

AE Date: 28. April 2017

PRODUCT: AESTUVER® Tx Fire-protective board (ETA-17/0170)

AESTUVER®

European Technical Assessment

Aestuver® Tx Fire-protective board

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0170 of 28 April 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"AESTUVER Tx" fire protective board

Product family
to which the construction product belongs

Fire protective board

Manufacturer

Fermacell GmbH
Düsseldorfer Landstraße 395
47259 Duisburg
DEUTSCHLAND

Manufacturing plant

10

This European Technical Assessment contains

16 pages including 11 annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

Guideline for European technical approval of "Fire Protective Products", ETAG 018 Part 4: "Fire protective board, slab and mat products and kits", December 2011, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific part**1 Technical description of the product**

"AESTUVER Tx" is a special cement-bonded, glass fibre-reinforced lightweight concrete board, produced from a mixture of cement, lightweight mineral aggregates and water. The fire protective board has a multi-layer design.

The fire protective board "AESTUVER Tx" shows a minimum modulus of rupture (MOR) of at least 1.5 MPa in wet condition in accordance with EN 12467, chapter 7.3.2.

The dimensions and dry bulk density determined in accordance with EN 12467, clause 7.3.1, of the fire protection board "AESTUVER Tx" are listed in Table 1.

Table 1 Dimensions and dry bulk density of "AESTUVER Tx" fire protective boards

Board thickness ¹ [mm]	Length/width [mm]	Tolerance [mm]	Dry bulk density [kg/m ³]
20 ± 1			
25 ± 1			
30 ± 1			
35 ± 1	≤ 3000 x 1250	± 2	800 ± 15 %
40 ± 1			
50 ± 1			
60 ± 1			

Details on the materials used and the manufacturing process of "AESTUVER Tx" fire protective boards are deposited with Deutsches Institut für Bautechnik.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The "AESTUVER Tx" fire protective board is intended to be used as a fire protective cladding for building components or as a component of fire-resistant building components.

"AESTUVER Tx" fire protective boards are intended to be used in accordance with the use categories 1 to 10 given in ETAG 018-1.

The "AESTUVER Tx" fire protective boards may be used for indoor and outdoor use in following categories:

Board thickness $t \geq 20 \text{ mm}$ and $t < 60 \text{ mm}$

- Type X: All uses (Internal, semi-exposed and exposed use)²

Board thickness $t = 60 \text{ mm}$

- Type X: All uses (Internal, semi-exposed and exposed use)

Not all use categories were evaluated with regard to fire resistance within the framework of this European Technical Assessment. Annex B of this Assessment lists all designs for which the fire resistance performance was verified within the framework of this European Technical Assessment. Concerning fire resistance performance, this Assessment only applies to claddings and building components designed in accordance with the specifications given in Annex B.

¹

Intermediate board thicknesses are possible.

²

Fire protective boards may be used when a permanent moisture penetration is prohibited by design, see Annexes C1 to C6.

The performances given in section 3 are only valid if the "AESTUVER Tx" fire protective boards are used in compliance with

- the specifications and conditions given in Annexes A to E and
- the manufacturer's instructions as stated in section 5.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the "AESTUVER Tx" fire protective boards of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1 in accordance with EN 13501-1 See Annex A
Resistance to fire	See Annex B

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Water impermeability	Resistant in accordance with EN 12467, clause 5.4.5 ³
Content and/or release of dangerous substances	The chemical composition of the product shall be in compliance with the composition deposited with the Technical Assessment Body (DIBt). The construction product does not contain or release dangerous substances according to EOTA TR034 (version October 2014).

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Bending strength	See Annex A
Dimensional stability	See Annex A

3.4 Protection against noise (BWR 5)

No performance assessed

3.5 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance	No performance assessed
Water vapour transmission resistance value	See Annex A

³ Boards with a thickness $t \geq 20 \text{ mm}$ and $t < 60 \text{ mm}$ may be used for internal uses when a permanent moisture penetration is prohibited by design, see Annex C1 to C6.

3.6 General aspects

The verification of durability is part of testing the essential characteristics.

"AESTUVER Tx" fire protective boards are suitable for use in the following use categories specified in ETAG 018-1, with no essential changes in their fire protective properties to be expected.

Concerning durability, the following characteristics were tested:

Essential characteristic	Performance
Resistance to deterioration caused by water (for Type X ⁴ and Type Z ₁ ⁵)	Resistant in accordance with EN 12467, clause 7.3.5 ³
Resistance to soak/dry (for Type X ⁴ and Type Z ₁ ⁵)	Resistant in accordance with EN 12467, clause 7.3.6
Resistance to freeze/thaw (for Type X ⁴ and Type Z ₁ ⁵)	Resistant in accordance with EN 12467, clause 7.4.1
Resistance to heat/rain (for Type X ⁴ and Type Z ₁ ⁵)	Resistant in accordance with EN 12467, clause 7.4.2

Durability is only ensured if the specifications of intended use according to Annexes A to C and the manufacturer's instructions in section 5 are taken into account.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the guideline for European technical approval of "Fire Protective Products", ETAG 018 Part 4: "Fire protective board, slab and mat products and kits", December 2011, used as European Assessment Document (EAD), the applicable European legal act is: 1999/454/EC.

The system to be applied is: 1.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

The manufacturer shall provide instructions on processing, packaging, transport, storage and use, maintenance and repair of the construction product.

Damaged fire protective boards shall not be installed or used.

Issued in Berlin on 28 April 2017 by Deutsches Institut für Bautechnik

Prof. Gunter Hoppe
Head of Department

beglaubigt:
von Hoerschelmann

⁴ Type X: Fire protection boards for all uses (internal, semi-exposed and exposed).
⁵ Type Z₁: Fire protection boards for internal and semi-exposed use.

Annex

1 Performance of the product

1.1 Safety in case of fire (BWR 2)

1.1.1 Reaction to fire

Pursuant to Commission Decisions 96/603/EC and 2000/605/EC, the uncoated "AESTUVER Tx" fire protective boards are classified in class A1 in accordance with EN 13501-1.

1.1.2 Resistance to fire

Annex B includes fire resistant designs verified within the framework this European Technical Assessment.

1.2 Safety and accessibility in use (BWR 4)

1.2.1 Bending strength

Mean value of the modulus of rupture (MOR) determined in accordance with EN 12467, clause 7.3.2

Thickness t	Mean value of the modulus of rupture (MOR)
≥ 20 mm	At least 1.5 MPa

1.2.2 Maßhaltigkeit

Relative change in length and thickness after a change in the relative humidity, tested in accordance with EN 318

Thickness t	Relative change in length after a change in the relative humidity
20 mm	0.14 mm/m when the relative air humidity changes from 65 % to 85 %*
	- 0.25 mm/m when the relative air humidity changes from 65 % to 30 %**
60 mm	0.10 mm/m when the relative air humidity changes from 65 % to 85 %*
	- 0.21 mm/m when the relative air humidity changes from 65 % to 30 %**

Thickness d	Relative change in thickness after a change in the relative humidity
20 mm	0.0 % when the relative air humidity changes from 65 % to 85 %*
	- 0.1 % when the relative air humidity changes from 65 % to 30 %**
60 mm	0.0 % when the relative air humidity changes from 65 % to 85 %*
	- 0.1 % when the relative air humidity changes from 65 % to 30 %**

* swelling behaviour

** shrinking behaviour

1.3 Energy economy and heat retention (BWR 6)

1.3.1 Water vapour transmission resistance value in accordance with EN ISO 12572, test condition A

Thickness t	Water vapour diffusion resistance coefficient μ
20 mm	12
60 mm	10

"AESTUVER Tx" fire protective board

Performance of the product

Safety in case of fire; Safety and accessibility; Energy economy and heat retention

Annex A

2 Designs for which the fire-resistance was verified within the framework of this European Technical Assessment

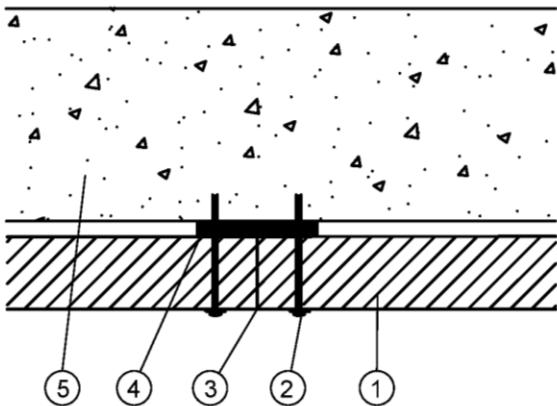
Table 2 provides an overview of the fire resistance classes of all designs for which the fire resistance performance was evaluated in the context of this European Technical Assessment.

For the designs listed in this table and executed in accordance with the specifications given in these annexes, the fire resistance performance given shall be deemed verified within the framework of this European Technical Assessment.

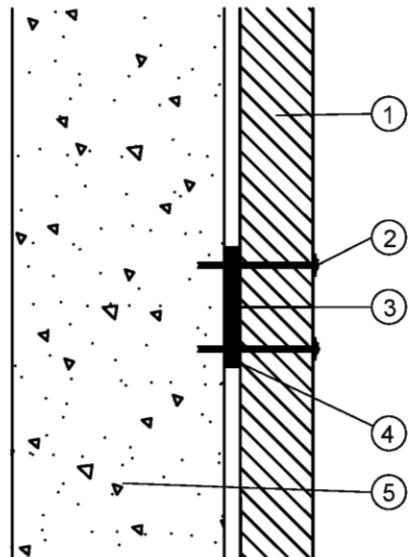
Table 2

Design (evaluated within the framework of this ETA)	Classification in accordance with EN 13501-2	Test method	Intended use as stated in ETAG 018-1 (use category)	Details	Date of addition to this ETA
Load-bearing concrete members cladded by 20 mm or 30 mm thick "AESTUVER Tx" fire protective boards	Assessment in accordance with Annex D	prEN 13381-3	Type 3	Annexes C1 and C2 Annex D	28/4/2017

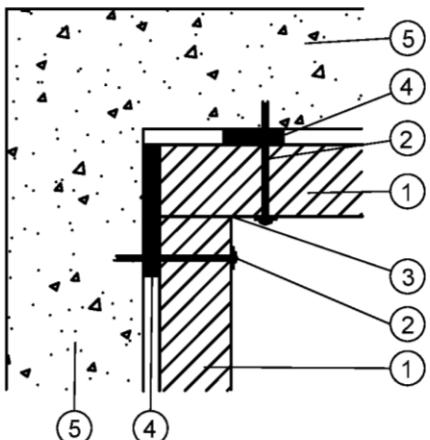
section ceiling with cladding made of fire protective boards



section wall with cladding made of fire protective boards



detail fastening of cladding made of fire protective boards



- ① "Aestuver Tx" fire protective board, thickness 20 mm or 30 mm
- ② distance of the fastening according to annex C2
- ③ joint, boards densely bumped
- ④ backing strips (transverse and longitudinal joints) made of fire protective board "AESTUVER T" according to ETA-15/0531, thickness ≥ 10 mm
width: in the field area ≥ 100 mm
in the edge area ≥ 50 mm
- ⑤ concrete ceiling / wall

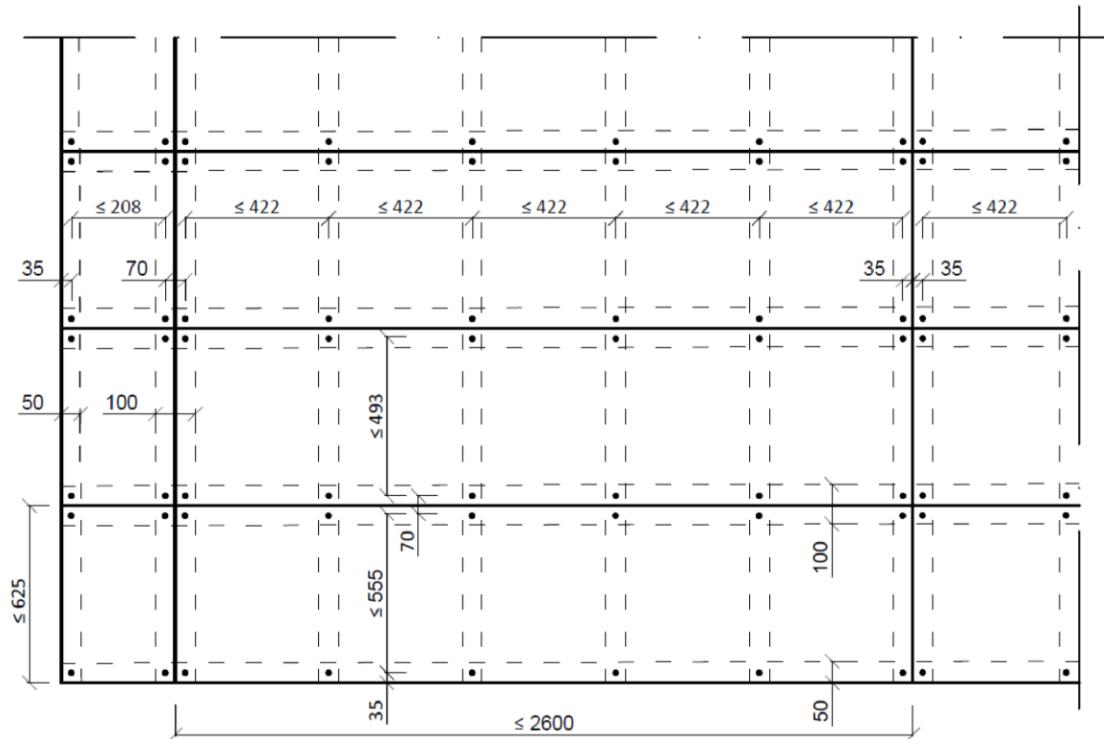
all measures in mm

"AESTUVER Tx" fire protective board

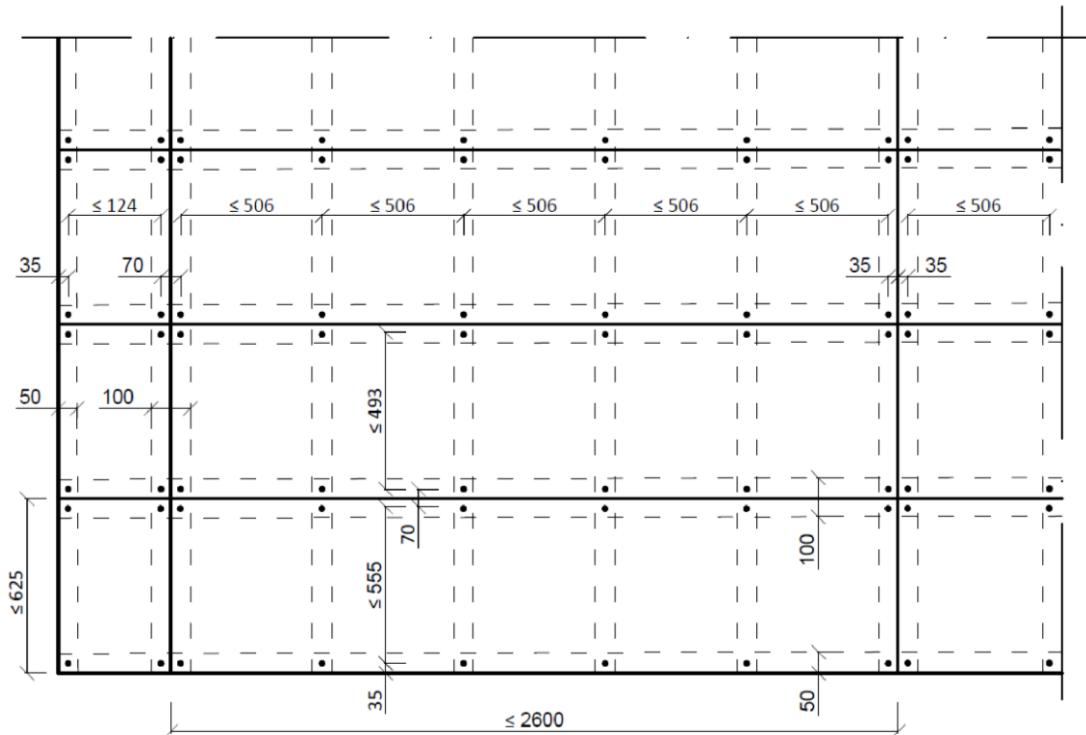
Arrangement and design of the fire protective boards
Variant 1
- Details of the fastening -

Annex C 1

cladding with 20mm thick fire protective boards



cladding with 30mm thick fire protective boards



all measures in mm

"AESTUVER Tx" fire protective board

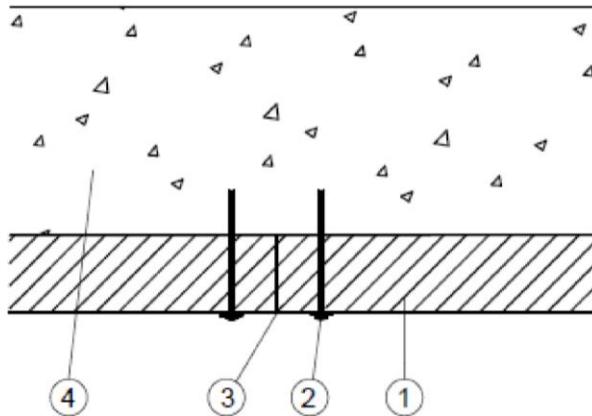
Arrangement and design of the fire protective boards

Variant 1

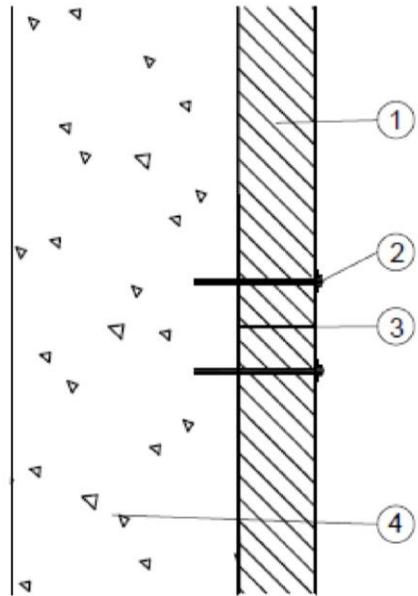
- Distance of the fastening -

Annex C 2

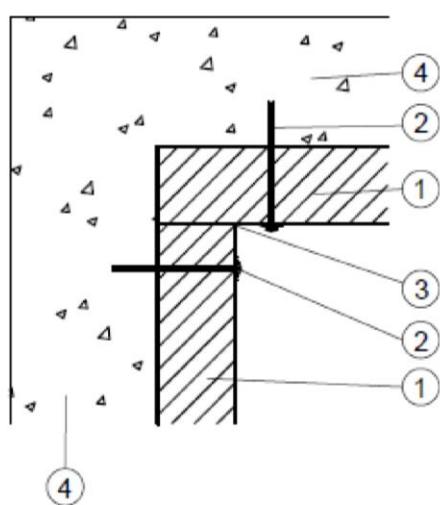
section ceiling with cladding made of
fire protective boards



section wall with cladding made of
fire protective boards



detail fastening of cladding made of
fire protective boards



- ① "Aestuver Tx" fire protective board, thickness 20 mm or 30 mm
- ② distance of the fastening according to annex C4
- ③ joint, boards densely bumped
- ④ concrete ceiling / wall

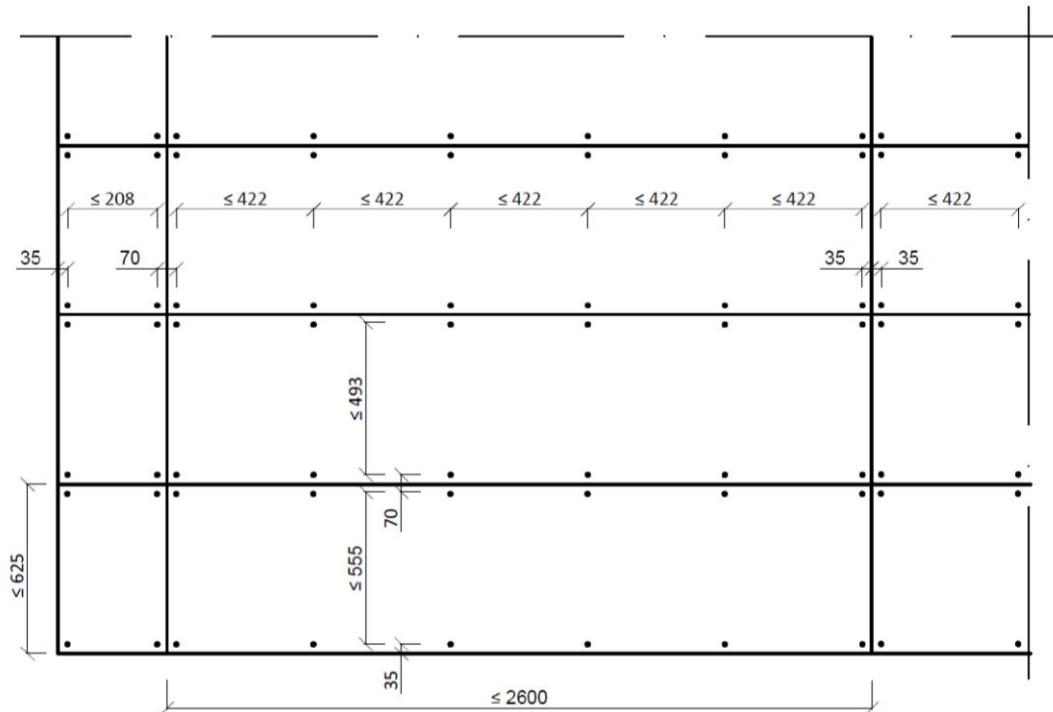
all measures in mm

"AESTUVER Tx" fire protective board

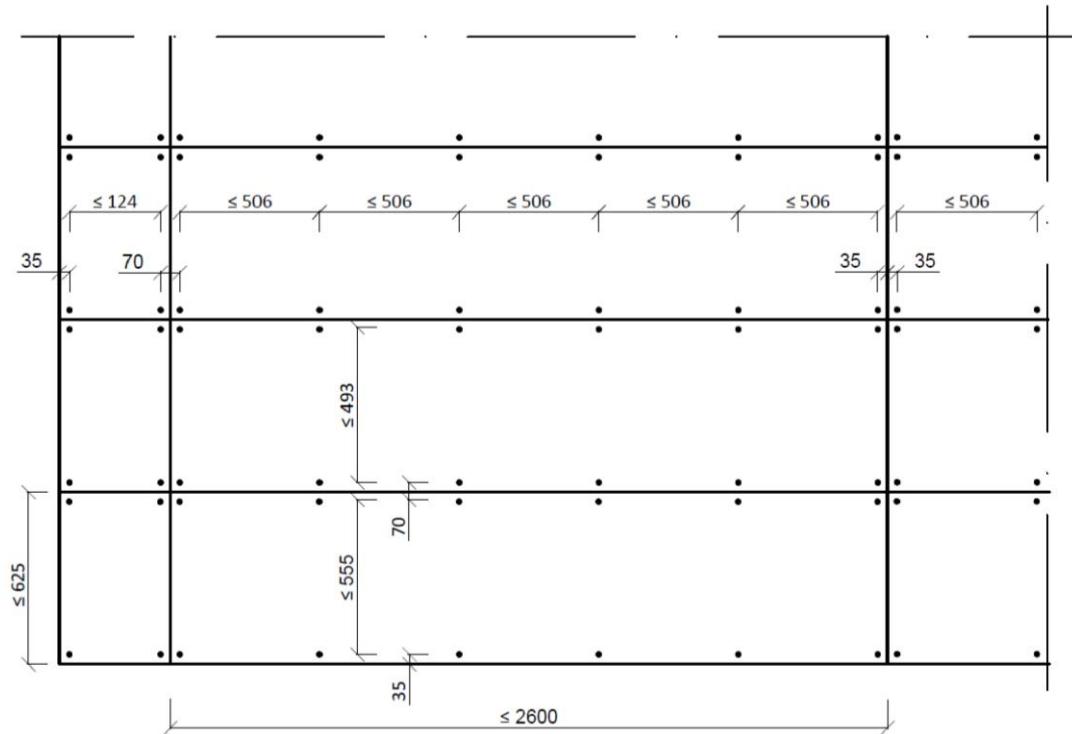
Arrangement and design of the fire protective boards
Variant 2
- Details of the fastening -

Annex C 3

cladding with 20mm thick fire protective boards



cladding with 30mm thick fire protective boards



all measures in mm

"AESTUVER Tx" fire protective board

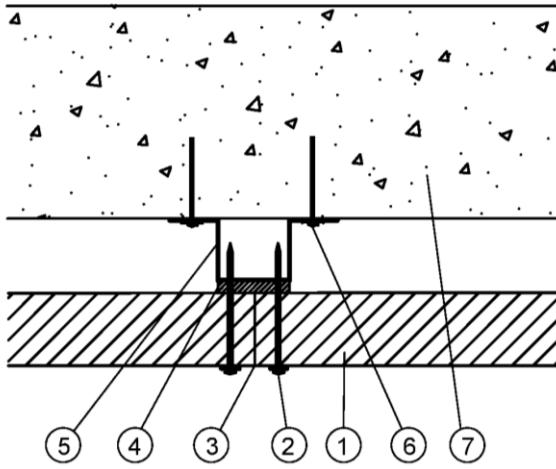
Arrangement and design of the fire protective boards

Variant 2

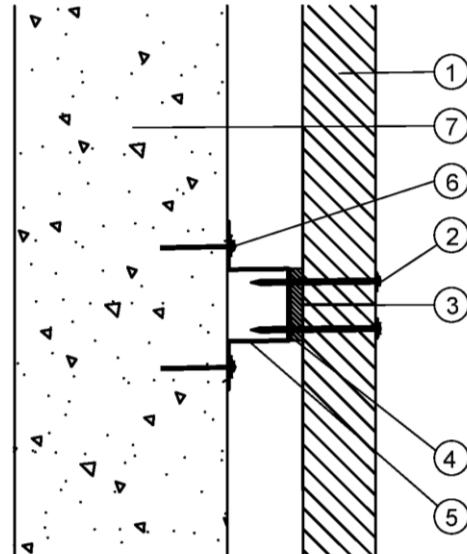
- Distance of the fastening -

Annex C 4

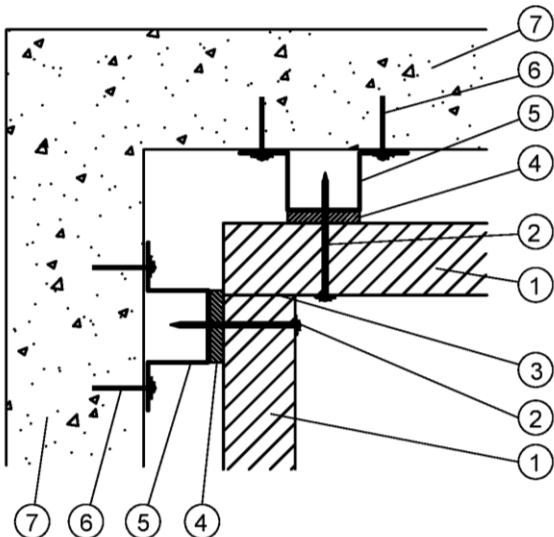
section ceiling with cladding made of fire protective boards



section wall with cladding made of fire protective boards



detail fastening of cladding made of fire protective boards



- ① "Aestuver Tx" fire protective board, thickness 20 mm or 30 mm
- ② distance of the fastening according to annex C6
- ③ joint, boards densely bumped
- ④ backing strips (transverse and longitudinal joints) made of fire protective board "AESTUVER T" according to ETA-15/0531, thickness ≥ 10 mm
width: in the field area ≥ 100 mm
in the edge area ≥ 50 mm
- ⑤ metal substructure
- ⑥ anchor / drilling screw with washer
- ⑦ concrete ceiling / wall

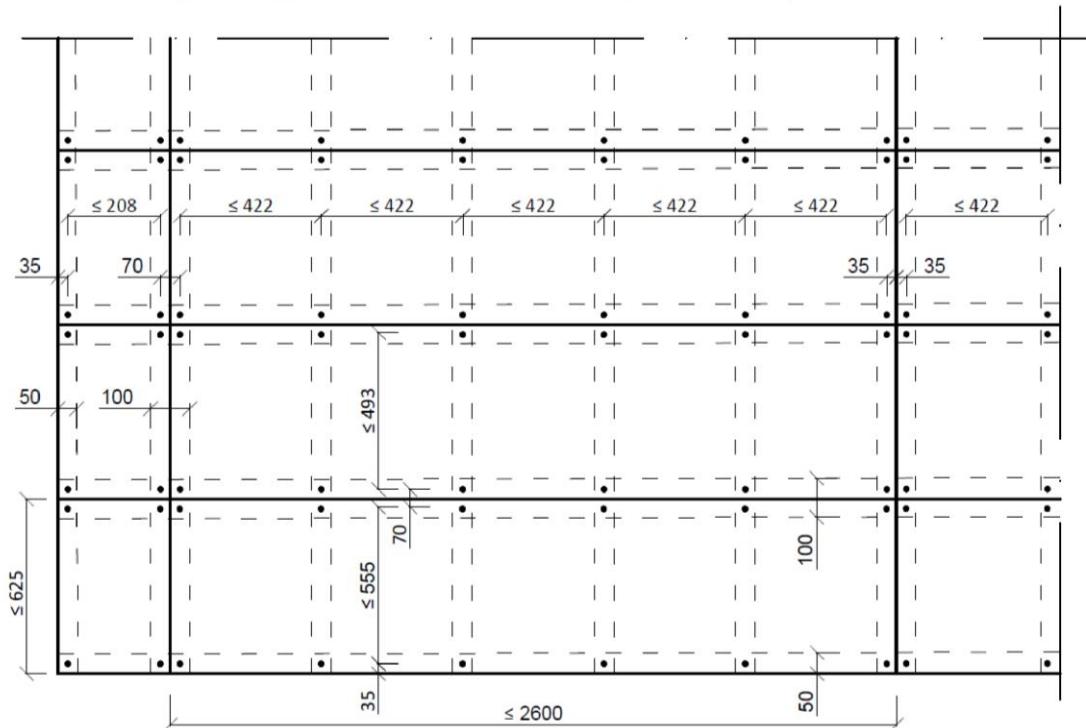
all measures in mm

"AESTUVER Tx" fire protective board

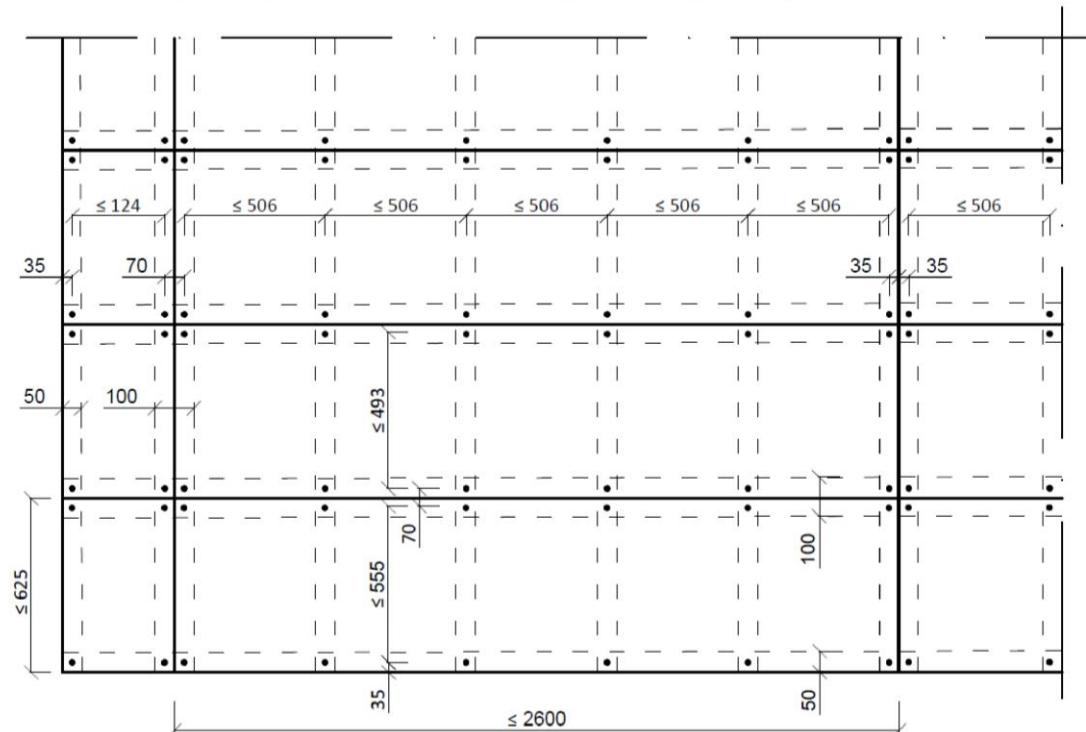
Arrangement and design of the fire protective boards
Variant 3
- Details of the fastening -

Annex C 5

cladding with 20mm thick fire protective boards



cladding with 30mm thick fire protective boards



all measures in mm

"AESTUVER Tx" fire protective board

Arrangement and design of the fire protective boards

Variant 3

- Distance of the fastening -

Annex C 6

3 Load-bearing concrete members cladded with 20 mm and 30 mm thick "AESTUVER Tx" fire protective boards (use category 3 as stated in ETAG 018-1)

3.1 General

The design described below was tested and assessed in accordance with prEN 13381-3. It meets the requirements in respect of compliance with the temperature criterion in accordance with EN 1363-1 (standard temperature/time curve) when exposed to fire on one side up to 260 minutes. It is valid for concrete slabs or walls in accordance with EN 206-1 and EN 1992-1-1 which are executed in accordance with the following provisions.

3.2 Description of the design

3.2.1 Concrete slab

Thickness	≥ 140 mm
Density	$2178 \text{ kg/m}^3 \pm 15\%$
Concrete strength	C20/25 and C25/30
Aggregates	in equal parts Quarz aggregates (grading range 0/4) and limestone (grading range 10/20)
Reinforcement	in accordance with prEN 13381-3
Reached deflection	127 mm* (20 mm thick fire protective boards) 100 mm* (30 mm thick fire protective boards)

* concrete slab after a test duration of 264 minutes

3.2.2 Fire protective boards

20 mm or 30 mm thick "AESTUVER Tx" fire protective boards (1 layer) with a maximum dimension of 2600 mm x 625 mm (length x width) shall be used.

The fire protective boards shall be arranged beneath the concrete slab so that the concrete slab is completely cladded with the boards.

The fire protective boards shall be butt-jointed. The joints between the fire protective boards shall be lined centred over the joints with stripes consisting of the fire protective boards with a thickness of 10 mm and a width of at least 50 mm (when the concrete slabs are connected to adjacent building components with a fire-separating function) or in all other cases 100 mm. The joints can be arranged in any position. The execution shall be in accordance with Annexes C 1 and C 2.

3.2.3 Fastening of the fire protective boards

The strips for the lining shall be fastened to the fire protective boards with Power Spray Glue Plus. The fire protective boards shall be fastened on 4 sides to the concrete member in accordance with Annexes C 1 and C 2.

Spacing of the fastening devices and distance to the edges	See Annex C 2
Fastening devices lining	Power Spray Glue Plus by Adolf Würth GmbH & Co. KG, Germany
Fastening devices boards	Nail Anchor with washers 24x8.4x2.0 mm FNA II 6x30/30 (20 mm thick fire protective boards) or FNA II 6x30/50 (30 mm thick fire protective boards) each by fischerwerke GmbH & Co. KG, Germany, or equivalent

"AESTUVER Tx" fire protective board

Use category 3 – Protection of load-bearing concrete members
Description of the design

Annex D 1

3.3 Determining the contribution of 20 mm and 30 mm thick "AESTUVER Tx" fire protective boards to the fire resistance of structural concrete members

3.3.1 General

The cladding of 20 mm and 30 mm thick "AESTUVER Tx" fire protective boards for the protection of structural concrete members was determined in accordance with prEN 13381-3 with regard to

- the insulation performance in accordance with the criteria of EN 1363-1
- the stickability when exposed to fire up to 260 minutes in accordance with EN 1363-1
- the determination of equivalent thickness of concrete relating to the insulation when exposed to fire up to 240 minutes in accordance with EN 1363-1.

3.3.2 Characteristic temperature and equivalent thickness of the concrete for concrete slabs cladded with "AESTUVER Tx" fire protective boards of a thickness of 20 mm

Period of exposure to fire [minutes]	Characteristic temperature inside concrete slab at 15 mm deep [°C]	Equivalent thickness of concrete ε [mm]
30	61	52
60	94	69
90	125	77
120	165	79
240	312	79

3.3.3 Characteristic temperature and equivalent thickness of the concrete for concrete slabs cladded with "AESTUVER Tx" fire protective boards of a thickness of 30 mm

Period of exposure to fire [minutes]	Characteristic temperature inside concrete slab at 15 mm deep [°C]	Equivalent thickness of concrete ε [mm]
30	44	64
60	72	80
90	92	92
120	113	99
240	224	103

5 Reference list

ETAG No 018-1 (Edition November 2004, Amended September 2012, Amendment April 2013)
Guideline for European Technical Approval of fire protective products - Part 1: General

ETAG No 018-4 (Edition December 2011)
Guideline for European Technical Approval of fire protective products - Part 4: Fire protective board, slab and mat products and kits

- | | |
|-------------------|---|
| EN 13501-1 | Fire classification of construction products and building elements
- Part 1: Classification using data from reaction to fire tests |
| EN 13501-2 | Fire classification of construction products and building elements
- Part 2: Classification using data from resistance tests, excluding ventilation services |
| EN 1363-1 | Fire Resistance tests – Part 1: General requirements |
| prEN 13381-3:2012 | Test methods for determining the contribution to the fire resistance of structural members - Part 3: Applied protection to concrete members |
| EN 318 | Wood-based panels – Determination of dimensional changes associated with changes in relative humidity |
| EN 12467 | Fibre cement flat sheets – Product specification and test methods |
| EN ISO 12572 | Hygrothermal performance of building materials and products - Determination of water vapour transmission properties |

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Last updated 04.2020

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