Technical Data Sheet

DOWSIL™ 991 Silicone High Performance Sealant

Description

Low-modulus elastomeric alkoxy sealant designed for weatherproofing sensitive natural stone, glass and metal panels.

Features & Benefits

- Low VOC emission[1]
- Non-staining on natural stone and reduces residue rundown on metal and glass panels.
- Low modulus, high movement capability - can accommodate ±50% movement in a properly designed joint.
- Good unprimed adhesion to a wide variety of building materials such as natural stone, glass, metal, ceramic tile, fluorocarbon paint finishes and anodized aluminum.
- One-part easy to use formulation, good working time.
- 10-year Limited Non-Staining Warranty is available.
- Formulated to prevent staining of porous substrates and reduce streaking on glass and metal panels to improve building aesthetic performance.
- Outstanding UV resistance, excellent weathering and durability resulting in longer lifecycle and superior long-term weatherproofing.

[1]Compliant to CDPH – California Specification Section 01350 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers Version 1.2.

Composition

- One-part, neutral cure alkoxy silicone.

Applications

- DOWSIL™ 991 Silicone High Performance Sealant is specially formulated to prevent staining of porous substrates such as natural stone and minimize streaking on metal panels and glass to improve building aesthetic performance.
- It forms a durable, flexible, watertight bond with most building materials and can be used for new and remedial construction applications.

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Test	Property	Unit	Result
	As supplied		
	Colors		Black, grey, bronze, white, limestone, charcoal, dark grey, sandstone and pink
ASTM[1] C 679	Tack-free time, 50% R.H. +25°C	minutes	30

1. ASTM: American Society for Testing and Materials

Typical Properties (Cont.)

Test	Property	Unit	Result
	Curing 25°C	days	7–14[2]
ASTM C 639	Flow (sag or slump)	mm	< 2
	VOC content[3]	g/l	< 30
	As cured – after 7 days at +23°C		
ASTM D412	Ultimate tensile strength	MPa	1.6
	Ultimate elongation	%	900
	As cured – after 21 days at +23°C		
ISO[4] 11600	Modulus at 150% elongation	MPa	0.3
	As cured – after 28 days at +23°C		
ASTM C1135	Ultimate tensile strength	MPa	0.7
	Ultimate elongation	%	500
	Elastic recovery rate	%	90
ASTM C661	Durometer hardness, Shore A	points	24
ASTM C719	Joint movement capability, glass, aluminum	%	±50
ASTM C1248	Staining/migration, natural stone		None

2. Depends on joint depth.
3. ISO 11890-2 Paints and varnishes Determination of volatile organic compound (VOC) content
4. ISO: International Standardization Organization

Processing and Application Guidelines

Weatherseal Joint Design

A thin bead of silicone will accommodate more movement than a thick bead (see Figure 1). DOWSIL™ 991 Silicone High Performance Sealant should be no thicker than 13 mm and no thinner than 6 mm for joints where excessive movement is expected. Ideally, the ratio of joint width to sealant depth should be about 2:1.

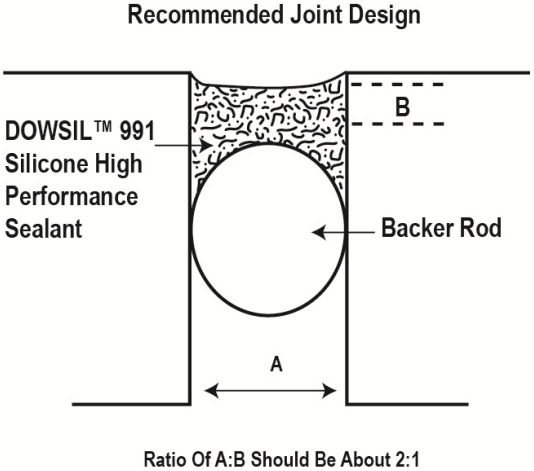

Figure 1

Processing and Application Guidelines (Cont.)

Weatherseal Joint Design (Cont.)

Open-cell polyurethane foam, closed-cell polyethylene or non-gassing polyolefin are the recommended backing materials for most joints; use polyethylene tape for joints too shallow to allow backer rod (see Figure 2). These materials permit application for a thin bead and act as bond breakers, which allow the silicone sealant to move freely with the joint.

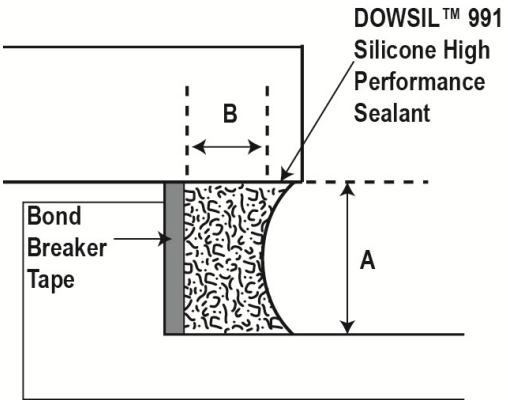

Figure 2

The width of building expansion joints varies because of seasonal and daily changes in temperature. If DOWSIL™ 991 Silicone High Performance Sealant cannot be installed when the design width is half way between the dimensional extremes, the designed joint should be at least twice the total anticipated joint movement. Good architectural practice calls for joint design of four times the anticipated movement due to construction tolerances and material variations.

Joints should be designed to allow installation and retention of bond breaking, backing material during the application and curing of DOWSIL™ 991 Silicone High Performance Sealant.

Joint Dimensions

For small curtain wall panels allow a minimum width of 6 mm for the sealant bead. With larger panels, or those in which a great deal of movement is expected, the joint size should be based on the calculated joint movement.

How to Use

Clean all joints and glazing pockets, removing all foreign matter and contaminants such as grease, oil, dust, water, frost, surface dirt, old sealants or glazing compounds and protective coatings.

Nonporous substrates (i.e. metal and glass) should be cleaned with solvent using the two cloth cleaning method. In all cases solvent should be wiped on and off with clean white lint-free cloths. Detergent or soap and water treatments are not acceptable.

Porous substrates should be cleaned by grinding, saw cutting, blast cleaning (sand or water) or mechanical abrading, or a combination of these methods as required to provide a sound, clean, dry surface for sealant application. Dust, loose particles, etc., should be blown out of joints with oil-free compressed air or vacuum cleaned.

How to Use (Cont.)

Priming
When using DOWSIL™ 991 Silicone High Performance Sealant, priming is not usually required. However, sealant adhesion should always be tested to determine the need for a primer. Where required, primer should be applied in a thin film to the joint surface using a clean lint-free cloth and allowed to dry before sealant application.

Masking
Areas adjacent to joints may be masked to ensure neat sealant lines. Do not allow masking tape to touch clean surfaces to which the silicone sealant is to adhere. Tooling should be completed in one continuous stroke immediately after sealant application and before a skin forms. Masking tape should be removed immediately after tooling.

Backing Materials
Open cell polyurethane foam, closed-cell polyethylene or non-gassing polyolefin are the recommended backing materials. Polyethylene tape is recommended for joints too shallow to prevent three-sided adhesion.

Method of Application
Install backing material or joint filler, setting blocks, spacer shims and tapes as specified. Apply DOWSIL™ 991 Silicone High Performance Sealant in a continuous operation using a positive pressure adequate to properly fill and seal the joint. Tool the DOWSIL™ 991 Silicone High Performance Sealant with light pressure to spread the sealant against backing material and the joint surfaces before a skin forms. A tool with a convex profile is recommended to keep the sealant within the joint. Do not use soap or water as a tooling aid. Remove masking tape as soon as the bead is tooled. DOWSIL™ 991 Silicone High Performance Sealant can be applied at outdoor temperatures as low as -25°C provided that surfaces are clean, dry and frost free. Please refer to the guidance of Dow technical manual if the application is at low temperature below the dew point or freezing, under which condition, the potential for condensation or frost on the substrate surface is greater. However, sealant will require considerable time to cure or may not cure in colder (below 4°C) temperatures.

It is imperative that uncured silicone sealants are not allowed to contact surfaces which cannot be abraded, such as polished granite or other natural stone. Because excess silicone sealant cannot be completely removed with organic or chlorinated solvents, these surfaces must be masked, or extreme care taken to prevent any silicone from contacting them during sealant application. Once an uncured sealant contacts the surface, it will leave a film that may change the aesthetic surface characteristic of that substrate.

In cases where uncured sealant is inadvertently applied to non-porous adjacent surfaces, the sealant should be cleaned up, while still uncured, using a commercial solvent such as xylene, toluene or methyl ethyl ketone. Observe proper precautions when using flammable solvents.

Maintenance
No maintenance is needed. If sealant becomes damaged, replace the damaged portion. DOWSIL™ 991 Silicone High Performance Sealant will adhere to cured DOWSIL™ 991 Silicone High Performance Sealant with only a preparatory solvent wipe to remove accumulated dirt.

Certifications

DOWSIL™ 991 Silicone High Performance Sealant meets or exceeds the test requirements of:

- ASTM Specification C920. Type S, Grade NS, Class 50, Use NT, G, A and M
- ASTM C1248
- GB23261-2009 1 SR 50 LM
- CNS 8903 G & F 9030 25LM

SGBP 5273

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

When stored at or below +30°C in the original unopened containers, DOWSIL™ 991 Silicone High Performance Sealant has a shelf life of 12 months from date of manufacture as indicated by the “use by date” included on the product packaging.

Packaging Information

DOWSIL™ 991 Silicone High Performance Sealant is supplied in 600 ml Turbo foil sausages.

Limitations

This product is not intended for use:

- In structural glazing applications or where the sealant is intended to be used as an adhesive
- In horizontal joint abrasion and where physical abuse are likely to be encountered
- In spaces totally confined from atmospheric moisture during cure
- On-frost-laden or damp surfaces
- For prolonged submersion in water
- On surfaces that might bleed oils, plasticizers or solvents such as impregnated wood, oil-based caulks, green or partially vulcanized rubber gaskets or tapes, bitumen-impregnated boards, felts, or sheets.
- In below-grade applications

Limitations (Cont.)

DOWSIL™ 991 Silicone High Performance Sealant will not improve pre-existing staining or residue rundown conditions. Surface appearance of any sealant will depend upon environmental conditions.

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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