



## **CLASSIFICATION REPORT n° EFR-19-005409 - Revision 1**

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

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**Reference laboratory  
assessment**

EFR-19-005409 - Revision 1

**Regarding**

A range of "CR2"-type fire dampers, installed in feed-through (penetrations) in aerated concrete walls, light gypsum plasterboard walls, gypsum block walls, sandwich panel wall construction or in aerated concrete floor slabs

Operating vacuum pressure: -300 / -500 Pa

**Sponsor**

RF TECHNOLOGIES  
Lange Ambachtstraat, 40  
B - 9860 OOSTERZELE

**This classification report EFR-19-005409 - Revision 1 cancels and replaces the classification report EFR-19-005409.**

## CHANGE HISTORY

Revision level	Date	Changes	Author
0	15/01/2020	- Document creation	RST
1	19/05/2021	<ul style="list-style-type: none"><li>- Installation in a flexible partition wall with a mortar seal</li><li>- Installation in a sandwich panel wall construction with a coated stone wool board seal</li><li>- Update of the field of direct application of test results</li></ul>	CSC

## 1. INTRODUCTION

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This classification report defines the classification assigned to a range of "CR2"-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

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

Notified body: 1812

## 3. SPONSOR

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RF TECHNOLOGIES  
Lange Ambachtstraat, 40  
B - 9860 OOSTERZELE

## 4. REFERENCE TEST

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- 11543 (WFRGENT)
- 11734 (WFRGENT)
- 11789 (WFRGENT)
- 12195 (WFRGENT)
- 14717 (WFRGENT)
- 10 - U - 543 (EFFECTIS France)
- 3456-1 (TUM)
- 12291 (WFRGENT)
- 12292 (WFRGENT)
- 20457A (WFRGENT)
- 20406A (WFRGENT)

## 5. REFERENCE AND ORIGIN OF THE TEST SPECIMENS

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Reference: CR2

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

## 6. OVERALL PRINCIPLE

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### 6.1. TYPE OF FUNCTION

The "CR2"-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 or vertically mounted blade pivots using an external mechanism and a transmission.

Approved fire dampers have flow cross-section dimensions of between Ø 200mm and Ø 630mm.

### 6.3. DETAILED DESCRIPTION OF THE ELEMENTS

#### 6.3.1. Fire damper casing

The 375mm-long fire damper casing is made of 2mm-thick galvanised steel. It is perforated with 80 x 6mm (L x w) rectangular holes, placed at regular intervals around the circumference of the tunnel. PALUSOL-type PVC-coated heat-sensitive tape covers this section on the inside and outside of the tunnel.

The damper blade axis is fixed in two holes, half-way up the tunnel.

Two stops are fixed using steel rivets (Ø 4.8 x 13mm) inside the tunnel, upstream and downstream of the position of the damper blade.

A 25 x 15mm foam seal is glued onto these stops using RF TECHNOJOINT mastic.

At the ends of the tunnel, an EPDM seal is glued to ensure airtightness between the connecting duct and the tunnel.

#### 6.3.2. Blade

The damper blade, with a total thickness of 50mm, consists of two 25mm-thick calcium silicate boards, glued and clamped together.

A counter plate is fixed to the blade at the same height as the transmission bearing.

The damper blade is fitted with a galvanised steel connection lever, fastened to the blade using M5 x 70mm bolts.

The blade pivots on a 12mm diameter axle. It turns in bearings fitted in the tunnel walls and covered by PVC-type adhesive tape.

For air tightness, the axis is fitted with a rubber sealing ring.

Clearance of approximately 8mm is left between the damper blade and the tunnel.

### 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 automatic, motor-operated or remote-controlled mechanism
- A 12mm-thick mounting profile
- A transmission mechanism consisting of a steel con-rod system

If there is a power cut or the fusible link is activated, the internal spring shuts the fire damper.

## 7. INSTALLATION OF THE TEST SPECIMENS

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The classification obtained with CR2 fire dampers for standard installation in the various construction elements and their respective sealing remain valid for fire dampers installed with horizontal or diagonal axis up to 45°, with a space:

- of 30mm to 200mm between fire dampers installed in separate ducts;
- of 30mm to 75mm between the fire damper and a construction element (wall or floor).

Sealing between the single fire damper and the supporting construction (wall or floor) is performed using a maximum of eight layers (three layers on each side of the wall and two layers in the opening) of stone wool of a total width of 400mm (stone wool with the following characteristics: thickness of the layer = 50mm, density = 150kg/m<sup>3</sup>, thermal conductivity  $\lambda = 0.041\text{W/mK}$  at 50°C and water vapour absorption = 0.02%, Euroclass A1).

### 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/m<sup>3</sup>.

The fire damper is positioned in an opening with dimensions ( $\varnothing + 100$ ) mm. The fire damper is then sealed with standard mortar or plaster.

### 7.2. ASSEMBLY IN A 150MM-THICK AERATED CONCRETE FLOOR

The fire damper is installed in feed-through in a 150mm-thick reinforced concrete floor with a density of 650kg/m<sup>3</sup>.

The fire damper is positioned in an opening with dimensions ( $\varnothing + 80$ ) mm. The fire damper is then sealed with standard mortar.

### 7.3. INSTALLATION IN A 70MM-THICK GYPSUM BLOCK WALL

The partition is made using a gypsum block assembly with dimensions of 660 x 400 x 70mm (w x h x th.) and a density of 850kg/m<sup>3</sup>.

The blocks are put together using gypsum adhesive.

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

For each fire damper, an opening with dimensions ( $\varnothing + 80$ ) mm is made in the partition by cutting out part of the gypsum blocks.

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 gypsum adhesive.

### 7.4. INSTALLATION IN A PLASTERBOARD (GYPSUM) PARTITION

#### 7.4.1. Partition

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

This partition is made using a metal framework fitted with twin-layer facings with type A or type F gypsum plasterboard; the partition has an overall thickness of 98mm, with an internal cavity of 48mm filled with stone wool.

#### 7.4.2. Outer framework

The outer framework is made using 6/10mm-thick galvanised steel MSH 50 rails, fixed to the concrete support frame with steel screws ( $\varnothing$  6mm) and anchors ( $\varnothing$  6mm), spaced at intervals of 800mm.

#### 7.4.3. Central framework

The framework of the partition is made using single, 6/10mm-thick galvanised steel MSV 50 studs, slotted into the upper and lower rails and screwed at the base with a centre-to-centre distance of 600mm. A thermal expansion gap of approximately 5mm is left at the top of each stud.

#### 7.4.4. Header joist

A header joist designed to allow the fire damper to pass through is made using MSV 50 studs and MSH 50 rails.

The header joist is made of:

- Two studs (A) added to the central framework of the partition spaced ( $\varnothing + 50$ ) mm [or ( $\varnothing + 100$ ) mm, for plaster sealing] apart and acting as support studs for the weight of the fire damper itself;
- An R 48 (B) horizontal rail, sheared and bent, and installed perpendicular to the additional studs at the top and bottom and spaced ( $\varnothing + 50$ ) mm [or ( $\varnothing + 100$ ) mm for plaster sealing] apart from one another.

As per EXAP 15882-2, the outer clearance left around the fire damper may be reduced provided the caulking solution described in this document may be applied or increased by 50%.

The various elements are fixed together using screws ( $\varnothing$  3.5mm).

#### 7.4.5. Facings

##### Solution 1:

The partition is made using 12.5mm-thick BPB GYPROC ABA-type plasterboard with a bulk density of 708kg/m<sup>3</sup>.

The plasterboard is installed with the vertical joints of one facing offset in relation to the other within the same facing and also between the inner surfaces of both facings.

The vertical joints of the plasterboards are perpendicular to the studs. The plasterboards are fixed to the framework with 212/25-type self-drilling screws spaced at intervals of 500mm for the first layer and 212/35-type screws at intervals of 300mm for the second layer.

The visible joints between the plasterboards and the screeds with concrete frame are treated using the JOINTFILLER filler + jointing tape technique. The screw heads are also concealed with the same filler.

The cavity between the plasterboards is filled with ROCKFIT 431-type stone wool with a bulk density of 33kg/m<sup>3</sup>.

##### Solution 2:

This twin-layer facing can be replaced by 1 x BA 25-type single-layer facing.

The facings are made using a single layer of BA 25 plasterboard. The plasterboards have a maximum width of 600mm.

The plasterboards are fixed to all the steel sheet studs using TTPC 35 screws spaced at average intervals of 250mm.

The joints between the plasterboards are treated with plaster filler, in which a 52mm-wide strip of micro-perforated jointing tape is smoothly applied.

The screeds and screw heads are treated with plaster filler.

##### Solution 3:

This twin-layer facing can be replaced by 2 x type F BA 13 twin-layer facing.

The facings are made using a twin layer of BA 13 plasterboard. The plasterboards have a maximum width of 600mm.

The plasterboards are fixed to all the steel sheet studs using TTPC 35 screws spaced at average intervals of 250mm.

The joints between the plasterboards are treated with plaster filler, in which a 52mm-wide strip of micro-perforated jointing tape is smoothly applied.

The screeds and screw heads are treated with plaster filler.

#### 7.4.6. Caulking around the fire damper

##### Option 1:

The space between the tunnel of the fire damper and the wall is approximately 30mm. A plasterboard heel, with a density of 750kg/m<sup>3</sup>, thickness of 12.5mm and width of 100mm, the same type as the facing and fixed to the entire periphery of the fire damper, is fixed to the wall every 250mm using self-drilling, steel M6 screws above this space.

This heel is the same type as the facing. However, it may be replaced by a 12.5mm-thick heel as initially described in the reference report.

The cavity between the two heel plates and between the fire damper and the wall is filled with mineral wool with a bulk density of 40 kg/m<sup>3</sup>.

All the joints between the plasterboard are covered with BPB GYPROC Jointfiller 45-type filler.

The screws are also covered with the same type of filler.

Option 2:

On both the fire side and the opposite to fire side, the clearance between the fire damper tunnel and the opening or between the header joist and the fire damper tunnel is plugged with standard plaster.

Option 3:

The joint between the fire damper casing and the wall is plugged with stone wool with a density of 60kg/m<sup>3</sup>. The clearance between the tunnel and the wall is approximately 25mm. On the facing side, the free space between the fire dampers and the wall, previously filled with stone wool, is covered with a layer of PREGYLYS (LAFARGE) type filler, spread across the fire damper casing and the supporting construction over a minimum length of 50mm, so as to ensure the two surfaces are perfectly sealed.

On both the fire side and the opposite to fire side, the clearance between the fire damper tunnel and the opening or between the header joist and the fire damper tunnel is plugged with standard plaster.

## 7.5. INSTALLATION IN A FLEXIBLE PARTITION WALL WITH A MORTAR SEAL

### 7.5.1. Flexible partition wall

The standard flexible wall consists of U and C profiles of width 50 mm which are covered by two layers of gypsum boards KNAUF DF of thickness 12.5 mm and density 821 kg/m<sup>3</sup> 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 40 mm and density 35.7 kg/m<sup>3</sup>.

The partition wall has a total thickness of 100 mm.

The installation opening in the partition wall has for dimensions ( $\varnothing + 100$  mm) x ( $\varnothing + 100$  mm) (w x h).

### 7.5.2. Penetration seal

The damper is sealed into the opening of the flexible partition wall with HOLCIM CLASSIC CEM II/B-M 32.5N mortar on a section of 50 x 100 mm (w x th). The composition of the mortar is 3 units sandy clay + 1 unit cement and water.

The axis of the damper is positioned vertically or horizontally.

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

### 7.6.1. Sandwich panel wall construction

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

The side profiles consist of coated steel profiles of section 50 x 70 x 0.5 mm (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  $\varnothing$  6.3 x 65 mm with a maximal spacing of 400 mm.



The sandwich panels PAROC AST S of thickness 100 mm and surface mass 19.3 kg/m<sup>2</sup> are composed by:

- Steel sheet panel skin of thickness 0.6 mm fixed to both sides of the core by means of adhesive glue (230 to 300 g/m<sup>2</sup>),
- Stone wool core PAROC CES 50C of thickness 98.8 mm and density 85 kg/m<sup>3</sup> provided with a tongue and groove system in the longitudinal direction,
- EPDM O-seal of thickness 1.8 mm and outer diameter 8.5 mm over the entire height of the sandwich panels.

The sandwich panels provided with a tongue and groove system (overlap 15 mm) are fixed by means of :

- Sealant HILTI CFS-S ACR at each joint at the inlet opening,
- One self-tapping screw SFS Ø 4.8 x 2 mm with washer Ø 10 x 3 mm at each joint above the inlet openings,
- Three self-tapping screws SFS Ø 4.8 x 2 mm with washer Ø 10 x 3 mm at each joint beneath the inlet openings with a maximal spacing of 400 mm.

An insulation made of stone wool PAROC UNM 37 of section 30 x 100 mm and density 30 kg/m<sup>3</sup> is clamped between the sandwich panels and the frame on top of the bottom horizontal edges of the frame and between the L profiles.

An insulation made of stone wool ROCKWOOL ROCKFIT MONO of density 35 kg/m<sup>3</sup> is added 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.

The installation opening in the sandwich panel wall has for dimensions (Ø + 100 mm) x (Ø + 100 mm) (w x h).

Some steel L profiles of section 30 x 30 x 2 mm are fixed all around the inlet opening to the sandwich panels by means of sealant HILTI CFS-S ACR and self-tapping screws with washers SL2-S-S14 Ø 5.5 x 25 mm.

#### 7.6.2. 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 50 mm (coating thickness 0.7 mm) and density 166 kg/m<sup>3</sup>. The maximum annular gap is 45 mm and the total seal depth is 100 mm.

Both boards are placed 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 by means of a thin layer of acrylic sealant HILTI FIRESTOP ACRYLIC SEALANT CFS-CT applied between the boards edges and the inlet opening in the sandwich panel wall.

An acrylic dispersion coating HILTI FIRESTOP COATING CFS-CT covers the joints, the facing and the edges of the board seal.

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.

- 100mm-thick aerated concrete wall
- 70mm-thick gypsum block partition
- Light partition made using 98/48 type gypsum plasterboard
- 150mm-thick aerated concrete floor slab
- PAROC AST S sandwich panel wall

The dimensional range covered by the performances stated below is Ø 200mm to Ø 630mm.

No other classification is authorised.

- 8.2.1. For fire dampers built into a  $\geq 100$ mm-thick aerated concrete wall with a bulk density of  $550\text{kg/m}^3$  and a negative pressure of  $-500\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		120		ve	-		-	i	↔	o	-	S

- 8.2.2. For fire dampers built into a  $\geq 70$ mm-thick gypsum block partition with a bulk density of  $850\text{kg/m}^3$  and a negative pressure of  $-500\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		120		ve	-		-	i	↔	o	-	S

- 8.2.3. For fire dampers built into a type A gypsum plasterboard partition with a negative pressure of  $-500\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		60		ve	-		-	i	↔	o	-	S

- 8.2.4. For fire dampers built into a type F gypsum plasterboard partition, fire dampers sealed with plaster and a negative pressure of  $-500\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		120		ve	-		-	i	↔	o	-	S

- 8.2.5. For fire dampers built into a type F gypsum plasterboard partition, fire dampers sealed with stone wool + plasterboard, with a negative pressure of  $-300\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		90		ve	-		-	i	↔	o	-	S

8.2.6. For fire dampers built into a  $\geq 150$ mm-thick aerated concrete floor slab with a bulk density of  $650\text{kg/m}^3$  and a negative pressure of  $-500\text{Pa}$ :

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		120			-	ho	-	i	↔	o	-	S

8.2.7. For fire dampers built into a type F gypsum plasterboard partition, fire dampers sealed with mortar, with a negative pressure of  $-300\text{ Pa}$  and vertical or horizontal axis:

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		90		ve	-		-	i	↔	o	-	S

8.2.8. For fire dampers built into a PAROC AST S sandwich panel wall, fire dampers sealed with coated stone wool boards, with a negative pressure of  $-300\text{ Pa}$  and horizontal axis:

E	I		t		ve	-	ho	-	i	↔	o	-	S
E	I		120		ve	-		-	i	↔	o	-	S

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  $\varnothing 630\text{mm}$  and that the minimum flow cross-section dimensions are not less than  $\varnothing 200\text{mm}$ .

### 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 of:

- of 30mm between fire dampers installed in separate ducts;
- of 30mm between the fire damper and a construction element (wall or floor).

### 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.

The circular fire dampers with a horizontal blade axis and tested with a vertical blade axis can be installed with a blade axis oriented at any angle.

## 10. EXAP EN 15882-2

Rule	Parameter	Factors	Factor influence on criteria			
Reference			Integrity (E)	Insulation (I)	Smoke Leakage (S)	Rules
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]	Under-pressure tested to -300 Pa suitable for up +300 Pa
						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 <sup>3</sup> /hr/m <sup>2</sup> and 360 m <sup>3</sup> /hr/m <sup>2</sup> 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 Less 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

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
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 <a href="#">EN 1366-2</a> , direct field of application
X.36	Change in wall/floor thickness	Greater or lower	See rule	See rule	See rule	Covered by <a href="#">EN 1366-2</a> , 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.

Rule	Parameter	Factors	Factor influence on criteria			
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 <a href="#">EN 1366-1:2014</a> , 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			
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 <a href="#">EN 1366-2</a> , 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 ( <a href="#">EN 1366-1</a> ) may be used in practice, including the damper housing if tested with a protection system.

Maizières-lès-Metz, 19 May 2021

X



Project leader

Signé par : Charlotte SCHNELLER

X



Supervisor

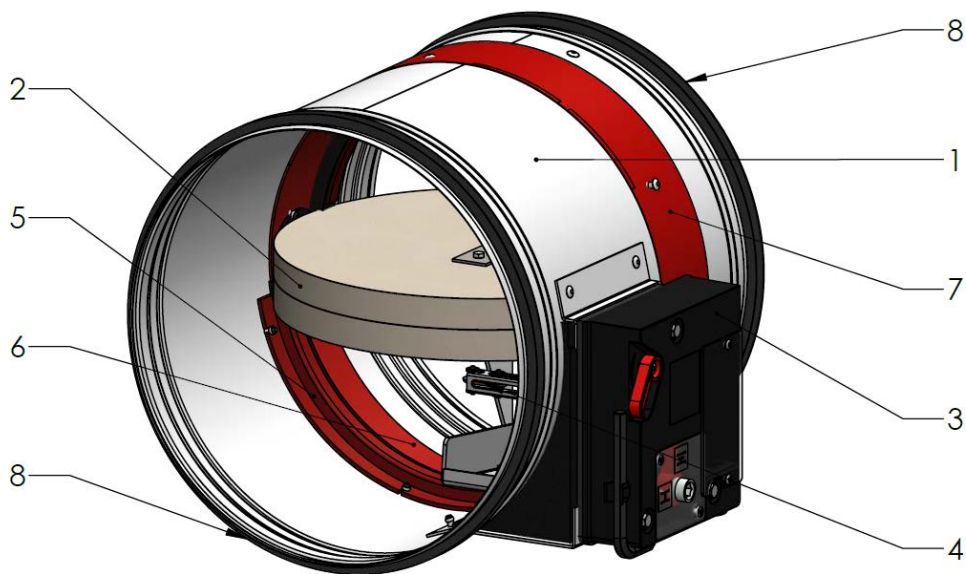
Signé par : Romain STOUVENOT



FIGURES APPENDIX

 www.rf.t.be	<u>Reference - Subject - Date</u> <b>CR2_Commercial_02_10_20</b>	<u>Plate</u> A 1/2
  <b>CR2</b>		
<u>Plan Title:</u>		


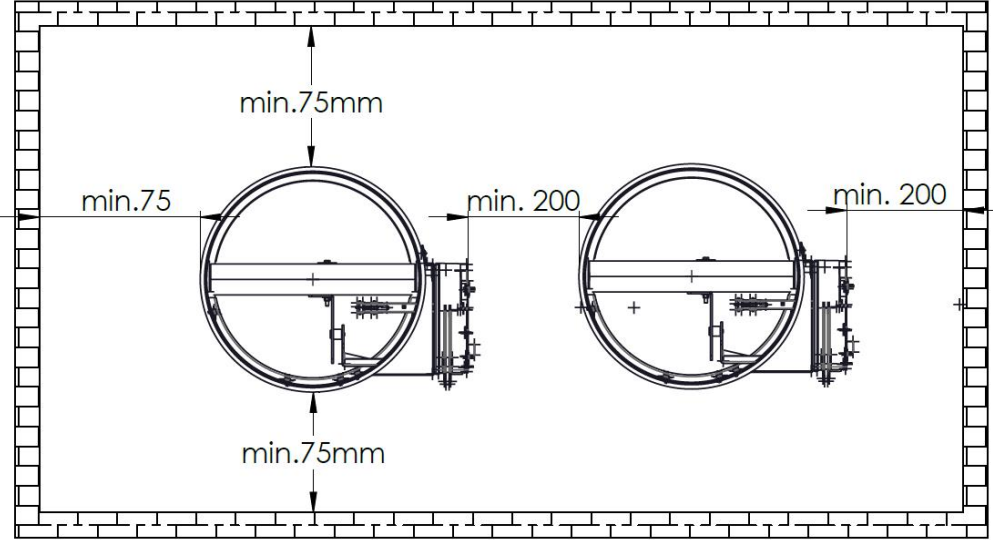
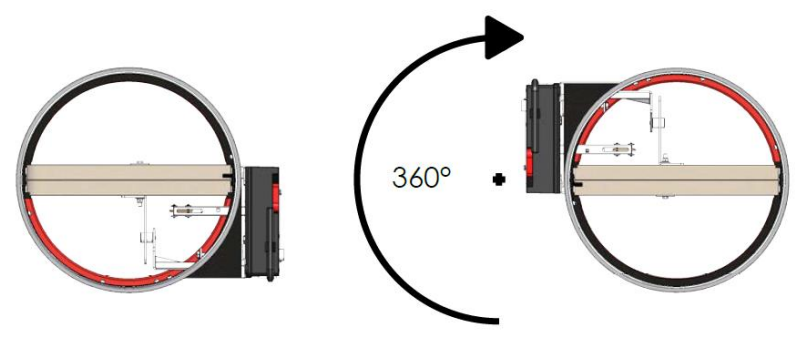
	Reference - Subject - Date	Plate
	CR2_Commercial_02_10_20	A 2/2



1. Galvanized steel tunnel
2. Damper blade
3. Operating mechanism
4. Fusible link 72 °C
5. Sealing cold smoke
6. Blade bumper
7. Intumescent strip
8. Rubber air tightness sealing ring

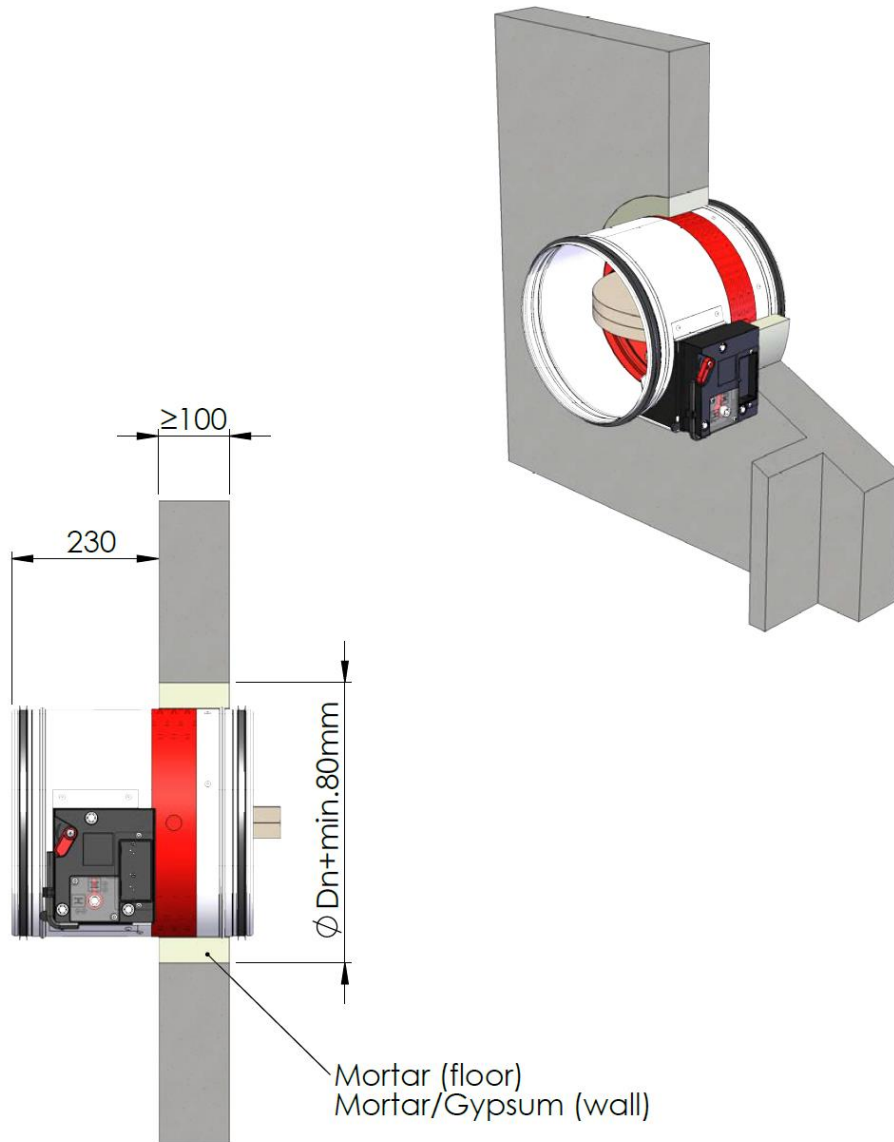
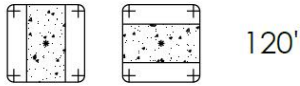
	PRODUCT RANGE								
Dn(mm)	200	250	315	355	400	450	500	560	630

Plan Title:

	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate  E 1/9</p>
<div style="text-align: center;">  </div> <div style="text-align: center;">  </div>		
<p>Plan Title:</p>		

	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate          E 2/9</p>
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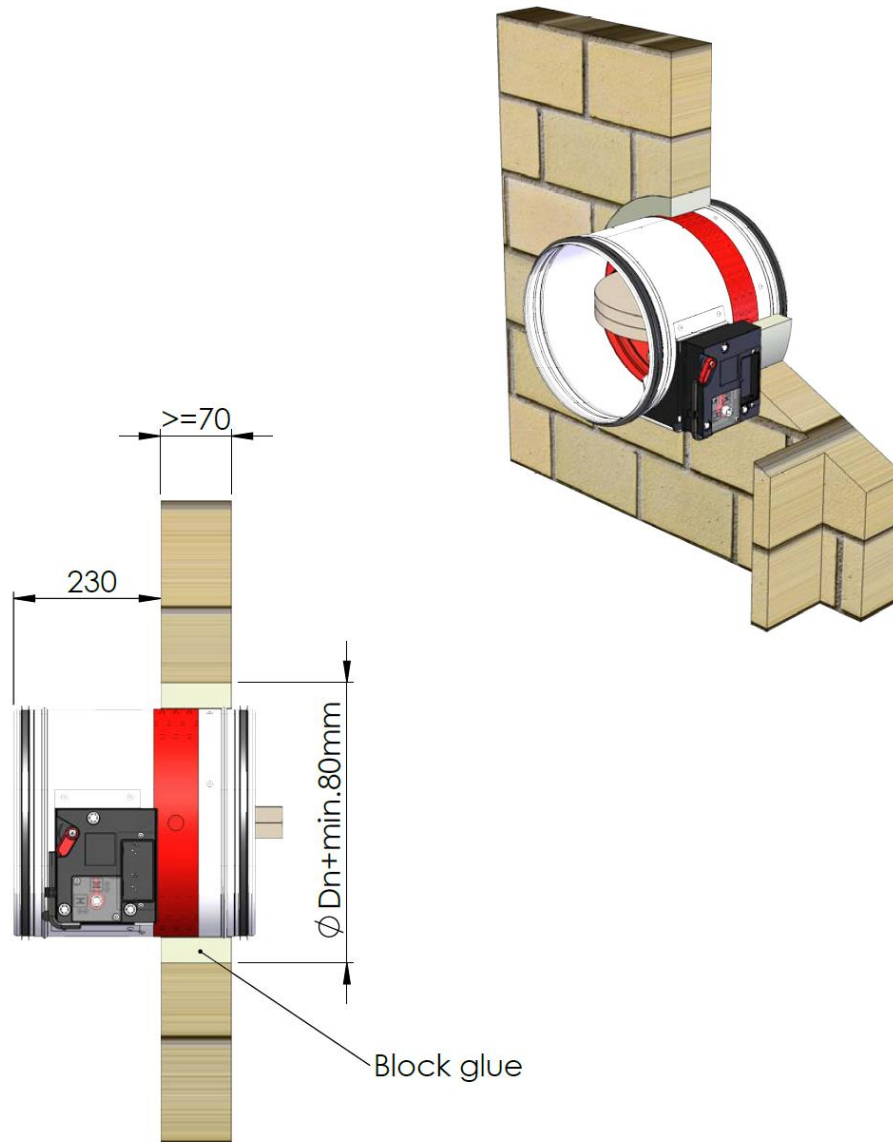
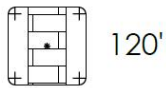
Rigid wall and floor



Plan Title:

	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate  E 3/9</p>
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Gypsum block wall (carreau de plâtre)



Plan Title:

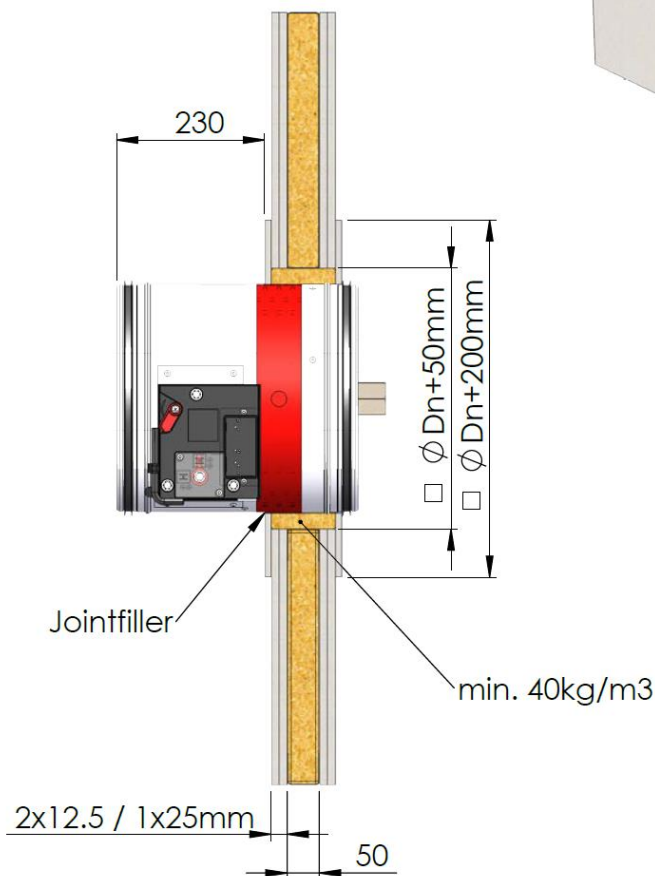
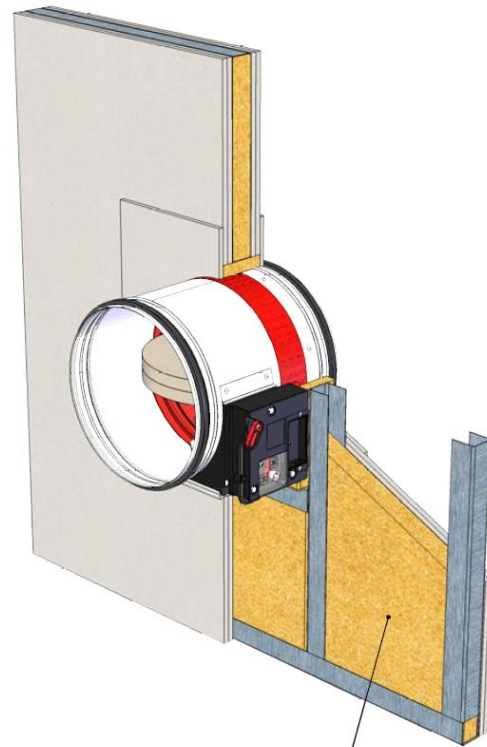
	<p>Reference - Subject - Date <b>CR2_Installation_12_02_2019</b></p>	<p>Plate E 4/9</p>
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Flexible wall



Type A 60' (500Pa)  
Type F 90' (300Pa)

Wall type A/F acc. EN 520



min. 40kg/m3

min. 40kg/m3

Plan Title:

	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate          E 5/9</p>
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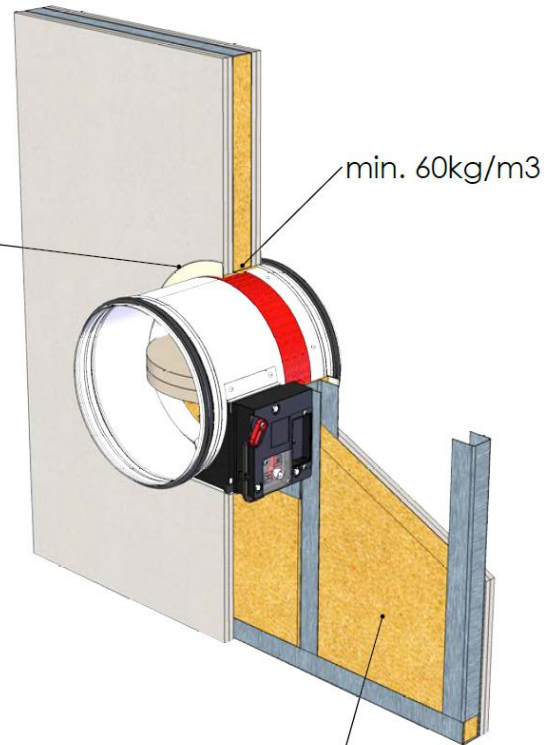
Flexible wall



Type A 60' (500Pa)  
 Type F 90' (300Pa)

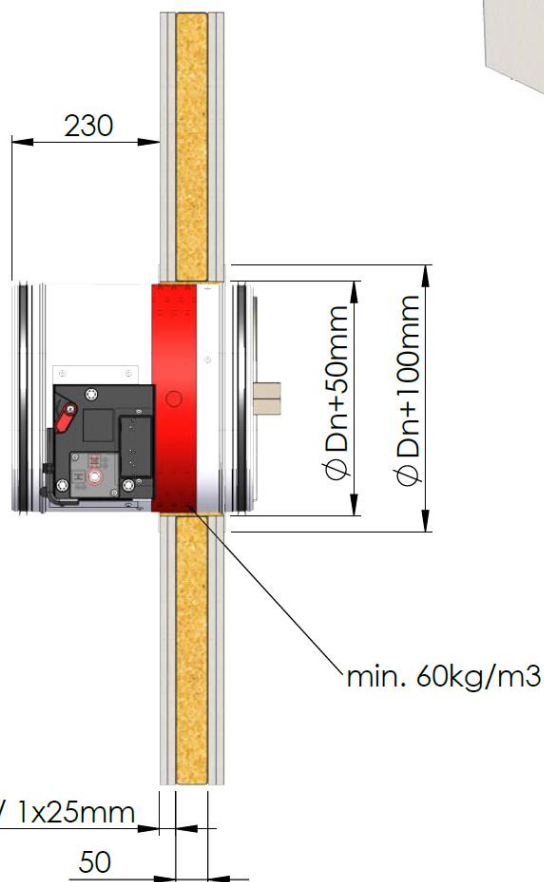
Wall type A/F acc. EN 520

Filler Pregylys (Lafarge)  
 50mm on wall and funnel



min. 60kg/m<sup>3</sup>

min. 40kg/m<sup>3</sup>



Plan Title:

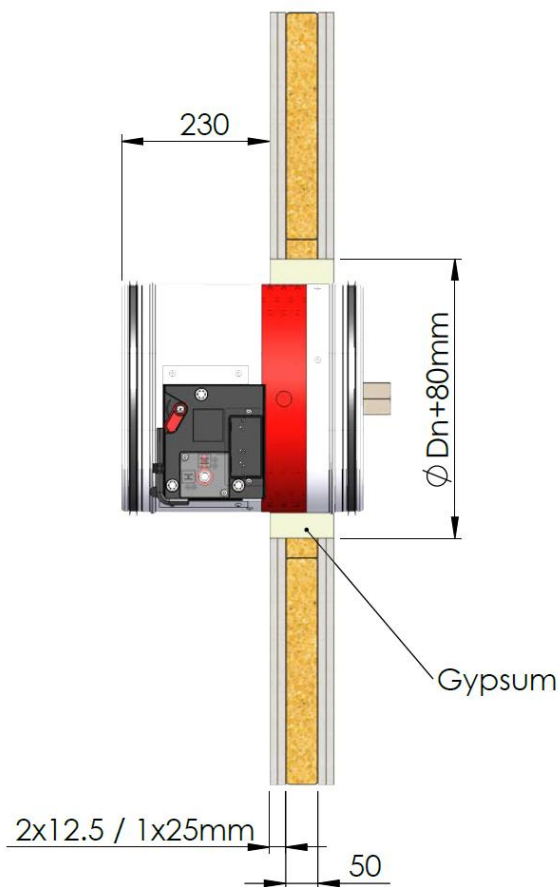
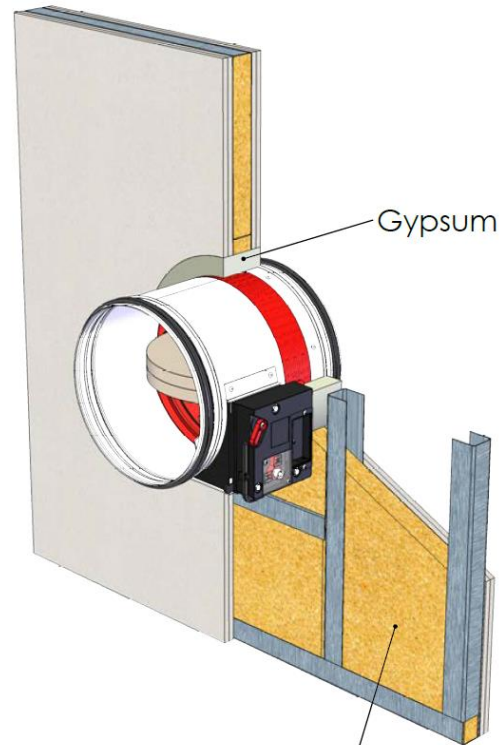
	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate          E 6/9</p>
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Flexible wall



Type A 60' (500Pa)  
 Type F 120' (500Pa)

Wall type A/F acc. EN 520



Plan Title:



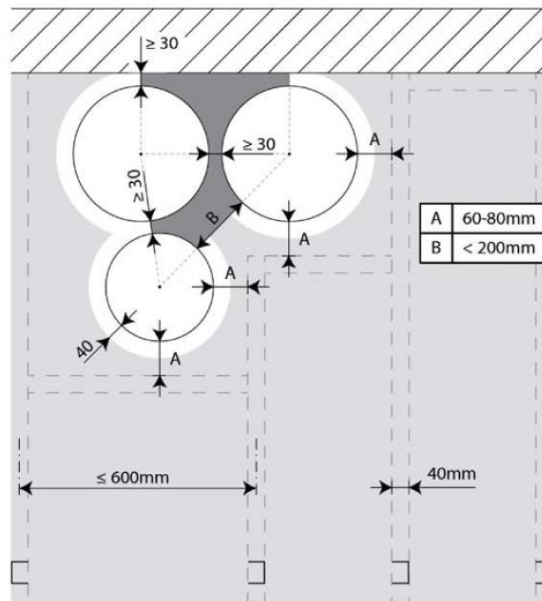


Reference - Subject - Date  
**CR2\_Installation\_12\_02\_2019**

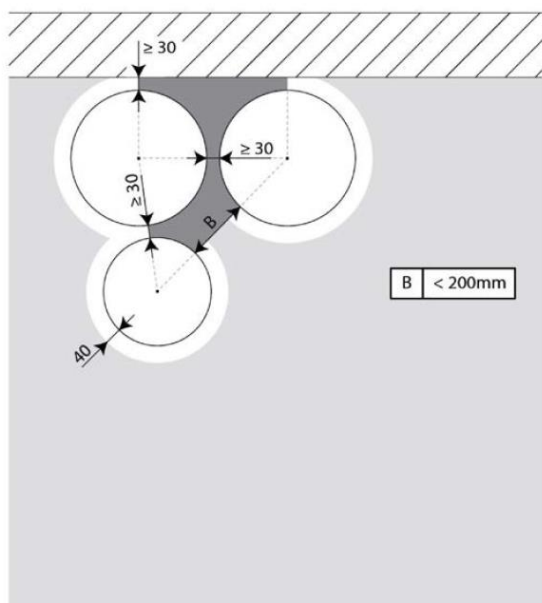
Plate

E 7/9

### Mounting flexible wall at 0 distance



### Mounting rigid wall at 0 distance



Plan Title:



Reference - Subject - Date

**CR2\_Installation\_12\_02\_2019**

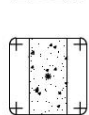
Plate

E 8/9

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



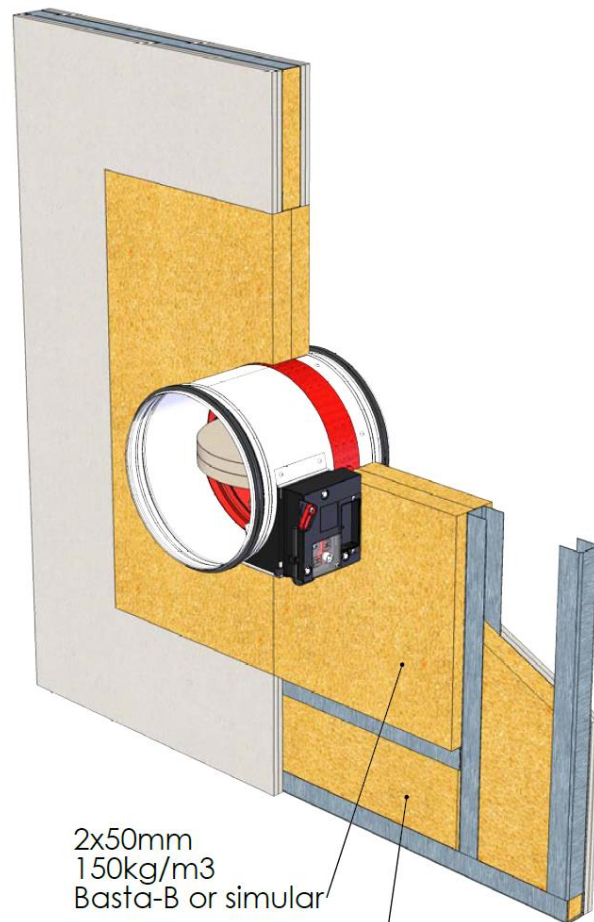
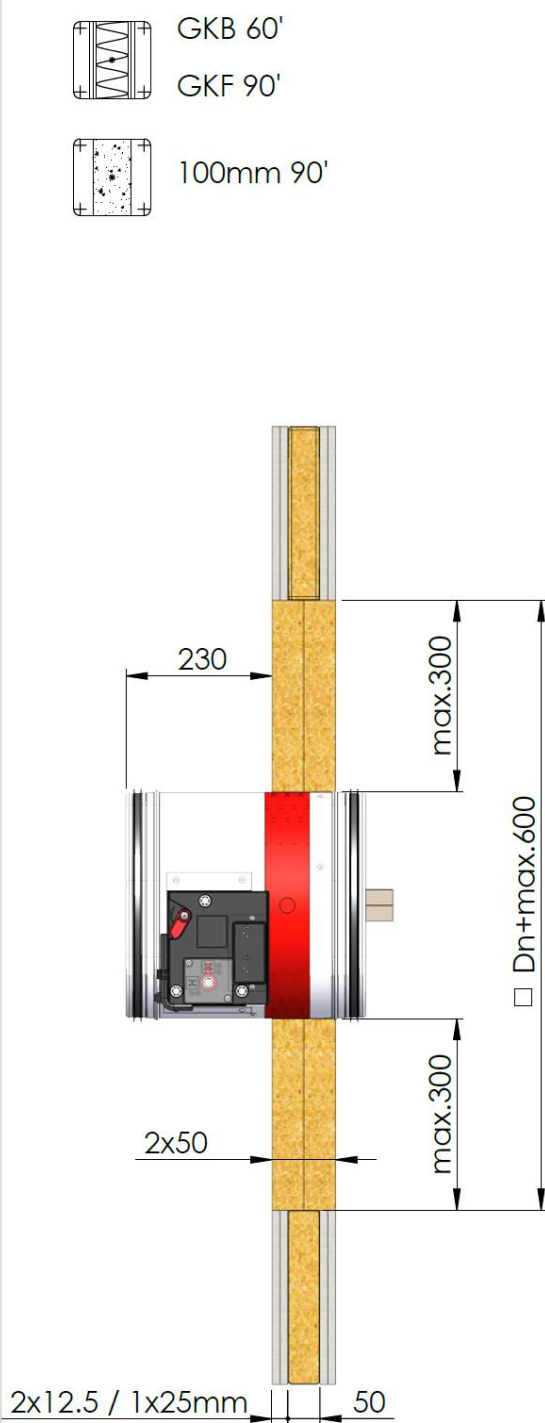
GKB 60'



GKF 90'



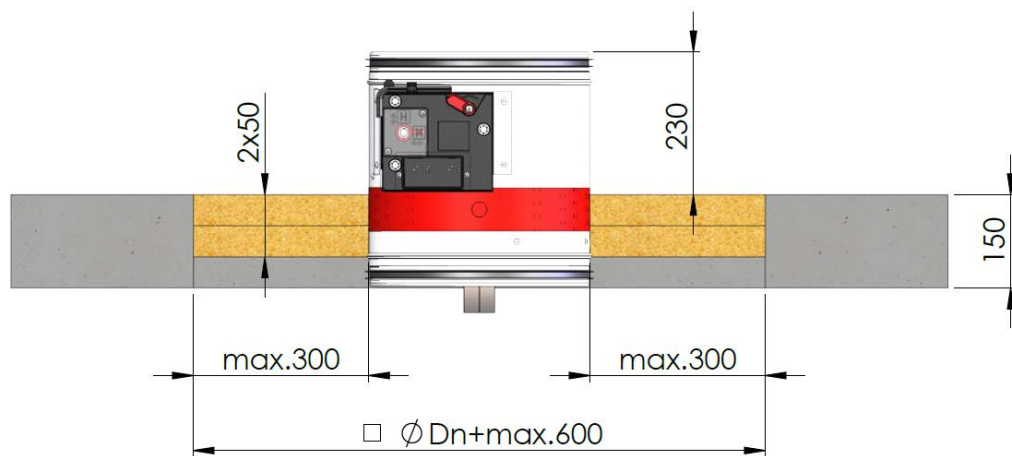
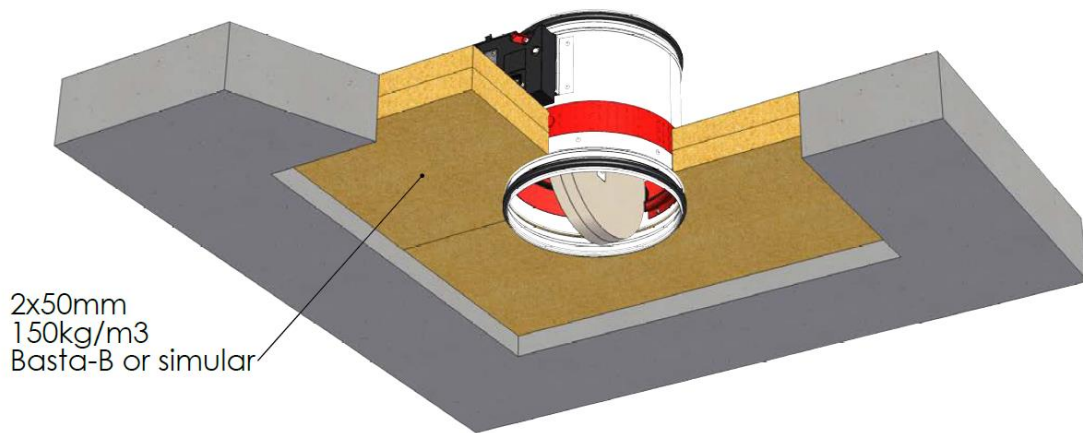
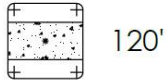
100mm 90'



Plan Title:

	<p>Reference - Subject - Date  <b>CR2_Installation_12_02_2019</b></p>	<p>Plate  E 9/9</p>
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Rigid floor - Sealing with fire resistant rigid panels of mineral wool



Plan Title: