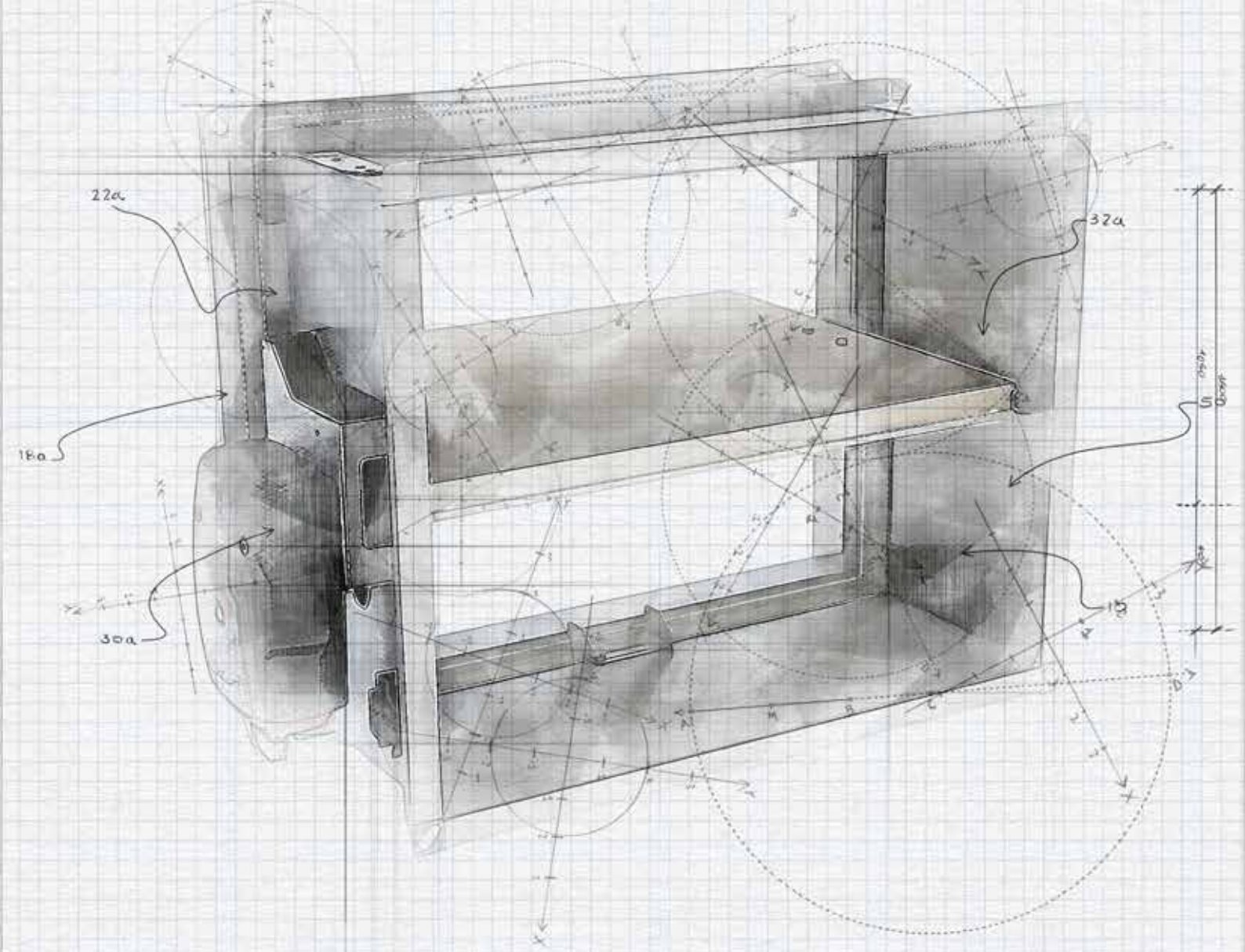
CU-LT

OPTIMISED RECTANGULAR FIRE DAMPER UP TO EI120S

Product guide



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1 GENERAL INFO

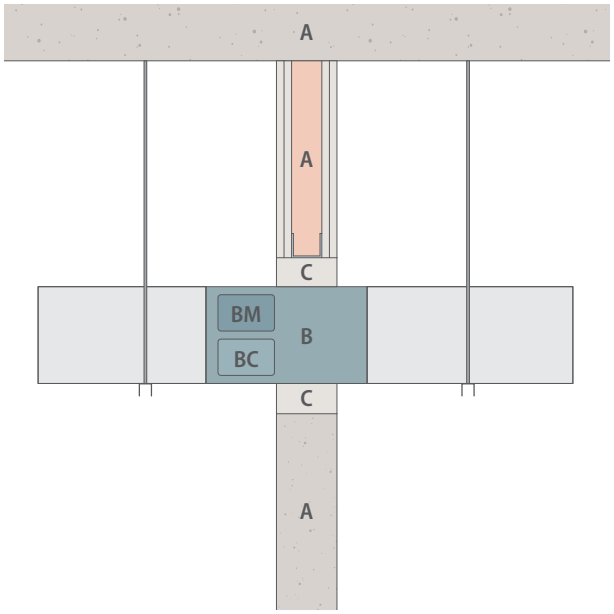
We address this guide to all parties requiring detailed technical information on the fire damper, its installation and technically and regulatory relevant aspects. From designer and design office, to contractor and maintenance engineer. This document aims to provide a clear overview of the various aspects 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
W Fire damper
BM: mechanism
BC: communication
C Sealing

1.1 APPLICATION

Fire dampers 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 CU-LT is an optimised rectangular fire damper with a fire resistance of up to 120 minutes. Minimal pressure drop is guaranteed by the thin damper blade, the fusible link in line with the damper blade and the transmission located outside the tunnel. The damper is available in small dimensions (from 200 x 100 mm). The galvanised steel tunnel contributes to the low weight of the damper. The CU-LT fire damper is distinguished by its fire resistance, universal installation options and optimal air technical properties.

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. The declaration of performance can be consulted at www.rft.eu/dop.

- BCCA-0749-CPR-BC1-606-0464-15650.05-0464: 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 (ve, ho, i ↔ o) S (500Pa)
- EN 60068-2-52: corrosion protection
- EN 1751 ≥ class 3 (leakage through closed damper blade)
- EN 1751 ≥ class ATC 3 (formerly C) (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. 26812
- SP Certificate: SC0644-15
- UKCA Certificate 2822-UKCA-CPR-0060
- Hygiene-Konformitätsprufung CU-LT W-379334-23-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 dirt 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 damper 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

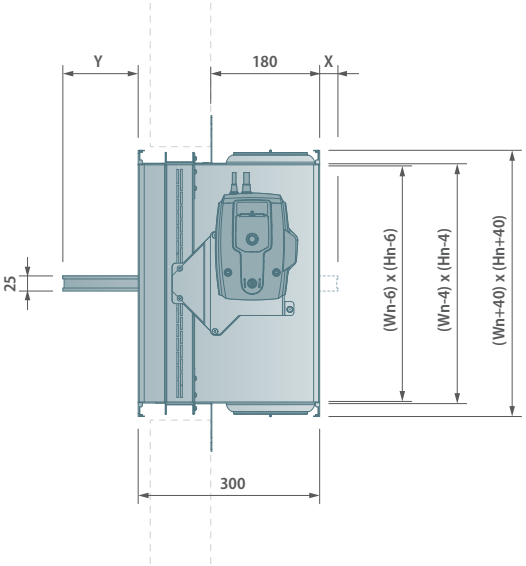
2.1.1 CU-LT

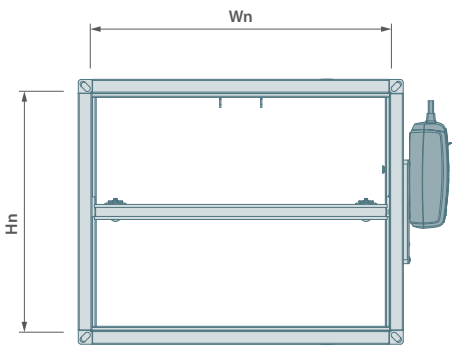
The CU-LT is an optimised rectangular fire damper with a fire resistance of up to 120 minutes. Minimal pressure drop is guaranteed by the thin damper blade, the fusible link in line with the damper blade and the transmission located outside the tunnel. The damper is available in small dimensions (from 200 x 100 mm). The tunnel in galvanised steel contributes to the low weight of the damper.

Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes can be provided at surplus cost

	≥	≤
(Wn x Hn) mm	200x100	800x600

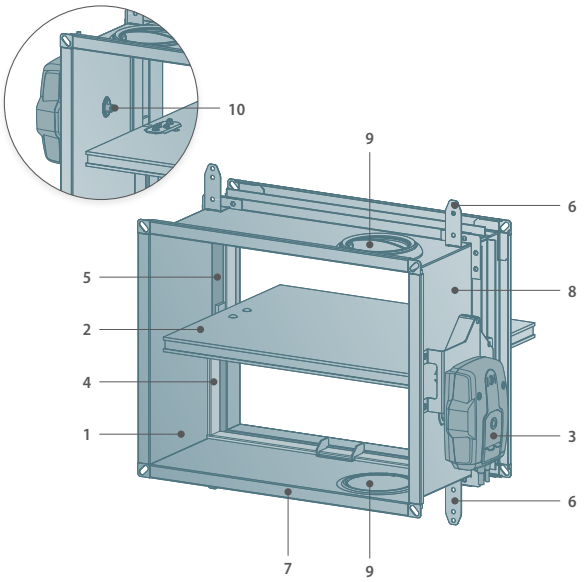




Exceeding blade: X = on the mechanism side, Y = on the wall side

Hn [mm	150	200	250	300	350	400	450	500	550	600
X	-	-	-	-	-	-	-	17	42	67
Y	2	27	52	77	102	127	152	177	202	227

Components



1. tunnel in galvanised steel
2. damper blade
3. operating mechanism
4. cold smoke seal
5. intumescent strip
6. installation stop
7. connection flange PG20
8. product identification
9. inspection opening (optional)
10. fusible link

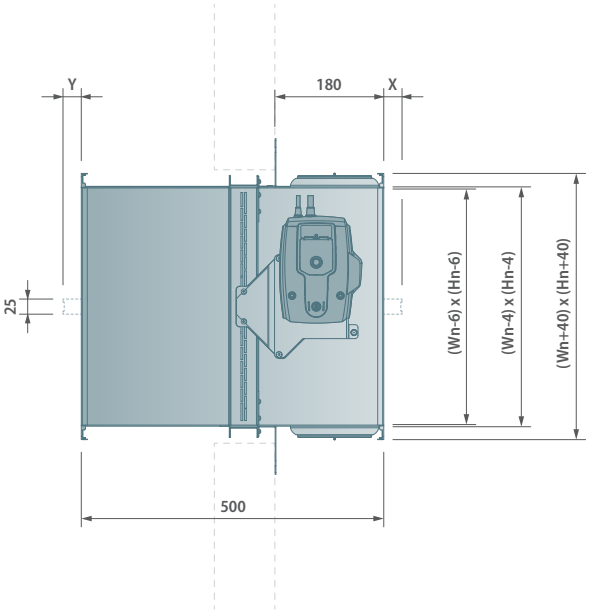
2.1.2 CU-LT-L500

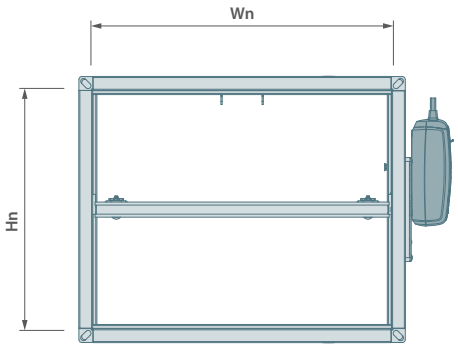
CU-LT fire damper with extended tunnel on the wall side to facilitate duct connection if walls thicker than 100mm. For dampers up to a height of 450 mm, the damper blade does not protrude, allowing a grille or a bend to be connected directly to the flange or a circular connection to be provided.

Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes can be provided at surplus cost

	≥	≤
(Wn x Hn) mm	200x100	800x600

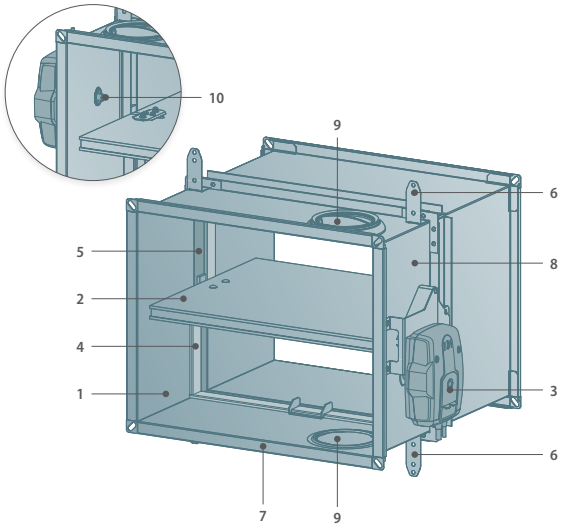




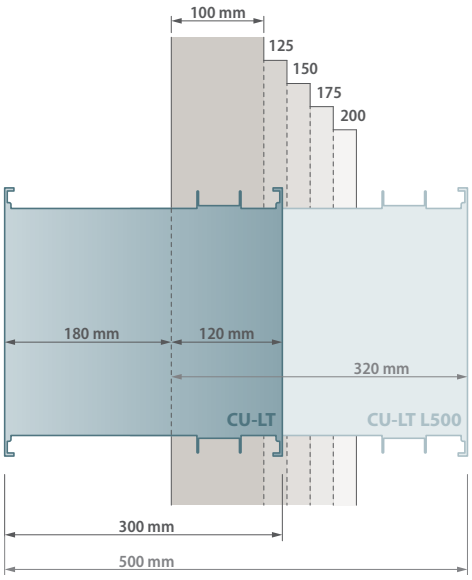
Exceeding damper blade: X = on the mechanism side, Y = on the wall side.

Hn [mm]	500	550	600
X	17	42	67
Y	-	2	27

Components



1. tunnel in galvanised steel
2. damper blade
3. operating mechanism
4. cold smoke seal
5. intumescent strip
6. installation stop
7. connection flange PG20
8. product identification
9. inspection opening (optional)
10. fusible link



Extended dampers can facilitate installation in case of thicker walls, for example. To improve the ease of installation, the CU-LT, with a standard length of 300 mm, can be replaced by a longer version of 500 mm (CU-LT-L500).

2.1.3 CU-LT-1S

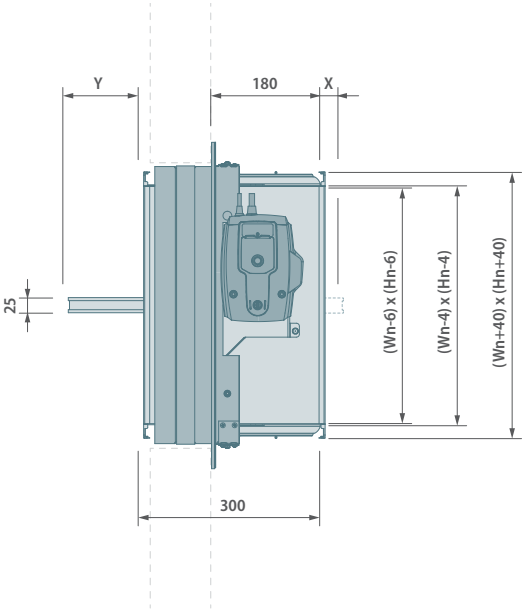
The CU-LT-1S is an optimised rectangular fire damper for surface mounting with a fire resistance of up to 120 minutes. The CU-LT-1S combines the high energy efficiency of our range of optimised dampers (minimal pressure drop, small dimensions) with the ease and speed of dry installation. Easy installation and low weight make the CU-LT-1S the ideal solution for renovation projects or construction sites where the damper is difficult or impossible to access from one side of the wall.

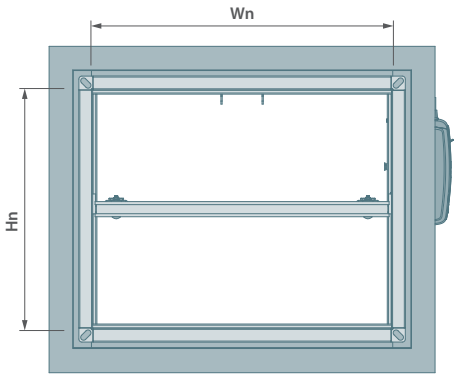
The CU-LT-1S is screwed to the (load-bearing) construction with 4 (Wn ≤400mm) or 6 (Wn >400mm) universal screws or nail anchors.

Range and dimensions

Wn/Hn per step of 50 mm;
intermediate sizes are available at surplus cost

	≥	≤
(Wn x Hn) mm	200x100	800x600

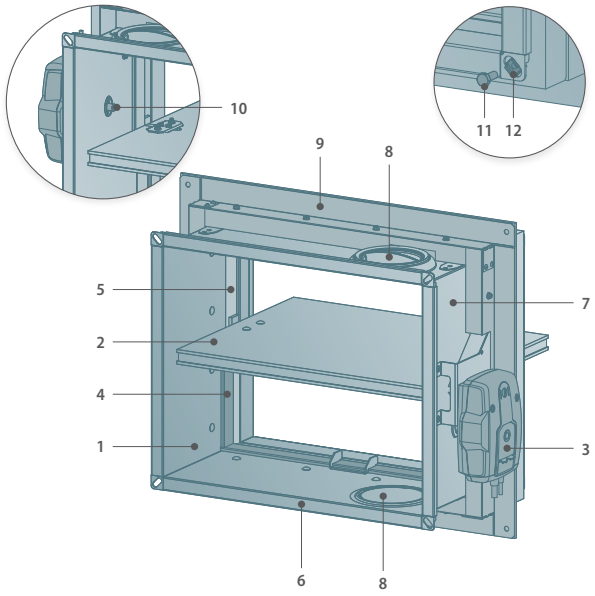




Exceeding blade: X = on the mechanism side, Y = on the wall side

Hn [mm]	150	200	250	300	350	400	450	500	550	600
X	-	-	-	-	-	-	-	17	42	67
Y	2	27	52	77	102	127	152	177	202	227

Components

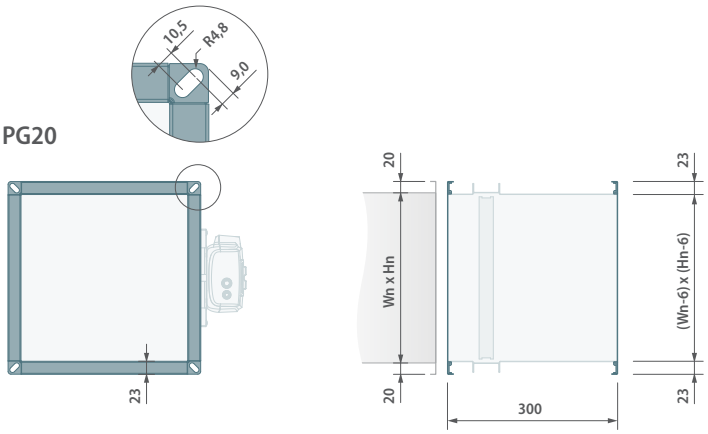


1. tunnel in galvanised steel
2. damper blade
3. operating mechanism
4. cold smoke seal
5. intumescent strip
6. installation stop
7. connection flange PG20
8. product identification
9. inspection opening (optional)
10. fusible link
11. bolt
12. cage nut

2.1.4 FLANGE TYPES

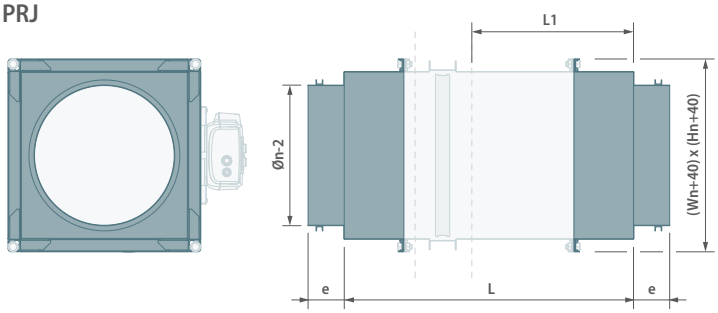
The CU-LT, CU-LT-L500 & CU-LT-1S are supplied with PG20 flanges on both sides as standard. The 3 variants can also be supplied with a round connection type PRJ.

PG20



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

PRJ



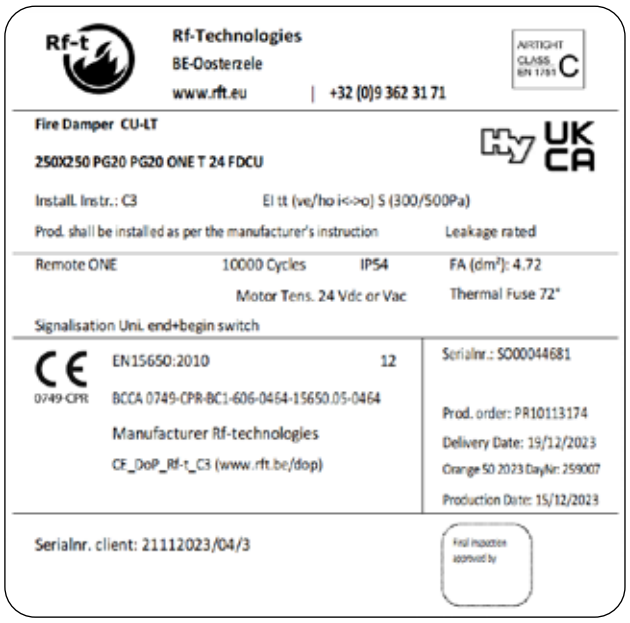
Round connection with sealing ring.
The dimensions of the fire damper vary according to the desired diameter of the PRJ connections.

Ø Hn/Wn [mm]	100 200	125 200	160 200	200 200	250 250	315 350	355 400	400 400	450 450	500 500	560 600
L	430	430	430	460	510	560	610	660	710	760	810
L1	245	245	245	260	285	310	335	360	385	410	435
e	45	45	45	45	65	65	65	90	90	90	90

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 of the damper classification	
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

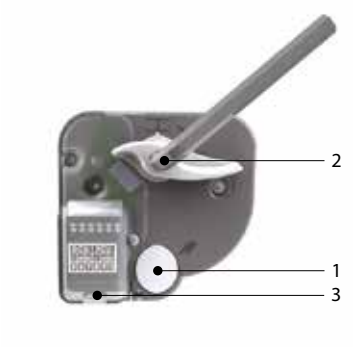
The CU-LT fire damper can be equipped with different types of mechanisms.

	MECHANISM	TYPE	VERSION	
CU-LT CU-LT-L500 CU-LT-1S	Fusible link	MFUSP	Standard	
			MFUSP + FDCU	
	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)
			230 V	With or without thermoelectric fusible link/plug BFL(T)(-ST)
	Motorised with integrated field module	ONE-X	24 V	ONE-X 24
			230 V	ONE-X 230

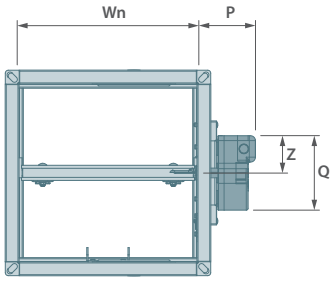
2.2.2 CU-LT WITH FUSIBLE LINK MECHANISM MFUSP

The MFUSP release mechanism automatically closes the 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 and brings the damper blade to its safety position (closed). The proper functioning of the fire damper can be tested periodically by manual release and reset.

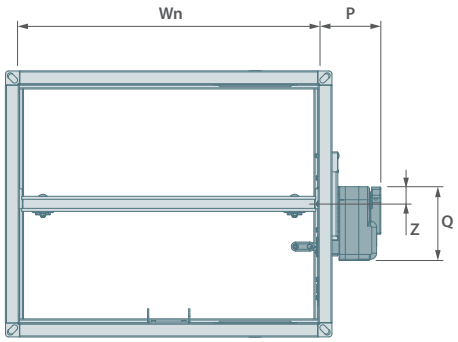
The position of the damper blade can optionally be monitored. A start and end run switch (FDCU) indicates an open or a closed position of the damper blade.



1. release button
2. reset lever
3. cable entry



MFUSP (H < 400 mm)



MFUSP (H ≥ 400 mm)

H < 400 mm

	MFUSP
P	101
Q	122
Z	61

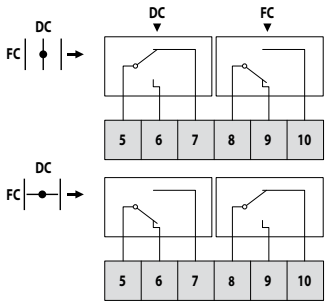
H ≥ 400 mm

	MFUSP
P	101
Q	123
Z	28

Detailed features

RUN TIME SPRING RETURN	POSITION SWITCHES STANDARD
1s	1mA...1A, DC 5V...AC 48V
OPERATIONAL RELIABILITY	**PROTECTION CLASS**
50 cycles	IP 42

Electrical connection diagram

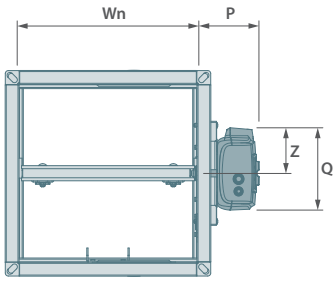


DC : Switch open position fire damper
FC : Switch closed position fire damper

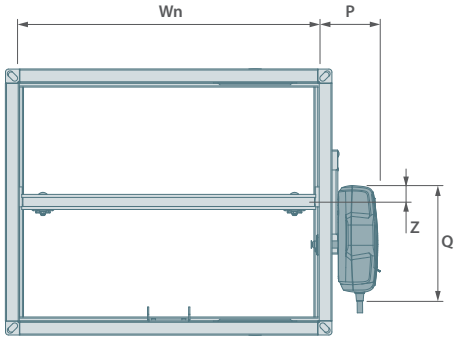
2.2.3 CU-LT WITH SPRING RETURN ACTUATOR ONE

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 (ST) (optional)



ONE (H < 400 mm)



ONE (H ≥ 400 mm)

H < 400 mm

	ONE
P	97
Q	136
Z	75

H ≥ 400 mm

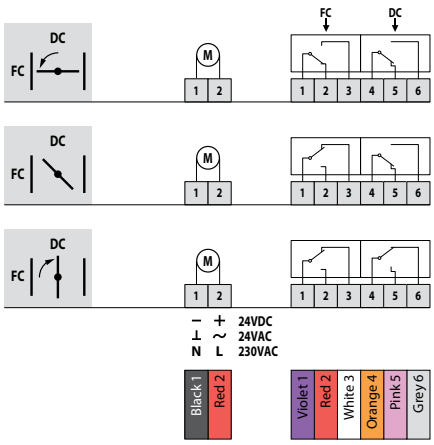
	ONE
P	97
Q	191
Z	27

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

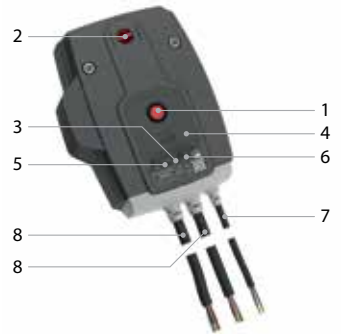


DC : Switch open position fire damper
FC : Switch closed position fire damper

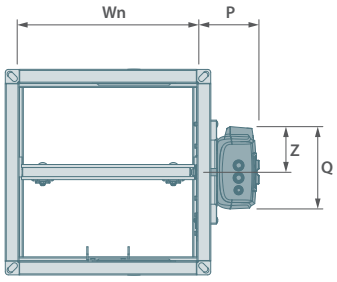
ONE T	RUNNING TIME SPRING	ENDURANCE TEST	PROTECTION CLASS	CABLE POWER SUPPLY	CABLE SWITCH
24 FDCU	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
230 FDCU	< 30 s	10,000 cycles	IP 54	1 m, 2 x 0.75 mm² (halogen-free)	1 m, 6 x 0.75 mm² (halogen-free)
24 FDCU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

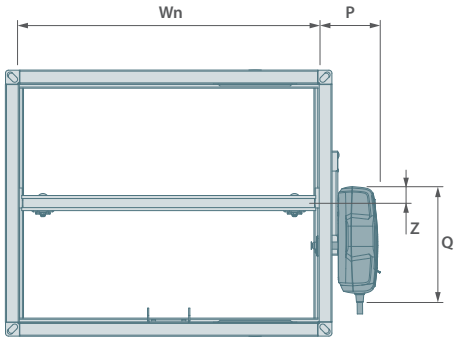
The ONE-X is a spring return actuator with an integrated communication module. The ONE-X allows automatic and remote control of the full range of Rf-t fire dampers. When the spring return actuator is energised, it brings the damper blade into its waiting position. If the voltage is interrupted or the 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 < 400 mm)



ONE-X (H ≥ 400 mm)

H < 400 mm

	ONE-X
P	97
Q	136
Z	75

H ≥ 400 mm

	ONE-X
P	97
Q	191
Z	27

Detailed features

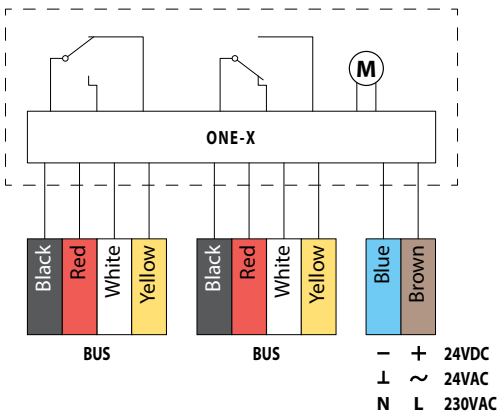
ONE-X	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN OPERATION)
ONE-X 24	24 V AC/DC (-10/+20%)	0,28W	4,2W
ONE-X 230	230 V AC (-15/+15%)	0,57W	4,2W

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	OPERATIONAL RELIABILITY	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)

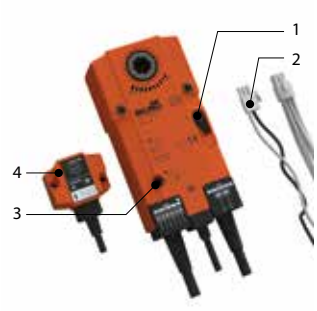
Electrical connection diagram



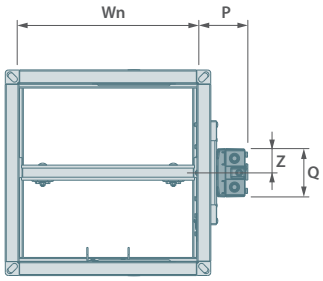
2.2.5 CU-LT WITH SPRING RETURN ACTUATOR BELIMO

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. A thermoelectric fuse (T) that reacts when the temperature exceeds 72°C is included, as is a plug (ST) to facilitate connection.

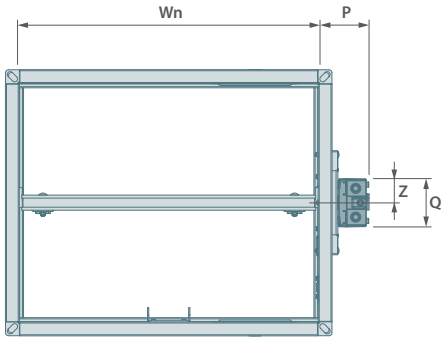
The motor is equipped with a start and end switch as standard, but can also be optional fitted with a double set of start and end switches contacts (SN2).



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



BFL (H < 400 mm)



BFL (H ≥ 400 mm)

H < 400 mm

	BFL(T)
P	81
Q	80
Z	40

H ≥ 400 mm

	BFL(T)
P	81
Q	80
Z	40

Detailed features

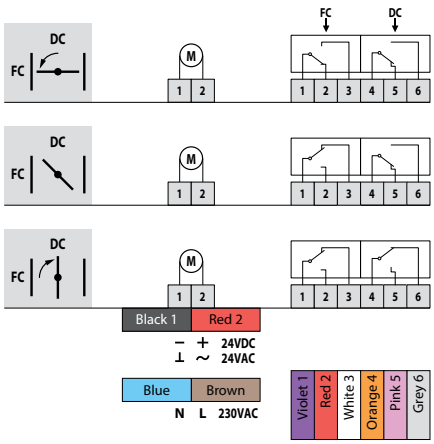
BFL(T)	MOTOR RATED VOLTAGE	POWER (AT REST)	POWER (IN USE)
BFL24(-ST)	24 V AC/DC	0,7W	2,5W
BFL230	230 V AC	0,9W	3W
BFLT24(-ST)	24 V AC/DC	0,8W	2,5W
BFLT230(-ST)	230 V AC	1,1W	3,5W

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

2.3 MONITORING AND CONTROL OF FIRE DAMPERS

Fire dampers with spring return actuators must 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 module. 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 CU-LT

Weight of damper without mechanism (kg)

Wn [mm] / Hn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
100	3,21	3,59	3,96	4,33	4,70	5,08	5,45	5,82	6,20	6,57	6,94	7,31	7,69
150	3,70	4,13	4,55	4,98	5,41	5,84	6,27	6,70	7,12	7,55	7,98	8,41	8,84
200	4,18	4,67	5,15	5,63	6,12	6,60	7,09	7,57	8,05	8,54	9,02	9,51	9,99
250	4,67	5,21	5,74	6,28	6,82	7,36	7,90	8,44	8,98	9,52	10,06	10,6	11,14
300	5,15	5,74	6,34	6,94	7,53	8,13	8,72	9,32	9,91	10,51	11,10	11,7	12,29
350	5,63	6,28	6,94	7,59	8,24	8,89	9,54	10,19	10,84	11,49	12,14	12,79	13,44
400	6,12	6,82	7,53	8,24	8,94	9,65	10,36	11,06	11,77	12,48	13,18	13,89	14,59
450	6,60	7,36	8,13	8,89	9,65	10,41	11,17	11,94	12,7	13,46	14,22	14,98	15,75
500	7,09	7,90	8,72	9,54	10,36	11,17	11,99	12,81	13,63	14,44	15,26	16,08	16,90
550	7,57	8,44	9,32	10,19	11,06	11,94	12,81	13,68	14,56	15,43	16,30	17,18	18,05
600	8,05	8,98	9,91	10,84	11,77	12,7	13,63	14,56	15,48	16,41	17,34	18,27	19,20

Weight of the mechanism (incl. mounting plate) (kg)

MFUSP	ONE(X)	BFL(T)
0,4	1,6	1,2

2.4.2 CU-LT-L500

Weight of the damper without mechanism (kg)

Wn [mm] / Hn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
100	3,85	4,31	4,75	5,20	5,64	6,10	6,54	6,98	7,44	7,88	8,33	8,77	9,23
150	4,44	4,96	5,46	5,98	6,49	7,01	7,52	8,04	8,54	9,06	9,58	10,09	10,61
200	5,02	5,60	6,18	6,76	7,34	7,92	8,51	9,08	9,66	10,25	10,82	11,41	11,99
250	5,60	6,25	6,89	7,54	8,18	8,83	9,48	10,13	10,78	11,42	12,07	12,72	13,37
300	6,18	6,89	7,61	8,33	9,04	9,76	10,46	11,18	11,89	12,61	13,32	14,04	14,75
350	6,76	7,54	8,33	9,11	9,89	10,67	11,45	12,23	13,01	13,79	14,57	15,35	16,13
400	7,34	8,18	9,04	9,89	10,73	11,58	12,43	13,27	14,12	14,98	15,82	16,67	17,51
450	7,92	8,83	9,76	10,67	11,58	12,49	13,40	14,33	15,24	16,15	17,06	17,98	18,90
500	8,51	9,48	10,46	11,45	12,43	13,40	14,39	15,37	16,36	17,33	18,31	19,30	20,28
550	9,08	10,13	11,18	12,23	13,27	14,33	15,37	16,42	17,47	18,52	19,56	20,62	21,66
600	9,66	10,78	11,89	13,01	14,12	15,24	16,36	17,47	18,58	19,69	20,81	21,92	23,04

Weight of the mechanism (incl. mounting plate) (kg)

MFUSP	ONE(X)	BFL(T)
0,4	1,6	1,2

2.4.3 CU-LT-1S

Weight of damper without mechanism (kg)

Wn [mm] / Hn [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
100	6,17	6,89	7,6	8,32	9,03	9,75	10,46	11,18	11,9	12,61	13,33	14,04	14,76
150	7,1	7,92	8,74	9,57	10,39	11,21	12,03	12,86	13,68	14,5	15,32	16,15	16,97
200	8,03	8,96	9,89	10,82	11,75	12,67	13,6	14,53	15,46	16,39	17,32	18,25	19,18
250	8,96	9,99	11,03	12,07	13,1	14,14	15,17	16,21	17,25	18,28	19,32	20,35	21,39
300	9,89	11,03	12,17	13,32	14,46	15,6	16,74	17,89	19,03	20,17	21,32	22,46	23,6
350	10,82	12,07	13,32	14,57	15,81	17,06	18,31	19,56	20,81	22,06	23,31	24,56	25,81
400	11,75	13,1	14,46	15,81	17,17	18,53	19,88	21,24	22,6	23,95	25,31	26,67	28,02
450	12,67	14,14	15,6	17,06	18,53	19,99	21,45	22,92	24,38	25,84	27,31	28,77	30,23
500	13,6	15,17	16,74	18,31	19,88	21,45	23,02	24,59	26,16	27,73	29,3	30,87	32,44
550	14,53	16,21	17,89	19,56	21,24	22,92	24,59	26,27	27,95	29,62	31,3	32,98	34,65
600	15,46	17,25	19,03	20,81	22,6	24,38	26,16	27,95	29,73	31,51	33,3	35,08	36,87

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

MFUSP	ONE(X)	BFL(T)
0,4	1,6	1,2

2.5 NET PASSAGE

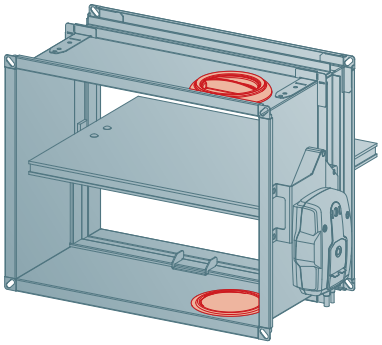
Below you will find an overview of the net free passage for the different dimensions of our fire damper.Discover the complete aeraulic data via our BIM library (https://bim.rft.eu).

Hn [mm] \ Wn [mm]		200	250	300	350	400	450	500	550	600	650	700	750	800
100	Sn (m^2)	0,01	0,013	0,015	0,018	0,021	0,024	0,026	0,029	0,032	0,035	0,037	0,04	0,043
150	Sn (m^2)	0,019	0,024	0,029	0,035	0,04	0,045	0,05	0,056	0,061	0,066	0,071	0,077	0,082
200	Sn (m^2)	0,028	0,036	0,043	0,051	0,059	0,067	0,074	0,082	0,09	0,098	0,105	0,113	0,121
250	Sn (m^2)	0,037	0,047	0,057	0,068	0,078	0,088	0,098	0,109	0,119	0,129	0,139	0,15	0,16
300	Sn (m^2)	0,046	0,059	0,071	0,084	0,097	0,11	0,122	0,135	0,148	0,161	0,173	0,186	0,199
350	Sn (m^2)	0,055	0,07	0,085	0,101	0,116	0,131	0,146	0,162	0,177	0,192	0,207	0,223	0,238
400	Sn (m^2)	0,064	0,082	0,099	0,117	0,135	0,153	0,17	0,188	0,206	0,224	0,241	0,259	0,277
450	Sn (m^2)	0,073	0,093	0,113	0,134	0,154	0,174	0,194	0,215	0,235	0,255	0,275	0,296	0,316
500	Sn (m^2)	0,082	0,105	0,127	0,15	0,173	0,196	0,218	0,241	0,264	0,287	0,309	0,332	0,355
550	Sn (m^2)	0,091	0,116	0,141	0,167	0,192	0,217	0,242	0,268	0,293	0,318	0,343	0,369	0,394
600	Sn (m^2)	0,1	0,128	0,155	0,183	0,211	0,239	0,266	0,294	0,322	0,35	0,377	0,405	0,433

2.6 OPTIONS

2.6.1 INSPECTION HATCH (SET OF 2) (UL)

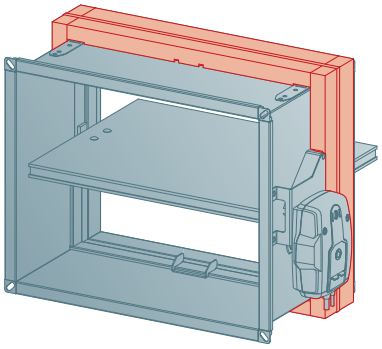
An inspection hatch can be used to visually check the position and condition (e.g. fouling) of the damper. The inspection hatch is always mounted in pairs, one at the bottom and one at the top of the fire damper.



2.6.2 IFW INSTALLATION BLOCK

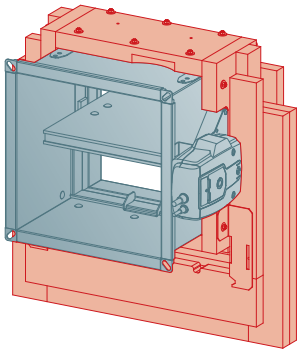
The IFW installation block is prescribed in several installation methods in section 3.3. If the installation block is ordered together with the fire damper, it is pre-assembled during production. However, the IFW installation block can also be supplied separately for installation on site.

On the wall side, the flange's slot holes are fitted with cage nuts (M6).



2.6.3 GDA (SLIDING CEILING CONNECTION)

Mounting frame with a sliding ceiling connection (up to 40 mm height difference) for installation in flexible walls (=metal stud walls). This option guarantees the fire resistance of the fire damper if the ceiling deflects due to high loads from the floors above. The GDA allows quick, easy and safe installation, directly against or with a gap of up to 75 mm under rigid ceilings.



2.6.4 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.

2.6.5 HYGIENE CERTIFICATE

Hygiene-Konformitätsprufung CU-LT W-379334-23-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).

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

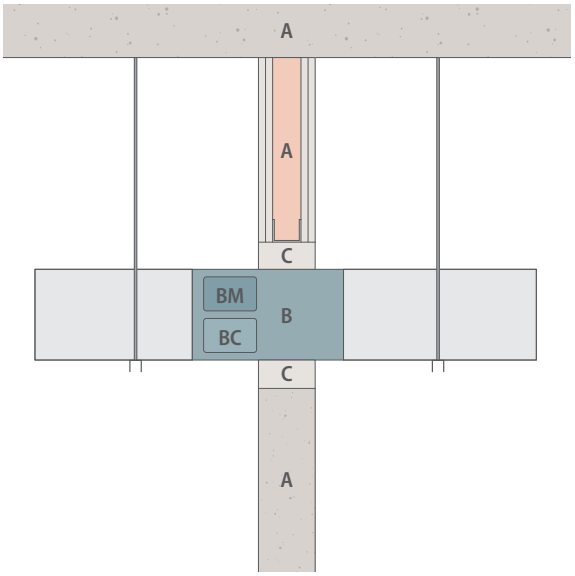
Ventilation ducts can be insulated to avoid condensation, to save energy or to make them fire-resistant. The flanges of fire dampers may also be insulated according to the rules of good workmanship and to the specifications of the insulation product. The operating mechanism of the fire damper must be 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 opting for a sealing method 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
W Fire damper
BM: mechanism
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 plasterboard F (EN 520)	Aerated concrete	Metal stud plasterboard A (EN 520)	Metal stud plasterboard F (EN 520)	Gypsum blocks	Aerated concrete	Concrete	Reinforced concrete	Aerated concrete	Concrete	Reinforced concrete
Shaft wall	Metal stud plasterboard F	•										
	Aerated concrete	•	•									
Flexible wall	Metal stud plasterboard A			•								
	Uninsulated metal stud plasterboard A			•								
	Metal stud plasterboard F			•	•							
	Uninsulated metal stud plasterboard 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 as specified in European standard EN 13501-2. The walls are constructed in accordance with the manufacturer's guidelines or locally applicable standards.

The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^3.

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.

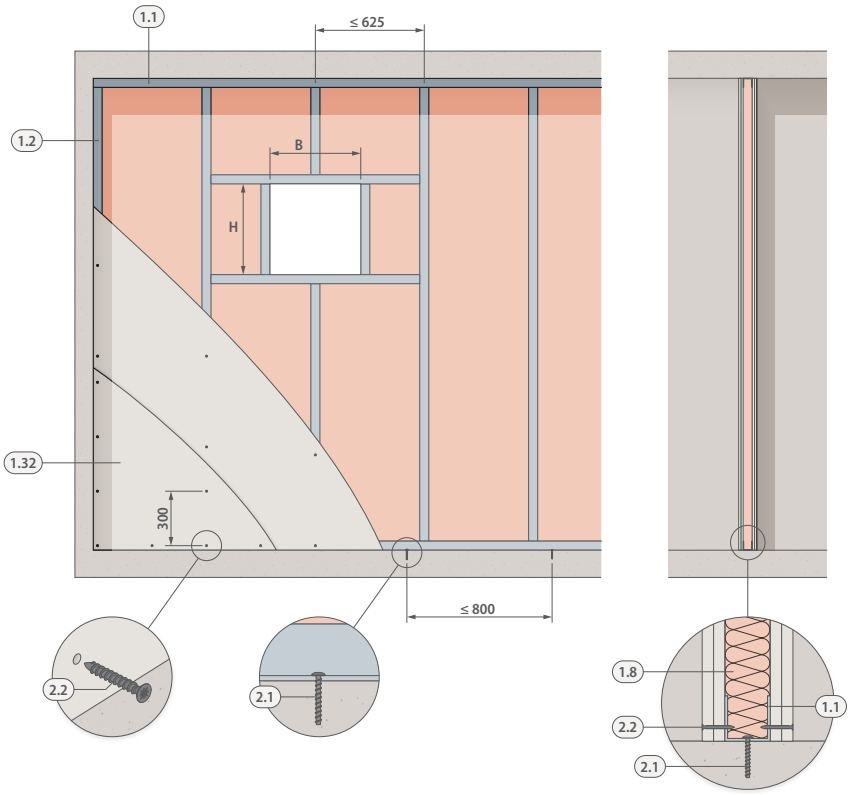
The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared.

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 "3.1.8 Installation at minimal distance").

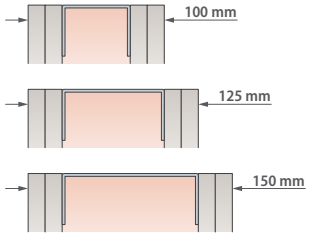
Rf-t tests fire dampers without drywall or anchors in the day edges. The addition of such components does not adversely affect the classification of the fire dampers.

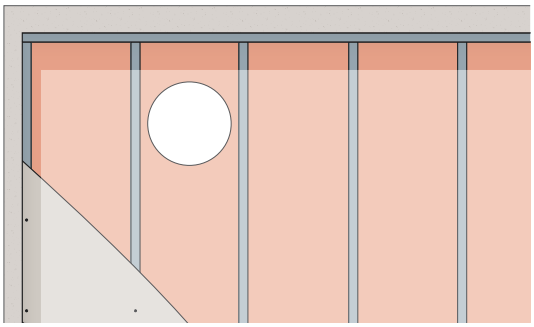
Flexible walls type A are typically used in installation methods for fire resistance of 60 minutes.

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



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





Alternative: without horizontal reinforcement.

When installing a fire damper in a flexible metal stud wall, it is not necessary from a fire technical point of view to install reinforcement profiles around the wall opening in some installation methods. Where applicable, this alternative is shown in the installation methods in section 3.3.

When constructing this type of wall, always follow the general instructions of the manufacturer of these wall systems.

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^3.

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.

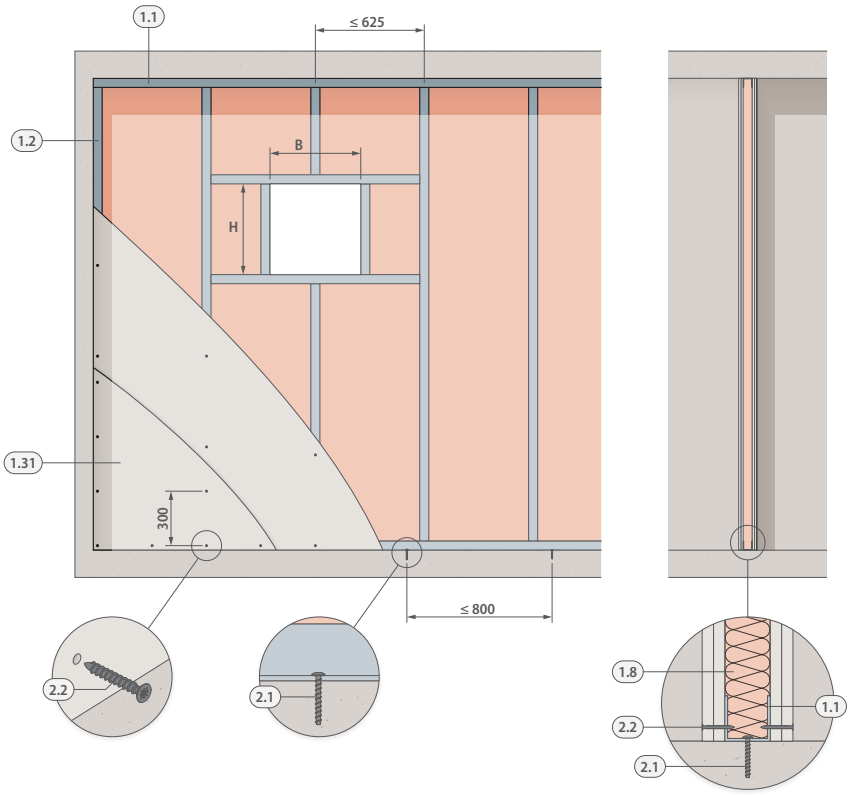
The visible joints and the connection with the (load-bearing) structure are finished with covering tape and joint filler, as specified by the manufacturer. The screw heads are smeared.

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 "3.1.8 Installation at minimal distance").

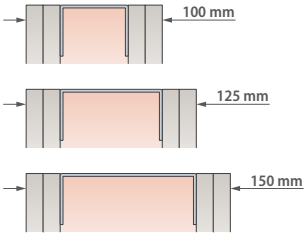
Rf-t tests fire dampers without drywall or anchors in the day edges. The addition of such components does not adversely affect the classification of the fire dampers.

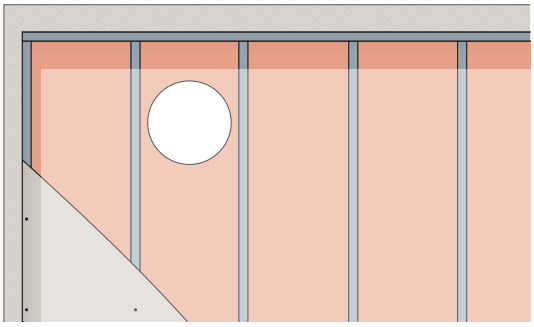
Type F flexible walls are typically used in installation methods for fire resistance of 90 or 120 minutes.

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	mounting screws Ø 6 mm
2.2	mounting screws Ø 3.5 mm
1.8	stone wool 40 kg/m³





Alternative: without horizontal reinforcement.

When installing a fire damper in a flexible metal stud wall, it is not necessary from a fire technical point of view to install reinforcement profiles around the wall opening for some installation methods. Where applicable, this alternative is shown in the installation methods in section 3.3.

When constructing this type of wall, always follow the general instructions of the manufacturer of these wall systems.

3.1.4 GYPSUM BLOCK WALL

A gypsum block wall is a non-load-bearing partition wall made of prefabricated gypsum blocks with a density ≥ 850 kg/m³ (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.

3.1.5 RIGID WALL

Rigid walls are walls made of cellular concrete, concrete or masonry with a minimum density of 650 ± 200 kg/m³ (EN 1363-1) and can also be applied on rigid walls made of hollow blocks. Any hollow spaces around the fire damper must be filled. The solutions in flexible wall constructions also apply to rigid walls.

3.1.6 RIGID FLOOR

Rigid floors are floors made of cellular concrete or concrete with a minimum density of 650 ± 200 kg/m³ (EN 1363-1). Any hollow spaces around the fire damper must be filled.

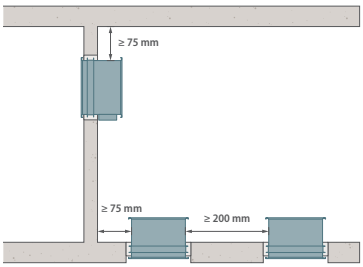
Rf-t fire dampers can be installed with the mechanism either above or below the floor.

3.1.7 RIGID FLOOR OF REINFORCED CONCRETE

Rigid floor of reinforced concrete with a specific mass of 2200 ± 200 kg/m³.

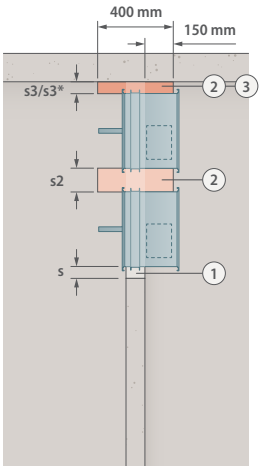
3.1.8 INSTALLATION AT MINIMAL DISTANCE

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/m³ 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)

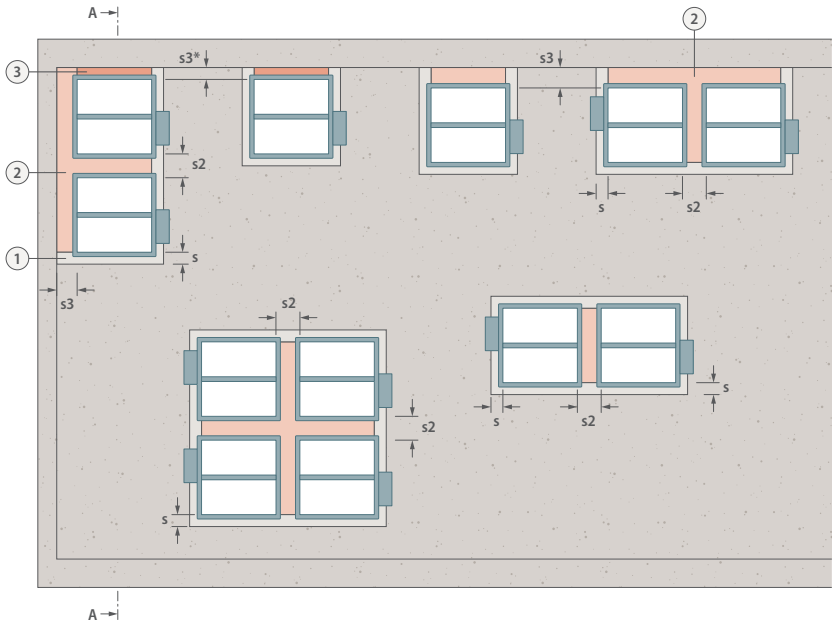
s3 Clearance between fire damper and vertical or horizontal (load-bearing) construction: **50 ≤ s3 < 75 mm**
② Rock wool panels ≥ 150 kg/m³ over a depth of 400 mm, of which 150 mm on the mechanism side of the wall[*]. This sealing is applied along the full width/height of the damper. (C.10)

s2 Spacing between two fire dampers: **50 ≤ s2 < 200 mm**
② Rock wool panels ≥ 150 kg/m³ over a depth of 400 mm, of which 150 mm on the mechanism side of the wall[*]. This sealing is applied along the entire width/height of the damper. (C.10)

Sealing according to existing solutions

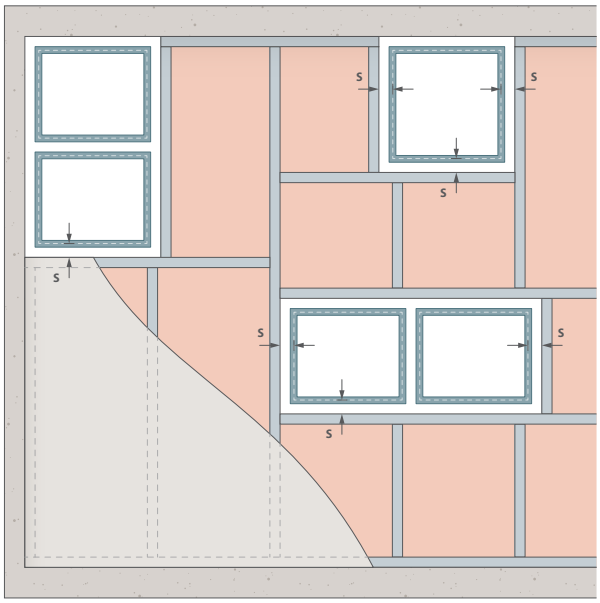
s Spacing
① E.g. mortar, gypsum or fire batts.

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



- 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 the minimal distance in a light partition wall, no metal profiles should be installed between the fire damper and the (load-bearing) construction or between the fire dampers themselves.



Information about each wall/sealing combination is provided in more detail in this manual.

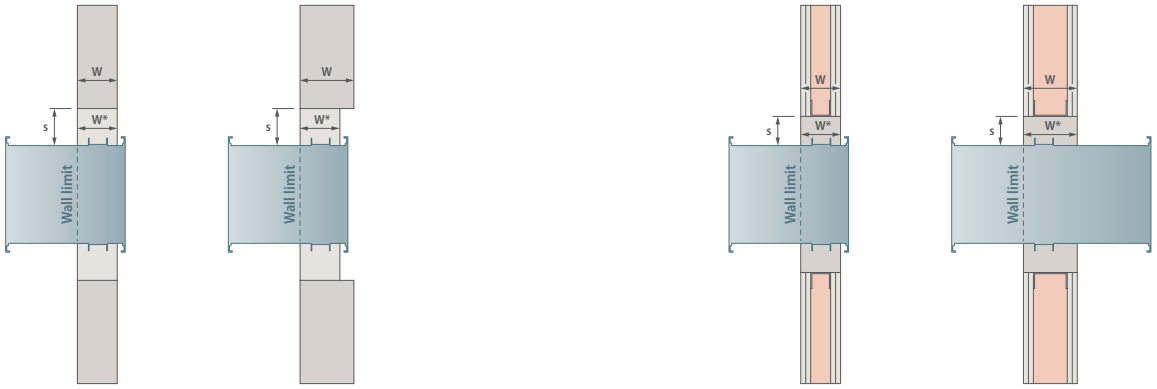
3.2 SEALING AND INSTALLATION MATERIALS

3.2.1 SEALINGS AND DIMENSIONS

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

For rigid walls, rigid floors and gypsum block walls, the minimum wall thickness (w) and the minimum sealing depth (w*) may differ. 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 achieved at the height of the damper blade

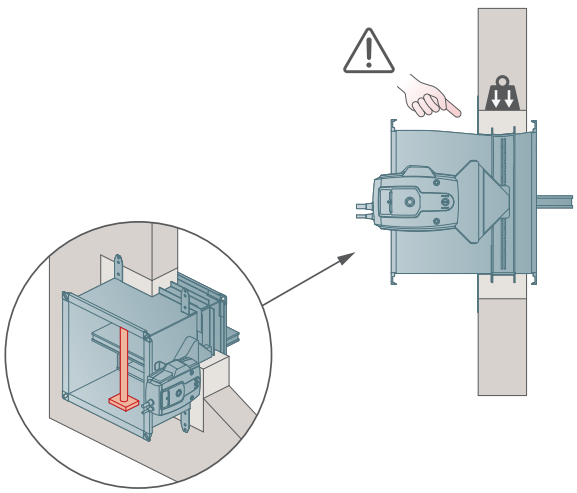
For flexible walls and sandwich panel system walls, the minimum wall thickness (w) and the minimum sealing depth (w*) are always the same.



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. 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.

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

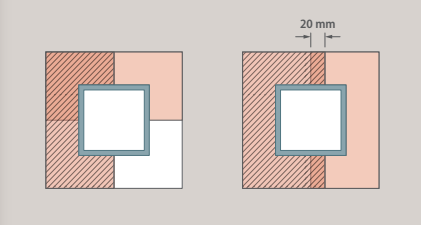


w	wall thickness	minimum thickness of the (load-bearing) construction
w	sealing depth	minimum sealing depth in the (load-bearing) construction
s	spacing in general	The width of the sealing opening 's' is determined by the distance tested during the official fire tests. If the gap around the fire damper 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 (load-bearing) construction
s3	s3* min distance	minimal distance between rectangular damper and the horizontal (load-bearing) construction ≤ 50 mm

3.2.2 OVERVIEW OF SEALING SYSTEMS

Below you will find an overview of the different systems and sealing materials that can be used when installing our fire dampers. Each system has been assigned a code beginning with the letter C. In the installation details further on in this document, you will always find a reference to this code with a brief description of the system in question. Below and in the legend at the end of this document, you will find all the 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.20	IFW	IFW installation block
C.22	1S mounting kit	1S - the rectangular fire damper is fitted with a mounting frame that is screwed to the wall.
C.31	Fire batt 2 x 50 mm	Single-sided fire batt (3.6) 2 x 50 mm When sealing with fire batt, the saw cuts of the batt must not coincide: the batt are therefore installed offset (min. 20 mm) to improve stability. 
C.4	Sliding ceiling connection (GDA)	
C.52	Remote 1 x 80 - fire batt	Fire damper offset from the wall, installation with fire batt 1 x 80 mm (3.6)
C.53	Remote 2 x 50 - fire batt	Fire damper offset from the wall, installation with fire batt 2 x 50 mm (3.6)

Generic sealing for installation at minimal distance.

C.10	Stone wool 150 kg/m	Stone wool ≥ 150 kg/m^3 over a depth of 400 mm, of which 150 mm on the mechanism side of the wall. For wall thicknesses of > 250 mm, the stone wool panel must be installed over a depth of > 400 mm until the entire wall thickness is filled. Flat stone wool panels can be used for rectangular fire dampers. For round fire dampers, 50 mm thick moulded pieces can be cut out to fit between the dampers (s2) and/or the wall construction (s3). By combining several 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, heat conductivity of l = 0.041 W/mK at 50 °C, water vapour absorption 0.02 %, Euroclass A1.
C.11	Stone wool 40 kg/m^3	Compressed standard stone wool Euroclass A1 with a density after compression of min. 67 kg/m^3 (e.g. Rockfit 431 with a density of 40 kg/m^3 and a thickness of 40 mm compressed to 25 mm) (cf. s3*), to be installed at a distance between the fire damper and the ceiling of ≤ 50 mm over a depth of 400 mm, 150 mm of which must be 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 entire width of the damper.

3.3 INSTALLATION METHODS

This chapter 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.

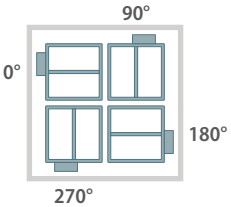
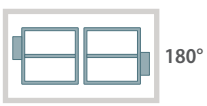
In the overview table below, you can quickly find which installation methods qualify for your specific application depending on the required fire resistance (classification) and the type and thickness of the (load-bearing) construction.

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.

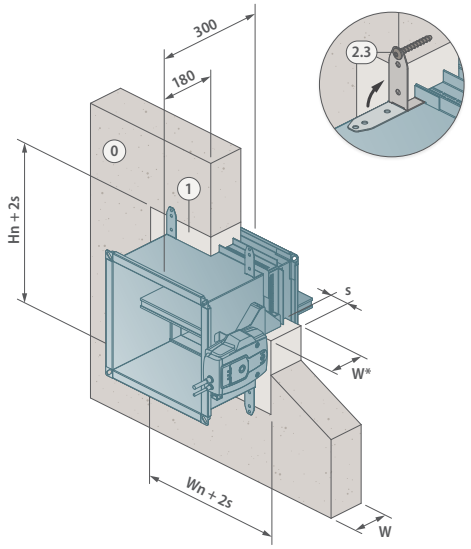
Overview of installation details

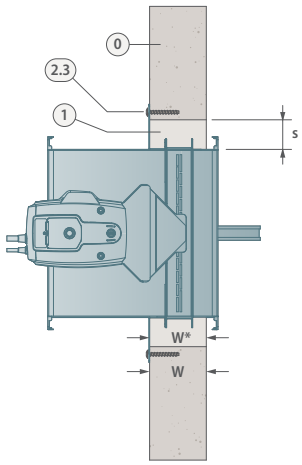
(LOAD-BEARING) CONSTRUCTION	INSTALLATION WITH	WALL THICKNESS	CLASSIFICATION	PAG
CU-LT (-L500)				
Rigid wall	mortar	≥ 100 mm	EI90S	38
	gypsum	≥ 100 mm	EI120S	39
	fire batt	≥ 100 mm	EI90S / EI120S	40
	offset from the wall - fire batt + IFW	≥ 100 mm	EI90S	42
Rigid floor	mortar	≥ 110 mm	EI90S	46
	gypsum	≥ 150 mm	EI120S	47
	fire batt	≥ 150 mm	EI90S / EI120S	48
Flexible wall	mortar	≥ 100 mm	EI90S	50
	gypsum	≥ 100 mm	EI60S / EI90S	51
	IFW installation block	≥ 100 mm	EI60S / EI90S	52
	fire batt	≥ 100 mm	EI60S / EI90S / EI120S	53
	sliding ceiling connection (GDA)	≥ 100 mm	EI120S	55
	offset from the wall - fire batt + IFW	≥ 100 mm	EI90S	56
CU-LT-1S				
Rigid wall	1S surface-mounted installation	≥ 100 mm	EI120S	58
Rigid floor	1S surface-mounted installation	≥ 150 mm	EI120S	59
Flexible wall	1S surface-mounted installation	≥ 100 mm	EI60S / EI90S	60
Gypsum block wall	1S surface-mounted	≥ 70 mm	EI120S	61

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

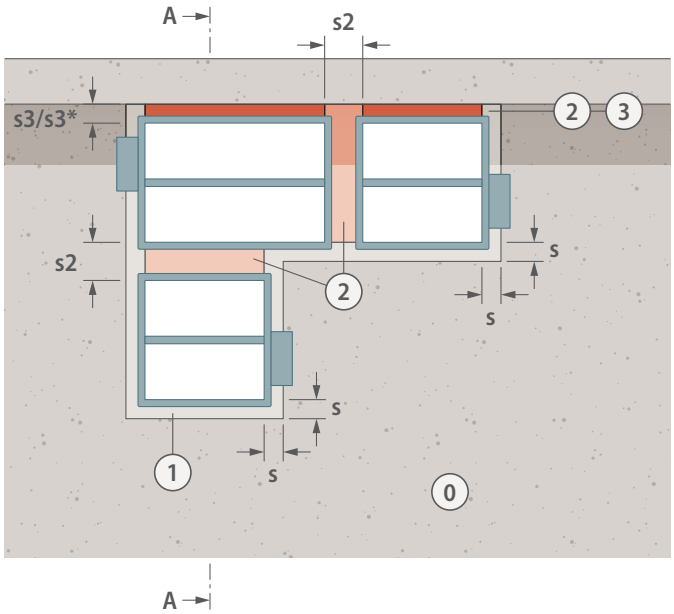
3.3.1 RIGID WALL - MORTAR

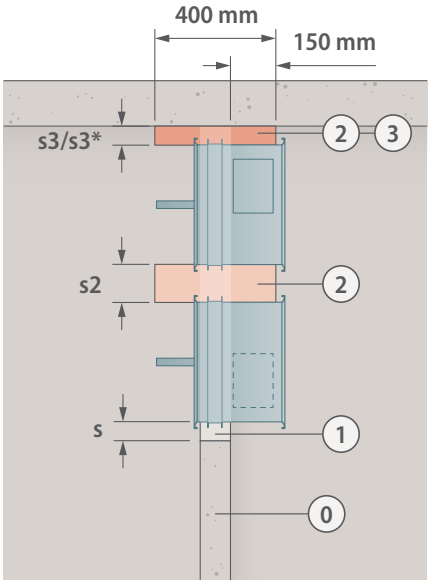
≤ 800 x 600	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	I





Minimal distance

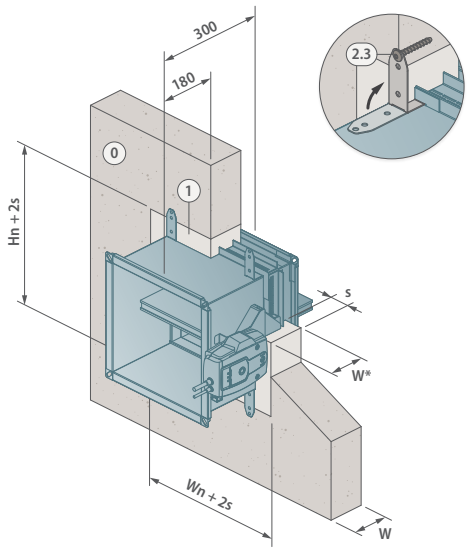


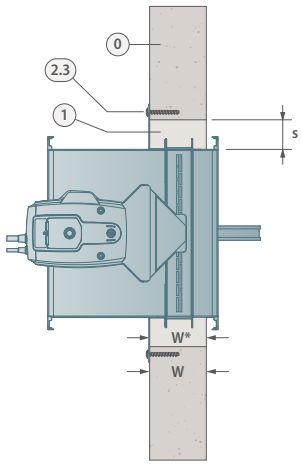


⓪	A.4	Rigid wall		
①	C.01	Mortar	20 ≤ s ≤ 50	
	2.3	Universal screw (optional)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

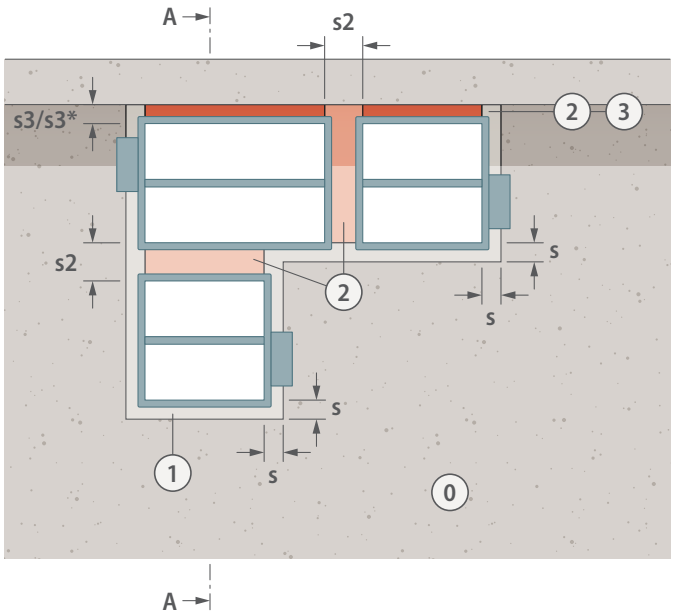
3.3.2 RIGID WALL - GYPSUM

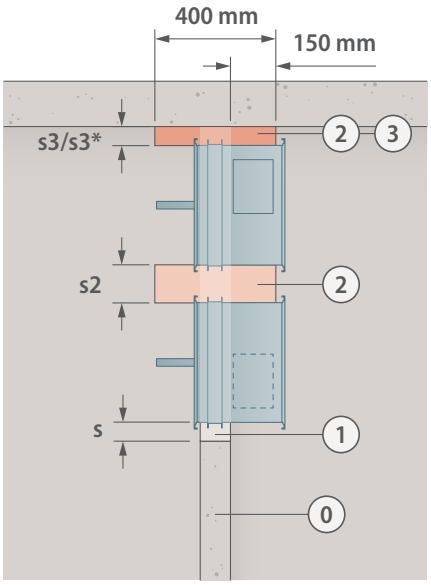
≤ 800 x 600	w ≥ 100, w* ≥ 100	EI120 (v_e i ↔ o)S	I





Minimal distance

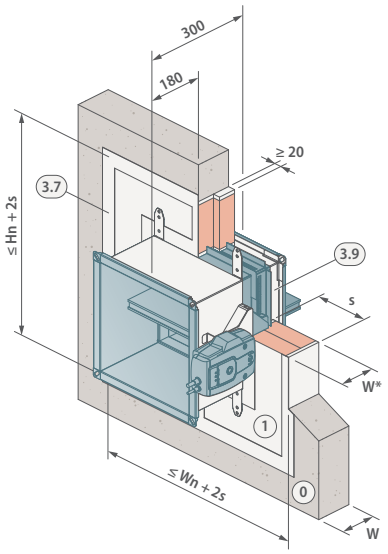


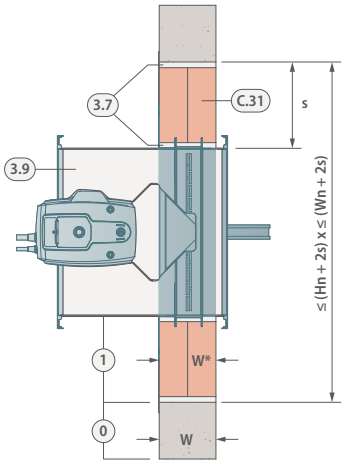


⓪	A.4	Rigid wall		
①	C.02	Gypsum	20 ≤ s ≤ 50	
	2.3	Universal screw (optional)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

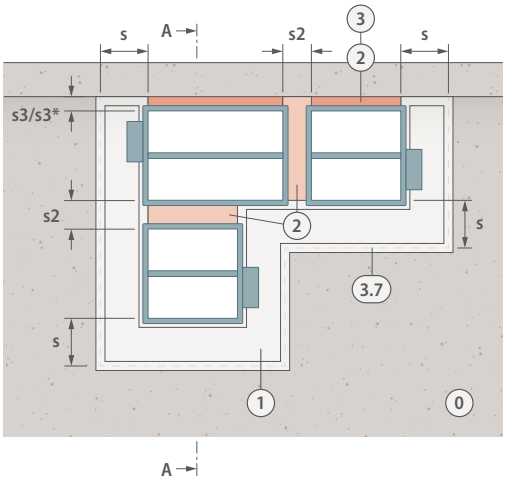
3.3.3 RIGID WALL - FIRE BATT

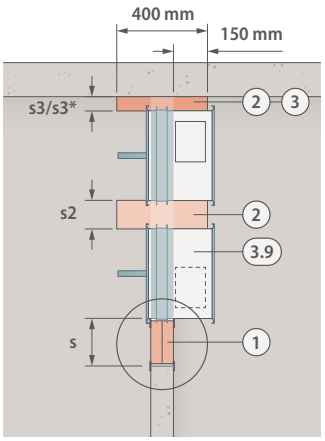
≤ 800 x 600	w ≥ 100, w* ≥ 100	EI120 (v_e i ↔ o)S	I

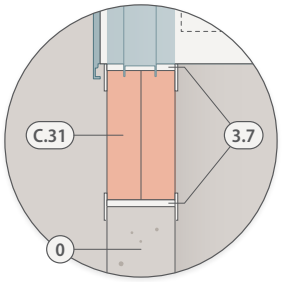




Minimal distance

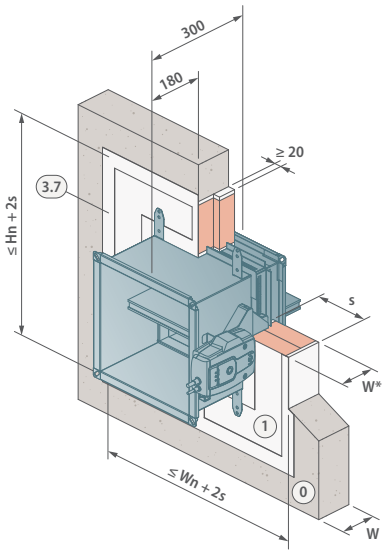


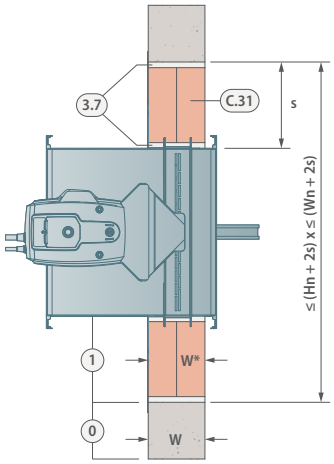




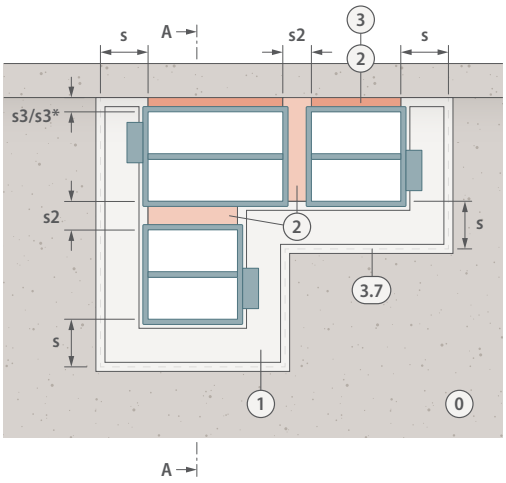
⓪	A.4	Rigid wall		
①	C.31	Fire batt 2 x 50 mm(Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
	3.9	Coating tunnel		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

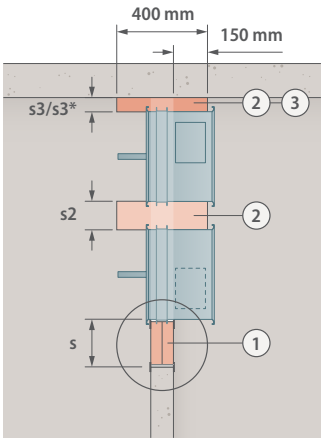
≤ 800 x 600	w ≥ 100, w* ≥ 100	EI90 (v_e i ↔ o)S	I

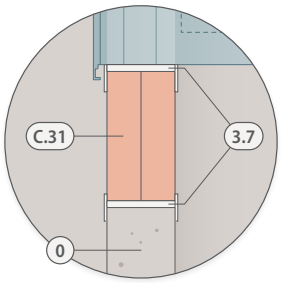




Minimal distance





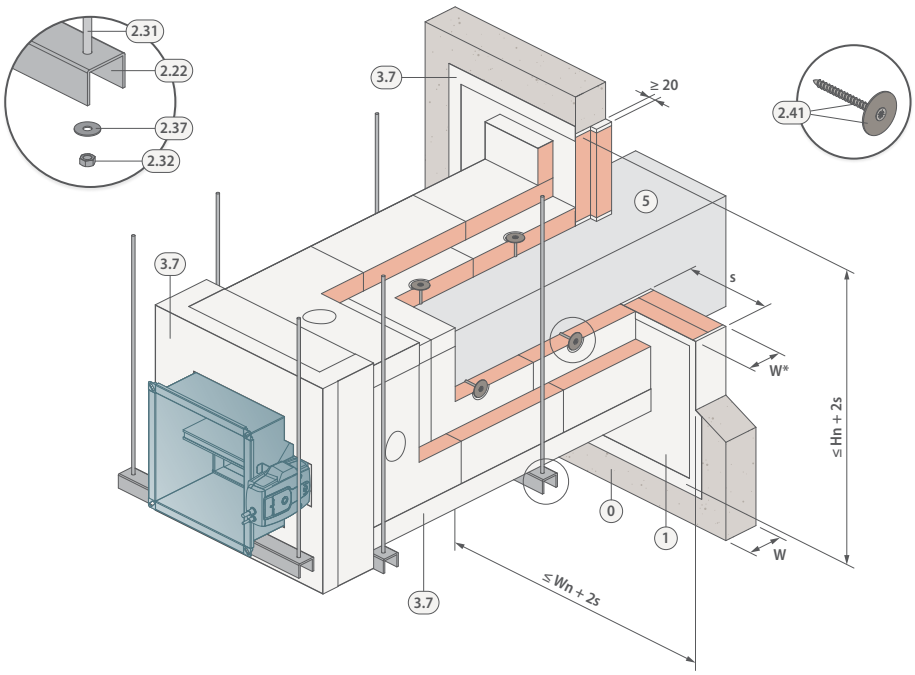


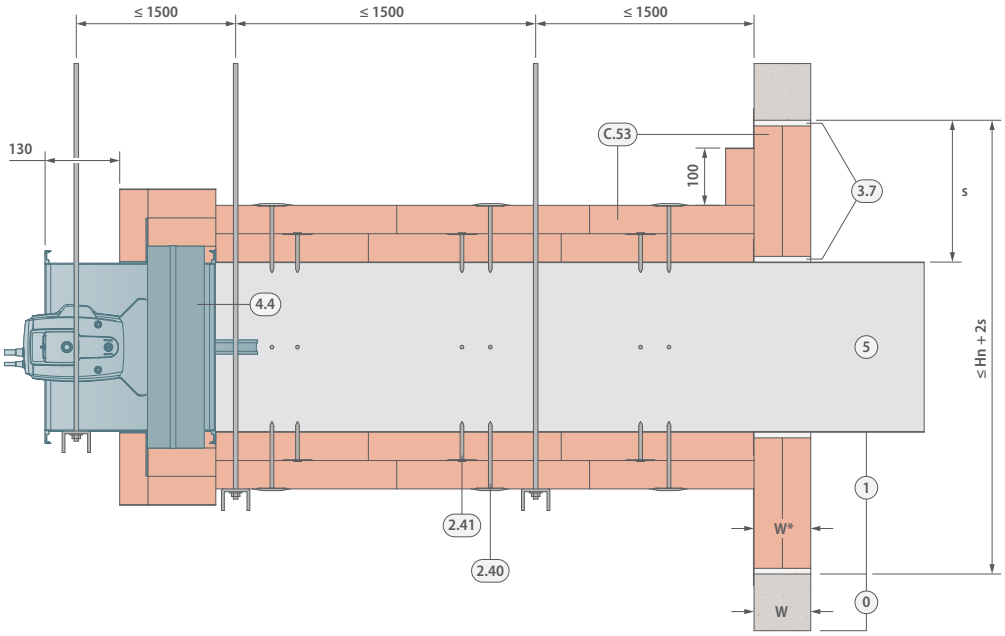
⓪	A.4	Rigid wall		
①	C.31	Fire batt 2 x 50 mm (Installation minimal distance: only with Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.4 RIGID WALL - OFFSET FROM THE WALL WITH FIRE BATT AND IFW INSTALLATION BLOCK

■ **C.53 DAMPER OFFSET FROM THE WALL, INSTALLATION WITH FIRE BATT 2 X 50 MM**

≤ 800 x 600	w ≥ 100 , w* ≥ 100	EI90 (v_e i ↔ o)S	II





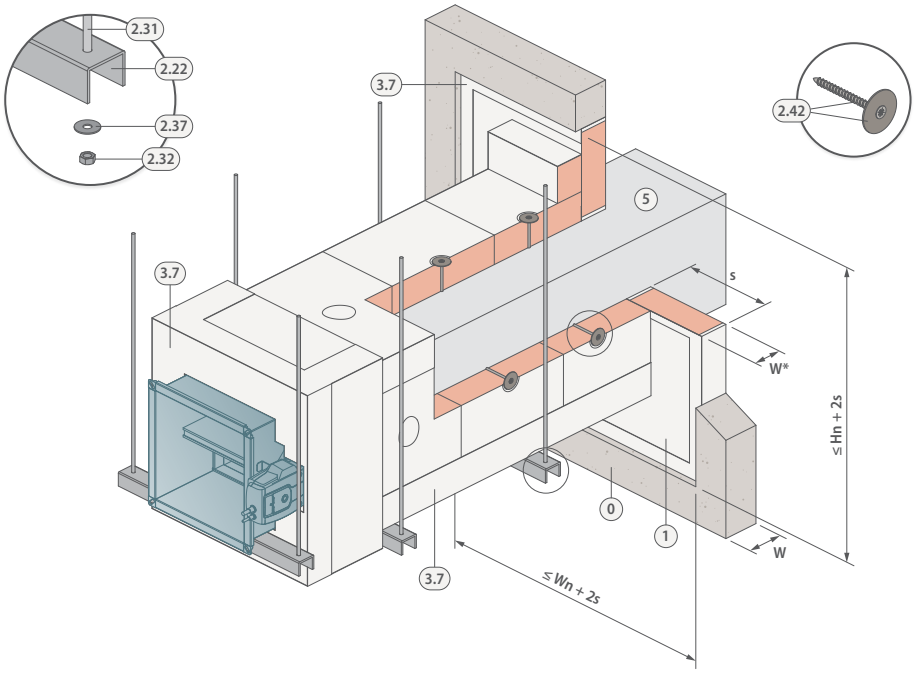
Minimal distance

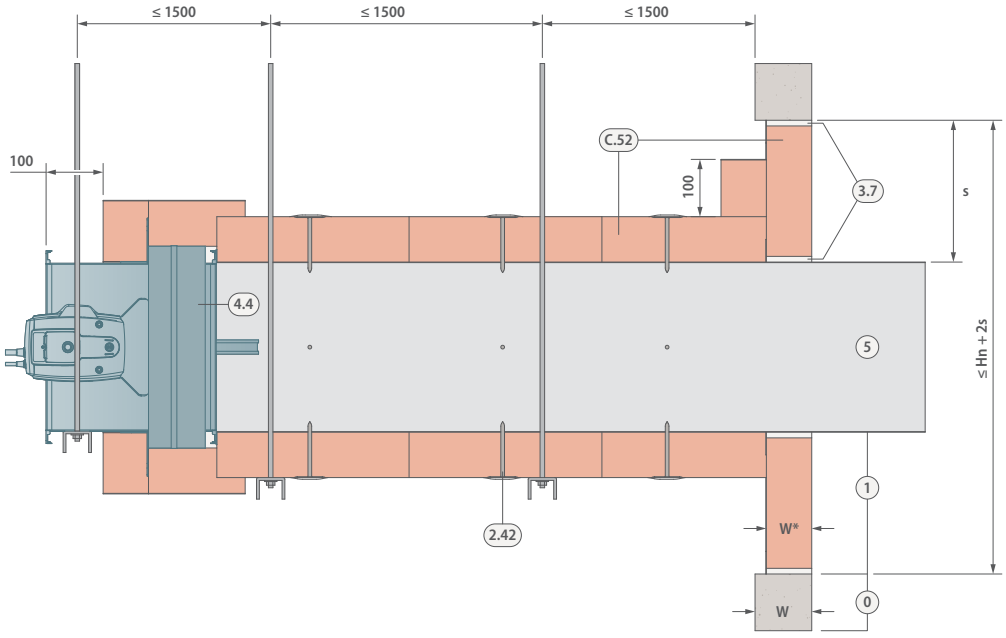
With this installation method, it is permitted to install the fire damper at a minimal distance from another fire damper or a (load-bearing) construction. Please contact Rf-t for more information about the installation guidelines for this specific configuration.

⓪	A.4	Rigid wall	
①	C.53	Remote 2 x 50 - fire batt (Promat or Hilti)	$20 \leq s \leq 400$; $2s \leq 600$
	3.7	Coating of end faces and joints	
	2.22	U-profile 50 x 38 x 5	
	2.31	M8 threaded rod	
	2.32	M8 nut	
	2.37	M8 washer	
	2.40	Universal screw Ø5x120 + washer M6x44 (9/m^2) (coated)	
	2.41	Universal screw Ø5x90 + washer M6x44 (9/m^2) (coated)	
	4.4	IFW installation block	
	5	Galvanised duct	

■ C.52 DAMPER OFFSET FROM THE WALL, INSTALLATION WITH FIRE BATT 1 X 80 MM

≤ 800 x 600	w ≥ 100, w* ≥ 80	EI90 (v_e i ↔ o)S	II





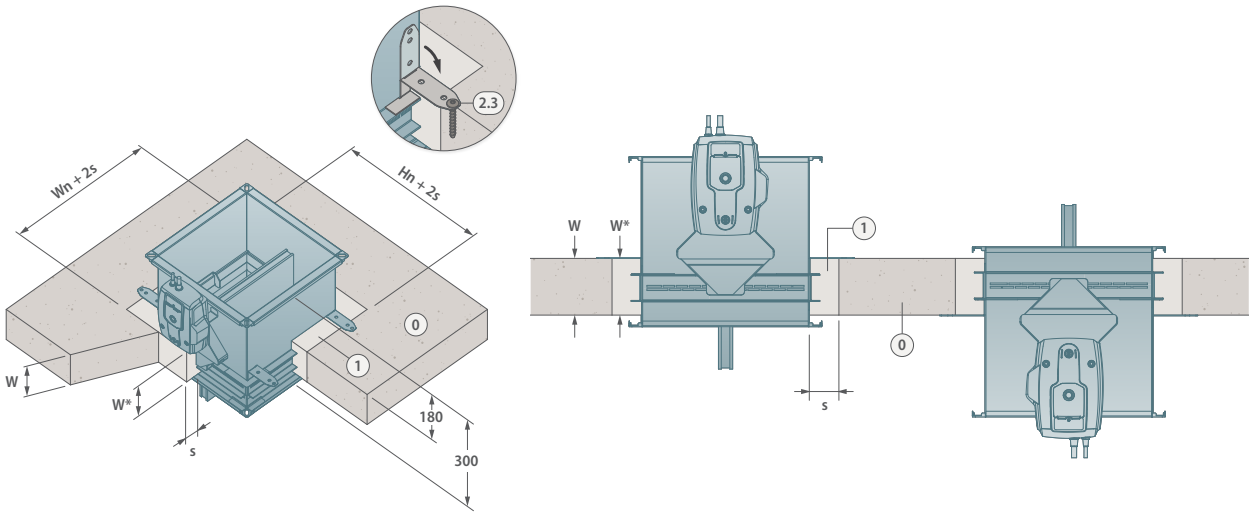
Minimal distance

With this installation method, it is permitted to install the fire damper at a minimal distance from another fire damper or a (load-bearing) construction. Please contact Rf-t for more information regarding the installation guidelines for this specific configuration.

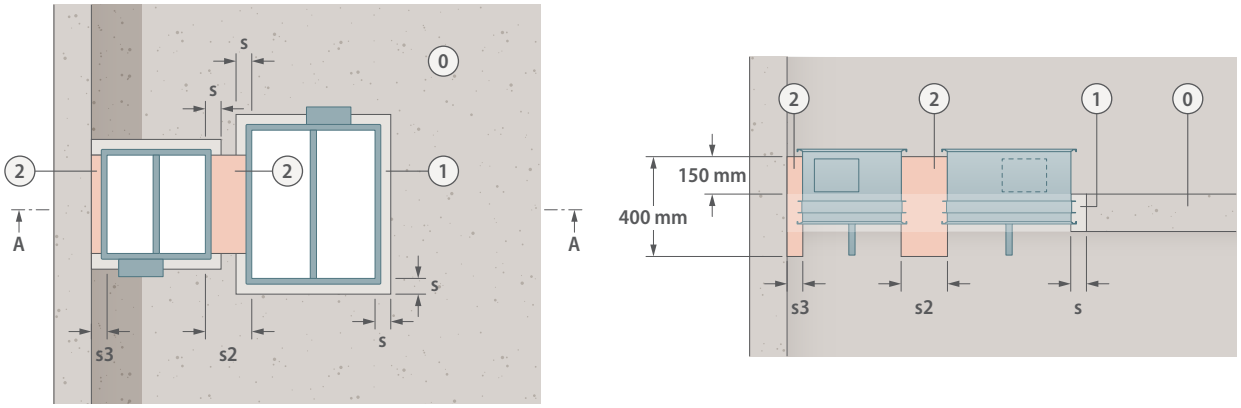
⓪	A.4	Rigid wall	
①	C.52	Remote 1 x 80 - fire batt (Promat or Hilti)	20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating of end faces and joints	
	2.22	U-profile 50 x 38 x 5	
	2.31	M8 threaded rod	
	2.32	M8 nut	
	2.37	M8 washer	
	2.42	Universal screw Ø5x100 + washer M6x44 (9/m^2) (coated)	
	4.4	IFW installation block	
	5	Galvanised duct	

3.3.5 RIGID FLOOR - MORTAR

≤ 800 x 600	w ≥ 110, w* ≥ 110	EI90 (h_o i ↔ o)S	I



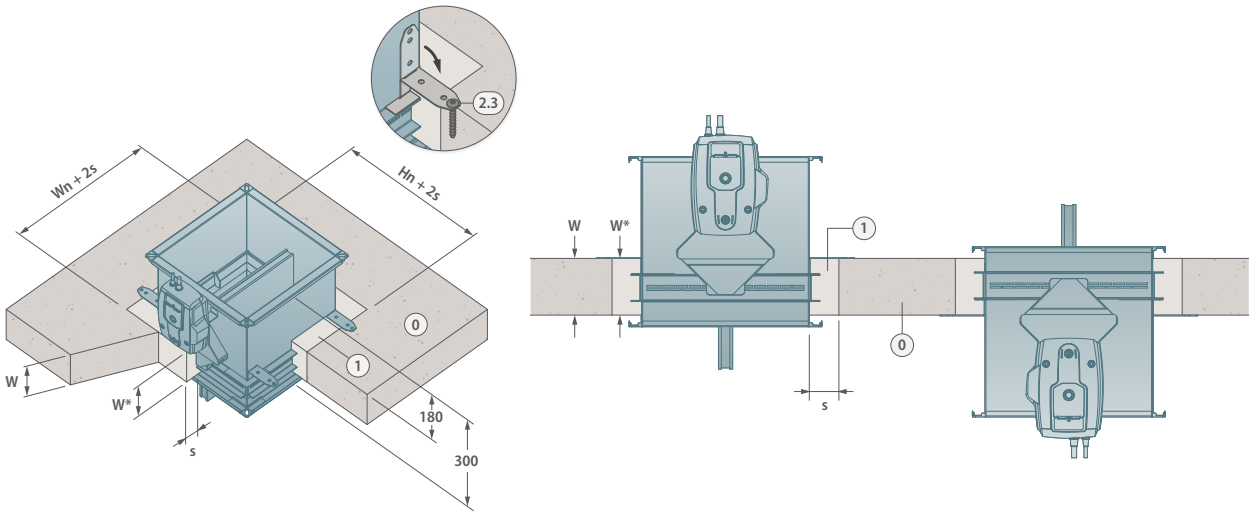
Minimal distance



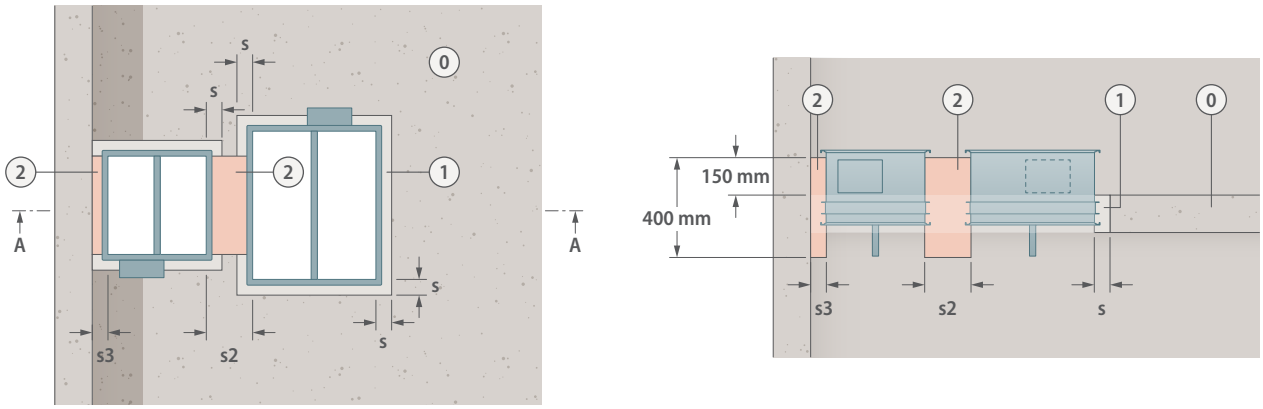
⓪	A.8	Rigid floor made of reinforced concrete		
①	C.01	Mortar	20 ≤ s ≤ 50	
	2.3	Universal screw (optional)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall)

3.3.6 RIGID FLOOR - GYPSUM

≤ 800 x 600	w ≥ 150, w* ≥ 150	EI120 (h_o i ↔ o)S	I



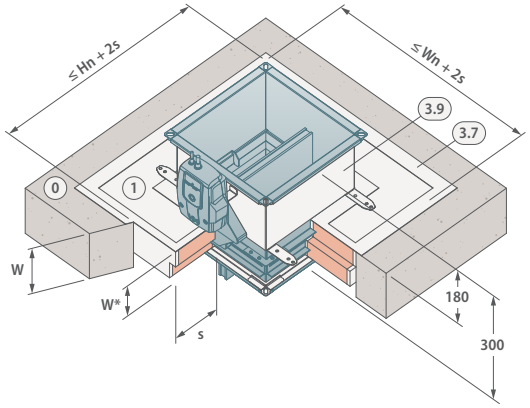
Minimal distance

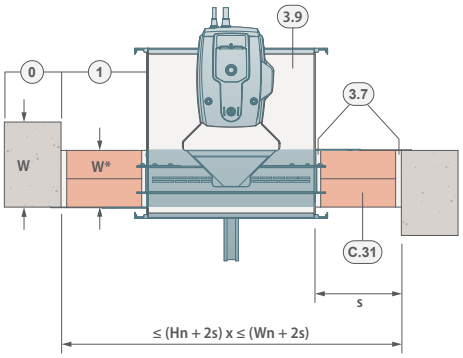


⓪	A.8	Rigid floor of reinforced concrete		
①	C.02	Gypsum	20 ≤ s ≤ 50	
	2.3	Universal screw (optional)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall)

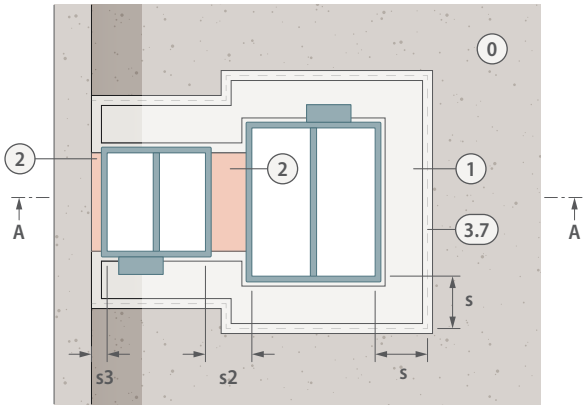
3.3.7 RIGID FLOOR - FIRE BATT

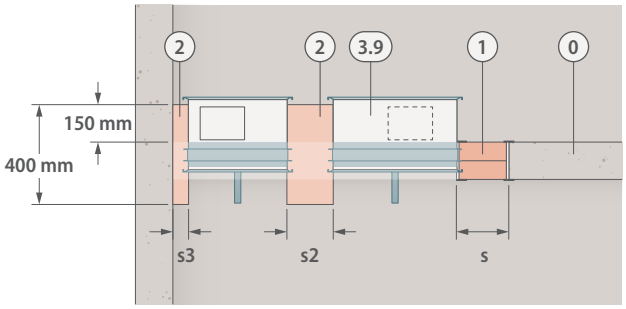
≤ 800 x 600	+ tunnel coating	w ≥ 150, w* ≥ 100	EI120 (h_o i ↔ o)S	I





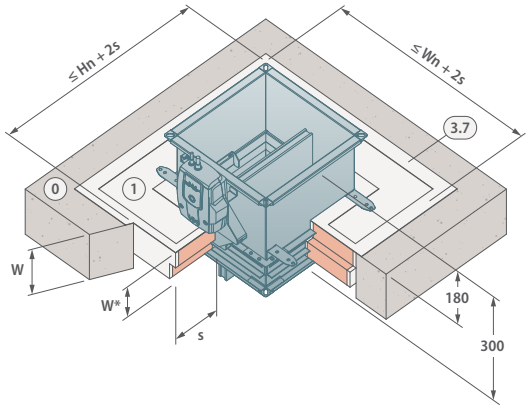
Minimal distance

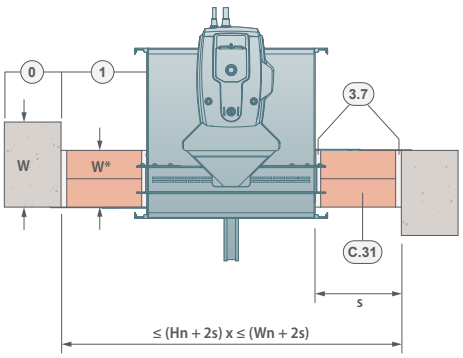




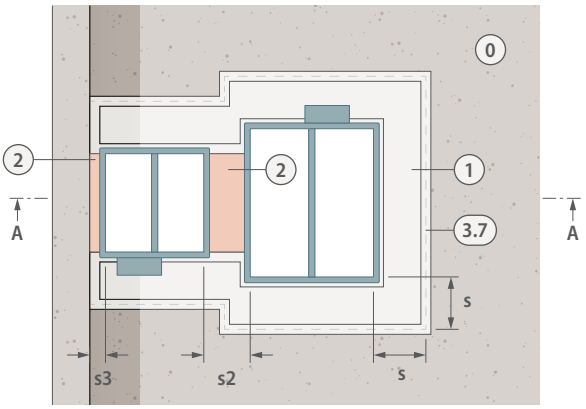
⓪	A.7	Rigid floor		
①	C.3	Fire batt 2 x 50 mm (Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
	3.9	Coating tunnel		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (towards wall)

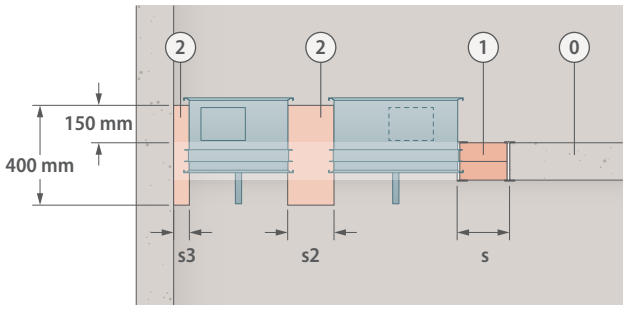
≤ 800 x 600	w ≥ 150, w* ≥ 100	EI90 (h_o i ↔ o)S	I





Minimal distance

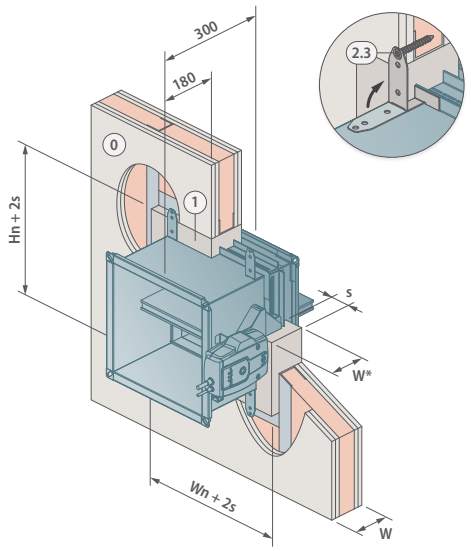


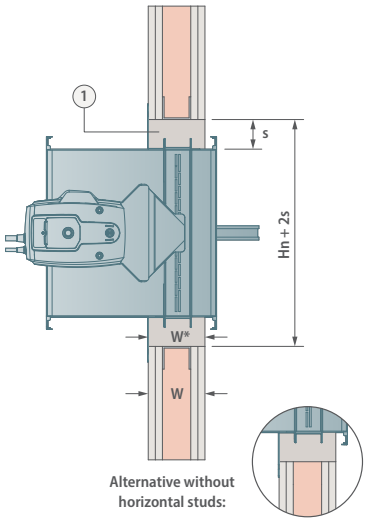


⓪	A.7	Rigid floor		
①	C.31	Fire batt 2 x 50 mm (Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall)

3.3.8 FLEXIBLE WALL - MORTAR

≤ 800 x 600	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	II





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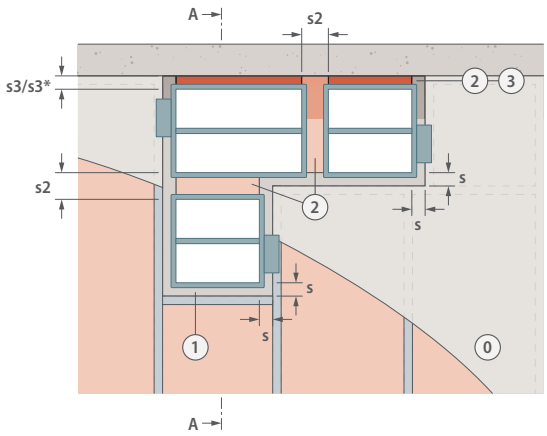
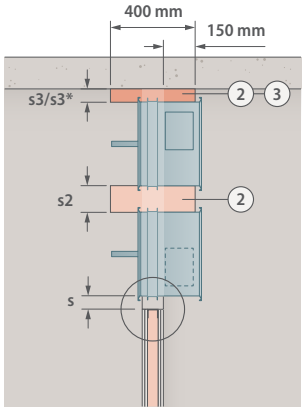
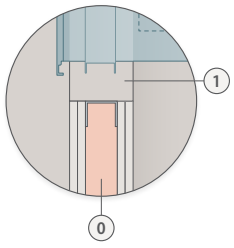




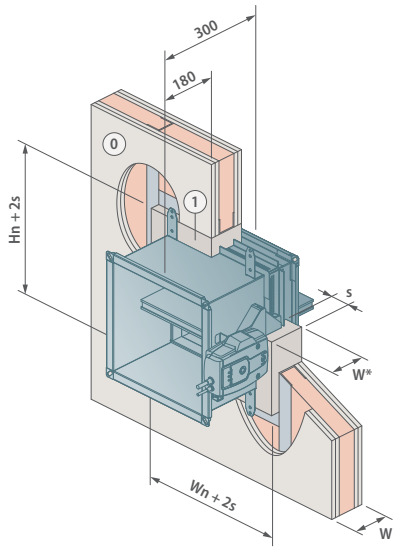


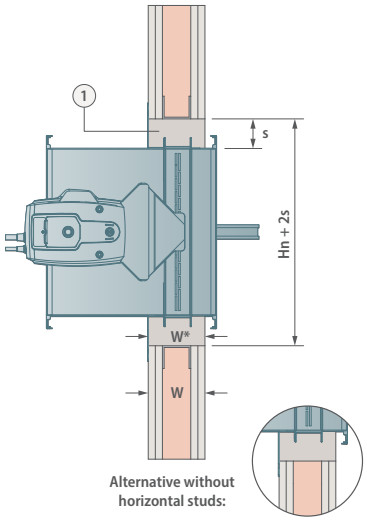
⓪	A.2	Flexible wall	20 ≤ s ≤ 50	
①	C.01	Mortar		
	2.3	Universal screw (optional)		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

- It is permitted to provide (single or double) cladding on the day edges, but this is not required. In this case, the plasterboards must be fixed to the metal profiles using screws.
- Anchoring the mortar seal using anchor points is permitted, but is not required to meet the intended fire resistance.

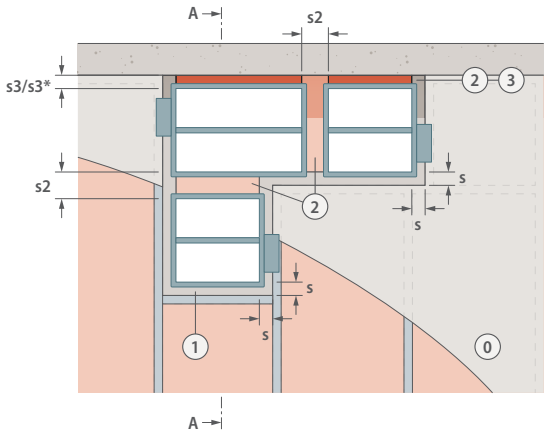
3.3.9 FLEXIBLE WALL - GYPSUM

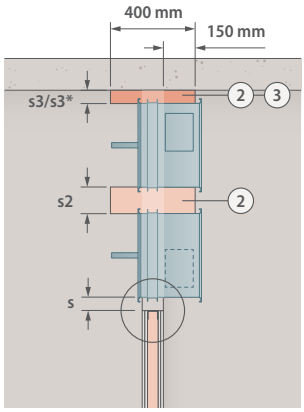
≤ 800 x 600	A.1 Type A	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	I
≤ 800 x 600	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	I

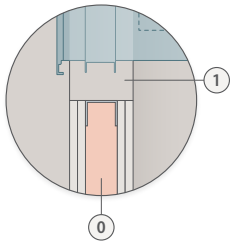




Minimal distance



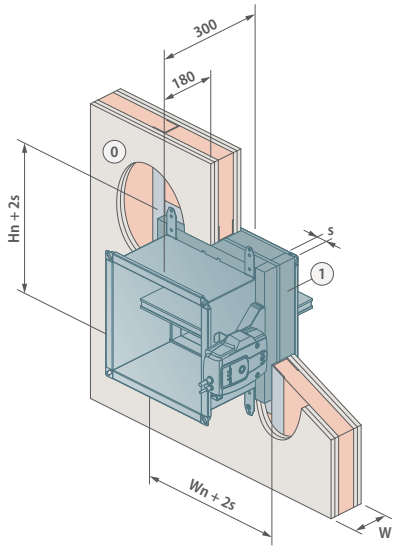


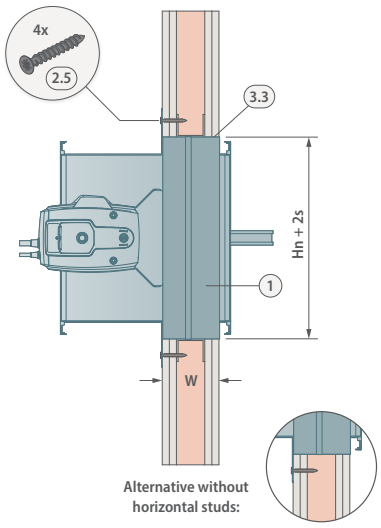


⓪	A.1	Flexible wall type A		
⓪	A.2	Flexible wall type F		
①	C.02	Gypsum	20 ≤ s ≤ 50	
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.10 FLEXIBLE WALL - IFW INSTALLATION BLOCK

≤ 800 x 600	A.1 Type A	w ≥ 100	EI60 (v_e i ↔ o)S	III
≤ 800 x 600	A.2 Type F	w ≥ 100	EI90 (v_e i ↔ o)S	III

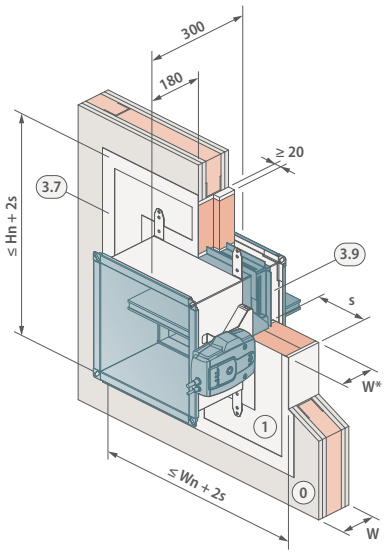


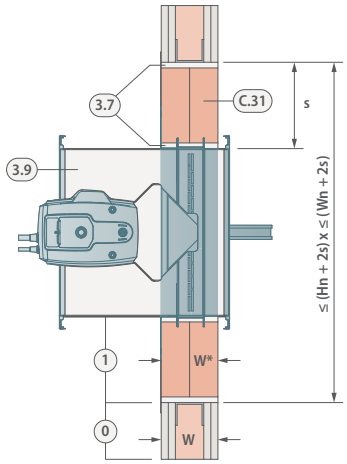


⓪	A.1	Flexible wall type A	
⓪	A.2	Flexible wall type F	
①	C.20	IFW installation block	2s = 65
	2.5	4 x universal screw Ø 6 x 50 (optional)	
	3.3	Joint filler	

3.3.11 FLEXIBLE WALL - FIRE BATT

≤ 800 x 600	A.1 Type A + tunnel coating	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	I
≤ 800 x 600	A.2 Type F + tunnel coating	w ≥ 100, w* = w	EI120 (v_e i ↔ o)S	I





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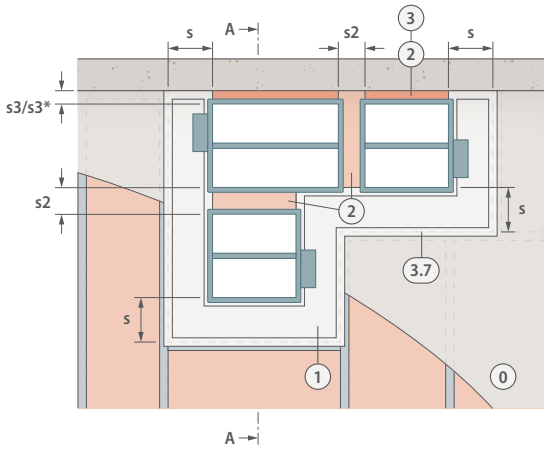
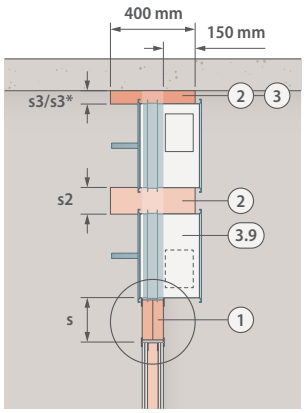
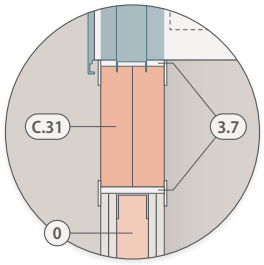
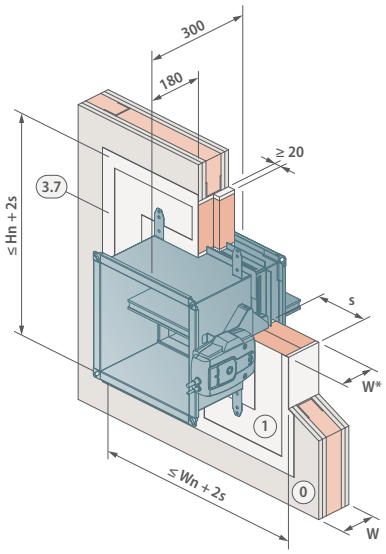


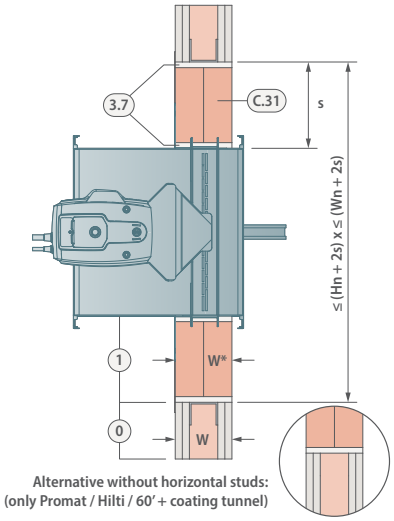




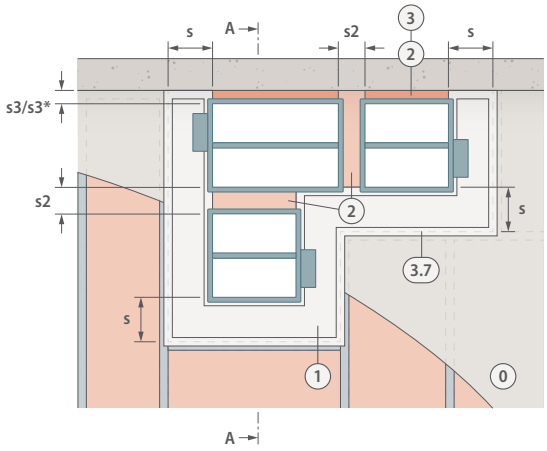
⓪	A.2	Flexible wall		
①	C.31	Fire batt 2 x 50 mm (Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
	3.9	Coating tunnel		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

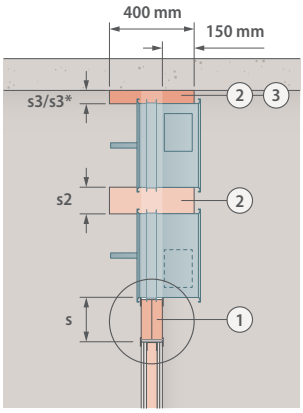
≤ 800 x 600	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	I

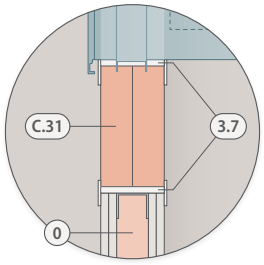




Minimal distance



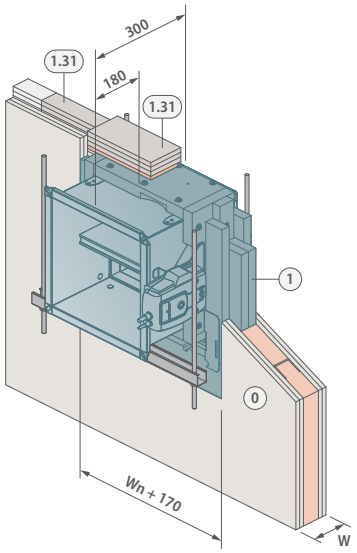


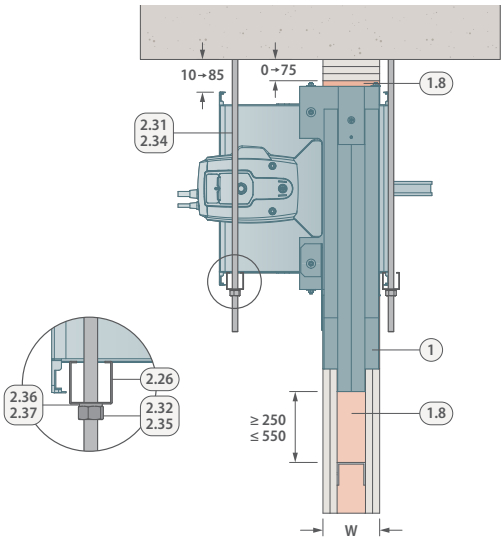


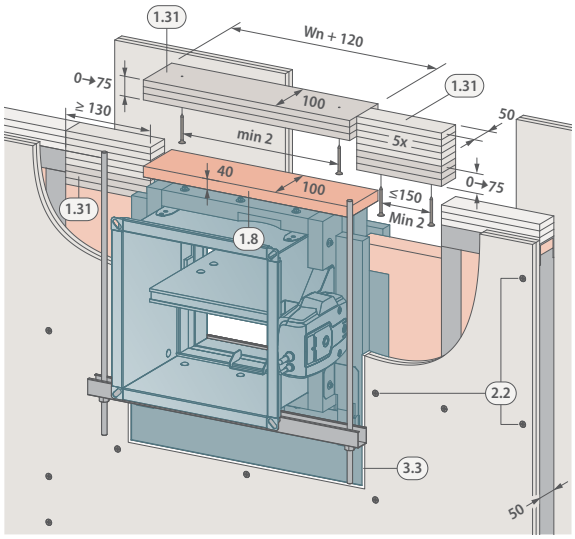
⓪	A.1	Flexible wall type A		
⓪	A.2	Flexible wall type F		
①	C.31	Fire batt 2 x 50 mm (Installation minimal distance: only with Promat or Hilti)		20 ≤ s ≤ 400; 2s ≤ 600
	3.7	Coating end faces and joints		
②	C.10	Stone wool 150 kg/m³	50 ≤ s2 < 200	50 ≤ s3 < 75 (to wall/ ceiling)
③	C.11	Stone wool	25 ≤ s3* ≤ 50 (to ceiling)	

3.3.12 FLEXIBLE WALL - SLIDING CEILING CONNECTION (GDA)

≤ 800 x 600	A.2 Type F	w ≥ 100	EI120 (v_e i ↔ o)S	IV







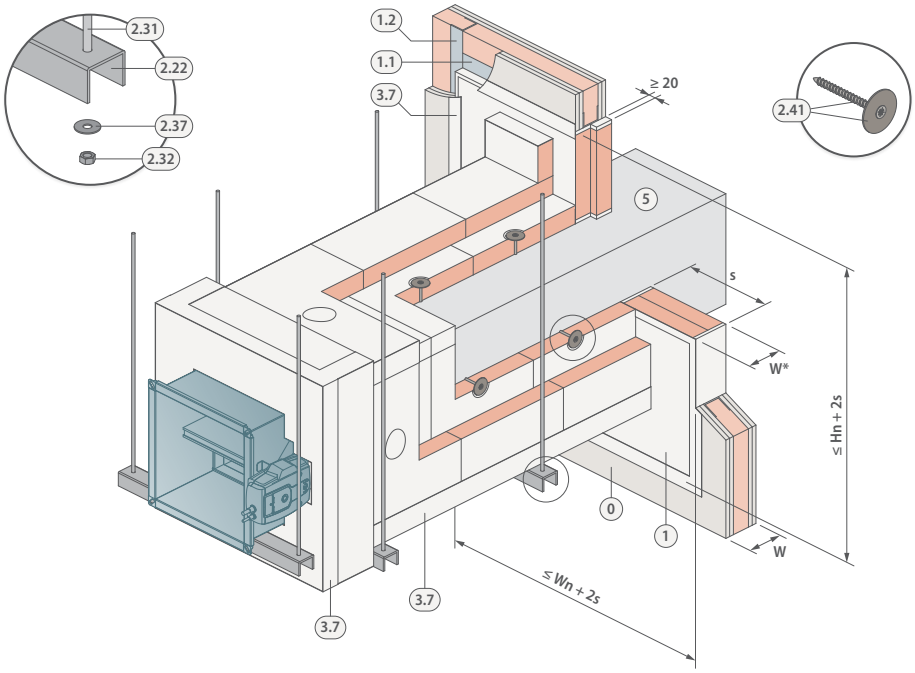
⓪	A.2	Flexible wall
①	C.4	Sliding ceiling connection*
	1.31	12.5 mm plasterboard type F
	1.8	stone wool 40 kg/m^3
	2.2	mounting screws Ø3.5 mm
	2.26	U-profile 25x25x2
	2.31	M8 threaded rod
	2.32	M8 nut
	2.34	M10 threaded rod
	2.35	M10 nut
	2.36	M10 washer
	2.37	M8 washer

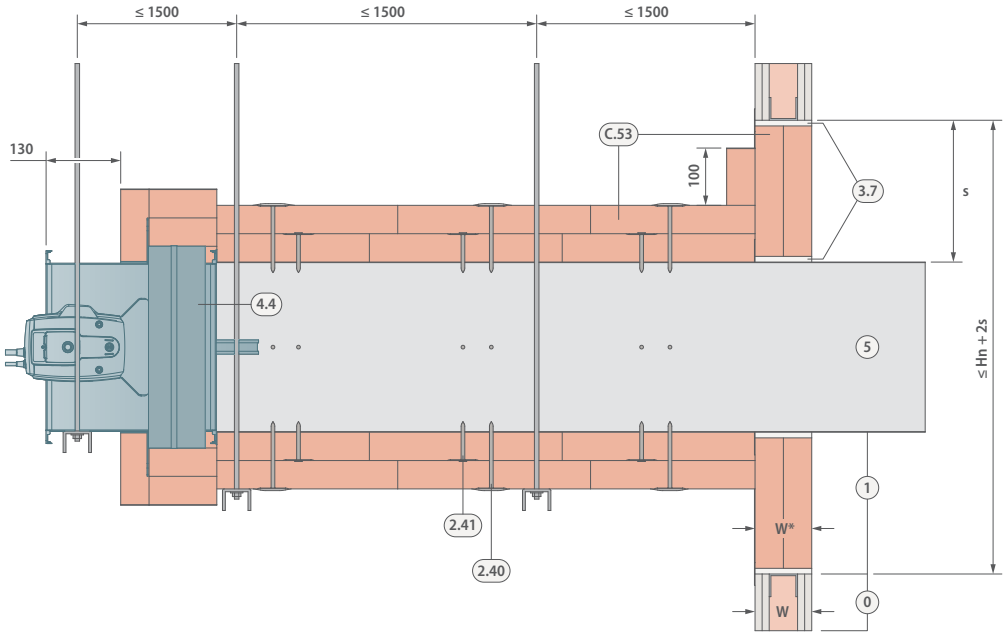
*see supplier's instructions

3.3.13 FLEXIBLE WALL - OFFSET FROM THE WALL WITH FIRE BATT AND IFW INSTALLATION BLOCK

■ C.53 FIRE DAMPER OFFSET FROM THE WALL, INSTALLATION WITH FIRE BATT 2 X 50 MM

≤ 800 x 600	A.1 Type A	w ≥ 100, w* = w	EI60 (v_e i ↔ o)S	II
≤ 800 x 600	A.2 Type F	w ≥ 100, w* = w	EI90 (v_e i ↔ o)S	II





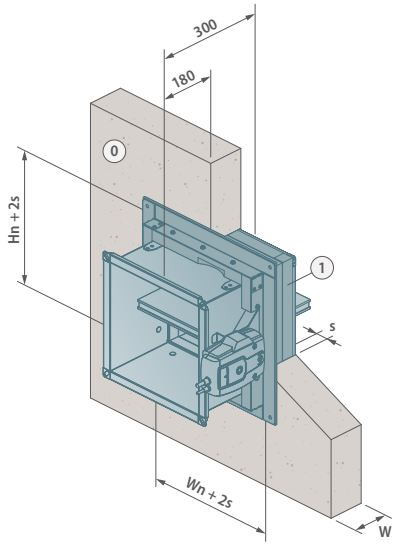
Minimal distance

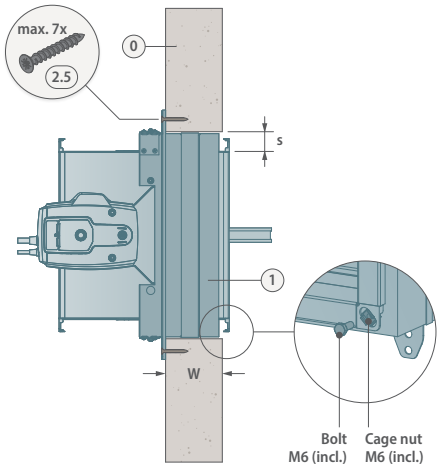
With this installation method, it is permitted to install the fire damper at a minimal distance from another fire damper or a (load-bearing) construction. Please contact Rf-t for more information about the installation guidelines for this specific configuration.

⓪	A.1	Flexible wall type A
⓪	A.2	Flexible wall type F
①	C.53	Remote 2 x 50 - fire batt (Promat or Hilti)
	3.7	Coating on ends and seams
	1.1	Horizontal profile
	1.2	Vertical profile
	2.22	U-profile 50x38x5 mm
	2.31	M8 threaded rod
	2.32	M8 nut
	2.37	M8 washer
	2.40	Universal screw Ø5x120 + washer M6x44 (9/m^2) (coated)
	2.41	Universal screw Ø5x90 + washer M6x44 (9/m^2) (coated)
	4.4	IFW installation block
	5	Galvanised duct

3.3.14 RIGID WALL - SURFACE MOUNTING WITH CU-LT-1S

≤ 800 x 600	w ≥ 100	EI120 (v_e i ↔ o)S	III

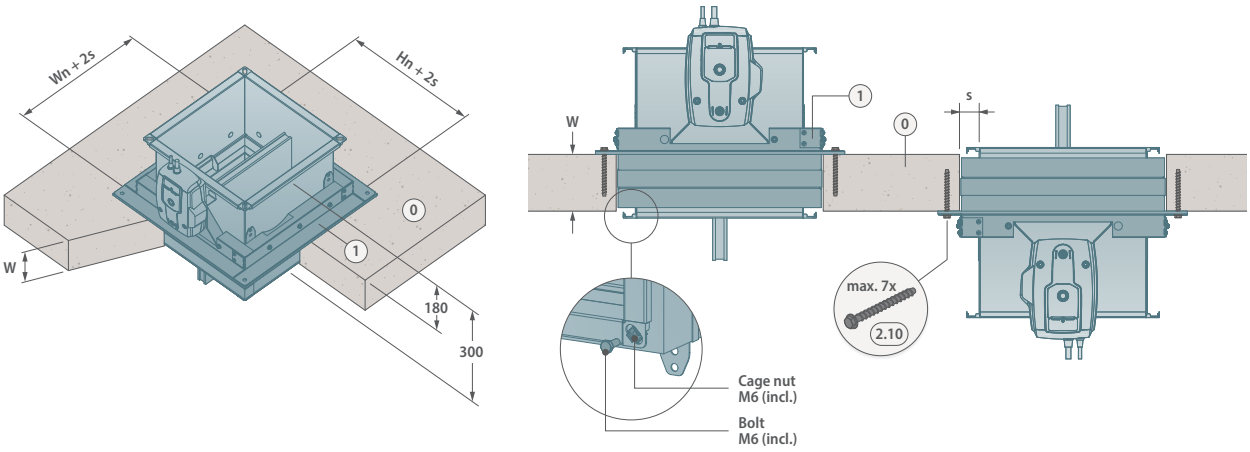




⓪	A.4	Rigid wall	
①	C.22	1S mounting kit	33 ≤ s ≤ 40
	2.5	Universal screw Ø6x50	
	2.38	Cage nut M6 (included)	
	2.39	Bolt M6 x 16 (included)	

3.3.15 RIGID FLOOR - SURFACE MOUNTING WITH CU-LT-1S

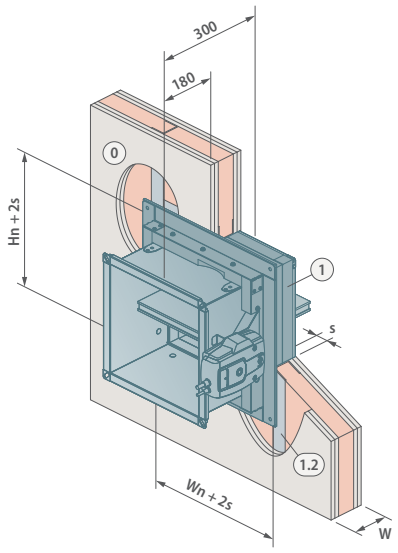
≤ 800 x 600	w ≥ 150	EI120 (h_o i ↔ o)S	III

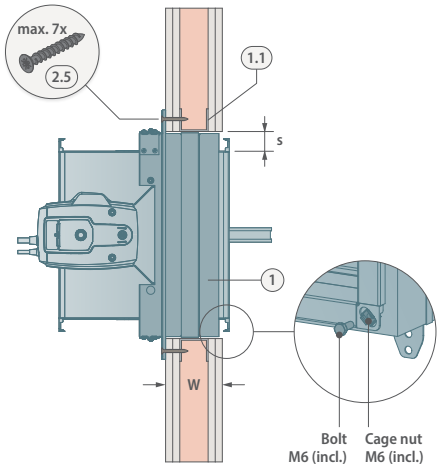


⓪	A.7	Rigid floor	
①	C.22	1S mounting kit	33 ≤ s ≤ 40
	2.10	Bolt Ø6x80	
	2.38	Cage nut M6 (included)	
	2.39	Bolt M6 x 16 (included)	

3.3.16 FLEXIBLE WALL - SURFACE MOUNTING WITH CU-LT-1S

≤ 800 x 600	A.1 Type A	w ≥ 100	EI60 (v_e i ↔ o)S	III
≤ 800 x 600	A.2 Type F	w ≥ 100	EI90 (v_e i ↔ o)S	III

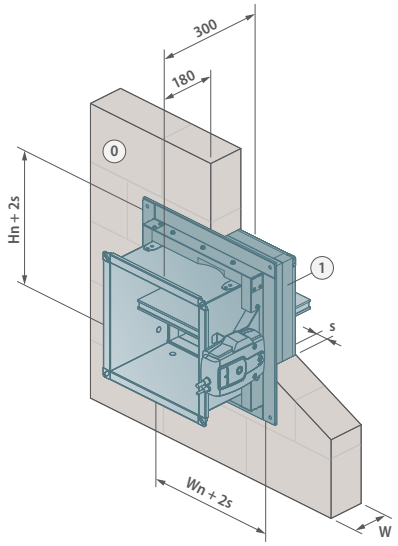


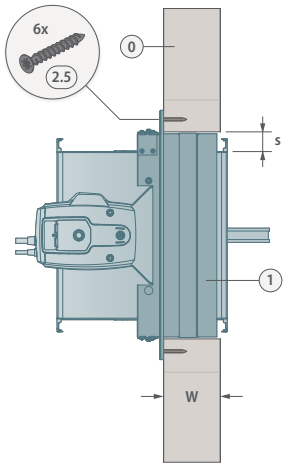


⓪	A.1	Flexible wall type A	
⓪	A.2	Flexible wall type F	
①	C.22	1S mounting kit	33 ≤ s ≤ 40
	2.5	Universal screw Ø6x50	
	2.38	Cage nut M6 (included)	
	2.39	Bolt M6 x 16 (included)	
	1.1	Horizontal profile	
	1.2	Vertical profile	

3.3.17 GYPSUM BLOCK WALL - SURFACE MOUNTING WITH CU-LT-1S

≤ 800 x 600	w ≥ 70	EI120 (v_e i ↔ o)S	I





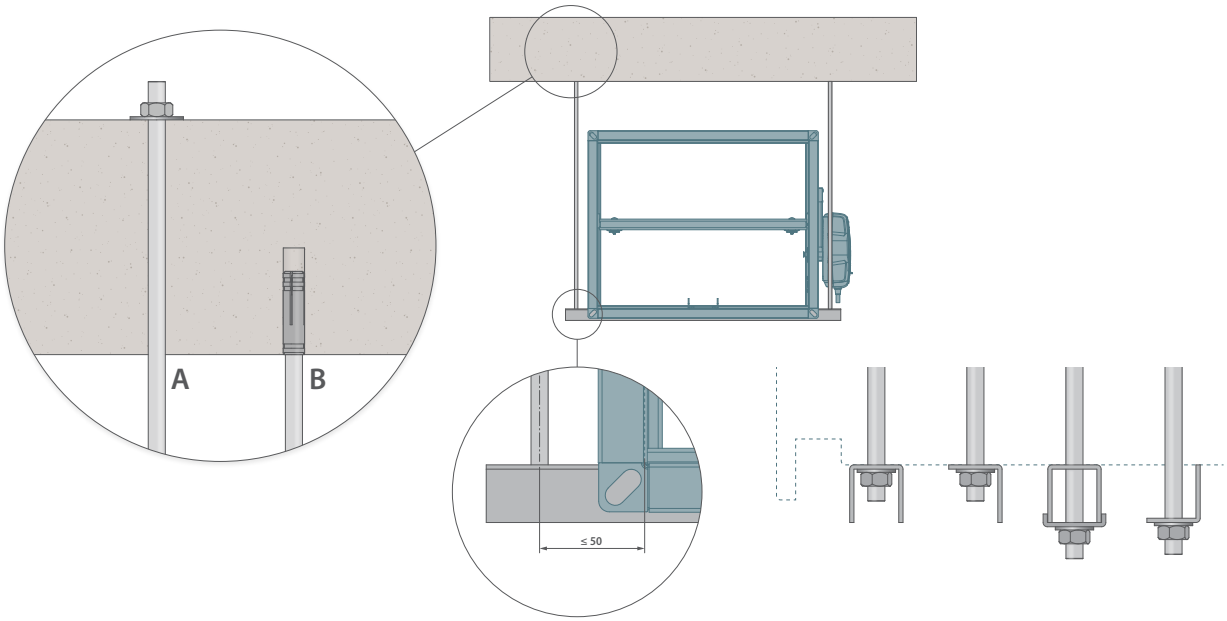
⓪	A.3	Gypsum block wall	
①	C.22	1S mounting kit	33 ≤ s ≤ 40
①	2.5	Universal screw Ø 6 x 50	
	2.38	Cage nut M6 (included)	
	2.39	Nut M6 x 16 (included)	

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.

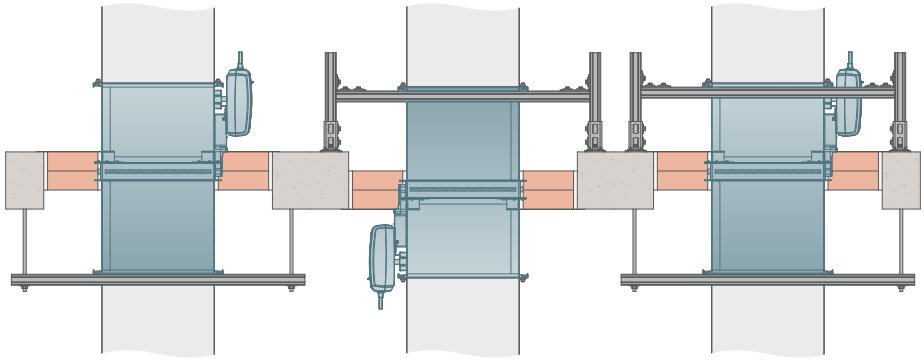


If it is opted to support the fire dampers, the dimensioned threaded rods of the suspensions can be fixed through the floor on the one hand (A). On the other hand, the threaded rods can be fixed in the ceiling with impact sleeves or screws (B) according to the manufacturer's specifications and taking 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 permitted to connect multiple CU-LT dampers to one common ventilation duct.

3.6 COMBINED PENETRATIONS

Combined penetrations occur when techniques that are evaluated according to different test standards pass through the same opening in the (load-bearing) construction and are sealed in the same way. Fire dampers are tested in accordance with EN 1366-2 and are usually given an EIS classification. Fire dampers are subjected to high pressure differences during fire tests, during which, among other things, the smoke resistance of the dampers is checked.

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

An EXAP standard (Extended application of results from fire resistance tests) has recently been published that covers this area (EN 15882-5). It is expected that solutions tested in accordance with this standard will be added to the classifications in the near future.

Please consult RF-Technologies for more information on this subject.

3.7 DISCLAIMER

RF-Technologies has prepared this document with the necessary 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 accepts no liability for administrative errors and reserves the right to change information without prior 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

(LOAD-BEARING) CONSTRUCTIONS		
A.1	Flexible wall type A	Flexible walls type A are constructed with metal studs as specified in European standard EN 13501-2. The walls are constructed in accordance with the manufacturer's guidelines or in accordance with locally applicable standards. The wall thickness is at least 98 mm, with 2 x 12.5 mm double-sided gypsum plasterboard, namely gypsum (cardboard) boards type A in accordance with EN520 (GKB in accordance with DIN 18180). The internal cavity ≥ 48 mm is filled with stone wool ≥ 40 mm of 40 kg/m^3. 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 made of galvanised steel with a minimum thickness of 0.6 mm and are fastened every ≤ 800 mm by Ø 6 mm steel screws and Ø 6mm anchors to the rigid (load-bearing) construction. The vertical metal profiles must be made of galvanised steel with a minimum thickness of 0.6 mm and must be placed at a centre-to-centre distance of ≤ 625 mm. A clearance of 5 mm accommodates thermal expansion. The profiles comply with EN 14195. The profiles are fastened to each other with Ø 3.5mm screws, pop rivets or metal stud fixing pliers. The cladding is fastened to the metal profiles with Ø 3.5 mm screws. The visible joints and the connection with the (load-bearing) construction are finished with cover tape and joint filler, as indicated by the manufacturer. The screw heads are lubricated. A reinforcement of horizontal and vertical metal profiles is provided around the damper, which is fixed to the metal frame of the wall construction (unless otherwise specified). These profiles are installed around the fire damper at a distance 's', which is the recess to be provided for sealing the fire damper. If the distance between the fire damper and the (load-bearing) construction on the one hand or between the 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 necessary to provide a profile at this location (see 'Installation at minimal distance'). The solutions in flexible wall constructions also apply to rigid walls. Flexible walls type A are generally used in installation methods for a fire resistance of 60 minutes.
A.2	Flexible wall type F	Flexible walls type F are constructed with metal studs as specified in European standard EN 13501-2. The walls are constructed in accordance with the manufacturer's guidelines or in accordance with locally applicable standards. The wall thickness is at least 98 mm, with 2 x 12.5 mm double-sided gypsum sheathing, namely gypsum (cardboard) boards of type F in accordance with EN520 (GKF in accordance with DIN 18180). The internal cavity of ≥ 48 mm is filled with stone wool of ≥ 40 mm and 40 kg/m^3. 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 fastened every 800 mm by Ø 6 mm steel screws and 6 mm anchors to the rigid (load-bearing) construction. The vertical metal profiles are made of galvanised steel with a minimum thickness of 0.6 mm and are placed centre to centre at a maximum distance of 625 mm from each other. A clearance of 5 mm accomodates thermal expansion. The profiles comply with EN 14195. The profiles are fastened to each other with Ø 3.5 mm screws, pop rivets or a metal stud fixing pliers. The cladding is fastened to the metal profiles with Ø 3.5 mm screws. The visible joints and the connection with the (load-bearing) construction are finished with cover tape and joint filler, as indicated by the manufacturer. The screw heads are lubricated. A reinforcement of horizontal and vertical metal profiles is provided around the damper and secured to the metal frame of the wall construction (unless otherwise specified). These profiles are placed around the fire damper at a distance 's', which is the recess to be provided for sealing the fire damper. If the distance between the fire damper and the (load-bearing) construction on the one hand or between the 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 necessary to provide a profile at this location (see 'Installation at minimal distance'). The solutions in flexible wall constructions also apply to rigid walls. Flexible walls type F are generally used in installation methods for a 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 laid in a staggered pattern (half-brick bond) using block glue. The thickness of the joints is approximately 2 mm; larger openings can be sealed with block glue in accordance with the manufacturer's specifications.

A.4	Rigid wall	Rigid walls are walls made of cellular concrete, concrete or masonry with a minimum specific mass of 650 ± 200 kg/m³ (EN 1363-1) and can also be used on rigid walls made of hollow blocks. Any hollow spaces around the fire damper must be filled. The solutions in flexible wall constructions also apply to rigid walls.
A.7	Rigid floor	Rigid floors are floors made of cellular concrete or concrete with a specific mass of 650 ± 200 kg/m³ (EN 1363-1). Any hollow spaces around the fire damper must be filled.
A.8	Rigid floor of reinforced concrete	Rigid floor of reinforced concrete with a specific mass of at least 2200 ± 200 kg/m³.

DISTANCES		
w	Wall thickness	Minimum thickness of the (load-bearing) construction.
w	Sealing depth	Minimum sealing depth in the (load-bearing) construction.
s	Recess in general	The width of the sealing recess 's' is determined by the distance tested during the official fire tests. If the recess around the fire damper is larger than specified in the technical data sheet, the following options are available: reduce the opening in the wall using the same material as the wall; use a different sealing system; seek alternative advice from a competent local authority (if necessary 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 (load-bearing) construction.
s3	s3* min distance	Minimal distance between rectangular damper and horizontal (load-bearing) construction. ≤ 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.10	Stone wool 150 kg/m³	Stone wool ≥ 150 kg/m³ over a depth of 400 mm, of which 150 mm on the mechanism side of the wall. For wall thicknesses of > 250 mm, the stone wool panel must be installed over a depth of > 400 mm until the entire wall thickness is filled. Flat stone wool panels can be used for rectangular fire dampers. For round fire dampers, 50 mm thick moulded pieces can be cut out to fit between the dampers (s2) and/or the wall construction (s3). By combining several 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, heat conductivity of l = 0.041 W/mK at 50 °C, water vapour absorption 0,02 %, Euroclass A1.
C.11	Stone wool 40 kg/m³	Compressed standard stone wool Euroclass A1 with a density after compression of min. 67 kg/m³ (e.g. Rockfit 431 with a density of 40 kg/m³ and a thickness of 40 mm compressed to 25 mm) (see s3*), to be installed at a distance between the fire damper and the ceiling of ≤ 50 mm over a depth of 400 mm, 150 mm of which must be 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.20	IFW	IFW installation block
C.22	1S mounting kit	1S - the rectangular fire damper is fitted with a mounting frame that is screwed to the wall.
C.31	Fire batt 2 x 50 mm	Single-sided fire batt (3.6) 2 x 50 mm When sealing with fire batt, the saw cuts of the batt must not coincide: the batt are therefore installed offset (min. 20 mm) to improve stability.
C.4	Sliding ceiling connection	Sliding ceiling connection (GDA)
C.52	Remote 1 x 80 - fire batt	Fire damper offset from the wall, installation with fire batt 1 x 80 mm (3.6)
C.53	Remote 2 x 50 - fire batt	Fire damper offset from the wall, installation with fire batt 2 x 50 mm (3.6)

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
2.1	Mounting screws Ø6mm (anchored to the (load-bearing) construction)
2.10	Bolt Ø6x80 mm
2.11	Universal screw Ø3x25 mm
2.2	Mounting screws Ø3.5mm
2.22	U-profile 50x38x5 mm
2.26	U-profile 25x25x2
2.31	M8 threaded rod
2.32	M8 nut
2.34	M10 threaded rod
2.35	M10 nut
2.36	M10 washer
2.37	M8 washer
2.38	Cage nut M6 (included)
2.39	Bolt M6 x 16 (included)
2.40	Universal screw Ø5x120 + washer M6x44 (9/m^2) (coated)
2.41	Universal screw Ø5x90 + washer M6x44 (9/m^2) (coated)
2.42	Universal screw Ø5x100 + washer M6x44 (9/m^2) (coated)
2.5	Universal screw ø 6 x 50 mm
3.3	Joint filler
3.6	Single-sided fire batt ≥ 140kg/m^3 - the stone wool is coated on one side with a 1mm fire-resistant coating and is installed with a ≥ 20mm offset. The coated side is always installed on the visible side. **Stone wool panel 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 stone wool panel is certified for rigid and flexible walls. Not for minimal distances, fire dampers protruding from the wall or fire dampers sealed in a rigid floor. * SVT: Sealing with SVT stone wool panel is certified in rigid and flexible walls. Not for minimal distances, fire dampers protruding from the wall or fire dampers sealed in a rigid floor.
3.7	Coating on the connection with the damper in the wall thickness (w*) - without coating of the fire damper: Promastop-E/CC 6-10 mm; Hilti CFS-S ACR ≤1 mm; Mulcol Multimastic SP - with coating of the fire damper: Promatstop-E/CC 1-2 mm; Hilti CFS-S ACR < 1 mm.
3.9	Coating tunnel/duct; Promastop E/CC > 1 mm; Hilti CFS-CT >1 mm
4.4	IFW installation block
5	Galvanised duct