

FIRE REACTION OF ADHESIVE PRODUCTS IN FAÇADE CONSTRUCTION

In modern façade engineering, fire safety is one of the most critical aspects of building performance. As façade systems become more advanced and buildings continue to grow taller, every component within the façade assembly must contribute to a safer and more reliable construction.

This includes adhesive technologies.

While adhesives represent only a small part of the total façade system, their fire behavior and integration within the overall façade assembly are essential considerations in passive fire protection design.

When a Building Fire Becomes a Structural Threat

There is a major difference between a fire inside a building and a building fully involved in fire.

In the early stages of a fire, the structure often remains stable and reliable. However, once the fire develops beyond the compartment of origin, the building itself becomes exposed to severe thermal loads.

At that point:

- Structural materials are heavily stressed
- Façade systems can become involved in the fire
- Vertical fire spread through the façade may occur
- Emergency services often switch to a defensive strategy focused on protecting the surroundings rather than saving the building itself

This is why façade fire performance has become such a critical part of modern building regulations.

Fire Performance Applies to the Entire Façade System

According to European fire safety standards, façade fire performance is never assessed based on individual products alone.

The performance requirement applies to the complete façade construction as an integrated system.

European Standard EN 13501-1 requires façade assemblies to be tested in conditions that simulate the real end-use application as closely as possible. This is essential because fire behavior depends not only on the properties of individual materials, but also on:

- Installation methods
- Mounting systems
- Material combinations
- Structural detailing
- Ventilation cavities
- Thermal exposure during fire

In façade engineering, system performance is what matters most.

The Role of Passive Fire Protection

The purpose of passive fire prevention is to slow down fire development and limit the rapid spread of flames through the building envelope.

This is achieved by designing façade systems that use:

- Non-combustible materials
- Low-combustible components
- Fire compartmentation
- Properly tested assemblies

Even in the event of a fully developed fire, the façade should help prevent rapid fire propagation and provide valuable time for evacuation and emergency response.

Understanding European Fire Reaction Classes

The European fire classification system defines how materials and façade systems behave when exposed to fire.

The classification includes:

- A1 and A2: non-combustible or very limited combustibility
- B to F: increasing contribution to fire development

Additional classifications indicate:

- Smoke production: s1, s2, s3
- Burning droplets and particles: d0, d1, d2

For many medium-rise and high-rise buildings in countries such as Belgium, Netherlands, and Germany, façade constructions are typically required to achieve at least fire reaction class B according to EN 13501-1.

Fire Resistance Requirements by Building Height

The required fire resistance of façade systems generally increases with building height because evacuation and firefighting become more complex.

Typical requirements include:

- Medium-rise buildings (10–25 meters): minimum 60 minutes fire resistance
- High-rise buildings: up to 120 minutes fire resistance
- Basements and cellars: often 120 minutes fire resistance

These requirements are designed to maintain safe evacuation routes and slow the spread of fire throughout the building envelope.

Advanced Adhesive Technology for Safer Façades

Extensive testing and practical experience have demonstrated that the fire reaction of adhesive products developed by TWEHA® does not require separate evaluation within the façade assembly under specific conditions.

This applies when the adhesive:

- Is protected by a building element with sufficient fire resistance
- Is shielded from direct fire exposure on both sides
- Has a mass below 1.0 kg/m²
- Has a thickness below 1.0 mm
- Represents less than 5% of the total façade assembly

These characteristics allow advanced bonding systems to support modern façade design without negatively affecting the fire classification of the complete façade construction.

Combining Design Freedom with Fire Safety

Today's architects and façade engineers increasingly demand solutions that combine:

- High structural performance
- Architectural flexibility
- Clean visual aesthetics
- Long-term durability
- Reliable fire behavior

Modern adhesive technologies help meet these demands while supporting compliance with stringent fire safety regulations.

By integrating tested bonding systems into certified façade assemblies, construction professionals can achieve both design innovation and improved fire performance.

Safer Façades Begin with Smarter Systems

Fire-safe façade construction is not about one single product — it is about the intelligent interaction of all components within the building envelope.

A properly engineered façade system:

- Slows fire spread
- Supports evacuation safety
- Improves structural reliability
- Reduces external fire propagation
- Help emergency services operate more effectively

With advanced façade technologies and proven adhesive systems, the industry can continue to create buildings that are not only visually striking, but fundamentally safer for everyone inside and around them.

TWEHA®, 2026