

DEVELOPMENT AND EXPANSION OF FIRE ONT CLADDING RELATED TO TESTS AND CERIFICATIONS -PART 2-

Using structural adhesive to apply panels on a façade we like to explain contribution of the development and expansion of a fire onto cladding referring to tests and classifications.

According a SBI-test (Single Burning Item test, EN 13501-1) performed on TWEHA adhesives are classified as B-s1,d0.



However, a classification of parts of a cladding by a SBI-test in itself does not say much about the façade construction. Because a fire classification is not intended as a material property but as a construction property.

The aforementioned fire classification (Single Burning Item test, EN 13501-1) only says something about the fire behavior of the façade structure in the case of radiation from the front. It therefore says nothing about the fire behavior when connecting the facades to other structural components, such as the frame or behavior when the edge of the façade surface is loaded.

Consequently, you have to establish which fire performance classification is established in combination with several materials on a particular façade construction by for example BS 8414.

In 2019 a ceramic cladding with our TWEHA StoneMate system was tested, based on BS 8414, by the Fire Protection Association in Gloucestershire and met the criteria for classification.

For a correct understanding into the risk of the contribution of the development and expansion of a fire onto cladding several factors are of influence. It is therefore not only the type of cladding itself that is important, but also the structure behind the cladding, such as, for example, the choice of material for the bearing structure, the insulation, any water-repellent, vapor permeable foil and the presence of an air cavity. These components, alone and together, also have an influence on the fire behavior of the façade construction. Moreover, it must be stated that with the combination of several materials, for example each of which individually meets class B, it cannot be concluded without restraint that the complete composition of the façade structure also meets fire class B. The fire class of the entire structure can then shift to, for example, class C or D. “Stacking” of fire classes is therefore not an option.

Practice is even more difficult. We also see that tested situations do not match the actual situation to be realized. When the cladding by SBI test is classified as fire class A only on a non-flammable background, it cannot simply be given when applied to a flammable background, for example mounting on pinewood framework with fire class D. And what about structures built with timber frame construction or the application of using flammable façade insulation.

Also the influence of open joints in the cladding and the fire propagation in the air cavity also play an important role. With fire propagation over the façade you can observe a fire in time and you can extinguish. You can't do that with a fire in the cavity. You do not know what is happening there and you cannot extinguish as long as the façade cladding is in front. In addition, a façade that is classified according to BS 8414 can show very different practical behavior than would be expected based on the fire class. This is because in practice the thermal load of a natural fire is much greater than the thermal load in the standardized test methods, whereby, for example, the aluminum frame reaches its melting point sooner. And also be aware of the fact that the mechanical behavior in the event of a fire is also different in practice, as a result of which different and often larger deformations occur than in the test situation.

But nevertheless testing brings assumption closer to reality and is very helpful understanding the contribution of the development and expansion of a fire onto cladding.

In case the ventilated façade construction is finished with a bonded non-flammable façade panel, this type of cladding can make an additional contribution to fire safety. Some type of panels, compared to others, remains extremely stable under fire load. Only when there is almost no construction beams is left, the cladding slab will fall down due to its own weight. Probably after about a few hours of full fire. That, contrary to more combustible cladding material.

In practice, even with the use of more vulnerable type of cladding it turns that out the influence of the adhesive bead appears to be negligible. There is relatively little material available and, moreover, sandwiched between façade plate and framework. Its contribution to fire can therefore be eliminated and therefore we know that, in this specific case,

adhesives does not reduce any fire classification.

We refer to hereunder showed photos of a fire on an hpl bonded cladding in 2006. As you can see the parts of cladding close to the pinewood framework last longest without failure of the adhesive.

TWEHA, 2020

