

Structural Silicone Attachment for Blast Hazard Mitigation

Installation Instructions



Technical Bulletin TBF-54

December 2004

Updated: December 16, 2004

Domestic Use

Document Summary

This bulletin describes the installation procedures for a silicone perimeter attachment system for a safety/security film installation. Sometimes this type of system is referred to as a “wet glazing” system. Its purpose, in the configuration specified here, is to retain glass safely within a framing system to mitigate bomb blast damage. The system is critically different from the system described in Technical Bulletin TBF-44 (LLumar Edge Grip™) in a number of ways:

1. The bevel of sealant around the perimeter is here specified to be ¾” x ¾” [19mm x 19mm] rather than ½” x ½”.
2. The sealant is specified to be Tremco ProGlaze SSG.
3. The original gaskets must be removed completely and replaced by rubber wedges of the type described below.

Important Notice

Following these installation instructions carefully and in the proper order will ensure maximum bonding of the silicone sealant to the window frame and film. Bond strength completely determines the performance of the silicone attachment system.

Step 1 — Clean window frame and gaskets

Clean the frame and gasket surfaces using isopropyl alcohol applied to a clean lint-free cloth. For highly soiled surfaces (or where alcohol does not seem to clean the surfaces completely) you can try using a citrus-based cleaner. (Do *not* use citrus cleaners on wood-framed windows). If using the citrus cleaner, cover any furniture and flooring near the working area with drop cloths and be careful not to spray the cleaner on any delicate surfaces. Spray the citrus cleaner onto the frame and gaskets. Allow the cleaner to stand for 5 minutes. Wipe off the solution with a clean lint-free cloth. Wipe off any solution that was inadvertently sprayed onto the glass surface.

Finally, if these methods do not sufficiently clean the frame, lightly scrub the surface with a very fine steel wool (0000) pad and one of the cleaning solutions above. Reapply the cleaning solution and wipe off. Again, wipe off any solution that was inadvertently sprayed onto the glass surface.

Step 2 — Replace glazing gaskets

Remove the interior glazing gasket (see Figure 1 for reference) on all sides of the window and replace it with a rubber wedge. Do this step one side at a time. Installing a wedge is important so as not to compromise the integrity of the window seal.

There are two types of rubber wedge profiles that CPFilms recommends. We have included cross-sectional views of two popular products: Tremco TR-1632E Headless Wedge (Figure 2a) and Tremco TR-335E Arrowshim Wedge (Figures 2b).

Figure 1

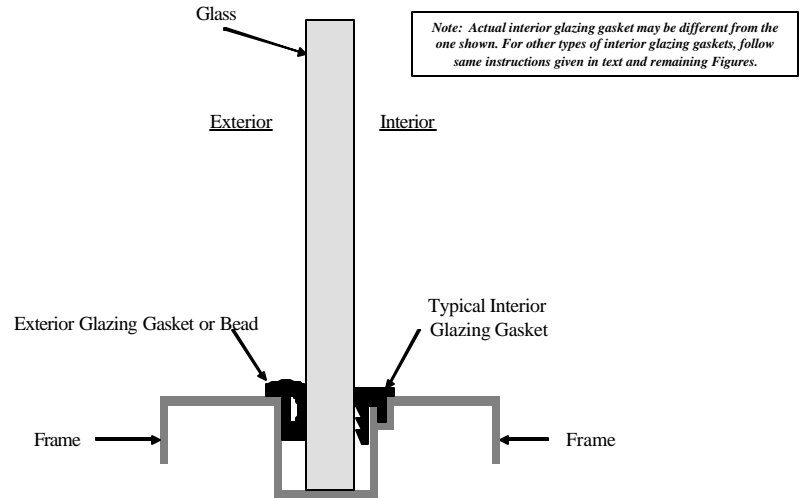


Figure 1 – Cross-section view of window prior to film and silicone installation

Figure 2a

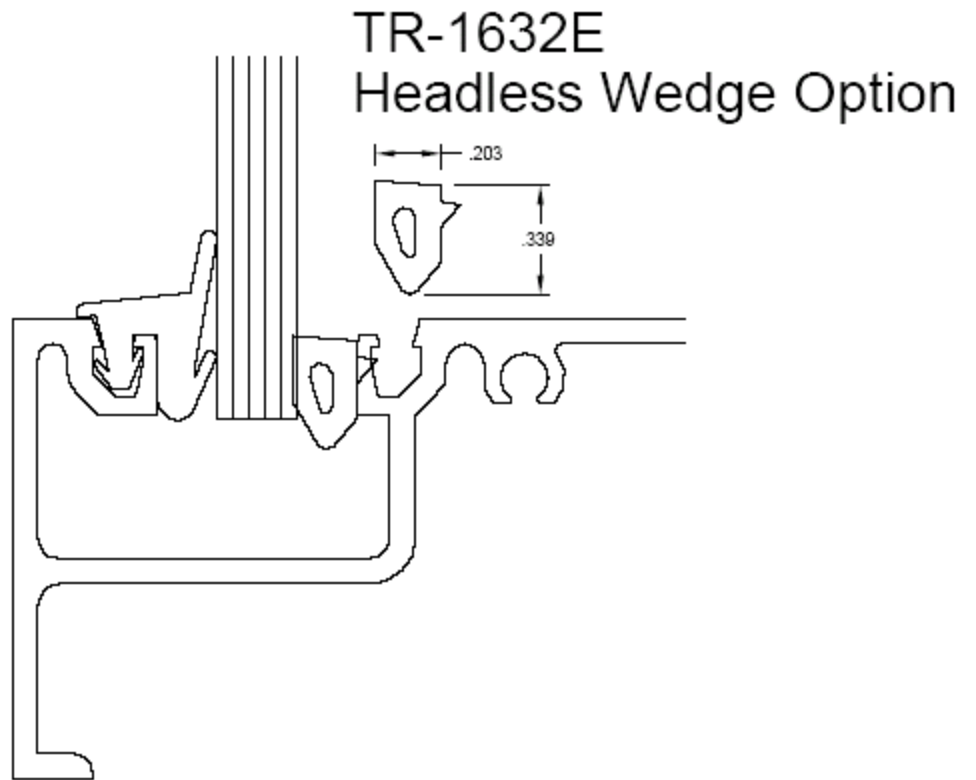


Figure 2a – Tremco's Headless Wedge Option (dimensions in inches)

Figure 2b

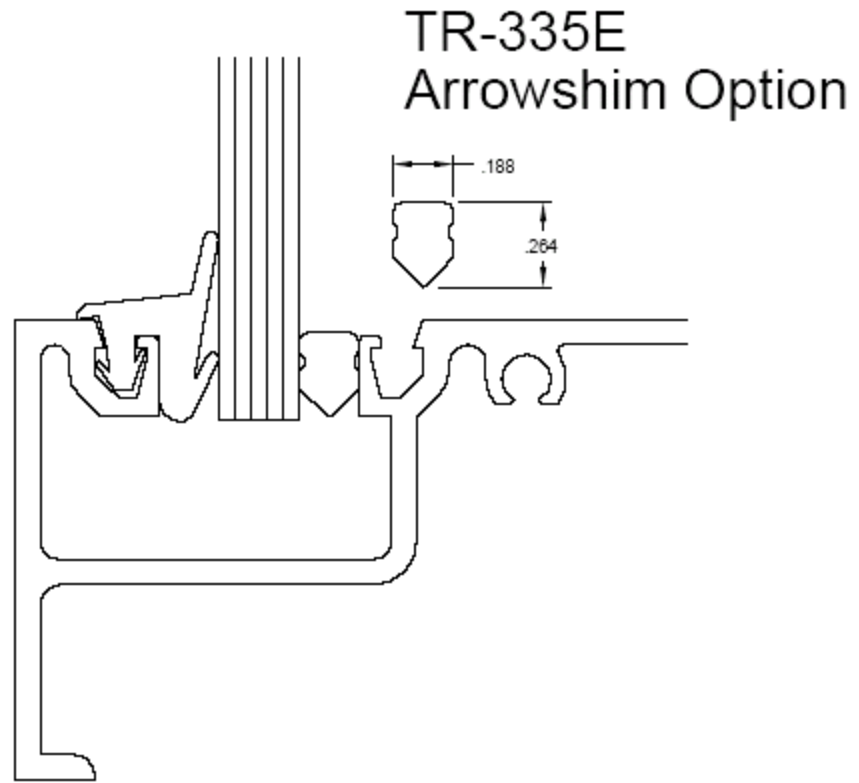


Figure 2b – Tremco’s Arrowshim Wedge Option (dimensions in inches)

Step 3 — Clean glass surfaces

Follow glass prep instructions found in the *LLumar Installation Guidelines for Window Film* (#356/93) using the Dirt-Off solution. A copy of this brochure can be obtained from your distributor and is also available on CPFilms’ Technical Support website www.llumartech.com in the Marketing Materials section. If you have not previously used this website, contact your CPFilms Distributor for your Technical Support web site username and pass word.

If you used a citric-based cleaner above, be sure to remove all of this cleaner using Dirt-Off and a nylon scrub pad.

**Step 4 — Install LLumar
Magnum Safety/Security Film**

Carefully follow instructions in CPFilms' Technical Bulletin TBF-15, *Installing Safety Films*.

Install the film as close as possible to the remaining gasket (see Figure 3). Remove as much of the mounting solution as possible when installing the film. Dry the edges of the film near the frame with a lint-free cloth.

Figure 3

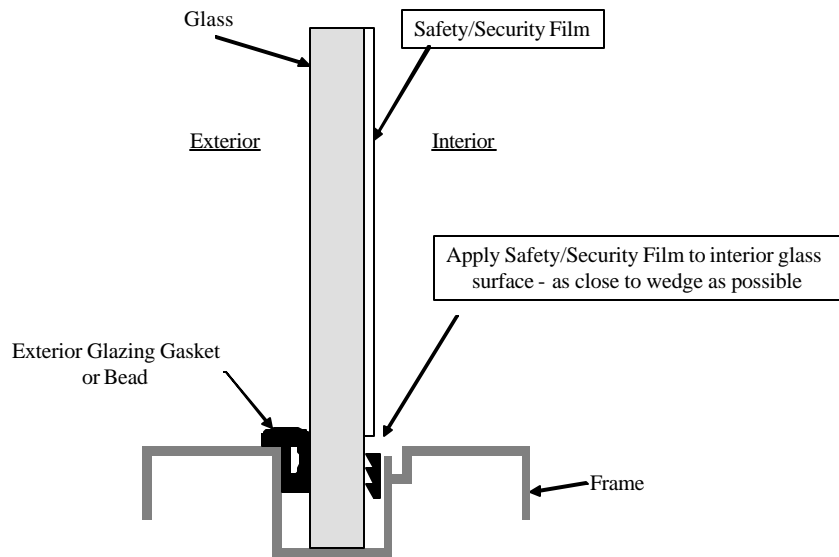


Figure 3 - Apply Safety/Security Film

Step 5 - Ensure frames and wedges are dry BEFORE applying silicone sealant

To ensure that no moisture is left on the frame, wedge materials or film surface that might interfere with application of the silicone sealant, it is recommended to allow the installation to dry for several (3-5) days. A longer period may be necessary if cloudy, cold conditions persist following film installation.

As an alternative, dry the film edges, frame and wedge with a lint-free cloth and also dry this area on each window with a blow dryer for 5 to 10 minutes (**DO NOT USE A HEAT GUN. BE CAREFUL NOT TO OVERHEAT THE GLASS, WHICH CAN CAUSE THE GLASS TO BREAK**). If the frame and wedges are dry to the touch, and the film edges are dry, immediate application of the silicone is acceptable. If you notice the silicone not flowing smoothly onto the coverage area, this means the surfaces have not been dried sufficiently. For applications with wood frames it most likely will be necessary to allow the frame to dry for several days.

Step 6 - Install Silicone Sealant (See Figures 4, 5 and 6)

IMPORTANT: The ONLY TESTED AND RECOMMENDED silicone sealant is Tremco ProGlaze SSG Structural Silicone. Other silicone sealants may not provide the necessary bond strength to the frame and film and may have other undesirable properties. DO NOT SUBSTITUTE OTHER SILICONE SEALANTS UNLESS APPROVED BY CPFILMS . Tremco ProGlaze SSG is available in Black. (For sources of Tremco Sealants, call Tremco Customer Service 1-800-321-7906 or <http://www.tremcosealants.com>). See last pages of this bulletin for more information on the product and availability.

Wipe the frame and film surfaces that will be covered with silicone sealant (approximately 3/4 inch or 19 mm on both surfaces) with a clean, lint-free cloth and isopropyl alcohol. Allow to dry for 5 minutes. During the following steps (before applying the silicone), take care not to contaminate or touch these surfaces. Touching cleaned surfaces could deposit oils onto the frame or film and reduce the silicone bond strength.

Using 1-inch (25 mm) wide, *low-tack*, painter's masking tape, apply a strip of tape to the film surface, 3/4 inch or 19 mm in from the edge of the film to all four sides of the window.

Also apply a 1 inch (25 mm) wide strip of the same tape onto the entire perimeter of the frame system, 3/4 inch or 19 mm in from the surface of the film. This will form a parallel

sealant channel that will allow a uniform sealant bead to be applied to the frame and film surfaces. This amount of sealant on both the film and frame surfaces is necessary to form an approved bond.

Using Tremco ProGlaze SSG Structural Silicone Adhesive in a standard caulking gun, apply a sealant bead into the channel formed by the tape. Read and follow all product information and installation instructions provided by Tremco. To apply a bead of the recommended width will require trimming the caulking cartridge spout very close to the base. Smooth the sealant bead with an appropriate plastic tool (such as a putty knife or other plastic tool trimmed to give a 3/4-inch (19mm) wide finished bead) to give a finished look. The finished sealant bead should have a flat surface, yielding a triangular bead cross-section (see Figure 4 and Figure 5). The finished bead should not have an inward curved surface (see Figure 6). Tooling should be completed in one continuous stroke immediately after application and before a skin forms on the bead (within 5 minutes). Carefully remove the masking strips from the film and frame as soon as tooling is completed.

Figure 4

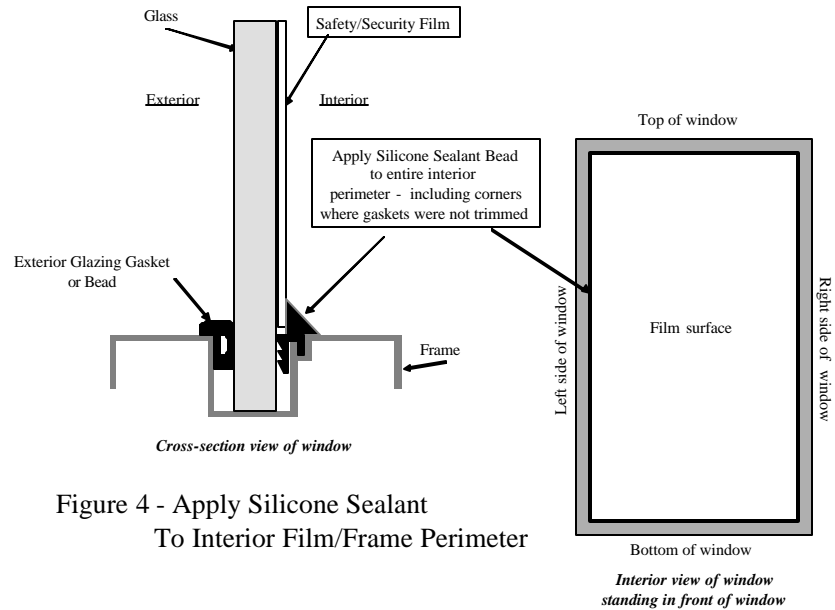


Figure 4 - Apply Silicone Sealant To Interior Film/Frame Perimeter

Remember to apply the sealant around the complete window interior perimeter.

Figure 5

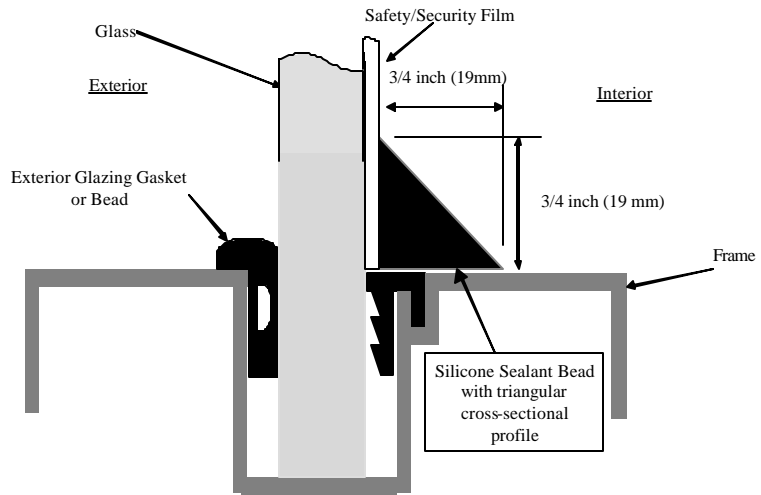


Figure 5 - Enlarged View of **ACCEPTABLE** Silicone Sealant Bead Profile

Figure 6

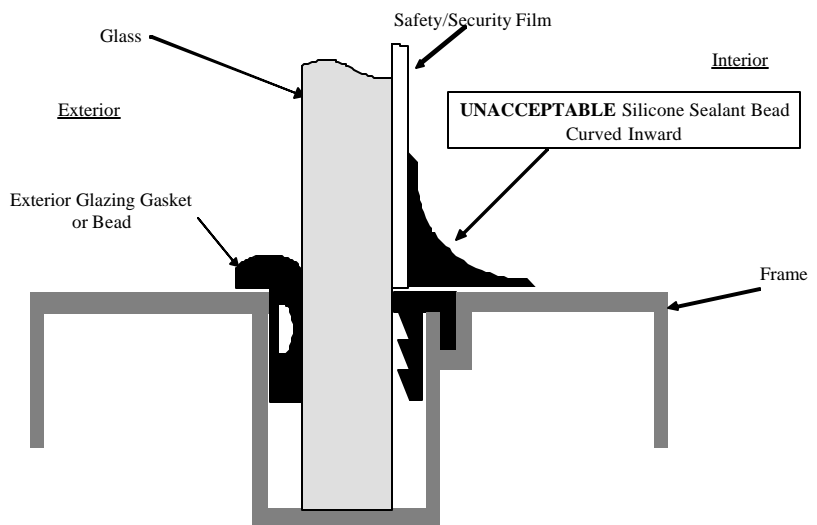


Figure 6 - Enlarged View of **UNACCEPTABLE** Silicone Sealant Bead Profile (Bead Curved Inward)

For more professional appearing results, apply sealant to opposite sides first, let harden, then apply to remaining opposite sides.

You may obtain more professional looking results by masking and sealing the right and left sides of the film/frame first, leaving the top and bottom film/frame surfaces for a second, separate step. After removing the masking from the right and left sides, allow the sealant on the right and left sides to harden slightly (30 minutes), then mask and seal the top and bottom of the film/frame surfaces.

Do not allow the silicone sealant to contact other film or frame surfaces or to fall onto the floor. A plastic throwaway drop cloth or garbage bag below the installation should be used. Be extremely careful not to step on loose silicone and transfer the silicone to flooring surfaces. Should you get some of the silicone on surrounding surfaces, apply

the citrus-based cleaner and wipe gently. For wood surfaces, do not use citrus-based cleaners; try cleaning with isopropyl alcohol.

Curing time for the silicone depends upon temperature and humidity. Do not clean the film or frame for at least 30 days following installation of the silicone. Full cure of the silicone should occur within 30 days following installation.

Depending on the thickness of the bead used, it will take approximately two (2) standard caulking cartridges (10.3 fl oz. or 305 ml) for every 5.3 feet (roughly 1.6 meters) of frame perimeter to be sealed.

IMPORTANT NOTICES :

CAUTION: Tinted motor vehicle windows must comply with local laws. Dark tinting may reduce outward visibility during poor lighting conditions. Use care to avoid accidents.

CAUTION: Do not apply residential / commercial film to plastic surfaces such as acrylic (Plexiglas™) or polycarbonate (Lexan™) sheeting (unless the film is designed specifically for that purpose) or to motor vehicle windows.

CAUTION: Always test glass surfaces for susceptibility to scratching before cleaning with metal tools. Soft glass, some types of tempered glass, and sputtered/low-e coatings may be damaged by defective, rusty, or nicked blades, or by applying excessive force to scraping tools. Be prepared to use non-scratching fabrics/pads for window preparation.

CAUTION: Always use absorbent dropcloths to protect sensitive surfaces from overspray, drips, or runs when cleaning windows and installing films.

All statements and recommendations in this document are based on tests and information the CPFilms Inc. believes are reliable and are offered in good faith. CPFilms Inc. cannot warrant or guarantee the accuracy or completeness of this information nor its relevance for a particular user's situation. It is essential that the user evaluate this information to determine its suitability for a given application.

For inquiries outside the US and Canada:

CPFilms Inc.
International Division
P.O. Box 5068
Martinsville, VA 24115 USA
Phone: 276-627-3324
Fax: 276-627-3008
www.llumar.com

For inquiries inside the US and Canada:

CPFilms Inc.
P.O. Box 5068
Martinsville, VA 24115 USA
Phone: 1-800-2LLUMAR
Fax: 276-627-3032
www.llumar.com

Proglaze® SSG Structural Glazing Silicone Sealant

Product Description:

Proglaze SSG is a one-part, high modulus, neutral cure silicone sealant ideal for a wide variety of glazing applications. Proglaze SSG provides high performance capabilities as well as exceptional cure stability and shelf life properties.

Basic Uses:

Proglaze SSG is designed to meet the stringent needs for performance glazing. Whether it is a two or four-sided conventional structural glazing, Miami/Dade Hurricane protocol or bomb blast mitigation, Proglaze SSG will perform in the most demanding structural silicone applications. Proglaze SSG can also be used for sealing joints within window or wall systems as well as a cap, heel or toe bead. **All structural glazing applications must be reviewed and approved by Tremco Technical Service.**

Limitations:

- Do not apply over damp or contaminated surfaces.
- Use with adequate ventilation.

Packaging:

1/12 Gallon (300 ml) cartridges, 20 oz. (600 ml) sausages, 4.5 (17.1 L) gallon pails and 50 gallon (189.3 L) drums.

Color:

Black

Applicable Standards:

Conforms to ASTM C920 Type S, Grade NS. Use NT, G, A and O and CAN/CGSB-19.13-M87 and U.S. Federal Specification TT-S-00230C (COM-NBS) Class A, Type II, and U.S. Federal Specification TT-S-001543A (COM-NBS) Class A.

INSTALLATION**Joint Design:**

May be used in any vertical design in accordance with accepted architectural/engineering practices. Joint width should be 4 times anticipated movement, but not less than 1/4 inch (6.4 mm) wide.

Dimensions:

For joints 1/4 inch (6.4 mm) to 1/2 inch (12.7 mm) wide, the width to depth ratio should be equal. Joints 1/2 inch (12.7 mm) wide or greater should have a maximum sealant depth of 1/2 inch (12.7 mm). Minimum joint size is 1/4 inch by 1/4 inch (6.4 mm by 6.4 mm).

Surface Preparation:

Substrates for every structural silicone glazed project should be submitted for adhesion and compatibility testing by Tremco Technical Services prior to commencement of glazing. The surface preparation (cleaning method and primer if required) for each structural glazing project will be recommended based on production run sample substrates supplied by the customer and based on laboratory testing performed by Tremco.

Joint interfaces must be clean, dry, and free from any foreign matter prior to sealant application. Metal, glass and other non-porous surfaces should be wiped clean with a solvent dampened clean towel, followed immediately by a dry wipe with a clean, lint free towel before the solvent evaporates (i.e. 2 rag method). Preferred solvent is Isopropyl Alcohol (IPA) or Methyl Ethyl Ketone (MEK). Follow all precautions on label during handling of solvent. A trial application of the solvent is recommended to ensure there is not adverse reaction with the substrates.

Tooling & Cleaning:

Tooling is recommended immediately after application to insure firm, intimate contact with the joint interface. Dry tooling is preferred. Cleaning can be accomplished with solvents such as IPA or MEK while sealant is in uncured state.

Joint Backing

Bond Breaking Tape:

Closed cell polyethylene backer rods are preferred as joint backing to control depth of sealant bead. Where depth of joint will prevent use of joint backing, an adhesive backed polyethylene tape should be installed to prevent three-sided adhesion.

Joint backing must be dry at time of sealant application

Application:

Proglaze SSG is easy to apply with conventional caulking equipment. Fill joint completely and tool. At 75°F (23.9°C), 50% R.H. recorded tooling time is 7 minutes.

Maintenance:

Damaged sealant can be repaired. Consult your Tremco Field Representative or Distributor for repair procedures.

TYPICAL PHYSICAL PROPERTIES

Extrusion rate	33 seconds
Sag (ASTM C-619)	None
Tooling time	5-10 minutes
Tack free time (ASTM C-679)	10-15 minutes
Shore A hardness (ASTM C-661)	40
Tensile (ASTM D-412)	350 psi
Tear strength (ASTM D-624)	67 lbs/in
Peel adhesion: (ASTM C-794)	
Aluminum and Glass	60 lbs/in
Elongation (ASTM D-412)	380%



December 16, 2004

[Press Room](#)[Career Center](#)[MSDS & Data Sheets](#)[Login](#)

[Tremco
Sealants/Weatherproofing
Home](#)

[Tremco Commercial
Sealants and
Waterproofing](#)

[Tremco Barrier Solutions](#)

[Tremco Fire Protection
Systems](#)

[Tremco Industrial
Products](#)

[Tremco Incorporated](#)



Europe

**Tremco Limited
(European Headquarters)**
393 Edinburgh Avenue
Slough, Berkshire SL1 5JX
England
Tel: +44 (0)1753 691696
Fax: +44 (0)1753 822640
Website: <http://www.tremcoeurope.com>

**Tremco AB
(Sweden, Norway, Denmark)**
Orrikulla Industrigate 30, Box 104
S-425-02 Hisings Kärra
Göteborg, Sverige
Tel: +46 (0)31 57 00 10
Fax: +46 (0)31 57 20 07
Website: <http://www.tremco.se>

**Tremco AB
(Sales Office)**
Waldemar Thranesgt. 77
NO-0175 Oslo
Norway
Tel: +47 (0)23 32 71 70
Fax: +47 (0)22 20 70 39
Website: <http://www.tremco.no>

**Tremco BV
(Netherlands, Belgium)**
Mezenweg 13, 7332 AD Apeldoorn
PO Box 1129, 7301 BJ Apeldoorn
Nederland
Tel: +31 (0)55 533 6062
Fax: +31 (0)55 522 5054
Website: <http://www.tremco.nl>

**Oy Tremco Ltd.
(Finland, Baltic States, Russia)**
Tullikirjurinkuja 2
Helsinki 00750
Finland
Tel: +358 (0)95 499 4500
Fax: +358 (0)95 499 4555
Website: <http://www.tremco.fi>

**Tremco Estonia
(Sales Office)**
Tallinn, Estonia
Tel: +372 6 599221
Fax: +372 6 599229

**Tremco GmbH
(Germany, Austria, Switzerland)**
Schumanstraße 18
D-52146 Würselen
Deutschland
Tel: +49 (0)2405 426662
Fax: +49 (0)2405 426662

Africa

**Tremco Limited
(Sales Office)**
PO Box 2205
Halfway House 1685
South Africa
Tel: +27 11 254 5583
Fax: +27 11 310 3274
Mobile: +27 82 8239 894
Email: tremco@mweb.co.za

Middle East

**Tremco Limited
(Middle East)**
PO Box 3034
Dubai
United Arab Emirates
Tel: +971 4 347 0460
Fax: +971 4 347 1820

**Tremco Limited
(Middle East)**
PO Box 61331
Riyadh 11565
Saudi Arabia
Tel: +966 5 440 7379
Fax: +966 5 416 0940

**Tremco Israel
(Sales Office)**
11 Dakar Street
Haifa
Israel
Tel: +972 4825 7356
Fax: +972 4825 7356

Far East - Pacific Rim

Tremco Australia
Unit 1, 2 Park Rd
RYDALMERE NSW 2116
Australia
Tel: (02) 9638 2755
Fax: (02) 4322 5990
Email: tremco@tremco.com.au
Website: <http://www.tremco.com.au>

**Tremco Asia Pte Ltd
(Singapore)**
39 Ubi Road1, #01-00
World Publications Building
Singapore 408695
Tel: 65-6848 7162
Fax: 65-6749 0038
Email: gen@tremcoasia.com.sg

**Tremco Far East Limited
(Hong Kong)**
Hong Kong
Tel: 852-2880-0082
Fax: 852-2880-0774
Email: sales@tremcofe.com

**Tremco Malaysia Sdn Bhd
(Malaysia)**
No. 33 Jalan TPJ 4
47200 Petaling Jaya
Selangor Darul Ehsan Malaysia
Tel: 603-7846 3040
Fax: 603-7846 3025
Email: neelanaginlal@tremco.com.my