



EFFECTIS France
Voie Romaine
F-57280 Maizières-lès-Metz
Tél : +33 (0)3 87 51 11 11

CLASSIFICATION REPORT

CLASSIFICATION REPORT No. EFR-24-001206

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

Delivered the	April, 2 nd 2024 by Efectis France / Notified body number: 1812
Reference laboratory assessment	<ul style="list-style-type: none">▪ EFR-24-001206
Regarding	<p>A range of hinged door type smoke control dampers, KAMOUFLAGE AP type, installed on a vertical smoke extraction duct or a compartment wall.</p> <p>Commercial reference of damper:</p> <ul style="list-style-type: none">▪ KAMOUFLAGE 1V60 AP▪ KAMOUFLAGE 1V120 AP
Sponsor	<p>RF TECHNOLOGIES Lange Ambachtstraat 40 9860 OOSTERZELE BELGIUM</p>

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1. INTRODUCTION

The classification report defines the classification assigned to the KAMOUFLAGE AP 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
F - 57280 MAIZIERES-LES-METZ

Notified Body: 1812

3. APPLICANT

RF TECHNOLOGIES
Lange Ambachtstraat 40
9860 OOSTERZELE
BELGIUM

4. RÉFÉRENCE DOCUMENT

EFR-23-Zn-003817 (EFECTIS)
EFR-23-Zn-003818 (EFECTIS)
EFR-23-Zn-003821 (EFECTIS)
EFR-23-Zn-003822 (EFECTIS)
EFR-24-Zn-000635 (EFECTIS)
EFR-24-T-001000 (EFECTIS)

5. REFERENCES AND ORIGIN OF THE ELEMENTS EXAMINED

References: KAMOUFLAGE 1V 60/120 AP
Projectname: "VAW"

Source: RF TECHNOLOGIES
Lange Ambachtstraat 40
9860 OOSTERZELE
BELGIUM

6. PRINCIPLE OF ASSEMBLY

6.1. TYPE OF FUNCTION

KAMOUFFLAGE 1V 60/120 AP type 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.

6.2. GENERAL

The elements tested are a range of smoke control dampers fitted in a vertical smoke extraction duct and a compartment boundary wall.

Each damper has flush-mount measurements of between:

- 350 x 385 to 700 x 1165 mm (Wn x Hn) (Wn= Nominal Width; Hn = Nominal Height).
- Free passage: for KAMOUFFLAGE 1V 60/120 AP: (Wn -36) x (Hn-36) mm.

6.3. DETAILED DESCRIPTION OF ELEMENTS

6.3.1. Damper

Smoke control damper	
Type	VAW
Commercial name	Kamouflage 1V60/120 AP
Composed of	Frame Doorleaf with vertical axis Actuating mechanism Lock

6.3.2. Frame

Frame composition	
Composed of	Aluminum frame (outside) Calcium silicate frame (middle) Steel frame (inside) Cold sealing between frame and wall Cold sealing between frame and doorleaf Hot sealing between frame and wall Hot sealing between frame and doorleaf Electrical connection box Hinges Corner brackets Guide plates
Aluminum frame	
Frame dimensions	Outer dimensions (Wn + 51.7 x Hn + 51.7)
Profile dimensions	T-shaped profile of section 71.5 x 44.6 x 1.6 mm (w x h x th) including a cavity of section 27 x 3.3 mm (w x h)
Corner connectors	L-shaped steel plates of dimensions 76.5 x 76.5 x 3 mm (w x h x th)
Fixation corner connectors	4 steel countersunk screws DIN 965 M5 x 8 mm for each corner connector
Finishing frame	White or black painted 0.05 to 0.1 mm

Calcium silicate frame	
Material	PROMATECT H (PROMAT) of density 870 kg/m ³
Position	On the inside of the aluminum frame
Dimensions	4 stepped strips with a width of 101 mm and unit thicknesses of 30/15/13.7/10 mm
Fixation	See fixation of the steel frame
Steel frame	
Position	Inside the calcium silicate frame
Dimensions	4 steel strips of section 53.9 x 1.25 mm (w x th)
Fixation	Clamped on the aluminum frame with 28 blind rivets Ø 4.8 x 24 mm. By doing this, the aluminum, the calcium silicate and the steel frames are fixed together.
Cold sealing between frame and duct	
Type	Rectangular foam strip SITUSEAL (RECTICEL) on the aluminum frame, compressed between aluminum frame and duct
Material	Polyurethane
Section	10 x 8 mm (w x th)
Fixation	Self-adhesive on the aluminum frame
Cold sealing between frame and doorleaf	
Type	V-shaped silicone extrusion profile VAW-D210 (KEENEAGLE)
Dimensions	Overall dimensions 16.9 x 9.5 x 1.4 mm (w x h x th)
Position	Between the calcium silicate and the steel frames
Fixation	Clamped + fixed with steel staples of section 12 x 9.3 mm (w x h) every 40 mm
Hot sealing between frame and duct/wall	
Material	Intumescent graphite BLAZESEAL (RECTORSEAL)
Section	2 strips of section 15 x 2 mm (w x th)
Position	On the outside of the calcium silicate frame
Fixation	Steel staples of section 12 x 9.3 mm (w x h) every 50 mm
Material sleeve (only for 1V120)	Silicone coated glass fabric tissue 480g/m ²
Position sleeve (only for 1V120)	Around the intumescent strip positioned at the back of the frame
Hot sealing between frame and doorleaf	
Material	Intumescent graphite BLAZESEAL (RECTORSEAL)
Section	2 strips of section 20 x 2 mm (w x th)
Position	On the inside of the calcium silicate frame on thicknesses of 30 mm and 10 mm
Fixation	Steel staples of section 12 x 9.3 mm (w x h) every 50 mm
Electrical connection box	
Type	Plastic box VA-D203 with cover and integrated film hinge
Dimensions	Outer dimensions of 139 x 47 x 56 mm (L x w x h)
Material	PPC
Position	On the steel frame, in the middle between both hinges
Fixation	Screwed on the steel frame with 2 steel pan head screws DIN 7981 Ø 4.2 x 9.5 mm. A steel plate of dimensions 120 x 48 x 0.8 mm (w x h x th) with an integrated hook was clamped in between the box and the steel frame to insure the closing of the box
Connector	Euro connector block 10 poles

Hinges	
Composed of	Fixed part, movable part and axis
Number	2 hinges
Position	On each of both corners
Size of fixed part	101.2 x 54.3 x 1.25 mm (w x h x th)
Size of movable part	112 x 60 x 1.5 mm (w x h x th)
Size of axis	Ø 5 mm
Material	Zinc plated steel
Fixation	5 steel blind rivets Ø 4.8 x 24 mm, fixed on both horizontal and vertical parts of the steel frame
Corner brackets	
Size	95.2 x 95.2 x 53.8 x 0.8 mm (L x w x h x th)
Number	2
Material	Zinc plated steel
Fixation	On the steel frame, 3 steel blind rivets Ø 4.8 x 24 mm
Guide plates	
Size	262 x 48.9 x 2 mm (L x w x th)
Position	On the horizontal frame parts
Number	2
Fixation	On the steel frame with 4 steel ISO 7380 M5 x 15 mm screws with a steel bushing 5 mm high in between
Material	Zinc plated steel
Lock plate	
Size	Steel L-shaped plate of dimensions 40 x 27 x 9.6 x 2 mm (L x w x h x th)
Material	Zinc plated steel
Fixation	2 steel ISO 7380 M4 x 8 mm screws

6.3.3. Doorleaf

Doorleaf composition	
Composed of	Calcium silicate frame Finishing plate Lock Keyhole plug A Clutch rod Drive arm brackets Insulation Motor Drive arms
Calcium silicate frame	
Composition	2 calcium silicate plates screwed on 4 calcium silicate spacers
Material	Calcium silicate PROMATECT H (PROMAT) of theoretical density 870 kg/m ³
Frontplate dimensions	Wn - 57.7 x Hn - 57.7 x 10
Backplate dimensions	663 x 1125 x 10 mm (Wn-37 x Hn-40 x th)
Spacer dimensions	Strips of dimensions 66.1 x 25 mm (w x h)
Spacers' position	At 21 mm from the edge of the frontplate at the side of the hinges and aligned with the frontplate on 3 other edges
Fixation	Steel woodscrews Ø 4 x 40 mm every 336.4 mm
Finishing plate	
Material	Aluminum
Dimensions	Wn-84 x Hn-84 x 0.8mm
Finishing	White spraypainted Hard Hat (Rust-oleum) - th = 0.05 to 0.1 mm
Fixation	Velcro strips glued on the finishing plate and fixed on the calcium silicate frontplate with staples of section 10 x 7 mm (w x h) every 30 mm

Lock	
Composition	<p>Motorized lock composed of:</p> <ul style="list-style-type: none"> ▪ A steel base with plastic latch bearings ▪ A steel latch with a plastic driveblock and a pushspring ▪ A motor with a plastic drive cam, ▪ A position switch, ▪ A plastic key housing, ▪ A clutchplate with pullspring, ▪ Steel screws and pins to fix the assembly.
Fixation of the lock	3 steel bolts M5 x 25 mm and 3 steel nuts M5 to the backplate of the doorleaf
Baseplate	Stainless steel of dimensions 81.9 x 87.8 x 43.75 x 2 mm (L x w x h x th)
Latch	Ø 10 x 128 mm
Position switch	Type T-VA-D302-500 (KEENEAGLE)
Motor	Type T-VAW-S030 (KEENEAGLE)
Keyhole plug	
Material	Aluminum
Composition	Plate with inner thread, plug with outer thread
Dimensions	<p>Plate dimensions: 60 x 20 x 15 mm (w x h x th)</p> <p>Plug dimensions: Ø 22 x 19.5 mm</p>
Fixation	<p>The plate was fixed to the frontplate with 2 steel countersunk screws M4 x 16 mm</p> <p>The plug was turned in the plate</p>
Clutch rod	
Material	Threaded steel rod
Dimensions	M4 x Wn-310 mm
Fixation	2 steel torque nuts DIN 985 M4 at each end of the clutch rod
Insulation	
Material	2 rock wool boards ROCKSONO SOLID (ROCKWOOL) of thickness 25 mm and theoretical density 45 kg/m ³
Boards' dimensions	Wn-146,7 x Hn-25.7 mm (w x h)
Cover foil	PE foil of thickness 25 µm
Fixation	<p>1 board was fixed to the front plate with staples of section 9.5 x 32 mm (w x h) every 100 mm</p> <p>1 board was fixed to the backplate with staples of section 9.5 x 32 mm (w x h) every 100 mm</p>
Motor	
Composition	<p>A motor with integrated gearbox type VAME-D045 A mechanical spring operated clutch</p> <p>A 2 steps reduction fitted in a box</p> <p>A box composed out of 2 steel plates, steel spacers and a plastic casing</p> <p>A plastic housing to accommodate a motor PCB</p> <p>A motor PCB with integrated position switches</p> <p>A steel output drive rod of section 10 x 10 mm (w x h)</p>
Fixation	To the backplate by means of an L-shaped steel fixation plate of section 65.5 x 23 x 2 mm (w x h x th), 2 steel bolts M5 x 25 mm and 2 steel M5 nuts

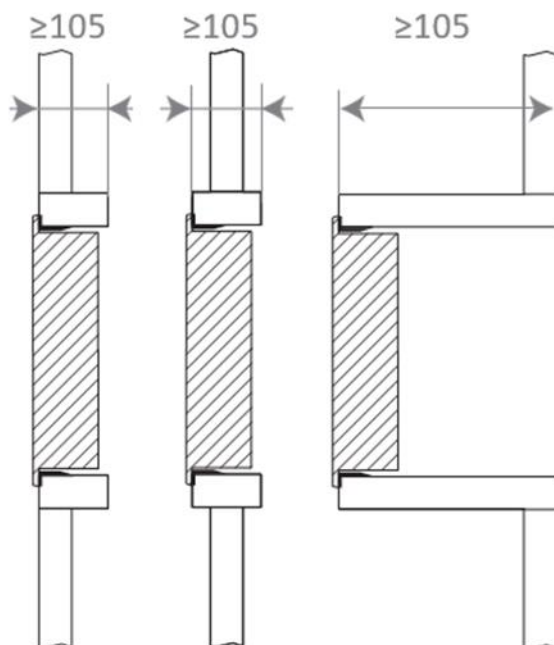
Drive arms	
Composition	2 drive arms (1 upper, 1 lower) 2 brackets to guide the drive arms, mounted on the backplate
Drive arms	A Z-shaped stainless steel arm of dimensions 201.7 x 34 x 10 mm (L x w x h) A steel guiding tab \varnothing 15 x 12.4 mm fixed to the drive arm with a steel M4 bolt The drive arm was connected to the steel output drive rod by means of a shaft connection pin
Bracket	L-shaped of dimensions 60 x 54.5 x 48.3 x 33 mm (L x w x h x th) Zinc plated steel Fixed on the backplate with 3 steel bolts M5 x 25 mm

7. INSTALLATION OF ELEMENT

7.1. DUCT MOUNTED

The damper is fixed in a sleeve of the duct that has a depth of minimum 105mm and an opening of maximum $(W_n+10) \times (H_n+10)$.

Duct	
Material plates	Promat Promatect L500, 30mm (500kg/m ³)
Fixaxtion	Glued and screwed
Glue	Promacol-S
Screws to connect plates	Steel, Diameter 4mm, length 70mm, CCdistance: 150mm
Screws to fix perforated plate	Steel: diameter 5mm, length 50mm
Screws to connect duct to the wall	Steel, diameter 8mm, length 90mm



7.2. WALL MOUNTED

The smoke control damper can be built in a massive 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_{nsmoke control damper} +10) x (H_{nsmoke control damper} +10) mm (w x h).

The tested element is built within the opening in the wall and maintained in position by 4 screws Ø 6 x 60 mm on the horizontal side of the frame at distance of 71mm from the inside corners of the frame.

8. FIRE RESISTANCE CLASSIFICATIONS

8.1. CLASSIFICATION REFERENCES

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

8.2. CLASSIFICATIONS

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

Smoke control dampers with the classification have undergone cycles without loads in order to achieve the following classification:

- C300
- C10 000

No other classification is permitted.

- **KAMOULAGE AP 1V 60 installed into massive wall described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	60	(	Vew	-		-	i	<->	o	)	S	-1000/+0 Pa		C300	AA	multi
E	I	60	(	Vew	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi

- **KAMOULAGE AP 1V 60 installed into PROMATECT L500 30mm duct described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	60	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C300	AA	multi
E	I	60	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi

- **KAMOUFLAGE AP 1V 120 installed into massive 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	-1000/+0 Pa		C300	AA	multi
E	I	90	(	Vew	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi
E	I	120	(	Vew	-		-	i	<->	o	)	S	-1000/+0 Pa		C300	AA	multi
E	I	120	(	Vew	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi

- **KAMOUFLAGE AP 1V 120 installed into PROMATECT L500 30mm duct described into the document.**

E	I	t	(	Vedw	-	Hodw	-	i	***	o	)	S	Operating pressure	Hot 400/30	Cyy	AA	multi
E	I	90	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C300	AA	multi
E	I	90	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi
E	I	120	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C300	AA	multi
E	I	120	(	Ved	-		-	i	<->	o	)	S	-1000/+0 Pa		C10000	AA	multi

9. DIRECT FIELD OF APPLICATION (DIAP) FROM EN1366-10:2022

9.1. COMPARTMENT BOUNDARY MOUNTED SMOKE CONTROL DAMPERS

The direct field of application of EN 1366-2 applies.

NOTE: This does not apply to smoke control dampers tested only on the surface of a duct.

9.2. SMOKE CONTROL DAMPER SIZES

Smoke control dampers of sizes between the smallest size tested for ambient leakage and the largest size subjected to ambient leakage and to the elevated temperature tests shall be used.

They shall be installed in all duct sizes permitted within the direct field of application stated in EN 1366- 8 and EN 1366-9.

They shall only be used in the applications tested and those applications covered in this DIAP.

9.3. DUCT MOUNTED SMOKE CONTROL DAMPER MOUNTING POSITIONS

Vertically mounted SCD tested in a horizontal duct as presented in Figure 7b) of EN1366-10:2022 are also valid to be mounted in a vertical duct Figure 7a) of EN1366-10:2022.

Vertically mounted SCD tested in a vertical duct as presented in Figure 7a) of EN1366-10:2022 are also valid to be mounted in a horizontal duct Figure 7b) of EN1366-10:2022.

Smoke control dampers tested in the horizontal position on the top surface of horizontal duct Figure 7c) of EN1366-10:2022 are only valid in that position.

Smoke control dampers tested in the horizontal position on the bottom surface of horizontal duct Figure 7d) of EN1366-10:2022 are only valid in that position.

9.4. DISTANCE BETWEEN MOUNTING POSITIONS IN COMPARTMENT BOUNDARY APPLICATIONS

Individual dampers can be positioned in a supporting construction such that the distance between damper casings (maximum damper outer dimension excluding face flanges used for installation) is not smaller than 200 mm and the distance between the damper casing (maximum damper outer dimension excluding face flanges used for installation) and the supporting construction edge, joint or boundary (e.g. corner, roof junction) is not smaller than 75 mm - see Figure 23 of EN1366-10:2022.

If smaller distances are proven by testing with more than one unit closer together or one unit closer to a supporting construction edge, joint or boundary then these may be used.

9.5. BLADE PIVOT AXIS

Tests with the actuator mounted at the bottom of the smoke control 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.

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

Circular smoke control dampers tested with the blade axis horizontal and also tested with blade axis vertical may be installed with the blade axis at any angle.

9.6. PRESSURE DIFFERENCE

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 in Table 6 of EN1366-10:2022.

Tested pressure level (see Table 1 of EN1366-10:2022)	Under pressure to	Over pressure to
1	- 500 Pa	+ 500 Pa
2	- 1 000 Pa	+ 500 Pa
3	- 1 500 Pa	+ 500 Pa

9.7. ELEVATED TEMPERATURES

Multi compartment smoke control dampers tested to the EN 1363-1 standard fire test curve are suitable for single compartment applications for the same time period and other application data.

Single compartment smoke control dampers tested to elevated temperatures are applicable to all temperatures below the temperature tested for the same time period and other application data.

9.8. CYCLING TESTS

9.8.1. Smoke control dampers meeting the cycling requirements for modulating applications

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

- a. systems for use with combined smoke control and general HVAC applications;
- b. systems with smoke control dampers that are cycle checked every day;
- c. systems where the smoke control dampers are operated only in the case of emergency.

9.8.2. 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

The results for smoke control dampers meeting the above requirements are also applicable to systems where the smoke control dampers are operated only in the case of emergency.

9.8.3. Smoke control dampers meeting the cycling requirements for smoke control dampers that are operated only in the case of emergency

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

9.8.4. Load application

SCDs tested without load are not valid for applications where testing with load is required. SCDs tested with load are suitable for both applications. See 6.6.1. of EN1366-10:2022.

9.9. INITIATION METHOD

Smoke control dampers that have been tested for systems with manual activation are suitable for application in automatic systems, but not vice versa.

9.10. DUCT MOUNTED SMOKE CONTROL DAMPERS - APPLICATION TO DUCTS OTHER THAN THAT TESTED

9.10.1. Single compartment smoke control dampers

Single compartment smoke control dampers may be applied to ducts that have been tested to EN 1366-9 with the following restrictions:

- a) single compartment smoke control dampers may be applied to ducts constructed from materials of the same or greater density as those tested;
- b) single compartment smoke control dampers may be applied to ducts of the same material as those tested with the same or a greater thickness;
- c) application may not be made to ducts where there is a change in the surface protection materials of the duct;
- d) paint surface finish of the ducts and/or dampers shall be as the duct and/ or dampers were tested or assessed.

Single compartment smoke control dampers tested on the surface of the duct may also be used in line with the single compartment smoke control duct (i.e. between duct sections), providing that the smoke control damper is independently provided a with duct support (support, drop rod, anchor etc. - as tested for the smoke control duct) within 100 mm of the centre of the smoke control damper blade axis. The damper should not support the duct or vice versa.

9.10.2. Multi compartment smoke control dampers

Multi- compartment smoke control dampers may be applied to ducts that have been tested to EN 1366-9 and EN 1366-8 as appropriate, with the following restrictions:

- a) multi- compartment smoke control dampers may be applied to ducts constructed from materials of the same or greater density as those tested;
- b) multi- compartment smoke control dampers may be applied to ducts of the same material as those tested with the same or a greater thickness;
- c) application may not be made to ducts where there is a change in the surface protection materials of the duct;
- d) paint surface finish of the ducts and/or dampers shall be as the duct and/ or dampers were tested or assessed.

Multi compartment smoke control dampers tested on the surface of the duct may also be used in line with single or multi compartment smoke control duct (i.e. between duct sections), providing that the smoke control damper is independently provided with a duct support (support, drop rod, anchor etc. - as tested for the smoke control duct) within 100 mm of the centre of the smoke control damper blade axis. The damper should not support the duct or vice versa.

This does not apply to smoke control dampers tested only in compartment boundaries.

Duct mounted multi-compartment smoke control dampers tested to this document may be used in association with fire resisting ductwork tested to EN 1366-1 . They may also be used in line with fire resisting ductwork (e.g. for flow control and isolation between duct sections), providing that the smoke control damper is independently provided a with duct support (support, drop rod, anchor etc. - as tested for the fire resisting duct) within 100 mm of the centre of the smoke control damper blade axis. The damper should not support the duct or vice versa.

This does not apply to smoke control dampers tested only in compartment boundaries.

9.11. COMPARTMENT MOUNTED SMOKE CONTROL DAMPERS - APPLICATION TO SHAFTS, WALLS AND CONSTRUCTIONS OTHER THAN THAT TESTED

9.11.1. Single compartment smoke control dampers

Single compartment smoke control dampers are not accepted in this application.

9.11.2. Multi compartment smoke control dampers

Compartment mounted multi compartment smoke control dampers may be applied to builders work (e.g. ducts/shafts created on site - concrete, blockwork etc), or walls and floors s restricted by the following:

- a) multi- compartment smoke control dampers may be applied to shafts, walls and floors constructed from materials of the same or greater density as those tested;
- b) multi- compartment smoke control dampers may be applied to shafts, walls and floors of the same material as those tested with the same or a greater thickness

9.12. STANDARD DAMPER OPEN OR CLOSED POSITION

An SCD tested with blade open and then having to close for the tests is applicable to SCDs when set in normal operation, either open or closed.

An SCD tested with blade closed and then remaining closed is only applicable to SCDs when set closed in normal operation.

10. 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, April 2nd, 2024

X 
Guillaume
SIEMONET

Project leader
Signé par : SIEMONET Guillaume

X 
Romain
STOUVENOT

Supervisor
Signé par : Romain STOUVENOT

APPENDIX: DRAWINGS

