

REQUIREMENTS FOR A TIMBER SUBSTRUCTURE FOR BONDED FAÇADE PANELS

Why the timber substructure determines the reliability of the entire façade system

In bonded ventilated façade systems, the adhesive bond is only as reliable as the substrate behind it.

When façade panels such as:

- HPL,
- fiber cement,
- aluminum composite,
- or ceramic panels

are bonded to a timber substructure, all loads are transferred through the adhesive interface into the timber battens or rails.

This makes the quality of the timber subframe critical.

At TWEHA®, we therefore emphasize that successful bonded façade construction requires not only a high-performance adhesive system, but also a correctly designed and prepared timber substructure.

The timber subframe is a structural component

A timber substructure should never be treated as a secondary or low-risk component.

The timber battens directly influence:

- adhesion performance,
- dimensional stability,
- long-term durability,
- and façade safety.

Even the best adhesive system cannot compensate for:

- unstable timber,
- excessive moisture movement,
- poor surface preparation,
- or structural deflection.

Timber grade and dimensional stability

For bonded façade applications, structural-grade timber should always be used.

Typically: **C24 structural timber**

is recommended due to its predictable mechanical properties and dimensional stability.

However, timber grading alone is not sufficient.

The battens or rails must also remain:

- straight,
- stable,
- and resistant to twisting or bowing.

Excessive deformation can introduce stress into the adhesive bond and negatively affect long-term façade performance.

Planed timber is essential

The bonding surface quality is non-negotiable.

For reliable adhesion, the timber surface must be:

- planed,
- smooth,
- homogeneous,
- and dimensionally consistent.

Rough-sawn timber is not suitable for bonded façade systems.

Why?

Because uneven surfaces reduce adhesive contact quality and create uncontrolled stress concentrations within the bond line.

A flat and uniform bonding surface is essential for predictable adhesive performance.

Moisture protection and durability

Although positioned behind ventilated cladding, the timber substructure must still be considered an exterior application.

The façade build-up should therefore be designed according to a proper durability strategy, including:

- rear ventilation,
- drainage,
- moisture management,
- and prevention of standing water.

Excessive moisture exposure is one of the greatest risks in bonded façade systems.

Moisture can lead to:

- timber swelling and shrinkage,
- reduced adhesion performance,
- dimensional instability,
- and increased long-term failure risk.

Moisture content requirements

Now of bonding, timber moisture content should remain **below 18%**

Controlling moisture variation during service life is equally important.

Timber movement caused by changing humidity conditions can create cyclic stress in the adhesive joint.

For this reason, the façade system must always be:

- rear ventilated,
- protected against direct water exposure,
- and properly detailed to minimize moisture accumulation.

Surface preparation: critical for long-term adhesion

Proper surface preparation is one of the most important factors for durable bonded façades. Before bonding, timber must be:

- dry,
- dust-free,
- grease-free,
- and properly planed.

The bonding area must also be free from:

- knots,
- cracks,
- resin pockets,
- contamination,
- and planer burns.

Only a clean, homogeneous bonding surface can ensure consistent adhesive performance.

Use only system-tested components

Reliable façade bonding is based on tested system compatibility.

Bonding should therefore only be performed using:

- the specified adhesive,
- compatible primer,
- and approved fixation tape.

Mixing products from different manufacturers is strongly discouraged.

At TWEHA®, our systems are designed and tested as complete façade bonding solutions, ensuring optimal compatibility between all components.

Protection with TWEHA® WoodProtect

To improve the durability of timber substructures, the correct protection system is essential.

TWEHA® WoodProtect should only be applied:

- according to the specified coverage rates,
- within the prescribed window,
- and following the official application guidelines.

Correct application contributes to:

- moisture resistance,
- improved durability,
- and long-term façade reliability.

Structural requirements of the timber subframe

The timber substructure must provide sufficient stiffness under wind and façade loads.

Deflection is typically limited to: **L/300 or stricter** depending on:

- panel type,
- project location,
- wind load,
- and façade geometry.

Excessive movement can compromise the adhesive bond and façade integrity.

Batten spacing and continuous bonding

The required batten spacing depends on:

- panel dimensions,
- panel stiffness,
- wind loads,
- and project-specific engineering.

Typical spacing ranges between **300–600 mm**

In addition, adhesive beads should remain continuous without interruptions.

A continuous bonding line ensures:

- uniform load transfer,
- reduced stress concentrations,
- and improved long-term performance.

A successful façade starts behind the panel

In bonded façade construction, most critical performance factors are hidden behind the cladding.

A stable, dry, and properly prepared timber substructure forms the foundation of:

- façade durability,
- adhesive reliability,
- and long-term safety.

This is why professional façade engineering always considers the complete system — not only the visible panel.

Conclusion

The performance of bonded façade panels depends directly on the quality of the timber substructure behind them.

Correct timber selection, moisture control, surface preparation, and structural detailing are essential for achieving durable and safe bonded façade systems.

At TWEHA®, we combine adhesive technology with façade engineering expertise to support reliable bonded façade solutions from the substructure outward.
