Hail Impact Protection Register (HSR)

ACFI Test specifications No. 08 Render on external insulation/thermal insulation composite systems (ETICS)

The most up-to-date version of this document can be found on the internet at:
www.hagelregister.ch

This version replaces ACFI Test specification No. 8 Render on external insulation, Version 1.04

Version:	1.05
Date:	01.09.2020

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8 Render on external insulation

8.1 General

The test specification for the building component category "Render on external insulation/thermal insulation composite system (ETICS)" includes additional, building component-specific specifications for the standard test, which are not covered by the general test specifications. The following specifications for testing apply to render on external insulation. The test applies to the insulation thicknesses of the test sample or even thicker.

The test for Render on a solid subsurface is described in Test specification 21.

8.2 Intended purpose

These test specifications include render on external insulation for façade applications. Also known as thermal insulation composite systems (ETICS).

8.3 Execution of test

The test is carried out according to the description in Part A. You may deviate from this method and the test sample can be tested using 10 instead of 5 shots. If a test sample is tested with 10 shots, conversely one shot may cause one defect. The test method selected must be shown in the test report.

8.4 Test samples

The render is always tested on the external insulation material scheduled for the application. The external insulation material is composed of several panels, so that a number of T-shaped shots result (Figure 1). The external insulation material lies on a rigid board (e.g. a structural panel made of wood, fibre cement or a cement slab). The external insulation material must be fixed according to the manufacturer's specification (e.g. mortar over the entire surface and/or with insulation anchors spaced out appropriately). The test sample is to have a length of approx. 1,200 mm and a width of approx. 1,000 mm, a defined granular composition and surface (coated, painted or adhered) as well as a specified thickness of the render base coat/layer.

The following also applies:

- The colour of the top layer of render or top coat of the test sample must be white
- All four side faces and edges of the test sample must be rendered
- The edges and joints may be reinforced with some kind of protection (e.g. corner angle)
- It is possible to test several render systems on the same test sample
- If the external insulation material is secured with insulation anchors, then the position and design of the anchors must be known

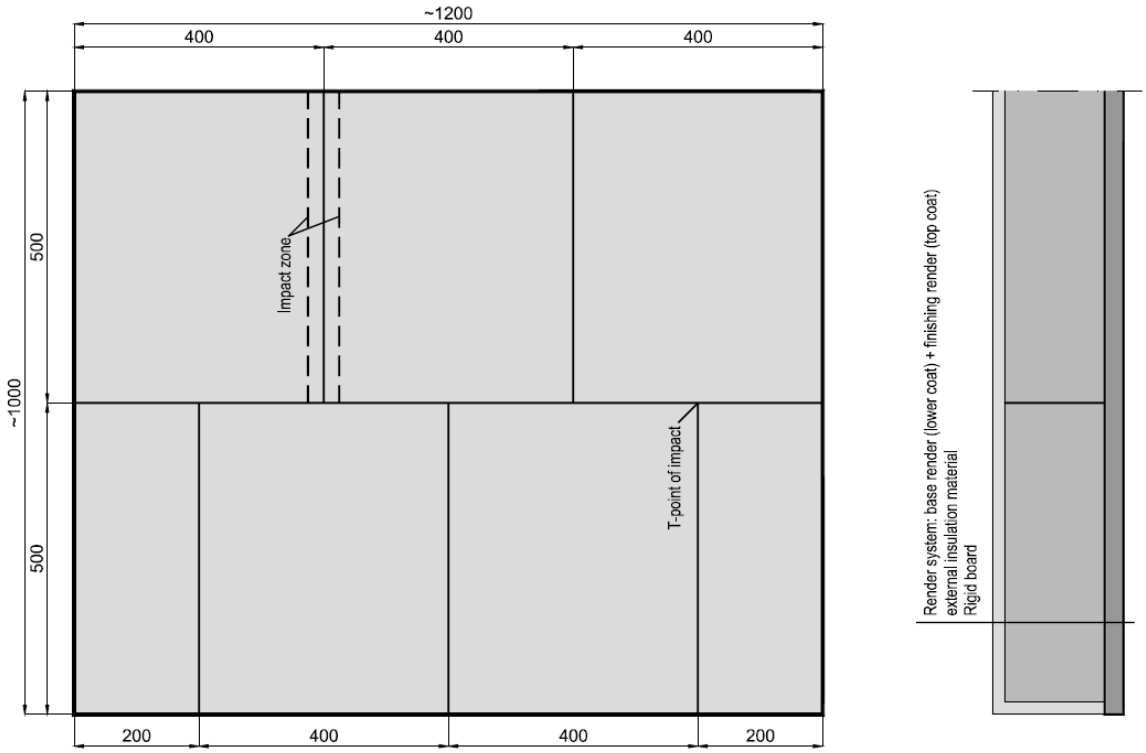

Figure 1 Floor plan and cross-section of a possible test set-up. Render with a number of external insulation panels (dimensions in millimetres)

8.5 Test set-up

The test sample is secured firmly with the test sample holder.

8.6 Pre-storage of test sample before testing

At the time of the test, the render must be at least 28 days old.

8.7 Pre-treatment of samplеduring firing

The surface of the render is moistened three times at 30- second intervals with a damp sponge. Firing takes place at the earliest one minute after the third moistening procedure and at the latest two minutes after the third moistening procedure.

8.8 Target area and angle of impact

The test sample is targeted at the following points (Figures 2, 3 and 4):

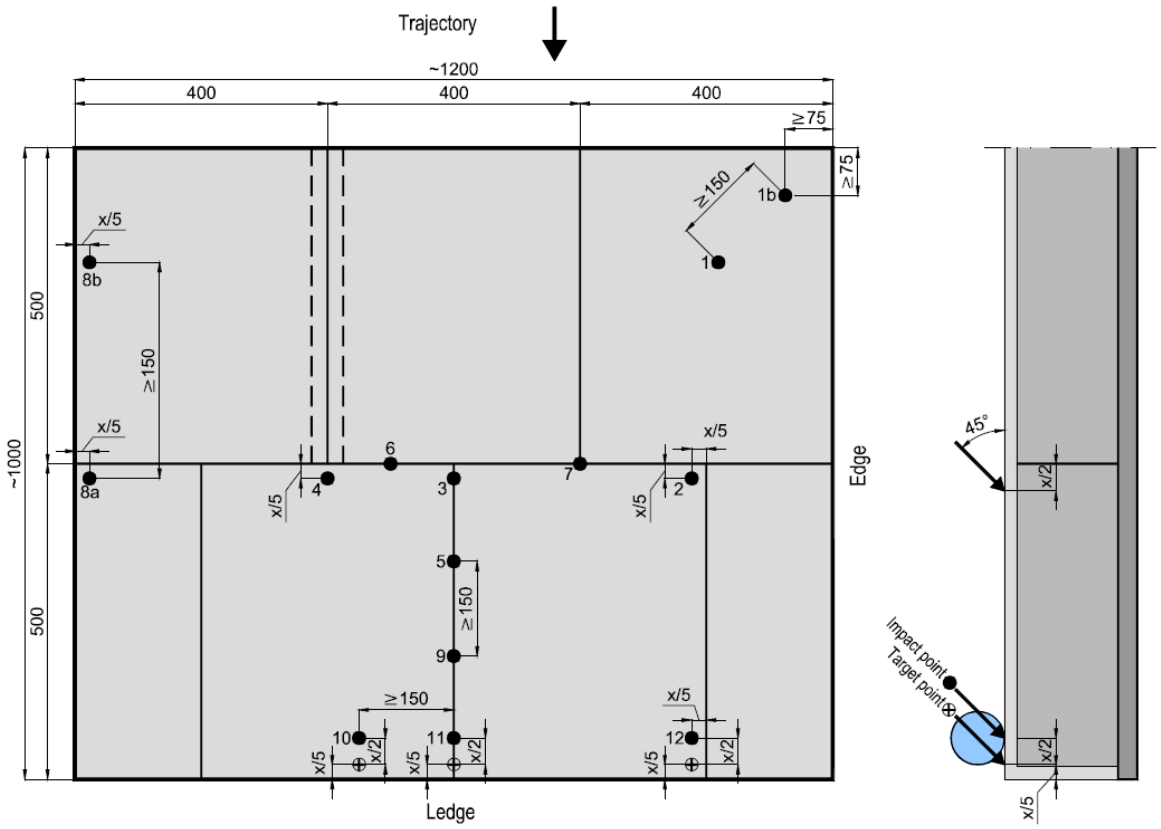

Figure 2 Target areas on floor plan (left figure) and cross-section (right figure)

- **Area = points 1 and 10:**
  The area is targeted taking into consideration the minimal distances (75 mm from the edge, 150 mm between target areas).
- **Edge = points 8, 10, 11 and 12:**
  The distance of the target point from the edge amounts to 1/5 of the projectile diameter. The distance between the target areas is a minimum of 150 mm. Targeting the corner, vertical edge and horizontal lower edge count as the edge (corresponds to the door or window lintel).
- **Point of impact = points 2, 3, 4, 5, 6, 7, 8, 9, 11 and 12:**
  The point of impact is a 50 mm wide zone. The centre line of the impact zone corresponds to the centre line of the impact width (for term "impact width", please see Figure 2). Targeting the vertical and horizontal impact zones and T-point of impact count as the point of impact
- If the external insulation material is secured with **anchors**, then the render in the area of the anchor must be targeted.

Multiple tests can be carried out on one test sample. The distance between the target areas must, however, be at least 150 mm. The angle of impact is 45°. If further weak points are present, they must be subjected to extra testing.

8.9 Measurement of the test sample after a test

The render thickness is specified at the target points in the area and at the edge (two centimetres towards the inside from the level between the insulation and base render coat). At least three measurements must be made at each (total of at least 6 measurements).

In the case of render systems with a measured thickness of base render coat of up to and including 5.0 mm, the render thickness at the edge may be a maximum of 1.0 mm thicker than in the area. In the case of render systems with a measured thickness of base render coat of greater than 5.0 mm, the render thickness at the edge may be a maximum of 2.0 mm thicker than in the area. The point at which the measurement of the base render coat is thickest is always decisive.

Furthermore, the thickness of the render must also be measured at the critical point (where damage occurs with the lowest kinetic energy).

8.10 Building component function

The render is tested for waterproofing and appearance.

8.11 Damage criterion

Waterproofing: the building component is waterproof, as long as no cracks are visible. If a crack is visible (with the exception of shrinkage cracks and the like), the building component is to be regarded as damaged in relation to waterproofing.

Appearance: the building component is not considered damaged where appearance is concerned as long as no indentations or surface changes are visible. If an indentation or surface change is visible, the building component is regarded as being damaged.

8.12 Assessment methods

Waterproofing: waterproofing is checked by looking for cracks with a magnifying glass (6x magnification) in a front light.

Another method for specifying waterproofing is by tapping the target area and close to it ("woodpecker test"). If you hear a different sound, it could indicate some damage. The point of impact must be cut open and examined for delamination and material separation.

Appearance: The appearance of the render on external insulation is visually inspected under all possible lighting conditions and from different angles to the test sample at a distance of 5 m from the test sample.

If the building component function of appearance from a 5 m distance achieves a higher hail impact resistance than the building component function of watertightness, the test sample is also to be inspected for the building component function of appearance according to the same damage criteria at a distance of 0.5 m.

8.13 Test report

In the test report covering render on external insulation, apart from the specifications in general part B, the following points must also be described:

- Test method utilised: The report must explicitly indicate whether the test sample has been tested using 5 or 10 shots (chapter 8.3).
- The structure of the render must be specified in the test report according to the description in chapter 8.4, and the following information must be included without fail:
    - Base coat: composition, layer thickness and position of mesh, measured on test sample
    - Top coat: composition, strength and diameter of granulation, measured on test sample
    - Overall strength of render and information on the strength of the insulation material. Measurement must take place at a T-shot and a target point on the edge
    - Position, technical properties and number of reinforcing meshes
    - Optional: ETAG number

In particular, it must be specified whether the tolerances listed in chapter 8.9 have been complied with.

- It must also be specified which of the following render systems are concerned: synthetic render, mineral-based render, silicate render, silicate resin render or a hybrid system
- If the insulation material is secured to the façade with insulation anchors, the test sample must also use this system. The anchor points must be tested (see chapter. target area and angle of impact). The test report must also indicate:
    - that the thermal insulation system has been tested when secured mechanically with insulation anchors
    - whether the insulation anchors are countersunk into the insulation or are flush-mounted on the insulation.
- If the test is carried out with reinforced edges or joints, this must be indicated in the test report.