



CLASSIFICATION REPORT No. EFR-21-001637 - Revision 1

In accordance with standards EN 12101-8: 2011 and EN 13501-4:2016

Delivered the	06 July 2022 by Efectis France / Notified body number: 1812
Reference laboratory assessment	<ul style="list-style-type: none">▪ EFR-21-001637-Revision 1
Regarding	<p>A range of multi-blades smoke control dampers MARKAGE MB mounted in massive supporting construction or PROMATECT LS, AD or L500 ducts.</p> <ul style="list-style-type: none">▪ Overall smoke control damper dimensions:<ul style="list-style-type: none">- Minimum: 200 x 200 mm (Wn x Hn)- Maximum: 1000 x 1600 mm (Wn x Hn) (-1500/-500 Pa)- Maximum: 1200 x 2400 mm (Wn x Hn) (-1000/-500 Pa)▪ Blades' axis : horizontal or vertical.
Sponsor	RF TECHNOLOGIES Lange Ambachtstraat 40 9860 OOSTERZELE BELGIUM

This document EFR-21-001637 - Revision 1 cancel and replace the previous one.

LIST OF REVISIONS

Revision index	Date	Modification	Author
0	08/04/2021	- Document creation	RST
1	06/07/2022	- Maximum size increasing - Mortar sealing validation	RST

1. INTRODUCTION

The classification report defines the classification assigned to the MARKAGE MB type smoke damper in compliance with the operating procedures given in the standard EN 13501-4: 2016 "Fire classification of construction products and building elements - Part 4: Classifications from the fire resistance test data on the products used in the smoke extraction systems: ducts and smoke control dampers and in the standard EN 12101-8:2011 "Smoke control dampers".

2. ORGANISATION

Efectis France
Voie Romaine
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Notified Body: 1812

3. APPLICANT

RF TECHNOLOGIES
Lange Ambachtstraat 40
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BELGIUM

4. REFERENCE DOCUMENT

- EFR-19-H-001423 (EFECTIS France)
- EFR-19-H-001425 (EFECTIS France)
- EFR-19-H-001426 (EFECTIS France)
- EFR-19-H-001428 (EFECTIS France)
- EFR-19-H-001429 (EFECTIS France)
- EFR-19-H-001432 (EFECTIS France)
- EFR-19-H-001433 (EFECTIS France)
- EFR-19-H-001434 (EFECTIS France)
- 319071003-1 (IBS)
- EFR-20-T-002038 (EFECTIS France)
- EFR-21-001637 - laboratory assessment (EFECTIS France)
- EFR-21-H-002855 (EFECTIS France)

5. REFERENCES AND ORIGIN OF THE ELEMENTS EXAMINED

References: MARKAGE MB

Source: RF TECHNOLOGIES
Lange Ambachtstraat 40
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6. PRINCIPLE OF ASSEMBLY

6.1. TYPE OF FUNCTION

MARKAGE MB type smoke control dampers are defined as "smoke control dampers".

Their function is to resist fire, as specified by the fire resistance performance characteristics given in section 5 of standard EN 13501-4:2016.

6.2. GENERAL

See appendix.

The studied specimen is a multi-compartment smoke control damper built into supporting construction or on ducts, mechanism on fire side or on un-exposed side.

Each smoke control damper is constituted as follows:

- A rectangular insulated housing.
- One up to eight insulated blades.
- An actuating mechanism.
- A grid or metal duct connection frame (optional).

The main dimensional characteristics of the smoke control damper are as follows:

- Overall smoke control damper Maximal nominal dimensions: 1000 x 1600 mm (Wn x Hn), under nominal pressure of -1500/-500 Pa,
- Overall smoke control damper Maximal nominal dimensions: 1200 x 2400 mm (Wn x Hn) under nominal pressure of -1000/-500 Pa,
- Overall smoke control damper Minimal nominal dimensions: 200 x 200 mm (Wn x Hn),

The smoke control dampers can be mounted into:

- Cellular concrete supporting construction
- Smoke exhaust duct made of PROMATECT LS, AD or L500 validated through 08-A-380 documents.

6.3. LIST OF THE COMPONENTS

The exact list of the components is available into the laboratory assessment reference EFR-20-003134.

6.4. DETAILED DESCRIPTION OF THE SPECIMEN

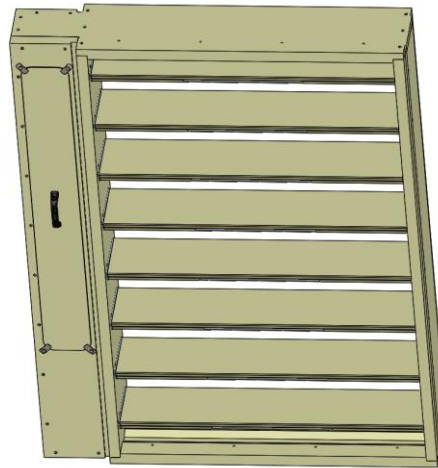
The drawings in the appendix have been supplied by the Sponsor, checked by the test laboratory EFECTIS France, and are in conformity with the tested specimen.

The description below is a light version of the detailed description. See laboratory assessment EFR-21-001637 for the exact description.

6.4.1 Housing

The smoke control damper housing is composed of insulated plates in calcium silicate PROMATECT MT (PROMAT) of thickness 40 mm and density 640 kg/m³ making a closed tunnel with inner dimensions $W_n \times (H_n - 10) \times 250$ mm (w x h x L). Two additional plates are enclosed between the top and bottom plates, making a cavity which housed the actuation system. A third additional plate closes the cavity and gives access to the actuation system by a 140 mm or 310 mm wide opening. The 170mm wider actuator compartment is valid for an actuation system on a small damper which houses a communication module as well. The installation openings will be accordingly 170mm wider.

The cavity is closed using a 150 mm or 320 mm wide and 40 mm thick calcium silicate board PROMATECT MT (PROMAT) of density 640 kg/m³. This removable cavity cover have a PA6-GF15 handle of dimensions 141 x 28 x 24 mm (w x h x th) installed by two bolts M5 x 50 mm with two washers Ø 5 mm and nuts M5. There are 4 bolts M6 which held the cavity cover by small zinc coated steel plates of dimensions 20 x 42,7 x 2 mm (w x h x th). The zinc coated steel plates have a small bend angle to improve clamping.



The walls of the casing which carried the damper blades are equipped with a 240 mm wide self-adhesive layer. The two other remaining walls contain a 15 mm deep V-groove which acted as damper blade stops.

6.4.2 Blades

The damper blades are machined out of 40 mm thick calcium silicate board PROMATECT MT (PROMAT) of density of 640 kg/m³.

The damper blades have two axis-symmetric grooves which contain both a high and low temperature sealing. Both seals are installed using staples.

6.4.3 Actuating mechanism

The electric actuator BEN, BEE or BE (BELIMO) (24 or 230V) is driving the damper blades in both open and closed positions. The actuator is installed in the damper housing cavity and is accessible through the removable cavity cover.

The actuator is attached to a base plate using two M6 bolts.

When power is shut off, the actuator and so all damper blades remained in position.

The actuator is directly powered by an external power source or by a communication module included in the cavity housing. Both actuator cables of the BEN, BEE or BE actuator (BELIMO) are wired to the outside or to the communication module (BELIMO/BV CONTROL BKNE, SMT/RFT IXI R1, AGNOSYS BRM-10-S, BUSTEC EURO ICC RBFU 2.01 ST or RFT ZENIX 1SDST).

Powering the corresponding lines of the actuator cabling or input on the controller of the bus line drive the damper blades open or closed.

6.4.4 Grille or metal duct connection frame (optional)

The grille is made out of 0.8 mm galvanized steel with flanges on all 4 sides of 22 mm total height. It has 20 x 20 mm square openings with intermediate material across the full area of the damper opening. The metal duct connection frame is made out of 1.25 mm galvanized steel with flanges and slot holes for connecting metal ducts. The grille or metal duct connection frame is fixed on the damper using screws \varnothing 4 x 15 mm inserted in the 35 mm thick flange of the damper housing.

6.4.5 1S kit

The plate which close the cavity and contained the access cover for the actuation system is larger compared to the standard smoke control damper. On three sides, the PROMATECT MT (PROMAT) board of thickness 40 mm and density 640 kg/m³ is extended outside the smoke control damper's outside surface. This extended flange have a hole \varnothing 12 mm above and below the access door. On the third side, there are some holes \varnothing 12 mm with a maximal spacing of 400 mm as well. All holes are at 20 mm from the outside of the outer flange.

On the three remaining sides of the damper housing is a flange as well, these three flanges are made out of PROMATECT MT (PROMAT) of thickness 40 mm and density 640 kg/m³. On the damper housing side, all plates are reduced, creating space for connecting ducts to the damper housing.

The flange is used to install the damper against a wall with an opening for the damper housing. The damper flange have a self-adhesive high temperature felt strip attached on the flange adjacent to the damper housing. The damper is developed for a dry installation and have an intumescent strip attached to the smoke control damper housing periphery.

6.5. TEST ASSEMBLY

6.5.1. MARKAGE MB into vertical and horizontal PROMATECT LS, AD or L500 smoke exhaust ducts

An opening of dimensions ($W_{\text{smoke control damper}} + 70$) x ($H_{\text{smoke control damper}} + 70$) mm (w x h) is cut through a side of the duct for the installation of each damper.

Option 1 :

The smoke control damper is installed centred into the opening. Cover strips made of PROMATECT® LS (PROMAT) of section 80 x 35 mm (w x th) are applied on the periphery of the damper for all right corners between duct and damper. They are fixed to the large side of the duct with screws \varnothing 5 x 50 mm with a maximal spacing of 200 mm. Additional cover strips made of PROMATECT® LS (PROMAT) of section 60 x 35 mm (h x th) are applied on the periphery of the damper, above the first cover strips. They are fixed to the housing of the damper with screws \varnothing 5 x 50 mm with a maximal spacing of 200 mm. The Cover strips are made of duct material. In case of duct construction in a PROMATECT AD or L500 board, the cover strips can be made accordingly, using longer screws for the installation. Another type of cover strip made of PROMATECT® H (PROMAT) of section 100 x 10 mm (w x th) and density 870 kg/m³ is applied on the side of the damper where damper and duct surface are in the same plane. It is fixed against the small side of the duct with screws \varnothing 3.9 x 35 mm located every 150 mm on two rows distant from 35 mm minimum.

The tightness of the junction between the duct and the damper is improved with glue KLEBER K84 (PROMAT) laid over each side of cover strips in contact prior to their assembly and fixing. After assembly and fixing, the external overflowing of glue is smoothed with a spatula.

Option 2:

The smoke control damper is installed centred into the opening. The first cover strip of width 80 mm is applied horizontally inside the duct, on the periphery of the opening and was fixed to the internal face of the top board of the duct with screws $\varnothing 5 \times 60$ mm placed every 150 mm. The second cover strip of width 80 mm is applied horizontally outside the duct, on the periphery of the opening and is fixed to the external face of the top board of the duct with screws $\varnothing 5 \times 80$ mm placed every 150 mm. The third cover strip of height 100 mm is applied vertically inside the periphery of the opening and was fixed to the first and second cover strips with screws $\varnothing 5 \times 80$ mm placed every 150 mm in a staggered arrangement on two rows distant from 60 mm.

The tightness between the covers strips and between the cover strips and the duct is improved with glue KLEBER K84/16 (PROMAT) laid over each side of cover strips in contact prior to their assembly and fixing. After assembly and fixing, the external overflowing of glue was smoothed with a spatula.

The gap between the smoke control damper and the duct is filled with standard mortar made with 75% sand, 25% cement CEM II/B-M 32,5 N (HOLCIM) and water.

Wiring for communication and power supply of the damper installed is performed using fire resistant cabling in case of manual intervention (MA) initiation method.

6.5.2. MARKAGE MB into massive walls/slabs, mortar system

The smoke control damper can be built in a concrete wall/slab with:

- Minimum thickness : 100 mm.
- Minimum density : 550 kg/m³.

The element is built within the concrete wall/slab by means of mortar realized according to the following characteristics:

- Cement : 25 kg.
- Sand : 60 L.
- Water : 20 L.

The opening made in the wall/slab in order to fit the smoke control damper is done with maximal dimensions:

- ($W_{\text{smoke control damper}} + 375$) x ($H_{\text{smoke control damper}} + 150$) mm (w x h).
- Or
- ($H_{\text{smoke control damper}} + 150$) x ($W_{\text{smoke control damper}} + 375$) mm (w x h).

6.5.3. MARKAGE MB into massive walls, with 1S installation

The smoke control damper can be built in a concrete wall with:

- Minimum thickness : 100 mm.
- Minimum density : 550 kg/m³.

The element is built within the concrete wall by means of a flange on the damper and screws. There is no additional sealing.

The opening made in the wall in order to fit the smoke control damper is done with maximal dimensions:

- ($W_{\text{smoke control damper}} + 315$) x ($H_{\text{smoke control damper}} + 90$) mm (w x h).
- or
- ($H_{\text{smoke control damper}} + 90$) x ($W_{\text{smoke control damper}} + 315$) mm (w x h).

The tested element is built within the opening in the wall and maintained in position by screws $\varnothing 8 \times 110$ mm and washers $\varnothing_{\text{external}} 22$ mm inserted on the whole periphery of the damper.

6.5.4. MARKAGE MB into massive walls/slabs, WEICHSCHOTT system

The smoke control damper can be built in a concrete wall/slab with:

- Minimum thickness : 100 mm.
- Minimum density : 550 kg/m³.

The opening made in the wall/slab in order to fit the smoke control damper is done with maximal dimensions:

- (W_{nsmoke control damper} +1095) x (H_{nsmoke control damper} +870) mm (w x h).
- or
- (H_{nsmoke control damper} +870) x (W_{nsmoke control damper} +1095) mm (w x h).

This opening is filled with two layers of single side coated mineral wool boards PROMASTOP® CB CC (PROMAT) density 140 kg/m³. The tightness between boards and between boards and wall/slab is improved with glue PROMASTOP® CC (PROMAT) laid over each side of boards in contact prior to their assembly. After assembly, the overflowing of glue is smoothed with a spatula.

The tested element is built within the weichschott system and maintained in position by glue PROMASTOP® CC (PROMAT) applied between the weichschott and the smoke control damper.

7. FIRE RESISTANCE CLASSIFICATIONS

7.1. CLASSIFICATION REFERENCES

This classification procedure is performed in accordance with Section 7.2.4. of Standard EN 13501-4:2016.

7.2. CLASSIFICATIONS

The elements are classified according to the following combinations of performance and class parameters.

Smoke control dampers with the classification have undergone cycles with loads in order to achieve the following classification:

- C300
- C10 000

No other classification is permitted.

- **Smoke control dampers (with or without any grilles), range up to 1000x1600, installed into wall described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	90	(	Vew	-		-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	90	(	Vew	-		-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C10000	MA	multi

- **Smoke control dampers (with or without any grilles), range up to 1000x1600, installed into slab described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	How	-		-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	How	-		-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C10000	MA	multi

- **Smoke control dampers (with or without any grilles), range up to 1000x1600, installed into PROMATECT LS, AD or L500 ducts described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	90	(	Ved	-	Hod	-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	90	(	Ved	-	Hod	-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C10000	MA	multi

- **Smoke control dampers (with grilles only), range up to 1000x1600, installed into PROMATECT LS, AD or L500 ducts described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Ved	-	Hod	-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Ved	-	Hod	-	i	<->	o	)	S	-1500/+500 Pa	HOT400/30	C10000	MA	multi

- **Smoke control dampers (with or without any grilles), range up to 1200x2400, installed into PROMATECT LS, AD or L500 ducts described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	60	(	Ved	-	Hod	-	i	<->	o	)	S	-1000/+500 Pa		C300	MA	multi

E	I	T	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	60	(	Ved	-	Hod	-	i	<->	o	)	S	-1000/+500 Pa		C10000	MA	multi

- Smoke control dampers (with grilles only), range up to 1200x2400, installed into PROMATECT LS, AD or L500 ducts described into the document.

E	I	t	(	Vedw	-	Hodw	-	i	***	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Ved	-	Hod	-	i	<->	)	S	-1000/+500 Pa		C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Ved	-	Hod	-	i	<->	)	S	-1000/+500 Pa		C10000	MA	multi

- Smoke control dampers (with or without any grilles) installed into wall with 1S dry installation system as described into the document.

E	I	t	(	Vedw	-	Hodw	-	i	***	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Vew	-		-	i	<->	)	S	-1500/+500 Pa	HOT400/30	C300	MA	multi

E	I	t	(	Vedw	-	Hodw	-	i	***	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	120	(	Vew	-		-	i	<->	)	S	-1500/+500 Pa	HOT400/30	C10000	MA	multi

8. SCOPE OF APPLICATION OF THE RESULTS

8.1. GENERAL

The requirements relating to the scope of application of all fire-resistant dampers submitted for testing in accordance with EN 1366-10 apply, as well as the following elements.

8.2. DIMENSIONS OF SMOKE CONTROL DAMPERS

Dampers with the following nominal dimensions may be used:

- 200 x 200 to 1000 x 1600 mm (Wn x Hn) under (-1500/-500 Pa)
- 200 x 200 to 1200 x 2400 mm (Wn x Hn) under (-1000/-500 Pa)

8.3. PRESSURE DIFFERENCES

The test results of the smoke control dampers are applicable to smoke control dampers with an under pressure or overpressure up to the relevant values as specified below

Maximal size	Tested pressure level	Under pressure up to	Overpressure up to
1200 x 2400 mm	2	1000 Pa	500 Pa
1000 x 1600 mm	3	1500 Pa	500 Pa

8.4. ELEVATED TEMPERATURES

The multi-compartment smoke control dampers submitted for test in accordance with the standardized fire test curve in EN 1363-1 are suitable for single-compartment applications for the same period of time.

8.5. CYCLING TESTS

- 8.5.1. Smoke control dampers meeting the cycling requirements for use with combined smoke control and general HVAC applications and for smoke control systems that are cycle checked every day (C10 000)

The results for smoke control dampers meeting the above requirements are also applicable to:

- a) Systems where the smoke control dampers are operated only in the case of emergency

- 8.5.2. Smoke control dampers meeting the cycling requirements for smoke control dampers that are operated only in the case of emergency (C300)

The results for smoke control dampers meeting the above requirements are not applicable to other installations.

8.6. INITIATION METHOD

Smoke control dampers submitted for testing for manual activation (MA) systems are suitable for use in manual automatic activation (AA) systems.

8.7. APPLICATION TO DUCT CONSTRUCTION OTHER THEN TESTED

Multi-compartment smoke control damper may be applied to ducts that have been tested to EN1366-9 and EN 1366-8 as appropriate, constructed from materials of the same density as those tested or of the same material with a greater density or thickness. Application may not be made where there is a change in the surface protection materials. Paint surface finish, shall be as the duct tested or assessed.

Multi-compartment smoke control dampers tested to this standard may be used in association with fire resisting ductwork tested to EN 1366-1, as flow control damper.

Multi compartment smoke control dampers may be applied to builders work (created on site) ducts, concrete or aerated concrete ducts and walls, provided that the multi compartment smoke control damper has been tested on a duct or in a wall constructed from materials of lower density and thickness (e.g. boards or sheet steel), provided that the concrete/aerated concrete construction has a thickness that complies with the supporting construction information shown in EN 1363-1 and EN 1366-2 for the time period of classification required. Correct fire resisting fasteners to suit the materials shall be used.

9. LIMITATION

This classification document does not represent type approval or certification of the product.

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.

Maizières-lès-Metz, 06 July 2022

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APPENDIX: DRAWINGS _ MARKAGE MB Product

