

How to Adjust your Stuffing Box

Article by Al Schober, 1973 T30 #173, "Sea Cup"

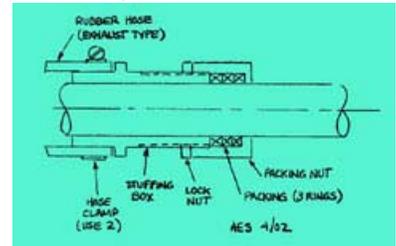
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There seem to be a lot of questions about stuffing boxes. They're pretty simple, but are an area of considerable concern as they keep the water out of the boat. The following material concerns the type of stuffing box that I (and most other sailboats) have.

Leakage:

The stuffing box shouldn't leak when the shaft isn't turning. When running, there should be some slight leakage to keep things cool - we're talking drops per minute here. If there's too much or too little leakage, the box needs adjusting.



Tools:

The locknut and packing nut will be fairly large - probably bigger than any standard wrench you carry aboard. You can buy a special wrench for these nuts, or use a large pair of slip joint pliers.

Adjustment:

The stuffing box has right hand threads on the outside. The locknut and packing nut have right hand threads on the inside. To tighten the stuffing box and reduce leakage, you first have to move the locknut away from the packing nut. Looking aft, turn the locknut clockwise using a suitable tool. You can then use the same tool to turn the packing nut clockwise, compressing the packing. When it's where you want it, put the lock nut back against the packing nut and jam the two together. You don't want the packing nut backing off when the shaft turns.

Loosening the stuffing box to get more leakage is similar. Move the locknut away from the packing nut (clockwise), then loosen the packing nut (counter clockwise), and finally jam them together again. Note that loosening packing is usually not successful as the packing has probably hardened and taken a set. To get looser packing, you usually have to start with new.

Packing Replacement:

The hard part of this job is getting the old packing out of the packing nut. Access is usually terrible. Try to time this job for when the boat is out of the water and the shaft has been slid aft out of the engine coupling. This will allow you to slide the packing nut off the fwd end of the shaft and work on it somewhere where you can see what you're doing.

For doing it in place, there are tools available that look like mini corkscrews that will go down inside the packing nut and screw into the old packing. I've also seen success using a variety of homemade wire hooks made from pieces of coat hanger wire. Whatever works.

Size of Replacement Packing:

The packing has to fit the space. Packing comes in different cross sections, such as 3/16 or 1/4 inch. Measure the diameter of the threads on the stuffing box, subtract the shaft diameter, divide by two, and that's the packing size. Go to the nearest smaller 1/16 of an inch - you'll have a tough time fitting in rings of bigger stuff.

Cutting the Rings of Packing:

You'll need three rings. To make these, you'll need a single length of packing material 10 time the shaft diameter plus about 2 inches.

I.e.: 12 inches for a 1 inch shaft. You'll also need a sharp single edge (unless you're into blood and pain) razor blade. Put a piece of electrical tape along the shaft, about 2 inches long. Then, wrap the packing material around the shaft three times over the electrical tape, keeping the wraps taut and close together. With one hand, hold the ends against the shaft. With the other hand, hold the razor parallel and perpendicular to the shaft and cut down through all 4 pieces of packing. This will give you three rings of the proper length, plus two pieces at the ends to throw away.

Installing the New Rings:

I like to install the packing rings with the splits 180 degrees apart. Left, right, left. Up, down, up. Others like to space the splits 120 degrees - noon, 4 o'clock, 8 o'clock. Just don't line the splits up with each other. Stuff the new rings down into the packing nut using your weapon of choice, trying to do minimal damage to you nice new packing. Finally, screw the packing nut (with the new packing) onto the stuffing box and just bring it up snug. Go back to the instructions on adjustment.

Selection of Packing:

I think I can safely say that any packing is better than none - as long as it doesn't damage the shaft too badly. I've seen pieces of cord twisted together to make a proper size rope, installed without any cuts to make rings, and greased up a bit to slide on the shaft. They certainly acted to keep leakage under control. Perhaps requiring adjustment too frequently, allowing more leakage than I'd like, requiring replacement too soon, and scoring the shaft quite badly. But those are the faults that a good packing is supposed to avoid.

The traditional packing is a flax braid with a tallow lubricant. Today, there seem to be as many different types of packing as there are manufacturers, if not more, as each manufacturer offers different types. And the claims are like the claims for brake pads - guaranteed to last forever! But the brake pad guys never seem to claim that they'll stop the car to your satisfaction or not damage your rotors!

Square is the traditional shape for shaft packing. But, you wrap a square shape around a shaft, and it distorts. The part against the shaft gets wider and the part away from the shaft gets narrower. You stuff a shape like this into a stuffing box, and it leaves gaps for leakage. The only way to close these gaps is to tighten the packing nut more, increasing pressure on the packing, and increasing shaft wear.

There's at least one manufacturer that is making a packing that is keystone shaped. The thought being that when you wrap it around the shaft (skinny part of the keystone against the shaft) it comes out square, fills the space better, and gives reduced leakage with reduced pressure, and hence longer packing life and less shaft wear. I got a piece that I used to pack my stuffing box about 5 years ago, and it's still going strong. The US Navy uses the same stuff to pack the stuffing boxes on reactor feed pumps, and they seem to like it. If you can find some, perhaps you'll like it too.

Owner Addendum:

Good advice. I actually used the external section of the shaft to cut my lengths. Since the packing was somewhat stiff the lengths were a bit too long, so I then trimmed them just prior to installing.

Rick O'Donnel

Maighdean Mhara T-37 #79

Good advice and to cut the packing get a 1" dowel and a sharp razor

Laird Bruster

Windfall T34C #246

Be absolutely certain that your 1 inch dowel is in fact a 1 inch dowel. Went this route and when I packed the box I had huge gaps between the packing ends. Turned out my 1 inch dowel was a tad under 1 inch. Measure twice cut once.

Neal Musto

Aeolus T34C #57

3/16 makes the best sense for a 1 inch shaft, that is what I use on my T-33. Also, remember to cut the rings (three individual rings not wrapped around the shaft three times) at a 45 degree angle so that it slips together when you tighten the cap also, try to make the end butts of the packing in different locations on the diameter of the shaft.

Leo Corsetti

T-33 Satisfaction

