



Window bonding and sealing

APPLICATION MANUAL



Window bonding and sealing: unlimited design and styling capabilities

It has been proven many times: the worse the conditions, the more important the quality of the marine adhesives and sealing products become. Everywhere, ship builders and yacht builders agree. Therefore they choose the sustainable features of the Marine Special Range (MSR).

Another major reason is the technical support offered by Bostik's nautical specialists. They know all about the specific problems involved in building and owning yachts and ships. They are familiar with all current safety requirements. When you choose MSR products, you also have access to this extensive Bostik know-how and experience.





INTERESTING INFORMATION ON WINDOWS IN YACHTS

Today's yachts follow the trend in Building construction. Roofs and bulkheads used to be solid structures with relatively small openings in which windows were fitted, where the need for light and vision were required. We now see the opposite of this: designs with glass panels all over, and covers or shades on the inside where light and vision are not essential. From the inside of their air conditioned saloons, yacht owners want unobstructed views of their surroundings. From the outside, the sleek shiny look of shaded glass greatly adds to the yachts allurements.

There is a fundamental difference though between a yacht and a building: Where a building stands safely on its foundations even without the glass fitted, a yacht depends on the glazing to maintain its water- and weather tight integrity. If the glazing fails, the vessel will be open to ingress of water and it may be prone to sinking or capsizing.

This is where Bostik's high-quality solutions come in, to ensure reliable bonding and sealing of every window on your yacht. This application manual will be of help in the construction process of durable bonding and sealing of any type of window in a nautical environment. Detailed planning, as well as a conscientious and skilled realization of the instructions need to be followed in order to obtain an optimal result.

GENERAL CONDITIONS

Working in the right conditions during bonding and sealing of windows is a basic requirement for a good result. The air temperature must be between +15°C and +25°C. Working indoors or in conditioned areas gives more certainty of the quality than working outdoors. During the construction and curing process of adhesives and sealants, the windows have to be protected against direct sunlight and rain, otherwise uncontrollable effects on the adhesives and sealants can occur.

Requirements for durable window bonding & sealing

In window bonding on yachts, the glass is bonded directly to the body of the vessel. It is of major importance that this process complies with all industry standards as laid down by the governing bodies, such as the classification societies, in each respective country.

ISO 1133-6 Part II International Standard specifies technical requirements for direct adhesive bonding of glazing materials into recesses forming part of the structure of the ship, and of glazed openings on a large yacht. This also includes technical requirements for direct adhesive bonding into a frame that is fastened to the structure of the ship. Also the same standard can be used for smaller yachts

TYPES OF WINDOWS

In the nautical industry, various types of windows are being used. All of the different window types can be bonded and sealed using the same application method, and this will always achieve a durable and qualitative end result.

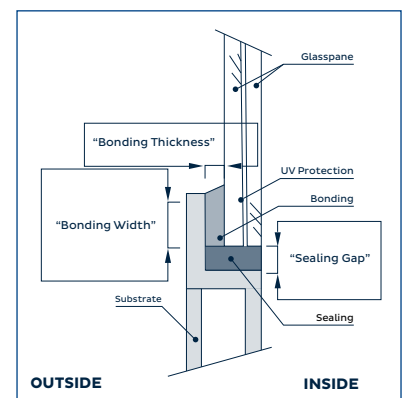
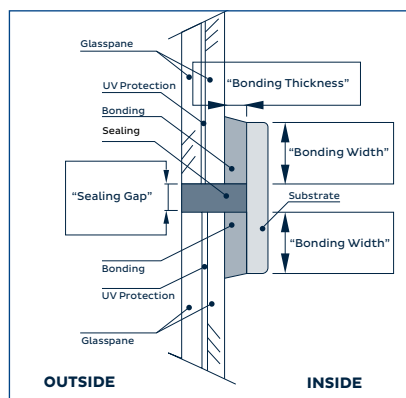
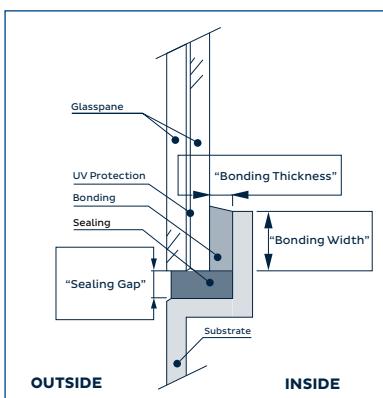
Types of windows:

- Monolithic glass
- Laminated glass
- Polycarbonate
- Acrylic (PMMA)
- Chemical or Thermal Toughened
- Single or multi curved

BONDED WINDOW

A bonded window is a glazed opening where the glass is attached to the adjacent structure by an adhesive. The adhesive holds the weight of the glass and keeps the glass in position under load. Bonded windows can be used like a framed window in any position on board of a large yacht. There are different window arrangements possible in window bonding which are illustrated in the drawings on the next page.

ILLUSTRATIONS OF DIFFERENT WINDOW ARRANGEMENTS



ELASTIC BONDING

Bonding is considered elastic if bonded joints are capable of transferring forces and distributing stresses evenly. Furthermore, the bonded joint shows a high degree of flexibility (ability to return to its original shape after deformation). Its purpose is to hold the glazing in place and to maintain its attachment to the structure (transmitting loads from the glazing to the ships structure). Additionally it will provide the watertight/weather tight boundary, whilst allowing rotational deflection and expansion/ contraction of the glazing and/or the supporting structure.

BONDING DIMENSIONS

The bonding thickness is the distance between the above defined mating faces. The bonding width is the distance between the mating faces of the substrate and adhesive, and the adhesive and glazing (see drawings at page 4).

SEALING GAP

In case of flush or recessed glazing, the sealing gap is the distance between the edge of the glazing and the substrate/ and or adjacent glazing measured in the plane of the glazing (see illustrations of different window arrangements on page 4).

UV PROTECTION

Bostik's MSR Range has a very high UV resistance, but the bond line material must be protected from direct UV radiation, as this causes deterioration of the chemical composition, leading to failure. This is normally carried out by including a light impermeable mask as part of the design of the window. This can appear in the form of:

- Ceramic coating (peripheral) for mineral glass
- UV impervious paint or ink for organic glass
- External trim



Download Bostik's Marine app!

THE APP INCLUDES:

- Instruction videos
- Supporting documentation
- Calculation tool
- Dealer locator



IOS



Android

Scan the code or go to the app store and search for 'Bostik marine solutions'.



Window bonding & sealing: one system for all type of windows

Bostik offers smart solutions. In the window bonding & sealing application, the smart aspect of our system solution manifests itself in having the same pre-treatment and application process for all type of windows. Important benefits of our window bonding & sealing system are that it enables primerless adhesion and that the adhesives are multifunctional and one adhesive can be used for all bonding steps of this application.

PREPARATION OF THE SUBSTRATES

- Bond and seal dimensions needs to be calculated according Bostik specifications. These dimensions can be calculated with the calculation tool in the Bostik Marine App (available for Apple/Android) or Bostik technical support can be consulted.
- All bonding areas have to be cleaned with a dry, colourless and fluff free cloth, wetted with Bostik Cleaner I, according to the wipe on, wipe off system.
- Apply Bostik Prep M to the frame with a dry, colourless and fluff free cloth; Wipe on in one direction to avoid spreading the contamination of the surface. Drying time 5 minutes, maximum 6 hours.

>> Windows with ceramic coating:

- Pre-treat frame and ceramic coating with a dry, colourless and fluff free cloth wetted with Bostik Prep M, wipe in one direction to avoid spreading the contamination of the surface. Drying time 5 minutes, maximum 6 hours
- Pre-treat the edges of the window with Bostik Prep G with the proper tools. In this way, your sealing will be protected from UV. Drying time 5 minutes, maximum 24 hours.

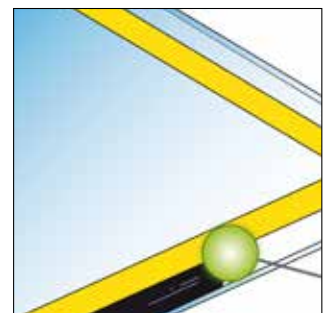
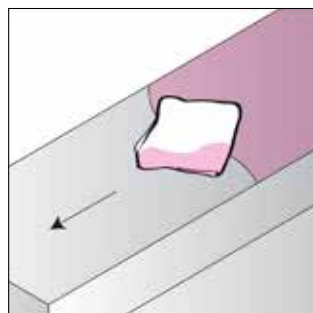
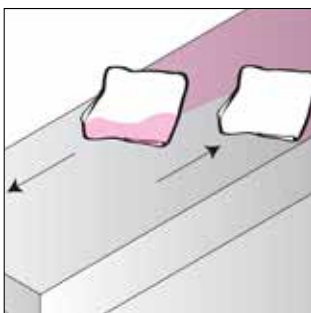
>> Windows without ceramic coating:

- Apply Prep G with the popper tools to create a certain layer (covering power), also on the edge of the window. Make sure the applied Prep G has the right dimensions to avoid UV penetration on the bonding surface. Drying time 5 minutes, maximum 24 hours.

Note: Make sure the applied Bostik Prep G has the right dimensions to avoid UV penetration on the bonding surface.

BONDING OF THE WINDOWS

- Use distance keepers to control the dimensions of the sealings and bond lines as calculated with the Bostik window calculation tool.
- The temperature should be between +5°C and +35°C, maximum relative humidity is 75%.
- Use weight holder to prevent the window from sliding. With our high green strength product Bostik MSR Fast Tack clamping can be avoided in most cases.
- Apply a triangle bead of the Bostik MSR Construction Adhesive (SSKF)* or Bostik MSR Fast Tack.
- Place the window in the frame and push the window until the distance keepers are reached.
- After 24 hours at a minimum of 23°C and 50%RH the windows can be sealed.
- Avoid condensation or cleaning water on the bonding line, recommendation will be to seal the window on the interior side.



SEALING OF THE WINDOWS

- During the caulking procedure the deck should be protected from direct sunlight and rain. The temperature should be between +5°C and +35°C, relative humidity between 40% and 75%.
- Cut the nozzle to the width of the seam.
- The seams must be filled from the bottom to the top, to prevent air voids to be included in the sealant. The nozzle is placed on the seam bottom, the gun is held at an angle of 60° to 80°. Pull the nozzle at a constant speed through the seam.
- Clean the window on the exterior side with Bostik Cleaner I with a dry, colourless and fluff free cloth according to the wipe on, wipe off system
- Apply masking tape on both sides of the seam.
- Apply Bostik MSR Construction Adhesive (SSKF)* into the seam and avoid air in closers.
- After the seam has been sealed, a spatula can be used to level the seam and to remove the excess of Bostik MSR Construction Adhesive (SSKF)*.

FINISHING THE WINDOWS

- Remove masking tape and, if needed, level the seam before the skin forming time with a small amount of Bostik Finishing Soap. This can be sprayed onto the seam and the seam can be levelled easily by hand.

MAINTAINING OF THE WINDOW SEAMS

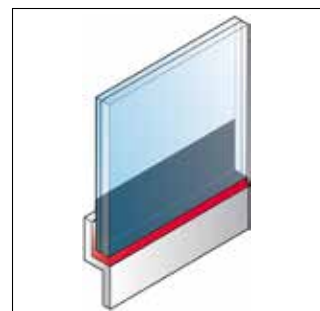
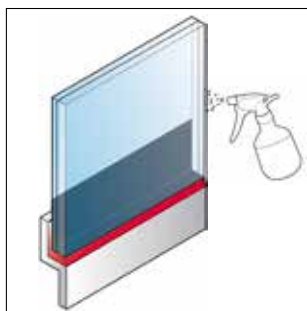
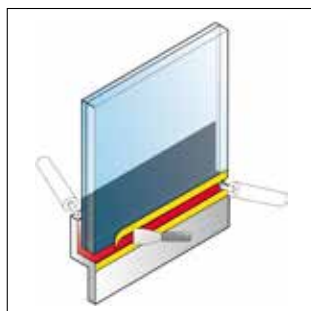
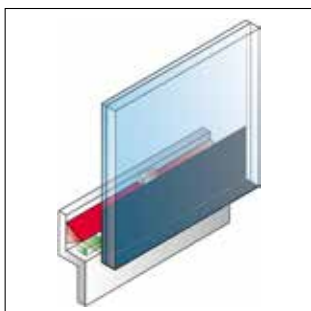
Bostik recommends the following to clean and maintain the windows and Bostik MSR Construction Adhesive (SSKF) seams:

To keep the window clean, give them a weekly wash down with 1% liquid pH neutral dish soap in warm fresh water and a plastic pot scrubber.

Never use household detergents like ammonia, bleach, Tri-Sodium-Phosphate (TSP) and vinegar to clean, All of these products may cause irreversible damage to the seam. Never use 2-component cleaners and brighteners. The majority of these heavy-duty 2-component systems are alkaline-acid combining a very strong alkaline solution (chlorine bleach, potassium and sodium hydroxides) and a very strong acid

(oxalic, sulfuric or phosphoric acid), in liquid or crystal form to be diluted. These 2-component chemicals corrode, soften and damage the caulk.. These cleaners also harm the surrounding and attached hardware like the fiberglass polyester (they harm the gel coat), anodized aluminium, chrome fittings, paint and varnishes especially if any residue is left on the deck. These chemicals are also hazardous for you and the environment. 1-Component cleaners on the market are much gentler, but most of them are still corrosive chemicals (some of them contain oxalic acid), which will damage your seams. If you want to use one of these products for oil spots or food spots contact Bostik for proper recommendation.

- Bostik MSR Construction Adhesive SSKF complies to the RINA, GL-DNV and IMO certifications. The IMO certification is indicated by a steering wheel logo and offers proof that the product has passed the IMO tests for low flame spread. MSR CA (SSKF) has also been tested and certified according to DNV-GL and RINA structural glazing procedures, approved as class A and B adhesives for nautical window bonding.





Please contact your local
Bostik representative for
more information or to
arrange trials.

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