



Chesapeake Tartan 30 Association

T-30 CABIN WINDOW REPLACEMENT — THREE VIEWS

The Chesapeake Tartan 30 Association has always welcomed different viewpoints concerning maintenance, repair & upgrading of the yacht. Following are three views of the above subject, all reprinted from the Association's newsletter, *The Hook*.

View #1

DO YOUR CABIN WINDOWS LEAK?

Lee Greenbaum, T-30 #90, *Cloudsong*, October 1987

Do the port lights in your main cabin leak? Do they look like they've been hit by someone's heavy foot? Are you tired of looking at patchwork caulking around the frames? Well if you are, now's the time to replace your aging port lights with new, clear, unscratched, see-through-able port lights.

Actually the job is relatively easy to replace all your windows; the job could be completed in one day but two hands (people) are needed. Before you begin, you must buy some $\frac{3}{8}$ " clear Lucite. I bought mine at Read Plastic in Rockville (MD). They will also sell you a sabre saw blade to do the cutting. You'll need to make two more purchases before you begin: caulking compound and barrel nuts ($\frac{3}{16}$ "). There are probably a number of caulking compounds that will do the job; I bought mine (Silpruf) at a local yacht yard.

Now that you have all of the essentials and a clear dry day, it's time to begin. With the help of your partner, remove the old port lights by unscrewing the bolts from the barrel nuts. In general they're going to be tight after years of sitting. We used a large screwdriver inside and the person outside used a brace and phillips head bit. Using the ratchet on the brace made the job *relatively* easy.

Once the frames are off and the windows punched out, remove the old caulking from the frames. Throw away the old windows — unless they are a perfect match for the holes they were removed from. Make certain you've cleared away all of the caulking that was pushed between the window and the cabin wall. Once this is done you may find that in some cases you had a $\frac{1}{2}$ " holiday. In fact, all of my windows had great spaces — after the caulking was stripped away.

The next step is to make a pattern from each window opening by using a piece of paper (I used an opened brown paper bag and a felt-tipped pen) taped over the opening. Cut out the paper on the line and place it over the covered Lucite. Do not remove the brown paper covering from the Lucite until the glass has been cut and properly placed for the opening. In the event the glass doesn't fit, the paper covering protects the window from being scratched during any additional shaping.

Once you are satisfied that the glass is adequately shaped, remove the paper and position the glass in the opening. With a caulking gun, fill all spaces with caulk and then on the outside put a hefty bead of caulk around the window. This bead should cover the area under the outside aluminum frame. Don't worry about having an excess of caulk. Now carefully position the outside frame over the holes. To secure the inner and outside frames for final bolting, use smaller-sized bolts pushed through two holes. This will hold the two frames in place over the holes. Now rebolt the frames, gently but firmly tightening the nuts with brace and bit, while the person inside holds the bolt tightly with a heavy screwdriver.

If your newly cut window has no gaps, you may need to drill through the pre-drilled holes of the frames because the Lucite now fills some of the space that the caulking once filled. With the proper sized bit, drill through the hole in the aluminum frame, through the Lucite, hopefully coming through the hole in the other aluminum frame. When all the bolts have been tightened down you can proceed with cleaning off the excess caulking. And now to wait for the next downpour — to see how nice a job you did.

Our job was not complete because the oozing and dripping of water during the last few years discolored the teak. Bringing it back to its almost original state required sanding and a little Clorox on some of the more recalcitrant spots. Generous rubbings of teak oil finished the job.

(Continued)

View #2

REPLACEMENT OF CABIN WINDOWS

Dick Thompson, T-30 #343, *Scotch Mist*, August 1984

This spring I replaced the Plexiglas inserts in all of the portholes or windows on *Scotch Mist*. The original windows had become crazed, due to stress cracking according to Read Plastics, where I bought the replacement Plexiglas. The Plexiglas for the entire job cost about \$125.00 from Read Plastics; other places may be less expensive. Due to their custom cutter being on vacation, they were only able to cut the replacements down to the nearest rectangle. I found, however, that the Plexiglas was easy to cut with a handheld electric saber saw. (Be sure to obtain the special blade for cutting Plexiglas of $\frac{3}{8}$ " thickness.) I also found out that some minor differences existed from window to window, which required some slight recutting.

In removing the old glass, I simply unscrewed the windows from the inside and then with a putty knife removed the outside frame. I left the inside frames in place in the main cabin, which are mounted on wood and were clearly well sealed. The inside frames in the forepeak, however, which are mounted on fiberglass, became loose as I removed the outside frame. I then gently pushed out the glass inserts, which sometimes required a little prying with a screwdriver. I first removed one of the large main cabin windows and one of the small forepeak windows to use as templates in ordering the new inserts. In the interim, I taped clear heavy plastic over the openings, since it took about a week to obtain the replacements.

The next and most time-consuming step was to remove the old caulking from the frames and window openings. Where I had left the inside frames in place, I carefully avoided digging too deeply around the opening and the frame, but in general, I removed as much of the old caulking as possible. The most tedious task is that the old caulking must be removed from each and every one of the barrel nuts around the outer frame. Furthermore, there is a small pin hole in the center of the cap of these barrel nuts that must be cleared (I used an ice pick for this task). The barrel nuts must be cleaned in order to allow the new caulking to ooze out as you tighten the screw inserts, otherwise (as I found out) you will be unable to completely and firmly tighten the screws and the frames. Be sure to also clean the old caulking out of the groove around the frames, even on the frames left in place.

I used Boatlife silicone rubber for replacement caulking, although I am not sure this is preferred, both because it dries relatively fast and (thinking ahead) it may be very difficult to remove if, and when, I have to do this job again. I believe the original caulking was either an acrylic or some general purpose sealant. I first laid caulking around the groove of the inner (in-place) frame, then pressed the new Plexiglas insert into place. I then filled the space between the glass and the opening. Finally, I generously applied caulking around the grooves of the outer frame and pressed it into place. You should also put a bit of caulking in each screw hole around the opening before screwing the window frame into place. Try not to take more than about 15 minutes from start to finish, per window, so the caulking doesn't begin to dry. I recommend putting in and tightening the corner screws first, and then the center screws, to get an even tightening around the window.

You can clear the excess sealant away immediately or after it dries for about an hour, using a razor blade. I am happy to report that I can not only see through my portholes, but that they don't leak (yet).

View #3

MORE ON WINDOW REPLACEMENT

Brad Armendt, T-30 #282, *Emprise*, May 1998

Barrel Nuts. The barrel nuts used to hold the port frames could be either stainless steel or chrome plated brass; in either case, the corrosion of the aluminum alloy frame that occurs because of dissimilar metals in contact sometimes locks the barrel nuts in place. In 1989, when I first did a job on my ports, some of the barrel nuts fell out, while others had to be knocked out with a hammer and punch. It's best to remove all of the barrel nuts:

(a) so that you can get all of the old caulk off of the port frames, then wet-sand them with fine sandpaper to remove surface corrosion and provide a good, polished finish, and

(b) so you can completely replace all of the original screws and barrel nuts with new (and perfectly clean) stainless steel ones. This makes final reassembly of each port much easier, thus helping to insure

that the new caulk gets into every last crevice to stop water leaks, and helps to minimize future corrosion problems on the frames.

Window Material. I completely removed all my ports (both small and large) and measured the sizes of replacement plastic that would be needed. The thickness would have to be $\frac{5}{16}$ " (but don't just copy this; measure your old window thickness, and don't try to use pieces that are even a little thicker). The original openings were cut rather roughly, and they vary a lot. You won't have a whole lot of slack to work with, so plan to custom-cut each new window to size. The plastics company I was dealing with (Gar-Ron Plastics Corp., Baltimore, MD) said it would cost me the same to get the plastic in one big sheet or in several smaller pieces. Therefore, I figured I needed four pieces $\frac{5}{16}$ " x 8" x 25" for the main cabin, and three pieces $\frac{5}{16}$ " x 7 $\frac{3}{4}$ " x 14 $\frac{3}{4}$ " for the forward ports (the head port is a Bomar opening type and wasn't replaced).

So I went down to the plastics company. Knowing that Lexan (polycarbonate) was superstrong, I announced that I needed seven pieces of $\frac{5}{16}$ " Lexan in these sizes to make new ports for my boat.

The counterman looked at me funny and then said "You're a sailor, aren't you?"

"Yeah. Why?"

"Sailors always ask for Lexan," he said.

He then went on to explain that if you want to protect a fancy stained glass window in a cathedral from vandals, or protect a cashier from holdups, using Lexan makes good sense. But what you will find is that the Lexan doesn't hold up well in direct sunlight; it tends to darken and become translucent rather than transparent. This may be OK if you're going to sail around the world, because you'll probably be back before the darkening gets too serious, but most people won't find Lexan windows satisfactory for long term use. On the other hand, he continued, if you go out to Arizona you can find airfields where old warplanes have been sitting out in the sun since World War II was over, and their canopies are still as clear as glass. That's because they're made of acrylic plastic (for which Lucite and Plexiglas are both trade names). That's what you need. And, indeed, later I found out that's what Tartan originally used.

So they cut me the seven pieces of acrylic, which happened to be made by Polycast Technology Corporation, one of a number of companies who manufacture acrylic sheet. It cost \$44 (in 1989).

Caulk. Several years before, one of my main cabin ports started leaking water. I partially disassembled it and recaulked with a silicone caulk. I'm not sure which brand it was — just the typical silicone caulk from a boat store, and it stunk like vinegar. It stopped the water leak, but after a couple of years, I noticed that the acrylic window had started to craze — that is, to form a network of minute cracks — in the vicinity of the new caulk. Thus, I suspected that common marine silicone caulk might not be a good thing to put onto acrylic.

When I bought the new acrylic to replace my windows, I inquired about the proper caulk to use. The counterman gave me the phone number of Polycast. I called them, and they switched me to their lab, with whom I had a very interesting discussion.

An important fact that they brought out was that the thermal coefficient of expansion for acrylic was quite large compared to most other boat materials. In other words, when the boat gets hot in the summer, the acrylic windows are going to expand more than the fiberglass around them. Thus it is very important to leave room for this expansion, or there is danger that your windows will shatter. Around windows of the size on the T-30, leave at least $\frac{1}{8}$ " all around the acrylic. It's OK if this space is filled with caulk, which is soft and will flow, but you don't want the acrylic to butt up against stiff, hard structure (or screws, either). Rather, it should sort of "float" in a surround of caulk.

Regarding the proper caulk to use, they explained that there are lots of kinds of silicone caulk, designed for lots of different purposes. When applied, polymerization of a liquid silicone caulk may be triggered by any of a large number of chemicals. With the silicones we usually buy in hardware or marine stores, polymerization is triggered by acetic acid — hence the vinegar smell. But this kind of caulk is bad news for acrylic; it will eventually cause crazing, which weakens the plastic and is unsightly. Other silicones are designed to be polymerized by any of a variety of alcohols; many of these are OK for acrylics. But you definitely do not want to use any silicone that contains acids, or solvents, or MEK (methyl ethyl ketone). They suggested that I call General Electric for more specific recommendations, and gave me their phone number.

Well, "in for a penny, in for a pound," so I called GE. I described my problem, and I still don't know why they leaped to the unfounded conclusion that I ran a boatyard, but they were very helpful. For use on acrylics, they recommended GE SilPruf Sealant, SCS 2020 (white). From Read Plastics, Inc., Rockville, MD, (301) 881-7900, I got six cartridges of SilPruf to fit a caulking gun, for \$27 (in 1989). One very important thing to remember is that SilPruf (and some other kinds of caulk, too) has an *expiration date* somewhere on the cartridge, and/or perhaps on the box it comes in. If you use out-dated SilPruf, *it may not cure*. Before buying, check the date. Apparently, some people who sell caulk may not be aware of the existence of an expiration date. If they cannot show you the date for their SilPruf, go somewhere else.

Compared to other kinds of silicone caulk, SilPruf is a relative delight to work with. It flows on nicely. It doesn't stink you to death. It has a rather long setup time, giving you plenty of time to get all the pieces together carefully. When you tighten up all the screws it squirts into all the interstices like it should, and all the excess that squeezes out is easy to wipe up. (Why don't they sell this in marine stores instead of that other junk!?!)

Port Frames. The best way that we found to clean the stubborn old caulk off the port frames was working outdoors in a shallow pan partially full of ordinary paint thinner (mineral spirits). The caulk was scrubbed off using a soft metal brush — actually, a *suede brush* (borrow one from your wife). The port frames on *Emprise* and, I think, other T-30s are solid aluminum alloy. They are not anodized. This aluminum alloy does corrode, but very slowly. (I don't know what the alloy is, but in my humble opinion, it resembles Marinium, which was used by Wilcox Crittenden to make cleats, chocks and some other hardware used by Tartan Marine on the T-30.) Therefore, being solid metal, they can be sanded to remove the corrosion that has occurred. *Now check this out* before you attack your port frames with sandpaper; I'd hate to hear that you ruined your frames because Tartan put something different on your T-30. Try the sandpaper on the back (i.e., hidden side) of the frame.

We put each frame in a basement laundry tub partially full of water, and wet-sanded them using 360-400 grit wet-or-dry sandpaper (but see the *Update* at the end of these notes). With a little patience, you can get a nice satin finish.

Screws. As far as I know, the $\frac{3}{16}$ " barrel nuts only come in one length. On the other side of the frames $\frac{3}{16}$ " round head stainless steel screws are used. If we had a convenient and effective method of cleaning caulk off the old barrel nuts and screws, we probably would have reused most of them. Not having any such method available, we bought all new screws and barrel nuts. The length of the screws must be exactly right. Too short, and you cannot get enough of a connection with the barrel nut. Too long, and the screw will bottom out in the barrel nut before the frame is pulled together tightly. And the required length *varies* over the ports! The majority of the screws needed to be $\frac{1}{2}$ " long, most of the rest needed to be $\frac{5}{8}$ ", and a few needed to be $\frac{3}{4}$ " long. You simply have to determine the length required for each hole by trial and error, which can be a mess with caulk all over. It's possible that the screw lengths needed on another T-30 could be different, which is part of the reason that a preliminary assembly without caulk is useful — to make sure everything fits together and you have the right screws at hand.

Re-assembly. It doesn't have to be done like this, but this is how we did it in 1989. Two people are required: one inside and one outside, both with screwdrivers to fit. You will be sorry if you start this project without a power screwdriver for one side, but the second person doesn't need one.

Do not remove the protective paper from the acrylic sheets. Hold an acrylic sheet tightly against a port cutout and mark (on the protective paper) around the existing hole in the cabin, with a pencil. Using a portable power jigsaw, cut the sheet to fit inside the hole, with $\frac{1}{8}$ " clearance all around as mentioned above; use the right kind of blade, and cut slowly to avoid melting the acrylic.

Place wide masking tape around the port to cover the fiberglass (outside) or teak (inside) from the edge of the hole to about 2" outside the port frames. Assemble the entire port without any caulk, then

- (a) check everything for proper fit & clearances,
- (b) mark all pieces so you can put them back together the same way, then
- (c) cut very lightly and carefully around the inside & outside of the frame with an X-acto knife.

On the outside of the frame, you want to just barely cut through the masking tape, without cutting into the gel coat (outside) or the teak (in the cabin). On the inside of the frame, you want to just barely cut through the protective paper on the acrylic, without scratching into the acrylic itself.

Now take the whole thing apart. Remove the masking tape (both inside and outside) that's within the cuts you made — i.e., the tape that was covered up by the port frame. Remove the protective paper (from both sides of the acrylic sheet) that's outside the cuts you made — i.e., the paper that was covered up by the port frame.

You are now ready for final assembly. Have lots of paper towels handy, and a trash bag to throw them in. Squirt a generous amount of SilPruf Sealant on, so that as you tighten up the screws, the sealant will be squeezed into all the spaces. Squirt a bit of sealant into each screw hole before inserting the screw; any excess will squirt out the tiny center hole in the barrel nuts. As you finish tightening everything up, wipe off excess sealant with paper towels.

Now wait a while; sometimes more sealant will gradually squeeze out from joints, and more wiping will be needed. When no more sealant comes out, pull off the masking tape (from the boat, inside & out) and the protective paper from the center of the acrylic, and admire your masterpiece!

Time Required. Allow plenty. For the whole job (7 ports), we spent seven days. Most was on the boat, some was at home cleaning & polishing the frames. All time on the boat required two people. If we were to do it again, we could do it a lot faster.

All the trouble was worth it. Great appearance. No more leaks.

Update. In February 1998 we had the cabin, deck and hull of *Emprise* AwlGripped by a yacht yard. To do this, everything (hardware and teak) had to come off, except the teak toe rails. The yard took off the outside port frames and the acrylic. The inside frames, which were in good shape, were left in place — stuck on with caulk. The nine year old acrylic windows were in excellent condition, neither scratched nor crazed, so they were reused. We took the outside frames home for cleaning and polishing. After wet-sanding the frames (as described above) to remove corrosion, we polished the outside of the frames with 3M Marine Aluminum Restorer & Polish, Part No. 051131-09020. We got a beautiful shine, much better than from wet-sanding alone. We strongly recommend this polish for all the aluminum and stainless steel hardware on the T-30.

The other thing we learned from the yard is that cleanup after mounting things with marine caulk can be quick & easy if you use the right stuff. First, use a plastic spreader, cut to a convenient size/shape to wipe up most of the unwanted caulk. Then put a little 3M General Purpose Adhesive Cleaner, Part No. 051135-08984 (comes in a quart can) on a rag or paper towel and wipe away all the rest. This stuff works on all the caulks and glues we tried it on, and it's safe to use on gelcoat, new AwlGrip, and acrylic, among others. Saves a bunch of time and leaves a neat job. After using it to clean up caulk, it's advisable to wash the area down with water and a little detergent as soon as the caulk is well-cured. This removes residue that may become an unsightly stain later. With this cleaner, we realized we could have saved much of the time (on the 1989 job) by not having to do all the masking of the cabin and the acrylic on the outside. However, if I had to do the entire job over as in 1989, I still would do some masking on the inside to keep the caulk off the teak plywood around the ports. I don't think it would be easy to clean caulk out of the pores of the teak.

By the way, having made recommendations for several products, I should include a disclaimer. I have no affiliation with any maker of caulk or any other boat product, nor any other commercial or governmental organization.