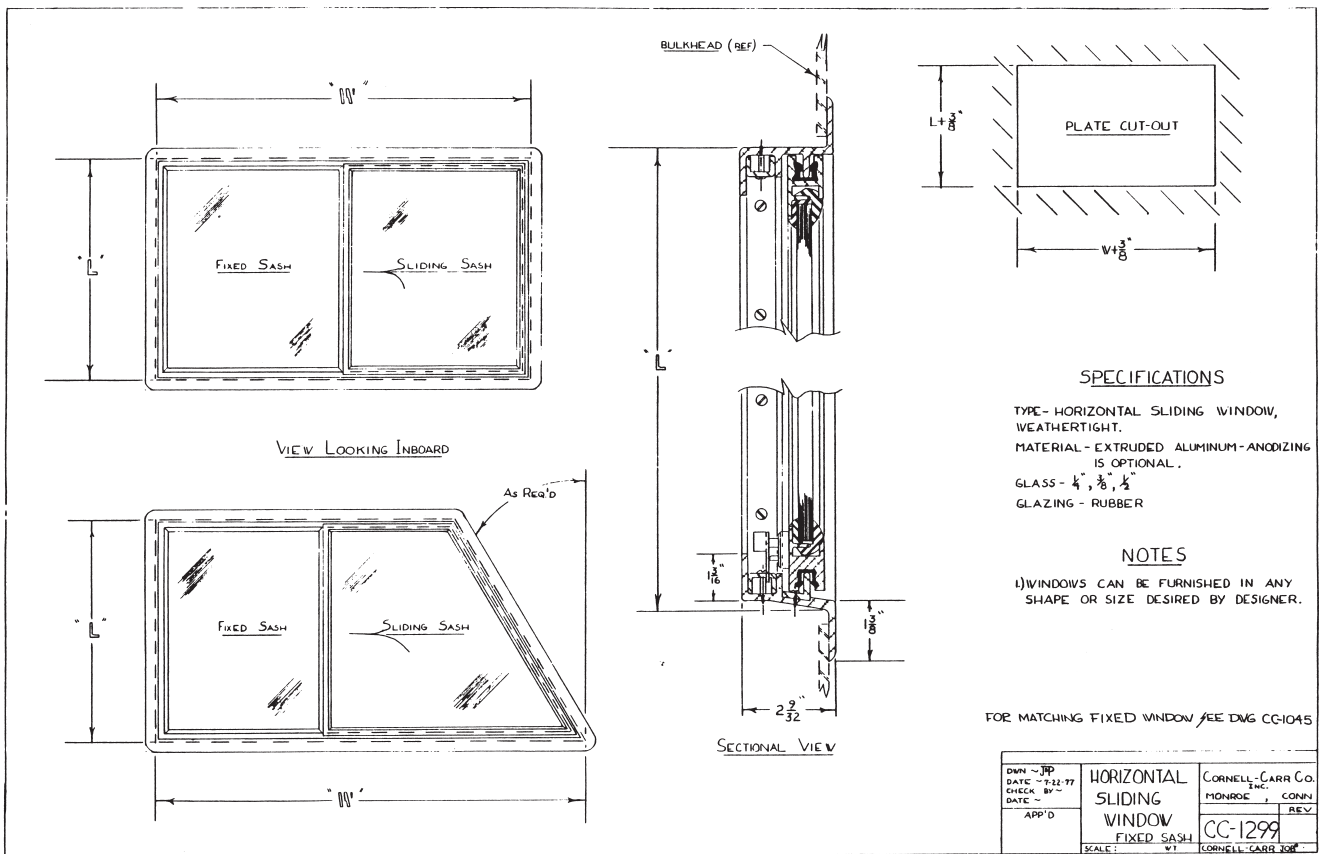
CORNELIUS - CARP CO.
 ROUTE #25 MONROE, CONNECTICUT

FIXED WINDOW

REV	DATE	BY	CC-1046
1			

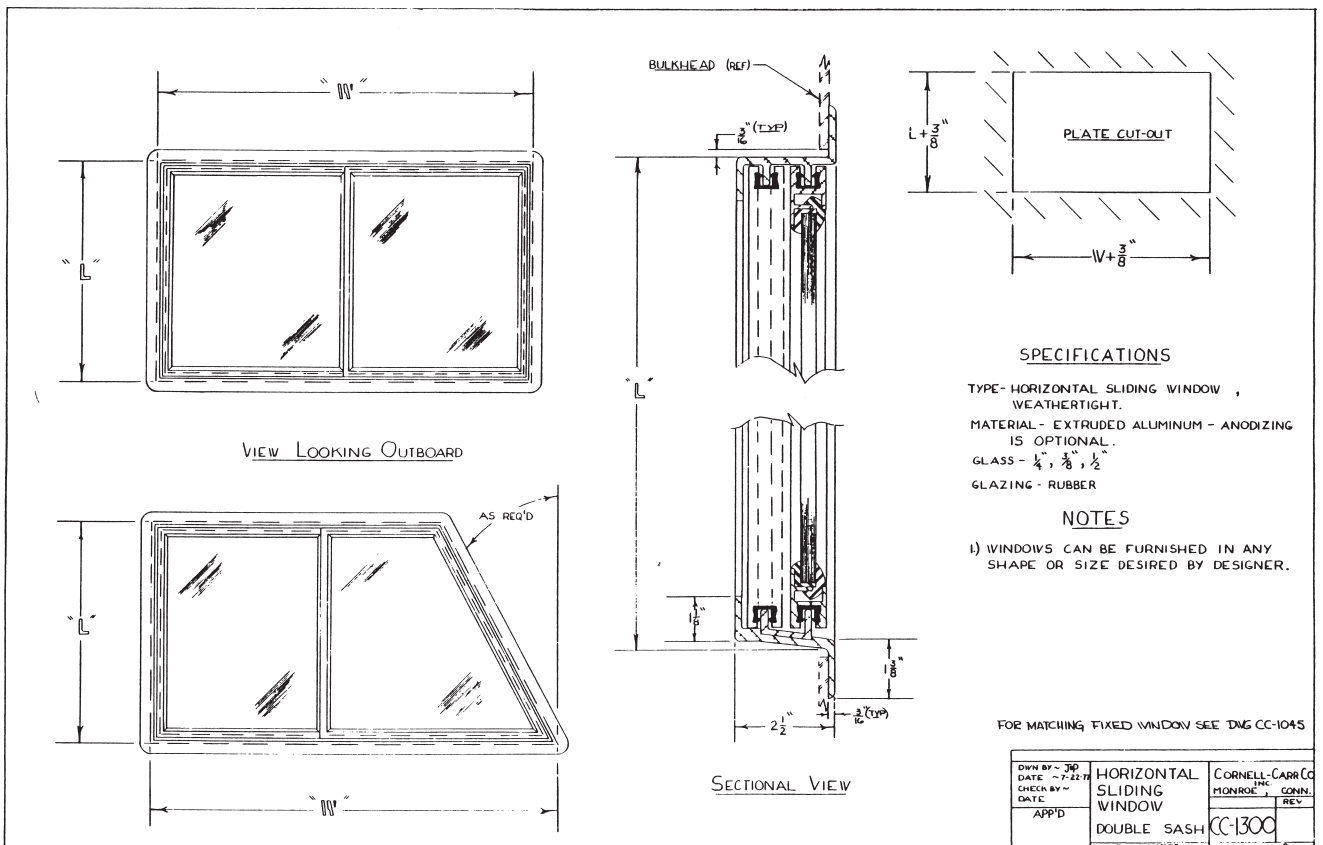
FIXED WINDOWS

CC 1046



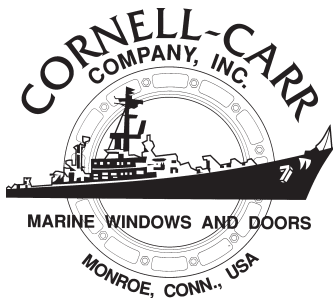
HORIZONTAL SLIDING WINDOW - FIXED SASH

CC 1299



HORIZONTAL SLIDING WINDOW - DOUBLE SASH

CC 1300



ELECTRICALLY HEATED WINDOWS

For the past 18 years Cornell-Carr Company has been manufacturing electrically heated windows designed to meet the severest weather conditions. Since the first heated window was produced for the U. S. Navy, now all naval vessel's pilot houses are equipped with one or more and 90% of the cargo and passenger ships have them. The flying spray which in extremely low temperatures causes ice to form instantly on windows is no longer a navigational hazard with the use of ice free, electrically heated windows. External and internal fogging can no longer occur when Cornell-Carr electrically heated windows are installed.

In order to accomplish the heating of these windows a conductive coating is applied to the surface of one panel of glass. This coating is completely transparent and has a high electrical resistance. This coated panel is then laminated to another panel of glass with a vinyl filler sandwiched between. Current passing from busbars located at both ends of the panel supplies the electrical energy to the conductive coating between the laminated glass providing thermal energy which evenly heats the entire glass panel. The heating is controlled by a control box containing hermetically sealed thermostats or imbedded sensors. Either AC 115, 220, 440 volts can be used to heat the panel which can be laminated with various glass thicknesses and configurations.

Cornell-Carr Company manufactures heated windows in a complete assembly which can be installed in the ship's superstructure by means of through bolts. The frames for these heated assemblies can be made of corrosion resistant steel, bronze or aluminum and the glass being glazed within the frame by special rubber channel gaskets fully sealing the entire assembly. These units are manufactured to customer's specifications and meet the requirements of MIL-W-18445C.

GRAVE MATTERS

If you're dead, you're history. Here are some not-very-grave epitaphs from around the world.

Anna Wallace

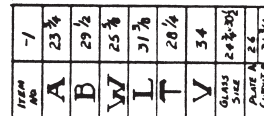
The children of Israel wanted bread
And the Lord sent them manna,
Old clerk Wallace wanted a wife,
And the Devil sent him Anna.

Under the sod and under the trees
Lies the body of Jonathan Pease.
He is not here, there's only the pod:
Pease shelled out and went to God.

A victim of fast women
and slow horses

Some come to this graveyard
To sit and think,
But I've come here to Rot and stink.

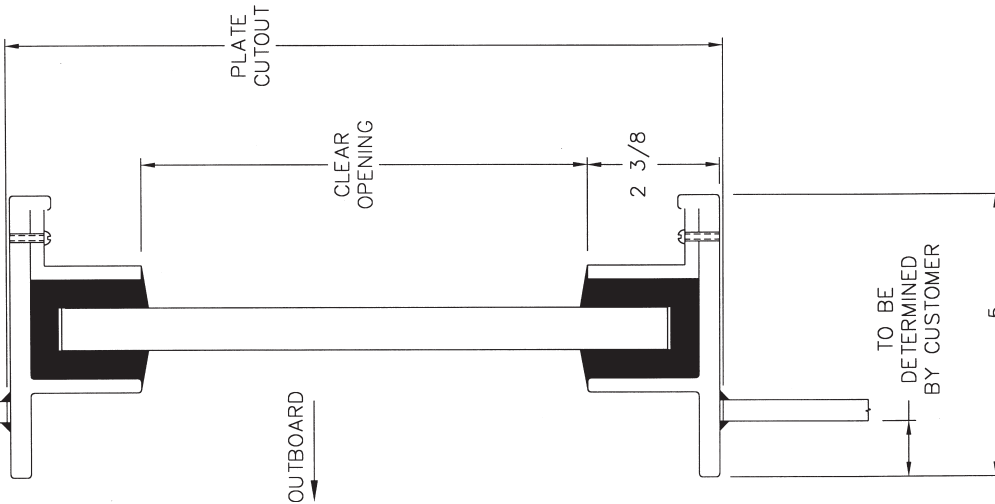
Owen Moore
Gone away Owin' more Than he
could pay.



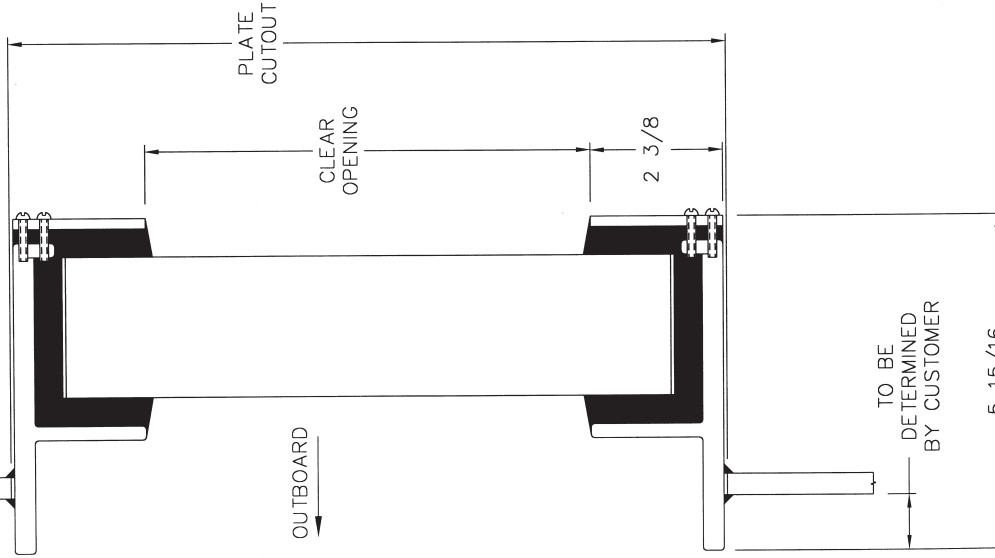
DATE: 9-13-72	FIXED	CONNELL - CAR INC.
DATE: 9-13-72	NON-ICE	
DATE: 9-13-72	WINDOW	MOVING CONN.
DATE: 9-13-72		REV
DATE: 9-13-72		CC-1208

CC 1208

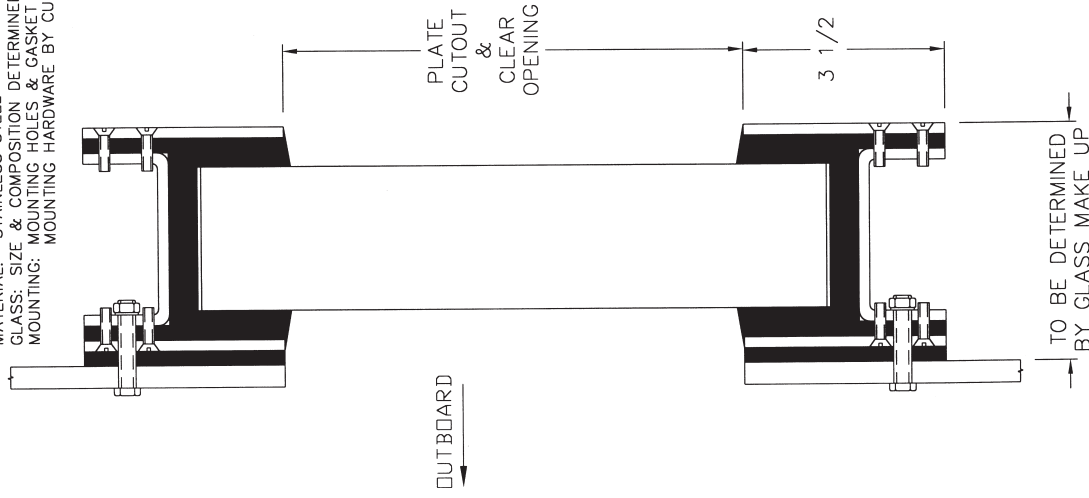
CC-8009
 TYPE: WELD-IN WINDOW WITH FIRE RATED GLASS BY (DNV)
 MATERIAL: STEEL
 GLASS: SIZE & COMPOSITION DETERMINED BY APPLICATION
 MOUNTING: WELD IN BY CUSTOMER



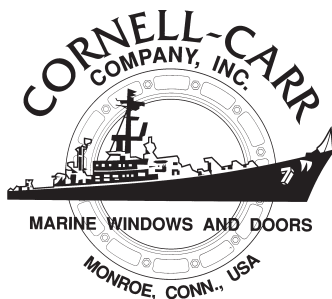
CC-8010
 TYPE: WELD-IN WINDOW WITH FIRE RATED GLASS BY (DNV)
 MATERIAL: STEEL
 GLASS: SIZE & COMPOSITION DETERMINED BY APPLICATION
 MOUNTING: WELD IN BY CUSTOMER



CC-8011
 TYPE: BOLT-IN WINDOW WITH FIRE RATED GLASS BY (DNV)
 MATERIAL: STAINLESS STEEL
 GLASS: SIZE & COMPOSITION DETERMINED BY APPLICATION
 MOUNTING: MOUNTING HOLES & GASKET BY CORNELL-CARR
 MOUNTING HARDWARE BY CUSTOMER



A - 60 FIRE RATED WINDOWS



PENDULUM WINDOW WIPER

Cornell-Carr Company manufactures a Pendulum Type Airport and Window Wiper which combines simplicity, efficiency and durability. This motor driven wiper can be readily mounted inboard or can be outside mounted. It is built to resist the severe conditions inherent in navigation. Heated arms on inboard mounted wipers or heated pivots on those that are outside mounted are also available. Wipers can be provided with a window washing/anti-ice feature as well as with a radio frequency interference suppression feature.

All parts are made of corrosion resistant material. The unit is powered by a 110/ 120 AC/DC volt, 1/30 or 1/8 HP motor with a variable rheostat speed control and a shut off switch. Various wiper arm arrangements can be furnished including single, dual arms and parallel blade motion.

Also available is our 12, 24, 32 volts model designed for moderate duty for small boats. The wiping angle is set at a 100° swipe, the housing is watertight and all parts are resistant to salt spray and other corrosive environmental conditions.

The wiper can be mounted above, below or at the side of the windshield frame. The drive shaft supplied can be 3", 4", 5" and 6" depending on wall thickness.

Standard Navy Wiper -	CC-5065-Inboard Mounted
(Not Shown in Catalogue)	CC-5086-Outboard Mounted

Kindness

Human kindness has never weakened the stamina or softened the fiber of a free people. A nation does not have to be cruel in order to be tough. *Franklin D. Roosevelt*

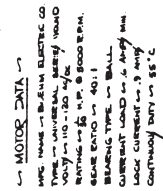
Kindness is a language the dumb can speak and the deaf can hear and understand. *Christian Nestel Bovee*

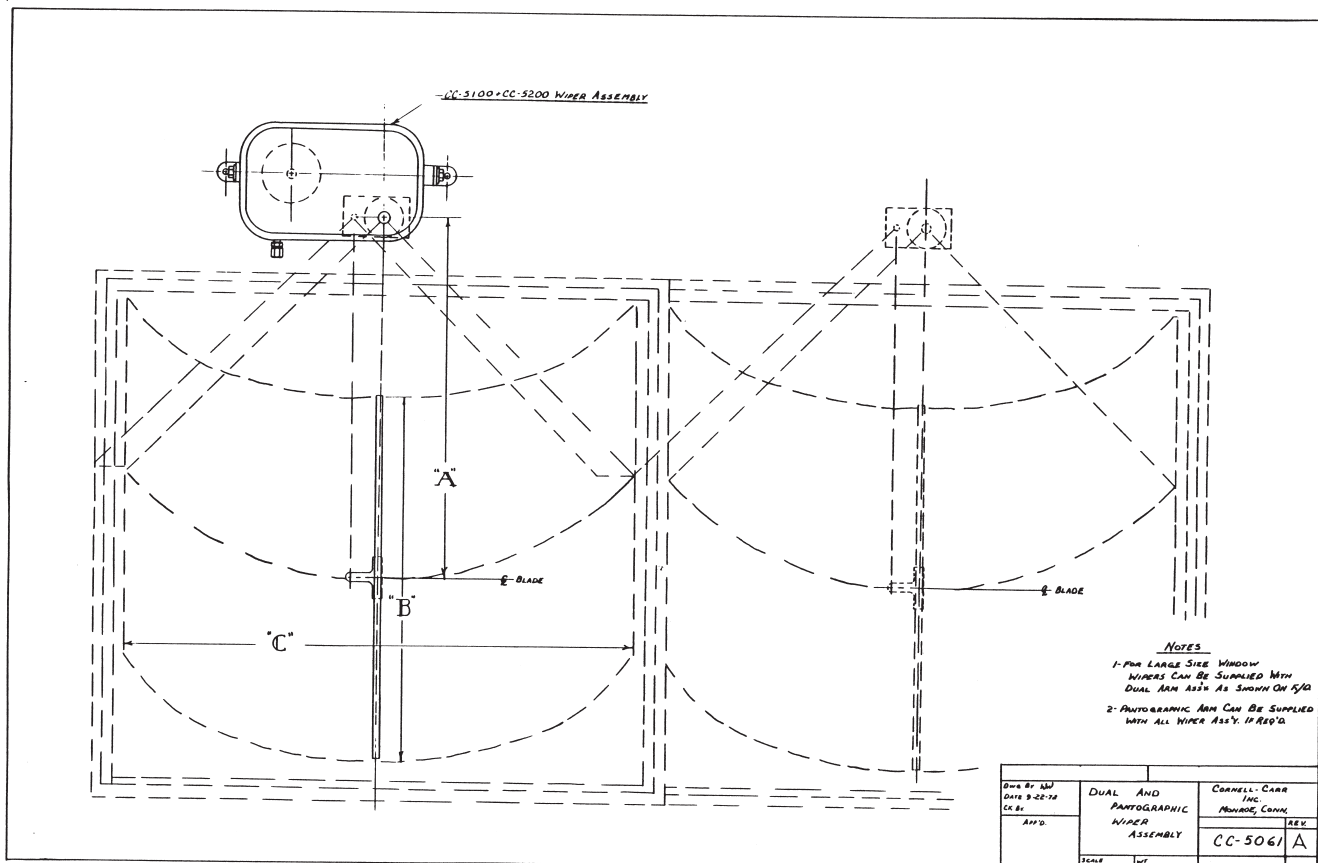
You cannot do a kindness too soon, for you never know how soon it will be too late. *Ralph Waldo Emerson*

If a farmer has 5 hay stacks in one field and 4 in the other field, how many haystacks would he have if he combined them all in the center field?

One. If he combines all of his haystacks, they all become one big stack.

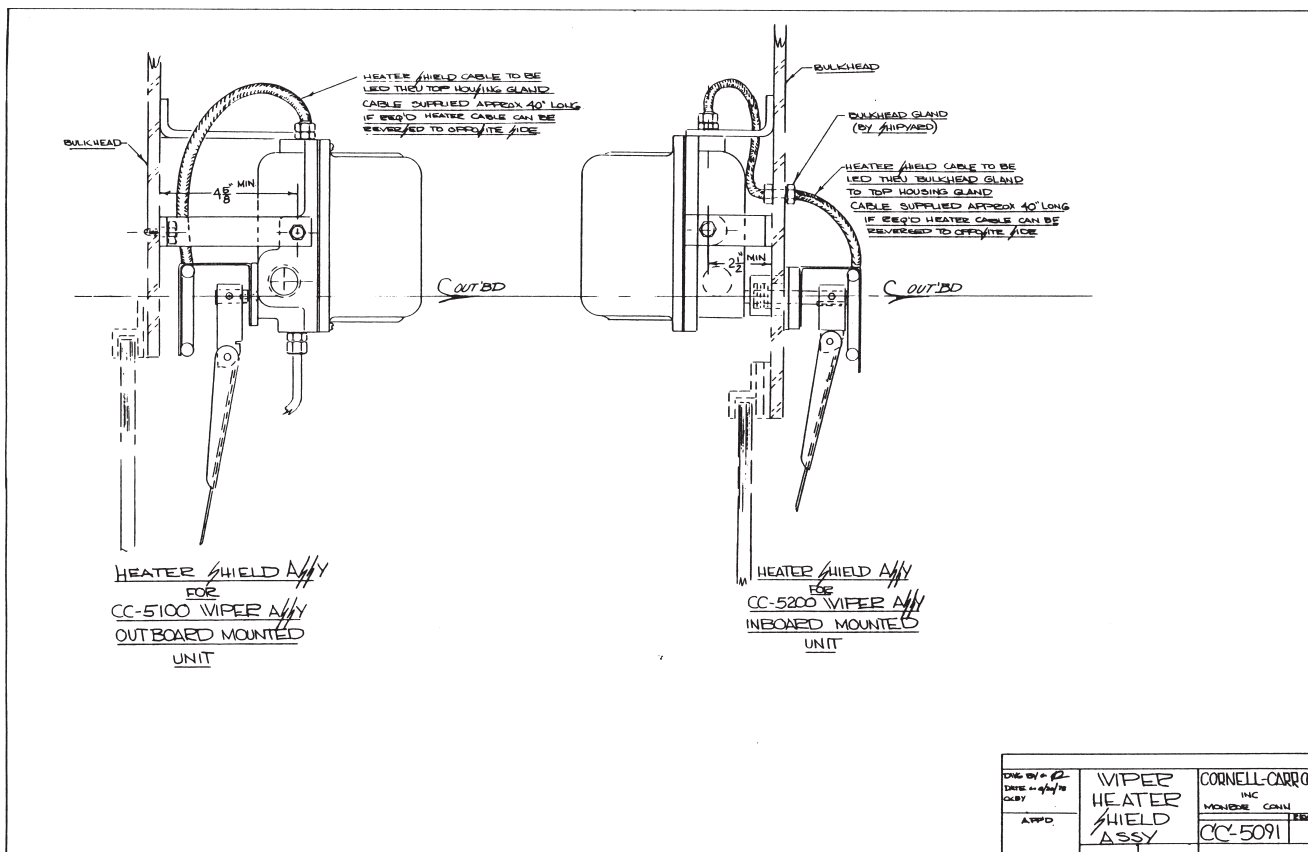
CC 5200
CC 5100





DUAL AND PANTOGRAPHIC WIPER ASSEMBLY

CC 5061



WIPER HEATER SHIELD ASSEMBLY

CC 5091

INSTALLATION

NYLON BULKHEAD FITTING JACO # 10-4-2-N-Q

END OF PLASTIC TUBING

THREAD COPPER NOZZLE INTO 1/8" PLASTIC TUBING

DETAIL XX

BULKHEAD FITTING CAN BE LOCATED EITHER SIDE OF WIPER HOUSING (SEE DETAIL XX)

NOZZLE TUBE

NYLON CLAMP 8 SUPPLIED

DELL #28 TAP 8-32

1/8" HOLE (15 FEET SUPPLIED)

1/2" HOLE

PLASTIC RESERVOIR (2 QUARTS)

1 - LOCATE PUMP FUSE PUMP ON BULKHEAD OR ANY CONVENIENT LOCATION. USE PAPER TEMPLATE FOR MOUNTING HOLE LOCATION. DEELL #16-TAP #12-24 (2 REQ'D)

13 - LOCATE RESERVOIR MOUNTING BRACKET ON BULKHEAD OR ANY CONVENIENT LOCATION. USE BRACKET & TEMPLATE DEELL #16-TAP #12-24 (2 REQ'D). SELECT CORRECT BRACKET ANGLE ADJUSTMENT SO THAT RESERVOIR IS IN A LEVEL POSITION

(C) - DETERMINE BEST LOCATION FOR MOUNTING NOZZLE TUBE (SEE DETAIL XX). SHAPE THE NOZZLE TUBE (BY HAND) SO THAT WATER STREAM REACH CENTER OF WIPER AREA. MAKE ADJUSTMENT CAREFULLY TO PREVENT COLLAPSE OF TUBE

DELL #24 TAP 1/8" HOLE (5 REQ'D)

NOTES

1 - CUT & INSTALL PLASTIC TUBING AS REQUIRED. LOCATE NYLON CLAMP AS REQUIRED.

2 - LIFT FLIP-CAP ON LID OF RESERVOIR & FILL WITH CLEAN WATER OR WINDSHIELD WASHER ANTI-FREEZE (ALCO OR EQUAL)

CAUTION: DO NOT USE A CHEMICAL WHICH MAY CAUSE HAZARD TO PAINTED SURF OR WAXED PARTS

3 - UNIT TO BE INSTALLED ON WINDOW

4 - UNIT COMPLY OF:

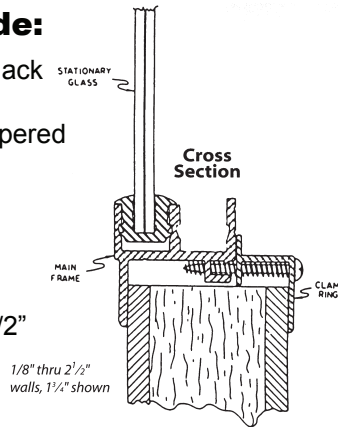
- A - PUMP FUSE PUMP (2-412-24 THIN 1/2" LONG)
- B - RESERVOIR TANK (2 QUARTS) & MOUNTING BRACKET (3-412-24 THIN 1/2" LONG)
- C - COPPER NOZZEL
- D - NYLON BULKHEAD FITTING
- E - 1/8" DIA HOLE - 15 FT, 1/8" DIA HOLE - 5 FT
- F - 8 NYLON CLAMP, (6-8-32 THIN 1/2" LONG)

SCHEDULE	ITEM
	FORM
	QUANTITY
	REMARKS

DATE - 1-11-72	WINDOW WASHING ASSY	CORNELL-CARCO INC
CHK BY A/C	HAND OPERATED	NO. BOST. CORN. 157
APPRO DATE		CC-5062

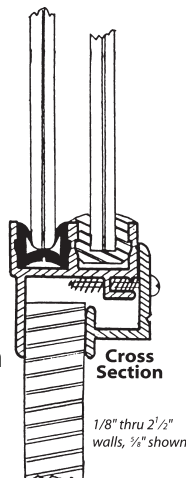
Features for the Model 200 Stationary Window include:

- Heavy duty satin finish anodized or black painted aluminum construction
- 7/32" laminated or 1/4", 3/8 or 1/2" tempered safety glass
- Clear or tinted glass
- Vinyl weatherseals
- 3" Radius corners
- Available in any size or shape
- Clamp ring mounting for 1/8" thru 2 1/2" Walls
- All stainless steel hardware



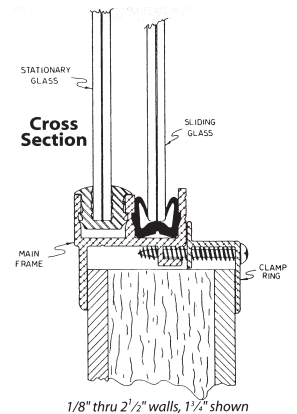
Features for the Model 210 Sliding Window include:

- Heavy duty satin finish anodized or black painted aluminum construction
- Laminated or tempered safety glass
- 7/32" clear or tinted glass
- Vinyl weatherseals
- 3" Radius corners
- Positive locking handle
- Available in any size or shape
- Clamp ring mounting for 1/8" thru 2 1/2" Walls
- No screen
- These weathertight windows have the forward (outside) glass sliding aft to open
- All stainless steel hardware



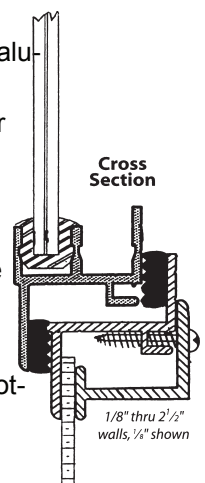
Features for the Model 220 include:

- Heavy duty satin finish anodized or black painted aluminum construction
- Laminated or tempered safety glass
- 7/32" clear or tinted glass
- Vinyl weatherseals
- 3" Radius corners
- Positive locking handle
- Available in any size or shape
- Clamp ring mounting for 1/8" thru 2 1/2" walls
- These weathertight windows have the AFT (inside) glass sliding forward to open
- All stainless steel hardware



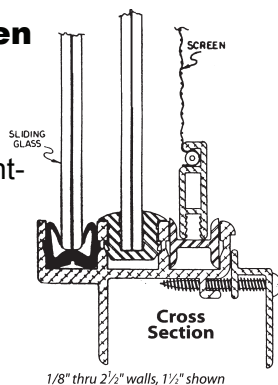
Features for the Model 230 Hinged Window include:

- Heavy duty satin finish anodized or black painted aluminum construction
- 7/32" safety glass, laminated or tempered, clear or tinted
- Vinyl and foam rubber weatherseals
- 3" Radius corners
- Stainless steel and chrome plated brass hardware
- Adjustable dogs for positive closure
- Available in any size or shape
- Available full swing out or top portion swing out, bottom portion fixed
- Clamp ring mounting for 1/8" thru 2 1/2" walls
- Double gasket construction



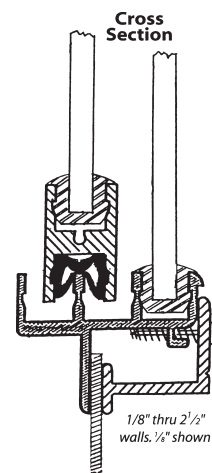
Features for the Model 300 Sliding Window with Sliding Screen include:

- Sliding removable screens
- Heavy duty satin finish anodized or black painted aluminum construction
- Laminated or tempered safety glass
- 7/32" clear or tinted glass
- 3" Radius corners
- Fiberglass screen cloth
- Positive locking handle
- Available in any size or shape
- Clamp ring mounting for 1/8" thru 2 1/2" walls
- All stainless steel hardware



Features for the Model 310 Sliding Window include:

- Heavy duty satin finish anodized or black painted aluminum construction
- 7/32" laminated or 1/4", 3/8" or 1/2" tempered safety glass
- Clear or tinted glass
- Vinyl weatherseals
- 3" Radius corners
- Positive locking handle, rivited in place
- Available in any size or shape
- Horizontal or vertical sliding
- With or without stationary screen
- Clamp ring mounting for 1/8" thru 2 1/2" walls
- All stainless steel hardware



Ordering Information

Advance planning of your requirements can expedite, your ordering process. By answering the following questions you can save your valuable time.

- What type of window is required? (*fixed, sliding, swing out etc.*)
- What are the actual dimensions of the rough opening in your wall? (*Height x width*) (*template or drawing may be required*)
- What type of glazing do you require? (See below)
- How will you mount the window? (*Clamp ring or flange bolted*)
- What is your overall wall thickness? (*For clamp ring mounting*)
- Do you require screens? (*Sliding screens-Model 300*) (*Fixed screens-Model 220 & 310*)
- Where will this window be mounted? (*Left or right side, front or rear*)
- 3" radius corners or mitered corners?



Glazing Options

First, choose the type of glazing you require from the list below.

- Laminated safety
- Tempered safety
- Polycarbonate
- Acrylic

Second, choose the tint you require

- No tint-clear
- Blue/green tint
- Solar bronze
- Solar gray
- Graylite 14

PRODUCT INFORMATION:

DECCA STRAIGHT LINE WIPERS

KEY FEATURES & BENEFITS

- Suitable for all ship categories
- Robust and smart design
- Cleans up to 90% of the window
- Fully adjustable wiper arm
- Stroke length up to 350 cm
- Voltage: AC (110/220V) or DC (24V)
- Easy installation and maintenance
- Variable speed and intermittent
- Automatic parking function
- Heated wiper casing
- Optional water spray with air purge
- Optional dual arm setup

THE HEAVY DUTY ALTERNATIVE

Decca straight line wiper systems are built in Norway and engineered to survive the rigors of the North Sea. With unique technical design features and built with only high quality materials, Decca wipers meet the demand for efficient and reliable wiper operation in extreme weather conditions.

VISIBILITY

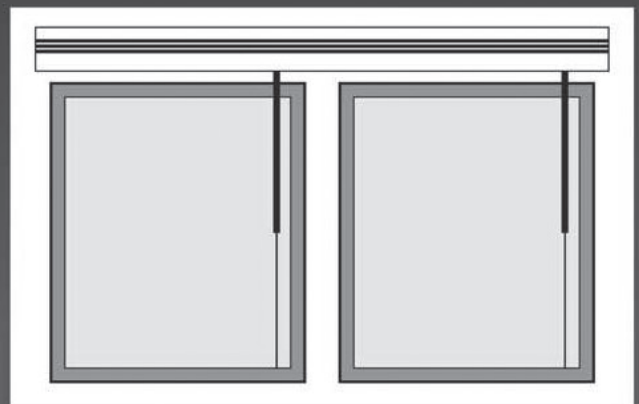
Modern shipbuilding design takes full account of visibility requirements. Larger wheelhouses with an omni-directional view are part of this trend. As a result, there is an increase in window area that must be kept clear in all weather conditions. Decca straight line wipers are designed to meet these demands with reliable and efficient operation in heavy rain, storm conditions, sleet, and even snow.

CUSTOM DESIGNED WIPERS FOR ALL WINDOW SHAPES

The stroke length can be set to any distance from 45 to 350 cm, and wiper blades range from 40 to 100 cm. For tall windows, an additional wiper can be installed below the window frame, increasing the wiped area by up to 100 percent. For wide windows, the wiper unit can be equipped with an extra arm and wiper blade. The dual arm setup allows a longer combined stroke length compared to the standard unit. One dual wiper unit can also be set to cover two adjacent windows.



Decca Wipers installed on the "The World".



Decca dual wiper covering two adjacent windows.

WIPER ARMS

For light duty (LD) applications, the lightweight and minimalist single arm is often the preferred choice. The LD arm supports wiper blades up to 800 mm. Besides more stability and ruggedness, the dual heavy duty (HD) alternative also features a more advanced spring tension adjustment. The HD arm supports wiper blades up to 1000 mm.

DECCA CONTROL SYSTEMS

Based on variables such as the number of wiper units, wiper groups and water spray zones, the control system is individually adapted to meet the relevant requirements for each vessel. There are two controller series available.

THOR CONTROLLER SERIES

- Supports up to 40 wipers
- Supports up to 4 separate wiper groups
- Supports up to 4 water spray zones
- Optional air purge function
- Heater function with LED indicator
- Step-less motor speed control
- Step-less intermittent timer
- Heavy duty toggle switches
- Custom versions available on request

ODIN CONTROLLER SERIES

- Supports up to 100 wipers
- Supports up to 5 separate wiper groups
- Supports up to 5 water spray zones
- Built-in air purge function
- Heater function with LED indicator
- Adjustable speed and intermittent
- Soft-touch keypad
- LED indicated speed setting for each group
- Dimmer (night mode) function
- Auto-resume function in standby mode

DECCA STRAIGHT LINE WIPERS



LD single arm and HD double arm, both in stainless steel.



Thor controller series.



Odin controller series.

TECHNICAL DETAILS:

LIST OF MATERIALS

- Main structure: Corrosion resistant anodized aluminium
- Wiper arm: Stainless steel (316L)
- Track rollers: Hardened polyamide
- Driving belt: Reinforced polyurethane
- All other parts: 316L or corrosion resistant anodized aluminium

UNIQUE CABLE CONNECTOR

The waterproof (IP67) cable connection system is a unique feature with Decca wiper systems. This allows the cable to be connected or disconnected from the wiper unit within seconds. Combined with the easily accessible wiper fixing brackets, it takes less than five minutes to detach a wiper unit from the bulkhead. Simple maintenance work that would otherwise take several hours due to poor working conditions on site can be efficiently executed indoors for your convenience.

WATER SPRAY SYSTEM

Decca wipers come with an optional water spray system that consists of 12 mm piping and nozzles, all in stainless steel (316L). The piping can be fitted onto the wiper fixing brackets, or it can be installed directly onto the bulkhead.

AIR PURGE SYSTEM

The optional air purge system prevents trapped water from freezing within the pipes or nozzles at sub zero temperatures. The Decca air purge system consists of solenoid air valves and an electronic valve controller with a programmable timer function (1 to 60 seconds).

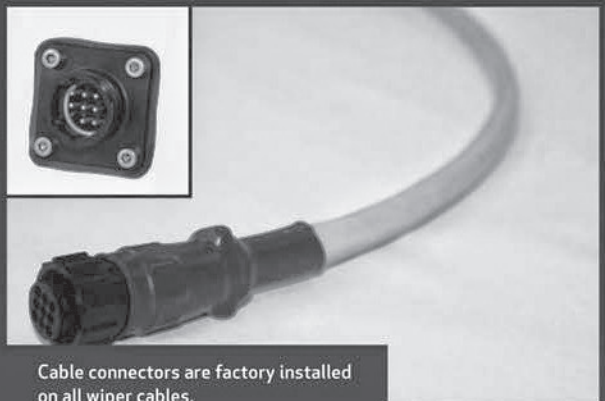
MOTOR

The featured heavy duty motor is specifically engineered for maximum durability. Thanks to innovative technology, this motor delivers maximum torque throughout the entire speed range, which translates to a linear and powerful output (110Nm). The motor is installed directly onto the wiper main structure, eliminating noise and the need for a complex driveshaft bulkhead penetration. For weather protection, all motors are sealed (IP66).

DECCA STRAIGHT LINE WIPERS



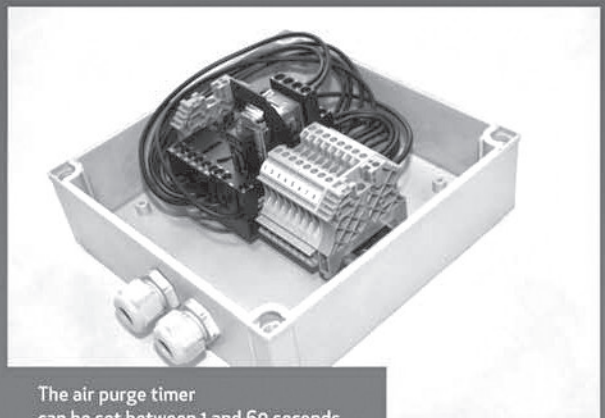
Smart design with a minimum number of moving parts ensure reliable operation.



Cable connectors are factory installed on all wiper cables.



Water spray system in stainless steel.

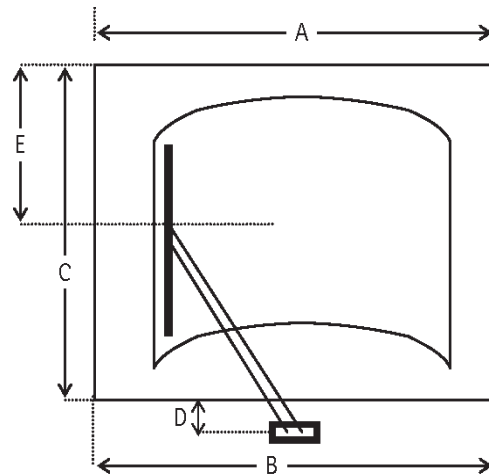


The air purge timer can be set between 1 and 60 seconds

WINDSHIELD WIPER QUESTIONNAIRE **imtra** MARINE PRODUCTS

Contact Information

Name: _____
 Company: _____
 Address: _____
 City: _____ State: _____ ZIP: _____
 Tel: _____ Fax: _____
 E-Mail: _____
 Owner's Name: _____
 Yacht Name: _____



Motor Voltage and Location

- ☐ 12VDC
☐ 24VDC
☐ Below Window
☐ Above Window

Switchgear Selection

- ☐ Electronic Control Panel (Synchronized)
☐ Electronic Wiper Switch (Synchronized)
☐ Individual Switch with Intermittent
☐ Individual Switch without Intermittent
☐ No Switchgear Needed

Washing System Details

- ☐ Complete System from Ship's Supply
☐ Complete System from Reservoir
☐ Bulkhead Mounted Jet
☐ Arm Mounted Jet
☐ No System Required

Window Type:



Window Dimensions

	Port	Port/Center	Center	Starboard/Ctr	Starboard
Window Type (see above)					
Window Height [C]					
Width of Glass/Top [A]					
Width of Glass/Bottom [B]					
Motor Setback* from Window [D]					
Eye Level [E]					
Bulkhead Thickness					

* The "Motor Setback from Window" is the distance between the inside edge of the windshield frame and the center of the motor shaft

☐ Please check if wiper motor mounting position is not parallel with windshield. If known, what is the angle between them: _____

Additional Comments:

WINDSHIELD EQUIPMENT

AFI WIPER MOTORS

HEAVY DUTY MOTORS

AFI-2000

Waterproof Wiper Motor

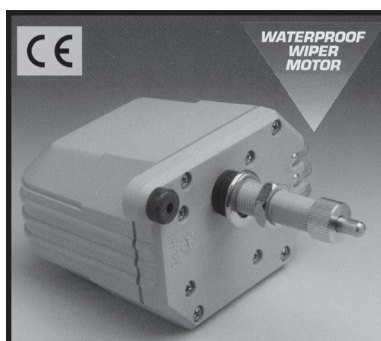
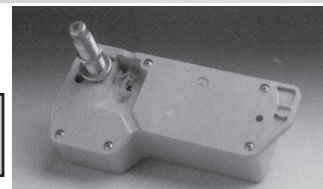
- Easily powers up to 24" x 24" arm/blade combinations Factory pre-set sweep of 80° or 110° adjustable to 45°, 60°, 80° or 110°
- 5/8" diameter shaft
- Available in two shaft lengths: 1-1/2" and 2-1/2"
- Fully sealed waterproof housing made of UV stabilized, high-temperature, high-impact thermoplastic
- 12 volt heavy-duty motor with anti-rotation drive shaft Knurled drive shaft and solid brass arm drive nut Adjustable right or left self parking
- Coast to park
- Includes 5 amp fuse and holder (no on/off switch)
- RF shielded circuitry
- Maximum current draw: 5 amps
- Compact size - 7-3/4" L x 3-7/8" W x 2-3/8" H
- Weight: 2.7 lbs.
- Made in the U.S.A.

3 Year Warranty



1-1/2" Shaft Length

80° Sweep	110° Sweep
36280	36210



2-1/2" Shaft Length

WINDSHIELD FRAME MOUNT

80° Sweep	110° Sweep
35500	35510

STANDARD MOTORS

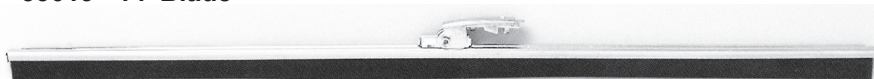
- Powers up to 14" x 14" arm/blade combinations Waterproof housing made of UV stabilized high-temperature, high-impact thermoplastic Maximum current draw: 2 amps
- Adjustable right or left self-parking Shaft diameter: 1/2"
- 80° or 110° adjustable sweep
- For external use in open cabin boats

AFI WIPER BLADES

STANDARD STRAIGHT BLADE

- Stainless steel
- Not for use with deluxe arms

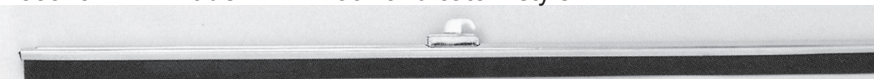
33001 11" Blade
33019 14" Blade



CLASSIC STRAIGHT BLADE

- Stainless steel
- Replaces most standard blades made before 1990

33901 11" Blade "Hook and catch" style
33911 16" Blade Bolt-on style
33919 14" Blade "Hook and catch" style



DELUXE CURVED BLADE

- Stainless steel
- Works well on curved or flat windshields

33004 11" Blade
33005 14" Blade
33015 16" Blade
33016 18" Blade
33017 20" Blade



CLASSIC CURVED BLADE

- Stainless steel
- "Hook and catch" style
- Replaces 11" and 14" deluxe blades on boats manufactured before 1990

33904 11" Blade
33905 14" Blade



He was lying there in the weeds and tall grass just beyond the side lot, and he was watching carefully the side door of the house. He was thinking of all of the miserable mixed-up things he had ever done in his life, and what was now the most contemptible, because he was about to kidnap a little two-year-old red-headed girl. He couldn't believe he had come to this. He had time to wait. He had cased the joint and knew that every mid-afternoon she came out to play in the yard, and there he could grab her and hasten away.

"What a life," he thought. When he was five years old his Hoosier farmer father died. At fourteen he quit school and hit the road. He worked odd jobs as a farmhand and hated every one of them. He got a job as a streetcar conductor and hated that. At sixteen he lied about his age and joined the army - and he really hated that! After one year he got out. He tried his hand at black-smithing and failed at that. He sold insurance - and failed again. Sold tires and failed at that. Then he got a job as a locomotive fireman on a train. He liked that and thought he had finally found his niche.

He got married at eighteen. A few months later his wife announced she was pregnant. That was the same day he announced to her he had been fired ... again. When he was out job hunting some time later, his wife gave away all of their meager goods and went home to live with her folks - and then the depression came. He just couldn't win for losing, says Paul Harvey. He was a born loser.

Now here he was lying in the weeds planning a kidnaping! For the sake of his memory, we should note that it was his two-year-old daughter he was going to kidnap from his departed wife. That too failed; the little girl didn't come out to play that day! We wouldn't want to break his string of failures. But it didn't matter, because the next day the wife and the little girl came back to live with him. He got a job as chief cook and bottle washer at a restaurant in Corbin, and that looked very promising because, you see, the state highway was scheduled to come by there. This, indeed, might be the pot of gold. Then the state changed its plans, and the state highway went somewhere else.

The years slipped by and then one day, for the first time he felt old when he opened an envelope the postman gave him which contained his first Social Security check - \$105. Harlan looked at that check and something happened inside of him. He got mad, and said, "Nuts, now even the government is feeling sorry for me." They said he had had enough times at bat. It was time to quit; it was time to give up - and he was angry.

He took the check that represented the sixtyfifth candle on his cake and went out and started all over again. He started his own business - that's what Harlan did. That business, started when most other men stopped, prospered. Some of you know already about whom I am speaking - Harlan Sanders. In case you don't immediately recognize the name, that's Colonel Harlan Sanders. The company he started with a \$105 Social Security check is called Kentucky Fried Chicken. When he was eighty-six years of age he looked down on a global enterprise with over 9,000 restaurants around the world. "And that," says Paul Harvey, "is the rest of the story." Here was a man who got a second chance at life when most other people are cashing in, and he made good at it.

Index Section J

AIDS TO NAVIGATION

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URBAN LEGENDS

Urban legends are stories that are not true or unverified.

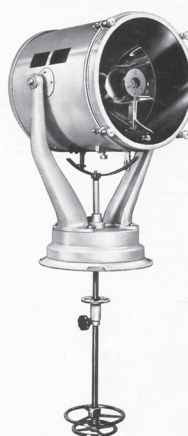
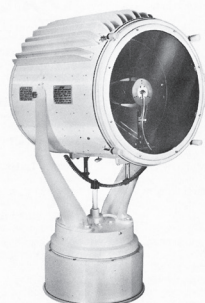
December 1999, Michigan

A man bought himself a new \$30,000 Jeep Grand Cherokee for Christmas. He and four friends decided to take his new vehicle on a duck hunting trip. They loaded up the Jeep with a dog, guns, decoys, and beer. They then headed out to a nearby lake. The lake was frozen, so they needed to make a hole in the ice to make a natural landing area for the ducks and decoys. It is common practice in Michigan to drive your vehicle out onto the frozen lake, and it is also common (if slightly illegal) to make a hole in the ice using dynamite. The stick of dynamite they used has a short 20-second fuse. They decided to throw the dynamite out where they wanted the hole in the ice. There was a bit of contention over who had the best throwing arm. Eventually the owner of the Jeep won the honor. His friend lit the fuse and he hurled it across the ice at a great velocity and ran in the other direction. Unfortunately the dog saw his master throw the dynamite and ran to retrieve it. The five frantic men began yelling at the dog, trying to get him to stop. Before you know it, the dog was headed back to his owner, proudly carrying the stick of dynamite. In a desperate act, his master grabbed his shotgun and fired at his own dog. The gun was loaded with duck shot, and it didn't kill the dog. Bewildered, the dog ran for cover under the brand-new Jeep Grand Cherokee. Boom! The dog and the Jeep were blown to bits, and sank to the bottom of the lake, leaving a large hole in the ice in their wake. The owner of the Jeep was left to explain to his insurance company what happened. Needless to say, the insurance company determined that sinking a vehicle in a lake by illegle use of explosives is not covered under their policy, and the owner is still making \$400 monthly payments.



Lever-Gear
Control
1KW

Distant Electric Control
2.5KW

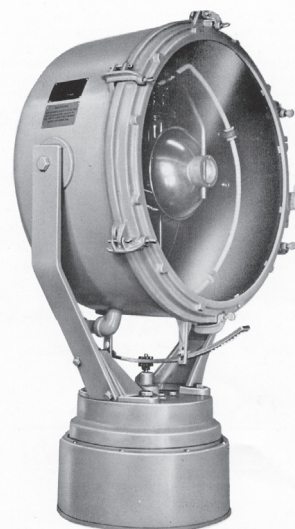
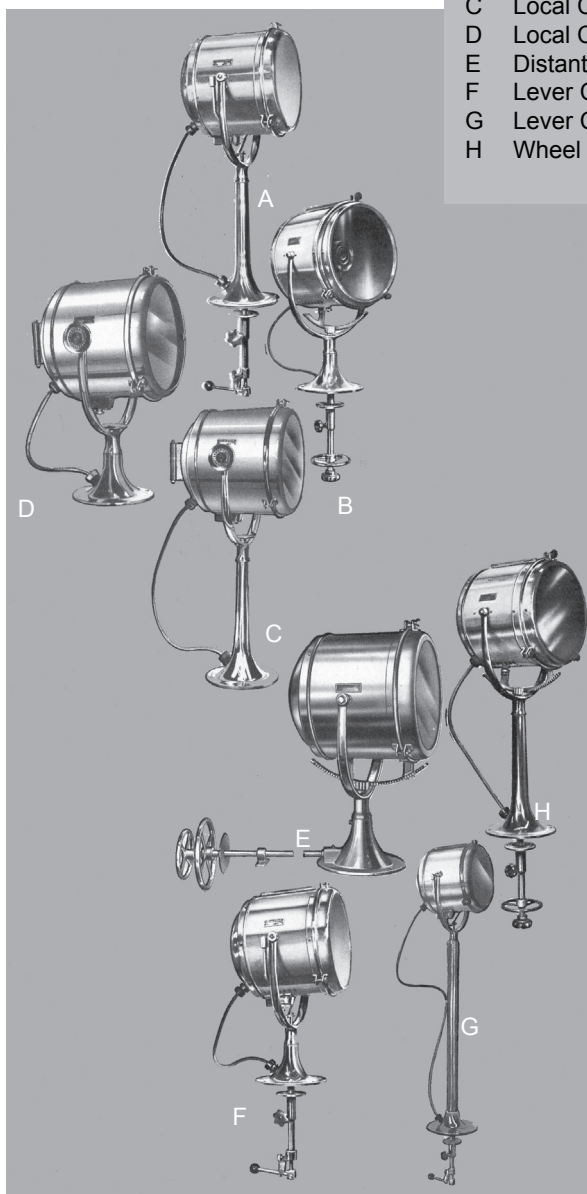


Wheel Control
1KW

- 10/12/15 - Inch Distant Electric Control
- 19 Inch Incandescent Searchlights
- 24 Inch Searchlights
- Xenon Search lights
- Carbon Arc Searchlights
- Searchlight Power Supplies
- Signaling Searchlights
- Marine Floodlights
- Navy Searchlights/Navigation Lights
- Lighthouse Beacons

Key to Photographs

- A Lever Control / High Ease
- B Wheel Control / Standard Base
- C Local Control / High Base
- D Local Control / Standard Base
- E Distant Mechanical Control
- F Lever Control / Standard Base
- G Lever Control / Pedestal Base
- H Wheel Control / High Base



24 - Inch Searchlight



19 - Inch Searchlight



Lever-Gear
Control



Distant Electric Control



Wheel Control



A. Available in Three Beautiful External Finishes: white enamel, polished brass, or polished chrome. Interior finished with heat resistant flat black paint.

B. Vented Drum Available for 12" and 15" searchlights allowing use of 1000 watt lamps.

C. Many Lamp Types accommodated. See listing on page 3.

D. Metal Louvers eliminate front spill light.

E. High Quality Silvered Glass Reflector efficiently concentrates light into a powerful beam.

F. Choice of Lampholders

	10"	12"	15"
1 Medium Screw	Yes	Yes	Yes
2 Medium Prefocus	*Yes	*Yes	*Yes
3 Mogul Screw	No	Yes	Yes
4 Mogul Bipost	No	No	Yes
5 2-Pin Prefocus	Yes	Yes	Yes

*Supplied as standard if lampholder not specified.

G. External Focus Control permits changing beam from spot to flood with lamp operating, without the use of tools.

H. Heat-Tempered Cover Glass and tight sealing door gasket provide maximum protection for drum interior.

I. Double seals around control shaft prevent leakage to pilot house. Lubricated for life.

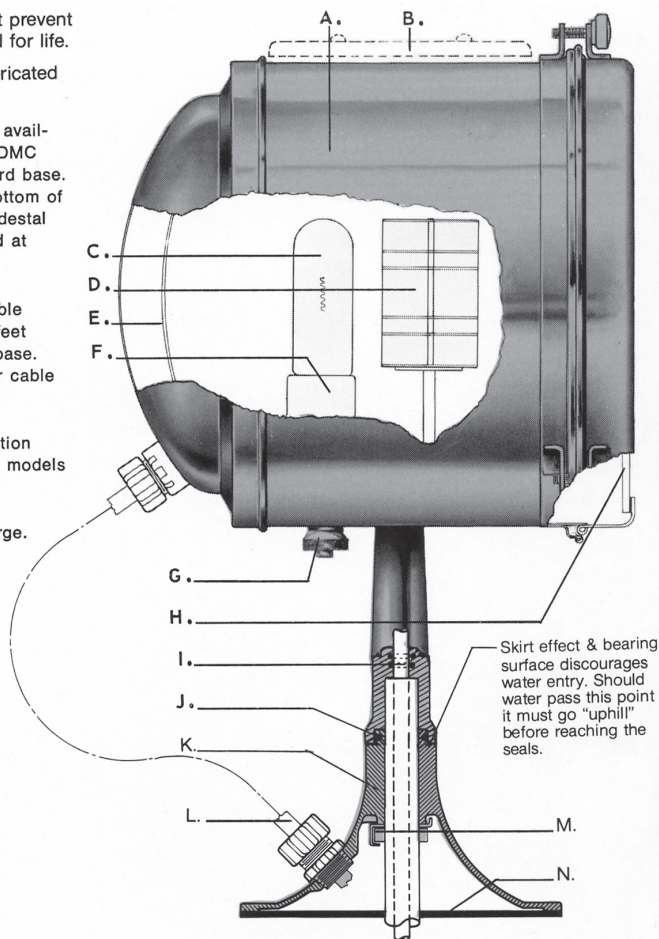
J. Seal between base and yoke. Lubricated for life.

K. Standard, High, or Pedestal Bases available with any control type except DMC which is available only with standard base. Special heights (measured from bottom of base to centerline of beam) for pedestal base searchlights may be specified at extra charge.

L. Heavy Duty Three-Conductor Flexible Cable extends approximately two feet below water-tight stuffing tube in base. Third conductor grounded. Longer cable can be supplied at extra charge.

M. Sliding Stop allows horizontal rotation in excess of 360°. Supplied on all models except Local Control and DMC.

N. Base Gasket optional at extra charge.

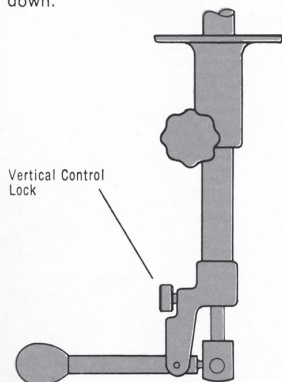


These searchlights are ruggedly constructed entirely of brass and are designed for heavy duty marine service.

Six Basic Control Types

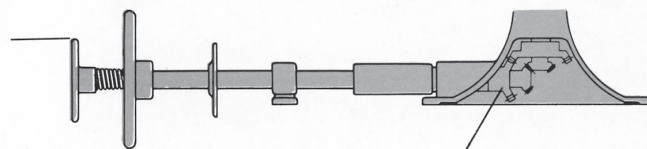
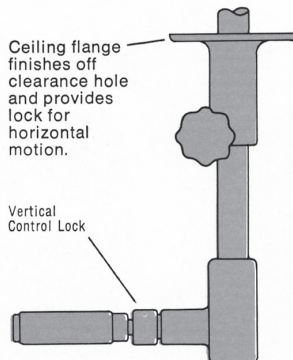
Lever Control:

Single lever controls all motions. Horizontal movement by pointing lever, vertical by moving knob on lever up or down.



Lever-Gear Control:

Operates conveniently with one hand. Horizontal movements by pointing lever. Vertical by twisting handle.

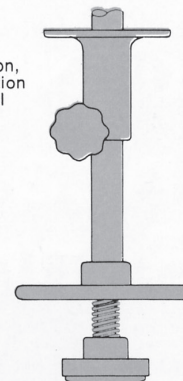


Distant Mechanical Control (DMC):

Similar to wheel control except that control shafts are at right angle to searchlight base.

Wheel Control:

Upper wheel controls horizontal motion, lower wheel the vertical motion. Friction brake holds searchlight in any vertical position.

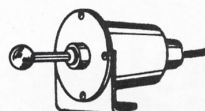


Local Control

(see Figs. 1, 2, 3, on page 5): Searchlight has training handle on back dome and hand clamps for clamping in any position.

Distant Electric Control (DEC):

See latest revision of bulletin D116 for these same size searchlights controlled from one or more electric remote control stations.



Searchlight Lamp Data

Lamp Data									Peak Beam Candlepower		
Ref.	Code	Watts	Volts	Bulb Size	Base	Description	Filament	*Average Hrs. Life	10" Scht.	12" Scht.	15" Scht.
21.5	FDT	100	12	T4	2-Pin Prefocus	Tungsten Halogen	C6	50	765,000	1,170,000	1,750,000
22	CPR	108	6	T10	Medium Prefocus	Projection	C8	50	350,000	563,000	-----
23.01	FDS	150	24	T4	2-Pin Prefocus	Tungsten Halogen	C6	500	935,000	1,380,000	2,030,000
46.5	BTM	500	120	T6	Medium Prefocus	Tungsten Halogen	C13D	100	950,000	1,160,000	2,080,000
47	CZX	500	120	T10	Medium Prefocus	Projection	C13D	25	900,000	1,170,000	-----
51	DMX	500	120	T20	Meduim Prefocus	Projection	C13	50	475,000	780,000	-----
53.8	DYS	600	120	G7	2-Pin Prefocus	Tungsten Halogen	CC6	75	**781,000	1,130,000	1,840,000
54.5	BTP	750	120	T6	Medium Prefocus	Tungsten Halogen	C13D	200	not used	1,520,000	2,280,000

LAMPS BELOW TO BE USED IN VENTED DRUMS ONLY

68.05	BTR	1000	120	T7	Medium Prefocus	Tungsten Halogen	C13D	200	not used	2,820,000	2,282,000
70	DRS	1000	120	T20	Medium Prefocus	Projection	C13D	25	not used	1,650,000	3,280,000
71	DRC	1000	120	T20	Medium Prefocus	Projection	C13	50	not used	800,000	1,760,000

* These lamp manufacturer's figures are relative only. Individual lamps may vary considerably.

**Intermittent duty only (one hour or less).

NEW!!

Medium Prefocus Lampholders on 12 and 15-inch searchlights have unique Shock Absorbing Base Design, which helps prevent lamp filament damage due to excess vibration and shock impact.

Accessories & Parts

Description	Part No. For Size Scht.		
	10"	12"	15"
Cover, Protective	SL3322A	SL3322A	SL3322B
Cover Glass	SL62	SL102	SL1085
Gasket, Base, DMC	SL3318B	SL3318B	SL3318B
Gasket, Base, High	SL3318B	SL3318B	SL3318B
Gasket, Base, Pedestal	SL3318C	SL3318C	SL3318C
Gasket, Base, Standard	SL3318A	SL3318B	SL3318B
Lampholder, Med. Pref.	SL1250C	SL1250C	SL1250C
Lampholder, Med. Screw	SL1087-1	SL1087-1	SL1087-1
Lampholder, Mogul Bip.	—	—	FE132X
Lampholder, Mogul Screw	—	SL96	SL96
Lampholder, 2-Pin Pref.	8704	8704	8704
Reflector	SL1083A	SL107	SL1084

How to Order Searchlights

Specify size searchlight, type control, type base, type drum, type finish, type lampholder, and give code word or catalog number. Give ordering code and volts of lamp. Specify length of control (measured from bottom of base to centerline of lever or upper wheel) if other than the standard dimensions shown on the dimension drawings. Specify pedestal height (measured from bottom of base to centerline of drum) if different from the standard 48 inches.

Example: 12" searchlight, lever control, standard base, vented drum, enamel finish, medium prefocus lampholder, code RECITE-E2. Special length control 22" base to centerline lever. Two lamps code BTR 120 volts.

To designate the specific lampholder desired add one of the following suffixes to the code word or catalog number:

Medium Screw Lampholder	—1	Mogul Screw Lampholder	—3
Medium Prefocus Lampholder	—2	Mogul Bipost Lampholder	—4
		2-Pin Prefocus Lampholder	—5

BRAINTEASER

A man married 48 women. None of them died, he was never divorced, and he was one of the most admired men in town. How come?

ANSWER
He's the town minister.

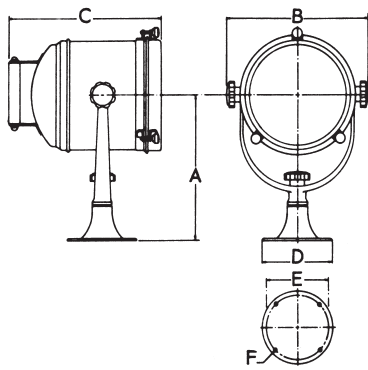
Searchlight Selection Table

10 inch

12 inch

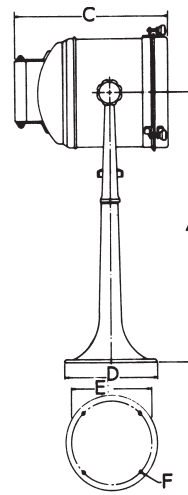
15 inch

Type Control	Type Base		Type Drum	Searchlight Code Word or Catalog No.			Net Wt. Lbs.	Shipping Wt. Lbs.
				Enamel Finish	Polished Finish	Chromium Finish		
Local	Standard	(Fig. 1)	Non Vented	RAIN-E	RAIN	CRAIN	15	21
	High	(Fig. 2)	Non Vented	ROSE-E	ROSE	CROSE	22	28
	Pedestal	(Fig. 3)	Non Vented	RAJAH-E	RAJAH	CRAJAH	29	59
Lever	Standard	(Figs. 4 & 7)	Non Vented	REDAN-E	REDAN	CREDAN	19	25
	High	(Figs. 5 & 7)	Non Vented	REFORM-E	REFORM	CREFORM	27	33
	Pedestal	(Figs. 6 & 7)	Non Vented	10SL1624XE	10SL1624X	10SL1624XC	34	55
Lever-Gear	Standard	(Figs. 4 & 8)	Non Vented	10SL8425E	10SL8425P	10SL8425C	22	28
	High	(Figs. 5 & 8)	Non Vented	10SL8426E	10SL8426P	10SL8426C	30	36
	Pedestal	(Figs. 6 & 8)	Non Vented	10SL8427E	10SL8427P	10SL8427C	37	58
Wheel	Standard	(Figs. 4 & 9)	Non Vented	RANK-E	RANK	CRANK	19	25
	High	(Figs. 5 & 9)	Non Vented	ROPE-E	ROPE	CROPE	27	33
	Pedestal	(Figs. 6 & 9)	Non Vented	10SL1620XE	10SL1620X	10SL1620XC	37	55
DMC	Standard	(Fig. 10)	Non Vented	10SL200E	10SL200P	10SL200C	32	53
Local	Standard	(Fig. 1)	Non Vented	RAKE-E	RAKE	CRAKE	22	31
			Vented	RATE-E	RATE	CRATE	22	31
	High	(Fig. 2)	Non Vented	ROME-E	ROME	CROME	27	36
			Vented	RUN-E	RUN	CRUN	27	36
	Pedestal	(Fig. 3)	Non Vented	RETARD-E	RETARD	CRETARD	34	64
			Vented	12SL1648XE	12SL1648X	12SL1648XC	34	64
Lever	Standard	(Figs. 4 & 7)	Non Vented	REDEEM-E	REDEEM	CREDEEM	26	35
			Vented	RECITE-E	RECITE	CRECITE	26	35
	High	(Figs. 5 & 7)	Non Vented	REFUGE-E	REFUGE	CREFUGE	32	41
			Vented	RESIN-E	RESIN	CRESIN	32	41
	Pedestal	(Figs. 6 & 7)	Non Vented	12SL1625XE	12SL1625X	12SL1625XC	39	60
			Vented	12SL1650XE	12SL1650X	12SL1650XC	39	60
Lever-Gear	Standard	(Figs. 4 & 8)	Non Vented	12SL8186E	12SL8186P	12SL8186C	29	38
			Vented	12SL8186VE	12SL8186VP	12SL8186VC	29	38
	High	(Figs. 5 & 8)	Non Vented	12SL8410E	12SL8410P	12SL8410C	35	44
			Vented	12SL8410VE	12SL8410VP	12SL8410VC	35	44
	Pedestal	(Figs. 6 & 8)	Non Vented	12SL8428E	12SL8428P	12SL8428C	42	63
			Vented	12SL8428VE	12SL8428VP	12SL8428VC	42	63
Wheel	Standard	(Figs. 4 & 9)	Non Vented	RASP-E	RASP	CRASP	26	35
			Vented	REAR-E	REAR	CREAR	26	35
	High	(Figs. 5 & 9)	Non Vented	RUSE-E	RUSE	CRUSE	32	41
			Vented	RIPE-E	RIPE	CRIFE	32	41
	Pedestal	(Figs. 6 & 9)	Non Vented	12SL1621XE	12SL1621X	12SL1621XC	39	60
			Vented	12SL1649XE	12SL1649X	12SL1649XC	39	60
DMC	Standard	(Fig. 10)	Non Vented	12SL201E	12SL201P	12SL201C	37	58
			Vented	12SL203E	12SL203P	12SL203C	37	58
Local	Standard	(Fig. 1)	Non Vented	REDGUM-E	REDGUM	CREDGUM	39	51
			Vented	REDGUM-VE	REDGUM-V	CREDGUM-V	39	51
	High	(Fig. 2)	Non Vented	REEL-E	REEL	CREEL	44	56
			Vented	REEL-VE	REEL-V	CREEL-V	44	56
	Pedestal	(Fig. 3)	Non Vented	RONTY-E	RONTY	CRONTY	50	80
			Vented	RONTY-VE	RONTY-V	CRONTY-V	50	80
Lever	Standard	(Figs. 4 & 7)	Non Vented	RADIAL-E	RADIAL	CRADIAL	43	55
			Vented	RADIAL-VE	RADIAL-V	CRADIAL-V	43	55
	High	(Figs. 5 & 7)	Non Vented	RAINBOW-E	RAINBOW	CRAINBOW	49	61
			Vented	RAINBOW-VE	RAINBOW-V	CRAINBOW-V	49	61
	Pedestal	(Figs. 6 & 7)	Non Vented	15SL1626XE	15SL1626X	15SL1626XC	56	77
			Vented	15SL1626XVE	15SL1626XV	15SL1626XVC	56	77
Lever-Gear	Standard	(Figs. 4 & 8)	Non Vented	15SL8184E	15SL8184P	15SL8184C	46	58
			Vented	15SL8184VE	15SL8184VP	15SL8184VC	46	58
	High	(Figs. 5 & 8)	Non Vented	15SL8408E	15SL8408P	15SL8408C	52	64
			Vented	15SL8408VE	15SL8408VP	15SL8408VC	52	64
	Pedestal	(Figs. 6 & 8)	Non Vented	15SL8429E	15SL8429P	15SL8429C	59	80
			Vented	15SL8429VE	15SL8429VP	15SL8429VC	59	80
Wheel	Standard	(Figs. 4 & 9)	Non Vented	RACKET-E	RACKET	CRACKET	43	55
			Vented	RACKET-VE	RACKET-V	CRACKET-V	43	55
	High	(Figs. 5 & 9)	Non Vented	RABBIT-E	RABBIT	CRABBIT	49	61
			Vented	RABBIT-VE	RABBIT-V	CRABBIT-V	49	61
	Pedestal	(Figs. 6 & 9)	Non Vented	15SL1622XE	15SL1622X	15SL1622XC	56	77
			Vented	15SL1622XVE	15SL1622XV	15SL1622XVC	56	77
DMC	Standard	(Fig. 10)	Non Vented	15SL202E	15SL202	15SL202C	54	75
			Vented	15SL202VE	15SL202V	15SL202VC	54	75



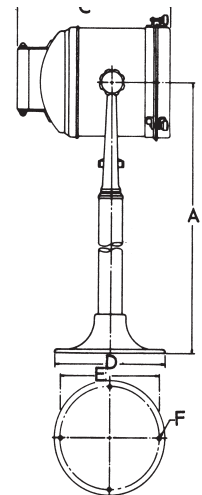
**FIG. 1 LOCAL CONTROL
STANDARD BASE**

SIZE	A	B	C	D	E	F
10"	12 $\frac{3}{4}$	13 $\frac{1}{8}$	12	6 $\frac{3}{8}$	5 $\frac{5}{8}$	1 $\frac{1}{32}$
12"	15 $\frac{1}{16}$	15 $\frac{3}{8}$	15 $\frac{1}{2}$	8 $\frac{1}{4}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
15"	19 $\frac{1}{8}$	18 $\frac{1}{8}$	16 $\frac{1}{8}$	8 $\frac{1}{4}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$



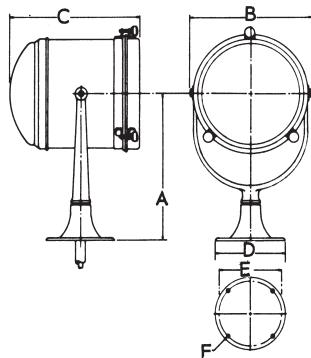
**FIG. 2 LOCAL CONTROL
HIGH BASE**

SIZE	A	C	D	E	F
10"	23 $\frac{5}{8}$	12	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
12"	25 $\frac{5}{8}$	15 $\frac{1}{2}$	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
15"	29 $\frac{1}{2}$	16 $\frac{1}{8}$	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$



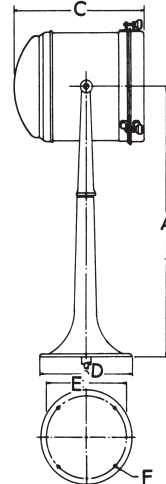
**FIG. 3 LOCAL CONTROL
PEDESTAL BASE**

SIZE	A	C	D	E	F
10"	48	12	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$
12"	48	15 $\frac{1}{2}$	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$
15"	48	16 $\frac{1}{8}$	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$



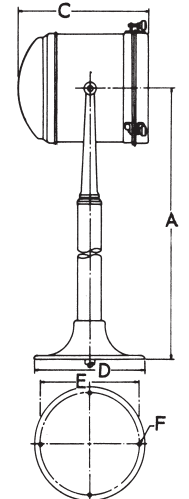
**FIG. 4 STANDARD BASE
MANUAL CONTROLS BELOW**

SIZE	A	B	C	D	E	F
10"	12 $\frac{3}{4}$	11	10	6 $\frac{3}{8}$	5 $\frac{5}{8}$	1 $\frac{1}{32}$
12"	15 $\frac{1}{16}$	13 $\frac{1}{2}$	13 $\frac{1}{4}$	8 $\frac{1}{4}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
15"	19 $\frac{1}{8}$	16 $\frac{3}{4}$	14 $\frac{7}{8}$	8 $\frac{1}{4}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$



**FIG. 5 HIGH BASE
MANUAL CONTROLS
BELOW**

SIZE	A	C	D	E	F
10"	23 $\frac{5}{8}$	10	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
12"	25 $\frac{5}{8}$	13 $\frac{1}{4}$	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$
15"	29 $\frac{1}{2}$	14 $\frac{7}{8}$	8 $\frac{3}{8}$	7 $\frac{3}{8}$	1 $\frac{13}{32}$



**FIG. 6 PEDESTAL BASE
MANUAL CONTROLS
BELOW**

SIZE	A	C	D	E	F
10"	48	10	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$
12"	48	13 $\frac{1}{4}$	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$
15"	48	14 $\frac{7}{8}$	10	8 $\frac{7}{8}$	1 $\frac{13}{32}$

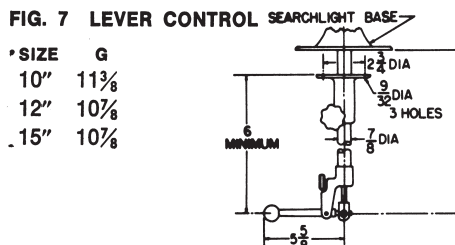


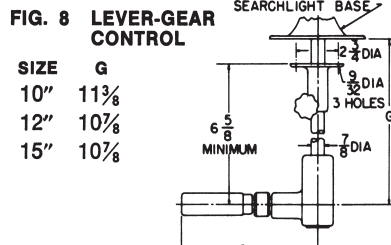
FIG. 7 LEVER CONTROL SEARCHLIGHT BASE

SIZE G

10" 11 $\frac{3}{8}$

12" 10 $\frac{7}{8}$

15" 10 $\frac{7}{8}$



**FIG. 8 LEVER-GEAR
CONTROL**

SIZE	G
10"	11 $\frac{3}{8}$
12"	10 $\frac{7}{8}$
15"	10 $\frac{7}{8}$

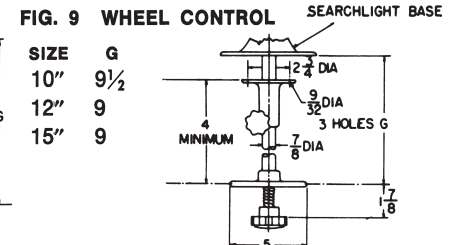
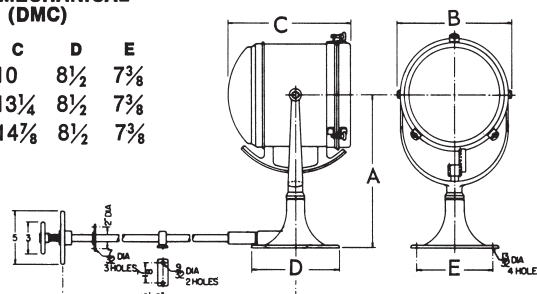


FIG. 9 WHEEL CONTROL SEARCHLIGHT BASE

SIZE	G
10"	9 $\frac{1}{2}$
12"	9
15"	9

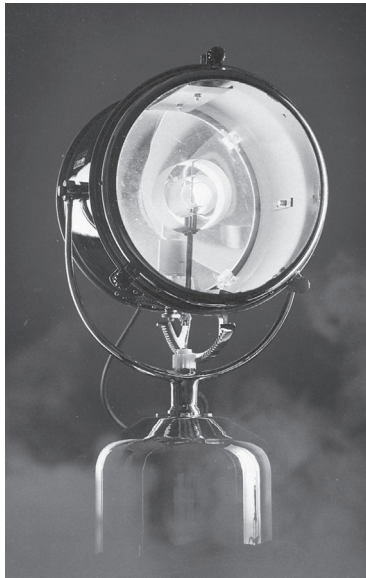
**FIG. 10 DISTANT MECHANICAL
CONTROL (DMC)**

SIZE	A	B	C	D	E
10"	14 $\frac{3}{8}$	11	10	8 $\frac{1}{2}$	7 $\frac{3}{8}$
12"	16 $\frac{1}{8}$	13 $\frac{1}{2}$	13 $\frac{1}{4}$	8 $\frac{1}{2}$	7 $\frac{3}{8}$
15"	20 $\frac{1}{8}$	16 $\frac{3}{4}$	14 $\frac{7}{8}$	8 $\frac{1}{2}$	7 $\frac{3}{8}$



NOTE: The specifications and details described by drawings or text in this literature are subject to change without notice.

10 / 12 / 15 - INCH SEARCHLIGHTS DISTANT ELECTRIC CONTROL (DEC)



- Powerful motors in weatherproof base direct the penetrating beam with finger-tip ease from any distance.
- Automatic brakes provide instant start and instant stop with no overtravel.
- Complete flexibility in mounting. Searchlight can be controlled from many separate locations.
- Motors operate on 110-125 volts, 50-60 hz (cycles).

Rugged construction. Drum, door. and yoke. etc., constructed of solid brass - same as the searchlights described in bulletin A110. Base is marine aluminum or brass as specified. Refer to bulletin A110 for information pertaining to lamps, lamp-holders, reflectors, cover glasses, beam candlepower. etc.

Finish. Drum/door. and yoke white enamel, polished, or chrome as specified.

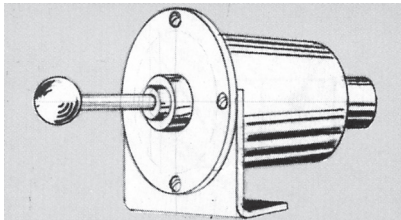
Rugged drive unit is housed in watertight corrosion resistant marine aluminum or brass base as specified. Slip clutches allow manual override at all times, a convenience when relamping. A small heater on drive unit keeps temperature in base housing above ambient to minimize condensation on and in motors.

Catalog listings, dimensions, and ordering information on next page.

Aluminum base always white enamel.

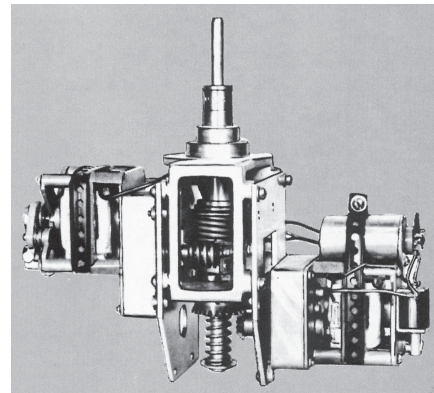
Brass base white enamel, polished, or chrome as specified.

Rugged Joystick Switch controls both motions. No limit to distance between searchlight and joystick. Second, third, fourth, or more joysticks can be added at any time. Just five control conductors and a ground conductor required between searchlight and joystick. Either way, one standard unit is used. No interlocks required. Corrosion resistant and oiltight. the joystick can be mounted almost anywhere.



Joy Stick Controller mounted in an enclosure for surface mounting. Also available for flush mounting in console.

Completely self-contained drive unit may be easily removed from base for bench testing if desired.



SEARCHLIGHT SELECTION TABLE

The complete catalog number must include a suffix for the lampholder desired. Add one of the following suffixes to the basic catalog number: medium screw lampholder, -1; medium prefocus, -2; mogul screw, -3; mogul bipost, -4; 2-pin prefocus, -5.

Size	Drum	Base	SEARCHLIGHT CATALOG NUMBER			Weight lb (kg)	
			Enamel Finish	Polished Finish	Chrome Finish	Net	Ship
10-Inch	Non-Vented	Aluminum	105AE	105AP	105AC	30(14)	40(18)
		Brass	105BE	105BP	105BC	35(16)	45(20)
12-Inch	Non-Vented	Aluminum	125AE	125AP	125AC	35(16)	46(21)
		Brass	125BE	125BP	125BC	40(18)	51(23)
	Vented	Aluminum	125AEV	125APV	125ACV	35(16)	46(21)
		Brass	125BEV	125BPV	125BCV	40(18)	51(23)
15-Inch	Non-Vented	Aluminum	155AE	155AP	155AC	51(23)	65(29)
		Brass	155BE	155BP	155BC	56(25)	70(32)
	Vented	Aluminum	155AEV	155APV	155ACV	51(23)	65(29)
		Brass	155BEV	155BPV	155BCV	56(25)	70(32)



19" INCANDESCENT SEARCHLIGHT



Pedestal Base
Lever Twist-
Lock Control
Model 19SL1174DX



Standard Prison/Security
Turntable Base
Lever Twist-Lock Control
Model 19SL1597DX



Pedestal Prison/Security
Turntable Base
Lever Twist-Lock Control
Model 19SL1599DX



Standard Base
Wheel Control
Model Redcoat-D



Standard Base
Lever-Gear
Control
Model 19SL3794DX



Pedestal Base
Local Control
Model 19SL1299DX



Standard Base
Distant Mechanical
Control
(Consult Factory)

Other Products. 10/12/15-inch Incandescent searchlights, 24-inch Incandescent searchlights, Xenon searchlights, Searchlight Power Supplies, Signalling Searchlights, Marine Floodlights, Navy Searchlights/Navigation Lights, Lighthouse Beacons, and special Marine Lighting Equipment.

Manufacturers of high quality lighting fixtures for over 100 years.



These searchlights are designed in conformance with IEEE recommendations for rugged marine use and high security outdoor lighting applications.

Bases

Four base options are made out of high strength corrosion resistant marine grade aluminum:

1. **Standard Marine Base.** Contains sliding stop allowing horizontal rotation in excess of 360 degrees without damaging cables. Three conductor heavy-duty flexible weatherproof cable enter base and drum through stuffing tubes and extends approximately two feet below the base. See Figure 1.

2. **Pedestal Marine Base.** Same as Standard Marine Base except taller. Any custom height can be specified. See Figure 3.

3. **Standard Prison/Security Turntable Base.** Slip rings and brushes provide unlimited continuous rotation guaranteeing that the searchlight will never come to a mechanical stop. Unrestricted movement is necessary when emergency conditions occur in high security applications. Three single conductor heavy-duty weatherproof cables extend approximately two feet below the base. See Figure 2.

4. **Pedestal Prison/Security Turntable Base.** Same as Standard Turntable Base except taller. See Figure 4. Consult factory for any custom height.

Drums

Constructed of high strength corrosion resistant marine grade aluminum, the drum has a hinged door fastened by four clamps and houses a high quality silvered glass reflector. Louver assembly mounted in front of lamp eliminates front spill light. Heat-tempered cover glass and gaskets make drum weatherproof. Interior finished with heat-resistant flat black paint, exterior surfaces white enamel.

Lampholders

Several different types accommodate many lamps. See lamp listings and beam candlepower on page 3.

1. Mogul Bipost
2. Mogul Prefocus
3. Mogul Screw
4. 2-Pin Prefocus
5. Medium Prefocus (accommodates largest variety of lamps)

Vibration/Shock Mount. All Medium Prefocus Lampholders are mounted on a special shock absorbing base which helps prevent lamp breakage due to excess vibration.

Focus fore and aft can be accomplished quickly and simply by turning knob beneath searchlight drum.

Controls

Five styles of manual controls are constructed of all brass. O-ring seals prevent leakage around control shafts.

1. **Local Control.** No pilot house controls. Searchlight has training handle on drum and hand clamps to lock searchlight in any position. See Figs. 1/ 2, 3, and 4.

2. **Lever-Gear Control.** Operates conveniently with one hand. Horizontal movement controlled by pointing lever, vertical by twisting lever. Vertical lock conveniently located on control handle. Ceiling lock clamps horizontal movements. See Figs. 5, 9A, and 9B.

3. **Wheel Control.** Upper wheel controls horizontal movements, lower wheel vertical movements. Friction brake holds searchlight in any vertical position. Ceiling lock clamps horizontal movements. See Fig. 6.

4. **Lever Twist-Lock Control.** Single lever controls all movements. Spring loaded friction brake holds searchlight in any vertical position which can be easily and quickly locked by twisting control handle. Ceiling lock clamps horizontal movements. See Fig. 7.

5. **Distant Mechanical Control.** Similar to items 2 and 3. See Figs. 10A and 10B.

Distant Electric Control (DEC). See Bulletin SL123 for these searchlights controlled from one or more control stations.

Special Features

Searchlight can be tailored to suit your exact needs by specifying these features at time of order.

A. **Special control length.** Longer or shorter than standard.

B. **Special pedestal height.** Higher or lower than standard.

C. **Special length electrical cable.** Longer than standard.

D. **All Brass and Stainless Steel.** Instead of Marine Grade Aluminum. Consult Factory.

E. **Vibration/Shock Mount.** Specify Medium Prefocus Lampholder.

F. **Special Prison/Security Base.** Specify any Turntable Base.

G. **Remote Electric Beam-Size Focus.** Allows beam to be widened (short range) and narrowed (long range) from a remote electric switch. Add "-RF" to searchlight catalog number and specify control station number C2-5.

Searchlight Lamp Data

Lamp Code	Watts	Volts	Base	Type	*Rated Life (Hrs.)	**Candlepower
BTM	500	120	Medium Prefocus	Tungsten Halogen	100	2,971,000
CZX	500	120	Medium Prefocus	Incandescent	25	2,200,000
BTP	750	120	Medium Prefocus	Tungsten Halogen	200	3,981,000
DPJ	750	120	Medium Prefocus	Incandescent	25	4,260,000
BVA	900	120	2-Pin Prefocus	Tungsten Halogen	75	4,600,000
BTR	1000	120	Medium Prefocus	Tungsten Halogen	250	4,300,000
DRS	1000	120	Medium Prefocus	Incandescent	25	4,410,000
DWK	1000	230	Medium Prefocus	Incandescent	50	1,600,000
FKN	1000	230	Medium Prefocus	Tungsten Halogen	200	1,800,000
BVV	1000	120	Mogul Prefocus	Tungsten Halogen	250	4,300,000
DRW	1000	120	Mogul Screw	Incandescent	25	4,410,000
IM/T20BP	1000	120	Mogul Bipost	Aero	500	2,381,000
CWZ	1500	120	Mogul Prefocus	Tungsten Halogen	325	3,614,000
CXZ	1500	120	Mogul Bipost	Tungsten Halogen	325	3,614,000
***BVW	2000	120	Mogul Prefocus	Tungsten Halogen	300	3,000,000

* These lamp manufacturer's figures are relative only. Individual lamps may vary considerably.

** These figures provided to aid in lamp selection.

*** Intermittent use only.

Accessories & Parts

Description	Part No.	Description	Part No.	Description	Part No.
Brush, with pigtail	EF176	Gasket, Standard		Lampholder, Mogul Bipost ..	FE132X
Cover, Protective	SL3322C	Turntable Base	4093B	Lampholder, Mogul Prefocus .	SL978
Cover Glass	EF239	Gasket, Pedestal		Lampholder, Mogul Screw	SL96
Gasket, Standard		Turntable Base	4093C	Lampholder, 2-Pin Prefocus	8704
and Ped Base	SL3356	Lampholder, Medium Prefocus with		Louver Assy.	9656X
		Special Shock Mount	7540X	Reflector	EF240

How to Order Searchlights

Specify 19-inch incandescent searchlight with a. Base, b. Controls, c. Lampholder, d. Catalog Number and describe Special Features e.

a. Bases

Standard
Standard Turntable
Pedestal
Pedestal Turntable

b. Controls

Local
Lever-Gear
Wheel
Lever Twist-Lock
Distant Mechanical Wheel
Distant Mechanical Lever-Gear

c. Lampholder

Mogul Bipost
Mogul Prefocus
Mogul Screw
Medium Prefocus
2-Pin Prefocus

d. Code or Cat. No.

Choose from Selection Table

e. Special features available at extra charge when specified on order.

Special control lengths. Longer or shorter than standard. Give dimension from bottom of base to center line of lever or large wheel. Order parts to anchor lower end of extra long lever-gear controls (Figs. 9A & 9B) by part no. and name and give dimensions A and B.

Special pedestal height. Higher or lower than standard. Specify height from bottom of base to center line of drum.

Special length electrical cable. Specify length from bottom of base to end of cable.

All Brass and Stainless Steel. Instead of Marine Aluminum.

Example. 19-inch Searchlight with Standard Base, Lever-Gear Control, Medium Prefocus Lampholder with Shock Mount Design, Catalog Number 19SL3794DX. Special control 32 inches from base to centerline of lever (see Figure 5, Page 5). Two lamps Code BTR.

Searchlight Selection Table

Base	Control	Searchlight Model or Catalog No.					2-Pin Prefocus		Approx. Lbs.	
		Mogul Bipost	Mogul Prefocus	Mogul Screw	Med. Prefocus	Prefocus			Net	Ship
Standard Base Horizontal rotation in excess of 360° but limited by positive mechanical stops to prevent damage to cable by excessive rotation. (Fig. 1)	Local (Fig. 1)	REDUNDANT	REDUNDANT-A	REDUNDANT-B	REDUNDANT-D	REDUNDANT-E			51	76
	Lever-Gear (Fig. 5)	19SL3794X	19SL3794AX	19SL3794BX	19SL3794DX	19SL3794EX			65	90
	Wheel (Fig. 6)	REDCOAT	REDCOAT-A	REDCOAT-B	REDCOAT-D	REDCOAT-E			65	90
	Lever Twist-Lock (Fig. 7)	RIOT	RIOT-A	RIOT-B	RIOT-D	RIOT-E			65	90
	Distant Mechanical Lever-Gear (Fig. 10B)	19SL4590-LG	19SL4590A-LG	19SL4590B-LG	19SL4590D-LG	19SL4590E-LG			85	115
	Distant Mechanical Lever-Gear (Fig. 10A)	19SL4590-W	19SL4590A-W	19SL4590B-W	19SL4590D-W	19SL4590E-W			85	115
Standard Prison/Security Turntable Base Slip rings and brushes in base allow continuous unrestricted horizontal rotation. (Fig. 2)	Local (Fig. 2)	19SL1593X	19SL1593AX	19SL1593BX	19SL1593DX	19SL1593EX			76	101
	Lever-Gear (Fig. 5)	19SL3784X	19SL3784AX	19SL3784BX	19SL3784DX	19SL3784EX			90	115
	Wheel (Fig. 6)	19SL1605X	19SL1605AX	19SL1605BX	19SL1605DX	19SL1605EX			90	115
	Lever Twist-Lock (Fig. 7)	19SL1597X	19SL1597AX	19SL1597BX	19SL1597DX	19SL1597EX			90	115
Pedestal Base Horizontal rotation in excess of 360° but limited by positive mechanical stops to prevent damage to cable by excessive rotation. (Fig. 3)	Local (Fig. 3)	19SL1299X	19SL1299AX	19SL1299BX	19SL1299DX	19SL1299EX			68	97
	Lever-Gear (Fig. 5)	19SL3798X	19SL3798AX	19SL3798BX	19SL3798DX	19SL3798EX			83	112
	Wheel (Fig. 6)	19SL1302X	19SL1302AX	19SL1302BX	19SL1302DX	19SL1302EX			83	112
	Lever Twist-Lock (Fig. 7)	19SL1174X	19SL1174AX	19SL1174BX	19SL1174DX	19SL1174EX			83	112
Pedestal Prison/Security Turntable Base Slip rings and brushes in base allow continuous unrestricted horizontal rotation. (Fig. 4)	Local (Fig. 4)	19SL1595X	19SL1595AX	19SL1595BX	19SL1595DX	19SL1595EX			88	117
	Lever-Gear (Fig. 5)	19SL3804X	19SL3804AX	19SL3804BX	19SL3804DX	19SL3804EX			103	132
	Wheel (Fig. 6)	19SL1607X	19SL1607AX	19SL1607BX	19SL1607DX	19SL1607EX			103	132
	Lever Twist-Lock (Fig. 7)	19SL1599X	19SL1599AX	19SL1599BX	19SL1599DX	19SL1599EX			103	132

Dimension Drawings

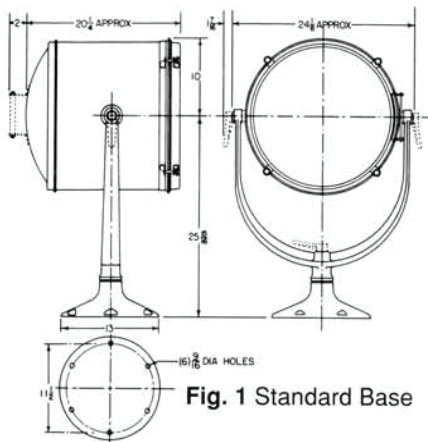


Fig. 1 Standard Base

Combine base and control figures for complete searchlight.

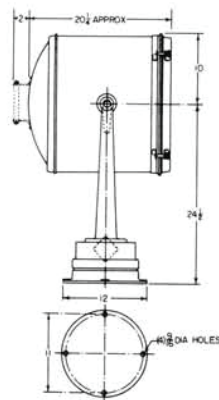


Fig. 2 Standard Turntable Base

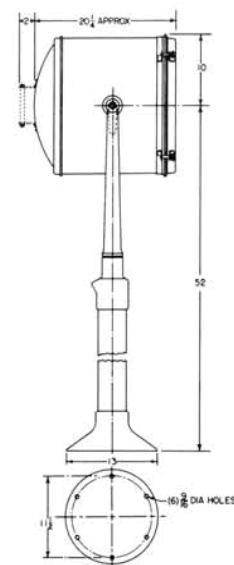


Fig. 3 Pedestal Base

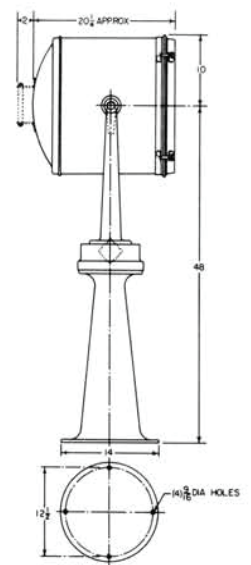


Fig. 4 Pedestal Turntable Base

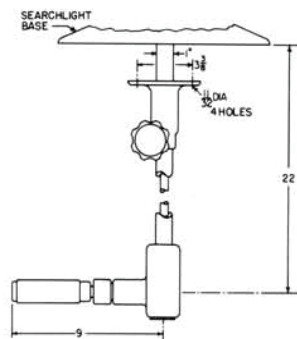


Fig. 5 Lever-Gear Control

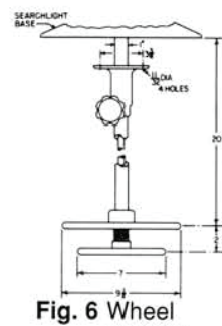


Fig. 6 Wheel Control

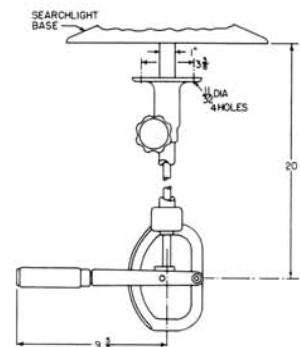


Fig. 7 Lever Twist-Lock Control

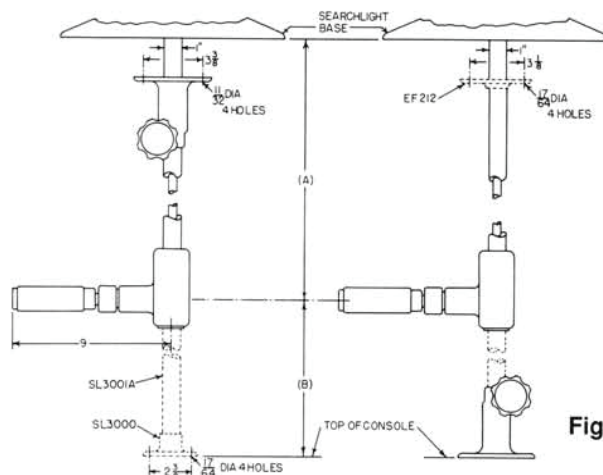


Fig. 9A
Alternate arrangements for lever-gear control with extra long control shafts. Parts shown as dashed lines priced separately.

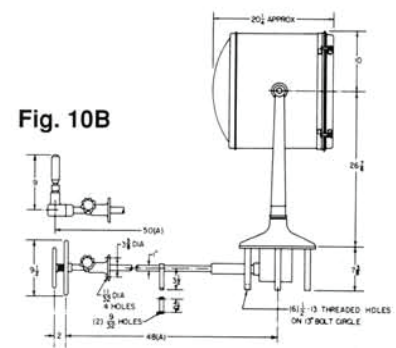
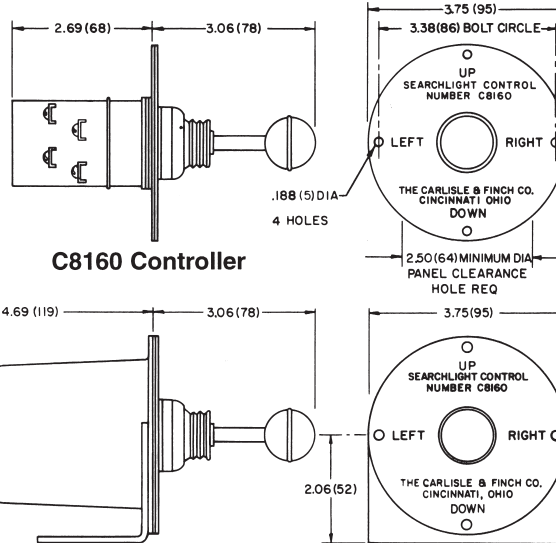
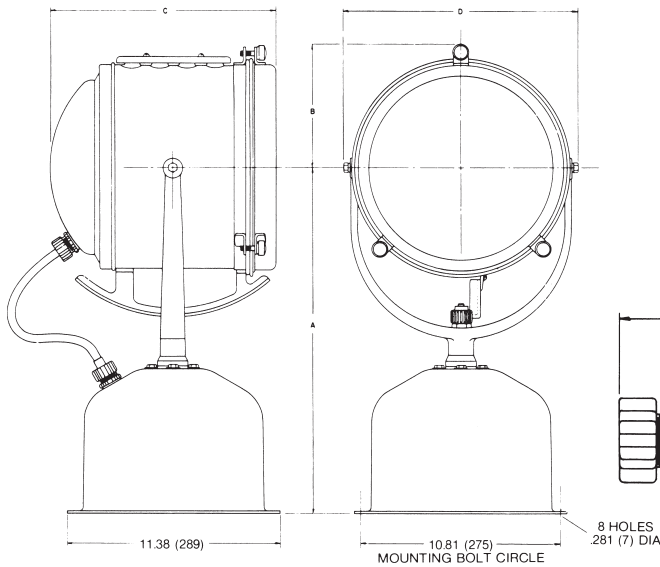
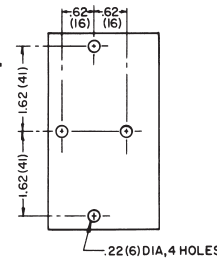


Fig. 10A Distant Mechanical Control (DMC)

NOTE: The specifications and details described by drawings and or text in this literature are subject to change without notice.



SIZE	A	B	C	D
10-Inch	18.18(462)	6.00(152)	10.00(254)	11.00(279)
12-Inch	20.12(511)	7.12(181)	13.25(337)	13.75(349)
15-Inch	24.06(611)	8.00(203)	15.00(381)	16.75(425)



8171X Enclosure and Bracket Assembly (with controller installed). Polished chrome finish over brass.

*** NOTE ***

220 VOLTS and 24 VOLTS OFFERED. CONSULT FACTORY

HOW TO ORDER SEARCHLIGHT SYSTEMS

Specify quantity Distant Electric Control (DEC) Searchlight, size, drum, base material, finish, and lampholder desired. Give searchlight catalog number from table and add suffix for lampholder type. Specify quantity controller C8160, with or without Enclosure and Bracket Assembly 8171X. Specify quantity lamps and give volts, watts, and ordering code from lamp list.

Order Example:

2 DEC Searchlight, 12", vented, aluminum base, enamel finish, medium prefocus lampholder, catalog no. 125AE-2.

4 Controller C8160

4 Enclosure and Bracket Assembly 8171 X

4 Lamp, 120V, 1000W, code BTR

The 10 Smartest Things Ever Said About Money

- 1 "Annual income, twenty pounds ,annual expenditure, nineteen pounds; result, happiness. Annual income, twenty pounds; annual expenditure, twentyone pounds; result, misery." -Charles Dickens'
- 2 "Beware of little expenses. A small leak will sink a great ship." -Benjamin Franklin
- 3 "October is one of the singularly worst months to speculate in stocks, Others are November, December, January, February, March, April, June, July, August and September." -Mark Twain How did he know this 35 years before the Great Crash of October 1929?And almost 100 years before the Nearly as Dramatic Crash of October 1987?
- 4 "Your average Wall Streeter, faced with nothing profitable to do, does nothing for only a brief time. Then, suddenly and hysterically, he does something which turns out to be extremely unprofitable. He is not a lazy man." -Fred Schwed, in the book Where Are the Customers' Yachts?
- 5 "The people who sustain the worst losses are usually the ones who overreach, and it's not necessary! Steady, moderate gains will get you where you want to go." John Train, investment counselor

Specifications

General. These searchlights are designed for heavy duty marine service on commercial vessels. Motors in the searchlight base control both horizontal and vertical beam movements so that the searchlight can be located any distance from the pilot house. Dynamic braking stops beam movement instantly upon controller release. Page three shows control stations for both single-station and multiple-station systems. These components are priced separately.

Drum. Contains the optical system. 19-inch searchlight drum is constructed of formed brass and stainless steel. 24-inch drum all corrosion resistant aluminum. All doors are hinged and clamped to drum by captive fasteners.

Base and Arms. Constructed of high strength corrosion resistant marine aluminum. Base assembly is weatherproof and contains motors, slip clutches, ball bearing, and sliding stop which permits horizontal rotation more than 360 degrees while providing positive mechanical stops to prevent damage to the electric cables due to excessive rotation. **Collector/Slip-Rings** and brushes can be specified to permit searchlight to turn continuously through 360 degrees (optional feature - CR). Brass construction is an optional feature (-B).

Lamp Wattages Acceptable. 19-inch searchlight up to 1500W continuous, 2000W intermittent (approx. one hour or less). 24-inch up to 2000W-continuous, 3000W intermittent.

Beam Characteristics. See table below.

Unique "Lamp Shock-Mount Design". Medium Prefocus Lampholder is mounted on a Special Shock-Absorbing Base, which helps prevent Lamp Filament Damage, due to excess Vessel Vibration and Shock.

Reflector. High quality parabolic silvered glass reflector efficiently concentrates light into a powerful beam. Circular louvers cut off unwanted front spill light.

Cover Glass. One piece heat-tempered clear glass.

Finish. Drum Interior heat resistant, flat black paint. Exterior surfaces high quality, Scratch and Salt-Resistant Powder Coat.

Anti-icing. Searchlight with sliding-stop type base can be equipped with heaters to prevent icing between rotating and fixed base, between rack and pinion, and between trunnions and drum (optional feature -H). Bases with collector rings and brushes can have heaters only between rotating gear and fixed base (optional feature -CRH).

Wiring. Multi-conductor flexible power cable extends from drum and is clamped to the rotating base. Sufficient length is supplied to terminate in a junction box (not supplied) near the searchlight without causing mechanical stress when searchlight is moved throughout its entire horizontal travel. Two single conductor power cables extend out bottom of base when collector rings and brushes are specified. Terminal block provided in base for motor and anti-icing heater wiring.

Optional Features

Searchlight can be tailored to your exact needs by specifying these features at extra charge.

Brass base and arms instead of marine aluminum. Add -B* to searchlight catalog no.

Collector/Slip-Ring Base. Provides totally uninterrupted and continuous horizontal rotation, with No End Points. Increases Safety for Marine Vessels where both Fore and Aft Illumination is important, and is critical for all Prison and Security Applications. Add -CR* to searchlight catalog number.

Anti-icing heaters. Add -H* to searchlight catalog no.

*When more than one options are selected list them alphabetically (same order as listed above) after a single hyphen. Example 19" searchlight with brass base and arms, collector rings, and anti-icing heaters is 19SL8660D-BCRH.

Selected Searchlight Lamp Data

LAMP REF. CODE	WATTS	VOLTS	BASE	19-INCH SEARCHLIGHT				24-INCH SEARCHLIGHT			
				*LIFE HRS.	** CANDLEPOWER	BEAM HOR.°	SPREAD VERT.°	** CANDLEPOWER	BEAM HOR.°	SPREAD VERT.°	
54.5 BTP	750	120	MED. PREF.	200	3,700,000	2.6	3.7	4,287,500	2.1	2.9	
68.05 BTR	1000	120	MED. PREF.	200	4,300,000	4.1	4.4	7,350,000	3.2	3.5	
73 1M/T2OBP	1000	120	MOG. BIP.	500	2,381,500	4.9	5.2	2,450,000	3.9	4.1	
FKN	1000	230	MED. PREF.	200	1,800,000	5.6	5.9	N/A	N/A	N/A	
83.7 CWZ	1500	120	MOG. PREF.	325	3,614,000	3.4	5.1	6,431,000	2.6	4.0	
85.5 CYX	2000	120	MOG. BIP.	300	NOT USED	6.6	5.1	5,512,500	5.2	4.1	

* THESE LAMP MANUFACTURER'S FIGURES ARE RELATIVE ONLY. INDIVIDUAL LAMPS MAY VARY CONSIDERABLY.

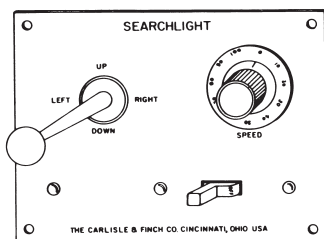
** THESE FIGURES PROVIDED TO AID IN LAMP SELECTION.

Searchlight Selection Table

Size	Searchlight Catalog No. for Lampholder Types:					Weight	lb. (kg)
Searchlight	Mog. Bip.	Mog. Pref.	Mog. Scr.	Mog. Bip. 3KW	Med. Pref.	Net*	Ship*
19-Inch	19SL8660	19SL8660A	19SL8660B	N/A	19SL8660D	131(59)	190(86)
24-Inch	24SL8659	24SL8659A	24SL8659B	24SL8659D	24SL8659E	218(99)	338(153)

* Searchlight only. Does not include control components.

Control Components

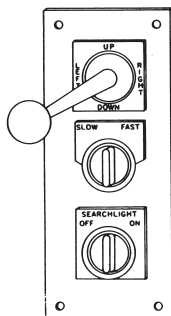


Control Station C5777-S

For distant electric control (DEC) searchlights controlled from a single remote location. See 8779X-S and 8973XS-1 for multi-station control. Single joystick controls all beam movements. Also contains power off-on switch and a device allowing operator to adjust speed of beam movement.

Mounted on bright stainless steel plate 6.00" x 8.00" (152 x 203mm). Depth clearance 3.50" (89mm). Fits enclosure 5402. Net weight 4.5 lb. (2.0 kg.).

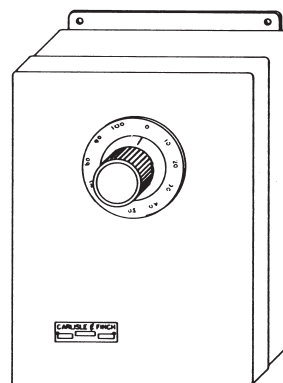
Note: Specify C5777-S-230 for 230 VAC Applications.



Control Station 8779X-S

Used when DEC searchlight is to be controlled from multiple locations. Contains searchlight off-on switch, single joystick for beam direction, and slow-fast switch to select speed of beam movements. As many stations as desired can be used with one 8973XS Control Assembly to control one DEC searchlight. Cannot be used without 8973XS.

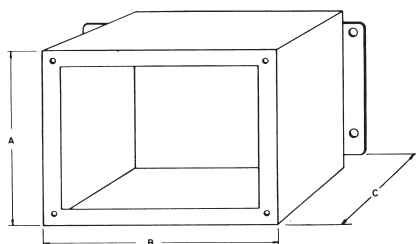
Mounted on bright stainless steel plate 3.25" x 8.00" (83 x 203mm). Depth clearance 2.75" (70mm). Fits enclosure 5079G. Net weight 1.8 lb. (0.8 kg.).



Control Assembly 8973XS-1

Used when DEC searchlights are controlled from more than one remote location. Only one required per searchlight regardless of quantity of 8779X-S control stations used with the searchlight. Steel oiltight enclosure contains circuit breaker, contactor, rectifier, relays, fuses, and external adjustment to preset the slow speed.

Enclosure size 20.00 x 16.00 x 6.62" (508 x 406 x 168 mm). Net weight 45 lb. (20 kg.).



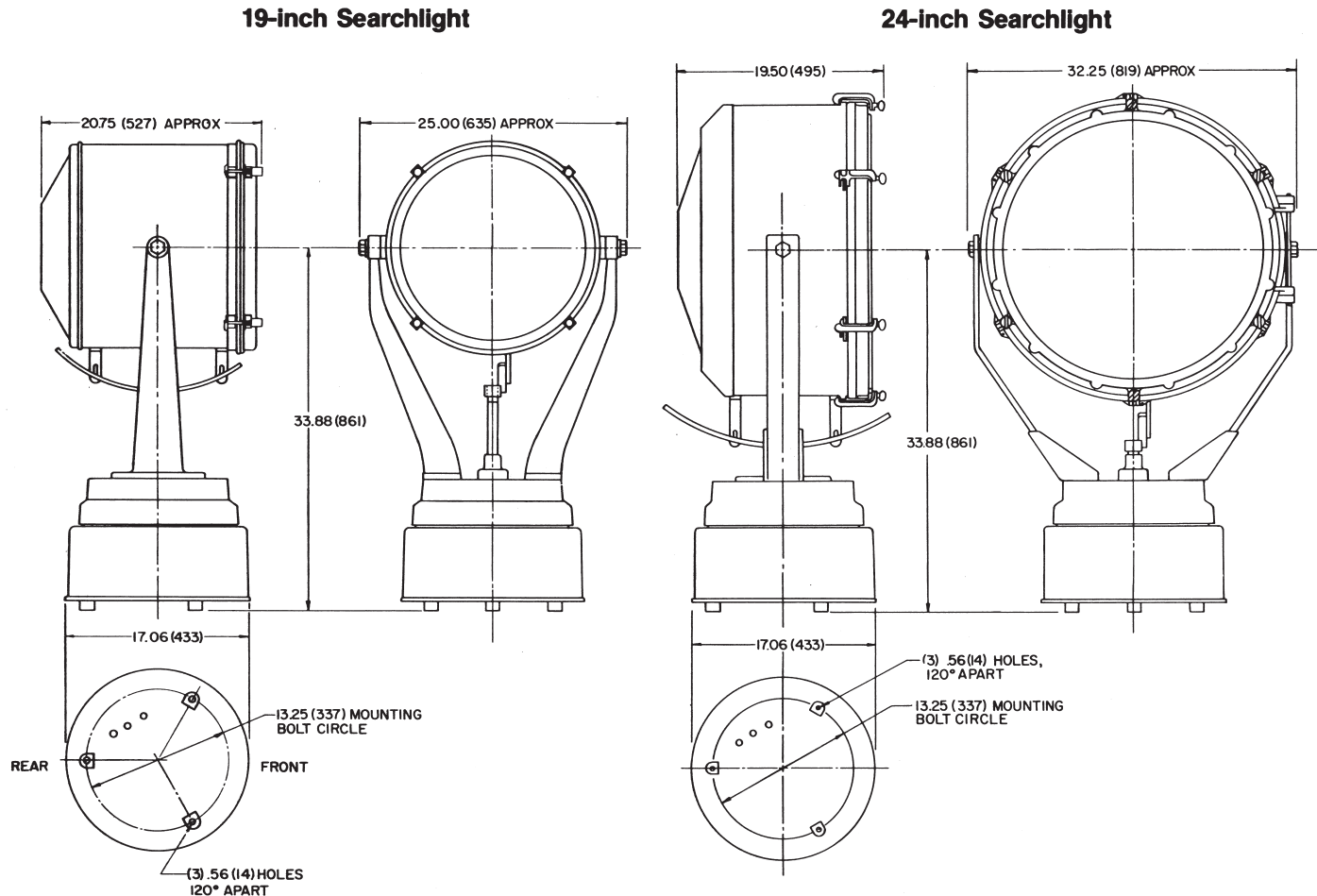
Cat. No.	Used For	Dimensions Inch (mm)			Weight	
		A	B	C	lb.	(kg)
5402	C5777-S	6.00 (152)	8.00 (203)	3.50 (89)	3.7	(1.7)
5079G	8779X-S	3.25 (83)	8.00 (203)	2.75 (70)	2.6	(1.2)

Other Accessories & Parts

Description (size searchlight)	Part No.	Description (size searchlight)	Part No.
Cover Glass (19")	EF239	Lampholder, Mog. Pref. (19/24")	SL978
Cover Glass (24")	SL547	Lampholder, Mog. Scr. (19/24")	1988
Reflector (19")	EF240	Lampholder, Med. Pref. (19/24")	SL1250C
Reflector (24")	347M	Motor, Drive (19/24")	K2315A
Lampholder, Mog. Bip. (19/24")	FE132X		

"I'll Tread Water As Long As
You Think You Can Make It Rain."
-actual country song

Searchlight Dimension Drawings inch (mm)



How to Order Searchlight Systems

Step 1: Specify Searchlight... 19 or 24-inch (See Searchlight Selection Table, page 2), with Standard or Collector/Slip-Ring Base (add "-CR" to model number for Slip-Ring Base), and select Lampholder (Medium Prefocus with Special Shock-Mount Design is recommended), and add desired Optional Features (see page 2...add suffixes to Cat. No.)

Step 2: Specify Lamp... compatible with Lampholder and Voltage (see Lamp Table, page 2).

Step 3: Specify Controls... Cat. No. C5777-S Joystick Control Station (if only one control station per searchlight is required) or Cat. No. 8973XS-1 Relay Box plus 2 or more Cat. No. 8779X-S Joystick Control Stations (if more than one control station per searchlight is required).

Sample Order of System controlled from only Single location:

19-inch with Slip-Ring Base, Medium Prefocus Lampholder: **Cat. No. 19SL8660D-CR**

Lamp, 1000 Watt, 120 VAC, Medium Prefocus: **Cat. No. BTR**

Joystick Control Station: **Cat. No. C5777-S**

Sample Order of System controlled from Multiple locations:

19-inch Searchlight with Collector/Slip-Ring Base, Anti-icing Heaters, Medium Prefocus Lampholder: **Cat. No. 19SL8660D-CRH**

Lamp, 1000 Watt, 120 VAC, Medium Prefocus: **Cat. No. BTR**

Relay Box: **Cat. No. 8973XS-1**

Joystick Control Stations (2 or more): **Cat. No. 8779X-S**

"Thank God and Greyhound You're Gone."
-actual country song

These Searchlights are designed for heavy duty marine service on commercial vessels.

Specifications

Searchlight Intensity. The beam of light is produced by a xenon arc lamp with a color temperature of 6000 degrees Kelvin and is rated at 30 Million Candle Power.

Lamp. Xenon-arc, 1500 hour average life, warranted for 1500 hours. Warranted hourly lamp cost is considerably less than non-warranted hourly carbon cost and non-warranted hourly cost of many incandescent lamps.

Adjustable Beam Size. The horizontally mounted lamp combined with the deep parabolic metal reflector gives the capability of changing from the lamp than do most concentrated intense beam for long reaches to a much larger beam for lighting large areas at closer range. Beam size can be adjusted manually at the searchlight or electrically from a remote control station as an optional feature.

Reflector. Precision, parabolic, constructed of virtually indestructible nickel with corrosion resistant rhodium finish.

Short focal length deep parabola captures a higher percentage of total light from the lamp than do most conventional reflectors thus producing a remarkably intense beam.

Cover Glass. Extremely strong impact and thermal shock resistant heat tempered clear glass.

Starter. Simple, reliable, and compact. Produces the high voltage necessary to start the lamp instantly. It is readily accessible and replaceable as a single unit.

Bases. Standard and pedestal for manual control. Motorized base for distant electric control (DEC) can be controlled from one or more remote stations. All are constructed of high strength corrosion resistant aluminum and contain a sliding stop allowing horizontal rotation in excess of 360 degrees without damaging the electric cables.

Drum. Constructed of marine grade corrosion resistant material with a hinged front door for easy lamp replacement. Rear dome is removable for ease in servicing.

Finish. Drum interior finished with heat resistant flat black paint. Exterior surfaces are white enamel and mechanical control shafts inside pilot house are polished brass. The control parts that are normally polished can be chrome plated (see optional features).

Wiring. Three conductor (one ground) power cable and multiconductor control cables extend through watertight stuffing tubes in drum and are clamped to rotating base. Sufficient length is supplied to terminate in a junction box (not supplied) near the searchlight without causing mechanical stress when searchlight is moved through its entire horizontal and vertical travel.

Electrical. A power supply to produce the required ballasted DC for the searchlight, control station, and DEC components are described on pages 3 and 4. Other DC sources with appropriate ballasts and controls may also be used—especially cost-efficient when replacing or converting existing carbon arc searchlights. Consult factory.

Controls

Please refer to page 3 for descriptions of manual control options listed below (see page 4 for electric controls).

Local Control. Fig. 1 and 2. No pilot house controls. Searchlight has training handle on drum and hand clamps to lock searchlight in any position.

Lever-Gear Control. Fig. 4, 5A and 5B. Operates conveniently with one hand. Horizontal movement controlled by pointing lever, vertical by twisting lever. Vertical lock conveniently located on control handle. Ceiling lock clamps horizontal movement.

Wheel Control. Fig. 6. Upper wheel controls horizontal movements, lower wheel vertical movements. Friction brake holds searchlight in any vertical position.

Distant Electric Control (DEC). Fig. 3. Motors in searchlight base control horizontal and vertical beam movements so that searchlight can be located any distance from pilot house. Dynamic braking stops beam movement instantly upon controller release. Page 4 shows controllers and control stations for both single-station and multiple-station systems. These components priced separately.

Distant Mechanical Control (DMC). Fig. 7A and 7B. Similar to lever-gear or wheel except that control shafts are at right angle to searchlight base.

Optional Features

Searchlight can be tailored to your exact needs by specifying these features at time of order at extra charge.

Special control length longer or shorter than standard. Specify length from bottom of base (vertical centerline of base if DM) to centerline of lever handle or large wheel.

Special pedestal height higher or lower than standard. Specify height from bottom of base to centerline of beam.

Brass base and yoke instead of marine aluminum. Add -B to searchlight cat. no.

Remote focus. Add -RF to searchlight cat. no.

Chromium plated pilot house controls. Add -CC to cat. no.

Anti-icing heaters. Supplied on DEC searchlights only. Add -H to cat. no.

See "How to Order" on page 4.

Searchlight Selection Table

Control	Base	Searchlight Catalog No.*	Weight lb. (kg)	
			*Net	*Ship
Local	Standard (fig. 1)	X4197	65 (29)	90 (41)
	Pedestal (fig. 2)	X4790	80 (36)	105 (48)
Lever-Gear (fig. 4 or 5)	Standard (fig. 1)	X9396LG	80 (36)	105 (48)
	Pedestal (fig. 2)	X4785LG	95 (43)	125 (57)
Wheel (fig. 6)	Standard (fig. 1)	X9396W	80 (36)	105 (48)
	Pedestal (fig. 2)	X4785W	95 (43)	125 (57)
Distant Mechanical Lever-Gear Wheel	DM (fig. 7B)	X9397LG	100 (45)	130 (59)
	DM (fig. 7A)	X9397W	100 (45)	130 (59)
Distant Electric	DE (fig. 3)	X9398	131 (59)	200 (91)

*Searchlight only. Does not include power supply or accessories.

Dimension Drawings Inch (mm)

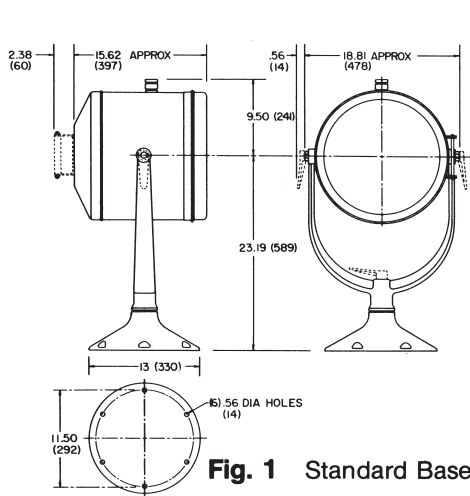


Fig. 1 Standard Base

Combine base and control figures for complete searchlight. (except DEC)

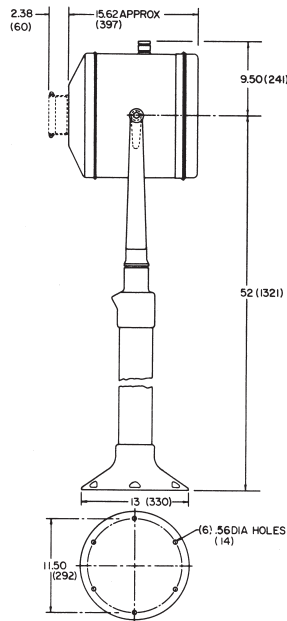


Fig. 2 Pedestal Base

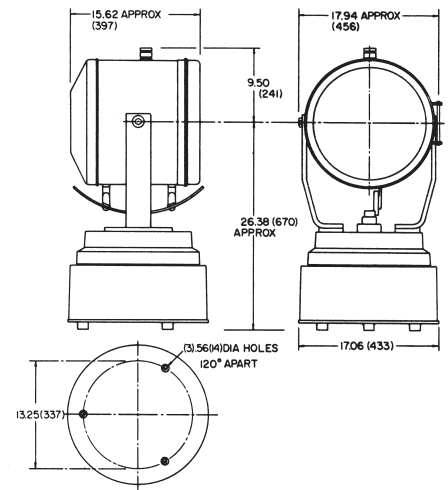


Fig. 3 Distant Electric Control (DEC)

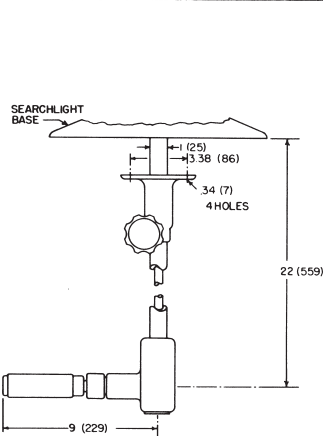


Fig. 4 Lever-Gear Control

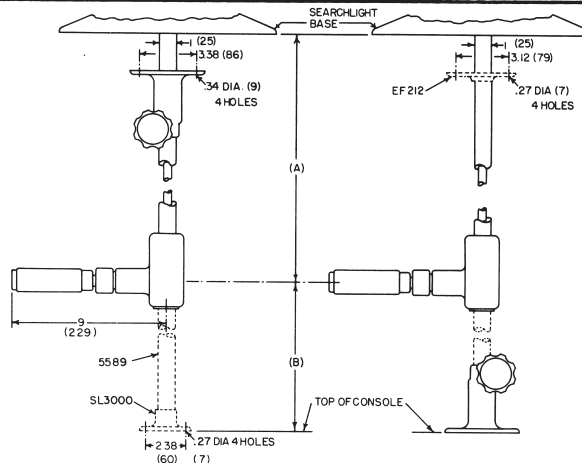


Fig. 5A

Fig. 5B

Alternate arrangements for lever-gear control with extra long control shafts. Parts shown as dashed lines priced separately.

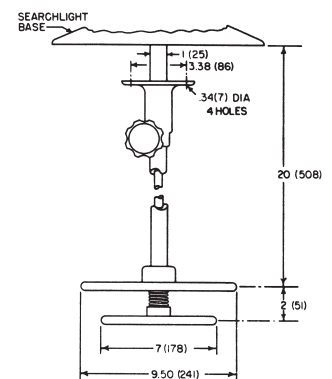


Fig. 6 Wheel Control

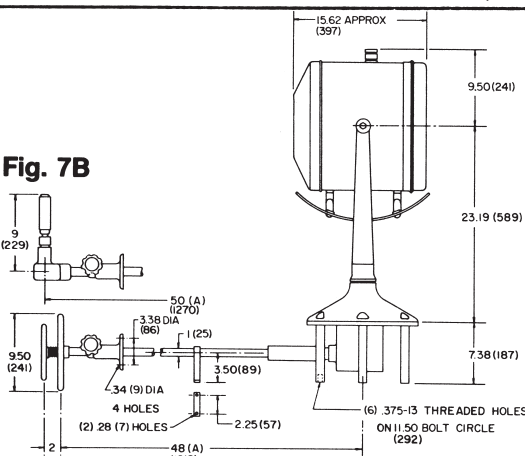


Fig. 7B

Fig. 7A Distant Mechanical Control (DMC)

Power Supply 4198PS

Operates on AC 120/1/50-60 to provide ballasted DC power to the searchlight. Also contains fused disconnect switch, contactor, DC ammeter, and time meter.

Net weight 99 lb (50 kg), shipping 131 lb (59 kg).

Optional Deck Stand Kit 6810X.

Available at extra charge to permit power supply to be mounted on deck instead of bulkhead. Shown in fig. 8.

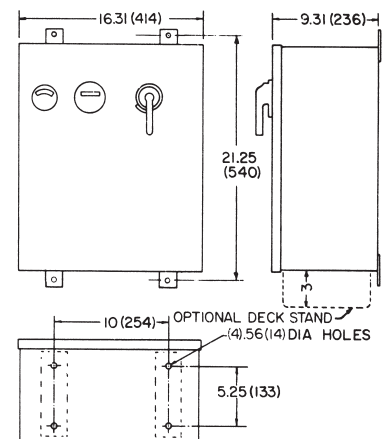


Fig. 8 Power Supply

Control Components

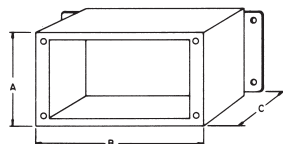


Control Station

4441X (without remote focus)
4441X-RF (with remote focus)

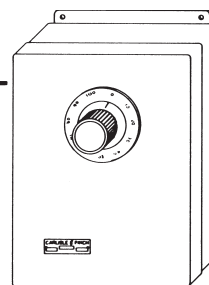
For manual control searchlights. Contains searchlight off-start switch, standby switch, and remote focus switch (if specified). Mounted on bright stainless steel plate 3.12" x 5.62" (79 x 143). Depth clearance 2.5" (64).

Net weight 1.00 lb (0.40 kg).



Optional Enclosures for Control Stations

Cat. No.	Used for	Dimensions inch (mm)		
		A	B	C
5079A	4441X,-	3.25(83)	5.75(146)	2.75(70)
5288	C5388,-	6.00(152)	8.00(203)	3.50(89)
9824	4799X,-	6.00(152)	6.00(152)	4.00(102)

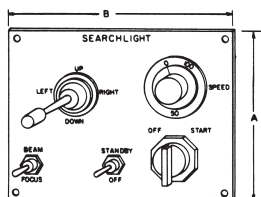


8672X (without speed control)
8672XS (with speed control)

Used when DEC searchlights are controlled from more than one remote location. Only one required per searchlight regardless of quantity of 4799X type control stations used. Steel oiltight enclosure contains rectifier, relays, fuses, etc. In addition 8672XS contains beam speed control devices with external adjustment to preset the slow speed.

Enclosure size 12 x 10 x 5" (305 x 254 x 127 mm). Net weight 19.4 lb (8.80 kg).

Distant Electric Control Stations



Two types: 1) when searchlight is controlled from one location only and 2) when searchlight is controlled from more than one location. In each the basic station is a compact unit incorporating OFF-ON switch, UP-DOWN-LEFT-RIGHT joystick controller, and STANDBY-OFF switch. Operator can change searchlight aim with beam off when switch is on "Standby."

Optional controls are: 1) Remote Focus to change beam size and 2) Speed Control to change speed of beam travel. Remote focus requires searchlight also to be equipped with remote focus option. Speed control requires no additional feature in searchlight.

TABLE I SINGLE-STATION CONTROLS

Cat. No.	Options		Dimensions		Depth	Weight
	Remote Focus	Speed Control	Inch (mm) A	Inch (mm) B		
C5388	No	No	6(152)	8(152)	3.5(89)	4.8(2.18)
C5388-RF	Yes	No	6(152)	8(152)	3.5(89)	4.8(2.18)
C5388-RFS	Yes	Yes	6(152)	8(152)	3.5(89)	7.3(3.31)

TABLE II MULTI-STATION CONTROLS

Cat. No.		Options		Dimensions		Depth	Weight
Multiple Control Station	Compatible Control Assembly	Rem. Foc.	Sp. Con.	Inch (mm) A B		Inch (mm)	lb (kg)
4799X	8672X	No	No	6(152)	6(152)	3.12(79)	2.5(1.14)
4799X-RF	8672X	Yes	No	6(152)	6(152)	3.12(79)	2.5(1.14)
4799X-RFS	8672XS	Yes	Yes	6(152)	6(152)	3.12(79)	5.0(2.27)

Other Accessories & Parts

Description	Part No.	Description	Part No.	Description	Part No.
Capacitor (starter)	2896	Cover Glass	SL1085	Lamp	1000TRC
Capacitor (power)	4404X	Fan	4434X	Reflector	9719X
Capacitor (power)	4405	Gasket (std & ped base)	SL3356	Starter Assembly	4636X

How to Order Searchlight Systems

A minimum of 3 components must be specified separately to order a complete searchlight system: 1) searchlight from table on page 2 (including suffix for optional feature(s)), 2) power supply described on page 3, and at least one operator's control station from those described on page 4. Distant electric control searchlights to be controlled from more than one remote location also require one 8672X type control assembly (described on page 4) to consolidate signals from the multiple control stations.

Example of manual control searchlight order:

- 2 X9396LG-CCRF 500W xenon searchlight, standard base, with remote focus and chrome plated lever-gear controls 46 inches longer than standard, arranged per dimension fig. 5A, complete with 5589 stem and SL3000 bearing.
- 2 4198PS 500W xenon power supply.
- 2 4441X-RF control station with remote focus.

Example of order for DEC system:

- 2 X9398-HRF 500W xenon searchlight, DEC, with anti-ice heaters and remote focus.
- 2 4198PS 500W xenon power supply.
- 2 8672XS control assembly with speed control.
- 4 4799X-RFS control station for multiple control of DEC xenon searchlight with remote focus and speed control.

1000 Watt Xenon Electric Control Searchlight

80 Million Candlepower... with “Proportional-Speed Joystick”

Features

- **80 Million Beam Candlepower...** Powerful Beam services a distance of approx. 5 Miles on a clear night!
- **Remote Electric Beam-Size Focus...** Beam can be instantly narrowed or widened, with remote electric switch, throughout a continuous spectrum, on demand.
- **Advanced Proportional-Speed Joystick...** Beam-Speed and Beam-Direction are controlled simultaneously with one hand, while operator uses free hand to steer vessel or hold binoculars... “move the Joystick to the first position and it will move slowly... move it further and it speeds up!”
- **Fast Searching Capability...** Beam-speed is a approximately 30 degrees per second, providing a quick and accurate search.
- **Manual Focus Back-up Knob ...** External Knob changes changes the Beam-Size with no tools, if Focus Motor Fails.
- **Beyond Full Circle of Rotation...** Unique Sliding-Stop Design allows 385 Degrees horizontal motion.
- **Anti-corrosive Design...** Marine Grade Aluminum and Stainless Steel with High Quality Salt-Resistant Powder Coat Finish
- **Optional Azimuth Indication...** LCD Display provides digital read out in Degrees for Horizontal Motion.



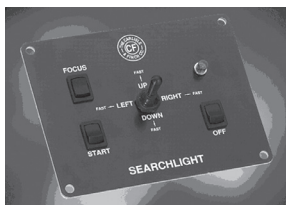
United States Coast Guard Approved
Searchlight for Marine Applications

Powerful Searchlight for Marine Applications

This “USCG-Approved Fixture”, with assigned “U.S. Military National Stock Number” (NSN: 6220-01-331-5923), is a Powerful, Rugged Design, composed of Marine Grade Aluminum and Stainless Steel, with a High Quality Salt and Scratch-Resistant Powder Coat Finish. The Indestructible, Nickel Reflector produces a precision 1-Degree Beam at a Powerful 80 Million Beam Candlepower. The Advanced Joystick changes the Beam-Speed and Beam-Direction simultaneously, requiring only one hand of operation (this technology eliminates a separate speed dial which requires two hands of operation!). The Searchlight Focus has Safety Back-up, with no tools required (if the Focus Motor fails, the Beam-Size can be adjusted quickly and easily, with an external focus knob). The Searchlight is mounted on a rugged base, which includes ball bearings held captive within stainless steel races, producing greater than 385 Degrees of Horizontal Rotation with unique sliding stop. Top Beam-speed is a rapid 30 Degrees per second. Each control station will provide Remote Electric Beam-Size Focus, Beam-ON/OFF Control, Beam-ON Indication Light and the Advanced Joystick which controls Beam-Speed and Beam-Direction concurrently, using only one hand of operation!

“Proportional-Speed Joystick”

Beam-Speed and Aiming Control are built into Joystick... providing Single-hand Control



The Carlisle & Finch Company has developed a Sleek “Proportional-Speed” Joystick Control Station. The Beam-Speed and Beam-Direction functions are built into the Joystick (move the Joystick to the first position, and the Beam moves slowly... move it further, and the Beam speeds up!). This capability eliminates the need for a separate Speed Dial or Fast/Slow switch, which requires two hands of operation (i.e. one hand on Joystick and one hand one on Speed Dial). Now the operator can now use his/her free hand to steer the vessel, hold binoculars or hold a firearm. Additional functions are: Beam-ON, Beam-OFF, Electric Beam-size Focus, Advanced Joystick (described above), and a Beam-On Indicator light offered on control stations mounted inside, out of the weather.

1 KW & 2.5KW Xenon Searchlight Systems

These Searchlights are designed for heavy duty marine service on oceangoing vessels.

Specifications

The xenon arc lamp and precision deep parabolic reflector combine to produce a range of 5 miles or more on a clear dark night. The 1 KW searchlight lamp produces in excess of 65 million candela and the 2.5KW over 130 million. These very intense beams, with a color approaching that of sunlight, are particularly effective in areas of dense fog. They are also excellent for searching out ice floes in polar regions.

Lamp. 1000 watt or 2500 watt xenon arc depending upon searchlight selected, over 1500 hours average life, warranted for 1500 hours.

Adjustable Beam Size. The horizontally mounted lamp combined with the deep parabolic metal reflector gives the capability of changing from the most concentrated intense beam for long reaches to a much larger less intense beam for lighting large areas at closer range. Beam size can be adjusted manually at the searchlight or electrically from the operator's control station(s) as an optional feature (optional feature - RF).

Reflector. Precision, parabolic, constructed of virtually indestructible nickel with corrosion resistant rhodium finish. Short focal length deep parabola captures a higher percentage of total light from lamp than do most conventional reflectors thus producing a remarkably intense beam.

Cover Glass. Extremely strong impact and thermal shock resistant heat-tempered glass mounted in a spring loaded front door which relieves drum internal pressure in the rare event of lamp failure.

Starter. Simple, reliable, and compact. Produces the high voltage necessary to start the lamp instantly. It is readily accessible and replaceable as a single unit.

Bases and Arms. Rotating base supported on ball bearings for easy movement. Sliding stop permits horizontal rotation in excess of 360 degrees but limits motion to prevent cable damage by excessive windup. Standard construction is heavy section cast aluminum. Cast brass can be specified at extra charge (optional feature - B).

Drum. Corrosion resistant aluminum with hinged front door for easy lamp replacement. Rear cover removable for ease in servicing the starter, fan, and focus assembly.

Finish. Drum interior finished with heat-resistant flat-black paint. Exterior surfaces are white enamel. Manual beam direction controls inside pilot house are polished brass. They can be chrome plated at extra charge (optional feature - CC).

Wiring. Single conductor lamp cables, ground conductor, and multi-conductor control cables extend through watertight stuffing tubes in drum and are clamped to rotating base. Sufficient length is supplied to permit full horizontal and vertical searchlight movement without causing mechanical stress to cables terminated in junction box (not supplied) near searchlight.

Anti-icing. Can be equipped with heaters to prevent icing between rotating and fixed base, between rack and pinion, and between trunnions and drum (optional feature - H).

Electrical. Xenon lamps require ballasted direct current. The power supplies described on page 5 operate on 3-phase input of various voltages to produce proper lamp current, reduced control voltage, and (when specified) heater power. Operator control stations and related components are described on page 4.

Controls

Manual control parts ruggedly constructed of brass. See page 4 for electrical control stations for both manual and distant electrical controlled searchlights.

Local Control. Fig. 1. No pilot house controls. Searchlight can be clamped in any position. Handle is provided for aiming the searchlight.

Wheel Control. Fig. 2. Upper wheel controls horizontal movement, lower wheel controls vertical movement. Friction brake holds searchlight in any vertical position. Horizontal movement locked by conveniently located clamp.

Lever-Gear Control. Fig. 3, 4A and 4B. Operates conveniently with one hand. Horizontal movements controlled by pointing lever. Vertical movements controlled by twisting lever. Vertical lock conveniently located on control handle. Horizontal movement locked by conveniently located clamp.

Distant Mechanical Control. Fig. 5A and 5B. Control shafts 90° to searchlight vertical centerline. Wheel type or lever-gear control can be selected. Additional 90° gear box can be supplied at extra charge (Fig. 6A, 6B).

Distant Electric Control. Fig. 7. Motors in searchlight base control horizontal and vertical beam movements so that searchlight can be located any distance from control location. Dynamic braking stops beam movement instantly upon release of controller. See page 4 for control stations which are priced separately. Systems are available to control searchlight from more than one remote station. Some stations incorporate speed control—fast beam movement for long swings and slow for pin-pointing targets at long range.

Optional Features

Searchlight can be tailored to your exact needs by specifying these features at time of order at extra charge.

Special manual control length longer or shorter than standard. Specify length from bottom of base (vertical centerline of base if distant mechanical control) to centerline of lever handle or large wheel.

Vibration/Shock Kit. Helps prevent lamp breakage due to excess vibration and shock. Add kit number V244IX.

Beam Speed Control. See control stations, page 4.

Chromium plated pilothouse controls. Add - CC* to searchlight cat. no.

Advertising Effects. Searchlight beam sweeps back and forth across sky drawing attention to vessel and making evening more festive for passengers. Add -E* to searchlight cat. no. and include kit no. 10961X.

Anti-icing heaters. Add - H* to searchlight cat. no.

Pointer to indicate horizontal aim of distant electric control searchlights. Add - P* to searchlight cat. no.

Remote focus to change beam size from operator's control station(s). Add - RF* to searchlight cat. no.

*When more than one option are selected list them alphabetically (same order as listed above) after a single hyphen (-) in the cat. no. suffix. Example: Cat. No. for 2.5KW searchlight with chrome lever-gear controls and remote focus is XE5203LG-CCRF.

Searchlight Selection Table

Control		1KW Searchlight			2.5KW Searchlight		
		Cat. No.	Weight lb (kg)		Cat. No.	Weight lb (kg)	
			Net*	Shipping*		Net*	Shipping*
Local	Fig. 1	XE9663	115(52)	185(84)	XE5202	145(66)	215(98)
Wheel	Fig. 2	XE9664W	130(59)	200(91)	XE5203W	160(73)	230(104)
Lever-Gear	Fig. 3	XE9664LG	130(59)	200(91)	XE5203LG	160(73)	230(104)
Distant Mechanical							
Wheel	Fig. 5A	XE9665W	175(79)	250(114)	XE5204W	205(93)	280(127)
Lever-Gear	Fig. 5B	XE9665LG	175(79)	250(114)	XE5204LG	205(93)	280(127)
Distant Electric (DEC)	Fig. 7	XE9666	155(70)	230(104)	XE5205	185(84)	260(118)

*Searchlight only. Does not include power supply or other accessories.

Searchlight Dimension Drawings inch(mm)

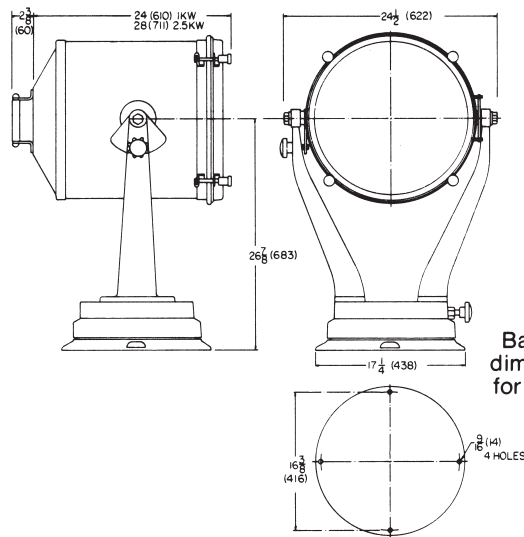


Fig. 1 Local Control

Base mounting dimensions same for Fig. 1, 2, & 3.

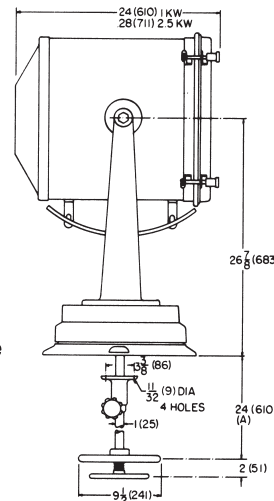


Fig. 2 Wheel Control

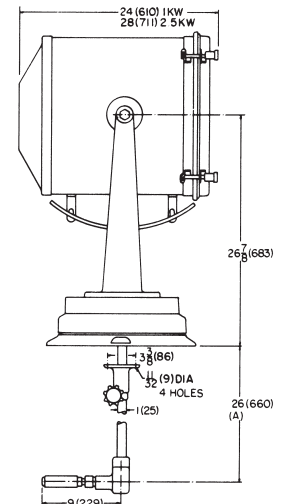


Fig. 3 Lever-Gear Control

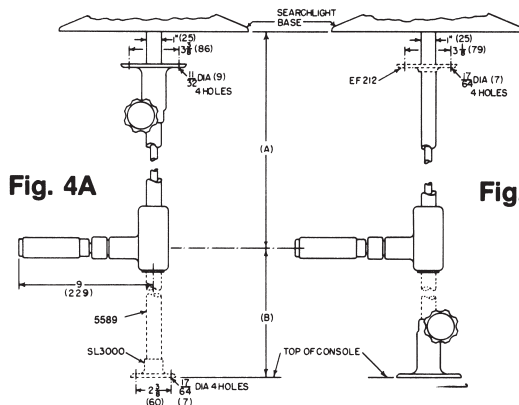


Fig. 4A

Fig. 4B

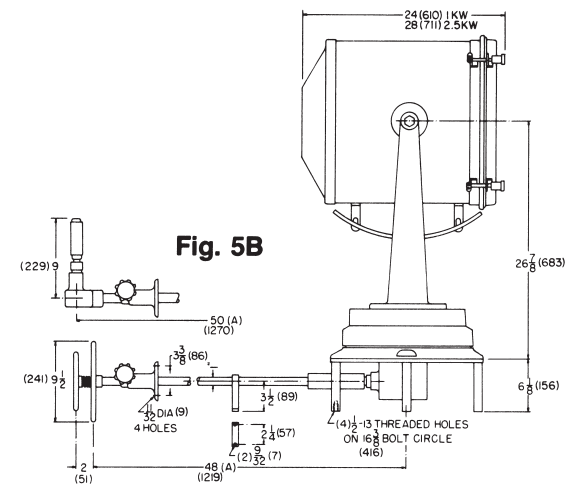


Fig. 5A Distant Mechanical Control (DMC)

Alternate arrangements for lever-gear control with extra long control shafts. Parts shown as dashed lines priced separately.

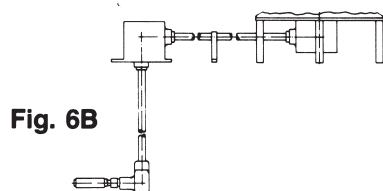


Fig. 6B

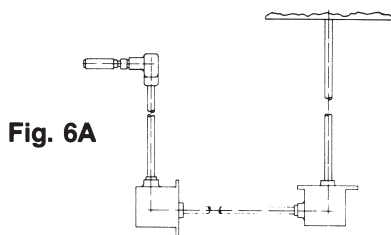


Fig. 6A

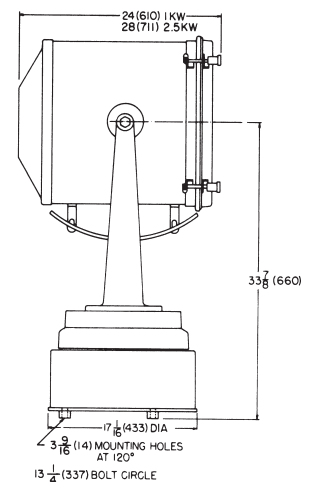


Fig. 7 Distant Electric Control (DEC)

Alternate distant mechanical control arrangements. Others possible consult factory.

Control Components

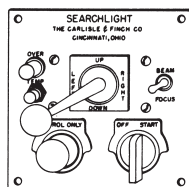


Control Station

9754X (without remote focus control)
9754X-RF (with remote focus control)

For manual control searchlights. Contains selector switch, light to indicate if searchlight or power supply is too hot, indicator light test switch, switch for remote focus control (if specified).

Mounted on bright stainless steel plate 3-1/8 x 5-5/8" (79 x 143 mm). Depth clearance 2-1/2" (64 mm). Fits enclosure 5079A. Net weight 1.00 lb (0.45 kg).



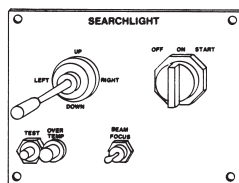
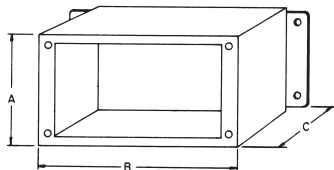
Control Station

9815X (without remote focus control)
9815X-RF (with remote focus control)

Used when DEC searchlight is to be controlled from multiple locations. Contains searchlight off-start switch single joystick for beam direction, over-temp light and test switch, switch to allow searchlight positioning with beam off, and remote focus control switch (if specified). As many stations as desired can be used with one 8672X Control Assembly to control one DEC searchlight.

Mounted on bright stainless steel plate 6 x 6" (152 x 152 mm). Depth clearance 3-1/8" (79 mm). Fits enclosure 9824. Net weight 2.5 lb (1.14 kg).

Optional Enclosures for Control Stations

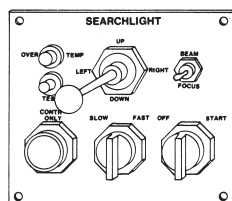


Control Station

C5268 (without remote focus control)
C5268-RF (with remote focus control)

For distant electric control (DEC) searchlights using only a single control station. See 9815X type stations and 8672X type control assembly for multi-station control. Single joystick controls all beam movements. Also contains off-on-start switch, over-temp indicator light and test switch, and remote focus control switch (if specified).

Mounted on bright stainless steel plate 6 x 8" (152 x 203 mm). Depth clearance 3-1/2" (89 mm). Fits enclosure 5288. Net weight 4.8 lb (2.18 kg).

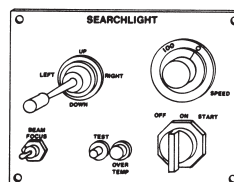


Control Station, Speed Control

9815X-RFS (with remote focus control)

Same as 9815X/9815X-RF except with addition of slow-fast switch to select speed of beam movements. As many stations as desired can be used with one 8672XS Control Assembly to control one DEC searchlight.

Mounted on bright stainless steel plate 6-1/4 x 7-1/4" (159 x 184 mm). Depth clearance 3" (76 mm). Fits enclosure 5079H. Net weight 5.0 lb (2.27 kg).

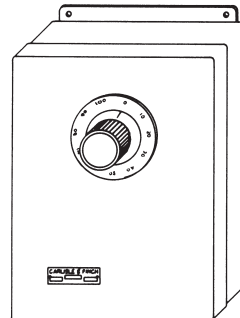


Control Station, Speed Control

C5268-RFS (with remote focus control)

For DEC searchlights using only a single control station. See 9815X type stations and 8672X type control assembly for multi-station control. Similar to C5268/C5268-RF except with addition of a device allowing operator to adjust speed of beam movements.

Mounted on bright stainless steel plate 6 x 8" (152 x 203 mm). Depth clearance 3-1/2" (89 mm). Fits enclosure 5288. Net weight 4.8 lb (2.18 kg).



Control Assembly

8672X (without speed control)
8672XS (with speed control)

Used when DEC searchlights are controlled from more than one remote location. Only one required per searchlight regardless of quantity of 9815X type stations used with the searchlight. Steel oiltight enclosure contains rectifier, relays, fuses, etc. In addition 8672XS contains beam speed control devices with external adjustment to preset the slow speed.

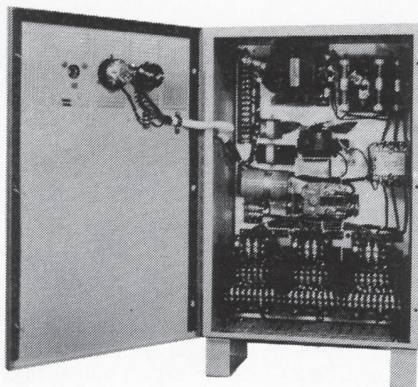
Enclosure size 12 x 10 x 5" (305 x 254 x 127 mm). Net weight 19.4 lb (8.80 kg).

Cat. No.	Used for	Dimensions inch (mm)			Weight	
		A	B	C	lb.	(kg)
5079A	9754X,-RF	3-1/4 (83)	5-3/4 (146)	2-3/4 (70)	2.4	(1.09)
5079H	9815X,-RFS,-S	6-1/4 (159)	7-1/4 (184)	3 (76)	4.6	(2.09)
5288	C5268,-RF,-RFS,-S	6 (152)	8 (203)	3-1/2 (89)	5.4	(2.45)
9824	9815X,-RF	6 (152)	6 (152)	4 (102)	3.8	(1.73)

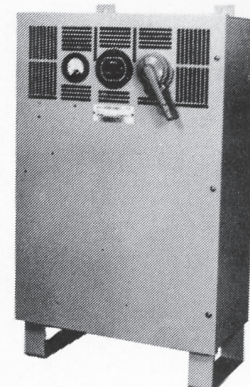
Other Accessories & Parts

Description	Catalog No.		Description	Catalog No.	
	1KW	2.5KW		1KW	2.5KW
Cover Glass	EF239	EF239	Reflector	9719X	5377X
Fan Assy (SL)	9615X	9615X			
Fan Motor (PS)	8036	8036			
Lamp, Xenon	1000TRC	7500	Starter Assy	9748X	9748X

Xenon Power Supplies



Power Supply
on optional deck stand



Completely self-contained compact units provide all necessary equipment to supply and control xenon searchlights from 3-phase AC input.

Designed for bulkhead or deck mounting (optional) with these important features:

Fused Disconnect Switch interlocked with door secures equipment when not in use and for safe maintenance.

AC Magnetic Contactor with separately fused reduced voltage 3-wire control is provided to switch searchlight on and off. Off-on controls not part of power supply. See control stations on page 4.

DC Ammeter continuously indicates lamp current.

Coarse and Fine Current Adjustments conveniently made on terminal boards provide proper lamp current for input voltages ranging above and below nominal AC supply.

Air Flow Monitor signals insufficient air flow.

Line Current Monitor signals overloaded transformer.

Reactance Ballasting provided by special transformers eliminates need for inefficient heat-producing resistance ballast.

3-Phase Silicon Rectifier capable of withstanding high voltage transients sometimes associated with ignition.

Elapsed Time Meter automatically records xenon lamp usage to indicate when lamp should be replaced and help substantiate claims for xenon lamps under warranty.

Terminals provided for all external connections to AC input, DC output, pilot controls and ground.

Ease of Maintenance. Full sized hinged front door swings clear to allow easy removal of individual components front-mounted on panel.

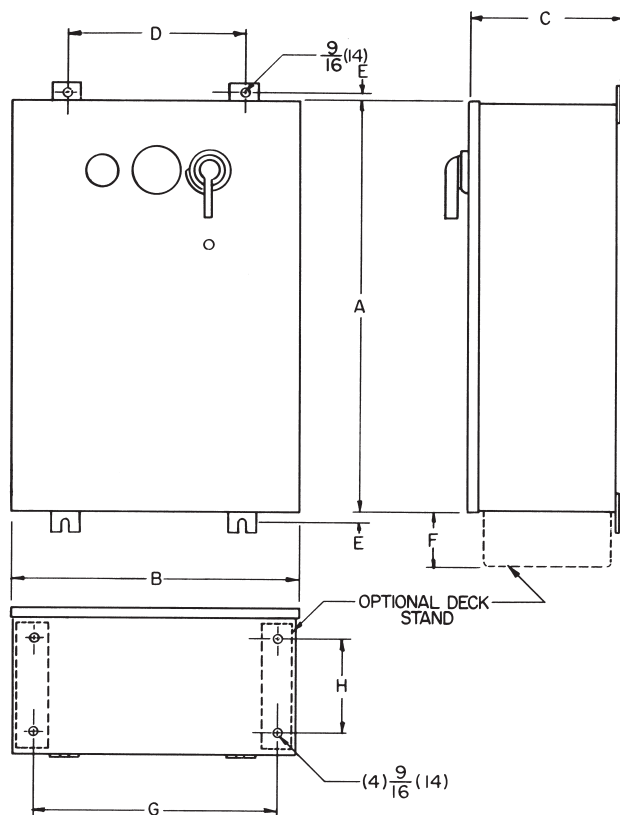
Optional Heater Supply available at extra charge. Larger capacity transformer producing 120 VAC wired to switch, indicator light, and terminals for connection to anti-ice heaters in searchlight. Specify by adding suffix -H to catalog numbers in selection table.

Optional Deck Stand Kit, cat. no. 5287X, available at extra charge to permit power supply to be mounted on deck instead of bulkhead.

Power Supply Selection Table

Nominal AC Supply	1KW Power Supply			2.5KW Power Supply		
	Cat. No.	Weight lb (kg)		Cat. No.	Weight lb (kg)	
		Net	Shipping		Net	Shipping
230/3/60	5275PS2	195(88)	220(100)	5206PS2	255(116)	335(152)
380/3/50	5275PS3	195(88)	220(100)	5206PS3	255(116)	335(152)
460/3/60	5275PS4	195(88)	220(100)	5206PS4	255(116)	335(152)
575/3/60	5275PS5	195(88)	220(100)	5206PS5	255(116)	335(152)

Power Supply Dimensions



Dimensions inch (mm)

	1KW	2.5KW
A	29-1/2 (749)	33-1/2 (851)
B	20-5/16 (516)	22-5/16 (567)
C	10-7/16 (265)	10-7/16 (265)
D	12-1/2 (318)	16 (406)
E	3/4 (19)	3/4 (19)
F	4 (102)	4 (102)
G	17-1/4 (438)	19-1/4 (489)
H	6-5/8	6-5/8

How to Order Searchlight Systems

A minimum of 3 components must be specified separately to order a complete searchlight system: (1) A searchlight from the selection table on page 2 (including suffix for optional feature(s)), (2) power supply from the selection table on page 5 with suffix -H if heater supply is desired and (3) at least one operator's control station from those described on page 4. Distant electric control searchlights to be controlled from more than one remote location also require one 8672X type control assembly (described on page 4) to consolidate signals from the multiple control stations. Although each required component can be specified by a unique catalog number, it is recommended that, to avoid mistakes, a brief description of the equipment wanted be given in addition to the quantity desired and its catalog number.

Example of manual control searchlight order:

- 2 XE9664LG-CCRF 1KW xenon searchlight with remote focus and chrome plated lever-gear controls 46 inches longer than standard, arranged per Dimension fig. 4A, complete with 5589 stem and SL3000 bearing.
- 2 5275PS4 1KW xenon power supply to operate from 460/3/60 input.
- 2 9754X-RF Control station with remote focus.

Example of order for DEC system:

- 2 XE5205-BHRF 2.5KW xenon searchlight, DEC with brass bases and arms, anti-ice heaters and remote focus.
- 2 5206PS2-H 2.5KW xenon power supply with heater circuit to operate from 230/3/60.
- 2 8672XS control assembly with speed control.
- 4 9815X-RFS control station for multiple control of DEC xenon searchlight with remote focus and speed control.

For Navigation Lights on Vessels Over 20 Meters (65.6 ft.) in Length

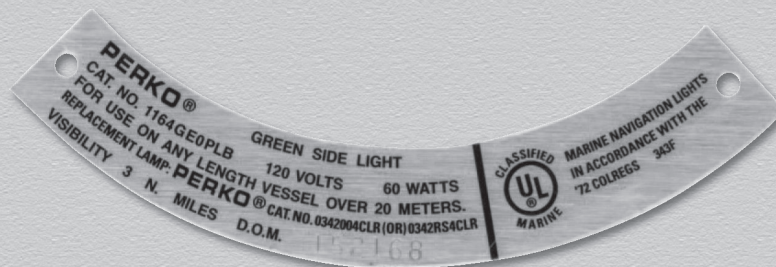
On March 31, 1977, the U.S. Coast Guard published, in the Federal Register, an amendment to the navigation and navigable water regulations which added a new subchapter DD, (33 CFR 87). This subchapter contains rules implementing and interpreting the International Regulations for Preventing Collisions at Sea, 1972 ('72 COLREGS). The International Regulations for Preventing Collisions at Sea, 1960, were replaced by the '72 COLREGS at 1200 hours, zone time on July 15, 1977. Therefore, all vessels on the high seas must comply with the '72 COLREGS at this time. In addition, with the enactment of the U.S. Inland Navigation Rules Act of 1980, the Inland Rules, Western Rules, and Great Lakes Rules were unified into a single set of requirements. The effective date for this legislation was December 24, 1981 (March 1, 1983 for Great Lakes). Therefore, all vessels must comply with these rules at this time.

Rules 21 and 22 of the '72 COLREGS and the U.S. Inland Navigation Rules give the color and range requirements for various navigation lights. Annex 1 to the '72 COLREGS and the U.S. Inland Navigation Rules gives positioning and technical details for these lights.

U.S. Coast Guard Acceptance of Navigation Lights

All U.S. Registered vessels are subject to either the '72 COLREGS or the U.S. Inland Rules. The U.S. Coast Guard is accepting lights that have passed the UL tests (UL Standard 1104) as meeting the '72 COLREGS and the U.S. Inland Rules for vessels over 20 meters (65.6 ft.) in length. U.S. requirements for smaller vessels are less strict. As the first domestic manufacturer to pass UL 1104, PERKO's lights can be installed on vessels over 20 meters (65.6 ft.) in length. Some models are designed for use on vessels over 20 meters (65.6 ft.) in length, while others are designed for use on vessels 20 meters (65.6 ft.) to 50 meters (164.0 ft.) in length.

A brass tag is permanently affixed to the light indicating the type of light, catalog number, voltage and bulb type to install to meet the visibility requirements. It also states that the light is classified by UL in accordance with the '72 COLREGS. This is the only documentation needed by a vessel for navigation lights to certify light construction compliance with the '72 COLREGS and the Inland Navigation Rules, and eliminates the former "Certificate of Compliance".

**Each Light Has Its Own Serial Number For Identification.**

The lights indicated for use on vessels over 20 meters (65.6 ft.) in length have passed UL 1104. The facsimile of the tag shown above is used on our cast bronze lights. Similar rectangular tags are used on other style lights.

Please note that any changes made to PERKO navigation lights, including substitution of bulbs other than those shown in our catalog, instruction sheets, or metal tags (affixed to some lights) will void all certifications and U.S. Coast Guard acceptance.

For the present, the U.S. Coast Guard will not publish a list of UL classified lights. However, field offices have been notified. For more detailed information, consult the complete '72 COLREGS, the U.S. Inland Navigation Rules, and your local U.S. Coast Guard office.

Special Purpose Lights

Other lights (not shown) for use where the vessel is subject to special local requirements are available. Contact PERKO for further information.

NAVIGATION LIGHT SELECTION CHART

FOR COMMERCIAL POWER DRIVEN VESSELS OVER 20 METERS (65.6 Ft.) IN LENGTH.

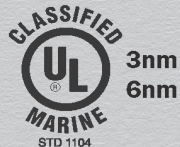
This Chart is Provided as a guide for Light Selection, Not Positioning. Refer to the "72 COLREGS and the U.S. Inland Navigation Rules for positioning Details. Depending Upon the Activity of the Vessel, It May be Required to Carry a Combination of Several of the Types of Lights Listed Below. Consult your Local U.S. Coast Guard Office for Specific Vessel Requirements. Refer to Product Listings for Specific Visibility Arc and Range Requirements.

VESSEL ACTIVITY AND SIZE		LIGHTING CODES
Power driven, underway and making way.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length.	SL, SN, M
Power driven, underway and making way.	Vessels over 50 Meters (164.00 ft.) in length.	SL, SN, M, MR
Towing by pushing ahead (COLREGS)	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, SN, 2M SL, SN, 2M, MR SL
Towing by pushing ahead (Inland) Note: Tug and Barge rigidly connected in a composite unit. Same as power driven vessel above	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, 2T, 2M SL, 2T, 2M, MR SL
Towing Alongside (COLREGS)	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, SN, 2M SL, SN, 2M, MR SL, SN
Towing Alongside (Inland)	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, 2T, 2M SL, 2T, 2M, MR SL, SN, SF
Towing Astern, tow length less than 200 meters (656.0 ft.) in length.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, T, 2M SL, T, 2M, MR SL, SN
Towing Astern, tow length over 200 meters (656.0 ft.) in length.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length. Barges	SL, T, 3M SL, T, 3M, MR SL, SN
Fishing, engaged, underway and making way with nets or lines astern.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length.	SL, SN, RW SL, SN, 3M, RW
Fishing, engaged, underway and making way "trawling" dragging a dredge net.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length.	SL, SN, GW SL, SN, 3M, GW
Fishing, engaged, underway and making way with an obstruction over the side more than 150 meters (492.0 ft.).	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length.	SL, SN, RW, W SL, SN, MR, RW, W
Fishing, engaged, not making way or at anchor.	Vessels of any length.	RW
Restricted in maneuverability making way.	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length.	SL, SN, M, RWR SL, SN, MR, RWR
Restricted in maneuverability not making way.	Vessels of any length.	RWR
Restricted in maneuverability not making way with an obstruction over the side.	Vessels of any length. Obstruction such as a pipeline.	RWR, 2R, 2G Y (See COLREGS for Details)
Restricted in maneuverability and towing.	See "towing" above for running and towing light requirements.	RWR
At Anchor	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels 50 Meters (164.00 ft.) to 100 Meters (328.0 ft.) in length. Vessels over 100 Meters (328.0 ft.) in length.	W W, W/A W, W/A, WL
Not under command and making way.	Vessels of any length.	SL, SN, 2R
Not under command and not making way.	Vessels of any length.	2R
Aground	Vessels 20 Meters (65.6 ft.) to 50 Meters (164.00 ft.) in length. Vessels over 50 Meters (164.00 ft.) in length.	W, 2R W, W/A, 2R
Pilot vessel engaged in pilotage duty.	Vessels of any length.	SL, SN, WR
Pilot vessel at anchor.	Vessels of any length.	W, WR

KEY TO LIGHTING CODES

SL - Side Lights (Red & Green).	T - Towing Light mounted vertically above a Stern light.	W - White All-Round Light.
SN - Stern Light.	2T - 2 Towing Lights mounted in a vertical line.	W/A - White All-Round Light forward and above anchor light astern.
M - Masthead Light.	GW - Green All-Round Light mounted vertically above a White All-Round Light.	WR - White All-Round Light mounted vertically above a Red All-Round Light.
MR - Masthead "Range" Light.	RW - Red All-Round Light mounted vertically above a White All-Round Light.	SF - Special Flashing Yellow Barge Light.
2M - 2 Masthead Lights mounted in a vertical line.	RWR - 3 All-Round Lights mounted vertically, the highest and lowest being red and the middle being white.	YA - Yellow All-Round Light.
3M - 3 Masthead Lights mounted in a vertical line.		WL - Working lights that illuminate the deck.
2R - 2 Red All-Round Lights mounted in a vertical line.		
2G - 2 Green All-Round Lights mounted in a vertical line.		

DOUBLE LENS L.E.D. NAVIGATION LIGHTS



Figs. 1384 - 1388 Series Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Lightweight, Durable Fiber-Filled Polycarbonate Black Polymer
- Includes Two 3 Foot Lengths of 16/3-SO Cable Through Watertight Terminal Tubes
- Watertight Access Cap for Rebulbing and Cleaning

Upper Lens Section - For "Back-Up" Use

- Removable Incandescent Bulb
- Pre-Wired Medium Prefocus Socket
- 24, 120 & 220 Volt Options, Bulb Not Included
- Rough Service Bulbs Available

Lower Lens Section - Permanently Sealed L.E.D. Chamber

- Long Life, Maintenance Free L.E.D. (120 VAC Only)

ORDERING INFO

Description	Visibility Arc	Visibility Miles	Cat. No. Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	3	1384RE0BLK	10.5
Green Side Light	112-1/2°	3	1384GE0BLK	10.5
White Masthead Light	225°	6	1385E00BLK	11.2
White Stern Light**	135°	3	1386E00BLK	10.0
Yellow Towing Light	135°	3	1386ME0BLK	10.0
White All-Round Light**	360°	3	1387E00BLK	10.0
White All-Round Light***	360°	6	1387HE0BLK	10.0
Red All-Round Light	360°	3	1388RE0BLK	10.0
Green All-Round Light	360°	3	1388GE0BLK	10.0
Yellow All-Round Light	360°	3	1388ME0BLK	10.0

TECH INFO

Bulb Upper: 24, 120 or 220 Volt (Not Included)

Lower: 120 VAC L.E.D.

Mounting Bolt Size: 3/8"

Height Overall: 18-3/8"
(Masthead 20-1/4")

Height Lens: 6-3/4"

Special lights to meet local requirements are available upon request.

**These lights are supplied with a Gray Tinted Lens (upper section only)

***For Great Lakes use



Close-up of Sealed L.E.D. Chamber



Fig. 1384
Green Side Light



Fig. 1385
White Masthead



Fig. 1386
Yellow Towing



Fig. 1386
White Stern



Fig. 1384
Red Side Light

IMPORTANT INCANDESCENT BULB DATA- TOP LENS SECTION

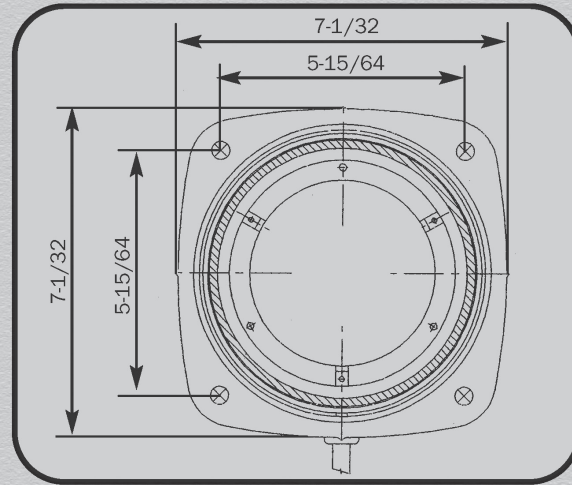
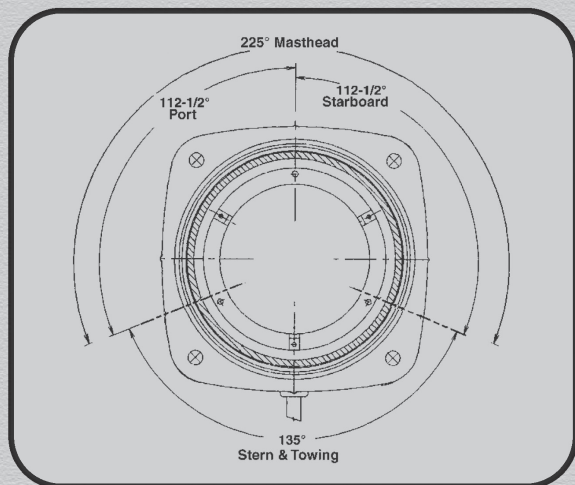
To comply with the UL Standard 1104, the lights listed on this page must be used with the Following:

For 24 Volt Use: Cat. No. 0342024CLR,

For 120 Volt Use: Cat. No. 0342004CLR or For "Rough Service" Use Cat. No. 0342RS4CLR

For 220 Volt Use: Cat. No. 0342220CLR

DOUBLE LENS L.E.D. NAVIGATION LIGHTS TECHNICAL INFORMATION



**4 - Mounting Holes, for 3/8 inch bolts
Spaced 5-15/64 apart on Center**

Figs. 1384, 1386, 1387 & 1388 Series Lights

SPARE PARTS ORDERING INFORMATION

- 1) Access Cap Assembly Including Top Socket
Cat. No. 1363DBLBLK
- 2) Medium Prefocus Socket
Cat. No. 0367
- 3) Bulb Information
24V = 0342024CLR
120V = 0342004CLR & 0342RS4CLR
220V = 0342220CLR

Note: L.E.D. Chamber Permanently Sealed

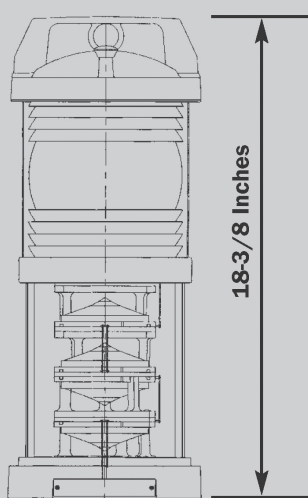
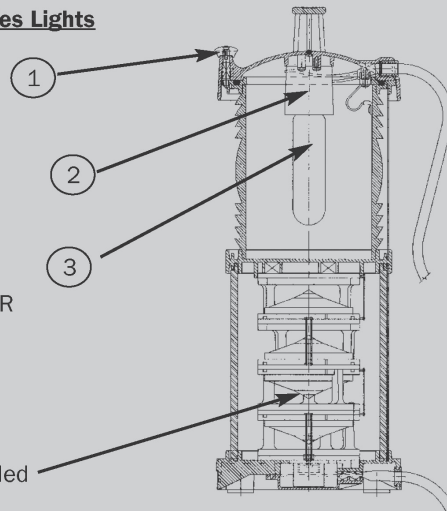
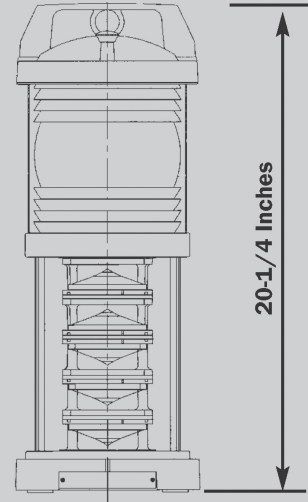
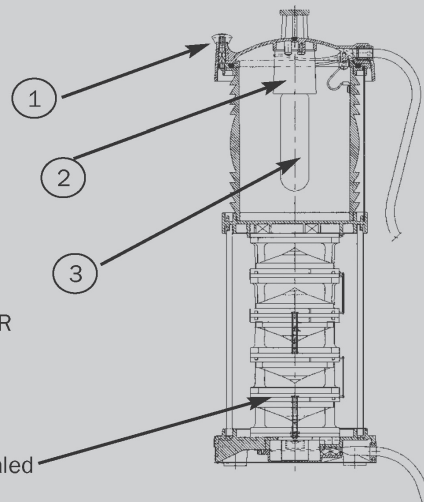


Fig. 1385 Masthead Light

SPARE PARTS ORDERING INFORMATION

- 1) Access Cap Assembly Including Top Socket
Cat. No. 1363DBLBLK
- 2) Medium Prefocus Socket
Cat. No. 0367
- 3) Bulb Information
24V = 0342024CLR
120V= 0342004CLR & 0342RS4CLR
220V= 0342220CLR

Note: L.E.D. Chamber Permanently Sealed



SINGLE LENS NAVIGATION LIGHTS



Figs. 1369 - 1374 Series Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Lightweight But Durable Fiber-Filled Polycarbonate Black Polymer
 - Pre-Wired Medium Prefocus Socket
 - Includes One 3 Foot Length of 16/3-SO Cable Through Watertight Terminal Tubes
- Watertight Access Cap for Rebulbing and Cleaning
 - Rough Service Bulbs are Available

ORDERING INFO				TECH INFO	
Description	Visibility Arc	Visibility Miles	Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.	
Red Side Light	112-1/2°	3	1372RE0BLK	4.4	Bulb: 24, 120 or 220 Volt (Not Included, see below) Mounting Bolt Size: 3/8" Height Overall: 9-1/4" Height Lens: 6-3/4"
Green Side Light	112-1/2°	3	1372GE0BLK	4.4	
White Masthead Light	225°	6	1373E00BLK	4.3	
White Stern Light*	135°	3	1374E00BLK	4.4	
Yellow Towing Light	135°	3	1374ME0BLK	4.4	
White All-Round Light*	360°	3	1369E00BLK	4.1	
White All-Round Light**	360°	6	1369HE0BLK	4.1	
Red All-Round Light	360°	3	1370RE0BLK	4.1	
Green All-Round Light	360°	3	1370GE0BLK	4.1	
Yellow All-Round Light	360°	3	1370ME0BLK	4.1	

Special lights to meet local requirements are available upon request.

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use

Fig. 1372
Green Side Light



Fig. 1370
Green All-Round



Fig. 1370
Red All-Round



Fig. 1372
Red Side Light



Fig. 1373
White Masthead



Fig. 1370
Yellow All-Round



Fig. 1374
White Stern



Important Bulb Data

To comply with UL Standard 1104, the lights listed on this page must be used with the following PERKO bulbs:

24 Volt Use Cat. No. 0342024CLR

120 Volt Use Cat. No. 0342004CLR or 0342RS4CLR when a "Rough Service" bulb is required.

220 Volt Use Cat. No. 0342220CLR.

SPARE PARTS ORDERING INFORMATION

Access Cap Assembly: 1363SGLBLK

Medium Prefocus Socket: 0367

Bulb Information:

24V = 0342024CLR

120V= 0342004CLR or 0342RS4CLR

220V= 0342220CLR

DOUBLE LENS NAVIGATION LIGHTS

Figs. 1364 - 1368 Series Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length



CONSTRUCTION:

- Lightweight But Durable Fiber-Filled Polycarbonate Black Polymer
- Pre-Wired Medium Prefocus Socket
- Includes Two 3 Foot Lengths of 16/3-SO Cable Through Watertight Terminal Tubes
- Watertight Access Cap for Rebulbing and Cleaning
- Rough Service Bulbs are Available

ORDERING INFO

Description	Visibility Arc	Visibility Miles	Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	3	1364RE0BLK	7.0
Green Side Light	112-1/2°	3	1364GE0BLK	7.0
White Masthead Light	225°	6	1365E00BLK	6.9
White Stern Light*	135°	3	1366E00BLK	6.9
Yellow Towing Light	135°	3	1366ME0BLK	6.9
White All-Round Light*	360°	3	1367E00BLK	6.3
White All-Round Light**	360°	6	1367HE0BLK	6.3
Red All-Round Light	360°	3	1368RE0BLK	6.3
Green All-Round Light	360°	3	1368GE0BLK	6.3
Yellow All-Round Light	360°	3	1368ME0BLK	6.3

TECH INFO

Bulb: 24, 120 or 220 Volt
(Not Included)
Mounting Bolt Size: 3/8"
Height Overall: 17-1/4"
Height Lens: 6-3/4"

Special lights to meet local requirements are available upon request

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use



Fig. 1364
Green Side Light



Fig. 1368
Red All-Round



Fig. 1366
Yellow Towing



Fig. 1367
White All-Round

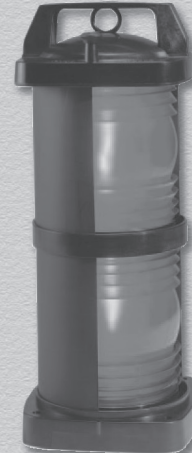


Fig. 1364
Red Side Light

Important Bulb Data

To comply with UL Standard 1104, the lights listed on this page must be used with the following PERKO bulbs:

24 Volt Use Cat. No. 0342024CLR

120 Volt Use Cat. No. 0342004CLR or 0342RS4CLR when a "Rough Service" bulb is required.

220 Volt Use Cat. No. 0342220CLR.

SPARE PARTS ORDERING INFORMATION

Access Cap Assembly Including

Top Socket: 1363DBLCLK

Medium Prefocus Socket: 0367

Bulb Information:

24V = 0342024CLR

120V= 0342004CLR or 0342RS4CLR

220V= 0342220CLR

SINGLE LENS NAVIGATION LIGHTS



Figs. 1169 - 1174 Series Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Heavy Duty Cast Bronze
- Pre-Wired Medium Prefocus Socket
- 3 Feet of 16/3-SO Cable Through a Watertight Terminal Tube
 - Watertight Access Cap for Rebulbing and Cleaning
 - 120 Volt Only, Bulb Not Included
 - Rough Service Bulbs are Available

ORDERING INFO				TECH INFO
Description	Visibility Arc	Visibility Miles	Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	3	1172RE0PLB	12.4
Green Side Light	112-1/2°	3	1172GE0PLB	12.4
White Masthead Light	225°	6	1173E00PLB	12.4
White Stern Light*	135°	3	1174E00PLB	12.4
Yellow Towing Light	135°	3	1174ME0PLB	12.6
White All-Round Light*	360°	3	1169E00PLB	11.2
White All-Round Light**	360°	6	1169HE0PLB	11.2
Red All-Round Light	360°	3	1170RE0PLB	11.2
Green All-Round Light	360°	3	1170GE0PLB	11.2
Yellow All-Round Light	360°	3	1170ME0PLB	11.2

Special lights to meet local requirements are available upon request

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use

Fig. 1172
Green Side Light



Fig. 1170
Green All-Round



Fig. 1170
Red All-Round



Fig. 1172
Red Side Light



Fig. 1173
White Masthead



Fig. 1170
Yellow All-Round



Fig. 1174
White Stern



IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed on this page must use a PERKO Cat. No. 0342004CLR bulb or 0342RS4CLR bulb when a "Rough Service" bulb is required.

Spare Parts Ordering Information

Spare Lenses:

Red: 0261001RED
Green: 0261001GRN
White: 0261001CLR
Gray: 0261001GRY
Yellow: 0261001YLW

Lens Gasket: 1143
O-Ring for Cap: 1119
Medium Prefocus Socket: 0367
Lens Retaining Clip with Bolt: 1133
Access Cap, O-Ring and Retainer: 1105000BLK

DOUBLE LENS NAVIGATION LIGHTS

Figs. 1164 - 1168 Series Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Heavy Duty Cast Bronze
- Pre-Wired Medium Prefocus Socket in Each Compartment
- Two 3 Foot Lengths of 16/3-SO Cable Through a Watertight Terminal Tube
- Watertight Access Cap for Rebulbing and Cleaning
- 120 Volt Only, Bulb Not Included
- Rough Service Bulbs are Available



ORDERING INFO

TECH INFO

Description	Visibility Arc	Visibility Miles	Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	3	1164RE0PLB	22.5
Green Side Light	112-1/2°	3	1164GE0PLB	22.5
White Masthead Light	225°	6	1165E00PLB	21.5
White Stern Light*	135°	3	1166E00PLB	22.3
Yellow Towing Light	135°	3	1166ME0PLB	22.4
White All-Round Light*	360°	3	1167E00PLB	20.0
White All-Round Light**	360°	6	1167HE0PLB	20.0
Red All-Round Light	360°	3	1168RE0PLB	20.0
Green All-Round Light	360°	3	1168GE0PLB	20.0
Yellow All-Round Light	360°	3	1168ME0PLB	20.0

Bulb: 120 Volt
(Not Included)

Mounting Bolt Size: 3/8"

Height Overall: 17-1/4"

Height Lens: 6-3/4"

Special lights to meet local requirements are available upon request

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use



Fig. 1164
Green Side Light

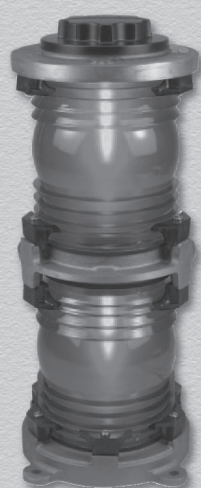


Fig. 1168
Red All-Round

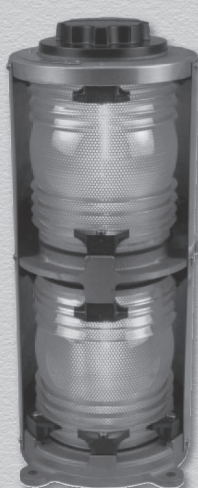


Fig. 1166
Yellow Towing

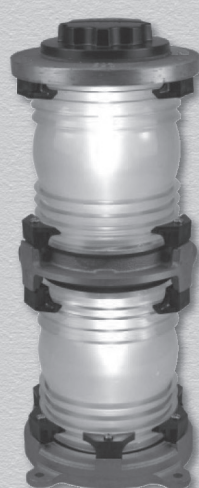


Fig. 1167
White All-Round



Fig. 1164
Red Side Light

IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed on this page must use a PERKO Cat. No. 0342004CLR bulb or 0342RS4CLR bulb when a "Rough Service" bulb is required.

Spare Parts Ordering Information

Spare Lenses:

Red: 0261001RED
Green: 0261001GRN
White: 0261001CLR
Gray: 0261001GRY
Yellow: 0261001YLW

Lens Gasket: 1143
O-Ring for Cap: 1119
Dual Medium Prefocus Socket Assembly: 0303
Lens Retaining Clip with Bolt: 1133
Access Cap, O-Ring and Retainer: 1105000BLK

L.E.D. NAVIGATION LIGHTS - BLACK

USCG USCG

2
nm

See Below

5
nm

CE

CLASSIFIED
UL
MARINE
STD 1104



**NEW
Item**

Available by
Dec. 2010

Figs. 1377 - 1380 Series L.E.D. Navigation Lights

Certified For Use on Vessels 20 Meters (65.6 ft.)
to 50 Meters (164.0 ft.) in Length

CONSTRUCTION:

- Black Polymer
- Pre-Wired with 3 Feet of 16/3-SO Cable
- Sealed Cap
- No User Serviceable Parts Inside

ORDERING INFO

Description	Visibility Arc	Visibility Miles	Black Polymer Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	2	1377RA0BLK	3.2
Green Side Light	112-1/2°	2	1377GA0BLK	3.2
White Masthead Light	225°	5	1378A00BLK	3.1
White Stern Light	135°	2	1379A00BLK	3.2
Yellow Towing Light	135°	2	1379MA0BLK	3.2
White All-Round Light	360°	2	1380A00BLK	3.0
White All-Round Light**	360°	5	1380HA0BLK	3.0
Red All-Round Light	360°	2	1380RA0BLK	3.0
Green All-Round Light	360°	2	1380GA0BLK	3.0
Yellow All-Round Light	360°	2	1380MA0BLK	3.0

TECH INFO

- L.E.D.: Operates on 12 or 24 Volt D.C. System
- Screw Size: 1/4"
- Height Overall: 7-1/2"
- Height Lens: 4-1/2"

Special lights to meet local requirements are available upon request

**For Great Lakes use



Fig. 1377
Red & Green Side Lights



Fig. 1378
Masthead Light



Fig. 1379
Stern Light



Fig. 1380
All-Round Light

L.E.D. NAVIGATION LIGHTS - WHITE

Figs. 1377 - 1380 Series L.E.D. Navigation Lights

Certified For Use on Vessels 20 Meters (65.6 ft.)
to 50 Meters (164.0 ft.) in Length

CONSTRUCTION:

- White Polymer
- Pre-Wired with 3 Feet of 16/3-S0 Cable
- Sealed Cap
- No User Serviceable Parts Inside



See Below



ORDERING INFO

Description	Visibility Arc	Visibility Miles	White Polymer Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	2	1377RA0WHT	3.2
Green Side Light	112-1/2°	2	1377GA0WHT	3.2
White Masthead Light	225°	5	1378A00WHT	3.1
White Stern Light	135°	2	1379A00WHT	3.2
Yellow Towing Light	135°	2	1379MA0WHT	3.2
White All-Round Light	360°	2	1380A00WHT	3.0
White All-Round Light**	360°	5	1380HA0WHT	3.0
Red All-Round Light	360°	2	1380RA0WHT	3.0
Green All-Round Light	360°	2	1380GA0WHT	3.0
Yellow All-Round Light	360°	2	1380MA0WHT	3.0

TECH INFO

- L.E.D.: Operates on 12 or 24 Volt D.C. System
- Screw Size: 1/4"
- Height Overall: 7-1/2"
- Height Lens: 4-1/2"

Special lights to meet local requirements are available upon request

**For Great Lakes use



Fig. 1377
Red & Green Side Lights



Fig. 1378
Masthead Light



Fig. 1379
Towing Light



Fig. 1379
Stern Light



Fig. 1380
Yellow All-Round Light

NAVIGATION LIGHTS - BLACK



See Below



Figs. 1127 - 1130 Series Navigation Lights
 Certified For Use on Vessels 20 Meters (65.6 ft.)
 to 50 Meters (164.0 ft.) in Length

CONSTRUCTION:

- Black Polymer
- Pre-Wired Double Contact Socket and 3 Feet of 16/3-SO Cable
- Watertight Access Cap for Rebulbing and Cleaning

ORDERING INFO

Description	Visibility Arc	Visibility Miles	Black Polymer Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	2	1127RA0BLK	2.7
Green Side Light	112-1/2°	2	1127GA0BLK	2.7
White Masthead Light	225°	5	1128A00BLK	2.6
White Stern Light*	135°	2	1129A00BLK	2.7
Yellow Towing Light	135°	2	1129MA0BLK	2.7
White All-Round Light*	360°	2	1130A00BLK	2.5
White All-Round Light**	360°	5	1130HA0BLK	2.5
Red All-Round Light	360°	2	1130RA0BLK	2.5
Green All-Round Light	360°	2	1130GA0BLK	2.5
Yellow All-Round Light	360°	2	1130MA0BLK	2.5

TECH INFO

Bulb: 12, 24, 32 or 120 Volt (Not Included)

Screw Size: 1/4"
 Height Overall: 7-1/2"
 Height Lens: 4-1/2"

Special lights to meet local requirements are available upon request

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use



Fig. 1127
Red & Green Side Lights



Fig. 1128
Masthead Light



Fig. 1129
Stern Light



Fig. 1130
All-Round Light

IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed on this page must use a PERKO Cat. No. 0374 bulb.

SPARE PARTS ORDERING INFORMATION

Lens Assemblies:

Red: 0249000RED
 Green: 0249000GRN
 White: 0249000CLR
 Gray: 0249000GRY
 Yellow: 0249000YLW

Required Bulbs:

12 Volt: 0374001CLR
 24 Volt: 0374002CLR
 32 Volt: 0374003CLR
 120 Volt: 0374004CLR

Other Parts:

O-Ring for Cap: 1119
 Double Contact Socket: 0134
 Access Cap, O-Ring and Retainer: 1105000BLK

NAVIGATION LIGHTS - WHITE

Figs. 1127 - 1130 Series Navigation Lights

Certified For Use on Vessels 20 Meters (65.6 ft.)
to 50 Meters (164.0 ft.) in Length

CONSTRUCTION:

- White Polymer
- Pre-Wired Double Contact Socket and 3 Feet of 16/3-S0 Cable
- Watertight Access Cap for Rebulbing and Cleaning



See Below



ORDERING INFO

Description	Visibility Arc	Visibility Miles	White Polymer Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.
Red Side Light	112-1/2°	2	1127RAOWHT	2.7
Green Side Light	112-1/2°	2	1127GAOWHT	2.7
White Masthead Light	225°	5	1128A00WHT	2.6
White Stern Light*	135°	2	1129A00WHT	2.7
Yellow Towing Light	135°	2	1129MAOWHT	2.7
White All-Round Light*	360°	2	1130A00WHT	2.5
White All-Round Light**	360°	5	1130HAOWHT	2.5
Red All-Round Light	360°	2	1130RAOWHT	2.5
Green All-Round Light	360°	2	1130GAOWHT	2.5
Yellow All-Round Light	360°	2	1130MAOWHT	2.5

TECH INFO

Bulb: 12, 24, 32 or
120 Volt (Not Included)

Screw Size: 1/4"
Height Overall: 7-1/2"
Height Lens: 4-1/2"

Special lights to meet local requirements are available upon request

*These lights are supplied with a Gray Tinted Lens

**For Great Lakes use



Fig. 1127
Red & Green Side Lights



Fig. 1128
Masthead Light



Fig. 1129
Towing Light



Fig. 1129
Stern Light



Fig. 1130
Yellow All-Round Light

IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed
on this page must use a PERKO Cat. No. 0374 bulb.

SPARE PARTS ORDERING INFORMATION

Lens Assemblies:

Red: 0249000RED
Green: 0249000GRN
White: 0249000CLR
Gray: 0249000GRY
Yellow: 0249000YLW

Required Bulbs:

12 Volt: 0374001CLR
24 Volt: 0374002CLR
32 Volt: 0374003CLR
120 Volt: 0374004CLR

Other Parts:

O-Ring for Cap: 1119
Double Contact Socket: 0134
Access Cap, O-Ring and
Retainer: 1105000WHT



NAVIGATION LIGHTS



Figs. 1150 - 1154 Series Lights

Certified For Use on Vessel Lengths as Specified Below

CONSTRUCTION:

- Sheet Metal, Preprimed Galvanized Steel
- Medium Prefocus Socket
- Watertight Terminal Tube for 16/3-SO Cable
- Watertight Access Cap for Rebulbing and Cleaning

ORDERING INFO

Certified For Use on Vessels 20 Meters (65.6 ft.) to 50 Meters (164.0 ft.) in Length

Description	Standard Pkg. 1 Pc.	Visibility Arc	Visibility Miles	Required Bulb	Ship Wt. Carton Lbs. Std. Pkg.
Red Side Light	1150RE1GAL	112-1/2°	2	0342002CLR	6.1
Green Side Light	1150GE1GAL	112-1/2°	2	0342002CLR	6.1
White Masthead Light	1151E01GAL	225°	5	0342003CLR	6.3
White Stern Light	1152E01GAL	135°	2	0342000CLR	6.1
Yellow Towing Light	1152ME1GAL	135°	2	0342000CLR	6.1
White All-Round Light	1153E01GAL	360°	2	0342001CLR	6.5
Red All-Round Light	1154RE1GAL	360°	2	0342004CLR*	6.7
Green All-Round Light	1154GE1GAL	360°	2	0342003CLR	6.7
Yellow All-Round Light	1154ME1GAL	360°	2	0342002CLR	6.7

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

Red Side Light	1150RE2GAL	112-1/2°	3	0342004CLR*	10.9
Green Side Light	1150GE2GAL	112-1/2°	3	0342004CLR*	10.9
White Masthead Light	1151E02GAL	225°	6	0342004CLR*	10.0
White Stern Light	1152E02GAL	135°	3	0342002CLR	9.5
White All-Round Light	1153E02GAL	360°	3	0342003CLR	10.6

*0342RS4CLR bulbs can be substituted for 0342004CLR where "Rough Service" bulbs are required

Bulb: 120 Volt
(Not Included)

Screw Size: 1/4"

Size No. 1

Height Overall: 11-1/2"

Height Lens: 6-3/4"

Size No. 2

Height Overall: 13-1/2"

Height Lens: 7-1/2"



FIG. 1150

FIG. 1151

FIG. 1152

FIG. 1153

FIG. 1154

IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed as specified above on this page must use a PERKO Cat. No. 0342 bulb, as specified above.

SPARE PARTS ORDERING INFORMATION

Lenses:

112-1/2° 0259 No. 1 or 2, Specify RED or GRN.

135° 0269 No. 1 or 2, Specify YLW or WHT.

225° 0256 No. 1 or 2, WHT.

360° 0261F No. 1 or 2, Specify RED, GRN, YLW or WHT.

Medium Prefocus Socket: 0347A00.

Access Cap, O-Ring and Retainer: 1105000BLK.

O-Ring for Cap: 1119.

Socket Supports: 0341001PLB or 034101APLB.

Figs. 0004D, 0005D & 0007D Lights

Certified For Use on Vessels 20 Meters (65.6 ft.) to 50 Meters (164.0 ft.) in Length



CONSTRUCTION:

- Sheet Metal, Preprimed Galvanized Steel, Polished or Chrome Plated Brass
- Bottom Opening, Complete with Mounting Bracket
- Single Contact Prefocus Socket



Fig. 0004G



Fig. 0004R



Fig. 0005



Fig. 0007



Fig. 0007M

ORDERING INFO

Description	Galvanized Steel	Polished Brass	Chrome Plated Brass	Visibility Arc	Visibility Miles	Required Bulb	Ship Wt. Carton Lbs. Std. Pkg. 1 Pc.
Red Side Light	0004RD3GAL	0004RD3POL	0004RD3CHR	112-1/2°	2	0373003CLR	2.7
Green Side Light	0004GD3GAL	0004GD3POL	0004GD3CHR	112-1/2°	2	0373002CLR	2.7
White Masthead Light	0005D03GAL	0005D03POL	0005D03CHR	225°	5	0373005CLR	2.9
White Stern Light	0007D03GAL	0007D03POL	0007D03CHR	135°	2	0373001CLR	2.8
Yellow Towing Light	0007MD3GAL	0007MD3POL	0007MD3CHR	135°	2	0373002CLR	2.8

TECH INFO

Bulb: 12 Volt
(Not Included)

Height Overall: 8-1/2"
Height Lens: 5-3/16"

IMPORTANT BULB DATA

To comply with UL Standard 1104, the lights listed on this page must use a PERKO Cat. No. 0373 bulb, as specified above.

SPARE PARTS ORDERING INFORMATION

Lenses:

112-1/2° Red: 0259CL3RED.
112-1/2° Green: 0259CL3GRN.
135° White: 0269CL3WHT.
135° Yellow: 0269CL3YLW.
225° Gray: 0256CL3WHT.

Mounting Bracket: 0131000GAL or 0131000PLB.
Single Contact Prefocus Socket Assembly, Complete with Stand, Bottom Plate and Gasket: 0294003PLB.

SPECIAL PURPOSE LIGHTS



Fig. 1111

Fig. 1111 - Flashing Yellow Light

For Use on Vessels of Any Length

CONSTRUCTION:

- Sheet Metal, Preprimed Galvanized Steel
- Medium Prefocus Socket
- Watertight Terminal Tube for 16/3-SO Cable
- Sealed Flasher Unit
- Watertight Access Cap for Rebulbing and Cleaning

Designed to meet Federal Requirements for Flashing yellow 180° - 225° light for barges, canal boats, etc., that are being pushed ahead or towed along side of a tug boat. For use on 120 volt A.C. only. Federal Requirements for this light are applicable for: inland waters, the Atlantic, Pacific and Gulf coasts, intercoastal waterways and western rivers. Refer to the U.S. Inland Navigation Rules for application, configuration and technical details.

ORDERING INFO

Standard Pkg. 1 Pc.	Visibility Miles	Visibility Arc	Flashes Per Minute	Ship Wt. Carton Lbs. Std. Pkg.
1111ME1GAL	2	225°	50-70	6.4

TECH INFO

Bulb: 120 Volt
(Not Included)
Height Overall: 11-1/2"
Height Lens: 6-3/4"

IMPORTANT BULB DATA

To comply with Federal Requirements this light must use a PERKO Cat. No. 0342004CLR bulb or 0342RS4CLR bulb when "Rough Service" bulbs are required.

SPARE PARTS ORDERING INFORMATION

Flasher: 0133. Medium Prefocus Socket: 0347A00.
O-Ring for Cap: 1119. Access Cap, O-Ring and Retainer: 1105000BLK.
Lens: 0256001YLW.



Fig. 0112A



Fig. 0309A

Figs. 0112 & 0309 - "A" Series All Round Lights

Certified For Use on Vessels 20 Meters (65.6 ft.) to 50 Meters (164.0 ft.) in Length

CONSTRUCTION:

- Cast Bronze, Plain or Chrome Plated
- Complete with Double Contact Electrical Socket

ORDERING INFO

Description	Plain Bronze	Chrome Plated Bronze	Ship Wt. Carton Lbs. Std. Pkg. 1 Pc.
White All-Round	0112A00PLB	0112A00CHR	2.4
Red All-Round	0112RA0PLB	0112RA0CHR	2.4
Green All-Round	0112GA0PLB	0112GA0CHR	2.4
Yellow All-Round	0112MA0PLB	0112MA0CHR	2.4

TECH INFO

Bulb: 12, 24, 32 or 120 Volt (Not Included)
Visibility: 2 Miles
Height Overall: 8-3/4"
Dia. Base: 3-1/8"

ORDERING INFO

Description	Plain Bronze	Chrome Plated Bronze	Ship Wt. Carton Lbs. Std. Pkg. 1 Pc.
White All-Round	0309A00PLB	0309A00CHR	1.8
Red All-Round	0309RA0PLB	0309RA0CHR	1.8
Green All-Round	0309GA0PLB	0309GA0CHR	1.8
Yellow All-Round	0309MA0PLB	0309MA0CHR	1.8

TECH INFO

Bulb: 12, 24, 32 or 120 Volt (Not Included)
Visibility: 2 Miles
Height Overall: 6-1/2"
Tapped Pipe Size: 1/2"

IMPORTANT BULB DATA

To comply with UL Standard 1104, these lights must use a PERKO Cat. No. 0374 bulb.

SPARE PARTS ORDERING INFORMATION

Lenses:
Red: 0106000RED.
Green: 0106000GRN.
White: 0106000WHT.
Yellow: 0106000YLW.
Double Contact Bayonet Socket: 0276002.

Required Bulbs:
12 Volt: 0374001CLR.
24 Volt: 0374002CLR.
32 Volt: 0374003CLR.
120 Volt: 0374004CLR.

Figs. 0403 & 0412 - Specialty All-Round Lights

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Cast Bronze
- White, Red, Green or Yellow Lens
- Medium Prefocus Socket

Fig. 0403 - Pipe Mount

Fig. 0412 - Hanging Mount



Fig. 0403
Tapped For
Pipe Mount



Fig. 0403



Fig. 0412

TECH INFO - 120 VOLT ONLY (BULB NOT INCLUDED)

Fig. No.	Ht. Overall Inches	Ht. Lens Inches	Tapped Pipe Size Inches	Visibility Miles
0403	11-1/2	6-3/4	1	3
0412	14	6-3/4	*	3

ORDERING INFO

White	Red	Green	Yellow	Ship Wt. Carton Lbs. Std. Pkg. 1 Pc.
0403E03PLB**	0403RE3PLB	0403GE3PLB	0403ME3PLB	8.6
0412E00PLB**	0412RE0PLB	0412GE0PLB	0412ME0PLB	9.1

*Supplied with watertight terminal tube for 16/3-SO cable.

**These lights are supplied with gray tinted lenses.

IMPORTANT BULB DATA

To comply with UL Standard 1104, these lights must use a PERKO Cat. No. 0342004CLR bulb or 0342RS4CLR bulb when a "Rough Service" bulb is required

SPARE PARTS ORDERING INFORMATION

Gray Lens: 0261001GRY. Yellow Lens: 0261001YLW. Gasket for lens: 1143.
Red Lens: 0261001RED. Green Lens: 0261001GRN. Medium Prefocus Socket: 0367.

Fig. 1129 - Panama Canal Blue Steering Light

For Use on Vessels of Any Length

CONSTRUCTION:

- Black Polymer
- Pre-Wired Double Contact Socket with 3 Feet of 16/3-SJO Cable

ORDERING INFO

Std. Pkg. - 1 Pc.	Visibility Arc	Ship Wt. Carton Lbs. Standard Pkg.
1129BA0BLK	135°	2.7

IMPORTANT BULB DATA

To comply with Panama Canal Requirements this light must use a PERKO Fig. No. 0374 bulb.

SPARE PARTS ORDERING INFORMATION

Bulbs
12 Volt: 0374001CLR. Lens: 0249000BLU.
24 Volt: 0374002CLR. O-Ring for Cap: 1119.
32 Volt: 0374003CLR. Double Contact Socket: 0134.
120 Volt: 0374004CLR. Polymer Access Cap, O-Ring and Retainer: 1105000BLK.

TECH INFO

Bulb: 12, 24, 32 or
120 Volt
(Not Included)
Height Overall: 7-1/2"
Height Lens: 4-1/4"



Fig. 1129

Fig. 0454 - Pipe Mount All-Round White Whistle Light

Certified For Use on Vessels Over 20 Meters (65.6 ft.) in Length

CONSTRUCTION:

- Cast Bronze
- Medium Prefocus Socket



Fig. 0454E
Tapped For
Pipe Mount



Fig. 0454

ORDERING INFO

Std. Pkg. - 1 Pc.	Ship Wt. Carton Lbs. Standard Pkg.	Visibility Miles
0454E00PLB	8.6	5

SPARE PARTS ORDERING INFORMATION

Bulb: 0342004CLR. Lens or Cover Gasket: 1143.
Lens: 0261001CLR. Medium Prefocus Socket: 0367.

TECH INFO

Bulb: 120 Volt
(Not Included)
Height Overall: 11-1/2"
Height Lens: 6-3/4"
Tapped Pipe Size: 1"

BULBS & PARTS FOR NAVIGATION LIGHTS

For Navigation Lights on Vessels Over 20 Meters (65.6 ft.) in Length

DUAL MEDIUM PREFOCUS SOCKET ASSEMBLY



Phenolic - 250 Volts - 1000 Watts
Plug In Type - Prewired with two medium
prefocus sockets. For use in double lens lights.

Std. Pkg. 1 Pc.	Ht Overall Inches	Width Overall Inches	Weight Ounces
0303	3-7/8	3-7/8	11

Male Plug Only Cat. No. 0303A00. Female Socket Only Cat. No. 0303B00.

MEDIUM PREFOCUS SOCKETS



Phenolic - 250 Volts - 1000 Watts

5 Pcs.	Height Overall Inches	Diameter Overall Inches	Std. Pkg. 1 Pc.	Weight Per Pkg. Ounces
0367	1-7/8	1-1/2	1	12.5
0347A00*	1-7/8	1-1/2	5	22.7

* Cat. No. 0347A00 (pictured) supplied with metal mounting cap tapped for 3/8 Inch I.P.S.

SINGLE CONTACT PREFOCUS SOCKET ASSEMBLY WITH STAND, BOTTOM PLATE AND GASKET



Std. Pkg. 1 Pc.	Ht Overall Inches	Dia. Overall Inches	Weight Ounces
0294003PLB	3	3-3/4	6

DOUBLE CONTACT SOCKET



Std. Pkg. 1 Pc.	Height Overall Inches	Diameter Overall Inches	Weight Ounces
0134	7/8	1-3/4	1-1/4

112-1/2° LENSES



Color	Ht. Inches	Width Inches	Std. Pkg. 1 Pc.	Weight Ounces
Red	4-1/4	3-1/16	0259CL2RED	5
Green	4-1/4	3-1/16	0259CL2GRN	5
Red	5-1/16	3-11/16	0259CL3RED	10
Green	5-1/16	3-11/16	0259CL3GRN	10



Color	Ht. Overall Inches	Dia. Opening Inches	Std. Pkg. 1 Pc.	Weight Ounces
Red	6-3/4	6-1/8	0259001RED	16
Green	6-3/4	6-1/8	0259001GRN	16
Red	7-1/2	9-1/4	0259002RED	30
Green	7-1/2	9-1/4	0259002GRN	30

135° LENSES



Color	Height Inches	I.D. Inches	Std. Pkg. 1 Pc.	Weight Lbs.
White	4-1/4	3-1/2	0269CL2WHT	0.4
White	5-1/8	3-5/8	0269CL3WHT	0.6
Yellow	4-1/4	3-1/2	0269CL2YLW	0.4
Yellow	5-1/8	3-5/8	0269CL3YLW	0.6

Color	Height Overall Inches	Dia. Opening Inches	Std. Pkg. 1 Pc.	Weight Lbs.
White	6-3/4	5-1/8	0269001WHT	1.1
Red	6-3/4	5-1/8	0269001RED	1.1
Yellow	6-3/4	5-1/8	0269001YLW	1.1
White	7-1/2	7-1/4	0269002WHT	1.6
Red	7-1/2	7-1/4	0269002RED	1.6

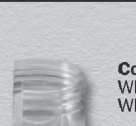
360° LENSES



Color	Height Overall Inches	Diameter Opening Inches	Clear Std. Pkg. 1 Pc.	Frosted Std. Pkg. 1 Pc.
White	6-3/4	5-1/8	0261001CLR	0261001FRD
Red	6-3/4	5-1/8	0261001RED	0261RF1FRD
Green	6-3/4	5-1/8	0261001GRN	0261GF1FRD
Yellow	6-3/4	5-1/8	0261001YLW	0261MF1FRD
Gray	6-3/4	5-1/8	0261001GRY	—
White	7-1/2	7-3/8	0261002CLR	0261002FRD
Red	7-1/2	7-3/8	0261002RED	0261RF2FRD
Green	7-1/2	7-3/8	0261002GRN	0261GF2FRD

Weight Size 1, 2.2 Lbs. - Weight Size 2, 3.2 Lbs.

225° LENSES



Color	Ht. Inches	I.D. Inches	Std. Pkg. 1 Pc.	Weight Lbs.
White	4-1/4	3-3/8	0256CL2WHT	0.5
White	5-1/8	3-1/4	0256CL3WHT	0.8

Color	Ht. Overall Inches	Dia. Opening Inches	Std. Pkg. 1 Pc.	Weight Lbs.
White	6-3/4	4-1/2	0256001WHT	1.4
Yellow	6-3/4	4-1/2	0256001YLW	1.4
White	7-1/2	6-5/8	0256002WHT	2.3

360° LENSES



Color	Height Inches	I.D. Inches	O.D. Inches	Std. Pkg. 1 Pc.
Red	5	2-7/8	3-1/4	0106000RED
Green	5	2-7/8	3-1/4	0106000GRN
White	5	2-7/8	3-1/4	0106000WHT
Yellow	5	2-7/8	3-1/4	0106000YLW
Gray	5	2-7/8	3-1/4	0106000GRY

Weight 12 oz.

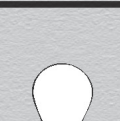
360° LENSES With Top Assembly



Color	Ht. Overall Inches	Dia. Opening Inches	Std. Pkg. 1 Pc.
White	5-3/4	5-1/2	0249000CLR
Red	5-3/4	5-1/2	0249000RED
Green	5-3/4	5-1/2	0249000GRN
Yellow	5-3/4	5-1/2	0249000YLW
Gray	5-3/4	5-1/2	0249000GRY

Weight 1.6 Lbs.

SINGLE CONTACT PREFOCUS BULBS



Std. Pkg. 1 Pc.	C-8 Filament Clear - 12 Volts	Amperage	Mfg. No.
0373001CLR	.25	25A/S8	—
0373002CLR	.55	55A/S8	—
0373003CLR	.77	77A/S8	—
0373004CLR	1.15	1.15A/S8	—
0373005CLR	2.03	2.03A/S8SCP	—

Weight 1 oz.

DOUBLE CONTACT BAYONET BULBS



Std. Pkg. 1 Pc.	Clear Type T-8, C-8, Filament - 1-3/8 Inch L.C.L.	Voltage	Wattage	Candella
0374001CLR	12	30	24	—
0374002CLR	24	30	24	—
0374003CLR	32	30	24	—
0374004CLR	120	30	24	—

Weight 1 oz.

CLEAR MEDIUM PREFOCUS BULBS



Cat. No.	Volts	Wattage
0342000CLR	120	7.5
0342001CLR*	120	15
0342002CLR*	120	25
0342003CLR*	120	40
0342024CLR	24	55
0342004CLR*	120	60
0342RS4CLR**	120	60
0342220CLR	220	65

Standard Pkg. - 1 pc. - *OEM - 25 pcs available.
Weight 1 Pc.: 0.1 lbs. - Weight 25 pk: 3.5 lbs
**Designed for rough service.

Note: Bulbs MUST BE ORDERED in Standard or Dealer Package Quantities Only!
Bulbs for Navigation Lights Under 20 Meters (65.6 ft.)

XR SERIES XENON SEARCHLIGHTS

15 Inch Housing - Fig. 9304 (500 Watt), 110 or 220 VAC Power Supply

19 Inch Housing - Fig. 9854 (1600 Watt), 220 or 440 VAC Power Supply

XR Series Xenon Searchlights are designed and manufactured to meet the demanding needs of commercial marine applications. The short arc Xenon filled lamps produce an extremely bright and very white light which can be focused in the pilothouse into a narrow long range beam. The heavy duty head of the 1,600 watt light is a marine grade aluminum casting with integral cooling fins to assure cool operation at high output levels. The cast marine aluminum yoke & base are equally rugged. High quality Timkin bearings provide for smooth 380° rotation.

The XR Series model 9854 is available manually controlled with a traditional lever gear control system or remotely controlled with a distant electric control system. In addition, an optional heating capability is available to assure trouble free operation in areas of the world prone to icing conditions. The XR Series model 9854 searchlight can be operated continuously at 1,600 watts for maximum brightness providing in excess of 100,000,000 candlepower and up to 5.5 mile (IES Handbook) range.

The XR Series model 9304 searchlight can be operated continuously at 500 watts for a maximum brightness of 35,000,000 candlepower and over 3 mile (IES Handbook) range. An iridium coated precision reflector provides for maximum light output and sharp focus. The remote control panel controls lamp ignition (start-up) and focus from the pilothouse. Superior cooling is provided by a heavy duty cooling fan which blows air across the lamp inside the sealed housing.

Both XR Series Searchlights include a single Xenon lamp. Perko offers a choice of several replacement lamps (1,000 and 1,600 watt) which will operate for the 9854 series searchlight when the proper amperage settings have been chosen. For the 9304 series, a 500 watt Xenon lamp is the only available option.

Fig. 9304 - 500 WATT

Fig. 9854 - 1600 WATT



FIGS. 9304 & 9854 CONTROL TYPES

LEVER GEAR

Aim handle for horizontal position. Twist handle for vertical position.

REMOTE ELECTRIC

Joystick type controller with variable speed function for both horizontal & vertical positioning

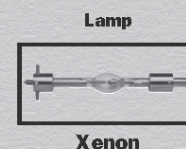
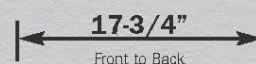
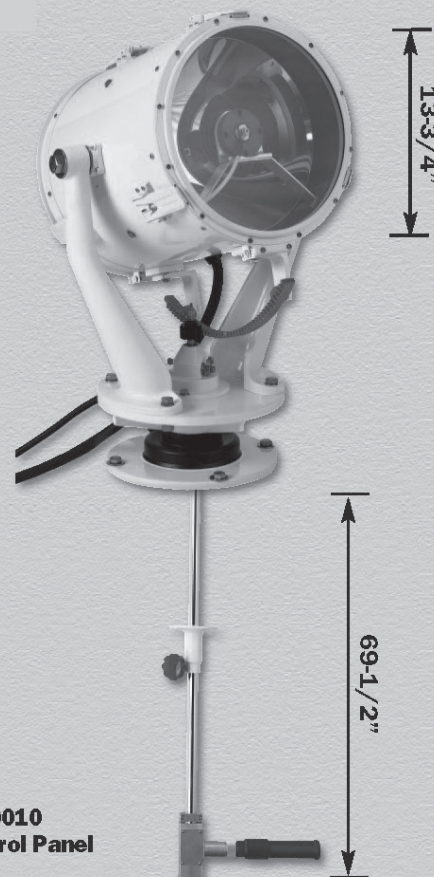
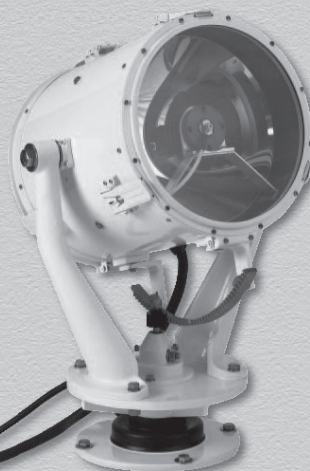


XR SERIES 15" XENON SEARCHLIGHT

FIG. 9304 (500 WATT) WITH 120 OR 220 VAC POWER SUPPLY

Remote Distant Electric
Control Base

TECH INFO		
Nominal Drum Diameter <u>Inches</u>	Nominal Searchlight Assembly Weight <u>Pounds</u>	<u>IP Rating</u>
13-3/4	71	65
Gross Shipping Weight		
<u>Including Crate</u>	<u>Pounds</u>	
Searchlight	185	
Power Supply	95	
Control Rod & Tube	11.5	
Base Diameter, 12 Inches.		

Lever/Gear
Control9551001
Remote Control PanelHead, Yoke and
Base AssemblyFig. 9511
500 Watt Power Supply9510010
Control PanelComplete
9304 XR Series Searchlights

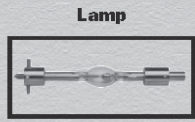
ORDERING INFO With Distant Electric Control Base			
Lamp Type & Lamp Size	Voltage	Catalog No. Without Heaters	Catalog No. With Heaters
500 Watt Xenon	120 VAC	9304E01WH5	9304EH1WH5
500 Watt Xenon	220 VAC	9304E02WH5*	9304EH2WH5*

ORDERING INFO With Lever/Gear Controls			
Lamp Type & Lamp Size	Voltage	Catalog No. Without Heaters	Catalog No. With Heaters
500 Watt Xenon	120 VAC	9304L01WH5	9304LH1WH5
500 Watt Xenon	220 VAC	9304L02WH5*	9304LH2WH5*

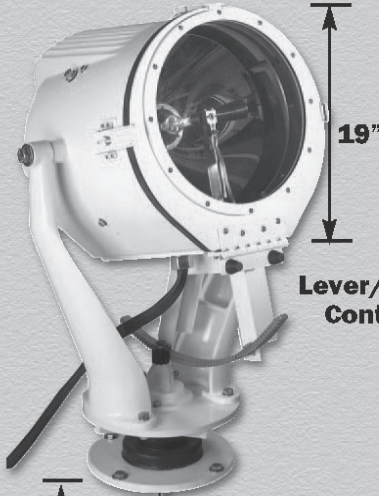
NOTE: Lamps are included with complete Searchlights.

* 500 Watt 220 Power Supply Ships 60hz unless 50hz is requested.

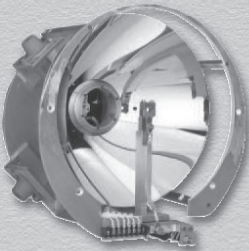
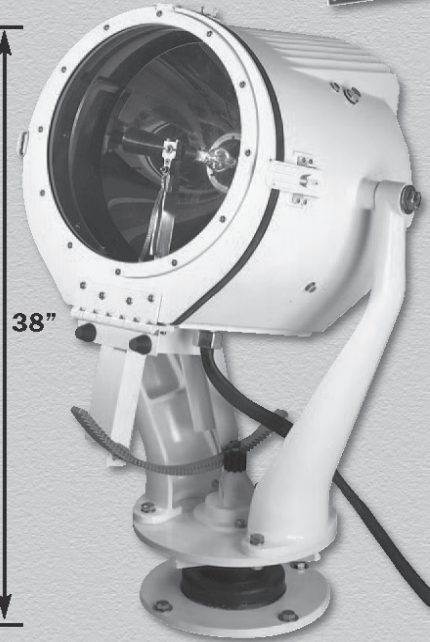
XR SERIES 19" XENON SEARCHLIGHT

FIG. 9854 (1600 WATT) WITH 220 & 440 (3Ø) VAC POWER SUPPLY

Xenon

19-1/2"
Front to Back

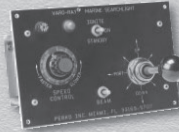

Lever/Gear Control
Head, Yoke and Base Assembly

69-1/2"


Fig. 9521000 Optical Assy.

**Complete
9854 XR Series Searchlights**
TECH INFO

Nominal Drum Diameter Inches	Nominal Searchlight Assembly Weight Pounds	IP Rating
19	145	65
Gross Shipping Weight Including Crate		
Searchlight	310	
Power Supply	250	
Control Rod & Tube	11.5	
Base Diameter, 12 Inches.		

Remote Distant Electric Control Base

9551001 Remote Control Panel

Figs. 9510/9512/9514 Power Supply

9510010 Control Panel
**Ordering Info
With Distant Electric Control Base**

Lamp Type & Lamp Size	Voltage	Catalog No. Without Heaters	Catalog No. With Heaters
1000 Watt Xenon	220 VAC	9854E02WH0	9854EH2WH0
1600 Watt Xenon	220 VAC	9854E02WH6	9854EH2WH6
1000 Watt Xenon	440 VAC	9854E04WH0	9854EH4WH0
1600 Watt Xenon	440 VAC	9854E04WH6	9854EH4WH6

**Ordering Info
With Manual Lever Control**

Lamp Type & Lamp Size	Voltage	Catalog No. Without Heaters	Catalog No. With Heaters
1000 Watt Xenon	220 VAC	9854L02WH0	9854LH2WH0
1600 Watt Xenon	220 VAC	9854L02WH6	9854LH2WH6
1000 Watt Xenon	440 VAC	9854L04WH0	9854LH4WH0
1600 Watt Xenon	440 VAC	9854L04WH6	9854LH4WH6

Lamps are included with complete searchlights.

XR SERIES XENON SEARCHLIGHTS BULBS & SPARE COMPONENTS

Major Component Ordering Information

Components used in the XR Series searchlights are available as spare parts. Detailed ordering information can be found in the operator's maintenance manual for each light. In addition, power supplies can be easily exchanged for factory-rebuilt models offering a low cost means of upgrading or repairing an older unit in the field.

A unique design feature of the 1600-watt light is the ease with which the optical assembly can be changed by removing a few bolts and easily accessible wires. With this feature, complete optical assemblies (both new and factory refurbished) are available to easily upgrade or refurbish an old unit in the field.

Replacement control components, manuals and tools to make adjustments and lamp changing easier are shown below.

Searchlight Head and Optical Components

Cat. No.	Description
9504000	Complete 15" Searchlight Head with Optical Assembly
9508000	15" Searchlight Yoke & Base Assy Only
9501000	Complete 19" Searchlight Head with Optical Assembly
9506000	19" Searchlight Yoke & Base Assy Only
9521000	Removable 1,600 Watt Optical Assembly

Power Supply Components

Cat. No.	Description
9511000110	500 Watt-110 Volt Power Supply
9511000220	500 Watt-220 Volt Power Supply
9510000220	1,000 Watt-220 Volt (3Ø) Power Supply
9510000440	1,000 Watt-440 Volt (3Ø) Power Supply
9512000	1,600 Watt-220 Volt (3Ø) Power Supply
9514000	1,600 Watt-440 Volt (3Ø) Power Supply

Meters, Gauges & Control Components

Cat. No.	Description
9530000	Std. Length Lever Gear Mechanical Controls for Fig. 9854
9551000	Remote Distant Electric Controls for Fig. 9854
9510009	Remote Ammeter
9510003	Hour Meter
9510010	Control Panel Assembly
9551001	Control Panel for Distant Electric Base and Slave Controller

Additional Components

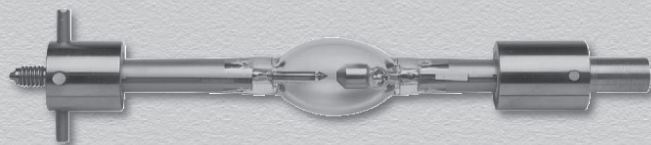
Cat. No.	Description
9510001	Accessory Transformer
9510013	Main Power Transformer
9521009	Excitation Transformer
9521017	Injection Transformer
9510011	Power Supply Fan
9521008	Optical Assembly Fan
9521003	Spark Gap Assembly
9510005	Ignite Toggle Switch
9510006	Beam Focus Switch

Searchlight Tools

Cat. No.	Description
9582001	9/64" Hex Lamp Changing Tool (1600 & 1000 Watt)
9582002	500 Watt Lamp Extractor Tool
9582003	1/4" x 10" Reflector Adjusting Wrench
9582005	Spare Emulator Kit for Fig. 9854 (See Manual Fig. 9581001 for item list)

Manuals

Cat. No.	Description
9581001	Installation Manual - For Fig. 9854 Complete Searchlights
9581002	Installation Manual - For Fig. 9551 Remote Distant Electric Control Unit
9581003	Installation Manual - For Figs. 9501 & 9521 Head and Optical Assemblies
9581004	Installation Manual - For Fig. 9304 Complete Searchlights



XR Series Xenon Lamps Ordering Info AMPERAGE RATINGS

WARNING!!
Xenon lamps are filled with Xenon Gas under high pressure. They may explode in either hot or cold state, especially if dropped or mishandled. **ALWAYS wear protective safety equipment** (a protective face mask with neck guard, chest protector, heavy clothing and leather gloves) **when handling a lamp.**

Xenon Lamp Size	Catalog Number	Current Range	Recommended Operation	Candle Power	Range Miles
300 Watt*	9563000	12A - 16A	15A @ 20V	20,000,000	3.1
500 Watt*	9565000	20A - 30A	30A @ 15V	35,000,000	3.8
1000 Watt	9560000	30A - 55A	50A @ 20V	80,000,000	5.1
1600 Watt	9566000	50A - 70A	65A @ 24V	100,000,000	5.5

* 300W and 500W lamps shown as replacements on earlier VARO 300W and 500W model searchlights only. Not used on 9854 series searchlights.

LAMP WARRANTIES REQUIRE COMPLETION OF WARRANTY REGISTRATION FORMS SHORTLY AFTER PURCHASE AND INSTALLATION

NOTE: PERKO offers a limited warranty on both the shelf and operating life of the XR series Xenon lamps. Please see the XR series "Limited Eighteen (18) Month Warranty" for all explicit terms and conditions of this warranty. All XR series Xenon lamps are supplied with an adapter sized to fit XR series searchlights. Adapters for other searchlights can be manufactured upon request. Contact customer service for details.

PERKO Purchase Notification Purchase Price _____ Date Completed _____ Date of Purchase _____ Authorized Dealer _____ Motor Vessel Name _____ PERKO Inc. Miami, FL. 33169	PERKO Warranty Registration Purchase Price _____ Hour Meter Reading _____ Date of Installation _____ Authorized Dealer _____ Motor Vessel Name _____ PERKO Inc. Miami, FL. 33169
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1900 Series

All Aluminum - White Perko•Kote Finish

32, 120 or 230 Volts

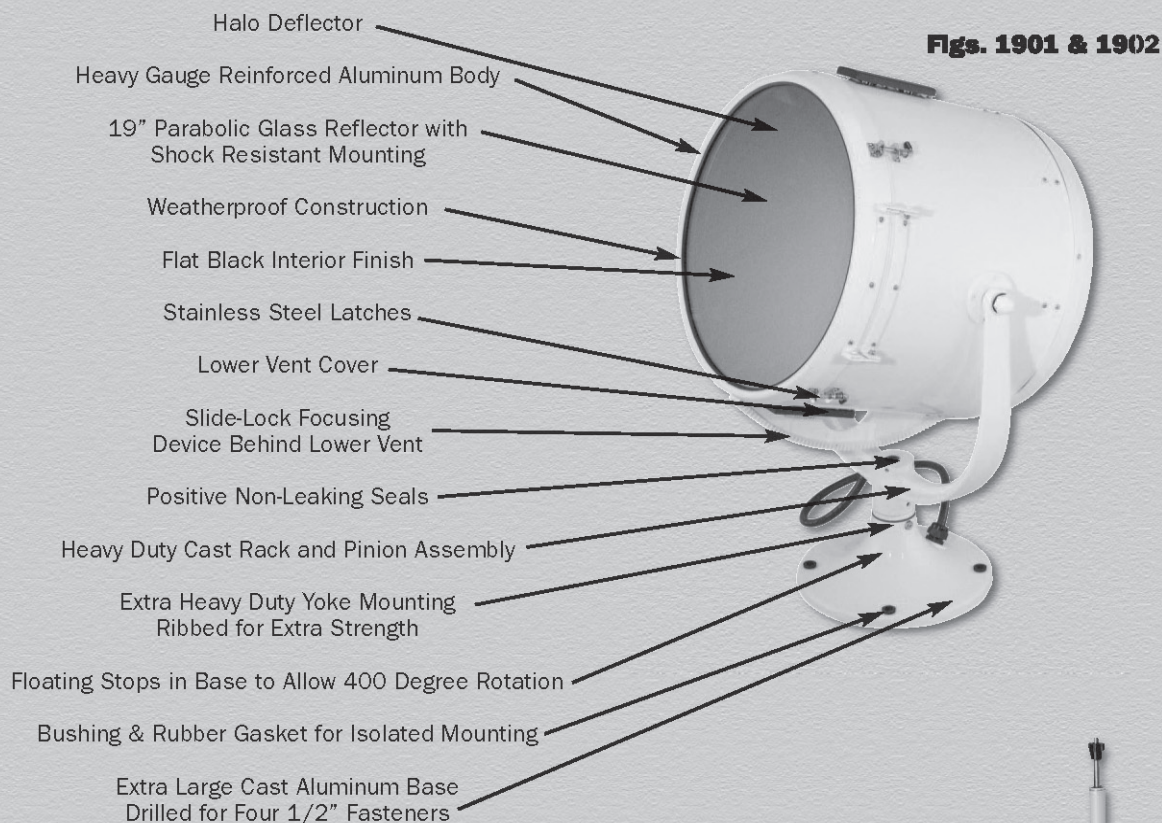


The 1900 Series - Solar-Ray® Searchlights are designed and built with the commercial user in mind where maximum size and brilliance count. These units are constructed of marine aluminum with heavy duty castings and heavy gauge reinforced bodies for extra durability. They are finished in our white PERKO•KOTE finish, an advanced process that eliminates the need for painting while providing a scratch resistant and chip-proof surface for painting when necessary to match the color of the vessel.

The 1900 Series is available with Deck, Wheel, Lever/Gear or Distant Electric Remote Controls. All models feature halo deflectors, parabolic glass mirror reflectors for maximum light output and ventilation covers for quick dissipation of heat to help prolong bulb life. Hinged front doors have quick release stainless steel latches to provide easy access for bulb replacement.

Bulbs are not included and must be ordered separately. PERKO offers a choice of the traditional incandescent or the brighter, more piercing quartz-halogen bulbs in a variety of voltages and wattages. For complete information on bulbs and candlepower output, see page 96.

"1900 Series" High Power Searchlight Features



DECK CONTROL

Equipped with handles on the rear cover for positioning.

WHEEL CONTROL

Turn upper wheel for horizontal position. Turn lower wheel for vertical position.



Fig. 1922

CONTROL TYPES

DISTANT ELECTRIC CONTROL

Joystick type controller with variable speed control for both horizontal and vertical positioning

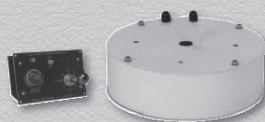


Fig. 1925

LEVER/GEAR CONTROL

Aim handle for horizontal position. Twist handle for vertical position.

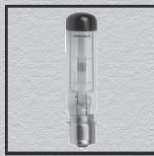


Fig. 1921

19 INCH SOLAR-RAY® SEARCHLIGHT & CONTROL ASSEMBLIES



Lamp



INCANDESCENT

TECH INFO

Nominal Drum
Diameter
Inches

19

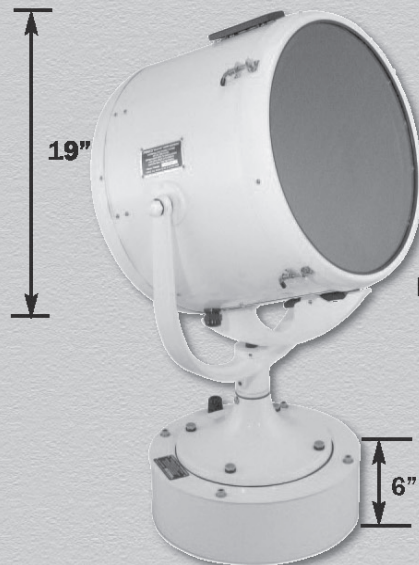
Base
Diameter

13



**Fig. 1902 Light
Shown With Fig. 1922
Wheel Control**

Distance Between Wheels,
2-1/2 Inches.



**Fig. 1902DE4
Light
Shown With
Fig. 1925
Distant
Electric
Control**



**Fig. 1901
Deck Control**



**Fig. 1902 Light
Shown With Fig. 1921
Lever/Gear Control**



**WATER-PROOF
SEAL FOR GEAR MECHANISM**

All Aluminum - White Perko•Kote Finish

ORDERING INFO

Description	Catalog No.	Weights
Deck Control Searchlight Head Assembly*	1901004WHT	76 lbs.
Wheel or Lever/Gear Control Searchlight Head Assembly (Requires Control Assembly Below)	1902004WHT	76 lbs.
Searchlight Head Assembly For Distant Electric Control Base	1902DE4WHT	103 lbs.
Wheel Control Assembly (For Above)	1922000WHT	10.3 lbs.
Lever/Gear Control Assembly (For Above)	1921000WHT	100 lbs.
Distant Electric Control Assembly (For Above)	1925000WHT	50 lbs.

*Cannot Be Fitted With Alternate Controls.

Custom Control Lengths and Pedestal Heights Are Available. Price Upon Application. Specify Measurements.

Bulbs Are Not Included in Lights

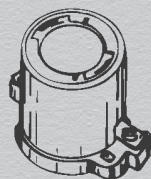
SPARE PARTS FOR 1900 SERIES SOLAR-RAY® SEARCHLIGHTS

Electric Socket and Support Stand Assemblies for 19 Inch Searchlights

Solar-Ray® Searchlights include a socket and support stand based on the bulb or socket information given when ordering. The following chart makes it possible to order and stock different assemblies for field conversion, to meet a large variety of voltage and candlepower requirements with a minimum of inventory.

ORDERING INFO			
Socket Type	Socket Code	Socket & Stand Catalog Number	Height Stand Inches
Medium Screw	B	0872004	5-3/4
Medium Prefocus	E	0873004	5-7/16
Mogul Prefocus (1500 Watt)	L	1930004	3-5/8
Mogul Prefocus (1000 & 2000 Watt)	M	1931004	3-1/8
2-Pin Prefocus (900 Watt)	K	0880004	7-5/16

Replacement Socket Ordering Info For 0800 Series and 1900 Series Solar-Ray® Searchlights



Mogul Prefocus Socket
(Codes "L & M")
Catalog No. 0893



Medium Screw Socket
(Code "B")
Catalog No. 0894

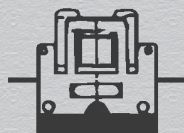


Medium Prefocus Socket
(Code "E")
Catalog No. 0895



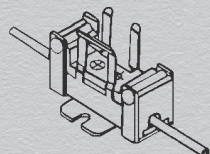
Mogul Screw Socket
(Code "D")
Catalog No. 0897

OLD SOCKET



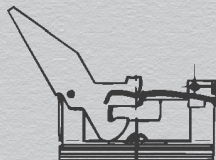
2-Pin Prefocus Socket
(Codes "F, G, H & I"*)
Catalog No. 0899

NEW SOCKET



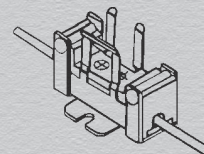
2-Pin Prefocus Socket
(Code "F, G, H, I & K"*)
Catalog No. 0899

OLD SOCKET



2-Pin Prefocus Socket
(Code "K"**)
Catalog No. 0866

NEW SOCKET



2-Pin Prefocus Socket
(Code "K"**)
Catalog No. 0899

*For Use In 10", 12" and 14" Searchlights Except When Catalog No. 0839, 900 Watt Bulb is Used.

**For Use In 12", 14" and 19" Searchlights Only When the Catalog No. 0839, 900 Watt Bulb is Used.

19 INCH SOLAR-RAY® SEARCHLIGHT BULB & SOCKET INFORMATION

Bulb Ordering Information For 19 Inch Searchlights

For best results, the bulb and reflector must be perfectly compatible; therefore be sure to specify the catalog number of the bulb desired. Peak candlepower is exceedingly sensitive to many factors, (i.e., a light source out of focus by 1/32 inch, under-voltage of only 4%, or differences between bulb manufacturers) which can cause a reduction of range of up to 20%. See below. For a more concentrated beam, longer range, brighter light and a longer life, we recommend the Quartz/Halogen bulbs.

Voltage	Approx. Range Miles*	Bulb Catalog Number	Bulb Type	Socket Type	Socket Code Letter	Wattage	Rated Life Hours**	Maximum Candlepower Output	Horizontal Beam Spread Degrees	Vertical Beam Spread Degrees	Mfg. Bulb Code
32	1-2/3	0806	Incandescent	Medium Screw	B	500	50	3,520,000	3.5	3.7	DLT
120	1-5/8	0807	Incandescent	Medium Prefocus	E	500	25	3,191,000	3.5	4.0	CZX
120	1-3/8	0837	Incandescent	Medium Prefocus	E	750	200	2,076,000	3.6	4.2	DDY
120	1-3/4	0809	Incandescent	Medium Prefocus	E	750	25	4,569,000	3.6	4.5	DDB
120	2	0810	Incandescent	Medium Prefocus	E	1000	25	5,622,000	3.6	4.2	DRS
120	1-3/4	0844	Quartz/Halogen	Medium Prefocus	E	500	500	3,861,000	3.0	5.4	BTL
120	1-5/8	0845	Quartz/Halogen	Medium Prefocus	E	750	200	2,871,000	3.6	5.4	BTP
120	2	0839	Quartz/Halogen	2-Pin Prefocus	K	900	75	5,769,000	5.9	5.4	BVA
120	1-2/3	0847	Quartz/Halogen	Mogul Prefocus	M	1000	200	3,659,000	4.5	5.4	BVV
120	1-7/8	0846	Quartz/Halogen	Medium Prefocus	E	1000	200	4,601,000	4.5	5.4	BTR
120	2	0848	Quartz/Halogen	Mogul Prefocus	L	1500	300	5,596,000	5.9	5.7	DTA
120	1-2/3	0859	Quartz/Halogen	Mogul Prefocus	M	2000	250	3,633,000	9.4	5.9	BVW
230	1-3/8	0860	Quartz/Halogen	Medium Prefocus	E	1000	950	2,162,000	7.9	6.5	FKD

*The approximate ranges listed above are based on photometric measurements of beam candlepower output under ideal conditions. Many factors such as atmospheric conditions, size and color of target, background, etc., may reduce effective range considerably; therefore, these figures are offered only as a guide to compare different bulb and voltage options.

Please Order Carefully, Bulbs Are Not Returnable.

****NOTE:** These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing of groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

Spare Parts Ordering Information For 19 Inch Searchlights

ORDERING INFO					
Fig. No.	Front Glass	Front Door with Glass	Rear Cover	Reflector*	Pinion Gear
1901	0889004CLR	1936000WHT	1932000WHT	0890004	---
1902	0889004CLR	1936000WHT	1933000WHT	0890004	0905

*Replacement Retaining Clips (Cat. No. 0911) for the Reflector Should Also Be Ordered When Ordering a Replacement Reflector to Assure a Proper Fit.

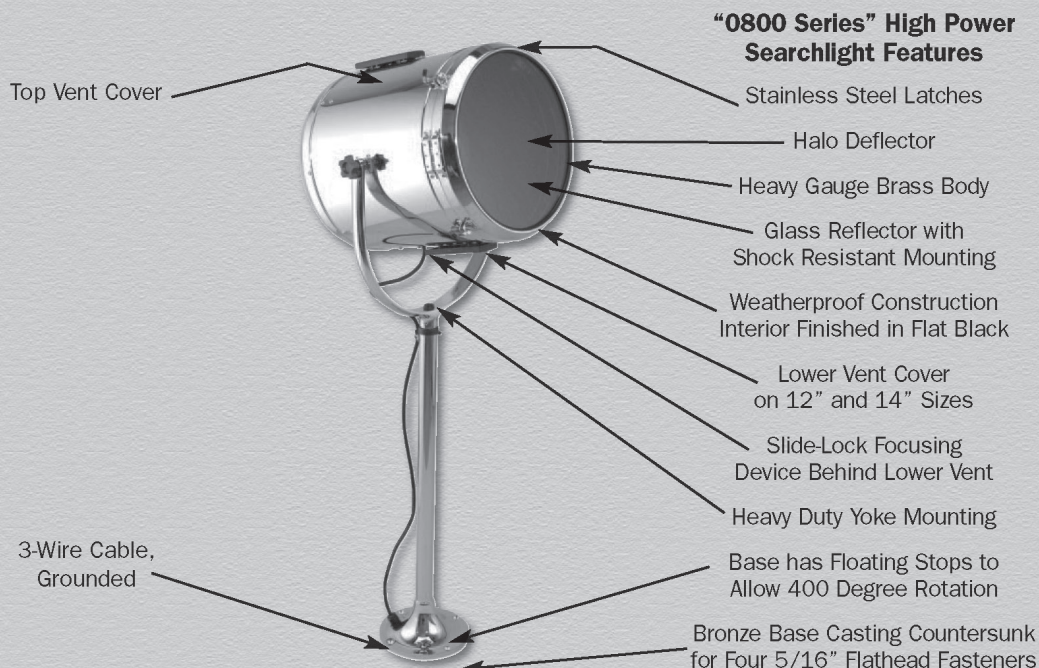
0800 Series 10", 12" or 14"

**Cast Bronze and Heavy Gauge Brass
Polished Chrome or White Perko•Kote Finish
12, 24, 32, 120 or 230 Volts**



The 0800 Series - Solar-Ray® Searchlights are available in 10", 12" and 14" sizes with your choice of Deck, Wheel, Lever/Gear Controls or DEC on 14 inch model. All models feature: halo deflectors, parabolic glass mirror reflectors for maximum light output and ventilation covers for quick dissipation of heat to help prolong bulb life. Hinged front doors have quick release stainless steel latches to provide easy access for bulb replacement. The 0800 Series models are also available in our white PERKO•KOTE finish, an advanced powder coating process that eliminates the need for painting while providing a scratch resistant and chip-proof surface for painting when necessary to match the color of the vessel.

Bulbs are not included and must be ordered separately. PERKO offers a choice of the traditional incandescent or the brighter, more piercing quartz-halogen bulbs in a variety of voltages and wattages to fit every need. For complete information on bulbs and candlepower output, see pages 106 & 107.



BULBS ARE NOT INCLUDED IN LIGHTS.

CONTROL TYPES

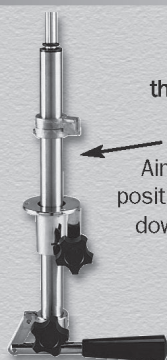


Fig. 0851

DECK CONTROL

Equipped with handles on the rear cover for positioning.

LEVER CONTROL

Aim handle for horizontal position. Move handle up and down for vertical position.



WHEEL CONTROL

Turn upper wheel for horizontal position. Turn lower wheel for vertical position.

LEVER/GEAR CONTROL

Aim handle for horizontal position. Twist handle for vertical position.

DISTANT ELECTRIC CONTROL

Joystick type controller for both horizontal & vertical positioning (Only Available on the 0887)



Fig. 0852

Fig. 0969

0883 Series Deck Control Solar-Ray® Searchlights

10", 12" or 14"



TECH INFO

"A" Nominal
Drum Diameter
Inches

10

12

14

"C" Length
Drum
Inches

13

15

17

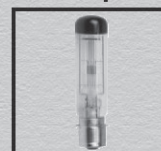
Approx. Ship
Weight
Pounds

28

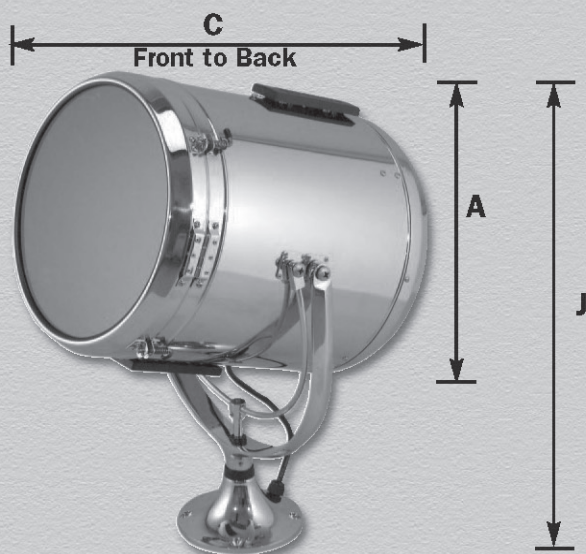
38

45

Lamp



Incandescent



**Fig. 0883 - Standard Pedestal
Chrome**



**Fig. 0883 - Medium Pedestal
White**



**Fig. 0883 - High Pedestal
Chrome**

- A - Nominal drum diameter
- C - Drum length
- J - Overall height from mounting surface to top of searchlight

Bulbs Are Not Included in Lights

0883 Series Deck Control Solar-Ray® Searchlights**10", 12" or 14"****Ordering Info**

- NOTES: 1) These Searchlights Cannot Be Fitted With Controls.
2) Bulbs Must be Ordered Separately.

ORDERING INFO - STANDARD PEDESTAL

Nominal Reflector Size Inches	"J" Height Overall Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	20-1/8	08830P1CHR	08830P1WHT
12	22-1/8	08830P2CHR	08830P2WHT
14	25-1/8	08830P3CHR	08830P3WHT

Standard Pedestal Base Diameter, 7 Inches

ORDERING INFO - MEDIUM PEDESTAL

Nominal Reflector Size Inches	"J" Height Overall Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	27-1/2	0883MP1CHR	0883MP1WHT
12	29-1/2	0883MP2CHR	0883MP2WHT
14	32-1/2	0883MP3CHR	0883MP3WHT

Medium Pedestal Base Diameter, 8 Inches

ORDERING INFO - HIGH PEDESTAL

Nominal Reflector Size Inches	"J" Height Overall Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	44	0883HP1CHR	0883HP1WHT
12	46	0883HP2CHR	0883HP2WHT
14	49	0883HP3CHR	0883HP3WHT

High Pedestal Base Diameter, 8 Inches

NOTE: Custom Pedestal Heights are Available.
Price Upon Application.
Specify the "J" Dimension for Custom Pedestal Height.

High Pedestal White**Med. Pedestal White****Std. Pedestal White****Std. Pedestal Chrome****Med. Pedestal Chrome****High Pedestal Chrome**



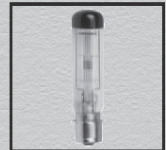
0884 Series Lever Control Solar-Ray® Searchlights

10", 12" and 14"

TECH INFO

"A" Nominal Drum Diameter <u>Inches</u>	"C" Length Drum <u>Inches</u>	Approx. Ship Weight <u>Pounds</u>
10	13	28
12	15	38
14	17	45

Lamp



Incandescent

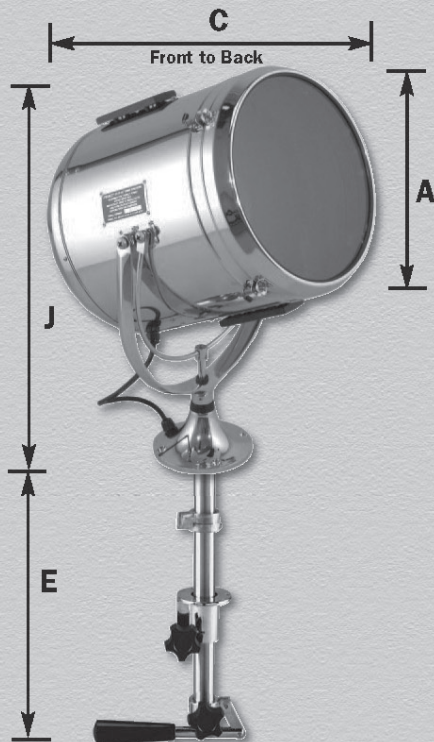


Fig. 0884
Standard Pedestal
Chrome

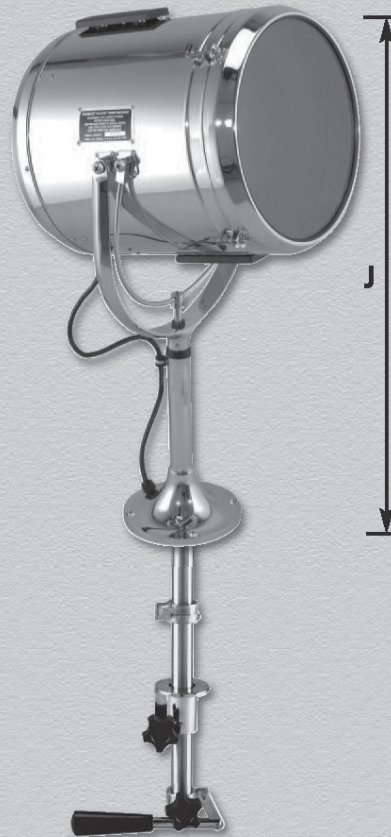


Fig. 0884
Medium Pedestal
Chrome

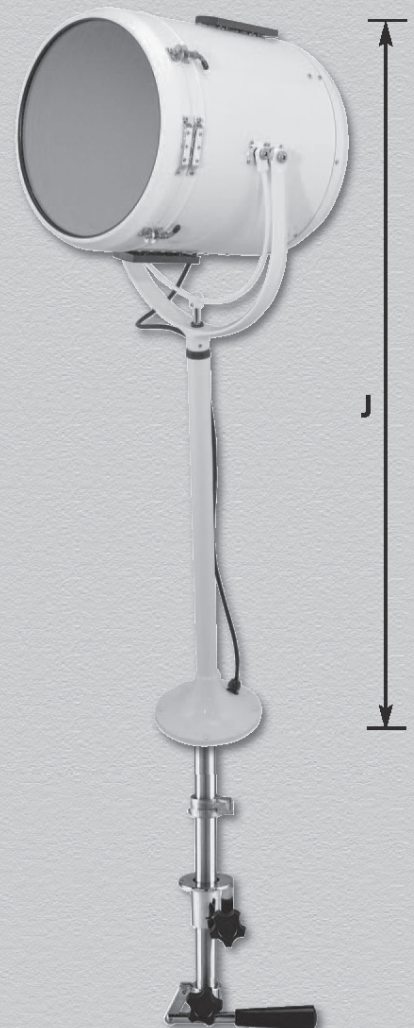


Fig. 0884
High Pedestal
White

- A - Nominal drum diameter
- C - Drum length
- J - Overall height from mounting surface to top of searchlight
- E - Control length

Bulbs Are Not Included in Lights

LEVER CONTROL SOLAR-RAY® SEARCHLIGHT HEAD ASSEMBLIES

0884 Series Lever Control Solar-Ray® Searchlights 10", 12" and 14" Ordering Info

Notes: 1) Bulbs Must be Ordered Separately

ORDERING INFO - STANDARD PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	20-1/8	08840P1CHR	08840P1WHT
12	22-1/8	08840P2CHR	08840P2WHT
14	25-1/8	08840P3CHR	08840P3WHT

Standard Pedestal Base Diameter, 7 Inches

ORDERING INFO - MEDIUM PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	28-1/4	0884MP1CHR	0884MP1WHT
12	30-1/4	0884MP2CHR	0884MP2WHT
14	33-1/4	0884MP3CHR	0884MP3WHT

Medium Pedestal Base Diameter, 8 Inches

ORDERING INFO - HIGH PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	44-3/4	0884HP1CHR	0884HP1WHT
12	46-3/4	0884HP2CHR	0884HP2WHT
14	49-3/4	0884HP3CHR	0884HP3WHT

High Pedestal Base Diameter, 8 Inches

High Pedestal White



Med. Pedestal White



Std. Pedestal White



Std. Pedestal Chrome



Med. Pedestal Chrome



High Pedestal Chrome



NOTE: Custom Pedestal Heights are Available. Price Upon Application.
Specify the "J" Dimension for Custom Pedestal Height.

Fig. 0851 - Lever Control Assemblies

Control assemblies of different lengths may be interchanged on Solar-Ray® searchlights (Fig. 0884) of the same pedestal height. The following chart makes it possible to order and stock different lengths of these assemblies separately to offer a large variety of Solar-Ray® searchlights with a minimum of inventory. Custom Control Lengths are Available. Price Upon Application. Specify the "E" Dimension for Custom Control Lengths.

ORDERING INFO

"E" Length Control Inches	0 For Standard Pedestal	M For Medium Pedestal	H For High Pedestal Cat. No.	Approx. Ship Weight Lbs. 0/M/H
8-1/2	0851000*	0851M00*	0851H00*	3.4/4.3/6.1
15-1/2	08510A0	0851MA0	0851HA0	4.1/4.9/6.3
22-1/2	08510B0	0851MB0	0851HB0	5.0/5.8/6.9
29-1/2	08510C0	0851MC0	0851HC0	5.8/6.6/8.5

* Maximum Ceiling Thickness, 4-1/2 Inches

WHEEL OR LEVER/GEAR CONTROL SOLAR-RAY® SEARCHLIGHTS

0885 Series Wheel or Lever/Gear Control Solar-Ray® Searchlights

10", 12" and 14"



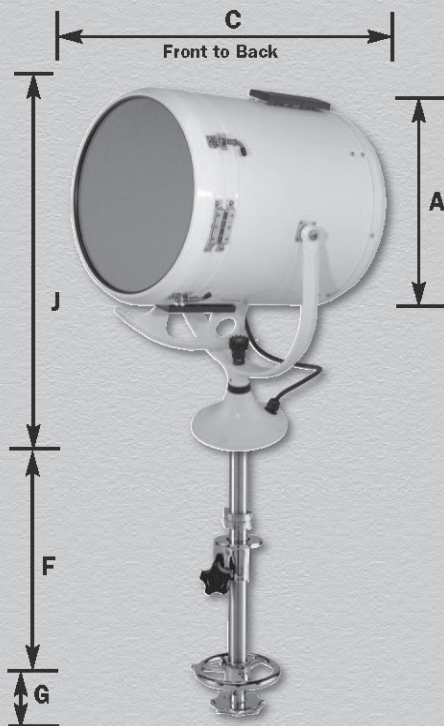
TECH INFO

"A" Nominal Drum Diameter <u>Inches</u>	"C" Length Drum <u>Inches</u>	Nominal Weight <u>Pounds</u>
10	13	28
12	15	38
14	17	45

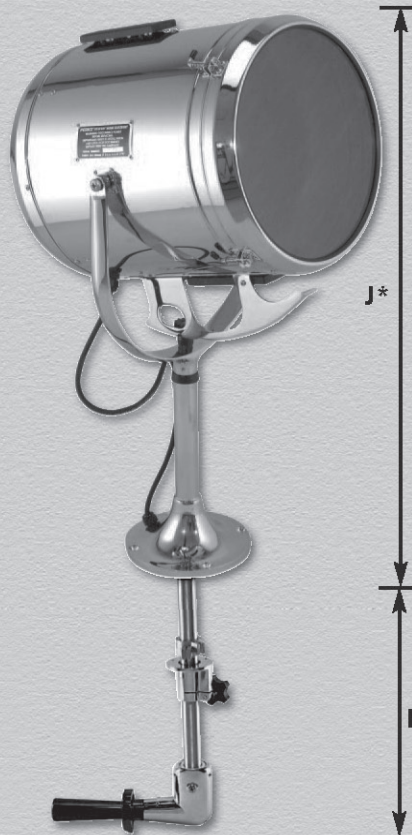
Lamp



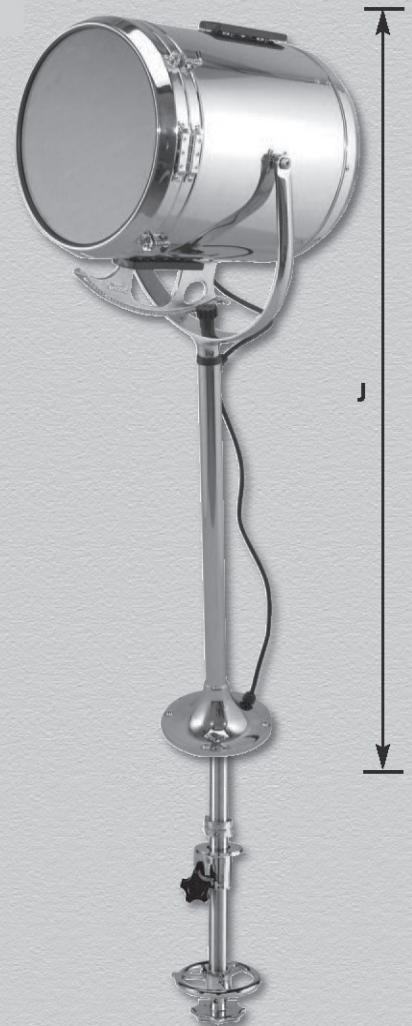
Incandescent



**Fig. 0885 White
Standard Pedestal
Shown With Wheel Control**



**Fig. 0885 Chrome
Medium Pedestal
Shown With
Lever/Gear Control**



**Fig. 0885 Chrome
High Pedestal
Shown With Wheel Control**

- A - Nominal drum diameter
- C - Drum length
- E - Control length (lever/gear control)
- F - Control length (wheel control)
- G - Distance between wheels, 2 inches.
- J - Overall height from mounting surface to top of searchlight

Bulbs Are Not Included in Lights

WHEEL OR LEVER/GEAR CONTROL SOLAR-RAY® SEARCHLIGHT HEAD ASSEMBLIES

0885 Series Wheel or Lever/Gear Control Solar-Ray® Searchlights 10", 12" and 14" Ordering Info

Notes: Bulbs Must be Ordered Separately,

ORDERING INFO - STANDARD PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	20-1/8	08850P1CHR	08850P1WHT
12	22-1/8	08850P2CHR	08850P2WHT
14	25-1/8	08850P3CHR	08850P3WHT

Standard Pedestal Base Diameter, 7 Inches

ORDERING INFO - MEDIUM PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	28-1/4	0885MP1CHR	0885MP1WHT
12	30-1/4	0885MP2CHR	0885MP2WHT
14	33-1/4	0885MP3CHR	0885MP3WHT

Medium Pedestal Base Diameter, 8 Inches

ORDERING INFO - HIGH PEDESTAL HEAD ASSEMBLIES

Nominal Reflector Size Inches	"J" Height Inches	Polished Chrome Catalog No.	White PERKO•KOTE Catalog No.
10	44-3/4	0885HP1CHR	0885HP1WHT
12	46-3/4	0885HP2CHR	0885HP2WHT
14	49-3/4	0885HP3CHR	0885HP3WHT

High Pedestal Base Diameter, 8 Inches

High
Pedestal
White



Med. Pedestal
White



Std. Pedestal
White



Std. Pedestal
Chrome



Med. Pedestal
Chrome



High
Pedestal
Chrome



NOTE: Custom Pedestal Heights are Available. Price Upon Application. Specify the "J" Dimension for Custom Pedestal Height.

Control Assemblies - Figs. 0852 & 0969

Control assemblies of different lengths may be interchanged on Solar-Ray® searchlights (Fig. 0885) of the same pedestal height. The following chart makes it possible to order and stock different lengths of these assemblies separately to offer a large variety of Solar-Ray® Searchlights with a minimum of inventory.

ORDERING INFO WHEEL CONTROL - FIG. 0852

"F" Length Control Inches	0 For Standard Pedestal	M For Medium Pedestal	H For High Pedestal	Nominal Wt. Lbs. 0/M/H
7-1/2	0852000*	0852M00*	0852H00*	4.1/5.0/7.0
14-1/2	08520A0	0852MA0	0852HA0	4.9/5.7/7.6
21-1/2	08520B0	0852MB0	0852HB0	5.8/6.5/8.5
28-1/2	08520C0	0852MC0	0852HC0	6.5/7.3/9.2

*Maximum Ceiling Thickness, 3 Inches

ORDERING INFO LEVER/GEAR CONTROL - FIG. 0969

"E" Length Control Inches	0 For Standard Pedestal	M For Medium Pedestal	H For High Pedestal	Nominal Wt. Lbs. 0/M/H
8-1/2	0969000*	0969M00*	0969H00*	5.2/6.1/7.8
15-1/2	09690A0	0969MA0	0969HA0	6.0/6.6/8.5
22-1/2	09690B0	0969MB0	0969HB0	6.9/7.6/9.4
29-1/2	09690C0	0969MC0	0969HC0	7.6/8.3/10.2

*Maximum Ceiling Thickness, 3-1/2 Inches

NOTE: Custom Control Lengths are Available. Price Upon Application. Specify the "E" or "F" Dimension for Custom Control Lengths.



0887 Series for 12, 24 & 120 Volt

TECH INFO

Nominal Drum Diameter <u>Inches</u>	Length Drum <u>Inches</u>	Gross Shipping Weight <u>Pounds</u>
14	17	68

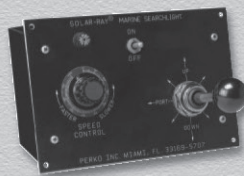
Lamp



Incandescent

Distant Electric Control

Joystick type controller
with variable speed control
for both horizontal &
vertical positioning



**Fig. 0887 - Standard Pedestal
With DEC Base**

All Aluminum - White Perko•Kote Finish

ORDERING INFO

Description	Catalog No.
Searchlight Head Assembly w/ Distant Electric Control Base - 12 Volt	0887EA3WHT
Searchlight Head Assembly w/ Distant Electric Control Base - 24 Volt	0887EB3WHT
Searchlight Head Assembly w/ Distant Electric Control Base - 120 Volt	0887EC3WHT

Bulbs Are Not Included in Lights

SOLAR-RAY® SEARCHLIGHT ORDERING WORKSHEET

0800 Series

1) **Head Assembly Type:** _____

a) For deck control - 0883
b) For lever control - 0884
c) For wheel and lever/gear control - 0885

2) **Pedestal (overall) Height (see catalog page for details):** _____

a) Standard - O
b) Medium - M
c) High - H
For custom pedestal height see no. 10 below.

3) **Reflector Size:** _____

a) 10 inch - 1
b) 12 inch - 2
c) 14 inch - 3

4) **Finish:** _____

a) PERKOPLATE (polished chrome) - CHR
b) PERKO•KOTE (white) - WHT

5) **Control Type:** _____

a) Lever control (For 0884 Head Assembly) - 0851
b) Wheel control (For 0885 Head Assembly) - 0852
c) Lever/Gear control (For 0885 Head Assembly) - 0969

6) **Control Length (when necessary):** _____

a) (8-1/2" for 0851 & 0969) or (7-1/2" for 0852) - O
b) (15-1/2" for 0851 & 0969) or (14-1/2" for 0852) - A
c) (22-1/2" for 0851 & 0969) or (21-1/2" for 0852) - B
d) (29-1/2" for 0851 & 0969) or (28-1/2" for 0852) - C

7) **Bulb Number (see pages 106 & 107 for details):** _____

8) **Socket Type:** _____ Code: _____

a) Medium Screw "B"
b) Medium Prefocus "E"
c) Mogul Screw "D" (Not for use with 10 inch reflector.)
d) 2-Pin Prefocus (12 volt) "F"
e) 2-Pin Prefocus (24 volt) "G"
f) 2-Pin Prefocus (32 volt) "H"
g) 2-Pin Prefocus (600 Watt) "I"
h) 2-Pin Prefocus (900 watt) "K"

9) **Custom control length:** _____
Specify control length desired as measured from pedestal base to lower end of control assembly ("E" or "F" dimension).

10) **Custom pedestal height:** _____
Specify overall height of searchlight desired as measured from the top of the searchlight head to the bottom of the pedestal base ("J" dimension).

Head Assembly Cat. No. _____ **P** _____

Control Assembly Cat. No. _____ **0** _____

Bulb Cat. No. _____

Socket Code _____

See
www.perko.com
for interactive
Searchlight
Ordering Guide

Spare Parts Ordering Info for 0800 Series Solar-Ray® Searchlights

Fig.	Size	Front Glass Cat. No.	Front Door with Glass Cat. No. *	Rear Cover Cat. No. *	Reflector** Cat. No.	Pinion Gear Cat. No.
0883	10"	0889001CLR	0891001CHR	0908001CHR	0890001	---
	12"	0889002CLR	0891002CHR	0908002CHR	0890002	---
	14"	0889003CLR	0891003CHR	0908003CHR	0890003	---
0884	10"	0889001CLR	0891001CHR	0902001CHR	0890001	---
	12"	0889002CLR	0891002CHR	0902002CHR	0890002	---
	14"	0889003CLR	0891003CHR	0902003CHR	0890003	---
0885	10"	0889001CLR	0891001CHR	0902001CHR	0890001	0905
	12"	0889002CLR	0891002CHR	0902002CHR	0890002	0905
	14"	0889003CLR	0891003CHR	0902003CHR	0890003	0905

* NOTE: The Spare Part catalog numbers listed above are for the polished chrome (CHR) finish.

To order white finish, replace the "CHR" in the catalog number with the "WHT" finish code.

**Replacement Retaining Clips (Cat. No. 0910) For The Reflector Should Also Be Ordered When Ordering a Replacement Reflector To Assure a Proper Fit.

BULB TECHNICAL DATA FOR SOLAR-RAY® SEARCHLIGHTS

0800 Series Bulbs

The Following Chart is Provided to Aid in Proper Bulb Selection:

Searchlight Size Inches	Voltage	Approximate Range Miles*	Bulb Catalog Number	Bulb Wattage	Rated Life Hours**	Maximum Candlepower Output	Horizontal Beam Spread Degrees	Vertical Beam Spread Degrees
10"	12	1	0816	100	50	1,168,000	1.7	1.4
	24	1	0836	150	50	891,000	2.6	1.5
	32	3/4	0817	200	200	571,000	2.6	1.7
	32	1	0806	500	50	943,000	3.4	3.9
	120	1	0820	600	75	908,000	4.4	2.2
	120	1-1/8	0807	500	25	1,332,000	3.5	2.8
	120	1-1/8	0844	500	500	1,260,000	3.1	3.4
12"	12	1-1/4	0816	100	50	1,617,000	1.5	1.2
	24	1-1/8	0836	150	50	1,349,000	2.2	1.5
	32	7/8	0817	200	200	865,000	2.4	1.6
	32	1-1/8	0806	500	50	1,496,000	3.4	3.5
	120	1	0837	750	200	977,000	4.1	3.7
	120	1	0845	750	200	1,185,000	3.7	5.2
	120	1-1/8	0820	600	75	1,410,000	4.3	1.9
	120	1-1/4	0809	750	25	1,792,000	3.6	3.4
	120	1-1/4	0844	500	500	1,641,000	3.2	3.4
	120	1-1/4	0807	500	25	1,799,000	3.3	3.1
	120	1-1/4	0811	1000	50	1,816,000	4.0	4.9
	120	1-3/8	0810	1000	25	1,894,000	4.0	3.8
	120	1-3/8	0846	1000	200	1,911,000	3.9	5.0
	120	1-1/2	0839	900	75	2,482,000	4.5	5.5
	230	7/8	0860	1000	950	865,000	6.9	5.9
14"	12	1-1/4	0816	100	50	1,756,000	1.5	1.0
	24	1-1/8	0836	150	50	1,367,000	2.3	1.2
	32	1	0817	200	200	943,000	2.2	1.5
	32	1-1/8	0806	500	50	1,591,000	4.0	3.7
	120	1-1/8	0837	750	200	1,254,000	3.9	4.5
	120	1-1/8	0845	750	200	1,531,000	3.6	5.1
	120	1-1/4	0820	600	75	1,626,000	4.5	1.9
	120	1-3/8	0844	500	500	1,840,000	2.9	3.2
	120	1-3/8	0811	1000	50	2,249,000	4.0	5.1
	120	1-1/2	0807	500	25	2,353,000	3.2	3.2
	120	1-1/2	0809	750	25	2,422,000	3.7	4.0
	120	1-1/2	0846	1000	200	2,586,000	3.8	5.0
	120	1-1/2	0810	1000	25	2,621,000	4.0	4.5
	120	1-5/8	0839	900	75	2,889,000	4.5	5.2
	230	1	0860	1000	950	1,021,000	7.7	6.2

*The approximate ranges listed above are based on photometric measurements of beam candlepower output under ideal conditions. Many factors such as atmospheric conditions, size and color of target, background, etc., may reduce effective range considerably; therefore, these figures are offered only as a guide to compare different bulb and voltage options.

**NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing of groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.



2-PIN PREFOCUS



MOGUL SCREW



MEDIUM PREFOCUS



MEDIUM SCREW

BULB AND SOCKET ORDERING INFORMATION FOR SOLAR-RAY® SEARCHLIGHTS

0800 Series Bulbs

Bulbs Are Not Included in Lights and Must Be Ordered Separately.

For best results, the bulb and reflector must be perfectly compatible; therefore, be sure to specify the catalog number of the bulb desired. Peak candlepower is exceedingly sensitive to many factors, (i.e., a light source out of focus by 1/32 inch, under-voltage of only 4%, or differences between bulb manufacturers) which can cause a variation in range of up to 20%.

INCANDESCENT BULB ORDERING INFO

Bulb Catalog Number	Voltage	Wattage	Socket Type	Socket Code Letter	For Searchlight Sizes Inches	Rated* Life Hours	Mfg. Bulb Code
0806	32	500	Medium Screw	B	10, 12, 14	50	DLT
0807	120	500	Medium Prefocus	E	10, 12, 14	25	CZX/DAB
0809	120	750	Medium Prefocus	E	12, 14	25	DDB
0837	120	750	Medium Prefocus	E	12, 14	200	DGH
0810	120	1000	Medium Prefocus	E	12, 14	25	DRS
0811	120	1000	Mogul Screw	D	12, 14	50	DPT

For a More Concentrated Beam, Longer Range, Brighter Light and a Longer Life, We Recommend the Following Bulbs:

"QUARTZ" TUNGSTEN-HALOGEN BULB ORDERING INFO

Bulb Catalog Number	Voltage	Wattage	Socket Type	Socket Code Letter	For Searchlight Sizes Inches	Rated* Life Hours	Mfg. Bulb Code
0816	12	100	2-Pin Prefocus	F	10, 12, 14	50	FDT
0836	24	150	2-Pin Prefocus	G	10, 12, 14	50	DZE-FDS
0817	32	200	2-Pin Prefocus	H	10, 12, 14	200	1945
0844	120	500	Medium Prefocus	E	10, 12, 14	500	BTL
0820	120	600	2-Pin Prefocus	I	10, 12, 14	75	DYS
0845	120	750	Medium Prefocus	E	12, 14	200	BTP
0839	120	900	2-Pin Prefocus	K	12, 14	75	BVA
0846	120	1000	Medium Prefocus	E	12, 14	200	BTR
0860	230	1000	Medium Prefocus	E	12, 14	950	FKD

Please Order Carefully, Bulbs are Not Returnable.

*NOTE: These are the "Rated Average Laboratory Life in Hours" of the Bulb Manufacturer obtained in closely controlled laboratory life testing groups of lamps at their design voltage. It is not necessarily the same as the service life where conditions such as shock, vibration, voltage fluctuation and environment may result in a shorter average attained life.

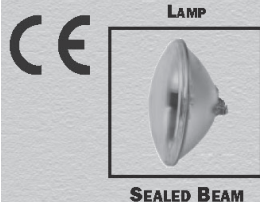
Electric Socket and Support Stand Assemblies

Solar-Ray® Searchlights include a socket and support stand assembly based on the bulb or socket information given when ordering. The following chart makes it possible to order and stock different socket and stand assemblies for field conversion to meet a large variety of voltage and candlepower requirements with a minimum of inventory.

ORDERING INFO

Socket Type (See Page 95 for Drawing)	Socket Code	For 10" Searchlights		For 12" Searchlights		For 14" Searchlights	
		Catalog Number	Height Stand Inches	Catalog Number	Height Stand Inches	Catalog Number	Height Stand Inches
Medium Screw	B	0872001	1-1/4	0872002	2-1/4	0872003	3-1/4
Medium Prefocus	E	0873001	1-5/16	0873002	1-15/16	0873003	2-15/16
Mogul Screw	D	----	---	0874002	7/16	0874003	1-1/4
2-Pin Prefocus (12 Volt)	F	0875001	3-1/2	0875002	4-1/2	0875003	5-1/2
2-Pin Prefocus (24 Volt)	G	0876001	3-1/4	0876002	4-1/4	0876003	5-1/4
2-Pin Prefocus (32 Volt)	H	0878001	3-1/4	0878002	4-1/4	0878003	5-1/4
2-Pin Prefocus (600 Watt)	I	0879001	3-1/8	0879002	4-1/8	0879003	5-1/8
2-Pin Prefocus (900 Watt)	K	----	---	0880002	3-13/16	0880003	4-13/16

PILOT HOUSE CONTROL SEALED BEAM SEARCHLIGHT®


Fig. 0314 - Pilot House Control Searchlight
CONSTRUCTION:

- Chrome Plated or White PERKO•KOTE Powder Coated Brass
 - Corrosion Resistant, Splash Proof Construction
 - 7 & 8 Inch Sealed Beam Units Included
 - Tin Plated Electrical Contacts and Wiring
 - Lever Action, Pilot House Control
 - 380° Horizontal Movement, 70° Vertical Movement
 - Lever Handle Controls both Horizontal and Vertical Movement
 - For Ceiling Thicknesses of up to 5"
 - For 12, 24 or 32 Volts


ORDERING & TECH INFO

Overall Length	Voltage	Approx. Range Miles	Beam Candle Power	Wattage	Chrome Catalog Number	White Catalog Number	Ship Wt. Carton Lbs. Std. Pkg.
7 Inch Head							
24	12	5/8	250,000	100	0314C0712V	0314W0712V	13.1
24	24	3/4	470,000	450	0314C0724V	0314W0724V	13.1
24	32	5/8	260,000	200	0314C0732V	0314W0732V	13.1
8 Inch Head							
26	12	3/4	500,000	250	0314C0812V	0314W0812V	13.4
26	24	3/4	500,000	600	0314C0824V	0314W0824V	13.4
26	32	3/4	500,000	600	0314C0832V	0314W0832V	13.4

Replacement Sealed Beam Information
7 Inch Head

12 Volt: 043300312V

24 Volt: 043300324V

32 Volt: 043300332V

8 Inch Head

12 Volt: 043300412V

24 Volt: 043300424V

32 Volt: Order 24V Sealed Beam. If converting from another voltage, order Internal Dropping Resistor (0314R3299A) in addition to the bulb.

SOLAR-RAY® SEALED BEAM SEARCHLIGHTS

Figs. 0305 & 0313 Series

- Bronze Base, Brass Body
- Chrome Plated or White PERKO•KOTE Powder Coating
- For 12, 24 or 32 Volts

Dimensions (Inches)

A	B	C	D	G	H
8	8-1/2	10	7	2	2-1/8

TECH INFO

Voltage	Wattage	Approximate Candlepower	Sealed Beam Range Miles	Sealed Beam Catalog No.
12	100	250,000	5/8	043300312V
24	450	470,000	3/4	043300324V
32	200	260,000	5/8	043300332V

ORDERING INFO - FIGS. 0305 & 0313 SEARCHLIGHT HEADS

Voltage	Head Only Chrome Plated For Lever Control	Head Only White PERKO•KOTE For Lever Control	Head Only Chrome Plated For Wheel or Lever/Gear Control	Head Only White PERKO•KOTE For Wheel or Lever/Gear Control
12	0305H12CHR	0305H12WHT	0313H12CHR	0313H12WHT
24	0305H24CHR	0305H24WHT	0313H24CHR	0313H24WHT
32	0305H32CHR	0305H32WHT	0313H32CHR	0313H32WHT

Nominal Weight - 20 lbs.

Fig. 0354 Front Bezel with Glass for Figs. 0305 & 0313, Specify Chrome or White.

Fig. 0355 Rear Cover for Figs. 0305 & 0313, Specify Chrome or White.

Figs. 0851, 0852 & 0969 - Control Assemblies

- Stainless Steel Tubes with Chrome Plated Fittings
- Lever Control Fits Fig. 0305 Head Assemblies.
- Wheel and Lever/Gear Controls Fit Fig. 0313 Head Assemblies.

ORDERING & TECH INFO

Control Length Inches		"E" Lever Control For 0805	"E" Lever/Gear Control For 0313	"F" Wheel Control For 0313	Nominal Weight Pounds E/E/F
"E"	"F"				
8-1/2	7-1/2	0851000*	0969000**	0852000***	3.4/4.1/5.2
15-1/2	14-1/2	08510A0	09690A0	08520A0	4.1/4.9/6.0
22-1/2	21-1/2	08510B0	09690B0	08520B0	5.0/5.8/6.9
29-1/2	28-1/2	08510C0	09690C0	08520C0	5.8/6.5/7.6

Maximum Ceiling Thickness,

*0851: 4-1/2 Inches.

**0969: 3-1/2 Inches.

***0852: 3 Inches.

Custom Lengths Available by Special Order.

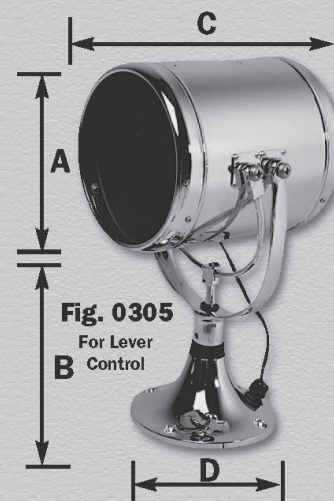
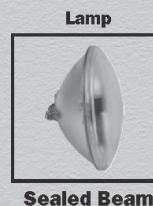


Fig. 0305
For Lever Control



Fig. 0313
For Wheel or
Lever/Gear Control



Fig. 0969
Lever/Gear Control
Fits 0313 Head

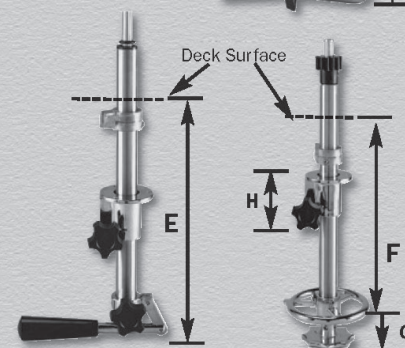


Fig. 0851
Lever Control
Fits 0305 Head

Fig. 0852
Wheel Control
Fits 0313 Head

SOLAR-RAY® SEALED BEAM SEARCHLIGHTS

CE



Fig. 0538



Sealed Beam Included



Fig. 0535



Fig. 0534

Figs. 0534, 0535 & 0538 - Searchlights

CONSTRUCTION:

- Chrome Plated Brass Head
 - For 12, 24 or 32 Volts
- Tungsten or Halogen Bulb
 - Switch in Head

Fig. 0534 - Deck Control

- Chrome Plated Bronze Base
- 7 Inch Sealed Beam Bulb Included

Fig. 0535 - Pilot House Control

- Chrome Plated Bronze Base
- 7 Inch Sealed Beam Bulb Included
- Lever Handle Controls both Horizontal and Vertical Movement
 - Control Length: 7-1/2 Inches
- Maximum Ceiling Thickness: 4-1/2 Inches

Fig. 0538 - Deck Control

- Chrome Plated Brass Base
- 4-1/2 Inch Sealed Beam Bulb Included

ORDERING & TECH INFO

Voltage	O.D. Bulb Inches	Approx. Range Miles	Beam Candlepower	Wattage	Height Overall Inches	Base Dimension Inches	Catalog Number	Ship Wt. Carton Lbs. Std Pkg.
12	7	5/8	250,000	100	12-1/2	4-7/8 x 3-1/8	053400312V	9.0
24	7	3/4	470,000	450	12-1/2	4-7/8 x 3-1/8	053400324V	9.0
32	7	5/8	260,000	200	12-1/2	4-7/8 x 3-1/8	053400332V	9.0
12	7	5/8	250,000	100	—	4-7/8 x 3-1/8	053500312V	9.0
24	7	3/4	470,000	450	—	4-7/8 x 3-1/8	053500324V	9.0
32	7	5/8	260,000	200	—	4-7/8 x 3-1/8	053500332V	9.0
12	4-1/2	1/4	50,000	30	7-1/2	3-1/2 O.D.	0538000CHR	1.5
12	4-1/2	1/3	100,000	50	7-1/2	3-1/2 O.D.	0538H00CHR*	1.5

*NOTE: "H" in the Catalog Number Designates a Halogen Bulb.

CE



Fig. 0440
No. 3
Shown



Sealed Beam Included

Fig. 0440 - Removable Hand Held Deck Control Searchlight

CONSTRUCTION:

- Chrome Plated Brass Head and Base
 - For 12 or 32 Volts
- 4-1/2 or 7 Inch Sealed Beam Bulb Included
- 8 Feet of Coiled Cord & Cigarette Lighter Plug
 - Watertight Deck Connection
 - Switch in Head

ORDERING & TECH INFO

Voltage	O.D. Bulb Inches	Approx. Range Miles	Beam Candlepower	Wattage	Height Overall Inches	Catalog Number	Ship Wt. Carton Lbs. Std Pkg.
12	4-1/2	1/4	50,000	30	7-1/2	044000112V	2.4
12	4-1/2	1/3	100,000	50	7-1/2	0440H0112V*	2.4
12	7	5/8	250,000	100	10	044000312V	5.5
32	7	5/8	260,000	200	10	044000332V	5.5

Base Diameter, 2-1/8 Inches.

*NOTE: "H" in the Catalog Number Designates a Halogen Bulb.

SPARE SEALED BEAM ORDERING INFORMATION

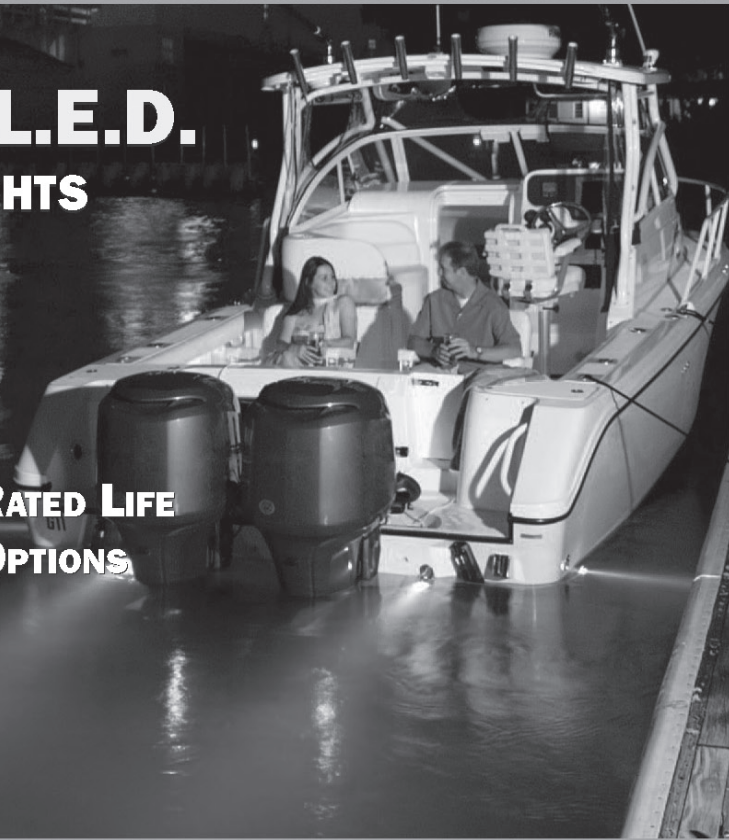
4-1/2 Inch Sealed Beam: 043300112V. 7 Inch Sealed Beam (12 Volt): 043300312V.
 4-1/2 Inch Halogen Sealed Beam: 043500112V. 7 Inch Sealed Beam (24 Volt): 043300324V.
 7 Inch Sealed Beam (32 Volt): 043300332V.

Replacement Base: 0494000CHR

SURFACE MOUNT L.E.D. UNDERWATER LIGHTS



- **EASY INSTALLATION**
- **50,000 HOUR. L.E.D. RATED LIFE**
- **BLUE OR WHITE L.E.D. OPTIONS**
- **SINGLE OR DOUBLE PACK**



TRADITIONAL THRU-HULL MOUNT UNDERWATER LIGHTS

- **CHROME OR PLAIN BRONZE**
- **INCANDESCENT OR L.E.D.**
- **LARGE LIGHTS FOR LARGE BOATS**
- **SMALL LIGHTS FOR SMALL BOATS**
- **CHANGEABLE BEAM & COLOR
OPTIONS**
- **IGNITION PROTECTED**



UNDERWATER LIGHTING - L.E.D. SURFACE MOUNT FOR TRIM TABS



Fig. 0178 - L.E.D. Surface Mount Trim Tab Underwater Light

CONSTRUCTION:

- Non-Corrosive Molded Black Polymer Housing
 - White or Blue L.E.D.'s
- 8 Feet of 18 AWG Marine Grade Electrical Cable
 - Removable brackets can be positioned for horizontal or vertical mounting applications
- Trim Tab mounting allows for adjustability of the beam as the tab moves up and down
 - Mounting riser included in DP Package for use with lipped trim tabs.
- L.E.D.'s provide Longer Life, Less Heat and Use 1/10th the Energy of Standard Lights

Fig. 0178

Mounted on Trim Tab
(Not Included)



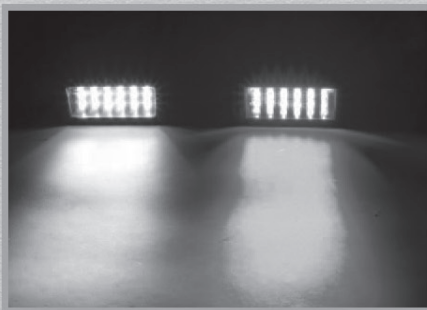
Vertical Mount



Horizontal Mount



**Shown with
Mounting Riser**



White or Blue L.E.D.'s



Shown on Trim Tab In the water



ORDERING INFO

Description	L.E.D. Color	Dealer Pkg. 1 Pkg.	Std. Pkg. - 1 Pc. OEM Bulk Pkg. 10 Pcs.	Ship Wt. Carton Lbs. DP/STD/OEM Bulk
Trim Tab Mount 1-Pk	White	0178DP1WHT	0178001WHT	0.7/0.7/5.0
Trim Tab Mount 2-Pk	White	0178DP2WHT	-----	1.8
Trim Tab Mount 1-Pk	Blue	0178DP1BLU	0178001BLU	0.7/0.7/5.0
Trim Tab Mount 2-Pk	Blue	0178DP2BLU	-----	1.8

Available for Retail Sale in Single or Double Pack

TECH INFO

- 12 Volt, 7.0W
- 75 Lumens, 324 C.P. - White
- 27 Lumens, 207 C.P. - Blue
 - L.E.D. Beam: 15°
 - Lab Rated L.E.D. Life: 50,000 Hrs.
 - Dimensions: 4-1/8" x 1-5/16" x 1-1/4"
 - Bolt Size: 8/32 P.H.

UNDERWATER LIGHTING - L.E.D. SURFACE MOUNT®

Fig. 0181 - Surface Mount L.E.D. Underwater Light

CONSTRUCTION:

- Lightweight Molded Polymer Body
- White or Blue L.E.D.s
- Affordable, Rugged & Reliable
- Low Draw, Long Life L.E.D.
- Installs Easily with 3 Screws



**50,000 Hr.
Rated
L.E.D. Life**



**Fig. 0181
Profile**



Available for Retail Sale in Single or Double Pack



Fig. 0181 White

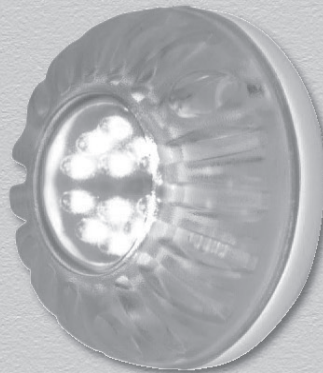


Fig. 0181 Blue



**Installs with just
3 Screws (Not Included)**

ORDERING INFO

Description	L.E.D. Color	Dealer Pkg. 5 Pkgs.	OEM Bulk Pkg. 10 Pcs.	Ship Wt. Carton Lbs. DP/OEM Bulk
Surface Mount 1-Pk	White	0181DP1WHT	0181001WHT	3.4/4.6
Surface Mount 2-Pk	White	0181DP2WHT	-----	5.7
Surface Mount 1-Pk	Blue	0181DP1BLU	0181001BLU	3.4/4.6
Surface Mount 2-Pk	Blue	0181DP2BLU	-----	5.7

TECH INFO

- 12 Volt, 4.5W
- 50 Lumens, 216 C.P. - White
- 18 Lumens, 138 C.P. - Blue
- L.E.D. Beam: 15°
- Lab Rated L.E.D. Life: 50,000 Hrs
- Projection: 1-1/4"
- Overall Dia.: 2-7/8"
- Screw Size: #8 R.H.

UNDERWATER LIGHTING - L.E.D. THRU-HULL MOUNT



Fig. 0176 - L.E.D. Thru-Hull Mount Underwater Light

CONSTRUCTION:

- Polished or Chrome Plated Bronze Body and Mounting Ring
- 10 Feet of 16/2 Electrical Cable
- Safety Seal Design Prevents Water Intrusion in the Event of Glass Breakage
 - Terminal for Bonding Wire
- L.E.D.'s provide Longer Life, Less Heat and Use 1/10th the Energy of Standard Lights
 - Ignition Protected



Fig. 0176



**Fig. 0078
L.E.D.**

ORDERING INFO			TECH INFO
Description	Dealer Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Dealer Pkg.	<ul style="list-style-type: none"> • 12 Volt, 5W, 0.4 Amps • Bulb 20° Beam • 85 Lumens • Lab Rated Bulb Life: 50,000 Hrs • Length Overall: 6-3/4" • Flange Dia.: 3-3/4" • Mounting Hole Dia.: 2-3/8"
Polished Bronze	0176DP3PLB	5.0	
Chrome Plated	0176DP3CHR	5.0	
Description	Std. Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Std. Pkg.	
Polished Bronze	0176003PLB	4.6	
Chrome Plated	0176003CHR	4.6	

SPARE PARTS ORDERING INFORMATION

Replacement 12V L.E.D.: 0078DP112V
 Replacement Lens Kit (includes O-Rings): 0174DP1LNS
 IGNITION PROTECTED Power Relay for use with up to 4 lights: (12 volt) 0061DP1RLY

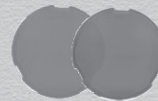
UNDERWATER LIGHTING - INCANDESCENT THRU-HULL MOUNT®

Fig. 0174 - Thru-Hull Mount Underwater Light

CONSTRUCTION:

- Polished or Chrome Plated Bronze Body and Mounting Ring
- Two Bulb Options:
 - 25° Beam Bulb (3000 CB Candle Power)
 - 40° Beam Bulb (1700 CB Candle Power)
- 10 Feet of 16/2 Electrical Cable
- Safety Seal Design Prevents Water Intrusion in the Event of Glass Breakage
- Terminal for Bonding Wire
- Includes Green & Blue Lens Filters
- Ignition Protected

Color Lens Filters



Included in Package

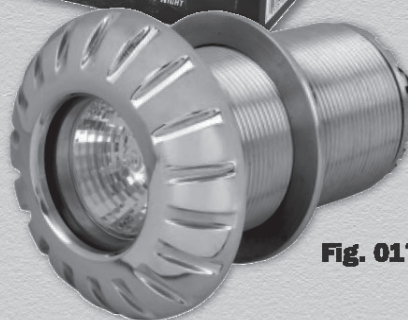
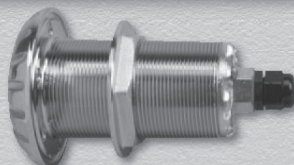


Fig. 0174



Easy Access for Bulb Changes



ORDERING INFO

Description	Bulb Beam	Dealer Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Dealer Pkg.
Polished Bronze	25° & 40°	0174DP3PLB*	5.1
Chrome Plated	25° & 40°	0174DP3CHR*	5.1

Description	Bulb Beam	Std. Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Std. Pkg.
Polished Bronze	25°	0174003PLB	4.6
Polished Bronze	40°	0174004PLB	4.6
Chrome Plated	25°	0174003CHR	4.6
Chrome Plated	40°	0174004CHR	4.6

TECH INFO

- 12 Volt, 50W, 4.1 Amps
 - 2 Bulb Options:
 - 25° & 40° Beam
 - 800 Lumens
 - Lab Rated Bulb Life: 5000 Hrs**
 - Length Overall: 6-3/4"
 - Flange Dia.: 3-3/4"
- Mounting Hole Dia.: 2-3/8"



Fig. 0061 Ignition Protected Relay



Fig. 0077 Halogen Bulbs
50 Watt - 25° Beam
50 Watt - 40° Beam

SPARE PARTS ORDERING INFORMATION

12 Volt, 50 Watt, 25° Beam Bulb: 0077DP112V

12 Volt, 50 Watt, 40° Beam Bulb: 0077DP212V

24 Volt Bulb Options Available

Blue & Green Lens Filter Kit & 2 O-Rings: 0174DP099A

Replacement Lens Kit (includes O-Ring): 0174DP1LNS

IGNITION PROTECTED Power Relay for use with up to 4 lights:
(12 volt) 0061DP1RLY or (24 volt) 0061DP2RLY

* Dealer Package includes both bulbs

** In Accordance with ANSI Standards

UNDERWATER LIGHTING - INCANDESCENT SPACE SAVER THRU-HULL MOUNT



Color Lens Filters



**Smaller
Space
Saver
Version**

Fig. 0175 - Space Saver Thru-Hull Mount Underwater Light

CONSTRUCTION:

- Polished or Chrome Plated Bronze Body and Mounting Ring
- 10 Feet of 18/2 Electrical Cable
- Safety Seal Design Prevents Water Intrusion in the Event of Glass Breakage
 - Terminal for Bonding Wire
- Includes Green & Blue Lens Filters
- Ignition Protected



Fig. 0175

**Proportional Relationship
between Figs. 0174 & 0175**

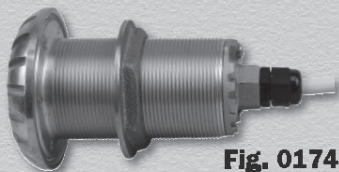


Fig. 0174

Mounting Hole Dia.: 2-3/8"

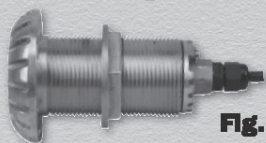


Fig. 0175

Mounting Hole Dia.: 1-3/4"

ORDERING INFO

Description	Dealer Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Dealer Pkg.
Polished Bronze	0175DP3PLB	2.3
Chrome Plated	0175DP3CHR	2.3
Description	Std. Pkg. 1 Pc. per Box	Ship Wt. Carton Lbs. Std. Pkg.
Polished Bronze	0175003PLB	2.1
Chrome Plated	0175003CHR	2.1

TECH INFO

- 12 Volt, 35W, 2.9 Amps
 - Bulb 30° Beam
 - 550 Lumens
- Lab Rated Bulb Life: 3500 Hrs.*
- Length Overall: 5-1/4"
 - Flange Dia.: 2-7/8"
- Mounting Hole Dia.: 1-3/4"

SPARE PARTS ORDERING INFORMATION

12 Volt, 35 Watt, 30° Beam Bulb: 0080DP112V
24 Volt Bulb Options Available

Blue & Green Lens Filter Kit & 2 O-Rings: 0175DP099A
Replacement Lens Kit (includes O-Ring): 0175DP1LNS

IGNITION PROTECTED Power Relay for use with up to 4 lights:
(12 volt) 0061DP1RLY or (24 volt) 0061DP2RLY



Fig. 0080 Halogen Bulb
35 Watt - 30° Beam

* In Accordance with ANSI Standards

LED[®] L.E.D. DOCKING LIGHTS & UTILITY LIGHTS

Fig. 0202 - L.E.D. Straight Docking Light

Fig. 0203 - L.E.D. Angled Docking Light



CONSTRUCTION:

- Marinium Alloy or Chrome Plated Bronze
- Angled or Straight Light Direction
- Low Draw, Long Life L.E.D. Lighting
- 12 Volt L.E.D.



**Fig. 0203
Angled**

**Fig. 0202
Straight**



**Fig. 0203
Angled**



**Fig. 0202
Straight**

ORDERING INFO

Light Direction	Material	Projection Inches	Dealer Pkg. 1 Pair per Pkg.	OEM Bulk Pkg. 5 Pairs	Ship Wt. Carton Lbs. DP/OEM Bulk
Straight	Chr. Bronze	1/2	0202DPOCHR	0202000CHR	1.7/7.0
Straight	Marinium	1/2	0202DPOMAR	0202000MAR	1.2/5.5
Angled	Chr. Bronze	1/2	0203DPOCHR	0203000CHR	2.9/13.2
Angled	Marinium	1/2	0203DPOMAR	0203000MAR	1.4/8.0

TECH INFO

- 12 Volt, 4.5W
- L.E.D. Beam: 15°
- Lab Rated L.E.D. Life: 50,000 Hrs
- Screw Size: #6

Dimensions:

Angled: 4-1/8" x 3-3/8"
Straight: 3-1/8" O.D.

Fig. 0606 - White L.E.D. Utility Light

Fig. 0607 - White/Red L.E.D. Utility Light



CONSTRUCTION:

- Chrome Plated Brass Frame
- Low Draw, Long Life L.E.D. Lighting
- 12 Volt L.E.D.



**Fig. 0606
White**



**Fig. 0607
White/Red**

ORDERING INFO

L.E.D. Color	Dealer Pkg. 1 Card 1 Pc. per Card	OEM Bulk Pkg. 10 Pcs.	Screw Size	Ship Wt. Carton Lbs. DP/OEM Bulk
White	0606DPOCHR	0606000CHR	6	0.7/2.5
White/Red	0607DPOCHR	0607000CHR	6	0.7/2.6

TECH INFO

- L.E.D.: 12 Volt, 4W
- Lab Rated L.E.D. Life: 50,000 Hrs.

Base Dimensions:

7-1/4" x 1-1/2"



BGBZ-FLOOD



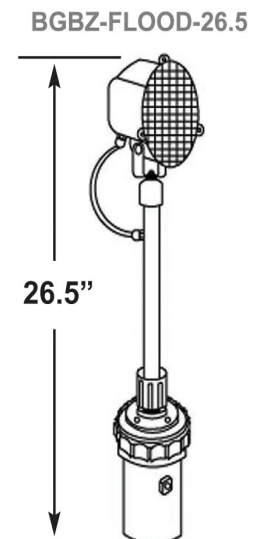
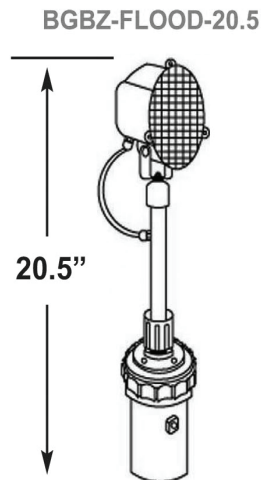
BGBZ-FLOOD-20.5

**Battery-powered portable LED floodlight
with 150 lb. magnetic pull base
and clevis head.**

**Ideal for welding or painting.
No more running an AC line cord for
floodlights or stopping to change burned
out light bulbs.**

OPTIONS:

Battery Life:	32 hours on standard alkaline
Light Output:	Over 400 candlepower
Lamp Life:	20,000 hours
Material:	High-impact polycarbonate
Power Options:	6 volt battery
Weight:	8 lbs.





BGLED888

LED Barge Navigation Lights

**Certified to meet
requirements for unmanned
barges per UL 1104**

**The market leader in
lightweight, rugged, certified barge
navigation lights.**

**Runs for 30 nights on one set
of standard alkaline batteries.**

Polycarbonate
handle

Polycarbonate
Case



BGLED888-FL

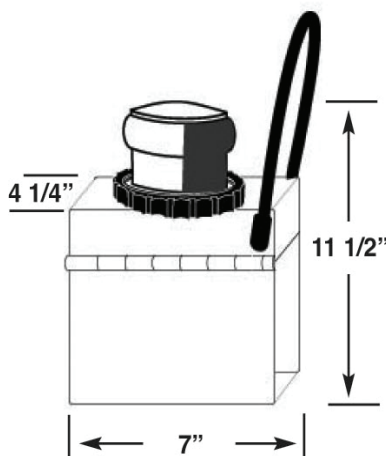
SPECIFICATIONS:

Range:	3 nautical miles
Mount:	Magnetic
Light Source:	LEDs rated up to 20,000 hrs
Material:	High-impact polycarbonate
Battery Life:	30 nights on standard alkaline
Weight:	7 lbs.
Dimensions:	11 1/2"h x 7"l x 4 1/4"w



BGLED888-PORT

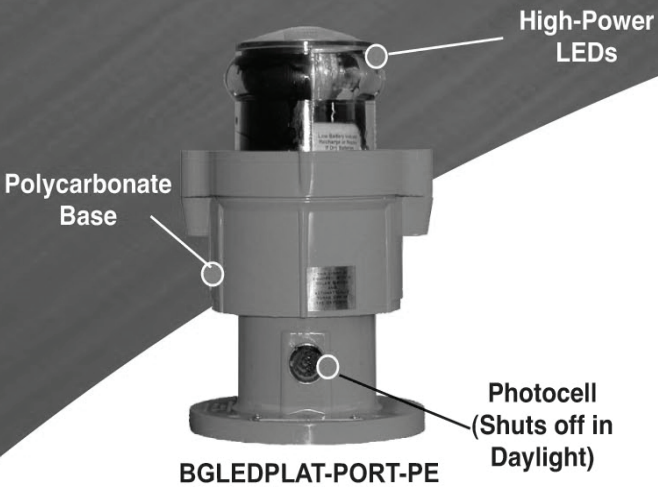
BGLED888



BGLED888-STAR

BGLEDPLAT

LED Barge Navigation Lights



BGLEDPLAT-PORT-PE

**Certified to meet
applicable sections of UL 1104**

**Platform-mounted barge navigation
lights enable you to use your own
power source.**

**Get 18 months of light on one
12 volt air alkaline battery.**



BGLEDPLAT-STAR-PE



BGLEDPLAT-STERN-PE

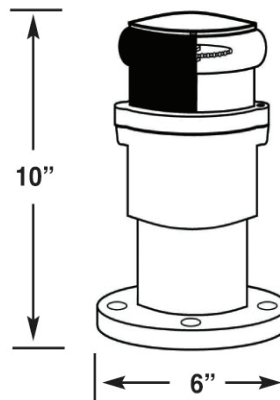


BGLEDPLAT-FL-PE

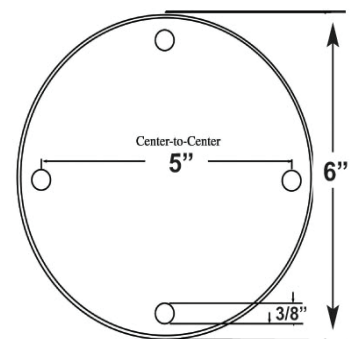
SPECIFICATIONS:

Range:	3 nautical miles
Mount:	Magnetic or Flat Mount
Light Source:	High-power LEDs
Material:	High-impact polycarbonate
Battery Life:	18 months on 12V air alkaline battery
Power Source:	12, 24 VDC; 120, 220 VAC
Weight:	5 lbs.
Dimensions:	10"h x 6" dia.

BGLEDPLAT



MOUNTING BASE



TB3/TB6

LED Navigation Lights



High-intensity
Xelogen Lamp

TB6-MAST-GL35

3 Mile Navigation Lights
Certified to meet applicable
sections of UL 1104

**Three miles for vessels greater
than 50 meters in length.**
**Three miles of LED light for
years of service and no bulb
maintenance.**



TB3-TOW



TB3-PORT



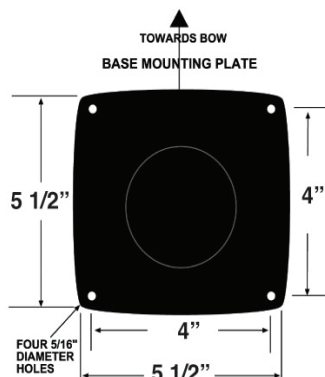
TB3-78-WHITE

TB6-MAST-GL35 SPECIFICATIONS:

Range:	5 or 6 nautical miles available
Mount:	5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Light Source:	High-intensity Xelogen Lamps
Material:	High-impact polycarbonate
Visibility Arc:	225 degrees
Power Sources:	12, 24, 32 VDC; 120, 220 VAC
Weight:	6 lbs.
Dimensions:	6"h x 5 1/2"l x 5 1/2"w

TB3 SPECIFICATIONS:

Range:	3 nautical miles
Mount:	5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Light Source:	High-power LEDs
Material:	High-impact polycarbonate
Visibility Arc:	112.5, 135, 360 degrees
Power Sources:	12, 24, 32 VDC; 120, 220 VAC
Weight:	2 lbs.
Dimensions:	6"h x 5 1/2"l x 5 1/2"w



BGLEDCase

Solar LED Barge Navigation Lights



High-Power
LEDs

Solar Powered

Magnetic mount

BGLEDCase-FL-4.5



Flat Mount

BGLEDCase-PORT-4.5



BGLEDCase-STERN-4.5



BGLEDCase-STAR-4.5

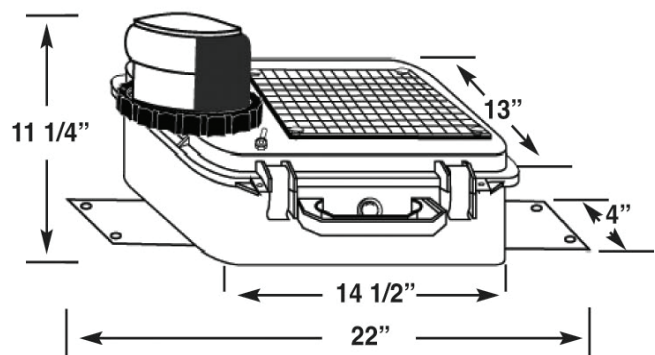
**Certified to meet
requirements for unmanned
barges per UL 1104**

**The most advanced solar barge
navigation light available.
Enjoy years of service with
no maintenance and get the
power of the sun.**

SPECIFICATIONS:

Range:	3 nautical miles
Mount:	Magnetic or Flat Mount
Light Source:	LEDs rated up to 20,000 hrs.
Material:	High-impact polycarbonate
Battery Life:	Rechargeable, 2 - 4 years
Autonomy:	25 sunless days
Weight:	22 lbs.
Dimensions:	11 1/4"h x 13"w x 14 1/2"l - Mag 11 1/4"h x 13"w x 22"l - Flat

BGLEDCase-4.5





TOPHAT

Solar LED Lights

Tophat Series Solar Lights

The most versatile, low-cost, solar solution for stand-alone locations. McDermott Tophats combine solar power with LED technology to provide years of maintenance-free operation.

SPECIFICATIONS:

Range:	1-3 miles available
Mount:	Magnetic, Flat or Pipe Mount
Lamp Source:	High-power LEDs
Material:	High-impact polycarbonate
Power Supply:	NI-MH
Autonomy:	10 nights with no sun
Flash Rates:	15, 24, 30, 60 flashes per minute
Weight:	2 lbs.
Dimensions:	5"h x 7" dia.

High-impact
Polycarbonate

High-Power
LEDs

TOPHAT-FLAT

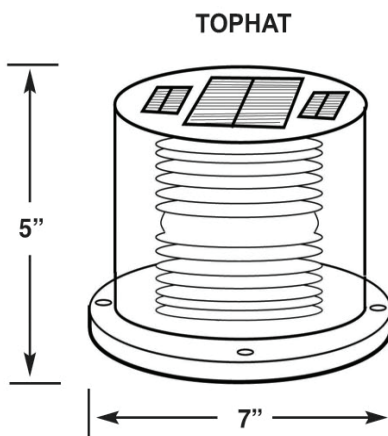
Mounting
Holes

High-performance
Solar Panel

TOPHATX

TOPHAT-BUNY

TOPHAT-PLAT

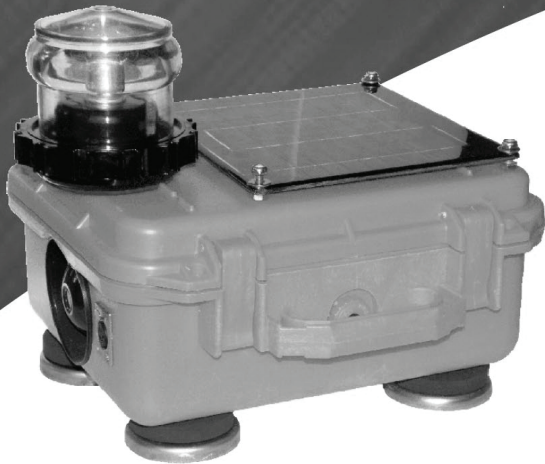




**McDermott Light
& Signal**

Solar Bilge Alarm

Don't let bilge water sink your ship!



**Get immediate notification of
emergency conditions:
High-Powered LED strobes.
High-Decibel audible sirens.
Emergency messages sent
directly to your cell phone.**

**Solar power provides complete
autonomy for remote moorings.**



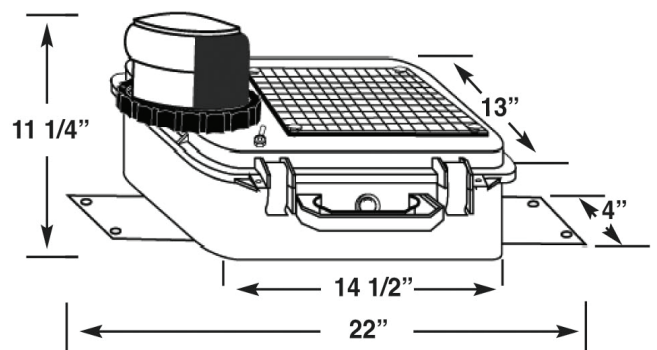
ALARM OPTIONS:

Visual Alarm:	High-Power LED Strobe Light
Audible Alarm:	High-Decibel Siren
Cell Phone Alarm:	Emergency Text Messages
Material:	High-Impact Polycarbonate
Power Options:	Solar-powered; Hardwired

Wiring: Can accept normally-open
or normally-closed circuits

Alarm supports remote text messaging

Weight: 22 lbs.





TB2/TB5

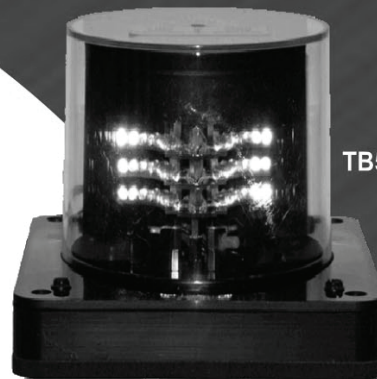
LED Navigation Lights

2 Mile Navigation Lights
Certified to meet applicable
sections of UL 1104

Switch to McDermott
LED Navigation Lights and stop
wasting money on light bulbs.
Our LED lights can be used with
most existing alarm panels making
them a perfect option for retrofits.

LED MASTHEAD LIGHT SPECIFICATIONS:

Range:	5 or 6 miles available
Mount:	7" x 7" Base; 6" x 6" holes on center
Lamp Source:	High-power LEDs
Material:	High-impact polycarbonate
Visibility Arc:	225 degrees
Power Sources:	12, 24, 32 VDC; 120, 220 VAC
Weight:	4 lbs.
Dimensions:	6"h x 7"l x 7"w



TB5-LED-MAST



TB2D-STERN



TB2D-PORT



TB2-266-TOW

TB2 SPECIFICATIONS:

Range:	2 nautical miles
Mount:	5 1/2" x 5 1/2" Base; 4" x 4" holes on center
Lamp Source:	High-power LEDs
Material:	High-impact polycarbonate
Visibility Arc:	112.5, 135, 360 degrees
Power Sources:	12, 24, 32 VDC; 120, 220 VAC
Weight:	3 lbs.
Dimensions:	5"h x 5 1/2"l x 5 1/2"w

World Class Products for World Class Customers

Aqua Signal is the worldwide leader in marine navigational lighting. Since 1868, Aqua Signal has been manufacturing "World Class Products for World Class Customers". With Aqua Signal, you are assured that your boat is safe. Our products comply with strict international rules and regulations with UL, USCG, ISO, ABYC, NMMA, and CE certifications.

Premium Commercial Halogen Floodlights IP 67 Protection Class



1000 Watt
PN 1069012 (120V)
PN 1069015 (220 V)



500 Watt
PN 1069040 (120V)



200 Watt
PN 1076060

Series 55 Navigational Light IP 56 Protection Class

USCG approved
For vessels > 20m - < 50m / > 65' - < 164'
Visibility 2 n.m. (masthead 5 n.m.)



PN 55200-1* (starboard)
PN 55300-1* (port)
PN 55400-1* (masthead)
PN 55500-1* (stern)
PN 55502-1* (stern yellow)
PN 55000-1* (all around white)
PN 55004-1* (all around red)
PN 55002-1* (all around green)
* bulb not included

Series 70 Navigational Lights for Large Vessels IP 56 Protection Class

USCG Approved
For vessels >= 20m / 65'
Visibility 3 n.m. (masthead 6 n.m.)



PN 70200-1* (starboard)
PN 70300-1* (port)
PN 70400-1* (masthead)
PN 70500-1* (stern white)
PN 70502-1* (stern yellow)
PN 70000-1* (all around white)
PN 70004-1* (all around red)
PN 70002-1* (all around green)
PN 70006-1* (all around yellow)
* bulb not included

Series 70M Combined Main/ Reserve Navigation Lights IP 56 Protection Class



USCG approved
For vessels >= 20m / 65'
Visibility 3 n.m. (masthead 6 n.m.)

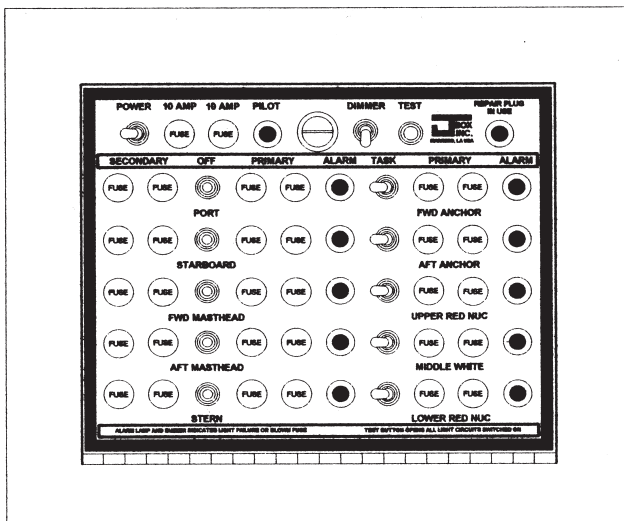
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PN 3584209* (port)
PN 3581009* (masthead)
PN 3582709* (stern)
PN 3582499* (stern yellow)
PN 3580009* (all around white)
PN 3580209* (all around red)
PN 3580109* (all around green)
PN 3580499* (all around yellow)
* bulb not included



NAVIGATION LIGHT PANELS

SUPERVISED SOLID STATE SEMI-AUTOMATIC ALARM PANELS

TYPICAL SHIP PANEL



STANDARD FEATURES

- VISUAL AND AUDIBLE ALARM OF LAMP FAILURE OR BLOWN FUSE
- SOLID STATE CURRENT SENSORS FOR TOTAL SHORT CIRCUIT PROTECTION
- PLUG-IN PRINTED CIRCUIT BOARD
- ANY WATTAGE LAMP IN ANY CIRCUIT
- AVAILABLE IN FLUSH OR SURFACE MOUNT
- SYSTEM TEST BUTTON
- EMERGENCY REPAIR PLUG STANDARD
- EACH PANEL LABELED TO OWNERS SPECS.
- LIFETIME WARRANTY OF PLUG-IN PC BOARD

COMPLIES WITH

- USCG SECTION 111.75-17
- * ABS SECTION 4/4A7.3.2, 4/5A7.3.2
- IEEE std. 45SECTION 34.2

OPTIONS AVAILABLE

- DP DUAL POWER SOURCES
- RA REMOTE ALARM
- MO MAN-OVERBOARD
- FL FLASHING LIGHT
- WL WHISTLE LIGHT
- F/A FWD / AFT MOTION SELECTOR
- AU AUTOMATIC ON AND OFF
- AD ALARM LAMP DIMMER
- RS ROTARY SWITCH FOR TASK LTS.
- OL OBSTRUCTION LIGHTS
- LD RUNNING LIGHT DIMMER CONT.
- AT AUTO POWER TRANSFER

- 120A 120 VAC INPUT POWER
- 220A 220 VAC INPUT POWER
- 12DC 12 VDC INPUT POWER
- 24DC 24 VDC INPUT POWER
- 32DC 32 VDC INPUT POWER

EXCLUSIVE "EMERGENCY REPAIR PLUG"

IF ANYTHING ON THE PLUG-IN PRINTED CIRCUIT BOARD SHOULD FAIL, THE BOARD MAY BE REMOVED FOR SERVICE AND REPLACED WITH THE "EMERGENCY REPAIR PLUG". THIS ALLOWS FOR NORMAL OPERATION OF ALL LIGHTS. A STATUS LAMP INDICATES WHEN THE "EMERGENCY REPAIR PLUG" IS IN USE.

- * NOTE: TO MEET ABS RULES YOU MUST SPECIFY "PFA" OUR POWER FAILURE ALARM MODULE AND HAVE TWO POWER SOURCES

DIMENSIONS

NOTE

- SURFACE MOUNT 12" H x 14" W x 4" D
10" H x 12" W x 4" D
- FLUSH MOUNT 18.5" H x 14.5" W x 4" D HOLE 16" x 12"
14.5" H x 12.5" W x 4" D HOLE 12" x 10"

THE DIMENSIONS SHOWN MAY VARY OR BE ROTATED 90 DEGREES DEPENDING ON THE NUMBER OF CIRCUITS

MODEL SHOWN: NLFM5D5SUG120A OPTIONS

NL FM 5D 5S UG 120A

FM FLUSH MOUNTING
SM SURFACE MOUNTING

5D NUMBER OF DUAL LAMP CIRCUITS

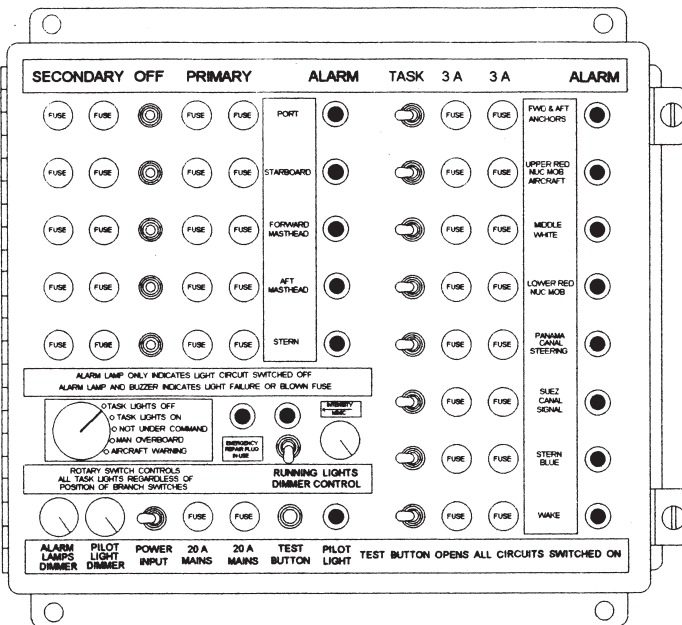
5S NUMBER OF SINGLE LAMP CIRCUITS

UG UNGROUNDED NEUTRAL MEANS BOTH SIDES OF EACH BRANCH CIRCUIT ARE SWITCHED AND FUSED
GN GROUNDED NEUTRAL MEANS ONLY THE HOT SIDE OF EACH BRANCH CIRCUIT IS SWITCHED AND FUSED

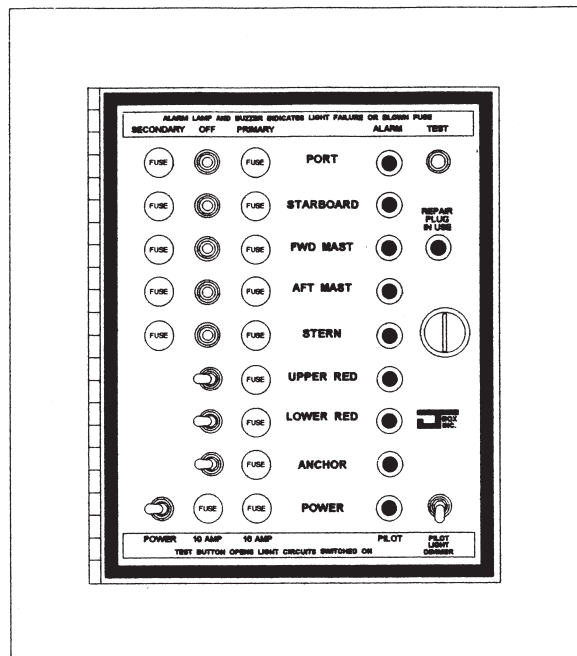
WHEN ORDERING BE SURE TO PROVIDE A LIST OF THE LIGHT NAMES

"I Borrowed the Shoes,
But the Holes are Mine."
-actual country song

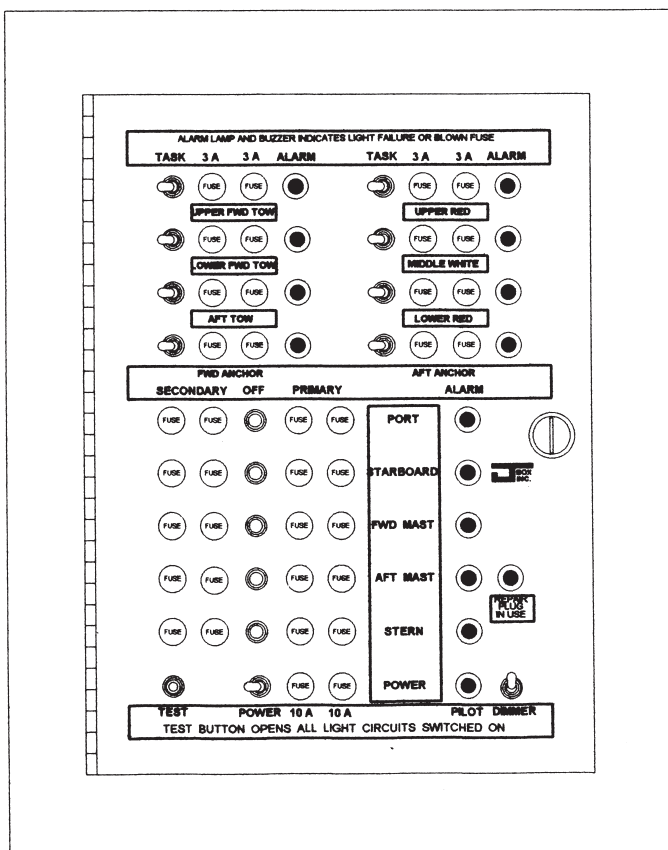
NAVIGATION LIGHT PANELS



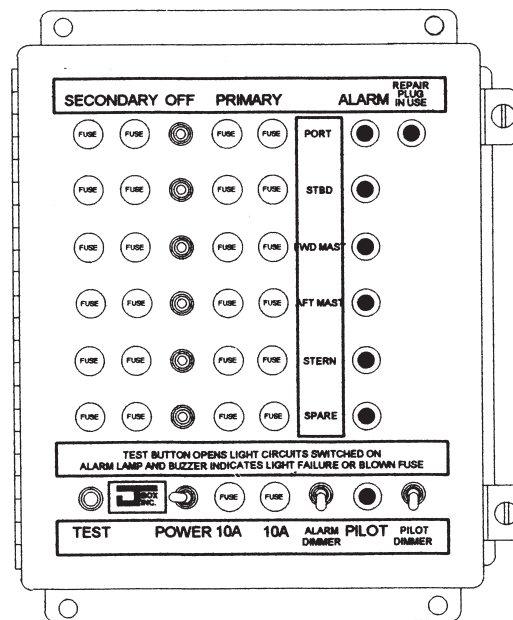
MODEL NO: NLSM5D8SUG120ARSMOLDAD
DIMENSIONS 14"W x 12"H x 4"D



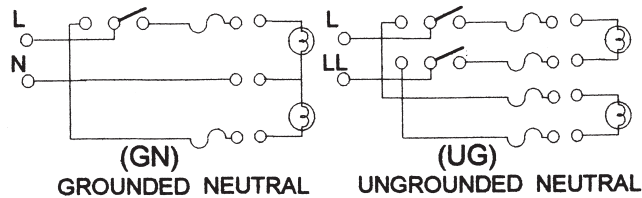
MODEL NO: NLFM5D3SGN120A
DIMENSIONS 12.5"W x 14.5"H x 4"D



MODEL NO: NLFM5D8SUG120A
DIMENSIONS 14.5"W x 18.5"H x 4"D



MODEL NO: NLSM6DUG120AAD
DIMENSIONS 10"W x 12"H x 4"D

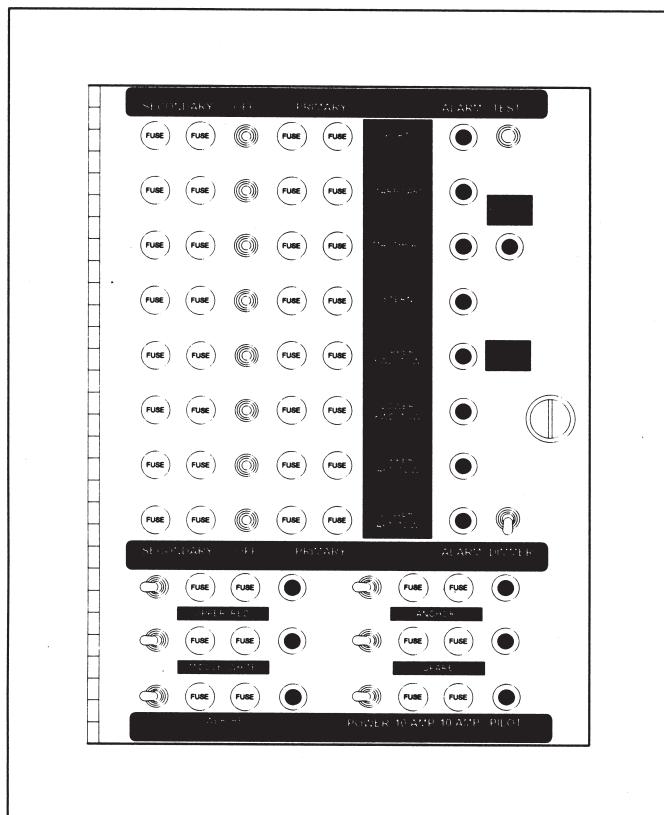


“I’m Either Living Too Fast
or Dying Too Slow!”
-actual country song

NAVIGATION LIGHT PANELS

SUPERVISED SOLID-STATE SEMI-AUTOMATIC & FULLY AUTOMATIC ALARM PANELS

ABS TYPE APPROVAL NO: 99 NO 29704-X



STANDARD FEATURES

- POWER FAILURE ALARM MODULE
- VISUAL AND AUDIBLE ALARM OF LAMP FAILURE OR BLOWN FUSE
- SOLID STATE CURRENT SENSORS FOR TOTAL SHORT CIRCUIT PROTECTION
- PLUG-IN PRINTED CIRCUIT BOARD ANY WATTAGE LAMP IN ANY CIRCUIT
- AVILABLE IN FLUSH OR SURFACE MOUNT
- SYSTEM TEST BUTTON
- EMERGENCY REPAIR PLUG STANDARD
- LIFETIME WARRANTY OF PLUG-IN PC BOARD
- EACH PANEL LABELED TO OWNERS SPECKS
- PFA - POWER FAILURE ALARM MODULE

COMPLIES WITH

ABS SECT. 4/4A7.3.1 & 4/4A7.3.2
4/5A7.3.1 & 4/5A7.3.2
IEEE std. 45 SECTION 34.2
USCG SECTION 111.75-17

OPTIONS AVAILABLE

- DP** DUAL POWER SOURCES
- RA** REMOTE ALARM
- MO** MAN-OVERBOARD
- FL** FLASHING LIGHT
- WL** WHISTLE LIGHT
- F/A** FWD / AFT MOTION SELECTOR
- AU** AUTOMATIC ON AND OFF
- AD** ALARM LAMP DIMMER
- RS** ROTARY SWITCH FOR TASK LTS.
- OL** OBSTRUCTION LIGHTS
- AT** AUTOMATIC POWER TRANSFER
- LD** RUNNING LIGHT DIMMER CONT. (MILITARY ONLY)

EXCLUSIVE "EMERGENCY REPAIR PLUG"

IF ANYTHING ON THE PLUG-IN PRINTED CIRCUIT BOARD SHOULD FAIL, THE BOARD MAY BE REMOVED FOR SERVICE AND REPLACED WITH THE "EMERGENCY REPAIR PLUG". THIS ALLOWS FOR NORMAL OPERATION OF ALL LIGHTS. A STATUS LAMP INDICATES WHEN THE "EMERGENCY REPAIR PLUG" IS IN USE.

MODEL SHOWN: NLFM8D5SUG120A

OPTIONS

NL **FM** **8D** **5S** **UG** **120A**

FM FLUSH MOUNTING
SM SURFACE MOUNTING

5D NUMBER OF DUAL LAMP CIRCUITS

5S NUMBER OF SINGLE LAMP CIRCUITS

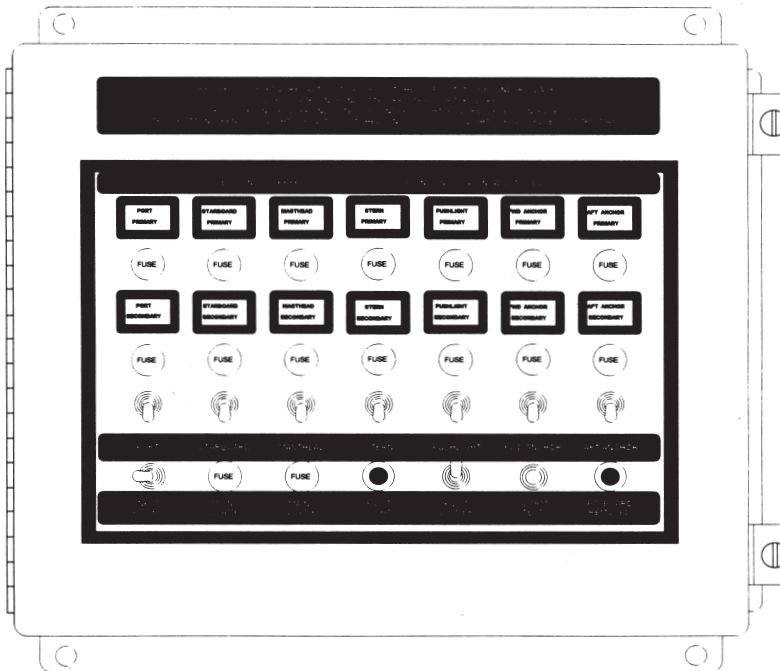
UG UNGROUNDED NEUTRAL MEANS BOTH SIDES OF EACH BRANCH CIRCUIT IS SWITCHED AND FUSED
GN GROUNDED NEUTRAL MEANS ONLY THE HOT SIDE OF EACH BRANCH CIRCUIT IS SWITCHED AND FUSED

120A 120 VAC INPUT POWER
220A 220 VAC INPUT POWER
12DC 12 VDC INPUT POWER
24DC 24 VDC INPUT POWER
32DC 32 VDC INPUT POWER

WHEN ORDERING BE SURE TO PROVIDE A LIST OF THE LIGHT NAMES

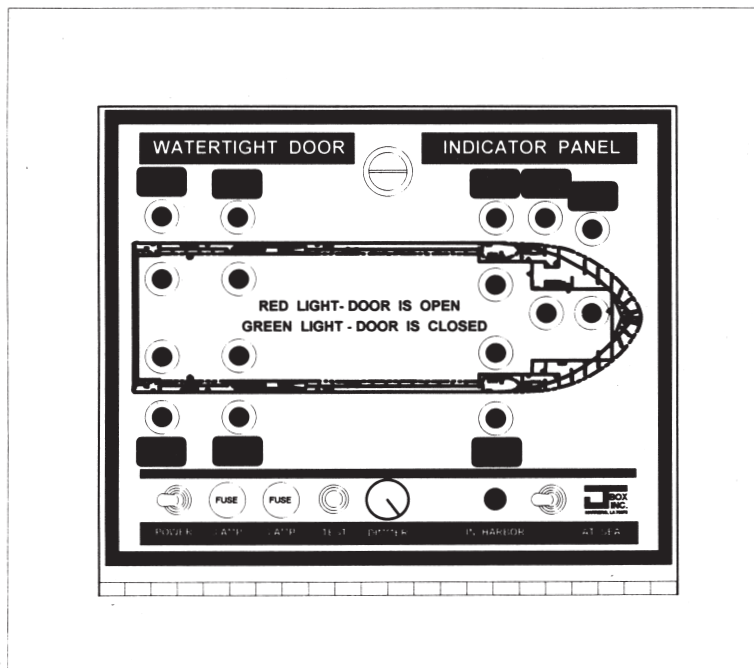
NAVIGATION LIGHT PANELS

FULLY AUTOMATIC



THE FULLY AUTOMATIC PANELS CONTAIN ALL THE FEATURES OF THE SIMI-AUTOMATIC PANELS, IN ADDITION, IF A PRIMARY LIGHT SHOULD FAIL, THE PANEL AUTOMATICALLY SWITCHES TO THE SECONDARY LIGHT. A FAIL LAMP INDICATES THE PRIMARY LIGHT FAILURE. IF THE SECONDARY LIGHT SHOULD FAIL BOTH A VISUAL AND AUDIBLE ALARM OPERATES. WHEN THE PRIMARY LIGHT IS REPLACED THE PANEL AUTOMATICALLY SWITCHES BACK TO THAT CIRCUIT.

WATERTIGHT DOOR ALARM PANELS



THE WATERTIGHT DOOR INDICATOR PANEL PROVIDES A GRAPHICAL REPRESENTATION OF THE MAIN DECK.

THE PANEL CONTAINS LED LAMPS, RED FOR OPEN AND GREEN FOR CLOSED. A DIMMER CONTROLS THE INTENSITY OF ALL LAMPS.

A BUZZER AND LED INDICATES WHEN A DOOR IS OPEN. A PUSHBUTTON TESTS ALL LAMPS AND BUZZER.

A SWITCH SELECTS "IN HARBOR" OR "AT SEA". IN THE HARBOR POSITION A FLASHING GREEN LED OPERATES INSTEAD OF THE BUZZER.

FLUSH OR SURFACE MOUNTED PANELS ARE AVAILABLE IN ANY OPERATING VOLTAGE.

"Her Teeth Were Stained,
But Her Heart Was Pure!"
-actual country song

THIS PANEL COMPLIES WITH ABS RULE 17.1.2(a)

The diagram illustrates the wiring for the L1 Horn Controller. The power source (CB) is connected to the relay (K1) and the fuses (F1-F16) for the eight branches. The L1 unit has terminals for power, pilot house contact maker, engine room contact maker, P/A alarm break pushbutton, and horn solenoid valve. It also features a RUN/STOP button and a timer (L1).

IT PROVIDES SEVEN ONE SECOND BLASTS AND ONE FIVE SECOND BLAST OF HORN BEFORE RECYCLING

IT ONLY OPERATES THE HORN WHEN THE PILOT HOUSE CONTACT MAKER IS USED

IT SHUTS OFF THE GENERAL ALARM SYSTEM WHEN THE PA SYSTEM IS ACTIVATED

HORN CONTROLLER IS AVAILABLE AS AN ADD-ON TO ANY GENERAL ALARM SYSTEM (ABS MOD KIT)

ie: JBGA6R-24-ABS FOR 6 CKT

BRANCH CIRCUITS LABELED AS
PER DRAWINGS PROVIDED

BRANCH CIRCUIT FUSES ARE
3 AMPS UNLESS SPECIFIED

ALL TERMINALS WILL ACCEPT
CABLES UP TO D16 UNLESS
LARGER ONES ARE SPECIFIED

12 VDC PANELS ALSO AVAILABLE

PANEL AVAILABLE LESS RELAY

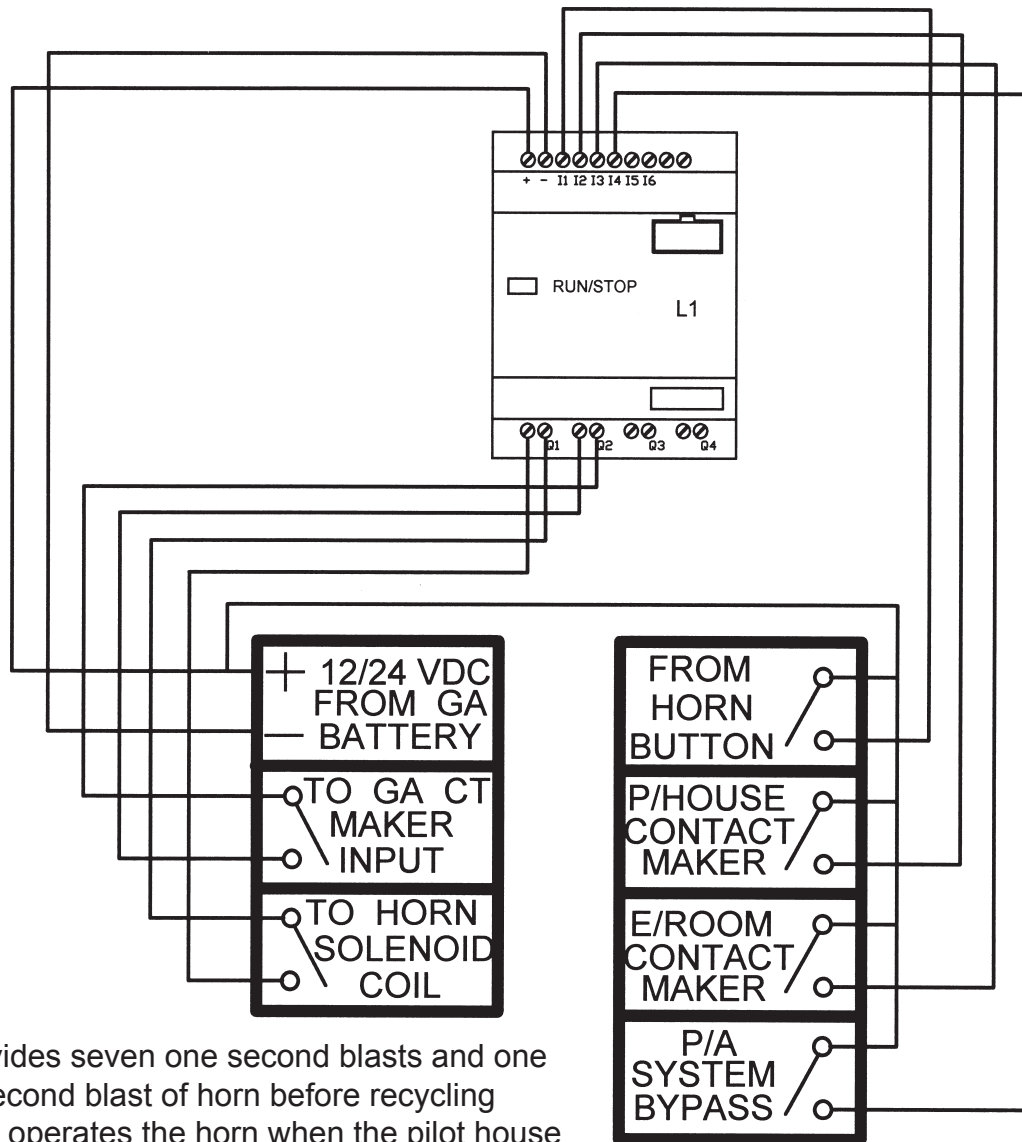
PARTS LIST				
ITEM	QTY	DESCRIPTION	PART NUMBER	MANUFACTURER
CB	1	20 AMP DP CKT. BKR. MAIN DISC.	AB2B0106202D1	CARLINGSWITCH
F1-F16	16	3 AMP FUSE 250 VAC	318-003	LITTLEFUSE
FH	16	SINGLE POLE FUSEHOLDER	351-001	LITTLEFUSE
ENC.	1	NEMA 4 ENCLOSURE STEEL	A-1412CHNF	HOFFMAN
K1	1	DPST 30 AMP 24 VDC COIL	PRD7DYO - 24 DC	POTTER BRUMFIELD
L1	1	SMART RELAY	FL1AB12RCE	IDEC CORP.

Seattle, Washington

A man attempted to siphon gasoline from a motor home parked on the street. Police arrived at the scene to find an ill man curled up next to a motor home near spilled sewage. A police spokesman said that the man admitted to trying to steal gasoline and plugged his hose into the motor home's sewage tank by mistake. The owner of the vehicle declined to press charges, saying it was the best laugh he'd ever had.

ABS MOD KIT

THIS PANEL COMPLIES WITH ABS RULE 17.1.2(a)



- It provides seven one second blasts and one five second blast of horn before recycling
- It only operates the horn when the pilot house contact maker is used
- It shuts off the general alarm system when the PA system is activated
- Horn button does not have to be connected to this panel if already connected to horn solenoid

17.1.2 System Requirements

17.1.2(a) The general emergency alarm system is to be capable of sounding the general emergency alarm signal consisting of seven or more short blasts followed by one long blast on the ship's whistle or siren and additionally on an electrically operated bell or klaxon or other equivalent warning system, which is to be powered from the ship's main supply and the emergency source of electrical power required by 4-6-2/5. The system is to be capable of operation from the navigation bridge and, except for ship's whistle, also from other strategic points. The system is to be audible throughout all the accommodation and normal crew working spaces. The alarm is to continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

**GENERAL ALARM PANELS ARE REQUIRED ON MOST VESSELS OVER 100 GT.
A MAXIMUM OF FIVE BELLS ARE ALLOWED ON EACH BRANCH CIRCUIT**



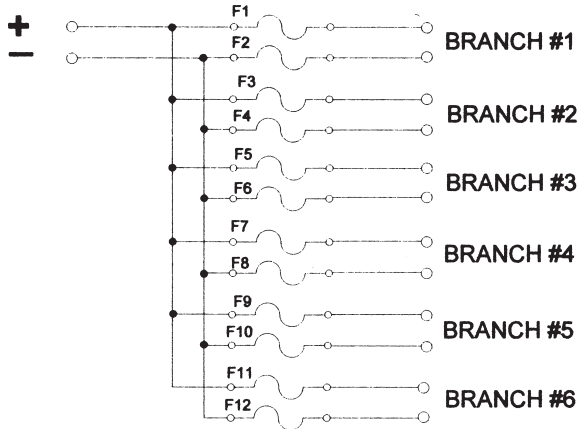
**NEMA 4 ENCLOSURE
ENCLOSURE CAPABLE OF BEING LOCKED
MAIN DISCONNECT BUILT-IN
(30 AMP 2 POLE CIRCUIT BREAKER)
BRANCH FUSES ARE AGC 3 AMP
NON TYPE FUSES ARE OPTIONAL**

NUMBER OF BRANCH CIRCUITS
DC VOLTAGE - IF RELAY IS REQUIRED
CABLE SIZE IF LARGER THAN D16
BRANCH FUSE TYPE AND RATINGS
IF OTHER THAN AGC-3

www.brtmarine.com

DC DISTRIBUTION PANELS

DC DISTRIBUTION PANELS ARE AVAILABLE IN NEMA 1, NEMA 4, OR NEMA 12 ENCLOSURES
GENERAL ALARM BRANCH DISTRIBUTION PANELS ARE ALWAYS NEMA 4



STANDARD PANEL CONTAINS TERMINALS WITH TRAVELING PRESSURE PADS FOR WIRES UP TO D16

DC DISTRIBUTION PANELS ARE AVAILABLE WITH AGC OR NON FUSEHOLDERS

WHEN ORDERING SPECIFY:

NUMBER OF BRANCH CIRCUITS
TYPE OF ENCLOSURE: NEMA 1, 4, OR 12
TYPE OF FUSEHOLDERS: AGC OR NON
CABLE SIZE IF LARGER THAN D16

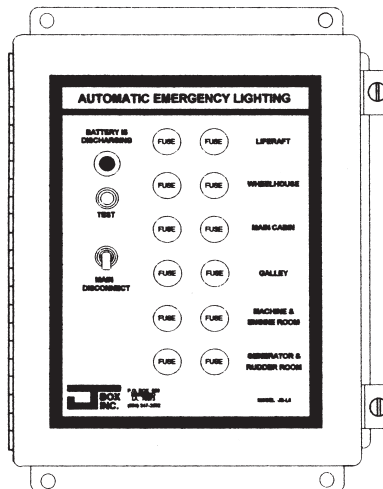
EXAMPLE: DP6N4AGC

FUSEHOLDERS MAY BE MOUNTED ON THE PANEL FRONT EXCEPT FOR GENERAL ALARM PANELS

MODEL NO: DP6N4AGC OR MODEL NO: DP6N4NON

TERMINALS ARE LABELED AS PER DRAWINGS PROVIDED

EMERGENCY LIGHTING PANEL



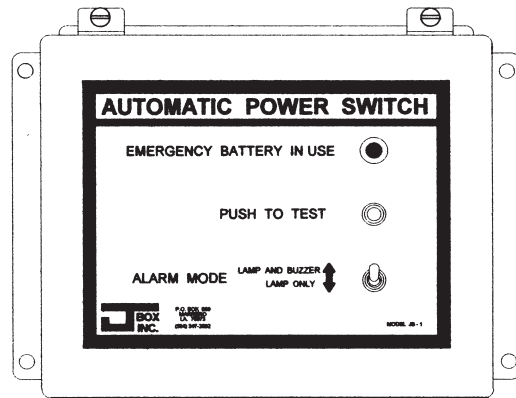
MODEL NO: JB-L6

FOR INTERIOR OR EXTERIOR LIGHTING

FEATURES:

MAIN DISCONNECT CIRCUIT BREAKER
TEST SWITCH
BATTERY DISCHARGE INDICATOR
RELAY CONTACTS RATED FOR 30 AMPS
DUAL FUSES FOR EACH BRANCH CIRCUIT
6 BRANCH CIRCUITS ARE STANDARD
ANY NUMBER OF CIRCUITS AVAILABLE

AUTOMATIC POWER SWITCH



MODEL NO: JB-1

AUTOMATICALLY SWITCHES ANY LOAD FROM POWER SUPPLY TO BATTERY IN THE EVENT OF GENERATOR OR POWER SUPPLY FAILURE
AUDIBLE AND VISUAL ALARM IN THE EVENT OF GENERATOR OR POWER SUPPLY FAILURE
ALARM SILENCE SWITCH AND TEST BUTTON

30 AMP CONTACTS
ENCLOSURE IS 10"W x 8"H x 4"D
AVAILABLE FOR 12, 24 VDC AND 120 VAC

ALSO AVAILABLE:

MODEL NO: JB-L
SIMILAR TO JB-L6 BUT WITH:
3 SWITCHED CIRCUITS FOR POINTS OF DEBARKATION
3 CONTINUOUS CIRCUITS FOR 12 VDC POWER SOURCE

According to Kirk Douglas, the slave army's cries of "I am Spartacus" were actually recorded using the crowd at a Michigan State (Spartans) v. Notre Dame football game.

PERKO® FOG BELLS

The 8 and 12 Inch Bells Listed on This Page Have Been Reviewed by the U.S. Coast Guard and Comply with C.G. 169 Regulations for Sound Signal Appliances as Required by Annex III Paragraph 2 of the '72 Colregs. The 8 Inch Size is for Use on Vessels Under 20 Meters (65.6 ft.) in Length. The 12 Inch Size is for Use on Vessels of any Length.

Fig. 0420 - Fog Bell

Fig. 0420 Polished



CONSTRUCTION:

- Cast Bronze
- Chrome Plated or Polished
- Medium Weight
- Removable

ORDERING & TECH INFO

Bottom Diameter Inches	Height Overall Inches	Polished Bronze Std. Pkg. - 1 Pc.	Chrome Plated Bronze Std. Pkg. - 1 Pc.	Ship Wt. Carton Lbs.
6	5	0420006POL	0420006CHR	3.8
8	6-1/8	0420008POL	0420008CHR	8.7

Screw Size #8 F.H.

Fig. 0420 Chrome

Fig. 0150 - Fog Bell



CONSTRUCTION:

- Cast Bronze
- Chrome Plated, Plain or Polished
- Heavy Weight
- Removable

ORDERING & TECH INFO

Bottom Diameter Inches	Height Overall Inches	Plain Bronze Std. Pkg. 1 Pc.	Polished Bronze Std. Pkg. 1 Pc.	Chrome Plated Bronze Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs.
8	8	0150008PLB	0150008POL	0150008CHR	9.5
12	12	0150012PLB	0150012POL	0150012CHR	36.0

Screw Size 1/4" F.H.

SPARE PARTS ORDERING INFORMATION

For complete Spare Part No. Insert Finish Code: P or PLB, for Plain Bronze or Brass Finish (i.e. 0420P0699A or 0127000PLB). B or POL, for Polished Bronze or Brass Finish (i.e. 0420B0699A or 0127000POL). C or CHR, for Chrome Plated Finish (i.e. 0420C0699A or 0127000CHR).

	ARMS	WALL PLATES	CLAPPERS	EYE BOLTS	ACORN NUTS
Figure No.	Spare Part No.	Spare Part No.	Spare Part No.	Spare Part No.	Spare Part No.
0420-6"	0420_0699A	0127000_	0153008CHR	0113000CHR	0465004_
0420-8"	0171000_	0127000_	0144000_	0123000PLB	0465008_
0150-8"	0171000_	0127000_	0144000_	123000PLB	0465008_
0150-12"	0150_1299A	0150_1299B	0172000_*	0172000_*	0465009_
0158-12	0158_99A*	0158_0099A*	0172000_*	0172000_*	0465009_
0179	017900099A*	017900099A*	0144000_	017900099B	0465008_
0159-6"	0159_0099A	0166000_	0159C0699B	0113000CHR	0465004_
0159-8"	0159_0099A	0166000_	0153008_	0113000CHR	0465004_
	*Includes Wall Bracket	*Includes Arm	*Includes Eye Bolt	*Includes Clapper	

The 8 and 12 Inch Bells Listed on This Page Have Been Reviewed by the U.S. Coast Guard and Comply with C.G. 169 Regulations for Sound Signal Appliances as Required by Annex III Paragraph 2 of the '72 Colregs. The 8 Inch Size is for Use on Vessels Under 20 Meters (65.6 ft.) in Length. The 12 Inch Size is for Use on Vessels of any Length.

Fig. 0158 - Fog Bell

CONSTRUCTION:

- Cast Bronze
- Chrome Plated, Plain or Polished
- Heavy Weight
- Fixed Mounting



Fig. 0158 Polished

ORDERING & TECH INFO

Bottom Diameter Inches	Height Overall Inches	Plain Bronze Std. Pkg. 1 Pc.	Polished Bronze Std. Pkg. 1 Pc.	Chrome Plated Bronze Std. Pkg. 1 Pc.	Ship Wt. Carton Lbs.
12	12	0158012PLB	0158012POL	0158012CHR	37.0

Screw Size 1/4" R.H.

Fig. 0179 - Fog Bell

CONSTRUCTION:

- Wrought Brass
- Plain Brass Finish
- Light Weight
- Fixed Mounting



Fig. 0179

ORDERING & TECH INFO

Bottom Diameter Inches	Height Overall Inches	Standard Pkg. 1 Pc.	Ship Wt. Carton Lbs. Std. Pkg.
12	8	0179012PLB	7.3

Screw Size #12 R.H.

Fig. 0159 - Fog Bell

CONSTRUCTION:

- Stamped Brass
- Plain or Chrome Plated
- Light Weight
- Removable



Fig. 0159 Chrome



Fig. 0159 Plain

ORDERING & TECH INFO

Bottom Diameter Inches	Height Overall Inches	Chrome Plated Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg.	Plain Brass Dealer Pkg. - 2 Pcs. 1 Pc. per Pkg.	Ship Wt. Carton Lbs.
6	4	0159DP6CHR	0159DP6PLB	3.4
8	5	0159DP8CHR*	0159DP8PLB*	6.0

Screw Size #4 F.H.

* 2 pc. bulk package available, Chrome Plated or Plain Brass

SINCE 1895

All Kahlenberg commercial horn models were developed to withstand the punishment of commercial and military service. Their durability has been demonstrated over decades of service on all sizes and types of ocean-going vessels ranging from shrimp boats to aircraft carriers. Military specifications have required extensive testing for many of these whistles and the accessories supplied with them, proving the exceptional qualities of Kahlenberg design and manufacturing.

All Kahlenberg Sound Signals are tested in an in-house anechoic testing chamber to ensure conformance to the standards established by the International Maritime Organization (IMO), ('72 COLREGS). U.S. Coast Guard Certificates of Conformance are included with every shipment. Certificates from numerous other approval bodies are also available.

Model KB-20 Electronic Horn

For vessels less than 75 Meters in length, the Model KB-20 Electronic Horn does not require air or steam piping and is entirely electronic. An electromagnet assembly drives the stainless steel diaphragm to produce over 130 dB (1/3 Octave Band) at 1 Meter. The KB-20 is available in both 24 Volt D.C. or 50 and 60 Hz A.C. models up to 220 Volts. The entire driver assembly is electrically heated to prevent condensation and freezing.



Model KB-20 Electronic Horn

Model "S" and "CHIMETONE" AIR Horn

For vessels less than 75 Meters in Length, these air horns are the most economical solution for signaling where compressed air is readily available. Several models are available utilizing multiple projectors or "trumpets" in their design. Most models are available with optional heating, combination solenoid/manual operating valves and maneuvering lights. Chrome or white powdercoat finishes are also available.



Model S-OA Air Horn



Model S-2 Air Horn

Chimetone Air Horns

Kahlenberg "Chimetone" models all utilize more than one projector or "trumpet" in their design. These projectors each produce a different fundamental frequency which combine to produce powerful, distinctive, musical chords. Owners, builders, and designers of the finest yachts world-wide insist on using Kahlenberg Air Horns because they realize that the sound of a vessel can be one of its most impressive aspects.

Never requiring tuning or adjustments of any kind, most Chimetone Air Horn models are also available with optional clear 360 degree maneuvering light. Made entirely of bronze and brass, all models are available with either chrome or white powdercoat finish.



Model D-2 Air Horn



Model T-3A Air Horn

Zero Series Air Horns

SINCE 1895

Kahlenberg ZERO SERIES AIRHORNS are the perfect choice for any vessel, whether designed for pleasure or commercial service. They meet or exceed the U.S. Coast Guard and International Maritime Organization Safety Regulations for vessels less than 20 meters in length. Since Kahlenberg Airhorns are very conservative with regard to air consumption, they can be operated with an extremely small compressor-tank kit.

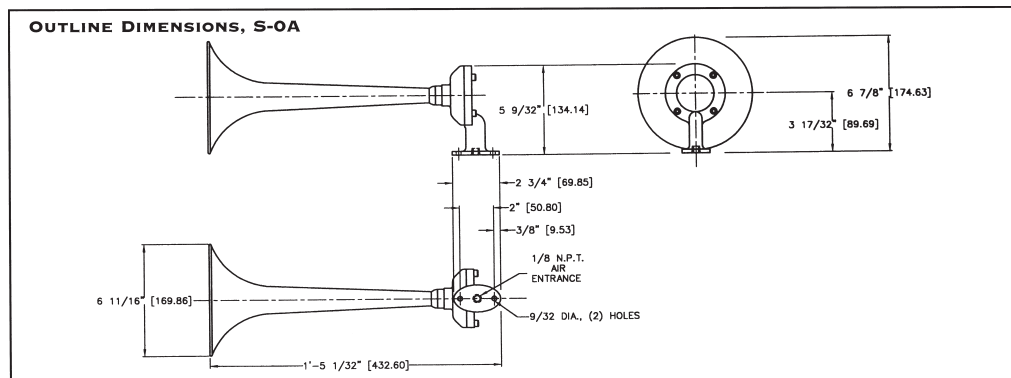
The distinctive sound of these airhorns is scientifically developed for volume, audibility, and richness of tone, based on musical instrument design. Kahlenberg Airhorns require little maintenance. They do not require tuning adjustments, and incorporate no moving parts other than the sound producing diaphragm. All horn castings are of accurately machined bronze, while horn projectors are spun brass. THREE FINISHES ARE NOW AVAILABLE INCLUDING BUFFED BRASS, CHROME PLATE, OR WHITE POWDER-COAT.

TECHNICAL DATA, S-OA

FREQUENCY:	322 HZ
SOUND PRESS:	LEVEL: 122.9 DB (1 /3 OCTAVE @ 1 M)
AIR CONSUMPTION:	7.5 C.F.M. @ 100 P.S.I.
AIR PRESSURE REQUIRED:	50 TO 200 P.S.I.
MATERIAL:	SPUN BRASS AND CAST BRONZE
NET WEIGHT:	4.75 LBS.
SHIPPING WEIGHT:	9 LBS.



Model S-OA Air Horn



TECHNICAL DATA, D-OA

FREQUENCY:	322 & 254 HZ
SOUND PRESS:	LEVEL: 122.5 DB (1 /3 OCTAVE @ 1 M)
AIR CONSUMPTION:	14 C.F.M. @ 100 P.S.I.
AIR PRESSURE REQUIRED:	50 TO 200 P.S.I.
MATERIAL:	SPUN BRASS AND CAST BRONZE
NET WEIGHT:	9 LBS.
SHIPPING WEIGHT:	14 LBS.



Model D-OA Horn

Kahlenberg Horns Model Selection Chart

Kahlenberg

SINCE 1895

Horn Model	Certified for Vessels	Dimensions L x W x H (inches)	Weight (LBS.)	Air Cons. C.F.M.*	Pressure Req'd P.S.I.	HEATED	Compressor	Valve
S-0A	Up to 20 Meters	17 x 6.88 x 6.88	4.75	9	50 to 200	NO	P449-3/P449-4	V-69-K
D-0A	Up to 20 Meters	22.68 x 11.59 x 7.25	9	17.6	50 to 200	NO	P449-3/P449-4	V-69-K
T-0A	Up to 20 Meters	22.68 x 14.53 x 9.31	16	21.5	50 to 200	NO	P449-9/P449-10	V-69-K
S-2	Up to 20 Meters	17.18 x 7.63 x 8.31	20	26.4	100 to 250	NO	CE-50A	V-150AL
S-2CHT	Up to 75 Meters	26.63 x 14.25 x 9.13	37	26.4	100 to 250	YES	CE-50A	INCLUDED
D-2	Up to 75 Meters	20.61 x 15.5 x 8.56	33	31.2	100 to 250	NO	TUE-52	V-150AL
T-1	Up to 75 Meters	18.31 x 13.03 x 13.66	23	36	100 to 250	NO	TUE-52	V-150AL
T-2	Up to 75 Meters	22.24 x 22.4 x 12.03	55	42	100 to 250	NO	CUE-1001A	V-150AL
T-3A	Up to 75 Meters	21.13 x 20.13 x 18.75	75	56.4	100 to 250	NO	CUE-200A	V-152L
Q-3A	Up to 75 Meters	24.38 x 16.31 x 20.13	100	70.8	100 to 250	NO	CUE-200A	V-152L
KB-20	Up to 75 Meters	37.38 X 11.5 X 21.31	49	NONE	ELECTRIC	YES	NONE	NONE
S-216C	75 to 200 Meters	20.41 x 12 x 16.16	45	46	100 to 250	NO	CUE-200A	INCLUDED
S-216CHT	75 to 200 Meters	30.14 X 13.25 X 13.56	75	46	100 to 250	YES	CUE-200A	INCLUDED
S-203C	Over 200 Meters	44.375 x 22 x 22	70	98	100 to 250	NO	CUE-200A	V-152L
S-203CHT	Over 200 Meters	47.5 X 22 X 22	110	98	100 to 250	YES	CUE-200A	INCLUDED
KPH-130	Over 75 Meters	39.3 x 13.31 x 33.25	220	NONE	ELECTRIC	YES	NONE	NONE

Air Consumption (C.F.M.) measured at 100 p.s.i. Air Pressure.

Additional models are available in addition to those referenced herein.

Complete Technical Data Sheets are available for all items.

Buell-Strombos Air Horns

No one ignores these horns. No one.

Rising above ambient noise of any sort, Buell-Strombos air horns adapt to any application where authoritative, unmistakable signals must be the norm. On emergency vehicles, on boats of all kinds, in industrial plants, these horns deliver the message at 50-150 psi.

They are constructed entirely of brass and bronze with hand-spun bells and a diaphragm of stainless steel. Their blazing chrome is thick and tough, able to resist both salt water and the daily onslaughts of heavy urban use.

No.	Nominal Bell Length	Freq.
1061	10" Buell-Strombos Horn	493
1062	12" Buell-Strombos Horn	392
1063	15" Buell-Strombos Horn	311
1064	18" Buell-Strombos Horn	246



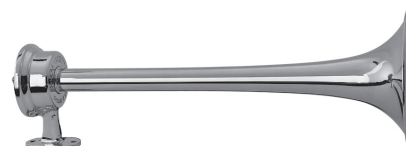
1061 Buell-Strombos - Ten



1062 Buell-Strombos - Twelve



1063 Buell-Strombos - Fifteen



1064 Buell-Strombos - Eighteen

A manual horn incorporating the quality and tone of larger models, the Buell selfpowered horn creates deep-toned signals from a 22-inch instrument bell. The handle adapts to remote control from cabin or cockpit. It's the perfect stand-by signal for power failures, and it too is heavy with brass and chrome.



Solenoid Valves

Designed for the remote control of air horns, these electric valves feature brass bodies with 1 / 8" inlet/ outlet ports and a molded coil. Rated for intermittent duty, these valves open against a maximum pressure of 150 psi.

12070 Series Solenoid Valve



Manual Valves

With rugged brass construction, these valves will serve for many years in the manual control and mechanical operation of all Buell air horns.

Air Tanks

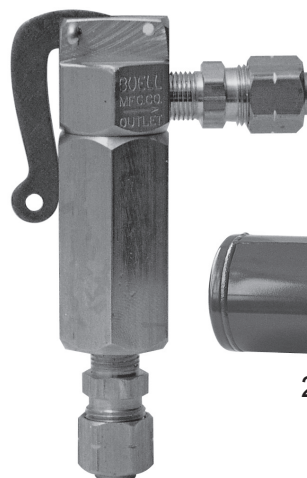
These tanks are tough, and therefore safe and durable. All-steel, welded construction lends extra strength. Fitted steel straps and brass tubing fittings make for easy mounting.

High Pressure Nylon Tubing

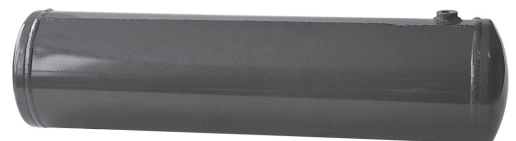
The preferred tubing for safe, trouble-free service in all signalling applications. It's available in three standard diameters.

No.	Product	Specs.
12076	Solenoid Valve	12 volt DC
12077	Solenoid Valve	24 volt DC
12078	Solenoid Valve	32 volt DC
12079	Solenoid Valve	115 volt AC
2040	Manual Valve	-
2242	Air Tank	6" x 25"
2243	Air Tank, legs, & platform	6" x 25"
5150	Air Tank	6" x 12"
2103	High Pressure Nylon tubing	³ / ₁₆ " O.D.
2105	High Pressure Nylon tubing	⁵ / ₁₆ " O.D.
2108	High Pressure Nylon tubing	³ / ₈ " O.D.

2040 Manual Valve



5150 6" x 12" Air Tank



2242 6" x 25" Air Tank

Functioning alone, Buell-Strombos air horns are commanding and powerful. Bracketed in pairs or groups, they become musical in their power and command.

A gleaming chrome finish highlights the brackets' all-bronze construction. The mounting kit contains gaskets, stainless steel mounting screws, lockwashers, and a tube fitting in addition to the bracket in duplex, triplex, or quadruplex configuration.

Horns and brackets are sold separately.



1085 Duplex Bracket



Duplex Bracket and Horn Assembly



1086 Triplex Bracket



Triplex Bracket and Horn Assembly

No. Product

1085 Duplex Bracket

1086 Triplex Bracket

Horns and brackets sold separately

AFI ELECTRIC TRUMPET HORNS

Deluxe Single Trumpet Electric Horn

- 100% stainless steel exterior
- Type 304 stainless steel diaphragm
- Dimensions: 16-1/2" L x 4" W x 4-3/4" H
- Maximum amp draw: 5 Amps
- dB(A) rating: 116 at one meter
- Fundamental frequency: 390±15

11025



24 Volt Deluxe Single Trumpet Electric Horn

- Maximum amp draw: 2.5 Amps
- dB(A) rating: 116 at one meter
- Fundamental frequency: 390±15

11017

Deluxe Dual Trumpet Electric Horn

- 100% stainless steel exterior
- Type 304 stainless steel diaphragm
- Dimensions: 18-1/2" L x 8" W x 5" H
- Maximum amp draw: 10 Amps
- dB(A) rating: 122 at one meter
- Fundamental frequency: 390±15/330±15

11026



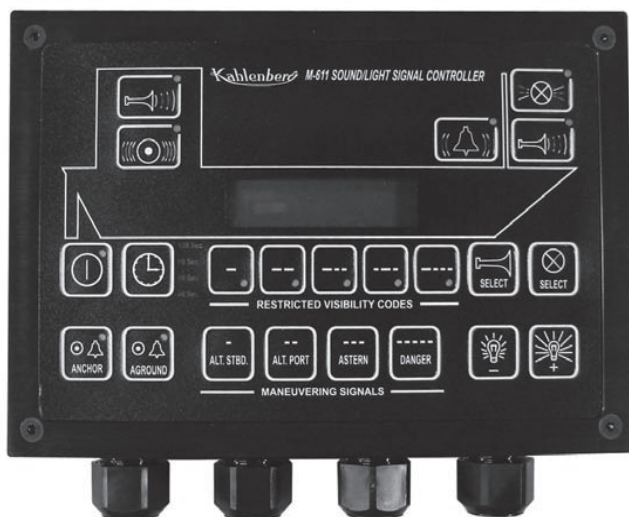
24 Volt Deluxe Dual Trumpet Electric Horn

- Maximum amp draw: 5 Amps
- dB(A) rating: 122 at one meter
- Fundamental frequency: 390±15/330±15

11018

For Automated Control of Navigational Whistles and Light

The new M-611 Sound and Light Control significantly improves safety by producing automatic sound and light signals required by IMO and SOLAS with a simpler, more user friendly control panel. Producing automated restricted visibility codes, maneuvering codes, general alarm, and abandon ship codes per IMO and SOLAS requirements, the M-611 controls multiple horns, morse light, ship's bell and gong, and can be configured for use with external alarm systems and sound surveillance systems to suit the needs of almost any arrangement of ship systems.



Power Source Required:	100-240 V.A.C. 50/60 Hz AND/OR 8-30 V.D.C., .5 AMP
Switching Capacity of Outputs:	A.C. or D.C., 2 Amps Maximum each
Operating Temperature:	-40°C to +85°C [-40°F to +176°F]
Enclosure and Bezel: Finish:	IP65, Aluminum Hardcoat black anodized

- Ruggedly constructed to withstand the harsh marine environment
- Generates IMO Navigation Rule 35 Automated Signals for Restricted Visibility (40, 60, 90, 120 second cycle times)
- Generates IMO Navigation Rule 34 Maneuvering Codes
- At-Will and Automatic Control of all connected devices (horns, bell, gong, morse light)
- Produces SOLAS General Emergency Alarm and Abandon Ship Codes with external push buttons
- Mute connection for external Sound Surveillance Systems
- Connects to any external device push buttons
- Integrates with External Alarm Systems
- Internal Log Function
- Multiple M-611 Units can be connected for control from multiple locations onboard
- Illuminated, Dimmable Display
- Red LED Indicator Lighting and LCD Display
- Easy to use graphical switch panel

REV.	BY	DATE	DESCRIPTION	APP'D
A	ZN	03/22/10	ADDED CAGE NUMBER	EMK
B	ZN	06/02/10	ADDED CUT OUT DIMENSIONS	EMK



CUT OUT & DRILLING DIMENSIONS FOR INSTALLATION.

CAGE: 75214

PARTS LIST DRAWING 3-6542



KAHL ENBERG BROS. CO. TWO RIVERS WISCONSIN 54241

OUTLINE DIMENSIONS

M-611 WHISTLE CONTROL

DR.	DATE	CKD.	SCALE	DRWG. NO.	REV.
ZJN	09/29/09	EMK	N.T.S.	3-6540	B

MATERIALS & FINISHES

ENCLOSURE: 16 AWG ALUMINUM, HARDCOAT BLACK ANODIZED,
MIL SPEC 8625 TYPE 3 CLASS 2 BLACK

ELECTRICAL RATINGS

INPUT: 120/240 V.A.C. 50/60 Hz
24 V.D.C.
OUTPUT: 2 AMPS MAXIMUM

Index Section K

MISCELLANEOUS

<u>product</u>	<u>pages</u>
Corrosion Treatment for Metal Ospho	801
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In 1923, a very important meeting was held at the Edgewater Beach Hotel in Chicago. Attending this meeting were nine of the world's most successful financiers: Charles Schwab, president of the largest independent steel company; Samuel Insull, president of the largest utility company; Howard Hopson, president of the largest gas company; Arthur Cotton, the greatest wheat speculator; Richard Whitney, president of the New York Stock Exchange; Albert Fall, a member of the President's cabinet; Leon Fraser, president of the Bank of International Settlements; Jesse Livermore, the greatest "bear" on Wall Street; and Ivan Krueger, head of the greatest monopoly.

Twenty-five years later, Charles Schwab had died in bankruptcy, having lived on borrowed money for five years before his death; Samuel Insull had died a fugitive from justice, and penniless in a foreign land; Howard Hopson was insane; Arthur Cotton had died abroad-insolvent; Richard Whitney had spent time in Sing Sing State Prison; Albert Fall had been pardoned so that he could die at home; Jesse Livermore, Ivan Krueger, and Leon Fraser had all died by suicide. All these men had learned well the art of making a living, but none of them had learned *how to LIVE*. ‘

- quoted from Jesus and the Intellectual by Bill Bright

The 10 Smartest Things Ever Said About Money (continued)

- 1 "I can calculate the motions of heavenly bodies, but not the madness of people." - Isaac Newton
- 2 "He is richest who is content with least." - Socrates
- 3 "A great investment opportunity occurs when a marvelous business encounters a one-time huge, but solvable, problem." - Warren Buffett
- 4 "Buy straw hats in the wintertime. Summer will surely come." - Financier Bernard Baruch
- 5 "Rich people plan for four generations. Poor people plan for Saturday night." - Gloria Steinem

How did you break your arm? By Gloria Abrahamson

Even if you aren't a skier, you'll be able to appreciate the humor of the slopes as written in this account by a New Orleans paper.

A friend just got back from a holiday ski trip to Utah with the kind of story that warms the cockles of anybody's heart. Conditions were perfect, 12 below, no feeling in the toes, basic numbness all over, the "tell me when we're having fun" kind of day.

One of the women in the group complained to her husband that she was in dire need of a restroom. He told her not to worry, that he was sure there was relief waiting at the top of the lift in the form of a powder room for female skiers in distress. He was wrong, of course, and the pain did not go away.

If you've ever had nature hit its panic button in you, then you know that a temperature of 12 below zero doesn't help matters. So, with time running out, the woman weighed her options.

Her husband, picking up on the intensity of the pain, suggested that since she was wearing an all-white ski outfit, she should go off in the woods. No one would even notice, he assured her. The white will provide more than adequate camouflage. So she headed for the tree line, began disrobing and proceeded to do her thing. If you've ever parked on the side of a slope, then you know there is a right way and wrong way to set your skis so you don't move. Yup, you got it. She had them positioned the wrong way.

Steep slopes are not forgiving, even during embarrassing moments. Without warning, the woman found

herself skiing backward, out-of-control, racing through the trees, somehow missing all of them and into another slope. Her derriere and the reverse side were still bare, her pants down around her knees, and she was picking up speed all the while.

She continued on backwards, totally out-of-control, creating an unusual vista for the other skiers.

The woman skied, if you define that verb loosely, back under the lift, and finally collided violently with a pylon. The bad news was that she broke her arm and was unable to pull up her ski pants. At long last her husband arrived, put an end to her nudie show, then went to the base of the mountain and summoned the ski patrol, who transported her to a hospital.

In the emergency room she was regrouping when a man with an obviously broken leg was put in the bed next to hers.

"So, how'd you break your leg." She asked, making small talk.

"It was the darndest thing you ever saw," he said. "I was riding up this ski lift, and suddenly I couldn't believe my eyes. There was this crazy woman skiing backward out of control down the mountain with her bare bottom hanging out of her clothes and her pants down around her knees. "I leaned over to get a better look and I guess I didn't realize how far I'd moved. I fell out of the lift.

"So how'd you break your arm?"

SKYCO



A METAL TREATMENT — NOT A PAINT

When applied to rusted metal, OSPHO chemically changes the rust (iron oxide) into iron phosphate — an inert hard gray surface. Rust action is completely stopped. Paint applied over OSPHO adheres so tightly that moisture cannot get through to attack the metal. Result: paint lasts and protects much longer.

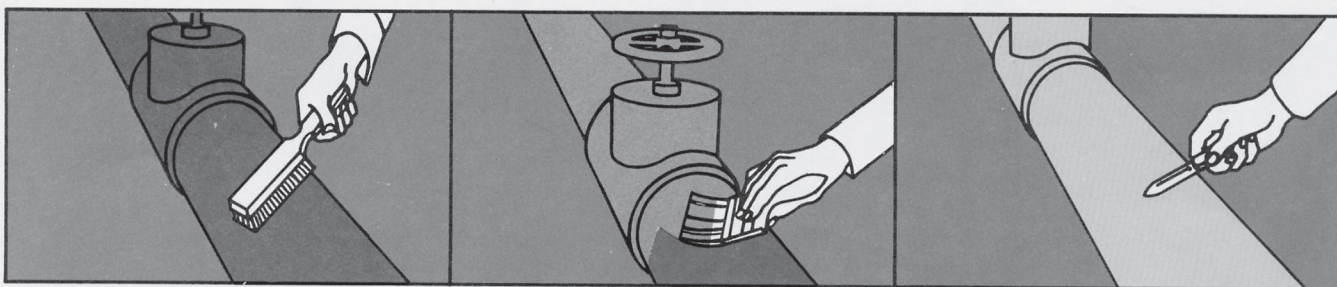
OSPHO PROVES ITS WORTH WHEREVER THERE'S RUST

OSPHO is ordered and reordered by many nationally known institutions and companies across all industries. Since it was introduced in 1947, it has proved its worth wherever corrosive conditions create a problem.— on boats, in refineries, in chemical and packing plants, in arsenals, in power stations, etc. Put it to work for you!

OSPHO SAVES TIME ON HUNDREDS OF MAINTENANCE JOBS

If it's made of ferrous metal it will rust. Use OSPHO to conquer rust on railroad cars, downspouts, gutters, ships' hulls, stacks, tanks, buildings, fences, fire escapes, sash, roofs, girders, plates, pipe — any metal surface.

TEST OSPHO YOURSELF



1. Brush away loose rust and scale.
2. Brush or spray OSPHO on rusted metal. Let it dry overnight.
3. Test it. Scrape the surface with a knife, notice that it's just like rough glass. OSPHO forms the perfect base for paint.

No Sand Blasting or Flame-Cleaning —

You save hours of preparation time. OSPHO goes on right over the rust to form a perfect base for paint.

Easy to Apply —

Use OSPHO as it comes from the container. No mixing or stirring. OSPHO can be used to touch up rusted spots, avoiding adjacent non-metal or separately painted surfaces. Non-flammable.

Paint Jobs Last Longer —

One application of OSPHO kills all the rust . . . stops further rust action. Paint coat adheres so tightly that moisture can't penetrate to the metal. Paint lasts and protects much longer — you save time and materials' costs of frequent repainting.

SKYCO TECHNICAL BULLETIN

OSPHO

Compounded exclusively by The Skybryte Company, Cleveland, Ohio
A METAL TREATMENT - NOT A PAINT
RESISTS / RETARDS RUST - PROVIDES A SOUND BASE FOR PAINT
DIRECTIONS FOR USE

RUSTED METALS - OSPHO is a rust-inhibiting coating - NOT A PAINT. You do not have to remove tight rust. Merely remove loose paint and rust scale, dirt, oil, grease and other accumulations with a wire brush - apply a coat of OSPHO as it comes in the container - let dry overnight, then apply whatever paint system you desire. When applied to rusted surfaces, OSPHO causes iron oxide (rust) to chemically change to iron phosphate - an inert, hard substance that turns the metal black. Where rust is exceedingly heavy, two coats of OSPHO may be necessary to thoroughly penetrate and blacken the surface to be painted. A dry, powdery, grayish-white surface usually develops; this is normal - brush off any loose powder before paint application.

NEW METALS - For new ferrous or aluminum metals: remove dirt, grease, or oil; apply OSPHO, let dry overnight, then paint.

GALVANIZED: where appearance is important, apply one coat of OSPHO, let stand for approximately thirty minutes or until metal is etched. Flush with water, avoiding damage to adjacent areas; or wipe to a smooth finish, let dry, then paint. Where appearance is not important, one coat of OSPHO is recommended to thoroughly coat and etch the metal. Let stand overnight or until completely dry. Brush off any loose powder before painting.

A typical paint application will last much longer after an application of OSPHO because subsequent paint coatings attach themselves so tightly that moisture and oxygen cannot attack the metal. OSPHO is water-thin, and therefore goes on easily and covers a larger area than paint. One gallon covers approx. 600 square feet. Historically, best results have been achieved using an oil-base primer and topcoat. Test a trial sample before using under epoxy or latex-base paint applications. OSPHO is equally effective for exterior and interior work alike and is highly recommended as a pre-treatment coating by leading paint manufacturers.

For best results, use OSPHO at temperatures no lower than 36 degrees F. Excessive dew and humidity may prolong drying time and cause powdery buildup.

Spray equipment should be flushed out with water after using. Clean brushes with water. Avoid getting OSPHO on adjacent areas such as painted surfaces, concrete, masonry and stonework. If splashing occurs, flush immediately with water to remove.

WARNING: OSPHO contains phosphoric acid. **KEEP OUT OF REACH OF CHILDREN**. If taken internally give large quantities of milk or water. Call physician. Avoid contact with eyes. In case of contact, flush with water. Prolonged exposure to skin may cause irritation - use rubber gloves or other forms of skin protection.

SAFELY DISSOLVES BLEEDING RUST FROM MANY PAINTED SURFACES:

CAUTION: paint composition & quality vary greatly. A check should be made by testing OSPHO on a small area. Dulling or peeling may occur in some finishes. The manufacturer assumes no liability for damage to finished surfaces.

OSPHO MAKES A LASTING BOND BETWEEN RUSTED METAL AND PAINT

CHEMICAL DATA:

OSPHO is a balanced formula of Phosphoric acid, Sodium Dichromate, Surfactants, and Extenders.

PHYSICAL DATA:

Boiling Point 240 degrees F Specific Gravity. 1.22 + / - .04 Average % Nonvolatile= 37.6% + / - 0.5%
Soluble in Water Color. Green Liquid Odor. Typical Acidic

SPILLS: Neutralize with basic material, flush with plenty of water.

RESPIRATORY: Use adequate ventilation in confined areas, skin and eye protection should be used.

FIRE DATA: No hazard **DECOMPOSITION PRODUCTS**: Oxides of phosphorus

HEALTH HAZARD: Irritant to eyes and mucous membranes. In case of external contact, flush with cool water. If swallowed, give 1 or 2 glasses of water or milk and call physician. **KEEP OUT OF REACH OF CHILDREN**

REACTIVITY DATA: Can react with various metals to generate hydrogen gas, which could form an explosive concentration in confined spaces. Use adequate ventilation.

Splash Zone Mastic

Selection & Specification Data

Generic Type	Epoxy Polyamide
Description	Solvent-free <u>patching compound</u> used for <u>repairing pits, cracks and voids</u> in steel, concrete, wood and other surfaces. Has the unique ability to be mixed, applied and cured underwater.
Features	<ul style="list-style-type: none"> ▪ Designed for underwater and other wet applications. ▪ Can be applied up to 2" in thickness ▪ Self-priming on most surfaces and over most generic types of coatings ▪ Rapid cure characteristics ▪ VOC compliant to current AIM regulations
Color	Olive Green
Finish	Flat
Primers	Self-priming
Topcoats	Epoxies, Polyurethanes if required
Dry Film Thickness	1/8"-2" (3.1-50 mm) for most applications 1/4" (6.4 mm) is practical maximum thickness for vertical and overhead applications.
Solids Content	By Volume: 99% ± 1%
Theoretical Coverage Rate	1604 mil ft ² (24.5 m ² /l at 25 microns) Allow for loss in mixing and application. Field experience has displayed a realistic coverage rate of 8 ft ² /gallon (.2 m ² /l). This figure accounts for actual losses and the fact that the product is frequently applied at higher dry film thicknesses.
VOC Values	As supplied: 0.00 lbs/gal (0 g/l) These are nominal values.
Dry Temp. Resistance	Continuous: 200°F (93°C) Non-Continuous: 250°F (121°C)

Substrates & Surface Preparation

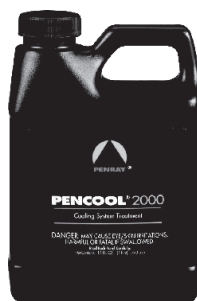
General	<p>Remove all oil or grease from the surface with Carboline Surface Cleaner 3 in accordance with SSPC-SP1.</p> <p>Remove all dirt, loose paint, spalling concrete, rotted wood, marine growth and other contaminants by abrasive blasting or high pressure water blasting.</p> <p>Hand or power tool cleaning methods may be used but are of limited benefit and are time consuming.</p> <p>Abrasive blasting can be done underwater as the initial air blast will clear a path through the water for the abrasive/air mixture.</p> <p>When working at the splash zone or in salt water, coat cleaned metal surfaces as soon as possible to minimize new corrosion.</p>
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Penray® Cooling System Liquid Inhibitors

Pencool® 2000 Cooling System Treatment with Corrosion Inhibitor

Pencool 2000 is a patented liquid formula to keep diesel engines running cleaner. This easy-to-use product reduces scaling and corrosion and acts as a lubricant in the cooling system. Pencool 2000 controls formation of harmful scale deposits, reduces metal corrosion and cavitation erosion, and lubricates the water pump and other metal surfaces. Pencool 2000 eliminates messy filters, saving you maintenance time costs.



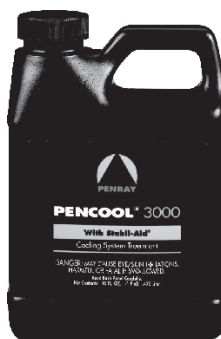
Part #	Qty.	Net Cont.	Container
200016	12 / cs.	16 fl. oz.	Bottle
200064	6 / cs.	½ gal.	Bottle
200005	1	5 gal.	Pail
200065	1	55 gal.	Drum

To pre-charge system: one pint of Pencool 2000 for every four gallons of cooling system capacity

To maintain system: one pint of Pencool 2000 for every 20 gallons of cooling system capacity

Pencool®3000 with Stabil-Aid® Cooling System Treatment with Corrosion Inhibitor and Coolant Stabilizer

Pencool 3000 is an advanced cooling system treatment that helps prevent the formation of gel deposits in cooling systems. These deposits can plug radiator passages, aftercoolers, and oil coolers, and can cause excessive water pump wear. Pencool 3000 blocks the formation of this gel, conditions cooling system water, and protects all cooling system metal components from corrosive attack. Use Pencool 3000 to maintain proper cooling system heat transfer characteristics and long engine life.



Part #	Qty.	Net Cont.	Container
300016	12 / cs.	16 fl. oz.	Bottle
300064	6 / cs.	½ gal.	Bottle
300005	1	5 gal.	Pail
300065	1	55 gal.	Drum

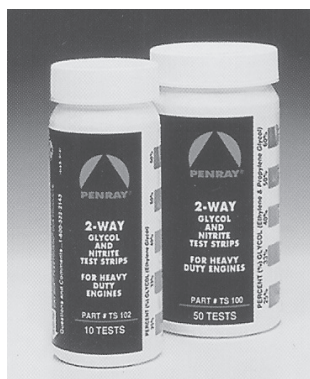
To pre-charge system: one pint of Pencool 3000 for every four gallons of cooling system capacity

To maintain system: one pint of Pencool 3000 for every 20 gallons of cooling system capacity

Penray Coolant Test Strips

This system provides a quick and easy way of testing your heavy duty coolant system. Test strips provide a hassle free, more precise way to determine the freeze and nitrite levels contained in your cooling system. Penray recommends the use of 2-Way test strips to evaluate nitrite containing coolants including Pencool®, Caterpillar®, Fleet Charge®, Fleetguard®, Detroit Diesel®, John Deere®, Quaker State®, AFS, Toxguard, etc.

Part #	Qty.	Contents
TS-100	12 bot / cs.	50 Strips per Bottle
TS-102	12 bot / cs.	10 Strips per Bottle in a blister card case





Pencool® Diesel Fuel Treatments

Penray Winter Pow-R PLUS® Diesel Fuel Treatment

Winter Pow-R PLUS®, with HAFI® Technology (Hybrid Anti-Settling Flow Improver), was developed to inhibit the gelling of diesel fuel at sub-zero temperatures, for easier starting. It also emulsifies water in diesel fuel to prevent ice crystal formation which can block fuel lines and filters. In addition, Winter Pow-R PLUS® enhances the cold flow characteristics of diesel fuel, stabilizes it, and suppresses sludge and gum formation. It does not contain harmful alcohol.

Prevents gelling of diesel fuel

Utilizes HAFI® Technology (Hybrid Anti-Settling Flow Improver)

Emulsifies water to prevent ice crystal formation

Improves cold weather starting

Reduces emissions

Improves fuel economy

Stabilizes fuel and prevents corrosion

Will pour from the bottle at -15°F

Part #	Qty.	Net Cont.	Container	Treat Rate
202016	24 / cs.	16 fl. oz.	Bottle	125 gal.
202005	1	5 gal.	Pail	7,500 gal.
202055	1	55 gal.	Drum	82,500 gal.



Penray Fuel Prep Diesel Fuel Conditioner

Fuel Prep 1000 and 2012 combat sludge formation and disperse existing sludge in fuel tanks, while controlling bacterial and fungal growth. The result: fewer plugged lines, fuel filters, and injector nozzles. Fuel Prep also conditions less stable diesel fuels by allowing them to burn cleaner and more completely, thus improving emissions and injector spray patterns. Fuel Prep also reduces accumulation of unburned carbon particles so engines stay cleaner. Regular use of this conditioner also reduces lube oil dilution and contamination.



Part #	Qty.	Net Cont.	Container	Treat Rate
100016	24/cs.	16 fl. oz.	Bottle	125 gal.
100005	1	5 gal.	Pail	5000 gal.
100055	1	55 gal.	Drum	
201201	6/cs.	1 gal.	Bottle	12-15,000 gal.
201205	1	5 gal.	Pail	
201255	1	55 gal.	Drum	

Penray Winter Thaw® Emergency Diesel Fuel Treatment

Winter Thaw®, dissolves already gelled fuel fast. Reduces clogging of fuel lines and filters. It also prevents ice crystal build-up in fuel lines and filters. In addition, it eliminates hard starting, pounding, excessive smoking, and helps improve combustions. Winter Thaw® is 100% compatible with all No. 2 fuel and fuel blends.

Part #	Qty.	Net Cont.	Container	Treat Rate
202132	12 / cs.	32 fl. oz.	Bottle	25 gal.
202101	1	1 gal.	Bottle	100 gal.

Penray Winter Blend Diesel Fuel Treatment

Winter Blend, with HAFI® Technology (Hybrid Anti-Settling Flow Improver), is an excellent product for bulk fuel applications. It reduces pourability to below 0° F, Prevents fuel gelling, fuel line icing, and disperses water. Winter Blend is 100% compatible with all No. 2 fuel and fuel blends.

Part #	Qty.	Net Cont.	Container	Treat Rate
203025	2 / cs.	2.5 gal.	Jug	7,500 gal.

Penray Total Diesel Fuel System Cleaner

Penray's Total Diesel Fuel System Cleaner is a year-round diesel fuel additive. The clear quart bottle conveniently treats 250 gallons, or 2 saddle tanks. The properties of the product are:



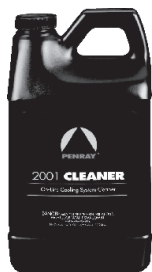
Part #	Qty.	Net Cont.	Container	Treat Rate
202432	12 / cs.	32 fl. oz.	Bottle	250 gallons



Penray® Cooling System Cleaners

Penray 2001 On-Line Cooling System Cleaner

Penray 2001 On-Line Cooling System Cleaner cleans diesel engine cooling systems *while they remain in service*. This liquid product is an excellent alternative to in-shop cleaning for engines having only light scale and limited corrosion product formation. 2001 Cleaner is ideal for periodic on-the-road cleaning, as it removes harmful mineral scale and oxide deposits. For engines with green slime, excessive scaling, or heavy oil deposits, Penray recommends the 2015 Twin Pac.



Part #	Qty.	Net Cont.	Container
200164	6 / cs.	½ gal.	Bottle
200105	1	5 gal.	Pail
200155	1	55 gal.	Drum

One half gallon of 2001 Cleaner treats eight gallons.

Penray 2015 Twin Pac Off-Line Cooling System Cleaner and Conditioner

The Penray 2015 Twin Pac combines 2010 Cleaner with 2011 Conditioner for heavy duty cooling system treatment. 2010 removes harmful scale and sludge deposits from the entire cooling system. It also removes corrosion deposits, green slime, and oil deposits. 2011 flushes the cooling system of loosened deposits, removes any accumulated oil, and conditions the metal surfaces. The cooling system is then ready to begin a Pencool treatment program.



Part #	Qty.	Container
201549	2 Twin Pacs / cs.	Each Twin Pac contains one 8lb. Bottle of 2010 Cleaner and one 8lb. Bottle of 2011 Conditioner
*Also available in 30lb. and 50 lb. drums		

Part #	Qty.	Container	Treat Rate		
201549	2 Twin Pacs / cs.	Each Twin Pac contains one 8lb. Bottle of 2010 Cleaner and one 8lb. Bottle of 2011 Conditioner	Capacity	Normal	Extreme
			Up to 10 gal.	3 lb.	6 lb.
			11-16 gal.	5 lb.	10 lb.
			17-25 gal.	7 lb.	14 lb.
			26-32 gal.	10 lb.	20 lb.

Penwash Truck Wash Concentrate

Penray is proud to introduce a fantastic cleaner into our line. This cleaner was developed especially for the truck, bus, and off-road industry. It washes away the toughest road dirt, shop grease, and environmental grime. It is now available in 5 gallon pails and 55 gallon drums.

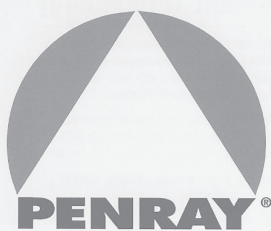
Part #	Qty.	Net Cont.	Container
TVWC-05	1	5 gal.	Pail
TVWC-55	1	55 gal.	Drum

Treat Rate	Water: Soap Ratio
Regular Wash	100:1
Excess Dirt	50:1
Extreme Cases	10:1

Penwash Marine Cleaner and Degreaser

Penray is proud to introduce a fantastic cleaner into our line. This cleaner was developed especially for the marine industry. It washes away the toughest marine grime, rig grease, and environmental grime. It is now available in 5 gallon pails and 55 gallon drums.

Part #	Qty.	Net Cont.	Container
MMVC-05	1	5 gal.	Pail
MMVC-55	1	55 gal.	Drum
Treat Rate		Water: Conc. Ratio	
Regular Wash		4:1	
Excess Dirt		2:1	
Extreme Cases		Full Strength	



Pencool® Cooling System Filters

Penray Need-Release® Extended Life Cooling System Treatment

NEW AND IMPROVED TREAT RATE

Need-Release filters now last 150,000 miles, 15 months, or 3,000 hours!

The Penray Need-Release Extended Life Cooling System Treatment is much more than just another cooling system filter. It goes beyond just filtration by releasing Supplemental Coolant Additive (SCA) when your engine needs it. This unique system senses the corrosivity of the coolant and releases the correct amount of treatment to keep your cooling system protected at all times. Penray's patented Need-Release membrane technology makes this possible and saves on labor costs and filter inventory. One Need-Release filter can replace from eight to ten ordinary filters.

Penray sells adapters for irregular filter nipples on Volvo® engines (part # VFA-1000).

NF2088

Fits standard filter bracket for Detroit Diesel, Caterpillar, Cummins, Ford, etc. engines. Compatible with an 8-20 gallon cooling system capacity that has been pre-charged with 1200-1400 PPM nitrite.

NFC2089

Fits Mack, Mid-Liner, Mack V-8, 65, and Econo-Dyne series engines. Compatible with an 8-20 gallon cooling system capacity that has been pre-charged with 1200-1400 PPM nitrite.

NFC2090

Fits Mack, ESI, E-9, and Maxi-Dyne engines. Compatible with an 8-20 gallon cooling system capacity that has been pre-charged with 1200-1400 PPM nitrite.



NF2091

Fits standard filter bracket for Detroit Diesel, Caterpillar, Cummins, Ford, etc. engines. Compatible with an 8 gallon or less cooling system capacity that has been pre-charged with 1200-1400 PPM nitrite.

NF2095

Fits standard filter bracket for Cummins ISX engine. Compatible with an 8-20 gallon cooling system capacity that has been pre-charged with 1200-1400 PPM nitrite.

MONEY

Money doesn't grow on trees;
you've got to beat the bushes for
it.

Two can live as cheaply as one but
only half as long.

By the time a man has money to
burn, the fire has gone out.

Money can't buy everything—pov-
erty, for example.

My wife found a way to save her
money—she uses mine.

The love of money is the root of all
evil. 1Timothy 6:10

Pencool® 3000 Cooling System Filters With Corrosion Inhibitor and Coolant Stabilizer

All Pencool 3000 Cooling System Filters combine a high-quality, long-life Pencool Filter with one pint or more of Pencool 3000 Cooling System Corrosion Inhibitor and Coolant Stabilizer. It's the only high performance filter that can stop coolant gel formation. Pencool 3000 is accepted for use by major engine manufacturers and is compatible with all types of antifreezes.

All NF3000 version filters fit standard filter brackets for Detroit Diesel, Caterpillar, Cummins, Ford, etc. engines.

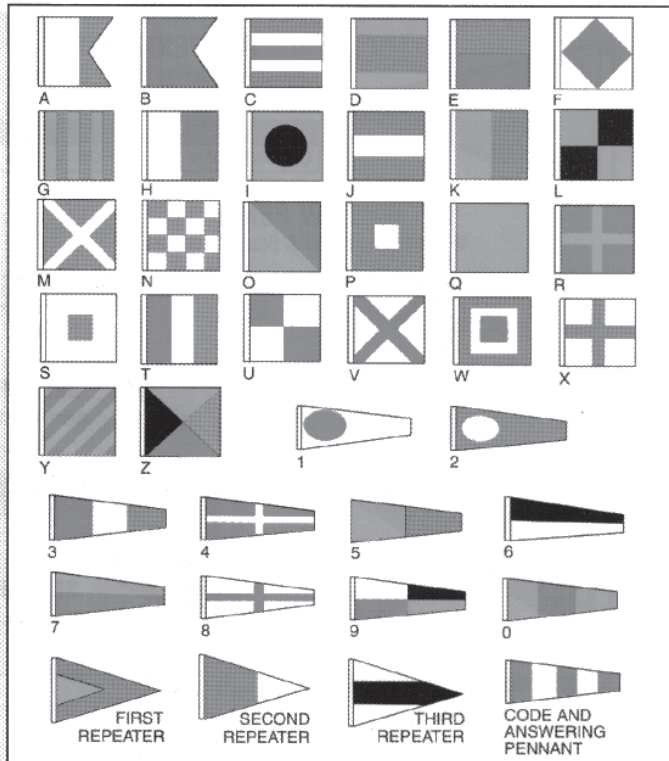
Part No.	Treat
NF3000	4-16 gal.
NF3008	16-32 gal.
NF3012	32-50 gal.
NF3016	50-75 gal.
NF3032	75-100 gal.
NF3053	100-150 gal.



NAUTICAL FLAGS

INTERNATIONAL CODE OF SIGNALS

Forty flags to a set including alphabet, numerals, repeaters and code and answering pennant. Nylon, sewn throughout with double-stitched seams and all in approved colors. Complete with rope distance lines. Sizes 0, 2, 3, 7 & 10 supplied with ash toggles and size 14 supplied with bronze snaps & rings. All complete sets are supplied with durable storage/carrying bag.



SIZE	DESCRIPTION	SIZE	DESCRIPTION
0	26 Alphabet Flags: 1' x 1 1/4' 11 pennants: 2/5' x 2' 3 Substitutes: 2/5' x 1 1/8'	7	26 Alphabet Flags: 3' x 3' 11 Pennants: 2' x 4 1/2' 3 Substitutes: 2' x 4'
2	26 Alphabet Flags: 1 1/2' x 2' 11 Pennants: 1 1/5' x 3' 3 Substitutes: 1' x 2'	10	26 Alphabet Flags: 4' x 4' 11 Pennants: 2 2/5' x 6' 3 Substitutes: 2 2/5' x 5 1/8'
3	26 Alphabet Flags: 2' x 2' 11 Pennants: 1 1/5' x 3' 3 Substitutes: 1 1/5' x 2 1/5'	14	26 Alphabet Flags: 4' x 6' 11 Pennants: 2 2/5' x 9' 3 Substitutes: 2 2/5' x 5 1/8'

COMPLETE SETS

ITEM #	SIZE	LBS.
080073	0	6.0
080074	2	9.0
080075	3	11
080076	7	16
080077	10	27
080078	14	39

INDIVIDUAL FLAGS

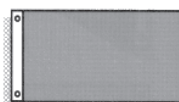
SIZE	LBS.
0	.12
2	.20
3	.24
7	.36
10	.63
14	.95



SKIN DIVER FLAGS

Nylon with canvas header & brass grommets.

ITEM #	SIZE	LBS.
080644	10" x 15"	.07
080645	12" x 18"	.10
080646	16" x 24"	.15
080647	20" x 30"	.20
080648	24" x 36"	.25



QUARANTINE FLAGS

Nylon with canvas header & brass grommets.

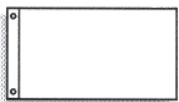
ITEM #	SIZE	LBS.
080649	10" x 15"	.07
150059	12" x 18"	.10
080650	16" x 24"	.15
080651	20" x 30"	.20
150137	24" x 36"	.25



ABSENT FLAGS

Nylon with canvas header & brass grommets.

ITEM #	SIZE	LBS.
080652	10" x 15"	.07
150030	12" x 18"	.10
080653	16" x 24"	.15
080654	20" x 30"	.20
150108	24" x 36"	.25



DINNER FLAGS

Nylon with canvas header & brass grommets.

ITEM #	SIZE	LBS.
080655	10" x 15"	.07
150001	12" x 18"	.10
080656	16" x 24"	.15
080657	20" x 30"	.20
150079	24" x 36"	.25



PROTEST FLAGS

Nylon with canvas header & brass grommets.

ITEM #	SIZE	LBS.
080658	10" x 15"	.07
150069	12" x 18"	.10
080659	16" x 24"	.15
080660	20" x 30"	.20
150147	24" x 36"	.25



GUEST FLAGS

Nylon with canvas header & brass grommets.

ITEM #	SIZE	LBS.
080661	10" x 15"	.07
080662	12" x 18"	.10
080663	16" x 24"	.15
080664	20" x 30"	.20
080665	24" x 36"	.25

MONEY (CONT'D)

The darkest hour of any man's life is when he sits down to plan how to get money without earning it. Horace Greeley

Money talks. It says, good-bye. Anonymous

The buck stopped before it got to me.

Have You Heard of the Four Spiritual Laws?

Just as there are physical laws that govern the physical universe, so are there spiritual laws that govern your relationship with God.

LAW 1

God **loves** you and offers a wonderful **plan** for your life.

God's Love

"God so loved the world that He gave His one and only Son, that whoever believes in Him shall not perish but have eternal life" (John 3:16, NIV).

God's Plan

[Christ speaking] "I came that they might have life, and might have it abundantly" [that it might be full and meaningful] (John 10:10). Why is it that most people are not experiencing the abundant life? Because...

LAW 2

Man is **sinful** and **separated** from God. Therefore, he cannot know and experience God's love and plan for his life.

Man Is Sinful

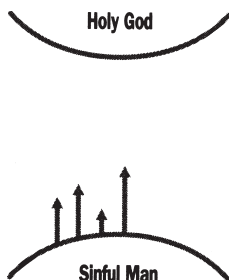
"All have sinned and fall short of the glory of God" (Romans 3:23).

Man was created to have fellowship with God; but, because of his own stubborn self-will, he chose to go his own independent way and fellowship with God was broken. This self-will, characterized by an attitude of active rebellion or passive indifference, is an evidence of what the Bible calls sin.

Man Is Separated

"The wages of sin is death" [spiritual separation from God] (Romans 6:23).

This diagram illustrates that God is holy and man is sinful. A great gulf separates the two. The arrows illustrate that man is continually trying to reach God and the abundant life through his own efforts, such as a good life, philosophy, or religion-but he inevitably fails.



The third law explains the only way to bridge this gulf...

LAW 3

Jesus Christ is God's **only** provision for man's sin. Through Him you can know and experience God's love and plan for your life.

He Died In Our Place

"God demonstrates His own love toward us, in that while we were yet sinners, Christ died for us" (Romans 5:8).

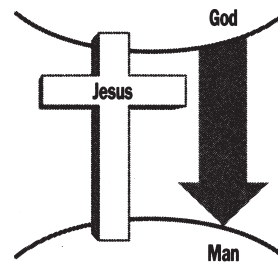
He Rose from the Dead

"Christ died for our sins ... He was buried ... He was raised on the third day, according to the Scriptures ... He appeared to Peter, then to the twelve. After that He appeared to more than five hundred..." (1 Corinthians 15:3-6).

He Is the Only Way to God

"Jesus said to him, 'I am the way, and the truth, and the

life; no one comes to the Father but through Me'" (John 14:6). This diagram illustrates that God has bridged the gulf that separates us from Him by sending His Son, Jesus Christ, to



die on the cross in our place to pay the penalty for our sins. It is not enough just to know these three laws..

LAW 4

We must individually **receive** Jesus Christ as Savior and Lord; then we can know and experience God's love and plan for our lives.

We Must Receive Christ

"As many as received Him, to them He gave the right to become children of God, even to those who believe in His name" (John 1:12).

We Receive Christ Through Faith

"By grace you have been saved through faith; and that not of yourselves, it is the gift of God; not as a result of works that no one should boast" (Ephesians 2:8,9).

When We Receive Christ, We Experience a New Birth (Read John 3:1-8.)

We Receive Christ Through Personal Invitation [Christ speaking] "Behold, I stand at the door and knock; if any one hears My voice and opens the door, I will come in to him" (Revelation 3:20). Receiving Christ involves turning to God from self (repentance) and trusting Christ to come into our lives to forgive our sins and to make us what He wants us to be. Just to agree **intellectually** that Jesus Christ is the Son of God and that He died on the cross for our sins is not enough. Nor is it enough to have an **emotional** experience. We receive Jesus Christ by **faith**, as an act of the **will**. These two circles represent two kinds of lives:

Which circle best represents your life?

Which circle would you like to have represent your life?

Self-Directed Life

S - Self is on the throne

† - Christ is outside the life

● - Interests are directed by self, often resulting in discord and frustration



Christ-Directed Life

† - Christ is in the life and on the throne

S - Self is yielding to Christ

● - Interests are directed by Christ, resulting in harmony with God's plan

The following explains how you can receive Christ:

You Can Receive Christ Right Now by Faith Through Prayer (Prayer is talking with God)

God knows your heart and is not so concerned with your words as He is with the attitude of your heart. The following is a suggested prayer:

Lord Jesus, I need You. Thank You for dying on the cross for my sins. I open the door of my life and receive You as my Savior and Lord. Thank You for forgiving my sins and giving me eternal life. Take control of the throne of my life. Make me the kind of person You want me to be.

Does this prayer express the desire of your heart? If it does, I invite you to pray this prayer right now, and Christ will come into your life, as He promised.

How to Know That Christ Is in Your Life

Did you receive Christ into your life? According to His promise in Revelation 3:20, where is Christ right now in relation to you? Christ said He would come into your life. Would He mislead you? On what authority do you know God has answered your prayer? (The trustworthiness of God Himself and His Word.)

The Bible Promises Eternal Life to All Who Receive Christ

"God has given us eternal life, and this life is in His Son. He who has the Son has the life; he who does not have the Son of God does not have the life. These things I have written to you who believe in the name of the Son of God, in order that you may know that you have eternal life" (1 John 5:11-13).

Thank God often that Christ is in your life and that He will never leave you (Hebrews 13:5). You can know on the basis of His promise that Christ lives in you and that you have eternal life from the very moment you invite Him in. He will not deceive you.

An important reminder...

Do Not Depend on Feelings

The promise of God's Word, the Bible-not our feelings-is our authority. The Christian lives by faith (trust) in the trustworthiness of God Himself and His Word. This train diagram illustrates the relationship among **fact** (God and His Word), **faith** (our trust in God and His Word), and **feeling** (the result of our faith and obedience). (Read John 14:21.)

The train will run with or without the caboose. However, it would be useless to attempt to pull the train by the caboose. In the same way, as Christians we do not depend on feelings or emotions, but we place our faith (trust) in the trustworthiness of God and the promises of His Word.



Now That You Have Received Christ

The moment you received Christ by faith, as an act of the will, many things happened, including the following:

- Christ came into your life (Revelation 3:20; Colossians 1:27).
 - Your sins were forgiven (Colossians 1:14).
 - You became a child of God (John 1:12).
 - You received eternal life (John 5:24).
 - You began the great adventure for which God created you (John 10:10; 2 Corinthians 5:17; 1 Thessalonians 5:18).
- Can you think of anything more wonderful that could happen to you than receiving Christ? Would you like to thank God in prayer right now for what He has done for you? By thanking God, you demonstrate your faith.

To enjoy your new life to the fullest...

Suggestions for Christian Growth

Spiritual growth results from trusting Jesus Christ. "The righteous man shall live by faith" (Galatians 3:11). A life of faith will enable you to trust God increasingly with every detail of your life, and to practice the following:

- Go to God in prayer daily (John 15:7).
- Read God's Word daily (Acts 17:11); begin with the Gospel of John.
- Obey God moment by moment (John 14:21).

G
R

O
W

T

Witness for Christ by your life and words (Matthew 4:19; John 15:8).
Trust God for every detail of your life (1 Peter 5:7).
Holy Spirit-allow Him to control and empower your daily life and witness (Galatians 5:16,17; Acts 1:8).

Fellowship in a Good Church

God's Word instructs us not to forsake "the assembling of ourselves together" (Hebrews 10:25). Several logs burn brightly together, but put one aside on the cold hearth and the fire goes out. So it is with your relationship with other Christians.
If you do not belong to a church, do not wait to be invited. Take the initiative; call the pastor of a nearby church where Christ is honored and His Word is preached. Start this week, and make plans to attend regularly.

Special Materials Are Available for Christian Growth

If you have come to know Christ personally through this presentation of the gospel, helpful materials for Christian growth are available to you. For more information, write Campus Crusade for Christ, 100 Lake Hart Drive 2100, Orlando, FL 32832-0100.

If this booklet has been helpful to you, please share it with someone else.
To encourage the widest distribution possible, this booklet is available at a nominal price for use by you or your organization. You may place your name or the name of your organization in the space below.

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For God	the greatest lover
so loved	the greatest degree
the world	the greatest company
that He gave	the greatest act

his only begotten son	the greatest gift
that whosoever	the greatest opportunity
believeth	the greatest simplicity
in Him	the greatest attraction
should not perish	the greatest promise
but	the greatest difference
have	the greatest certainty
everlasting life	the greatest possession

Jesus J. Edwin Hartell

(References contained in this booklet should be read in context from the Bible wherever possible.)

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