Building with conscience.

StoSeal™ STPE Sealant

Installation Guide
May 2023
Product No. 81802

Facades

Interiors

StoSeal™ STPE Sealant is a high movement, medium modulus, non-sag, one component silyl-terminated polyether sealant designed for use on vertical above grade walls. It complies with ASTM C920.

Installation Guide

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ATTENTION

The final design of any project is the sole responsibility of the Design Professional, with considerations for compliance with local building and design codes and requirements. Sto Corp. accepts no liability for design, engineering, or workmanship of any project. The information provided herein is in addition to other technical data provided by Sto Corp. (System Bulletin, Specification, Guide Details, etc). For more information, please visit www.stocorp.com

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StoSeal™ STPE Sealant

StoSeal™ STPE Sealant is a high movement, medium modulus, non-sag one component silyl-terminated polyether sealant designed for use on vertical above grade walls in Sto wall assemblies and in a wide range of other wall construction. The sealant comes in eight standard colors and 300 custom colors offered by request. Priming of joint substrates is generally not required when using StoSeal™ STPE Sealant, except for substrates such as masonry mortar and some EIFS base coats.

Applications for StoSeal™ STPE Sealant include Sto wall assemblies wherever sealant is called out in Sto Guide Details. It should be used in accordance with the general guidance provided in this booklet. Additional applications include building restoration and other areas where a high-performance sealant is required. For more information on use, handling, installation, and limitations of StoSeal™ STPE Sealant refer to the Product Bulletin available at www.stocorp.com.

Sealant Width-Depth Ratio of 2:1

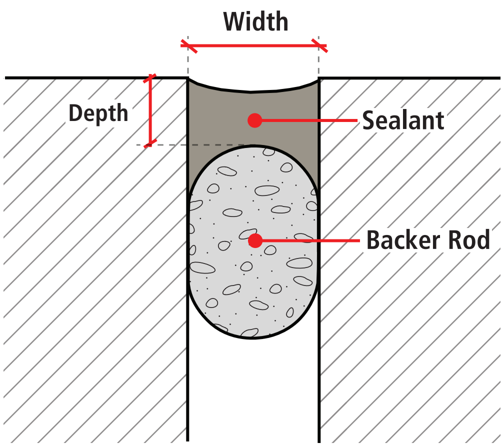

Table 1.0 StoSeal™ STPE Sealant Coverage

Joint Width	Joint Depth		
Inches (mm)	Lineal Feet (m) at 1/4" (6mm)	Lineal Feet (m) at 3/8" (9mm)	Lineal Feet (m) at 1/2" (12mm)
1/2" (13mm)	24 ft. (7.3m)	16 ft. (5.0m)	12 ft. (3.6m)
5/8" (16mm)	20 ft. (6.1m)	14 ft. (4.3m)	10 ft. (3.0m)
3/4" (19mm)	16.5 ft. (5.0m)	12 ft. (3.6m)	8 ft. (2.4m)
7/8" (22mm)	14 ft. (4.3m)	10 ft. (3.0m)	7 ft. (2.1m)
1" (25mm)	12.5 ft. (3.8m)	8 ft. (2.4m)	6 ft. (1.8m)
1-1/4"(32mm)	-	-	5 ft. (1.5m)

*Based on 20 oz. (0.6L) sausage pack. Coverages are approximate and may vary depending on joint condition, application technique, waste factor and other variables. 20 sausage packs per carton.

Key Considerations in Design and Construction of Joints

Joint sealants in exterior wall construction are most often used to maintain a watertight seal at junctures where different materials or components of construction meet. Examples of where joint sealants are used include:

- Perimeter weather seal around windows, doors, scuppers, and other through wall penetrations
- Perimeter weather seal around fixture attachments such as electrical boxes or light fixtures
- Floor line deflection joints
- Thermal expansion and contraction joints
- Control joints in masonry wall construction
- Panel-to-panel joints between precast, metal frame, and other prefabricated panel wall construction
- Bedding sealant for flashing, flanged windows, and similar applications
- Interior or exterior air seal at joints and seams in wall construction for air barrier continuity

Calculation of Joint Movement and Sizing of Joints

All building materials move with temperature change. Design professionals use the thermal coefficient of expansion to calculate the amount of movement of building materials caused by a change in temperature. The thermal coefficient of expansion for common building materials is listed in building design, construction, and engineering handbooks, such as the AISC Steel Construction Manual, and the ASHRAE Fundamentals Handbook. Joint movement, and in turn, joint width, is then determined by calculating anticipated thermal expansion and contraction of the substrate materials on either side of the joint, based on maximum expected temperature differential that the substrate materials will encounter and the distance between joints.

Other material properties, such as moisture content and moisture behavior of the substrate materials may factor into the final calculation. The results of this calculation, construction tolerances, and other sources of joint movement, such as long-term creep or deflection at floor lines from live or dead loads, factor into the final determination of the designed joint width. For a more detailed account of how to determine sealant joint width, refer to **ASTM C1472, Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width.**

Joint Backing Material

Joint backing material, commonly known as backer rod, serves four purposes:

1. It controls the depth of the sealant to achieve proper joint width-to-depth ratio.

2. It enables proper joint configuration (i.e., hourglass shape of sealant bead).

3. It prevents three-sided adhesion so the sealant is not restrained by adhesion at the back surface of joint.
(If the sealant is restrained at the back of the joint, its ability to accommodate joint movement is compromised)

4. It aids when tooling the sealant to force the sealant against the adjacent joint surfaces for more complete wetting of these surfaces and adhesion.

Three Common Types of Joint Backing

1. Closed cell polyethylene foam backer rod
2. Open cell polyethylene foam backer rod
3. Hybrid (or bi-cellular polyethylene foam) backer rod: open cell polyethylene backer rod core with an outer closed cell polyethylene foam "skin"

The backer rod is round in cross-section, compressible, and is deliberately over-sized in diameter to friction fit into the joint, which provides an optimum hourglass sealant configuration (Figure 1.1). The selection of which type of backer rod to use is discussed further below.

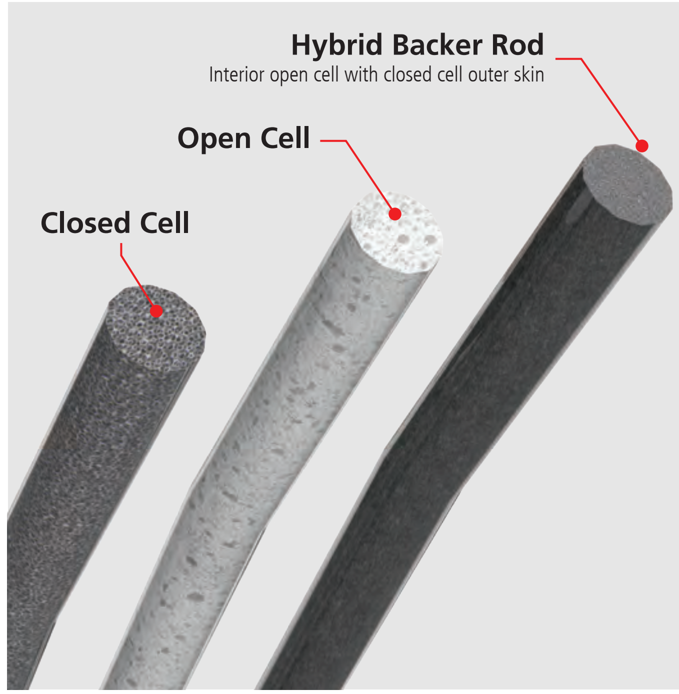

Figure 1.0 - Types of Backer Rod

Joint Configuration

An hourglass configuration is optimum for joint sealants because:

1. It maximizes the surface area of sealant adhered to the sides of the joint. As the joint width increases with a reduction in temperature, the tensile load imposed on the sides of the joint is spread over a wider area, and the tensile stress at the bond line is minimized.

2. The sealant is thinnest at the middle of the joint, which concentrates stress and movement at the mid-section of the joint, where the joint sealant has its greatest elasticity. To the contrary, a thicker section at the middle of the joint (or a rectangular configuration) would diminish the joint sealant's elasticity and its ability to accommodate movement. This is similar to a thick rubber band requiring more force to stretch than a thin rubber band and not being as "elastic." (all other things being equal with the rubber bands).

The general recommendation in this Installation Guide is to install sealant in an hourglass configuration unless conditions prohibit this configuration. For further guidance on joint configurations refer to **ASTM C1193, Standard Guide for Use of Joint Sealants.**

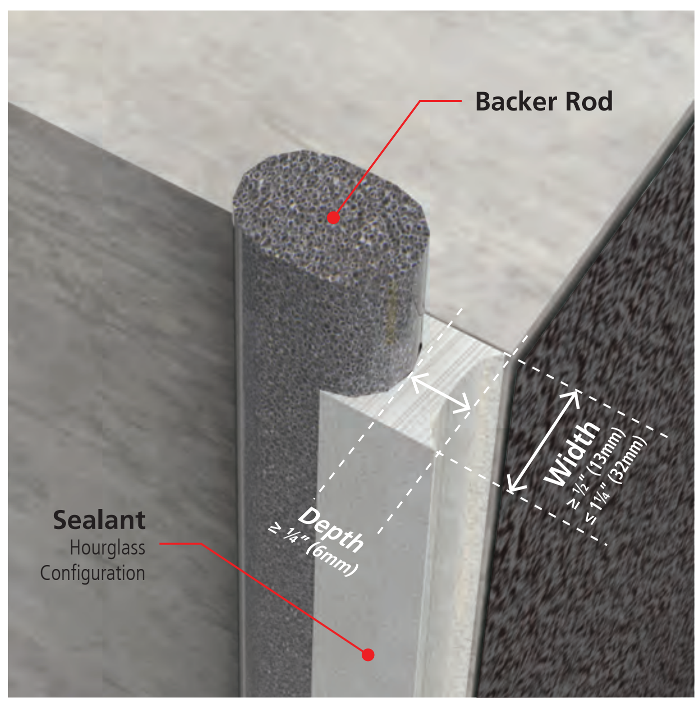

Figure 1.1 - Sealant Joint Configuration

IMPORTANT: In no case should sealant depth be less than ¼ inch (6mm), as a sealant that is too thin may not have enough tensile strength to accommodate the stresses caused by movement.

Single-stage and Two-stage Joint Sealant Design

Single-stage joints (Figure 1.2) have one line of sealant that functions as a weather seal. Two-stage joints (Figure 1.3) have a second line of sealant that functions as a second line of defense if/when the first line of sealant suffers wear and tear from weather exposure and may no longer be 100% functional.

The second line of sealant may also be a connecting component of the air barrier and WRB (Water-resistive Barrier) in the wall assembly to maintain air barrier and WRB continuity. If the second line of sealant is located "in-plane" with the air barrier and WRB it also maintains the drainage plane in drained wall assemblies.

A third option is a two-stage drained joint design (Figure 1.4), in which openings, or weepholes, are created at intervals (floor lines for example) along the length of the joint and the second line of sealant is redirected to the weep hole. This joint sealant design strategy foresees that at some point in time water will penetrate the outer seal and the "weeped" design will provide for its removal without further water ingress to the interior. The weeps, however, can allow significant amounts of water to enter the wall at the joint, which may have adverse effects and unintended consequences if the water accumulates elsewhere in the wall.

The final joint sealant design is usually determined based on several factors that influence the severity of the sealant's exposure to wind-driven rain, for example, location and height of the building, and degree of water shedding protection afforded by the design of the building. Generous eaves for example on a one-story building in a dry climate may suggest single-stage design, while a 50-story building in Miami with windows flush with the face of the wall and no protective overhangs would suggest a more conservative joint sealant design. An informed decision about any of these joint sealant designs can be made by conducting water penetration tests to verify performance.

The general recommendations reflected in this Installation Guide are for two-stage joint sealant design. An open cell polyethylene foam backer rod is recommended for the interior seal. The open cell foam enables two-way drying and faster cure of the sealant as compared to a closed cell polyethylene foam. This is particularly important in a two-stage joint design where the outer seal can inhibit drying and curing of the inner sealant.

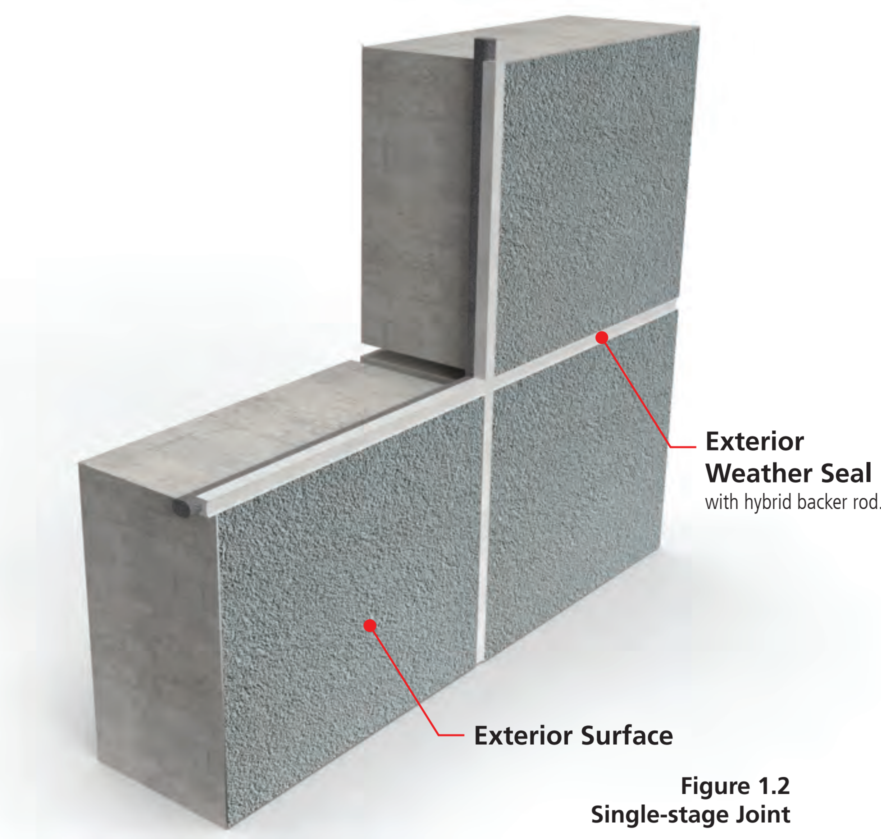

Figure 1.2
Single-stage Joint

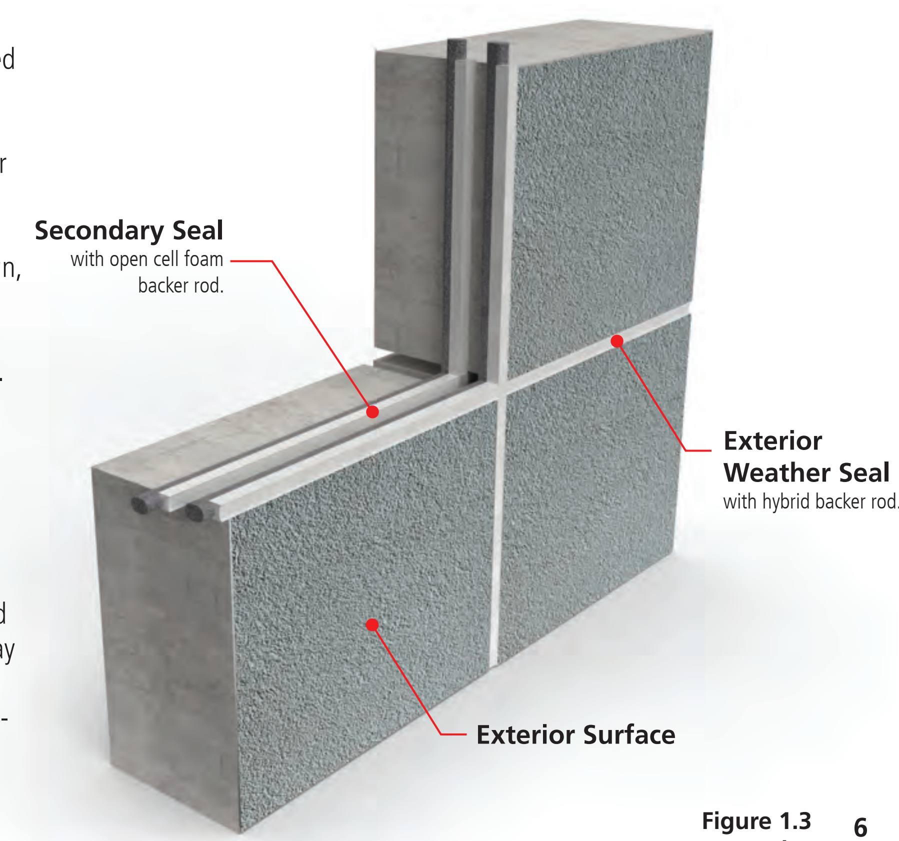

Figure 1.3
Two-stage Joint

Two-stage Drained Joint Sealant Design

A hybrid backer rod with closed cell "skin" and open cell core is recommended for the outer seal. The closed cell "skin" prevents three-sided adhesion, and, in the event of puncture during installation, the open cell foam does not "out-gas" as would occur with a closed cell foam core.

"Out-gassing" causes bubbling or other defects in the uncured sealant that can affect its performance.

As a general rule, the backer rod diameter should be 40-50% larger than the joint width for open cell foam and 24-33% larger for closed cell foam[1]

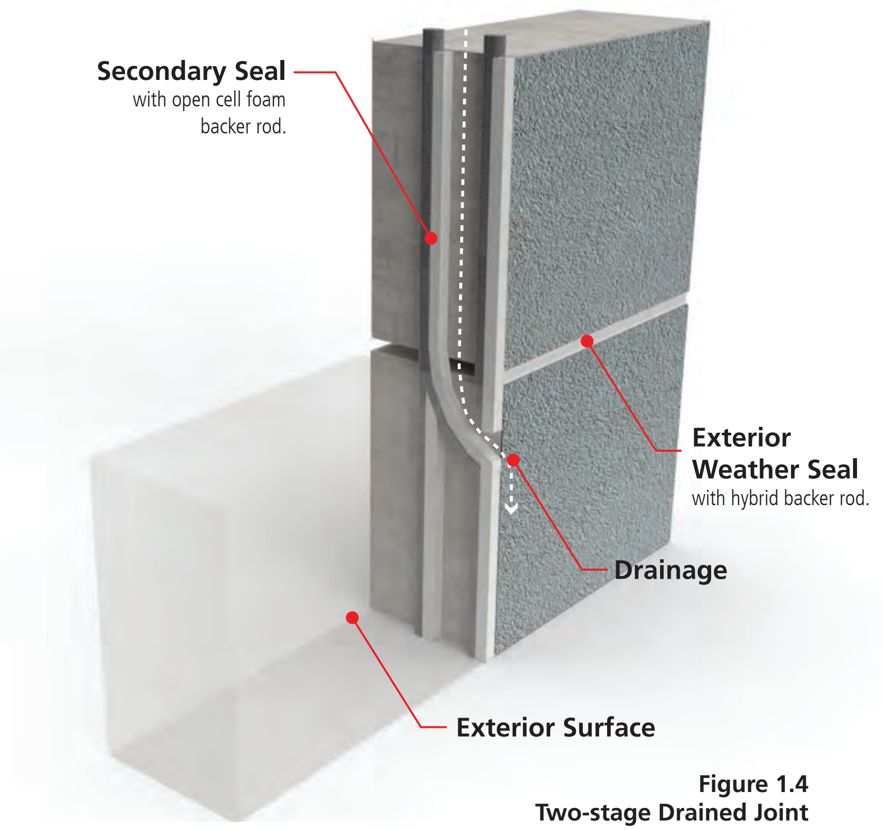

Figure 1.4
Two-stage Drained Joint

Priming

The necessity for priming is generally dependent on substrates. Priming is not a substitute for surface preparation which must be done to provide a clean, structurally sound substrate. For more information on substrate surface preparation and use and application of primers refer to **ASTM C1193, Standard Guide for Use of Joint Sealants**.

Field Adhesion Testing

Because of the variety of substrates and conditions that exist on job sites, sealant adhesion and compatibility to joint sealant substrates should be verified with field adhesion testing. Refer to **ASTM C1521, Evaluating Adhesion of Installed Weatherproofing Sealant Joints**, for a detailed description of methods used to evaluate adhesion.

Compliance Testing

StoSeal™ STPE Sealant complies with or has been tested in accordance with industry standards that confirm compatibility with common building materials, durability, and movement capability of 100% extension and 50% compression. These standards include:

- ASTM C920: Type S, Grade NS, Use NT, A, M, Class 100/50
- Federal Specification TT-S-00230C Type II
- AAMA 808.3 (Type 1) Exterior Perimeter Sealing
- ASTM C1382 for use in EIFS wall systems

Footnotes:

1. Standard Guide for Use of Joint Sealants, ASTM C1193-16, ASTM International, West Conshohocken, PA, 2016, pp. 10.