

DURABILITY IS MORE THAN PASSING A TEST

 **The real question is not just how an adhesive system is tested — it's what happens after.**

In bonded façade construction, a successful laboratory test is essential. But it is not the final answer.

At TWEHA®, durability testing is used to determine whether the complete bonding combination — façade material, surface treatment, adhesive and supporting structure — can continue to perform after exposure to severe environmental conditions.

However, even the best-tested adhesive system can only deliver its intended performance when it is incorporated into a well-designed façade and correctly applied on site. That is why we look beyond the test result.

 **Testing proves the potential of the system. Design, detailing and application determine whether that potential is realized in practice.**

Why TWEHA® performs ageing and durability testing

A façade adhesive is expected to perform for decades while being exposed to constantly changing conditions. During its service life, the bonding system may have to withstand:

- moisture and prolonged humidity;
- high and low temperatures;
- repeated thermal expansion and contraction;
- wind-induced tensile and shear loads;
- movement between façade panel and supporting structure;
- ageing of coatings, primers and other surface layers;
- and combinations of these influences.

A simple initial adhesion test therefore tells only part of the story.

An adhesive may show excellent strength shortly after curing but behave differently after prolonged exposure to water, heat or severe temperature changes.

 **For that reason, TWEHA® does not only ask: “Does it bond?”
The more important question is: “Will it continue to bond after ageing?”**

From initial adhesion to accelerated ageing

Before an adhesive system is recommended for a particular façade material, TWEHA® evaluates the complete interface. This can include the:

façade panel → surface/coating → pretreatment → adhesive → supporting structure

Each layer matters. Coating, mesh reinforcement, resin layer, mill or anodized surface aluminum may become the weakest link, even when the adhesive itself remains perfectly intact.

Testing the adhesive alone would therefore provide an incomplete picture.

Initial assessment

Test specimens are prepared using defined materials and application procedures. Depending on the substrate, this may include cleaning, mechanical surface preparation or the use of TWEHA® surface treatment.

The adhesive is subsequently applied under controlled conditions and allowed to be cured.

A typical reference conditioning period is: 14 days at approximately 20 °C and 65% relative humidity. This establishes the initial bonding condition before accelerated ageing begins.

Accelerated ageing: testing beyond normal conditions

The purpose of an ageing test is not to reproduce twenty or thirty years of façade exposure literally.

Instead, the system is deliberately subjected to a sequence of severe environmental conditions intended to reveal weaknesses in the adhesive bond or one of the materials forming part of the load path.

A TWEHA® durability program may therefore include successive exposure to conditions such as:

- **Water exposure**
Prolonged immersion or moisture exposure is used to determine whether can influence adhesion, coatings, primers, resin layers or the substrate itself.
- **Low-temperature exposure**
Exposure to determine whether low temperature will influence the adhesion.
- **High-temperature exposure**
Elevated temperatures accelerate thermal ageing and challenge the compatibility of the different materials.
- **Cataplasma / combined heat and moisture exposure**
A severe combination of elevated temperature and moisture is used to accelerate degradation mechanisms that may otherwise become visible only after long-term outdoor exposure.

Repeated thermal conditioning

Temperature- and circumstances-changes expose differences in thermal expansion between the façade panel, adhesive and supporting structure and impact the adhesion, coatings, primers, resin layers or the substrate itself.

The exact test program can be adapted to the material combination and intended application.



The purpose is deliberately demanding: We are not trying to prove that a fresh adhesive is strong. We are trying to find out where the complete system could eventually become weak.

The failure mode is as important as the measured strength

After conditioning, the specimens are mechanically assessed.

But TWEHA® does not look at the numerical strength value alone. The location and type of failure often provide even more valuable information.

For example:

- **Cohesive failure in the adhesive** means the adhesion to both surfaces has remained stronger than the internal strength of the adhesive.
- **Adhesive failure at an interface** may indicate insufficient surface compatibility or deterioration of the bond.
- **Substrate failure** may demonstrate that the adhesive bond is stronger than the material onto which it has been applied.

And sometimes testing exposes something that would otherwise remain unnoticed: a coating, mesh resin or intermediate layer may fail internally while the TWEHA® adhesive remains perfectly bonded to it. This is exactly why complete system testing matters.

 **The adhesive connection can never be stronger than the weakest layer in the entire load path.**

Passing the test is the beginning — not the end

A successful durability test demonstrates that a specific combination of materials has technical potential to provide a durable bond. But a test specimen is prepared under controlled conditions. A façade is not.

On site, many additional factors determine the eventual quality of the bonded façade.

And that brings us to what is perhaps the most important question: What happens after the test?

1. Application quality

Surface preparation must correspond with the tested procedure.

Dust, contamination, moisture, incorrectly applied primers or undocumented coatings can completely change the adhesion behavior.

The same applies to adhesive geometry. Correct bead dimensions and adhesive thickness are important because the adhesive layer must not only transfer loads — it must also remain sufficiently flexible to accommodate movement.

TWEHA® systems are therefore designed around a defined adhesive geometry, typically creating a controlled elastic bonding layer after installation.

Changing that geometry also changes the mechanical behavior of the connection.

2. Environmental conditions during installation

Temperature, humidity, condensation and dew point all influence application and curing.

The substrate must therefore be suitable for bonding now the adhesive is applied.

A technically approved material combination does not automatically compensate for an incorrectly prepared or contaminated surface.



A qualified product still requires a qualified application.

3. Durable façade detailing

The adhesive connection is only one component of the façade.

A durable ventilated façade also requires correct consideration of:

- water drainage;
- ventilation of the cavity;
- panel joints;
- thermal movement;
- supporting-profile layout;
- panel dimensions;
- edge distances;
- local wind loads;
- interaction between neighboring panels;
- and movement of the supporting structure.

Poor detailing can introduce stresses that were never intended to be transferred through the adhesive connection.

Good façade engineering therefore starts with understanding how the complete façade behaves.

4. Allowing the façade to move

Façade panels and supporting structures expand and contract continuously.

Different materials have different coefficients of thermal expansion. Aluminium, ceramics, fiber cement, natural stone, glass and composite panels do not move in the same way.

A rigid connection can concentrate these stresses.

A properly engineered elastic adhesive connection can absorb part of these differential movements — provided that the adhesive thickness, bead geometry and structural layout are correct.

This is one of the reasons why TWEHA® evaluates not only adhesive strength but also the mechanical behavior of the bonding system as part of the façade construction.

5. Ventilation and moisture management

In a ventilated façade, the cavity behind the panels is an important part of the building-envelope concept.

Ventilation helps remove heat and moisture and contributes to more stable conditions behind the façade panels. But this only works if the façade has been detailed accordingly.

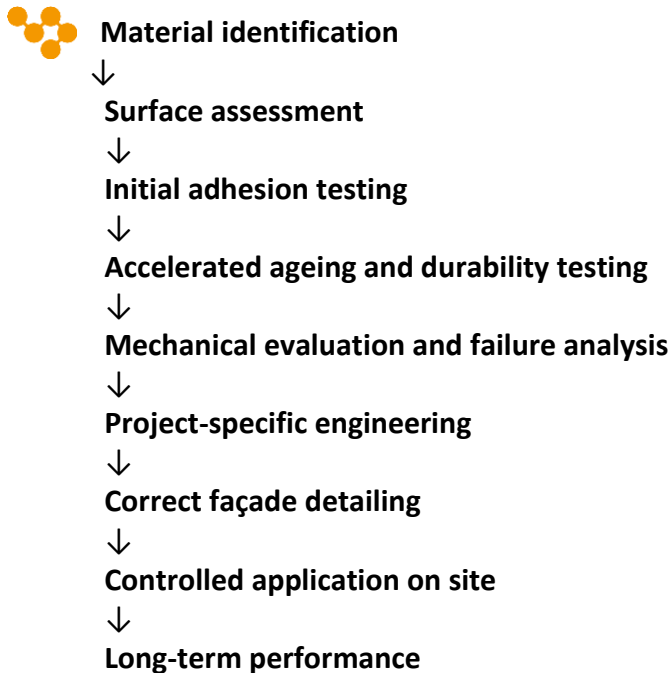
Blocked ventilation openings, inadequate drainage or poorly designed joints can alter the moisture and temperature conditions to which panels, substructure and adhesive system are exposed.

Durability therefore depends on both material performance and façade physics.

From laboratory test to real façade performance

This is why TWEHA® follows a broader philosophy than simply approving an adhesive based on a laboratory value.

Our approach can be summarized as:



Every step contributes to the reliability of the final façade.

Technical knowledge creates safer decisions

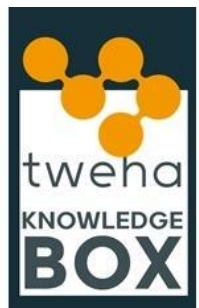
With decades of international experience in bonded façade systems, TWEHA® has learned that failures are rarely explained by one single number. They are usually the result of an interaction between materials, design, environmental exposure and workmanship. That is why we do not simply ask whether an adhesive reaches a particular tensile strength. We want to understand:

- **What happens after water exposure?**
- **What happens after heat?**
- **What happens after severe cold?**
- **What happens to coatings and intermediate layers?**
- **Where does the system eventually fail?**
- **Can the adhesive accommodate real façade movement?**
- **And can the tested solution be reproduced reliably on site?**

Those questions ultimately provide much more information than a certificate showing that an adhesive once passed a test.

Tested in the laboratory. Engineered for the real world.

At TWEHA®, ageing and durability testing is therefore not isolated laboratory exercise. It is part of a wider engineering process in which adhesive technology, façade design, detailing and application quality must work together.



Because the real objective is not to produce a test specimen that survives an accelerated ageing program.

The real objective is to create a façade that continues to perform safely and reliably for decades.

 **The real question is not just about the test.
It is what happens after.**

TWEHA®, 2026

