
Short version of the final report

DIBt reference: P-52-5-4.192-1461/14

09 August 2016

1st copy

Research project:

Reaction to fire of external thermal insulation composite systems (ETICS) with polystyrene insulation

Investigation of the fire behaviour of ETICS during external fire tests in the base area

Client:

Deutsches Institut für Bautechnik
Section Reaction to fire of building materials, Fire protective coatings
Kolonnenstraße 30 B
D - 10829 Berlin
Germany

According to the state building codes of the German federal states, surfaces of external walls and external wall coverings of buildings of building class 4 or 5 have to be at least flame-resistant (B1 according to DIN 4102-1).

External thermal insulation composite systems (ETICS) with rigid polystyrene foam (EPS for expanded polystyrene) as insulating material require an approval by the Deutsches Institut für Bautechnik (DIBt) to be used as external wall covering in Germany. For the approval of ETICS with building material class B1 and an EPS insulating material thickness above 100 mm, additional fire tests on a scale of 1:1 are usually required in addition to the usual building material tests for a more detailed assessment of the reaction to fire. In these so-called façade fire tests, the external wall covering is exposed to flames coming out of a window. A wood crib or a gas burner is used as a fire source. The ETICS which are tested in this way are currently assigned to building material class B1 as integral systems taking appropriate fire protection measures into account. Suitable fire protection measures commonly include fire barriers made of mineral wool above every second floor or fall protection made of mineral wool above every opening in the external wall.

The "Reaction to Fire of ETICS" project group of the conference of building ministers of the German federal states analysed a list of fire events at ETICS, which was prepared by fire brigades, and found out that burning waste containers or vehicles in the base area of external walls covered with EPS based ETICS as observed by the fire brigades can pose a threat.

Initially, to verify these findings in tests, a special fire test was developed which simulates the burning of fire loads such as large waste containers or small vehicles in the base area of external walls.

These fire tests confirmed that the event of fire which was simulated in this way at a selected approved low flammability ETICS with polystyrene insulation boards can indeed pose a threat since a quick vertical fire spread may occur.

As a result, reinforcing design measures for EPS-ETICS to improve their reaction to fire were presented, the effectiveness of which could be repeatedly demonstrated.