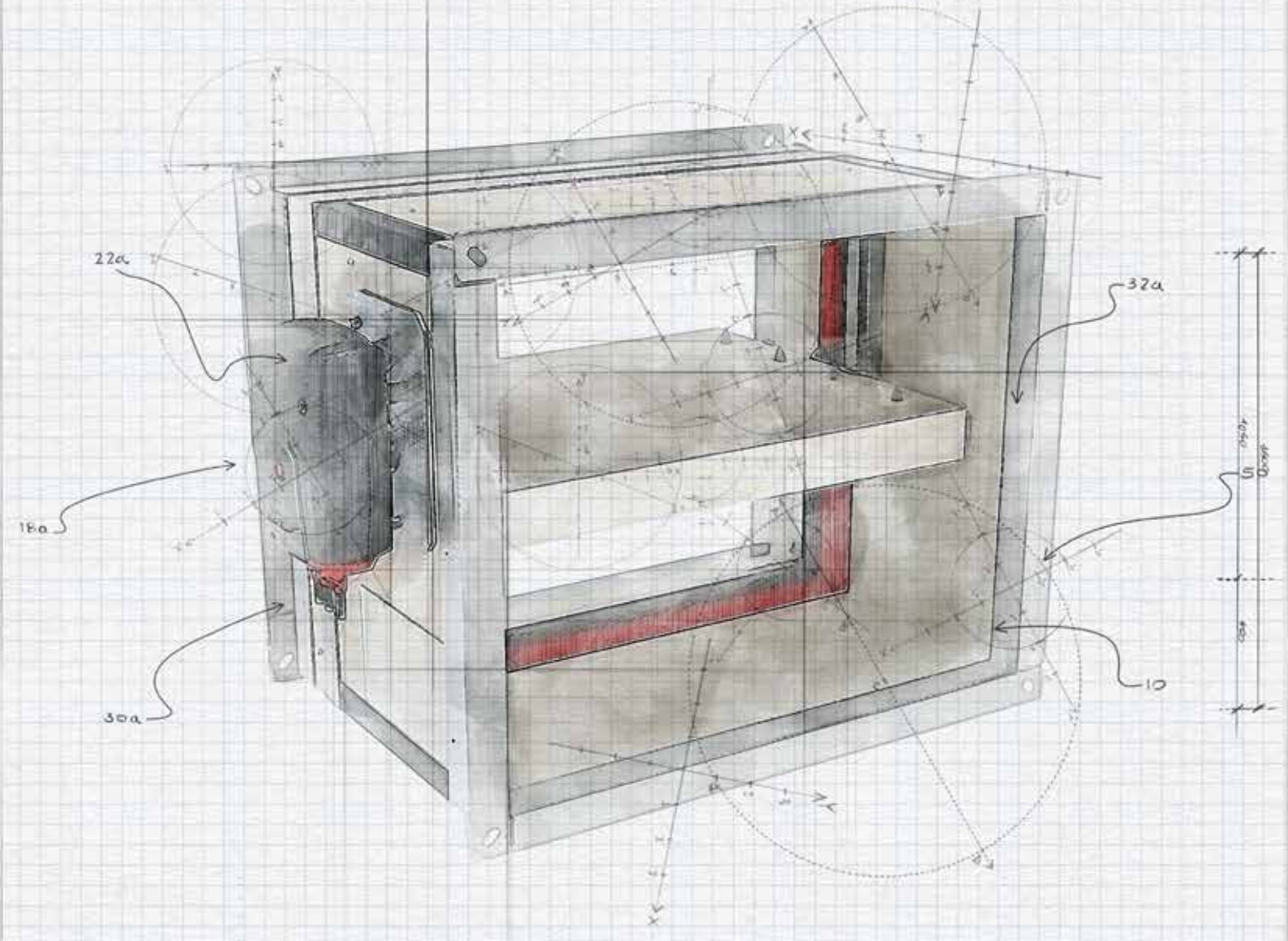
CU2

RECTANGULAR FIRE DAMPER UP TO EI120S

Product guide



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PG - C2 - EN - 06/2025

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1 GENERAL INFO

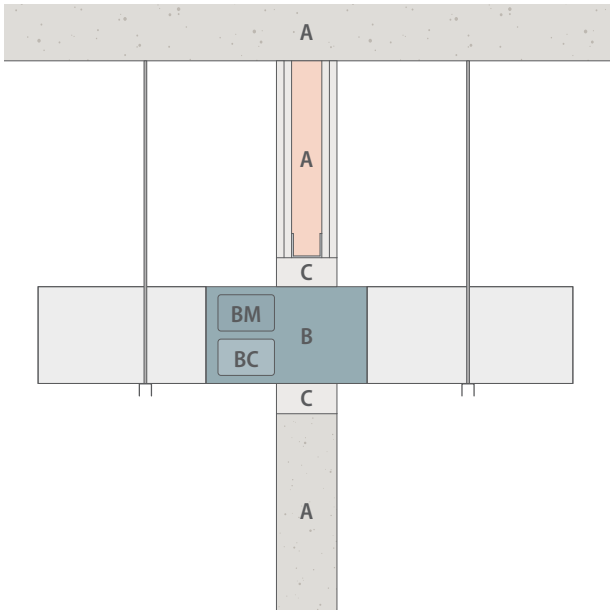
We address this guide to all parties requiring detailed technical information on the fire damper, its installation and technically and regulatory relevant aspects. From designer and design office, to contractor and maintenance engineer. This document aims to provide a clear overview of the various aspects involved in selecting, installing and maintaining a fire damper.

This guide is intended as a supplement to our existing product documentation. Price information can be found in our product catalogue or price list. For a step-by-step guide to installation, we refer you to our technical product sheet.

The logical structure of this document prioritizes ease of use first. The first chapter covers general relevant information. The second chapter delves into the technical aspects of the different models and versions of the fire damper. The third chapter guides the user through the correct installation of the fire damper.

The installation of fire dampers is based on several key principles. Chapter 3 addresses each of these aspects in a clear and concise manner:

- The (load-bearing) structures in which the fire dampers are installed (compartment boundaries). These are indicated by the letter 'A'. Details are covered in chapter 3.1.
- The sealing of fire dampers is represented by the letter 'C'. Details of this are discussed in chapter 3.2.
- The various installation options, depending on the desired fire resistance, are documented in detail in chapter 3.3.
- Fire dampers are connected to ventilation ducts that are suspended and/or supported. This suspension is discussed in chapter 3.4.
- More info on the connection of the fire damper to the ventilation duct is given in chapter 3.5.



A (Load-bearing) construction
B Fire damper
BM: mechanism
BC: communication
C Sealing

1.1 APPLICATION

Fire dampers are part of the fire safety measures in a building. They are installed where ventilation ducts cross a wall or floor with a fire resistance (compartment boundary). Their purpose is to ensure that the fire resistant properties and smoke tightness of the compartment boundaries are maintained. Rf-Technologies' dampers are CE marked. They can be equipped with different types of mechanisms according to the specific needs of the project and local regulations.

The CU2 is a rectangular fire damper designed for large dimensions (up to 1500 x 1000 mm) with a fire resistance of up to 120 minutes. The damper tunnel is made of moisture-resistant and asbestos-free material. The fire resistance up to 120 minutes and numerous options make the CU2 fire damper a reference on the market. For maximum dimensions up to 3050 x 1650 mm, we refer to the CE marked battery assembly CU2/B.

1.2 STANDARDS AND CERTIFICATES

CE Certification

All Rf-Technologies fire dampers are CE-certified according to the harmonised European product standard for fire dampers, EN 15650: 2010. Declaration of performance can be consulted at www.rft.eu/dop.

- BCCA-0749-CPR-BC1-606-0464-15650.03-0464 & 2517: certificate of constancy of performance
- EN 1366-2: test standard for fire resistance of fire dampers
- EN 13501-3: classification standard up to EI 120 (v_e, h_o, i ↔ o) S (500Pa)
- EN 60068-2-52: corrosion protection
- EN 1751 ≥ class 2 (leakage through closed damper blade)
- EN 1751 ≥ class ATC 4 (formerly B) (≥class ATC 3 (formerly C) on request) (casing leakage)
- (EU) No 305/2011: in accordance with the Construction Products Regulation
- EN 15882-5 combined penetrations

Other certificates

- The NF label ensures conformity with standard NF S 61-937 parts 1 and 5: 'Systèmes de Sécurité Incendie Dispositifs Actionnés de Sécurité'. It guarantees the classification of fire resistance in accordance with the National Decree of 22 March 2004 and its amendment of 14 March 2011. It guarantees the other properties of the product as mentioned in this document.
- VKF - no. 26813
- UKCA Certificate 2822-UKCA-CPR-0057
- ATEX certificate TÜV 14 ATEX 7540 X
- Hygiene-Konformitätsprüfung CU2/B-336769-20-Zd

1.3 GENERAL INSTALLATION GUIDELINES

- Rf-Technologies products should be installed according to the rules of good workmanship, in accordance with the technical manual as well as locally applicable laws, standards and regulations.
- Rf-t fire dampers are always tested in standardised (load-bearing) structures according to EN 1366-2. The results are valid for similar (load-bearing) structures with a fire resistance, thickness and density equal to or greater than the (load-bearing) test structure.
- Rf-t fire dampers can be connected to the ventilation system on one or both sides. For single-sided connections, the other side must be fitted with a non-combustible, sealing grille to prevent access to the damper blade and to ensure no risk of entrapment.
- Rf-t fire dampers can be connected to both combustible and non-combustible ventilation ducts.
- During installation, safety distances from other construction elements must be respected. The operating mechanism must remain accessible: allow a minimal clearance of 200 mm between the operating mechanism and any structural element or other systems.
- Prevent obstruction of the free movement of the damper blade by adjoining ducts or fastening materials.
- Axial orientation of the damper blade: see Declaration of Performance.
- The airflow direction is arbitrary.
- To guarantee air tightness at all times, the connection between fire damper and duct must be executed correctly following best practices.
- Fire dampers are intended for indoor use and must be protected from outdoor exposure and weather conditions.
- Operating temperature between -30°C and 50°C.
- Use the damper in environments with a maximum of 95% non-condensing humidity (no droplet formation).
- It is recommended to keep the damper blade closed during installation.
- After installation, check that the damper blade can move freely.
- The damper must be accessible for inspection and maintenance.
- Rf-Technologies provides several kits to modify the operating mechanism after installation. Only use these official kits and install them according to the instructions to ensure that the fire dampers classification remains unchanged.
- Transformations or repairs made by third parties without prior written consent from Rf-T are not covered under the company's responsibility.

1.4 SAFETY

- Improper use can lead to both material damage or personal injury. We emphasize the importance of adhering to general and specific safety guidelines for installers, particularly when working at heights.
- Injuries caused by sharp edges are a real risk. Wearing appropriate gloves, safety shoes and a safety helmet helps prevent accidents.
- Always pay attention to ergonomic factors when handling and installing fire dampers.
- During damper testing, ensure fingers or hands are not trapped by the damper blade.
- Electrical connections must be made by qualified personnel to avoid electrical shocks. It is recommended to switch off the power during installation work.

1.5 INSPECTION AND MAINTENANCE

A fire damper is maintenance-free. However, the fire damper and its mechanisms must always remain accesible. After installation, the correct mechanism of the fire damper (opening and closing of the damper blade) must be checked immediately. Subsequently, the damper must be checked every six months to identify potential damage in a timely manner (see art. 8.3 of EN 15650 - product standard for fire dampers). Local inspection regulations and EN 13306 must also be followed.

Record the findings in a logbook. While this is not mandatory, it is highly practical.

The owner or user of the installation is responsible for ensuring its proper operation.

POINTS OF ATTENTION:

During installation, sealing materials may contaminate the fire damper. Ensure no debris remains inside the damper, and the damper blade must be able to move freely. Clean the damper thoroughly inside if necessary. Keeping the damper blade closed during installation can be helpful.

The sealing materials used must also not impair the operation of the mechanism. This can be verified by manually opening and closing the fire damper after installation. It is recommended to shield the mechanism and moving components during installation where needed.

If using a monitoring and control system, validate the mechanism by opening and closing the fire damper using the control system. At the same time, confirm the proper functioning of the status indicators for the start and end position contacts.

RECOMMENDED INSPECTIONS:

- ☑ Damper cleanliness: clean where necessary with a dry or damp cloth. Local regulations often dictate how the ventilation system should be cleaned.
- ☑ Inspect the condition of the damper, its blade, and the connection to the structure.
- ☑ Test the control mechanism's functionality by manually opening and closing the damper blade.
- ☑ Check the wiring for the power supply and the start and end position contacts (if applicable).
- ☑ Validate the operation of the start and end contacts (if applicable).
- ☑ When using a monitoring and control system: check the opening and closing of the damper blade through the system and confirm that the fire damper performs its function correctly within the system (if applicable).
- ☑ After the inspection, ensure that the fire damper is returned to its open position.

Contact Rf-Technologies in case of any problems (service@rft.eu / contact details at www.rft.eu).

CLEANING THE FIRE DAMPER:

We recommend regularly cleaning ventilation ducts and fire dampers. Cleaning the fire damper can be done with a dry or damp cloth. Household cleaning agents are permitted, as long as it does not contain abrasive components. Mechanical cleaning with rotating and/or telescopic brushes is not allowed.

If hygiene requirements apply, use disinfectants that comply with applicable regulations, e.g. disinfectants according to the list of the Robert Koch Institute. Here, consider the damper's corrosion resistance.

1.6 STORAGE AND LOGISTICS

As fire dampers are safety devices, they require careful handling and storage.
Avoid shocks, damage, exposure to water and deformation of the product.

Hidden defects will only be considered for warranty if they are reported to Rf-Technologies within 5 days of detection.

It is recommended to

- ☑ unload in a dry area
- ☑ do not tilt the damper in order to move it
- ☑ not to use the damper as a rack, work table, etc.
- ☑ do not store smaller dampers inside larger dampers
- ☑ -30°C ≤ use temperature ≤ 50°C
- ☑ Sort packaging in an environmentally conscious manner.

2 TECHNICAL DATA

2.1 FIRE DAMPER

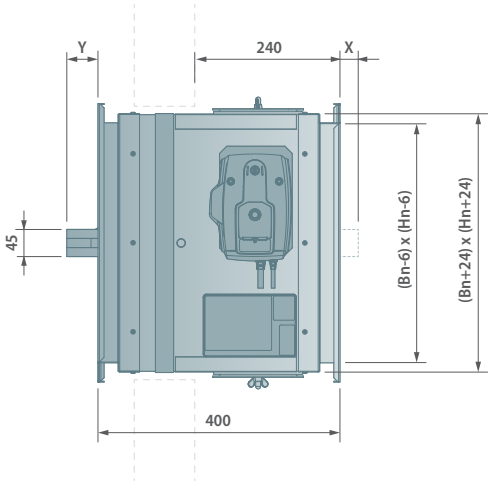
2.1.1 CU2

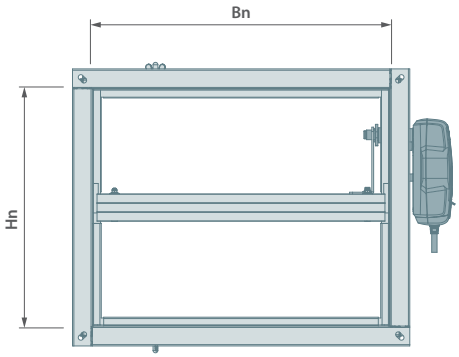
The CU2 is a rectangular fire damper for larger dimensions (up to 1500 x 1000 mm) with a fire resistance of up to 120 minutes. It is made of moisture-resistant and asbestos-free material. The fire resistance up to 120 minutes and numerous options make the CU2 fire damper a reference on the market. For applications requiring even larger dimensions up to 3050 x 1650 mm, please refer to the CE marked battery assembly CU2 W.

Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes can be provided at surplus cost
(heights between ≥ 275 and ≤ 299 mm are not possible).

	≥	≤
(Wn x Hn) mm	200x200	1500x1000

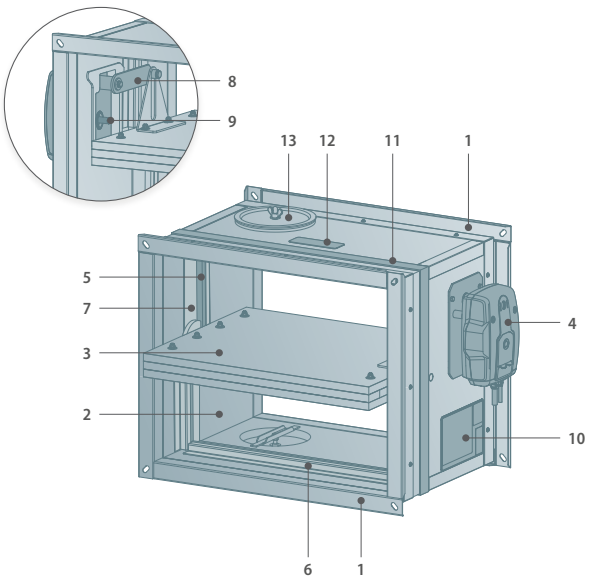




Exceeding blade : X = on the mechanism side, Y = on the wall side

Hn [mm]	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
X	-	-	-	-	-	1	26	51	76	101	126	151	176	201	226
Y	2	27	52	77	102	127	152	177	202	227	252	277	302	327	352

Components



1. connection flange PG30
2. refractory tunnel
3. damper blade
4. operating mechanism
5. cold smoke seal
6. damper blade stop
7. intumescent joint
8. transmission
9. fusible link
10. product identification
11. intumescent strip
12. installation stop
13. inspection hatch (option)

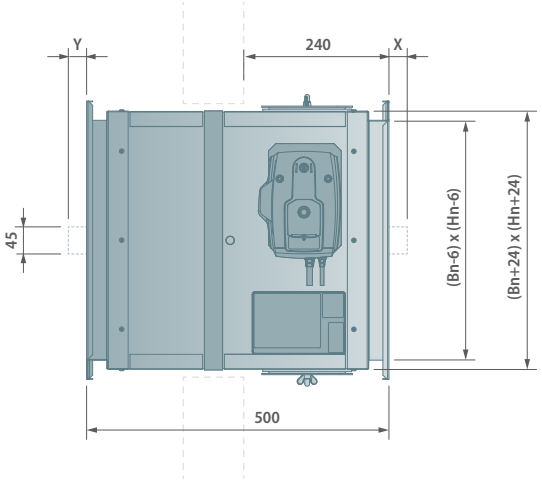
2.1.2 CU2-L500

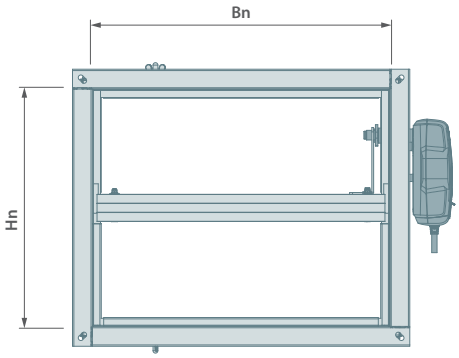
CU2 fire damper with extended tunnel on the wall side to facilitate duct connection if walls thicker than 100 mm. For dampers up to a height of 450 mm, the damper blade does not protrude, allowing a grille or a bend to be connected directly to the flange or a circular connection to be provided.

Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes can be provided at surplus cost
(heights between ≥ 275 and ≤ 299 mm are not possible).

	≥	≤
(Wn x Hn) mm	200x200	1500x1000

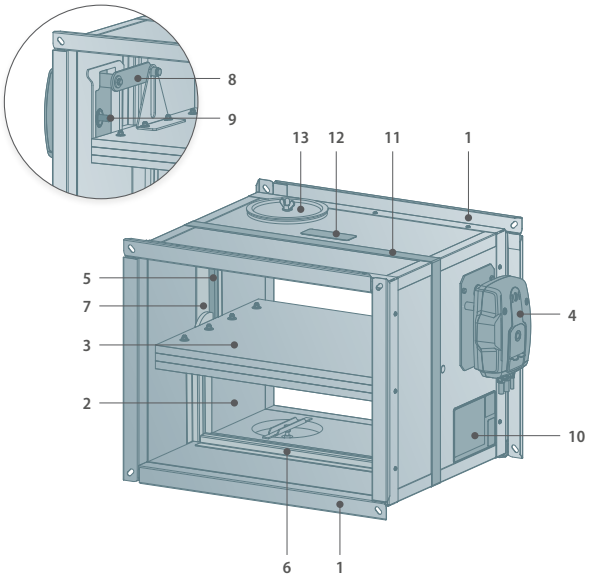




Exceeding blade: X = on to the mechanism side, Y = on to the wall side

Hn [mm]	500	550	600	650	700	750	800	850	900	950	1000
X	-	1	26	51	76	101	126	151	176	201	226
Y	2	27	52	77	102	127	152	177	202	227	252

Components



1. connection flange PG30
2. refractory tunnel
3. damper blade
4. mechanism
5. cold smoke seal
6. damper blade stop
7. intumescent joint
8. transmission
9. fusible link
10. product identification
11. intumescent strip
12. installation stop
13. inspection hatch (option)

2.1.3 CU2L

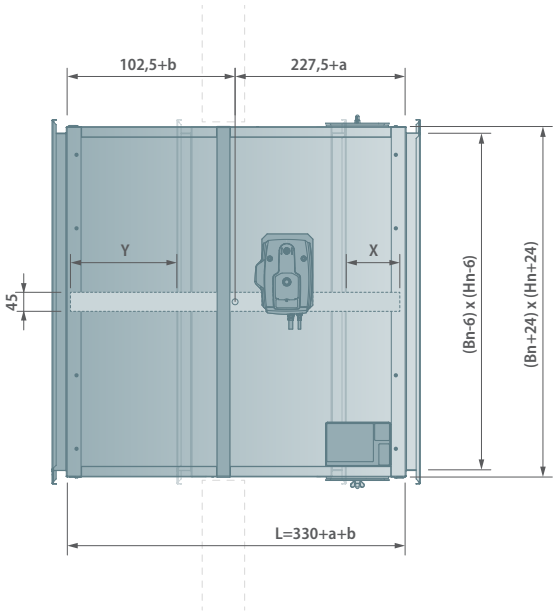
The CU2L is extended to size so that the damper blade does not extend beyond the tunnel. This allows the CU2L to connect a grille or a bend directly to the flange or to provide a circular connection.

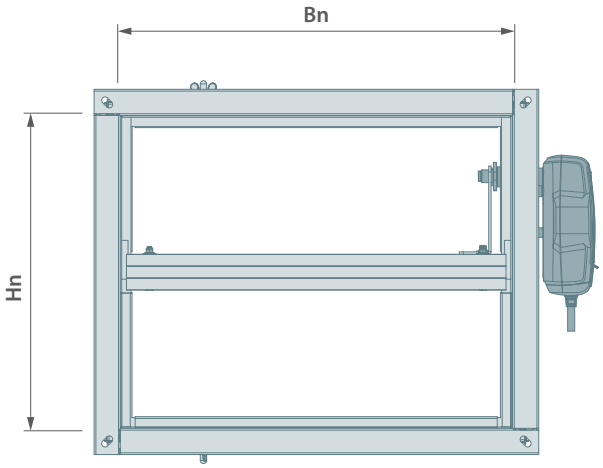
Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes can be provided at surplus cost
(heights between ≥ 275 and ≤ 299 mm are not possible).

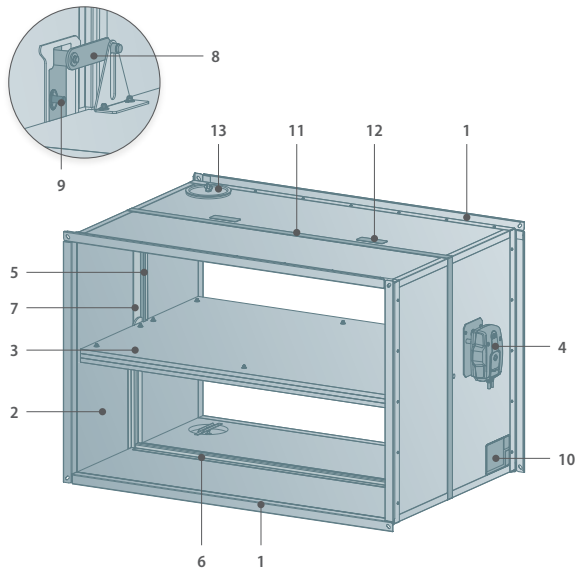
Extension a = Hn/2-230 mm (on mechanism side);
b = Hn/2-100 mm (on wall side)

	≥	≤
(Wn x Hn) mm	200x200	1500x1000

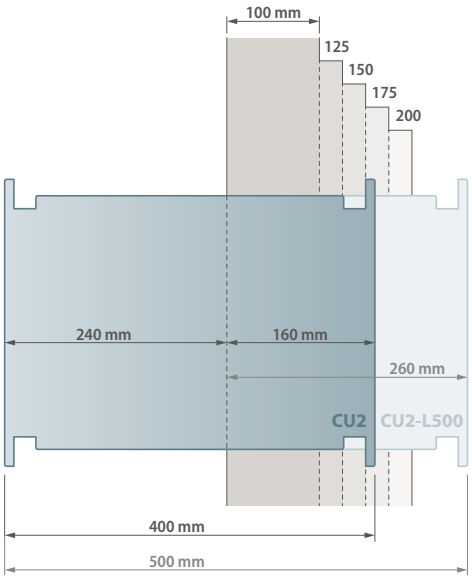




Components



1. connection flange PG30
2. refractory tunnel
3. damper blade
4. operating mechanism
5. cold smoke seal
6. damper blade stop
7. intumescent joint
8. transmission
9. fusible link
10. product identification
11. intumescent strip
12. installation stop (the fire damper is installed up to the indication 'wall limit' on the fire damper)
13. inspection hatch (option)

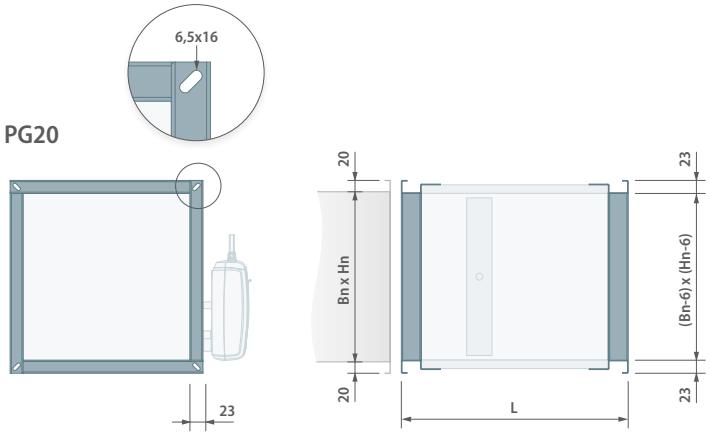


Extended dampers can facilitate installation in the case of thicker walls, for example. To improve the ease of installation, the CU2, with a standard length of 400 mm, can be replaced by a longer 500 mm version (CU2-L500) or by a version where the tunnel length is adjusted so that there is no protruding damper blade (CU2L).

2.1.4 FLANGE TYPES

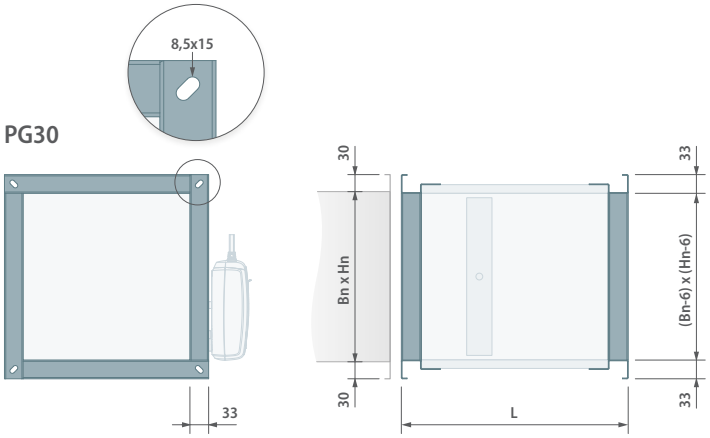
The CU2(L) and CU2-L500 are supplied with PG30 flanges on both sides as standard. These dampers can also be supplied with PG20, PG40, PM, PPT grille (only available on the CU2L) and PRJ round connection (only available on the CU2L) or without connection flange (PP).

PG20



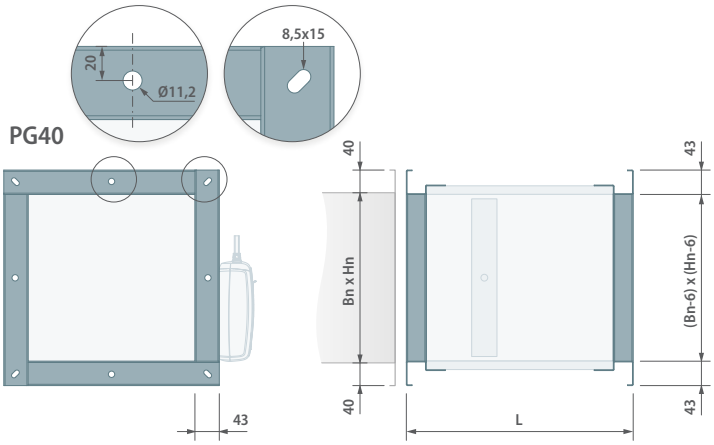
Connection to ducts with 20 mm flanges (for connection with sliding tray system, bolts or clamps).

PG30



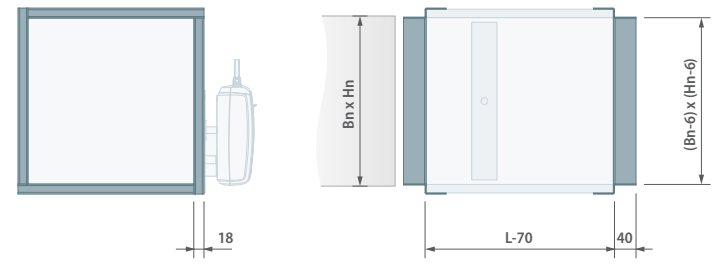
Connection to ducts with flanges of 30 mm (for connection with sliding tray system, bolts or clamps).

PG40



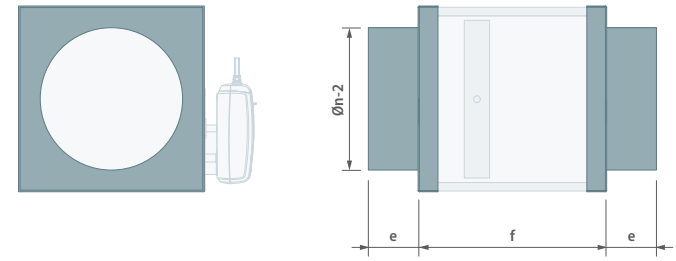
Connection to ducts with 40 mm flanges (for a connection with sliding tray system, bolts or clamps).

PM



Connection where the connection flange is slid into the duct.
This type of flange is used when there is insufficient space to use the standard PG30 flanges.

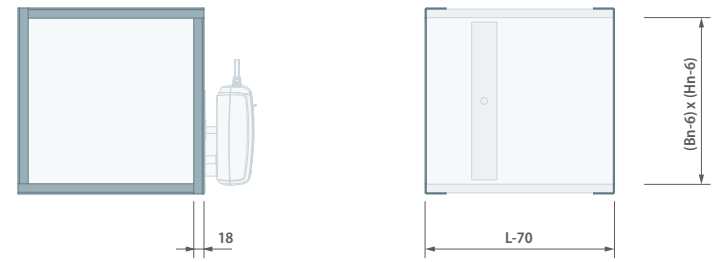
PRJ



Round connection with sealing ring. Always order this in combination with the extended CU2L fire damper.
The dimensions of the CU2L fire damper vary according to the required diameter of the PRJ connection.

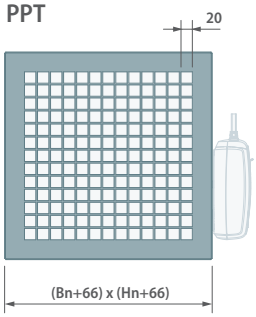
Ø Hn/Bn [mm]	100 200	125 200	160 200	200 200	250 250	315 350	355 400	400 400	450 450	500 500	560 600	630 650	710 750	800 800	900 900	1000 1000
f	330	330	330	330	355	405	430	430	455	500	600	650	750	800	900	1000
e	45	45	45	45	65	65	65	90	90	90	90	90	90	90	90	90

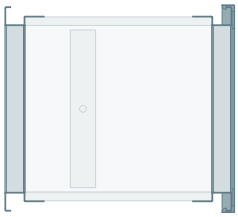
PP



No connection flange.
This flange type is used on one side of the damper that exits into a room.

PPT





Grid. Extremely suitable as a protection grille on the end piece of a duct.
Net passage: approx. 75%.
Always order this in combination with the extended CU2L fire damper.

2.1.5 PRODUCT LABEL

The product label of the fire damper specifies unique information that allows individual traceability of the fire damper. It is possible to add an additional customer reference per fire damper on the product label. For more information, please contact Rf-t.

In addition, each fire damper is supplied with a QR-linked manual.

①	Manufacturer Air tightness class	
②	Description of the damper and its options Display classification of the damper	
③	Description operating mechanism and performance	
④	CE marking DoP web address with declaration of performance Reference standard Certified body	Production log
⑤	Customer order reference	

2.2 MECHANISMS

2.2.1 Overview

The CU2 fire damper can be equipped with different types of mechanisms.

	OPERATION	TYPE	VERSION	
CU2(L) CU2-L500	Fusible link	CFTH	Standard	
			CFTH + FCU	
			CFTH + FDCU	
			CFTH + FDCB	
	Motorised	ONE	24 V	Unipolar limit switch with or without plug FDCU(-ST)
				Bipolar auxiliary limit switch FDCB
			230 V	Unipolar limit switch with or without plug FDCU(-ST)
				Bipolar auxiliary limit switch FDCB
		BELIMO	24 V	With or without thermoelectric fusible link/plug BFL(T)(-ST)
				With or without thermoelectric fusible link/plug BFN(T)(-ST)
			230 V	With or without thermoelectric fusible link/plug#BFL(T)(-ST)
				With or without thermoelectric fusible link/plug#BFN(T)(-ST)
	Motorised with integrated field device	ONE-X	24 V	
			230 V	
	Motorised ATEX	RMEX(T)	24-230 V	zone 2/22
		EMEX(T)	24-230 V	zone 1/2/21/22

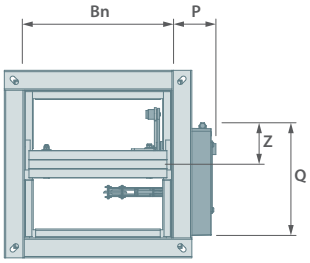
2.2.2 CU2 WITH FUSIBLE LINK MECHANISM CFTH

The release mechanism CFTH automatically closes the fire damper blade when the temperature in the duct exceeds 72°C. The temperature rise causes the fusible link to react. This causes a strained, internal torsion spring to relax which brings the damper blade to its safety position (closed). The proper functioning of the fire damper can be tested periodically by manual release and resetting.

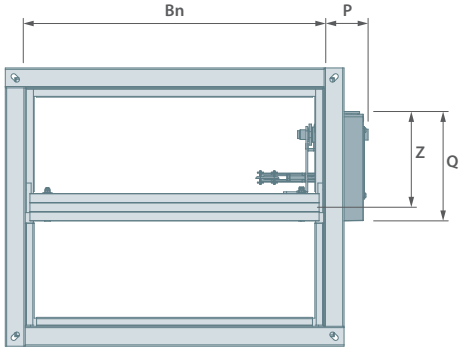
The position of the damper blade can optionally be monitored. An end-of-run switch (FCU) indicates that the damper blade is closed. A unipolar limit switch (FDCU) indicates an open or a closed position of the damper blade.

A bipolar auxiliary limit switch (FDCB) provides a double pass-through and signals an open position of the damper blade twice and a closed position of the damper blade twice.

1. release button
2. re-arming lever
3. cable entry



CFTH (H < 300 mm)



CFTH (H ≥ 300 mm)

H < 300 mm

	CFTH
P	78
Q	180
Z	62

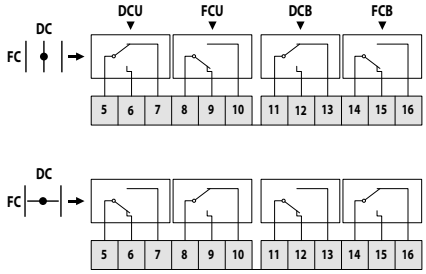
H ≥ 300 mm

	CFTH
P	78
Q	180
Z	157

Detailed features

RUNNING TIME SPRING RETURN	POSITION SWITCHES STANDARD
1s	1mA...6A, DC 5V...AC 250V
OPERATIONAL RELIABILITY	**PROTECTION CLASS**
50 cycles	IP 42

Electrical connection diagram

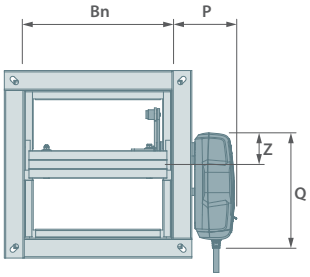


DC : Switch open position fire damper
FC : Switch closed position fire damper

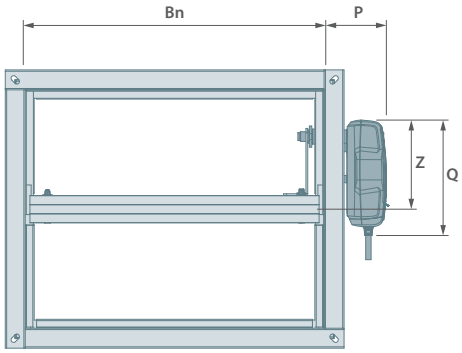
2.2.3 CU2 WITH SPRING RETURN ACTUATOR ONE

The Rf-t spring return actuator ONE has been specially developed to easily monitor and automatically and remotely control Rf-t fire dampers of all sizes. The ONE is available in 24V and 230V versions. A thermal fusible link reacts when the temperature exceeds 72°C. The ONE comes standard with a start and end switch (FDCU) but can also be fitted with a double set of start and end switches contacts (FDCB). It can also be optionally equipped with plug (ST) to facilitate connection.

1. release button
2. damper blade position indicator
3. LED
4. battery compartment for rearming
5. plug connection (ST) (option)



ONE (H < 300 mm)



ONE (H ≥ 300 mm)

H < 300 mm

	ONE
P	104
Q	191
Z	47

H ≥ 300 mm

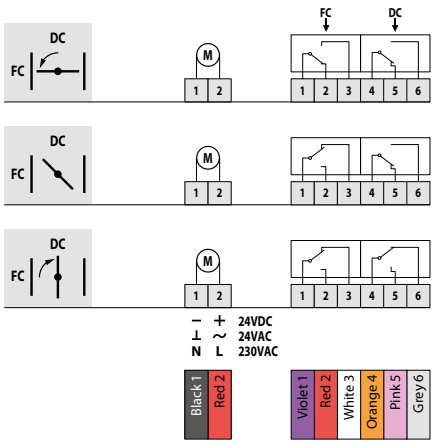
	ONE
P	104
Q	191
Z	147

Detailed features

ONE T	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
24 FDCU	24 V AC/DC (-10/+20%)	0,28W	4,2W
230 FDCU	230 V AC (-15/+15%)	0,57W	4,2W
24 FDCU ST	24 V AC/DC (-10/+20%)	0,28W	4,2W
230 FDCU ST	230 V AC (-15/+15%)	0,57W	4,2W
24 FDCB	24 V AC/DC (-10/+20%)	0,28W	4,2W
230 FDCB	230 V AC (-15/+15%)	0,57W	4,2W

ONE T	POSITION SWITCHES STANDARD	MOTOR REINFORCEMENT TIME
24 FDCU	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)
230 FDCU	1mA...100mA 230V	< 75 s (wired) / < 85 s (battery)
24 FDCU ST	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)
230 FDCU ST	1mA...100mA 230V	< 75 s (wired) / < 85 s (battery)
24 FDCB	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)
230 FDCB	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)

Electrical connection diagram

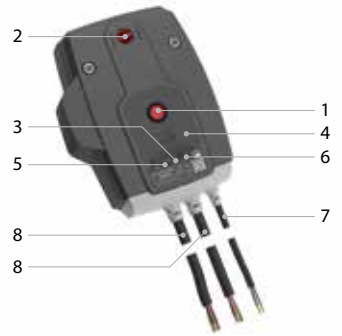


DC : Switch open position fire damper
FC : Switch closed position fire damper

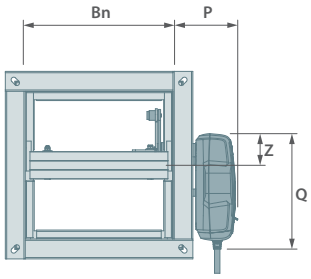
ONE T	RUNNING TIME SPRING	ENDURANCE TEST	PROTECTION CLASS	CABLE POWER SUPPLY	CABLE SWITCH
24 FDCU	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
230 FDCU	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
24 FDCU ST	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
230 FDCU ST	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
24 FDCB	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (2x) (halogen-free)
230 FDCB	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (2x) (halogen-free)

2.2.4 CU2 WITH SPRING RETURN ACTUATOR ONE-X

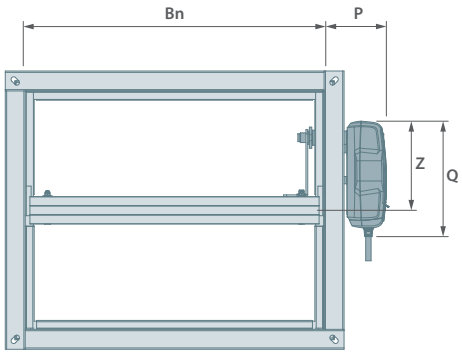
The ONE-X is a spring return actuator with an integrated communication module. The ONE-X allows automatic and remote control of the full range of Rf-t fire dampers. When the spring return actuator is energised, it brings the damper blade into its waiting position. If the voltage is interrupted or the temperature in the ventilation duct exceeds 72°C, the internally tensioned spring brings the damper into safety position. Manual rearming of the spring return actuator is done using a standard 9V battery. Thanks to the integrated communication module, using a ZENiX controller, you can read the status of the fire damper and control it remotely. Via bus communication, it is possible to read the status of the fire damper even when the power supply on the fire damper is not yet connected. 3 LEDs on the ONE-X display the status of the damper, of the bus communication and any error messages. The ONE-X exists in 2 variants: 24V and 230V.



1. release button
2. damper blade position indicator
3. LED red: status
4. battery compartment
5. LED blue: communication
6. LED orange: error message
7. power supply
8. bus cable



ONE-X (H < 300 mm)



ONE-X (H ≥ 300 mm)

H < 300 mm

	ONE-X
P	104
Q	191
Z	47

H ≥ 300 mm

	ONE-X
P	104
Q	191
Z	147

Detailed features

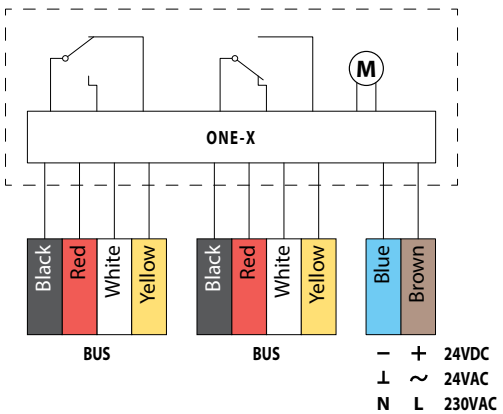
ONE-X	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
ONE-X 24	24 V AC/DC (-10/+20%)	0,28W	4,2W
ONE-X 230	230 V AC (-15/+15%)	0,57W	4,2W

ONE-X	POSITION SWITCHES STANDARD	MOTOR REINFORCEMENT TIME
ONE-X 24	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)
ONE-X 230	1mA...1A 60V	< 75 s (wired) / < 85 s (battery)

ONE-X	RUNNING TIME SPRING	ENDURANCE TEST	PROTECTION CLASS
ONE-X 24	< 30 s	10,000 cycles	IP 54
ONE-X 230	< 30 s	10,000 cycles	IP 54

ONE-X	CABLE POWER SUPPLY	CABLE BUS
ONE-X 24	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 4 x 0.75 mm² (2x) (halogen-free)
ONE-X 230	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 4 x 0.75 mm² (2x) (halogen-free)

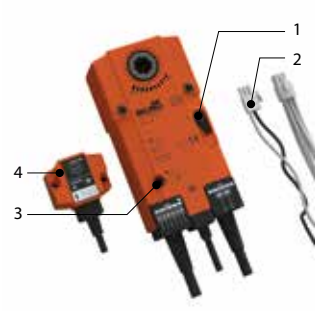
Electrical connection diagram



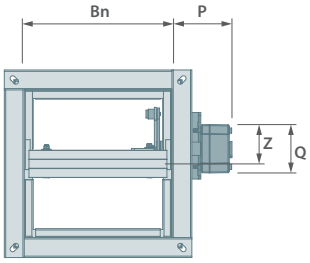
2.2.5 CU2 WITH SPRING RETURN ACTUATOR BELIMO

The spring return actuator BFL-(T)(-ST) is specially designed to remotely monitor, open and operate fire dampers and is available in 24V and 230V versions. The BFL version is intended for CU2 fire dampers whose W+H ≤ 1200 mm.
A thermoelectric fuse (T) that reacts when the temperature exceeds 72°C is included, a plug (ST) to facilitate connection.

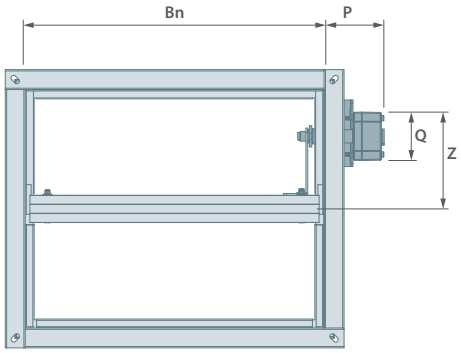
The motor is equipped with a start and end switch as standard, but can also be optional fitted with a double set of start and end switches (SN2).



1. locking button
2. plug connection (ST) (optional)
3. access for manual rearming
4. thermoelectric fuse (T)



BFL (H < 300 mm)



BFL (H ≥ 300 mm)

H < 300 mm

	BFL(T)
P	96
Q	110
Z	74

H ≥ 300 mm

	BFL(T)
P	96
Q	110
Z	180

Detailed features

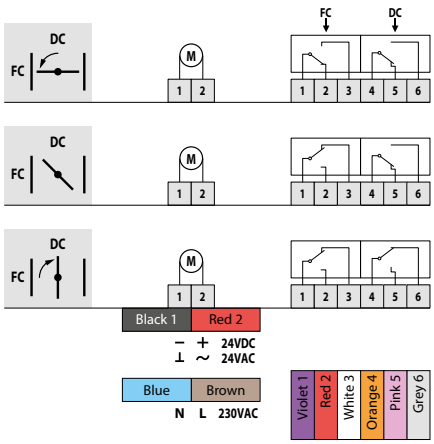
BFL(T)	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
BFL24(-ST)	24 V AC/DC	0,7W	2,5W
BFL230	230 V AC	0,9W	3W
BFLT24(-ST)	24 V AC/DC	0,8W	2,5W
BFLT230(-ST)	230 V AC	1,1W	3,5W

BFL(T)	POSITION SWITCHES STANDARD	MOTOR REINFORCEMENT TIME	RUNNING TIME SPRING
BFL24(-ST)	1mA...3A, AC 250V	< 60 s	20 s
BFL230	1mA...3A, AC 250V	< 60 s	20 s
BFLT24(-ST)	1mA...3A, AC 250V	< 60 s	20 s
BFLT230(-ST)	1mA...3A, AC 250V	< 60 s	20 s

BFL(T)	ENDURANCE TEST	PROTECTION CLASS
BFL24(-ST)	10,000 cycles	IP 54
BFL230	10,000 cycles	IP 54
BFLT24(-ST)	10,000 cycles	IP 54
BFLT230(-ST)	10,000 cycles	IP 54

BFL(T)	CABLE POWER SUPPLY	CABLE SWITCH
BFL24(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFLT24	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFLT24(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFLT230(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)

Electrical connection diagram



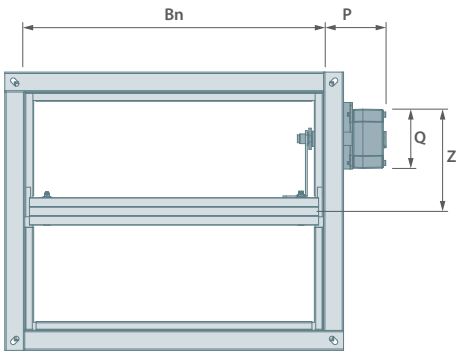
DC : Switch open position fire damper
FC : Switch closed position fire damper

CU2

The spring return actuator BFN(T)(-ST) is intended for CU2 fire dampers of which W+H > 1200 mm and is available in 24V and 230V versions. A thermoelectric fuse (T) that reacts when the temperature exceeds 72°C is included, a plug (ST) to facilitate connection.

The motor is equipped with a start and end switch as standard, but can also be fitted with a double set of start and end switches (SN2).

1. locking button
2. plug connection (ST) (optional)
3. access for manual rearming
4. thermoelectric fuse (T)



BFN (H ≥ 300 mm)

	BFN(T)
P	100
Q	110
Z	180

Detailed features

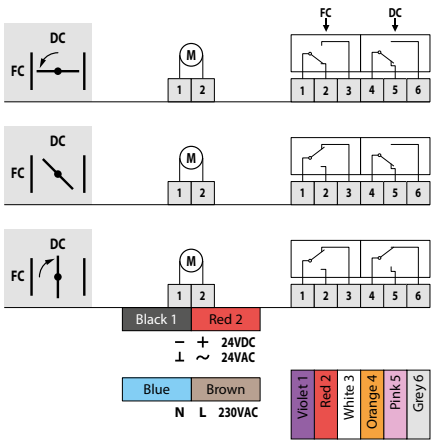
BFN(T)	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
BFN24(-ST)	24 V AC/DC	1,4W	4W
BFN230	230 V AC	2W	4,5W
BFNT24(-ST)	24 V AC/DC	1,4W	4W
BFNT230(-ST)	230 V AC	2,1W	5W

BFN(T)	POSITION SWITCHES STANDARD	MOTOR REINFORCEMENT TIME	RUNNING TIME SPRING
BFN24(-ST)	1mA...3A, AC 250V	< 60 s	20 s
BFN230	1mA...3A, AC 250V	< 60 s	20 s
BFNT24(-ST)	1mA...3A, AC 250V	< 60 s	20 s
BFNT230(-ST)	1mA...3A, AC 250V	< 60 s	20 s

BFN(T)	ENDURANCE TEST	PROTECTION CLASS
BFN24(-ST)	10,000 cycles	IP 54
BFN230	10,000 cycles	IP 54
BFNT24(-ST)	10,000 cycles	IP 54
BFNT230(-ST)	10,000 cycles	IP 54

BFN(T)	CABLE POWER SUPPLY	CABLE SWITCH
BFN24(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFN230	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFNT24(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
BFNT230(-ST)	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)

Electrical connection diagram



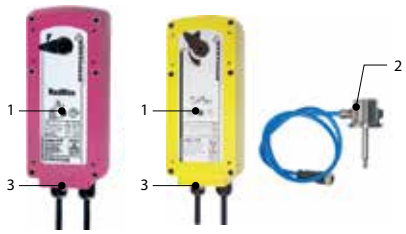
DC : Switch open position fire damper
FC : Switch closed position fire damper

More info at https://www.rft.eu/assets//PIM/DOCUMENTS/BROCHURE%20KITS/BRO_KIT_BFL(T)_NL-FR-EN.pdf

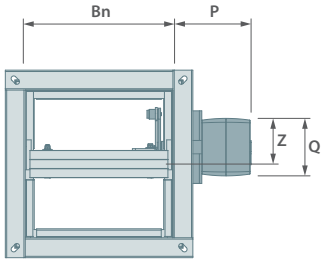
2.2.6 CU2 WITH ATEX EXPLOSION-PROOF SPRING RETURN ACTUATOR

The fire damper CU2 with option Atex is an explosion-proof fire damper for use in Ex area zone 1,2 (gas) and zone 21,22 (dust). The option is available for all sizes of the CU2.
For explosion risk, a distinction is made between different risk zones:
- Zone 1/21: moderate explosion risk > 100 h/year explosive environment (type EMEX(T))
- Zone 2/22: low explosion risk < 10 h/year explosive environment (type RMEX(T) or EMEX(T))

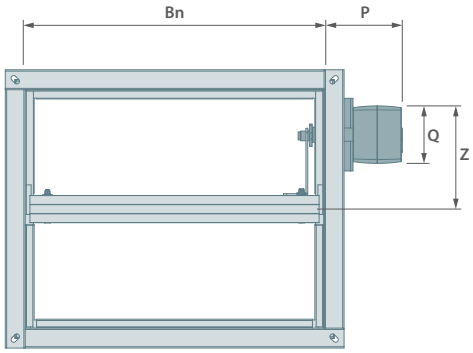
☑ ATEX certificate TÜV 14 ATEX 7540 X



1. access for manual rearming
2. thermoelectric fuse (T)
3. switch S (runtime selection)



ATEX (H < 300 mm)



ATEX (H ≥ 300 mm)

H < 300 mm

	E/RMEX(T)
P	118
Q	95
Z	72,5

H ≥ 300 mm

	E/RMEX(T)
P	118
Q	95
Z	167,5

Detailed features

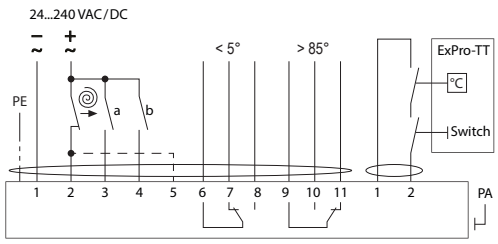
ATEX	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
RMEX	24…230 V AC / DC	5W	20W
RMEXT	24…230 V AC / DC	5W	20W
EMEX	24…230 V AC / DC	5W	20W
EMEXT	24…230 V AC / DC	5W	20W

ATEX	POSITION SWITCHES STANDARD	MOTOR REINFORCEMENT TIME	RUNNING TIME SPRING
RMEX	max AC = 250V/5A, DC = 48V/1A	3/15/30/60/120s	3/10 s
RMEXT	max. AC = 250V/5A, DC = 48V/1A	3/15/30/60/120s	3/10 s
EMEX	max. AC = 250V/5A, DC = 48V/1A	3/15/30/60/120s	3/10 s
EMEXT	max. AC = 250V/5A, DC = 48V/1A	3/15/30/60/120s	3/10 s

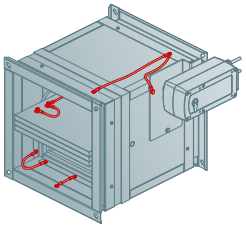
ATEX	ENDURANCE TEST	PROTECTION CLASS
RMEX	10,000 cycles	IP 66
RMEXT	10,000 cycles	IP 66
EMEX	10,000 cycles	IP 66
EMEXT	10,000 cycles	IP 66

ATEX	AMBIENT TEMPERATURE	ZONES CLASSIFICATION
RMEX(T)	-10°C ≤ Ta ≤ 40°C	II3G IIC T6 - II3D T80°C
	-10°C ≤ Ta ≤ 50°C	II3G IIC T5 - II3D T95°C
EMEX(T)	-10°C ≤ Ta ≤ 40°C	II2G IIC T6 - II2D T80°C
	-10°C ≤ Ta ≤ 50°C	II2G IIC T5 - II2D T95°C

Electrical connection diagram



This version is always provided with an equipotential connection.



2.3 MONITORING AND CONTROL OF FIRE DAMPERS

Fire dampers with spring return actuators need to be monitored and controlled remotely. A bus network-based control and monitoring system can be used for this purpose. Such a system allows continuous and individual monitoring of all fire dampers (including non-motorised ones). It can automate function tests and provide the necessary reporting. In case of fire, the control system will automatically and immediately execute the programmed scenarios (close the necessary fire dampers so that other compartments remain protected from fire and smoke).

Rf-Technologies has developed its own control and monitoring system to ensure optimal cooperation with our products.

The ZENiX system is a full-fledged system for controlling fire dampers, smoke control dampers and shutters, inputs and outputs. It permanently monitors the status of all components in the bus network and adjusts where necessary.

Flexibility characterises the ZENiX system: fire dampers can not only be controlled by a pre-programmed scenario. It is also possible to handle a matrix of scenarios defining different fire zones. The Zenix system can be interfaced with all common fire and building management systems or operate standalone.

The ONE-X is a unique part of the ZENiX system: a fire damper actuator with an integrated ZENiX field device. It comes pre-assembled on the fire damper, requires no addressing or configuration and is immediately ready to be connected. The ONE-X saves installation time, reduces wiring errors and saves installation space.

2.4 WEIGHTS

2.4.1 CU2

Weight of damper without mechanisms (kg)

Wn [mm] / Hn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800	850
200	9,0	10,1	11,1	12,2	13,2	14,3	15,3	16,4	17,5	18,5	19,6	20,6	21,7	22,7
250	10,0	11,1	12,2	13,4	14,5	15,6	16,7	17,9	19,0	20,1	21,2	22,4	23,5	24,6
300	11,0	12,2	13,4	14,6	15,8	16,9	18,1	19,3	20,5	21,7	22,9	24,1	25,3	26,5
350	12,0	13,3	14,5	15,8	17,0	18,3	19,5	20,8	22,0	23,3	24,5	25,8	27,1	28,3
400	13,0	14,3	15,7	17,0	18,3	19,6	20,9	22,2	23,6	24,9	26,2	27,5	28,8	28,6
450	14,0	15,4	16,8	18,2	19,6	20,9	22,3	23,7	25,1	26,5	27,9	29,2	29,0	30,4
500	15,0	16,5	17,9	19,4	20,8	22,3	23,7	25,2	26,6	28,1	29,5	29,4	30,8	32,3
550	16,0	17,5	19,1	20,6	22,1	23,6	25,1	26,6	28,1	29,7	29,6	31,1	32,6	34,1
600	17,0	18,6	20,2	21,8	23,4	24,9	26,5	28,1	29,7	29,7	31,2	32,8	34,4	36,0
650	18,0	19,7	21,3	23,0	24,6	26,3	27,9	29,6	29,6	31,2	32,9	34,5	36,2	37,8
700	19,0	20,8	22,5	24,2	25,9	27,6	29,3	29,4	31,1	32,8	34,5	36,3	38,0	39,7
750	20,1	21,8	23,6	25,4	27,2	28,9	29,1	30,9	32,7	34,4	36,2	38,0	39,8	41,5
800	21,1	22,9	24,7	26,6	28,4	28,7	30,5	32,3	34,2	36,0	37,9	39,7	41,5	43,4
850	22,1	24,0	25,9	27,8	28,1	30,0	31,9	33,8	35,7	37,6	39,5	41,4	43,3	45,2
900	23,1	25,0	27,0	27,4	29,4	31,3	33,3	35,3	37,2	39,2	41,2	43,1	45,1	47,1
950	24,1	26,1	26,5	28,6	30,6	32,7	34,7	36,7	38,8	40,8	42,8	44,9	46,9	48,9
1000	25,1	25,6	27,7	29,8	31,9	34,0	36,1	38,2	40,3	42,4	44,5	46,6	48,7	50,8

Wn [mm] / Hn [mm]	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	23,8	24,9	25,9	25,4	26,4	27,5	28,5	29,6	30,7	31,7	32,8	33,8	34,9
250	25,7	26,8	26,4	27,5	28,6	29,7	30,9	32,0	33,1	34,2	35,3	36,5	37,6
300	27,6	27,2	28,4	29,6	30,8	32,0	33,2	34,4	35,5	36,7	37,9	39,1	40,3
350	28,0	29,2	30,5	31,7	33,0	34,2	35,5	36,7	38,0	39,2	40,5	41,7	43,0
400	29,9	31,2	32,5	33,8	35,1	36,5	37,8	39,1	40,4	41,7	43,1	44,4	45,7
450	31,8	33,2	34,6	35,9	37,3	38,7	40,1	41,5	42,9	44,2	45,6	47,0	48,4
500	33,7	35,2	36,6	38,1	39,5	41,0	42,4	43,9	45,3	46,8	48,2	49,6	51,1
550	35,6	37,1	38,7	40,2	41,7	43,2	44,7	46,2	47,7	49,3	50,8	52,3	53,8
600	37,5	39,1	40,7	42,3	43,9	45,4	47,0	48,6	50,2	51,8	53,3	54,9	56,5
650	39,5	41,1	42,8	44,4	46,0	47,7	49,3	51,0	52,6	54,3	55,9	57,6	59,2
700	41,4	43,1	44,8	46,5	48,2	49,9	51,6	53,4	55,1	56,8	58,5	60,2	61,9
750	43,3	45,1	46,9	48,6	50,4	52,2	54,0	55,7	57,5	59,3	61,1	62,8	64,6
800	45,2	47,1	48,9	50,7	52,6	54,4	56,3	58,1	59,9	61,8	63,6	65,5	67,3
850	47,1	49,0	51,0	52,9	54,8	56,7	58,6	60,5	62,4	64,3	66,2	68,1	70,0
900	49,1	51,0	53,0	55,0	56,9	58,9	60,9	62,9	64,8	66,8	68,8	70,7	72,7
950	51,0	53,0	55,1	57,1	59,1	61,2	63,2	65,2	67,3	69,3	71,3	73,4	75,4
1000	52,9	55,0	57,1	59,2	61,3	63,4	65,5	67,6	69,7	71,8	73,9	76,0	78,1

Weight of mechanisms (incl. mounting plate) (kg)

CFTH	ONE(X)	BFL(T)	BFN(T)	ATEX
1,8	2,6	2	2,3	5,9

2.4.2 CU2-L500

Weight of damper without mechanisms (kg)

Wn [mm] / Hn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800	850
200	9,8	11,0	12,1	13,3	14,4	15,6	16,8	17,9	19,1	20,2	21,4	22,5	23,7	24,8
250	10,9	12,2	13,4	14,6	15,8	17,1	18,3	19,5	20,7	22,0	23,2	24,4	25,6	26,9
300	12,0	13,3	14,6	15,9	17,2	18,5	19,8	21,1	22,4	23,7	25,0	26,3	27,6	28,9
350	13,1	14,5	15,9	17,2	18,6	20,0	21,3	22,7	24,1	25,4	26,8	28,2	29,6	30,9
400	14,2	15,7	17,1	18,5	20,0	21,4	22,9	24,3	25,7	27,2	28,6	30,1	31,5	31,2
450	15,3	16,8	18,3	19,9	21,4	22,9	24,4	25,9	27,4	28,9	30,4	31,9	31,7	33,2
500	16,4	18,0	19,6	21,2	22,8	24,3	25,9	27,5	29,1	30,7	32,2	32,1	33,7	35,2
550	17,5	19,2	20,8	22,5	24,1	25,8	27,4	29,1	30,7	32,4	32,3	34,0	35,6	37,3
600	18,6	20,3	22,1	23,8	25,5	27,2	29,0	30,7	32,4	32,4	34,1	35,8	37,6	39,3
650	19,7	21,5	23,3	25,1	26,9	28,7	30,5	32,3	32,3	34,1	35,9	37,7	39,5	41,3
700	20,8	22,7	24,5	26,4	28,3	30,1	32,0	32,1	34,0	35,9	37,7	39,6	41,5	43,3
750	21,9	23,8	25,8	27,7	29,7	31,6	31,8	33,7	35,7	37,6	39,6	41,5	43,4	45,4
800	23,0	25,0	27,0	29,0	31,1	31,3	33,3	35,3	37,3	39,4	41,4	43,4	45,4	47,4
850	24,1	26,2	28,3	30,4	30,7	32,8	34,8	36,9	39,0	41,1	43,2	45,3	47,3	49,4
900	25,2	27,4	29,5	29,9	32,1	34,2	36,4	38,5	40,7	42,8	45,0	47,1	49,3	51,5
950	26,3	28,5	29,0	31,2	33,4	35,7	37,9	40,1	42,4	44,6	46,8	49,0	51,2	53,5
1000	27,4	28,0	30,2	32,5	34,8	37,1	39,4	41,7	44,0	46,3	48,6	50,9	53,2	55,5

Wn [mm] / Hn [mm]	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	26,0	27,2	28,3	27,7	28,9	30,0	31,2	32,3	33,5	34,6	35,8	37,0	38,1
250	28,1	29,3	28,8	30,0	31,3	32,5	33,7	34,9	36,2	37,4	38,6	39,8	41,1
300	30,2	29,7	31,0	32,3	33,6	34,9	36,2	37,5	38,8	40,1	41,4	42,7	44,0
350	30,5	31,9	33,3	34,6	36,0	37,4	38,8	40,1	41,5	42,9	44,2	45,6	47,0
400	32,6	34,1	35,5	37,0	38,4	39,8	41,3	42,7	44,2	45,6	47,0	48,5	49,9
450	34,7	36,2	37,8	39,3	40,8	42,3	43,8	45,3	46,8	48,3	49,8	51,4	52,9
500	36,8	38,4	40,0	41,6	43,2	44,7	46,3	47,9	49,5	51,1	52,7	54,2	55,8
550	38,9	40,6	42,2	43,9	45,5	47,2	48,9	50,5	52,2	53,8	55,5	57,1	58,8
600	41,0	42,7	44,5	46,2	47,9	49,6	51,4	53,1	54,8	56,6	58,3	60,0	61,7
650	43,1	44,9	46,7	48,5	50,3	52,1	53,9	55,7	57,5	59,3	61,1	62,9	64,7
700	45,2	47,1	48,9	50,8	52,7	54,6	56,4	58,3	60,2	62,0	63,9	65,8	67,6
750	47,3	49,3	51,2	53,1	55,1	57,0	58,9	60,9	62,8	64,8	66,7	68,6	70,6
800	49,4	51,4	53,4	55,4	57,4	59,5	61,5	63,5	65,5	67,5	69,5	71,5	73,5
850	51,5	53,6	55,7	57,7	59,8	61,9	64,0	66,1	68,2	70,2	72,3	74,4	76,5
900	53,6	55,8	57,9	60,1	62,2	64,4	66,5	68,7	70,8	73,0	75,1	77,3	79,4
950	55,7	57,9	60,1	62,4	64,6	66,8	69,0	71,3	73,5	75,7	77,9	80,2	82,4
1000	57,8	60,1	62,4	64,7	67,0	69,3	71,6	73,9	76,2	78,5	80,8	83,0	85,3

Weight of mechanisms (incl. mounting plate) (kg)

CFTH	ONE(X)	BFL(T)	BFN(T)	ATEX
1,8	2,6	2	2,3	5,9

2.4.3 CU2L

Weight of damper without mechanisms (kg)

Hn [mm] \ Wn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800	850
200	9,0	10,1	11,1	12,2	13,2	14,3	15,3	16,4	17,5	18,5	19,6	20,6	21,7	22,7
250	10,0	11,1	12,2	13,4	14,5	15,6	16,7	17,9	19,0	20,1	21,2	22,4	23,5	24,6
300	11,0	12,2	13,4	14,6	15,8	16,9	18,1	19,3	20,5	21,7	22,9	24,1	25,3	26,5
350	12,2	13,5	14,8	16,0	17,3	18,6	19,8	21,1	22,4	23,6	24,9	26,2	27,4	28,7
400	13,9	15,3	16,7	18,0	19,4	20,8	22,1	23,5	24,8	26,2	27,6	28,9	30,3	30,1
450	15,7	17,2	18,7	20,1	21,6	23,1	24,5	26,0	27,4	28,9	30,4	31,8	31,7	33,2
500	17,7	19,2	20,8	22,4	23,9	25,5	27,1	28,6	30,2	31,7	33,3	33,2	34,8	36,4
550	19,8	21,4	23,1	24,7	26,4	28,1	29,7	31,4	33,0	34,7	34,7	36,4	38,1	39,7
600	22,0	23,7	25,5	27,2	29,0	30,7	32,5	34,3	36,0	36,2	37,9	39,7	41,4	43,2
650	24,3	26,2	28,0	29,9	31,7	33,6	35,4	37,3	37,5	39,4	41,2	43,1	44,9	46,8
700	26,8	28,7	30,7	32,6	34,6	36,5	38,5	38,8	40,8	42,7	44,7	46,6	48,6	50,5
750	29,4	31,4	33,5	35,5	37,6	39,6	40,1	42,1	44,2	46,2	48,3	50,3	52,4	54,4
800	32,1	34,2	36,4	38,5	40,7	41,2	43,4	45,5	47,7	49,8	52,0	54,1	56,3	58,4
850	35,0	37,2	39,4	41,7	42,3	44,6	46,8	49,1	51,3	53,6	55,8	58,1	60,3	62,5
900	37,9	40,3	42,6	43,4	45,7	48,1	50,4	52,7	55,1	57,4	59,8	62,1	64,5	66,8
950	41,1	43,5	44,3	46,8	49,2	51,7	54,1	56,5	59,0	61,4	63,9	66,3	68,8	71,2
1000	44,3	45,3	47,8	50,3	52,9	55,4	57,9	60,5	63,0	65,6	68,1	70,6	73,2	75,7

Hn [mm] \ Wn [mm]	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	23,8	24,9	25,9	25,4	26,4	27,5	28,5	29,6	30,7	31,7	32,8	33,8	34,9
250	25,7	26,8	26,4	27,5	28,6	29,7	30,9	32,0	33,1	34,2	35,3	36,5	37,6
300	27,6	27,2	28,4	29,6	30,8	32,0	33,2	34,4	35,5	36,7	37,9	39,1	40,3
350	28,4	29,6	30,9	32,2	33,4	34,7	36,0	37,2	38,5	39,8	41,0	42,3	43,6
400	31,4	32,8	34,2	35,5	36,9	38,2	39,6	41,0	42,3	43,7	45,1	46,4	47,8
450	34,6	36,1	37,5	39,0	40,5	41,9	43,4	44,8	46,3	47,8	49,2	50,7	52,2
500	37,9	39,5	41,1	42,6	44,2	45,7	47,3	48,8	50,4	52,0	53,5	55,1	56,6
550	41,4	43,0	44,7	46,3	48,0	49,7	51,3	53,0	54,6	56,3	58,0	59,6	61,3
600	44,9	46,7	48,5	50,2	52,0	53,7	55,5	57,2	59,0	60,7	62,5	64,3	66,0
650	48,7	50,5	52,4	54,2	56,1	57,9	59,8	61,6	63,5	65,3	67,2	69,0	70,9
700	52,5	54,4	56,4	58,3	60,3	62,2	64,2	66,2	68,1	70,1	72,0	74,0	75,9
750	56,5	58,5	60,6	62,6	64,7	66,7	68,8	70,8	72,9	74,9	76,9	79,0	81,0
800	60,6	62,7	64,9	67,0	69,1	71,3	73,4	75,6	77,7	79,9	82,0	84,2	86,3
850	64,8	67,0	69,3	71,5	73,8	76,0	78,3	80,5	82,7	85,0	87,2	89,5	91,7
900	69,1	71,5	73,8	76,2	78,5	80,9	83,2	85,5	87,9	90,2	92,6	94,9	97,3
950	73,6	76,1	78,5	81,0	83,4	85,8	88,3	90,7	93,2	95,6	98,0	100,5	102,9
1000	78,3	80,8	83,3	85,9	88,4	90,9	93,5	96,0	98,6	101,1	103,6	106,2	108,7

Weight of mechanisms (incl. mounting plate) (kg)

CFTH	ONE(X)	BFL(T)	BFN(T)	ATEX
1,8	2,6	2	2,3	5,9

2.5 NET PASSAGE

Below is an overview of the net passage for the different sizes of our fire damper.
Discover the full aeraulic data via our BIM library (https://bim.rft.eu).

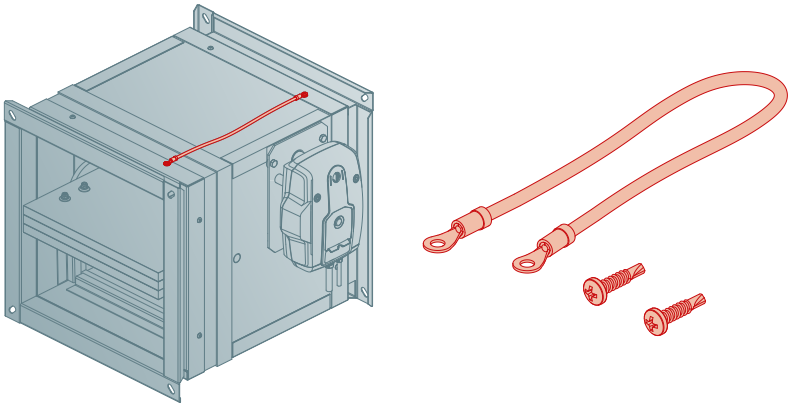
Hn [mm] \ Wn [mm]		200	250	300	350	400	450	500	550	600	650	700	750	800	850
200	Sn (m^2)	0,020	0,025	0,031	0,037	0,043	0,049	0,055	0,061	0,067	0,073	0,079	0,085	0,091	0,097
250	Sn (m^2)	0,028	0,036	0,045	0,053	0,062	0,070	0,078	0,087	0,095	0,104	0,112	0,121	0,129	0,138
300	Sn (m^2)	0,036	0,047	0,058	0,069	0,080	0,091	0,102	0,113	0,124	0,134	0,145	0,156	0,167	0,178
350	Sn (m^2)	0,044	0,058	0,071	0,084	0,098	0,111	0,125	0,138	0,152	0,165	0,179	0,192	0,206	0,219
400	Sn (m^2)	0,052	0,068	0,084	0,100	0,116	0,132	0,148	0,164	0,180	0,196	0,212	0,228	0,244	0,260
450	Sn (m^2)	0,061	0,079	0,097	0,116	0,134	0,153	0,171	0,190	0,208	0,227	0,245	0,263	0,282	0,300
500	Sn (m^2)	0,069	0,090	0,111	0,132	0,153	0,173	0,194	0,215	0,236	0,257	0,278	0,299	0,320	0,341
550	Sn (m^2)	0,077	0,100	0,124	0,147	0,171	0,194	0,218	0,241	0,265	0,288	0,311	0,335	0,358	0,382
600	Sn (m^2)	0,085	0,111	0,137	0,163	0,189	0,215	0,241	0,267	0,293	0,319	0,345	0,371	0,397	0,422
650	Sn (m^2)	0,093	0,122	0,150	0,179	0,207	0,236	0,264	0,292	0,321	0,349	0,378	0,406	0,435	0,463
700	Sn (m^2)	0,102	0,132	0,163	0,194	0,225	0,256	0,287	0,318	0,349	0,380	0,411	0,442	0,473	0,504
750	Sn (m^2)	0,110	0,143	0,177	0,210	0,244	0,277	0,310	0,344	0,377	0,411	0,444	0,478	0,511	0,545
800	Sn (m^2)	0,118	0,154	0,190	0,226	0,262	0,298	0,334	0,370	0,406	0,441	0,477	0,513	0,549	0,585
850	Sn (m^2)	0,126	0,165	0,203	0,241	0,280	0,318	0,357	0,395	0,434	0,472	0,511	0,549	0,588	0,626
900	Sn (m^2)	0,134	0,175	0,216	0,257	0,298	0,339	0,380	0,421	0,462	0,503	0,544	0,585	0,626	0,667
950	Sn (m^2)	0,143	0,186	0,229	0,273	0,316	0,360	0,403	0,447	0,490	0,534	0,577	0,620	0,664	0,707
1000	Sn (m^2)	0,151	0,197	0,243	0,289	0,335	0,380	0,426	0,472	0,518	0,564	0,610	0,656	0,702	0,748

Hn [mm] \ Wn [mm]		900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	Sn (m^2)	0,103	0,109	0,115	0,121	0,127	0,133	0,139	0,144	0,150	0,156	0,162	0,168	0,174
250	Sn (m^2)	0,146	0,154	0,163	0,171	0,180	0,188	0,197	0,205	0,214	0,222	0,231	0,239	0,247
300	Sn (m^2)	0,189	0,200	0,211	0,222	0,233	0,244	0,255	0,266	0,277	0,288	0,299	0,310	0,321
350	Sn (m^2)	0,232	0,246	0,259	0,273	0,286	0,300	0,313	0,327	0,340	0,353	0,367	0,380	0,394
400	Sn (m^2)	0,276	0,292	0,308	0,323	0,339	0,355	0,371	0,387	0,403	0,419	0,435	0,451	0,467
450	Sn (m^2)	0,319	0,337	0,356	0,374	0,393	0,411	0,430	0,448	0,466	0,485	0,503	0,522	0,540
500	Sn (m^2)	0,362	0,383	0,404	0,425	0,446	0,467	0,488	0,509	0,530	0,551	0,572	0,592	0,613
550	Sn (m^2)	0,405	0,429	0,452	0,476	0,499	0,522	0,546	0,569	0,593	0,616	0,640	0,663	0,687
600	Sn (m^2)	0,448	0,474	0,500	0,526	0,552	0,578	0,604	0,630	0,656	0,682	0,708	0,734	0,760
650	Sn (m^2)	0,492	0,520	0,549	0,577	0,605	0,634	0,662	0,691	0,719	0,748	0,776	0,805	0,833
700	Sn (m^2)	0,535	0,566	0,597	0,628	0,659	0,690	0,721	0,751	0,782	0,813	0,844	0,875	0,906
750	Sn (m^2)	0,578	0,611	0,645	0,678	0,712	0,745	0,779	0,812	0,846	0,879	0,913	0,946	0,979
800	Sn (m^2)	0,621	0,657	0,693	0,729	0,765	0,801	0,837	0,873	0,909	0,945	0,981	1,017	1,053
850	Sn (m^2)	0,664	0,703	0,741	0,780	0,818	0,857	0,895	0,934	0,972	1,010	1,049	1,087	1,126
900	Sn (m^2)	0,708	0,749	0,790	0,830	0,871	0,912	0,953	0,994	1,035	1,076	1,117	1,158	1,199
950	Sn (m^2)	0,751	0,794	0,838	0,881	0,925	0,968	1,012	1,055	1,098	1,142	1,185	1,229	1,272
1000	Sn (m^2)	0,794	0,840	0,886	0,932	0,978	1,024	1,070	1,116	1,162	1,208	1,254	1,299	1,345

2.6 OPTIONS

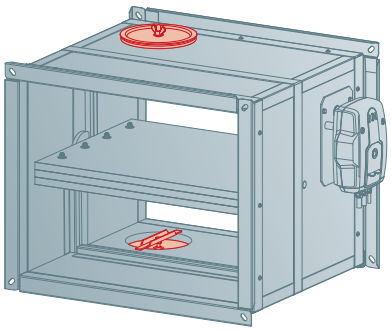
2.6.1 EQUIPOTENTIAL BONDING (EQ)

An equipotential bond (EQ) is an electrical cable intended to bring the conductive components of the installation, interrupted by the fire damper, to the same potential, thus restoring earthing.



2.6.2 INSPECTION HATCH (SET OF 2) (UL)

An inspection door can be used to visually check the position and condition (e.g. fouling) of the damper. The inspection hatch is always mounted in pairs, one at the bottom and one at the top of the fire damper.



2.6.3 EPOXY

The fire damper can be fitted with an epoxy coating along the inside of the damper for higher resistance to corrosive influences and/or very high humidity. In swimming pool environments, this is recommended due to the presence of chlorinated air. Information on specific resistance in different environments is available on request.

Rf-t fire dampers have been successfully fire tested after undergoing a salt spray test. The salt spray test is a method of testing the corrosion resistance of a material or product via artificial/accelerated ageing.

2.6.4 EN 1751 - CLASS ATC 3 (FORMERLY C)

CU2 fire dampers are class ATC 4 (formerly W) as standard. CU2 dampers with dimensions W > 800 or H > 600 are available with air-tightness class ATC 3 (formerly C) according to EN 1751. This corresponds to classes C/D for ventilation ducts. Pay due attention to an airtight connection between duct and fire damper.

2.6.5 HYGIENE CERTIFICATE

Hygiene-Konformitätsprüfung CU2 W-336769-20-Zd

This fire damper complies with the requirements according to VDI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 16798-3, Ö-standard H 6020 and H 6021 and SWKI. During the assessment, it was verified that the fire damper components were resistant to mould and bacteria (according to EN ISO 846). It was found that the components of the fire damper do not favour the growth of micro-organisms (moulds, bacteria), thus reducing the risk of infection for humans.

The fire damper was exposed to various disinfectants during the assessment with good results. The fire damper is suitable for use in hospitals and similar environments. Standard disinfectants and methods may be used for decontaminating the fire damper (in accordance with the list drawn up by the Robert Koch Institute).

Option only available for CU2 dampers with dimensions W > 800 or H > 600. For the Hygiene option for smaller sizes, please refer to our CU-LT fire damper.

2.7 VARIA

2.7.1 FLEXIBLE CONNECTION

Flexible connections may be applied. For example based on local or regional regulations or guidelines (e.g. M-LüAR, DW145).

The ventilation duct designer and/or installer selects the way these flexible connections are realised and applied. Both elastic connections and flexible ventilation ducts are possible to avoid possible forces on the installed fire damper. The ventilation ducts are then suspended independently of the fire damper.

Take grounding into account and provide an equipotential connection to ensure conductivity if required.

2.7.2 INSULATION

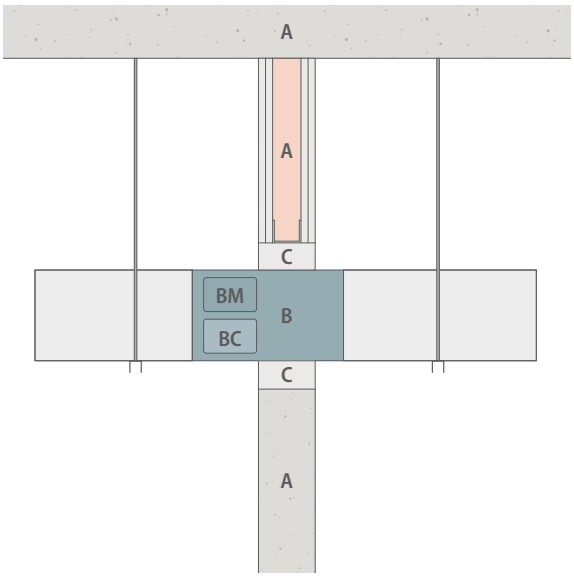
ventilation ducts can be insulated to avoid condensation, to save energy or to make them fire-resistant. The flanges of fire dampers may also be insulated according to the rules of good workmanship and to the specifications of the insulation product. The operating mechanism of the fire damper must be accessible at all times. The fire damper should be sealed as indicated in the declaration of performance (DoP) and installation instructions.

If condensation is a concern, we recommend using fire batts, which ensures continuous insulation at the level of the penetration.

3 INSTALLATION

The installation of fire dampers relies on several key principles. This third chapter deals with each of these aspects in a clear and concise manner:

- The (load-bearing) structures in which the fire dampers are installed (compartment boundaries). These are indicated by the letter 'A'. Details are covered in chapter 3.1.
- The sealing of fire dampers is represented by the letter 'C'. Details of this are discussed in chapter 3.2.
- The various installation options, depending on the desired fire resistance, are documented in detail in chapter 3.3.
- Fire dampers are connected to ventilation ducts that are suspended and/or supported. This suspension is discussed in chapter 3.4.
- More info on the connection of the fire damper to the ventilation duct is given in chapter 3.5.



A (Load-bearing) construction
B Fire damper
BM: operation
BC: communication
C Sealing

3.1 (LOAD-BEARING) CONSTRUCTIONS

3.1.1 GENERAL

Rf-t fire dampers are tested in standardised (load-bearing) structures according to EN 1366-2. The results obtained apply to similar (load-bearing) structures with a fire resistance, thickness and density equal to or greater than the tested (load-bearing) structure.

According to the test standard, it is possible in certain cases to transfer the solutions of one (load-bearing) structure to another (load-bearing) structure.

The test results obtained in a (load-bearing) structure made of aerated concrete are applicable in rigid (load-bearing) constructions made of hollow blocks provided the hollow blocks in the cavity are filled with mortar suitable for the required fire resistance before sealing the cavity around the fire damper.

For flexible structures, it is possible to extend the test results to:

- A rigid construction with a thickness and fire resistance greater than or equal to that of the tested wall. In this case, the sealing should be the same as that tested in the flexible wall.
- A flexible construction without insulation between the plasterboard sheets, even if the test was carried out with insulation. Provided, however, that the non-insulated wall has at least the same fire resistance as the tested wall including insulation.

Common extensions are listed in the table below.

		TESTED (LOAD-BEARING) CONSTRUCTION											
		SHAFTWALL		FLEXIBLE WALL			RIGID WALL			RIGID FLOOR			
Possible extension to:		Metal stud gypsum plasterboard F (EN 520)	Aerated concrete	Metal stud gypsum plasterboard A (EN 520)	Metal stud gypsum plasterboard F (EN 520)	Gypsum blocks	Aerated concrete	Concrete	Reinforced concrete	Aerated concrete	Concrete	Reinforced concrete
Shaftwall	Metal stud gypsum plasterboard F	•										
	Aerated concrete	•	•									
Flexible wall	Metal stud gypsum board A			•								
	Uninsulated stud gypsum plasterboard A			•								
	Metal stud gypsum board F			•	•							
	Uninsulated stud gypsum board F			•	•							
	Gypsum blocks					•						
Rigid wall	Aerated concrete			•	•		•					
	Concrete			•	•		•	•				
	Reinforced concrete			•	•		•	•	•			
	Masonry hollow brick			•	•		•	•	•			
	Masonry rigid brick			•	•		•	•	•			
Rigid floor	Aerated concrete									•		
	Prestressed concrete units									•		
	Concrete									•	•	
	Reinforced concrete									•	•	•

3.1.2 FLEXIBLE WALL TYPE A

Flexible walls type A are constructed with metal studs according to manufacturer's guidelines or standards in force locally.

The wall thickness is at least 98 mm, with 2 x 12.5 mm double-sided gypsum plasterboard, namely gypsum (cardboard) boards type A according to EN 520 (GKB according to DIN 18180). The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^2.

According to EN 1366-2, the insulation of the flexible wall may be omitted. Addition of additional layers or use of thicker boards and wider metalstuds is allowed.

The horizontal metal profiles consist of at least 0.6 mm thick galvanised steel and are fixed every ≤ 800 mm by Ø 6 mm steel screws and 6 mm anchors to the rigid (load-bearing) construction. The vertical metal profiles are at least 0.6 mm thick galvanised steel and are placed centre-to-centre at maximum 625 mm apart (see manufacturer's instructions). A clearance of 5 mm accommodates thermal expansion. The profiles conform to EN 14195. The profiles are fixed together with Ø 3.5 mm screws, with pop rivets or with metal stud fixing pliers.

The cladding is fixed to the metal profiles with screws Ø 3.5 mm.

The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared.

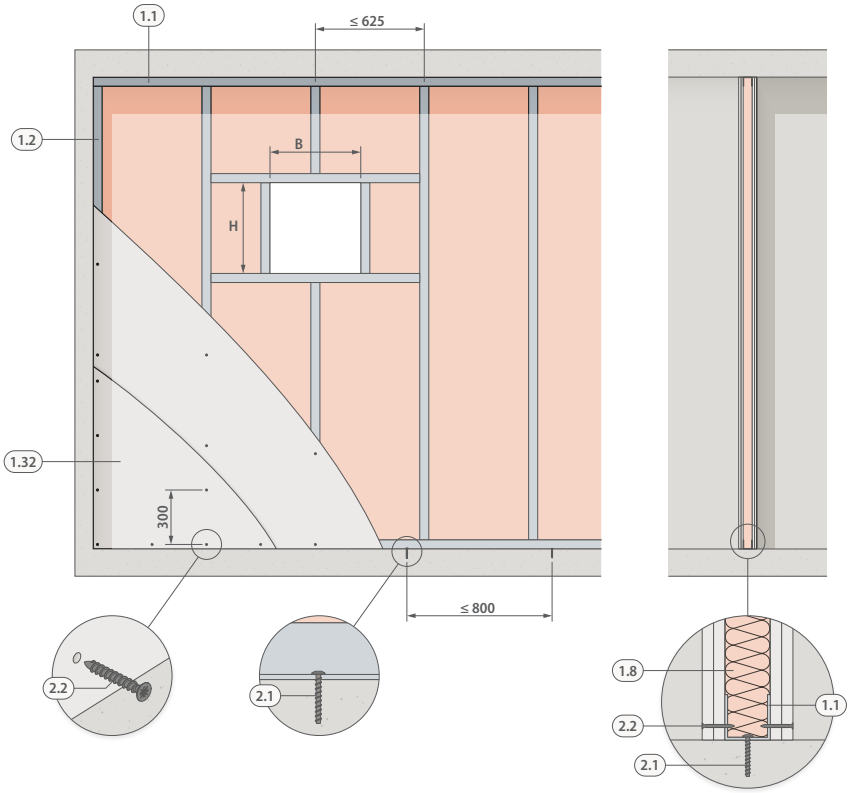
A reinforcement of metal horizontal and vertical profiles is provided around the damper, which is fixed to the metal framework of the wall construction (unless otherwise specified). These profiles are spaced ‘s’ around the fire damper, which is the gap to be provided for sealing the fire damper. If the distance between fire damper and (load-bearing) structure on the one hand or between fire damper and a second fire damper on the other hand is less than 75 and 200 mm respectively as prescribed by the standard, then it is not required to provide a profile at this location (see "3.1.9 Installation at minimal distance").

Rf-t tests fire dampers without drywall or anchors in the day edges. The addition of such components does not adversely affect the classification of the fire dampers.

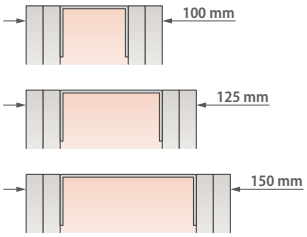
Flexible walls type A are typically used in installation methods for fire resistance of 60 minutes.

The solutions in these flexible wall constructions are also applicable to rigid walls.

CU2



1.1	horizontal profile
1.2	vertical profile
1.32	plasterboard
2.1	mounting screws Ø 6 mm
2.2	mounting screws Ø 3.5 mm
1.8	stone wool 40 kg/m^3



3.1.3 FLEXIBLE WALL TYPE F

Flexible walls type F are constructed using metal studs as specified in European standard EN 1363-1. The walls are constructed according to the manufacturer's guidelines or standards in force locally.

The wall thickness is at least 98 mm, with 2 x 12.5 mm double-sided gypsum plasterboard, namely gypsum (cardboard) boards type F according to EN 520 (GKF according to DIN 18180). The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^2.

According to EN 1366-2, the insulation of the flexible wall may be omitted. Addition of additional layers or use of thicker boards and wider metalstuds is allowed.

The horizontal metal profiles consist of at least 0.6 mm thick galvanised steel and are fixed every ≤ 800 mm by Ø 6 mm steel screws and 6 mm anchors to the rigid (load-bearing) construction. The vertical metal profiles are at least 0.6 mm thick galvanised steel and are placed centre-to-centre at maximum 625 mm apart (see manufacturer's instructions). A clearance of 5 mm accommodates thermal expansion. The profiles conform to EN 14195. The profiles are attached to each other with Ø 3.5 mm screws, with pop rivets or with metal stud fixing pliers.

The cladding is fixed to the metal profiles with screws Ø 3.5 mm.

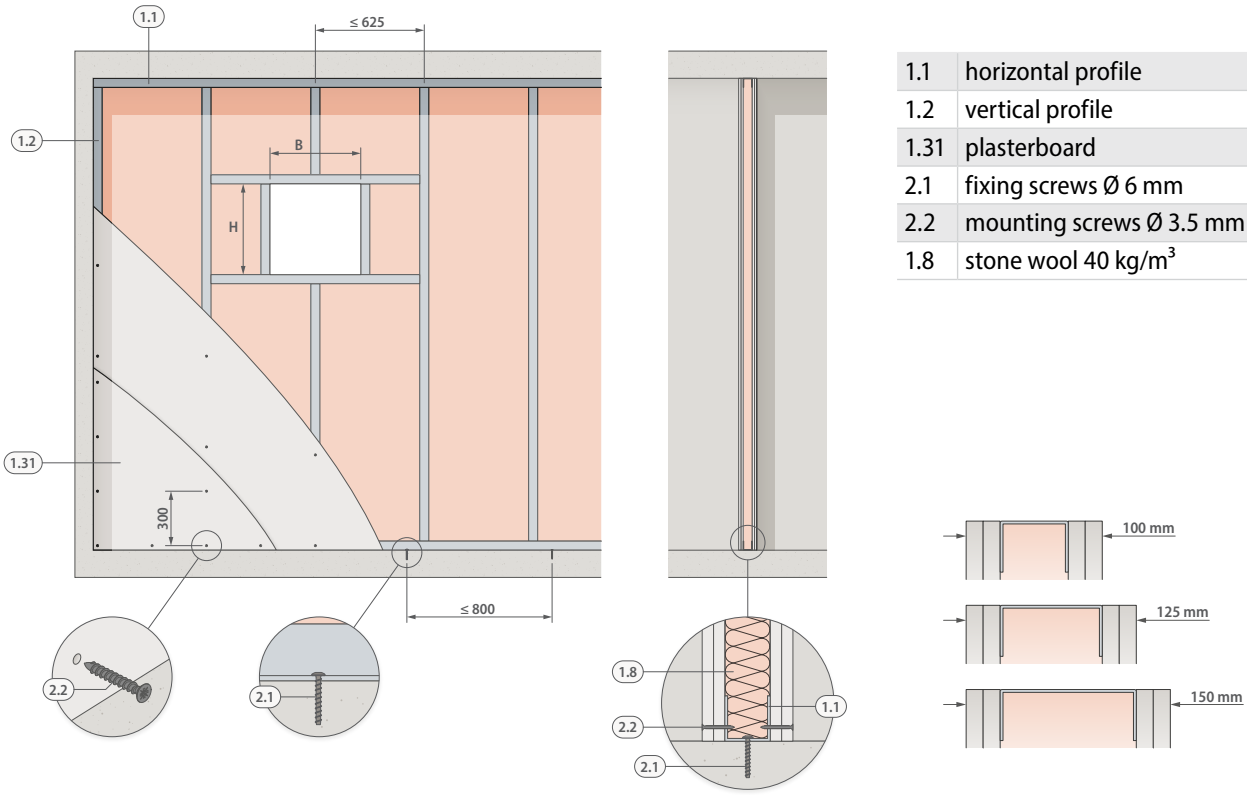
The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared.

A reinforcement of metal horizontal and vertical profiles is provided around the damper, which is fixed to the metal framework of the wall construction (unless otherwise specified). These profiles are spaced ‘s’ around the fire damper, which is the gap to be provided for sealing the fire damper. If the distance between fire damper and (load-bearing) structure on the one hand or between fire damper and a second fire damper on the other hand is less than 75 and 200 mm respectively as prescribed by the standard, then it is not required to provide a profile at this location (see "3.1.9 Installation at minimal distance"").

Rf-t tests fire dampers without drywall or anchors in the day edges. The addition of such components does not adversely affect the classification of the fire dampers.

Type F flexible walls are typically used in installation methods for fire resistance of 90 or 120 minutes.

The solutions in these flexible wall constructions are also applicable to rigid walls.



1.1	horizontal profile
1.2	vertical profile
1.31	plasterboard
2.1	fixing screws Ø 6 mm
2.2	mounting screws Ø 3.5 mm
1.8	stone wool 40 kg/m^3

3.1.4 SHAFTWALL

Pre-walls or shaftwalls are constructed with metal studs and single- or double-sided plasterboard (asymmetrical wall). The walls are constructed according to the manufacturer's guidelines or standards in force locally.

3.1.5 GYPSUM BLOCK WALL

A gypsum block wall is a non-load-bearing partition wall made of prefabricated gypsum blocks with a density ≥ 850 kg/m^3 (EN 12859). The blocks are lined up (half-brick bond) with gypsum-based block glue. The joint thickness is about 2 mm, larger gaps can be sealed with block glue according to the manufacturer's specifications.

3.1.6 RIGID WALL

Rigid walls are walls of cellular concrete, concrete or masonry with a minimal specific gravity of 650 ± 200 kg/m^3 (EN 1363-1) and can also be applied to rigid walls of hollow blocks. Any hollow spaces around the fire damper should be filled. The solutions in flexible wall constructions are also applicable to rigid walls.

3.1.7 RIGID FLOOR

Rigid floors are cellular concrete or concrete floors with a specific gravity of at least 650 ± 200 kg/m^3 (EN 1363-1). Any voids around the fire damper should be filled.

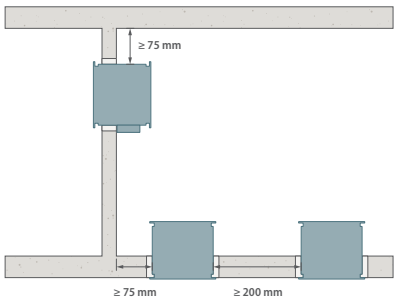
Rf-t fire dampers can be installed either with actuation mechanism below or above the floor.

3.1.8 SANDWICH PANEL SYSTEM

Paroc panels with thickness ≥ 100 mm, type: AST S, AST S+, AST F, AST F+, AST E; metal shell 0.6/0.6.
For full information regarding the construction of this type of wall, please refer to Paroc's installation details.

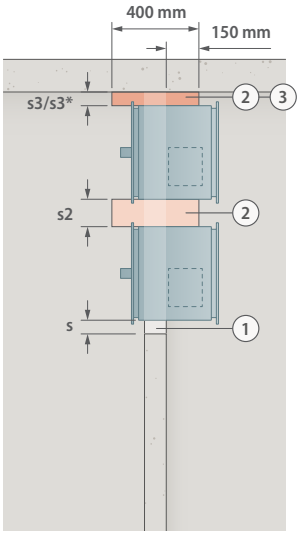
3.1.9 INSTALLATION AT MINIMAL DISTANCE

According to European test standard EN 1366-2, the minimal required distance between 2 fire dampers is 200 mm and between a fire damper and another (load-bearing) structure 75 mm. Rf-t fire dampers were successfully tested and may be installed at a shorter nominal distance than the minimal specified by the standard, both in vertical wall and floor/ceiling.



Standard installation according to EN 1366-2 ➲

The certified solution for Rf-t fire dampers consists of the following elements: on the one hand, to apply a **universal sealing** where the distance between fire damper and a second fire damper or to a structural component is smaller than the minimal specified by the standard and, on the other hand, to apply the **approved sealing methods** according to our existing classifications where the distance is equal to or greater than specified by the standard:



Universal sealing for distance smaller than specified by the standard

s3* Spacing between fire damper and horizontal (load-bearing) structure: **25 ≤ s3* ≤ 50 mm**
③ Standard stone wool ≥ 40 kg/m^3 at least 40% compressed over a depth of 400 mm of which 150 mm on the mechanism side of the wall[*]. This sealing is applied along the full width of the damper. (C.11)

s3 Spacing between fire damper and vertical or horizontal (load-bearing) structure: **50 ≤ s3 < 75 mm**
② Stone wool sheets ≥ 150 kg/m^3 over a depth of 400 mm, of which 150 mm on the mechanism side of the wall[*]. This sealing is applied along the full width/height of the damper. (C.10)

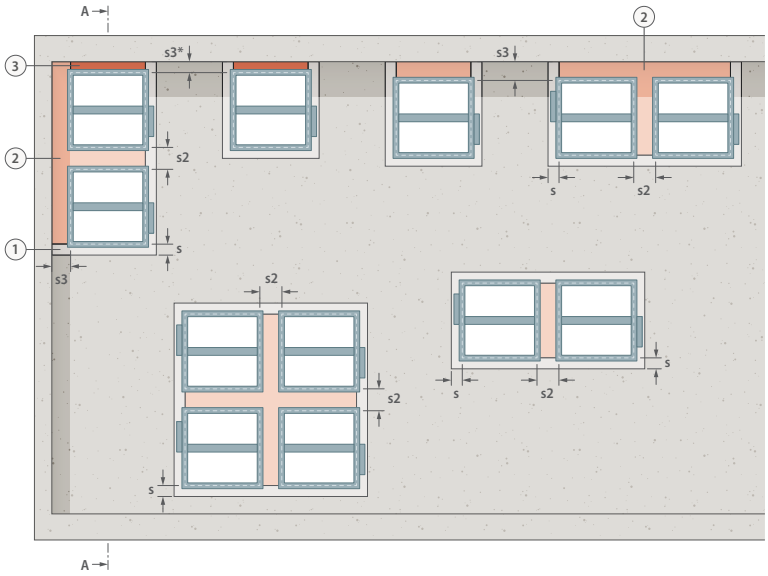
s2 Spacing between two fire dampers: **50 ≤ s2 < 200 mm**
② Stone wool sheets ≥ 150 kg/m^3 over a depth of 400 mm, including 150 mm on the mechanism side of the wall[*]. This sealing is applied along the full width/height of the damper. (C.10)

Sealing according to pre-existing solutions

s Sparing
① E.g. mortar, gypsum or fire batts (C.x)

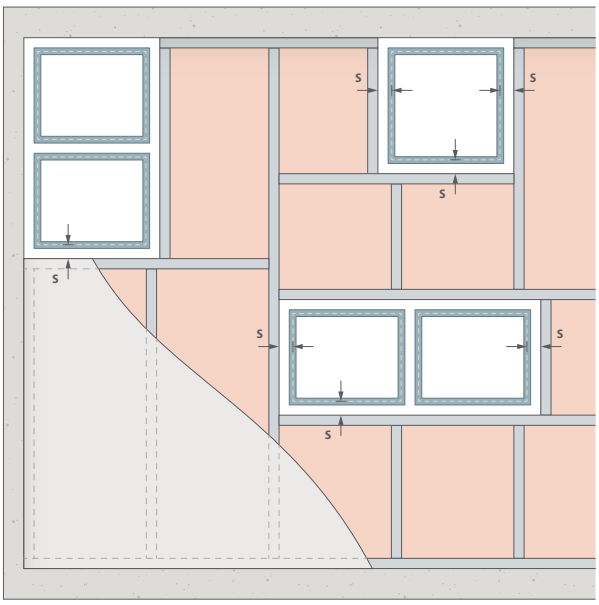
[*] For a wall thickness of > 250 mm, stone wool should be applied over a depth of > 400 mm until the entire wall thickness is filled.

CU2



- The minimal distance is calculated to the tunnel wall of the fire damper, without considering the flange.
- The axis direction of the damper blade - horizontal or vertical - is specified in the installation instructions.
- The maximum number of rectangular dampers that may be installed next to each other at a minimal distance is limited to 2 dampers, both horizontal and vertical (with a cluster of a maximum of 4 dampers).
- The operating mechanism must remain accessible for inspection and/or review at all times.

When installing Rf-t fire dampers at minimal distance in a lightweight partition wall, no metal profiles should be placed between the fire damper and the (load-bearing) structure or between the fire dampers themselves.



Information on each wall/sealing combination is further detailed in this manual.

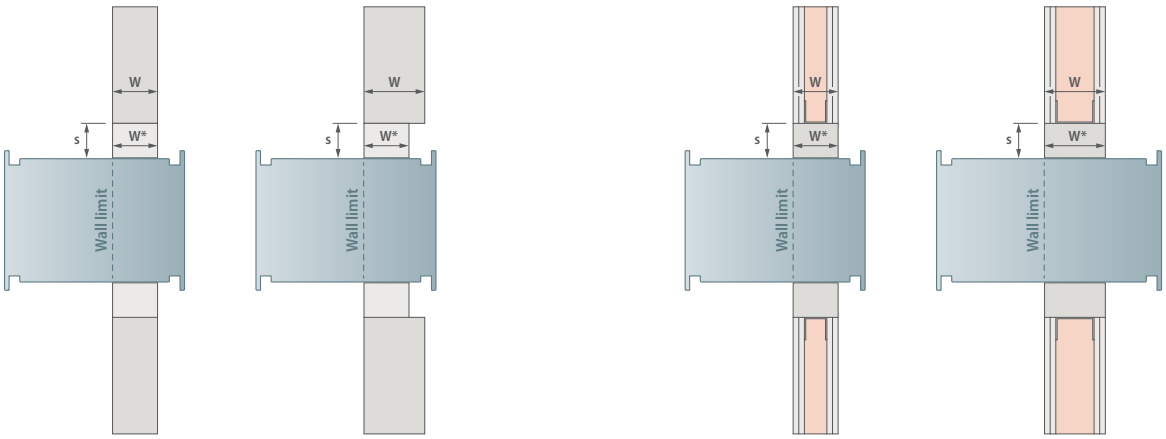
3.2 SEALING AND INSTALLATION MATERIALS

3.2.1 SEALINGS AND DIMENSIONS

The size of the sealing is determined by the minimal sealing depth/length (w*) and the sealing width (s).

For rigid walls, rigid floors and plaster block walls, the minimal wall thickness (w) and the minimal sealing depth (w*) can be different. For example, if a rigid (load-bearing) construction is at least 100 mm thick with a sealing depth of at least 100 mm, then e.g. w = 200 mm and w* ≥ 100 mm provided that the sealing is realised at the height of the damper blade (the position of the damper blade is indicated by the marking 'wall limit' or the recessed stops).

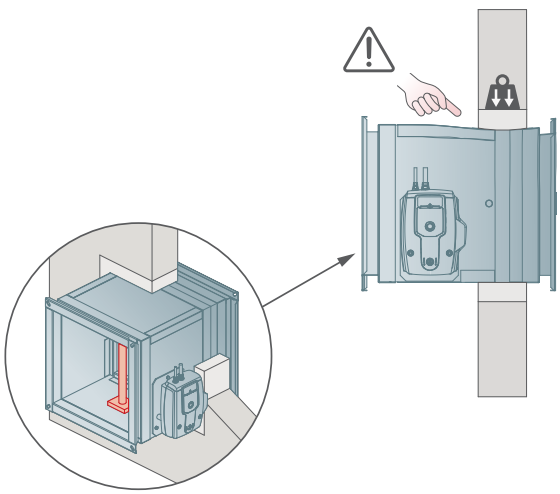
For flexible walls and sandwich panel system walls, the minimal wall thickness (w) and the minimal sealing depth (w*) are always the same.



If the opening around the fire damper is larger than stated in the technical data sheet, the following options are available: reduce the opening in the wall using the same material as the wall; apply a different sealing system; seek alternative advice from a competent local authority (possibly in consultation with Rf-t). Always take into account the stability of the wall and the proper functioning of the fire damper.

When using a wet sealing method (mortar or gypsum), deformation of the fire damper must be avoided due to excessive stress on the fire damper. If necessary, precautions should be provided at wall level. A temporary (wooden) brace can also help to prevent deformation of the fire damper during installation.

If a wet sealing method is used, Rf-t recommends protecting the fire damper (actuator and damper blade) during installation to prevent sealing material from compromising the correct operation of the damper.

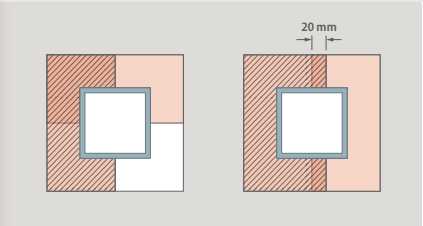


w	wall thickness	minimal thickness of the (load-bearing) structure
w*	sealing depth	minimal sealing depth in the (load-bearing) structure
s	general clearance	The width of the sealing recess 's' is determined by the tested distance during official fire tests. If the gap around the fire damper is larger than stated in the technical data sheet, the following options are available: reduce the gap in the wall using the same material as the wall; apply a different sealing system; seek alternative advice from a competent local authority (possibly in consultation with Rf-t). Always take into account the stability of the wall and the proper functioning of the fire damper.
s2	s2 min distance	minimal distance between two fire dampers
s3	s3 min distance	minimal distance between fire damper and (sub)structure
s3*	s3* min distance	minimal distance between rectangular damper and horizontal (load-bearing) structure ≤ 50 mm

3.2.2 OVERVIEW OF SEALING SYSTEMS

Below is an overview of the different systems and sealing materials that can be used when installing our fire dampers. Each system has been linked to a code starting with the letter C. In the installation details later in this document, you will always find the reference to this code with a brief description of the relevant system. Below, and also in the legend at the back of this document, you will find full details relating to the various systems and specific instructions on how to apply them.

Standard sealing

C.01	Mortar	Mortar according to EN 998-2: class M2.5 to M10 or fire-resistant mortar class M2.5 to M10. Mortar according to DIN 1053: groups II, IIa, III, IIIa or fire-resistant mortar groups II,III. Equivalent mortars, gypsum mortar or concrete
C.02	Gypsum	Gypsum mortar
C.03	Block glue	Gypsum-based block glue
C.23	Cover plates	Type A or type F plasterboard (according to EN 520) as indicated in the declaration of performance. The cover plates shall follow the contours of the fire damper and shall be provided with recesses around the operating mechanism where necessary. Spacing between fire damper and cover plate ≤ 5mm.
C.31	Fire batt slab 2 x 50 mm	Single-sided fire batt (3.6) 2 x 50 mm When sealing with fire batt slabs, the saw cuts of the slabs must not coincide: the slabs are therefore installed (min 20 mm) angled to promote strength. 

Generic sealing for installation at minimal distance

C.10	Stone wool 150 kg/m^3	Stone wool ≥ 150 kg/m^3 over a depth of 400 mm, including 150 mm on the mechanism side of the wall. For a wall thickness of > 250 mm, the stone wool slab should be applied over a depth of > 400 mm until the entire wall thickness is filled. For rectangular fire dampers, flat stone wool slabs can be used. For round fire dampers, 50 mm thick shaped pieces can be cut to fit between the dampers (s2) and/or the wall construction (s3). By combining multiple layers of 50 mm, 150 mm (3 x 50 mm) sealing can be achieved on the mechanism side and 250 mm (5 x 50 mm) in the wall and on the non-mechanism side (depending on the thickness of the wall). The stone wool has a layer thickness of 50 mm, a density of 150kg/m^3, thermal conductivity of l = 0.041 W/mK at 50 °C, water vapour absorption 0.02 %, Euro class A1.
C.11	Stone wool 40 kg/m^3	Compressed standard stone wool Euroclass A.1 with a density after compression of min. 67 kg/m^3 (e.g. Rockfit 431 with density 40 kg/m^3 and thickness 40mm compressed to 25mm) (cf. s3*), to be applied with a distance between fire damper and ceiling ≤ 50mm over a depth of 400mm, of which 150mm on the mechanism side of the wall. For wall thicknesses > 250 mm, the stone wool must be applied over a depth of > 400 mm until the entire wall thickness is filled. This sealing is applied along the full width of the damper.

3.3 INSTALLATION METHODS

This section provides an overview of our certified installation methods. A correct installation, meeting the required fire resistance, can only be achieved if the fire damper, the (load-bearing) construction and the sealing system are well matched.

In the overview table below, you can quickly find which installation methods qualify for your specific application depending on the required fire resistance (classification) and the type and thickness of the (load-bearing) construction.

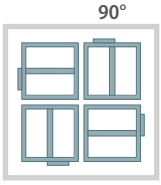
The installation drawings later in this chapter provide a clear picture of the finished installation, both for a single installation, and for installation with multiple fire dampers next to each other. For installation drawings showing the sequence of installation in different steps, please refer to our technical product sheets.

After installation, the correct operation of the fire damper (opening and closing of the damper blade) should always be checked immediately.

Overview of installation details

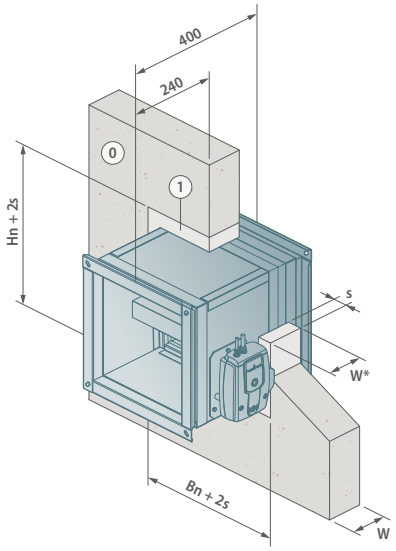
(LOAD-BEARING) CONSTRUCTION	INSTALLATION WITH	WALL THICKNESS	CLASSIFICATION	BLZ
Rigid wall	mortar	≥ 100 mm	EI60S / EI90S EI120S* / E120S	41
	gypsum	≥ 100 mm	EI60S / EI90S EI120S / E120S	42
	fire batt	≥ 100 mm	EI90S*	43
Rigid floor	mortar	≥ 125 mm	EI120S**	44
		≥ 150 mm	EI120S	
	fire batt	≥ 150 mm	EI90S*	45
Flexible wall	mortar	≥ 100 mm	EI90S	46
	gypsum	≥ 100 mm	EI60S* / EI120S	47
	fire batt	≥ 100 mm	EI60S* / EI90S	49
	stone wool + cover plates	≥ 100 mm	EI60S* / EI90S** E120S**	50
Shaftwall	stone wool + cover plates	≥ 82,5 mm	EI60S**	51
Gypsum block wall	block glue	≥ 70 mm	EI120S*	52
		≥ 100 mm	EI120S	
Sandwich panel system	fire batt	≥ 100 mm	EI90S	53

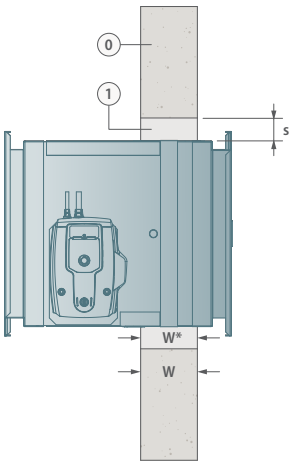
* ≤ 1200x800
** ≤ 1500x800

		I	II	III
Axis orientation	Standard installation	 0°/180°	 0°/90°/180°/270°	 0°/180°
	Minimal distance			

3.3.1 RIGID WALL - MORTAR

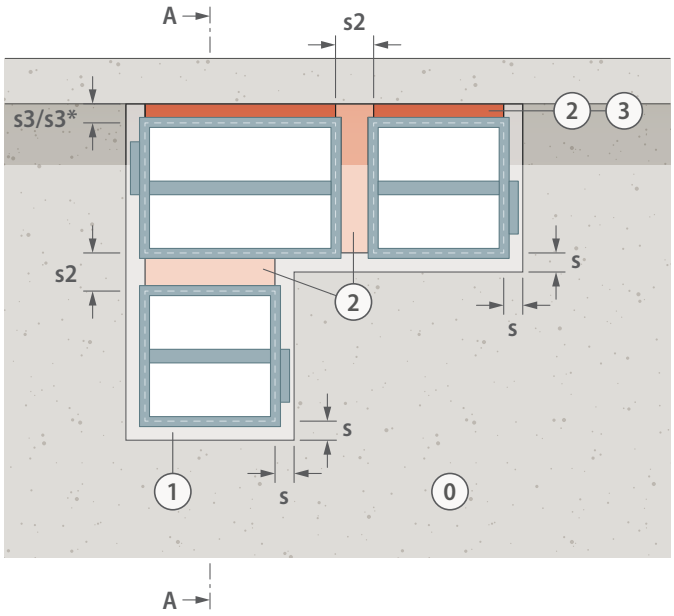
≤ 1200 x 800	w ≥ 100, w* ≥ 100	EI120 (v_e i ↔ o)S	II
> 1200 x 800; ≤ 1500 x 800	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	II
≤ 1500 x 1000	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	I
> 1200 x 800; ≤ 1500 x 1000	w ≥ 100, w* ≥ 100	EI60 (v_e i ↔ o)S	II
> 1200 x 800; ≤ 1500 x 1000	w ≥ 100, w* ≥ 100	E120 (v_e i ↔ o)S	II

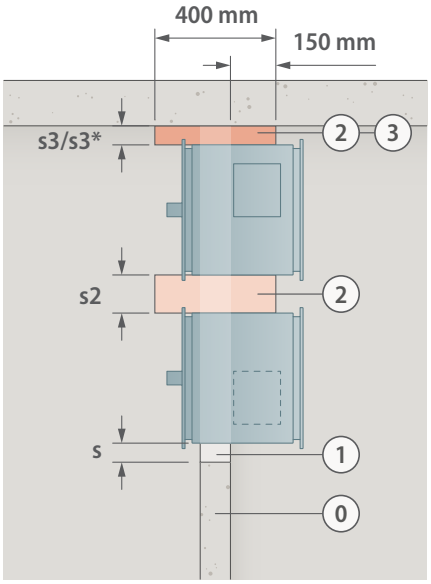




Minimal distance (see section 3.1.9 for more information) :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

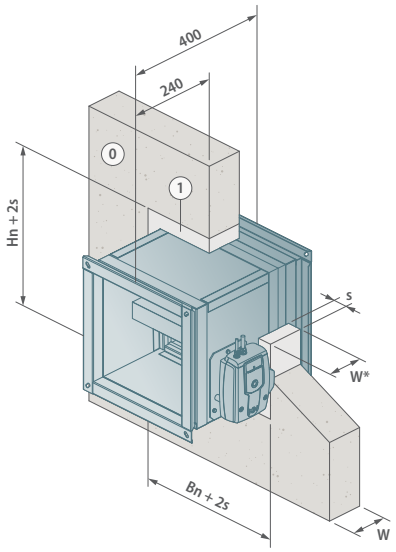


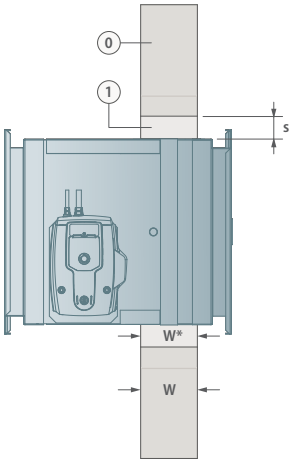


⓪	A.4	Rigid wall		
①	C.01	Mortar	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.2 RIGID WALL - GYPSUM

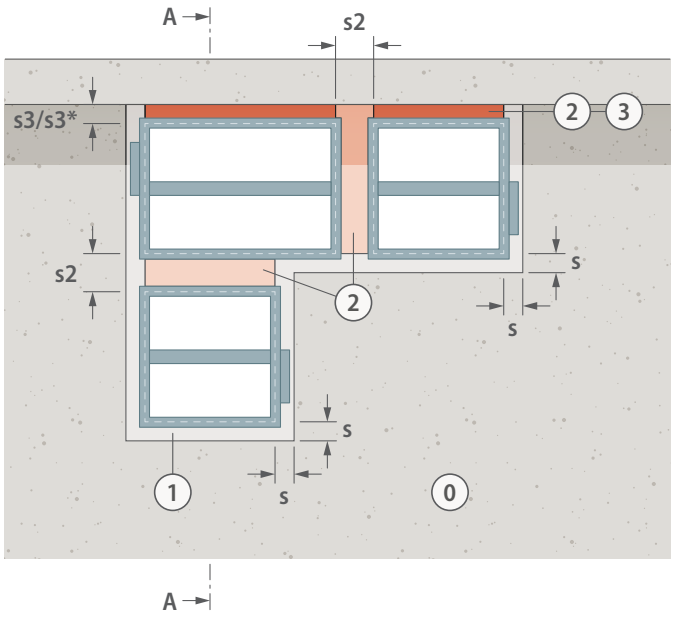
≤ 1500 x 1000	w ≥ 100, w* ≥ 100	EI120 (v_e i ↔ o)S	I
≤ 1200 x 800	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	II
> 1200 x 800; ≤ 1500 x 1000	w ≥ 100, w* ≥ 100	EI60 (v_e i ↔ o)S	II
> 1200 x 800; ≤ 1500 x 1000	w ≥ 100, w* ≥ 100	E120 (v_e i ↔ o)S	II

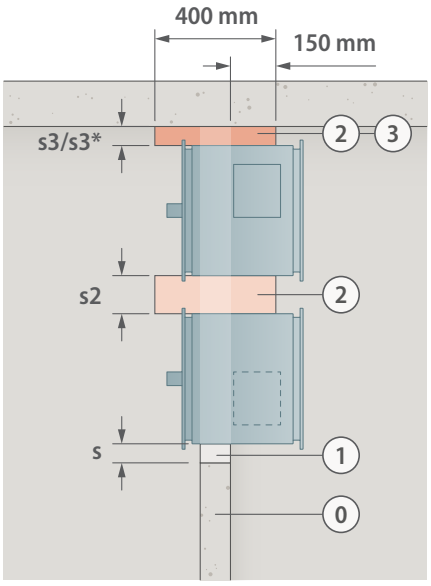




Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

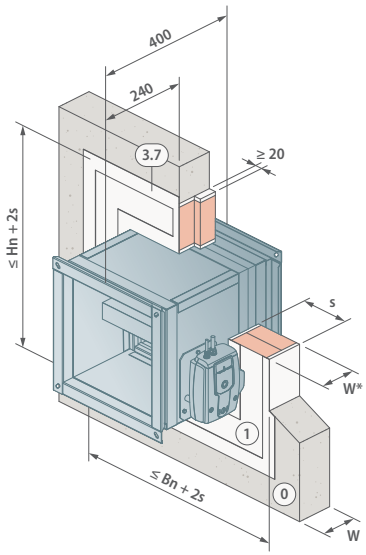


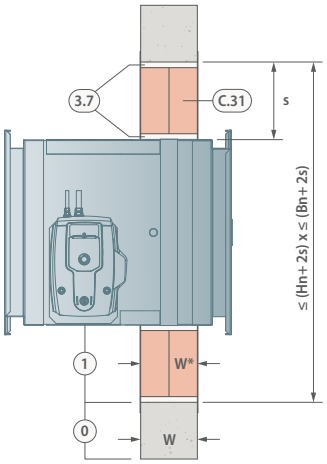


⓪	A.4	Rigid wall		
①	C.02	Gypsum	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.3 RIGID WALL - FIRE BATT

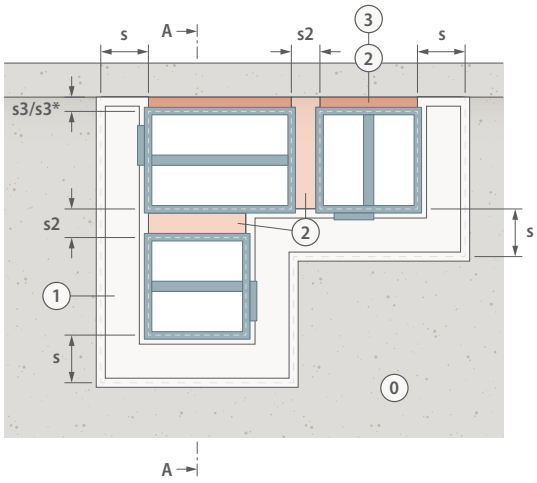
≤ 1200 x 800	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	II

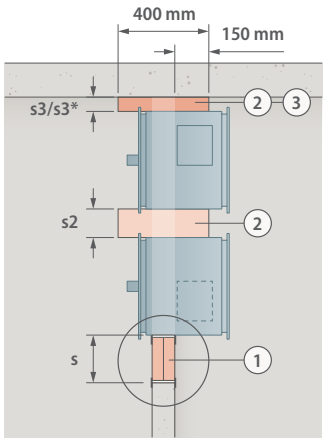


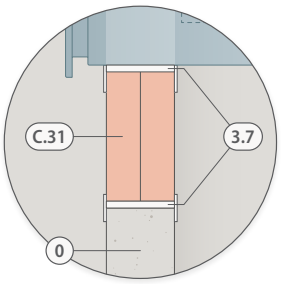


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)



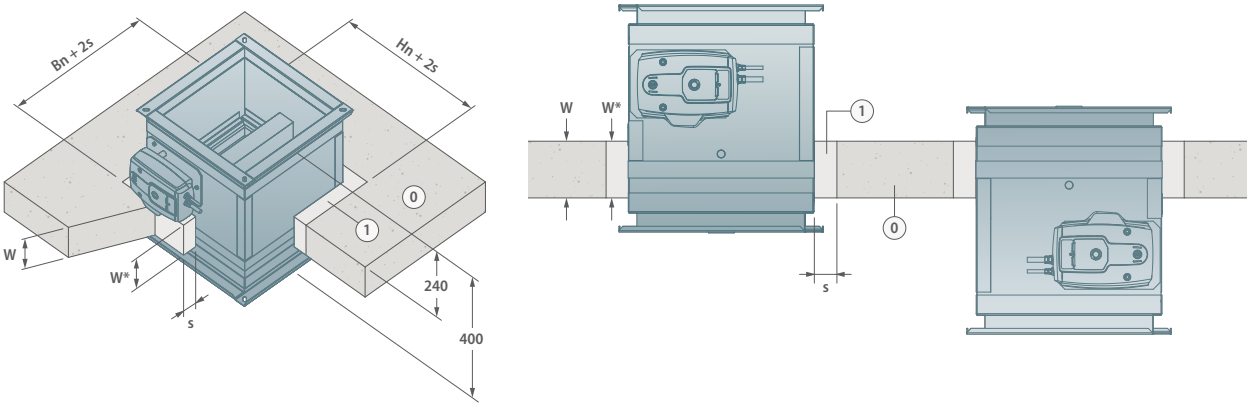




⓪	A.4	Rigid wall		
①	C.31	Fire batt 2 x 50 mm (installation minimal distance: only with Promat or Hilti)	20 ≤ s ≤ 400 The fire damper does not necessarily have to be placed centrally in the plane. Please refer to the installation instructions.	
	3.7	Coating of ends and seams		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

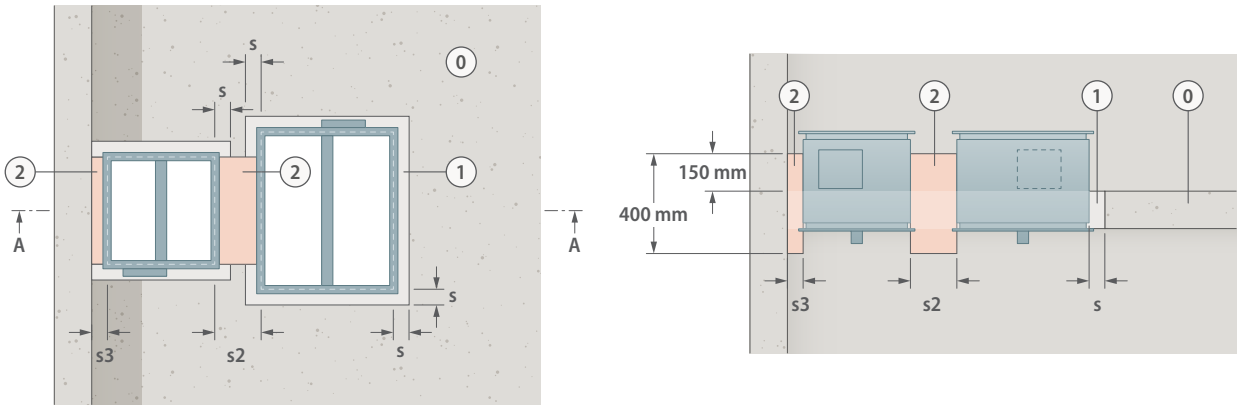
3.3.4 RIGID FLOOR - MORTAR

≤ 1500 x 1000	w ≥ 150, w* ≥ 150	EI120 (h_o i ↔ o)S	II
≤ 1500 x 800	w ≥ 125, w* ≥ 125	EI120 (h_o i ↔ o)S	II



Minimal distance :

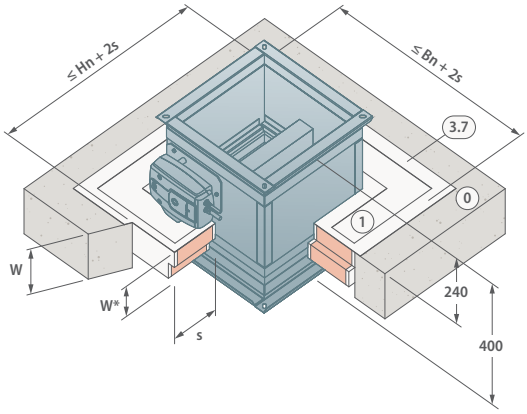
Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

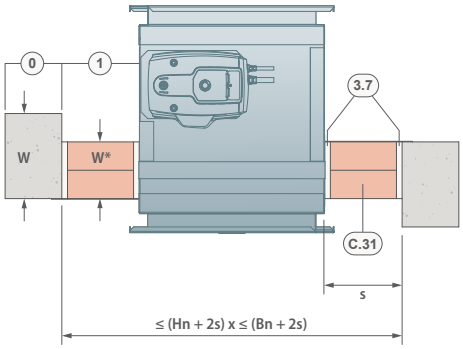


⓪	A.7	Rigid floor		
①	C.01	Mortar	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall)

3.3.5 RIGID FLOOR - FIRE BATT

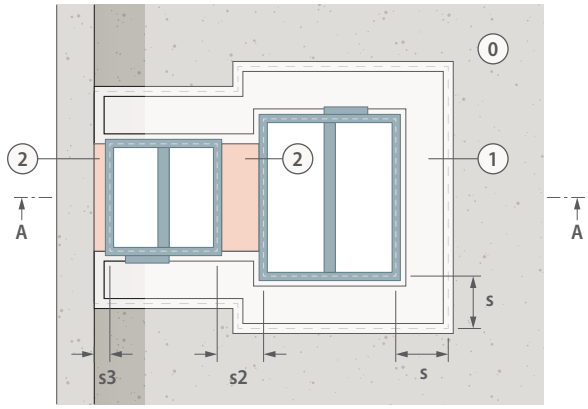
≤ 1200 x 800	w ≥ 150, w* ≥ 100	EI90 (h_o i ↔ o)S	II

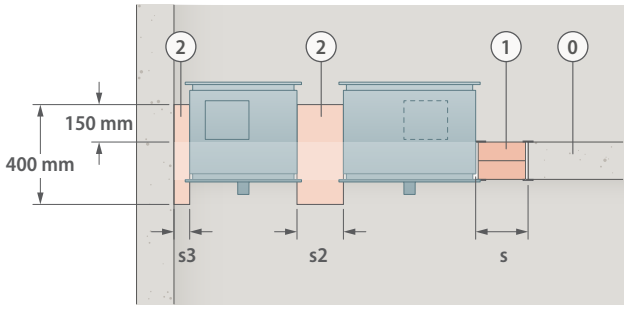




Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

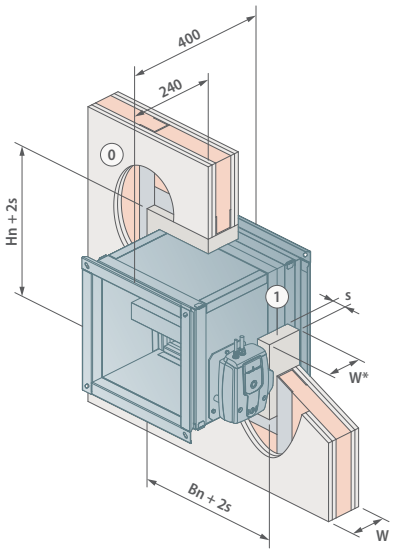


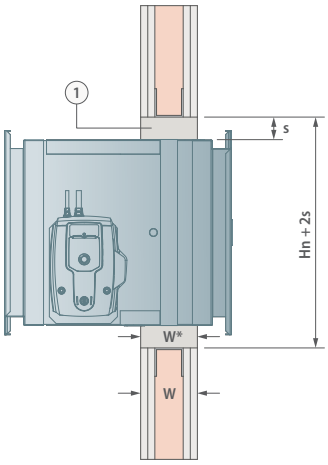


⓪	A.7	Rigid floor		
①	C.31	Fire batt 2 x 50 mm (Promat or Hilti)	20 ≤ s ≤ 400 The fire damper does not necessarily have to be placed centrally in the plane. Please refer to the installation instructions.	
	3.7	Coating of ends and seams		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall)

3.3.6 FLEXIBLE WALL - MORTAR

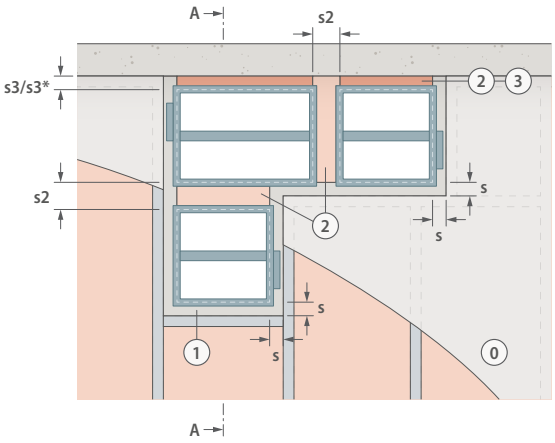
≤ 1500 x 1000	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	I

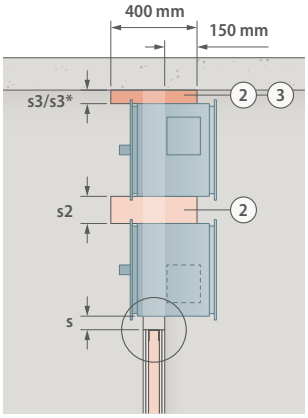


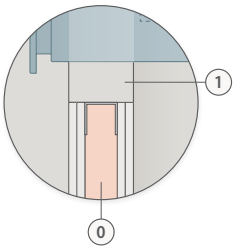


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)





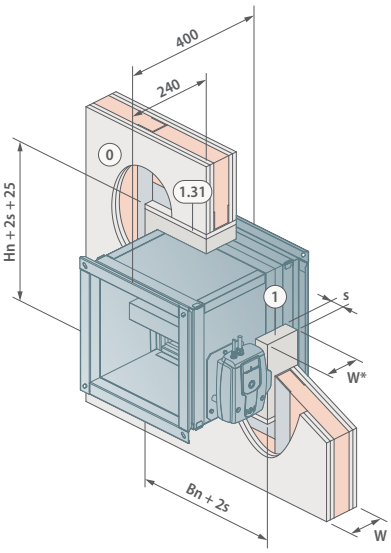


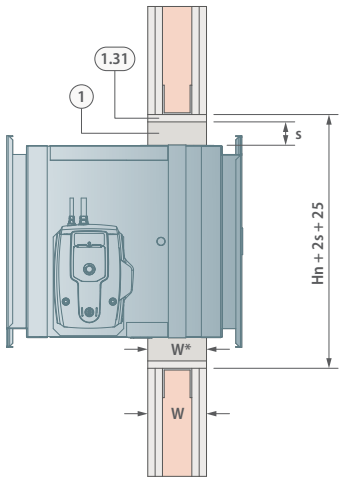
⓪	A.2	Flexible wall		
①	C.01	Mortar	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

- It is permissible to provide (single or double) plating on the day edges, but not required. In this case, the plasterboards should be fixed to the metal profiles by screws.
- Anchoring the mortar seal by means of anchor points is allowed, but not required to meet the intended fire resistance.

3.3.7 FLEXIBLE WALL - GYPSUM

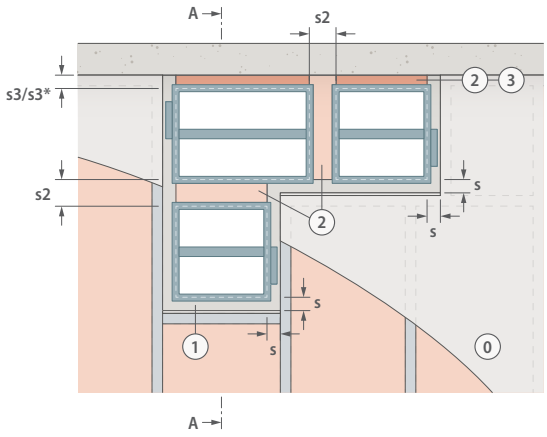
≤ 1500 x 1000	A.2 Type F	w ≥ 100, w* = w	EI120 (v_e i ↔ o)S	I

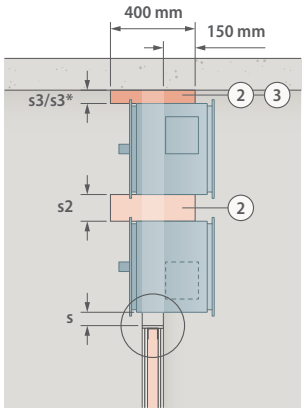


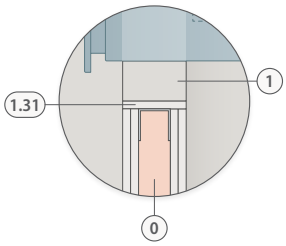


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

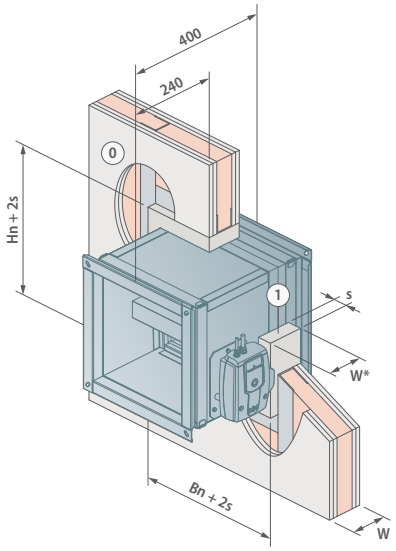


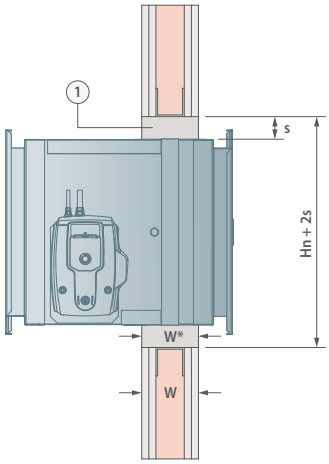




⓪	A.2	Flexible wall		
①	C.02	Gypsum	20 ≤ s ≤ 50	
	1.31	Plasterboard 12,5 mm type F		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

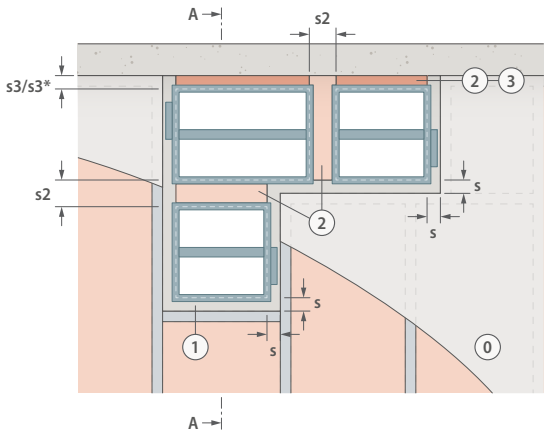
≤ 1200 x 800	A.1 Type A	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	I

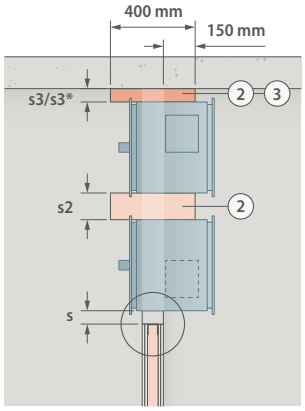


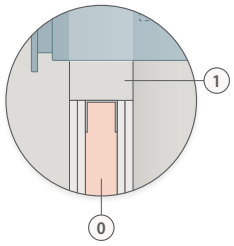


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)



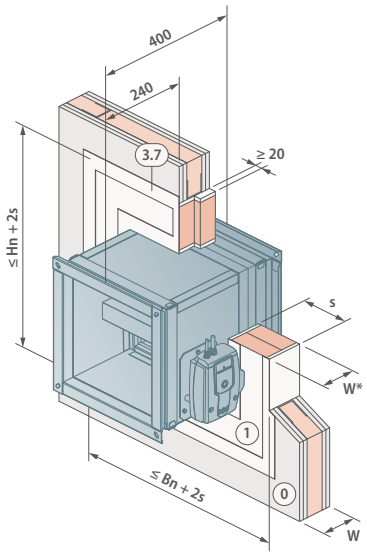


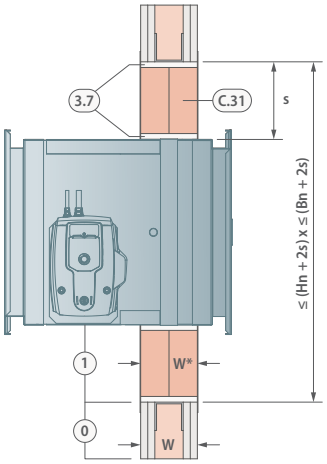


⓪	A.1	Flexible wall		
①	C.02	Gypsum	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m^3	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.8 FLEXIBLE WALL - FIRE BATT

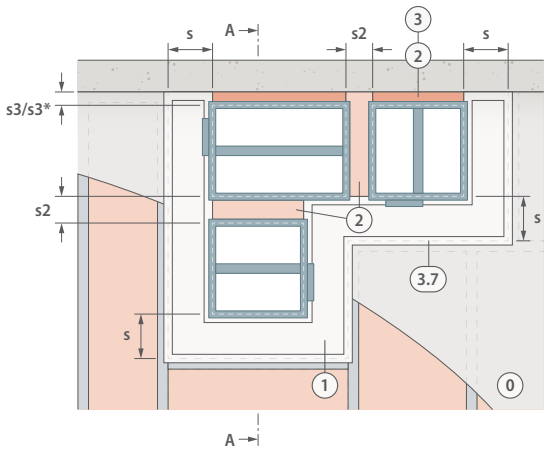
≤ 1200 x 800	A.1 Type A	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	II
≤ 1200 x 800	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	II

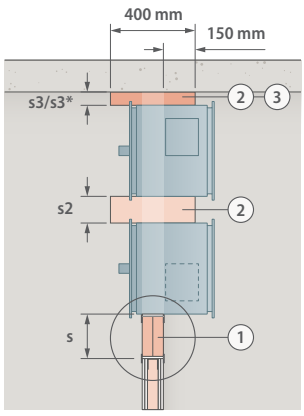


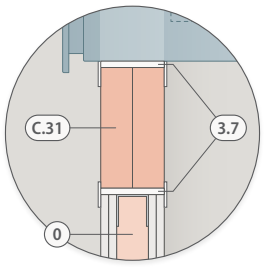


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)



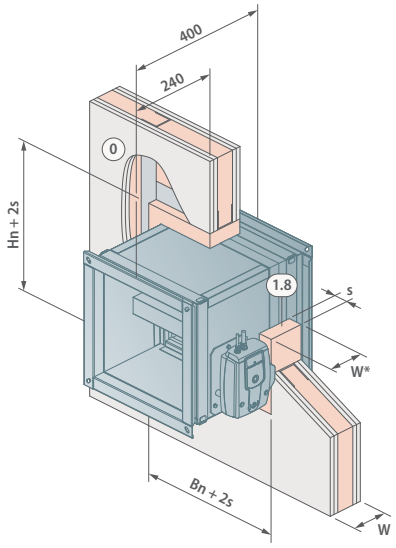


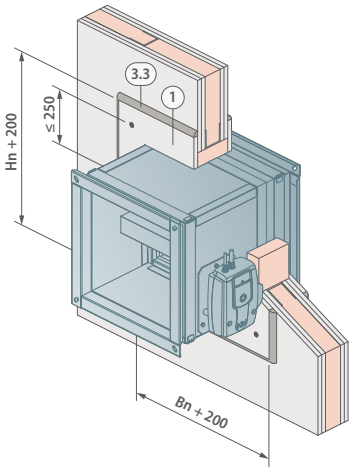


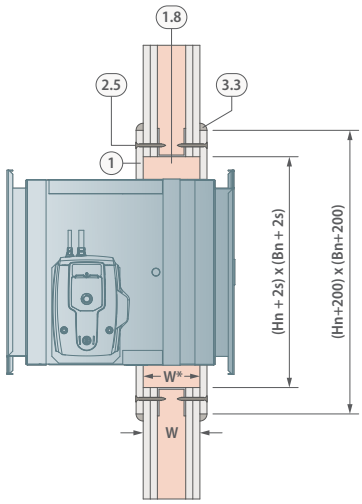
⓪	A.1/A.2	Flexible wall		
①	C.31	Fire batt 2 x 50 mm (installation minimal spacing: only with Promat or Hilti)		20 ≤ s ≤ 400 The fire damper does not necessarily have to be placed centrally in the plane. Please refer to the installation instructions.
	3.7	Coating of ends and seams		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.9 FLEXIBLE WALL - STONE WOOL & COVER PLATES

≤ 1500 x 800	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	I
≤ 1200 x 800	A.1 Type A	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	I
> 1200 x 800; ≤ 1500 x 800	A.2 Type F	w ≥ 100, w* = w	E120 (v_e i ↔ o)S	I

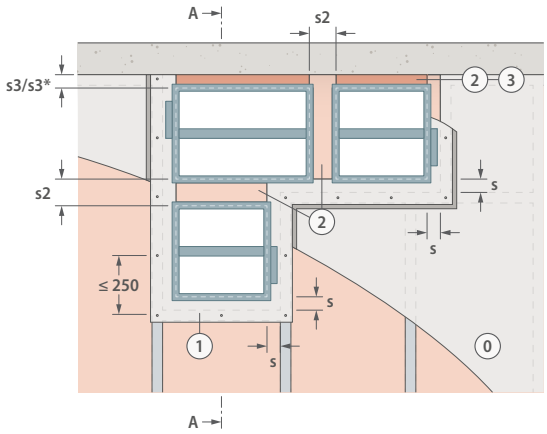


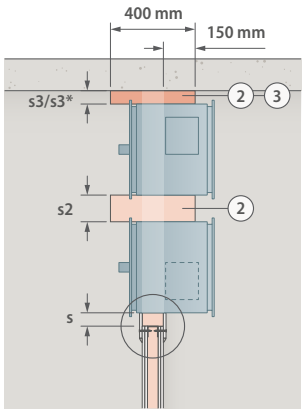


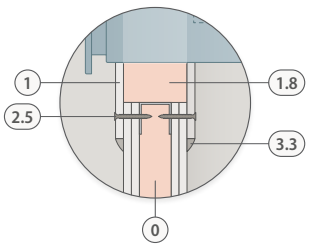


Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)



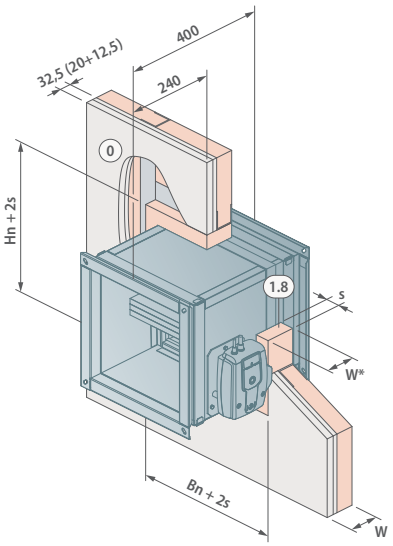


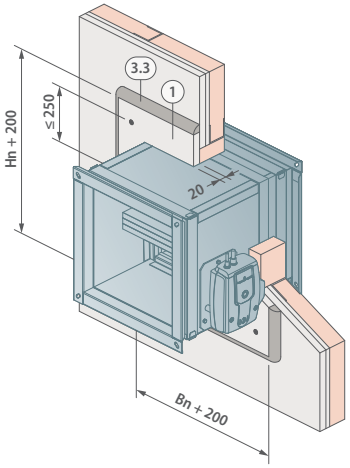


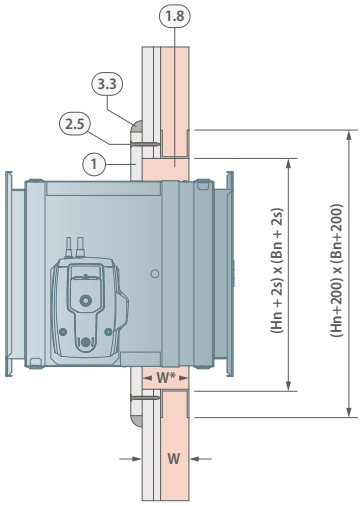
⓪	A.2	Flexible wall		
①	C.23	Cover plates		
	1.8	Stone wool 40 kg/m³	20 ≤ s ≤ 50	
	3.3	Joint filler		
	2.5	Universal screw 6 x 50 mm (fix into the metal stud frame)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.10 SHAFTWALL - STONE WOOL & COVER PLATES

≤ 1500 x 800	A.6 Type F	w ≥ 82.5, w* = w	EI60 (v_e i ↔ o)S	III



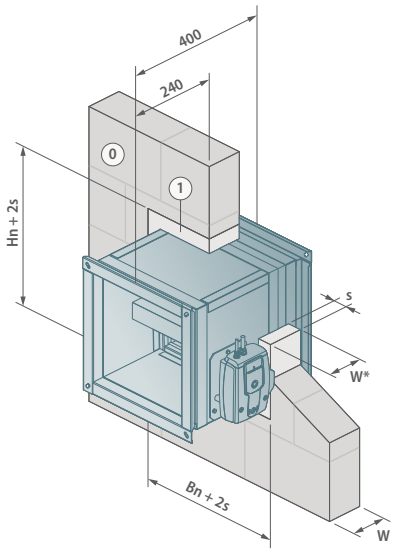


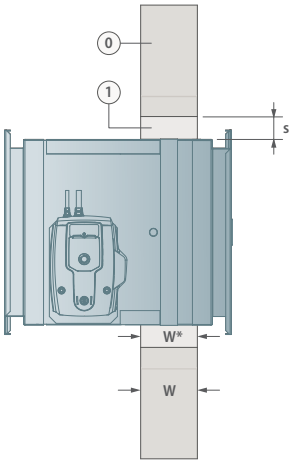


⓪	A.6	Shaftwall
①	C.23	Cover plates
	1.8	Stone wool 40 kg/m³ 20 ≤ s ≤ 35
	3.3	Joint filler
	2.5	Universal screw 6 x 50 mm (fix into metal stud frame)

3.3.11 GYPSUM BLOCK WALL - BLOCK GLUE

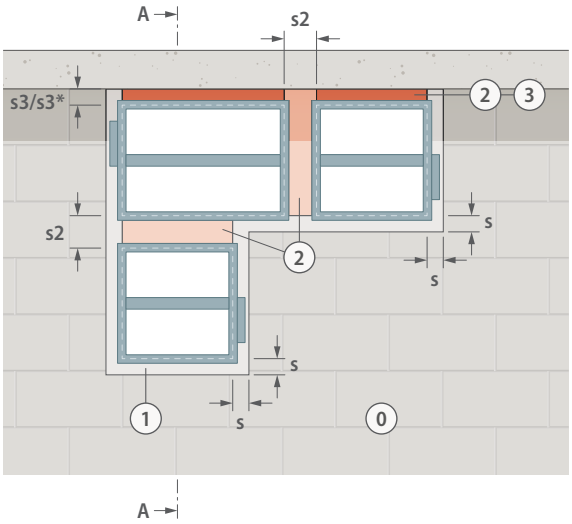
≤ 1500 x 1000	w ≥ 100, w* ≥ 100	EI120 (v_e i ↔ o)S	I
≤ 1200 x 800	w ≥ 70, w* ≥ 70	EI120 (v_e i ↔ o)S	I

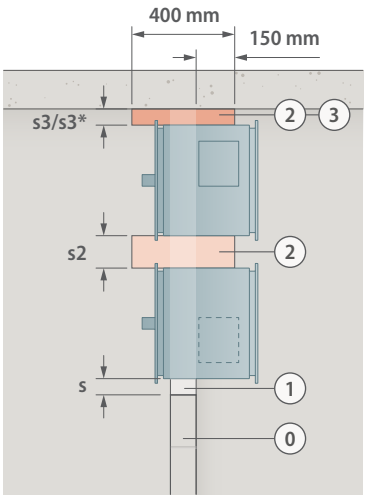




Minimal distance :

Maximum 4 CU2 fire dampers can be installed at minimal distance (2x2)

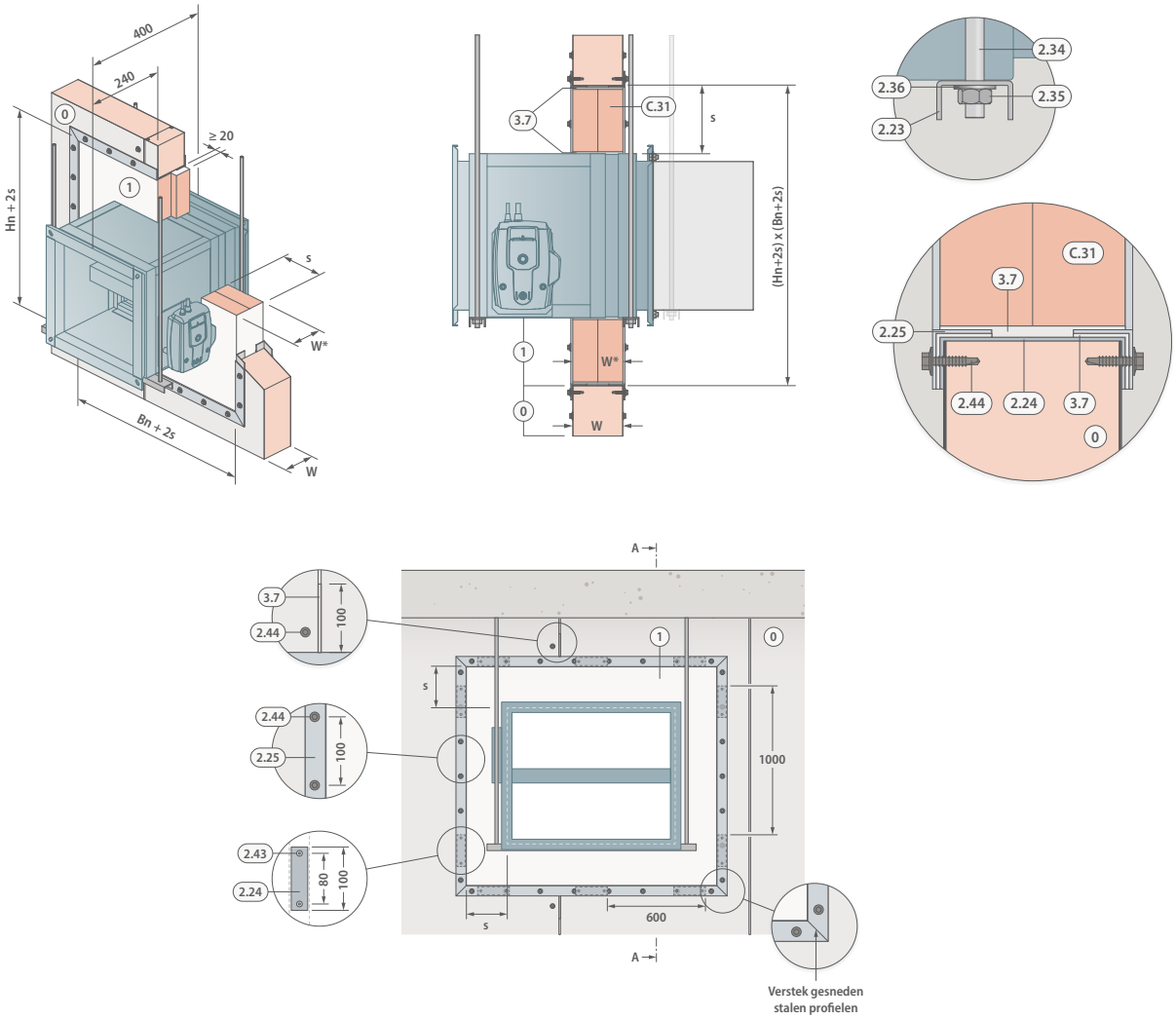




⓪	A.3	Gypsum block wall		
①	C.03	Block glue	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.12 SANDWICH PANEL SYSTEM - FIRE BATT

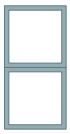
≤ 1500x1000	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	I

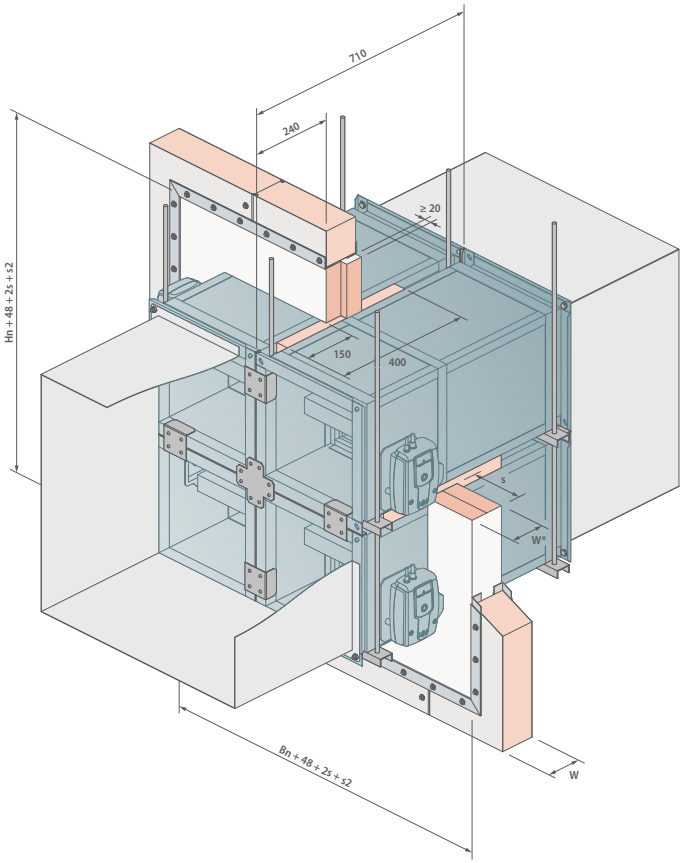


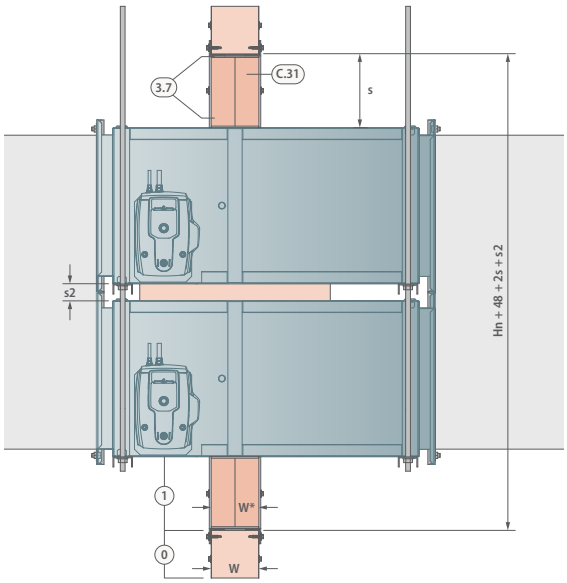
⓪	A.9	Sandwich panel system Paroc AST		
①	C.31	Hilti fire batt CFS-CT W 2 x 50 mm	20 ≤ s ≤ 100	
	2.24	U-profile MIT100		
	2.25	L-profile 30 x 30 x 2	2.23	Profile MQ-41 (41 X 41)
	2.43	Rivet	2.34	M10 threaded rod
	2.44	Hilti S-MD01Z 4.8 x 19	2.35	M10 nut
	3.7	Hilti coating CFS-S ACR	2.36	Roundel

Connection to one duct

When installed at minimal distance, several CU2 fire dampers can also be connected to one large duct. For this purpose, on specific request, the CU2 fire damper is extended to a length of 710 mm and fitted with adapted flanges (PG38). Together with the dampers, material is supplied to connect the dampers (contact Rf-t for more details regarding the order code).

Maximum configuration = 2b x 2h; also possible  or 





⓪	A.9	Paroc AST sandwich panel system		
①	C.31	Hilti fire batt 2 x 50 mm CFS-CTB	20 ≤ s ≤ 100	
	2.24	U-profile MIT100		
	2.25	L-profile 30 x 30 x 2	2.23	Profile MQ-41 (41 x 41)
	2.43	Rivet	2.34	M10 threaded rod
	2.44	Hilti S-MD01Z 4.8 x 19	2.35	M10 nut
	3.7	Hilti coating CFS-S ACR	2.36	Roundel
②	3.6	Hilti fire batt CFS-CTB 1 x 50mm	s2 = 50	

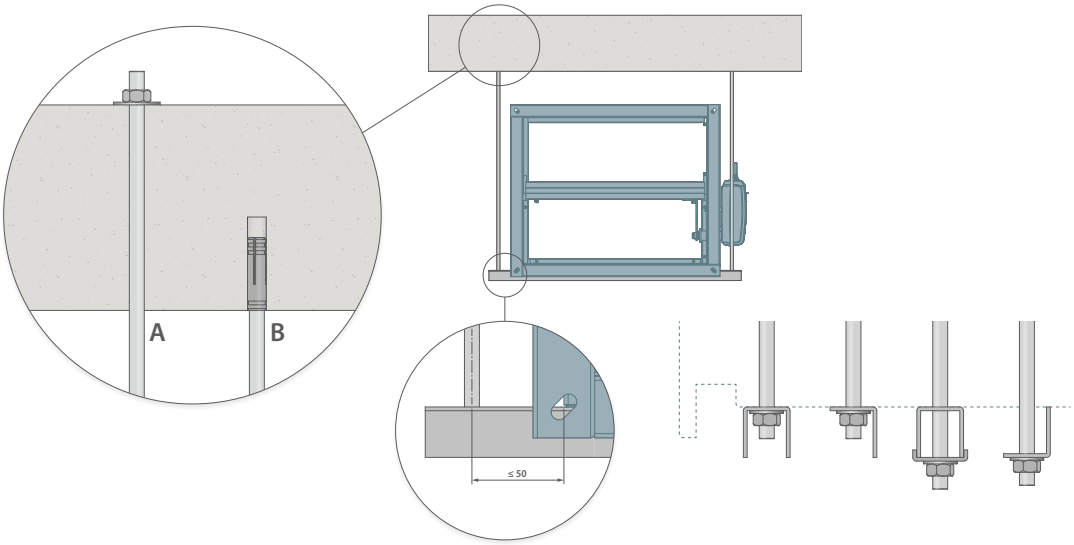
It is recommended to install insulation (C.10) between the fire dampers during installation of the fire dampers (over a depth of 400 mm, including 150 mm on the mechanism side).

3.4 SUSPENSION OF THE FIRE DAMPER

3.4.1 SUSPENSION OF THE FIRE DAMPER IN A VERTICAL (LOAD-BEARING) STRUCTURE

Rf-Technologies' fire dampers are usually tested in a vertical (load-bearing) construction (wall) without suspension. An exception to this are fire dampers located outside the wall, installation in Paroc Sandwich panel system or with sliding ceiling connection. Technical details of suspension in these situations are documented in the relevant installation sheet.

In some regions, when connecting an ventilation duct to the fire damper, it must be avoided that this duct exerts forces on the fire damper that prevent proper operation. In case of fire, under the influence of heat, dilation or sagging of the duct, or deflection of the wall may impact the installation of the fire damper in a flexible wall or when sealing with fire batts. According to local regulations or customs, it may be appropriate or mandatory to provide elastic or combustible duct connections between the fire damper and the ventilation duct, or to use flexible ventilation ducts, thus avoiding possible forces on the fire damper. The fire damper is then supported independently of the ventilation duct. Ventilation ducts, suspension structures or fixings must be made according to the manufacturer's guidelines.

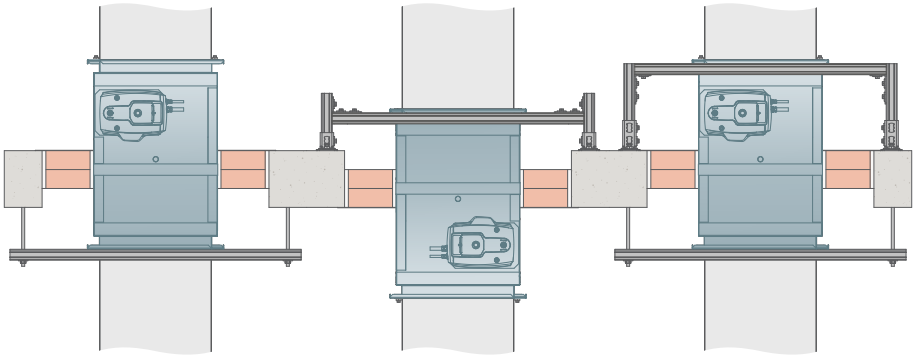


If it is opted to support the fire dampers, the dimensioned threaded rods of the suspensions can be fixed through the floor on the one hand (A). On the other hand, the threaded rods can be fixed in the ceiling with impact sleeves or screws (W) according to the manufacturer's specifications and taking into account fire protection requirements.

The support of fire dampers is possible with different materials (some examples image) applied according to the manufacturer's specifications.

3.4.2 SUSPENSION OF THE FIRE DAMPER IN A HORIZONTAL (LOAD-BEARING) CONSTRUCTION, SEALED WITH FIRE BATTS

The fire damper may be supported both at the level of the connecting flanges and at the ventilation duct. The flanges may be fixed to the support with suitable fixing material. The fire damper may be supported at the lower flange or at the upper flange.



3.5 VENTILATION DUCT CONNECTION

The fire damper is connected to ventilation ducts by bolts, a sliding tray system or clamps. The flanges of the fire damper are provided with slotted holes at the 4 corners.

Flexible connections may be applied, e.g. based on local or regional regulations or guidelines (e.g. M-LüAR, DW145). In accordance with the requirements, the designer and/or installer of the ventilation ducts determines how these flexible connections are realised and where they are applied. Both elastic connections and flexible ventilation ducts are possible to avoid possible forces on the installed fire damper. The ventilation ducts are then suspended independently of the fire damper. Take earthing into account and provide equipotential bonding where necessary.

The connected ventilation ducts should be installed according to the rules of good workmanship, in accordance with local regulations and with an eye for an ventilationtight finish. The suspension elements of the ventilation duct are made of steel and are dimensioned according to the values in the table below (source: EN 1366-1 §13.6.1 - Table 7). The table only takes into account the static load and not the stress of the installation.

	Maximum stress (N/mm²)	
Load type	t < 60 min	60 min < t < 120 min
Tensile stress in all vertically oriented components	9	6
Shear stress in screws of property class 4.6 according to EN ISO 898-1	15	10

Fixing materials are used as described in the manufacturer's documentation. Different installation is possible subject to acceptance by an accredited test institute or an inspection body. The extension of suspensions in the event of fire and the stress levels can be calculated. Suspensions longer than 1.5m must be protected from fire in accordance with EXAP rules EN 15882-1 and in accordance with the instructions of the manufacturer of the relevant system.

It is allowed to connect multiple CU2 dampers to 1 common ventilation duct.

3.6 COMBINED PENETRATIONS

One speaks of mixed penetrations when techniques evaluated according to different test standards pass through the same recess in the (load-bearing) structure and are sealed in the same way. Fire dampers are tested according to EN 1366-2 and are usually given an EIS classification. Fire dampers are subjected to high pressure differentials during fire tests, which include checking the damper's smoke resistance.

Techniques tested according to EN 1366-3 (including combustible ducts, non-combustible ducts and electrical cables) are usually assigned an EI classification. The scope of test standard EN 1366-3 explicitly excludes the testing of ventilation applications.

An EXAP standard (Extended application of results from fire resistance tests) has recently been released that covers this domain (EN 15882-5). One can expect tested solutions according to this standard to be added to the classifications in the near future.

Please consult Rf-Technologies for more information on this.

3.7 DISCLAIMER

RF-Technologies has prepared this document with due care. However, it is up to the installer to comply with project-specific and regulatory requirements. RF-Technologies cannot be held responsible for design errors. RF-Technologies is not liable for errors in the use of the products and for the consequences thereof. RF-Technologies assumes no liability for clerical errors and reserves the right to change information without notice. This document does not create, specify, modify or replace any new or existing contractual obligations agreed in writing between RF-Technologies and the user.

3.8 OVERVIEW LEGEND

(SUPPORT) STRUCTURES		
A.1	Flexible wall type A	Type A flexible walls shall be constructed with metal studs according to the manufacturer's guidelines or standards in force locally. The wall thickness is at least 98 mm, with 2 x 12.5 mm double-sided gypsum plasterboard, namely gypsum (board) boards type A according to EN520 (GKB according to DIN 18180). The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^2. According to EN1366-2, the insulation of the flexible wall may be omitted. Addition of additional layers or use of thicker boards and wider metal studs is allowed. The horizontal metal profiles are at least 0.6mm thick galvanised steel and are fixed every ≤ 800 mm by Ø 6 mm steel screws and Ø 6mm anchors to the rigid (load-bearing) construction. The vertical metal profiles are at least 0.6mm thick galvanised steel and are placed centre-to-centre ≤ 625mm apart (refer to manufacturer's instructions). A clearance of 5mm accommodates thermal expansion. The profiles conform to EN 14195. The profiles are attached to each other with Ø 3.5mm screws, with pop rivets or with metal stud fixing pliers. The cladding is fixed to the metal profiles with Ø 3.5 mm screws. The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared. A reinforcement of metal horizontal and vertical profiles is provided around the damper, which is fixed to the metal framework of the wall construction (unless otherwise specified). These profiles are spaced 's' around the fire damper, which is the gap to be provided for sealing the fire damper. If the distance between fire damper and (load-bearing) structure on the one hand or between fire damper and a second fire damper on the other hand is less than 75 and 200 mm respectively as prescribed by the standard, it is not required to provide a profile at this location (see 'Placement at minimal distance'). The solutions in flexible wall constructions also apply to rigid walls. Type A flexible walls are usually applied in installation methods for a fire resistance of 60 minutes.
A.2	Flexible wall type F	Type F flexible walls are constructed using metal studs as specified in European standard EN 1363-1. The walls shall be constructed according to the manufacturer's guidelines or standards in force locally. The wall thickness is 98 mm minimal, with 2 x 12.5 mm double-sided gypsum plasterboard, namely gypsum (cardboard) boards type F according to EN520 (GKF according to DIN 18180). The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^2. According to EN1366-2, the insulation of the flexible wall may be omitted. Addition of additional layers or use of thicker boards and wider metal studs are allowed. The horizontal metal profiles consist of at least 0.6 mm thick galvanised steel and are fixed every ≤ 800 mm by Ø 6 mm steel screws and 6 mm anchors to the rigid (load-bearing) construction. The vertical metal profiles are at least 0.6 mm thick galvanised steel and are placed centre-to-centre at maximum 625 mm apart (consult manufacturer's instructions for this). A clearance of 5 mm accommodates thermal expansion. The profiles conform to EN 14195. The profiles are fixed together with Ø 3.5 mm screws, with pop rivets or with metal stud fixing pliers. The cladding is fixed to the metal profiles with screws Ø 3.5 mm. The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared. A reinforcement of metal horizontal and vertical profiles is provided around the damper, which is fixed to the metal framework of the wall construction (unless otherwise specified). These profiles are spaced 's' around the fire damper, which is the gap to be provided for sealing the fire damper. If the distance between fire damper and (load-bearing) structure on the one hand or between fire damper and a second fire damper on the other hand is less than 75 and 200 mm respectively as prescribed by the standard, it is not required to provide a profile at this location (see 'Placement at minimal distance'). The solutions in flexible wall constructions also apply to rigid walls. Type F flexible walls are usually applied in installation methods for fire resistance of 90 or 120 minutes.
A.3	Gypsum block wall	A gypsum block wall is a non-load-bearing partition wall made of prefabricated gypsum blocks with a density ≥ 850 kg/m^3 (EN 12859). The blocks are lined (half-brick bond) together with block glue. The joint thickness is approximately 2 mm, larger gaps can be sealed with block glue according to the manufacturer's specifications.

A.4	Rigid wall	Rigid walls are walls of cellular concrete, concrete or masonry with a minimal specific gravity of 650 ± 200 kg/m³ (EN 1363-1) and can also be applied to rigid walls of hollow blocks. Any hollow spaces around the fire damper should be filled. The solutions in flexible wall constructions are also applicable to rigid walls.
A.6	Shaftwall	Pre-walls or shaftwalls are constructed with metal studs and single-sided plasterboard (asymmetric wall). The walls are constructed according to the manufacturer's guidelines or standards in force locally.
A.7	Rigid floor	Rigid floors are cellular concrete or concrete floors with a specific gravity of 650 ± 200 kg/m³ (EN 1363-1). Any voids around the fire damper should be filled.
A.9	Sandwich panel system	Paroc panels with thickness ≥ 100 mm, type: AST S, AST S+, AST F, AST F+, AST E; metal shell 0.6/0.6. For full information regarding the construction of this type of wall, please refer to Paroc's installation details.

DISTANCES		
w	Wall thickness	Minimal thickness of the (load-bearing) structure
w*	Sealing depth	Minimal sealing depth in the (load-bearing) structure
s	General clearance	The width of the sealing recess 's' is determined by the tested distance during official fire tests. If the gap around the fire damper is larger than stated in the technical data sheet, the following options are available: reduce the gap in the wall with the same material as the wall; apply a different sealing system; seek alternative advice from a competent local authority (possibly in consultation with Rf-t). Always take into account the stability of the wall and the proper functioning of the fire damper.
s2	s2 min distance	Minimal distance between two fire dampers
s3	s3 min distance	Minimal distance between fire damper and (bearing) structure
s3*	s3* min distance	Minimal distance between rectangular damper and horizontal (load-bearing) structure ≤ 50 mm

SEALING SYSTEMS		
C.01	Mortar	Mortar according to EN 998-2: class M2.5 to M10 or fire-resistant mortar class M2.5 to M10. Mortar according to DIN 1053: groups II, IIa, III, IIIa or fire-resistant mortar groups II,III. Equivalent mortars, gypsum mortar or concrete
C.02	Gypsum	Gypsum mortar
C.03	Block glue	Gypsum-based block glue
C.10	Stone wool 150 kg/m³	Stone wool ≥ 150 kg/m³ over a depth of 400 mm, including 150 mm on the mechanism side of the wall. For a wall thickness of > 250 mm, the stone wool slab should be applied over a depth of > 400 mm until the entire wall thickness is filled. For rectangular fire dampers, flat stone wool slabs can be used. For round fire dampers, 50 mm thick shaped pieces can be cut to fit between the dampers (s2) and/or the wall construction (s3). By combining multiple layers of 50 mm, 150 mm (3 x 50 mm) sealing can be achieved on the mechanism side and 250 mm (5 x 50 mm) in the wall and on the non-mechanism side (depending on the thickness of the wall). The stone wool has a layer thickness of 50 mm, a density of 150kg/m³, thermal conductivity of l = 0.041 W/mK at 50 °C, water vapour absorption 0.02 %, Euro class A1.
C.11	Stone wool 40 kg/m³	Compressed standard stone wool Euroclass A.1 with a density after compression of min. 67 kg/m³ (e.g. Rockfit 431 with density 40 kg/m³ and thickness 40mm compressed to 25mm) (cf. s3*), to be applied with a distance between fire damper and ceiling ≤ 50mm over a depth of 400mm, of which 150mm on the mechanism side of the wall. For wall thicknesses > 250 mm, the stone wool must be applied over a depth of > 400 mm until the entire wall thickness is filled. This sealing is applied along the full width of the damper.

C.23	Cover plates	Type A or type F plasterboard (according to EN 520) as indicated in the declaration of performance. The cover plates shall follow the contours of the fire damper and shall be provided with recesses around the operating mechanism where necessary. Spacing between fire damper and cover plate ≤ 5mm.
C.31	Fire batt slab 2 x 50 mm	Fire batt (3.6) 2 x 50 mm When sealing with fire batt sheets, the saw cuts of the sheets must not coincide: the sheets are therefore installed (min 20 mm) angled to promote strength.

ACCESSORIES	
1.1	Horizontal profile
1.2	Vertical profile
1.31	Plasterboard 12.5 mm type F
1.32	Plasterboard 12.5 mm type A
1.8	Stone wool 40 kg/m^3
2.1	Mounting screws Ø6mm (anchored to the (load-bearing) structure)
2.2	Mounting screws Ø3.5mm
2.5	Universal screw ø 6 x 50 mm
2.23	MQ-41 mounting rail (41 x 41)
2.24	Perforated metal U-profile MIT100 96 x 25 x 1.5 L100 Zn; vertical ≤ 1000 mm c/c; horizontal ≤ 600 mm c/c
2.25	Steel L-profile 30 x 30 x 2 (galvanized)
2.34	M10 threaded rod
2.35	M10 nut
2.36	M10 roundel
2.43	Rivet polygrip 4.8 x 10
2.44	Hilti S-MD01Z 4.8 x 19
3.3	Jointfiller
3.6	Single-sided fire batt ≥ 140kg/m^3 - the rigid rockwool slabs have a 1mm fire-resistant coating on one side and are installed ≥ 20mm edge-to-edge. The coated side is always installed as the visible side. **Fire batt types:** Promastop-CB 50 (CC); Hilti CFS-CT W; Mulcol Multimastic FB1; SVT PYRO-SAFE® Flammotect-A (MFP). * Hilti: Flumroc (Flumroc 341), Isover (Fireprotect 150, Orsil Pyro, Orsil S, Orsil T, Protect BSP 150, Stropoterm), Knauf (Heralan BS-15, Heralan DDP-S, Heralan DP-15), Paroc (FPS 14, FPS 17, Pyrotech Slab 140, Pyrotech Slab 160), Rockwool (Hardrock II, RP-XV, RPB-15; * Promat: Rockwool (RP-XV, Hardrock 040/ Hardrock II, Rockwool 360, Taurox D-C, Taurox Duo NP, Rockwool Panel 755), Knauf (DP-15, FDB D150), Paroc OY AB (Pyrotech Slab 140-180, Paroc Pro Roof Slab), Isover (Orsil T-N). * Mulcol: Isover (BSP). Sealing with Mulcol's fire batt is attested in rigid and flexible wall. Not for minimal distances, fire dampers out of wall or fire dampers sealed in rigid floor. * SVT: Sealing with SVT fire batt is attested in rigid and flexible wall. Not for minimal distances, fire dampers from wall or fire dampers sealed in rigid floor.
3.7	Coating on end faces (Promastop E/CC, Hilti CFS-S ACR, Mulcol Multimastic SP, PYRO-SAFE® FLAMMOTECT-A), around the seams on the visible sides with an overlap on the wall and around the tunnel. The maximum thickness of Mulcol Multimastic SP is 15mm, joints are finished with a layer of Multimastic C with an overlap on the wall of 25mm.