

ReziBond™ Technical Specifications

Overview

Steelscape has developed an improved surface treatment system, trade named ReziBond™, which replaces the "Bare Bonderized" treatment used for decades in the rain water goods industry. ReziBond revolutionizes the performance attributes of the bare and painted rain water goods product. The ReziBond system benefits as compared with the traditional bare bonderized product include:

- Improved roll formability
- Improved adhesion of the surface treatment to the metal surface during forming
- Excellent wet stack resistance of inventory prior to post painting
- Significantly reduced chrome leaching behavior
- Increased corrosion resistance of inventory prior to post painting
- Better post paintability
- Superior sealant adhesion
- Equivalent soldering behavior

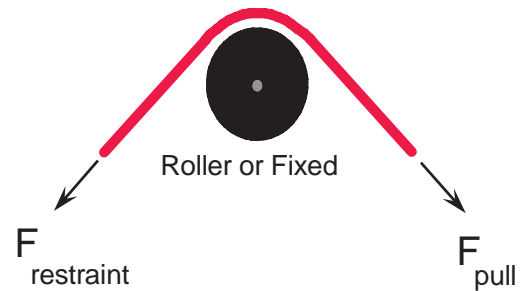
ReziBond is available in all typical thicknesses and widths, in both fluting and non-fluting substrates. Technical details regarding ReziBond performance are summarized within this specification.

ReziBond is manufactured at our facilities in Kalama, Washington, and Shreveport, Louisiana.



Roll Formability

ReziBond exhibits a lower coefficient of friction (COF) during roll forming as compared with bare bonderized. Samples of ReziBond and traditional bare bonderized product were subjected to a 90° Bend-Under-Tension test as illustrated here:



This test exposes the material to sliding movement over and along tool steel, thereby simulating the roll forming process. A strip of test material is first pulled over a roller bead to measure the force necessary to bend and unbend the material. Next the roller bead is replaced with a fixed bead and the force required to pull the material across and around the fixed bead is measured. Using a standard equation, the COF is then calculated. The table below shows the calculated COF values with and without lubricant (Freemont Industrial Lubricant GX2620) applied prior to testing:

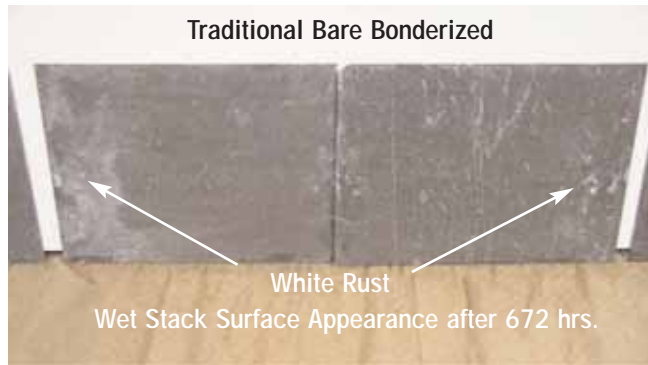
Coefficient of Friction Values

Material	With Lube	No Lube
Bare Bonderized	0.145	0.462
ReziBond	0.074	0.116

ReziBond exhibits a much lower COF with, or with out, lubrication. In fact, ReziBond exhibits better COF when forming with no lubrication than traditional bare bonderized exhibits with lubrication. The use of ReziBond in roll forming applications will reduce tooling wear and may eliminate the necessity of applying forming lubricants. In addition to ReziBond's lower COF, adhesion of the surface treatment system is excellent, resulting in less build-up on the roll former dies. The roll former should remain cleaner, leading to less operational/maintenance issues and additional up-time.

Wet Stack Resistance

As illustrated in the photos below, ReziBond provides significantly improved wet stack performance. Unprocessed inventory and formed parts treated with ReziBond are more resistant to oxidation caused by exposure to adverse weather and/or storage conditions than traditional bare bonderized material. Better corrosion protection results in a better surface for on-site painting.



Neutral Salt Spray Resistance

As illustrated in the photo below, ReziBond exhibits better salt spray resistance as compared with traditional bare bonderized. After 300-hours of exposure, the traditional bonderized product exhibits significant white rust as well as red rusting whereas ReziBond exhibits significantly less white rust and no red rust. This means that ReziBond will corrode less at job sites which are located near ocean spray and which contain salt-saturated dew.



Post-Painting

Spray painting was conducted on traditional bonderized and ReziBond samples using a Glidden Exterior 100% Acrylic House & Trim Flat Latex system and a Wagner power painter. After allowing the paint to dry and after placing the painted materials in a small oven at 140°F for 3-hours to simulate a warm summer day, paint adhesion was tested using a tape test (3M 610 tape). The photo below illustrates the superior adhesion performance of ReziBond versus traditional bonderized. Total adhesion failure was realized with the traditional bonderized product whereas no adhesion loss was experienced with ReziBond.



Samples of both products were also subjected to Gardner Impact testing where a weight is dropped from various heights, impacting the materials. As illustrated below, the adhesion of the paint was better to ReziBond product than to traditional bonderized.

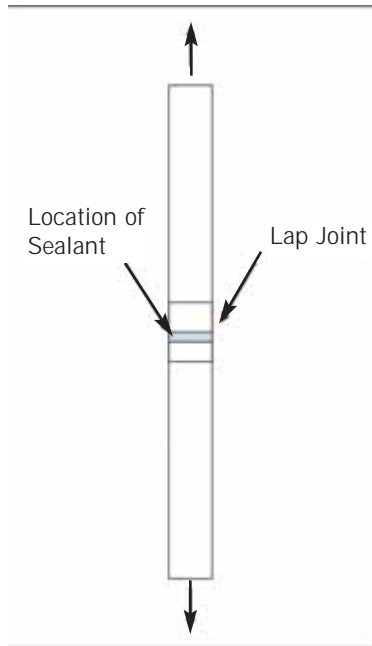


Chrome Leaching

ReziBond contains chrome as does traditional bare bonderized treatments. However, ReziBond exhibits ~ 95% less chrome leaching than bare bonderized material. In the future, as with the RoHS initiative for LCD's and CRT's in California, the use of chrome may be prohibited requiring that an alternative surface treatment for bare bonderized be developed.

Sealant Compatibility

Lap-shear joints, as illustrated below, were produced in the laboratory using the Sika Flex 1A polyurethane sealant. These lap-shear joints were then tensile tested to determine the force [lbs.] required to break the lap joint. ReziBond required 43% more load (119lbs. vs. 83lbs.) to fracture the joint as compared with the traditional bonderized.



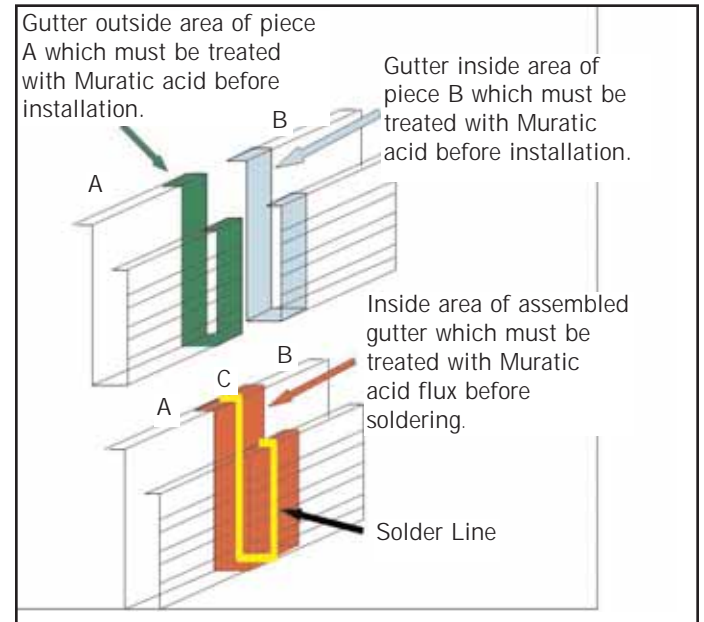
Soldering

Solder testing has been conducted with ReziBond consistently meeting performance requirements. Acceptable solderability has been realized. **It is important to note that Muratic Acid must be used as the fluxing agent.** Other fluxing agents which contain lesser amounts of hydrochloric acid will not cut through and remove the resin system in a timely fashion for productive soldering.

During the soldering of gutter material, as illustrated in the next drawing, the outside surface of the male portion of the joined gutter (segment A) and the inner surface of the female portion of the gutter (segment B) must be treated with

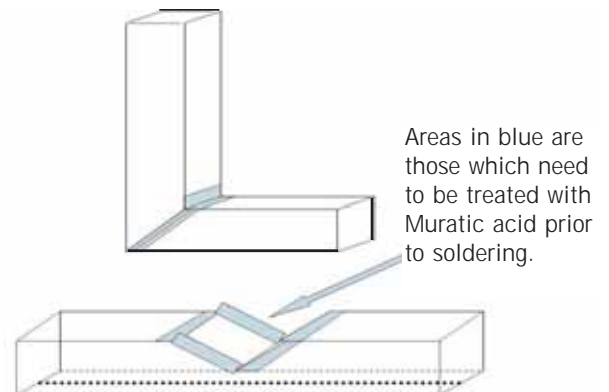
Muratic acid. The treatment of these two overlapping sections can be done at any time, not necessarily just prior to soldering, with the sole purpose of removing the resin. At the time of soldering, the traditional joint faces, as illustrated in red in the drawing below, must also be treated with Muratic Acid.

The residue from the fluxing process will contain some dark particles. This residue can be rinsed off with water and does not interfere with soldering or affect the efficiency of the fluxing agent to prepare the surface for soldering.



Soldering of Down Spouts

To ensure a proper solder joint for downspouts, it is recommended that the joining surface be treated with Muratic Acid to remove the surface treatment prior to folding the downspout. If it is neither possible nor desirable to treat the surfaces before folding, then it is expected that a good solder joint can be achieved.



For More Information on ReziBond, contact Steelscape at 1-888-285-7717 or visit us online at www.steelscape.com