

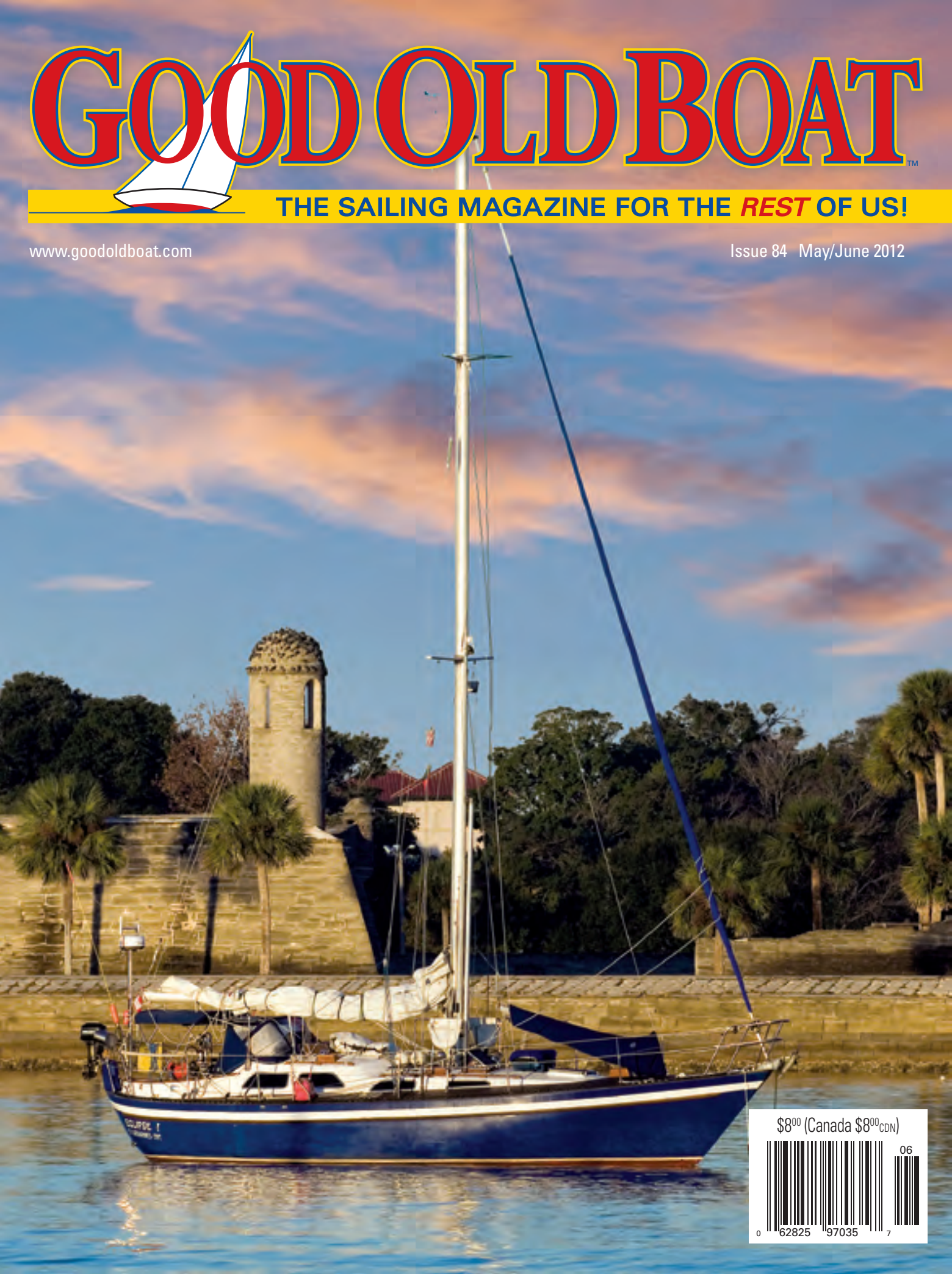
GOOD OLD BOAT™



THE SAILING MAGAZINE FOR THE *REST* OF US!

www.goodoldboat.com

Issue 84 May/June 2012



\$8⁰⁰ (Canada \$8⁰⁰CDN)



0 62825 97035 7

Stick vs. seal by Jerry Powlas

Although it may seem like a luxury, the testing Ferman Wardell did might be critical to a project. The results of his tests are specific to the materials he used. If you use other materials, your results will probably vary considerably.

Sealants are designed to seal. The adhesion properties are secondary. How much adhesion do you want? You don't need any adhesion if you have good mechanical fastening, and you need a lot of adhesion if you don't have any mechanical fasteners holding the parts together.

The silicones have very little adhesion. The urethanes have much more, and the King of Adhesive Sealants where adhesion is concerned is 3M 5200. In my opinion, there is almost never any reason to use 5200 for anything. Most people who use 5200 will come to regret it because it has too much adhesion . . . so the assemblies they use it on cannot be disassembled later. Very few things are forever, but 5200 is forever.

All materials change dimension with temperature. Almost all expand as they get hotter and contract as they get colder. The problem is that the rates of expansion vary with the material type. Plastics expand and contract a lot with temperature and, oddly, fiberglass — while it is a type of reinforced plastic — expands and contracts much less. Fiberglass has an expansion rate much closer to metals. Since many applications of sealants involve sealing plastics like acrylic or polycarbonate to fiberglass, there is a problem as the ambient temperature varies. In these applications, what is needed is a sealant with good elongation characteristics, or the ability to stretch without tearing or breaking. Thick beads of sealant have a better ability to stretch without failing as the two materials try to move relative to each other with temperature change.

The opening ports on our (perpetual) project boat are made from marine plywood and polycarbonate. The sealant I chose for this was BoatLIFE LifeSeal, which was not among those Ferman tested. I applied this sealant about .050-inch thick in a bead about 1-inch wide. I thermocycled the test panel for a whole winter before building the actual parts. There are no fasteners in the assembly. The ports are several years old and there have been no failures.

Finally, as I said, silicone sealants have very little adhesion. They are much maligned for this characteristic, as though due to having limited adhesion they will not seal. The previous owner of our beloved C&C 30 used silicones almost exclusively. None of the fittings he sealed that way ever leaked even though I did not get around to resealing them for many years in some cases. I thank him for that.

How sticky

Marine adhesive caulks

After experiencing poor adhesion results when replacing an acrylic port on my 1985 Hunter 28.5 sailboat, I decided to test a number of available marine adhesive caulks on this plastic. The plastic is Chemcast GP Cell-Cast Acrylic Sheet. The original caulk was BoatLIFE Black Marine Silicone Sealant (retested here with the others). The caulk adhered nicely to the fiberglass but not to the acrylic.



is your sealant?

are put to the test

by Ferman Wardell

I had read about 3M VHB (very high bond) adhesive foam tape in *Good Old Boat* and included it in the test. It was 45-mil-thick, 0.75-inch-wide black VHB double-stick tape. I cut a 1-inch piece, applied it to the acrylic, and let it set for three days. The manufacturer says the bond gets stronger with time.

I removed the protective paper from the new acrylic plastic sheet and cleaned the plastic with both Windex and

isopropyl alcohol. In a preliminary test, I found that cleaning was absolutely necessary for a decent bond. I applied a 2-inch, double-width bead of each caulk to the plastic at a temperature of about 70 F inside my air-conditioned home with relatively low humidity. I let the caulks cure for 10 days, exceeding the longest manufacturer-specified cure time. Then, with the expert assistance of my 11-year-old grandson and 7-year-old granddaughter, I attempted to remove each caulk bead. I applied both shear (parallel to the surface) and tension (perpendicular to the surface) forces by hand. The combined shear/tension results are presented in the table.

The clear winners were 3M 4000 and GOOP. Both were extremely tenacious. The 3M VHB tape also had a very good showing. My plan is to run the tape around the perimeter of the window about 0.5 inch in from the edge and push it onto the boat's fiberglass port cutout. I will then inject the white 3M 4000 into the 0.5-inch gap all the way around as well as run a beveled sealing bead around the window's edge. With this approach I'll have the holding power of the tape and caulk plus the sealing of the caulk. *▲*

Ferman Wardell began sailing an 11-foot Styrofoam Snark on a 30-acre lake in North Carolina. He later owned a 12-foot Scorpion, a San Juan 21, and now Wind-Borne, a 1985 Hunter 28.5, which he cruises and races on Lake Norman near Charlotte, N.C. He has sailed extensively in the Caribbean. Ferman enjoys doing boat maintenance, repairs, and "improvements."



To perform his test, Ferman lined up several caulks and sealants and applied two beads of each, one for a tension test and one for a shear test, to a sample of his acrylic glazing material.

Product	Adhesion
3M Fast Cure 4000	
UV Adhesive Sealant – white	Excellent
3M Fast Cure 5200 Adhesive Sealant – white	Good
BoatLIFE Life Calk – white	Poor
BoatLIFE Marine Silicone Rubber – black	Fair
GE Silicone II – white	Poor
(Amazing) GOOP UV-Resistant Contact Adhesive and Sealant – clear	Excellent
(Amazing!)	
Green Solutions EcoGlue Extreme Premium Adhesive & Sealant – white	Fair
Sikaflex 291 Lot Multi-purpose Polyurethane Marine Sealant – white	Good
West Marine Silicone Sealant – clear	Poor
West Marine Multi Caulk Sealant – white	Very Good
White Lightning 3006	
All-Purpose Adhesive Caulk (non-marine) – white	Poor
3M VHB Adhesive Foam Double-stick Tape	Very Good