Hail Impact Protection Register

ACFI Test Specifications No. 01 Clay and concrete roof tiles

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1 Clay and concrete roof tiles

1.1 General

The test specification for the building component category "Roof tiles" includes additional, building component-specific specifications for the standard test, which are not covered by the general test specifications. This test specification includes regulations for clay roof tiles and concrete roof tiles, which require more than five and fewer than 40 units per square metre, built in technically correctly. Excluded from this limit are shaped clay tiles and shaped concrete tiles.

The clay and concrete roof tile building component category includes:

- Clay tiles: Interlocking and non-interlocking (beavertail) roof tiles, as well as flat tiles
- Concrete roof tiles: Interlocking and non-interlocking concrete roof tiles, as well as flat concrete roof tiles.

1.2 Intended purpose

Clay roof tiles and concrete roof tiles can both be used as roofing, as well as being built onto a façade.

1.3 Test sample

A test sample consists of at least three rows each with at least four roof tiles. The roof tiles are laid according to the manufacturer’s specification on a corresponding support system.

1.4 Test set-up

The roof tiles are laid according to the manufacturer’s specification with the original fixings (with or without storm clips) on the corresponding support system (e.g. tile battens).
The test centre must be able to take any tiles it wants from a selection.

1.5 Pre-storage of test samples

The roof tiles must be at least 28 days and no more than one year old.

1.6 Pre-treatment of test samples

The test sample is wetted and targeted within the following two minutes.

1.7 Target area and angle of impact

Clay and concrete roof tiles are targeted at least at the following points (Figure 1):

Non-interlocking roof tiles:

1. Edge area (gap between two roof tiles)
2. Middle
3. Tip or curved area (most exposed point)
4. Edges in the case of changes in geometry
5. Edge overlapping area

Interlocking roof tiles:

1. directly underneath the bottom edge of the top clay/concrete roof tile
2. Middle of the tile
3. Recess area
4. Interlocking area
5. Lower corner in bottom edge area
6. Recess in bottom edge area
7. Outer lower corner
8. Overlapping area in bottom edge area

Explanatory note on corner target areas: with 1/5 projectile diameter distance from outer edge (Figure 1)

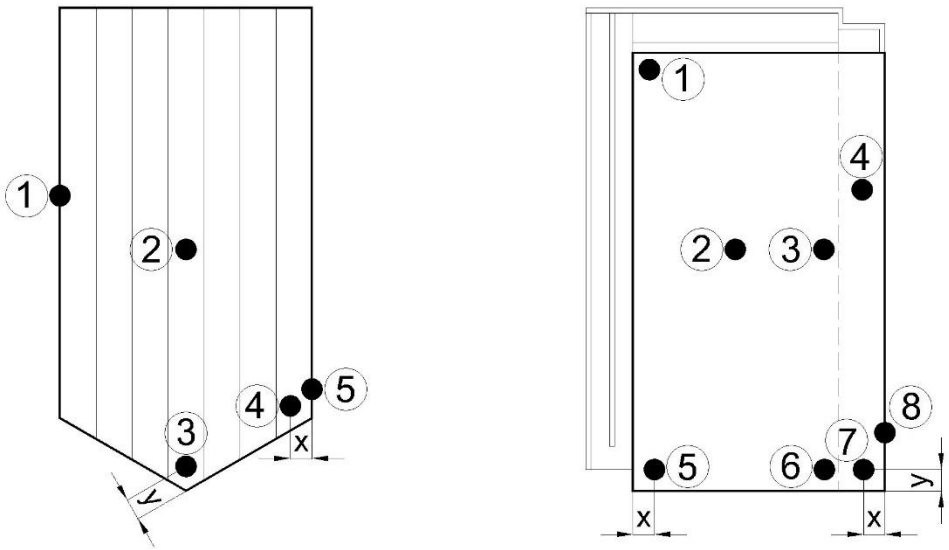

Figure 1 Target areas in ground plan for non-interlocking clay roof tiles and concrete roof tiles (left) and interlocking roof tiles (right), x = y: 1/5 projectile diameter

Only clay/concrete roof tiles may be targeted which are built in so they are surrounded on all sides within the tile layout. Multiple tests can be carried out on one roof tile. If further weak points are present, they must be subjected to extra testing (e.g. other recesses, grooves, changes in geometry, cantilevers, etc.)

1.8 Building component function

The building component is tested for waterproofing and appearance.

1.9 Damage criterion

Waterproofing: in the case of one or more cracks or breaks, the test sample is to be regarded as damaged. In general, underlying clay/concrete roof tiles must also be tested and remain undamaged.

Appearance: if splintering or a surface change is visible, the clay or concrete roof tile is damaged. In the event of splintering >1 cm^2, the test sample is damaged.

1.10 Measurement method

Waterproofing: as long as no cracks or breakages on the front or reverse side can be seen with the naked eye (distance of the test sample from the test equipment = 0.5 m), the watertightness of clay and concrete roof tiles is to be further investigated using the following two methods:

- Wetness: the targeted test sample is wetted and dried again. This method can be used to make visible any cracks due to delayed evaporation/a change in water absorption capacity. By means of repeated wetting and drying after targeting, at points with hairline cracking, the natural water drainage is changed by the suction effect of the material and therefore becomes visible. The roof tile is wetted at least three times, so that any cracks on the reverse side can also be seen. In the event of any type of crack(s), where a change in water absorption can be identified, the tile must be assessed as being damaged in relation to watertightness.
- Magnification:the test sample is investigated for cracks with a lupe offering 6x magnification.

Appearance: the appearance of the clay and concrete roof tiles 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. Incidences of splintering are also observed and measured from a distance of 0.5 m.

1.11 Additional specifications

- Each test report must record the mass (= weight) in grammes/piece of five different examples of the designs tested. Furthermore, the resulting average value is also to be specified and compared with the specifications on the product data sheet and evaluated by the test centre.
- The factory that made the tile must be documented for each design (including related surfaces and possible colouring) for the entry in the Hail Impact Protection Register test report
- The reverse side of the roof tile tested must be documented photographically in the test report (lettering, numbers)
- In the case of the specification of clay roof tile colours, the following options exist for specifications in the test report and on the ACFI Hail Impact Protection Register approval certificate:
    - Specification of explicit colours of individual roof tiles (specify individually)
    - Specification “applies for all available colours on roof tiles that are coloured right through”
    - Specification “applies for all available colours on naturally red roof tiles”