



CLASSIFICATION REPORT n° EFR-19-005413 - Revision 1

According to standards EN 15650: 2010 and EN 13501-3: 2007

Reference laboratory assessment	EFR-19-005413 - Revision 1
Regarding	A range of "CU2" type fire dampers Operating vacuum pressure: - 500Pa/-300Pa
Sponsor	RF TECHNOLOGIES Lange Ambachtstraat, 40 B - 9860 OOSTERZELE

This classification report supersedes classification report EFR-19-005413.

CHANGE HISTORY

Revision level	Date	Changes	Author
0	15/01/2020	- Document creation	RST
1	12/07/2021	<ul style="list-style-type: none">- Installation in a flexible partition wall with a mortar seal- Installation in a sandwich panel wall construction with a coated stone wool board seal- Update of the field of application of the results- Validation of a new cold sealing	CSC

1. INTRODUCTION

This classification report defines the classification assigned to a range of "CU2"-type fire dampers in accordance with the procedures set out in the standard EN 13501-3: 2007 "Fire classification of construction products and building elements – Part 3: Classification using data from fire resistance tests, on products and elements used in building service installations: fire resisting ducts and fire dampers" and in the standard EN 15650: 2010 "Ventilation for buildings. Fire dampers".

2. BODY

Efectis France
Voie Romaine
F - 57280 MAIZIERES-LES-METZ

Notified body: 1812

3. SPONSOR

RF TECHNOLOGIES
Lange Ambachtstraat, 40
B - 9860 OOSTERZELE

4. REFERENCE TESTS

11697 A	(WFRGENT)
11787 A	(WFRGENT)
11788 A	(WFRGENT)
12193 A	(WFRGENT)
11986 A	(WFRGENT)
14717 A	(WFRGENT)
10 - H - 426	(EFECTIS France)
10 - H - 432	(EFECTIS France)
20558 A	(WFRGENT)
20545 A	(WFRGENT)
EFR-21-T-000922	(EFECTIS France)

5. REFERENCE AND ORIGIN OF THE TEST SPECIMENS

Reference:	CU2
Origin:	RF TECHNOLOGIES Lange Ambachtstraat, 40 B - 9860 OOSTERZELE

6. OVERALL PRINCIPLE

6.1. TYPE OF FUNCTION

The "CU2"-type damper is defined as a "fire damper". Its function is to be fire-resistant as regards fire integrity, thermal insulation and leakage flow rates.

6.2. GENERAL POINTS

Each fire damper is composed of a tunnel, within which a horizontally-mounted mobile blade pivots using an external mechanism and a transmission.

Approved fire dampers have flow cross-section dimensions of between 200 x 200mm and 1200 x 800mm / 200 x 200mm and 1500 x 1000mm.

6.3. DETAILED DESCRIPTION OF THE ELEMENTS

6.3.1. Fire damper casing

The rectangular tunnel is made by assembling four 15mm-thick "PROMATECT H" plasterboard panels, allowing room for flow cross-section dimensions of $(W_n - 6) \times (H_n - 6)$ mm, where W_n is the nominal width of the fire damper and H_n is the nominal height.

The length of the standard tunnel, reference "CU 2", is 330mm. At the ends of the tunnel, where they are clamped together using 32mm staples, is an open celled EPDM sealing or a PP sealing, with dimensions 8 x 5mm.

The ends of the tunnel are each fitted with a 1.25mm-thick connection flange, 10 x 33 x 35 x 16.5 x 35mm, fixed using screws in the tunnel. The overall length of the fire damper is therefore 400mm.

1mm-thick, 25 x 25mm plastic corner brackets are fixed using steel nails on the outer corners of the tunnel.

The side of the tunnel on the mechanism side has an opening of 138.5 x 95mm to allow the mechanism control lever and thermal fuse to pass through.

The inside of the tunnel is equipped with galvanized steel bearings, placed on the lower semi-perimeter on the mechanism side, and on the upper semi-perimeter on the opposite to mechanism side, and fixed using rivets (4.8 x 25.4mm).

An open-cell "SITUSEAL"-type foam seal, with cross section dimensions of 15 x 25mm, is placed in the bearing opening or a silicon sealing is placed below the opening in the profile as cold sealing. Furthermore, a washer made of the same material, with a diameter of 80mm and 6mm thick or a closed cell EPDM with a diameter of 80mm and 6mm thick, is also placed between the tunnel and the damper blade, around each rotational axis.

If the damper is foreseen of an inspection shutter, the opening is closed using a sheet metal part with an open cell SITUSEAL sealing.

6.3.2. Blade

The damper blade, with dimensions of $(W - 24) \times (H - 24) \times 45$ mm, is made using two 15mm-thick "PROMATECT H" plates, forming a sandwich above and below a strip of "PROMATECT H" with cross section dimensions of 15 x 40mm fixed using clips.

Two 1.25mm-thick "U"-shaped sections (15 x 30 x 15mm) are screwed on the vertical edges, on the inside of the blade.

The various blade components are assembled using clips (32mm clips).

A PVC-coated "PALUSOL"-type intumescent seal (55 x 2mm) is fixed perpendicular to the blade on the inside of the tunnel using 12.5mm steel spikes spaced at intervals of 50mm in three rows.

Two drawn steel hinge pins (\varnothing 12mm) are welded to the sections in the centre of the blade, halfway along its length, in order to enable rotation.

Each of the hinge pins are driven into a riveted nylon bearing in the tunnel, with a steel DIN 9021 M12 washer placed before the bearing.

A 5mm clearance is left between the blade and the intumescent seal placed in the tunnel.

In the cavity between both PROMATECT H plates of the damper's blade is an open cell sealing SITUSEAL or a closed cell EPDM sealing with dimensions 15 x 15 x 43mm placed in the corners and next to the steel hinge pins.

6.3.3. Mechanism

The control mechanism is fully installed on the outside of the fire damper and is composed of the following elements:

- An automatically- or remote-controlled mechanism,
- A transmission mechanism consisting of a steel con-rod system, foreseen of an open celled SITUSEAL sealing or a closed cell EPDM sealing.

If the fuse is activated, the internal spring shuts the fire damper.

7. INSTALLATION OF THE TEST SPECIMENS

The classification obtained with CU2 fire dampers for standard installation in the various construction elements and their respective sealing remain valid for fire dampers installed with horizontal or vertical axis, with a space:

- of 50mm to 200mm between fire dampers installed in separate ducts;
- of 50mm to 75mm between the fire damper and a construction element wall;
- of 25mm to 75mm between the fire damper and a construction element ceiling.

At most, two rectangular dampers can be installed at a minimum distance from each other, vertically and horizontally (with a group of up to 4 dampers).

Sealing between the fire dampers:

- For a space \geq 50mm:
 - o density = 150kg/m³, thermal conductivity λ = 0.041W/mK at 50°C and water vapour absorption = 0.02%, Euroclass A1,
 - o total width : minimum 400 mm whose 150mm on the side of the mechanism and flush or protruding on the opposite side,

Sealing between the fire damper(s) and the supporting construction (wall or floor) must be performed using stone wool with following characteristics:

- For a space \geq 50mm:
 - o density = 150kg/m³, thermal conductivity λ = 0.041W/mK at 50°C and water vapour absorption = 0.02%, Euroclass A1,
 - o total width : minimum 400mm whose 150mm on the side of the mechanism and flush or protruding on the opposite side,
- For a space < 50mm:
 - o compressed stone wool with a density after compression of minimum 67kg/m³ (e.g. : rockwool ROCKFIT 431 (ROCKWOLL) with density of 40kg/m³ and thickness of 40mm compressed to 25mm,
 - o total width : minimum 400mm whose 150mm on the side of the mechanism and flush or protruding on the opposite side,

7.1. INSTALLATION IN A 100MM-THICK AERATED CONCRETE WALL

The fire damper is installed in feed-through in a 100mm-thick aerated concrete wall with a density of 550kg/m³.

The fire damper is positioned in an opening with dimensions (W + 100) x (h + 100)mm. The fire damper is then sealed with standard mortar or plaster.

7.2. THE FIRE DAMPER CAN BE POSITIONED WITH A HORIZONTALLY- OR VERTICALLY-MOUNTED BLADE. INSTALLATION IN A 125 OR 150MM-THICK AERATED CONCRETE FLOOR

The fire damper is installed in feed-through in a 125 or 150 mm-thick aerated concrete floor with a density of 650kg/m³.

The fire damper is positioned in an opening with dimensions (W + 100) x (h + 100)mm. The fire damper is then sealed with standard mortar.

7.3. INSTALLATION IN A 70MM-THICK GYPSUM BLOCKS WALL

The partition is made using a plasterboard panel assembly with dimensions 660 x 400 x 70mm (w x h x th.) and a density of 850kg/m³.

The panels are put together using plasterboard adhesive.

The panels are installed using offset joints, with a half panel offset from one row to another. The joints are approximately 2mm thick.

For each fire damper, an opening with dimensions (W + 100) x (H + 100)mm is made in the partition by cutting out part of the plasterboard panels.

On both the fire side and the opposite to fire side, the clearance between the fire damper's tunnel and the opening is plugged with plasterboard adhesive.

The fire damper can be positioned with a horizontally- or vertically-mounted blade.

7.4. INSTALLATION IN A 100MM-THICK GYPSUM BLOCKS WALL

The partition is made using a plasterboard panel assembly with dimensions 660 x 400 x 100mm (w x h x th.) and a density of 850kg/m³.

The panels are put together using plasterboard adhesive.

The panels are installed using offset joints, with a half panel offset from one row to another. The joints are approximately 2mm thick.

For each fire damper, an opening with dimensions (W + 100) x (H + 100) mm is made in the partition by cutting out part of the plasterboard panels.

On both the fire side and the opposite to fire side, the clearance between the fire damper's tunnel and the opening is plugged with plasterboard adhesive.

The fire damper can be positioned with a horizontally mounted blade.

7.5. BATTERY ASSEMBLY OF FIRE DAMPERS IN A CONCRETE WALL

CU2 reference fire dampers, described in the reference report (*procès-verbal*) may be battery assembled.

The maximum dimensions of the battery are 2450 x 1650mm (W x h) composed of fire dampers with maximum dimensions of 1200 x 800mm.

The battery assembly of fire dampers requires the following installation:

Unmodified individual fire dampers from the CU2 range with PM connection, are installed in battery assembly by applying the following construction provisions:

- 12.5mm Promatect H 50 horizontal and vertical brackets are fixed using a graphite-based EX174 seal fixed to the underside of the plates. The Promatect H plates are clamped using 25mm long steel clips (supplier: Senco).
- Side-by-side/stacked installation of fire dampers.
- Mechanical links for the side-by-side or stacked fire dampers provided by screwing 125/100mm-thick steel sheet plates. These plates are fixed on the fire damper flanges using self-drilling screws (Ø 4.2 x 13mm). The maximum distance between the screws is 200mm.
- The sections between the fire dampers are "U"-shaped and have dimensions of 54 x 40mm.
- The sections around the battery assembly are "L"-shaped and have dimensions of 40 x 32mm.
- The steel sheet sections and the fire damper flanges are sealed using BCM mastic (supplier: Rf-Technologies).

Battery assembly of fire dampers from the CU2 range is limited to the following configurations:

- Installation of a maximum of two rows of side-by-side fire dampers.
- Installation of a maximum of two levels of stacked fire dampers

The fire dampers are installed in feed-through in a concrete wall with a minimum thickness of 110mm and density of 2200kg/m³.

The fire dampers are positioned in an opening with overall dimensions (W + 100) x (h + 100)mm. The battery assembly is then sealed using standard mortar.

The fire damper blades are located in the thickness of the concrete wall, their front side aligned with the front of the wall. Their rotational axes are positioned horizontally.

The control mechanisms are offset from the wall and are always placed on the sides.

7.6. INSTALLATION IN A PLASTERBOARD PARTITION TH = 100 MM

7.6.1. Partitioning

The dampers are installed in a "D 98/48" partition.

This partition is formed by a metal framework carrying facings in a double thickness of A or F type paper-backed plasterboard; the partition having a total thickness of 98 mm with an internal gap of 48mm filled by rock wool.

7.6.2. Peripheral frame

The peripheral frame is formed from 6/10mm thick galvanised steel rails MSH 50, fixed to the support structure by steel screws Ø 6 mm and plugs Ø 6mm, at intervals of 800mm.

7.6.3. Central frame

The partition frame is formed from single MSV 50 uprights in 6/10mm thick galvanised steel, slotted into the top and bottom rails and screwed at the base, at 600mm intervals.

An expansion gap of around 5mm is maintained at the top for each upright.

7.6.4. Header

A header intended to allow for passage of the damper is made using MSV 50 uprights and MSH 50 rails.

The header comprises:

- an additional upright (A) at the central partition frame at a distance of (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80)mm [for sealing using plaster or mortar] or (L + 125)mm [for sealing with plaster or mortar to achieve EI 120 S] from the upright belonging to the central frame (B) and acting as the 2nd upright to carry the weight of the damper;
- a horizontal R 48 rail (C) cut and folded onto which is fixed a plasterboard stub, installed perpendicular to the additional uprights, at both top and bottom and at a separation of (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80) mm [for sealing using plaster or mortar] or (L + 100)mm [for sealing with plaster or mortar to achieve EI 120 S];
- the upright belonging to the central frame (D) is interrupted to fit the header for dampers having a length (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80)mm [for sealing using plaster or mortar] greater than 600mm.

To achieve fire resistance of EI120S using plaster or mortar sealing it is necessary to add a plasterboard stub of (L + 100) x 100 x 12.5mm, fitted onto the bottom horizontal rail and a stub on the top rail.

Fixing together of the different elements is by screws Ø 3.5mm.

The damper may be installed with the blade axis horizontal or vertical.

7.6.5. Facings

The partition is formed from 2 x 12.5mm thick BPB GYPROC ABA or GYPROC Rf panels of bulk density 750 kg/m³. The facings may also be formed of BA18 or BA25 plasterboard on condition that the procès-verbaux associated with partitions formed using these panels supports a fire resistance criterion of EI120 for type F, E190 for type A.

For BA 13 panels, the panels are fitted so as to offset the vertical joints of a facing on the same facing, and to offset those of the inner skins for two facings.

The vertical joints of the panels are aligned with the uprights. The panels are fixed to the framework with 212/25 self-tapping screws at 500mm intervals for the first layer, and 212/35 screws at 300mm intervals on the second layer.

Visible joints between panels and return angles and the concrete structure are treated with JOINTFILLER coating + a sealing strip. The screw heads are also covered with the same coating.

The void between the panels is filled with ROCKFIT 431 rock wool or equivalent of bulk density 33kg/m³.

7.6.6. Sealing around the damper

Solution 1:

The space between the damper tunnel and wall is increased to around 30mm. A 100mm wide stub of plasterboard of bulk density 750kg/m³ 12.5mm thick, and of the same type as the facing, fixed around the full periphery of the damper, is fixed to the wall every 250mm using steel self-tapping M6 screws above this space.

The space between the two stubs and between the damper and the wall is filled with rock wool of bulk density 40kg/m³.

All the joints between the panels are covered with a coating of BPB GYPROC Jointfiller 45.

The screws are also covered with a coating of the same type.

Solution 2:

The joint between the damper bodies and the wall is filled by rock wool of density 60kg/m³. The gap between the tunnel and wall is increased to around 25mm. On both the exposed and non-exposed sides, the free space between the dampers and the wall, previously filled with rock wool, is covered with a layer of PREGYLYS (LAFARGE) coating smoothed over at least 50mm of the damper bodies and supporting structure so as to ensure sealing between them.

Solution 3:

On both the fire side and side away from fire, the gap between the damper tunnel and the cut-out is plugged with standard plaster or mortar.

7.7. INSTALLATION IN A PLASTERBOARD WALL LINING TH = 82.5 MM

7.7.1. Partitioning

The dampers are installed in a "D 98/48" partition.

This partition is formed by a metal framework carrying facings in a double thickness of A or F type paper-backed plasterboard; the partition having a total thickness of 82.5mm.

7.7.2. Peripheral frame

The peripheral frame is formed from 6/10mm thick galvanised steel rails MSH 50, fixed to the support structure by steel screws Ø 6mm and plugs Ø 6mm, at intervals of 800mm.

7.7.3. Central frame

The partition frame is formed from single MSV 50 uprights in 6/10mm thick galvanised steel, slotted into the top and bottom rails and screwed at the base, at 600mm intervals.

An expansion gap of around 5mm is maintained at the top for each upright.

7.7.4. Header

A header intended to allow for passage of the damper is made using MSV 50 uprights and MSH 50 rails.

The header comprises:

- an additional upright (A) at the central partition frame at a distance of (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80)mm [for sealing using plaster or mortar] from the upright belonging to the central frame (B) and acting as the 2nd upright to carry the weight of the damper;
- an R 48 rail (C), cut and folded horizontally, fitted perpendicular to the additional uprights, at the top and bottom and separated by (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80)mm [for plaster or mortar sealing].
- the upright belonging to the central frame (D) is interrupted to fit the header for dampers having a length (L + 65)mm [for sealing with/without stubs + rock wool] or (L + 80)mm [for sealing using plaster or mortar] greater than 600mm.

Fixing together of the different elements is by screws Ø 3.5mm.

The damper may be installed with the blade axis horizontal or vertical.

7.7.5. Facings

The wall lining is formed from 1 x 12.5mm + 1 x 20mm thick BPB GYPROC ABA or GYPROC Rf panels of bulk density 750kg/m³.

The vertical joints of the panels are aligned with the uprights. The panels are fixed to the framework with 212/25 self-tapping screws at 500mm intervals for the first layer, and 212/35 screws at 300mm intervals on the second layer.

Visible joints between panels and return angles and the concrete structure are treated with JOINTFILLER coating + a sealing strip. The screw heads are also covered with the same coating.

The void between the panels is filled with ROCKFIT 431 rock wool of bulk density 33kg/m³.

7.7.6. Sealing around the damper

The space between the damper tunnel and wall is increased to around 30mm. A 100mm wide stub of plasterboard of bulk density 750kg/m³ 12.5mm thick, and of the same type as the facing, fixed around the full periphery of the damper, is fixed to the wall every 250mm using steel self-tapping M6 screws above this space.

The space between the two stubs and between the damper and the wall is filled with rock wool of bulk density 40kg/m³.

All the joints between the panels are covered with a coating of BPB GYPROC Jointfiller 45.

The screws are also covered with a coating of the same type.

7.8. INSTALLATION IN A FLEXIBLE PARTITION WALL WITH A MORTAR SEAL

7.8.1. Flexible partition wall

The standard flexible wall consists of U and C profiles of width 50mm which are covered by two layers of gypsum boards KNAUF DF of thickness 12.5mm and density 816.4kg/m³ on both sides. The vertical joints are staggered between the layers of gypsum boards. The flexible wall is insulated with ROCKWOOL ROCKFIT MONO NEW of thickness 40mm and density 35kg/m³.

The partition wall has a total thickness of 100mm.

The installation opening in the partition wall has for dimensions (W + 100) x (H + 100)mm.

7.8.2. Penetration seal

The damper is sealed into the opening of the flexible partition wall with HOLCIM CLASSIC CEM II/B-M 32.5N mortar of density 1773.9kg/m³ on a section of 50 x 100mm (w x th). The composition of the mortar is 2 units sandy clay + 1 unit sand + 1 unit cement and water.

The axis of the damper is positioned horizontally.

7.9. INSTALLATION IN A SANDWICH PANEL WALL CONSTRUCTION WITH A COATED STONE WOOL BOARD SEAL

7.9.1. Sandwich panel wall construction

The support structure of the sandwich panel wall construction consists of steel L profiles of section 50 x 70 x 1.5mm fixed on the horizontal edges of the concrete frame, at the exposed and unexposed sides, by means of carbon steel screws Ø 6.3 x 65mm with a maximal spacing of 400mm.

The side profiles consist of coated steel profiles of section 50 x 70 x 0.5mm (w x h x th) fixed on the vertical edges of the concrete frame, at the exposed and unexposed sides, by means of carbon steel screws Ø 6.3 x 65mm with a maximal spacing of 400 mm.

The sandwich panels PAROC AST S of thickness 100mm and surface mass 19.4kg/m² are composed by:

- Steel sheet panel skin of thickness 0.6mm fixed to both sides of the core by means of two component polyurethane glue (230 to 300g/m²).
- Stone wool core PAROC CES 50C of thickness 98.8mm and density 90.7kg/m³ provided with a tongue and groove system in the longitudinal direction.
- EPDM O-seal of thickness 1.8mm and outer diameter 8.5mm in the joints between the sandwich panels, on both sides.

The sandwich panels provided with a tongue and groove system (overlap 16mm) are fixed by means of:

- Sealant HILTI CFS-S ACR at each joint at the inlet opening.
- Self-tapping screw SFS Ø 4.8 x 2mm with washer Ø 10 x 3 mm with a maximal spacing of 400mm to the L-profiles and the side profiles.

An insulation made of stone wool PAROC FPS 17 of section 20 x 100mm and density 179.17kg/m³ is clamped between the sandwich panels and the frame at the bottom horizontal edges of the frame and between the L profiles.

An insulation made of stone wool ROCKWOOL ROCKFIT MONO of density 35kg/m³ is clamped between the sandwich panels and the frame in order to fill the gap between the upper horizontal edge of the frame and the sandwich panels and between the vertical edge of the frame and the sandwich panels.

Some steel mounting brackets of section 25.4 x 96 x 25.4 x 1.5mm (h x w x h x th) are inserted around the core, at the inlet opening in the sandwich panel wall, with a maximal spacing of 600mm for the horizontal edges and one in the middle of the vertical edges. Each mounting bracket is fixed to the sandwich panels by means of 4 stainless steel rivets Ø 4.8 x 10mm.

Some steel L profiles of section 30 x 30 x 2mm are located at the exposed and unexposed sides over the horizontal and vertical edges of the inlet opening. They are fixed to the sandwich panels by means of sealant HILTI CFS-S ACR and self-tapping flange screws HILTI S-MD21Z Ø 5.5 x 25mm with a maximal spacing of 100mm.

The installation opening in the sandwich panel wall has for dimensions (W + 100) x (H + 100)mm.

7.9.2. Penetration seal

The damper is sealed into the opening of the sandwich panel wall with two one-sided coated stone wool boards HILTI FIRESTOP COATED BOARD CFS-CT B 1S of thickness 50mm (coating thickness 0.7mm) and density 184.8kg/m³. The maximum annular gap is 45mm and the total seal depth is 100mm.

Both boards are installed around the damper casing over the entire length and width with staggered joints and installed flush with both sides of the inlet opening in the sandwich panel wall, back to back with the coating on the visible edges. They are fixed to the damper casing by means of a thin layer of acrylic sealant HILTI FIRESTOP ACRYLIC SEALANT CFS-CT applied between the damper and the boards' edges in the penetration seal and flush with both sides of the board seal.

An acrylic dispersion coating HILTI FIRESTOP COATING CFS-CT covers all the board facings and edges.

The axis of the damper is positioned horizontally.

8. FIRE RESISTANCE CLASSIFICATIONS

8.1. CLASSIFICATION REFERENCE

This classification procedure was conducted in accordance with section 7.2.4 of the standard EN 13501-4.

8.2. CLASSIFICATIONS

The elements are classified according to the following combinations of performance parameters and classes for the following supporting constructions.

- 100 mm-thick aerated concrete wall / 100 mm-thick gypsum blocks wall
- Light partition made using 100mm-thick 98/48 type gypsum plasterboard panels type A or F
- PAROC AST S sandwich panel wall construction
- 100/125/150mm-thick aerated concrete floor slab

The dimensional range covered by the performances stated below is 200 x 200mm to 1200 x 800mm / 200 x 200mm to 1500 x 1000mm.

No other classification is authorised.

Range	Wall type	Wall	Sealing	Installation	Classification
200x200 mm ≤ CU2 ≤ 1500x1000 mm	Rigid wall	Aerated concrete th ≥ 100 mm and density ≥ 550 kg/m ³	Gypsum	1	EI 120 (v _e i ↔ o) S - (500 Pa)
			Mortar	1	EI 90 (v _e i ↔ o) S - (300 Pa)
	Flexible wall	Metal studs gypsum plasterboard Type F (EN 520) ≥ 100 mm	Gypsum	1	EI 120 (v _e i ↔ o) S - (500 Pa)
			Mortar	1	EI 90 (v _e i ↔ o) S - (300 Pa)
			Sandwich panel wall construction type PAROC AST S th ≥ 100 mm	HILTI CFS-CT B 1S	1
		Gypsum blocks ≥ 100 mm	Block glue	1	EI 120 (v _e i ↔ o) S - (500 Pa)
Rigid floor	Aerated concrete ≥ 150 mm	Mortar	2	EI 120 (h _o i ↔ o) S - (500 Pa)	
200x200 mm ≤ CU2 ≤ 1200x800 mm	Rigid wall	Aerated concrete th ≥ 100 mm and density ≥ 550 kg/m ³	Mortar	2	EI 120 (v _e i ↔ o) S - (500 Pa)
			Gypsum	2	EI 90 (v _e i ↔ o) S - (300 Pa)
	Flexible wall	Metal studs gypsum plasterboard Type A (EN 520) ≥ 100 mm	Stone wool ≥ 40 kg/m ³ + cover plates	1	EI 90 (v _e i ↔ o) S - (500 Pa)
			Gypsum	1	EI 90 (v _e i ↔ o) S - (500 Pa)
			Metal studs gypsum plasterboard Type F (EN 520) ≥ 100 mm	Stone wool ≥ 40 kg/m ³ + cover plates	1
	Gypsum blocks ≥ 70 mm	Block glue	1	EI 120 (v _e i ↔ o) S - (500 Pa)	
1200x800 mm < CU2 ≤ 1500x1000 mm	Rigid wall	Aerated concrete th ≥ 100 mm and density ≥ 550 kg/m ³	Mortar	3	EI 60 (v _e i ↔ o) S - (500 Pa)
				3	EI 120 (v _e i ↔ o) S - (500 Pa)
1200x800 mm < CU2 ≤ 1500x800 mm	Rigid wall	Aerated concrete th ≥ 100 mm and density ≥ 550 kg/m ³	Mortar	2	EI 90 (v _e i ↔ o) S - (300 Pa)
	Flexible wall	Metal studs gypsum plasterboard Type F (EN 520) ≥ 100 mm	Stone wool ≥ 40 kg/m ³ + cover plates	1	EI 90 (v _e i ↔ o) S - (300 Pa)
				1	EI 120 (v _e i ↔ o) S - (300 Pa)
200x200 mm ≤ CU2 ≤ 1500x800 mm	Asymmetrical flexible wall (shaft wall)	Metal studs gypsum plasterboard Type F (EN 520) ≥ 82.5 mm	Stone wool ≥ 40 kg/m ³ + cover plates	1	EI 60 (v _e i ↔ o) S - (300 Pa)
	Rigid floor	Aerated concrete ≥ 125 mm	Mortar	2	EI 120 (h _o i ↔ o) S - (300 Pa)

1 : axis horizontal

2 : axis horizontal or vertical

3 : axis vertical

Range	all type	Wall	Sealing	Installation	Classification
CU2/B ≤ 4 x CU2 (200x200 mm ≤ CU2 ≤ 1200x800 mm)	Rigid wall	Reinforced concrete ≥ 110 mm	Mortar	1	EI 120 (v _e i ↔ o) S - (500 Pa)
CU2/B ≤ 4 x CU2 (200x200 mm ≤ CU2 ≤ 1500x800 mm)	Rigid wall	Reinforced concrete ≥ 110 mm	Mortar	1	EI 120 (v _e i ↔ o) S - (300 Pa) EI 60 (v _e i ↔ o) S - (500 Pa)

1 Type of installation: built-in 0/180° (B22, B21, B12)

The above performances of the elements are valid for heating as described in section 5.1.1 of the European standard EN 1363-1.

9. FIELD OF APPLICATION OF THE RESULTS

9.1. GENERAL POINTS

The requirements related to the field of application of all the fire dampers tested in accordance with EN 1366-2 apply, as well as the following items.

9.2. DIMENSIONS OF THE FIRE DAMPER

In accordance with section 13.1 of the standard EN 1366-2, the classifications indicated in section 8.2 of this classification report are valid for all fire dampers of the same type (including all the side reports), provided the maximum flow cross-section dimensions do not exceed 1200 x 800mm / 1500 x 1000mm and that the minimum flow cross-section dimensions are not less than 200 x 200mm.

9.3. FIRE DAMPERS INSTALLED WITHIN STRUCTURAL OPENING

A test result obtained for a fire damper installed within a structural opening is only applicable to fire dampers of the same type installed in the same orientation and position in relation to the supporting construction as that tested.

9.4. FIRE FROM ABOVE

Fire dampers tested horizontally in floors with fire from below are acceptable in installations where fire might come from above.

9.5. SEPARATION BETWEEN FIRE DAMPERS AND BETWEEN FIRE DAMPERS AND CONSTRUCTION ELEMENTS

In accordance with section 13.5 of the standard EN 1366-2, the fire classifications indicated in section 8.2. of this classification report apply, in practice, with a minimum spacing:

- a) of 50mm between fire dampers installed in separate ducts;
- b) of 50mm between the fire damper and a construction element wall;
- c) of 25mm between the fire damper and a construction element ceiling.

9.6. SUPPORTING CONSTRUCTIONS

A test obtained for a fire damper mounted in or on the face of a standard supporting construction is applicable to a supporting construction of the same type with a fire resistance equal to or greater than that of the standard supporting construction used in the test (thicker, denser, more layers of boards, as appropriate).

The test result can also apply to cellular or hollow masonry blocks or slabs that have a fire resistance time equal or greater than the fire resistance required for the fire damper installation.

Test results obtained with dampers installed in flexible vertical supporting constructions may be applied to rigid supporting constructions of a thickness equal to or greater than that of the element used in the tests, provided that the classified fire resistance of the rigid supporting construction is greater than or equal to the one used for the test. The sealants used shall be the same as those tested. Any fasteners used shall be fire rated to suit the supporting construction that is used.

Test results obtained with dampers installed in insulated flexible vertical supporting constructions may be applied to applications where the same flexible vertical supporting construction is uninsulated - aperture framing shall be used using the same materials as used in the test partition construction, using the same number of boards as was tested.

Test results obtained with dampers installed in flexible vertical supporting constructions made with steel studs are not applicable to flexible vertical supporting constructions made using timber studs.

Test results obtained with dampers installed in aerated concrete are applicable to rigid constructions made from hollow blocks, provided that the holes are filled/closed before the addition of the final penetration seal.

If a specific supporting construction different from those described in standard EN 1366-2 – paragraph 7.2 is selected, the test results obtained are applicable only to that specific wall, partition or floor having a thickness and/or density equal or greater than that tested.

9.7. BLADE PIVOT AXIS

Tests with the actuator mounted at the bottom of the fire damper for a test with the blades with a vertical pivot axis shall allow the damper to be installed with the actuator at the top of the unit.

No modifications may be applied to the dimensions expressed above and no modifications may be made to the structure of the element without the prior issue of a classification extension by the laboratory.

10. EXAP EN 15882-2

Rule	Parameter	Factors	Factor influence on criteria			Rules
			Integrity (E)	Insulation (I)	Smoke Leakage (S)	
Reference						
X.3	Changes in pressure (positive or negative)	Decreased under pressure $ \Delta P < \Delta P_{\text{tested}} $	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained.
X.4		Increased over pressure	Worse[-E]	Worse[-I]	Worse[-S]	
						a) any other under-pressure greater than or equal to -500 Pa suitable for up +500 Pa
						e.g.
						-500 Pa suitable for up to +500 Pa - 1000 Pa suitable for up to +500 Pa etc.
						The classification leakage values shall be maintained at 200 m ³ /hr/m ² and 360 m ³ /hr/m ² respectively.
X.5		Decreased over pressure	OK[=/+E]	OK[=/+I]	OK[=/+S]	Covered by above

Rule	Parameter	Factors	Factor influence on criteria			
X.9	Change in location of temperature sensing element	Higher from horizontal center plane	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained. Additional
X.11		Closer to exposed side	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained. Additional

Rule	Parameter	Factors	Factor influence on criteria			
X.18	Change in length of damper housing	Greater than tested	OK[=/+E] See rule	OK[=/+I] See rule	OK[=/+S] See rule	Assume that classification will be maintained Un-insulated casing – assume classification maintained
		Less than tested				

Rule	Parameter	Factors	Factor influence on criteria			
X.23	Change in duct connection flange	Change of material and/or change of shape or dimensions	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained.

Rule	Parameter	Factors	Factor influence on criteria			
X.26	Change in material of damper blade	Change of material	See rule	See rule	See rule	If galvanized steel has been tested, stainless steel grades are accepted as direct replacements without further testing, provided the same shapes and thicknesses are used. If a stainless steel grade has been tested, other stainless steel grades of higher specification are accepted as direct replacements without further testing, provided the same shapes and thicknesses are used. Use worst case to allow further EXAP

Rule	Parameter	Factors	Factor influence on criteria			
X.27	Change in material of damper housing	Change of material	See rule	See rule	See rule	If galvanized steel has been tested, stainless steel grades may be accepted as direct replacements without further testing, provided the same shapes and thicknesses are used. If a stainless steel grade has been tested, other stainless steel grades of higher specification may be accepted as direct replacements without further testing, provided the same shapes and thicknesses are used. Use worst case to allow further EXAP

Rule	Parameter	Factors	Factor influence on criteria			
X.32	Change in retaining profile/ stop	Change of shape and dimensions				
X.33	Change in intumescent material	Change of shape and dimensions				
X.34	Change in cold seal material	Change of shape and dimensions				
X.35	Change in wall/floor type	Rigid or flexible constructions	See rule	See rule	See rule	Covered by EN 1366-2 , direct field of application
X.36	Change in wall/floor thickness	Greater or lower	See rule	See rule	See rule	Covered by EN 1366-2 , direct field of application
X.37	Change in distance of the damper from the supporting	Closer to the supporting construction	OK[=+E]	OK[=+I]	OK[=+S]	Assume that classification will be maintained.
X.38	construction (built-up on the supporting construction)	Further from the supporting construction	Worse[-E]	Worse[-I]	Worse[-S]	Increase number of hangers/support calculated in accordance with EN 1366-1:2014 , Clause 13.6.
X.39	Change in suspension (hangers, bearers, anchors) of the damper and/or the connection duct	Increased hanger protection	OK[=+E]	OK[=+I]	OK[=+S]	Assume that classification will be maintained.

Rule	Parameter	Factors	Factor influence on criteria			
			OK[=/+E]	OK[=/+I]	OK[=/+S]	
X.42		Decreased distance between hangers	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained
X.43	Change in location of the damper blade according to the supporting construction	Closer to the center plane of the supporting construction	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that the classification will be maintained
X.45	Change in gap	Increase in size	See rule	See rule	See rule	Increase in area up to 50 % permitted
X.46	between the damper and the supporting construction	Decrease in size	See rule	See rule	See rule	Decrease permitted where there is sufficient room for installation of the seal.
X.47	Change in depth of penetration seal	Greater than tested	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that classification will be maintained.
X.49	Change in material of penetration seal	Type of penetration seal materials	See rule	See rule	See rule	with the exception of refractory mortar see 5.3
X.51	Change in damper orientation	Horizontal or vertical	See rule	See rule	See rule	Covered by EN 1366-2 , perform test in both horizontal and vertical plane
X.52		Sloping	See rule	See rule	See rule	Assume that classification will be maintained if the damper successfully passed a test in both the horizontal and vertical plane

Rule	Parameter	Factors	Factor influence on criteria			
X.54	Change in spacing between dampers	Greater or less than tested	See rule	See rule	See rule	Assume that the classification will be maintained
X.55	Change in distance between fire damper and a construction element (wall/floor)	Greater or less, but greater than 75 mm	OK[=/+E]	OK[=/+I]	OK[=/+S]	Assume that the classification will be maintained
X.56	E and E-S (No I) Dampers located remote from the supporting construction.	Change in design of fire resisting ductwork section - damper remote from the wall	See rule	See rule	See rule	If the damper is successfully tested with an uninsulated duct and damper casing, then any suitably tested fire-resisting duct system (EN 1366-1) may be used in practice, including the damper housing if tested with a protection system.

Maizières-lès-Metz, 12 July 2021

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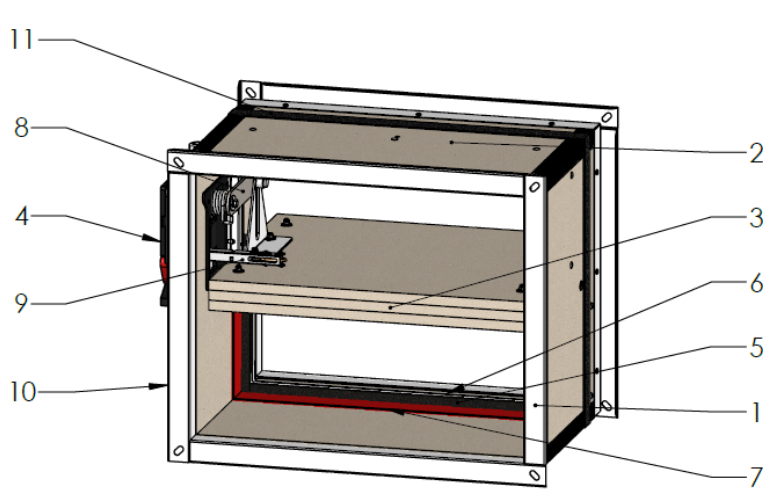
Project leader
Signé par : Charlotte SCHNELLER


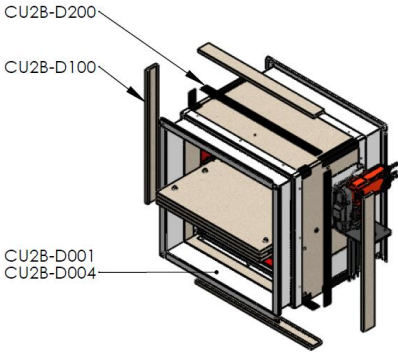
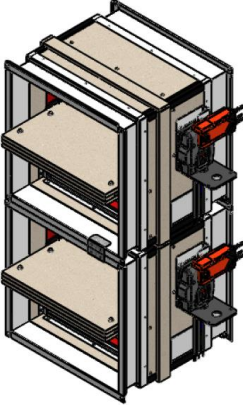
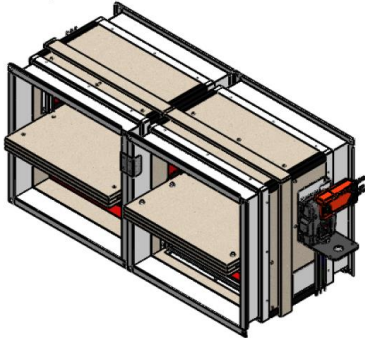
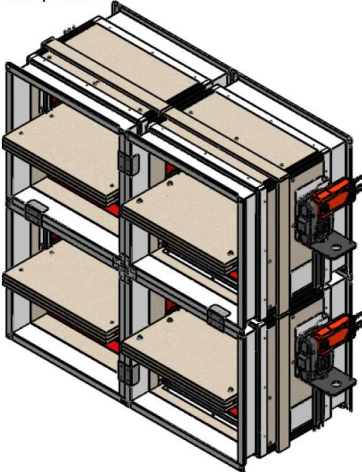
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Supervisor
Signé par : Romain STOUVENOT

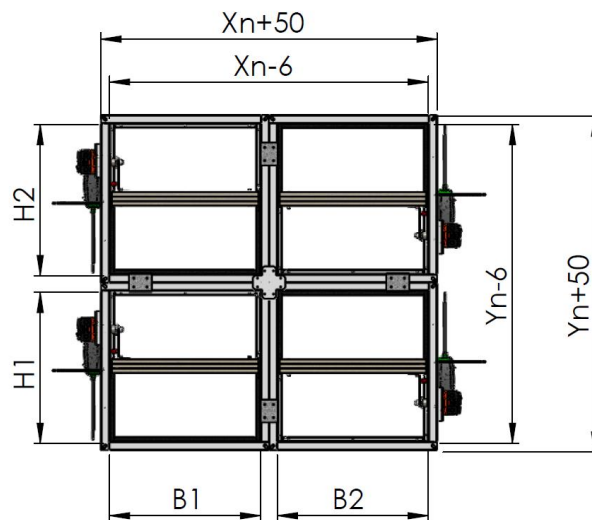
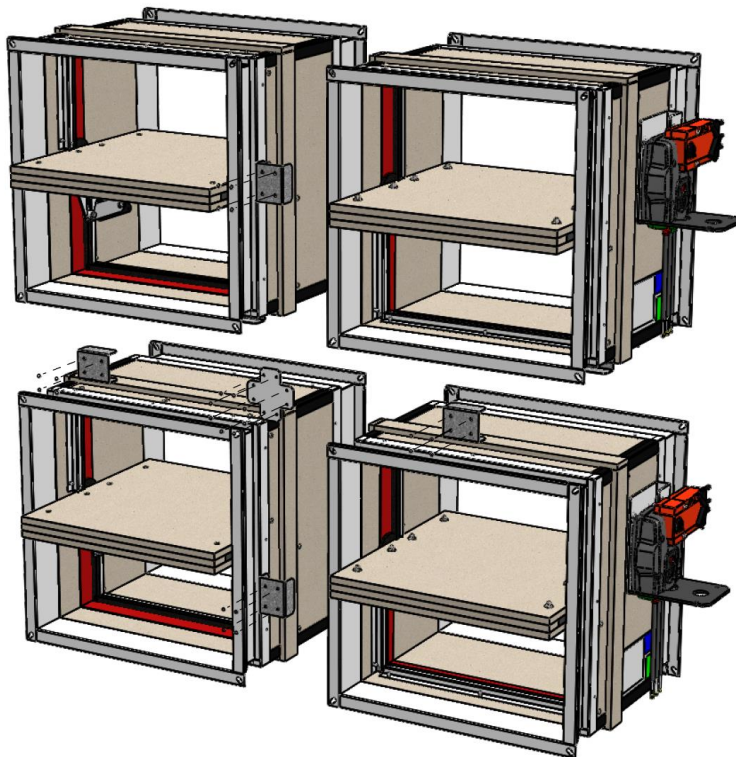
APPENDIX - FIGURES

	<p>Reference - Subject - Date CU2_Commercial_24_09_2019</p>	<p>Plate A 2/2</p>
<div style="text-align: center;">  </div> <ol style="list-style-type: none"> 1. Connection flange 2. Casing out of refractory material 3. Damper blade 4. Operating mechanism 5. Sealing cold smoke 6. Blade bumper 7. Intumescent strip 8. Transmission with locking (open/closed) 9. Fusible link 72°C 10. Product identification 11. External intumescent strip 		
<p>PRODUCT RANGE</p>		
	<p>Minimum dimensions</p>	<p>Maximum dimensions</p>
<p>WxH(mm)</p>	<p>200x200(*)</p>	<p>1500x1000(*)</p>
<p>W= Width H= Height</p>		
<p><i>* W/H per step of 50mm, intermediate dimensions available at an additional cost</i></p>		
<p><u>Plan Title:</u></p>		

	<p>Reference - Subject - Date CU2_Parts_Fasteners_05_12_2016</p>	<p>Plate B 6/9</p>
<p>Battery assembly CU2/B</p>  <p>CU2/B12</p>  <p>CU2/B21</p>  <p>CU2/B22</p> 		
<p>Plan Title:</p>		

	<p>Reference - Subject - Date CU2_Parts_Fasteners_05_12_2016</p>	<p>Plate B 7/9</p>
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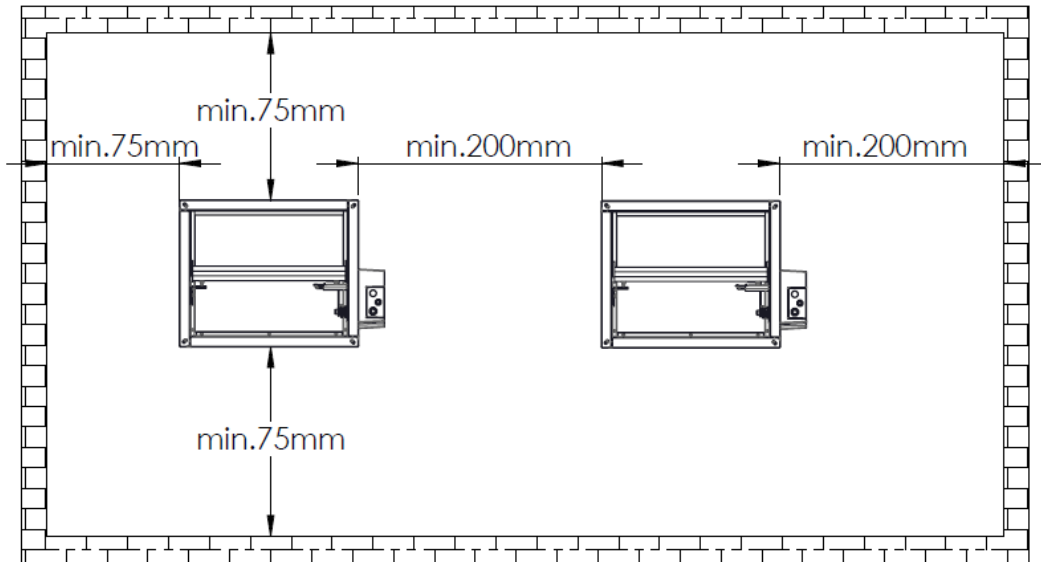
Battery assembly CU2/B

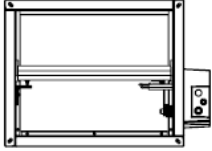
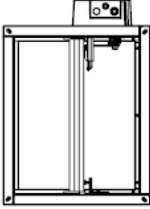
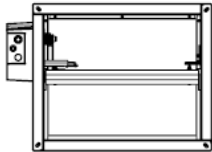
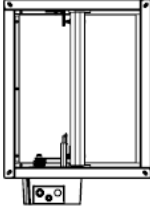


WIDTH	B1	B2
For X multiple of 100	$(Xn-100)/2$	$Xn/2$
For X ending with 50	$(Xn-50)/2$	
HEIGHT	H1	H2
For Y multiple of 100	$(Yn-100)/2$	$Yn/2$
For Y ending with 50	$(Yn-50)/2$	

Plan Title:

	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 1/10</p>
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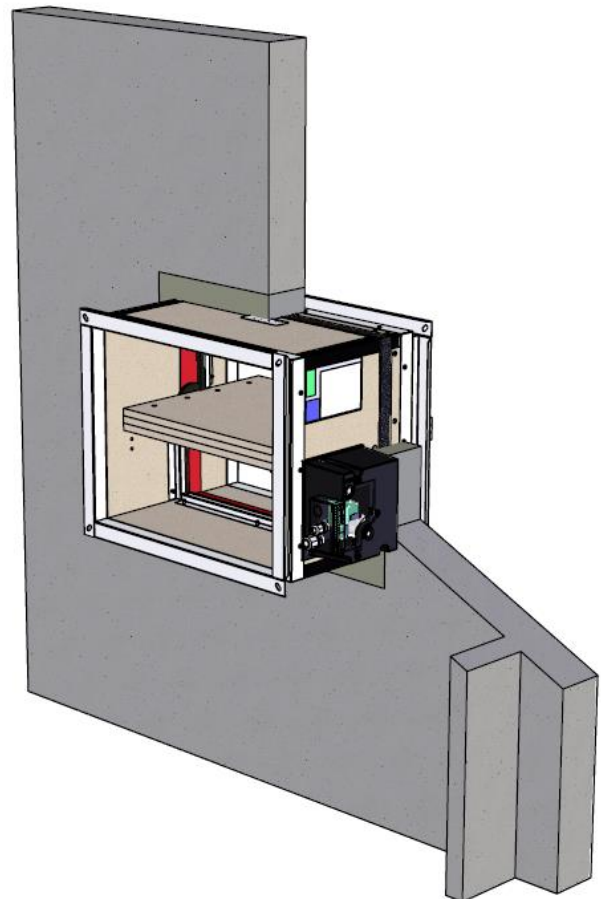
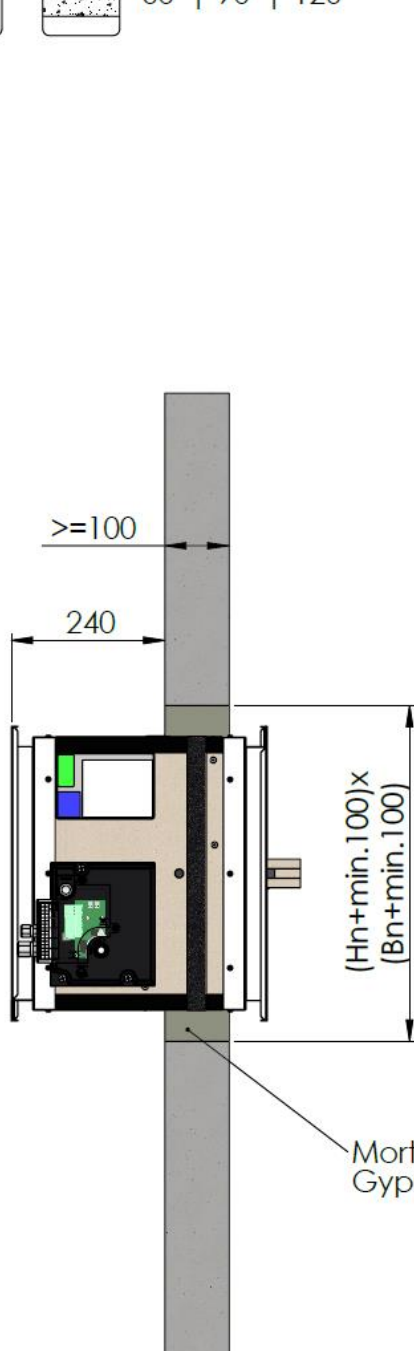
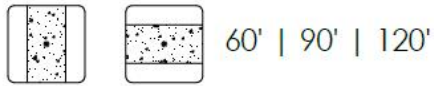


0°	90°
	
180°	270°
	

Plan Title:

 <p>Rf-t www.rf-t.be</p>	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 2/10</p>
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Rigid wall and floor

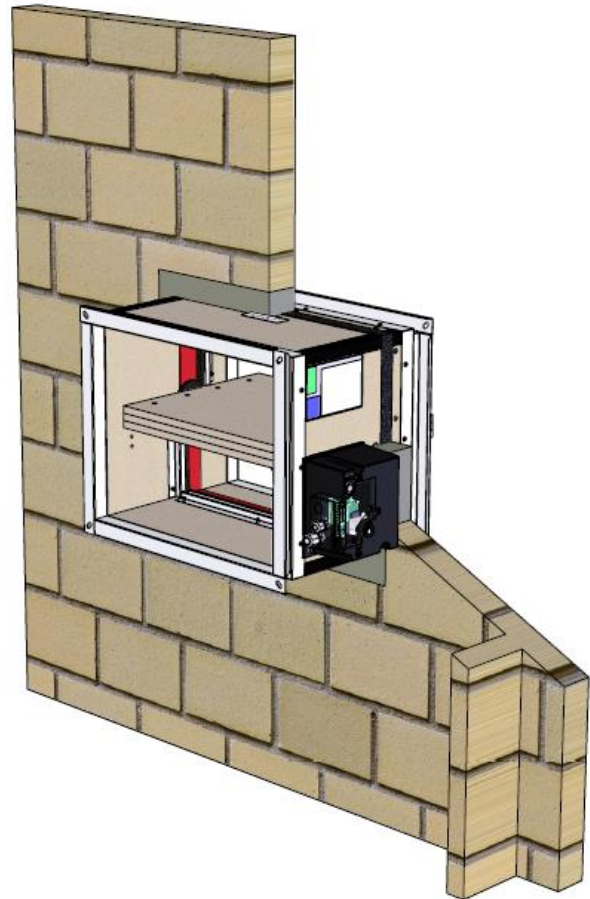
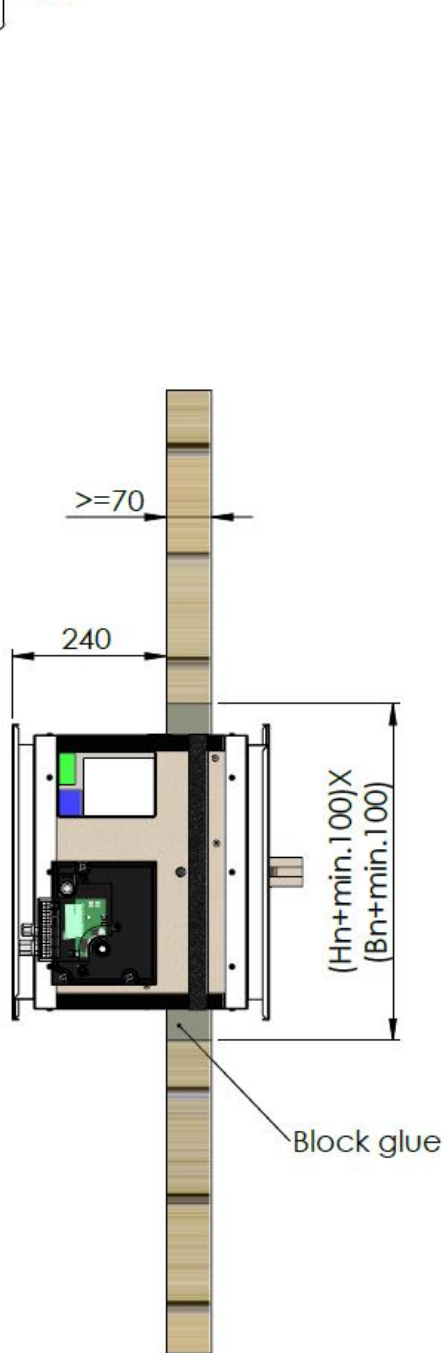
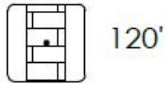


Mortar -> wall + floor
Gypsum -> only for rigid wall

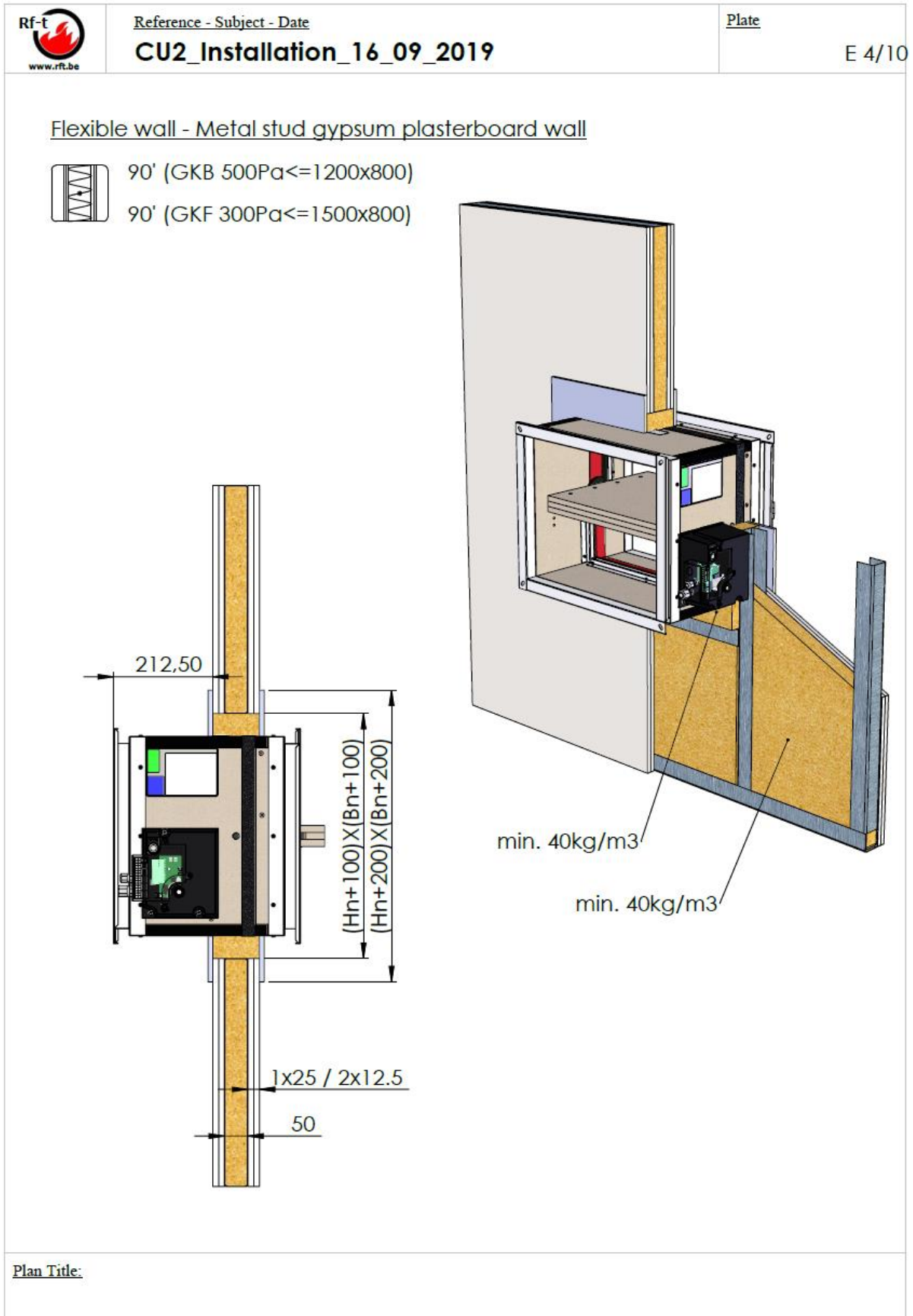
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

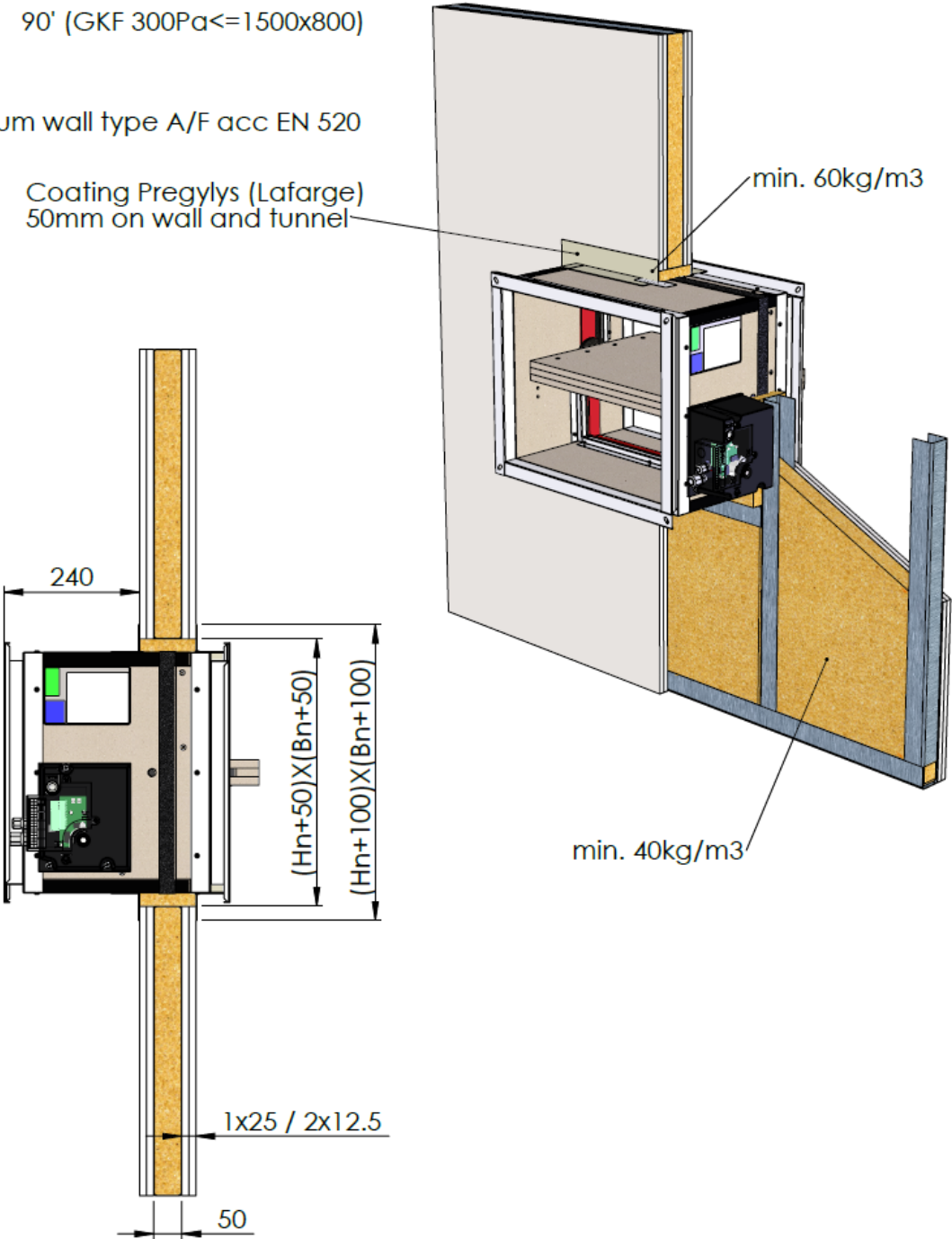
 <p>www.rf.t.be</p>	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 3/10</p>
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Gypsum block wall



Plan Title:



 <p>www.rft.be</p>	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 5/10</p>
<p><u>Flexible wall - Metal stud gypsum plasterboard wall</u></p> <p>  90' (GKB 500Pa≤1200x800)  90' (GKF 300Pa≤1500x800) </p> <p>Gypsum wall type A/F acc EN 520</p> <p>Coating Pregyls (Lafarge) 50mm on wall and tunnel</p> 		
<p><u>Plan Title:</u></p>		

	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 6/10</p>
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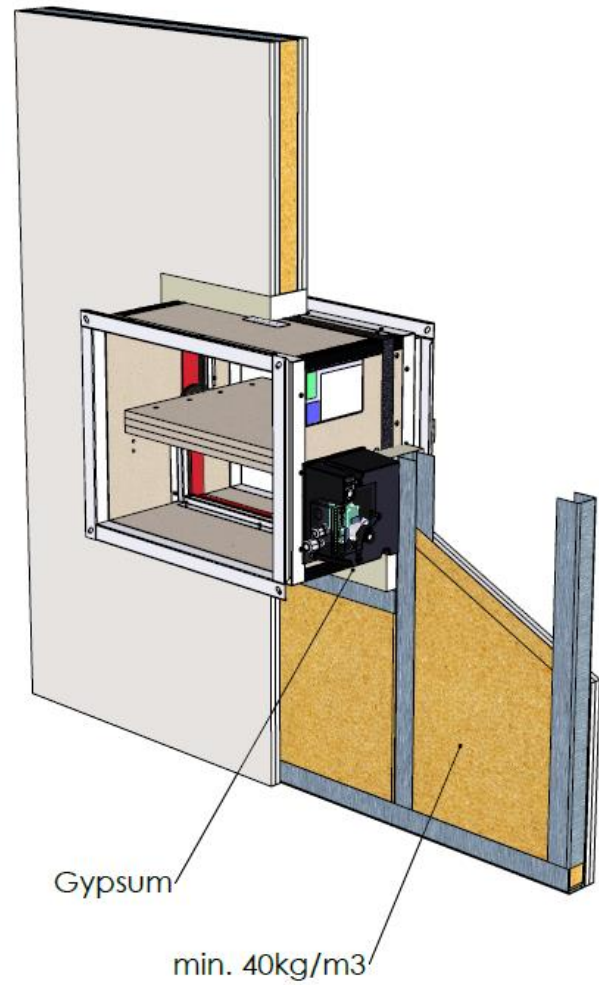
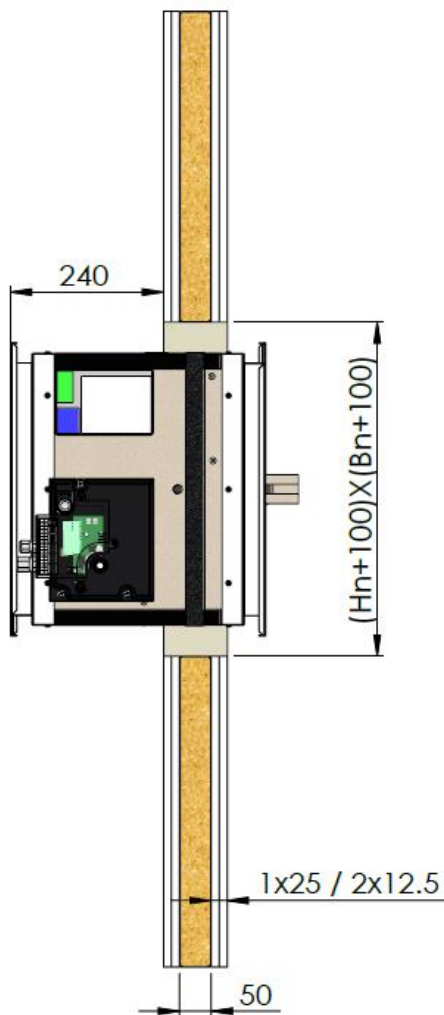
Flexible wall - Metal stud gypsum plasterboard wall



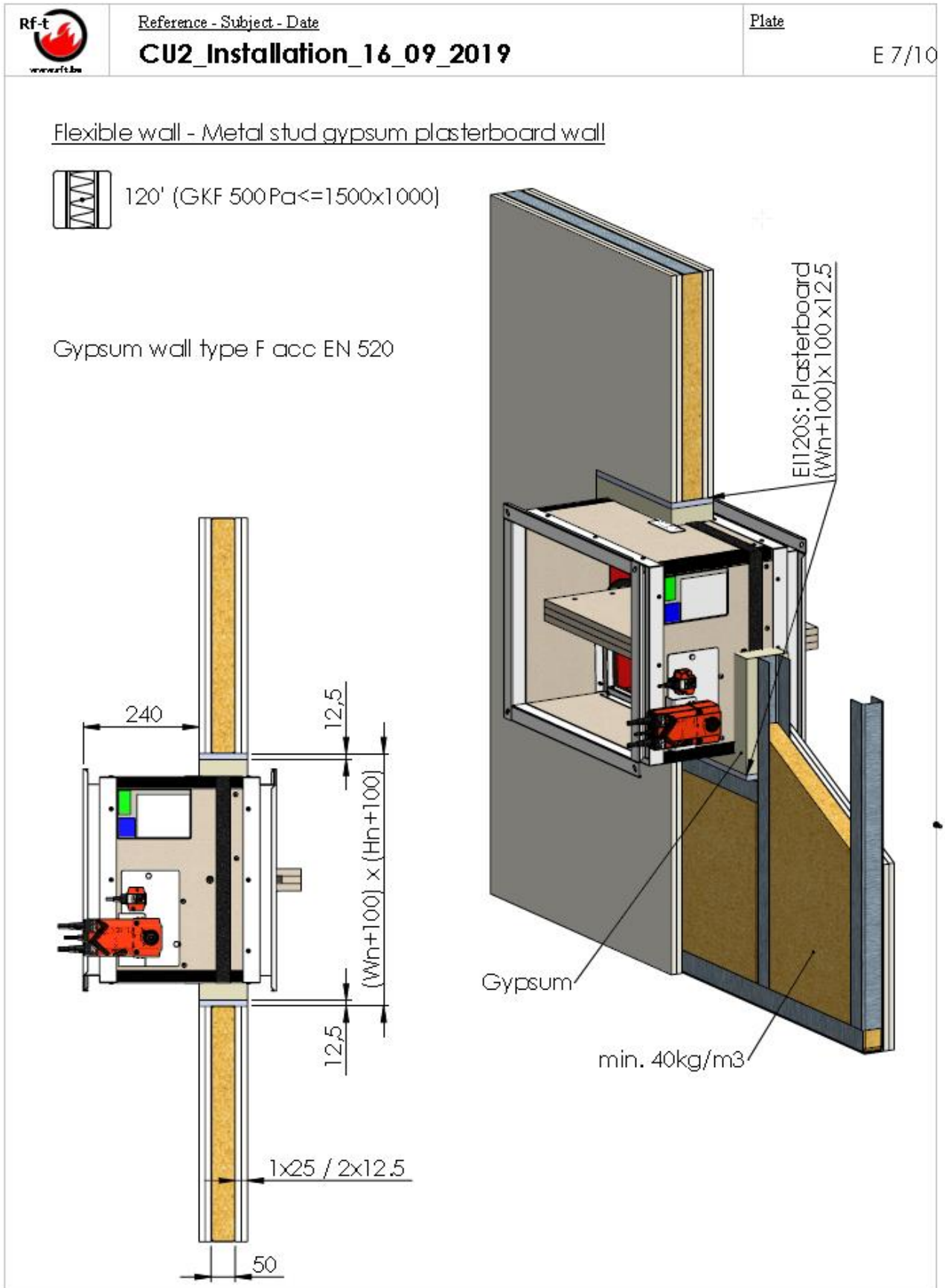
90' (GKB 500Pa<=1200x800)

90' (GKF 300Pa<=1500x800)

Gypsum wall type A/F acc EN 520






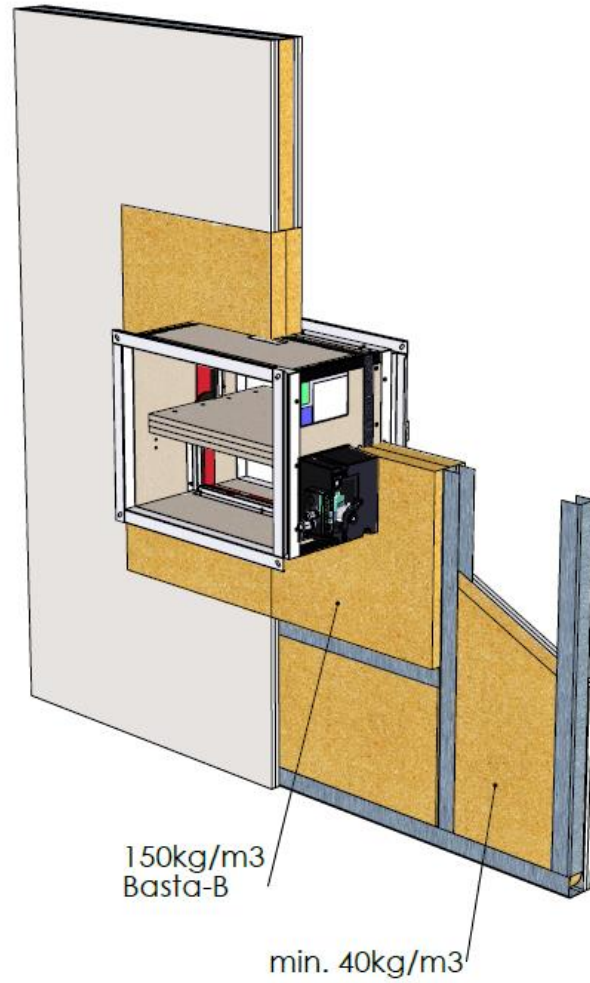
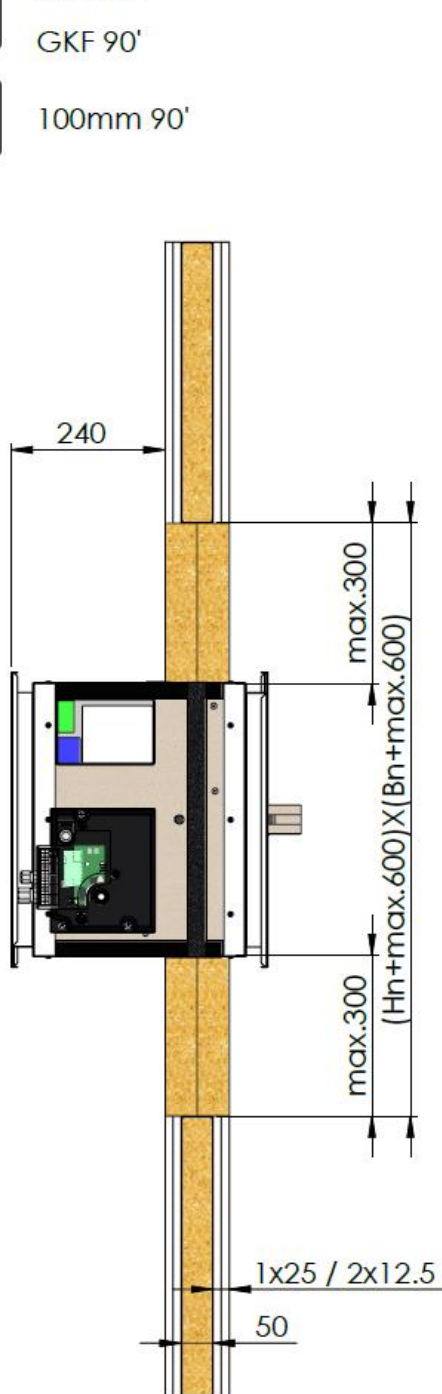
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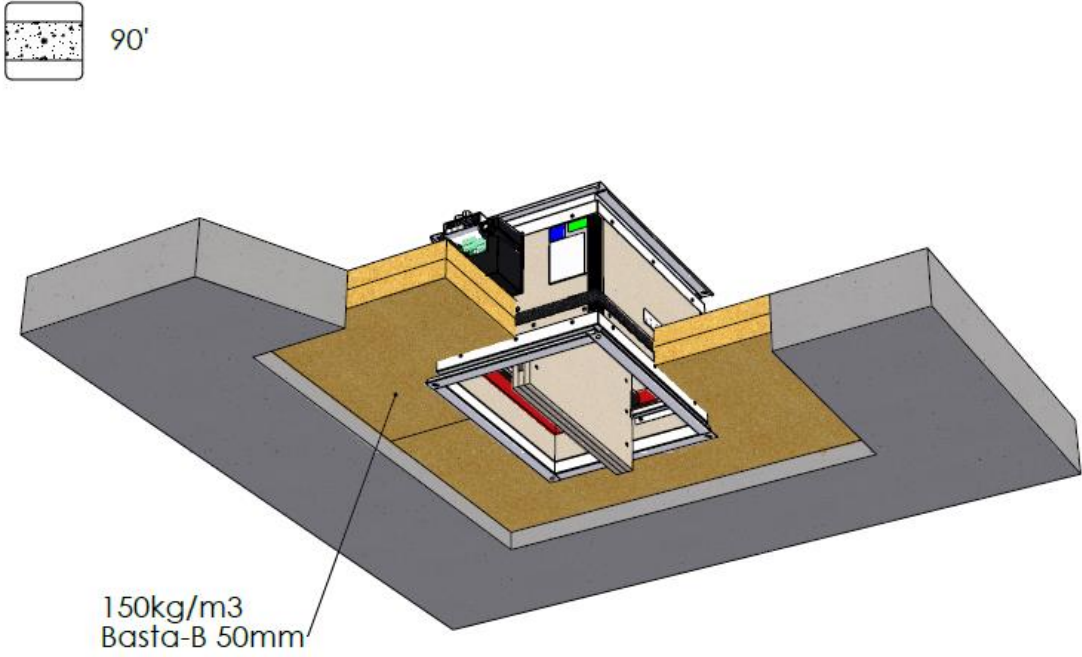
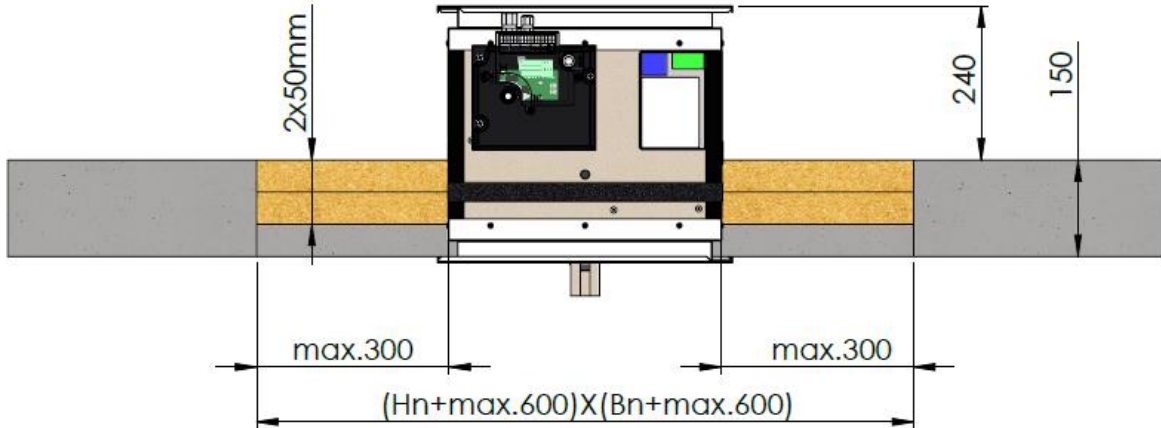
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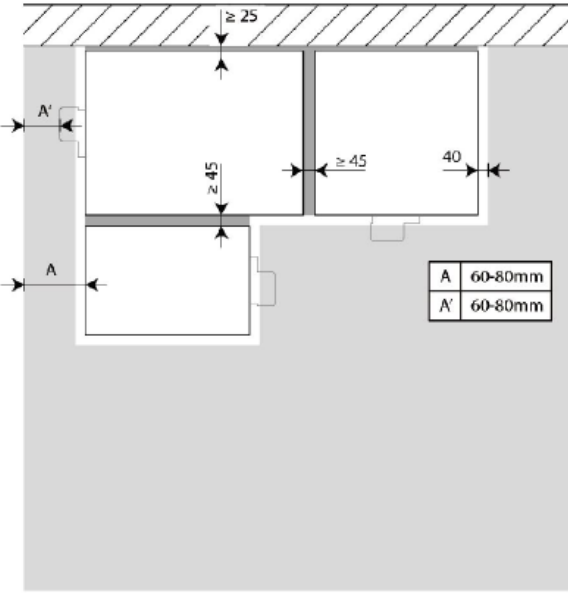
Rigid or flexible wall - Sealing with fire resistant rigid panels of mineral wool

-  GKB 60'
-  GKF 90'
-  100mm 90'



Plan Title:

 <p>Rf-t www.rf.be</p>	<p>Reference - Subject - Date CU2_Installation_16_09_2019</p>	<p>Plate E 9/10</p>
<p><u>Rigid floor - Sealing with fire resistant rigid panels of mineral wool</u></p>		
 <p>90'</p> <p>150kg/m3 Basta-B 50mm</p>		
 <p>2x50mm</p> <p>max.300</p> <p>max.300</p> <p>(Hn+max.600) X (Bn+max.600)</p> <p>240</p> <p>150</p>		
<p><u>Plan Title:</u></p>		

 <p>www.rf.t.be</p>	<p>Reference - Subject - Date</p> <p>CU2_Installation_16_09_2019</p>	<p>Plate</p> <p>E 10/10</p>
<p style="text-align: center;"><u>Mounting flexible wall at 0 distance</u></p>  <p style="text-align: center;"><u>Mounting rigid wall at 0 distance</u></p> 		
<p><u>Plan Title:</u></p>		