22-FEB-2008

A Bad Idea !!

Tip: If you would like a higher resolution or larger photo simply click on the picture and it will get bigger!

The picture on the left is what not to do! If your thru-hulls and valves, on your boat, are installed & look similar to this configuration you're not alone.

Unfortunately, for many owners of production boats, the factories cut many corners, proper seacocks being one of them! The correct installation involves more than just a thru-hull or mushroom-head, as some refer to them, and a valve.

The problem becomes more complicated when you learn why this is not necessarily safe. The vast majority of all available thru-hulls or, mushroom-heads, have what's referred to as a straight thread or NPS (National Pipe Straight Thread), and the vast majority of all ball valves are a tapered thread or NPT (National Pipe Tapered Thread). NPS thread and NPT thread are NOT intended to be used together period! Many unknowing sailors though

know nothing about NPT or NPS threads and as such many times use the two together.
In short, a proper seacock must have a female NPS flange that is through bolted to the hull to which the NPS straight thread thru-hull or mushroom head is then threaded into.

1 comment leave a comment

22-FEB-2008

A Good Idea !!

While both this photo, and the previous photo, were taken on my workbench the plywood is representative of the hull of your boat and the bronze fittings of two very typical installation methods used today. In this photo one can easily see the major differences in how both of these installations are affixed to the hull. This photo is representative of a proper seacock installation with a through-bolted flange and the previous photo of a not-so-good installation method with no flange and mis-matched threads.

1 comment leave a comment

20-NOV-2007

Removing The Old Thru-Hulls

This is the easy part of the project but you will need a few tools first. The must have tool for this project is called a step wrench. The step wrench can be inserted into the thru-hull and then used to tighten it into a seacock, remove it from a seacock or to break the marine sealant free from the hull. Most step wrenches have a nice flat spot for a pipe wrench or adjustable wrench for added leverage.

I purchased my step wrench from Hamilton Marine in Portland, ME and over the years it has certainly been paid for over and over.

The photo shows the step wrench inserted into the female side of the thru-hull ready to tighten or loosen..

Removal of the old thru-hull is easy:

1)First remove any hose clamps attached to the hose 2) Next remove the hose from the valve. 3)Using pipe wrenches remove the valve from the thru-hull. 4) Using pipe wrenches or in some locations a chisel remove the locking nut from the thru-hull. 5) Apply heat in the form of a heat gun to the exterior of the mushroom head part of the thru-hull. 6) While it's still hot use the step wrench to break the thru-hull free from the hull and remove it. 7) If it was put in with a product like 3M's 5200, & does not want to break free, sliding a three foot

pipe over the wrenches handle will give you the leverage needed. You can also use a pipe wrench on the threads to break it free but this will ensure total destruction of the thru-hull. 8) If all of the above methods fail to break it free from the hull use a 4 1/2 inch angle grinder and grind it out being very careful not to get it too hot from the grinding so you burn the hull...

0 comments leave a comment

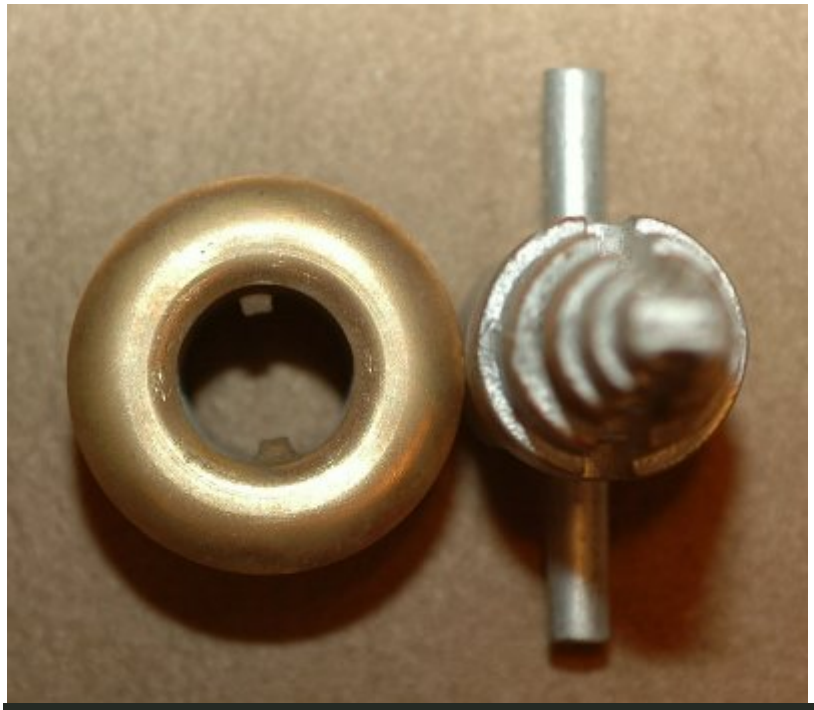
20-NOV-2007

A Close Up

Here's a close up view of the step wrench, and it's slots, inserted into a thru-hull.

1 comment leave a comment

20-NOV-2007

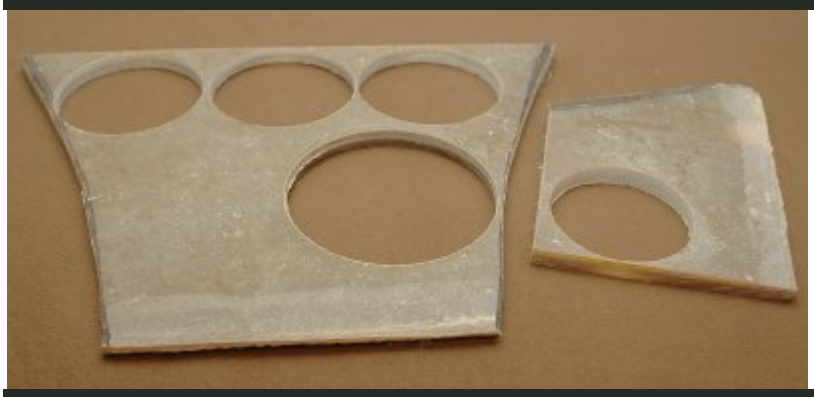


The Dogs

This photo shows the dogs or ears inside the thru-hull that allow the slot on the step wrench to grab hold and break it free or tighten it.

1 comment leave a comment

20-NOV-2007



Making Backing Plates

Unless your hull is close to an inch thick, of solid fiberglass, you're going to need backing plates for the seacocks. Backing plates are designed and used to distribute any stress loads over a larger footprint and to reduce and minimize any flexing of the hull at the seacock.

While most boat yards and DIY boaters use wood, because it's quick and easy, there really is a more

permanent method and that is fiberglass the same material your hull is made of. Of course if you have a beautiful old wooden boat don't use fiberglass.. Many wood backing plates can still eventually absorb moisture and then swell and contract, over time, and possibly compromise the fit of the seacocks and the water tight nature. Most wood's are also far softer than solid fiberglass so it can flex some with the constant opening and closing of a seacock. Many folks swear by coating the wood with epoxy, which I've done over the years, but, in my experience, it really does not take that much more effort to make them out of fiberglass.

I now use fiberglass for my backing plates so these instructions show how to do that. If you want to use wood just replace the "epoxy" or "kitty hair" step with a product like Sikaflex 291 or 3M 4200 and secure the wood to the hull with that.

Fiberglass backing plates are easy to make but yes they are admittedly a little more time consuming. The benefit is that once you have glassed these into the boat they will last a lifetime and never need replacing even if you replace the seacocks ten+ years down the road. My motto is "any job worth doing is a job worth doing right" Morris Yachts for instance, a one of the highest quality builders in the United States, currently uses solid fiberglass for their seacock installations on both their cored and solid fiberglass hulls. I personally feel wooden backing plates are a compromise but please do remember what you paid for this opinion when making your own decisions!

Fiberglass Backing Plates:

To make solid fiberglass backing plates you will need the following items.

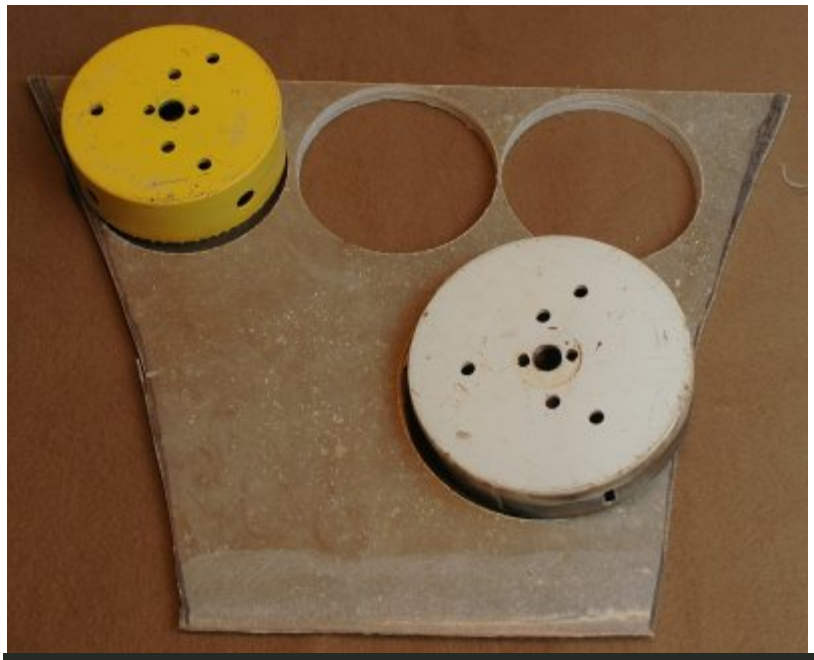
1) Fiberglass resin & hardener 2) Fiberglass in both 18oz "Woven Roving" and a standard 6oz "Fiberglass Cloth" 3) A 24 X 24 inch piece of relatively thick glass 5) A Fiberglass roller 6) Mold release wax for the glass.

To make the backing plate board wax the glass and begin laying up, wetting out, rolling & alternating the layers of roving and cloth until you have a fiberglass board at

least 5/8 of an inch thick. The whole laminating process may take you 30 minutes...
You may also be able to find scrap pieces fiberglass around your boat yard. This would save some time instead of laminating the backing plates yourself. Even two thicknesses of thinner fiberglass epoxied together is less work than actually doing the laminating. So ask around at the yard you never know what you might find!
Starboard?
O.K. I've had numerous questions about the use of the plastic marine lumber Starboard and it's many "knock off" iterations. Starboard is NOT a suitable product for a backing plate.
#1 Starboard is far to flexible to offer any sort of rigid stiffening to the hull.
#2 The manufacturer states that it does NOT stick well to any adhesives which includes bedding compounds such as 5200, 4200 or Sikaflex.
#3 The concept of a backing plate is to become one with the hull, make it thicker and add stiffness so the seal between the hull and through hull is not compromised and does not flex or move. Starboard fails in all these areas..
Starboard is a great product for many uses just not one where bonding to another substrate is required or rigidity is required. Use Starboard at your own risk.

4 comments leave a comment

20-NOV-2007



Cut Your Backing Plates

After the fiberglass board has cured you can then proceed to drill your backing plates. This is easier said than done! You will need at least a 5.5 to 6.5 inch hole saw and a very large and powerful drill.

The friction of the six inch hole saw, on the fiberglass hole, is tremendous and can and will kill a wimpy drill. I use my drill press for this but a large and powerful 1/2 inch drill from the likes of Milwaukee, Porter Cable or DeWalt is a must. Home Depot will rent you large drills and I advise this if you don't have a drill that is up to the task.

Trust me you will kill a Black and Decker or Ryobi before you even make it half way through your first hole!

One word of advice on drilling these backing plates is "CLAMPS". By this I mean always clamp your work down before you begin drilling or you'll have a giant spinning fiberglass saw on your hands..!

Circular fiberglass backing plates are certainly the best looking but tough on the hole saws and too much for cheap drill motors. Another practical alternative is to cut a hexagon or octagon with a miter saw or table saw. This method will be faster and easier but just not as neat.

20-NOV-2007

More Tools

In any job the proper tools will save you money and when dealing with below water applications this is especially true. For your thru-hulls you'll want a properly sized hole saw for each of the sizes you're using. This photo displays a properly sized hole saw for the task and a smaller one on the arbor..

0 comments leave a comment

05-JUN-2007

Just What is a Seacock ??

A seacock is simply a valve with a built in flange into which a thru-hull or mushroom head is inserted. The concept is that the flange is through bolted to the hull passing all the way through hull & the backing plate and the bronze bolt heads are then countersunk and faired over with filler on the exterior. A flanged seacock or a flanged adapter, as pictured above, is far stronger and also much safer than screwing a ball valve directly onto the thru-hull or mushroom-head. The cross section of a threaded thru-hull or mushroom-head is very thin. Because of the threads cut into it it becomes easier for it to break off in rough weather. All it takes is a tool box or other large or somewhat heavy item to slam into the valve and snap the thru-hull off to sink your boat. This is why you should ALWAYS use a proper flanged seacock or flanged adapter. I had this happen to me. A spare alternator hit a through hull on my old Catalina and cracked it. While the water did not rush in and the crack was small it was a stressful ordeal that required a haul out and repair and is one of the reasons i now only use flanged seacocks or flanged adapters.

The flanged adapter is a relatively new concept in seacock technology from Groco. In the traditional sense it's not what one thinks of when they think of a proper seacock but it certainly has some benefits over a one piece seacock. I chose to use flanged adapters for a few reasons over a seacock with an integral flange and valve.

First they allow you to replace just the valve portion, in the future, without ever having to replace the flange or worse ripping out an entire one-piece seacock. Second they accept a standard NPS or straight thread thru-hull into the bottom and a standard NPT or tapered thread ball valve threads onto the top thus eliminating the dangerous mismatching of threads.

Groco, however, is not the only game in town and products like Spartan Marine's seacocks have been reported, by many, to last close to 30 years, possibly more, with only the occasional re-build which is quite

easy. Many folks are also happy with Marelon which are also resistant to corrosion. Choosing a seacock configuration that allows you to sleep at night is what's most important.
In this photo you can see the flanged adapter screwed to the work bench, the thru-hull on top of the step wrench, the bronze ball valve, a bronze street elbow, teflon tape and some "pipe dope". If you click the photo & blow it up you'll see the difference between a tapered thread (on top of the flange) and a straight thread (the thru-hull). This should give you a better understanding of why a NPT ball valve, like the one pictured, should NEVER be threaded directly onto a NPS thru-hull!!
Hamilton Marine in Portland, ME stocks the Groco IBVF Flanged Adaptors.

3 comments leave a comment

05-JUN-2007

Dry Fit

For this particular valve I unfortunately had very little clearance and needed to turn 90 degrees. In this photo I am measuring my assembled height ahead of time.
One nice feature of the bronze Groco ball valves is the handle can be used in two different orientations for either a right or left close or open. By simply moving the handle stop set screw, to the other hole, you can

position the handle to open or close on the opposite side.

3 comments leave a comment

07-JUN-2007

Glassing In The Backing Plates

In this photo I have fiberglassed the backing plate to the hull, dry fitted and drilled it. The picture also clearly shows why I needed a quick 90 degree turn for this seacock.

To tackle this part of the process you'll need a few things. The first item is an electric drill and a coarse brass wheel to fit in the drills chuck, or an aggressive grit sand paper. The second is some fiberglass "kitty hair", Yes, it's really called Kitty Hair! Kitty Hair is a thick fiberglass filler mixture consisting of of long strands of chopped fiberglass mixed with a peanut butter consistency resin. The third item is a 3 inch bolt, that fits the pilot hole from the hole saw, and some Acetone. You could also use West System, System Three, M.A.S. Epoxy or any of the other epoxy based resins and your favorite filler. Regular old polyester fiberglass cures quickly though and bonds very well to a properly prepped surface. While polyester kitty hair is not as tough as an epoxy it's more than strong enough for installing backing plates.

To begin the process you'll want to insert the brass wheel into your drill and rough/scar up both the hull's surface and the backing plate or use a low grit sand

paper. Using a brass wheel, instead of sandpaper, creates nice deep scratches on both surfaces ensuring tenacious adhesion of the backing plate to the hull. Next vacuum up any dust and wipe both surfaces with Acetone. Now your ready to mix the Kitty Hair or epoxy what ever you chose. Follow the manufacturers directions on the can for both temperature and humidity and then mix it until you have a uniform color. In most cases the Kitty Hair hardener is blue so you can easily tell that it's mixed thoroughly.

To adjust the backing plate, and center it over the existing hole, insert the three inch bolt through the hole saw's guide hole. This will make it easy to center when you are out side the boat. You'll be able to grab the bolt and move the plate until it's seated and centered. Once the bolt has been inserted through the backing plate, spread a judicious amount of the Kitty Hair mixture on both the hull surface and the backing plate, then place it over the hole but don't push down or seat it just yet. At this point climb out of the boat, grab the bolt, and center and seat the backing plate into position. Now climb back into the boat and smooth the Kitty Hair with your finger, being very careful not to move the backing plate, until you have a nice smooth fillet.

07-JUN-2007

Dry Fitting The Seacock

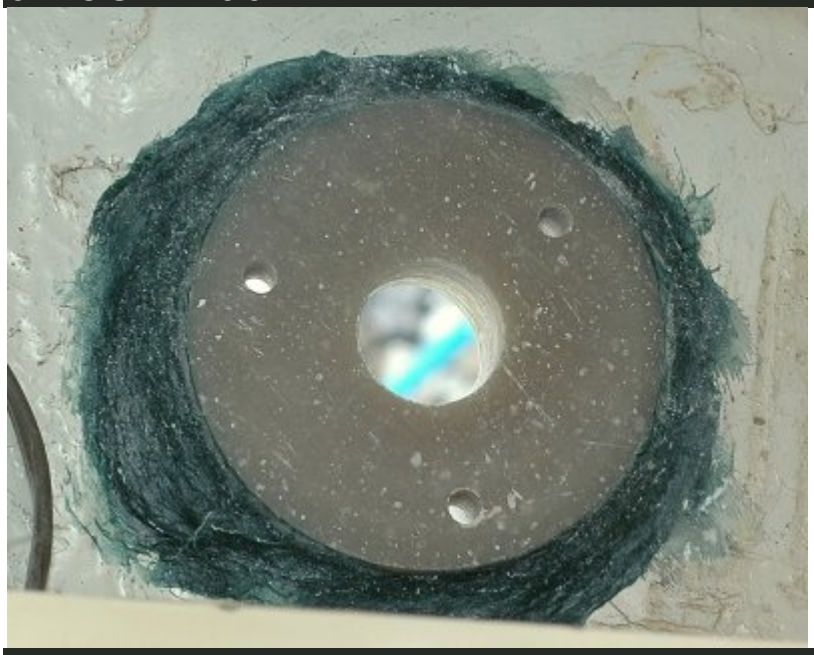
Now that your backing plate is installed and cured the first thing to do is to drill your hole for the thru-hull. This is made easier because you have already centered it over the old hole and already have a pilot hole in the center of the backing plate left over from the large hole saw you made the backing plate with. Now you simply choose a hole saw, to match your thru-hull's diameter, and using the existing pilot hole, drill your new mushroom-head / thru-hull hole.

Once that is done you'll need to thread the thru-hull up into the flange and measure it for length. In most cases the thru-hull will be too long and need to be cut to size. Cutting the thru-hull stem is easy. 1)With the thru-hull bottomed out into the flange measure from the outside of the hull to the mating side of the mushroom-head and add 1/4 of an inch. 2) Insert the thru-hull into a vice carefully clamping the threads that need to be cut off NOT the threads your keeping. 3)Using a hack saw cut the thru-hull to its required length. 4)Clean the threads you just cut with your drill and brass brush.

Now that you have the proper length thru-hull, re-insert it into the flange and tighten it down by hand. Climb back into the boat and adjust your seacock to align it with it's hose for proper orientation. Once you have everything

aligned, and situated where you want it, drill your flange bolts holes, one at a time, inserting a bronze bolt after drilling each hole. Inserting a bolt, after drilling each hole, guarantees proper hole alignment by the time you get to the last one! Doing it by eye, without bolts, leaves room for the seacock to twist and a potential fit failure. There is NO room for error with fiberglass like there is with wooden backing plates and all bolts must be 90 degrees to the hull and perfectly centered and aligned for a proper fit.
The next step is to countersink the machine screw heads into the hulls exterior. Again having the proper tool, in this case a countersink, is imperative. Not only must you use a countersink but it needs to be the right size for the silicon bronze slot head machine screws! Using a regular drill bit for countersinking is a HUGE NO, NO in this situation! In the picture the holes have been properly countersunk and the through-hull hole, in the hull, is over an inch thick of solid fiberglass.

07-JUN-2007



Countersink The Flange Side

In this photo I still need to countersink the flange side of the bolt holes slightly. The reason you want to do this is

to create an o-ring like effect of marine bedding compound surrounding the threads. If you don't countersink most of the sealant will squeeze out when you tighten everything down leaving very little to prevent a leak. The premise and design is that water should never even get to the top side of the backing plate but just in case it's best to countersink slightly and make and create an o-ring effect.
Countersinking any hole, where marine bedding compound is to be used, is a good idea especially with deck hardware. This slight countersinking makes a nice water tight gasket and also prevents crazing of the gelcoat from the sharp and abrupt edges a straight drilled hole creates!

0 comments leave a comment

07-JUN-2007

Flanged Adapter With Bronze Ball Valve Ready To Install

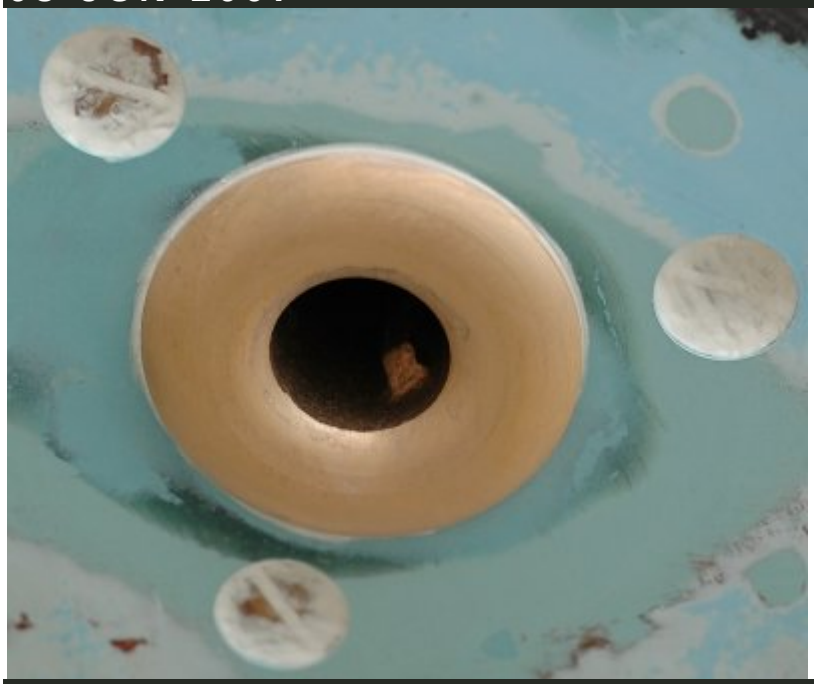
At this point I have applied some Sikaflex 291 marine sealant and am ready to install the flange. If you look very closely you'll see that the flange has been slightly countersunk so it's ready. First apply the sealant to the flange, in the fashion shown, then generously circle the machine screw heads with sealant and feed the bolts up through and into the boat from the outside. Now carefully set the flange onto the bolts. Thread the nuts and washers onto the bolts, finger tight, and then climb back outside the boat. Slather the thru-hull/mushroom-head's threads with sealant and apply a generous amount to the

head or mating surface & thread it into the flange and climb back into the boat. To tighten the nuts, with only one person, I find it much easier to use an impact driver. I use an 18V rechargeable Ryobi that was cheap and works well for the purpose. Be careful with the impact driver as you don't want to over torque them! The impact driver is a great tool that will tighten the nuts without having to have a second person outside the boat with a screw driver. Once the nuts are tight grab the step wrench, and a large adjustable wrench, and tighten the thru-hull into the flange from outside the boat.
Once everything is tight clean up the ooze from the sealant, including any that oozed out up inside the through hull and around the exterior. Be sure to clean excess sealant from the counter sunk bolt heads so you're ready to fill and fair the exterior with a vinyl ester filler such as 3M Marine Premium Filler. Marine Premium Filler is a unique vinyl ester formulation designed for marine filling and fairing applications above or below the waterline. Do not use products or fillers like Bondo or Evercoat below the waterline as they will absorb moisture! Make sure you're using either an epoxy based fairing compound or a vinyl ester fairing compound to prevent moisture intrusion...
So why do I use Sikaflex sealants or bedding compounds rather than 3M products? That's an easy one for me to answer. In my experience I've found it less aggressive in it's adhering properties than 5200 something I really like for future repairs. I've had vast amounts of experience, over 30+ years, with many marine sealants and none has performed better, been more reliable, than Sikaflex for me.
If there is one thing I've learned, in 30+ years of boating, it's that NOTHING on a boat is permanent, not even a keel joint, so there is absolutely NO need for a sealant as permanent as 5200. In my opinion 3M 5200 was invented to ensure future boatyard revenue but remember what my opinion is worth!
I've seen 5200 destroy gelcoat, port lights, hatches and teak among other things. There is only one product not

allowed on my boat and it's 3M 5200! 3M 4200 was a move in the right direction, being less adhesive than 5200, but for many projects it's highly adhesive properties are still not necessary and it's still overly tenacious in it's grip. Now don't get me wrong I'm not saying, in any way, that Sikaflex comes apart like butter, it does not, but it comes apart easier 5200. Try Sikaflex 291 & you'll like it's adhesion, flexibility and long life.

0 comments leave a comment

03-JUN-2007



Exterior View of Installed Thru-Hull

As you can see in this photo the silicon bronze bolt heads are countersunk and most of the excess Skiaflex sealant has been wiped away.

The next step is to fair over the bolt heads with 3M Marine Premium Filler to get a nice smooth hull with no visible bolts.

After the fairing step I also did a complete barrier coat of the area for added moisture protection using Interlux Interprotect 2000 series barrier coat. This step is not 100% necessary but I wanted to protect and prevent any water intrusion into the recessed bolt holes as I could and also protect the hull where I had sanded thin the original gel coat..

0 comments leave a comment

08-JUN-2007

A Few Words of Caution !!!!

WARNING, WARNING, WARNING if you are one of the "cheap skate types" who think "marine rated stuff" is a bogus marketing ploy DO NOT stop reading here.

This is a photo of a one year old YELLOW BRASS Home Depot ball valve installed by the previous owner. When I asked this seasoned boating veteran why he used a ball valve from Home Depot he said; "it was only in a pinch while coming up the ICW but after it was installed I forgot to replace it with bronze one".

This "Home Depot" valve was in use for about 8 months, of total in water time, and the ball, inside the valve, is completely GONE, NOT THERE, CORRODED AWAY! This valve was literally weeks away from catastrophic failure of the boat sinking type..

DO NOT USE ANYTHING BUT MARINE RATED SILICON BRONZE, RED BRASS OR MARELON ON YOUR BOAT'S SEACOCKS OR THROUGH HULLS!!!

2 comments leave a comment

08-JUN-2007

This is What the Exterior Looked Like

This is after only eight months of use! Again DO NOT cheap out on ball valves!!!

1 comment leave a comment

05-JAN-2008

The Finished Product

This is the finished product after the first seasons use. This seacock happens to be for the head intake..
-Happy Sailing

2 comments leave a comment