

Marine Hardware, Inc. is a one-stop source for OEM purchasing with a full line of shafting, rudders, water and exhaust parts and all related components, as well as deck hardware for the finishing touch. We have many different styles and sizes of parts available, or we can manufacture custom configurations to designers' specifications. **From prototypes to production quantities, our strong points are high quality materials, workmanship, competitive prices and on-time delivery.**

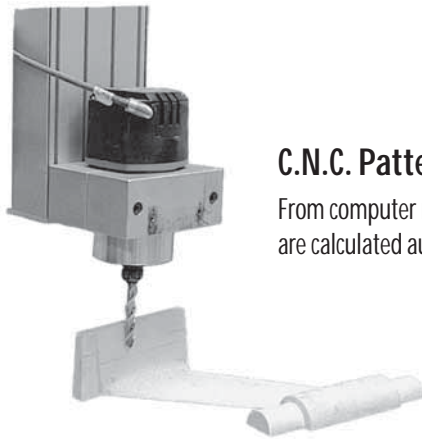
We also specialize in replacement parts and assemblies, with fast turnaround, large inventory of in-stock items, and hundreds of patterns for both recent and older-model boat parts. We will even cast and machine a like-new replacement from your bent or broken part.

For all boatbuilding, repair and supply needs, Marine Hardware, Inc. is your source for quality, precision and timely delivery. We welcome your inquiries and orders.

A typical job begins in our design department where we create your part using our Unigraphics 3D modeling system. Next we create a prototype using our stereo lithography system, and then we move the job to patterns and tooling. **The quality materials used in our foundry insure great castings for your parts.** This entire process is state of the art and entirely paperless.

C.M.M. Digitizing

All parts are inspected and documented along four axes simultaneously, whether parts have simple and flat lines or composite curves, using our coordinate measuring CMM digitizing system.

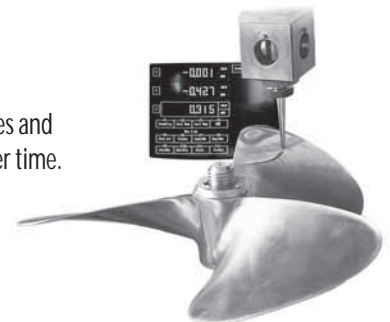


C.N.C. Pattern Router

From computer model to precision patterns, all drafts shrinkage and core allowances are calculated automatically. You can expect perfect patterns every time.

C.N.C. Machining

Our production shop utilizes Fadal milling machines and Mazak lathes for repeatable quality parts time after time.



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Nautilloy® Shafting

Marine Hardware™, Inc. worked for years with most of the world's leading stainless steel bar mills, to provide the ultimate in boat shafting quality. By combining our field experience with our metallurgical excellence, our goal is to bring to our customers a product that is superior in materials and exacting tolerances. Our Nautilloy® shafting is used in yachts manufactured by Bayliner, Maxum, and Luhrs, to ski boats such as Malibu and Fineline as well as Unlimited Hydroplanes like the Miss Budweiser. We supply bars in type 17, 19, 22 and 22HS with diameters ranging from 1 inch thru 6 inches. Our lengths are available to 32 feet.

Our computer-controlled Mazak turning centers make prime quality shafting, part after part. We start with Nautilloy® precision polished and ground modified 304 or 316 nitrogen stainless steel, and turn the taper, thread, and journal simultaneously in a Hardinge collet, not in a chuck which must be readjusted for each part. Our tapers have less than .002" runout, and the threads are Class 2 fit. After turning, keyways are cut to exacting standards which have proved over time and in the field to prevent shaft breakage at this critical area. Then we proceed with balancing and straightening to a tolerance of .002"



on 42" intervals. This is 300% better accuracy than specified in American Boat and Yacht Council (ABYC) standards.

The chart on page 5 outlines some of the standards we enforce when building a precision prop shaft; it reflects the toughest ABYC, SAE, and Navy specifications.

Please call or e-mail us, we would be happy to supply your requirements promptly with our precision products.



NAUTILLOY® BRAND COMPARISON GUIDE

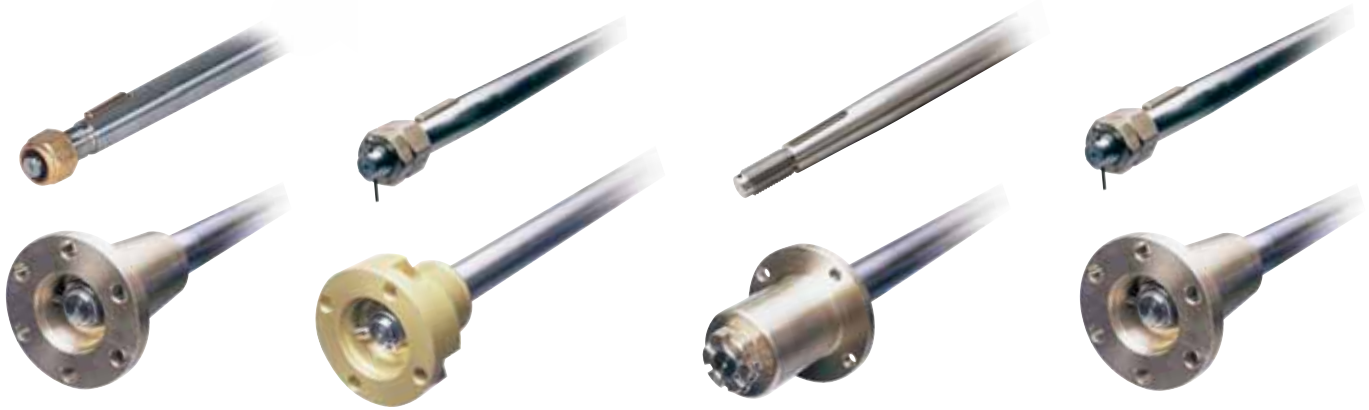
Type	Density	Marine Grade	Aquatech ¹	Aquamet ²	Marinox ³	Aqualloy	Temet	ASTM Family	Chrome	Nickel
Nautilloy 17	.284	17-4	17	17	17	17	17	17-4	18.00 - 20.00	18.00 - 10.50
Nautilloy 19	.286	304N	19	19	19	19	19	304	18.00 - 20.00	8.00 - 12.00
Nautilloy 22	.285	316N	22	22	22	22	22	316	16.00 - 18.00	10.00 - 14.00
Nautilloy 22HS	.285	XM19	22HS	22HS	22HS	22HS	22HS	316	18.00 - 20.00	18.00 - 20.00

¹Aquatech is a brand name of Gulf Global Corp., ²Aquamet is a registered trademark of Armco, Inc., licensed to Crucible Materials Corp., ³Marinox is a brand name of Valbruna Corp.

Nautilloy® Shaft Assemblies

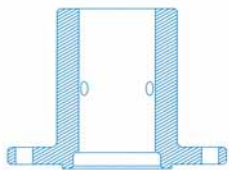
When replacing a shaft, we recommend replacement with a factory-assembled shaft/coupler set. Our assemblies are precision bored, honed, faced, straightened, and balanced to ensure concentricity and reduce vibration and shaft whip. Materials are the highest quality available in the industry, and all machining meets or exceeds ABYC standards. Our assemblies are shipped complete with all keys, nuts, and cotter pin. Specify

loose fit assembly for applications where shaft and coupler must be disassembled for installation, such as refits. Specify tight fit assembly for applications such as installation during boat builder's factory assembly of new boats.

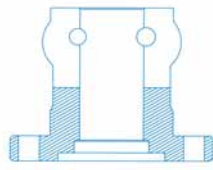


Types of Couplers

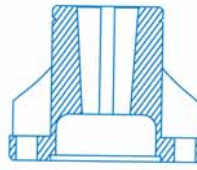
Marine Hardware™, Inc. manufactures and assembles a variety of couplings to meet your needs. As always, if room allows, a double taper bronze coupling insures the tightest tolerances for better accuracies.



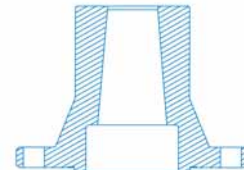
Straight Solid Coupler



Straight Clamp Coupler



Tapered Coupler



V-Drive Coupler

Bearing Spacing-ABYC

When calculating overall assembled length, please refer to the following formula to minimize whip of the shaft.

$$L = \sqrt{\frac{3.21 D}{N}} \times \sqrt[4]{\frac{E}{W_1}}$$

L = Max Unsupported length, feet (m)

D = Shaft diameter, inches (mm)

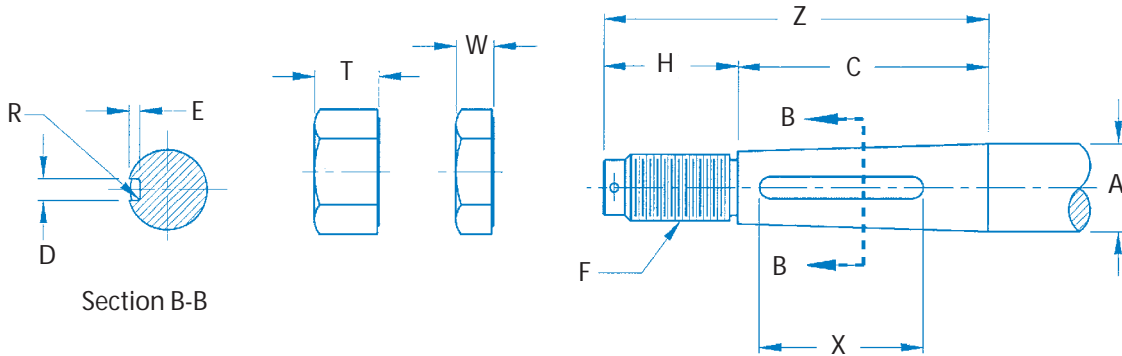
N = Shaft speed, RPM

E = Modulus of elasticity in tension, lbs/in² (MPa)

W₁ = Weight of one cubic inch (cm³) of material, pounds (gm)

Note: The minimum required spacing for rigid bearings should exceed 20 times the shaft diameter when possible. If the shaft seal is of the rigid type and is located approximately at the mid-point of the shaft, bearing spacing may be twice the values shown in the equation.

Nautilloy® Shaft Dimensions



MACHINING SPECIFICATIONS

Nom. Shaft Dia.	Taper Length	Keyway Width	Keyway Side Depth*	Keyway Fillet Radius	Thread Spec.	Extension Beyond Taper	Cotter Pin Dia.	Thickness		Keyway Length (min.)	Taper to Tip
								Full Nut	Jam Nut		
(A)	(C)	(D)	(E)	(R)	(F)	(H)		(T)	(W)	(X)	(Z)
1"	2-3/4"	1/4"	1/8"	1/16"	3/4" — 10	1-3/4"	1/8"	3/4"	7/16"	1-1/2"	4-1/2"
1-1/8"	3-1/8"	1/4"	1/8"	1/16"	3/4" — 10	1-3/4"	1/8"	3/4"	7/16"	1-3/4"	4-7/8"
1-1/4"	3-1/2"	5/16"	5/32"	1/16"	7/8" — 9	2"	5/32"	7/8"	1/2"	2-1/8"	5-1/2"
1-3/8"	3-7/8"	5/16"	5/32"	1/16"	1" — 8	2-1/4"	5/32"	1"	9/16"	2-1/2"	6-1/8"
1-1/2"	4-1/4"	3/8"	3/16"	1/16"	1-1/8" — 7	2-7/16"	5/32"	1-1/8"	5/8"	2-3/8"	6-11/16"
1-3/4"	5"	7/16"	7/32"	1/16"	1-1/4" — 7	2-3/4"	3/16"	1-1/4"	3/4"	3-1/8"	7-3/4"
2"	5-3/4"	1/2"	1/4"	1/16"	1-1/2" — 6	3-1/8"	3/16"	1-1/2"	7/8"	3-5/8"	8-7/8"
2-1/4"	6-1/2"	9/16"	9/32"	3/32"	1-3/4" — 5	3-1/2"	1/4"	1-3/4"	1"	4"	10"
2-1/2"	7-1/4"	5/8"	5/16"	3/32"	1-3/4" — 5	3-1/2"	1/4"	1-3/4"	1"	4-1/2"	10-3/4"
2-3/4"	7-7/8"	5/8"	5/16"	3/32"	2" — 4-1/2	4"	1/4"	2"	1-1/8"	5-1/8"	11-7/8"
3"	8-5/8"	3/4"	5/16"	3/32"	2-1/4" — 4-1/2	4-3/8"	1/4"	2-1/4"	1-1/4"	6-1/4"	13"
3-1/2"	10-1/8"	7/8"	5/16"	1/8"	2-1/2" — 4	5-1/8"	3/8"	2-1/2"	1-1/2"	7-3/4"	15-1/4"
4"	11-5/8"	1"	5/16"	1/8"	3" — 4	5-7/8"	3/8"	3"	1-3/4"	9-1/4"	17-1/2"

* For shafts of 3" diameter and larger, keystock material is machine-planed on one side so that it is no longer square. Keyway side depths on both shafts and couplers of these larger diameters are equal. All shafts 3/4" through 6" in diameter have 3/4" per foot taper

COMPOSITION OF NAUTILLOY® STAINLESS STEEL

AUSTENITIC GRADES

Type	Carbon Max.	Manganese Max.	Phosphorus Max.	Sulfur Max.	Silicon Max.	Chromium	Nickel	Other Elements
17	0.08	2.00	0.045	0.030	1.00	18.00-20.00	8.00-10.50	N 0.16-0.30
19	0.03	2.00	0.045	0.030	1.00	18.00-20.00	8.00-12.00	N 0.10-0.16
22	0.08	2.00	0.045	0.030	1.00	16.00-18.00	10.00-14.00	Mo 2.00-3.00
-	-	-	-	-	-	-	-	N 0.10 Max
22HS	0.08	2.00	0.040	0.030	1.00	18.00-20.00	8.00-10.50	N 0.20-0.30

Nautilloy® Shaft Specs

DIAMETER TOLERANCES

Allowance tolerance in overall diameter by size.

Diameter, inches	Permissible Variation, inches
3/4 to 15/16 incl	+.001 - .001
1 to 1-1/2 excl	+.002 - .001
1-1/2 to 2 incl	+.003 - .001
Over 2 to 4 incl	+.005 - .001
Over 4 to 4-1/2 incl	+.005 - .005
Over 4-1/2 to 5-1/2 incl	+.008 - .008
Over 5-1/2 to 7 incl	+.008 - .012
Over 7 to 8 incl	+.008 - .014
Over 8 to 12 incl	+.010 - .016
Over 12	+.015 - .020

NAUTILLOY® PROPELLER SHAFTING WEIGHT PER LENGTH

Dia. of shaft	Weight, lbs/ft	Dia. of shaft	Weight, lbs/ft
1"	2.607	3"	24.030
1-1/8"	3.379	3-1/4"	28.202
1-1/4"	4.172	3-1/2"	32.708
1-3/8"	5.048	3-3/4"	37.547
1-1/2"	6.008	4"	42.720
1-3/4"	8.177	4-1/2"	54.068
2"	10.680	5"	66.750
2-1/4"	13.517	5-1/2"	80.768
2-1/2"	16.688	6"	96.120
2-3/4"	20.192	8"	170.880

NAUTILLOY SHAFT ASSEMBLIES STRAIGHTNESS TOLERANCES

Specific diameter of shafting in inches	Standard distance between supports in inches	Permissible variation (per revolution) from straightness in inches	Marine Hardware™, Inc. specs in inches
1/2 to 15/16 incl	42	0.005	0.001
Over 15/16 to 1-15/16 incl	42	0.006	0.002
Over 1-15/16 to 2-1/2 incl	42	0.007	0.002
Over 2-1/2 to 4 incl	42	0.008	0.0025
3/4 to 15/16 incl	Specified lengths of 3 to 12 feet (Supported within 2" of ends)*	0.004 plus 0.0025 for each foot or fraction thereof in excess of 3 feet.	0.002
Over 15/16 to 8 incl	Specified lengths up to 25 feet (Supported within 2" of ends)*	0.005 plus 0.0015 for each foot or fraction thereof in excess of 3 feet.	0.003 plus 0.000
Over 15/16 to 8 incl	Specified lengths over 25 feet to 31-1/2 feet (Supported within 2" of ends)*	0.010 plus 0.0015 for each foot.	0.005
Over 8 to 14-1/2 incl	Up to 31-1/2 feet (Supported within 2" of ends)*	0.010 plus 0.0015 for each foot.	0.005

* If bars sag excessively by the end method, it is advisable to test using 42" method.



Marine Hardware™ Inc. inspects all Nautilloy® Shaft Assemblies to American Boat and Yacht Council specifications. The green above indicates we inspect to .002 inches beyond the most stringent standards.

Engineering Note: Safety factor for both ABYC and SAE specify when calculating appropriate shaft diameters, a safety factor of 3 used with gas and 5 with diesel. With today's mechanical transmissions we recommend a safety factor of 5 for all applications.

Nautiloy® Shafts

HOW TO SPECIFY A SHAFT AND COUPLER ASSEMBLY

To order a prop shaft and coupler assembly, specify:

Transmission Model

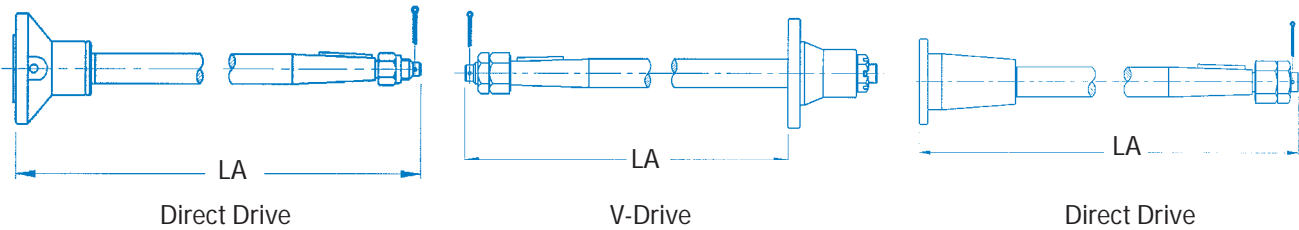
D = Shaft Diameter

Straight Shank or Double Taper

LA = Length of assembly

Material

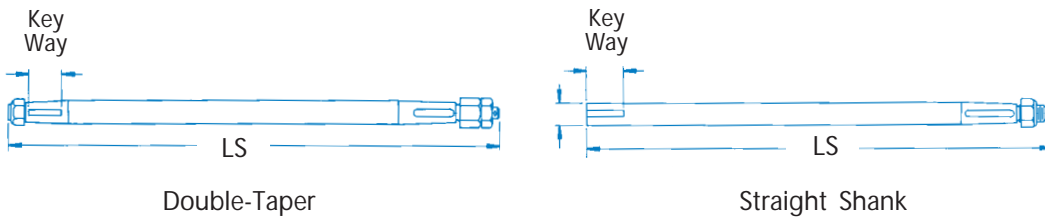
(Length of assembly is measured from coupler flange face to the tip of the shaft.)



To order only a prop shaft, specify:

LS = Length of Shaft

Material



Free Computer Shaft Analysis

Marine Hardware™, Inc. offers this unique service to boat builders and refitters. Just supply the data listed below and we will run our computer program and phone, fax or e-mail you the results for safety factor, maximum length between bearings, and shaft weight. Same day reply in most cases. The shaft analysis is helpful during your design process for deciding which diameter and material of shaft is correct for your power plant and other considerations.

Please provide the following necessary information:

- Engine horsepower
- Engine RPM
- Gear reduction ratio
- Desired shaft diameter and material, if known (we analyze a range of diameters for your consideration)

Optional information:

- Length of shaft



$$D = \sqrt[3]{\frac{321,000 \times P \times S.F.}{S_t \times N}} \quad S.F. = \frac{D^3 \times S_t \times N}{321,000 \times P}$$

D = Shaft Diameter, inches (mm)

P = Shaft Horsepower

S.F. = Safety Factor

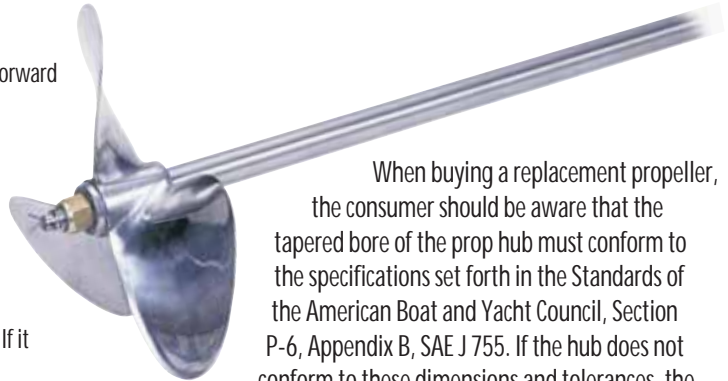
S_t = Yield Strength, torsional shear, lbs/in² (MPa)

N = Shaft Speed, RPM

Correct Fit of Propeller on Shaft

Procedure for Correct Fit of Propeller on Shaft

1. Put propeller snugly onto shaft taper without the key in place.
2. Make a line with a non-graphite marker on the shaft around the forward edge of the prop hub.
3. Remove prop from shaft.
4. Put key into keyway on shaft taper with radiused or chamfered corners in keyway.
5. Put propeller onto shaft taper.
6. Check to see that propeller moves forward to line made in Step 2. If it does, skip to Step 7. If not, perform Steps 6a through 6f.
 - a. If prop does not move forward to line, remove prop from shaft.
 - b. Remove key and secure in vise with radiused or chamfered corners down and square corners up.
 - c. File down top of key a small amount.
 - d. Replace filed key in shaft keyway with radiused or chamfered corners in shaft and filed edge on top.
 - e. Replace prop on shaft and again check to see if it moves forward to the line made in Step 2.
 - f. If it does not line up, repeat Steps 6a through 6e. Be sure to file only a small amount from key at a time, so that key will fit in keyway snugly, yet will not prevent prop from seating completely on the shaft taper.
7. When prop hub moves to correct position, install prop nut on shaft and torque to seat the propeller. (ABYC Standard, Sec. P-6, Appendix A, 6.2.5.) Install and torque jam nut also, if your shaft is so equipped.



When buying a replacement propeller, the consumer should be aware that the tapered bore of the prop hub must conform to the specifications set forth in the Standards of the American Boat and Yacht Council, Section P-6, Appendix B, SAE J 755. If the hub does not conform to these dimensions and tolerances, the

prop will not fit correctly on the shaft taper and will most likely result in vibration, inefficient power transmission, stress and weakening of the shaft, and possible shaft breakage. Once the correct dimensions of the prop hub length, bore, and keyway are verified, it is extremely important to ensure correct fit of the propeller on the shaft. The tapers of the shaft and the prop hub must be in contact over at least 75% of their surface area to transmit power effectively and without undue stress. If the prop is not installed far enough forward on the shaft taper because of interference by the key, stresses will occur which may result in shaft breakage.

Satisfactory installation of a correctly bored and keyed propeller is not difficult. If you have any doubts about the fit of the prop on the shaft, contact a qualified marine technician or boatyard for installation.

COMPOSITION OF NAUTILLOY® STAINLESS STEEL

Type	17	19	22	22HS	K-500	Type 304	Type 316	Type 17-4
Carbon (max.)	0.08	0.03	0.08	0.08	.25	0.03	0.08	0.08
Manganese (max.)	2.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00
Phosphorus	0.045	0.045	0.045	0.040	-	0.045	0.045	0.045
Sulfur (max.)	0.030	0.030	0.030	0.030	.010	0.030	0.030	0.030
Silicon (max.)	1.00	1.00	1.00	1.00	.050	1.00	1.00	1.00
Chromium	18.00-20.00	18.00-20.00	16.00-18.00	18.00-20.00	-	18.00-20.00	16.00-18.00	18.00-20.00
Nickel	8.00-10.500	8.00-12.00	10.00-14.00	8.00-10.50	63-70	8.00-12.00	10.00-14.00	8.00-10.500
Copper	-	-	-	-	Balance	-	-	-
Aluminum	-	-	-	-	2.30 min.	-	-	-
Titanium	-	-	-	-	.35-.85	-	-	-
Other Elements	N 0.16-0.30	N 0.10-0.16	Mo 2.00-3.00 N 0.10 max	N 0.20-0.30	-	-	Mo 2.00-3.00	N 0.16-0.30

Nautilloy® Brand Couplers

Marine Hardware™, Inc., manufactures a full range of shaft couplers, plus many special models depending on installation requirements, including V-drives. All are cast from pure bronze ingot or billet 6061-T6 aluminum and Computer Numerical Controlled (CNC) turned to insure absolute concentricity of the bore with the registration ring, part after part. All bolt patterns are jig-drilled and register from the finished bore. We make all models and styles of couplers (except solid style) from 70 manganese bronze; also available in mild steel by special order. Certain styles for ski boats are available in heat-treated, anodized aluminum. Our couplers are shipped with a thick, protective peel-off plastic coating to prevent damage in transit.

When a coupler or shaft needs replacing due to damage or wear, we recommend that the complete shaft/coupler assembly be replaced. Every solid-style coupler must be reamed to match the precise diameter of its mating shaft, since shafting stock has a diametrical tolerance of + .003" and - .001". A light interference fit (Class LN 3) is attained in every solid-style assembly. Best results are achieved when the two assembled parts can be faced, balanced, and precision-straightened at the factory.

COUPLERS



Note: Steel couplings are available upon request. Specify either solid style or split. All steel couplings on shafts 2-1/2" and larger are heat treated.

Nautilloy® Brand Couplers

Marine Hardware™, Inc. utilizes 70 manganese bronze for all yacht couplings. This alloy is very similar to that of propellers. The corrosion-resistant characteristic of this metal allows easy removal of the coupling from the shaft.

Our ski boat couplings are of 6061 T6 aluminum, anodized for corrosion resistance. The desirable qualities of this material are its light weight and sound-dampening properties.

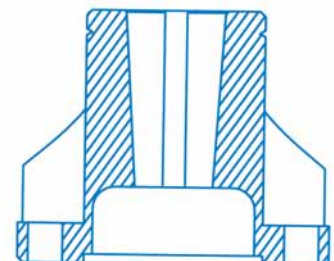
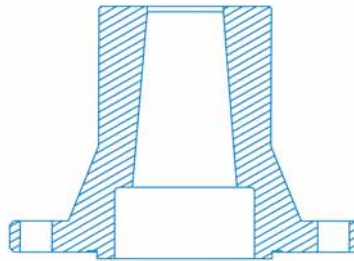
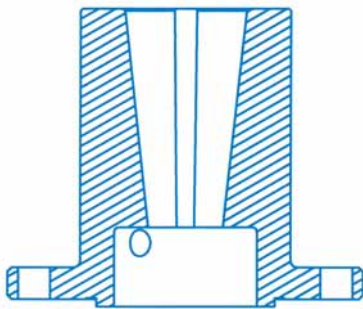
TAPERED BORE STYLE

The many advantages of Marine Hardware™, Inc.'s tapered-bore coupler assembly have made it the style of choice for more than two decades. It has racked up an impressive durability and performance record in all types of craft from competition ski boats to large motor yachts.

Tapered bore couplers offer many advantages over standard straight bore styles. Since the diameter of the shafting and exact bore diameter of a straight-bore coupler may vary from piece to piece, driving on a taper assures two major advantages:

- a snug and precise fit, yet very easy to disassemble
- a coupler which will run concentric with the shaft throughout an entire revolution (This makes alignment significantly easier, which in turn helps reduce vibration)

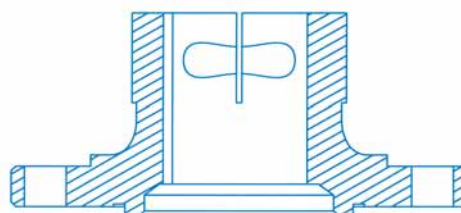
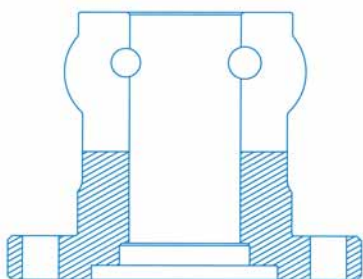
The Marine Hardware™, Inc., design team has engineered the most secure coupler-to-shaft locking system available for production boats. Heavy-duty set screws penetrate the coupler to seat against the nut on the shaft; these set screws are prevented from loosening by being tied together with high-strength wire. An absolute positive lock, yet still very accessible for service.



STRAIGHT BORE STYLE

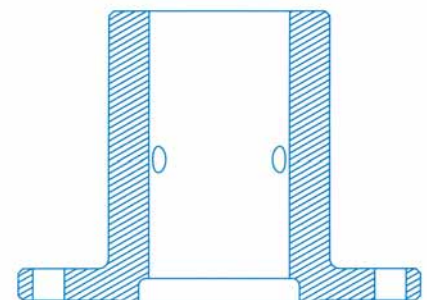
SPLIT STYLE

This straight bore style allows for easy removal and has bolts intersecting the shaft for reverse pull-out protection. Meets all ABYC specifications.



SOLID STYLE

This straight bore style is secured by two set screws which seat in dimples on the shaft, to guard against slippage during reversing maneuvers.



Nautiloy® Brand Couplers

HOW TO SPECIFY A COUPLER

The following dimensions are required to determine the correct application:

Transmission Make and Model-if known

Bore Diameter (shaft diameter)

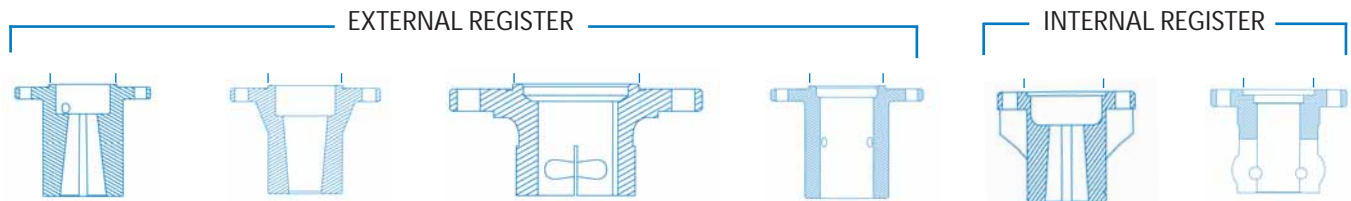
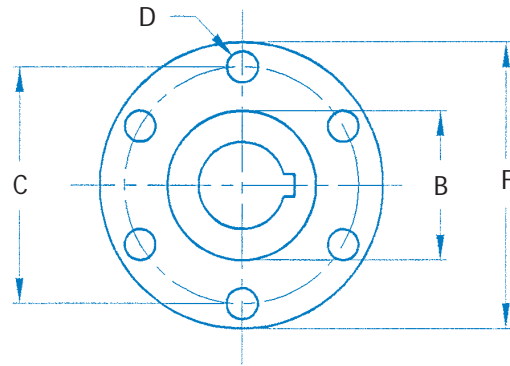
Internal or External Register

F = Flange Diameter

C = Bolt Circle Diameter

D = Diameter of Bolt

B = Register Diameter (a.k.a. registration ring or pilot)

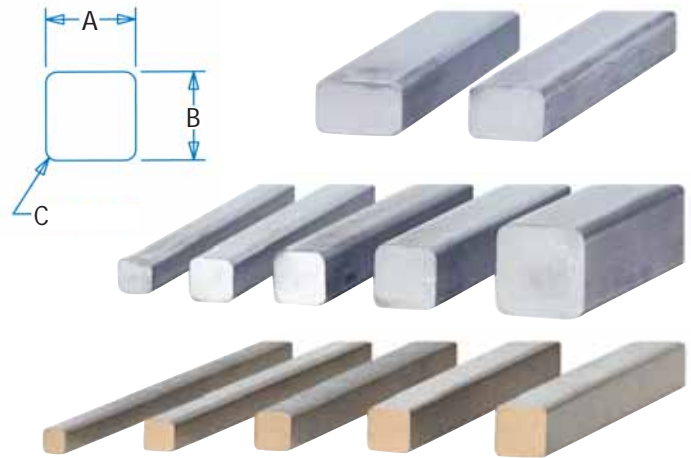


The following table is just a sample of the many sizes of couplers Marine Hardware™, Inc., manufactures. Please call with your specifications.

Name/Model	Flange Dia.	Pilot Dia. & Type	Bolt Circle	Bolt Size (dia.)	No. Holes	Bore Dia. Avail.	Length Overall	
							Tapered Bore	Straight Bore
Borg-Warner 71	4.00	2.50 External	3.25	3/8"	4	1" & 1-1/8"	3.00	2.25
B-W 72/Hurth 630	5.00	2.50 Ext.	4.25	7/16"	4	1-1/4" — 1-3/4"	3.00	2.25, 3.25
Velvet Drive 5000	5.00	2.50 Ext.	4.25	3/8"	4	1-1/4" — 1-3/4"	3.00	N/A
Borg-Warner 73	5.75	3.00 Internal	4.75	7/16"	8	1-1/2" — 2"	4.20	4.20
Caterpillar	5.75	3.00 Int.	4.75	5/8"	6	1-1/2" — 2"	4.20	Spc. Ord.
Twin Disc 502	4.75	2.50 Int.	3.88	7/16"	6	1-1/4" — 1-1/2"	4.25	3.70
Twin Disc 507	5.75	3.00 Int.	4.75	5/8"	6	1-1/2" — 2"	4.20	Spec. Ord.
Twin Disc 507A	7.25	3.75 Int.	6.00	3/4"	6	2" — 3"	7.38	N/A
Twin Disc 510A	9.00	6.00 Int.	7.50	7/8"	8	2" — 3-1/2"	7.38	N/A
Volvo Penta	100mm	60 mm Int.	80 mm	M10	4	1" — 1-1/2"	N/A	65 mm
Yanmar	3.95	1.97 Ext.	3.02	3/8" or M10	4	1" & 1-1/8"	3.50	N/A
Yanmar	4.72	2.55 Ext.	3.94	3/8" or M10	4	1" — 1-1/2"	N/A	2.75
Walters 26	3.50	2.00 Int.	2.88	3/8"	8	1" & 1-1/8"	2.95	N/A
Walters 36	4.00	2.00 Int.	3.25	3/8"	8	1" & 1-1/8"	2.95	N/A
ZF 25A	4.00	2.50 Int.	3.25	3/8"	4	1" & 1-1/8"	3.00	2.25
ZF 220A	4.75	2.50 Int.	3.88	7/16"	6	1-1/4" — 1-1/2"	4.25	3.70
ZF 63A and IV	5.25	2.50 Ext.	4.25	1/2"	4	1-1/4" — 1-3/4"	3.00	N/A
ZF 80A and IV	5.75	3.00 Int.	4.75	1/2"	6	1-1/2" — 2"	4.20	N/A
ZF 280A	5.75	3.00 Int.	4.75	5/8"	6	1-1/2" — 2"	4.20	N/A
ZF 302 IV and 311A	7.25	3.75 Int.	6.00	5/8"	8	2" — 3"	7.38	N/A
ZF 325-1 A	6.69	4.53 Int.	5.51	5/8"	12	1-3/4" — 2-1/2"	7.38	N/A

Nautilloy® Brand Keystock

This pre-radiused, extruded material is sold in bulk by the pound. Keystock comes in 12 foot lengths. Our custom-extruded stock fulfills the requirement for keys to be radiused on edges for proper fit in prop end of the shaft. Thus there is no contact in fillet areas of the keyway, where such contact would result in early shaft failure. These are the same high quality materials as used for the keys in our Prop Nut Kits, see below.



STAINLESS RADIUSED-304 Stainless Steel

Available in bulk

Part No.	Size	Radius	Weight per 12'
	(A x B)	(C)	
KYSL-SS-0.250-LB	1/4" x 1/4"	1/16"	2.32
KYSL-SS-0.312-LB	5/16" x 5/16"	1/16"	3.74
KYSL-SS-0.375-LB	3/8" x 3/8"	1/16"	5.52
KYSL-SS-0.438-LB	7/16" x 7/16"	1/16"	7.56
KYSL-SS-0.500-LB	1/2" x 1/2"	1/16"	9.96
KYSL-SS-0.560-LB	9/16" x 9/16"	3/32"	12.50
KYSL-SS-0.625-LB	5/8" x 5/8"	3/32"	15.80

STAINLESS RADIUSED-Rectangle-304 Stainless

Part No.	Size	Radius	Weight per 12'
	(A x B)	(C)	
KYSL-0.625R-LB	5/8" x 3/4"	3/32"	18.44
KYSL-0.875x0.625	7/8" x 5/8"	3/32"	20.00
KYSL-1.00x0.62	1" x 5/8"	3/32"	19.50

BRASS RADIUSED-360 Free Machining Brass

Material is pure brass, compatible with all bronze propellers.

Part No.	Size	Radius	Weight per 12'
	(A x B)	(C)	
KYBL-BRS-0.250-LB	1/4" x 1/4"	1/32"	2.32
KYBL-BRS-0.312-LB	5/16" x 5/16"	1/16"	3.74
KYBL-BRS-0.375-LB	3/8" x 3/8"	1/16"	5.52
KYBL-BRS-0.438-LB	7/16" x 7/16"	1/16"	7.56
KYBL-BRS-0.500-LB	1/2" x 1/2"	1/16"	9.96
KYBL-BRS-0.625-LB	9/16" x 9/16"	3/32"	12.50
KYBL-BRS-0.625R-LB	5/8" x 3/4"	3/32"	18.44

Nautilloy® Brand Prop Nuts

Part No.	For Shaft Dia.	Thread
PNUTFULL-1.000-B	1" & 1-1/8"	3/4"—10
PNUTFULL-1.250-B	1-1/4"	7/8"—9
PNUTFULL-1.375-B	1-3/8"	1"—8
PNUTFULL-1.500-B	1-1/2"	1-1/8"—7
PNUTFULL-1.750-B	1-3/4"	1-1/4"—7
PNUTFULL-2.000-B	2"	1-1/2"—6
PNUTFULL-2.250-B	2-1/4"	1-3/4"—5
PNUTFULL-2.500-B	2-1/2"	1-3/4"—5
PNUTFULL-3.000-B	3"	2-1/4"—4-1/2
PNUTJAM-1.000-B	1"	3/4"—10
PNUTJAM-1.250-B	1-1/4"	7/8"—9
PNUTJAM-1.370-B	1-3/8"	1"—8
PNUTJAM-1.500-B	1-1/2"	1-1/8"—7
PNUTJAM-1.750-B	1-3/4"	1-1/4"—7
PNUTJAM-2.000-B	2"	1-1/2"—6
PNUTJAM-2.250-B	2-1/4"	1-3/4"—5
PNUTJAM-2.500-B	2-1/2"	1-3/4"—5
PNUTJAM-3.000-B	3"	2-1/4"—4-1/2

All prop nuts are machined on a CNC turning center from extruded barstock. Material is compatible with XM21, Aquamet® 19, Marinox or Nautilloy® shafting and will not seize once installed. All prop nuts are made with extra wall thickness to mate compatibly with all propeller hubs, and a large washer face to allow easier tightening during installation. All features meet or exceed ABYC standards. Cotter pins are corrosion-resistant 304 18-8 stainless steel, sized as specified by ABYC. Keys are manufactured from pre-radiused extruded keystock for proper fit in prop end of shaft. Thus there is no contact in fillet areas where such contact would lead to early shaft failure.



Struts

All struts are precision bored to meet ABYC and Navy standards for light press fit of brass-shelled rubber bearings. These interchangeable bearings are installed with stainless steel cup point set screws for a firm mechanical lock.

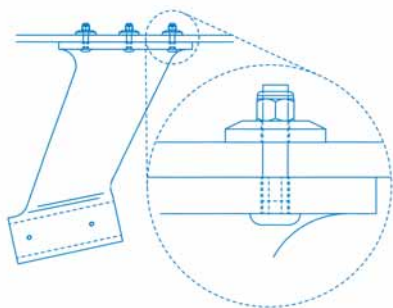
The length of the strut barrel (and bearing) is at least four times the diameter of the prop shaft. The thickness of the strut barrel is equal to at least one-fourth the diameter of the prop shaft. The average thickness of the leg(s) is determined by

mathematical formula prescribed by the ABYC.

ABYC and Navy standards require backing plates or backing washers with four-bolt mounting, but not with six-bolt mounting, for shaft diameters up to four inches.

We take special pride in precision machining bases of all struts so the parts are interchangeable from boat to boat, and specified shaft angles are maintained.

STRUTS



STRUT BACKING WASHERS

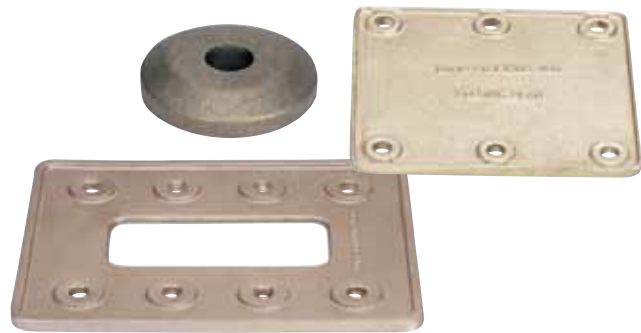
These washers replace the traditional backing plate and eliminate the problem of exact alignment of mounting holes from the strut base. Made from 360 free machining brass barstock. Proven reliable and effective in the field.

Part No.	I.D.	O.D.	Thickness
STBW-.38x1.50-B	3/8"	1-1/2"	1/4"
STBW-.50x2.00-B	1/2"	2"	5/16"

Marine Hardware™, Inc., has a wide variety of standard struts available, or we can easily tool up for your production needs. We also remake struts from those damaged in the field, and offer excellent turnaround times to get the customer back on the water.

All Marine Hardware™ Inc. struts are cast of 70 manganese bronze, a material extremely corrosion-resistant and strong, yet malleable so it does not work-harden with vibration and stress over time. We manufacture single-leg (straight base and port/starboard angled bases), Vee-struts, and competition ski boat struts.

Struts can be machined with either countersunk mounting holes for standard flat head machine screws, or with square broached holes to firmly hold standard carriage bolts. It is now generally accepted practice to use the latter system of carriage bolts; it facilitates a rapid single-person installation during assembly, and allows the future owner to insure bolt tightness without the need for a second person under the boat holding a screwdriver.



Our Strut-Cad program generates a 3-D model and casting pattern based on the mathematical proportions of design set out by ABYC, standards of naval architecture and our in house design staff. In a matter of a few hours the model, drawing and casting pattern can be generated from simple data provided: shaft diameter, shaft angle, depth (or drop), and hull angle (if port and starboard required).

HOW TO ORDER A CUSTOM STRUT

Contact our office for a strut dimension and specification worksheet. When ordering a custom strut, please call or e-mail us with the following information:

GENERAL SPECIFICATIONS

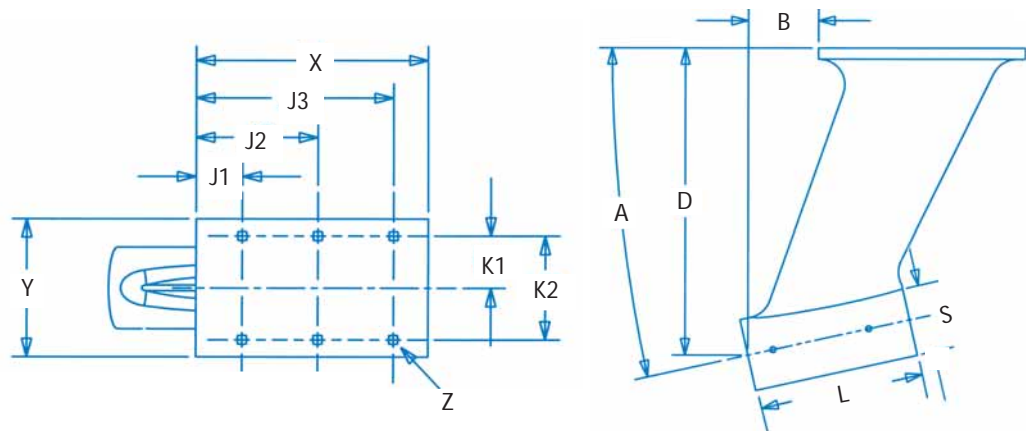
S = Shaft diameter
 D = Drop (at aft end)
 B = Backsweep
 L = Barrel Length
 A = Shaft angle

BASE DIMENSIONS

X = Length
 Y = Width

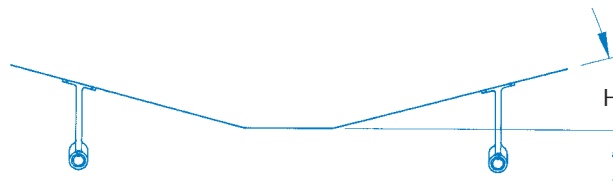
HOLE PATTERN

Specify plain, countersunk, or broached hole.
 Z = Nominal diameter of fasteners
 J1, J2, J3, K1, K2 = Hole locations



HULL ANGLE

H = Hull Angle
 Specify port or starboard
 Does not apply to single-screw boats.



Strut Bearings

Marine Hardware™, Inc., supplies water-lubricated brass-shelled rubber bearings with all our struts and has all bearing sizes listed below available for your replacement needs during regular maintenance of vessels.

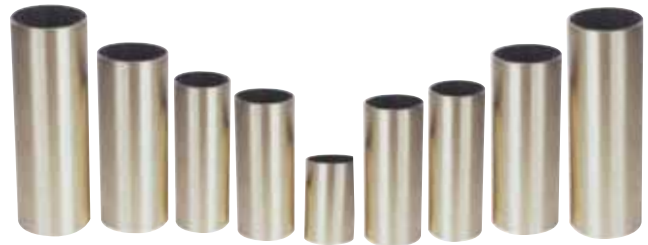
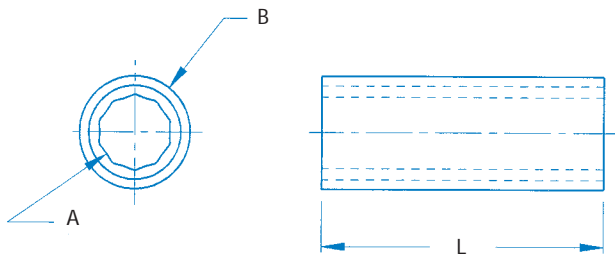
A good strut bearing reduces friction, dampens slight vibrations and misalignment, and flushes contaminants through the bearing to avoid abrasion that will mar the shaft surface. These functions are accomplished by having the bearing slightly oversized on the inside diameter, so that a thin film of water rides between the rubber surface and the stainless shaft. The grooved contour of the rubber surface is critical to the flow and circulation of water around the shaft.

A bearing worn by normal usage should be replaced during service to maintain that high level of mechanical performance.

Poor water lubrication in the bearing (usually caused by shaft misalignment or too tight a fit with the shaft) manifests itself in excessive bearing wear, transmission of shaft whip throughout the boat, and marring of the shaft surface.

When installing the strut bearing, it is important to have a light press fit between it and the bored casting, and to secure it mechanically with cup point stainless steel set screws. Be sure, however, not to collapse the bearing shell when installing the set screws, as it may then bind against the shaft.

Bearings with fiberglass outer shells are highly recommended for struts made of stainless steel, as they preclude the problem of dissimilar metals which would occur with a typical brass-shelled bearing. Fiberglass-shelled bearings with the same dimensions as listed below are available from Marine Hardware™, Inc. by special order.



Part No.	Shaft Dia.	Outside Dia.	Length
	(A)	(B)	(L)
SBRG-1.00x1.25x20	1"	1-1/4"	2"
SBRG-1.00x1.38x20	1"	1-3/8"	2"
SBRG-1.00x1.25x40	1"	1-1/4"	4"
SBRG-1.00x1.50x40	1"	1-1/2"	4"
SBRG-1.00x1.62x40	1"	1-5/8"	4"
SBRG-1.00x2.00x40	1"	2"	4"
SBRG-1.12x1.38x20	1-1/8"	1-3/8"	2"
SBRG-1.12x1.62x45	1-1/8"	1-5/8"	4-1/2"
SBRG-1.12x1.75x45	1-1/8"	1-3/4"	4-1/2"
SBRG-1.12x2.00x50	1-1/8"	2"	5"
SBRG-1.25x1.50x50	1-1/4"	1-1/2"	5"
SBRG-1.25x1.75x50	1-1/4"	1-3/4"	5"
SBRG-1.25x2.00x50	1-1/4"	2"	5"
SBRG-1.25x2.12x50	1-1/4"	2-1/8"	5"
SBRG-1.38x1.88x55	1-3/8"	1-7/8"	5-1/2"
SBRG-1.38x2.00x55	1-3/8"	2"	5-1/2"
SBRG-1.38x2.12x55	1-3/8"	2-1/8"	5-1/2"

Part No.	Shaft Dia.	Outside Dia.	Length
	(A)	(B)	(L)
SBRG-1.38x2.38x55	1-3/8"	2-3/8"	5-1/2"
SBRG-1.50x2.00x60	1-1/2"	2"	6"
SBRG-1.50x2.38x60	1-1/2"	2-3/8"	6"
SBRG-1.75x2.38x70	1-3/4"	2-3/8"	7"
SBRG-1.75x2.62x70	1-3/4"	2-5/8"	7"
SBRG-2.00x2.62x80	2"	2-5/8"	8"
SBRG-2.00x3.00x80	2"	3"	8"
SBRG-2.25x2.94x90	2-1/4"	2-15/16"	9"
SBRG-2.25x3.12x90	2-1/4"	3-1/8"	9"
SBRG-2.25x3.38x90	2-1/4"	3-3/8"	9"
SBRG-2.50x3.12x10	2-1/2"	3-1/8"	10"
SBRG-2.50x3.38x10	2-1/2"	3-3/8"	10"
SBRG-2.75x3.38x11	2-3/4"	3-3/8"	11"
SBRG-2.75x3.75x11	2-3/4"	3-3/4"	11"
SBRG-3.00x3.75x12	3"	3-3/4"	12"
SBRG-3.00x4.00x12	3"	4"	12"

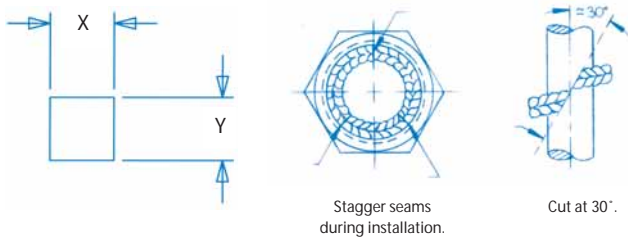
Nautiloy® Brand Packing Material & Hoses

COMPOSITE PACKING MATERIALS

A high-tech non-asbestos composite fiber impregnated with virgin PTFE suspension and internally saturated with a proprietary lubricant. Substantially less abrasive than asbestos, yet still able to withstand temperatures up to 500° F (200° C). Excellent watertight sealing ability with less required leakage at rest to compensate for frictional heat expansion when under way. Ideal replacement for standard flax packing material in shaft stuffing box and rudder box applications. Sold in two-foot lengths and in 1 lb. spools.



Part No.		X	Y
2 foot length	1 pound spool		
BPKG-0.125-2	BPKG-0.125-1LB (43')	1/8"	1/8"
BPKG-0.188-2	BPKG-0.188-1LB (36')	3/16"	3/16"
BPKG-0.250-2	BPKG-0.250-1LB (21')	1/4"	1/4"
BPKG-0.312-2	BPKG-0.312-1LB (14.5')	5/16"	5/16"
BPKG-0.375-2	BPKG-0.375-1LB (10.8')	3/8"	3/8"
BPKG-0.438-2	BPKG-0.438-1LB (8.3')	7/16"	7/16"
BPKG-0.500-2	BPKG-0.500-1LB (6.5')	1/2"	1/2"



HOSES AND CLAMPS

Marine Hardware™, Inc., stocks 4-ply reinforced marine hose for underwater and exhaust system applications. It is heavy walled to withstand torque as called for by A.B.Y.C. Lengths as indicated are supplied with two hose clamps to fit. For custom lengths, please call or e-mail. Additional clamps available on request.

Part No.	Dia.	Length
HOSE-1.50x4CL2	1-1/2"	3-1/2"
HOSE-1.62x4CL2	1-5/8"	3-1/2"
HOSE-1.75x4CL2	1-3/4"	3-1/2"
HOSE-2.00x4CL2	2"	4"
HOSE-2.25x4CL2	2-1/4"	4"
HOSE-2.50x4CL2	2-1/2"	5-1/2"
HOSE-3.00x4CL2	3"	5-1/2"
HOSE-3.50x6CL2	3-1/2"	5-1/2"
HOSE-4.00x6CL2	4"	6"
HOSE-4.50x8CL2	4-1/2"	8"
HOSE-5.00x8CL2	5"	8"
HOSE-6.00x8CL2	6"	8"



PACKING MATERIAL

Shaft Logs

Marine Hardware™, Inc., manufactures a variety of shaft log styles in aluminum or bronze to work in nearly all fiberglass boat applications, for any size shaft and shaft stuffing box you may have. These units are designed to be used with hose and clamps, allowing flexibility to compensate for shaft angle inaccuracies and shaft whip which is prevalent on long, non-supported shaft

areas. Industry standards recommend a yearly inspection of the shaft log, seal, and hose; hoses should be replaced every two years. Hull inserts are available to O.E.M.s for all shaft log sizes, to aid in production uses of these items.



ANGLED SHAFT LOGS

For boats without a shaft exit area cavity molded into the hull. Cast aluminum or red bronze; one size fits hose diameters of 1-1/2" and 1-5/8", shaft angles of 12°, 15° or 16°.

Part No.	Material	Fits Hose Dia.
SHLG-16150-A	Aluminum	1-1/2" & 1-5/8"
SHLG-16150-B	Bronze	1-1/2" & 1-5/8"
SHLG-12162-B	Bronze	1-5/8" & 1-3/4"



TRIANGLE FLANGE SHAFT LOGS

Cast red bronze, comes complete with backing plate. Square broached holes for simple carriage bolt installation. Available in aluminum by special order; please call or e-mail.

Part No.	Material	Fits Hose Dia.
TRFL-1.625-B	Bronze	1-5/8"
TRFL-1.750-B	Bronze	1-3/4"
TRFL-2.500-B	Bronze	2-1/2"
TRFL-3.000-B	Bronze	3"
TRFL-3.500-B	Bronze	3-1/2"



RECTANGLE FLANGE SHAFT LOG

Cast red bronze, available for hose diameters of 1-5/8" and 1-3/4".

Part No.	Material	Fits Hose Dia.
RCFL-1.625-B	Bronze	1-5/8"
RCFL-1.750-B	Bronze	1-3/4"



OVAL FLANGE SHAFT LOGS

Cast red bronze, available for various hose diameters of 2-1/2" and 3-1/2". 3/8" square broached holes for simple carriage bolt installation.

Part No.	Fits Hose Dia.	Neck Length
OVFL-1.750-B	1-3/4"	1-3/4"
OVFL-2.500-B	2-1/2"	3-1/8"
OVFL-3.500-B-S	3-1/2"	3-5/8"
OVFL-3.500-B-L	3-1/2"	5-1/2"

Shaft Stuffing Boxes

COMMERCIAL STYLE BULKHEAD MOUNT SHAFT BOX

A universal style in cast red bronze with brass studs and fasteners. Available with or without lantern ring, water service, and/or special stern tube mount. Please specify which options you prefer, and if male or female mounting register ring required. Order packing material separately. We are happy to quote on special sizes and configurations.

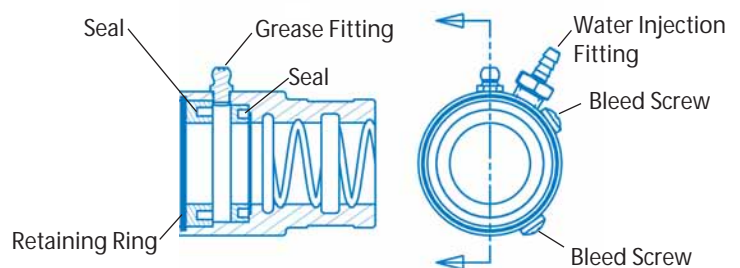
Part No.	Shaft Dia.	Lantern Ring	Water Service
SPBM-3.000-B	3"	Available	Specify
SPBM-3.500-B	3-1/2"	Available	Specify
SPBM-4.000-B	4"	Available	Specify
SPBM-4.500-B	4-1/2"	Available	Specify
SPBM-5.000-B	5"	Available	Specify
SPBM-5.500-B	5-1/2"	Available	Specify
SPBM-6.000-B	6"	Available	Specify
SPBM-6.500-B	6-1/2"	Available	Specify
SPBM-7.000-B	7"	Available	Specify
SPBM-7.500-B	7-1/2"	Available	Specify
SPBM-8.000-B	8"	Available	Specify
SPBM-8.500-B	8-1/2"	Available	Specify
SPBM-9.000-B	9"	Available	Specify
SPBM-9.500-B	9-1/2"	Available	Specify
SPBM-10.00-B	10"	Available	Specify
SPBM-10.50-B	10-1/2"	Available	Specify
SPBM-11.00-B	11"	Available	Specify
SPBM-11.50-B	11-1/2"	Available	Specify
SPBM-12.00-B	12"	Available	Specify



SEAL TYPE SHAFT STUFFING BOX

This precision-machined unit incorporates a water injected double seal design. It has a grease reservoir with a self-circulating grease supply that lubricates and cools the shaft and seals, and prevents water leakage into the boat. Our design utilizes a so-called lantern ring between the seals which balances and supports the shaft load, circulates the grease, and extends the life of the shaft seals.

Part No.	For Shaft Dia.	Fits Hose Dia.
SPST-1.12x1.62-B	1-1/8"	1-5/8"
SPST-1.12x1.75-B	1-1/8"	1-3/4"



Shaft Stuffing Boxes

GLAND STYLE

Cast 85-5-5-5 red bronze, precision machined for best quality and performance. Brass studs are provided for metal compatibility and strength. Low abrasion PTFE-impregnated composite fiber packing material included. Fittings for water-cooling and electrical grounding are available, please specify if desired. Also available in cast aluminum by special order.



Part No.	Shaft Dia.	Fits Hose
SPGF-1.25B3.00	1-1/4"	3"
SPGF-1.38B2.50	1-3/8"	2-1/2"
SPGF-1.38B3.00	1-3/8"	3"
SPGF-1.50B2.50	1-1/2"	2-1/2"
SPGF-1.50B3.00	1-1/2"	3"
SPGF-1.75B3.00	1-3/4"	3"
SPGF-1.75B3.50	1-3/4"	3-1/2"
SPGF-2.00B3.50	2"	3-1/2"
SPGF-2.25B3.50	2-1/4"	3-1/2"
SPGF-2.50B4.50	2-1/2"	4-1/2"
SPGF-4.00B6.00	4"	6"

NUT STYLE

Cast 85-5-5-5 red bronze with precision-machined threads. Left hand threads available on special orders only. Coolant fittings and electrical ground screw are available if specified. Unit comes complete with packing nut, jam nut, and composite fiber PTFE-impregnated packing material. Also available in cast aluminum by special order.



Part No.	Shaft Dia.	Fits Hose
SPNS-1.00B1.62	1"	1-5/8"
SPNS-1.00B1.75	1"	1-3/4"
SPNS-1.125B1.62	1-1/8"	1-5/8"
SPNS-1.125B1.75	1-1/8"	1-3/4"
SPNS-1.125B2.25	1-1/8"	2-1/4"
SPNS-1.25B2.25	1-1/4"	2-1/4"
SPNS-1.25B2.50	1-1/4"	2-1/2"
SPNS-1.50B2.50	1-1/2"	2-1/2"
SPNS-1.75B2.50	1-3/4"	2-1/2"
SPNS-1.75B3.00	1-3/4"	3"
SPNS-2.00B3.00	2"	3"
SPNS-2.50B3.50	2-1/2"	3-1/2"
SPNS-2.50B4.00	2-1/2"	4"

Rudder Stuffing Boxes

GLAND STYLE

Manufactured of cast 85-5-5 red bronze and machine finished to precise tolerances. Designed for internal mount, with a long neck below the flange for application in all hulls. Furnished with brass studs for metal compatibility and strength. Complete with flax packing in place. Backing plate available separately, please specify if desired. Mounting holes are optional so that these units may be fit to vessel under repair in the field. If you want factory-drilled holes, specify diameter and type of fasteners and hole location pattern, either machine screw or carriage bolt.



Part No.	Nom. Bore	Flange	Top Height	Neck Length
RBGF-1.250-B	1-1/4"	4-1/2" x 4-1/2"	2-1/2"	2-3/8"
RBGF-1.375-B	1-3/8"	4-1/2" x 4-1/2"	2-1/2"	3-3/8"
RBGF-1.500-B	1-1/2"	4-1/2" x 4-1/2"	3-1/4"	3-1/2"
RBGF-1.750-B	1-3/4"	5" x 5"	3-1/2"	3-1/2"
RBGF-2.000-B	2"	6" x 4"	3-3/4"	4"
RBGF-2.250-B	2-1/4"	7" x 4-3/4"	3-3/4"	2"
RBGF-2.500-B	2-1/2"	7" x 4-3/4"	3-3/4"	2"
RBGF-2.750-B	2-3/4"	7" x 6"	3-1/2"	3-1/2"
RBGF-3.000-B	3"	7" x 6"	3-1/2"	3-1/2"
RBGF-3.500-B	3-1/2"	8" x 6-1/2"	3-5/8"	3-1/2"
RBGF-4.000-B	4"	8" x 6-1/2"	3-5/8"	3-1/2"
RBGF-5.000-B	5"	9" x 7-1/2"	4-1/4"	4-1/2"

Also available in aluminum by special order. We also build heavy-duty extra-large rudder boxes for commercial vessels, please call, fax or e-mail your requirements.

Part No.	Nom. Bore	Flange (square)	Top Height	Flange Angle
RBNS-1.000-0	1"	4-1/8"	3-1/2"	0° (flat)
RBNS-1.125-0	1-1/8"	4-1/8"	3-1/2"	0° (flat)
RBNS-1.250-0	1-1/4"	4"	4-1/2"	0° (flat)
RBNS-1.250-18.5	1-1/4"	4-1/2"	4-3/4"	18.5°
RBNS-1.375-15	1-3/8"	6"	4-1/8"	15°
RBNS-1.500-0	1-1/2"	5"	5-1/2"	0° (flat)
RBNS-1.500-10	1-1/2"	6"	4-1/2"	10°
RBNS-1.500-12	1-1/2"	4-1/2"	5-3/4"	12°
RBNS-1.500-14	1-1/2"	6"	4-3/4"	14°
RBNS-1.500-15	1-1/2"	6"	4-1/4"	15°
RBNS-1.500-16	1-1/2"	6"	4-1/2"	16°
RBNS-1.500-16.5	1-1/2"	4-1/2"	5-1/4"	16.5°
RBNS-1.750-0	1-3/4"	5"	6"	0° (flat)
RBNS-1.750-12	1-3/4"	6-3/16"	5-3/8"	12°
RBNS-2.000-0	2"	6"	6"	0° (flat)
RBNS-2.000-04	2"	6-3/8"	4-5/8"	4°
RBNS-2.000-21	2"	6-1/8"	5-11/16"	21°
RBNS-2.250-0	2-1/4"	6"	6"	0° (flat)
RBNS-2.500-12	2-1/2"	7"	5-5/16"	12°

NUT STYLE

Cast 85-5-5 red bronze, precision-machined, complete with flax packing, packing nut, jam nut, and backing plate. Backing plate has a large cut-out so it may be installed without removing the packing nut. This unit provides the best support for all styles of inboard rudders. Specify holes as counter sunk or square broached. Special tooling available for all hull angles, please specify if required.



Outboard Rudder Assemblies

Marine Hardware™, Inc., is the largest manufacturer of outboard rudder assemblies in the world. Marine Hardware™ rudder systems are designed for strength, safety, and performance; they have stood the test of time by delivering years of dependable service in the field.

Marine Hardware's™ outboard rudder configuration is an intelligent choice for many power boats. It allows the strut and propeller to be moved further aft, sending prop noise behind the boat; it also allows use of a shallow shaft angle, which improves efficiency. This design lets the entire power plant be moved aft, in cases where interior bulkhead and engine room locations are critical.

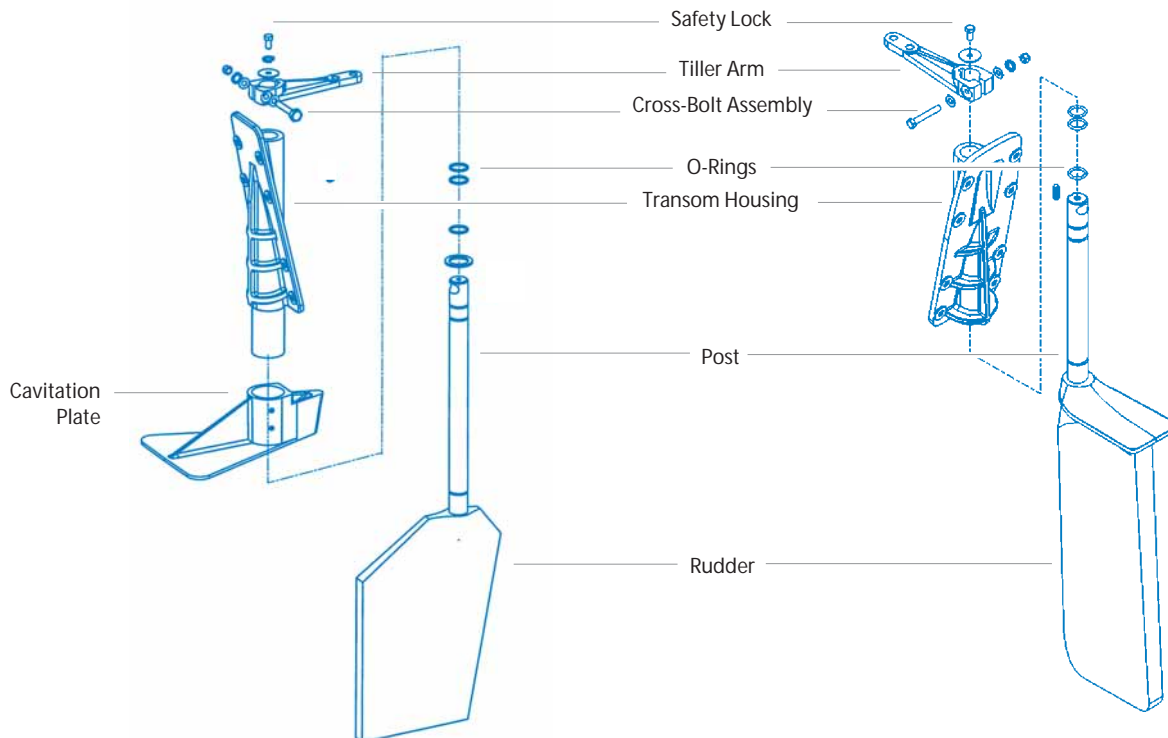
Outstanding performance is also a major consideration in our outboard rudder design. We incorporated the maximum leading edge to optimize steering, avoiding over steering yet providing adequate control in following seas. We also manufacture special blade designs to help correct any hull problems you may encounter in either transom configuration/installation or hydrodynamics.

We offer three different styles to accommodate nearly all application criteria; we invite your questions and interest in this quality Marine Hardware™ product.



Engineering Note: All our assemblies utilize a 70 manganese bronze blade to maximize strength and resist corrosion, yet be flexible enough to yield in high stress turns and not work-harden. This blade is cast directly onto the stainless steel post, a process

perfected by Marine Hardware™, Inc. The rudder post is engineered with an integral breakaway point. Should the blade hit an obstruction, the rudder will fail, but damage to the transom housing with its potential for serious hull leakage will be minimized.



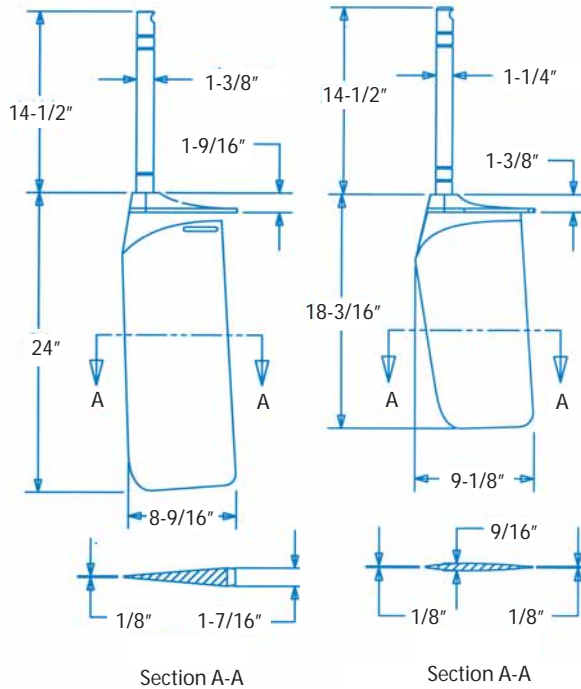
RUDDER COMPONENTS

Outboard Rudder Assemblies

MODEL OBRS

Our exclusive original design with one-piece transom housing for easy installation and alignment. Multiple o-rings for assured leak protection. Standard cavitation blade angle is designed for 8 degrees to 12 degrees transom angle. Mounts with eight 3/8" carriage bolts, tiller arms connect with 1/2" bolts. OBRS model blades have 120 sq. inch of surface area and 160 sq. inch respectively.

Part No.	Post Dia.	Boat Length
OBRS-1.250-B	1-1/4"	28' to 32'
OBRS-1.375-B	1-3/8"	32' to 46'



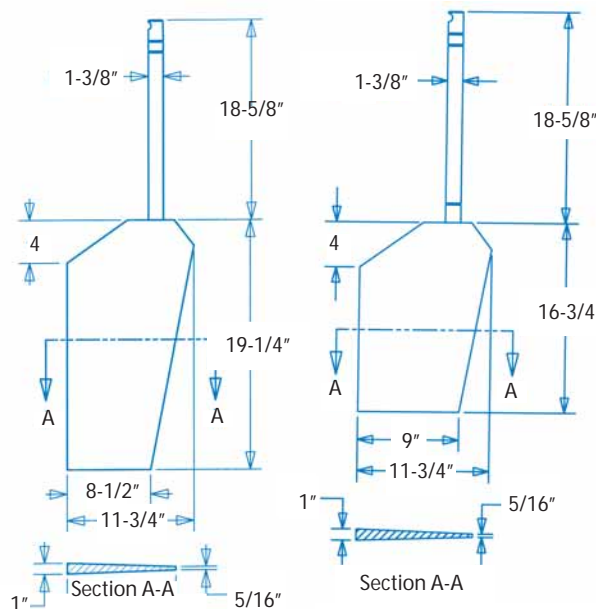
MODEL OBRI

Features a separate oversized cavitation plate. In mounted position, this plate is 4" below the water surface relative to the boat bottom, and prevents air from infiltrating down to the rudder blade. This effect increases rudder pressure, resulting in better rudder performance. This blade is designed for tunnel applications. When not using tunnels, or in high speed applications, the longer-blade model is recommended to capture the high pressure from the propeller wash.

Part No.	Post Dia.	Boat Length
OBRI-1.375-B	1-3/8"	28' to 46'
OBRI-1.375-B-E	1-3/8"	32' to 50'

Depending on speed and steering geometry, longer tiller arms are available for these rudders

The longer-blade rudders utilize rudder posts made of material with torsional yield of minimum 70,000 lbs.



Inboard Rudders

All Marine Hardware™, Inc., rudders are designed and refined from many years of boating experience, from uses such as recreational cruisers to record-setting inboard racing runabouts. Without a doubt, we are the inboard rudder design experts.

These rudders incorporate the swedging technique, wherein the bronze blade is cast on to a stainless steel post. This design allows us flexibility from boat to boat to accommodate tiller arm heights, engine stringers, upper support bearings, etc. We have also designed our family of rudders to incorporate breakaway points in the post; if an obstruction is hit, the blade and post will fail first at a point below the hull before disabling or breaking loose the rudder box itself, which would cause a life-threatening emergency.

Our rudders are all designed with an optimum leading edge formula to suit their application. This gives the operator an easy

steering wheel feel which will not pull in either direction at any point in a turn, a problem known as over steer or under steer condition.

Our inboard rudders are designed to use our rudder boxes and top bearing support. We recommend this method of installation for all inboard rudder systems. It utilizes a rudder box support parallel with the hull laminate and gains great structural strength by tying into engine stringers. This type of installation will ensure years of trouble-free performance.

For boats with inherent handling difficulties, please contact our design department to develop a rudder to perform to your handling expectations. Our years of experience creating unique rudder shapes and profiles allow us to meet any challenge with confidence and ultimate success.



Inboard Rudders

STANDARD INBOARD RUDDER

Marine Hardware™, Inc.'s standard inboard rudder family incorporates the maximum blade area that can be supported with the corresponding rudder post diameter.

The standard rudders are designed to optimize value of shape versus weight and typically work well with most hull shapes. All standard inboard rudders have 10% leading edge to provide easy steering. As with all Marine Hardware™, Inc. rudders, a standard post is swaged into bronze casting and designed with an integral breakaway point.

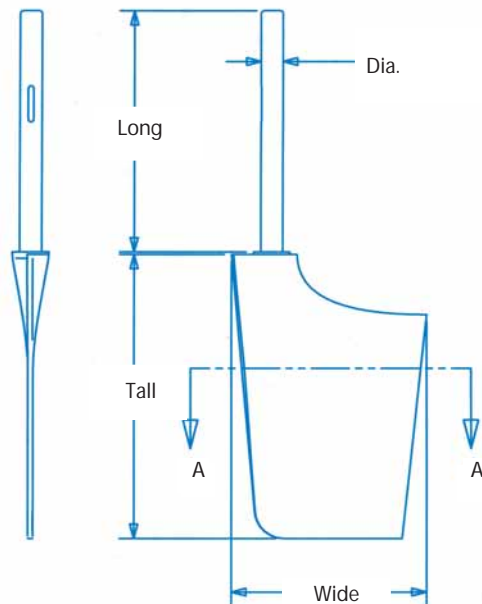
This design also works well with all inboard boats utilizing tunnels or pockets relieving pressure during turning maneuvers with the blade blocking the tunnel exit.

From tournament ski boats to charter vessels, thousands of our standard rudder applications are successfully in use today.



Cast of 70 manganese bronze, stainless steel post. 10% leading edge.

Part No.	Blade		Post	
	Tall	Wide	Dia.	Long
RPTR-1.000-B	13"	8-1/2"	1"	specify
RPTR-1.125-B	13"	8-1/2"	1-1/8"	specify
RPII-1.250-B	15"	9"	1-1/4"	specify
RPIM-1.250-B	17"	11-1/2"	1-1/4"	specify
RPII-1.375-B	15"	9"	1-3/8"	specify
RPIM-1.375-B	17"	11-1/2"	1-3/8"	specify
RPIL-1.500-B	20"	12"	1-1/2"	specify



Section A-A

Custom-styled rudders and service parts available on request. Call or e-mail us today.

Inboard Rudders



PERFORMANCE STYLE

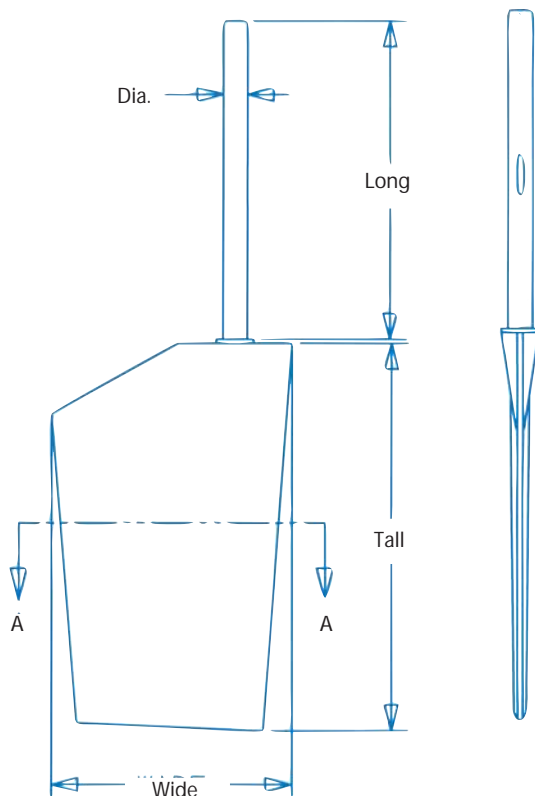
Marine Hardware™, Inc.'s highest performance inboard rudder designed for vessels traveling 15 knots or faster. A wedge shape keeps maximum water contact on the blade shape at all speeds and eliminates drift or wander.

This shape typically weighs significantly more than its standard counterpart. If speed and performance is desired, this is the perfect choice.

Available in all sizes from 1" to 2-1/2" post. This high performance rudder as with all Marine Hardware™, Inc.'s units includes a integral breakaway post design. All performance style rudders come complete with a standard stainless steel post. All blades are standard 10% leading edge.

Cast of 70 manganese bronze, stainless steel post . 10% leading edge.

Part No.	Blade		Post	
	Tall	Wide	Dia.	Long
RPBC-1.375-B	17"	12"	1-3/8"	specify
RPBC-1.500-B	20"	12"	1-1/2"	specify
RPBC-1.750-B	24"	15"	1-3/4"	specify
RPBC-2.000-B	24"	17"	2"	specify
RPBC-2.250-B	29"	17"	2-1/4"	specify
RPBC-2.500-B	29"	17"	2-1/2"	specify



Section A-A

Hundreds of styles to choose from and custom designs are also available

Inboard Rudders

NORDIC STYLE

The oversized blade configuration is designed for vessels 35 to 65 feet long. Also for vessels that move at slower speeds to 15 knots, yet still want great docking maneuverability.

This blade shape uses a 20% leading edge and is also recommended on vessels that have a center keel. The extreme leading edge offsets the keel steering effects.

Cast of 70 manganese bronze and is manufactured with a stainless steel post. Available for vessels 35 feet and larger. Post sizes begin at 1-1/2" to 2-1/2". All Nordic blades utilize an airfoil shape and are tapered from top to bottom.

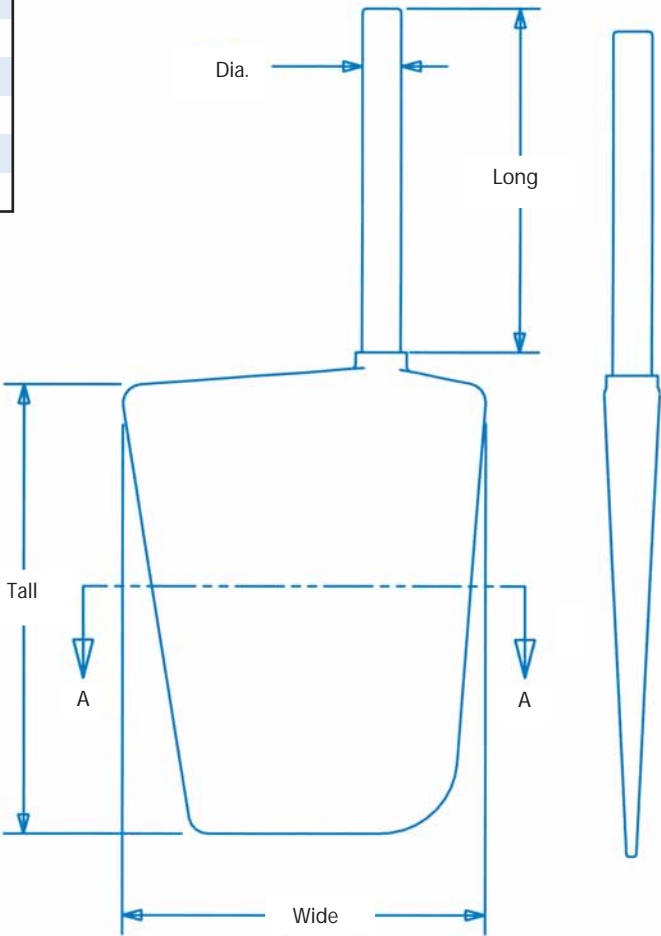


Cast of 70 manganese bronze, stainless steel post. 20% leading edge.

Part No.	Blade		Post	
	Tall	Wide	Dia.	Long
RPIX-1.500-B	20"	12"	1-1/2"	specify
RPIX-1.750-B	25"	17-1/2"	1-3/4"	specify
RPIX-2.000-B	25"	19"	2"	specify
RPIX-2.000-BL	30"	19"	2"	specify
RPIX-2.250-B	25"	19"	2-1/4"	specify
RPIX-2.250-BL	30"	19"	2-1/4"	specify



Section A-A



Call 1-800-526-5971
for more information or visit
www.marinehardware.com

Tournament Ski Boat Rudder Assemblies

Marine Hardware™, Inc., carries a complete line of unique rudders for enhanced performance of competition ski boats. In this type of boat, handling often makes the difference between winning and losing. The boat must work for the skier, not create a new set of obstacles. Marine Hardware™, Inc. rudder assemblies are original equipment on many major competition ski boats and the number is increasing all the time.

The benefits of factory-assembled rudder systems are assurance of quality workmanship, fast and easy installation,

and ease of replacement if repair is needed. As with our larger rudders, the 70 manganese bronze blade is cast on to the stainless steel post, assuring greatest strength and corrosion resistance.

All posts are one inch diameter, and several different blade configurations are readily available, for OEM or replacement use. We can also manufacture rudders to your specs, working with you to create a blade to optimize the handling characteristics of your boat design.

RUDDER COMPONENTS



ARC RUDDER

Marine Hardware's™ Accurate Rudder Control (ARC) system provides safe and stable steering precision for tournament ski and wakeboard boats. Typically, most single inboard boats drive with a "load" on the steering wheel that causes the boat to turn right when the wheel is released. Load can sometimes be removed by meticulous fine tuning the boat's running gear and steering system. The result can remove the load but leave play in the steering wheel, allowing the boat to wander off course without constant steering correction. The ARC rudder solves both problems. With its patented "window tab," the rudder can easily be fine tuned to suit the boat and the driver. On powered units the driver can actually set the rudder to the right amount of rudder feedback while underway. On manual units a set screw adjustment holds the tab in the optimal position to remove steering load without imparting play.

Part No.	Description
RPTT-1.00ASM-P	Powered
RPTT-1.00ASM-M	Manual



TOURNAMENT SKI BOAT RUDDER ASSEMBLIES

Competition ski boat rudder assemblies, with two mounting options for the rudder box. This complete assembly includes RPTN rudder, our seal-type rudder box with backing plate, and the tiller arm. Thru-bolt in tiller arm intersects at rudder post.

Option 1: For customer service repair/replacement parts, the rudder box has slots (with countersink angles around the edges of the slots) for easy match-up and mounting in any existing holes in the boat. The backing plate is also slotted.

Option 2: For OEM's, the rudder box is available with regular countersunk holes, or as you may specify.

All components are pre-assembled in our factory. For OEM's, this saves time in assembly, inventory, and purchasing departments. For repair/replacement jobs, this means no hassles with leaky seals, parts that don't mate, etc.

Can be keyed port or starboard, please specify.

Note: As a repair/replacement part, will not fit Mastercraft Tri-Star and 86 Malibu Skier.

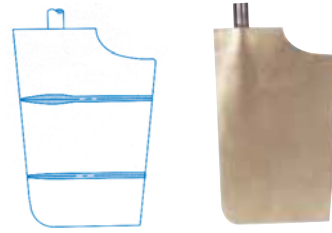
Part No.	Description
RPTN-1.00ASSY	Std. countersink holes
RPTN-SLOTRBSTASSY	Slotted

Tournament Ski Boat Rudders

MODEL RPTR

A universal application blade, giving best results on boats of 16' to 22'.

Part No.	Blade		Post	
	Tall	Wide	Dia.	Long
RPTR-1.000-SP	13-3/8"	8-1/2"	1"	5-3/4"



Available in bronze only

MODEL RPTA

A high-performance airfoil blade with a balanced 12% leading edge. Gives a power steering feel, yet minimizes water disturbance.

Part No.	Blade		Post		Blade Material
	Tall	Wide	Dia.	Long	
RPTA-1.000-SP	12-1/2"	8-1/2"	1"	5-3/4"	70 Mag Brz
RPTA-1.000-SP-S	12-1/2"	8-1/2"	1"	5-3/4"	316 SS



MODEL RPTE

Best feel for steady straightaways with no tendency for the boat to wander. Trailing edge is cupped much like performance propellers.

Part No.	Blade		Post	
	Tall	Wide	Dia.	Long
RPTE-1.000-SP	13"	8-1/4"	1"	5-3/4"



Available in bronze only

MODEL RPTN

An enhanced wedge blade, with radiused trailing edge, creates least turbulence for the skier. Widely used on the most recent ski boat models.

Part No.	Blade		Post		Blade Material
	Tall	Wide	Dia.	Long	
RPTN-1.000-SP	13"	8-1/4"	1"	5-3/4"	70 Mag Brz
RPTN-1.000-SP-S	13"	8-1/4"	1"	5-3/4"	316 SS



Turn Fins

Marine Hardware™, Inc., cast type 70 manganese bronze both for flat base and V-base competition standard ski boat fins. The base is machined flatness and CNC-drilled for easy installation. We can also tool up and manufacture custom turn fin designs.

Part No.	Description	Hole Size	Material
TURN-6.00F-B	Flat-Based	5/16"	Bronze
TURN-6.00V-B	V-Based	5/16"	Bronze
TURN-ECHELON-F-B	Flat-Based	5/16"	Bronze
TURN-ECHELON-F-S	Flat-Based	5/16"	SS



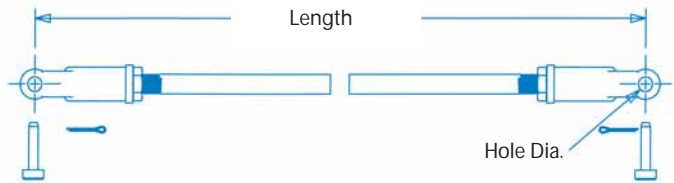
Tie-Bars & Clevises



We manufacture steering tie-bars of 1" or 1-1/8" diameter stainless steel barstock for greatest strength and corrosion resistance. Ends are turned and threaded to 1"-14 at both ends to accommodate our cast manganese bronze clevises, which fit virtually any tiller arm.

Tie-bars are custom made to your specified dimensions and clevis-pin holes drilled to your specification of pin diameter (Clevis-pins available on request). Please call, fax or e-mail for a quote.

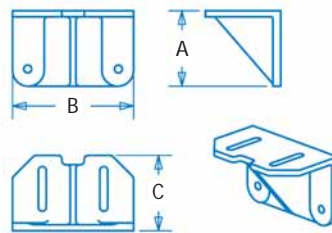
Part No.	Material	Thread	Pin Hole
CLVS-1.00-0.50-B	70 Mag Brz	1"-12 UNF-2B	1/2"
CLVS-1.00-0.50-S	316 SS	1"-12 UNF-2B	1/2"
CLVS-1.00-0.75-B	70 Mag Brz	1"-12 UNF-2B	3/4"
CLVS-1.00-0.75-S	316 SS	1"-12 UNF-2B	3/4"



Motor Mounts



All Marine Hardware™, Inc. motor mounts are sand cast of type 713 corrosion-resistant aluminum. Generally, boatbuilders have us tool for their custom design. Send us your drawing and let us create pattern and production parts for you.



MOTOR MOUNT WASHERS

This heavy-duty, large O.D. washer is designed specifically for motor mount use. They spread the compression load so the fiberglass is not fractured. Made of cast aluminum for metal compatibility. Drilled for 1/2" diameter fastener.

Part No.	Hole Diameter	O.D.	Thickness
MMWS-.50x2.00	1/2"	2"	5/16"
MMWS-.38x2.00	3/8"	2"	5/16"

Rudder Support Bearings

The rudder support bearing and safety collar work together to support stress and weight in inboard rudder installations. The support bearing holds the top of the rudder post steady, maintaining alignment and reducing "leverage" stress on the rudder box.

Made of cast red bronze, precision machined.

Part No.	Fits Post Dia.	Mounts Bolt
IRSB-1.000-B	1"	1/4"
IRSB-1.125-B	1-1/8"	1/4"
IRSB-1.250-B	1-1/4"	3/8"
IRSB-1.375-B	1-3/8"	3/8"
IRSB-1.500-B	1-1/2"	3/8"
IRSB-1.500-S	1-1/2"	3/8"
IRSB-1.750-B	1-3/4"	3/8"
IRSB-2.000-B	2"	1/2"
IRSB-2.500-B	2-1/2"	1/2"
IRSB-3.000-B	3"	1/2"
IRSB-3.500-B	3-1/2"	1/2"



Safety Collars

The rudder support bearing and safety collar work together to support stress and weight in inboard rudder installations. The safety collar ensures that the rudder will never drop down out of the boat should the tiller arm become loose for any reason, or if the rudder sustains a jarring blow such as a collision with a submerged obstacle.

Made of 316 stainless steel, precision machined. Safety collars come complete with two stainless steel set screws.

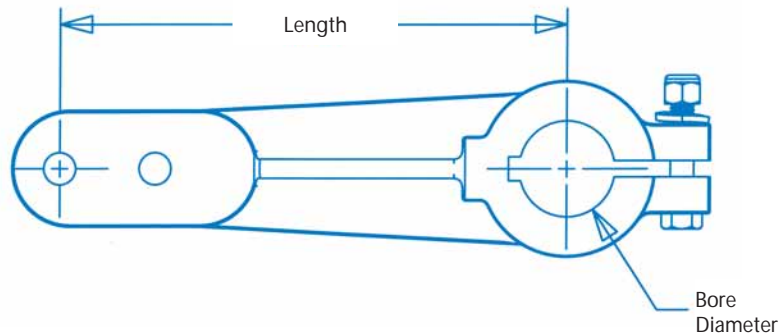
Part No.	Fits Post Dia.	Width
IRSC-1.000-S	1"	3/4"
IRSC-1.125-S	1-1/8"	3/4"
IRSC-1.250-S	1-1/4"	1"
IRSC-1.375-S	1-3/8"	1"
IRSC-1.500-S	1-1/2"	1"
IRSC-1.750-S	1-3/4"	1-1/4"
IRSC-2.000-S	2"	1-1/4"
IRSC-2.500-S	2-1/2"	1-1/2"
IRSC-3.000-S	3"	1-1/2"



Tiller Arms

Tiller arms are available in sand cast 70 manganese bronze or investment cast 316 stainless steel. Bronze is noted for strength and resistance to work-hardening (becoming brittle). Stainless steel is noted for unsurpassed resistance to corrosion. Bores are precision-machined to ensure compatibility with rudder posts. Clevis pin holes are drilled to precise tolerance

to prevent slack and vibration in the steering feel. All length dimensions shown in part titles or tables are measured from center of bore to center of clevis pin hole, as shown in diagram below. This allows easy steering ratio calculations. Every tiller arm comes complete with stainless steel clamping fasteners and nylon-insert nut.



STRAIGHT-Ski Boat

Designed especially for competition ski boats, this "flat" style is also used as a replacement part for old style inboard boats of 16 to 20 feet. The flat style with 3/8" hole fits 98% of all recent steering systems in ski boats. Comes complete with stainless steel fasteners and nylon-insert nut.

Part No.	Material	Bore Dia.	Length	Bolt	Key
TATS-1.000-5	70 mag brz	1"	5-1/8"	Non-intersecting	1/4"
TATS-1.000x5-IB	70 mag brz	1"	5-1/8"	Intersecting	1/4"
TATS-1.000x5-S	316 SS	1"	5-1/8"	Intersecting	1/4"
TATS-1.000x6-IB	316 SS	1"	6"	Intersecting	1/4"

GOOSENECK-Ski Boat

Used extensively in many of the most current competition ski boats. Bore is offset in the vertical dimension from the level of the clevis pin hole. Comes complete with stainless steel fasteners and nylon-insert nut.

Part No.	Material	Bore Dia.	Length	Bolt	Key	Offset
TAGN-1.000-5	70 mag brz	1"	5-1/2"	Intersecting	1/4"	5/8"
TAGN-1.00x5.5-1.0	316 SS	1"	5-1/2"	Intersecting	1/4"	1"

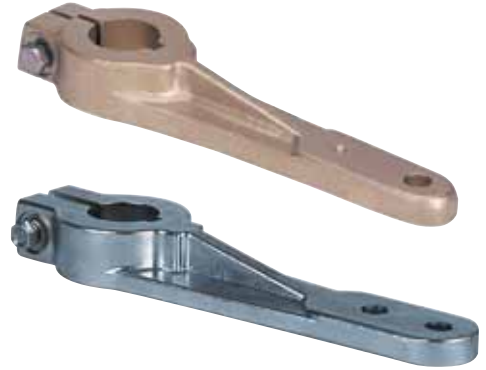


Tiller Arms

7" STANDARD TILLER ARMS

Comes complete with stainless steel fasteners and nylon nut.

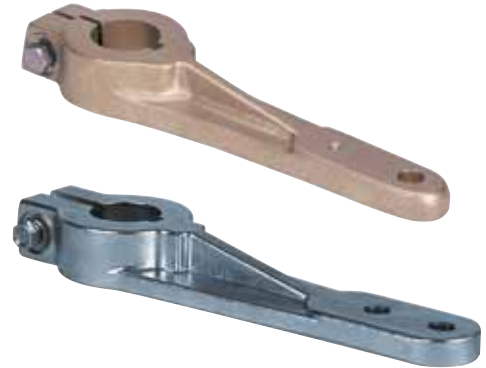
Part No.	Material	Bore Dia.	Key
TAHR-1.250-7	70 mag brz	1-1/4"	5/16"
TAHR-1.375-7	70 mag brz	1-3/8"	5/16"
TAHR-1.500-7S	316SS	1-1/2"	3/8"



8" STANDARD TILLER ARMS

Comes complete with stainless steel fasteners and nylon nut.

Part No.	Material	Bore Dia.	Key
TAHR-1.250-8	70 mag brz	1-1/4"	5/16"
TAHR-1.375-8	70 mag brz	1-3/8"	5/16"
TAHR-1.500-8	70 mag brz	1-1/2"	3/8"
TAHR-1.500-8S	316 SS	1-1/2"	3/8"
TAHR-1.750-8	70 mag brz	1-3/4"	7-16"



10" STANDARD TILLER ARMS

Comes complete with stainless steel fasteners and nylon nut.

Part No.	Material	Bore Dia.	Key
TAHL-1.250-10	70 mag brz	1-1/4"	5/16"
TAHL-1.375-10	70 mag brz	1-3/8"	5/16"
TAHL-1.500-10	70 mag brz	1-1/2"	3/8"
TAHL-1.750-10	70 mag brz	1-3/4"	7-16"



12" STANDARD TILLER ARMS

Comes complete with stainless steel fasteners and nylon nut.

Part No.	Material	Bore Dia.	Key
TAHL-2.000-12	70 mag brz	2"	1/2"
TAHL-2.000-12S	316 SS	2"	1/2"
TAHL-2.250-12	70 mag brz	2-1/4"	9/16"
TAHL-2.500-12	70 mag brz	2-1/2"	5/8"



Tiller Arms

TILLER ARMS



16" STANDARD TILLER ARMS

For larger motor yachts and commercial boats. Two styles to choose from, either centered arm (TACS) or flat under side (TACX). Comes complete with stainless steel fasteners and nylon locking nut.

Part No.	Material	Bore Dia.	Key
TACS-2.000-16	70 Mag Brz	2"	1/2"
TACS-2.250-16	70 Mag Brz	2-1/4"	9/16"
TACS-2.500-16	70 Mag Brz	2-1/2"	5/8"
TACX-2.000-16	70 Mag Brz	2"	1/2"
TACX-2.000-16S	316 SS	2"	1/2"
TACX-2.500-16	70 Mag Brz	2-1/2"	5/8"
TACX-2.500-16S	316 SS	2-1/2"	5/8"
TACX-2.750-16	70 Mag Brz	2-3/4"	5/8"
TACX-3.000-16	70 Mag Brz	3"	3/4"
TACX-3.500-16	70 Mag Brz	3-1/2"	3/4"

TACX style pictured



18" STANDARD TILLER ARMS

Cast of 70 manganese bronze and comes complete with stainless steel fasteners and nylon nut.

Part No.	Bore Dia.	Key
TACS-3.50-18	3-1/2"	3/4"
TACS-3.75-18	3-3/4"	3/4"
TACS-4.00-18	4"	3/4"

TACS style pictured



11-1/2" CLAMP STYLE

Our commercial choice for all retro fit applications. Will fit any shaft without removing the rudder. Cast of 70 manganese bronze and comes complete with stainless steel fasteners and nylon nut.

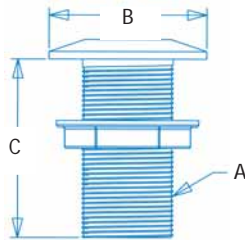
Part No.	Bore Dia.	Key	Length Range
TACR-1.375-10	1-3/8"	5/16"	5"-10"
TACR-1.500-10	1-1/2"	3/8"	5"-10"
TACR-1.750-10	1-3/4"	7/16"	5"-10"
TACR-2.000-10	2"	1/2"	5"-10"
TACL-1.750-14	1-3/4"	7/16"	5"-14"
TACL-2.000-14	2"	1/2"	5"-14"

Thru-Hulls

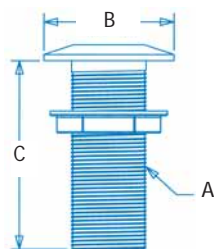
Our thru-hulls and water pickups are cast of 85-5-5-5 red bronze, also known as naval bronze, the most corrosion resistant copper alloy available. Our standard mushroom thru-hulls are also available in 316 stainless steel, for those who prefer the excellent characteristics of this metal. Our parts are cast with a very sturdy wall thickness and machined with straight pipe

thread, which blends into tapered pipe thread at the end of the neck. This thread configuration mates with virtually any piping or valve without the need for adapter connections. Generous neck lengths, threaded close to the flange, fit any hull thickness. Machined sealant groove on back of flange face to prevent leakage. Complete with flanged jam nut.

STANDARD MUSHROOM

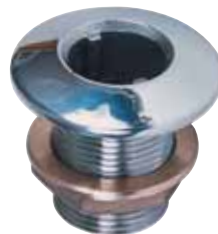


Machine Finish Bronze	Chrome Plated Bronze	316 Stainless Steel	Size (NPSM)	Flange O.D.	Neck Length
Part No.	Part No.	Part No.	(A)	(B)	(C)
THMR-0.500-B	THMR-0.500-C	—	1/2"	1-3/4"	2-1/4"
THMR-0.750-B	THMR-0.750-C	THMR-0.750-S	3/4"	1-3/4"	2-1/4"
THMR-1.000-B	THMR-1.000-C	THMR-1.000-S	1"	2-1/4"	2-1/2"
THMR-1.250-B	THMR-1.250-C	—	1-1/4"	3"	3-1/4"
THMR-1.500-B	THMR-1.500-C	THMR-1.500-S	1-1/2"	3-1/4"	3-1/2"
THMR-2.000-B	THMR-2.000-C	THMR-2.000-S	2"	3-1/2"	3-1/2"



EXTENDED MUSHROOM

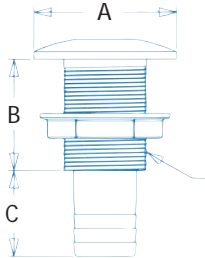
Machine Finish Bronze	Chrome Plated Bronze	Size (NPSM)	Flange O.D.	Neck Length
Part No.	Part No.	(A)	(B)	(C)
THME-0.500-B	THME-0.500-C	1/2"	1-3/4"	4"
THME-0.750-B	THME-0.750-C	3/4"	1-3/4"	4"
THME-1.000-B	THME-1.000-C	1"	2-1/4"	4-1/4"
THME-1.250-B	THME-1.250-C	1-1/4"	2-1/4"	4-1/4"
THME-1.500-B	THME-1.500-C	1-1/2"	3"	5"
THME-2.000-B	THME-2.000-C	2"	3-1/2"	5-1/2"



Special application short thru-hulls are available. Contact our sales department

BARBED MUSHROOM

Marine Hardware's™ barbed thru-hull fittings are designed for use above the waterline, attached directly to hose. The bodies have straight thread below the barbed section. All have heavy wall construction for strength and wrench flats on the end of the threaded portion for easy, one-person installation.



316 SS	Machine Finish Bronze	Chrome Plated Bronze	Size	Fits Hose Dia.	Flange Size	Neck Length	Barb Length
Part No.	Part No.	Part No.	(NPSM)		(A)	(B)	(C)
THMB-0.500-S	THMB-0.500-B	THMB-0.500-C	1/2"	1/2"	1-1/2"	1-1/2"	1-1/4"
THMB-0.750-S	THMB-0.750-B	THMB-0.750-C	3/4"	3/4"	1-3/4"	2"	1-1/2"
THMB-0.750-SHORT-S	—	—	3/4"	3/4"	1-3/4"	1"	1-1/4"
THMB-1.000-S	THMB-1.000-B	THMB-1.000-C	1"	1-1/8"	2-1/4"	2-1/4"	1-1/4"
THMB-1.125-S	THMB-1.00X1.250-B	THMB-1.00X1.250-C	1"	1-1/8"	2-1/4"	2-1/4"	1-1/2"
THMB-1.250-S	THMB-1.250-B	THMB-1.250-C	1-1/4"	1-1/4"	2-3/4"	2-1/4"	1-1/2"
THMB-1.500-S	THMB-1.500-B	THMB-1.500-C	1-1/2"	1-1/2"	3"	2-1/2"	1-1/2"
—	THMBE-1.500-B-FLAP	THMBE-1.500-C-FLAP	1-1/2"	1-1/2"	3"	3-3/4"	1-7/16"
THMB-2.000-S	THMB-2.000-B	THMB-2.000-C	2"	2"	3-1/2"	2-1/2"	1-3/4"

STAINLESS CLAD THRU-HULL FITTING

A tough glass filled nylon body is molded around an attractive stainless flange. Get the look and feel of stainless thru hulls at a fraction of the price. Nylon body is grey in color to match stainless flange. Flange sizes are uniform for multi-outlet applications.

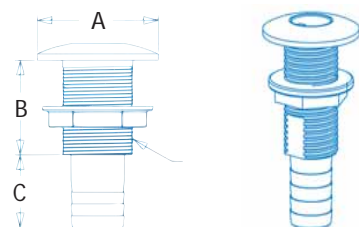


COMMON HEAD THRU-HULL FITTING

These Thru-hull fittings have the same quality construction and finish as our standard barbed mushroom fittings. Six sizes available for 5/8" to 2" hose. Flanges share only three head sizes for uniformity of style when multiple hose sizes are used.



316 SS Common Head	SS Clad Nylon Common Head	Thread (NPSM)	Fits Hose Dia.	Flange Size	Neck Length	Barb Length
Part No.	Part No.			(A)	(B)	(C)
THMB-0.500-X	THMB-0.500-N	1/2"	5/8"	1-7/8"	1-5/8"	1"
THMB-0.750-X	THMB-0.750-N	3/4"	3/4"	1-7/8"	1-5/8"	1-1/8"
THMB-1.000-X	THMB-1.000-N	1"	1"	1-7/8"	1-5/8"	1-3/16"
THMB-1.125-X	THMB-1.125-N	1"	1-1/8"	2-3/8"	1-7/8"	1-1/4"
THMB-1.250-X	THMB-1.250-N	1-1/4"	1-1/4"	2-3/8"	1-7/8"	1-5/8"
THMB-1.500-X	THMB-1.500-N	1-1/2"	1-1/2"	2-3/8"	1-7/8"	1-1/2"
THMB-2.000-X	—	2"	2"	3-1/4"	3"	2"
—	THMB-2.000-N	2"	2"	3-1/4"	2-1/4"	2"



Thru-Hulls

LOW VOLUME WATER PICKUP

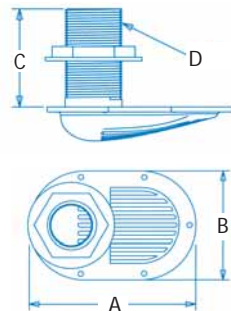
A thru-hull style of water pickup for low volume pumps such as bait well pumps. Designed like our thru-hulls, with straight pipe threads on the neck and tapered pipe threads at the end to mate with other fittings. Installs with the included flanged jam nut, like a regular thru-hull, with two #8 flat head screws in the flange to hold the cut-out "scoop" in the correct orientation. Available in machine-finish bronze only.



Part No.	Size (NPSM)	Flange O.D.	Neck Length
	(A)	(B)	(C)
THMR-0.750-B-HSWP	3/4"	1-7/8"	2-1/4"
THMR-1.000-B-HSWP	1"	2-1/4"	2-1/2"
THMR-1.25B-HSWP	1-1/4"	2-3/4"	3-1/4"
THMR-1.50B-HSWP	1-1/2"	3"	3-1/2"

HIGH SPEED WATER PICKUPS

Cast from 85-5-5-5 naval bronze with extra-sturdy wall thickness. Our pickups have a generous neck length to fit any hull and have straight pipe thread blending into tapered pipe thread at end for easy connection to piping or valves. Complete with flanged jam nut. The 1" size is our exclusive design for competition-style ski boats. It is available in naval bronze or 316 stainless steel.



Part No.	Material	Size (NPSM)	Scoop Length	Scoop Width	Neck Length
		(D)	(A)	(B)	(C)
HSWP-0.750-B	Bronze	3/4"	4"	3"	2-1/2"
HSWP-1.000-B	Bronze	1"	4"	2-1/2"	2-1/2"
HSWP-1.000-S	SS	1"	4"	2-1/2"	2-1/2"
HSWP-1.250-B	Bronze	1-1/4"	6-1/2"	4"	3-3/8"
HSWP-1.500-B	Bronze	1-1/2"	6-1/2"	4"	3-3/8"
HSWP-2.000-B	Bronze	2"	8"	5-1/2"	3-3/8"

PIPE NIPPLES

Marine Hardware™, Inc. is the only source for pipe nipples in 85-5-5-5 bronze. This alloy is resistant to work hardening and is less likely to become brittle or crack when subjected to vibration. The corrosion resistance and alloy compatibility of Marine Hardware pipe nipples make them ideally suited for use with other bronze fittings such as ball valves, sea strainers and seacocks.



Part No.	Description
PTPNM-0.50-NOHEX	Brass 1/2" NPT Pipe Nipple, No Hex
PTPNM-0.75-NOHEX	Brass 3/4" NPT Pipe Nipple, No Hex
PTPNM-1.00-NOHEX	Brass 1" NPT Pipe Nipple, No Hex
PTPNM-1.25-NOHEX	Brass 1-1/4" NPT Pipe Nipple, No Hex
PTPNM-1.50-NOHEX	Brass 1-1/2" NPT Pipe Nipple, No Hex
PTPNM-2.00-NOHEX	Brass 2" NPT Pipe Nipple, No Hex

Sea Strainers

UNIVERSAL SWIVEL MOUNT

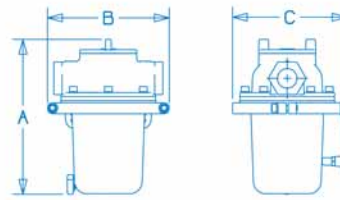
Marine Hardware's™ Universal Mount Sea Strainers incorporate all the best features required by the U.S. Navy. Starting with a cast 85-5-5-5 bronze housing, all units include a pull out strainer screen assembly for easy spill-proof maintenance. The inspection lens is heavy walled for maximum strength and is securely fastened to the housing with a bronze retainer ring plate.

Our unique design insures a firm mount to the engine stringers and allows full 360° rotation of the top housing to optimize plumbing fittings. A perfect choice for port and starboard engine installations.



Part No.	Inlet/Outlet	A	B	C
SEAS-UM 0.750	3/4" NPT	7.52"	5.92"	
SEAS-UM 1.000	1" NPT	7.52"	5.92"	5.56"
SEAS-UM 1.250	1-1/4" NPT	10.58"	6.75"	
SEAS-UM 1.500	1-1/2" NPT	10.58"	6.75"	6.40"
SEAS-UM 2.000	2" NPT	14.00"	10.82"	
SEAS-UM 2.500	2-1/2" NPT	14.00"	10.82"	9.85"

Drain plugs are provided for winterization. Failure to properly winterize can cause damage that is not covered under warranty.



Replacement Part No.				
Screen	Bowl	Cap	O-ring & Maint. Kit	Drain Plug
SEAS-SCREEN-0.750	SEAS-BOWL-.75/1.0	SEAS-CAP-0.75/1.00	SEAS-KIT-0.75/1.0	SEAS-DRAIN-PLUG
SEAS-SCREEN-0.750	SEAS-BOWL-.75/1.0	SEAS-CAP-0.75/1.00	SEAS-KIT-0.75/1.0	SEAS-DRAIN-PLUG
SEAS-SCREEN-1.500	SEAS-BOWL-125/150	SEAS-CAP-1.25	SEAS-KIT-1.25/1.5	SEAS-DRAIN-PLUG
SEAS-SCREEN-1.500	SEAS-BOWL-125/150	SEAS-CAP-1.50	SEAS-KIT-1.25/1.5	SEAS-DRAIN-PLUG
SEAS-SCREEN-2.000	SEAS-BOWL-200/250	SEAS-CAP-2.00-SM	SEAS-KIT-2.0/2.5	SEAS-DRAIN-PLUG
SEAS-DRAIN-PLUG	SEAS-DRAIN-PLUG	SEAS-DRAIN-PLUG	SEAS-DRAIN-PLUG	SEAS-DRAIN-PLUG

TOP VIEW MULTI-PORT SEA STRAINER - Self-Cleaning

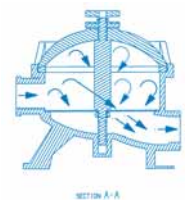
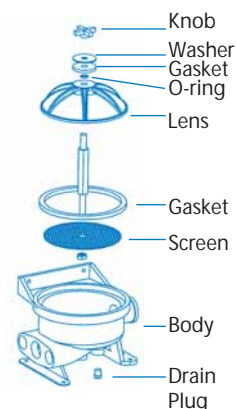
This compact assembly has proven efficient and reliable for years in the field in many types of craft, from ski boats to sport fisher to cruisers. Cast in 85-5-5-5 bronze, the multi-port strainers are precision machined, and assembled with the finest hardware available. The clear heavy duty lens allows easy inspection and a hand knob facilitates clean out with no need for tools. A plug simplifies drainage for winterization.

These units come standard with barbs for 1-1/4" diameter inlet hose, but can be tapped to accept 1" pipe fittings and elbows, if required for your specific installation. The outlet side is tapped for two 3/4" NPT and one 1" NPT.



Part No.	Lens	Inlet	Outlet (s)
SEAS-MP-NPT-DOME	Dome	1-1/4" dia. hose	(2) 3/4" NPT & 1" NPT
SEAS-MP-NPT	Flat	1-1/4" dia. hose	(2) 3/4" NPT & 1" NPT

Drain plugs are provided for winterization. Failure to properly winterize can cause damage that is not covered under warranty.



Pipe-to-Hose Fittings

Constructed of 85-5-5 naval bronze, these fittings are C.N.C. machined to class 3 fits, ensuring leak-free joints. All units are precision turned on hose end to ensure snug hose fits. All parts are bulk-packed. Also see Pipe Nipples on page 39.



STRAIGHT PIPE-TO-HOSE ADAPTERS

Part No.	Pipe Size (NPT)	Hose Barb O.D.	Hex Size
PTHA-S-0.75X0.75	3/4" NPT	3/4"	1-1/4"
PTHA-S-E-0.75X0.75	3/4" NPT	3/4"	1-1/4"
PTHA-S-0.75X1.00	3/4" NPT	1"	1-3/8"
PTHA-S-1.00X1.00	1" NPT	1"	1-1/2"
PTHA-S-1.00X1.25	1" NPT	1-1/4"	1-1/2"
PTHA-S-1.25X1.25	1-1/4" NPT	1-1/4"	2"
PTHA-S-1.25X1.50	1-1/4" NPT	1-1/2"	2"
PTHA-S-1.50X1.50	1-1/2" NPT	1-1/2"	2-1/8"
PTHA-S-2.00X2.00	2" NPT	2"	2-5/8"
PTHA-S-2.50X2.50	2-1/2" NPT	2-1/2"	2-7/8"
PTHA-S-3.00X3.00	3" NPT	3"	3-1/2"
PTHA-S-4.00X4.00	4" NPT	4"	4-1/2"



MALE 90° PIPE-TO-HOSE ADAPTERS

Part No.	Angle	Pipe Size	Hose Size
PTHA-90-0.75X0.75	90°	3/4" NPT	3/4"
PTHA-90-1.00X1.00	90°	1" NPT	1"
PTHA-90-1.25X1.25	90°	1-1/4" NPT	1-1/4"
PTHA-90-1.50X1.50	90°	1-1/2" NPT	1-1/2"
PTHA-90-2.00X2.00	90°	2" NPT	2"
PTHA-90-2.50X2.50	90°	2-1/2" NPT	2-1/2"
PTHA-90-3.00X3.00	90°	3" NPT	3"
PTHA-90-4.00X4.00	90°	4" NPT	4"



FEMALE 90° PIPE-TO-HOSE ADAPTERS

Part No.	Angle	Pipe Size	Hose Size
PTHA-F-0.50	90°	1/2" NPT	1/2"
PTHA-F-0.75	90°	3/4" NPT	3/4"
PTHA-F-1.00	90°	1" NPT	1"
PTHA-F-1.00x1.25	90°	1" NPT	1-1/4"
PTHA-F-1.25	90°	1-1/4" NPT	1-1/4"
PTHA-F-1.50	90°	1-1/2" NPT	1-1/2"
PTHA-F-2.00	90°	2" NPT	2"

Scuppers

SCUPPER - Ball Type

A traditional ball type scupper available in 1-1/2" and extra large 2 inch versions, both are cast stainless steel with removable grates.

SCUPPER - Oval

Cast stainless steel and mirror polished, this scupper adds class to the cockpit of any fishing or cruising boat. Fits 1-1/2 inch hose and has a removable grate for cleaning.

Part No.	Description
SSSC-15000	Ball-Type Cockpit Scupper for 1-1/2" hose
SSSC-2000	Ball-Type Cockpit Scupper for 2" hose
SSSC-15005	Oval Cockpit Scupper for 1-1/2" hose



Faucet

FAUCET - Washdown

Marine Hardware's™ wash down faucet is stylish and compact. It fits under the gunnels of most sport fishing boats for fresh or salt water wash down. Cruisers will add one to the anchor locker to hose mud and debris off of the ground tackle before stowing. Outlet side fits standard garden hose fittings, inlet side is 1/2" NPT. Construction is cast stainless steel with mirror polish finish.

Part No.
SSWF-62100



Fuel Line Fittings

Extra long hose barbs accommodate two clamps, as required by ABYC and Coast Guard for fuel lines. Made of brass for long, reliable service. Precision tapered pipe threads.

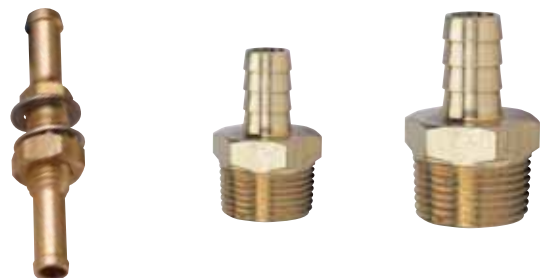
90° DEGREE FUEL FITTINGS

Part No.	Pipe Thread	Hose Dia.
PTHA-90-0.25 X 0.38	1/4"	3/8"
PTHA-90-0.25 X 0.50	1/4"	1/2"
PTHA-90-0.38 X 0.31	3/8"	5/16"
PTHA-90-0.38 X 0.38	3/8"	3/8"
PTHA-90-0.50 X 0.38	1/2"	3/8"
PTHA-90-0.50 X 0.50	1/2"	1/2"



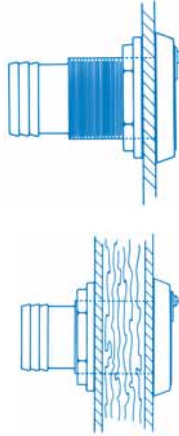
STRAIGHT FUEL FITTINGS

Part No.	Pipe Thread	Hose Dia.
PTHA-S-0.25 X 0.31	1/4"	5/16"
PTHA-S-0.25 X 0.50	1/4"	1/2"
PTHA-S-0.38 X 0.31	3/8"	5/16"
PTHA-S-0.50 X 0.50	1/2"	1/2"
HTHAS-0.38X0.38	Not Threaded	3/8"



Exhaust Systems

Marine Hardware™, Inc.'s exhaust ports are the finest on the market today. Manufactured of stainless steel or nylon for ultimate corrosion resistance and strength, with a 60 durometer nitrile rubber flap to prevent backwash. Fasteners are high-grade stainless steel.



316 SS GENERATOR EXHAUST PORTS

Investment cast 316 stainless steel, full thread length to insure fit in any wall thickness. The design allows easy installation in boat hulls of varying thicknesses, from 3/8" to 2-1/4" as used in inboard/outboard transoms or sides of hull. Fully serviceable from outside the vessel. Complete with flapper.

Part No.	Hose Dia.
GETH-1.500-S	1-1/2"
GETH-2.000-S	2"
GETH-2.500-S	2-1/2"
GETH-3.000-S	3"
GETH-3.500-S	3-1/2"



CUT PIPE EXHAUST OUTLET

The "bad boy" of our outlet offerings, the cut pipe is the finishing touch on the transom of your tournament ski boat or go fast. Cast stainless steel and mirror polished.

Part No.	Hose Dia.
SSEP-3.500-45	3-1/2"



NYLON EXHAUST OUTLET

Molded in tough fiber filled plastic, this exhaust outlet offers an economical alternative to our cast outlet.

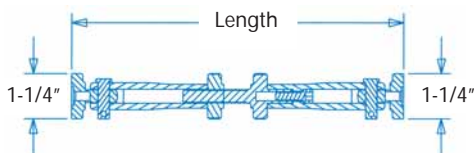
Part No.	Hose Dia.
GFEP-3.500-45	3-1/2"



TURNBUCKLE

Stainless steel thumb twist knob for simple adjustment in the water, no tools required. Investment cast 316 stainless steel for corrosion resistance and strength. CNC threads for smooth operation.

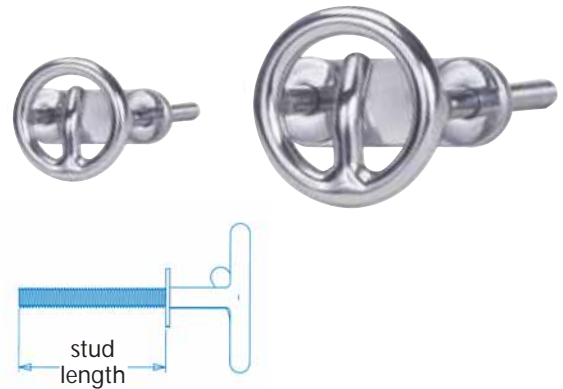
Part No.	Length
SSTB-66000	8-1/2" to 9-1/2"



SKI TOW RINGS - Standard

Manufactured of 304 stainless steel for maximum strength and corrosion resistance. Studs oriented horizontally, complete with one strap washer (backing plate), two split style lockwashers, and two nuts, all of stainless steel.

Part No.	Ring Diameter	Stud Dia.	Stud Length
SSRI-19006	2-1/2"	3/8"	2-1/2"
SSRI-19010	3"	3/8"	4"
SSRI-19011	3-1/2"	1/2"	4"



SKI TOW RINGS - Vertical

Manufactured of 304 stainless steel for maximum strength and corrosion resistance. Studs oriented vertically, come complete with stainless steel washers and nuts.

Part No.	Ring Diameter	Stud Dia.	Stud Length
SSRI-19007-V2.9	2-1/2"	3/8"	3"
SSRI-19007-V3.3	2-1/2"	3/8"	3-3/8"



SKI PYLONS

Marine Hardware™, Inc., CNC turns a variety of custom ski pylons for all competition ski boats. Manufactured of 6061-T6 aluminum, polished finish is standard. Satin finish, powder-coated, or anodized finishes are optional. Custom lengths as well as swiveled top are available upon request.

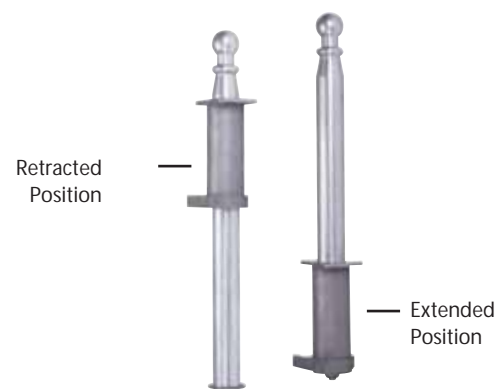
Part No.	Dia.	Length
PYLN-2.43-48-A	2-7/16"	48"
PYLN-2.43-56-A	2-7/16"	56"



PULL UP SKI PYLON

This unique design pylon assembly is crafted for V-drive ski boats and small runabouts. In a retracted position the pylon is out of harms way. When in the extended position it becomes a durable heavy duty ski pylon or mooring cleat.

Part No.	Dia.	Pylon Length
PULP-1.500	1-1/2"	20-3/8"



Garboard Drains



PLUG STYLE GARBOARD DRAINS

Our plug style garboard drain assembly is cast brass threaded for 1/2" pipe plug. Flanges are drilled and countersunk for three #8 flat head mounting screws. We supply a plug with the dry seal thread pitch to ensure no water seepage. Unlike hollow plugs which are subject to cracking by the expansion of freezing water, our solid plug will withstand this pressure and remain watertight. Our plugs are chemically resistant to all fuels, oils and battery acids found in typical boat bilges. Bulk-packaged in 100 per box.

Part No.	Type	Size	Flange O.D.	Material	
				Flange	Plug
GARB-0.500-P	Assembly	1/2"	2"	Brass	Brass
GARB-0.500-PL	Assembly	1/2"	2-1/4"	Brass	Brass
GARB-0.500-PB-OR	Assembly	1/2"	2"	Brass	Brass
GARB-0.500-PLS-OR	Assembly	1/2"	2-1/4"	SS	SS
GARB-0.500-PLS-OR	Assembly	1/2"	2-1/4"	SS	SS
PLUG-0.500-P	Plug only	1/2"	N/A	N/A	Brass
FLNG-0.500-P	Flange only	1/2"	2"	Brass	N/A
FLNG-0.500-PL	Flange only	1/2"	2-1/4"	Brass	N/A

O-ring style sold as assembly only.

SKI BOAT ACCESSORIES



CAPTIVE PLUG GARBOARD DRAIN

The plug is attached to the body by a stainless steel rod, preventing its loss and allowing full drainage when open.

Part No.	Type	Size	Flange O.D.	Material	
				Flange	Plug
GARB-0.500-PB-OR-RT	Ass'y	1/2"	2-1/4"	Brass	Brass

DRAIN TUBE AND EXPANDABLE PLUGS

Standard one inch drain tube for transoms and outboard wells. Threaded T-handle or flip-lock expandable drain plugs are available.

Part No.	Size
GARB-1.00-Tube	1"
GARB-1.00-T-Handle	1"
GARB-1.00-Flip-Plug	1"

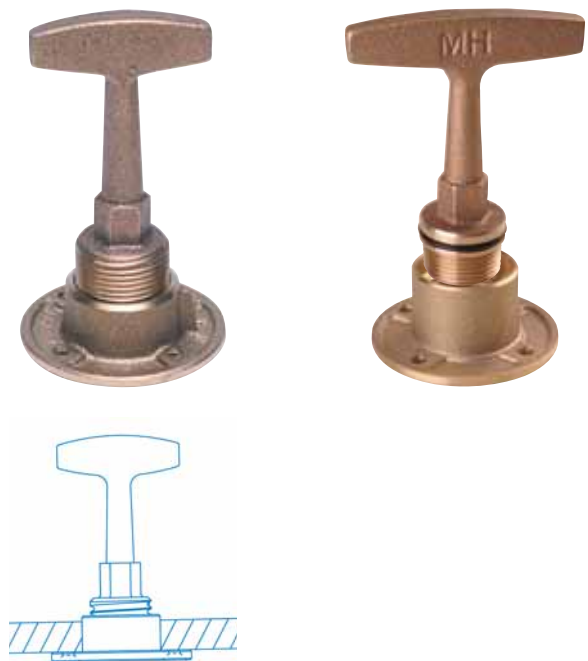
Garboard Drains

T-HANDLE GARBOARD DRAINS

The T-handle garboard drain assembly is designed specifically for competition ski boats, with their unique hull and interior configurations. The flange is threaded from the back side so the plug can fit inside the boat. The 1/2" size has three mount holes, the 3/4" size has four. The T-handle is long and easily accessible, to avoid fumbling through dirty bilge water. It also incorporates a hex for wrench operation. The plug is solid to prevent freeze damage. Bulk-packaged in 50 per box.

Part No.	Type	Size	Flange O.D.	Material	
				Flange	Plug
GARB-0.500-T	Assembly	1/2"	2"	Brass	Bronze
GARB-0.750-T	Assembly	3/4"	2-1/4"	Brass	Bronze
GARB-0.750-T-OR	Assembly	3/4"	2-1/4"	Brass	Brass
PLUG-0.500-T	T-handle only	1/2"	2"	N/A	Bronze
PLUG-0.750-T	T-handle only	3/4"	N/A	N/A	Bronze
FLNG-0.500-T	Flange only	1/2"	2"	Brass	N/A
FLNG-0.750-T	Flange only	3/4"	2-1/4"	Brass	N/A

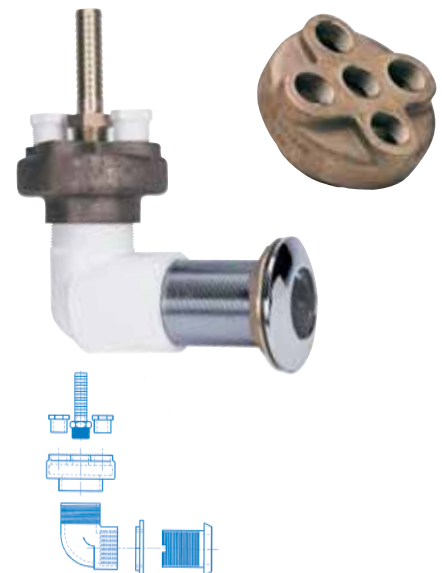
O-ring style also available.



MULTI PORT THRU-HULL

An innovative solution to the problem of outputting several water lines without cluttering the esthetic styling of the boat with numerous thru-hulls. Our unit is tapped for five 3/4" tapered pipe thread water fittings, and is engineered with the capacity to work with all outflows operating simultaneously. This one product eliminates the need for four extra thru-hulls, and is supplied with the 90 degree elbow that ensures positive looping. Manifold is cast red bronze, thru-hull is polished chrome-plated red bronze, elbow is heavy-duty PVC.

Part No.	Description
MPTH-5 X 0.75NPT-B	Complete Assembly
MPMF-5 X 0.75NPT-B	Bronze Manifold Only
0379-MPTH-ELBOW	2" Elbow 90°, PVC Str. L, Sch. 80
PTHA-X-E-0.75X0.75	3/4" NPT x 3/4" Barb, Ext Lth, Strt ftg., Brz
0377-0.75PVC-MPTH	3/4" NPT Plug, Hex Hd, PVC Sch. 80
0377-0.750BRS-SQ	3/4" NPT Plug, Sq Hd, Solid Brass



STAINLESS CLAD DRAIN TUBE

Plastic body can be cut to length leaving only stainless clad flanges visible. Matches style of stainless and chrome thru-hulls that have become increasingly popular.

Part No.	Size
SSAD-50001	3/4"



Underwater Light



UNDERWATER LIGHT

Marine Hardware™ now offers a selection of cast 316 stainless steel underwater lights with maintenance friendly features. The light source used singly or in multiple installations provides underwater illumination for a striking nighttime appearance at anchor or at the dock. Fisherman will enjoy the benefits of attracting bait and game fish. All models have easily replaceable light sources that do not require the vessel to be removed from the water for servicing.

These light assemblies are installed in the same manner as a typical thru-hull fitting and have the added benefit of a stainless end cap for security in case the lens seal is compromised.

4 inch models are equipped with an internal temperature switch and are available in both 12 and 24 volt versions.

Part No.	Opening Size	Volts
SSUL 90000	4"	12
SSUL 90024	4"	24
SSUL 20000	2"	12

Bow-Power®

Advanced design, state-of-the-art, simple cog belt system allows for longer thrust duration with less wear and tear. The sealed gear design requires no oiling, and that means low maintenance. Mounts at virtually any angle, freeing up interior space.

Marine Hardware™, Inc.'s advanced design and highest quality workmanship give you a bow-thruster with

smooth maneuverability and the best value at an attractive price. The Bow-Power's® simple hub cartridge is designed for easy servicing: no need to break seals and detach castings from the tube when performing maintenance on this bow thruster. Marine Hardware™, Inc.'s computer controlled machining results in precision fit and interchangeable part replacement.



BOW-POWER®

This 8" model features smooth operation with equal thrust power rated at 100 pounds in either direction, generated by a symmetrical propeller/impeller. The economical design comes in two powerful motor types: a hydraulic model 5-1/2", 2000 psi, 7 gal/min. for continuous use, or an electrical model 300 amp, 5 hp, 12V or 24V, with burnout protection.

Quality constructed with the finest materials available that include solid cast bronze or 356 aluminum, depending on your needs, both with stainless steel sealed lower gears. All models come complete with a pre drilled 3-foot long fiberglass tube, a 25-foot wiring harness and switch plate.

Part No.	Description
BWPW-8.00-BE	Electric Bow-Power, Bronze
BWPW-8.00-AE	Electric Bow-Power, Aluminum
BWPW-8.00-BH	Hydraulic Bow-Power, Bronze
BWPW-8.00-AH	Hydraulic Bow-Power, Aluminum
BWPW-HELMCONTROL	Bridge Control Switch w/25' Wire Harness
BWPW-AMKIT8	Maintenance Kit (Zinc, Large O-ring, Grease Fitting)



CUSTOM DESIGNED PARTS

Your designers' dreams can become reality. Finally available to the marine industry, Marine Hardware™, Inc. offers sophisticated computer modeling, parametric design, and a seamless link to computer-aided manufacturing to bring your most innovative concepts to life. Marine Hardware™, Inc. takes pride in custom-manufactured specialty components for all vessels. Whether your needs are stainless steel, bronze, or aluminum, we specialize in quick turnaround of tooling for rapid prototypes and first article approval parts to meet your most demanding schedules.



Mega Yacht



FABRICATED HAWSE ROLLER

Marine Hardware™, Inc. offers custom Hawse Rings manufactured to your specifications with 316 stainless steel plate material. These units can be made to fit flat or curved surfaces and are available without the need for custom tooling. Appearance finished to the highest quality, fit for mega-yacht application. They are available with and without roller assemblies. Rollers are supported with bearings on each end to provide years of trouble free service. Contact our sales department for more information on your application.



HAWSE CLEATS & RINGS

316 investment cast stainless steel for greatest strength and corrosion resistance. Finely detailed bright polishing, as expected for mega-yacht application. Available with or without horns, for any hawse pipe application. Standard neck length as shown can be modified to custom hull thickness requirements. Can be cut to your specified length in our factory or in your shop. Backing plate has blind holes to present a smooth, clean appearance on the outboard side of the boat.



Part No.	Dimensions	Horn Tip
SSHC-80000	4" x 6"	17-1/4"
SSHC-80100	5" x 10"	25"
SSHC-80200	6" x 12"	32"
SSHR-80000	4" x 6"	N/A
SSHR-80100	5" x 10"	N/A
SSHR-80200	6" x 12"	N/A



BOLLARDS

We offer investment cast 316 stainless steel bollards. Investment casting of these large parts requires special tooling, extra skill, and experience, to achieve precision results within tolerance. The tubes and base are cast as one piece, making our bollards much stronger than a similar welded part. In addition, the highly skilled polishers at our foundry provide unsurpassed quality of appearance, as necessary on a mega-yacht.

Part No.	Dimensions	Horn Tip
SSBD-90000	4" x 12"	7"
SSBD-90100	6" x 17"	10"
SSBD-90200	8-1/4" x 24-5/8"	13"

Retractable Cleats

RETRACTABLE CLEAT - Fender

Our unique style of single post retractable fender cleat is investment cast of 316 stainless steel. For water tight performance, the post is sealed with an o-ring and the base has a large sealant pocket on the underside. This unit is designed with a detent area so that the cleat stays up or stays down as desired, and does not rattle. The cleat swivels from the base at one discrete point for easy power-tool installation with two screws through the base. These fasteners are "hidden" and the cleat is flush to the base when in retracted position. Unit is styled with smooth lines which will not inadvertently catch lines or stub toes. Custom backing plates available by special order .



Part No.	Length	Fasteners		Hole dia.	Lift Height
		Qty	Type		
SSCL-80000-FENDER	4"	2	#10	7/8"	1/2"
SSCL-80100-FENDER	5"	2	1/4" flat head	1-1/8"	3/4"
SSCL-80200-FENDER	6"	4	1/4" flat head	1-1/8"	3/4"
SSCL-80300-FENDER	9-1/8"	4	1/4" flat head	1-1/8"	7/8"

This cleat is not designed for mooring
Patented: US D483,247 S

RETRACTABLE CLEAT - Stud Mount

Stud mount for smoothest appearance and to prevent dirt and rust accumulation in screw heads. Investment cast 316 stainless steel. Bright polished on all appearance surfaces. A sleek, smooth design for today's hottest boats. Ball lock in up position, for rigidity. Special design to minimize rattle in both up and down positions. Shipped with gasket and aluminum backing plate shaped to match. Drain fitting (1/4" NPT thread x 3/8" hose) included for hose connection to drain into bilge.



Part No.	Length	Fasteners
SSCL-70100-PU	4-1/2"	3/8"-20 Stud
SSCL-70000-PU	6"	1/4"-20 Stud
SSCL-70200-PU	8"	1/2"-20 Stud

RETRACTABLE CLEAT - Hole Mount

Hole mount for those who prefer the security of four fasteners. Investment cast 316 stainless steel. Bright polished on all appearance surfaces. A sleek, smooth design for today's hottest boats. Ball lock in up position, for rigidity. Special design to minimize rattle in both up and down positions. Shipped with gasket and aluminum backing plate shaped to match. Drain fitting (1/4" NPT thread x 3/8" hose) included for hose connection to drain into bilge.



Part No.	Length	Fasteners
SSCL-70101-PU	4-1/2"	#10
SSCL-70001-PU	6"	1/4"
SSCL-70201-PU	8"	1/4"

Euro Cleats

Marine Hardware™, Inc., cleats are manufactured with 316 stainless steel, chromic polished and passivated for a bright long lasting finish. Material has a minimum tensile strength of 100,000 ksi. All holes are machine drilled and 82° counter sunk for flat or oval head fasteners. Backing plates available for cleats, call or e-mail for details.



EURO STYLE CLEATS - Stud Mount

Investment cast 316 stainless steel. Bright polished. Machined flat base for flush mounting on the deck. Euro-style body for a smooth, contemporary look. Heavier body than the standard hollow-base Herreshoff style. "Blind" stud mounting system affords a smooth appearance and prevents rust and dirt accumulation in screw heads. Custom backing plates available by special order.

Part No.	Length	Height	Stud
SSCL-66009-2SE	6"	1-1/2"	5/16"
SSCL-66010-2SE	8"	1-5/8"	5/16"
SSCL-66011-2SE	10"	2-1/8"	1/2"
SSCL-66012-2SE	12"	2-1/2"	1/2"

SURFBOARD CLEAT

Surfboard Cleats are available in flat and rounded versions. Cast in 316 stainless steel and mirror polished, both offer attractive styling alternatives. An optional chafe plate is offered to fit under the base of the cleat to provide protection and to further enhance the sleekness of these designs. Surfboard Cleat kits include backing plates, nuts and washers.

Part No.	Length
SSCL-133277	8"
SSCL-133377	10"
SSCL-133477	12"

EURO STYLE CLEAT - Feet Mount

Investment cast 316 stainless steel for greatest strength and corrosion resistance. Finely detailed bright polishing, as expected for mega-yacht application. Euro-style body for smooth, contemporary styling. Four-hole mounting arrangement for those who prefer the strength of 4 fasteners rather than two studs. Custom backing plates available by special order.

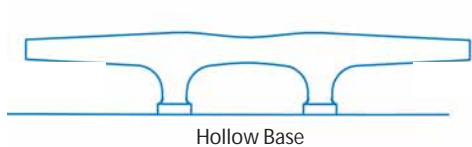
Part No.	Length	Height	Fastener
SSCL-66012-4HE	12"	2-3/8"	5/16"
SSCL-66015-4HE	15"	3"	5/16"
SSCL-66018-4HE	18"	3-5/8"	5/16"

Hollow Base Cleats

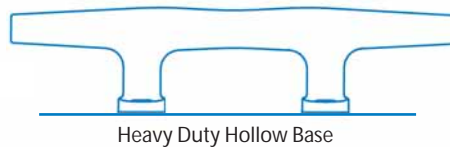
HOLLOW BASE CLEATS

Herreshoff hole mounted 316 solid stainless cleats. Custom backing plates available by special order.

Part No.	Length	Height	Fastener
SSCL-20004	4"	1"	#10
SSCL-20005	5"	1-1/8"	1/4"
SSCL-66009	6"	1-1/4"	1/4"
SSCL-66010	8"	1-3/8"	1/4"
SSCL-66011	10"	1-3/4"	5/16"
SSCL-66012	12"	2-1/8"	5/16"



Hollow Base



Heavy Duty Hollow Base

HEAVY DUTY HOLLOW BASE CLEATS

Herreshoff Style Heavy Duty, same as above but with 20% more metal overall than standard cleats, for superior strength. Investment cast 316 stainless steel. Bright polished. Machined flat base for flush mounting on the deck. Custom backing plates available by special order.

Part No.	Length	Height	Fastener
SSCL-66010-HD	8"	1-3/4"	1/4"
SSCL-66011-HD	10"	2"	5/16"
SSCL-66012-HD	12"	3"	5/16"
SSCL-66015	15"	4"	5/16"



2 - STUD HOLLOW BASE CLEATS

Same as Standard Cleats featuring stainless stud mounts. Intended to hide outside appearance of fastener head and the tendency for the screw heads to rust. Custom backing plates available by special order.

Part No.	Length	Height	Stud
SSCL-66009-2S	6"	1-1/4"	1/4"
SSCL-66010-2S	8"	1-3/8"	1/4"
SSCL-66011-2S	10"	1-3/4"	5/16"
SSCL-66012-2S	12"	2-1/8"	5/16"



Chocks

All of our Chocks are 316 investment cast stainless steel, the strongest and most corrosion resistant material available for deck hardware exposed to the rigors of a marine environment. Brightly polished for a flawless appearance.



SKENE BOW CHOCKS

Part No.	Unit	Length	Line Size	Fastener
SSCH-66113	Pair	4-1/2"	1/2"	#10
SSCH-66073	Pair	6"	3/4"	1/4"

BOW CHOCKS-Wide Opening

Part No.	Unit	Length	Line Size	Fastener
SSCH-66013	Pair	4-1/2"	1/2"	#10
SSCH-66030	Pair	6"	3/4"	1/4"
SSCH-66053	Left	9"	1"	3/8"
SSCH-66054	Right	9"	1"	3/8"

STRAIGHT CHOCKS-Narrow Opening

Part No.	Unit	Length	Line Size	Fastener
SSCH-66082	Ea.	5"	5/8"	#10
SSCH-66083	Ea.	6"	3/4"	1/4"

Deck Plates



DECK PLATE

Mirror polished, cast stainless steel, this deck plate has an O-ring for water resistant seal.

Part No.	Inner dim.	Outer dim.	Cutout size	Weight
SSTD-110044	3"	4-5/8"	3-3/8"	1 lb
SSTD-110144	4"	5-9/16"	4-3/8"	1.5 lbs
SSTD-110244	5"	7-5/16"	5-3/8"	3 lbs
SSTD-110344	6"	8-1/2"	6-1/2"	5 lbs

WASHDOWN DECK PLATE

A stainless steel deck plate conceals the valve for this washdown outlet. Useful for either fresh or salt water washdown or as a fresh water inlet, this unit comes complete with an o-ring seal and deck plate key.

Part No.	Size
SSDF-60000	2-1/2"

Fuel Vents

FLUSH FUEL VENTS

Our units feature wider flanges on the cup, to make it easier to fit and cover the edges of the hole drilled in the boat. Available in 90° elbow or straight styles. Made of 316 stainless steel. Screened vent holes for safety. Complete assembly with all gaskets, washers and jam nut.

Part No.	Hose	Angle	Material
SSGV-66075	3/4"	90°	SS
SSGV-66000	1"	90°	SS
SSGV-66005	5/8"	90°	SS
SSGV-66006	5/8"	0°	SS



CLAM VENT

Cast stainless steel tank vent with elbow for tight fit between hull and gunner.

Part No.	Hose Size
SSGV-66003	5/8"



Lift Rings & Pulls

HATCH PULLS

More simple and elegant than other hatch opening hardware, these pulls are also easy to install. One and two pin versions have all stainless construction with polished tops.

Part No.	Description
SSHP-80001	single stem
SSHP-80002	double stem



RECESSED LIFT RING - Small

Investment cast 316 stainless steel. Bright polished. Ring is flush to plate. For use on small cupboards and hatches.

Part No.	Size	Fastener
SSRI-66022	1-1/2" X 1-7/8"	#8



RECESSED LIFT RING - Large

Investment cast 316 stainless steel. Bright polished. Ring is flush to plate.

Part No.	Size	Fastener
SSRI-26700	2-5/16 X 2-1/2"	#8



Deck Fills

Investment cast 316 stainless steel. Bright polished on all appearance surfaces. Same font used for all embossed labels for a consistent appearance. CNC threads on flange and cap for smooth operation. Higher dome on flange/cap for styling flair. Both the 1-1/2" and the 2" sizes have the same flange O.D.

Cast-in sealant groove on underside of flange. Positive seal o-ring fits in groove of cap, won't fall out when cap is removed. Stainless steel ball chain attachment for non-tangle removal of cap. Key included with every deck fill, and also available separately as replacement part.



DECK FILLS with KEY

Investment cast 316 stainless steel. Assembly is complete with fill, cap, chain and key.

Part No.	Hose Size	Flange O.D.	Neck Length	Type	Chain	Fastener
	(A)	(B)	(C)			
SSDF-66124	1-1/2"	3-1/8"	3-1/4"	Diesel	Yes	#10
SSDF-66125	1-1/2"	3-1/8"	3-1/4"	Water	Yes	#10
SSDF-66126	1-1/2"	3-1/8"	3-1/4"	Waste	No	#10
SSDF-66127	1-1/2"	3-1/8"	3-1/4"	Gas	Yes	#10
SSDF-66128	1-1/2"	3-1/8"	3-1/4"	Oil	Yes	#10
SSDF-66394	2"	3-1/8"	3-1/4"	Gas	Yes	#10
SSDF-66395	2"	3-1/8"	3-1/4"	Diesel	Yes	#10
SSDF-66396	2"	3-1/8"	3-1/4"	Water	Yes	#10

DECK FILL - Toggle Cap

Toggle cap deck fills have a handle in the flush cap for convenient removal without tools. The unique design is leak proof and interchangeable with caps on other Marine Hardware™ deck fills.

Part No.	Hose Size	Flange O.D.	Neck Length	Type
	(A)	(B)	(C)	
SSDF66124-TC	1-1/2"	3-1/8"	3-1/4"	Diesel
SSDF66125-TC	1-1/2"	3-1/8"	3-1/4"	Water
SSDF66126-TC	1-1/2"	3-1/8"	3-1/4"	Waste

DECK FILL - 2" Angle Neck

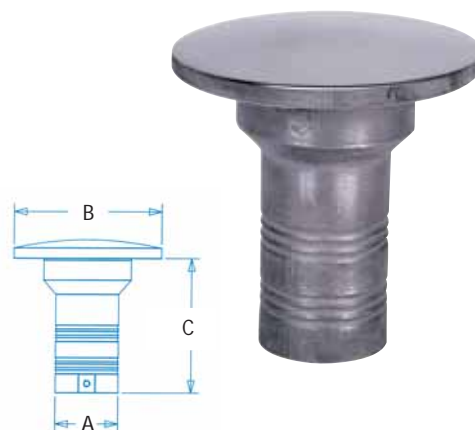
Refueling is made easier on the side gunnel and transom installations with this angled neck fill. The large neck size handles high capacity pumps and the polished stainless hand cap looks good on any boat.

Part No.	Hose Size	Angle
SSDF-66502	2"	45°

HAND CAP - DECK FILLS

The hand cap is keyless, and has a special recess on its underside which enables it to fit over all our deck fill flanges. It hugs close to the deck without actually making contact which might mar the deck. It can be ordered as an assembly with fill body, or separately as a replacement part (includes ball chain). Its highly polished low dome cap affords a neat, smooth appearance, and the knurled edge gives a good finger grip even when wet. The extra long chain allows this larger cap to be moved completely out of the way of fill nozzles, without scratching the deck.

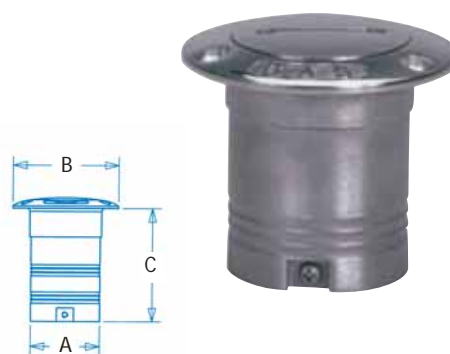
Part No.	Hose Size	Flange O.D.	Neck Length	Type	Chain	Cap	Fastener
	(A)	(B)	(C)				
SSDF-66127-LC	1-1/2"	3-1/2"	3-1/4"	Gas	Yes	Hand	#10
SSDF-66394-LC	2"	3-1/2"	3-1/4"	Gas	Yes	Hand	#10



2" SHORT DECK FILL

This unique short design was inspired by ski boat applications. The 2" diameter size affords high-volume filling of the tank. The short length allows for maximum height fuel tanks in ski boats where tank is mounted behind seats. This model can use the same flush cap and key as our other deck fills, or the hand-cap. In stock in "Gas" only. Other label types may be tooled by special order for your production needs.

Part No.	Hose Size	Flange O.D.	Neck Length	Type	Chain	Cap	Fastener
	(A)	(B)	(C)				
SSDF-66394-SHORT	2"	3-1/8"	2-3/8"	Gas	Yes	Keyed	#10
SSDF-66394-SHORT-LC	2"	3-1/2"	2-3/8"	Gas	Yes	Hand	#10



SPLASH GUARD FOR FUEL FILL

The cast stainless splash guard fits under the flange of our 1-1/2" standard and toggle cap fills. It helps prevent fuel overflow from entering the cockpit.

Part No.
SSDF-100200



REPLACEMENT KEY - Deck Fill

Investment cast 316 stainless steel. Fits 1-1/2" and 2" deck fills.

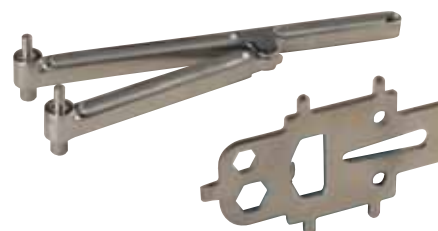
Part No.
SSDF-66060



REPLACEMENT KEY - Deck Plate

Marine Hardware offers a variety of deck plate keys to fit plates of all sizes and types. The spring type is used on deck plates up to four inches and the spanner type up to six. All have durable stainless steel construction.

Part No.	Description
SSDF-66056	Hinged
SSDF-66058	Universal



Rod Holders



ROD HOLDER- Tournament Series

A heavy duty cast stainless rod holder. Marine Hardware's™ Tournament Series have an attractive oval flange that is style matched in 30°, 15°, and 0° versions. All are equipped to accept a hose barb to divert washdown water to the bilge or overboard.

Part No.	Angle
SSRH-4500C-0	0°
SSRH-4500C-15	15°
SSRH-4500C-30	30°



Contact our sales department to order custom rod holders with your logo cast-in.

ROD HOLDER- Cast Oval

This unique design features an investment cast 316 stainless steel flange with neck. The cast-in neck (30 degree angle) affords more strength and corrosion-resistance to the unit. The 304 stainless steel tube is welded to the neck. Unit comes with white PVC flanged insert liner to protect rod butt. Also includes mounting gasket to seal out water.

Part No.	Int. Hole	Depth
SSRH-4035-C	1-5/8"	8-5/8"



ROD HOLDER- Stamped Oval

Our stamped rod holders are made of 304 stainless steel in the standard 30 degree angle and 8-1/2" length. Includes a gasket to fit under the flange for a sealed installation. Available with your choice of liner inserts to protect the rod butt: a white PVC insert (no cap model), or a black neoprene insert with self attaching cap to seal out water and debris when the holder is not in use. An optional drain and self-attached plug for the bottom end of the tube is available in black neoprene or drain with out plug.

Part No.	Int. Hole	Depth
SSRH-4300-S	1-5/8"	8"



ROD HOLDER- Stamped Triangle

Part No.	Int. Hole	Depth
SSRH-4307-S	1-5/8"	8-5/8"

Lifting Systems

Marine Hardware™ manufactures a complete lifting system assembly and offers individual components to meet your unique needs. All components are designed to work together.

All threaded assemblies are C.N.C. machined to ensure maximum strength. Mounting brackets are fabricated type 304. Deck fittings are type 316 investment cast.

LIFTING RINGS/CLEATS

316 investment cast stainless steel for greatest strength and corrosion resistance. Bright polished. 6" size for lifting up to 4,000 lbs., 7" size is heavy-duty, with 50% more metal overall than the 6" size. Rated for lifting up to 6,000 lbs.

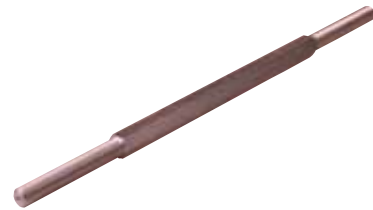
Part No.	Length	Diameter
SSRI-66098	6"	1-1/8"
SSRI-66099	7"	1-1/2"



LIFT ROD

Stainless steel hex rods threaded at both ends to go between lifting eye and keel plate. Contact us for production quantities in custom lengths.

Part No.
SSRI-LIFT ROD



KEEL PLATES

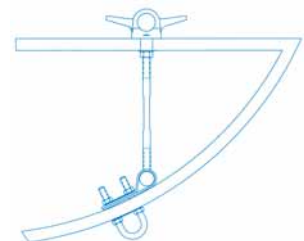
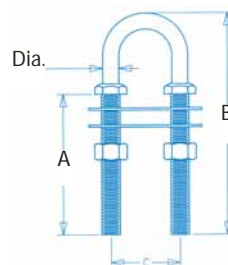
Part No.	Accommodates Bow Eye Size
SSRI-KEEL-PLATE	1/2" or 3/8"
SSRI-KEELPLT-58	5/8"
SSRI-KEELPLT-LH	5/8" Left-hand Thread



BOW EYES

Tested to min. 95,000 lbs/sq inch tensile strength, bright polished. Long nose available for special trailer applications.

Part No.	Diameter	Thread Length (A)	Overall Length (B)	Spread (C)
SSRI-66400	3/8"	2-5/16"	3-15/16"	1-3/8"
SSRI-66401	3/8"	2-3/4"	4-1/2"	1-7/16"
SSRI-66402	3/8"	3-1/4"	3-15/16"	1-3/8"
SSRI-66503	3/8"	3-11/16"	5-7/16"	1-3/8"
SSRI-66068	1/2"	2-1/4"	4-1/4"	1-7/8"
SSRI-66070	1/2"	3-1/4"	5-5/16"	1-13/16"
SSRI-66071	1/2"	3-3/4"	5-13/16"	1-7/8"
SSRI-66072	1/2"	3-1/4"	6-1/2"	1-13/16"
SSRI-66080	1/2"	3-1/4"	5-5/16"	1-13/16"
SSRI-66343	1/2"	4-1/2"	6-5/8"	1-3/4"
SSRI-70000	5/8"	5"	8"	1-13/16"



Stern plates available, please call or e-mail.
Long nose available for special trailer applications.

Rail Fittings



90° TEES

Provide connections at intermediate support points. Investment cast 316 stainless steel, bright polished. Complete with 1/4" 28 cup point set screws.

Part No.	Tube O.D.
SSFT-66043	7/8"
SSFT-66143	1"

60° TEES

Provide connections at intermediate rail support points. Also useful where a steep rise in rail height is required. Designed for left or right. Investment cast 316 stainless steel, bright polished. Comes with 1/4" 28 cup point set screws.

Part No.	Tube O.D.	Use
SSFT-66044	7/8"	Left
SSFT-66045	7/8"	Right
SSFT-66144	1"	Left
SSFT-66145	1"	Right

60° UNIVERSAL TEES

Can be used for either left or right applications. Investment cast 316 stainless steel, bright polished. Comes with 1/4" 28 cup point set screws.

Part No.	Tube O.D.
SSFT-66093	7/8"
SSFT-66193	1"

30° ROUND BASES

For sleek angles at starting and ending. Investment cast 316 stainless steel, bright polished. Comes with 1/4" 28 cup point set screws.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66077	7/8"	2-1/2"	#10
SSFB-66177	1"	2-3/4"	1/4"

45° ROUND BASES

For sleek angles at starting and ending. Investment cast 316 stainless steel, bright polished. Comes with 1/4" 28 cup point set screws.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66014	7/8"	2-1/2"	#10
SSFB-66379	7/8"	2-1/2"	#12
SSFB-66114	1"	2-3/4"	1/4"

Rail Fittings

60° ROUND BASES

For intermediate support, starting or ending. Investment cast 316 stainless steel, bright polished. With 1/4" 28 set screw.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66040	7/8"	2-1/2"	#10
SSFB-66140	1"	2-3/4"	1/4"



90° ROUND BASES

For intermediate support, starting or ending. Investment cast 316 stainless steel, bright polished. With 1/4" 28 set screws.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66039	7/8"	2-1/2"	#10
SSFB-66139	1"	2-3/4"	1/4"



45° RECTANGLE BASES

For sleek angles at starting and ending. Investment cast 316 stainless steel, bright polished. With 1/4" 28 set screws.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66015	7/8"	3"x1-3/4"	#10
SSFB-66115	1"	3-1/4"x 1-7/8"	1/4"



60° RECTANGLE BASES

For intermediate support, starting or ending. Investment cast 316 stainless steel, bright polished. With 1/4" 28 set screws.

Part No.	Tube O.D.	Base Dia.	Fastener
SSFB-66042	7/8"	3"x1-3/4"	#10
SSFB-66142	1"	3-1/4"x 1-7/8"	1/4"



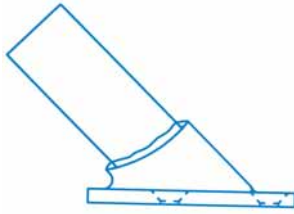
90° RECTANGULAR BASES

For intermediate support, starting or ending. Investment cast 316 stainless steel, bright polished. With 1/4" 28 set screws.

Part No.	Tube O.D.	Size	Fastener
SSFB-66041	7/8"	3-3/4" x 1-3/4"	#10
SSFB-66141	1"	3-1/4"x 1-7/8"	1/4"



Weldable Rail Bases



All of our weldable rail bases are heavy duty investment cast 316 stainless steel for consistent thickness and to prevent warping during welding. All are bright polished.



45° RECTANGLE BASES

Part No.	Tube O.D.
SSWB-77500	7/8"
SSWB-77501	1"



60° RECTANGLE BASES

Part No.	Tube O.D.
SSWB-77000	7/8"
SSWB-77001	1"



90° RECTANGLE BASES

Part No.	Tube O.D.
SSWB-77100	7/8"
SSWB-77101	1"



45° ROUND BASES

Part No.	Tube O.D.
SSWB-77400	7/8"
SSWB-77401	1"



60° ROUND BASES

Part No.	Tube O.D.
SSWB-77200	7/8"
SSWB-77201	1"



90° ROUND BASES

Part No.	Tube O.D.
SSWB-77300	7/8"
SSWB-77301	1"

Top Fittings

TOP CAPS

Investment cast 316 stainless steel. Bright polished. With 1/4" 28 cup point set screw.

Part No.	Tube O.D.	Pin Size
SSTF-66101	7/8"	1/4"
SSTF-66103	1"	1/4"
SSTF-66111	1-1/4"	1/4"



TOP SLIDES with BOLT

Available in closed type and hinged type. Investment cast 316 stainless steel. Bright polished. Closed type has 1/4" 28 cup point set screw.

Part No.	Tube O.D.	Type	Pin Size
SSTF-66100	7/8"	Closed	1/4"-20
SSTF-66102	1"	Closed	1/4"-20
SSTF-66116	1-1/2"	Hinged	1/4"-20
SSTF-66118	2"	Hinged	1/4"-20



90° DECK HINGE

Available with bolt or with removable pin. Investment cast 316 stainless steel. Machined base for flush fit. Bright polished.

Part No.	Type	Base Size	Fastener
SSTF-66104	Bolt 1/4"-20	7/8"x 2"	#10
SSTF-66220	Remov. Pin 1/4"	7/8"x 2"	#10



DECK HINGE, ANGLED BASE

12° slant off vertical. With bolt. Investment cast 316 stainless steel. Machined base for flush fit. Bright polished.

Part No.	Base Size	Pin Size	Fastener
SSTF-66222	7/8"x 2"	1/4"-20	#10



DECK HINGE, RADIUS BASE

Concave mounting surface will mount either 7/8" or 1" O.D. tubing. Investment cast 316 stainless steel. Available with bolt or removable pin.

Part No.	Base Length	Type	Fastener
SSTF-66104-RAD	2"	Remov. Pin 1/4"	#10
SSTB-66105	2"	Bolt 1/4"-20	#10



Fittings



PULL - PIN

For large quantities available in custom grip sizes and coated nylon with SST tab are optional.

Part No.	O.D. Dia.	Length
SSPP-.25x1.25W/RG	1/4"	1-1/4"



STAND OFF - Threaded

Investment cast 316 stainless steel. Bases machined flat for stable mounting surface. Radiused surface can fit 7/8" and 1" O.D. tube.

Part No.	Size
SSTF-50000	5/8"
SSTF-50100	7/8"
SSTF-50200	1"



STAND OFF - With Base

Investment cast 316 stainless steel. Bases machined flat for stable mounting surface.

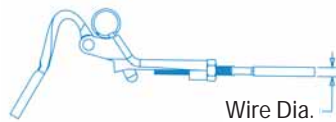
Part No.	Size
SSTF-50001	5/8"



PELICAN HOOKS

Easy open gate latch with clean simple styling. Opens with one hand tug on the integral spring loaded plunger. Automatically latches when snapped closed. Includes swage terminal and locknut. Investment cast 316 stainless steel, bright polished.

Part No.	For Wire Dia.
SSPH-PELICAN-.125	1/8"
SSPH-PELICAN-.188	3/16"



BIMINI HINGE

A sturdy hinge for folding bimini top frames. Molded in fiberfilled nylon with a stainless rivet at the pivot joint.

Part No.
GFBH-75000

DOOR HINGE, EQUAL SIDES

Part No.	Size	Fastener
SSHN-66028	1-1/2" x 3"	#8 (6)
SSHN-66029	1-1/2" x 4"	#10 (6)



DOOR HINGE, UNEQUAL SIDES

Part No.	Size	Fastener
SSHN-66007	1-1/2" x 2-1/4"	#10 (5)
SSHN-66021	1-1/2" x 3"	#10 (5)



TAKE - APART HINGE

Part No.	Size	Fastener
SSHN-66024	2" x 3-3/4"	#10



UPHOLSTERY HINGES

Part No.	Description
SSHN-66500	2-stud, 2-hole
SSHN-66501	4-stud



STRAP HINGES

Part No.	Size	Fastener
SSHN-66025	4" x 1"	#10 (4)
SSHN-66026	6" x 1-1/8"	#10 (6)
SSHN-66204*	6" x 1-1/8"	#10 (6)

* Removable Screw



BUTT HINGES

Part No.	Size	Fastener
SSHN-66163	1-1/2" x 3"	#10 (4)
SSHN-66164	2" x 2"	#10 (4)



Steering Wheels

Marine Hardware™, Inc. takes pride in manufacturing three styles of yacht steering wheels. All are precision machined and keyed to fit standard 3/4" taper. All stainless wheels are fabricated from 304 tubing with an oval hand grip which is

welded to an investment cast 316 hub. Hub caps are included on all sizes. Please specify diameter and dish angle. All units packed 10 per box.



DESTROYER - Stainless Steel

Fabricated from 304 tubing on a 316 hub. Brightly polished oval hand grip for comfort. Unit includes black cap. Please specify diameter and dish angle (B).

Part No.	Diameter	Dish
		(B)
SSSW-13.00 X 2.38	13"	10°
SSSW-13.00 X 3.75	13"	25°
SSSW-15.50 X 2.75	15-1/2"	10°
SSSW-15.50 X 4.00	15-1/2"	25°
SSSW-18.00 X 10DEG	18"	10°
SSSW-20.00 X 10DEG	20"	10°



ALUMINUM

Heavy duty cast aluminum, with finger grips, bright polished & clear anodized. An excellent choice for outside bridges in rugged sea conditions. Order washer and nut below.

Part No.	Diameter	Dish
		(B)
STWH-13.00-ALUM	13"	10°
STWH-15.50-ALUM	15-1/2"	10°



ALUMINUM with KNOB

Heavy duty cast aluminum, with finger grips and turning knob, polished, with anodized satin finish. Order washer and nut below.

Part No.	Diameter	Dish
		(B)
STWH-13.00-ALUM-K	13"	10°
STWH-15.50-ALUM-K	15-1/2"	10°



STEERING WHEEL NUTS

A polished, appearance finished acorn style nut in various thread types. Order to fit your steering column. Nylon washer included.

Part No.	Thread
STWH-NUT-112-13	1/2"-13 UNC
STWH-NUT-112-20	1/2"-20 UNC
STWH-NUT-12MM-175	M12x1.75
STWH-NUT-518-18	5/8"-18 UNF

Hawse Pipes

Hawse pipes are made of 316 investment cast stainless steel, bright polish top and smooth inside to prevent lines from chafing.

LARGE OVAL HAWSE PIPE

Part No.	Int. Hole	Depth	Fastener
SSDP-66009	6-1/4" x 2-7/8"	1-3/4"	#10



SMALL OVAL HAWSE PIPE- Stud Mounted

Stud mounted for a smooth contemporary style.

Part No.	Int. Hole	Depth	Fastener
SSDP-66010	3-3/4" x 1-3/4"	1-1/4"	#10



TRIANGLE HAWSE PIPE

Part No.	Int. Hole	Depth	Fastener
SSDP-66349	5" x 2-3/4"	1-3/4"	#10



CUSTOM CORNER HAWSE PIPE

Part No.	Int. Hole	Depth	Fastener
SSDP-66011	4-3/4" x 2-3/4"	1-3/4"	#10



Gunnel Caps

GUNNEL CAPS

Our specialty is custom parts for your yachts, for example, gunnel caps. We can manufacture them from investment cast 316 stainless steel, or from aluminum extrusion with anodized or powder coated finish. Send us a piece of your extrusion and let us build you a sample.



Latches



SLAM LATCH - Flush Mount

Made of investment cast 316, electropolished stainless steel, this latch incorporates a water resistant design and quality materials for smooth operation day after day. A pin cylinder is used in the locking version and a long pawl version is available for thicker mounting surfaces. Backing plates and mounting hardware are included.

Part No.	Description	Cutout Size
SSHN-77002	Standard	2-1/8"
SSHN-77005	Long Pawl	2"
SSHN-77004	Locking	2"

FLUSH LATCH

Cast in stainless steel and mirror polished. This latch is suited for medium size hatches and transom doors.

Part No.
SSHN-77010

Deck Hardware



VENT GRILL

This classy grill has a cast stainless body and stainless screen. Both are mirror polished and make a statement of quality installed on your boat.

Part No.
SSBC-90210



CHAIN AND ROPE DOCK PIPE

The large oval opening accommodates anchor rope, thimble and chain. The hinged cover can be locked in the open position. Construction is all stainless steel with a mirror polished cover and flange.

Part No.
SSDP-66008

Deck Hardware

DRINK HOLDER

This stamped stainless drink holder is electropolished for added corrosion resistance. The two step design holds standard 12 ounce beverage cans with or without insulators. A drain prevents water accumulation.

Part No.
SSDC-70000



TRANSOM STEP

This large transom step is designed to meet new ARYC and ISO standards for boarding steps. It also provides a large hand hold. Investment cast 316 stainless steel.

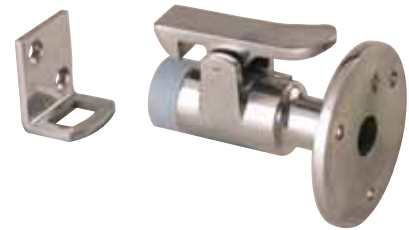
Part No.
SSTS-75000



DOOR STOP AND HOLDER

Door stop has a spring loaded catch that holds the door when fully open. A rubber cushion protects the door's finish. The holder is cast in stainless steel with a stamped keeper.

Part No.
SSDL-40000



Antenna Mounts

ADJUSTABLE ANTENNA MOUNT

A heavy duty adjustable antenna mount that articulates for horizontal or vertical mounting surfaces. This mount is cast stainless steel and mirror polished. It is threaded for all standard 1" x 14 antennas and has a hole to allow the wire to pass through the threaded portion.

Part No.
SSAM-10000



FIXED BASE ANTENNA MOUNTS

These sturdy antenna bases fit standard 1" x 14 threads common on standard VHF, GPS and TV antennas. The extensions have the same threads and are used for additional height or clearance on flybridges, T-top or radar arches. Antenna wire runs through the base.

Part No.	Description
SSAM-20000	Pedestal Antenna Mount
SSAM-30000	H/D Deck Antenna Mount
SSAM-40000	12" Antenna Mount Extension



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GENERAL POLICIES

Credit: Please call for a credit application, fill it out and return it. Marine Hardware, Inc. will notify you by return mail when credit has been approved. General terms of sale are C.O.D. or cash in advance. With approved credit, terms are net (10) days from date of invoice.

Shipping: Marine Hardware, Inc. does not warrant or insure any UPS shipments for damage or loss. All products leaving our warehouse are fully inspected; if you find damage, notify carrier at time of delivery. Do not refuse the shipment. The damage should be noted by the driver on the freight bill. It is your responsibility to file a claim for freight damage with the freight carrier. Any discrepancies in order shipped must be reported within (10) days of receipt.

Return Policy: Please call in advance before returning any items. Returns will be accepted only if a Return Goods Authorization number has been obtained through Marine Hardware, Inc. There is a 25% restocking fee on all returned merchandise for other than defect in workmanship.

Minimum Order: We require a \$25 minimum order and request that standard packaging quantities be followed as shown with each item.

LIMITED WARRANTY

Marine Hardware, Inc. (herein called "Marine Hardware") warrants the products described herein and manufactured by Marine Hardware to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Marine Hardware, under normal use and service, its sole obligation under warranty being limited to repairing and replacing, (as hereinafter provided) at its option, any product found to Marine hardware's satisfaction to be defective upon examination of it, provided that such product shall be returned for inspection, freight prepaid, to Marine Hardware's factory within 90 days after discovery of the defect.

The repair or replacement of defective products will be made without charge for parts or labor.

This warranty shall not apply to parts or products not manufactured by Marine Hardware, the warranty for such items being limited to the actual warranty extended to Marine Hardware by its supplier.

This warranty shall not apply to any product which has been subjected to abuse, negligence, accident, or misapplication, or to any product which shall have been altered or repaired by others than Marine Hardware, nor to normal maintenance services and the replacement of service items (such as, but not limited to: washers, gaskets, lubricants, etc.) made in connection with such purchases.

To the maximum extent permitted by applicable law, Marine Hardware disclaims all other warranties, either express or implied, including, but not limited to implied warranties of merchantability and fitness for a particular purpose. This limited warranty gives the purchaser specific rights that vary from state to state or from jurisdiction to jurisdiction.

To the maximum extent permissible by applicable law, in no event shall Marine Hardware be liable for any damages whatsoever (including, without limitation: special, incidental, consequential or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use or inability to use the products described herein, even if Marine Hardware has been advised of the possibility of such damages. Because some states or jurisdictions do not allow the exclusion of limitation of liability for consequential or incidental damages, the above limitation may not apply to the purchaser.

It is the responsibility of the boat builder to study the particular hydrodynamics and mechanical needs of their boats and evaluate our products for fitness and applicability through a testing program as may be necessary.

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