

Maintenance and
Trouble
shooting

How to Repair Window Leaks

by David Pascoe

There are few problems that can cause more damage and detract from the value of your boat than window, porthole and hatch leaks. Even well constructed boats will eventually develop leaks simply because boats are not totally rigid structures. In fact, they twist and flex quite a bit, and poorly constructed boats flex a lot, which is why we see so many entry-level boats that more or less just strain the water before it enters the interior.

I am constantly amazed at the number of boats I see where the owner has simply smeared some caulking around the window frames of leaking windows. Let's start with the point that not only does this make a mess of your boat, but this a complete waste of time. When you develop leaking windows, ports or hatches, no surface remedy is going to solve the problem.

The leaks usually develop because the seal between the window frame and the fiberglass part of the boat has broken. The break in the seal can be so small that you can't even see it. This is because of the capillary effect, which draws water into the smallest of cracks and more or less acts as a water pump to keep bringing water in. Its also why water can enter at one point and be coming out somewhere else, perhaps two feet away from the source of the leak.

Most boats now have aluminum window frames, and which constitute the major source of leaks. This is usually not the fault of the frame, but of the poor design of the structure to which the frame is attached. Please see the "*Windows, Windows,*" essay for photos and a more detailed discussion of design. Many boats are so badly designed that no matter what you do, you're not going to be able to stop the leaks. Before tackling the project, here's what to look for:

- ≠ The window frames are the only thing holding up the flying bridge.
- ≠ The side decks are weak, and when you walk on them, it pulls the deck and house side away from the window frame.
- ≠ Frame is not channelized, but consists of just the frame and glass clamped against the house side with screws.
- ≠ The window frames are black and you live in the south.

If you have a poorly designed boat where the window frames are holding up the flying bridge, or are very low to the side decks and the deck flexes when you walk on it, it is not likely that you can stop the leaks by recaulking the windows. This is a design problem that you're pretty much stuck with.

Black aluminum, anodized or painted, is a problem because aluminum is a great heat conductor, and when they heat up in the sun they expand and break the caulking seal, as well as helping to make the caulking brittle. To stop leaking, you have to use a non-hardening caulking so that the caulking can move with the expansion. To deal with this problem, you have to remove the frames, rebed them and refasten them less tightly than they were previously installed. The reason is that if the frames are drawn very tight, they will squeeze all the caulking out and not allow any movement without breaking the caulking seal. In this case, its best to use one of the specially formulated non-hardening silicone epoxy compounds and use 3/32" shims to prevent the frame from being drawn completely flush, particularly along the top of the frame where most leaks develop. Draw the frame tight against the shim- which is only inserted along the edges - and then let the bedding fully set before pulling the shims out. Once the caulking has fully set - say a week - then go back and retorque the fasteners just a little tighter. What you now have is a gasket against which the frame can be drawn up against.

This method works for all types of windows, including glass sandwiched between two pieces of wood. The trick here is to NOT initially draw the frame completely flush, thereby squeezing all the bedding out. If the frame starts to leak at a later date, you then have the opportunity to tighten it even further, whereas had all the bedding been squeezed out, retightening would have no effect because there's really no gasket in there.

Removal You must completely remove the frames and clean all the mating surfaces thoroughly before applying the bedding. Use toluol or lacquer thinner or acetone to completely clean off all old bedding. Be sure to clean the

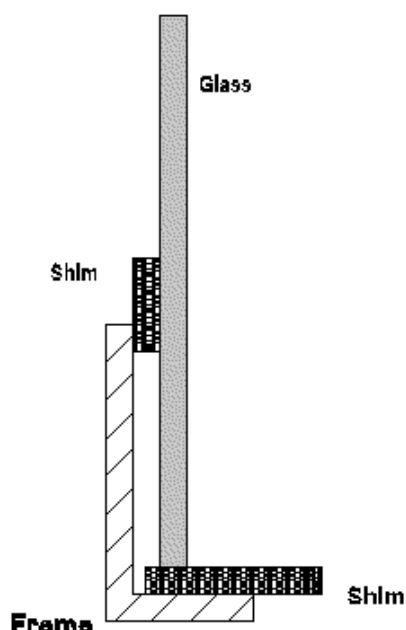
fiberglass mating surfaces as well. If there is corrosion on the surface, you should sand it off completely as water will wick right through the aluminum oxides and defeat your efforts.

Bedding Glass If you have water leaking under bedded glass, such as on a front windshield, the only way to fix this is to remove the glass and rebed. Don't even think about smearing caulking around it because that won't work. Besides, it is not particularly difficult to remove the glass and do it right.

After removing the glass, you also have to thoroughly clean the channel in the frame in which it sits. Most window channels will be full of crud and corrosion. If you do not get it perfectly clean, all your effort is likely to be wasted, so be sure to do a good job. Two people can reset three windshield lites in a half-day so its not a big job.

To reset the glass, use a silicone based window glazing SPECIFICALLY designed for this purpose. Do not use plain old silicone sealer. Clean the glass edges thoroughly with an alcohol based glass cleaner. Plain old Windex is fine. What you're going to do is to apply the window bedding very heavily to the frame channel and then press the glass into place, squeezing out the excess that you will later trim away with a razor blade once it fully cures. Don't attempt to smooth out the excess with your finger because you'll just make a mess of things. Yes, its going to look ugly at first, but the razor blade will trim it away as nice as can be.

Before setting the glass in place, you'll need a dozen 2mm or 3/32" shims for each pane of glass. The reason for this is the same as with window frames: you don't want your bedding to be too thin. Use any kind of stock sized material for the shims. Before applying the bedding, set the glass back in the frame and shim it into the final position that it will be in when the job is finished. From the interior, now place the shims right along the very edges of the frame between frame and glass. You can either use tape, or silicone sealer to hold them in the exact location. Silicone will work best because they won't move, but you have to give the silicone time to set before installing.



After the shims are in place, pull the glass back out and apply the bedding. Then set the window back into the bedded frame.

Note: You can use this same procedure for rebedding leaking hatch frames, especially on decks that flex a bit. Use the 3/16" shims under the edges of the hatch to keep from squeezing all the caulking out when you tighten the screws. After the caulking is fully cured, come back and retorque the screws. If the hatch ever starts leaking again, all you have to do is again retighten the screws and this should stop the leak. This is because you can continue to tighten the frame against the semi-soft caulking which is really now a gasket.

Now, place shims under the bottom edge of the glass from the exterior. We do not want the glass resting on the bottom of the frame because if the frame moves, it will also move the glass, so shim it up so the glass is approximately centered in the frame, not touching on any side. Allow the bedding to set up overnight before you go back and apply the final glazing to the exterior. If there are snap-in exterior moldings, wait a day before putting those back in so that you don't disturb the positioning.

After the bedding has cured, you can now trim the excess on the interior, or finish with the exterior glazing. To

trim, hold the razor blade at an angle about 30 degrees off of vertical and cut at this angle all the way around. Then finish up by trimming the horizontal surface, separating the bedding from the glass just up to the point of the vertical cut. Have a supply of blades because the glass will dull them quickly and they will not cut cleanly when dull.

If you do not have exterior moldings to install, use your bedding to finish up the glazing. To get a nice smooth surface, use a NEW chrome plated putty knife sprayed with silicone to prevent sticking. Don't try to remove all the excess, just get the glazing part smooth. You can trim the excess with a razor after it sets, which is very easy to do.

Viola! You're finished.

The Result: What you have done here is to create sort of a free-floating window pane. The soft bedding will allow considerable movement without breaking the seal so that future leakage will be eliminated, or at least greatly reduced. This method works not only for windows, but for portholes and deck hatches as well, or any place a more rigid frame is mounted to a flexing hull or deck surface.

Note: Most windows have a two-part frame, the outer frame which is the major part, and the inner which is more or less just a trim bezel. Even so, that trim bezel probably plays a major role in the sealing process, so the inner part needs to be removed and rebedded as well. However, you don't need to shim it when reinstalling. When drawing up the screws, don't pull them real tight, just draw it up within about a 1/16" until the bedding sets. Then go back and retorque the fasteners to make it a little tighter.

Deck Hatches Usually leak because the deck flexes somewhat, breaking the caulking seal. The remedy for this- as long as the deck doesn't flex too much - is the same as for the window glass described above. Again, the trick is to make the bedding layer thick enough so that it can be torqued down like a gasket. Pulling that hatch frame down tight was what created the problem in the first place, so once again use shims on the preliminary reinstallation. Then go back and retorque after the bedding cures.

Tinted Lexan against a black surface: This is a combination that will never stop leaking in Florida or the Gulf coast simply because the black absorbs too much heat from the sun and the rate of expansion is too high to permit a seal. The only solution is DON'T USE BLACK MATERIALS.

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