

APPLICATION QUALITY DETERMINES THE PERFORMANCE OF A BONDED FAÇADE

Discover why substrate preparation, climate control, adhesive bead geometry, open time and on-site quality assurance determine the durability of a bonded façade.

The Quality of a Bonded Façade Is Created on Site

At TWEHA®, nothing is left to chance. Our façade adhesive systems are developed, manufactured and tested under strictly controlled conditions. Raw materials are carefully selected, production processes are continuously monitored and finished products are subjected to extensive quality control.

System testing and project-specific adhesion tests provide additional confirmation that the selected products and material combinations meet the required technical performance criteria.

However, even the most thoroughly tested adhesive system can only achieve its intended performance when it is applied correctly.

Product quality provides the foundation. Application quality determines the result.

On the construction site, the adhesive system, façade panel, substructure, environmental conditions, detailing and installer workmanship all come together. This is where a tested product becomes a durable façade connection.

A High-Quality Product Is Only the Beginning

Product quality, technical approvals and test reports form the reliable basis of a bonded façade system. They demonstrate what a product or system can achieve under defined and representative conditions.

The completed connection, however, is created during installation.

Differences between tested conditions and actual site conditions can influence the final performance. Even a proven adhesive cannot compensate for:

- an unsuitable or contaminated substrate;
- incorrect surface preparation;
- condensation on the bonding surface;
- an incorrectly applied adhesive bead;
- installation outside the permitted open-time;
- insufficient curing;
- an unstable or incorrectly designed substructure.

A reliable façade therefore requires both a proven system and a controlled application process.

Every Bonding Surface Is Different

A durable adhesive connection starts with a suitable substrate. The bonding surface must be sufficiently strong, stable, clean, dry and free from substances that could interfere with adhesion.

Surfaces that look identical are not necessarily technically identical. Adhesion can be influenced by differences between:

- coatings and surface treatments;
- protective films or production waxes;
- manufacturing processes;
- production batches;
- resin or mesh backings;
- dust, grease and handling contamination;
- storage and transport conditions;
- moisture and weather exposure.

The actual material delivered to site must therefore correspond with the material that was tested and approved.

For example, a successful test performed on an abraded or specially prepared laboratory specimen cannot automatically be applied to an untreated or differently coated production surface.

The purpose of testing projects is not simply to prove that the adhesive can bond. It is to verify that the complete connection is representative of the final façade.

Surface Preparation Is Not a Formality

Correct surface preparation is essential for long-term adhesion.

Depending on the panel and substructure, the prescribed preparation may include:

- cleaning;
- mechanical abrasion;
- removal of weak or unstable surface layers;
- application of an approved TWEHA® surface enhancer.

Each step performs a specific function.

Cleaning removes contamination. Abrasion can remove an unstable surface layer and increase the effective bonding area. A surface enhancer may improve the surface condition, adhesion or resistance to moisture exposure.

Incorrect preparation can create a weak intermediate layer instead of improving the connection.

Typical application risks include:

- residual sanding dust;
- an unsuitable cleaning agent;
- contaminated cleaning cloths;
- insufficient evaporation or drying time;
- excessive application of a surface treatment;

- renewed contamination after preparation;
- touching prepared surfaces with bare hands;
- application outside the permitted temperature range.

Correct adhesive application therefore begins long before the foil pack is opened.

Climate Conditions Always Influence the Process

Temperature and relative humidity directly affect the application, open time and curing of a façade adhesive.

Air temperature alone is not sufficient. The temperature of the façade panel and the supporting profile must also be checked.

After a cold night, an aluminum profile may remain significantly colder than the surrounding air. If its temperature is too close to the dew point, an almost invisible layer of condensation can form on the surface.

Bonding onto condensation can seriously affect adhesion.

Within the TWEHA® system, the substrate temperature must remain at least 3 °C above the calculated dew point.

Environmental conditions also affect working speed:

- high temperatures can shorten the open-time;
- direct sunlight can heat panels and profiles rapidly;
- wind can accelerate skin formation;
- low temperatures slow down curing;
- low humidity can reduce the curing rate of moisture-curing adhesives.

The actual site conditions must therefore determine the work sequence, installation speed and amount of adhesive that can safely be applied at one time.

The Adhesive Bead Is Part of the Façade Design

The shape and dimensions of the adhesive bead are not arbitrary.

Within the TWEHA® façade bonding system, a triangular bead of approximately 8 × 8 mm is applied. During panel installation, it is compressed in a controlled manner to a final cross-section of approximately 12 × 3 mm.

The 3 mm TWEHA® Tape controls the final adhesive thickness and temporarily supports the panel during the initial curing period.

This defined adhesive geometry is necessary to:

- transfer wind pressure and wind suction;
- support the permanent dead weight of the panel;
- accommodate relative movement between different materials;
- distribute stresses over the connection;
- prevent direct contact between the panel and profile;
- create a durable and elastic bond.

A bead that is too thin, too thick, interrupted or incorrectly positioned can change the load distribution and reduce the durability of the connection.

It is therefore not enough for adhesive to be present. The correct bead geometry must be maintained over the full calculated bonding length.

Why the 3 mm Adhesive Thickness Matters

Façade panels and supporting structures expand and contract at different rates.

Aluminium, fiber cement, ceramics, natural stone and composite panels each have their own thermal and moisture-related movement characteristics. The adhesive layer must absorb these differences without transferring excessive stress into the panel or substructure.

An adhesive layer that is too thin has less deformation capacity and may create higher stress.

A bead that is insufficiently compressed may lead to inconsistent panel positioning, uneven load transfer and reduced control over the connection.

TWEHA® Tape ensures that the adhesive is compressed to the intended nominal thickness of 3 mm.

The tape:

- controls the final adhesive thickness;
- prevents excessive compression;
- positions the façade panel;
- provides temporary support during curing.

The tape is not the structural connection. Once fully cured, the adhesive transfers the loads.

Open-Time Requires Discipline

After the adhesive has been applied, the façade panel must be installed within the applicable open-time.

The available open time depends on several factors:

- ambient temperature;
- panel and profile temperature;
- relative humidity;
- wind;
- direct sunlight;
- length of the applied adhesive beads;
- accessibility and installation speed.

Under warm or windy conditions, skin on the surface can form more quickly. Once skin formation has progressed too far, the adhesive may no longer wet the panel surface sufficiently.

The panel may appear to be in contact with the adhesive, while the actual adhesion is significantly reduced.

Applying adhesive to too many profiles in advance may appear efficient, but it increases the risk of exceeding the permitted open-time.

Good preparation and realistic installation planning are therefore technical requirements—not merely organizational matters.

Press the Panel Correctly—Then Leave It Undisturbed

The façade panel must be pressed evenly against the spacer tape.

This controlled movement compresses the triangular adhesive bead to the designed final dimensions. The panel should not be pushed or slid excessively across the adhesive.

Uncontrolled sliding can:

- displace the adhesive bead;
- reduce the effective bead width;
- create uneven adhesive thickness;
- introduce air pockets;
- contaminate previously prepared surfaces.

Once correctly positioned, the panel must remain undisturbed while the adhesive cures.

During the initial curing period, the connection should be protected against:

- movement or displacement;
- shocks and vibrations;
- pulling forces;
- premature loading;
- pressure from temporary coverings;
- disturbance caused by other site activities.

The adhesive does not achieve its full mechanical properties immediately after installation. Sufficient curing time is therefore an essential part of the system.

Application Is Part of the Façade System

A TWEHA® façade bonding system consists of more than a foil pack of adhesive.

The complete solution includes:

- a technically correct façade design;
- suitable and tested materials;
- a stable and correctly aligned substructure;
- prescribed surface preparation;
- controlled environmental conditions;
- correct adhesive application;
- sufficient curing time;
- inspection and documentation.

The installer therefore does more than apply adhesive.

The installer creates the structural connection on which the façade design, engineering calculations and system tests are based.

This makes application knowledge, training and workmanship essential components of the façade system.

The installer does not simply bond a panel. The installer completes the engineered façade connection.

On-Site Quality Control Creates Confidence

A practical quality-control plan makes the installation process verifiable and traceable.

Depending on the project, the following information may be recorded:

- product names and batch numbers;
- expiry dates;
- storage conditions;
- ambient temperature and relative humidity;
- panel and profile temperatures;
- calculated dew point;
- surface-preparation procedure;
- cleaning and surface-treatment products used;
- nozzle dimensions and adhesive bead geometry;
- application and panel-installation times;
- tape position and final adhesive thickness;
- photographs of critical installation stages;
- periodic adhesion tests;
- deviations and corrective actions.

This documentation does more than confirm that the procedure was followed.

It protects:

- the installer;
- the façade contractor;
- the designer;
- the client;
- the building owner;
- the users of the building.

A controlled and documented process turns workmanship into demonstrable quality.

From a Proven Product to a Proven Façade

TWEHA® supplies high-quality, tested and controlled bonding systems for ventilated façade cladding.

Our involvement extends beyond product supply. We support designers, engineers, distributors, façade contractors and installers with:

- technical advice;
- project-specific adhesion testing;
- substrate assessment;
- façade engineering support;

- structural calculations;
- detailed application instructions;
- installer training;
- on-site guidance.

This creates a reliable connection between a proven product and a professionally executed façade.

Because product performance alone does not create a durable façade.

The substrate must be suitable. The environmental conditions must be controlled. The adhesive bead must have the correct geometry. The open time must be respected. The panel must be installed correctly, and the connection must be allowed to be cured.

Conclusion: Façade Quality Is Achieved During Application

Product development, manufacturing, quality control and system testing provide the technical foundation of a reliable façade bonding system.

The final performance, however, is achieved on the construction site.

A suitable substrate, correct surface preparation, controlled climate conditions, prescribed adhesive geometry, disciplined open-time management and sufficient curing all contribute to the final result.

Performance is proven during testing but realised during application.

With the right products, technical knowledge and controlled execution, TWEHA® transforms a sound façade design into a durable, safe and reliable façade system.

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