

# European Guidelines for Silicone Sealant Application at Cold-Temperature



## Introduction

Most silicone sealants have the unique ability to be used all year-round, including the middle of winter due to their flexible polymer, allowing them to be easily extruded in temperatures well below 0°C without heating. Typical organic sealants, such as polyurethanes, require heating at temperatures below +5°C.

DOWSIL™ 791 Silicone Weatherproofing Sealant and DOWSIL™ 813C Construction and Concrete Silicone Sealant are approved for application at temperatures as low as -25°C.

At temperatures below the dew or freezing point, there is an increased potential for condensation or frost on the substrate surface. Only moisture on the surface of a substrate is important. Moisture within the mass of a substrate, such as a concrete block or brick, is less important than the surface moisture.

Surface moisture can be removed by following a few simple procedures:

- Cold-temperature application is best done when humidity is lower. Do not apply sealant in rain, freezing rain, snow or heavy fog.



- Always solvent clean (and prime if required) immediately prior to sealant application. Use a water-soluble solvent, such as isopropyl alcohol (IPA) or, preferably, DOWSIL™ R-40 Cleaner or DOWSIL™ R-41 Cleaner Plus. Water-soluble solvents will absorb moisture and help to dry the substrate.
- Do not apply sealant if the substrate is visibly wet or if frost is present. Apply a tissue to the substrate surface prior to sealant application to determine if liquid moisture is present. If so, further cleaning with a solvent should be performed.
- Do not heat the joint with a forced air dryer or direct flame.
- Perform field adhesion tests on a frequent basis to verify sealant

adhesion. Due to slower cure rates at low-temperatures, the sealant may require 14 to 28 days or longer to achieve full cure and adhesion.

In colder, drier conditions, a silicone sealant will cure at a much slower rate. Ultimately, the sealant will achieve full physical properties.

The fact that silicone sealants have been used successfully at sub-zero temperatures for many years is evidence that this is an acceptable practice. This unique benefit of silicone allows building construction and weatherproofing to proceed during the winter months. This increased production capability will provide greater profit with no added risk.

## Surface Preparation and Sealant Application

This surface preparation and sealant application procedure outlines general requirements for installing DOWSIL™ brand weatherproofing sealants. By following these procedures closely, you will ensure good sealant performance. At cold temperatures, this application procedure can assist in the formation of a comprehensive quality assurance program.

The basic steps for joint preparation and sealant application are as follows:

- Clean** – Joint surfaces must be clean, dry, dust-free and frost-free.
- Prime** – If required, primer should be applied to the clean surfaces.
- Pack** – Backer rod or bond breaker tape should be installed to prevent 3-sided adhesion.
- Seal** – Sealant is applied into the joint cavity.
- Tool** – Apply pressure to sealant to ensure contact with the surfaces, create a flush joint and ensure adhesion and proper joint dimensions.

## Substrate Cleaning Procedures

Substrate cleaning is an important element of any successful joint weather sealing application. The key to good sealant adhesion is a clean joint dry and frost-free surface.

### Non-porous Substrates

Rough surfaces, such as an aggregate precast, limestone, and brick and mortar surfaces, may be difficult to clean using a cloth. These rougher surfaces may require abrasion cleaning to remove dust and/or laitance. Abrasion cleaning can be achieved through the use of a stiff bristle brush, vacuuming or blowing with water- and oil-free

compressed air. The porous substrate must be sound and free from loose debris, dirt or laitance. It is important that the sealant bonds to a sound, clean and dry surface.

### Non-porous Substrates

Non-porous surfaces are typically smooth and should be cleaned using the two-cloth cleaning method described below. DOWSIL™ R-40 Cleaner and DOWSIL™ R-41 Cleaner Plus are the recommended cleaning solvents for most non-porous substrates.

### Two-Cloth Cleaning Method

The “two-cloth cleaning method” is a proven technique to clean smooth porous and non-porous surfaces. The use of one cloth to clean a substrate is not a recommended procedure and it is not as effective as using two cloths. Clean, soft, absorbent, lint-free cloths must be used. This method consists of cleaning the substrate with a solvent-saturated cloth, followed by a drying wipe with a separate clean cloth. The procedure described in detail below:

- Thoroughly clean all surfaces of loose debris.
- Pour a small quantity of cleaning solvent into a working container. A clear plastic, solvent-resistant squeeze bottle works best for this purpose. Do not apply solvent directly from the original container.
- Wipe the joint surfaces with sufficient force to remove dirt and contaminants.
- Immediately wipe dry the solvent-wet surface of the substrate with a separate clean, dry cloth. The second cloth must wipe the substrate before the solvent has evaporated.
- Visually inspect the second cloth to determine if the contaminants were effectively removed. If the second cloth remains dirty, repeat the ‘two cloth cleaning method’ until the second cloth remains clean. For each subsequent cleaning, rotate the cloth

to a clean portion of the cloth. Do not clean with the dirty portion of the cloth. For best results, replace used and dirty cloths frequently.

## Primer Application Procedures

For weather sealing applications, Dow typically recommends the use of either DOWSIL™ 1200 OS Primer, UV Traceable, or DOWSIL™ Construction Primer P. These two primers are very different in handling and behavior. DOWSIL™ 1200 OS Primer, UV Traceable, is a chemical treatment primer that activates a surface to provide better sealant adhesion. Generally, DOWSIL™ 1200 OS Primer, UV Traceable, is preferred on non-porous or smooth porous substrates. DOWSIL™ Construction Primer P is a film-forming primer that leaves behind a thin film on a surface. DOWSIL™ Construction Primer P is typically recommended for use on concrete, brick, mortar and other porous substrates. Please refer to product data sheets for more information.

The following are recommended procedures for application of DOWSIL™ primers:

### DOWSIL™ 1200 OS Primer, UV Traceable

Joint surfaces must first be clean, dry and frost-free. In cold-temperatures, priming should begin within 30 minutes following completion of cleaning. If there is a greater time delay, joint surfaces must be re-cleaned prior to priming.

- Pour a small amount of primer into a clean, dry container. Do not pour more than a 10 minute supply of primer into the working container. Replace and tighten the cap on the container immediately after dispensing the primer. Excessive exposure of the primer to atmospheric moisture will cause it to deteriorate and turn milky white in the container.

- Pour a small amount of primer from the working container onto a clean, dry, lint-free cloth and gently wipe a thin film on all joint surfaces requiring primer. Apply only enough primer to wet the surface.

**Over-priming can cause adhesion loss between the sealant and the substrate.** If too much primer is applied, a powdery white film will form on the substrate. Over-priming is not an acceptable practice and should be stopped immediately. Over-primed surfaces must be re-cleaned using DOWSIL™ R-40 Cleaner and primed in a proper manner.

- Allow the primer to dry until all of the solvent evaporates. This typically takes from 10 to 30 minutes, depending on temperature and humidity. Once dry, backer rod and sealant may be installed.
- Inspect the surface for dryness and for the appearance of over-priming. A primed non-porous surface will have a slight haze. When DOWSIL™ 1200 OS Primer, UV Traceable is used, a UV lamp to trace the correct application of the primer may be used to assist with quality assurance. The UV tracer will be visible for several days and automatically disappears with time.
- Primed surfaces must be sealed within the next 30 minutes. Any surfaces primed and not sealed within one hour must be re-cleaned and re-primed before applying sealant.

### DOWSIL™ Construction Primer P

- Ensure the joint surface is clean, dry and frost-free. Priming should begin within 30 minutes following cleaning. If there is a greater time delay, joint surfaces must be re-cleaned prior to priming.
- Pour a small amount of primer into a clean, dry container and apply primer from the container rather than directly from the can
- Apply a thin, uniform layer of primer by brush to the surfaces to be primed. Avoid areas that will not be sealed.

- Allow the primer to dry for a minimum of 30 minutes, and inspect for dryness. Once dry, backer rod and sealant may be installed. Sealant should be applied within 1 hour of primer application.

\*In case of application in very cold conditions in which the substrate surface temperature is below -15°C, the use of the Primer P needs to be checked with your Dow technical contact.

## Quality Control

An effective quality control program is important for the application of DOWSIL™ brand weatherproofing silicone sealants.

### Field Adhesion Test Method

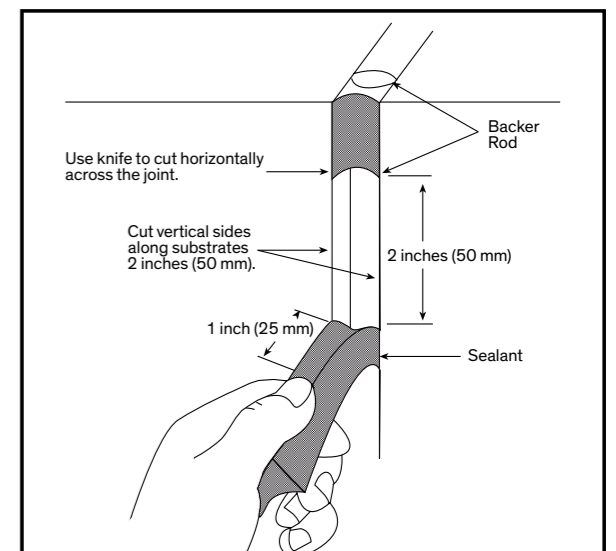
The field adhesion test is a simple method to evaluate the adhesion and installation of a weather seal joint. Problems such as poor adhesion, improper cleaning, poor primer application, joint underfill or overfill, improper backer rod placement, and improper tooling can all be identified with a field adhesion test. The field adhesion test is the primary test that should be used by the sealant applicator to verify that sealant is being installed correctly. This test should be performed at the start of a project and also throughout the project.

For refurbishment projects, this test should be performed before the project begins to identify the best surface preparation and sealant for the project. This test is normally performed 7 to 21 days after the sealant is installed and prior to project commencement. In winter, sealant cure may take longer. As a guideline, run the field adhesion tests after 3 weeks curing

at temperature above 0°C, after 4 weeks curing at variable temperature between -5°C and +5°C and after 6 weeks curing at temperature below 0°C.

Field adhesion testing should be performed frequently throughout the project. It is suggested that approximately 5 tests be performed in the first 300 linear meters of joint. Subsequently, one test every 300 linear meters of joint or one test per floor per elevation should be performed. The field adhesion test method is described below:

- Cut horizontally across the joint with a knife.
- Starting at the horizontal cut, make two equivalent 75 mm vertical cuts along both joint surfaces.
- Hold the tab of sealant approximately 25 mm from the end of the horizontal cut as shown in the illustration.
- Pull the sealant slowly at a 90° angle from the substrate.
- The sealant is considered to have acceptable adhesion if it either fails cohesively or is extended more than three times the maximum specified elongation of the sealant without



adhesive failure. For example, a 50% movement sealant must be able to extend 150% or greater without adhesive failure.

6. The sealant test sample should be inspected for voids, irregular joint fill, improper joint dimensions and other workmanship issues.
7. Results should be recorded in the Field Adhesion Testing Log in the Documentation section of the Dow Building Envelope Weatherproofing Manual.

### Repair of Field Adhesion Test Area

The field adhesion test area can easily be repaired by applying new sealant into the test area. The test sample should be removed. The new sealant will fully bond to the existing sealant surfaces in the joint, so further cleaning is not required.

### Documentation

The Product Quality Control Log can be used to document sealant quality control testing during the project. The Field Adhesion Testing Log can be used to document field adhesion testing results. Completed documents may be required for specific DOWSIL™ warranties. More information is available in the Dow Building Envelope Weatherproofing Manual.

### Warranty

Dow offers project-specific Weather seal Limited Warranties for new or remedial construction projects using DOWSIL™ brand weatherproofing sealants. Please contact your Dow technical representative for more information on available warranties.

These recommendations are designed to ensure that weather sealing joints sealed with DOWSIL™ brand silicone sealants achieve the best possible performance.

- Proper sealant usage is dependent on the following essential steps:
- Application must be carried out on clean and dry surfaces following the recommended cleaning and primer application procedures.
- Sealant adhesion has been tested and shows positive results on all different surface types to be sealed, on which adhesion is mandatory.
- Sealant compatibility has been tested for all organic materials in direct contact with the sealant (except silicone profiles and untreated closed cell polyethylene foam profiles). Compatibility with non-DOWSIL™ sealants must also be verified by laboratory testing.
- No stress or movement is permitted of the sealant joint until the sealant is completely cured.
- The sealant joint may not be covered before the curing process has completed. The maximum joint depth is 15mm when using mono-component sealants.
- When totally cured, the maximum joint movement may not exceed the allowed capability of the sealant, which, for example, is: +/-50% for DOWSIL™ 791 Silicone Weatherproofing Sealant.

On the condition that the designer and the sealant contractor have followed and completed all required steps of joint design, proper application and quality control according to the stated requirements in the Dow Building Envelope Weatherproofing Manual, Dow can offer a product warranty of 10 years (12.5 years in the UK) that warrants the performance of the sealant.

As of November 2017, Dow Performance Silicones, a global business unit of DowDuPont Materials Sciences division, announces the rollout of a new product brand name – DOWSIL™ – for its heritage Dow Corning high-performance silicone based building products. The new DOWSIL product brand name represents the combined power of Dow and Dow Corning and emphasizes longstanding global expertise in silicone technologies across dozens of industries. Dow offers a number of products to meet specific application needs. These products can be used for different types of cladding panels and supporting construction. Dow has sales offices, manufacturing sites and science and technology laboratories around the globe.

Learn more about the Dow full range of High Performance Building Solutions, including service and support, at [consumer.dow.com/construction](http://consumer.dow.com/construction).  
Dow has sales offices, manufacturing sites, and science and technology laboratories around the globe. Find local contact information at [consumer.dow.com/ContactUs](http://consumer.dow.com/ContactUs).



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#### LIMITED WARRANTY INFORMATION - PLEASE READ CAREFULLY

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