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CLASSIFICATION REPORT No. EFR-19-000768 - Revision 1

According to standards EN 12101-8: 2011 and EN 13501-4

Reference laboratory assessment report	▪ EFR-19-000768
Regarding	A range of VUW120-type smoke exhaust dampers, fitted in an aerated concrete wall - Sales reference of the damper: VUW120
Sponsor	RF TECHNOLOGIES Lange Ambachtstraat, 40 B - 9860 OOSTERZELE

This classification report supersedes classification report EFR-19-000768.

CHANGE HISTORY

Revision level	Date	Changes	Author
0	21/03/19	First issue of the document	MFE
1	28/11/2019	Interation of § 4 : reference tests	RST

1. INTRODUCTION

This classification report defines the classification assigned to VUW 120-type smoke exhaust dampers in accordance with the procedures set out in the standard EN 13501-4: 2016 "Fire classification of construction products and building elements – Part 4: Classification using data from fire resistance tests on components of smoke control systems: ducts and smoke extract ducts" and in the standard EN 12101-8 "Smoke control dampers".

2. BODY

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3. SPONSOR

RF TECHNOLOGIES
Lange Ambachtstraat, 40
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4. REFERENCE TESTS

EFR-18-U-001101
EFR-18-H-001102

5. REFERENCE AND ORIGIN OF THE TEST SPECIMENS

Reference:	VUW120
Origin:	RF TECHNOLOGIES Lange Ambachtstraat, 40 B - 9860 OOSTERZELE

6. OVERALL PRINCIPLE

6.1. TYPE OF FUNCTION

VUW120-type dampers are defined as "smoke exhaust dampers".

Their function is to be fire-resistant as regards the fire resistance performance characteristics stipulated in section 5 of the classification standard EN 13501-4.

6.2. GENERAL POINTS

The test specimen is a multi-compartment smoke exhaust damper embedded in an aerated concrete wall, with mechanism on the exposed-to-fire side.

The smoke exhaust damper consists of the following components:

- A tunnel.
- A horizontally-mounted mobile blade.
- A control mechanism.

The main characteristics of the damper are as follows:

- Nominal dimensions: 300 x 300 to 1500 x 1000 (w x h)

6.3. DETAILED DESCRIPTION OF THE ELEMENTS

6.3.1. Damper tunnel

The rectangular tunnel is made by assembling four 15mm-thick IGNIBOARD (KEEN EAGLE) plasterboard panels, allowing room for flow cross-section dimensions of 1494 x 994mm (w x h).

The length of the tunnel is 330mm. The panels are clamped together using four steel clips with dimensions of 32 x 8mm (w x h).

The smoke exhaust damper is fitted with two 130mm Ø inspection apertures with galvanised steel covers on the upper and lower sides of the damper, i.e. on the 1500mm-long sides.

Both ends of the tunnel are fitted with a 1.25mm-thick connection flange , with dimensions of 10 x 33 x 35 x 16,5 x 35mm, fastened to the tunnel using screws (Ø 4 x 15mm) positioned every 100mm to 200mm inside the tunnel. The total length of the damper therefore reaches 400mm, taking into account both flanges.

Cold sealing between the plasterboard panels of the tunnel and between the tunnel and the blade is provided by an EPDM seal and a silicone seal with cross-section dimensions of 26.7 x 12mm (w x h) respectively. The first half of the seal is placed on a semi-perimeter next to the control mechanism and the second half of the seal is placed on the remaining semi-perimeter on the opposite side to the damper blade axis. The galvanized steel sections with dimensions of 35 x 7,3 x 1.25mm (w x h x th) forming the blade stops and fitted with the silicone seal are fixed to the inside of the tunnel using steel blind nuts (Ø 4.8mm), positioned every 100 to 200mm.

A sodium silicate intumescent seal covered with a layer of PVC and with cross-section dimensions of 55 x 2mm (w x th) is positioned on the inside and outside of the tunnel, level with the blade axis, and fixed to the tunnel using three rows of steel nails (Ø 1 x 12mm) positioned every 50mm.

A 26mm Ø hole is made in the damper tunnel in order to control the damper blade using the mechanism. The bearings of the blade axis are inserted in the 14mm Ø holes made halfway up both sides of the damper tunnel.

6.3.2. Blade

The damper blade, with dimensions of (W-22) x (H-22) x 63mm (w x h x th), is made using two 24mm-thick IGNIBOARD boards, 15mm apart on each side of the blade axis.

The thickness of the 24mm boards is reduced by a 15mm groove on the outer contour of the blade, and on the control mechanism.

The blade axis is made using steel with dimensions of Ø 12 x 100mm and is welded to a steel U-shaped section with dimensions of 30 x 15 x 1.5mm (w x h x th). The two parts are inserted in a rectangular steel tube with dimensions of 30 x 15 x 1.5mm (w x h x th).

IGNIBOARD strips with cross-section dimensions of 40 x 15mm (w x th) are positioned between the two boards that make up the mobile blade, on the upper edge and the lower edge of the damper blade. They are fixed to the damper blade using steel clips with dimensions of 25 x 10mm (w x h) positioned every 100mm.

Both boards that make up the mobile blade are fixed together using eight M5 x 80mm screws and two M5 x 70mm screws (mechanism side), with M5 washers and M5 nuts.

The control mechanism is fixed in the same way as the damper blade.

6.3.3. Mechanism

The damper blade is controlled in open or closed position using a control mechanism, reference BLE (BELIMO).

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

- A steel base plate with dimensions of 205 x 120 x 3mm (w x h x th) including the mechanism part
- A two-way motor and transmission providing the link between the mechanism and the mobile blade.

The base plate is fixed to the inside of the damper tunnel using three M6 x 20mm screws.

When completing the opening/closing cycles of the blade only, the control mechanism is thermally protected by two semi-covers made using 18mm to 25mm-thick GEOSTAFF plasterboards. The lower semi-cover is positioned on the base plate prior to installation of the motor. Both semi-covers are fixed together using three M5 x 110mm screws, M5 nuts and M5 washers. The upper semi-cover is removed before the fire resistance test.

The torque of the actuator is transferred to the blade on the inside of the tunnel through a 18mm Ø steel shaft.

7. INSTALLATION OF THE TEST SPECIMENS

The smoke exhaust damper is embedded in an aerated concrete wall:

- Minimum bulk density: 550kg/m^3
- Minimum wall thickness: 100mm
- Dimensions of the opening: (W + 100) x (h + 100) mm (w x h).

The test specimen is sealed in the concrete wall using mortar made according to the following dosage and characteristics:

- Cement, reference CEM II/B-M (S-V-L) 32,5 R (BATI PRO): 25kg
- Sand: 60 litres
- Water: 20 litres
- Drying period: more than 28 days
- Application: by spatula

On the exposed-to-fire side, two brackets are positioned below the damper, approximately 150mm from each end, and fastened to the supporting construction using two M5 x 90mm screws. The brackets are each made of three rectangular steel tubes with cross-section dimensions of 30 x 15 x 1mm (w x h x th) welded together and forming an angle bracket with dimensions of 40 x 40mm (w x h).

The damper is then connected to a horizontal smoke control duct, the performance of which is at least EI 120S with a negative pressure of -1500/+500 Pa.

A flange, made with a duct material of 50mm or more connects the duct to the wall with an overlap on the duct of 90mm. The flange is connected to the duct using Ø 5 x 90 screws (2) every 150mm and the corresponding duct glue (1). The flange is placed on the wall using 50mm wide duct material strips over a height of 70mm. The strips are fixed in the concrete wall using a screwing material suited to the type of wall (3).

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.

The dampers that have been given this classification have undergone:
- 10,000 cycles (BELIMO BLE)

E	I	-	t	S	Ved	ho	i	<->	o	Operating pressure	multi	AA	C
E	**I**		**120**	**S**	**Vew**		**i**	<->	**o**	**-1500/+500Pa**	**multi**	**AA**	**C10000**

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 SMOKE EXHAUST DAMPERS

It is possible to use dampers with built-in dimensions:

- 300 x 300 to 1500 x 1000mm (BELIMO mechanism)

9.3. APPLICATION OF SMOKE EXHAUST DAMPERS IN VARIOUS POSITIONS IN THE DUCTS

The classification indicated in section 8.2 of this classification report only applies to dampers installed on the vertical side of an aerated concrete wall with a minimum thickness of 100mm and a minimum bulk density of 550kg/m^3.

9.4. PRESSURE DIFFERENCES

In accordance with standard EN 1366-10 - section 9.4, the performances stipulated in section 8.2 of this classification report are valid for any smoke exhaust damper operating at a vacuum pressure of -1500 Pa or at an overpressure of +500 Pa.

9.5. HIGH TEMPERATURES

The multi-compartment smoke exhaust dampers tested in accordance with the standard fire test curve in EN 1363-1 are suitable for single compartment uses over the same period of time.

9.6. ACTIVATION METHOD

Smoke exhaust dampers that have been tested for automatic activation (AA) systems are not suitable for use in manual activation (MA) systems.

9.7. APPLICATION IN DUCT CONSTRUCTIONS OTHER THAN THOSE TESTED

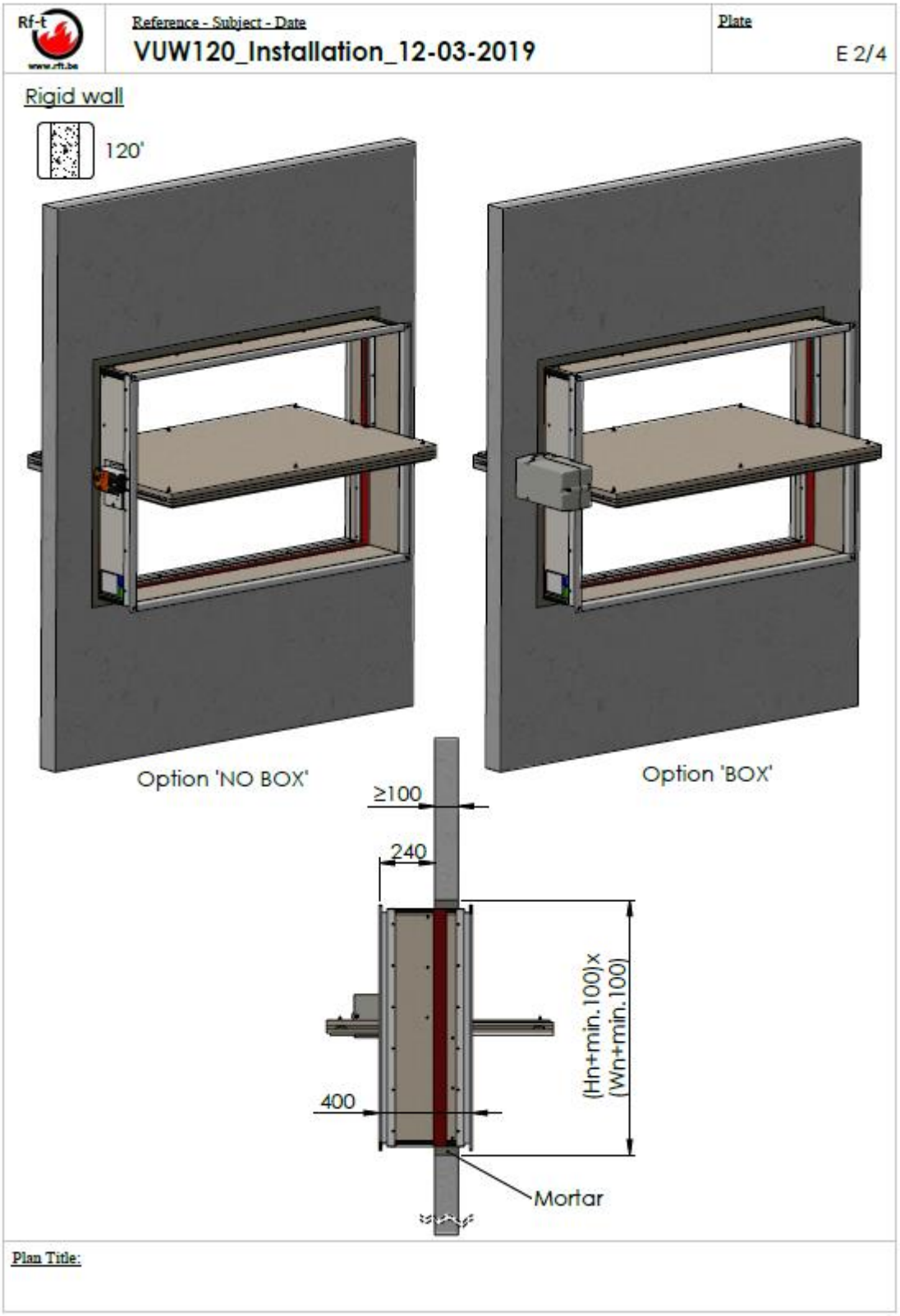
Multi-compartment smoke exhaust dampers may be applied in ducts tested in accordance with EN 1366-9 or EN 1366-8, as appropriate, provided they were made using materials with the same density as those tested or using the same material but with a greater density or thickness, and provided the operating pressure authorised in the classification document of the target smoke control duct is compatible.

These conclusions only relate to the fire resistance performances of the elements covered by this document. They are without prejudice, in any case, to other performances related to their use in a structure.

Issued in Maizières-lès-Metz, 28 November 2019

X _____	X _____
Project leader	Supervisor

FIGURES APPENDIX



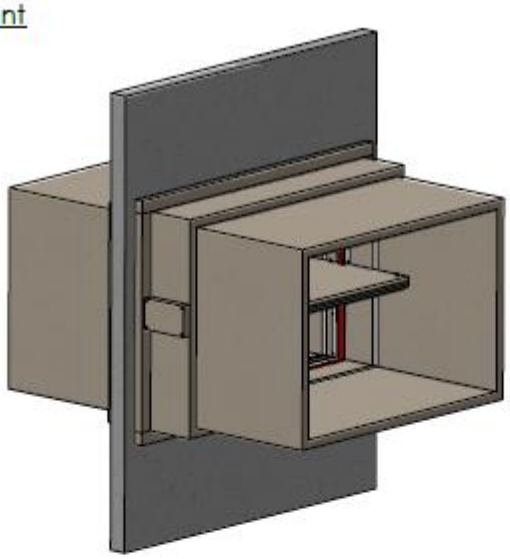
Reference - Subject - Date

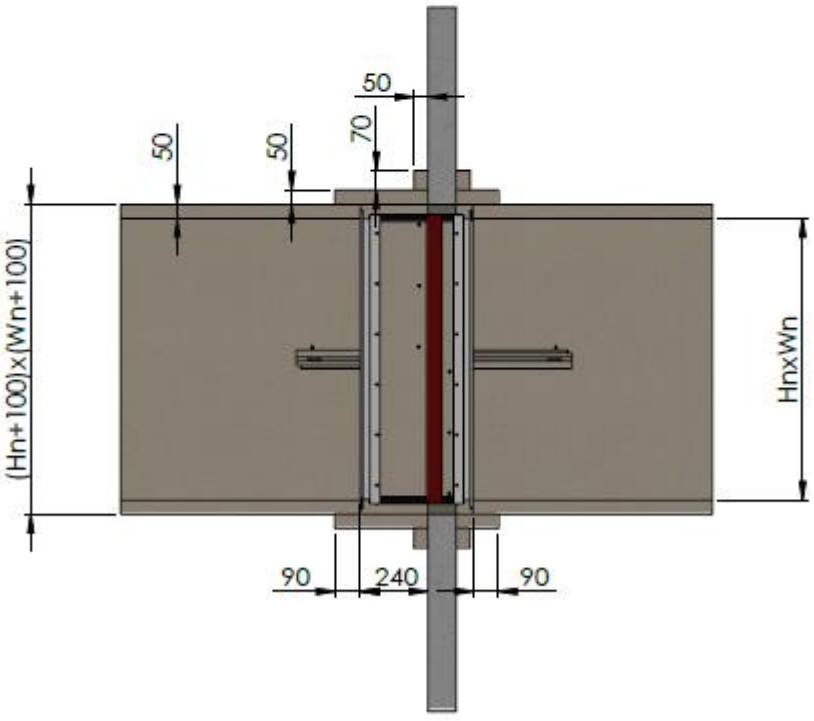
VUW120_Installation_12-03-2019

Plate

E 3/4

Multi-compartment





Plan Title:

Rf-t www.rft.be

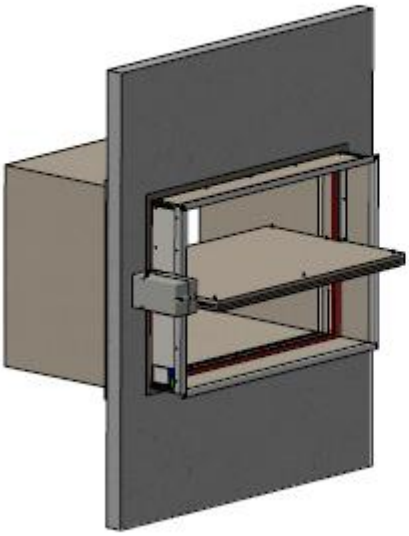
Reference - Subject - Date

VUW120_Installation_12-03-2019

Plate

E 4/4

Single compartment



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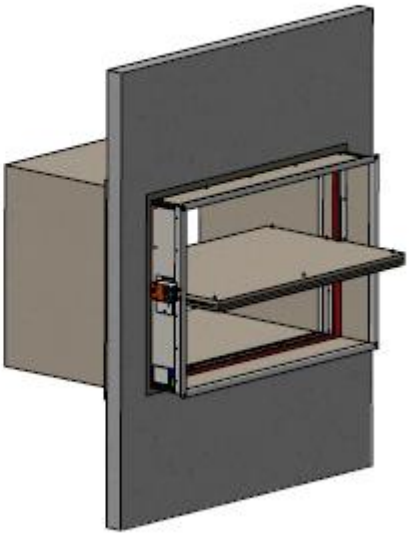

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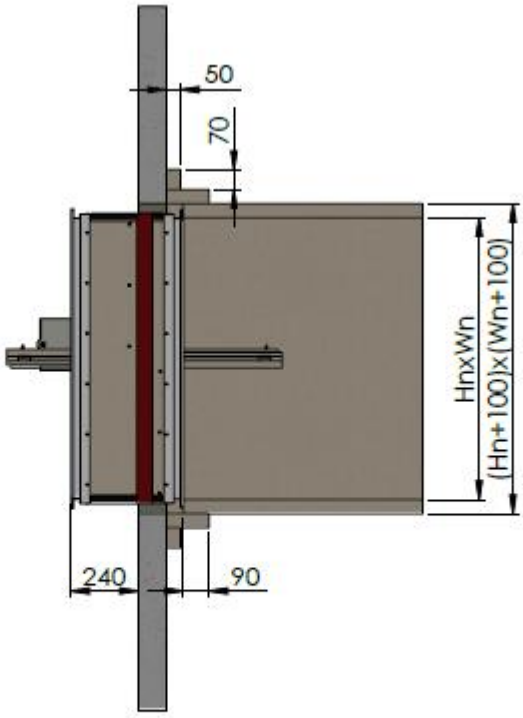

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