Hail Impact Protection Register

ACFI Test Specifications No. 07 Fibre-cement elements

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Version:	1.04 This version replaces ACFI Test Specifications No. 07 Fibre-Cement, Version 1.03
Date:	01/06/2021

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7.1 General

The test specification for fibre-cement elements includes additional, specific specifications for the standard test, which are not covered by the general test specifications. This test specification covers fibre-cement elements that are flat or profiled, which contain ≤ 30 units/m2 if professionally installed. For installations >30 units/m2, ACFI test specification No. 13 “Shingle” applies.

The test specimen must meet the technical specifications (e.g. corner design) required in the practical application of the component. The specifications of the company that manufactures the elements must be observed during the production of the test specimens.

7.2 Intended purpose

These test specifications cover fibre-cement components with a flat or profiled design for use on façades and on roofs.

7.3 Test specimen

7.3.1 Fibre-cement board-type product installed without completed specimen

The test specimen consists of at least two single pieces that are mounted with original fasteners on the corresponding support system with the most unfavourable spacing in accordance with the manufacturer’s instructions. If the installation instructions allow for projections, the test specimen must feature projections in the maximum allowable dimensions.

If the test is to apply to elements installed such that they overlap one another, the test specimen must exhibit an adequate amount of overlapping areas. In the case of profiled elements, this applies to horizontal and vertical overlaps.

7.3.2 Fibre-cement board-type products installed in completed specimen

The elements are mounted on the corresponding support system, whereby they are arranged in at least three rows each made up of at least four elements with original fasteners in accordance with the manufacturer’s instructions.

7.4 Test set-up

The test specimen must have a frictional connection with the test specimen holder.

7.5 Specimen storage prior to testing

The test specimen must be at least 28 days old and stored under the test conditions for at least three days.

7.6 Specimen treatment before testing

The test specimen is wetted and impacted within the following two minutes.

7.7 Target area

7.7.1 Fibre-cement elements installed in completed specimen

Flat and profiled fibre-cement elements are impacted at the following points as a minimum, provided that the test specimen exhibits the types of joint specified (Figure 1):

1. Corner: distance to the specimen edge being 1/5 of the projectile diameter
2. Centre line of the joint zone near the specimen edge:
   - 2a On vertically overlapping joint
   - 2b On horizontally overlapping joint
   - 2c On horizontal butt joint
   - 2d On vertical butt joint
3. Centre line of the joint zone at least 75 mm from the edge:
   - 3a On vertically overlapping joint
   - 3b On horizontally overlapping joint
   - 3c On horizontal butt joint
   - 3d On vertical butt joint
4. T-joint
5. Edge trim:
   - 5a Vertical
   - 5b Horizontal

Only the elements that are fully integrated into the completed specimen may be impacted.

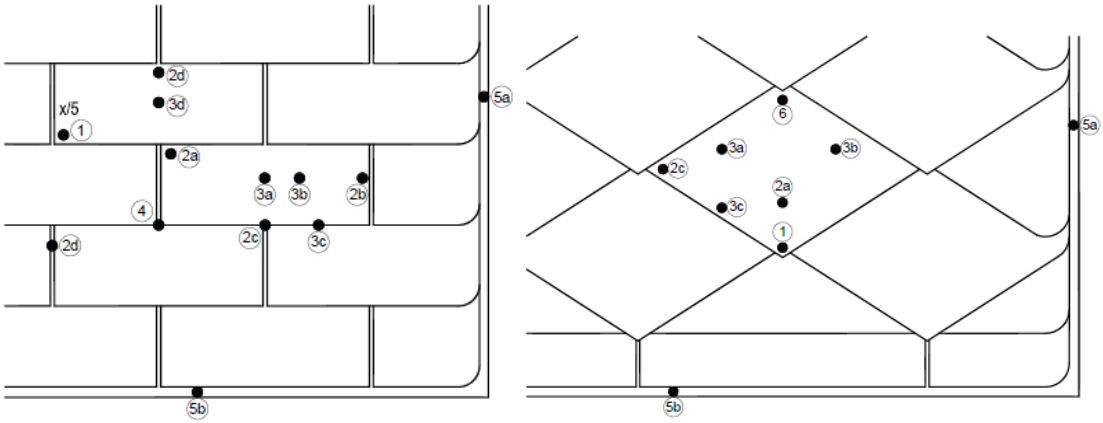

Figure 1 Target areas for flat fibre-cement elements (x/5 = projectile diameter)

7.7.2 Fibre-cement elements installed without completed specimen

The lower part of the flat fibre-cement board-type product that is not covered by adjoining boards is checked. The following locations are impacted (Figure 2):

1. Corner of projection: distance to the specimen edge being 1/5 of the projectile diameter
2. Centre line of the joint zone near the specimen edge:
   - 2c On vertical projection
   - 2d On vertical butt joint
3. Centre line of the joint zone at least 75 mm from the edge:
   - 3c On horizontal butt joint
4. T-joint:
   - 4a In the centre of the T-joint or cross joint
   - 4b 1/5 of the projectile diameter alongside the T-joint or cross joint
5. Projections or edge trim:
   - 5a Vertical
   - 5b Horizontal
6. Directly alongside the support for the substructure:
   - 6a horizontal
   - 6b vertical
7. Fastener:
   - 7a Centre fastening element
   - 7b Edge fastening element

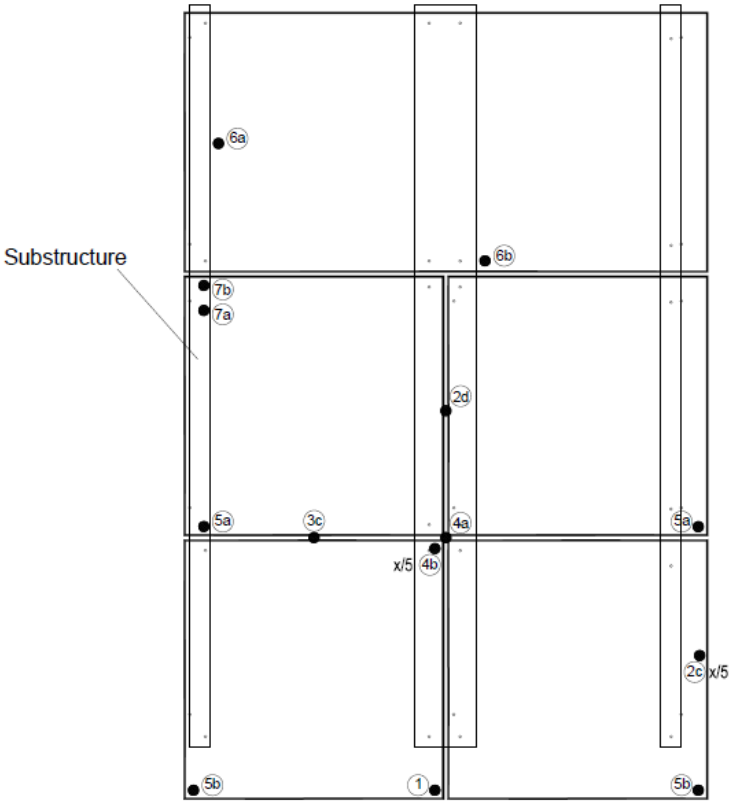

Figure 2 Target areas for fibre-cement elements as a suspended component (x/5 = projectile diameter)

Profiled fibre-cement elements must be impacted at additional points depending on the intended installation orientation (horizontal or vertical arrangement of the contour direction).

Profiled fibre-cement elements are additionally impacted at the following points depending on the type of profile (Figure 3):

10. Peak
11. Trough middle height
12. Trough
13. Exposed edges (if present)
14. Impact in the corner (if geometrically possible)

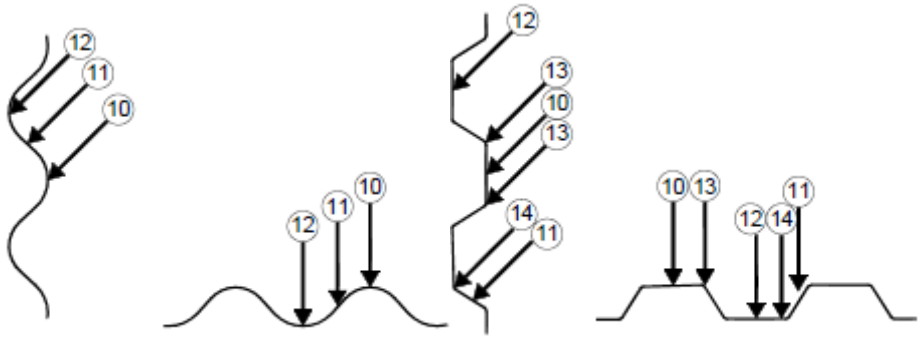

Figure 3 Target areas for profiled fibre-cement elements (left-hand side for use on roofs, right-hand side for use on façades)

If a horizontal and vertical installation orientation is permitted for elements used on façades, both variants must be checked accordingly.

7.8 Component function

The building component is tested for waterproofing and appearance.

7.9 Damage criterion

Watertightness: The component is considered to be damaged if cracks or fractures are detected.

Appearance: The component is considered to be damaged if indents or other changes to the surface (e.g. fragmentation) are visible.

7.10 Measuring method

Watertightness: A visual check is carried out to determine the presence of a fracture. The test specimen is examined for cracks and fractures using a magnifying lens with 6x magnification first. If no cracks or fractures are detected, the test specimen is wetted so that any cracks and fractures become visible as a result of water taking longer to evaporate from the damaged areas. Distance between the test specimen and tester = 0.5 m).

Appearance: the appearance of the components is visually inspected under all possible lighting conditions and from different angles to the test specimen at a distance of 5 m from the test sample. Changes to the surface (e.g. fragmentation) are also examined at a distance of 0.5 m.

7.11 Additional specifications

Fibre-cement components can be tested just as individual elements or as components including edge trims (system test). If only the individual element is tested, the following is to be indicated in the ACFI hail protection approval report: “Approval refers to the surface only. Any edge trims were not tested”.

Each test report must record the mass [= weight] in grams/element made up of several different elements.

The thickness of the element is determined at the surface and at the edge near the target areas. At least three measurements must be made at each (total of at least six measurements).

The distance between the individual target areas must be at least 150 mm.