

FIRE RESISTANCE CLASSIFICATION REPORT No. 17454C

Owner of the classification report

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Introduction

This classification report defines the classification assigned to a(n) loadbearing element – aerated concrete floor on steel beams, provided with a suspended ceiling (type: ROCKFON® Mono Acoustic), in accordance with the procedures given in EN 13501-2:2007+A1:2009: Fire classification of products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services.

This classification report consists of 12 pages and 3 annexes and may only be used or reproduced in its entirety.

1 Details of classified product

1.1 General

The element, aerated concrete floor on steel beams, provided with a suspended ceiling – type: ROCKFON® Mono Acoustic ceiling system, is defined as a loadbearing element.

1.2 Description

The element, ROCKFON® Mono Acoustic ceiling system, is fully described below, in support of this classification. The drawings of the test element as it was tested, are enclosed in the annexes 1 till 3 of this classification report.

1.2.1 Composition of the test specimen as tested

The test specimen is a loadbearing aerated concrete floor, provided with a suspended ceiling – type: ROCKFON® Mono Acoustic ceiling system, provided with an access panel and a light fixture.

Outer dimensions of the test specimen:

- length: 4000 mm;
- width: 3000 mm;
- height plenum: 420 mm;
- span: 4200 mm.

1.2.1.1 Standard supporting construction

[1] Steel beam – type: IPE 140 – outer dimensions: 140 mm x 73 mm – length: 4400 mm – yield strength: 327 N/mm² (MV).

- number: 5;
- position: resting on the rolling element bearings at the transversal ends of the furnace frame,;
- orientation: in longitudinal direction of the furnace frame;
- c/c distance: 600 mm;
- span: 4200 mm.

- [2] Aerated concrete slab – section dimensions: 600 mm x 150 mm – length: 2950 mm – volumetric mass: 650 kg/m³ (NV).
- number: 7;
 - position: on top of the steel beams [1];
 - orientation: perpendicular to the steel beams.

1.2.1.2 Ceiling

1.2.1.2.1 Suspension structure

- [3] Cross connector – brand: Chicago Metallic® – composed of: two steel plates held together by a bolt [4] – steel thickness of one plate: 1 mm – outer dimensions: 95 mm x 80 mm – reference: type 17 (183302).
- number: 2 plates per nonius hanger [5];
 - position: connection between the beams [1] and the nonius hangers [5];
 - fixing: slid over the lower flanges of the beam.
- [4] Bolt – material: steel – length: 16 mm – diameter: 5.8 mm – with washers and nut.
- [5] Nonius hanger.
- composition: upper part [5a], lower part [5b] and pins [5c];
 - fixing:
 - with a bolt [4];
 - to the cross connector [3];
 - c/c distance: 1200 mm x 1200 mm.
- [5a] Nonius upper part – brand: Chicago Metallic® – material: steel – length: 170 mm – outer section dimensions: 12 mm x 8 mm – steel thickness: 1 mm – reference: type 10201 (165459).
- [5b] Nonius lower part – brand: Chicago Metallic® – material: steel – length: 270 mm – section dimensions: 16 mm x 9 mm – steel thickness: 1 mm – reference: type 10230 (165415).
- [5c] Spring pin – brand: Chicago Metallic® – material: steel – diameter: 2.5 mm – number: 2 per hanger – reference: type 10228 (165409).

- [6] Wall profile – U-shape – brand and type: Chicago Metallic® Wall Angle – material: steel – steel thickness: 0.5 mm – dimensions: 40.5 mm x 30 mm x 40.5 mm – length: 3050 mm – reference: type 5110-69 (166777).
- position: around the test specimen, against the concrete furnace frame;
 - fixing:
 - to the concrete furnace frame;
 - by means of a tension sleeves [7];
 - c/c distance: 250 mm - 300 mm.
- [7] Tension sleeve – material: steel – diameter: 6 mm – length: 30 mm.
- [8] Main profile – T-shape – brand and type: Chicago Metallic® Main runner – material: steel – steel thickness: 0.5 mm – outer section dimensions: 38 mm x 35 mm – initial length: 3600 mm – applied lengths: 2900 mm / 1100 mm – firebreak: see annex 4 – weight per unit length: 0.48 kg/m (MV) – reference: type 5660-20-69 (MONO MR).
- total length: 4000 mm;
 - orientation: in longitudinal direction of the concrete furnace frame;
 - c/c distance: 1200 mm;
 - fixing to the wall profiles [5]:
 - resting on the lower flange of the wall profiles [5];
 - clearance: 5 mm;
 - fixing to the nonius hangers [3]:
 - the lower part [5b] of the nonius hanger is slid over the upper part of the main profile.
- [8b] Supplementary T-profile – material: main profile [8] – length: 1200 mm.
- number: 2;
 - position: at both sides of the access panel [15];
 - fixing: to the adjacent main profiles.
- [9] Transversal profile – omega-shape – brand: Chicago Metallic® Furring Channel – material: steel – steel thickness: 0.5 mm – outer section dimensions: 13 mm x 24 mm x 38 mm x 24 mm x 13 mm – length: 1200 mm – weight per unit length: 0.43 kg/m (MV) – reference: type 5234-30-69 (MONO FC).
- orientation: perpendicular to the main profiles [8];
 - c/c distance: 600 mm;

- fixing to the main profiles:
 - clicked into the openings provided in the main profiles;
- fixing to the wall profiles [6]:
 - resting on the lower flange of the wall profiles and clasped with the aid of a spring [10].

[10] Spring – brand: Chicago Metallic® – material: steel – steel thickness: 0.5 mm – width: 16 mm – reference: type AX087X500P (211184) – see annex 6.

- position: clamped between the connection of a transversal profiles [9] and the wall profile [6].

1.2.1.2.2 Ceiling panels

[11] Ceiling panels – brand and type: ROCKFON® Mono TE – material: rock wool clad on the visible side with a glass fibre fleece and on the back with a HPM fleece – total thickness: 40 mm – surface weight: 5.1 kg/m² (MV).

- applied dimensions:
 - 900 mm x 1200 mm;
 - 1200 mm x 1200 mm;
 - 1800 mm x 1200 mm.
- fixing to the main profiles [8]:
 - resting on the pressure distribution plates [12] and screw1 [13];
 - c/c distance: 300 mm;
- fixing to the transversal profiles [9]:
 - resting on the pressure distribution plates [12] and screws [13];
 - c/c distance: 400 mm;
- fixing at the centre of the panels:
 - to the main profiles [8] and transversal [9] profiles;
 - by means of a screws [13] and washers [14];
 - c/c distance: 600 mm x 1200 mm.
- fixing to the wall profiles [5]:
 - by means of a screws [13] and washers [14];
 - c/c distance: 300 mm.

[12] Pressure distribution plate – type: Mono Intersection Bracket – material: steel – steel thickness: 0.65 mm – reference: 136471.

- position: at the joints between the panels.

[13] Screw – material: steel – length: 55 mm – diameter: 3.5 mm.

[14] Recess washer – material: steel – steel thickness: 0.65 mm – outer diameter: 20 mm.

1.2.1.3 Access panel

[15] Access panel – brand: ROCKFON® – dimensions: 600 mm x 600 mm – thickness: 40 mm – total weight (panel frame included): 7.0 kg (MV).

- composition: panel frame [15a], leaf frame [15b] and leaf panel [15d];
- position: integrated flush with the ceiling panels [11];
- fixing: with the aid of 2 supplementary T-profiles [8a].

[15a] Panel frame – material: steel – type: L profile forming a square – steel thickness: 2 mm – section dimensions L profile: 30 mm x 40 mm – clear opening: 600 mm x 600 mm.

- fixing:
 - with 6 screws [16];
 - to the T-profiles [8b];
 - c/c distance: 230 mm.

[15c] Leaf frame – material: steel – type: L profile forming a square – steel thickness: 2 mm – dimensions L profile: 30 mm x 40 mm – outer dimensions square: 595 mm x 595 mm.

[15c] Intumescent strip – brand and type: Kuhn Kerafix Flexpan 200 – material: graphite-based.

- position: between the panel frame [15a] and the leaf panel [15d], along the full circumference.

[15d] Leaf panel – material: ceiling panel [11].

- fixing: with 16 screws [13] and washers [14];
- to the leaf frame [15b];
- c/c distance: 160 mm.

[16] Drilling screw – material: steel – threaded length: 15 mm – diameter: 4.7 mm (MV).

1.2.1.4 Lighting fixture

[17] Protective hood – material: insulation panel [17b] – inside dimensions: 250 mm x 250 mm x 120 mm – forming an open box – weight: 0.81 kg

- position: in the cavity, covering the light fixture;
- fixing: with the aid of 2 pieces of U-profile [6b].

[17b] Insulation panel – brand and type: ROCKFON® Fire box – material: rock wool clad on one side with a glass fibre fleece and on the back (outside protective hood) with an aluminium foil – thickness: 35 mm – surface mass: 3.8 kg/m² (MV).

[6b] U-profile – material: wall profile [6] – length: 250 mm.

- fixing: with 1 screw [13] and washer [14] per piece.

[18] Lighting fixture – brand and type: Thorn Cetus LED downlight – material: aluminium – recess diameter: 250 mm – weight: 0.58 kg.

1.2.1.5 Finishing

[19] Joint strip – brand and type: ROCKFON® Strip Mono Acoustic R40/150 – material: glass fibre fleece – width: 40 mm – thickness: 0.3 mm.

- position: over the joints of the Mono Acoustic panels.

[20] Joint plaster – brand and type: ROCKFON® Mono TE Filler.

- position: on top of the joint strip and the joints of the Mono Acoustic panels.

[21] Finishing layer – brand and type: ROCKFON® TE Ready-Mix – thickness: 1.2 kg/m².

- position: evenly applied on the complete surface of the ceiling with access panel.

2 Test reports/EXAP reports and test results in support of the classification

2.1 Test reports/EXAP reports

Name of the laboratory	Report ref. no.	Name of the owner	Date of the test	Method
WFRGENT nv	17454B	ROCKFON bvba	30/10/2015	EN 1365-2:2014

Exposure conditions during the fire resistance test:

Temperature/time curve: standard as in EN 1363-1:2012.

One side is exposed to the fire.

Direction of exposure: the floor with ceiling was exposed from below.

Both longitudinal edge are free, the other edges are fixed.

An extra load of 628 kg/m², supplementary to the 123 kg/m² of the own weight of the floor and ceiling, was applied during the test. This results in a bending moment of 60 % of the maximum bending moment in cold condition (25.28 kN.m, based on the measured steel strength).

2.2 Test results

Parameters	Exceeded
Thermal insulation – I^(*)	
$\Delta T_m = 140^\circ\text{C}$	68 minutes, no failure ⁽¹⁾
$\Delta T_M = 180^\circ\text{C}$	68 minutes, no failure ⁽¹⁾
Integrity – E^(*)	
Spontaneous and sustained flaming	68 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 6 mm	68 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 25 mm	68 minutes, no failure ⁽¹⁾
Ignition of cotton pad	68 minutes, no failure ⁽¹⁾
Radiation – W^(*)	
Radiation intensity = 15 kW/m ²	68 minutes, no failure ⁽¹⁾
Loadbearing capacity – R^(*)	
Deflection $D = L^2/(400 d) = 315$ mm	68 minutes, no failure ⁽¹⁾
Rate of deflection $dD/dt = L^2/(9000 d) = 14.0$ mm/min	68 minutes, no failure ⁽¹⁾

⁽¹⁾ The test was stopped after 68 minutes at the request of the sponsor.

3 Classification and field of application

3.1 Reference of classification

This classification has been carried out in accordance with clause 7 of EN 13501-2:2007+A1:2009.

3.2 Classification of loadbearing floors with fire separating function

The element, aerated concrete floor on steel beams, provided with a suspended ceiling – type: ROCKFON® Mono acoustic, is classified according to the following combinations of performance parameters and classes as appropriate. No other classifications are permitted.

REI 60 , REI 45, REI 30, REI 20, REI 15

RE 60, RE 30, RE 20

R 30

3.3 Classification of loadbearing floors without fire separating function

The element, aerated concrete floor on steel beams, provided with a suspended ceiling – type: ROCKFON® Monolithic ceiling system, is classified according to the following combinations of performance parameters and classes as appropriate. No other classifications are permitted.

R 60, R 45, R 30, R 20, R 15

3.4 Field of direct application

This classification is valid for the following end use applications according to EN 1365-2:2014.

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability:

a) With respect to the structural building member:

- The maximum moments and shear forces, which when calculated on the same basis as the test load, shall not be greater than those tested.

b) With respect to the ceiling system:

- The size of panels of the ceiling lining (900 mm x 1200 mm, 1200 mm x 1200 mm and 1800 mm x 1200 mm) may be increased by a maximum of 5 % but limited to a maximum of 50 mm. The length of the grid members can be increased accordingly.
- The total area occupied by fixtures and fittings relative to the area of the ceiling lining is not increased and the maximum tested opening in the lining is not exceeded.

c) With respect to the cavity:

- The height of the cavity h and the minimum distance d between the ceiling and the structural members are equal to or greater than those tested ($h \geq 380$ mm, $d \geq 240$ mm).
- No material is added to the cavity unless the same amount (in terms of both weight and fire load) of material was included in the test specimen.

4 Limitations

This classification report does not represent type approval nor certification of the product.

The classification assigned to the product in this report is appropriate to a Declaration of Performance (DoP) of the essential characteristics of the construction product by the manufacturer within the context of System 3 Assessment and Verification of Constancy of Performance (AVCP).

Under the Construction Products Regulation (CPR: EU 305/2011), such a Declaration of Performance (DoP) is a requirement for affixing the CE marking.

The test laboratory has played no part in sampling the product for the test, although it holds appropriate references, supplied by the manufacturer, to provide evidence for the traceability of the samples tested.

Provisions of Regulation (EU) 305/2011, commonly known as the Construction Products Regulation (CPR), prevail over any conflicting provisions in the harmonised standards and technical specifications.

SIGNED

APPROVED

This document is the original version of the classification report and is written in English.

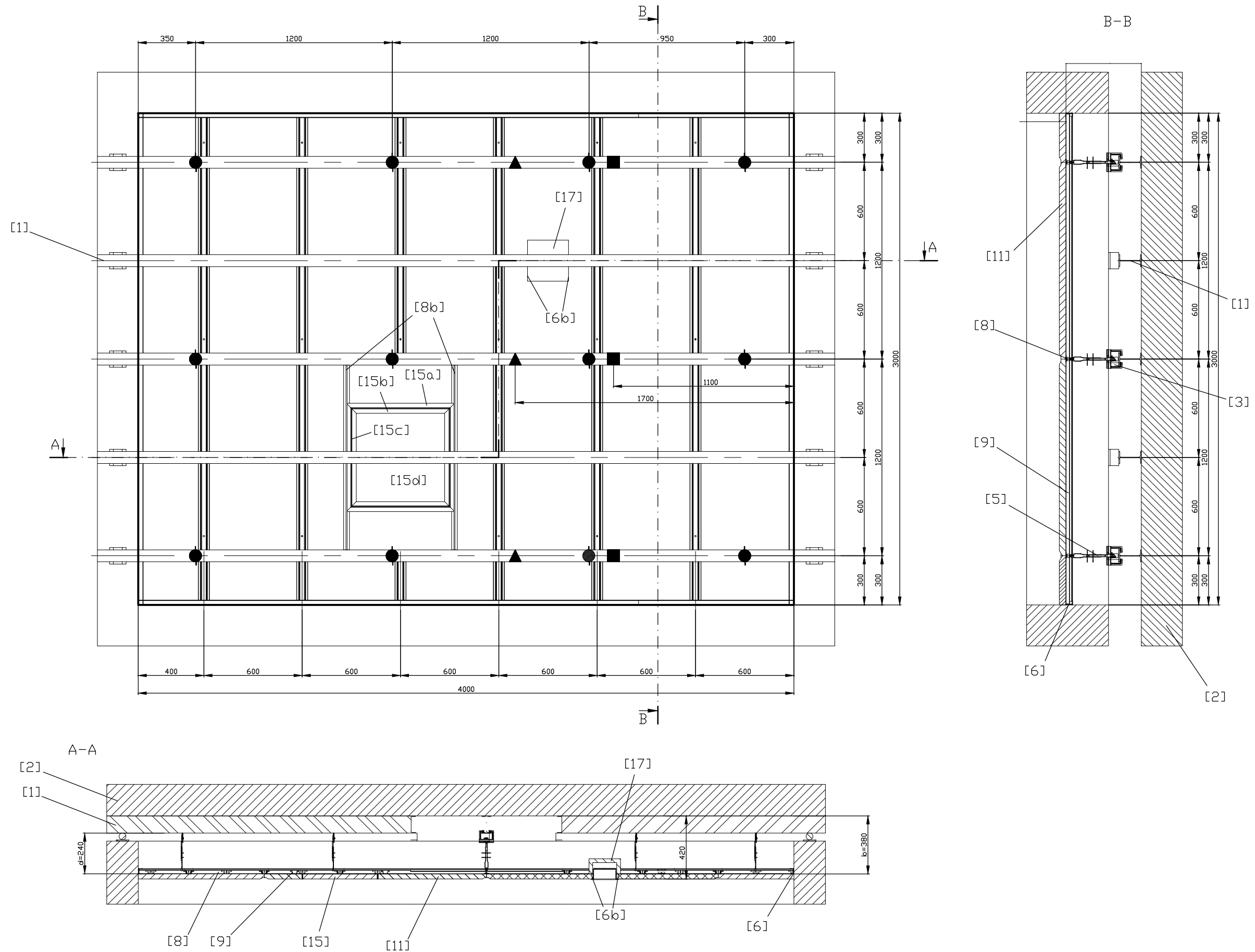
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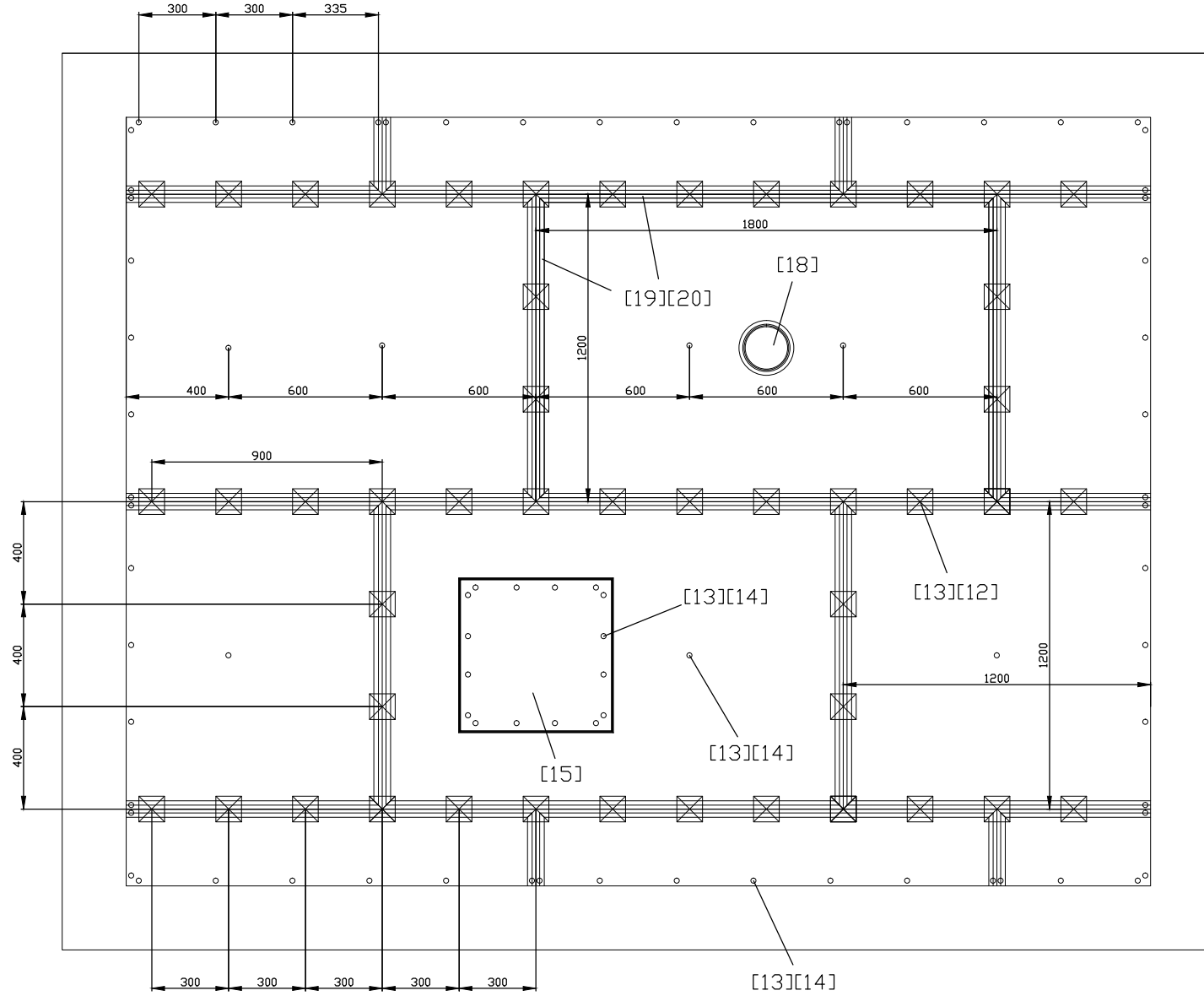
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- = nonius hangers [5]
- = coupling
- ▲ = firebreak

Top view - sections A-A and B-B - dimensions.



Top view - fixing ceiling panels - dimensions.



Details.

