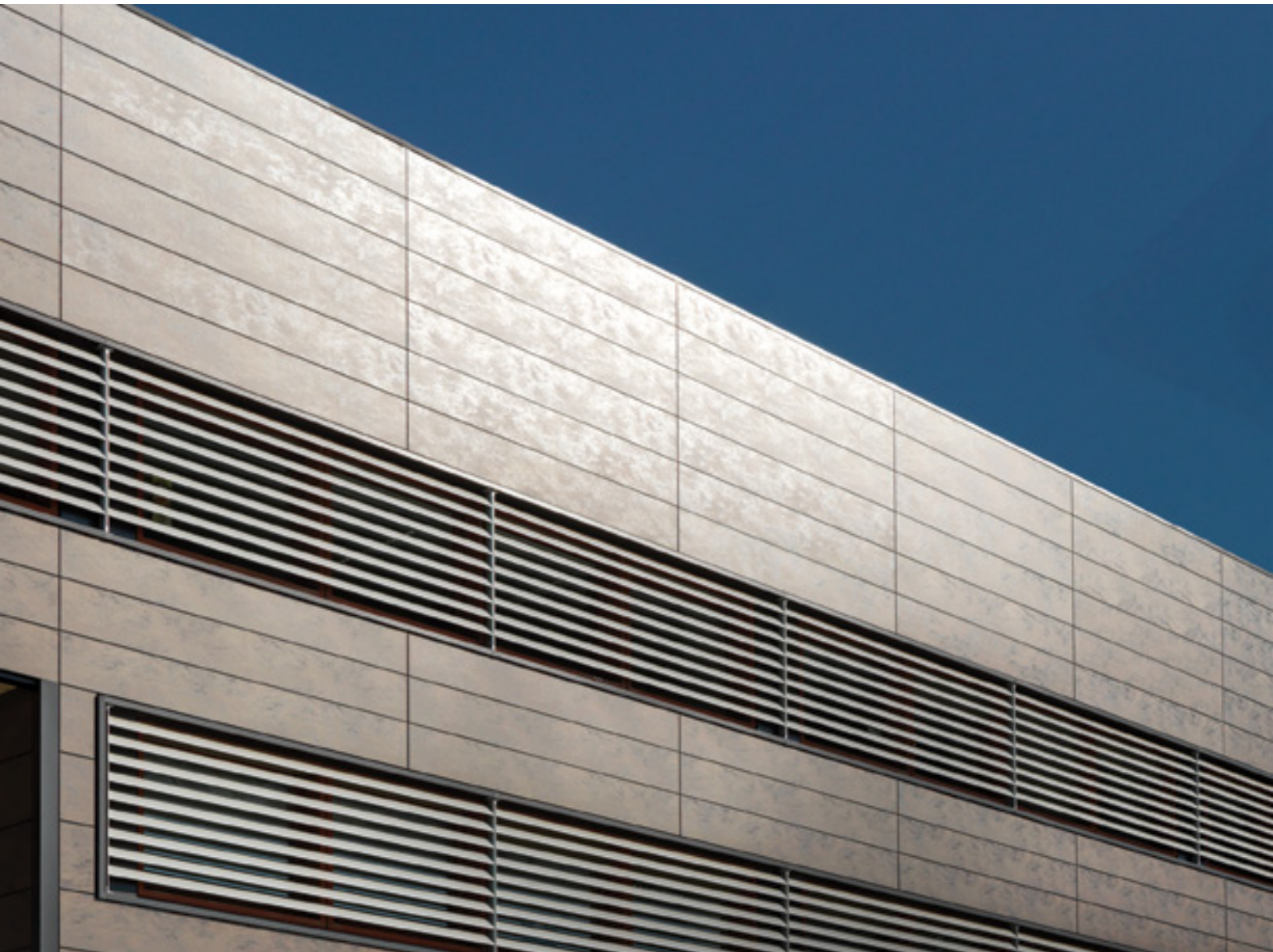
High Performance Building

Consumer Solutions

DOWSIL™ PanelFix System
Application Guide



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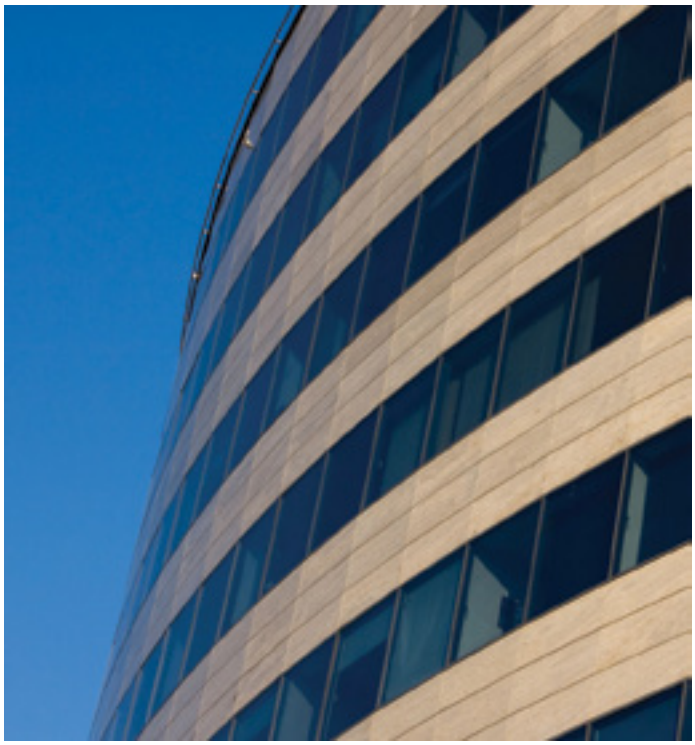


The DOWSIL™ PanelFix System has been specifically designed for elastic bonding of ventilated façade panels for both residential and commercial buildings in new build and renovation projects. It is suitable for both interior and exterior applications.

Products in the DOWSIL™ PanelFix System

DOWSIL™ 896 PanelFix

DOWSIL™ 896 PanelFix is an elastic one-component neutral-curing silicone adhesive specifically designed for non-glass panel bonding applications that require high durability and fast handling. It provides instant bond strength after application and high-strength adhesion once fully cured. It also has good adhesion to a variety of substrates such as aluminium, ceramics, FRC (fibre- reinforced cement), HPL (high-pressure laminates), aluminium-based composite panels, prefabricated mineral wool boards, etc. **DOWSIL™ 896 PanelFix is not suitable for structural glazing.**	PACKAGING: 600 ml sausage and 310 ml cartridge
	TENSILE STRENGTH: >1.1 Mpa
	ELONGATION AT BREAK: >100 %

DOWSIL™ PanelFix Tape

DOWSIL™ PanelFix Tape is a pre-fixing tape for temporary fixation of façade panels during the silicone adhesive curing process. It also ensures that the minimum thickness of the adhesive joint is achieved.	WIDTH: 12 mm
	THICKNESS: 3.2 mm
	COLOR: Black

Cleaners and Primers

DOWSIL™ Construction Primer P is recommended for use on fibre-reinforced cement (FRC) panels, concrete boards, ceramic panels and other porous cladding panels.	PACKAGING: 500 ml can
DOWSIL™ R-40 Universal Cleaner is a solvent blend for cleaning of non-porous cladding panels.	PACKAGING: 1 L and 5 L can
DOWSIL™ R41 Cleaner Plus is a specially formulated solvent blend for aluminium profiles and can also be used to improve adhesion on certain non-porous cladding panels. All primers and cleaners should be stored between +5°C and +25°C in their original unopened containers. Please refer to the relevant technical and safety data sheets for additional information on the above-mentioned products.	PACKAGING: 1 L and 5 L can

Project Review

Project workflow diagram

Complete a project checklist for Dow approval.

Dow reviews design and dimensioning. Dow provides approval letter.

Check whether the substrates are indicated as approved in the document "Approved substrates for DOWSIL™ PanelFix System." If they are not already approved, submit representative samples via Dow COOL for adhesion, compatibility and non-stain testing.

Dow tests substrates for adhesion and compatibility. Dow provides an approval letter within four (4) weeks with specific surface preparation procedures.

Fabricate in compliance with the DOWSIL™ PanelFix System Manual. Follow recommended surface preparation and sealant application procedures during production.

Complete sealant production, adhesion and cure quality control procedures as outlined in the DOWSIL™ PanelFix System manual. Document results in quality control and traceability logs.

Complete a warranty request via Dow COOL. Submit completed QC logs to Dow.

Dow or its partners provide periodic training and/or auditing of the application and quality control procedures to ensure compliance with Dow requirements.

Dow reviews documentation and warranty request and issues warranty if the warranty requirements are satisfied.

Step-by-Step Instructions for Application

STEP 1
CLEANING

STEP 2
PRIMER APPLICATION

STEP 3
TAPE APPLICATION

STEP 4
ADHESIVE APPLICATION

STEP 5
PANEL INSTALLATION

1. Cleaning

For project-specific substrate testing, please contact Dow Technical Service or your Dow distributor for further advice.

Porous substrates to be bonded must be clean, dry, sound, and free from loose debris, dirt or laitance to enable proper adhesion to the substrate.

Non-porous surfaces are typically smooth, and surface preparation will normally only require cleaning with an appropriate solvent. DOWSIL™ R-40 Universal Cleaner is the preferred cleaning solvent for most non-porous substrates, but local regulations concerning solvent use should be consulted.

How to clean

1. Thoroughly clean all surfaces of loose debris. Moisture or contaminants on the surface may have an adverse effect on adhesion to the substrate.
2. Pour a small quantity of cleaner into a working container. A clear plastic solvent-resistant squeeze bottle works best for this purpose. Do not apply cleaner directly from the original container.
3. Wipe the joint surfaces using a clean, absorbent lint-free cloth with sufficient force to remove dirt and contaminants. Allow the surface to dry for a minimum of five (5) minutes.

2. Primer application

Once selected, verify the product is in date and primer is in good condition.

1. Surface must be clean and dry. Primer application should commence within four (4) hours of cleaning. Panel surfaces must be recleaned prior to priming if this is exceeded.
2. Pour a small amount of primer into a clean, dry container and apply primer from the container rather than directly from the can to avoid contamination.
3. Apply a thin, uniform layer of primer by brush to the panel surfaces where the DOWSIL™ 896 PanelFix adhesive will be applied.
4. Allow the primer to dry for a minimum of 15 minutes.
5. Apply DOWSIL™ PanelFix Tape and DOWSIL™ 896 PanelFix within eight (8) hours of primer application. If needed, fresh silicone may be removed using DOWSIL™ R-40 Universal Cleaner.

Preparation of most common panel substrates

Based on our experience and internal testing, we advise the following surface preparation for most common substrates:

- **Aluminium –** Used for both frame and panel could be in composite form: Clean with DOWSIL™ R41 Cleaner Plus. No primer is required.
- **FRC –** Fibre-reinforced cement: Prime with DOWSIL™ Construction Primer P.
- **HPL –** High-pressure laminates: Clean with DOWSIL™ R-40 Universal Cleaner or DOWSIL™ R41 Cleaner Plus. Dow has tested most common panels, all of which show very good primerless adhesion.
- **Porous substrates –** Including ceramic tiles: Prime with DOWSIL™ Construction Primer P.

3. DOWSIL™ PanelFix Tape application*

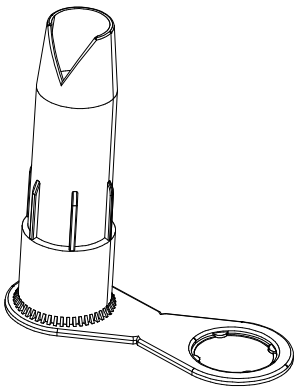
The use of DOWSIL™ PanelFix Tape is necessary for effective on-site panel bonding. Pre-fixing tape provides instant tack for immediate panel fixing and provides a temporary anchor that holds the panel in position while the silicone adhesive completely cures and reaches its final bond strength. Use of this tape also ensures that silicone beads are of a standard thickness once the panel has been positioned.

Once cleaning and priming has been completed and is dry, apply DOWSIL™ PanelFix Tape continuously and vertically onto the supporting structure. Press hard onto the tape to ensure proper adhesion. To avoid contamination of the adhesive surface, do not remove the upper protective layer from the tape until the panel is ready for installation.

4. DOWSIL™ 896 PanelFix adhesive application

After cleaning, priming (if required) and tape installation, DOWSIL™ 896 PanelFix may then be applied onto the supporting structure. Applying DOWSIL™ 896 PanelFix directly to the panel is also possible if required.

Apply DOWSIL™ 896 PanelFix in a continuous operation using a caulking gun, allowing a minimum of 10 mm distance from the tape. A positive pressure is needed to ensure the right amount of silicone is applied. The V-shaped nozzles available with DOWSIL™ 896 PanelFix in cartridges and sausages will form a triangular bead which will lead to a final joint of 12 mm x 3 mm, ensuring proper contact and wetting of the surface.



Extrude the silicone with a minimal angle between the nozzle and the surface to achieve the required joint dimensions.

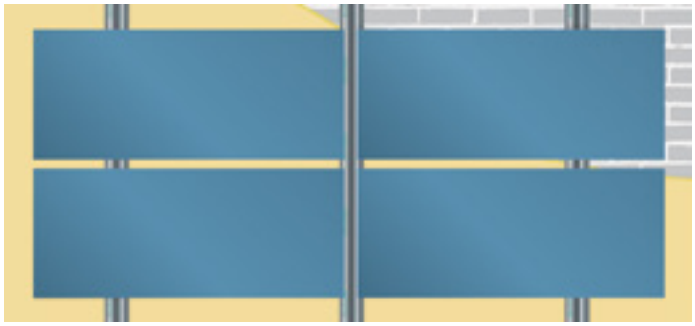
DOWSIL™ 896 PanelFix must be applied within eight (8) hours after priming. Should this be exceeded, the surface must be re-cleaned and re-primed before applying the silicone adhesive. After the silicone application, remove the protective layer from the pre-fixing tape.

If you require a colored finish on the visible part of the frame, apply a suitable paint between the two tape strips. Do not apply adhesive and tape on the painted area.

5. Panel installation

IMPORTANT: The panel must be installed before the silicone begins to form a skin – usually within five to ten minutes, depending on temperature and humidity.

Position the panel by gently pressing and correcting if needed. The installer may use panel suckers, setting blocks, spacers or other supporting tools to assist in the proper positioning of the panel. Once in position, apply further pressure to ensure that DOWSIL™ PanelFix Tape is in complete contact with the inner faces of both the panel and the supporting structure.



Project review – Requirements, Conditions and Limitations

Design

To ensure long-term durability, DOWSIL™ 896 PanelFix joint design should meet the following requirements:

a) For standard projects, using vertical profiles with a maximum distance of 600 mm between profiles, with a typical joint configuration of minimum 12 mm width and 3 mm thick on each frame, panel sizes up to 1200 mm x 1800 mm and windloads up to 2000 Pa can be accommodated. For this type of design, DOWSIL™ 896 PanelFix has the ability to withstand loads of panels up to 12 mm thick and up to 2500 kg/m^3 density. Safety factors applied to such panel bonding applications are similar to the Dow guidelines for structural projects.

b) If your project is likely to exceed these specifications (windloads above 2 kPa or bigger panels sizes) or if alternative bonding solutions are being examined, please contact Dow Technical Service or your local Dow distributor for specific project approval.

Supporting structure requirements

- For the supporting structure, local building regulations must be considered as well as general rules of good practice.
- Panel manufacturer specifications must be followed.
- The supporting structures to which DOWSIL™ 896 PanelFix adhesive and DOWSIL™ PanelFix Tape will be adhered should be of a sufficient width.
- The distance between construction support frames will depend upon the specific façade construction. This is designed according to wind load, panel weight and impact resistance and is determined by the façade designer.
- Suitable materials for supporting structures are anodized, mill-finished and alodine treated aluminium.

Limitations and external conditions during bonding

- The ambient temperature during application should be between +5°C and +45°C.
- Relative air humidity should be less than 85%. DOWSIL™ 896 PanelFix is not suitable for external application when raining.
- In wet conditions, substrates must be dry and of a temperature exceeding +5°C.
- For panel sizes larger than 1200 mm x 1800 mm, please contact Dow Technical Service or your Dow distributor.
- Due to the variability of wood, please consult Dow for specific advice.

*Refer to our pre-approved substrates list on: consumer.dow.com/construction

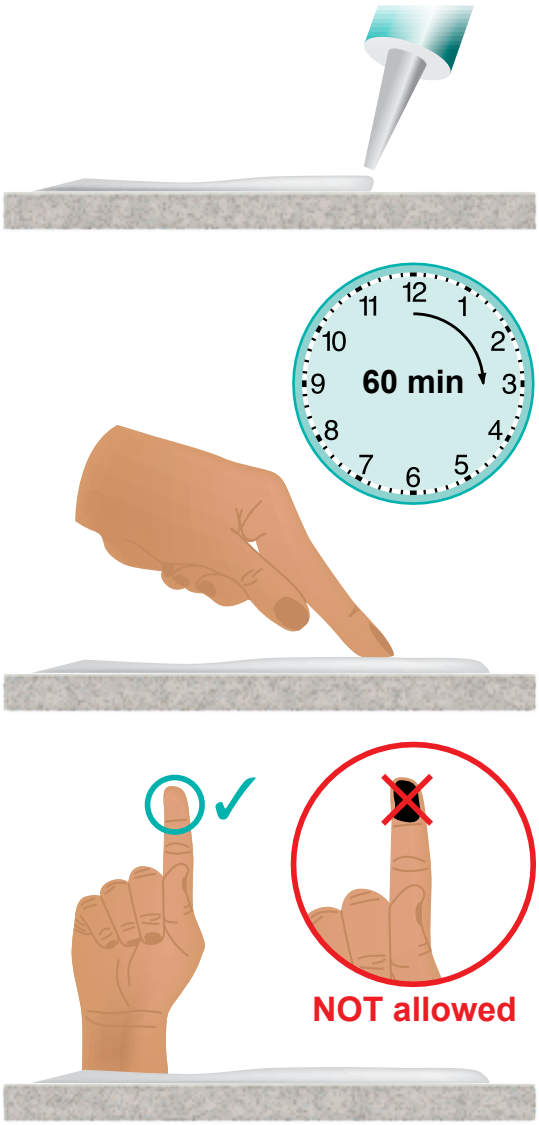
Quality Control

DOWSIL™ 896 PanelFix quality

Checking tack-free time is a simple method of confirming the quality of silicone adhesive. Extrude a small amount of DOWSIL™ 896 PanelFix onto a substrate. After 60 minutes, the skin of the silicone should be fully cured and leave no visible marks when touched. Please contact Dow Technical Service or your Dow distributor if full cure of the silicone skin is not observed within the stated time frame.

Adhesion to substrates and frames

Peel adhesion is a simple, effective test that verifies silicone adhesion to a substrate. This test should be performed one (1) week in advance on three (3) samples for all substrates to which DOWSIL™ 896 PanelFix and DOWSIL™ PanelFix Tape will be applied.



Peel test

1. Properly clean and prime the test substrate and place a piece of polyethylene sheet or bond breaker tape across the flat surface.

2. Apply a bead of DOWSIL™ 896 PanelFix adhesive and tool to form a strip that is approximately 20 cm long, 15 mm wide and 6 mm thick. At least 4 cm of the silicone should be applied on the polyethylene sheet or bond breaker tape.

3. After one week of cure at 20°C and 50% RH, hold firmly a 4 cm tab of the silicone adhesive that overlays the polyethylene sheet and pull at a 180° angle. Peel back 1-2 cm of silicone, leaving the remainder in place for additional testing. If the adhesive tears within itself, this is called 100% cohesive failure. If the adhesive releases from the substrate, the sample indicates 100% adhesive failure. A minimum of 70% cohesive failure is required. If less than 70% cohesive failure is achieved, please consult Dow for advice.

4. For aluminium, if >70% cohesive failure is recorded in dry conditions, immerse initial peel test sample in water (room temperature) for 15 minutes. Then remove the sample from the water and repeat the peel test. If adhesion does not maintain, contact your local Dow Technical Service or your Dow distributor.

5. If the use of DOWSIL™ PanelFix Tape is needed, perform a simple peel test for tape.

   a) Properly clean the test substrate.

   b) Apply the DOWSIL™ PanelFix Tape approximately 15 cm long on testing surface and leave approximately 4 cm of tape free.

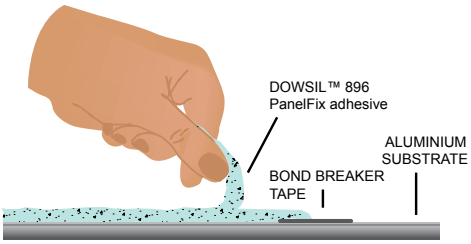
   c) After application, take the 4 cm of free tape and pull at 180° angle.

   d) If the tape has 100 % cohesive failure, the test result is positive. Otherwise, it is negative, and the DOWSIL™ PanelFix Tape must not be used. It is not suitable for use on this substrate.

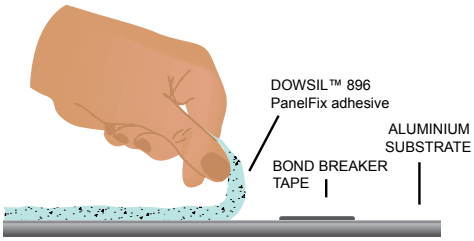
6. In case of negative test results, please consult Dow Technical Service or your Dow distributor.

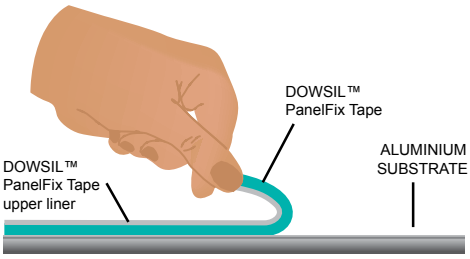
7. Complete the results of all tests in the Daily Quality Log within this document.

Peel Adhesion Test: Cohesive Failure



Peel Adhesion Test: Adhesive Failure





Quality control procedure for panel de-bonding and re-bonding

De-bonding is a method of quality inspection used to confirm sealant adhesion and bead size. De-bonding requires the complete detachment of a panel bonded to a frame. Once removed, the silicone sealant is inspected for sealant adhesion and size of silicone sealant bead. De-bonding is very useful to installation personnel as a form of feedback on their performance. Installation personnel should be present during the inspection.

Dow does not require this test method as a standard quality control procedure. Nevertheless, it is a good practice that should be incorporated in a comprehensive quality control program. For special warranties and certain projects, Dow may require this procedure to be carried out in a quality control program.

Dow recommends the following de-bonding and re-bonding procedure:

1. First of all, determine if the existing sealant is adhering well. A peel test must be performed to confirm that the existing sealant has excellent adhesion to the frame (100% cohesive failure). If the adhesion cannot be confirmed, please contact Dow's Technical Department.
2. Remove all existing damaged panel pieces. If the panel is still bonded to the façade, cut the DOWSIL™ 896 PanelFix Adhesive joint with a steel wire tool.
3. Cut away the silicone, leaving a thin film (1 to 2 mm) of sealant on the frame. Complete removal of the sealant is not necessary. However, if complete removal of the sealant is preferred, care must be taken to avoid damage to the finish of the substrate during removal of the sealant.
4. Remove the existing DOWSIL™ PanelFix Tape and clean a new panel substrate and aluminum support with cleaner and apply primer if it is required.
5. Apply new DOWSIL™ PanelFix Tape continuously onto the supporting structure. Apply pressure to the tape to ensure proper adhesion. Apply DOWSIL™ 896 PanelFix Adhesive in a continuous operation using caulking gun, allowing a minimum of 10 mm distance from the tape. The correct amount of sealant needs to be applied and the sealant bite for this application is 12 mm x 3.2 mm by default.
6. Position the panel gently, pressing and correcting if needed. The installer may use panel suckers, setting blocks, spacers or other supporting tools to assist in the proper positioning of the panel. Ensure that the DOWSIL™ PanelFix Tape is in complete contact with the inner faces of both the panel and the supporting structure.

The following is a recommended frequency for de-bonding testing to be performed on a structure:

1. First de-bond – 1 unit out of the first 10 units installed (1/10)
2. Second de-bond – 1 unit out of the 50 units installed (2/50)
3. Third de-bond – 1 unit out of the next 50 units installed (3/100)
4. Through the remainder of the project 1 unit out of every 100 units installed

For further assistance, please contact your Dow Technical Engineer.

The DOWSIL™ PanelFix System is available through Quality Bond™ from Dow – a program that brings together state-of-the-art products, standards of best practice in quality control, quality assurance and product application with specialist silicone fabricators and applicators. Quality Bond™ members benefit from specialized technical support, including assistance with joint calculations, adhesion testing and application training and warranty support.

For further information, please visit **consumer.dow.com/construction**.

Daily Quality Log

Company name and address:			
Project name and address:			
Panel type:		Profile type:	
Lot-n° panel cleaner + expiry date:		Lot-n° profile cleaner + expiry date:	
Lot-n° panel primer + expiry date (if applicable):		Lot-n° profile primer + expiry date (if applicable):	

Date	Temperature and humidity	Sealant lot-n° + expiry date	Peel test (% cohesive failure) after one week (panel – profile)		Tack-free time (min)	Person responsible for the test	Location on façade

Date	Temperature and humidity	Sealant lot-n° + expiry date	Peel test (% cohesive failure) after one week (panel – profile)		Tack-free time (min)	Person responsible for the test	Location on façade

Certifications

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 16/5306

Contact us

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. Find local contact information at **consumer.dow.com/construction** or **consumer.dow.com/panelfix**.

Technical inquiries:
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Marketing:
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Quality Bond:
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EHS inquiries:
europe.ehs@dow.com

Reach inquiries:
reachsupport@dow.com.

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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 WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DOW SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

DOW DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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