

Banish Window Leaks

The benefits of bonded windows

BY DAVID CAMPBELL



Any boat owners out there who have experienced a steady drip, drip from their boat's windows on a wet West Coast day? Probably quite a few. Glass doesn't leak; it's what's between the glass and the boat that does. Most windows are held in place with mechanical fastenings and clamp-on metal trim rings.

While these windows work well at keeping the environment out, some are susceptible to leaks, which can be caused by a variety of reasons.

The obvious one is you have an opening between the outside of your window and the inside of your boat. This opening could have originated from a poorly designed window, but more than likely it's due to the harsh marine environment attacking the frames. This can cause frame deterioration due to corrosion and UV breakdown of the sealant or rubber gaskets, making them dry out and crack. In some cases, water ingress may come from poorly sealed mechanical fastenings or the vessel itself flexing and torquing the frame.

HOW BONDING WORKS To reduce the likelihood of window leaks, most builders of new boats use a system that bonds the glass directly to the vessel with a single

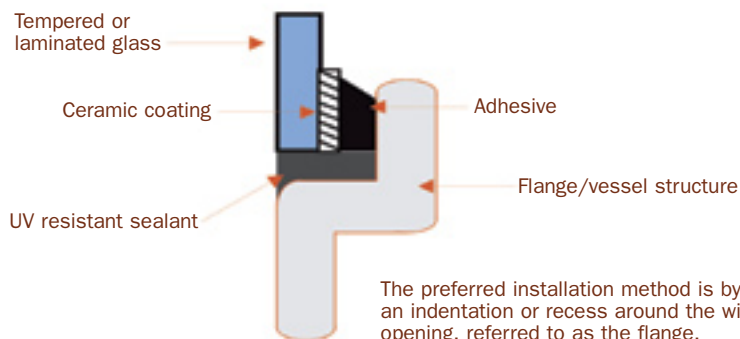
perimeter bead of high-strength elastic adhesive. This bonded window system eliminates the need to have a frame holding the glass in place, and as long as the manufacturer's application instructions are followed, it will eliminate any chance of leaks.

Today, all car manufacturers bond windshields into their vehicles because

These days, few manufacturers of production or custom yachts more than 40' still use traditional framed window glass. Most new boats sport bonded glass, which resists the elements and won't leak.

of the numerous benefits bonded windows provide to the overall design. In the last few years, many boatbuilders have recognized these benefits. Today, few manufacturers of production or custom yachts more than 40' still use traditional framed window glass.

This is a proven installation method on nearly every motor vehicle built over the last three decades, and on thousands of modern vessels as well. Ask yourself: "Does my automobile windshield leak at 120 kilometres an hour during a down-pour?"



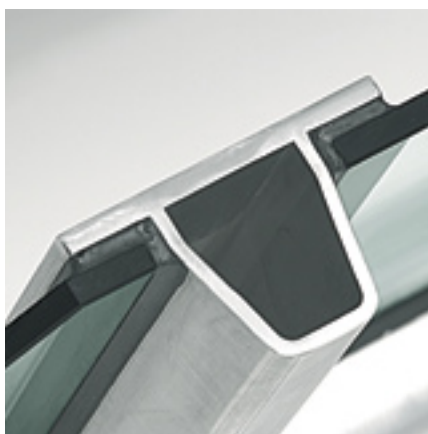
The preferred installation method is by using an indentation or recess around the window opening, referred to as the flange.

You may know of some older model sailboats that have an outdated and poor performing type of bonded window and be asking yourself, “What’s different about the new system?”

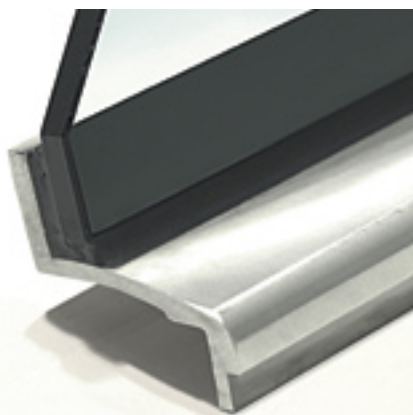
THE BONDING DIFFERENCE Bonded window installations work where others have failed because of two key components: the adhesive and the ceramic frit coated glass.

The adhesive system includes a moisture-curing polyurethane designed specifically for bonding and sealing glass, along with the proper joint dimensions and a pre-treatment method. Polyurethane adhesives are high-strength elastic adhesives designed to absorb the dynamic stress and thermal expansion incurred on the marine window. Despite their strength and elasticity, like many marine adhesives they are susceptible to UV breakdown. To prevent adhesive breakdown from occurring, the glass manufacturer applies a specially formulated black ceramic coating (referred to as a “frit”) to the window perimeter prior to the tempering process. When the glass is heated for tempering, the ceramic coating melts and fuses right to the glass. You may have seen this black frit on the inside of your automobile windshield. The ceramic coating blocks all the damaging UV rays, preventing the window adhesive from deteriorating as well as providing a better bonding surface.

INSTALLATION In some applications the window has been mounted “sitting proud”



For safety and strength, glass must be tempered or a tempered laminate combination, both of which come clear or tinted and range from five to 19 millimetres thick.



The success of bonded window installations comes down to the adhesive and the ceramic frit coated glass—the black coating seen here in profile.

on the exterior of the window opening, but the preferred installation is by using an indentation or recess around the window opening referred to as the flange.



Before and after shots of a refit on the Alameda Ferry. Note how the bonded windows also improve the vessel’s appearance, making it look more modern and stylish.

The flange surface can be fibreglass, aluminum or steel. A triangular-shaped bead of polyurethane adhesive is applied around the flange perimeter. The window is then pressed into place against the adhesive. Spacer shims are used to prevent too much pressure being put on the window and flattening out the adhesive. Once the adhesive has set, a perimeter sealant bead is applied to trim out the edge and the process is complete.

THE GLASS must be tempered or a tempered laminate combination for safety and strength. Glass is available clear or tinted in thicknesses from five millimetres to 19 mm. Plexiglas and Lexan are not compatible with the ceramic frit or polyurethane adhesives. While this system is not for the do-it-yourself crowd, many boatyards are capable of refitting existing vessels with this improved window system.

THE BOTTOM LINE Designers and builders now recognize bonded windows as an advancement over traditional framed windows in new private and commercial vessel construction. Bonded windows are competitively priced against framed windows; however, bonded windows are not suitable as opening windows, which must be built using traditional frame construction.

For those considering retrofitting bonded windows, the cost is comparable to replacing traditional frame windows, with the advantage that bonded windows won’t leak. Retrofitting, unless mounting the new windows “proud,” may involve some tricky flange work. As a result, most boat owners could probably not justify the cost of a refit.

David Campbell is the manager of marine sales for Garibaldi Glass Industries. His Vancouver-based glass fabricating company has introduced its OceanBond window system to boatbuilders around the world, from large-volume builders like Bertram Yacht in Miami to one-off custom builders like Sidney’s Jespersen Boatbuilders. For more information on marine bonded windows visit www.garibaldiglass.com. For more information on Sika adhesives visit: www.sikaindustry.com. ●