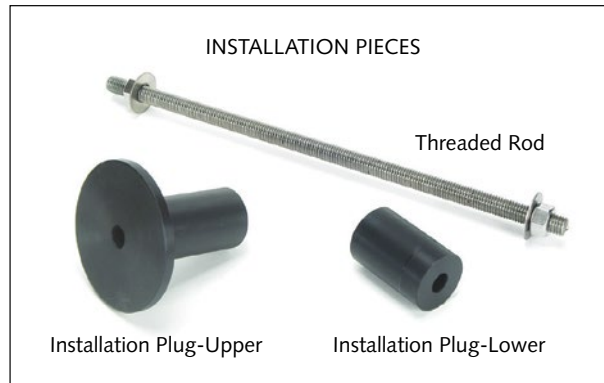
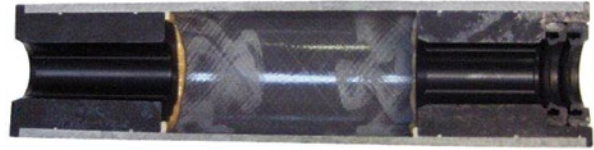


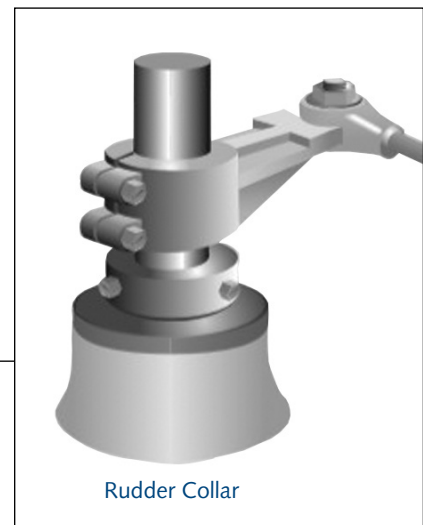
TIDEMARINE Rudder Tube System



Rudder Shelf

RPB Tube

Tapered Lay-Up
Transition



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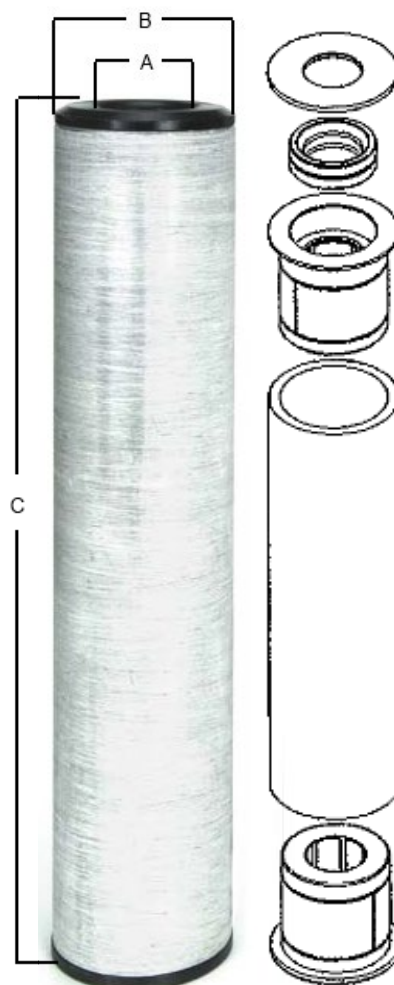
TIDEMARINE Rudder Tube System

Imperial Sizes (dimensions are in inches - height includes washer)

RUDDER STOCK OD	RUDDER TUBE OD	RUDDER TUBE HEIGHT	PART NUMBER
A	B	C	
1 1/8	2 1/4	8 3/4	TS-1125-0875
1 1/4	3	8.268	TS-1250-0827
1 1/4	3	10	TS-1250-1000-1
1 1/4	3	11	TS-1250-1100
1 1/4	3	11 1/2	TS-1250-1150
1 1/4	3	12	TS-1250-1200
1 1/4	3	13	TS-1250-1300
1 1/4	3	14 1/4	TS-1250-1425-1
1 1/4	3	15 1/2	TS-1250-1550
1 1/4	3	17	TS-1250-1700
1 1/4	3	22	TS-1250-2200
1 1/4	3	26	TS-1250-2600
1 3/8	3	40	TS-1375-4000
1 1/2	3 1/2	7 3/4	TS-1500-0775
1 1/2	3 1/2	10	TS-1500-1000
1 1/2	3 1/2	10 1/8	TS-1500-1012
1 1/2	3 1/2	11	TS-1500-1100
1 1/2	3 1/2	11.850	TS-1500-1185
1 1/2	3 1/2	12.1	TS-1500-1210
1 1/2	3 1/2	13	TS-1500-1300
1 1/2	3 1/2	14 1/4	TS-1500-1425
1 1/2	3 1/2	14 1/2	TS-1500-1450
1 1/2	3 1/2	17	TS-1500-1700
1 1/2	3 1/2	19 1/2	TS-1500-1950
1 3/4	3	8	TS-1750-0800
1 3/4	3 1/2	9 1/2	TS-1750-0950
1 3/4	3 1/2	11	TS-1750-1100
1 3/4	3 1/2	12 1/4	TS-1750-1225
1 3/4	3	12 3/4	TS-1750-1275
1 3/4	3 1/2	17 1/2	TS-1750-1750
1 3/4	3 1/2	19 1/2	TS-1750-1950
1 3/4	3 1/2	22 3/4	TS-1750-2275
1 3/4	3 1/2	23	TS-1750-2300
1 3/4	3	24	TS-1750-2400
1 3/4	3	26	TS-1750-2600
1 3/4	3	28	TS-1750-2800
2	4 1/2	12	TS-2000-1200-1
2	4 1/2	14.37	TS-2000-1437
2	4 1/2	15 1/2	TS-2000-1550
2	4 1/2	15 3/4	TS-2000-1575
2	4 1/2	16	TS-2000-1600
2	4 1/2	17	TS-2000-1700
2	4 1/2	18	TS-2000-1800

Metric (dimensions in inches except Rudder Stock OD – height includes washer)

RUDDER STOCK OD	RUDDER TUBE OD	RUDDER TUBE HEIGHT	PART NUMBER
A	B	C	
25mm	3	19.68	TS-25mm-1968
30mm	2 1/2	10.83	TS-30mm-1083
35mm	2 1/2	20.97	TS-35mm-532m
40mm	3 1/2	14 1/4	TS-40mm-362m
40mm	3 1/2	15 1/4	TS-40mm-400m
40mm	3 1/2	24	TS-40mm-2400
50mm	4	11.811	TS-50mm-300m
50mm	4	19.685	TS-50mm-500m
55mm	4 1/2	10 1/4	TS-55mm-1025
55mm	4 1/2	25	TS-55mm-2500
60mm	3.897	7 7/8	TS-60mm-0788
70mm	5 1/4	29.528	TS-70mm-750m



Rudder Tube System consist of an Upper and Lower Bearing, 2 Lip Seals and a Washer on the top.



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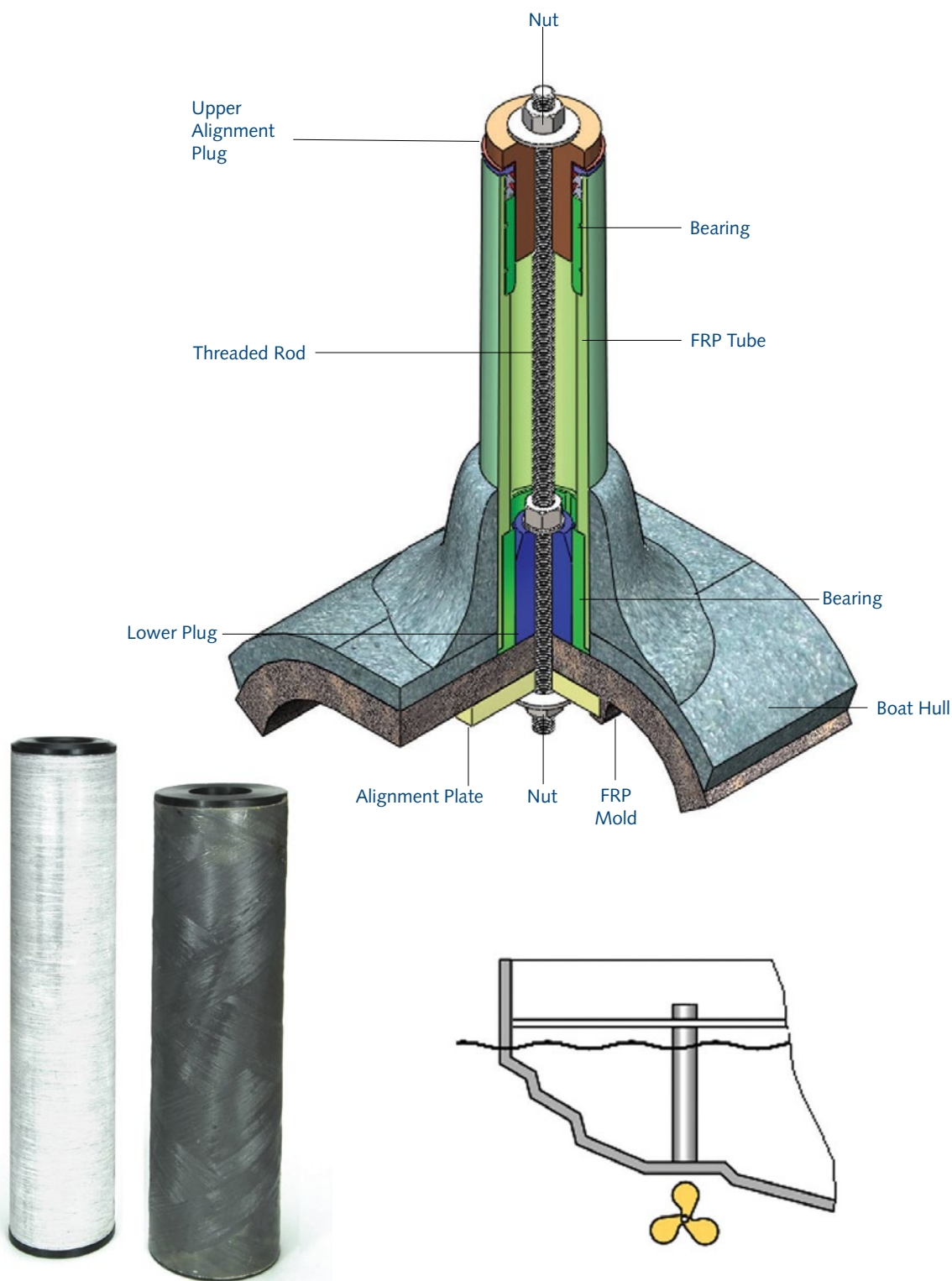
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TIDESMARINE Rudder Tube System



Please provide Tides with the exact rudder stock diameter (.000") you have decided to use and the length of the tube you require. Tube length can be determined by calculating the distance from the bottom of the hull, through the rudder shelf to that point above the rudder shelf which you have determined is optimal for installing other steering system components (rudder collars, steering arms, etc.).

If you provide Tides with drawings of your installation, Tides will recommend one or more solutions for your installation.



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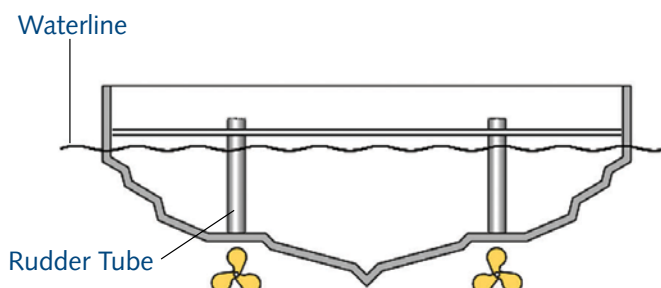
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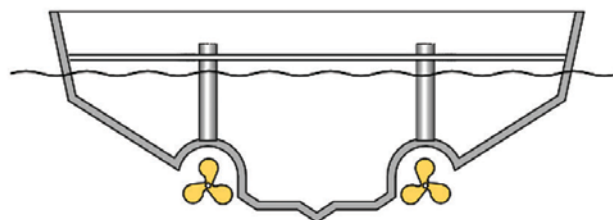
TIDEMARINE

The procedure for modifying the mold and installing the Tube System before lay-up begins will differ slightly depending upon the type of hull being produced. The following represent the three most common variations.

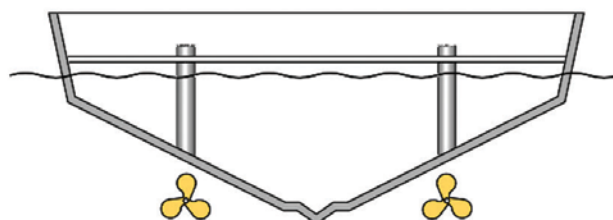
Type 1: Molds with an existing “flat” surface at the rudder port location, which will accept a standard FRP tube.



Type 2: Molds which require modification to achieve a “flat” surface or pocket to accept a standard FRP tube.



Type 3: Molds which require modification to accept an FRP tube with an “angled base” designed to match the dead rise and rocker angles.



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TIDEMARINE

Installation Overview Type One

Mold Modifications

1. Locate the exact position of the rudder stock center in the mold surface.
2. Carefully drill a hole perpendicular to the mold surface large enough from the plug bolt and bushing.

Installation

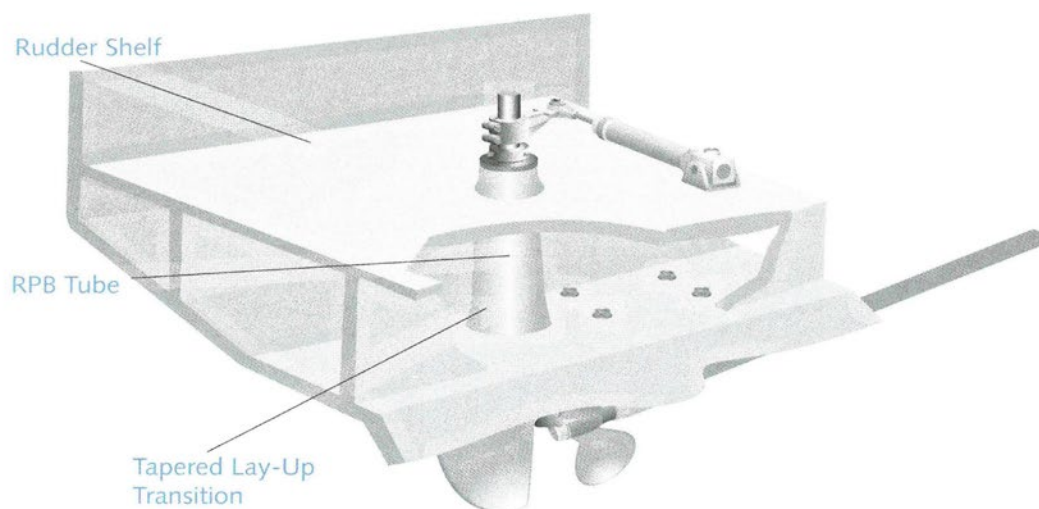
1. Prepare the tube for lay-up by roughing up the outer diameter surfaces with a grinder and wipe clean with thinner.
2. Mask the top of the assembly to protect it from overspray I excess resin.
3. Locate the assembly against the mold surface and bolt in place through the hole in the mold using the "plugs" provided by Tides.

Lay-Up Procedure

1. Begin the hull lay-up in the normal manner.
2. Cut an X in the cloth above the liner so that it can be laid down and around the base of the FRP tube with tabs against the outer wall of the tube.

3. On subsequent layers, stagger the position of the X cuts so the tabs overlay each other.
4. Taper the lay-up to at least 1" above the top of the lower bearing. Lay-up should radiate out away from the tube to at least 2 times the tube outside diameter.
5. **REMOVE THE LOWER PLUG AND BOLT.** Leave the upper plug in place until it is time to install the rudder.
6. When the rudder shelf is constructed, it should contain a hole through which the top of the FRP tube will pass. Once the shelf is in place, the upper end of the FRP tube is attached to the shelf using a lay-up procedure similar to the technique used during initial lay-up (staggered overlapping tabs throughout the lamination). Care should be taken to prevent excess resin and cloth from covering or entering the upper plug or tube insert.

NOTE: Before installing the rudder, remove the upper re-usable plug and insert the red installation hat into the top of the tube. Confirm that it is protecting the "lip" portion of the seal. After installation, remove the red installation hat and discard.



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Installation Overview Type Two

Mold Modifications

1. Locate the exact position of the rudder stock center in the mold surface.
2. Carefully drill a hole erpendicular to the mold surface large enough from the plug bolt and bushing.

Installation

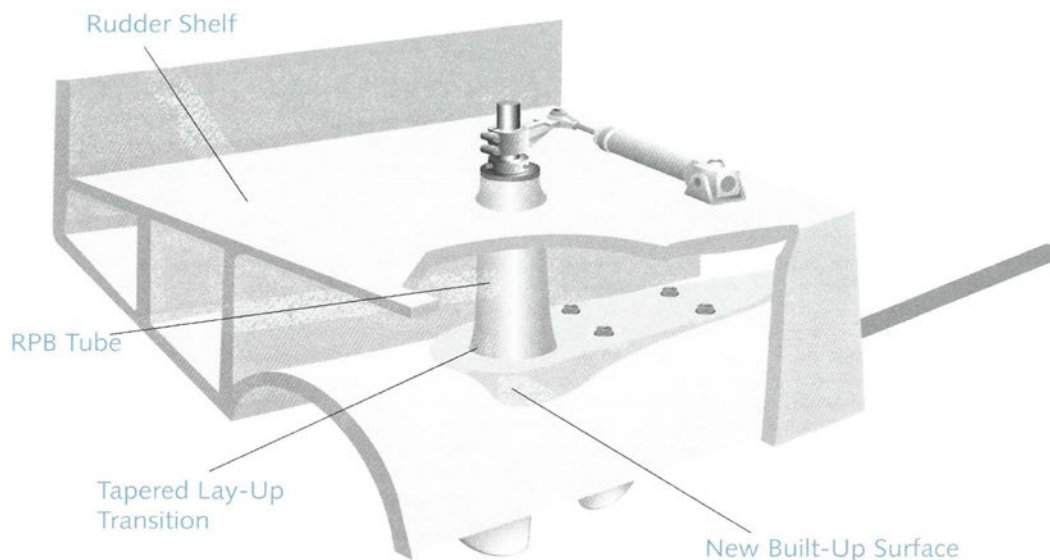
1. Prepare the tube for lay-up by roughing up the outer diameter surfaces with a grinder and wipe clean with thinner.
2. Mask the top of the assembly to protect it from overspray l excess resin.
3. Locate the assembly against the mold surface and bolt in place through the hole in the mold using the "plugs" provided by Tides.

Lay-Up Procedure

1. Begin the hull lay-up in the normal manner.
2. Cut an X in the cloth above the liner so that it can be laid down and around the base of the FRP tube with tabs against the outer wall of the tube.

3. On subsequent layers, stagger the position of the X cuts so the tabs overlay each other.
4. Taper the lay-up to at least 1" above the top of the lower bearing. Lay-up should radiate out away from the tube to at least 2 times the tube outside diameter.
5. **REMOVE THE LOWER PLUG AND BOLT.** Leave the upper plug in place until it is time to install the rudder.
6. When the rudder shelf is constructed, it should contain a hole through which the top of the FRP tube will pass. Once the shelf is in place, the upper end of the FRP tube is attached to the shelf using a lay-up procedure similar to the technique used during initial lay-up (staggered overlapping tabs throughout the lamination). Care should be taken to prevent excess resin and cloth from covering or entering the upper plug or tube insert.

NOTE: Before installing the rudder, remove the upper re-usable plug and insert the red installation hat into the top of the tube. Confirm that it is protecting the "lip" portion of the seal. After installation, remove the red installation hat and discard.



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TIDEMARINE

Installation Overview Type Three

Mold Modifications

1. Locate the exact position of the rudder stock center in the mold surface.
2. Carefully drill a hole perpendicular to the mold surface large enough from the plug bolt and bushing.

Installation

1. Prepare the tube for lay-up by roughing up the outer diameter surfaces with a grinder and wipe clean with thinner.
2. Mask the top of the assembly to protect it from overspray I excess resin.
3. Locate the assembly against the mold surface and bolt in place through the hole in the mold using the "plugs" provided by Tides.

Lay-Up Procedure

1. Begin the hull lay-up in the normal manner.
2. Cut an X in the cloth above the liner so that it can be laid down and around the base of the FRP tube with tabs against the outer wall of the tube.

3. On subsequent layers, stagger the position of the X cuts so the tabs overlay each other.
4. Taper the lay-up to at least 1" above the top of the lower bearing. Lay-up should radiate out away from the tube to at least 2 times the tube outside diameter.
5. **REMOVE THE LOWER PLUG AND BOLT.** Leave the upper plug in place until it is time to install the rudder.
6. When the rudder shelf is constructed, it should contain a hole through which the top of the FRP tube will pass. Once the shelf is in place, the upper end of the FRP tube is attached to the shelf using a lay-up procedure similar to the technique used during initial lay-up (staggered overlapping tabs throughout the lamination). Care should be taken to prevent excess resin and cloth from covering or entering the upper plug or tube insert.

NOTE: Before installing the rudder, remove the upper re-usable plug and insert the red installation hat into the top of the tube. Confirm that it is protecting the "lip" portion of the seal. After installation, remove the red installation hat and discard.

