

October/November 2020

by Steve D'Antonio

REQUIRED TOOLS:

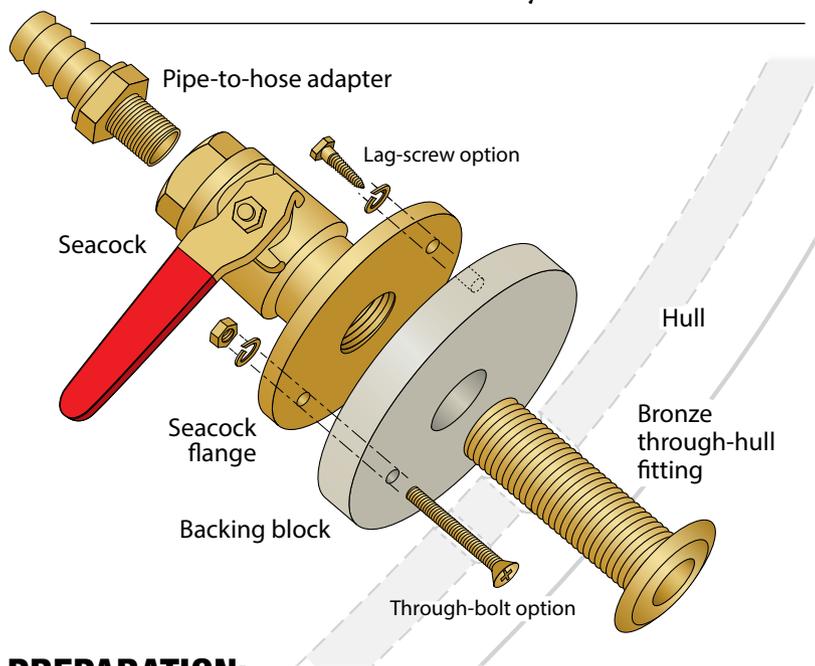
- common hand tools
- drill and bits
- holesaw
- socket set
- adjustable wrench
- through-hull socket tool
- eye protection

PARTS:

- seacock
- through-hull fitting
- backing block material. (GPO-3 or G10, 3/4"/19mm or purpose-made backing block such as Groco BB series, or 3/4" marine plywood fully encapsulated in epoxy.)
- bronze or stainless-steel tapping screws; or bronze round- or flat-head bolts, lock washers, and nuts, if through-bolting. (Round-head bolts should be used on thinner hulls to avoid weakening the installation with a recess; flat-heads should be used with flat, flush through-hulls for minimum resistance.)
- solid band/nonperforated all-stainless hose clamps
- #8 bonding wire and heat-shrink terminals for bonded vessels. (Avoid seacocks without bonding screws. Ring terminal holes must match the diameter of seacock bonding fasteners.)
- pipe-to-hose adapter (PTH)

LUBRICANTS, SEALANTS, ADHESIVES:

- polyurethane sealant
- West System epoxy and thickeners (Cab-O-Sil, 404, and/or milled fibers)
- denatured alcohol
- mineral spirits
- thread sealant such as Leak Lock



PREPARATION:

This is a guide to assist you in the installation or replacement of a seacock in an FRP vessel. At a minimum such installations must meet American Boat & Yacht Council (ABYC) guidelines, which specify that the assembly be able to withstand 500 lbs (226.8 kg) of static force for 30 seconds *when applied in any direction to the inboard portion of the installation*. This means the fewer hard-piped attachments made to the seacock the better. Ideally, the only hard plumbing component that should be attached directly to the seacock body is a pipe-to-hose (PTH) adapter or perhaps a street L (male-female threaded 90° fitting), the PTH adapter, and then the hose. After the hose interface, other raw-water-approved plumbing components may be plumbed into the system, but at the very least, every plumbing component that is below the waterline or conveys raw water—strainers, air-conditioning plumbing, watermakers, etc.—should be rugged and robust enough to withstand being stepped, sat, or leaned upon. Hose for below-the-waterline and raw-water plumbing should be either SAE J2006-rated, or specifically designed by the manufacturer for raw-water use.

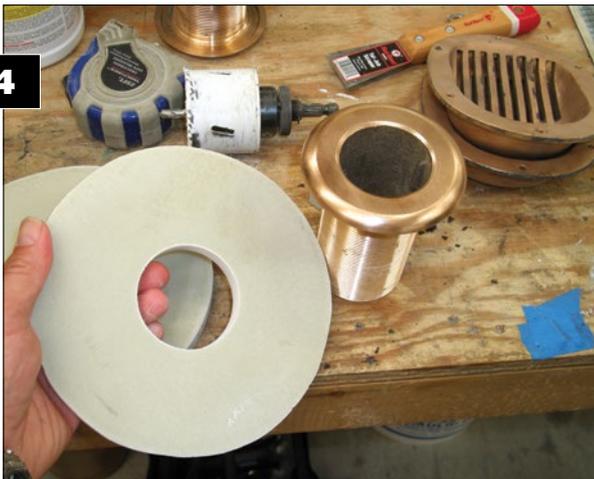
Choose seacocks and through-hull fittings carefully; they must meet the standards set forth in ABYC H-27 Seacocks, Thru-Hull Fittings, and Drain Plugs (components that meet these standards are usually labeled "Meets ABYC H-27"), and among other things they must have compatible threads. *Under no circumstances should an NPS-threaded through-hull and an NPT-threaded seacock be used together.*

If the seacock flange base is equipped with holes, use them either with tapping screws or through-bolt machine screws. While either approach will yield a strong, turn-resistant installation, the through-bolts add security but require drilling additional holes in the hull bottom. Don't use through-bolts on hulls less than 1/4" thick (6mm), as the holes can create a zipper-effect weakness if the through-hull installation is heavily stressed. Whichever method you choose, make certain the fastener shank diameter matches that of the flange holes.

PROCEDURE:

These instructions assume an installation in a solid fiberglass laminate. For installations in other materials or in cored laminates, core closeout procedures must be followed (core closeout will be covered in an upcoming guide). For replacement seacock installations, all of the following applies; simply skip over the hole-cutting section.

1. To begin your seacock installation, review the area where the seacock is to be installed. This area will have to be cleaned to remove oil, grease, and any other contaminants. Drill a 1/8" (3mm) hole from inside the hull as a pilot. Confirm, on the outside of the hull, that this is exactly where you want the seacock installed. (If it is not, the hole can be patched using resin and fabric reinforcement. Don't simply fill in the hole with epoxy.)
2. Select the appropriately sized holesaw for your through-hull. This should be a close fit with the smallest gap between the ID of the hole and the OD of the threaded portion of the fitting. Drill the hole.
3. Using a grinder and 80-grit sandpaper, prepare an area inside the hull around the hole approximately six times the diameter of the hole (a 1"/25mm hole would need a 6"/152mm-diameter prepared area). Grinding will remove the gelcoat and other contaminants and slightly roughen the area to improve epoxy adhesion.
4. Prepare a backing block using 3/4"-thick (19mm) GPO-3 fiberglass laminate (G10 is a stiffer but more costly option), or use a premanufactured backing block. Cut the block so that its shape matches the shape of the base of the seacock but 1" larger around its perimeter. For example, if the base of the seacock is round and 4" (102mm) in diameter, the backing block would be round and 6" in diameter. Cut a hole in the center of the backing block in approximately the same diameter as the OD of the through-hull fitting. (If you've just cut the hole in the hull, use the same holesaw.) As an alternative, fully epoxy-encapsulated, void-free marine-grade plywood may be used in place of GPO-3. Because of its flexibility, this material may be preferred for installation aboard wood vessels.



4



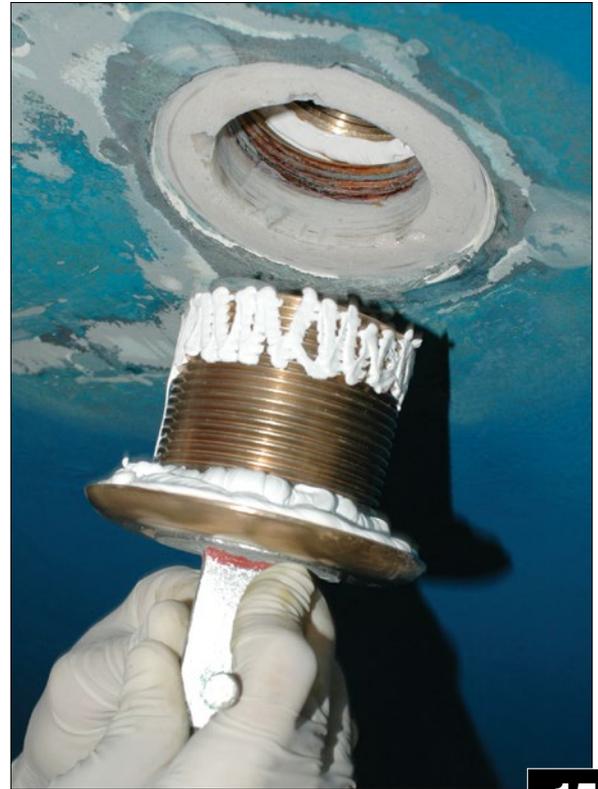
8

5. Dry-fit the assembly. Lay the backing block in place and, with the aid of an assistant, push the through-hull fitting through the hull from outside, and thread the seacock onto its threads until they bottom out. Then, push the seacock flange against the backing block. Now, measure the size of the gap between the hull and the side of the through-hull's outside flange. While the seacock is in place, carefully mark the location of the fastener holes in the flange on the backing block. You will later drill or pilot-drill these holes in the backing block. With the holes lined up, index the seacock base to the backing block base using a Sharpie marker, making a line that runs across both parts. Although it will not be used for the final assembly, do not discard the nut that came with the through-hull fitting; you'll need it shortly.
6. Working on a bench, install the nut onto the threaded end of the through-hull. Then, using the gap measurement you took from the outside, cut this much material plus an additional 1/4" from the inside end of the through-hull fitting. This will ensure that the two components will screw tightly together, with maximum thread engagement but without the fitting bottoming out. Now, remove the through-hull nut; doing so will clean the recently cut threads. Dry-fit the assembly once again to ensure proper length and that the through-hull threads do not bottom out when the assembly is tightened.
7. Remove antifouling paint down to the gelcoat or barrier coat from the hull area that will be covered by the through-hull flange.
8. Clean the ground area inside the hull and both sides of the backing block with denatured alcohol. Note: Do *not* use alcohol for sealant cleanup; it may inhibit curing.



14

9. If the inside of the hull is curved in way of the backing block, prepare a mixture of West System epoxy thickened with a 50/50 mix of Cab-O-Sil and 404 High-Density Adhesive Filler until the epoxy is the consistency of smooth peanut butter.
10. Apply the epoxy mixture to the inside of the hull and press the backing block in place (the epoxy will act as a shim between the flat backing block and the concave hull). Clean excess epoxy from the hole in the hull and center of the backing block. Apply mold-release wax to the threads of the through-hull fitting. Then, have an assistant push the through-hull through the hole from outside the boat. Install the nut so it is hand tight, securing the through-hull and backing block in place. Clean excess epoxy from the outer perimeter of the backing block, leaving a neat fillet.
11. After the epoxy has cured, remove the through-hull fitting.
12. In the locations marked earlier, drill holes for through-bolts or tapping screws that will secure the seacock's base flange to the backing block and hull. If you are not installing through-bolts, be sure to use a stop on the drill bit to avoid drilling through the backing block and into the hull. Bronze or stainless tapping or lag fasteners whose shank diameter matches the diameter of the hole in the seacock flange are appropriate for this installation. Use bronze bolts for through-bolt applications that penetrate the backing block and hull skin.
13. With denatured alcohol, clean the through-hull fitting's threads, the inner surface of the outer flange (the part that will rest against the hull), the bottom of the base of the seacock flange that will register against the backing block, the inside surface of the backing block, and the outside of the hull around the hole to avoid contaminating any other surfaces with bottom paint.
14. Using polyurethane sealant, coat the outside portion of the through-hull fitting (the threads) beginning $\frac{1}{4}$ " below the end of the fitting that will be installed into the seacock, as well as the portion of the through-hull's flange that will rest against the hull. Also apply sealant



15



- to the portion of the seacock's flange that will be placed against the backing block, being careful to keep sealant at least $\frac{1}{4}$ " away from the female threads inside the seacock's body. It's important that no sealant be allowed to migrate inside the seacock, where it may impede valve operation.
15. With the assistance of your helper on the outside of the boat holding the through-hull in place with a through-hull-fitting socket tool, thread the seacock onto the through-hull fitting and tighten from the outside with a large wrench. Guided by the index mark you made earlier, line up the holes in the base of the seacock with the holes in the base of the backing block. Insert the screws and tighten. If using through-bolts, install these from the outside, with the head of the fastener coming to rest on the outside of the hull. Clean up excess sealant with mineral spirits. Do not use alcohol.

16. Install a pipe-to-hose adapter into the seacock, coating the threads with a sealant such as Leak Lock, and install the hose using double solid-band hose clamps.
17. If the vessel is equipped with a bonding system, bond the seacock with the bonding screw provided on the flange. Use 8 AWG (6 AWG if the boat is already set up for lightning protection in accordance with ABYC guidelines), heat-shrink tubing, and dielectric or conductive paste on the wire-to-ring terminal and ring-terminal-to-seacock connections.

17

Immediately upon launching the vessel, cycle the seacock (and plumbing) and check for leaks.



About the Author: For many years a full-service yard manager, Steve now works with boat builders and owners and others in the industry as Steve D'Antonio Marine Consulting. He is an ABYC-certified Master Technician and sits on that organization's Engine and Transmission and Hull and Piping Project Technical Committees. He is also technical editor of Professional BoatBuilder.



ARE YOU A BOAT PRO? WE WANT TO WORK WITH YOU

Your Trade, Not Your Hobby. Boats are a weekend pastime for some, but for tradesmen who work in the profession, they are your livelihood. We've been working with pros like you for over 90 years and know that a reliable supplier is critical to your business. That is why we exist—to make your job easier, more efficient and more profitable. With discounted pro pricing, real-time inventory and same-day shipping—as well as our expert customer service reps—Fisheries Supply enables you to complete the job on time, on budget and with pride every time.



Fisheries Supply

Marine Supplies Since 1928

Deals and Services for Boat Pros Apply today at

fisheriessupply.com/pro