

CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH DS/EN 13501-2:2016

Sponsor:	Betonelementforeningen under Dansk Industri H.C. Andersens Boulevard 18 1553 København V Denmark
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Notified Body No:	No notified body, since fire testing of product is not described by harmonized standard.
Product name:	Outer leaf and stone wool edge isolation in a concrete sandwich-façade element primarily isolated with isolation that is not classified as at least material class D-s2,d2
Classification report number:	2022_BEf_Sandwich-façades
Issue number:	0
Date of Issue:	2022-09-27

This classification report consists of 5 pages and 1 Appendix and may only be used or reproduced in its entirety.

1. Introduction

This classification report defines the resistance of fire classification of the outer leaf and stone wool edge isolation in a concrete sandwich-façade element primarily isolated with isolation that is not classified as at least material class D-s2,d2 in accordance with the procedures given in DS/EN 13501-2:2016.

2. Details of classified product

2.1. General

The element, outer leaf and stone wool edge isolation in a concrete sandwich-façade element primarily isolated with isolation that is not classified as at least material class D-s2,d2, is defined as a hanging cosmetic façade-plate. Fire testing of the outer leaf is at present not governed by any harmonized standard. This classification report is only applicable as long as no harmonized standard for fire testing of this product exists.

2.2. Description

The element, outer leaf and stone wool edge isolation in a concrete sandwich-façade element primarily isolated with insulation that is not classified as at least material class D-s2,d2, is fully described below and in the figures appended, in support of classification listed in 3.1.

The tested specimen was 3m wide, 2,6m high and 0,46m thick.

Outer leaf

70mm outer leaf is cast first in the mold. 2 suspension anchors placed in the upper third of the outer leaf, see detail in Figure 3, are cast in the fresh concrete along with d=4mm stainless steel double wall ties with spacings according to Figure 2.

The concrete outer leaf is thus hanging from suspension anchors in the supporting construction in the end-use-conditions, see details. Outer leaf is furthermore connected to supporting construction with d=4mm stainless steel double wall ties as shown in figures below.

The outer leaf is cast in concrete with properties according to DS/EN 206:2013+A2:2021 and DS/EN 206 DK NA:2020.

The outer leaf has no (further) deformation restraints during the fire test.

Edge insulation

Edge insulation is placed in the mold, on the backside of the hardening outer leaf.

Edge insulation comprises of rock wool insulation batts ("Rockwool betonelementbatts 34", material class A2-s1,d0). It has a depth of 75mm to 100mm measured from edge and inwards (depth varying, see Figure 2). The edge insulation is placed along both top and bottom-edges and vertical joints as well as on vertical edges, simulating window-/door reveals in the concrete facade. Edge insulation is not fastened to the outer leaf in any way. The edge insulation has a density of 60-90kg/m³ and a compressive strength between 8kPa and 15kPa at 10% deformation according to DS/EN 826.

Main insulation

Main insulation (IKO Enertherm KR Alu) is placed in the remainder of the area between edge insulation, while respecting the protruding stainless steel double wall ties. The main insulation is comprised of insulation that may not be classified as at least material class D-s2,d2. The main insulation has a melting point in excess of 200°C. The main insulation is not fastened to the outer leaf in any way. The main insulation has a foam density of 32kg/m³.

Supporting construction

The supporting concrete wall is cast on top of the insulations and outer leaf, embedding the remainder of the suspension anchors and the d=4mm stainless steel double wall ties.

The reinforced concrete wall has a thickness of 150mm, and same height as the outer leaf. Concrete according to DS/EN 206:2013+A2:2021 and DS/EN 206 DK NA:2020.

3. Test reports/extended application reports and test results in support of the classification

3.1. Test reports/extended application reports

Name of laboratory	Name of sponsor	Report ref. no	Test standard and date/field of extended application standards and dates
DBI – Dansk brand- og sikringsteknisk institut	Betonelementforeningen	PGA11767A – classification test	DS/EN 1363-1 2021-01-18

3.2. Results

DBI - PGA11767A, 2021-01-18	Parameter: Integrity (E) Thermal insulation (I)	Results > 36 min (until termination of test) > 36 min (until termination of test)
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4. Classification and field of application

4.1. Reference of classification

This classification has been carried out in accordance with Clause 7 of DS/EN 13501-2:2016.

4.2. Classification

The element, outer leaf and stone wool edge isolation in a concrete sandwich-façade element primarily isolated with isolation that is not classified as at least material class D-s2,d2, is classified according to the example of the following combinations of performance parameters and classes as appropriate.

R	E	I	W		t	t	-	M	S	C	IncSlow	sn	ef	r	G	K
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Fire resistance classification: EI 30

4.3. Field of application

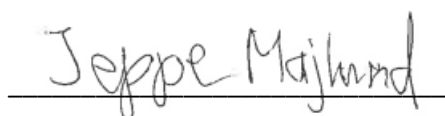
This classification is valid for the following end use applications:

The field of applications is described in “BEF Bulletin nr. 9”, appended below (Appendix A).

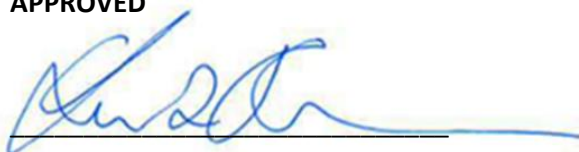
5. Limitations

This classification document does not represent type approval or certification of the product.

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APPROVED



The tested specimen is shown in Figure 1 and Figure 2 below with the following symbols:

- Red circle (and line): Temperature gauge provided by DBI. Temperature measured in interface between outer leaf and insulation.
- Blue cross(+): d=4mm stainless steel double wall ties
- Blue concentric circles: Point of deflection measurement.

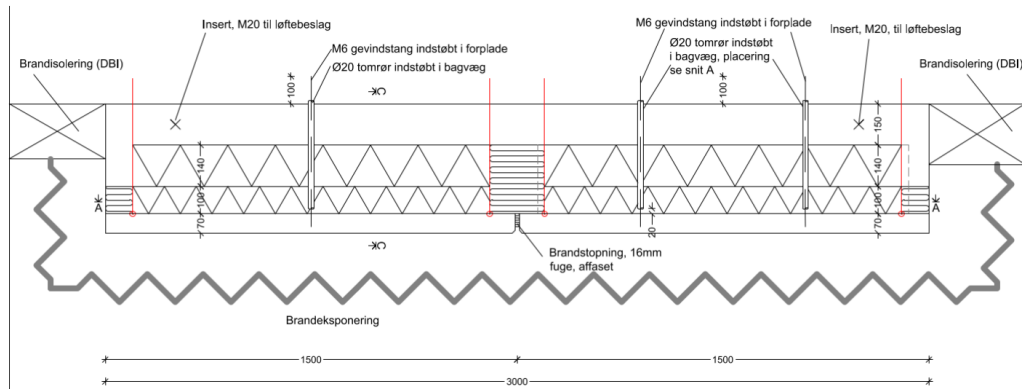


Figure 1. Horizontal section in the test specimen. From below: Outer leaves (2pcs.), edge and main insulation, supporting concrete wall. Left and right edge corresponds to window- or door-reveals with edge insulation. No window or doorframe is mounted.

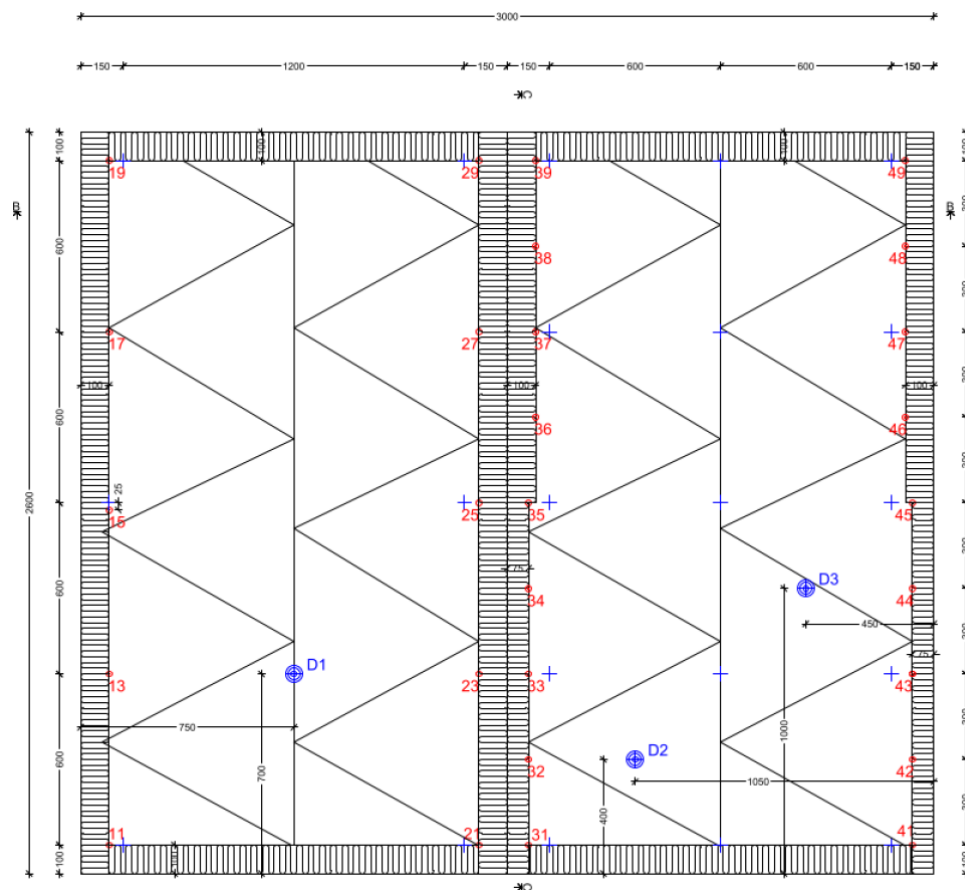


Figure 2. Distribution of edge- and main insulation. The middle corresponds to a vertical joint, with no connection of the two outer leaves. Numbers on temperature gauges and deflection gauges correspond to DBI report. Deflection point D4 og D5 in DBI report is reference-deflections of the supporting structure (concrete wall).

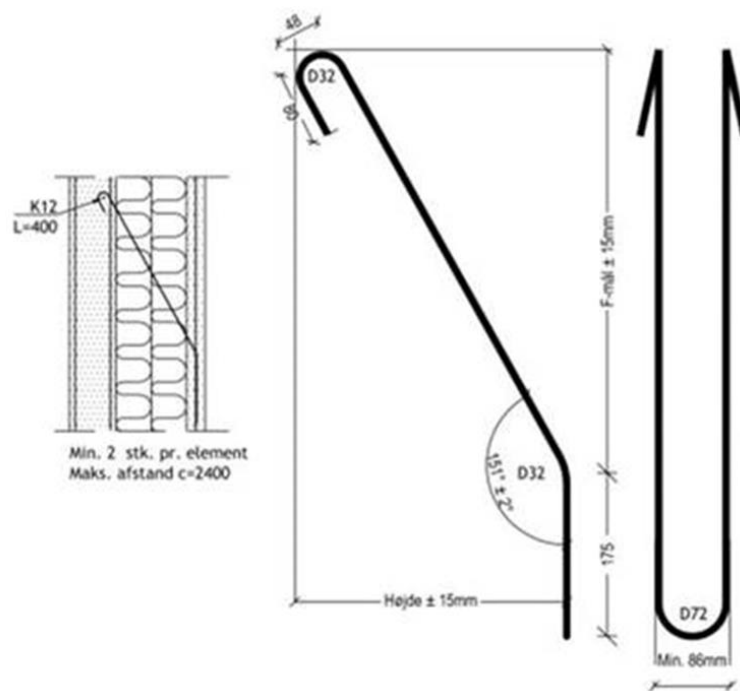
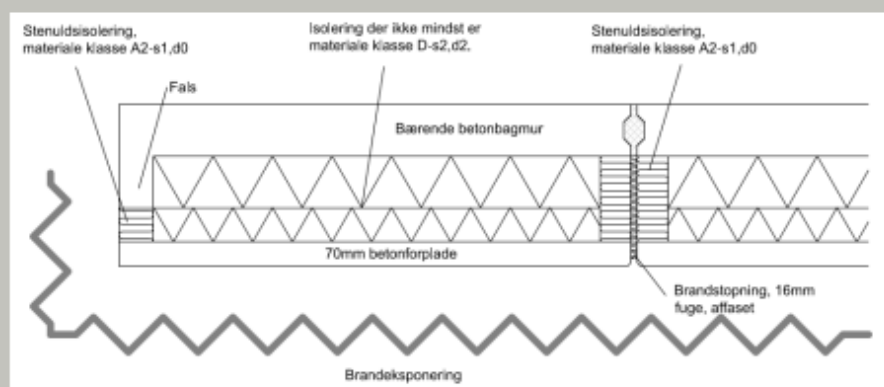


Figure 3. Suspension anchors used for suspension of outer leaves.



BEF-bulletin nr. 9
**Sandwichfacader med
brændbar isolering**

BETONELEMENT-FORENINGEN

26. MARTS 2021