

BONDING NATURAL STONE WHEN IT IS SOAKED WET

Natural stone façades create a timeless, luxurious, and durable architectural appearance. However, when bonding natural stone panels, one critical factor should never be underestimated: **moisture**.

If natural stone panels are fully soaked with water, proper adhesive bonding becomes impossible.

Understanding the influence of water on bonded cladding systems is essential to ensure safe, durable, and long-lasting façade performance.

Why Wet Natural Stone Creates Problems

When an adhesive bead is applied onto a water-saturated natural stone panel, the adhesive cannot establish proper contact with the substrate surface.

Instead, a microscopic water film develops between:

- the adhesive,
- and the natural stone surface.

This water layer prevents the adhesive from creating the necessary physicochemical bond with the substrate.

As a result:

- adhesion is blocked,
- bond strength decreases,
- and the glued connection may ultimately fail.

The Influence of Porosity

Natural stones, especially porous stone types — absorb moisture into its internal structure.

The more porous the material:

- the easier water penetrates the substrate,
- and the longer moisture remains trapped inside the panel.

Inside porous materials, water moves between the grains and pore structures of the stone.

Under stress conditions caused by:

- the panel's own weight,
- wind loads,
- thermal movement,
- and mechanical tension,

These internal grain structures can slightly shift.

This creates additional microscopic pore volume inside the material, allowing even more moisture movement within the substrate.

The Formation of a Water Film

When adhesive is applied onto a saturated porous material, the adhesive layer blocks moisture from escaping through the bonded area.

As pressure and internal moisture movement continue, water accumulates at the interface between:

- the adhesive layer,
- and the porous substrate.

This process gradually creates a continuous water film that prevents proper adhesion. Eventually, the adhesive bond can collapse because the adhesive is no longer bonded directly to the substrate itself — but effectively to a layer of water.

A Simple Comparison

A useful way to understand this phenomenon is to compare it with a playground slide.

On a dry slide:

- friction between your clothing and the surface slows movement.

But once a thin water film forms:

- friction disappears,
- and you suddenly slide much more easily.

The same principle applies to adhesive bonding.

A thin water film between the adhesive and the substrate drastically reduces adhesion performance.

Proper Storage Is Essential

To achieve a reliable and durable bonded connection, natural stone panels should always be stored:

- in a dry environment,
- protected from rain,
- and with sufficient time to dry before installation.

This allows excess moisture to evaporate from the material and ensures the adhesive can bond directly to the substrate surface as intended.

Proper substrate condition is one of the most important factors in successful façade bonding.

Not Only Natural Stone

Although this issue is often associated with natural stone, the same principle applies to virtually all cladding materials.

Moisture can negatively influence the adhesion performance of:

- fibre cement,
- ceramics,
- HPL panels,
- concrete-based materials,
- and other porous façade substrates.

That is why professional bonding always requires:

- correct storage,
- proper surface preparation,
- moisture awareness,
- and expert installation procedures.

TWEHA®: Expertise in Durable Façade Bonding

With decades of experience in façade bonding technology, TWEHA® understands the critical role substrate conditions play in long-term adhesive performance.

Through:

- technical expertise,
- practical support,
- extensive testing,
- and proven bonding systems,

TWEHA® helps architects, contractors, and façade specialists achieve safe and durable bonded façade constructions worldwide.

Because successful bonding starts long before the adhesive is applied.

TWEHA®, 2026