APPLICATION INSTRUCTIONS

VULKEM® MAX

Low-Modulus, Hybrid Sealant for Dynamic Joints

1. Testing

1.1 Tremco recommends project-specific testing be completed prior to starting production on any jobsite. Upon request, Tremco Technical Services can perform in-house testing of sealant for adhesion, compatibility, and potential staining on submitted project substrate materials.

1.2 Project-specific recommendations regarding surface preparation, primer use, and Vulkem Max approval are made after the completion of the project-specific testing process by Tremco. Contact Tremco Technical Services for details on how to initiate, complete, and interpret laboratory testing procedures, requirements, and results. Consult Tremco Technical Services bulletin for more detailed information pertaining to each test performed within the Tremco Technical Services laboratory.

1.3 In some instances, in-field testing may be adequate for qualifying a sealant for use in a specific application. Contact a local Tremco Sales Representative for assistance with testing at the job site.

2. Storage

2.1 Prior to use, Vulkem Max must be stored in a cool, dry location in its original undamaged packaging. The optimal storage temperature range is 60 to 80 °F (15 to 27 °C). Once the packaging of a single-component sealant is opened, the material will begin to cure. Preserving the sealant from developing undesired cure of the material can be achieved by promptly closing the sealant's container immediately after completion of use.

2.2 The curing mechanism of Vulkem Max is initiated with the introduction of airborne water vapor to the exposed sealant. The seals of Tremco sealant containers are effective at isolating the sealant from the atmosphere, and the water vapor that it contains, for extended periods of time.

2.3 Storage of packaged Vulkem Max in locations that experience significant temperature fluctuations and/or cyclic temperature changes may be problematic as these conditions are known to accelerate the migration of air and water vapor into the sealant container, unduly exposing the sealant to conditions that will ultimately reduce the effective shelf life of the material or the overall performance of the sealant when applied. Therefore, it is recommended to ensure that the storage of Vulkem Max be in a temperature-controlled environment with a stable ambient air temperature.

3. Surface Preparation

3.1 The five key steps for a successful sealant installation can be summarized as: clean, prime (if necessary), pack joint with backing material, gun the sealant, and tool the surface of the sealant. Specific instructions for each of these installation steps are provided in the subsequent sections within this document below.

3.2 **Two-Cloth Cleaning Method**

The two-cloth (or two-rag) cleaning method is completed by first wiping the substrate with a clean, white, lint-free cloth that is dampened with an approved cleaning solvent, such as isopropyl alcohol. The cleaning cloth should never be introduced or inserted directly into the solvent vessel or its contents to prevent contamination. Immediately following the solvent-wipe, before the cleaning solvent has flashed off the substrate surface, wipe the surface with a second cloth that is dry, clean, white, and lint-free to remove loosened dirt or oil. It is recommended to clean non-porous substrates using this cleaning method immediately before applying Vulkem Max; the substrate must be cleaned again if two or more hours have elapsed between the time that the substrate was cleaned, and the sealant is applied.

3.3 **Taping of Surfaces Surrounding the Joint**

Applying masking tape at the perimeter of a sealant joint is optional. This step is generally completed to support aesthetically favorable appearances of the sealant joint and to promote easier clean-up procedures. The masking tape must be removed immediately after the sealant's surface is tooled and before the sealant begins to develop a skinned surface.

3.4 **Masonry**

Concrete and masonry surfaces must be fully cured, stable, clean, dry, and free of contaminants. If film-forming curing aids or form release agents are present on a concrete substrate, they must be completely removed. If non-film-forming curing or form release agents have been used, adhesion testing must be employed to determine if they would be deleterious to adhesion.

The rough surfaces of these substrates can be prepared by sandblasting, mechanically abrading, wire brushing, grinding, or any combination of these preparation methods. These abrasive surface preparation procedures will introduce dust and other particles to the application area that must be treated as contaminants and thoroughly removed by blowing the affected substrate with oil-free compressed air or by brushing the contaminants away from the application area with a soft bristle brush.

Recommendation on the use of the primer is determined via project-specific testing. Specifics on priming substrates of this type can be found in section 5 of this document, "Priming". These substrates are porous in nature; TREMprime™ Silicone Porous Primer is to be used if a primer is required for the sealant to develop adequate adhesion.

3.5 **Glass, Porcelain, Tile, etc**.

These surfaces must be clean, dry, and free of any contaminants. Clean the substrate using the two-cloth cleaning method described above. Preventing oily fingerprints from being introduced onto these substrates is an important precaution to maintain cleanliness and create an ideal surface for the sealant to develop adhesion.

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3.6 **Wood**

Vulkem Max will typically develop adhesion to dry, fresh wood that is clean and free of any contaminants. Many species of wood, such as teak, contain oils that dry out very slowly. Oil bearing woods are usually not suitable substrates for Vulkem Max to develop adhesion with unless sufficient time has been allotted for the oils to vacate the substrate. Applications of Vulkem Max onto wood that will be painted or stained at a later time must utilize adequate masking techniques to ensure that Vulkem Max does not get onto surfaces that will be painted or stained.

When applying Vulkem Max to painted wood surfaces where adhesion will develop with the paint, it is important to note that the bond between the sealant and the paint is of no more value that the bond between the paint and the wood. Recognize the need for additional prudence because stresses of movement introduced to the sealant joint will be transferred to the paint material at the bond line. Use of a low-modulus sealant would be preferable to a medium-or high-modulus sealant to minimize such transfer of movement stress. Tremco recommends that any paint on the surface of the wood and the bonding area be removed mechanically, so bare wood is the exposed surface for the Vulkem Max to bond to. Where paint is not fully removed from wood and well-bonded residual paint is left after scraping or abrading, a low-modulus sealant is the preferred selection. Vulkem Max has historically been found to readily develop adhesion with a wide variety of different types of paint, but it is always recommended to confirm this with the implementation of project-specific testing with the materials present at the application site.

3.7 **Metals**

The bonding surface of the Vulkem Max must be clean, dry, and free of any contaminants. Metal substrates must be cleaned using the two-cloth cleaning method described previously within this document. Preventing oily fingerprints from being introduced onto these substrates is an important precaution to maintain cleanliness and create an ideal surface for the sealant to develop adhesion.

Metals that have the potential to corrode via oxidation pose a threat to the long-term adhesion of a sealant as oxidation can creep beneath the sealant bond line over time to cause failure. It is for that reason that factory-applied primers are recommended on steel substrates.

Recommendation on the use of the primer is determined via project-specific testing. Specifics on priming substrates of this type can be found in section 5 of this document, "Priming". These substrates are non-porous in nature; TREMprime Silicone Metal Primer is to be used if a primer is required for the sealant to develop adequate adhesion.

3.8 Plastics

Plastic surfaces must be clean, dry, and free of contaminants prior to the application of Vulkem Max. These substrates must be cleaned using the two-cloth cleaning method described previously within this document. Preventing oily fingerprints from being introduced onto these substrates is an important precaution to maintain cleanliness and create an ideal surface for the sealant to develop adhesion.

Recommendation on the use of the primer is determined via project-specific testing. Specifics on priming substrates of this type can be found in section 5 of this document, "Priming". These substrates are non-porous in nature; TREMprime Silicone Metal Primer is to be used if a primer is required for the sealant to develop adequate adhesion.

3.9 Insulated Concrete Forms

Nudura Insulated Concrete Forms (ICF) or other insulated concrete forms must be dry, clean, free of dust, mold, or any other substances that might prevent placement and bonding of sealant. After UV exposure it is recommended to rasp and clean the substrate to the standards above. Contact Tremco and/or Nudura Technical Services for additional information.

4. Application

4.1 Backing Materials

Backing Materials, such as backer rod, are included in appropriately designed sealant joints to control the depth of the sealant bead, promote an hour-glass sealant bead geometry, and to prevent three-sided adhesion. The depth of the sealant bead is to abide by the guidelines provided below.

4.2 Expansion Joints

The minimum joint width (W) and sealant contact depth (C) of any Vulkem Max application is 1/4" by 1/4" (6.35 mm by 6.35 mm). It is recommended that the sealant joint depth (D), when measured from the face of the sealant bead to the crown of the backer rod, be equal to one-half the sealant joint width (W), known as 2:1 width-to-depth joint ratio. For Vulkem Max, the minimum sealant joint depth (D) at crown of backer rod is 1/8" (3 mm) and the maximum sealant joint depth at crown of backer rod is 1/2" (13 mm). For joints that are wider than 1" (25 mm), contact Tremco Technical Services or the Tremco Sales Representative nearest to the application site for additional support.

4.3 Window Perimeter Joints

For filet beads, or angle beads around windows and doors, the sealant should exhibit a minimum sealant contact depth (C) of 1/4" (6.35 mm) onto each substrate. Proper joint backing or bond breaking must be implemented to allow the sealant to perform when exposed to joint movement.

4.4 Applying Sealant

After the joint is verified to be clean, dry, and free of contaminants, primer has been applied (if necessary), and backing material has been properly installed, the application of the Vulkem Max may begin. The process of gunning sealant is completed by dispensing sealant from it packaging, through a nozzle, and into the sealant joint.

4.5 **Joint Designs and Dimensions**

Tremco recommends that individuals responsible for designing sealant joints and those who are to apply Vulkem Max become familiar with the versions of the following industry guidelines and best practices that have been published most recently:

- ASTM C1193 - Standard Guide for Use of Joint Sealants
- ASTM C1472 - Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width

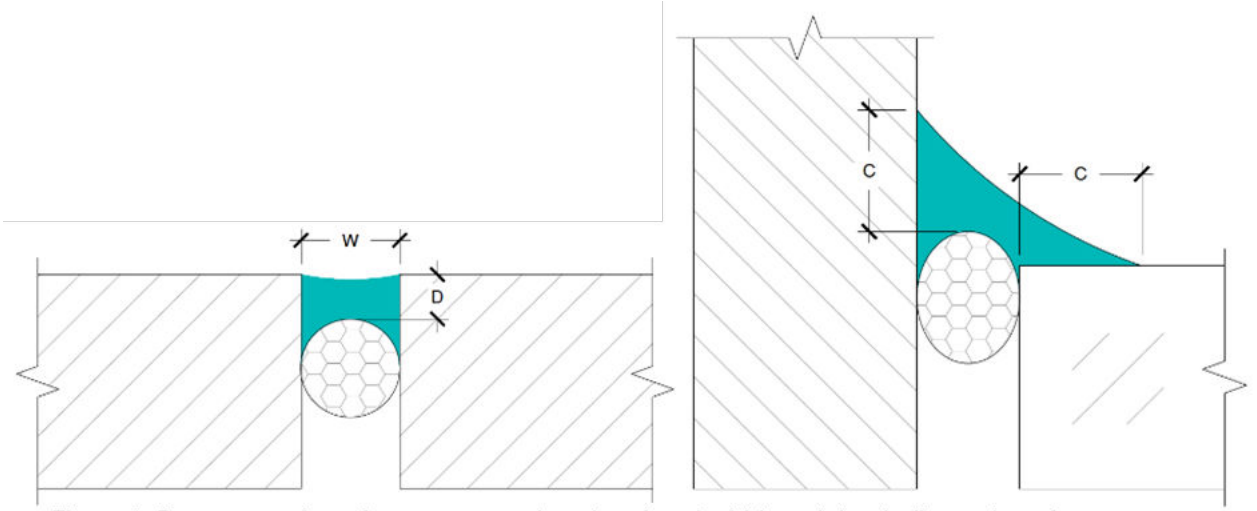

Figure 1. Representation of non-structural sealant bead width and depth dimensions for appropriate joint design.

All non-structural sealant joints should be designed and installed in accordance with ASTM C1193 and ASTM C1472, represented in Figure 1 with the following labels:

- W = Sealant Joint Width
- D = Sealant Joint Depth
- C = Sealant Contact Depth

4.6 Two Considerations must be acknowledged when gunning the sealant:

A. The joint is filled from the backside to the front-side. It is not recommended practice to fill the joint from front to back, as this introduces the potential for air to become entrapped within the body of the sealant bead. If air becomes encapsulated within the body of the sealant bead, then the sealant joint may demonstrate a reduced capacity to perform when exposed to dynamic movement.

B. Complete contact between the sealant and joint bonding surface of the substrate is required for the sealant to be able to perform as intended when the joint was designed. Substrate joint surfaces must be fully "wetted" with sealant, meaning that there must be contact between Vulkem Max and the substrate along with entire depth of the sealant-substrate interface. If the sealant does not fully contact the substrate along the bond line from the face of the sealant joint to the backer rod, then there is assumed potential for the sealant joint to be ineffective at preventing leaks and/or fail prematurely when exposed to a load or stress. Some force exerted during gunning of the sealant may be required to accomplish full "wetting" of the sealant onto the bonding surfaces as tooling, alone, may not be sufficient to force the sealant fully into the joint.

4.7 **Tooling**

Tooling is always required with the installation of a sealant bead to achieve an optimally performing sealant joint. Tooling the sealant joint will assist in creating an installation that has full "wetting" of the sealant onto the joint interfaces, achieved the desired hour-glass shaped cross-sectional joint geometry, and shaped the visible surface of the sealant to a clean and consistent appearance. The sealant joint should be deliberately tooled to shape to actively shed water and prevent the ponding of water of the surface of the joint.

Tooling can only be accomplished prior to the sealant achieving a skinned surface. Once the sealant has begun to form a skinned surface, the joint can no longer be effectively tooled. For information regarding the skin time of any Tremco sealants, consult the data sheet created for the specific sealant or contact Tremco Technical Services. Tooling is the process of applying consistent pressure to the sealant body through the exposed face of the sealant bead by running a rounded tip spatula along exterior surface of the sealant bead. A slightly concave surface at the exterior surface of the sealant bead is one characteristic of a properly tooled sealant bead. Pressure is applied by the applicator, with the tooling spatula to the face of the sealant bead, with a substantial enough magnitude, to ensure the sealant is completely filled into the joint The use of controlled force while tooling is a practice that is intended to provide additional assurance that the sealant has fully "wetted" the bonding interfaces of the substrates. The applied pressure is also effective in ensuring that the installed sealant has achieved complete contact with the backing material. Care must be observed while tooling the joint to not introduce enough pressure to displace the joint backing material.

Tremco recommends dry tooling be used to tool the surface of the sealant joint. The practice of dry tooling is completed without the use of tooling agents, such as water, soap, or detergent solutions. Sealant joints should be tooled to shed water and eliminate ponding.

5. Clean Up

5.1 Immediately clean all adjacent areas to remove any sealant stains or spills with isopropyl alcohol (IPA) before material cures. Tools and equipment can also be cleaned with isopropyl alcohol to remove curing material.

5.2 Clean sealant from hands by soaking in hot, soapy water.

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