



# Fire damper

## Type FKRS-EU

according to Declaration of Performance  
DoP / FKRS-EU / DE / 003



Read the instructions prior to performing any task!

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## General information

### About this manual

This operating and installation manual enables operating or service personnel to correctly install the TROX product described below and to use it safely and efficiently.

This operating and installation manual is intended for use by fitting and installation companies, in-house technicians, technical staff, properly trained persons, and qualified electricians or air conditioning technicians.

It is essential that these individuals read and fully understand this manual before starting any work. The basic prerequisite for safe working is to comply with the safety notes and all instructions in this manual.

The local regulations for health and safety at work and general safety regulations also apply.

This manual must be given to the system owner when handing over the system. The system owner must include the manual with the system documentation. The manual must be kept in a place that is accessible at all times.

Illustrations in this manual are mainly for information and may differ from the actual design.

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- Publishing content
- Copying content
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- Saving content to electronic systems and editing it

### TROX Technical Service

To ensure that a fault is processed as quickly as possible, please keep the following information ready:

- Delivery date of the TROX components and systems
- TROX order number
- Product name
- Brief description of the fault

### Contact in case of a fault

Online	<a href="http://www.troxtechnik.com">www.troxtechnik.com</a>
Phone	+49 2845 202-400

### Limitation of liability

The information in this manual has been compiled with reference to the applicable standards and guidelines, the state of the art, and our expertise and experience of many years.

The manufacturer does not accept any liability for damages resulting from:

- Non-compliance with this manual
- Incorrect use
- Operation or handling by untrained individuals
- Unauthorised modifications
- Technical changes
- Use of non-approved replacement parts

The actual scope of delivery may differ from the information in this manual for bespoke constructions, additional order options or as a result of recent technical changes.

The obligations agreed in the order, the general terms and conditions, the manufacturer's terms of delivery, and the legal regulations in effect at the time the contract is signed shall apply.

We reserve the right to make technical changes.


### Defects liability


For details regarding defects liability please refer to Section VI, Warranty Claims, of the Delivery and Payment Terms of TROX GmbH.


The Delivery and Payment Terms of TROX GmbH are available at [www.troxtechnik.com](http://www.troxtechnik.com).


Safety notes


Symbols are used in this manual to alert readers to areas of potential hazard. Signal words express the degree of the hazard.

 **DANGER!**  
Imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING!**  
Potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION!**  
Potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

 **NOTICE!**  
Potentially hazardous situation which, if not avoided, may result in property damage.


 **ENVIRONMENT!**  
Environmental pollution hazard.

Safety notes as part of instructions

Safety notes may refer to individual instructions. In this case, safety notes will be included in the instructions and hence facilitate following the instructions. The above listed signal words will be used.

Example:


1. ▶ Untighten the screw.
2. ▶ 

 **CAUTION!**  
Danger of finger entrapment when closing the lid.


Be careful when closing the lid.
3. ▶ Tighten the screw.

Specific safety notes

The following symbols are used in safety notes to alert you to specific hazards:

Warning signs	Type of danger
	Warning – danger zone.

Tips and recommendations



*Useful tips and recommendations as well as information for efficient and fault-free operation.*

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# 1 Safety

## 1.1 General safety notes

### Sharp edges, sharp corners and thin sheet metal parts



#### CAUTION!

#### **Danger of injury from sharp edges, sharp corners and thin sheet metal parts!**

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

### Electrical voltage



#### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

## 1.2 Correct use

- The fire damper is used as an automatic shut-off device to prevent fire and smoke from spreading through ducting.
- The fire damper is suitable for supply air and extract air systems.
- The fire damper may be used in potentially explosive atmospheres if appropriate special accessories are used with it and if the product bears the CE conformity marking according to Directive 94/9/EC. Fire dampers for use in potentially explosive atmospheres are marked for the zones for which they have been approved.
- Operation of the fire dampers is allowed only in compliance with installation regulations and the technical data in this installation and operating manual.
- Modifications of the fire damper and the use of replacement parts that have not been approved by TROX are not permitted.

### Incorrect use



#### WARNING!

#### **Danger due to incorrect use!**

Incorrect use of the fire damper can lead to dangerous situations.

Never use the fire damper

- without specially approved attachments in areas with potentially explosive atmospheres
- as a smoke control damper
- outdoors without sufficient protection against the effects of weather
- in atmospheres where chemical reactions, whether planned or unplanned, may cause damage to the fire damper or lead to corrosion

## 1.3 Qualified staff



#### WARNING!

#### **Danger of injury due to insufficiently qualified individuals!**

Incorrect use may cause considerable injury or damage to property.

- Only skilled qualified personnel must carry out work.

The following degrees of qualification are required for the work described in the operating manual:

#### **Skilled qualified electrician**

Skilled qualified electricians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on electrical systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

#### **Specialist personnel**

Specialist personnel are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to carry out their assigned duties, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

## 2 Technical data

### 2.1 General data

<b>Nominal sizes</b>	100 – 315 mm
<b>Volume flow rate range</b>	up to 770 l/s up to 2770 m³/h
<b>Differential pressure range</b>	up to 1500 Pa
<b>Operating temperature</b> <sup>1, 3</sup>	At least 0 – 50 °C
<b>Release temperature</b>	72 °C or 95 °C (for warm air ventilation systems)
<b>Upstream velocity</b> <sup>2, 3</sup>	≤ 8 m/s with fusible link ≤ 10 m/s with spring return actuator
<b>Closed blade air leakage</b>	EN 1751, Class 3
<b>Casing air leakage</b>	EN 1751, Class C
<b>EC conformity</b>	<ul style="list-style-type: none"> <li>Construction Products Regulation (EU) no. 305/2011</li> <li>EN 15650 – Ventilation for buildings – Fire dampers</li> <li>EN 13501-3 – Classification – Part 3: Fire resisting ducts and fire dampers</li> <li>EN 1366-2 – Fire resistance tests for service installations – Part 2: Fire dampers</li> <li>EN 1751 Ventilation for buildings – Air terminal devices</li> </ul>
<b>Declaration of performance</b>	DoP / FKRS-EU / DE / 003

<sup>1)</sup> Temperatures may differ for units with attachments. Details for other applications are available on request.

<sup>2)</sup> Data applies to uniform upstream and downstream conditions for the fire damper

<sup>3)</sup> For explosion-proof constructions of the FKRS-EU see the corresponding operating manual

### Rating plate



Fig. 1: Rating plate (example)

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>① CE mark</li> <li>② Manufacturer's address</li> <li>③ Number of the European standard and year of its publication</li> <li>④ Notified body</li> <li>⑤ The last two digits of the year in which the CE marking was affixed</li> </ul> | <ul style="list-style-type: none"> <li>⑥ Year of manufacture</li> <li>⑦ No. of the declaration of performance</li> <li>⑧ Website from which the DoP can be downloaded</li> <li>⑨ Regulated characteristics; the fire resistance class depends on the application and may vary ↪ Chapter 5.1 'Installation situations' on page 15</li> <li>⑩ Type</li> </ul> |
|--|---|

## 2.2 FKRS-EU with fusible link

### Dimensions and weight

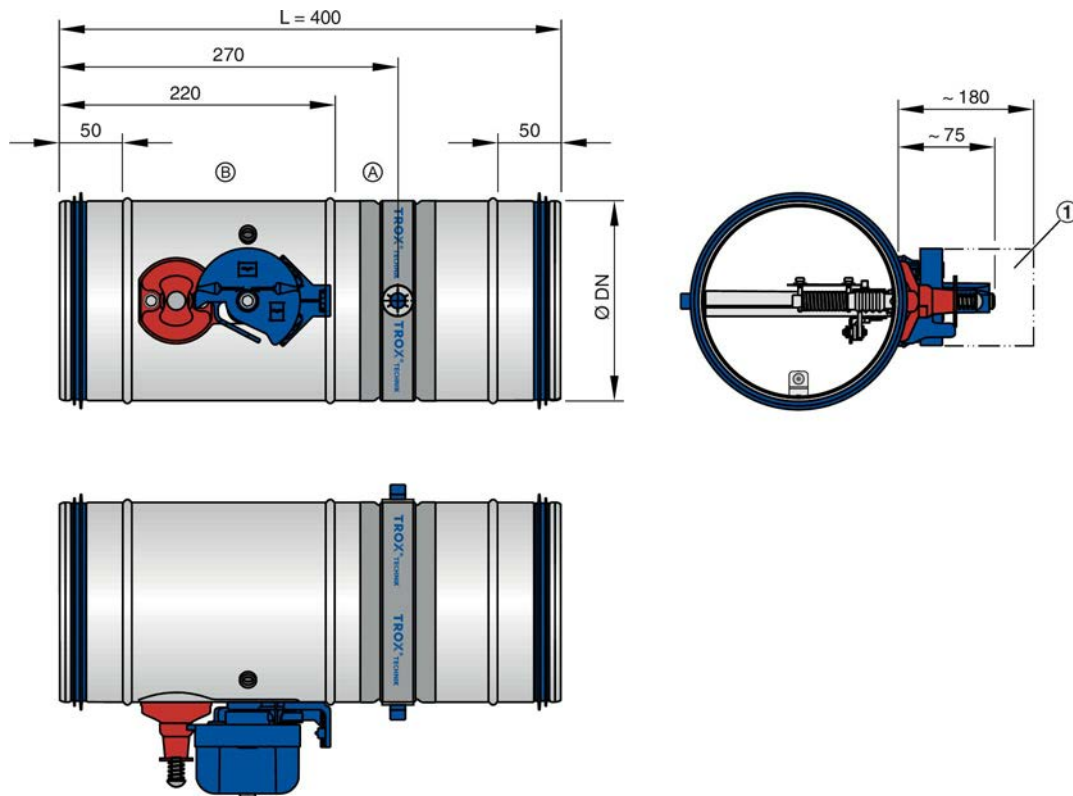


Fig. 2: FKRS-EU with fusible link

- 1 Keep clear to provide access for operation
- Ⓐ Installation side
- Ⓑ Operating side

	Weight [kg]									
Nominal size [mm]	100	125	150	160	180	200	224	250	280	315
ØDN [mm]	99	124	149	159	179	199	223	249	279	314
<b>FKRS-EU with fusible link</b>	1.3	1.6	1.8	2.0	2.3	2.5	2.7	3.3	3.8	4.4
<b>... with circular installation block (ER)</b>	5.7	8.6	7.6	7.3	11.0	9.8	13.5	12.1	16.0	15.0
<b>... with square installation block (TQ)</b>	5.4	6.1	7.0	7.9	8.8	9.7	10.6	12.0	13.7	15.8
<b>... with wall face frame (WA)</b>	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6
<b>... with installation kit for flexible ceiling joints (GL)</b>	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6
<b>... with installation kit for installation remote from walls and ceilings (WE)</b>	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6

Limit switches	
Connecting cable length / cross section	1 m / 3 × 0.34 mm <sup>2</sup>
Protection level	IP 66
Type of contact	1 changeover contact, gold-plated
Maximum switching current	0.5 A
Maximum switching voltage	30 V DC, 250 V AC
Contact resistance	approx. 30 mΩ

## 2.3 FKRS-EU with spring return actuator

### Dimensions and weight

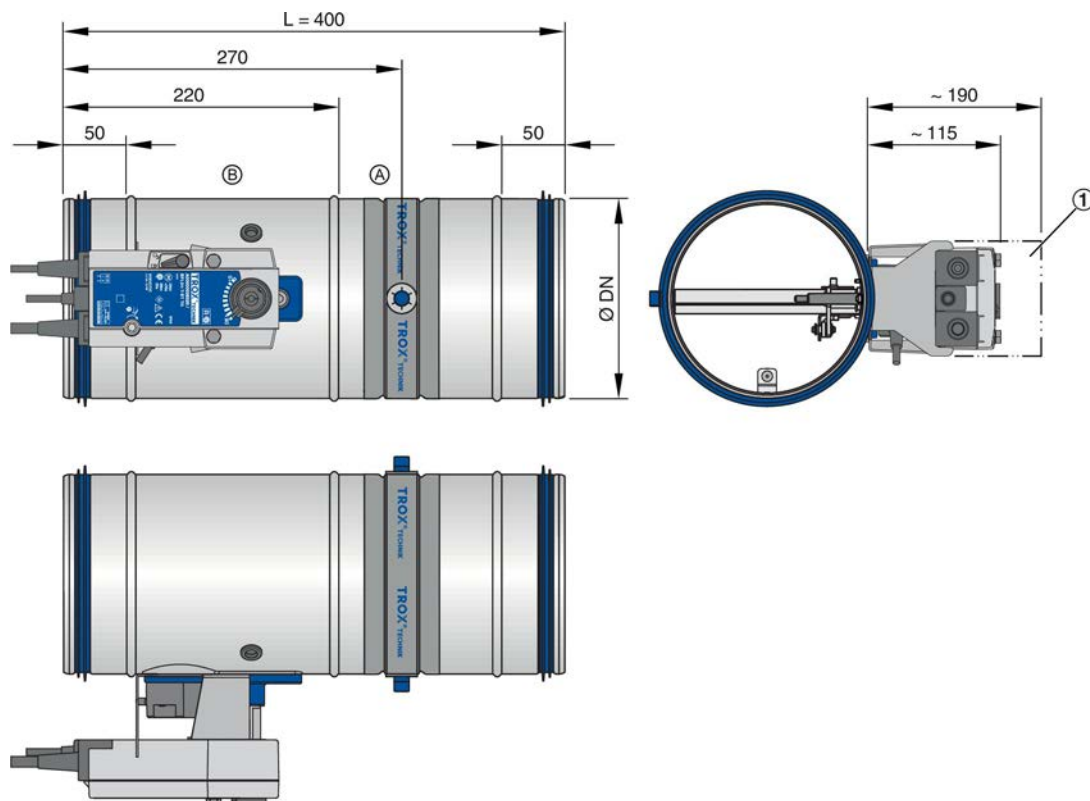


Fig. 3: FKRS-EU with spring return actuator

- 1 Keep clear to provide access for operation
- (A) Installation side
- (B) Operating side

Weight [kg]										
Nominal size [mm]	100	125	150	160	180	200	224	250	280	315
ØDN [mm]	99	124	149	159	179	199	223	249	279	314
<b>FKRS-EU with spring return actuator</b>	3.1	3.4	3.6	3.7	4.0	4.2	4.5	5.0	5.5	6.2
<b>... with circular installation block (ER)</b>	7.5	10.4	9.4	9.1	12.8	11.6	15.3	13.9	17.8	16.8
<b>... with square installation block (TQ)</b>	7.2	7.9	8.8	9.7	10.6	11.5	12.4	13.8	15.5	17.6
<b>... with wall face frame (WA)</b>	6.2	7.0	7.9	8.4	9.2	10.0	10.8	12.0	13.5	15.4

Weight [kg]										
Nominal size [mm]	100	125	150	160	180	200	224	250	280	315
... with installation kit for flexible ceiling joints (GL)	6.2	7.0	7.9	8.4	9.2	10.0	10.8	12.0	13.5	15.4
... with installation kit for installation remote from walls and ceilings (WE)	6.2	7.0	7.9	8.4	9.2	10.0	10.8	12.0	13.5	15.4

Spring return actuator BFL...			
Construction		230-T TR	24-T-ST TR
Supply voltage		230 V AC, 50/60 Hz	24 V AC/DC, 50/60 Hz
Functional range		198 ... 264 V AC	19.2 ... 28.8 V AC 21.6 ... 28.8 V DC
Power rating	Spring compression	3.5 W	2.5 W
	Hold position	1.1 W	0.8 W
	Rating	6.5 VA	4 VA
Running time	Actuator / spring return	< 60 s (< 60 s at -30 ... -10 °C)	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA ... 3 (0.5 inductive) A	
	Contact resistance	< 1 Ω (when new)	
IEC protection class		II	
Protection level		IP 54	
Storage temperature		-40 ... 55 °C	
Ambient temperature		-30 ... 55 °C <sup>1</sup>	
Ambient humidity		≤ 95 % RH, non-condensing	
Connecting cable	Actuator	1 m / 2 × 0.75 mm <sup>2</sup> (free of halogens)	
	Limit switch	1 m / 6 × 0.75 mm <sup>2</sup> (free of halogens)	

<sup>1</sup> Up to 75 °C the safe position will definitely be reached.

## 3 Transport and storage

### Delivery check

Check delivered items immediately after arrival for transport damage and completeness. In case of any damage or an incomplete shipment, contact the shipping company and your supplier immediately.

- Fire damper
  - Attachments/accessories, if any
- Operating manual (1 per shipment)



#### **Colour hues on the damper blade**

*The blades of fire dampers are treated with a greenish impregnating agent. Resulting colour hues on the damper blade are due to technical reasons and do not constitute a defect of any kind.*

### Transport on site

If possible, take the fire damper in its transport packaging up to the installation location.

### Storage

If the unit has to be stored temporarily:

- Remove any plastic wrapping.
- Protect the unit from dust and contamination.
- Store the unit in a dry place and away from direct sunlight.
- Do not expose the unit to the effects of weather (not even in its packaging).
- Do not store the unit below -40 °C or above 50 °C.

### Packaging

Properly dispose of packaging material.

## 4 Parts and function

Fire dampers are used as safety related components in ventilation systems. The fire damper is used as a shut-off device to prevent fire and smoke from spreading through ducting. During normal operation the damper blade is open to enable air passage through the ventilation system.

If the temperature increases in the event of a fire, the damper blade closes. Closure is triggered at 72 °C ( 95 °C in warm air ventilation systems). If the damper blade closes due to a temperature increase (i.e. in the event of a fire), it must not be reopened.

To ensure proper functioning of the fire damper, a test can be carried out. ↗ 88

### 4.1 FKRS-EU with fusible link

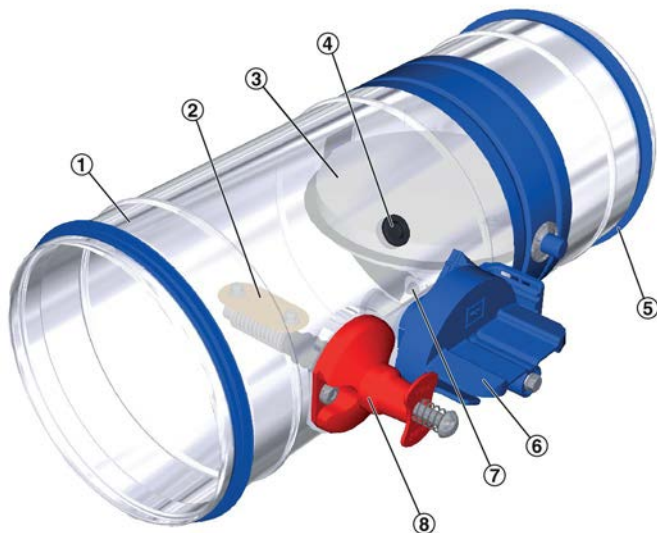


Fig. 4: FKRS-EU with fusible link

- 1 Casing
- 2 Fusible link
- 3 Damper blade with seal
- 4 Inspection access (12 mm)
- 5 Lip seal
- 6 Handle with interlock and damper blade position indicator
- 7 Travel stop for CLOSED position
- 8 Release mechanism

#### Functional description

In fire dampers with a fusible link, damper closure is triggered by the fusible link. If the temperature inside the fire damper rises to 72 °C or 95 °C, the fusible link triggers a coil spring mechanism. The coil spring mechanism then causes the fire damper to close.

As an option, the fire damper can be either supplied or subsequently fitted with one or two limit switches. The limit switches can signal the damper blade position to the central BMS or fire alarm system. One limit switch each is required for damper blade positions OPEN and CLOSED.

### 4.2 FKRS-EU with spring return actuator

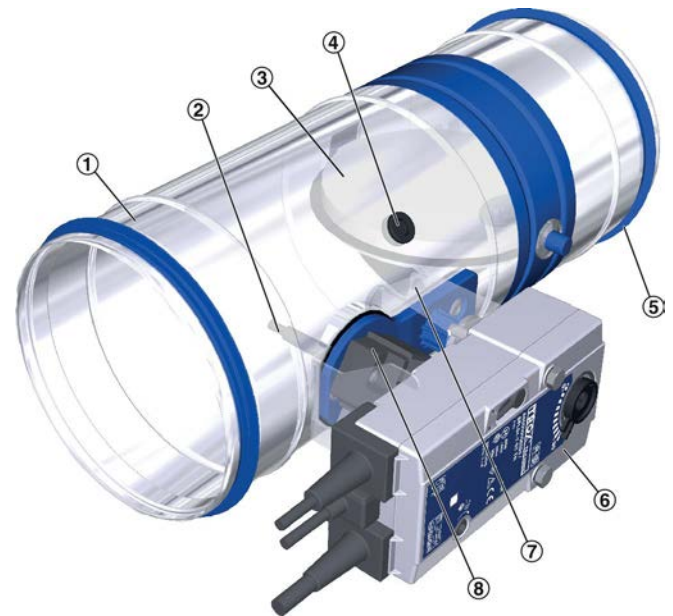


Fig. 5: FKRS-EU with spring return actuator

- 1 Casing
- 2 Temperature sensor
- 3 Damper blade with seal
- 4 Inspection access (12 mm)
- 5 Lip seal
- 6 Spring return actuator
- 7 Travel stop for CLOSED position
- 8 Thermoelectric release mechanism

#### Functional description

The spring return actuator enables the motorised opening and closing of the damper blade; it can be activated by the central BMS. As long as power is supplied to the actuator, the damper blade remains open. In the event of a fire, the internal thermoelectric release mechanism closes the damper blade when at least one of the following is true:

- Temperature in the fire damper > 72 °C or > 95 °C
- Ambient temperature outside the release mechanism > 72 °C
- The power supply is interrupted (power off to close)

As standard, the spring return actuator is equipped with limit switches that can be used to indicate the damper blade position.

## 4.3 FKRS-EU with fusible link and cover grille used as an air transfer unit

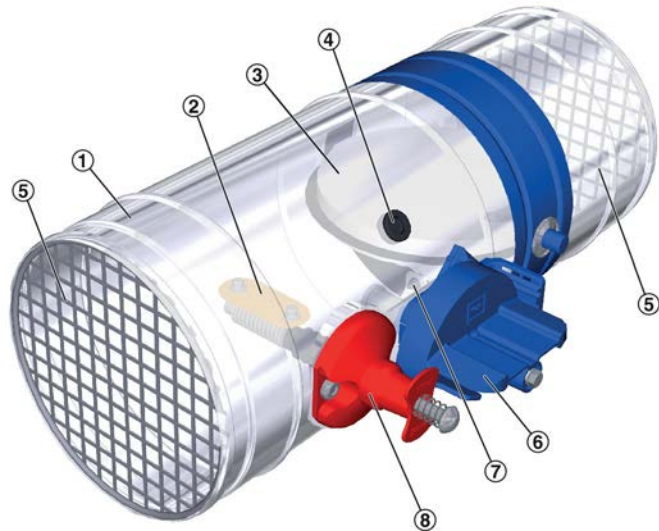


Fig. 6: FKRS-EU with fusible link and cover grille used as an air transfer unit

- 1 Casing
- 2 Fusible link
- 3 Damper blade with seal
- 4 Inspection access (12 mm)
- 5 Cover grille
- 6 Handle with interlock and damper blade position indicator
- 7 Travel stop for CLOSED position
- 8 Release mechanism

### Functional description

Air transfer units prevent fire and smoke from spreading in buildings. The thermal release mechanism closes the air transfer unit when the release temperature (72 °C) is reached. Smoke can, however, spread below this temperature. Air transfer units are installed in places where the general building inspectorate sees no risk, for example:

- As an inlet for additional supply air in the walls of required corridors (escape routes) if the inlet is near the ground (centre line up to 500 mm above floor surface)
- In installation shafts as long as they have sufficient fire resistance where they penetrate compartment floors
- In installation ducts as long as they have sufficient fire resistance where they penetrate compartment floors or walls (except for necessary corridors or escape routes)

The air transfer unit consists of the FKRS-EU fire damper with general building inspectorate licence Z-19.18-2128, with a thermal release mechanism for 72 °C and with cover grilles on both sides, but without a duct smoke detector.

## 5 Installation

### 5.1 Installation situations

#### Note

The performance classes of the fire damper and the wall or ceiling slab may differ. The lower performance class determines the performance class of the overall system.

Installation situations					
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v <sub>e</sub> -h <sub>o</sub> , i ↔ o) S up to	Installation type	Installation information
Solid walls	in	100	EI 120 S	N	↳ 19
		100	EI 90 S	E	↳ 21
		100	EI 120 S	W <sup>1</sup>	↳ 22
	in, with flexible ceiling joint	100	EI 90 S	N	↳ 20
	on the face of	100	EI 90 S	E	↳ 24
	remote from	100	EI 90 S	E	↳ 26
Solid ceiling slabs	in	100 (150) <sup>4</sup>	EI 120 S	N	↳ 30
		100 (150) <sup>4</sup>	EI 90 S	E	↳ 37
		100 (150) <sup>4</sup>	EI 120 S	W <sup>1</sup>	↳ 38
	in, with concrete base	100 (150) <sup>4</sup>	EI 120 S	N	↳ 35
	underneath (suspended, horizontal duct)	100 (150) <sup>4</sup>	EI 90 S	E	↳ 40
	combined with wooden beam ceilings	150	EI 90 S	N	↳ 33
	combined with modular ceilings <sup>5</sup>	150	EI 120 S	N	↳ 34
Lightweight partition walls	in, with metal support structure, cladding on both sides	98	EI 120 S <sup>2</sup>	N <sup>1</sup>	↳ 43
		98	EI 90 S	E	↳ 46
		98	EI 120 S <sup>2</sup>	W <sup>1</sup>	↳ 48
		75	EI 30 S	N	↳ 45
		75	EI 30 S	E	↳ 47

<sup>1</sup>) The class of performance depends on the installation details

<sup>2</sup>) For lightweight partition walls ≥ EI 120

<sup>3</sup>) Wall thickness 100 mm – 235 mm

<sup>4</sup>) Thickness increased near the installation opening

<sup>5</sup>) Cadolto system

N = Mortar-based installation

E = Installation kit

W = Fire batt

Installation situations					
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v <sub>e</sub> -h <sub>o</sub> , i ↔ o) S up to	Installation type	Installation information
		80	EI 60 S	W	↳ 50
	in, with steel support structure, cladding on both sides	98	EI 90 S	N	↳ 44
		98	EI 90 S	E	↳ 46
	remote from	98	EI 90 S	E	↳ 51
	in, with metal support structure, cladding on both sides, flexible ceiling joint	100 <sup>3</sup>	EI 90 S	E	↳ 55
	in, with timber support structure (also timber panel constructions and timber frames), cladding on both sides	130	EI 120 S	N <sup>1</sup>	↳ 58
		130	EI 120 S	E	↳ 60
		130	EI 120 S	W <sup>1</sup>	↳ 62
		105	EI 30 S	N	↳ 58
		105	EI 30 S	E	↳ 60
		105	EI 30 S	W	↳ 62
		140	EI 90 S	N	↳ 58
	in, half-timbered constructions, cladding on both sides	140	EI 90 S	E	↳ 60
		140	EI 90 S	W	↳ 62
		140	EI 90 S	W	↳ 62
<b>Fire walls</b>	in, with metal support structure, cladding on both sides	100	EI 90 S	N	↳ 70
		100	EI 90 S	E	↳ 71
<b>Shaft walls</b>	in, <b>with</b> metal support structure, cladding on one side	90	EI 90 S	N	↳ 74
		90	EI 90 S	E	↳ 76
	in, <b>with</b> steel support structure, cladding on one side	90	EI 90 S	N	↳ 74
	in, <b>without</b> metal support structure, cladding on one side	50	EI 90 S	E	↳ 79

<sup>1)</sup> The class of performance depends on the installation details

<sup>2)</sup> For lightweight partition walls ≥ EI 120

<sup>3)</sup> Wall thickness 100 mm – 235 mm

<sup>4)</sup> Thickness increased near the installation opening

<sup>5)</sup> Cadolto system

N = Mortar-based installation

E = Installation kit

W = Fire batt

## 5.2 Safety notes on installation

### Sharp edges, sharp corners and thin sheet metal parts

#### CAUTION!

#### **Danger of injury from sharp edges, sharp corners and thin sheet metal parts!**

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

## 5.3 General installation information

#### NOTICE!

#### **Risk of damage to the fire damper**

- Protect the fire damper from contamination and damage.
- Cover openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.
- Do not remove the transport and installation protection (if any) until installation is complete.

Please note:

- Control elements, electric actuator and inspection access panel must remain accessible for maintenance.
- Loads imposed on the casing may impair the function of the fire damper. Install and connect the damper in such a way that no loads will be imposed on the installed damper.
- Close larger installation openings or cut holes according to the wall structure, e.g. masonry work.
- Before installation: Perform a functional test, then close the fire damper. ↺ 88
- Protect the fire damper from humidity and condensation as they will damage the fire damper.

### Installation position

The fire damper can be installed with the damper blade shaft in any position (0 to 360°)(Fig. 7). The position of the release mechanism is not critical but the mechanism must remain accessible for maintenance.

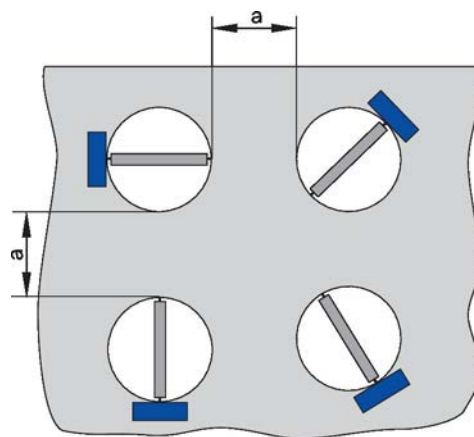


Fig. 7: Installation positions and distances

- a Distance between two fire dampers. The distance depends on the installation situation and is given in the installation details.

### Perimeter gap »s«

With mortar-based installation the perimeter gap »s« must not exceed 75 mm. The perimeter gap »s« must be large enough such that mortar can be filled in even in case of thicker walls. The gap must be large enough such that mortar can be filled in. We recommend a gap of at least 20 mm.

### Acceptable mortars for mortar-based installation

In case of mortar-based installation, the open spaces between the fire damper casing and the wall or ceiling slab must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth should be equal to the thickness of the wall but must be at least 100 mm.

The following mortars are acceptable:

- DIN 1053: Groups II, IIa, III, IIIa; fire protection mortar of groups II, III
- EN 998-2: Classes M 2.5 to M 10 or fire protection mortar of classes M 2.5 to M 10
- Equivalent mortars that meet the requirements of the above standards, gypsum mortar or concrete

### Mineral wool as filling material

Unless otherwise stated in the relevant installation details, mineral wool with a gross density of  $\geq 80 \text{ kg/m}^3$  and a melting point of  $1000^\circ\text{C}$  must be used.

### Fire batt systems

The following fire batt systems are acceptable (fire batt systems have to be provided by others):

## Hilti

- Firestop board CFS-CT B 1S 140/50
- Ablative coating CFS-CT
- Fire-resistant sealant CFS-S ACR

## HENSEL

- Mineral wool slab ROCKWOOL Hardrock 40
- Ablative coating HENSOMASTIK 5 KS Farbe
- Fire-resistant sealant  
HENSOMASTIK 5 KS Spachtel

## Promat

- Mineral wool slab Paroc Pyrotech Slab 160
- Ablative coating Promastopp-CC

For installation with a fire batt the FKRS-EU has to be coated. Alternatively, sleeves can be used. Sleeves are to be ordered separately.

## Fire-resistant cladding

When you use installation kit WE, the following materials are acceptable for the cladding of fire dampers and ducts:

- Promatect LS35
- Promatect L500
- Promatect AD40

### 5.3.1 After installation

- Clean the fire damper.
- Remove transport and installation protection, if any.  
In case of mortar-based installation this protection must not be removed until the mortar has hardened.
- Test the function of the fire damper.
- Connect the ductwork.
- Make electrical connections.

## 5.4 Solid walls

### 5.4.1 Mortar-based installation

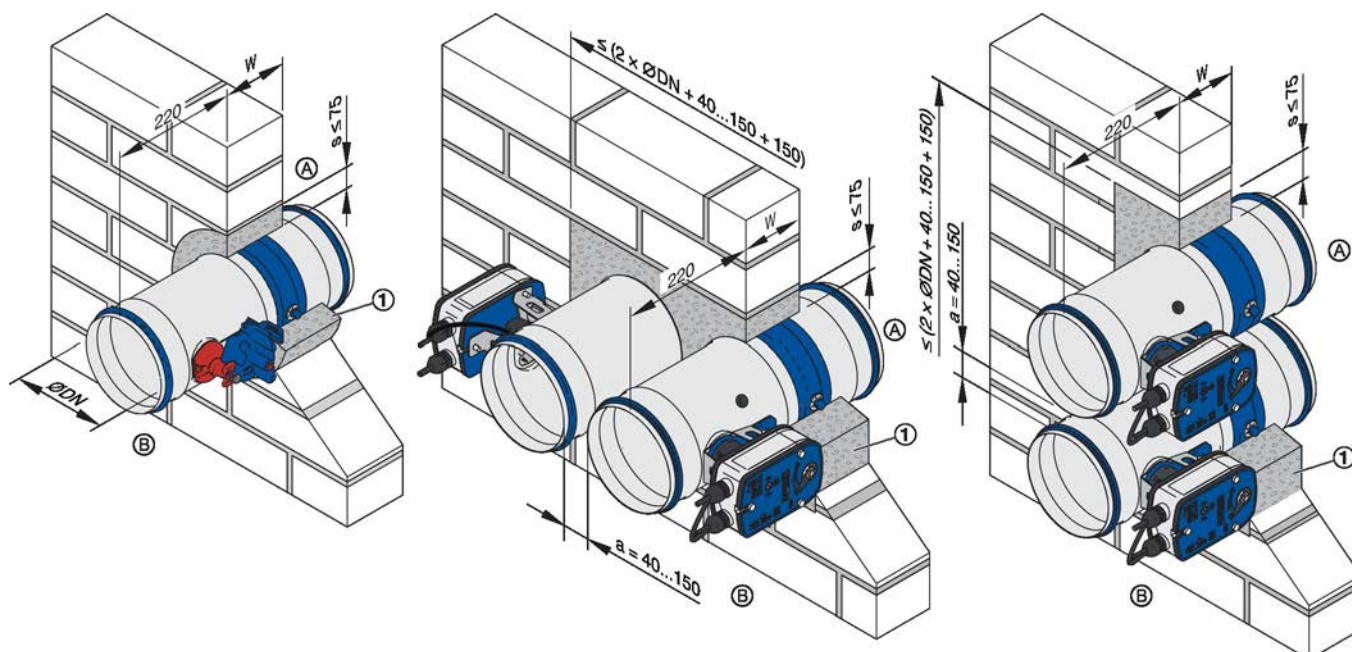


Fig. 8: Installation into a solid wall

- 1 Mortar
- Ⓐ Installation side
- Ⓑ Operating side

#### Personnel:

- Specialist personnel

#### Materials:

- Mortar ☞ 'Acceptable mortars for mortar-based installation' on page 17

#### Requirements

- Performance class up to EI 120 S
  - Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
  - $\geq 40 \text{ mm}$  distance to load-bearing structural elements
  - $\geq 40 \text{ mm}$  distance between two fire dampers
1. ▶ Create an appropriate installation opening,  $\text{ØDN} + 150 \text{ mm}$  max.. When you install two fire dampers next to each other into the same opening, the mortar bed between the two fire dampers must not exceed 150 mm.
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm. If the wall thickness is  $>115 \text{ mm}$ , extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.



If the fire damper is installed as the wall is being erected, the perimeter gap »s« is not required. The open spaces between the fire damper and the wall must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth should be equal to the thickness of the wall.

## 5.4.2 Mortar-based installation with flexible ceiling joint

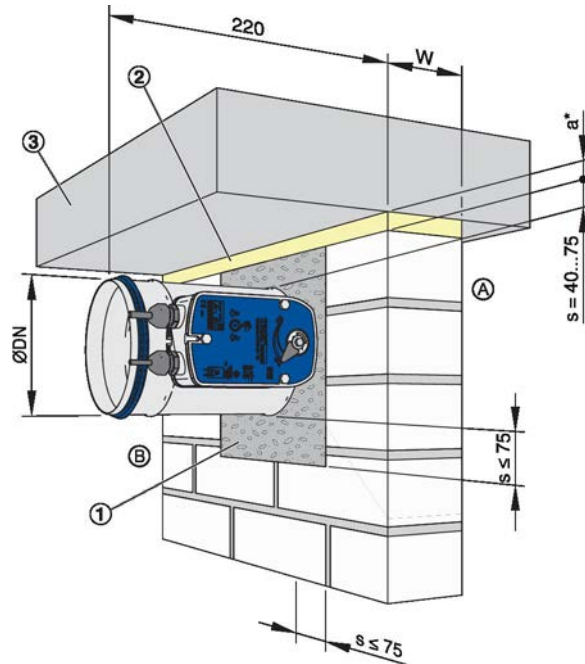


Fig. 9: Mortar-based installation in a solid wall with flexible ceiling joint

- |  |   |
|--|---|
| 1 Mortar   | (B) Operating side  |
| 2 Mineral wool (depending on the flexible ceiling joint) | a Subsidence of ceiling slab according to the code of good practice |
| 3 Solid ceiling slab                                     | * ≤ 30 mm (following subsidence)                                    |
| (A) Installation side                                    |   |

### Personnel:

- Specialist personnel

### Materials:

- Mortar ↗ 'Acceptable mortars for mortar-based installation' on page 17

### Requirements

- Performance class up to EI 90 S
  - Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
  - $\geq 40 \text{ mm}$  distance to load-bearing structural elements
  - $\geq 40 \text{ mm}$  distance between two fire dampers
1. ▶ Create an appropriate installation opening,  $\text{ØDN} + 150 \text{ mm}$  max.
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.  
If the wall thickness is  $>115 \text{ mm}$ , extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.
  4. ▶ Fill the gap above the mortar bed with mineral wool.

### 5.4.3 Dry mortarless installation with circular installation block ER

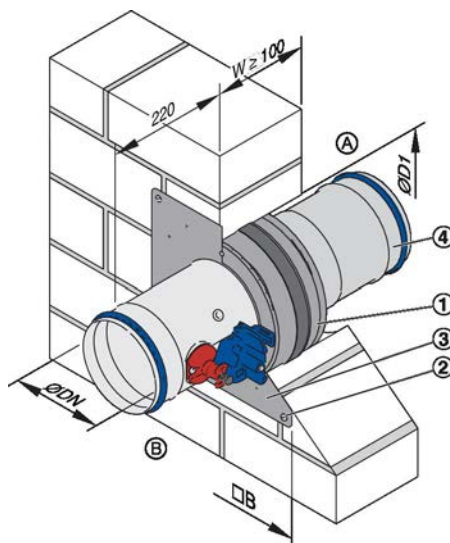


Fig. 10: Installation with circular installation block

- 1 Circular installation block (factory mounted)
- 2 Screw fixing
- 3 Cover plate
- 4 Extension piece

- ØD1 Installation opening ↪ Table on page 21
- (A) Installation side
- (B) Operating side

#### Personnel:

- Specialist personnel

#### Requirements

- Performance class EI 90 S
  - Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
  - $\geq 75 \text{ mm}$  distance between installation block and load-bearing structural elements
  - $\geq 200 \text{ mm}$  distance between two installation blocks
1. ▶ Create an appropriate opening with ØD1 ↪ Table on page 21
  2. ▶ Position the fire damper with the installation block in the centre of the installation opening and push it in up to the cover plate.  
If the wall thickness is  $>115 \text{ mm}$ , extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Fix the cover plate with four threaded rods (push through installation) or with at least four M6 screws. For solid walls and solid ceiling slabs, suitable steel anchors with building inspectorate approval must be used.

Dimensions of installation opening/cover plate [mm]										
Nominal size	100	125	150	160	180	200	224	250	280	315
ØD1	200	250	250	250	300	300	350	350	400	400
□B	250	300	300	300	350	350	400	400	450	450

Installation opening tolerance + 2 mm

## 5.4.4 Dry mortarless installation with fire batt

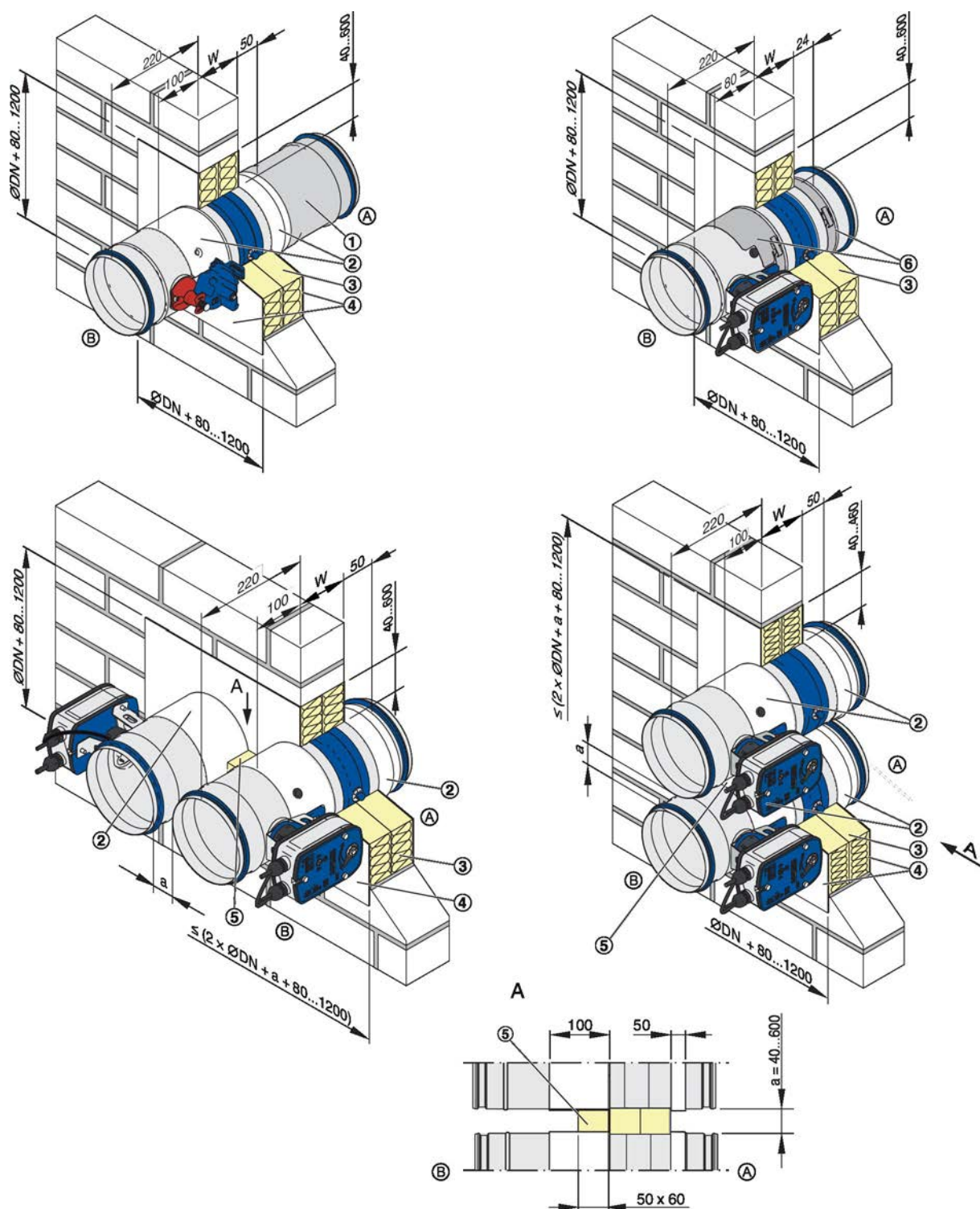


Fig. 11: Installation with fire batt

- |   |  |     |  |
|---|--|-----|--|
| 1 | Extension piece (if required)                        | 5   | Mineral wool strip, $50 \times 60 \times \text{ØDN}/2$ , $\geq 80 \text{ kg/m}^3$ (only when distance $a \leq 50 \text{ mm}$ ) |
| 2 | Ablative coating                                     | 6   | Sleeve (either one sleeve on the operating side only, or one sleeve each on the operating side and on the installation side)   |
| 3 | Coated mineral wool slabs, $\geq 140 \text{ kg/m}^3$ | (A) | Installation side  |
| 4 | Ablative coating                                     | (B) | Operating side   |

**Note:** Each fire damper has to be suspended both on the operating side and on the installation side  $\nless 80$ .

## Performance class and installation details

Performance class up to	Fire batt system	Size ØDN [mm]	Distances [mm]			Coating or sleeves	
			to load-bearing structural elements	between dampers (two installation openings)	between dampers (one installation opening)	Coating	Sleeves
EI 120 S	Hensel/ Hilti/ Promat	100...200	≥ 40	≥ 200	–	both sides	one sleeve <sup>1, 2</sup>
EI 120 S		100...315			–	both sides	two sleeves <sup>1</sup>
EI 90 S		100...315			a = 40...600	both sides	one sleeve <sup>1, 2</sup>

<sup>1)</sup> Sleeves are to be ordered separately.

<sup>2)</sup> On the operating side

## Personnel:

- Specialist personnel

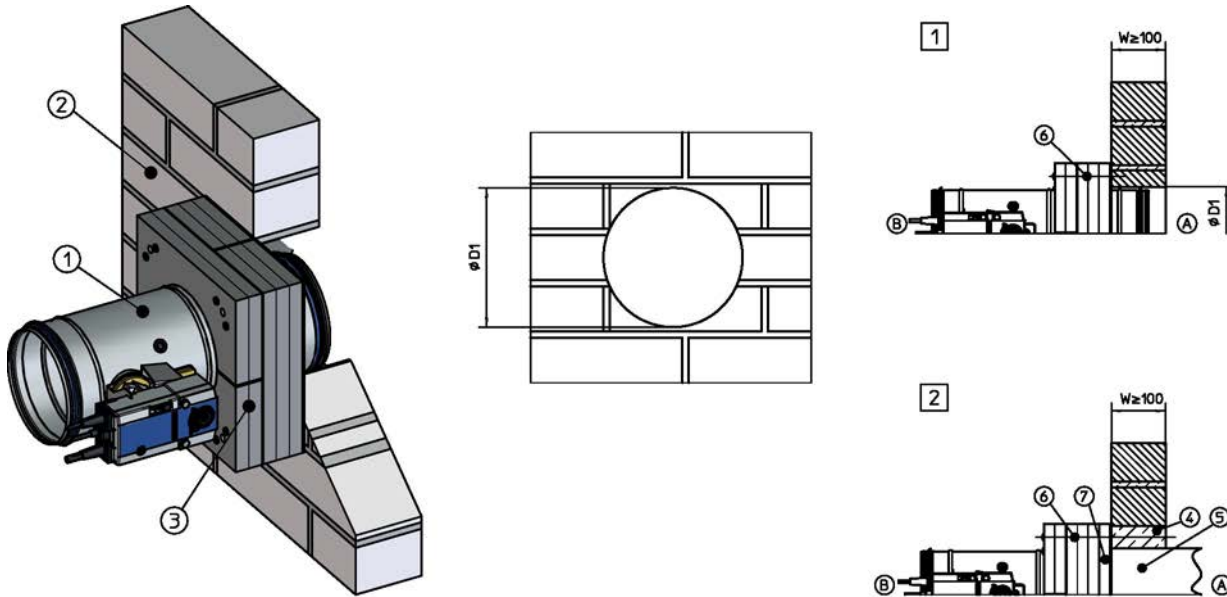
## Materials:

- Fire batt systems ↪ 'Fire batt systems' on page 17

## Requirements

- Performance class up to EI 120 S ↪ 'Performance class and installation details' on page 23
  - Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
  - Duct connection with flexible connector (recommended)
- ▶ An opening is required, see Fig. 11. 40...600 mm between fire damper and wall opening
  - ▶ Push the fire damper into the installation opening and suspend it both on the operating side and on the installation side. ↪ 80
  - ▶ Depending on the nominal size ØDN and wall thickness W you may have to extend the fire damper with an extension piece (attachment or provided by others) on the installation side.
  - ▶ Completely close off the perimeter gap between the fire damper and the wall or ceiling slab with two layers of coated mineral wool slabs,  $\geq 140 \text{ kg/m}^3$ . Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant.
  - ▶ Apply ablative coating to joints, transitions and any imperfections on the coated mineral wool slabs. Attach the mineral wool strip ⑤, if necessary.
  - ▶ You may use sleeves; if you do not use sleeves, you have to apply ablative coating ②,  $\geq 2.5 \text{ mm}$  thick, to the fire damper casing ↪ 'Performance class and installation details' on page 23. The actuator and release unit must not be coated.

## 5.4.5 Dry mortarless installation with wall face frame WA



GR2070103

Fig. 12: Installation with wall face frame WA

- 1 FKRS-EU
- 2 Bricks, concrete or aerated concrete
- 3 Installation kit WA (factory assembled)
- 4 Mortar or concrete
- 5 Duct
- 6 Fixing with steel anchors or with threaded rods (push through)

- 7 Reinforcing board (by others), calcium silicate  $x = 30 \text{ mm}$  or mineral wool  $x = 50 \text{ mm}$ ,  $\geq 140 \text{ kg/m}^3$ , A1,  $1000^\circ\text{C}$
- ØD1 Installation opening ↗ *Table on page 25*
- 1 Installation into a cut hole, EI 90 S
- 2 Installation into a duct with perimeter mortar infill, flush with the wall, EI 90 S
- A Installation side
- B Operating side

### Personnel:

- Specialist personnel

### Requirements

- Performance class EI 90 S
- Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
- $\geq 75 \text{ mm}$  distance to load-bearing structural elements
- $\geq 200 \text{ mm}$  distance between two fire dampers

### 1 Installation into a cut hole

1. ▶ Provide a cut hole (diameter ØD1) and even out any uneven wall patches ↗ *Table on page 25*
2. ▶ Position the fire damper in the centre of the installation opening fix it, either with fire-rated anchors suitable for the type of wall or with four M8 threaded rods (push through).

### 2 Installation into a duct with perimeter mortar infill, flush with the wall

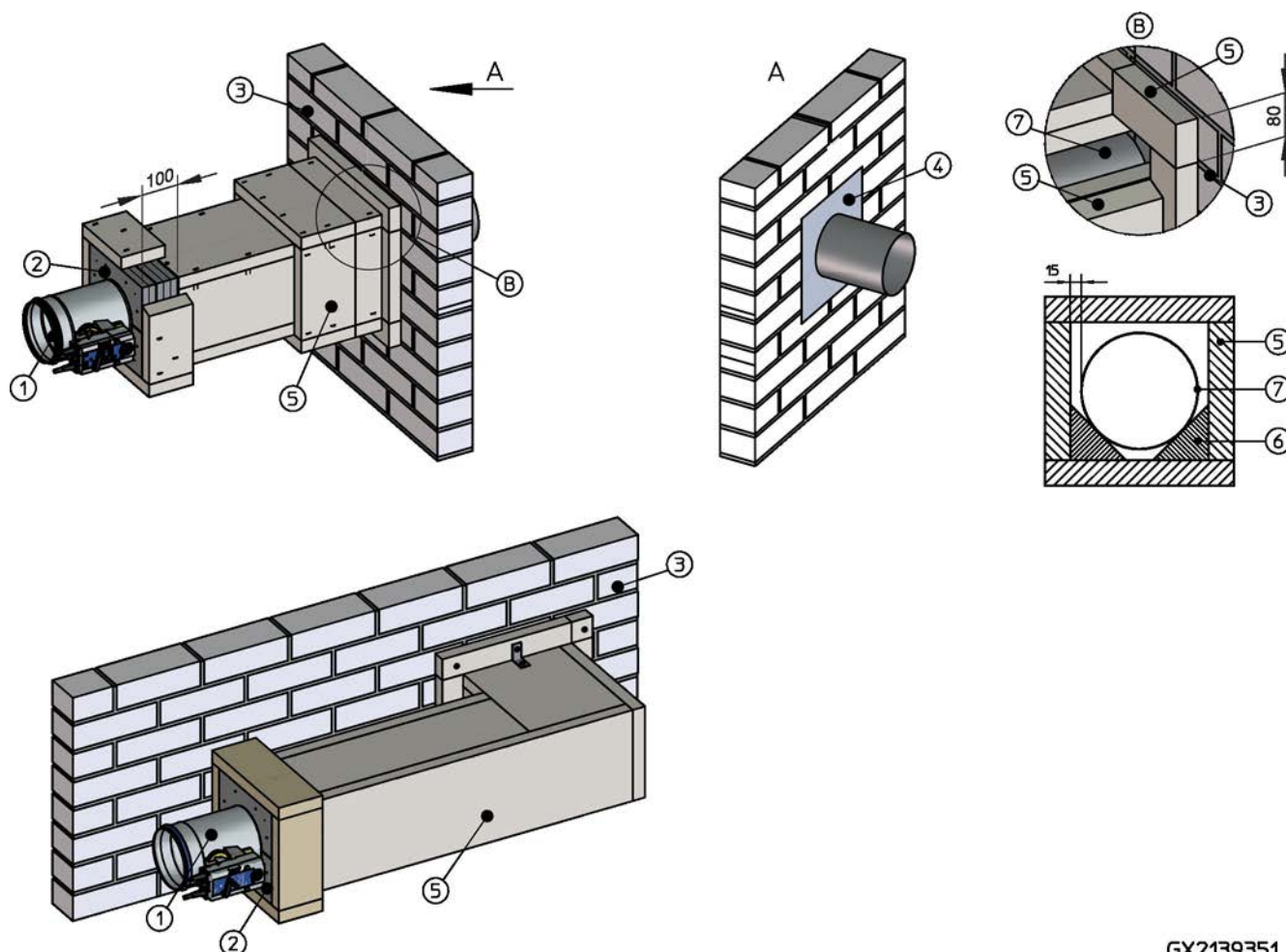
1. ▶ Provide a reinforcing board 7 and attach it to the installation side of the FKRS-EU.

2. ► The wall surface must be even. Push the fire damper into the duct (with perimeter mortar infill, flush with the wall) and fix it with four M8 threaded rods (push through).

Dimensions of installation opening/wall face frame [mm]										
Nominal size	100	125	150	160	180	200	224	250	280	315
ØD1	130	155	180	190	210	230	254	280	310	345
□B2	200	225	250	260	280	300	324	350	380	415

Installation opening tolerance - 20 mm / + 2 mm

## 5.4.6 Installation remote from solid walls, use of an installation kit, wall attachment

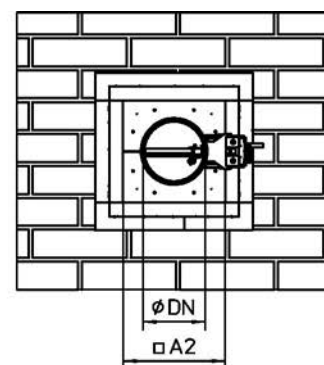
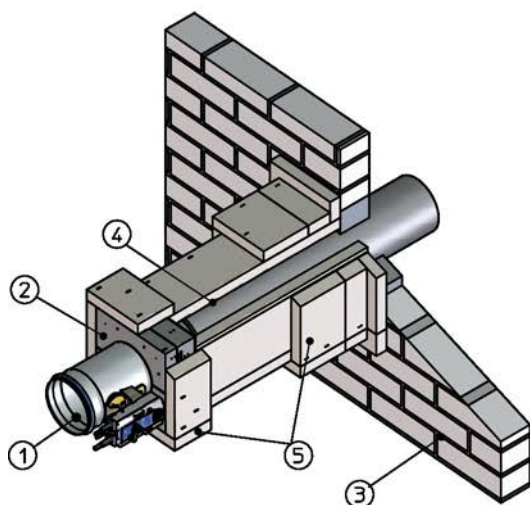


GX2139351

Fig. 13: Installation remote from solid walls, wall attachment

- |   |   |   |                         |
|---|---|---|-------------------------|
| 1 | FKRS-EU                                 | 5 | Fire-resistant cladding |
| 2 | Installation kit WE (factory assembled) | 6 | Support (Promat)        |
| 3 | Solid wall                              | 7 | Duct (sheet steel)      |
| 4 | Mortar                                  |   |                         |

**Note:** Fire damper and ducting must be suspended ↗ 83.

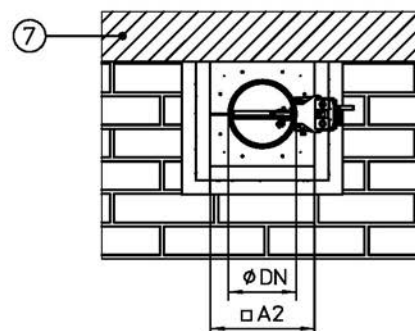
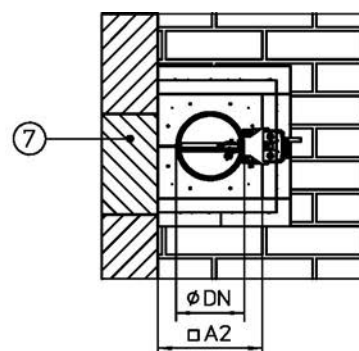
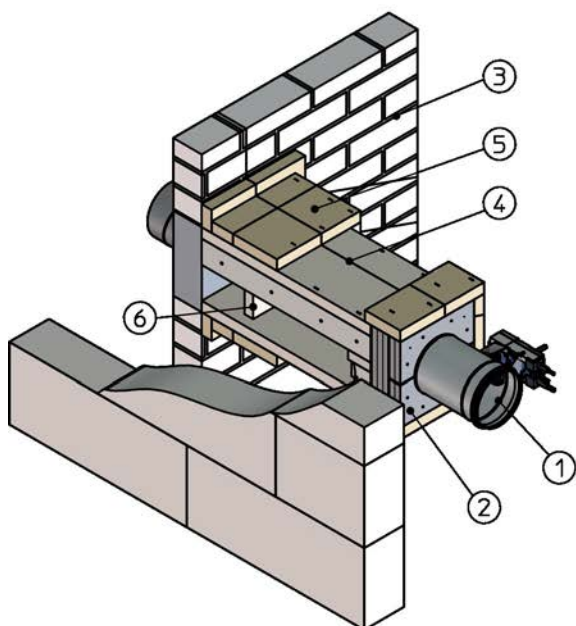


TX2144953

Fig. 14: Installation remote from solid walls, cladding on four sides

- |   |   |              |  |
|---|---|--------------|--|
| 1 | FKRS-EU                                 | 4            | Sheet steel duct with fire-resistant cladding            |
| 2 | Installation kit WE (factory assembled) | 5            | Reinforcing board, fire-resistant cladding on four sides |
| 3 | Solid wall                              |              |  |
|   |   | $\square A2$ | $= \phi DN + 100$  |

**Note:** Fire damper and ducting must be suspended 83.

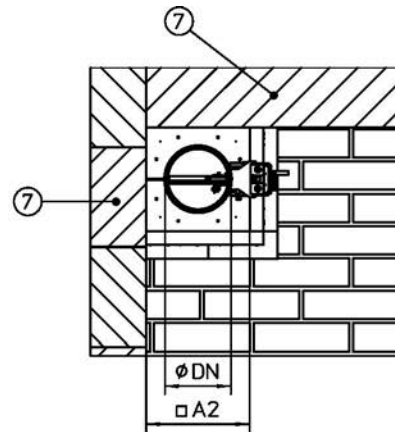
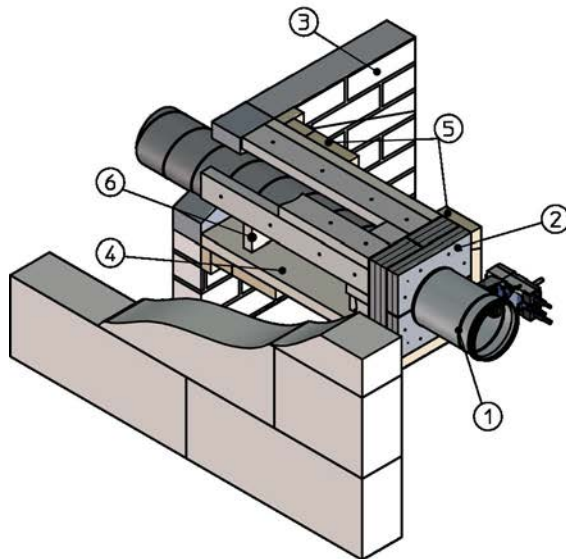


GX2152575

Fig. 15: Installation remote from solid walls, cladding on three sides

- |   |   |              |   |
|---|---|--------------|---|
| 1 | FKRS-EU                                       | 5            | Reinforcing board, fire-resistant cladding on three sides |
| 2 | Installation kit WE (factory assembled)       | 6            | Support   |
| 3 | Solid wall                                    | 7            | Solid ceiling slab or solid wall                          |
| 4 | Sheet steel duct with fire-resistant cladding | $\square A2$ | $= \phi DN + 100$   |

**Note:** Fire damper and ducting must be suspended 83.



GX2154630

Fig. 16: Installation remote from solid walls, cladding on two sides

- |   |   |      |   |
|---|---|------|---|
| 1 | FKRS-EU                                       | 5    | Reinforcing board, fire-resistant cladding on two sides |
| 2 | Installation kit WE (factory assembled)       | 6    | Support   |
| 3 | Solid wall                                    | 7    | Solid ceiling slab or solid wall                        |
| 4 | Sheet steel duct with fire-resistant cladding | □ A2 | = Ø DN + 100  |

**Note:** Fire damper and ducting must be suspended ☞ 83.

## Personnel:

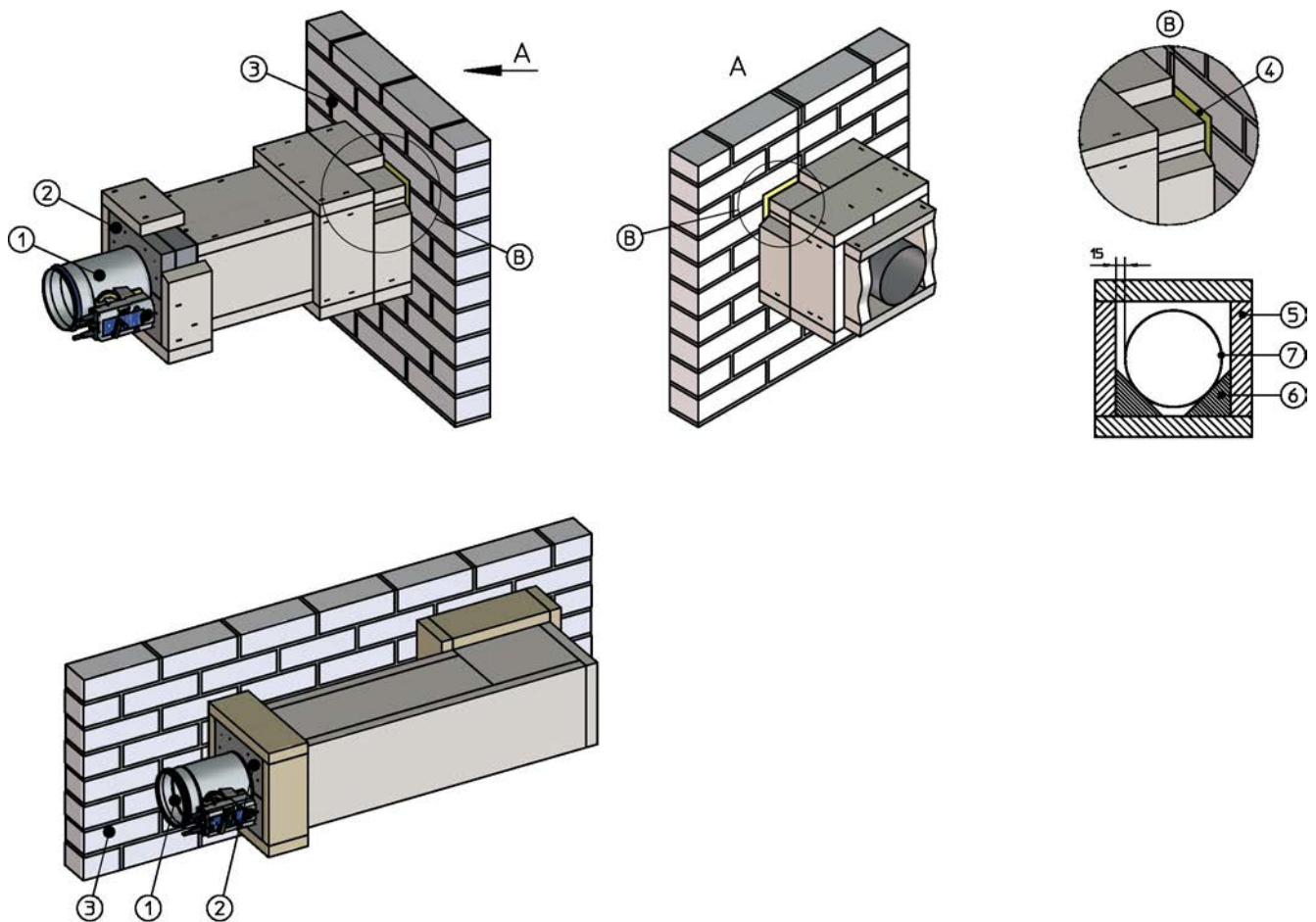
- Specialist personnel

## Requirements

- Performance class up to EI 90 S
- Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
- Sheet steel ducts without any openings, with fire-resistant cladding on two, three or four sides. Acceptable building materials ☞ 18 (Fittings with cladding according to instructions from Promat)
- $\geq 200 \text{ mm}$  distance between two fire dampers. Enough clear space is required for installation.
- Duct connection with flexible connector (recommended)

**Note:** Other installation details upon request.

#### 5.4.7 Installation remote from solid walls, use of an installation kit, wall penetration



GX2123944

*Fig. 17: Installation remote from solid walls, wall penetration*


- |   |   |   |                         |
|---|---|---|-------------------------|
| 1 | FKRS-EU                                 | 5 | Fire-resistant cladding |
| 2 | Installation kit WE (factory assembled) | 6 | Support (Promat)        |
| 3 | Solid wall                              | 7 | Duct (sheet steel)      |
| 4 | Mineral wool                            |   |                         |

**Note:** Fire damper and ducting must be suspended  83.

**Personnel:**

- Specialist personnel

## Requirements

- Performance class up to EI 90 S
- Solid walls or fire walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 350 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
- Sheet steel ducts without any openings, with fire-resistant cladding on two, three or four sides. Acceptable building materials  18 (Fittings with cladding according to instructions from Promat)
- Wall penetration according to instructions from Promat
- $\geq 200 \text{ mm}$  distance between two fire dampers. Enough clear space is required for installation.
- Duct connection with flexible connector (recommended)

**Note:** Other installation details upon request.

## 5.5 Solid ceiling slabs

### 5.5.1 Mortar-based installation

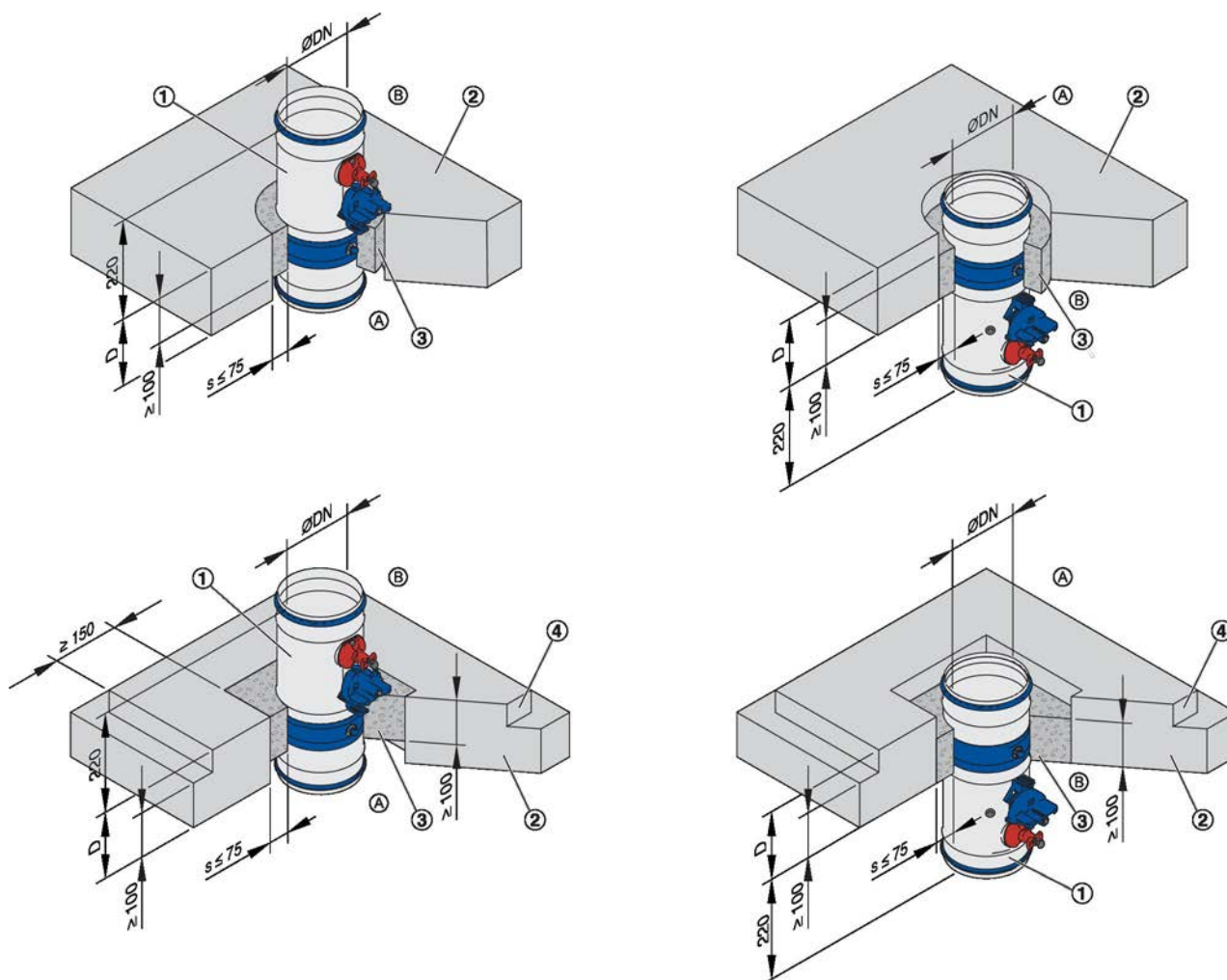


Fig. 18: Mortar-based installation into solid ceiling slab, suspended or upright

- |   |                    |   |                                       |
|---|--------------------|---|---------------------------------------|
| 1 | FKRS-EU            | 4 | Concrete with perimeter reinforcement |
| 2 | Solid ceiling slab | A | Installation side                     |
| 3 | Mortar             | B | Operating side                        |

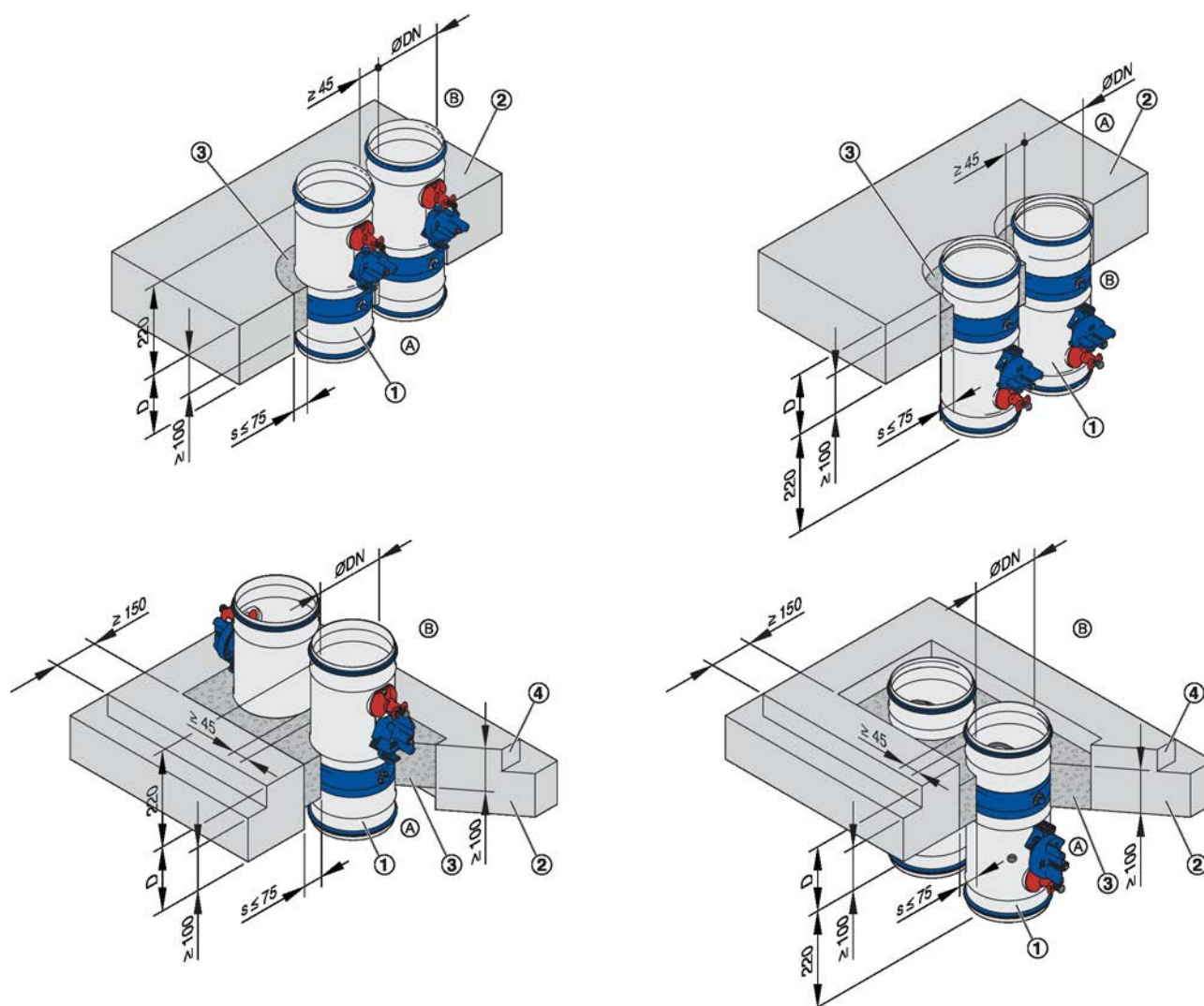


Fig. 19: Mortar-based installation into solid ceiling slab, suspended or upright, two fire dampers side by side

- |                      |   |
|----------------------|---|
| 1 FKRS-EU            | 4 Concrete with perimeter reinforcement |
| 2 Solid ceiling slab | (A) Installation side                   |
| 3 Mortar             | (B) Operating side                      |

#### Installation after completing the ceiling slab

##### Personnel:

- Specialist personnel

##### Materials:

- Mortar ↗ 'Acceptable mortars for mortar-based installation' on page 17

##### Requirements

- Performance class up to EI 120 S
  - Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 100 \text{ mm}$  (thickness increased to  $D \geq 150 \text{ mm}$  where required).
  - $\geq 40 \text{ mm}$  distance to load-bearing structural elements
  - $\geq 45 \text{ mm}$  distance between two fire dampers. When you install two fire dampers next to each other into the same opening, the mortar bed between the two fire dampers must not exceed  $150 \text{ mm}$  (reinforcement according to structural requirements).
1. ▶ Create an installation opening in compliance with the local structural requirements,  $\varnothing D = \varnothing DN + 150 \text{ mm max.}$
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the ceiling slab is  $220 \text{ mm}$ .
- If necessary, extend the fire damper with an extension piece or a spiral duct on the installation side.

3. ► Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.



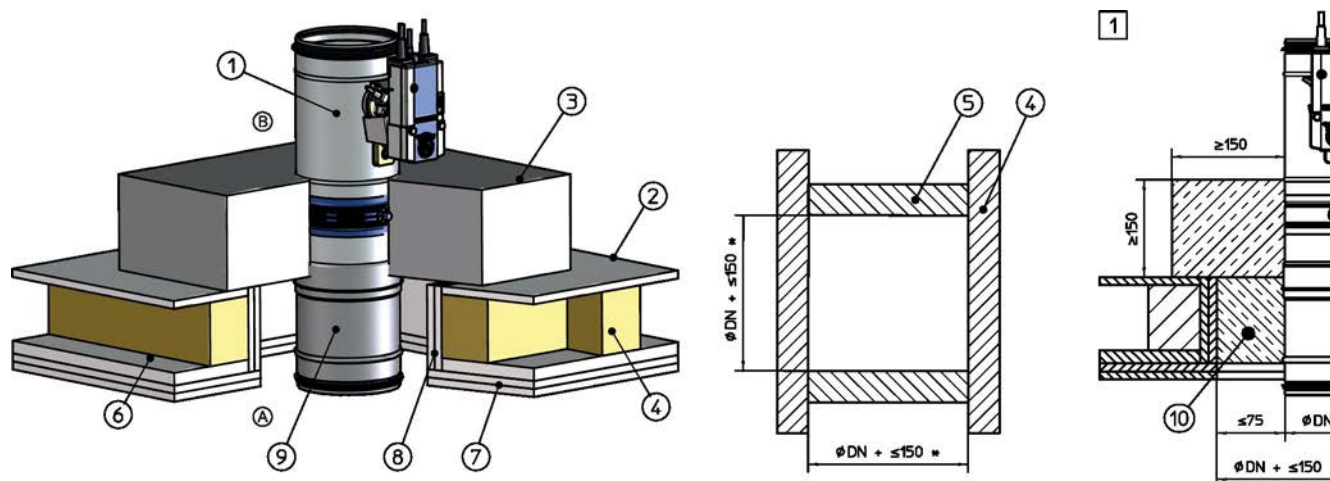
***Installation while completing the ceiling slab***

*If the fire damper is installed as the ceiling slab is being completed, the perimeter gap »s« is not required.*

**Note:**

- *Protect the inside of the damper and the control elements/actuator, e.g. with plastic foil.*

### 5.5.2 Mortar-based installation into wooden beam ceilings



TX1871464

Fig. 20: Mortar-based installation into a wooden beam ceiling up to EI 90 S, upright installation (shown; other structures upon request)

- |   |   |    |  |
|---|---|----|--|
| 1 | FKRS-EU   | 8  | Trim panels  |
| 2 | Wooden floorboard   | 9  | Extension piece or duct  |
| 3 | Reinforced concrete   | 10 | Concrete (optional)  |
| 4 | Wooden beams (distances between beams have to be reduced to fit the size of the installation opening) | *  | Can be increased to account for the thickness of the trim panels |
| 5 | Trimmers (wooden beam)  | 1  | Up to EI 90 S  |
| 6 | Formwork  | A  | Installation side  |
| 7 | Fire-resistant cladding (according to the local structural conditions)                                | B  | Operating side   |

#### Personnel:

- Specialist personnel

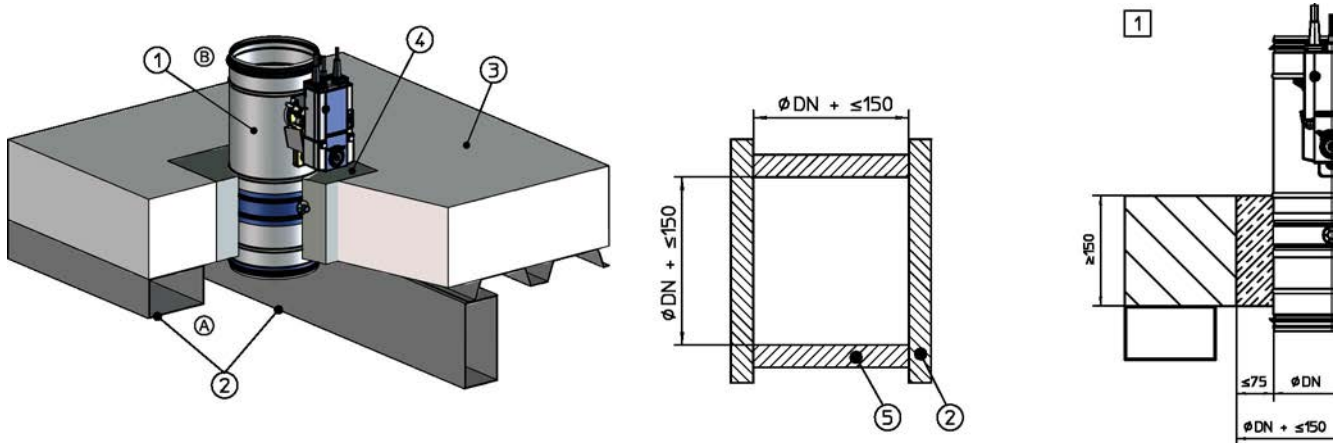
#### Materials:

- Concrete

#### Requirements

- Performance class up to EI 90 S
  - Wooden beam ceiling with fire-resistant cladding
  - ≥ 40 mm distance to load-bearing structural elements
  - ≥ 45 mm distance between fire dampers; when you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 150 mm.
- ▶ Create an installation opening,  $\varnothing \text{DN} + 150 \text{ mm}$  max. Professionally connect the trimmers.
  - ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the spigot on the operating side to the concrete bed is 220 mm.  
If necessary, extend the fire damper with an extension piece or a spiral duct on the installation side.
  - ▶ Create a partial concrete ceiling around the fire damper, with ≥ 150 mm reinforcement, ≥ 150 mm thick; or install the damper into a concrete ceiling later, with a perimeter mortar infill.
  - ▶ Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete, have to be evaluated and ensured by others.

## 5.5.3 Mortar-based installation into lightweight ceilings



TX1795371

Fig. 21: Mortar-based installation into a lightweight ceiling up to EI 120 S, upright installation

- |   |   |   |                   |
|---|---|---|-------------------|
| 1 | FKRS-EU   | 5 | Steel sections    |
| 2 | Lightweight ceiling (Cadolto modular ceiling system), installation according to manufacturer's instructions and general appraisal certificate | 1 | Up to EI 120 S    |
| 3 | Partial concrete ceiling with reinforcement   | A | Installation side |
| 4 | Mortar  | B | Operating side    |

### Personnel:

- Specialist personnel

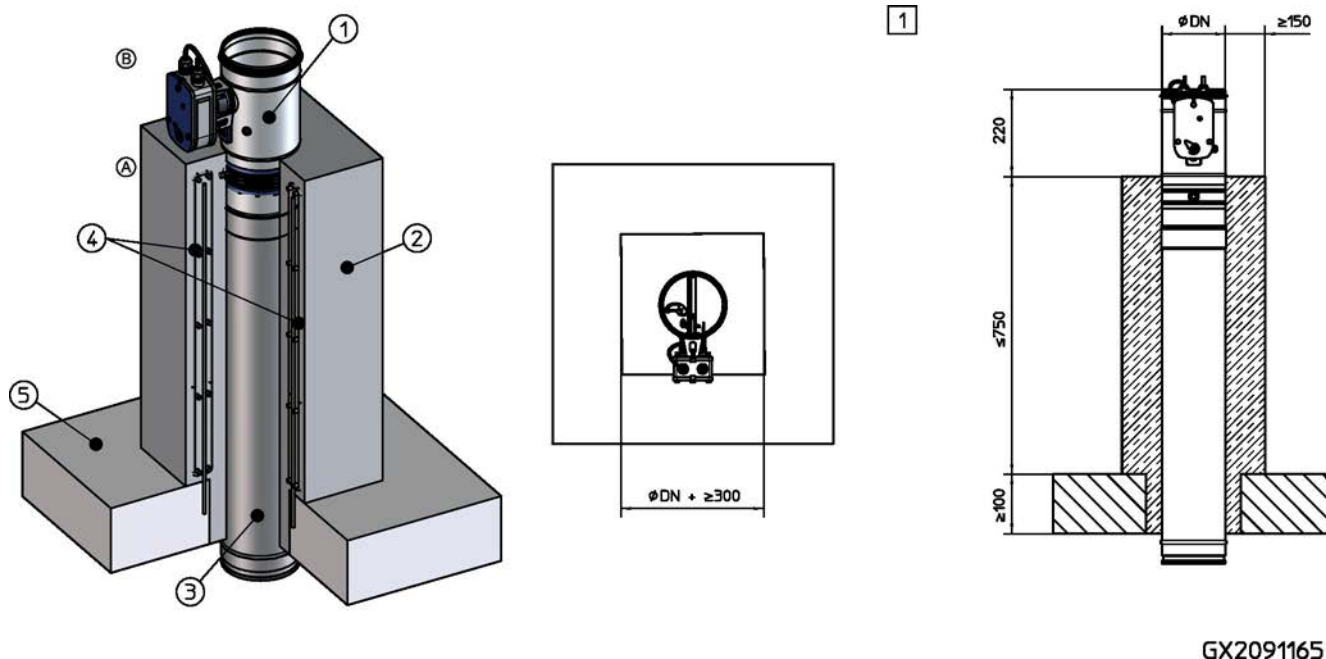
### Materials:

- Mortar or concrete ↗ 'Acceptable mortars for mortar-based installation' on page 17

### Requirements

- Performance class up to EI 120 S
  - Modular ceiling (Cadolto)
  - $\geq 40$  mm distance to load-bearing structural elements
  - $\geq 45$  mm distance between two fire dampers. When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 150 mm.
1. ▶ Create an installation opening,  $\varnothing DN + 150$  mm max. Provide and professionally connect the steel sections around the opening in the lightweight ceiling.
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the spigot on the operating side to the concrete bed is 220 mm.  
Extend the fire damper with an extension piece or a spiral duct on the installation side.
  3. ▶ Create a partial concrete ceiling around the fire damper, with  $\geq 150$  mm reinforcement,  $\geq 150$  mm thick; or install the damper into a concrete ceiling later, with a perimeter mortar infill.
  4. ▶ Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete, have to be evaluated and ensured by others.

### 5.5.4 Mortar-based installation into concrete base



GX2091165

Fig. 22: Mortar-based installation with concrete base into a solid ceiling slab, up to EI 120 S

- |   |  |   |                    |
|---|--|---|--------------------|
| 1 | FKRS-EU  | 5 | Solid ceiling slab |
| 2 | Reinforced concrete base                                       | 1 | Up to EI 120 S     |
| 3 | Duct   | A | Installation side  |
| 4 | Concrete base according to the reinforcement plan, see Fig. 23 | B | Operating side     |

#### Installation after completing the ceiling slab

##### Personnel:

- Specialist personnel

##### Requirements

- Performance class up to EI 120 S
  - Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 100 \text{ mm}$
  - $\geq 40 \text{ mm}$  distance to load-bearing structural elements.
  - $\geq 45 \text{ mm}$  distance between two fire dampers
1. ▶ Attach the new fire damper to the old fire damper
  2. ▶ Create concrete base, for a reinforcement plan see Fig. 23 (or similar, e.g. with steel fabric).

No reinforcement is required for bases with a height of  $\leq 100 \text{ mm}$ .

If the distance to adjacent solid walls is  $< 150 \text{ mm}$  and if the concrete base has been correctly attached, no reinforcement is required on the wall side.

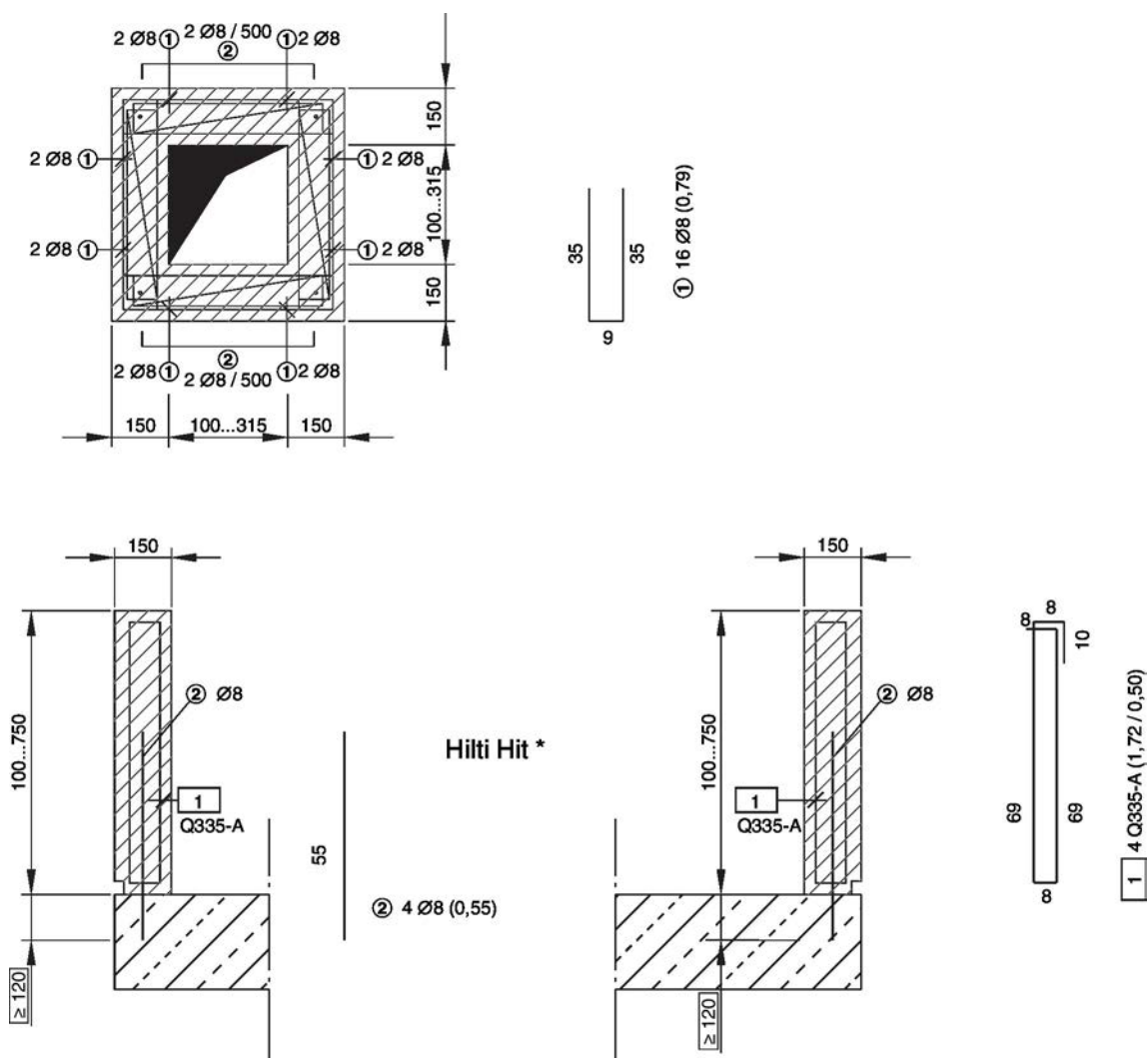


Fig. 23: Reinforcement plan for concrete bases with a height of 100 to 750 mm

\* or equivalent, e.g. steel anchor or threaded rods

**Note:** Alternative reinforcement plan available upon request.

### 5.5.5 Dry mortarless installation with circular installation block ER

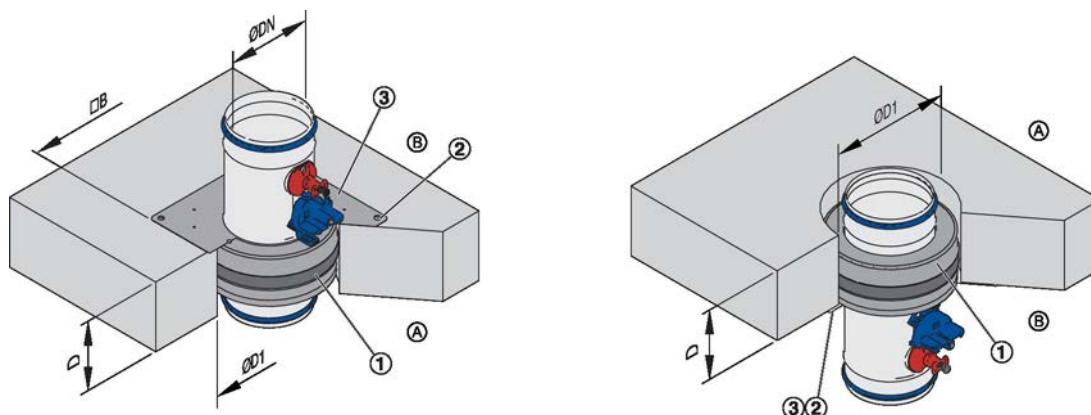


Fig. 24: Dry mortarless installation into solid ceiling slab, suspended or upright

- |   |                                      |     |  |
|---|--------------------------------------|-----|--|
| 1 | Installation block (factory mounted) | ØD1 | Installation opening ↗ <i>Table on page 37</i> |
| 2 | Screw fixing                         | (A) | Installation side                              |
| 3 | Cover plate                          | (B) | Operating side                                 |

#### Personnel:

- Specialist personnel

#### Requirements

- Performance class EI 90 S
  - Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 100 \text{ mm}$  (thickness increased to  $D \geq 150 \text{ mm}$  where required).
  - $\geq 75 \text{ mm}$  distance between installation block and load-bearing structural elements
  - $\geq 200 \text{ mm}$  distance between two installation blocks
1. ▶ Create an appropriate opening with ØD1 ↗ *Table on page 37*
  2. ▶ Position the fire damper with the installation block in the centre of the installation opening and push it in up to the cover plate.
  3. ▶ If necessary, extend the fire damper with an extension piece on the installation side (attachment or provided by others).
  4. ▶ Fix the cover plate with four threaded rods (push through installation) or with at least four M6 screws. For solid walls and solid ceiling slabs, suitable steel anchors with building inspectorate approval must be used.

Dimensions of installation opening/cover plate [mm]										
Nominal size	100	125	150	160	180	200	224	250	280	315
ØD1	200	250	250	250	300	300	350	350	400	400
□B	250	300	300	300	350	350	400	400	450	450

Installation opening tolerance + 2 mm

## 5.5.6 Dry mortarless installation with fire batt

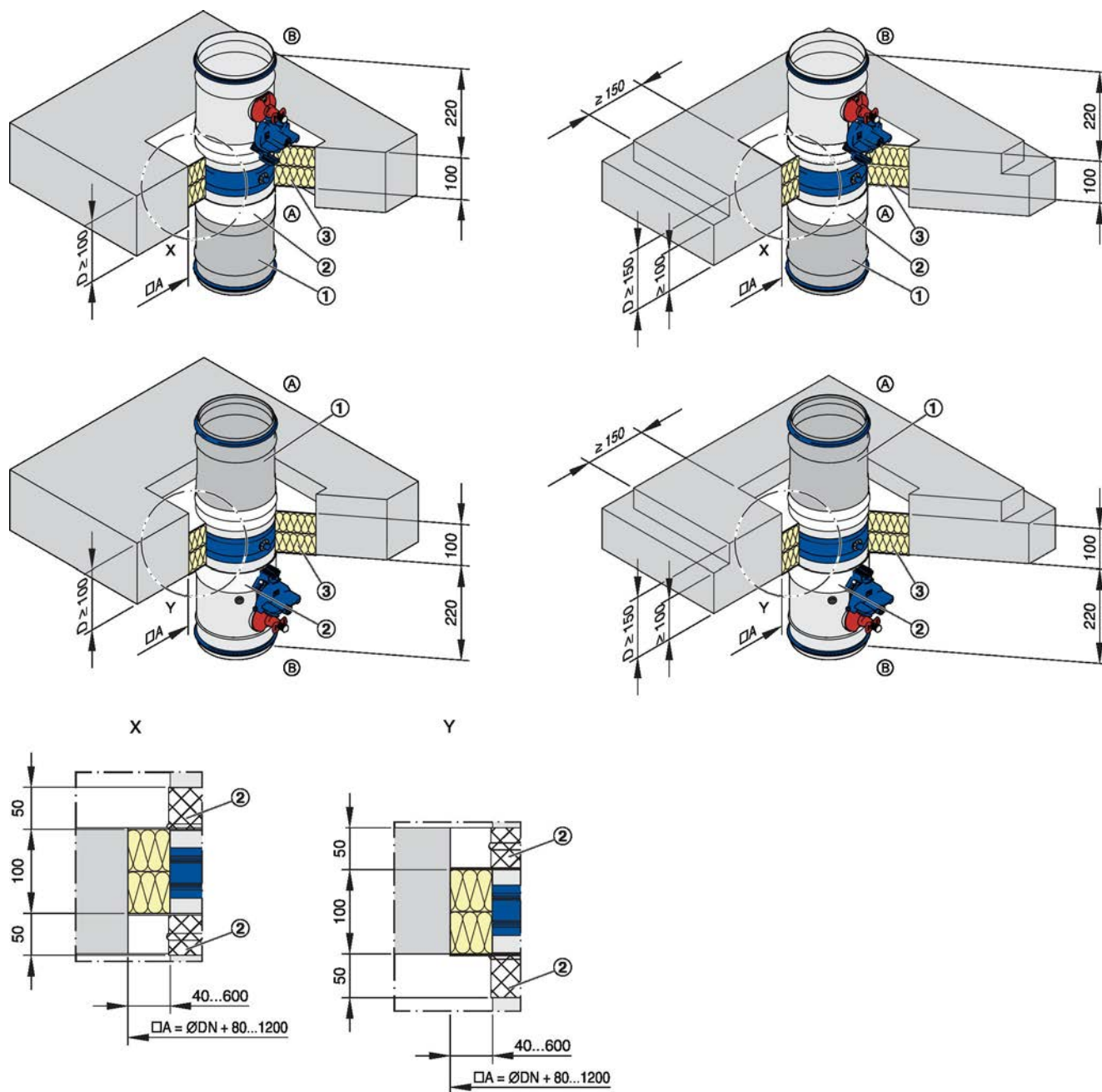


Fig. 25: Installation with fire batt, suspended or upright

- |   |   |   |   |
|---|---|---|---|
| 1 | Extension piece (if necessary, either attachment or provided by others) | ⓑ | Operating side  |
| 2 | Coating or sleeves  | X | Fire batt, flush with the floor (only for upright installation)     |
| 3 | Coated mineral wool slabs, $\geq 140 \text{ kg/m}^3$                    | Y | Fire batt, flush with the ceiling (only for suspended installation) |
| Ⓐ | Installation side   |   |   |

## Performance class and installation details

Performance class up to	Fire batt system	Size ØDN [mm]	Distances [mm]			Coating or sleeves	
			to load-bearing structural elements	between dampers (two installation openings)	between dampers (one installation opening)	Coating	Sleeves
EI 120 S	Hensel/ Hilti/ Promat	100...315	≥ 75	≥ 200	–	both sides	two sleeves <sup>1</sup>
EI 90 S							one sleeve <sup>1, 2</sup>

<sup>1)</sup> Sleeves are to be ordered separately.

<sup>2)</sup> On the operating side

## Personnel:

- Specialist personnel

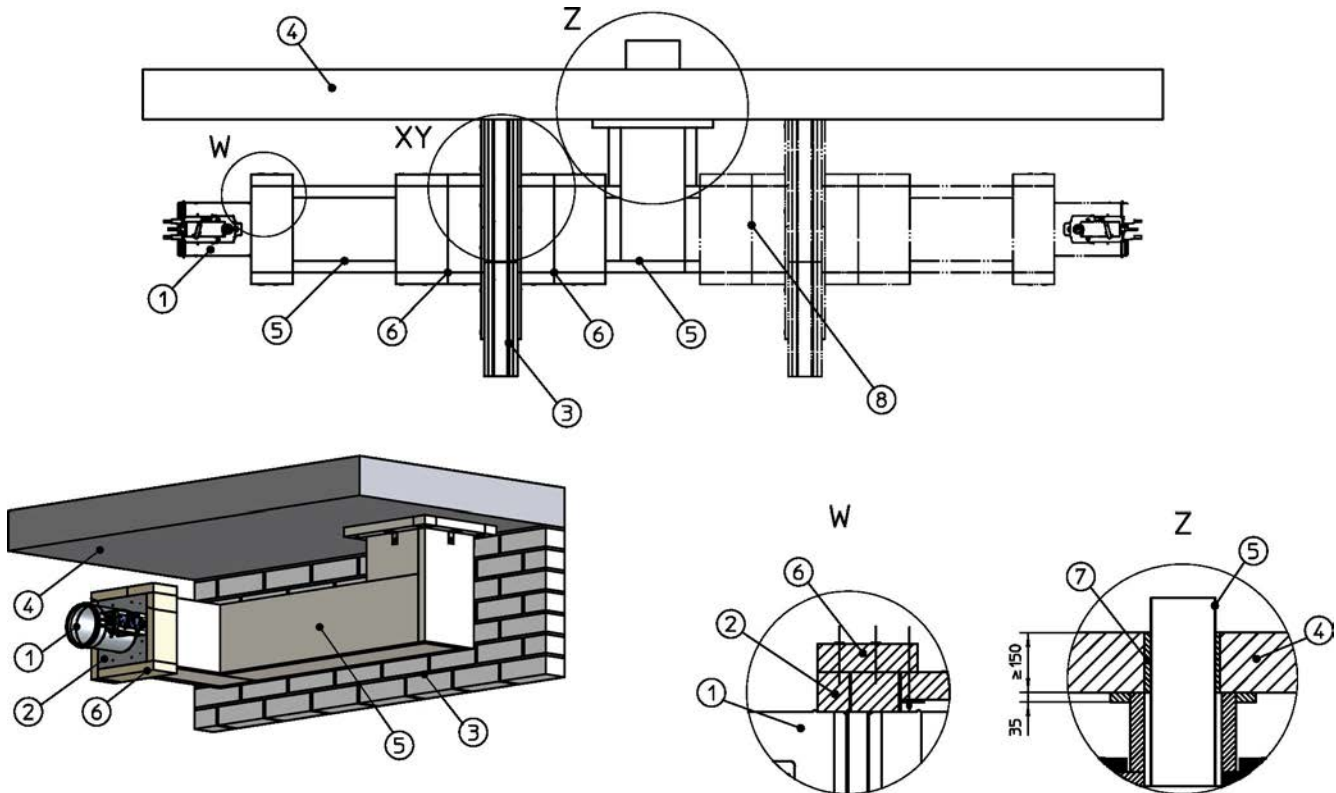
## Materials:

- Fire batt systems ↪ 'Fire batt systems' on page 17

## Requirements

- Performance class up to EI 120 S ↪ on page 38
  - Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 100 \text{ mm}$  (thickness increased to  $D \geq 150 \text{ mm}$  where required).
  - Duct connection with flexible connectors (recommended)
- ▶ An opening is required, see Fig. 25. 600 mm maximum distance between fire damper and installation opening
  - ▶ Push the fire damper into the installation opening and suspend it with threaded rods ↪ Chapter 5.10.3.2 'Vertical duct' on page 81.  
Make sure that the distance from the connecting spigot on the operating side to the ceiling slab is 220 mm.
  - ▶ If necessary, extend the fire damper with an extension piece on the installation side (attachment or provided by others).
  - ▶ Completely close off the perimeter gap between the fire damper and the wall or ceiling slab with two layers of coated mineral wool slabs,  $\geq 140 \text{ kg/m}^3$ . Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the opening. Seal any gaps between the mineral wool slabs and the trim panels, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire resistant sealant.
  - ▶ Apply ablative coating to joints, transitions and any imperfections on the coated mineral wool slabs.
  - ▶ You may use sleeves; if you do not use sleeves, you have to apply ablative coating ②,  $\geq 2.5 \text{ mm}$  thick, to the fire damper casing ↪ 'Performance class and installation details' on page 39. The actuator and release unit must not be coated.

## 5.5.7 Installation remote from solid walls with installation kit WE



TX2165093

Fig. 26: Installation remote from solid ceiling slabs, ceiling attachment

- |  |  |
|--|--|
| 1 FKRS-EU  | 5 Sheet steel duct with fire-resistant cladding  |
| 2 Installation kit WE (factory assembled)  | 6 Reinforcing strip with fire-resistant cladding |
| 3 Solid wall, detail X, see ↗ 29 or lightweight partition wall, detail Y, see ↗ 51 | 7 Mineral wool or mortar                         |
| 4 Solid ceiling slab   | 8 Additional ducting can be used                 |

**Note:** Fire damper and ducting must be suspended ↗ 83.

### Personnel:

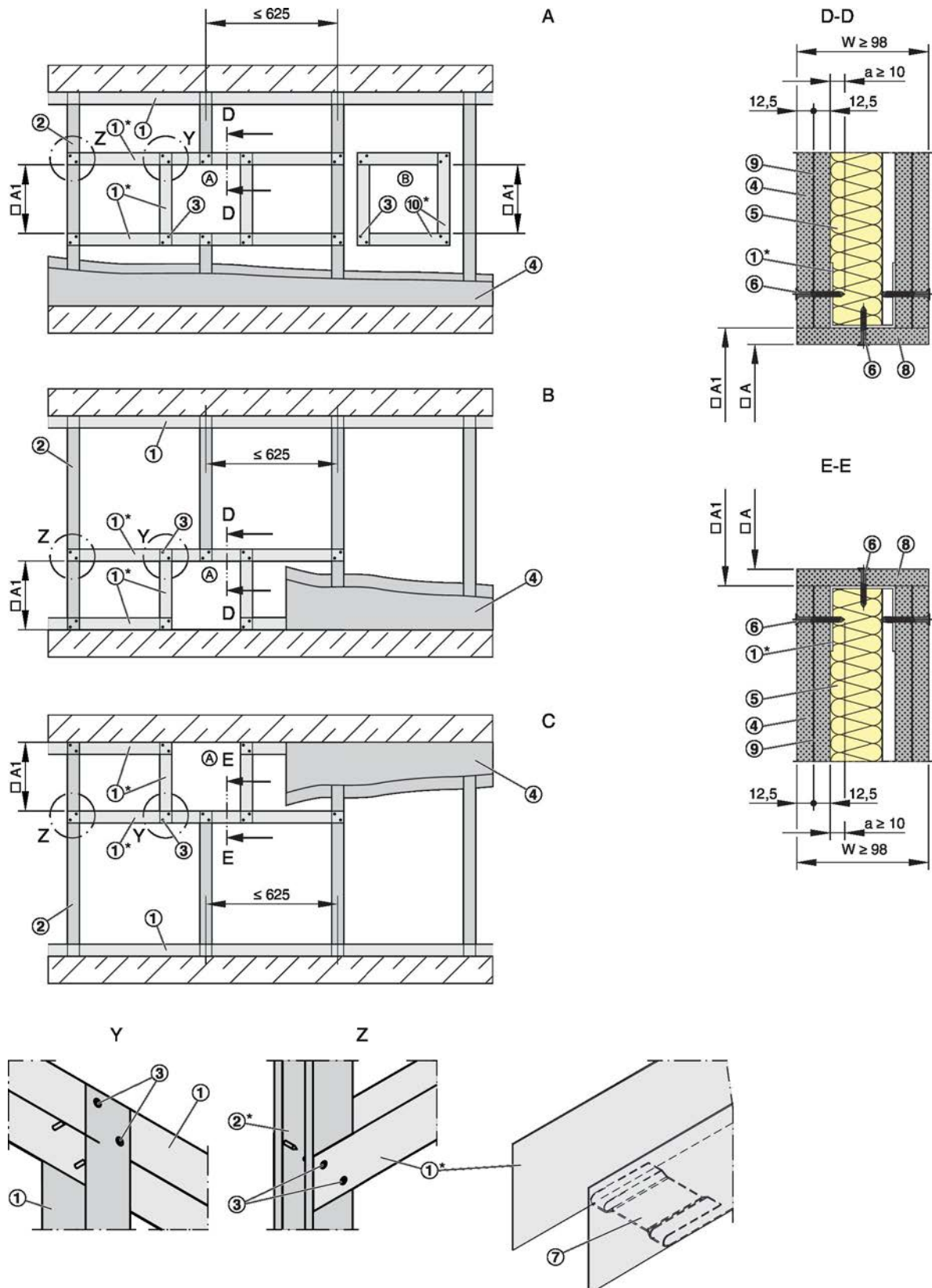
- Specialist personnel

### Requirements

- Performance class up to EI 90 S
- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 150 \text{ mm}$
- Ceiling penetration: Duct with perimeter mortar infill or mineral wool.
- Sheet steel ducts without any openings, with fire-resistant cladding. Acceptable building materials ↗ 18 (Fittings with cladding according to instructions from Promat)
- $\geq 200 \text{ mm}$  distance between two fire dampers. Enough clear space is required for installation.
- Duct connection with flexible connector (recommended)

**Note:** Other installation details upon request.

## 5.6 Lightweight partition walls with metal support structure



*Fig. 27: Lightweight partition wall with metal support structure and cladding on both sides*

- |   |   |   |  |
|---|---|---|--|
| A | Lightweight partition wall                                | 6 | Dry wall screw                                 |
| B | Lightweight partition wall, installation near the floor   | 7 | Fold the tab inward or cut it off              |
| C | Lightweight partition wall, installation near the ceiling | 8 | Trim panels, according to installation details |

## Lightweight partition walls with metal...

- |   |   |     |   |
|---|---|-----|---|
| 1 | UW section  | 9   | Sheet steel insert (according to usability certificate, e.g. for a safety partition wall) |
| 2 | CW section  | 10  | Perimeter metal sections, screw-fixed either at the corners or through the wall cladding  |
| 3 | Screw or steel rivet  | □A  | Installation opening  |
| 4 | Double layer cladding, on both sides of the metal stud system | □A1 | Opening in the metal support structure (without trim panels: □A = □A1)                    |
| 5 | Mineral wool (depending on wall construction)                 | *   | Closed end must face installation opening   |

### Requirements

- Lightweight partition wall, safety partition wall or wall to provide radiation protection, with metal support structure and cladding on both sides, with European classification to EN 13501-2 or equivalent national classification
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, of fibre-reinforced gypsum or of fire-rated calcium silicate boards, wall thickness  $W \geq 98$  mm
- $\leq 625$  mm distance between metal studs
- Installation only into square openings
- The installation opening must be stabilised with a reinforcing section or with horizontal and vertical sections
- Additional layers of cladding (up to two layers if stated in the usability certificate for the wall) and double stud constructions are approved.
- Duct connection with flexible connector (recommended)
- Trim panels have to be screw-fixed to the support structure

### Erecting a wall and creating an installation opening

- Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening, see Fig. 27
- – Option Ⓐ: Provide the installation opening in the metal support structure with suitable metal sections.
- – Option Ⓑ: After cladding the wall, create a square wall opening and brace it with a perimeter metal section.

Installation opening □A [mm]											
Installation type		Nominal size									
		100	125	150	160	180	200	224	250	280	315
Mortar-based installation <sup>1</sup>		□A = DN + 150 mm max.									
Dry mortarless installation with installation kit TQ <sup>1, 2</sup>	□A	210	235	260	270	290	310	334	360	390	425
	□B1	300	325	350	360	380	400	424	450	480	515
Dry mortarless installation with fire batt <sup>3</sup>		□A = $\varnothing$ DN + 80...1200 mm									
		□A1 = □A + (2 trim panels)									

<sup>1)</sup> Optional trim panels

<sup>2)</sup> Installation opening tolerance + 2 mm

<sup>3)</sup> Trim panels are required

### 5.6.1 Mortar-based installation

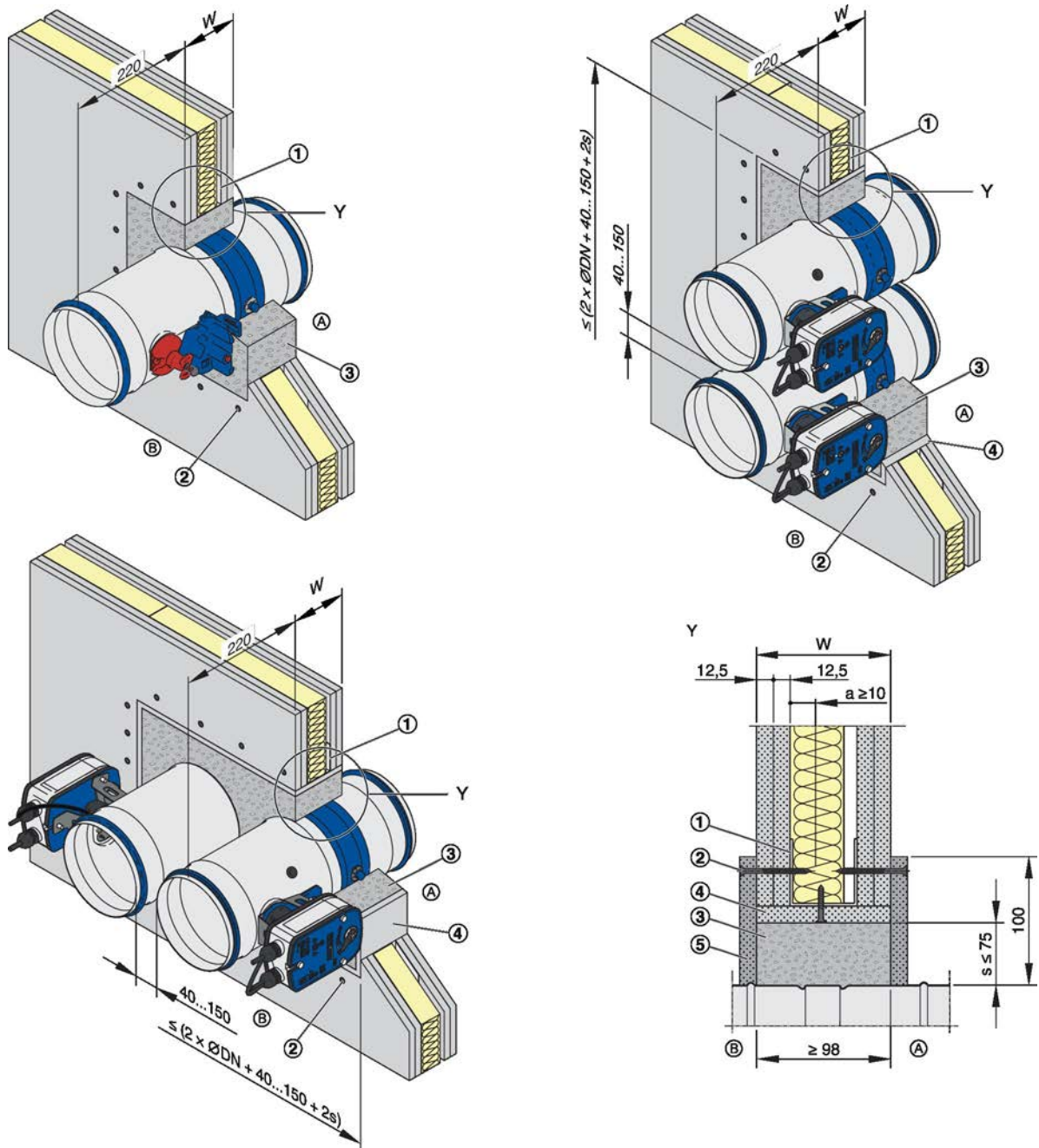


Fig. 28: Mortar-based installation

- |   |                         |     |  |
|---|-------------------------|-----|--|
| 1 | Perimeter metal section | 5   | Perimeter reinforcing board, 12.5 mm, required for EI 120 S and $\varnothing DN \geq 224$ mm |
| 2 | Dry wall screw          | (A) | Installation side  |
| 3 | Mortar                  | (B) | Operating side   |
| 4 | Optional trim panels    |     |  |

For details on the installation into walls of different thickness see Fig. 29

## Performance class and installation details

Performance class up to	Size ØDN [mm]	Distances [mm]		
		to load-bearing structural elements	between two fire dampers (two installation openings)	between two fire dampers (one installation opening – flange to flange)
EI 120 S	100...200	≥ 75	≥ 200	–
EI 120 S	224...315 <sup>1)</sup>	≥ 75	≥ 200	–
EI 90 S	100...315	≥ 40	≥ 200	40...150
EI 30 S	100...315	≥ 40	≥ 200	40...150

<sup>1)</sup> reinforcing board ⓘ required

### Personnel:

- Specialist personnel

### Materials:

- Mortar ⓘ ‘Acceptable mortars for mortar-based installation’ on page 17

### Requirements

- Performance class up to EI 120 S ⓘ ‘Performance class and installation details’ on page 44
  - Lightweight partition walls with metal support structure or steel support structure and cladding on both sides,  $W \geq 98$  mm, detailed specification ⓘ on page 41.
  - Duct connection with flexible connector (recommended)
  - ‘Flange-to-flange’ installation of two FKRS-EU fire dampers into one installation opening is only possible if both dampers are of the same size (details for other installations are available upon request)
- ▶ Erect a lightweight partition wall according to the manufacturer's instructions: EI 120 S with mineral wool; EI 30 S to EI 90 S with or without mineral wool; create an installation opening ⓘ on page 41.
  - ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.  
  
If the wall thickness is  $> 115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct (attachment or provided by others).
  - ▶ Close off the perimeter gap »s« with mortar.
  - ▶ Fix the reinforcing board or strips, if any.

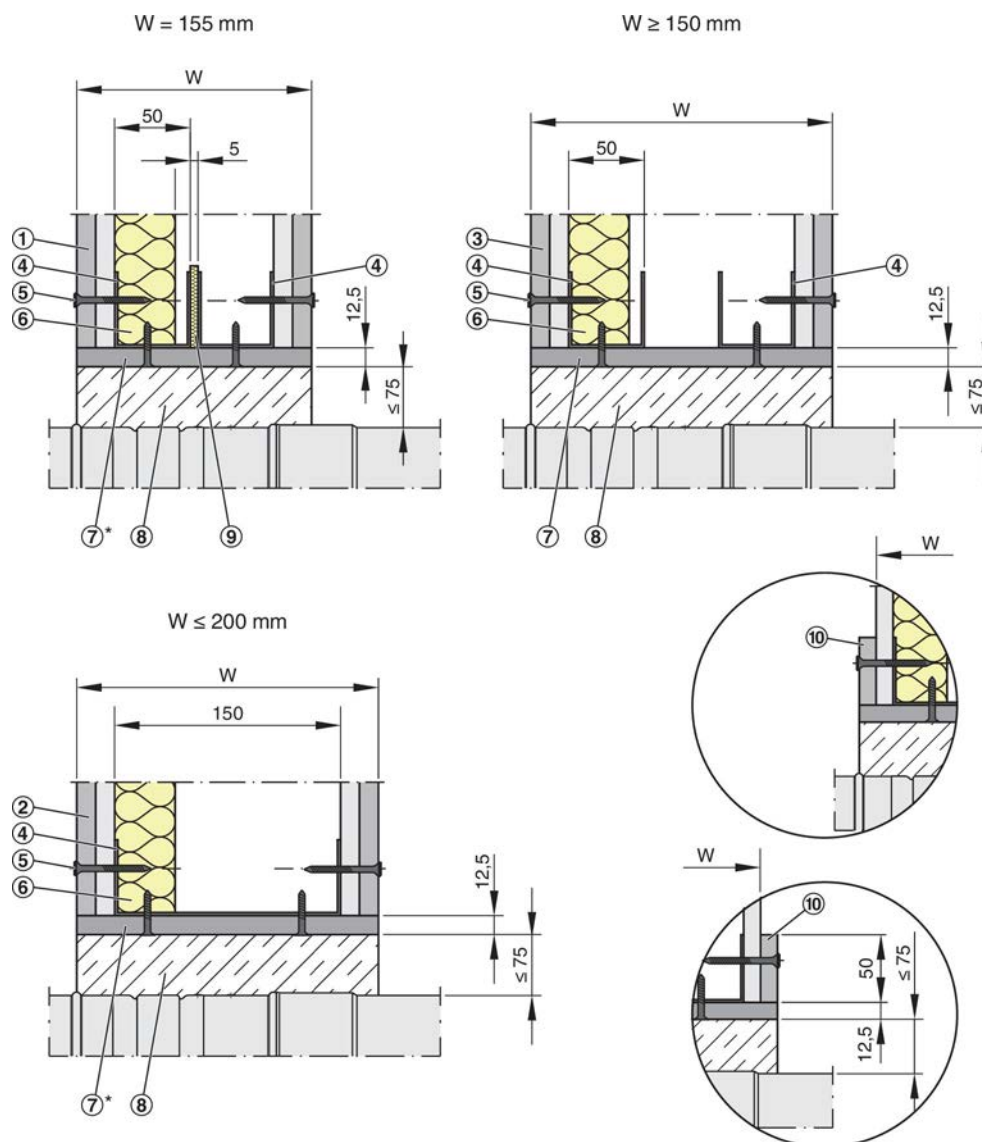


Fig. 29: Mortar-based installation into lightweight partition walls,  $W \geq 150 \text{ mm}$

- |   |  |    |   |
|---|--|----|---|
| 1 | F90 wall, double stud system, $W = 155 \text{ mm}$<br>( $W = 155 \text{ mm}$ shown)    | 7  | Trim panels, screw-fixed to stud system   |
| 2 | F90 wall, single stud system, $W \leq 200 \text{ mm}$<br>( $W = 200 \text{ mm}$ shown) | 8  | Mortar or gypsum mortar   |
| 3 | F90 wall, double stud system, $W \geq 150 \text{ mm}$<br>( $W = 200 \text{ mm}$ shown) | 9  | Insulating strip (depending on wall construction)   |
| 4 | Perimeter metal section  | 10 | Perimeter reinforcing strips, $12.5 \times 50 \text{ mm}$ , only<br>required for F30 wall |
| 5 | Dry wall screw   | *  | optional  |
| 6 | Mineral wool (depending on wall construction)  |    |   |

Installation details for other wall types are available on request

## 5.6.2 Dry mortarless installation with square installation kit TQ

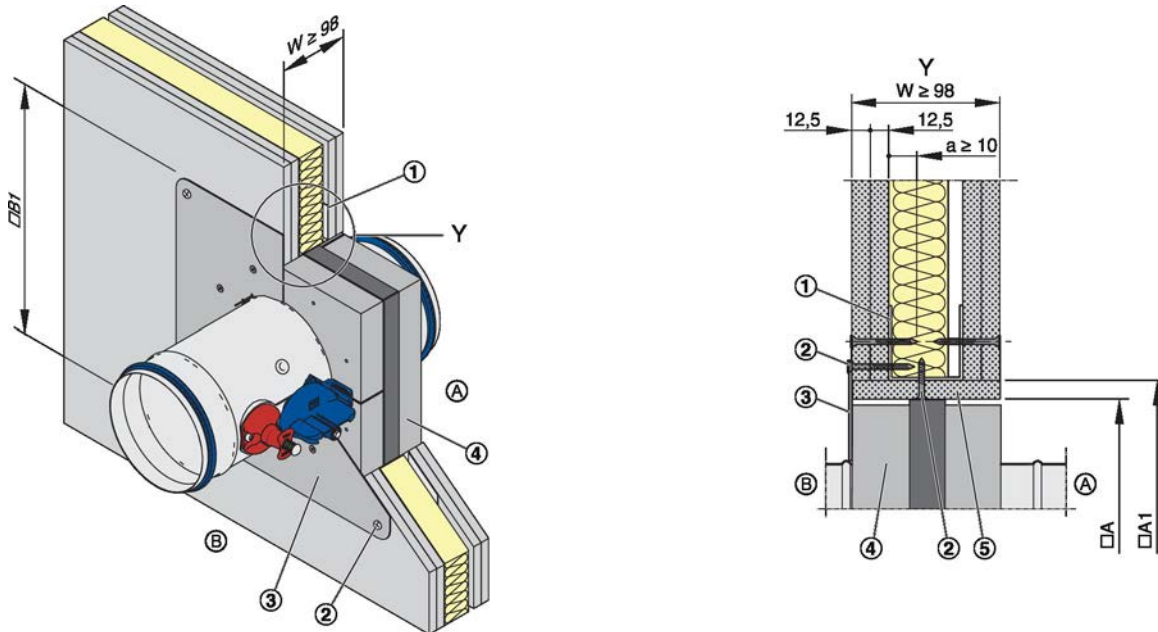


Fig. 30: Dry mortarless installation with square installation kit TQ

- |   |   |     |  |
|---|---|-----|--|
| 1 | Perimeter metal section                 | 5   | Optional trim panels for $W \geq 98$ mm (12.5 mm max. thickness) |
| 2 | Dry wall screw                          | (A) | Installation side  |
| 3 | Cover plate                             | (B) | Operating side   |
| 4 | Installation kit TQ (factory assembled) |     |  |

For details on the installation into walls of different thickness see Fig. 31

### Personnel:

- Specialist personnel

### Requirements

- Performance class EI 90 S
  - Lightweight partition walls with metal support structure or steel support structure and cladding on both sides,  $W \geq 98$  mm, detailed specification  $\varphi$  on page 41.
  - 40 mm distance to load-bearing structural elements ( $\geq 50$  mm if the cover plate has been shortened)
  - $\geq 200$  mm distance between two fire dampers
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the lightweight partition wall, EI 90 S, with mineral wool, according to the manufacturer's instructions and create an installation opening  $\varphi$  on page 41.
  2. ▶ Position the fire damper with the square installation kit in the centre of the installation opening and push it in up to the cover plate.  
If the wall thickness is  $>115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Fix the cover plate with at least four screws (dry wall screws  $\varnothing \geq 4.2$  mm,  $a \geq 10$  mm) to the perimeter metal section.
  4. ▶ If the wall thickness is  $\geq 125$  mm, fill the rear gap with mineral wool or gypsum mortar and seal it with reinforcing strips made of the same material as the wall Fig. 31.

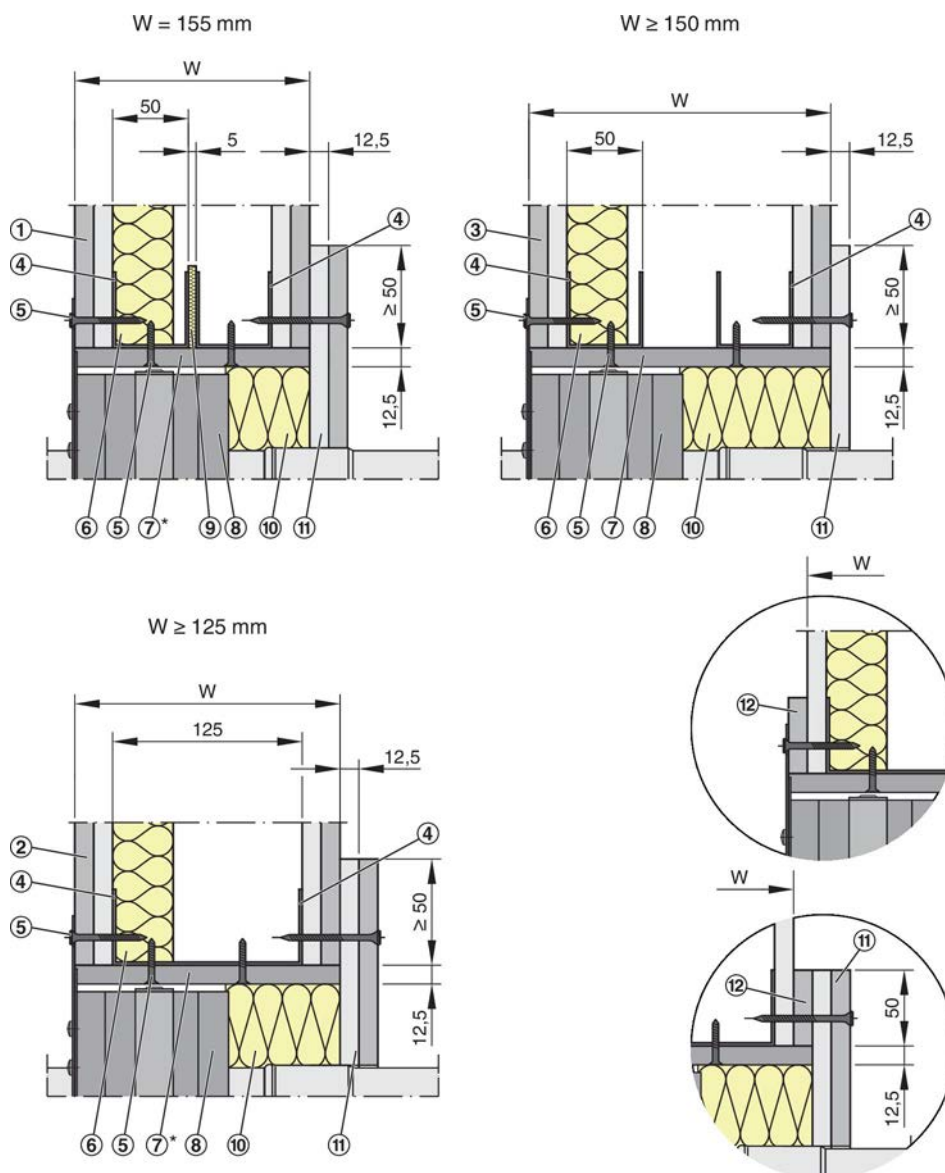


Fig. 31: Dry mortarless installation into lightweight partition walls,  $W \geq 125$  mm

- |   |  |
|---|--|
| 1 Double stud system, $W = 155$ mm ( $W = 155$ mm shown)    | 8 Installation kit (factory assembled)   |
| 2 Single stud system, $W \geq 125$ mm ( $W = 175$ mm shown) | 9 Insulating strip (depending on wall construction)                              |
| 3 Double stud system, $W \geq 150$ mm ( $W = 200$ mm shown) | 10 Infill (mineral wool $A1 \geq 50$ kg/m <sup>3</sup> or gypsum mortar)         |
| 4 Perimeter metal sections                                  | 11 Reinforcing board, made of wall panels, up to the fire damper casing          |
| 5 Dry wall screw  | 12 Perimeter reinforcing strips, $12.5 \times 50$ mm, only required for F30 wall |
| 6 Mineral wool (depending on wall construction)             | * optional   |
| 7 Trim panels   |  |

## 5.6.3 Dry mortarless installation with fire batt

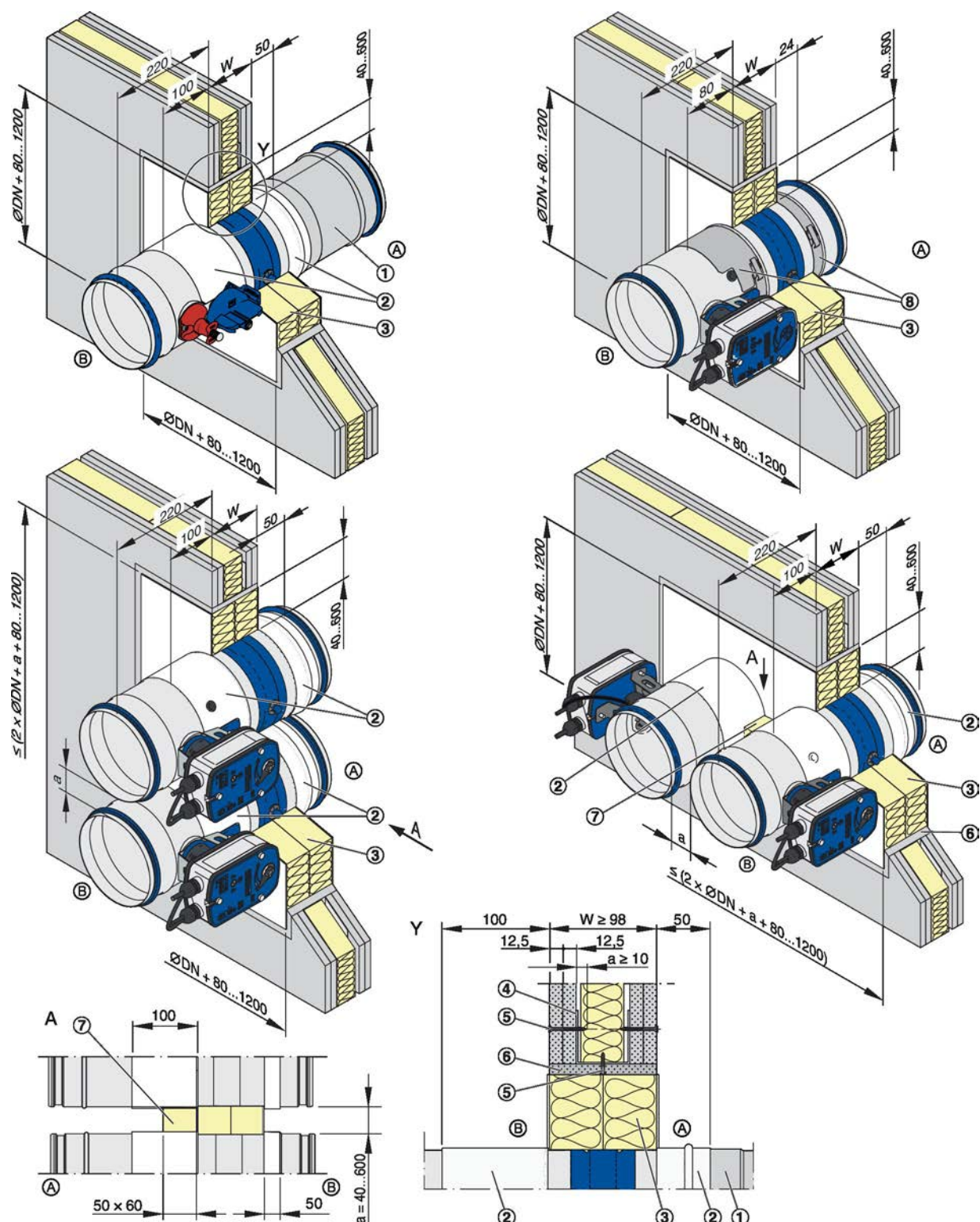


Fig. 32: Dry mortarless installation with fire batt

- |   |  |     |  |
|---|--|-----|--|
| 1 | Extension piece (if required)                        | 6   | Trim panels  |
| 2 | Ablative coating                                     | 7   | Mineral wool strips, $50 \times 60 \times \text{DN}/2$ , $\geq 80 \text{ kg/m}^3$ (only when distance $a \leq 50 \text{ mm}$ ) |
| 3 | Coated mineral wool slabs, $\geq 140 \text{ kg/m}^3$ | 8   | Sleeve (either one sleeve on the operating side only, or one sleeve each on the operating side and on the installation side)   |
| 4 | Perimeter metal section                              | (A) | Installation side  |
| 5 | Dry wall screw (for cladding)                        | (B) | Operating side   |

**Note:** Each fire damper has to be suspended both on the operating side and on the installation side ↗ 80.

### Performance class and installation details

Performance class up to	Fire batt system	Size ØDN [mm]	Distances [mm]			Coating or sleeves	
			to load-bearing structural elements	between dampers (two installation openings)	between dampers (one installation opening)	Coating	Sleeves
EI 120 S	Hensel/ Hilti/ Promat	100...200	≥ 40	≥ 200	–	both sides	one sleeve <sup>1, 2</sup>
EI 120 S		100...315	≥ 40		–	both sides	two sleeves <sup>1</sup>
EI 90 S		100...315	≥ 40		a = 40...600	both sides	one sleeve <sup>1, 2</sup>
EI 60 S		100...315	≥ 40		a = 40...600	–	–

<sup>1)</sup> Sleeves are to be ordered separately.

<sup>2)</sup> On the operating side

### Personnel:

- Specialist personnel

### Materials:

- Fire batt systems ↗ 'Fire batt systems' on page 17

### Requirements

- Performance class up to EI 120 S ↗ 'Performance class and installation details' on page 49
  - Lightweight partition walls with metal support structure and cladding on both sides, W ≥ 98 mm; detailed specification ↗ on page 41.
  - Duct connection with flexible connector (recommended)
  - 'Flange-to-flange' installation of two FKRS-EU fire dampers into one installation opening is only possible if both dampers are of the same size (details for other installations are available upon request)
- ▶ Erect a lightweight partition wall according to the manufacturer's instructions: EI 120 S with mineral wool; EI 90 S with or without mineral wool; create an installation opening ↗ 41. 40...600 mm between fire damper and wall opening
  - ▶ Push the fire damper into the installation opening and suspend it both on the operating side and on the installation side ↗ 80.
  - ▶ If necessary, extend the fire damper with an extension piece on the installation side (attachment or provided by others).
  - ▶ Completely close off the perimeter gap between the fire damper and the wall or ceiling slab with two layers of coated mineral wool slabs, ≥ 140 kg/m³. Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant.
  - ▶ Apply ablative coating to joints, transitions and any imperfections on the coated mineral wool slabs. Attach the mineral wool strip ⑦, if necessary.
  - ▶ You may use sleeves; if you do not use sleeves, you have to apply ablative coating ②, ≥ 2.5 mm thick, to the fire damper casing ↗ 'Performance class and installation details' on page 49. The actuator and release unit must not be coated.

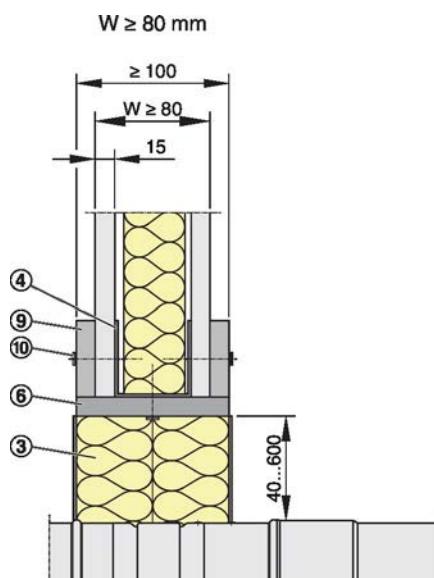
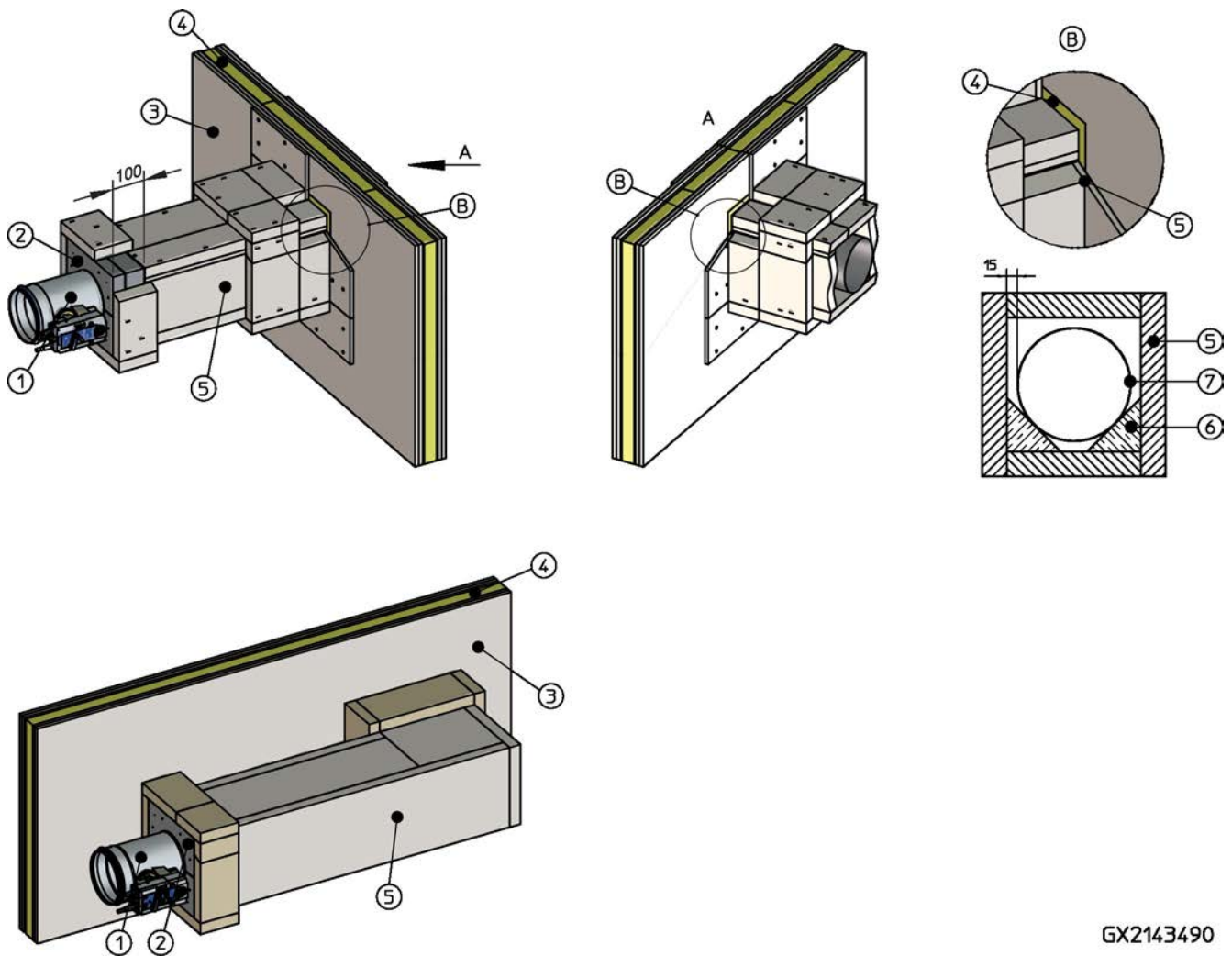


Fig. 33: Lightweight partition walls, dry mortarless installation with fire batt, EI 60 S

- |   |  |    |                   |
|---|--|----|-------------------|
| 3 | Fire batt with ablative coating                          | 9  | Reinforcing board |
| 4 | Perimeter metal section                                  | 10 | Dry wall screw    |
| 6 | Trim panels (screw-fixed to the metal support structure) |    |                   |

Installation details for other wall types are available on request

#### 5.6.4 Installation remote from lightweight partition walls with installation kit WE

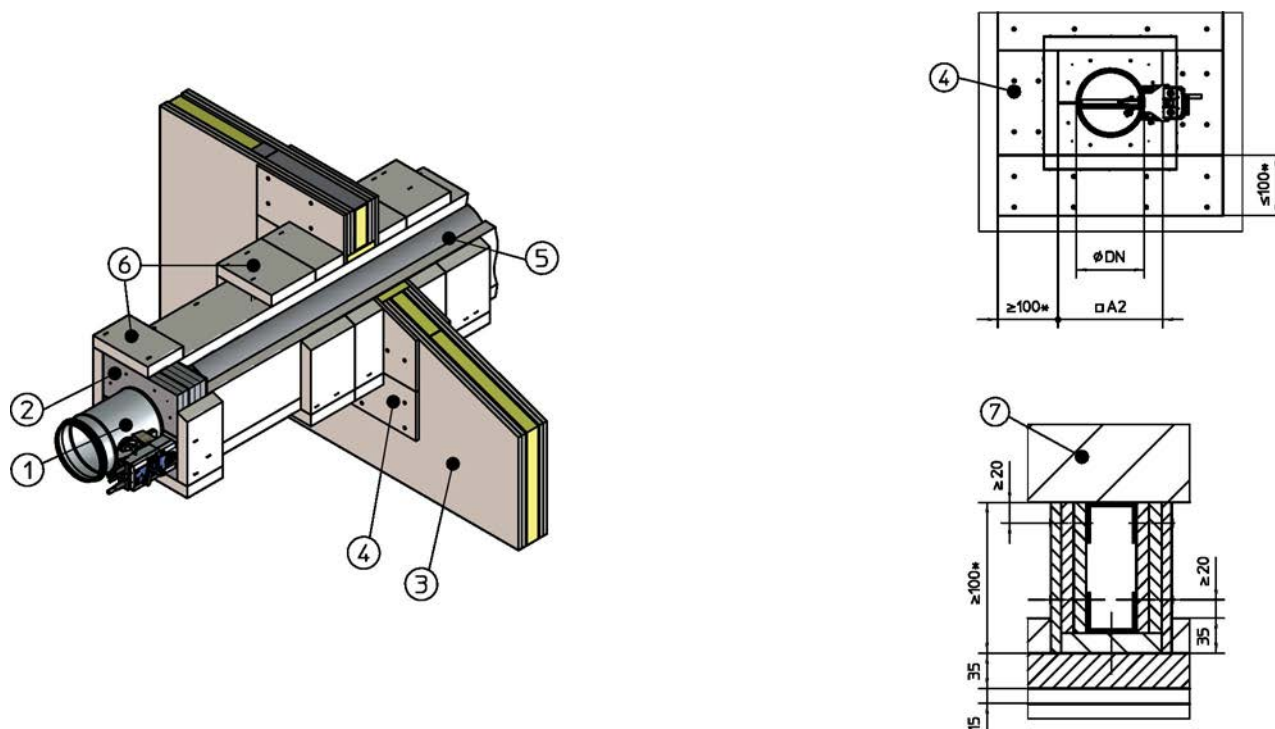


GX2143490

Fig. 34: Installation remote from lightweight partition walls, wall penetration

- |   |                           |
|---|---------------------------|
| 1 FKRS-EU                                 | 5 Fire-resistant cladding |
| 2 Installation kit WE (factory assembled) | 6 Support (Promat)        |
| 3 Lightweight partition wall              | 7 Duct (sheet steel)      |
| 4 Mineral wool                            |                           |

**Note:** Fire damper and ducting must be suspended ↗ 83.

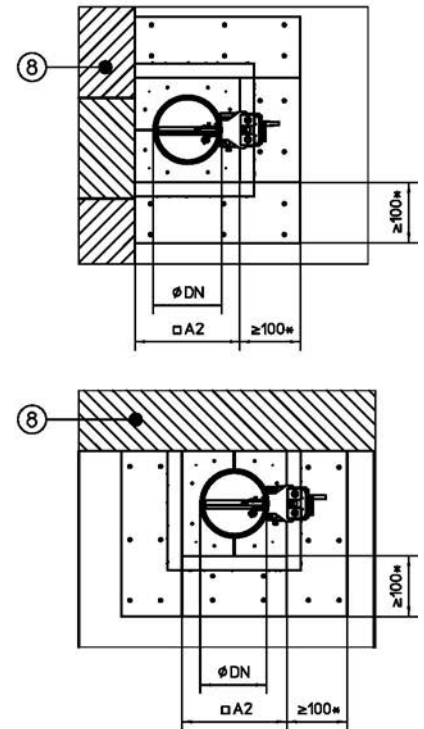
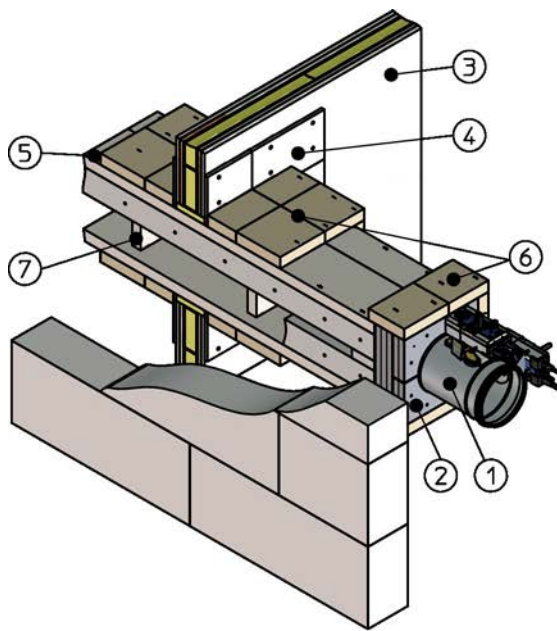


GX2152076

Fig. 35: Installation remote from lightweight partition walls, wall penetration, cladding on four sides

- |   |   |     |  |
|---|---|-----|--|
| 1 | FKRS-EU   | 6   | Reinforcing board, fire-resistant cladding on four sides                                       |
| 2 | Installation kit WE (factory assembled)                   | 7   | Solid wall, if any   |
| 3 | Lightweight partition wall                                | □A2 | = $\varnothing DN + 100$   |
| 4 | Reinforcing board with fire-resistant cladding, d = 10 mm | *   | Reinforcing board $\geq 100$ mm to be fixed to two studs; from 200 mm to be fixed to one stud. |
| 5 | Sheet steel duct with fire-resistant cladding             |     |  |

**Note:** Fire damper and ducting must be suspended ↗ 83.

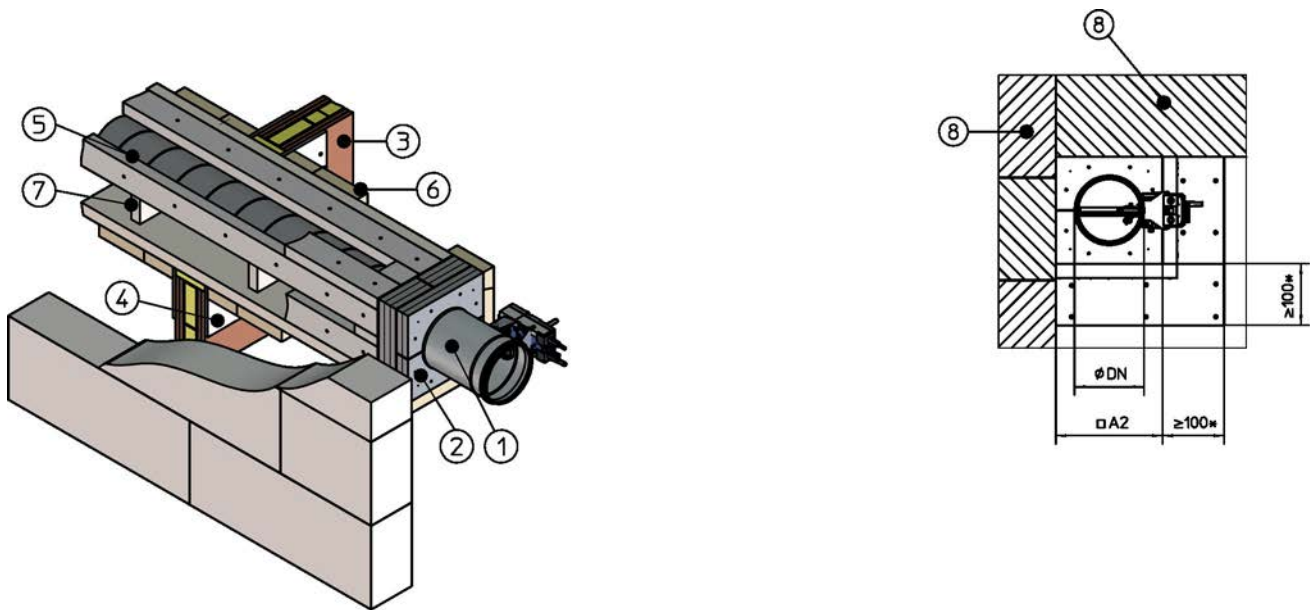


GX2156104

Fig. 36: Installation remote from lightweight partition walls, wall penetration, cladding on three sides

- |   |   |              |  |
|---|---|--------------|--|
| 1 | FKRS-EU   | 6            | Reinforcing board, fire-resistant cladding on three sides                                      |
| 2 | Installation kit WE (factory assembled)                   | 7            | Support  |
| 3 | Lightweight partition wall                                | 8            | Solid ceiling slab or solid wall   |
| 4 | Reinforcing board with fire-resistant cladding, d = 10 mm | $\square A2$ | = $\phi DN + 100$  |
| 5 | Sheet steel duct with fire-resistant cladding             | *            | Reinforcing board $\geq 100$ mm to be fixed to two studs; from 200 mm to be fixed to one stud. |

**Note:** Fire damper and ducting must be suspended 83.



GX2161716

Fig. 37: Installation remote from lightweight partition walls, wall penetration, cladding on two sides

- |   |   |      |   |
|---|---|------|---|
| 1 | FKRS-EU   | 6    | Reinforcing board, fire-resistant cladding on two sides                                   |
| 2 | Installation kit WE (factory assembled)                   | 7    | Support   |
| 3 | Lightweight partition wall                                | 8    | Solid ceiling slab or solid wall  |
| 4 | Reinforcing board with fire-resistant cladding, d = 10 mm | □ A2 | = Ø DN + 100  |
| 5 | Sheet steel duct with fire-resistant cladding             | *    | Reinforcing board ≥ 100 mm to be fixed to two studs; from 200 mm to be fixed to one stud. |

**Note:** Fire damper and ducting must be suspended ☞ 83.

## Personnel:

- Specialist personnel

## Requirements

- Performance class up to EI 90 S
- Lightweight partition wall, safety partition wall or wall to provide radiation protection, with metal support structure and cladding on both sides, with European classification to EN 13501-2 or equivalent national classification, W ≥ 98 mm
- Sheet steel ducts without any openings, with fire-resistant cladding. Acceptable building materials ☞ 18 (Fittings with cladding according to instructions from Promat)
- ≥ 200 mm distance between two fire dampers. Enough clear space is required for installation.

**Note:** Other installation details upon request.

### 5.6.5 Dry mortarless installation with installation kit GL

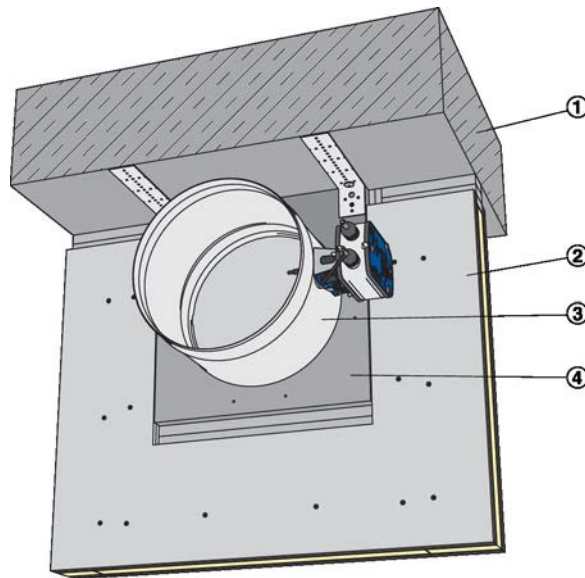



Fig. 38: Installation into lightweight partition wall with flexible ceiling joint, using installation kit GL

- |   |   |
|---|---|
| 1 Solid ceiling slab                      | 3 FKRS-EU                                 |
| 2 Lightweight partition wall or fire wall | 4 Installation kit GL (factory assembled) |

#### Personnel:

- Specialist personnel

#### Requirements

- Performance classes up to EI 90 S with or without mineral wool
- Lightweight partition walls or fire walls with metal support structure and cladding on both sides,  $W \geq 100$  mm, detailed specification  on page 41.
- Wall thickness  $W = 100 - 235$  mm
- 50 – 230 mm distance to the ceiling slab
- $\geq 50$  mm distance to load-bearing structural elements
- $\geq 200$  mm distance between two installation kits
- Subsidence of the ceiling slab  $a \leq 40$  mm



For installation, follow the supplied installation manual.

## 5.7 Lightweight partition walls with timber support structure

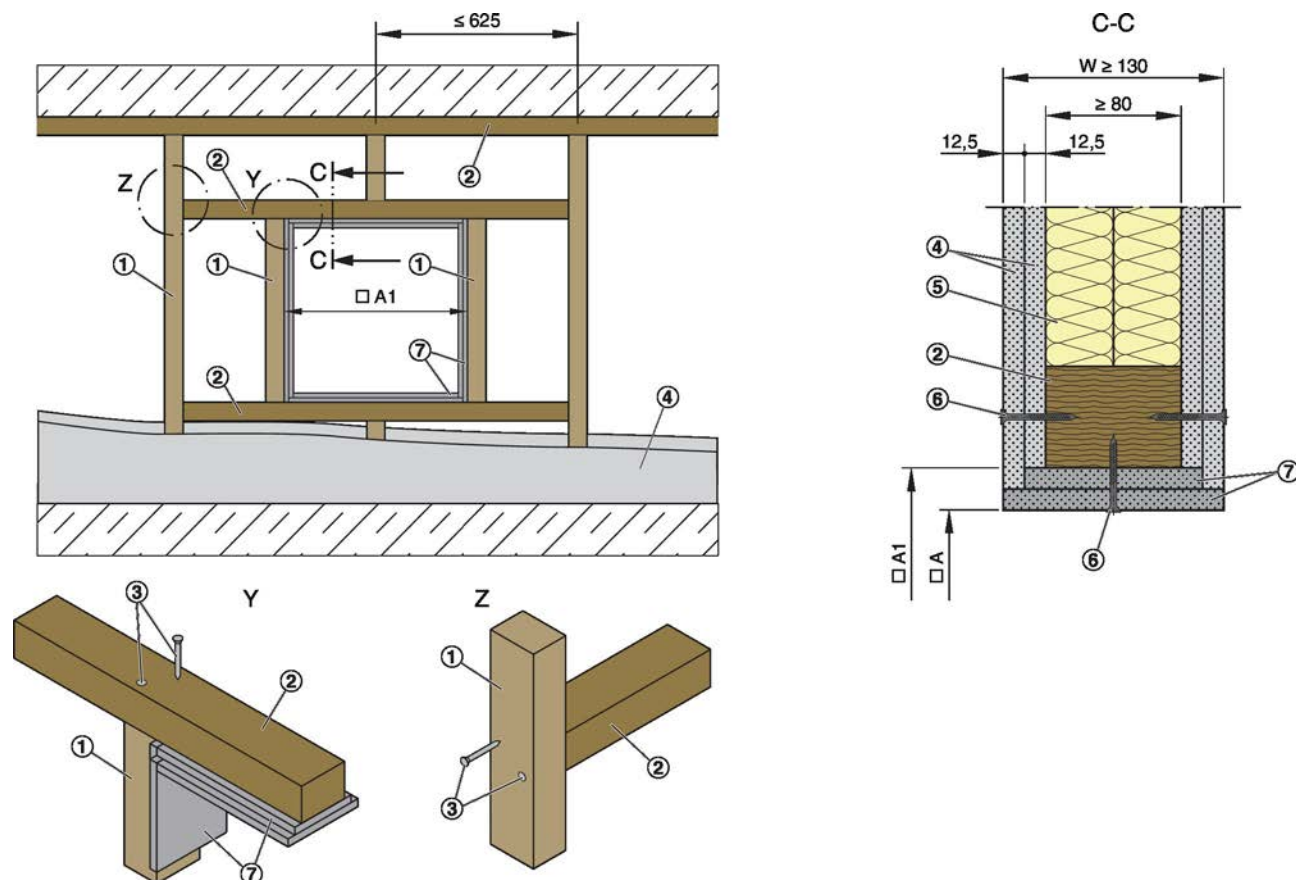


Fig. 39: Lightweight partition wall with timber support structure and cladding on one side

- |   |   |     |   |
|---|---|-----|---|
| 1 | Timber stud, at least 60 × 80 mm                                    | 6   | Screw   |
| 2 | Horizontal timber section, at least 60 × 80 mm                      | 7   | Trim panels, double layer, staggered joints                             |
| 3 | Screw or pin  | □A  | Clear installation opening  |
| 4 | Double layer cladding on both sides of the timber support structure | □A1 | Opening in the timber support structure,<br>□A1 = □A + (4 trim panels)A |
| 5 | Mineral wool (depending on wall construction)                       |     |   |

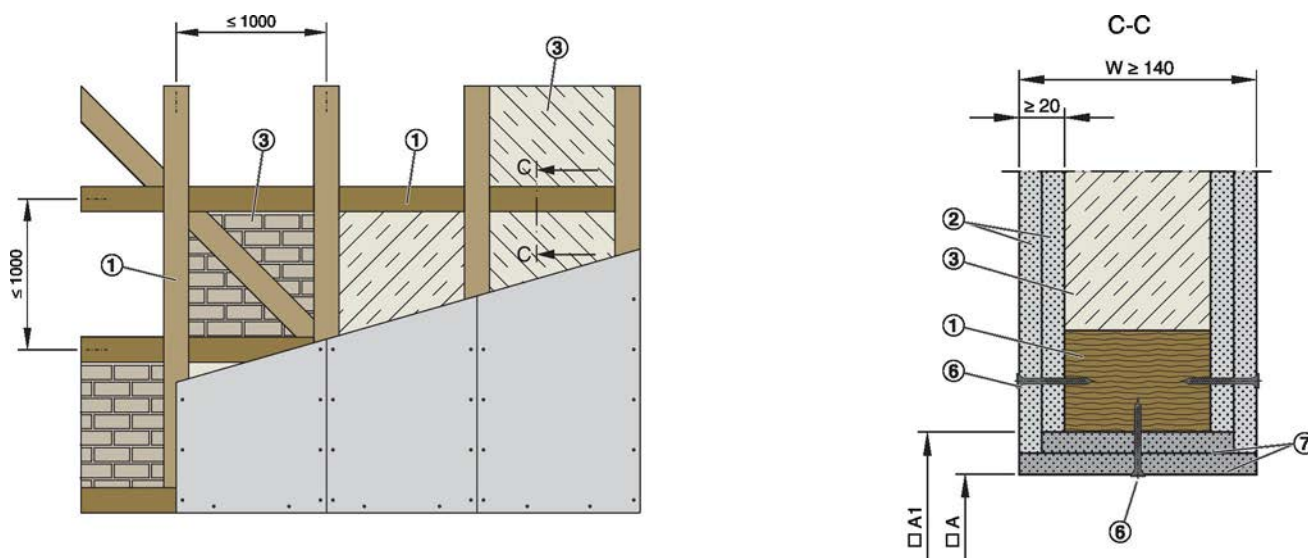


Fig. 40: Lightweight partition wall, half-timbered construction with cladding on both sides

- |  |   |
|--|---|
| <p>1 Half-timbered construction</p> <p>2 Double layer cladding, on both sides of the half-timbered construction</p> <p>3 Infilling*</p> <p>6 Screw</p> | <p>7 Trim panels, double layer, staggered joints</p> <p>* Cavities completely filled with mineral wool <math>\geq 50 \text{ kg/m}^3</math>, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay</p> <p>□A Clear installation opening</p> <p>□A1 Opening in the half-timbered construction, □A1 = □A + (4 trim panels)</p> |
|--|---|

## Requirements

- Lightweight partition walls, either timber stud walls or half-timbered constructions, with cladding on both sides, with European classification to EN 13501-2 or equivalent national classification
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, of fibre-reinforced gypsum or of fire-rated calcium silicate boards, wall thickness  $W \geq 130 \text{ mm}$ ; for half-timbered constructions: wall thickness  $W \geq 140 \text{ mm}$
- $\leq 625 \text{ mm}$  distance between timber studs; half-timbered construction after the wall has been erected
- Additional layers of cladding (up to two layers if stated in the usability certificate for the wall) and double stud constructions (details on request) are approved.
- Duct connection with flexible connector (recommended)
- Trim panels and reinforcing boards have to be made of cladding material and have to be fixed to the frame.

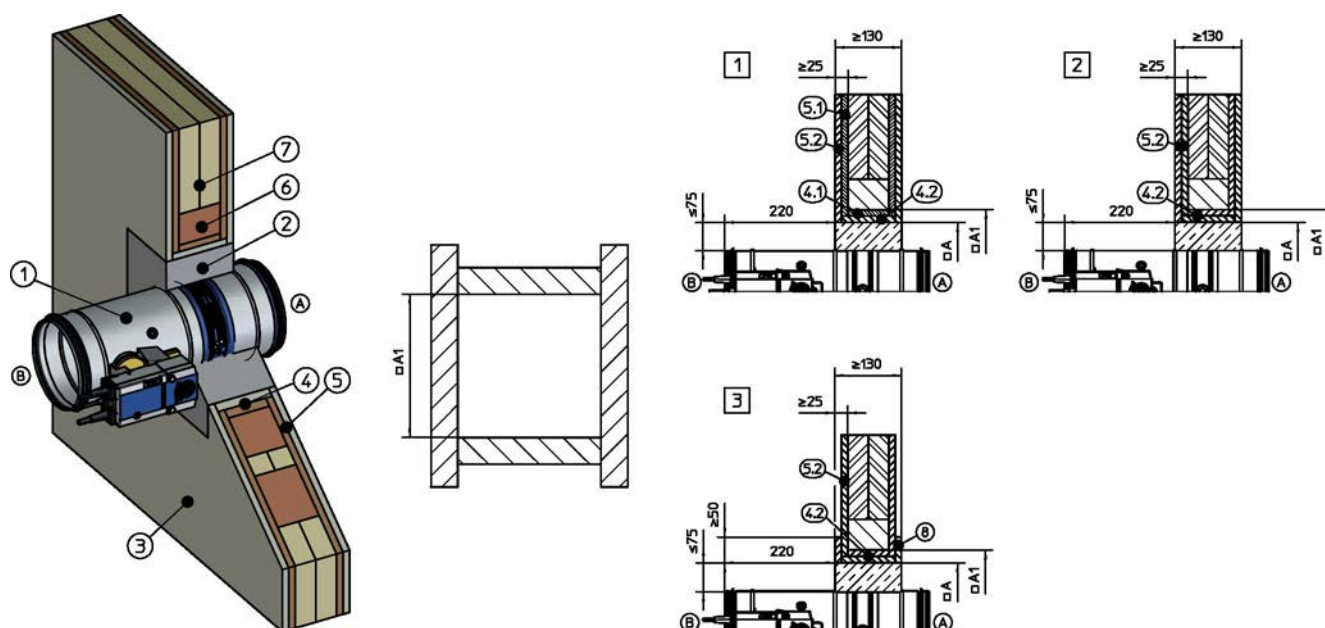
## Erecting a wall and creating an installation opening

- Erect the timber stud wall according to the manufacturer's instructions.
- Create an installation opening in the timber support structure with timber studs ①, horizontal timber sections ② and trim panels ⑦; or create an installation opening in the half-timbered construction ① with trim panels ⑦, see Fig. 39 or Fig. 40.

Installation opening □A [mm]										
Installation type		Nominal size								
		100	125	150	160	180	200	224	250	315
Mortar-based installation		□A = DN + 150 mm max.								
Dry mortarless installation with installation kit TQ <sup>1)</sup>	□A	210	235	260	270	290	310	334	360	425
	□B1	300	325	350	360	380	400	424	450	515
Dry mortarless installation with fire batt		□A = Ø DN + 80...1200 mm								

<sup>1)</sup> Installation opening tolerance + 2 mm

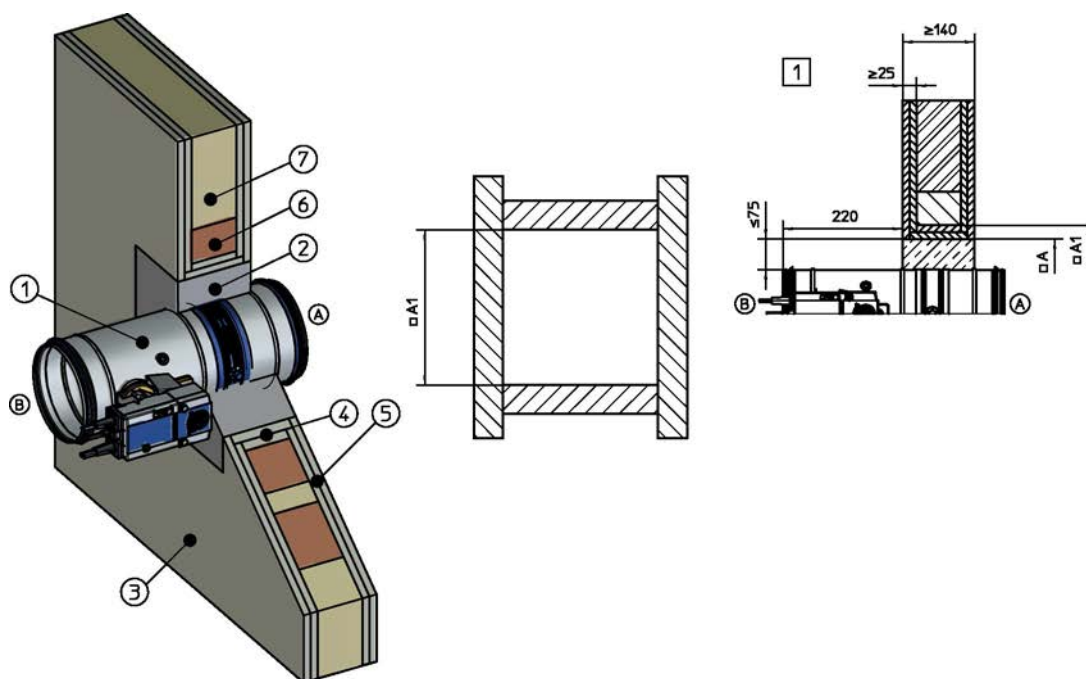
## 5.7.1 Mortar-based installation



GR2057988

Fig. 41: Mortar-based installation into a lightweight partition wall with timber support structure

- |     |   |     |  |
|-----|---|-----|--|
| 1   | FKRS-EU   | 6   | Horizontal timber section / stud, at least 60 x 80 mm  |
| 2   | Mortar  | 7   | Mineral wool (depending on wall construction)          |
| 3   | Timber stud wall  | 8   | Reinforcing board                                      |
| 4   | Trim panels   | 1   | EI 30 S (timber panel constructions and timber frames) |
| 4.1 | Trim panels, wood sheet, at least 600 kg/m <sup>3</sup>   | 2   | Up to EI 120 S   |
| 4.2 | Trim panels (fire-resistant)                              | 3   | EI 30 S  |
| 5   | Wall cladding   | (A) | Installation side                                      |
| 5.1 | Wall cladding, wood sheet, at least 600 kg/m <sup>3</sup> | (B) | Operating side   |
| 5.2 | Wall cladding (fire-resistant)                            |     |  |



GR2056734

Fig. 42: Mortar-based installation into a lightweight partition wall, half-timbered construction

- |   |   |   |  |
|---|---|---|--|
| 1 | FKRS-EU   | 7 | Infilling*   |
| 2 | Mortar  | * | Cavities completely filled with mineral wool                     |
| 3 | Half-timbered wall                                  |   | $\geq 50 \text{ kg/m}^3$ , bricks, aerated concrete, lightweight |
| 4 | Trim panels (fire-resistant), 2 layers              |   | concrete, reinforced concrete or clay                            |
| 5 | Wall cladding (fire-resistant), 1 layer or 2 layers | 1 | EI 90 S  |
| 6 | Half-timbered construction                          | A | Installation side  |
|   |   | B | Operating side   |

#### Personnel:

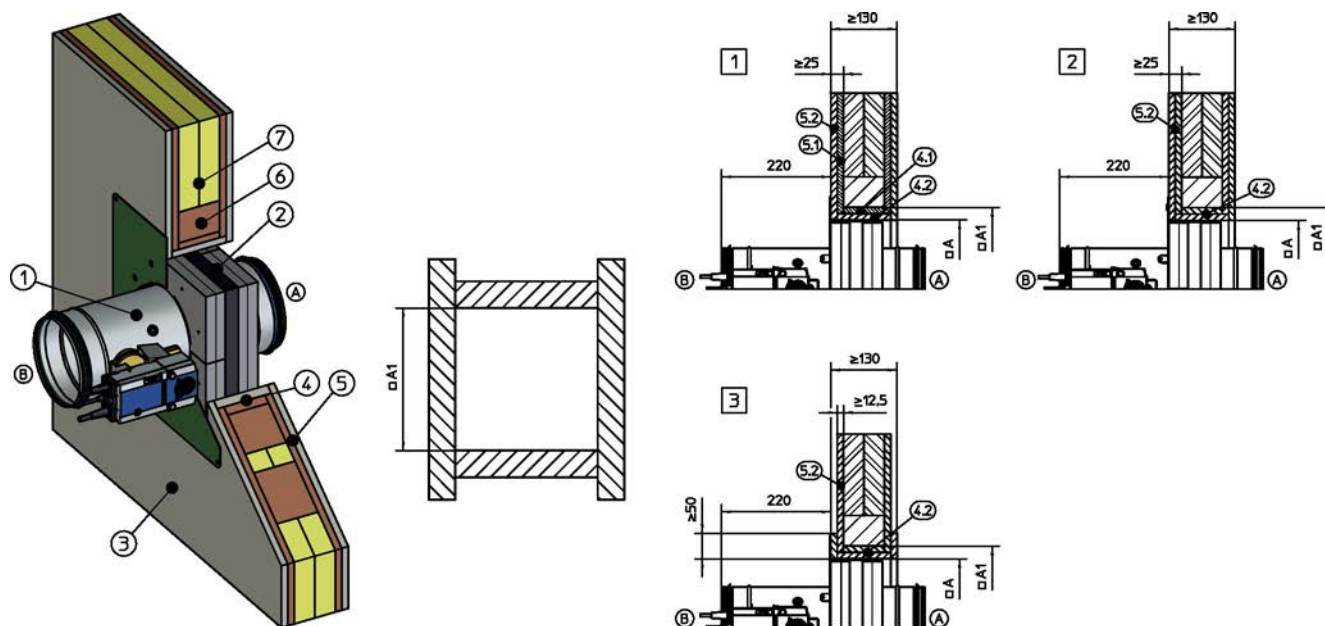
- Specialist personnel

#### Materials:

- Mortar ↗ 'Acceptable mortars for mortar-based installation' on page 17

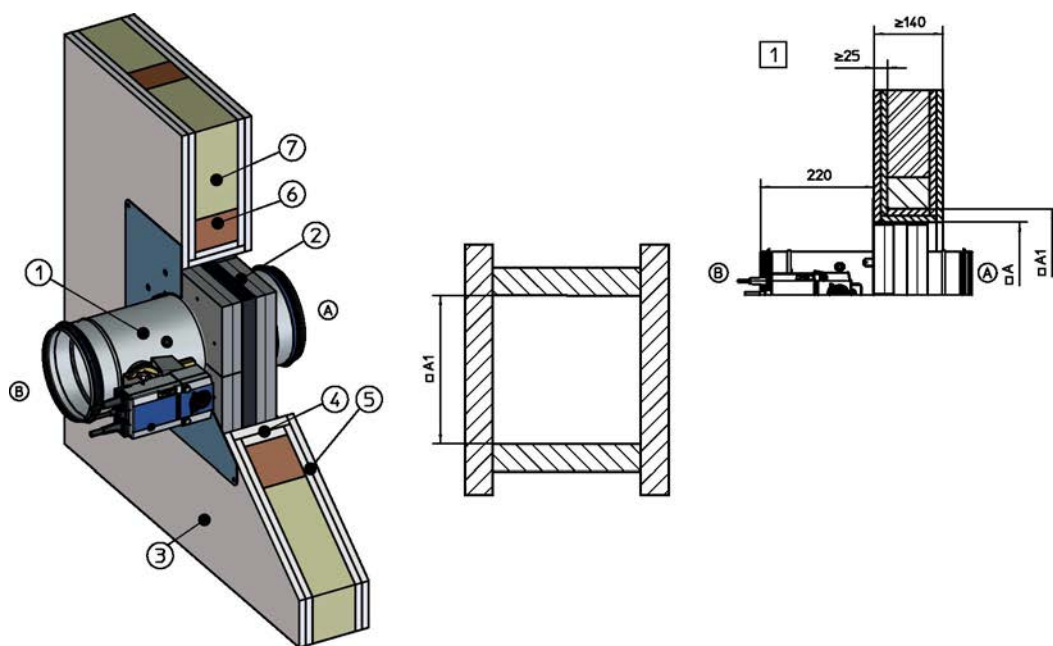
#### Requirements

- Performance class up to EI 120 S
  - Lightweight partition walls with timber support structure and cladding on both sides,  $W \geq 130 \text{ mm}$ ; half-timbered construction  $W \geq 140 \text{ mm}$ ; other specifications ↗ on page 56.
  - $\geq 40 \text{ mm}$  distance to load-bearing structural elements
  - Fire dampers to be installed in individual installation openings.  $\geq 200 \text{ mm}$  distance between two fire dampers (up to EI 120 S).
  - Installation of two fire dampers into the same opening.  $\geq 40 \text{ mm}$  distance between the two fire dampers (up to EI 90 S). The mortar bed between the two fire dampers must not exceed 150 mm.
  - 'Flange-to-flange' installation of two FKRS-EU fire dampers into one installation opening is only possible if both dampers are of the same size (details for other installations are available upon request)
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening ↗ on page 56.
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.  
Extend the fire damper with an extension piece or a spiral duct on the installation side.
  3. ▶ Close off the perimeter gap »s« with mortar.



*Fig. 43: Dry mortarless installation into a lightweight partition wall with timber support structure using installation kit TQ*

- |     |   |          |  |
|-----|---|----------|--|
| 1   | FKRS-EU   | 5.2      | Wall cladding (fire-resistant)                         |
| 2   | Installation kit TQ (factory assembled)                   | 6        | Horizontal timber section / stud, at least 60 x 80 mm  |
| 3   | Timber stud wall  | 7        | Mineral wool (depending on wall construction)          |
| 4   | Trim panels   | <b>1</b> | EI 30 S (timber panel constructions and timber frames) |
| 4.1 | Trim panels, wood sheet, at least 600 kg/m <sup>3</sup>   | <b>2</b> | Up to EI 120 S   |
| 4.2 | Trim panels (fire-resistant)                              | <b>3</b> | EI 30 S  |
| 5   | Wall cladding   | Ⓐ        | Installation side                                      |
| 5.1 | Wall cladding, wood sheet, at least 600 kg/m <sup>3</sup> | Ⓑ        | Operating side   |



GR2055142

Fig. 44: Dry mortarless installation into a lightweight partition wall, half-timbered construction, using installation kit TQ

- |  |   |
|--|---|
| 1 FKRS-EU  | 7 Infilling*                                      |
| 2 Installation kit TQ (factory assembled)                      | * Cavities completely filled with mineral wool    |
| 3 Half-timbered wall   | ≥ 50 kg/m³, bricks, aerated concrete, lightweight |
| 4 Trim panels (fire-resistant), double layer, staggered joints | concrete, reinforced concrete or clay             |
| 5 Wall cladding (fire-resistant), 1 layer or 2 layers          | 1 EI 90 S   |
| 6 Half-timbered construction                                   | A Installation side                               |
|  | B Operating side                                  |

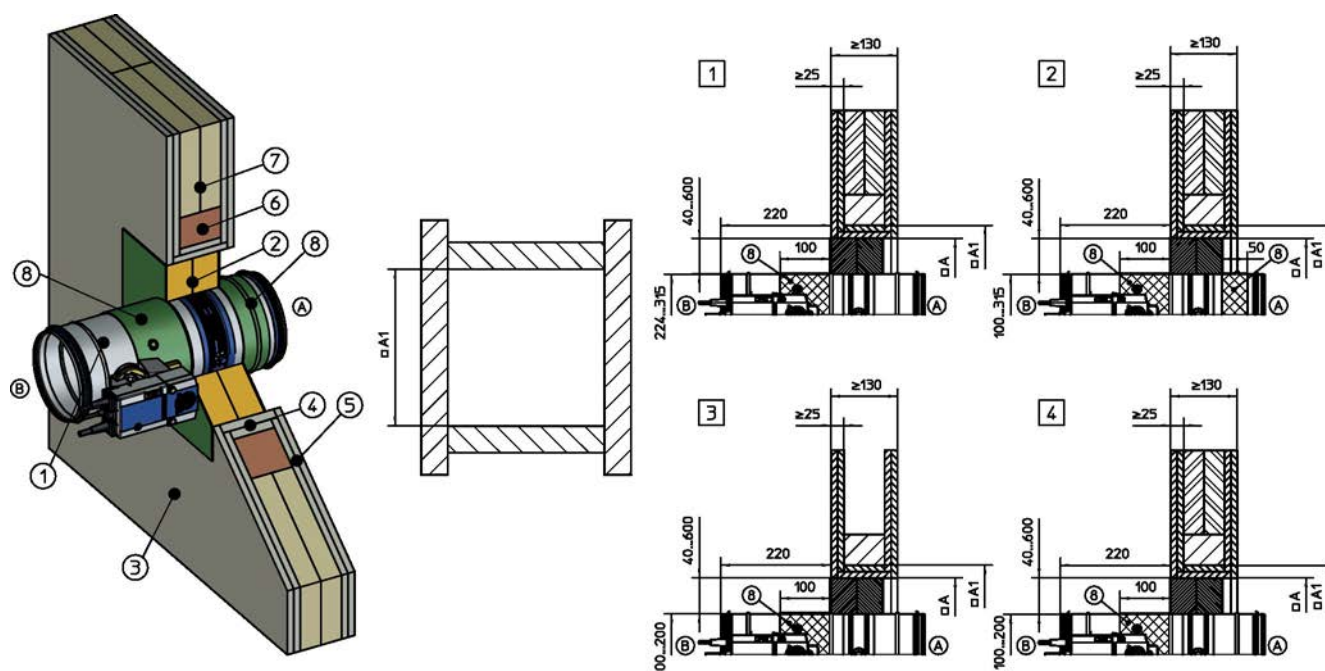
#### Personnel:

- Specialist personnel

#### Requirements

- Performance class up to EI 120 S
  - Lightweight partition walls with timber support structure and cladding on both sides,  $W \geq 130$  mm; half-timbered construction  $W \geq 140$  mm; other specifications ↪ on page 56.
  - ≥ 40 mm distance to load-bearing structural elements (≥ 50 mm if the cover plate has been shortened)
  - ≥ 200 mm distance between two fire dampers
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening ↪ on page 56.
  2. ▶ Position the fire damper with the square installation kit in the centre of the installation opening and push it in up to the cover plate.
  3. ▶ Fix the cover plate with at least four screws (dry wall screws  $\varnothing \geq 4.2$  mm,  $a \geq 10$  mm) to the timber support structure.

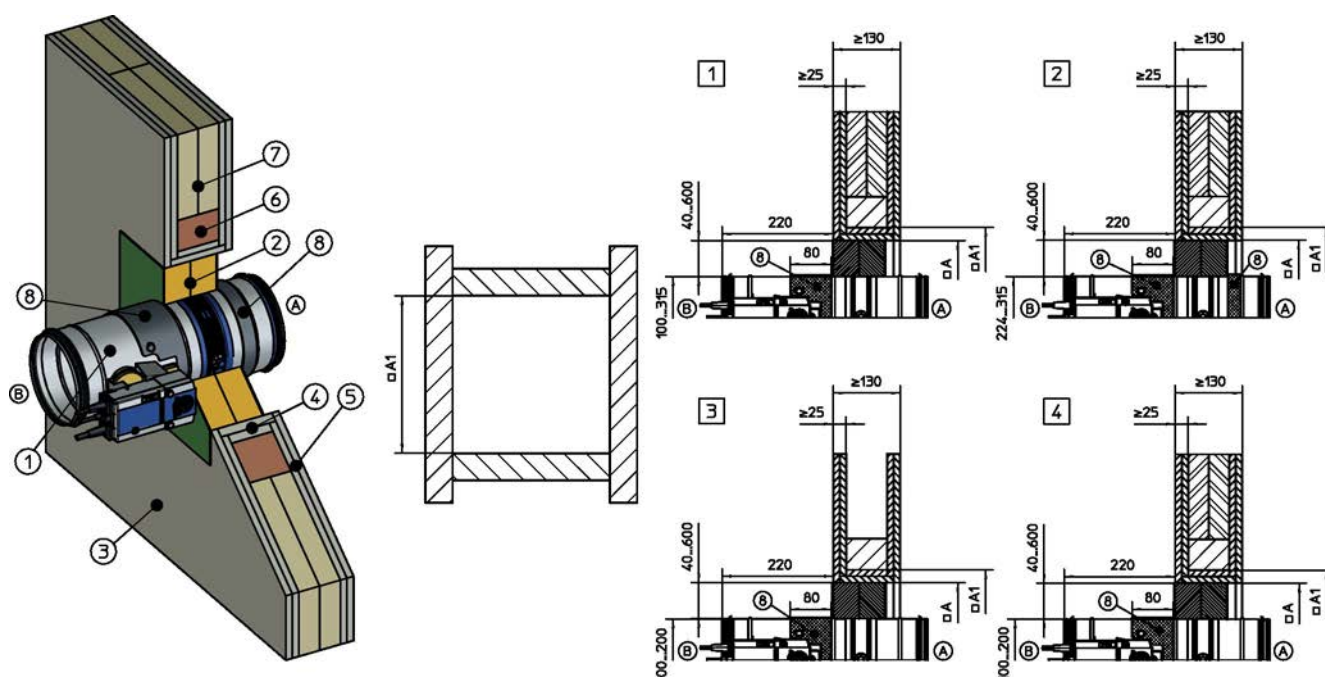
## 5.7.3 Dry mortarless installation with fire batt



GR2065322

Fig. 45: Dry mortarless installation into a lightweight partition wall with timber support structure, use of a fire batt

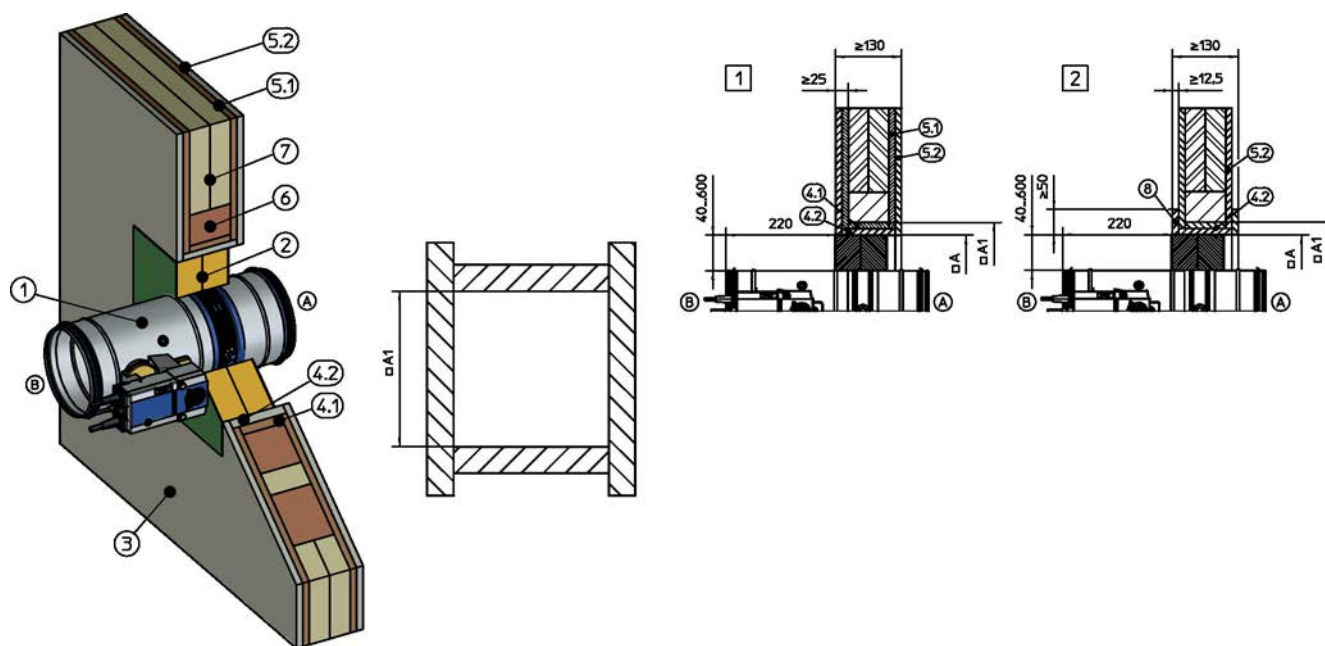
- |   |   |   |                                   |
|---|---|---|-----------------------------------|
| 1 | FKRS-EU   | 8 | Ablative coating, at least 2.5 mm |
| 2 | Fire batt with ablative coating                       | 1 | EI 90 S                           |
| 3 | Timber stud wall                                      | 2 | EI 120 S                          |
| 4 | Trim panels (fire-resistant)                          | 3 | EI 90 S                           |
| 5 | Wall cladding (fire-resistant)                        | 4 | Up to EI 120 S                    |
| 6 | Horizontal timber section / stud, at least 60 x 80 mm | A | Installation side                 |
| 7 | Mineral wool (depending on wall construction)         | B | Operating side                    |



GR2063128

Fig. 46: Dry mortarless installation into a lightweight partition wall with timber support structure, use of a fire batt

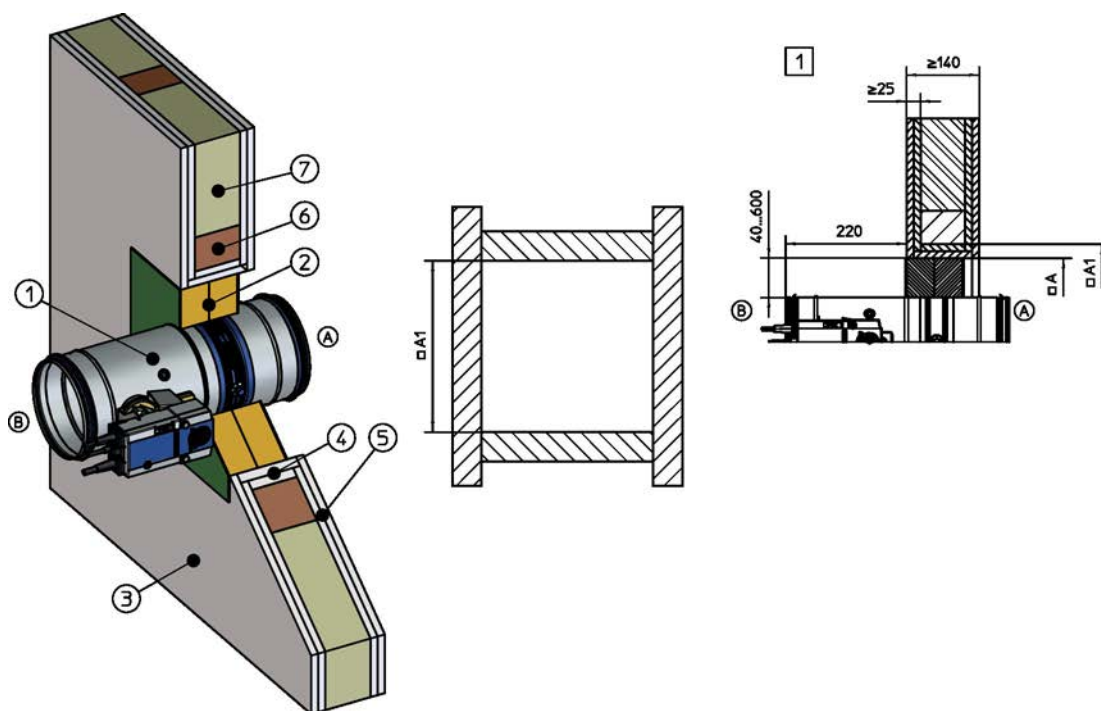
- |   |   |   |  |
|---|---|---|--|
| 1 | FKRS-EU   | 8 | Sleeve, galvanised steel with Kerafix-2000 |
| 2 | Fire batt with ablative coating                       | 1 | EI 90 S                                    |
| 3 | Timber stud wall                                      | 2 | EI 120 S                                   |
| 4 | Trim panels (fire-resistant)                          | 3 | EI 90 S                                    |
| 5 | Wall cladding (fire-resistant)                        | 4 | EI 120 S                                   |
| 6 | Horizontal timber section / stud, at least 60 x 80 mm | A | Installation side                          |
| 7 | Mineral wool (depending on wall construction)         | B | Operating side                             |



GR2062123

Fig. 47: Dry mortarless installation into a lightweight partition wall with timber support structure, use of a fire batt

- |     |   |          |   |
|-----|---|----------|---|
| 1   | FKRS-EU   | 6        | Horizontal timber section / stud, at least 60 x 80 mm |
| 2   | Fire batt with ablative coating                           | 7        | Mineral wool (depending on wall construction)         |
| 3   | Timber stud wall  | 8        | Reinforcing board                                     |
| 4.1 | Trim panels, wood sheet, at least 600 kg/m <sup>3</sup>   | <b>1</b> | EI 30 S   |
| 4.2 | Trim panels (fire-resistant)                              | <b>2</b> | EI 30 S   |
| 5.1 | Wall cladding, wood sheet, at least 600 kg/m <sup>3</sup> | A        | Installation side                                     |
| 5.2 | Wall cladding (fire-resistant)                            | B        | Operating side  |



GR2055911

*Fig. 48: Dry mortarless installation into a lightweight partition wall, half-timbered construction, use of a fire batt*

- |   |   |          |   |
|---|---|----------|---|
| 1 | FKRS-EU   | 7        | Infilling*  |
| 2 | Fire batt with ablative coating                     | *        | Cavities completely filled with mineral wool      |
| 3 | Half-timbered wall                                  |          | ≥ 50 kg/m³, bricks, aerated concrete, lightweight |
| 4 | Trim panels (fire-resistant), 2 layers              |          | concrete, reinforced concrete or clay             |
| 5 | Wall cladding (fire-resistant), 1 layer or 2 layers | <b>1</b> | EI 90 S   |
| 6 | Half-timbered construction                          | (A)      | Installation side                                 |
|   |   | (B)      | Operating side                                    |

### Performance class and installation details

Performance class up to	Fire batt system	Size ØDN [mm]	Distances [mm]			Coating or sleeves	
			to load-bearing structural elements	between dampers (two installation openings)	between dampers (one installation opening)	Coating	Sleeves
EI 120 S	Hensel/ Hilti/ Promat	100...200	≥ 40	≥ 200	–	one side	one sleeve <sup>1, 2</sup>
EI 120 S		100...315	≥ 40		–	both sides	two sleeves <sup>1</sup>
EI 90 S		100...315	≥ 40		a = 40...600	one side	one sleeve <sup>1, 2</sup>
EI 30 S		100...315	≥ 40		a = 40...600	–	–

<sup>1)</sup> Sleeves are to be ordered separately.

2) On the operating side

For more details see 🐾 *Chapter 5.7.3 'Dry mortarless installation with fire batt' on page 62*

**Note:** Each fire damper has to be suspended both on the operating side and on the installation side 80.

**Personnel:**

- Specialist personnel

**Materials:**

- Fire batt systems ↗ *'Fire batt systems' on page 17*

**Requirements**

- Performance class up to EI 120 S ↗ *'Performance class and installation details' on page 65*
  - Lightweight partition walls with timber support structure and cladding on both sides,  $W \geq 130$  mm; half-timbered construction  $W \geq 140$  mm; other specifications ↗ *on page 56*.
  - Duct connection with flexible connector (recommended)
  - 'Flange-to-flange' installation of two FKRS-EU fire dampers into one installation opening is only possible if both dampers are of the same size (details for other installations are available upon request).
1. ▶ Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening ↗ *on page 56*.
  2. ▶ Push the fire damper into the installation opening and suspend it with threaded rods ↗ 83 . Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.
  3. ▶ Completely close off the perimeter gap between the fire damper and the wall or ceiling slab with two layers of coated mineral wool slabs,  $\geq 140$  kg/m<sup>3</sup>. Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant.
  4. ▶ Apply ablative coating to joints, transitions and any imperfections on the coated mineral wool slabs.
  5. ▶ You may use sleeves; if you do not use sleeves, you have to apply ablative coating,  $\geq 2.5$  mm thick, to the fire damper casing. ↗ *'Performance class and installation details' on page 65*. The actuator and release unit must not be coated.

## 5.8 Fire walls

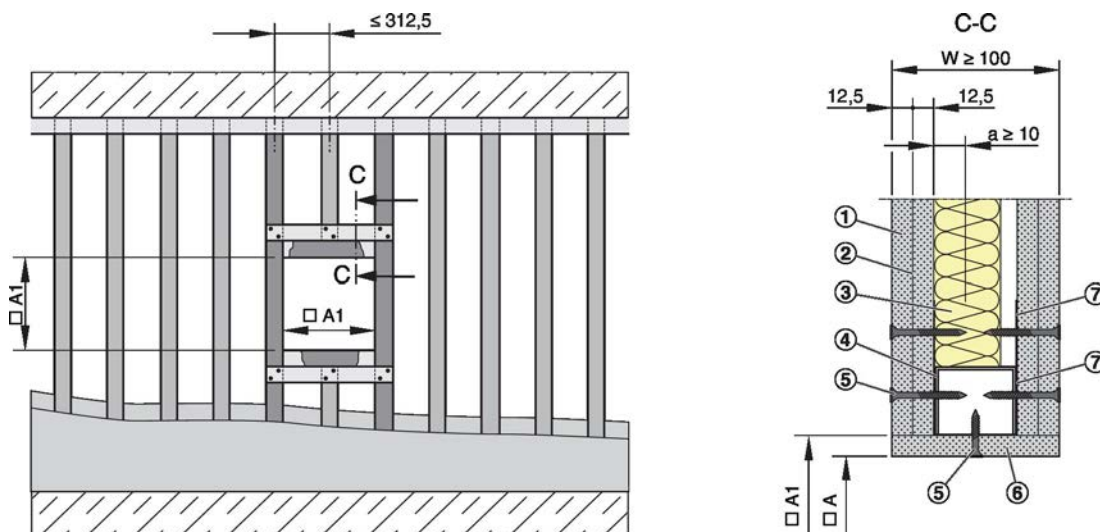


Fig. 49: Fire wall

- |   |   |
|---|---|
| 1 Double layer cladding, on both sides of the metal stud system | 6 Optional trim panels  |
| 2 Sheet steel insert  | 7 UW section  |
| 3 Mineral wool (depending on wall construction)                 | □A Installation opening   |
| 4 UA section  | □A1 Opening in the metal support structure (without trim panels: □A = □A1) ↪ 'Metal stud system' on page 68 |
| 5 Dry wall screw  |   |

For more details on the metal support structure, see Fig. 50, Fig. 51

### Requirements

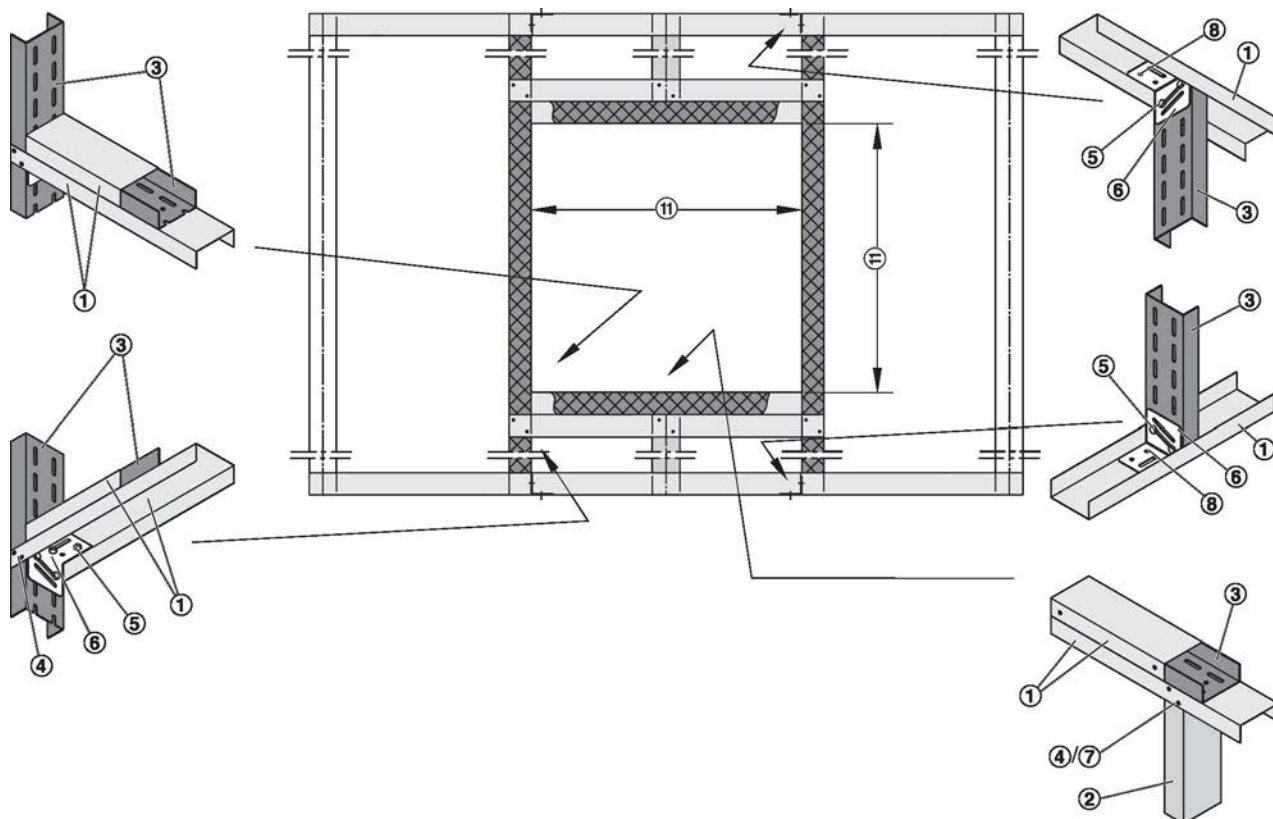
- Fire walls with a metal support structure and cladding on both sides, with European classification to EN 13501-2 or equivalent national classification
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, of fibre-reinforced gypsum or of fire-rated calcium silicate boards, wall thickness  $W \geq 100$  mm
- Additional steel inserts, additional layers of cladding (up to two layers if stated in the usability certificate for the wall) and double stud constructions are approved
- $\leq 312.5$  mm distance between metal studs
- Installation only into square openings
- Wall construction according to the manufacturer's instructions
- Duct connection with flexible connector (recommended)
- Trim panels have to be screw-fixed to the support structure

Installation opening □A [mm]										
Installation type		Nominal size								
		100	125	150	160	180	200	224	250	315
Mortar-based installation <sup>1</sup>		□A = Ø DN + 150 mm max.								
Dry mortarless installation with square installation kit TQ <sup>1, 2</sup>	□A	210	235	260	270	290	310	334	360	425
		□A1 = □A + (2 trim panels)								
	□B1	300	325	350	360	380	400	424	450	515

<sup>1</sup>) Optional trim panels

<sup>2</sup>) Installation opening tolerance + 2 mm

## Metal stud system



- 1 UW section
- 2 CW section
- 3 UA section
- 4 Dry wall screw TB
- 5 Carriage bolt, L  $\leq$  50 mm, with nut and washer
- 6 Bracket

7 Steel rivet Ø 4 mm  
8 2 × screw, Ø 6 mm, with anchor or hammer-in  
fixing  
9 Dry wall screw Ø 3.9 × 35 mm  
10 UA connecting bracket; construction elements  
according to manufacturer's instructions  
11 Installation opening depending on installation type  
👉 on page 67

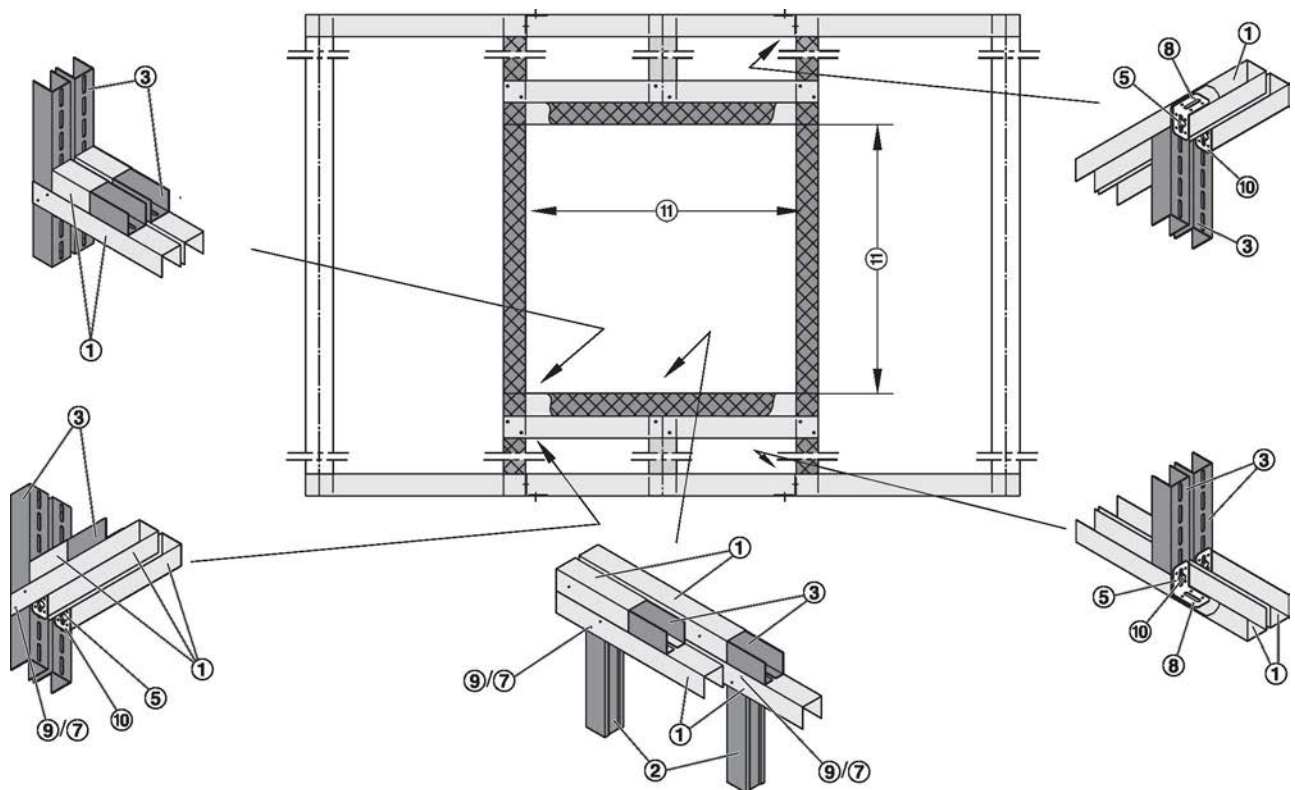


Fig. 51: Double stud system

- |   |   |    |   |
|---|---|----|---|
| 1 | UW section                                    | 7  | Steel rivet Ø 4 mm  |
| 2 | CW section                                    | 8  | 2 × screw, Ø 6 mm, with anchor or hammer-in fixing                                    |
| 3 | UA section                                    | 9  | Dry wall screw Ø 3.9 × 35 mm  |
| 4 | Dry wall screw TB                             | 10 | UA connecting bracket; construction elements according to manufacturer's instructions |
| 5 | Carriage bolt, L ≤ 50 mm, with nut and washer | 11 | Installation opening depending on installation type                                   |
| 6 | Bracket                                       |    | ↪ on page 67  |

## 5.8.1 Mortar-based installation

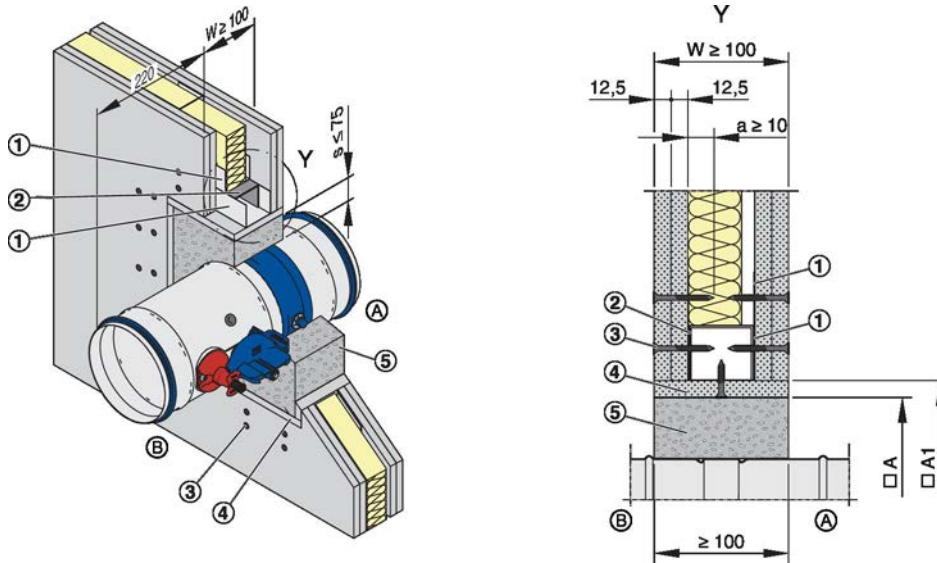


Fig. 52: Mortar-based installation

- 1 UW section, perimeter
- 2 UA section, perimeter
- 3 Dry wall screw
- 4 Optional trim panels
- 5 Mortar

- Ⓐ Installation side
- Ⓑ Operating side
- A Installation opening
- A1 Opening in the metal support structure (without trim panels: □A = □A1)
- s ≤ 75 mm

### Personnel:

- Specialist personnel

### Materials:

- Mortar ☞ 'Acceptable mortars for mortar-based installation' on page 17

### Requirements

- Performance class up to EI 90 S
- Fire walls with metal support structure and cladding on both sides,  $W \geq 100$  mm; detailed specification ☞ on page 67.
- $\geq 40$  mm distance to load-bearing structural elements
- $\geq 200$  mm distance between two fire dampers
- Duct connection with flexible connector (recommended)

1. ▶ Erect the fire wall according to the manufacturer's instructions and create an installation opening ☞ on page 67.

2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.

If the wall thickness is  $> 115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct (attachment or provided by others).

3. ▶ Close off the perimeter gap »s« with mortar.

### 5.8.2 Dry mortarless installation with square installation kit TQ

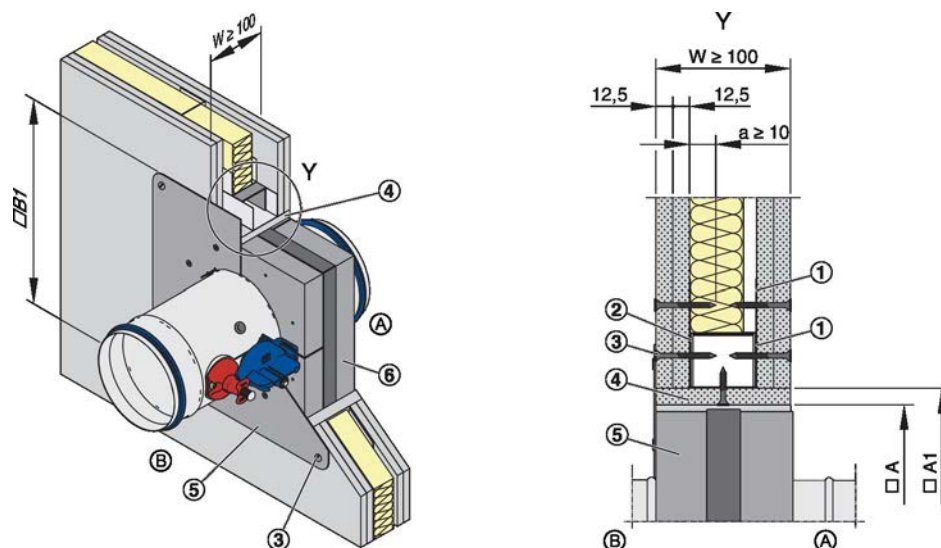


Fig. 53: Dry mortarless installation with square installation kit TQ

- |   |                       |     |  |
|---|-----------------------|-----|--|
| 1 | UW section, perimeter | 6   | Installation kit TQ (factory assembled)                                |
| 2 | UA section, perimeter | □A  | Installation opening   |
| 3 | Dry wall screw        | □A1 | Opening in the metal support structure (without trim panels: □A = □A1) |
| 4 | Optional trim panels  | Ⓐ   | Installation side  |
| 5 | Cover plate           | Ⓑ   | Operating side   |

#### Personnel:

- Specialist personnel

#### Requirements

- Performance class up to EI 90 S
  - Fire walls with metal support structure and cladding on both sides,  $W \geq 100$  mm; detailed specification [on page 67](#).
  - $\geq 40$  mm distance to load-bearing structural elements ( $\geq 50$  mm if the cover plate has been shortened)
  - $\geq 200$  mm distance between two fire dampers
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the fire wall according to the manufacturer's instructions and create an installation opening [on page 67](#)
  2. ▶ Position the fire damper with the square installation kit in the centre of the installation opening and push it in up to the cover plate.  
If the wall thickness is  $> 115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct (attachment or provided by others).
  3. ▶ Fix the cover plate with at least four screws (dry wall screws  $\varnothing \geq 4.2$  mm,  $a \geq 10$  mm) to the perimeter metal section.

## 5.9 Shaft walls

### 5.9.1 Shaft walls with metal support structure

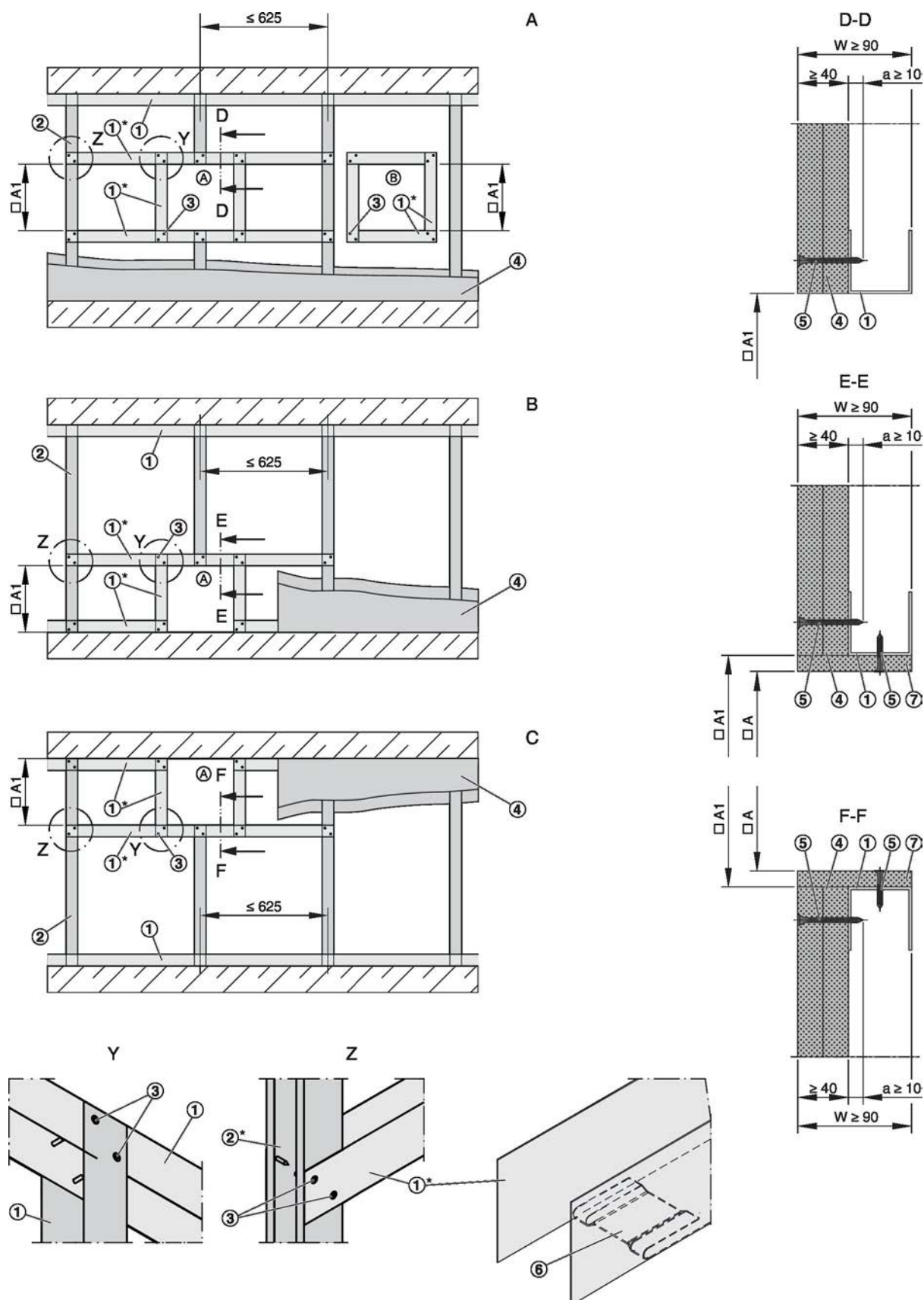


Fig. 54: Shaft walls with metal support structure and cladding on one side

A	Shaft wall	5	Dry wall screw
B	Shaft wall, installation close to the floor**	6	Fold the tab inward or cut it off
C	Shaft wall, installation close to the ceiling**	7	Trim panels, according to installation details
1	UW section	□A	Installation opening
2	CW section	□A1	Opening in the metal support structure (without trim panels: □A = □A1)
3	Screw or steel rivet	*	Closed end must face installation opening
4	Double layer cladding, on one side of the metal stud system	**	Mortar-based installation only

### Requirements

- Shaft walls with metal support structure and cladding on one side, with European classification according to EN 13501-2 or equivalent national classification
- Cladding on one side made of gypsum bonded or cement bonded panel materials, of fibre-reinforced gypsum or of fire-rated calcium silicate boards, wall thickness  $W \geq 90$  mm
- $\leq 625$  mm distance between metal studs
- Installation only into square openings
- The installation opening must be stabilised with a reinforcing section or with horizontal and vertical sections
- Duct connection with flexible connector (recommended)
- Trim panels have to be screw-fixed to the support structure

### Erecting a wall and creating an installation opening

- Erect the shaft wall according to the manufacturer's instructions and create an installation opening, see Fig. 54
- – Option Ⓐ: Provide the installation opening in the metal support structure with suitable metal sections.
- – Option Ⓑ: After cladding the wall, create a square wall opening and brace it with a perimeter metal section.

Installation opening □A [mm]											
Installation type		Nominal size									
		100	125	150	160	180	200	224	250	280	315
Mortar-based installation		□A = $\varnothing$ DN + 150 mm max.									
Dry mortarless installation with square installation kit TQ <sup>1)</sup>	□A	210	235	260	270	290	310	334	360	390	425
	□B	300	325	350	360	380	400	424	450	480	515

<sup>1)</sup> Installation opening tolerance + 2 mm

## 5.9.1.1 Mortar-based installation

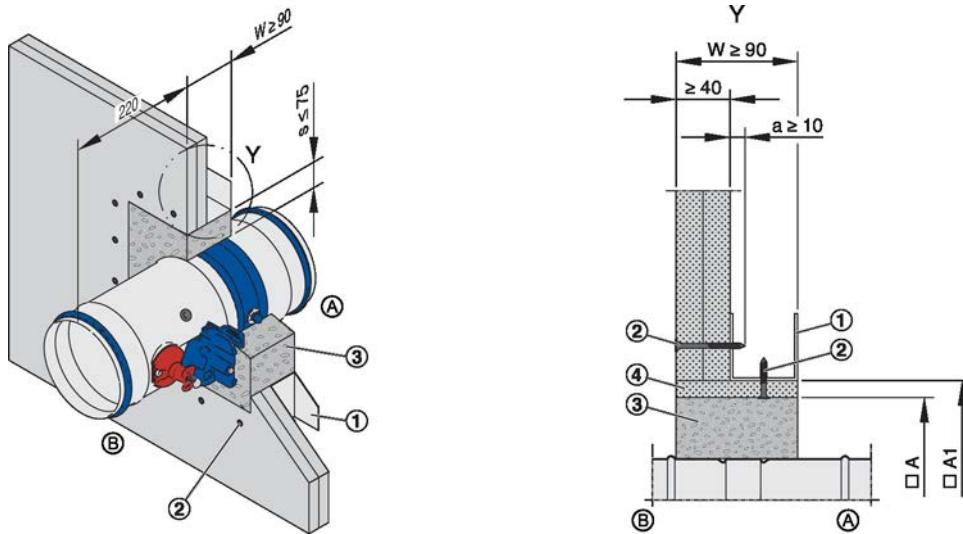


Fig. 55: Mortar-based installation in shaft wall with metal support structure

- |   |                         |     |  |
|---|-------------------------|-----|--|
| 1 | Perimeter metal section | □A  | Installation opening   |
| 2 | Dry wall screw          | □A1 | Opening in the metal support structure (without trim panels: □A = □A1) |
| 3 | Mortar                  | Ⓐ   | Installation side  |
| 4 | Optional trim panels    | Ⓑ   | Operating side   |

### Personnel:

- Specialist personnel

### Materials:

- Mortar ↗ 'Acceptable mortars for mortar-based installation' on page 17

### Requirements

- Performance class EI 90 S
  - Shaft walls with metal support structure or with steel support structure and cladding on one side,  $W \geq 90$  mm; detailed specification ↗ on page 72
  - $\geq 40$  mm distance to load-bearing structural elements
  - $\geq 200$  mm distance between two fire dampers
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the fire wall according to the manufacturer's instructions and create an installation opening ↗ on page 72.
  2. ▶ Push the fire damper into the installation opening and secure it. Make sure that the distance from the connecting spigot on the operating side to the wall is 220 mm.  
If the wall thickness is  $>115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct (attachment or provided by others).
  3. ▶ Close off the perimeter gap »s« with mortar.

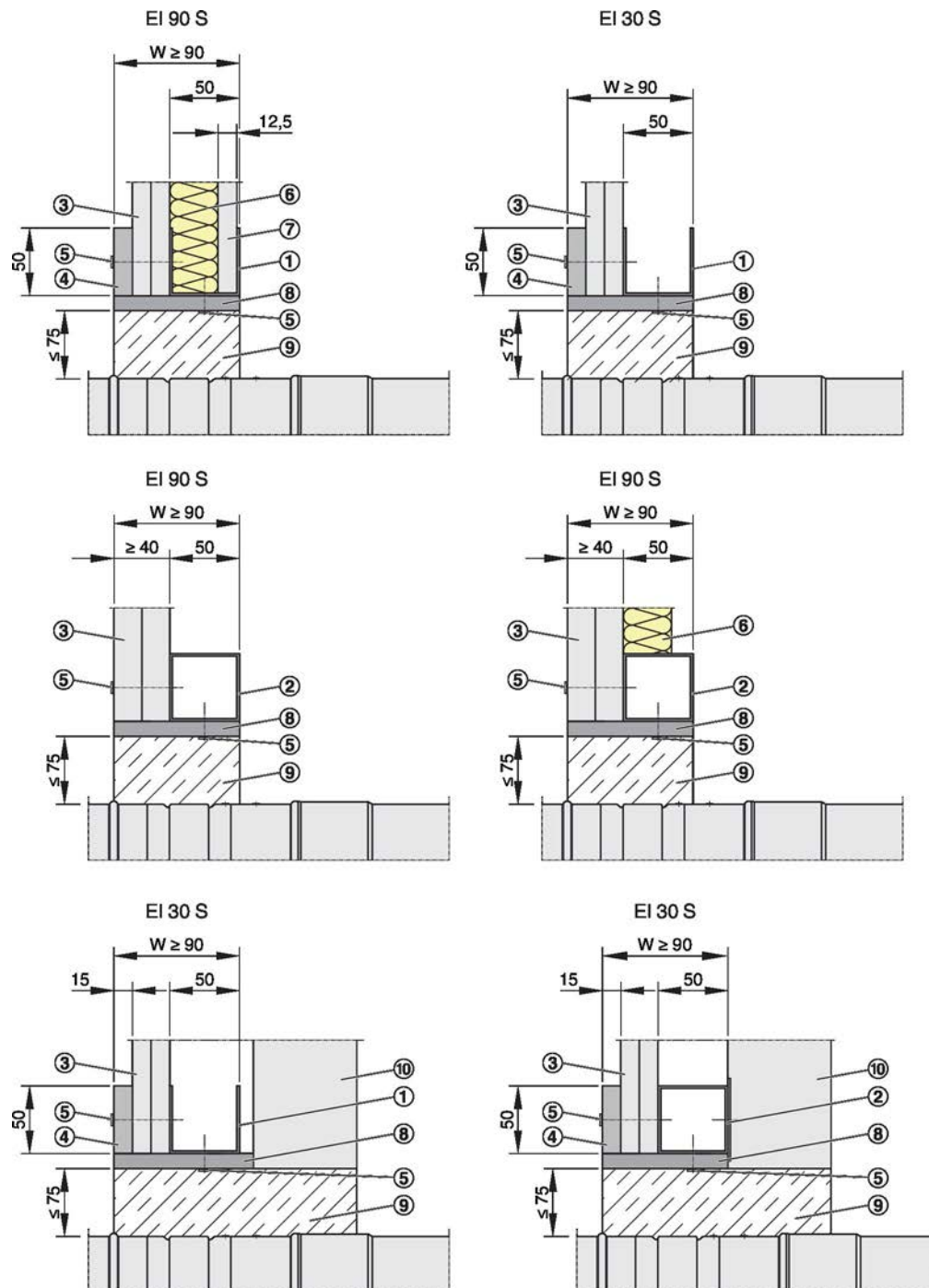


Fig. 56: Installation into shaft walls with metal support structure

- |   |   |    |   |
|---|---|----|---|
| 1 | UW section  | 6  | Mineral wool (depending on wall construction) |
| 2 | Steel support structure                                     | 7  | Plasterboard panel                            |
| 3 | Double layer cladding, on one side of the metal stud system | 8  | Optional trim panels                          |
| 4 | Reinforcing board of the same material as the wall          | 9  | Mortar  |
| 5 | Dry wall screw  | 10 | Wall without adequate fire resistance rating  |

## 5.9.1.2 Dry mortarless installation with square installation kit TQ

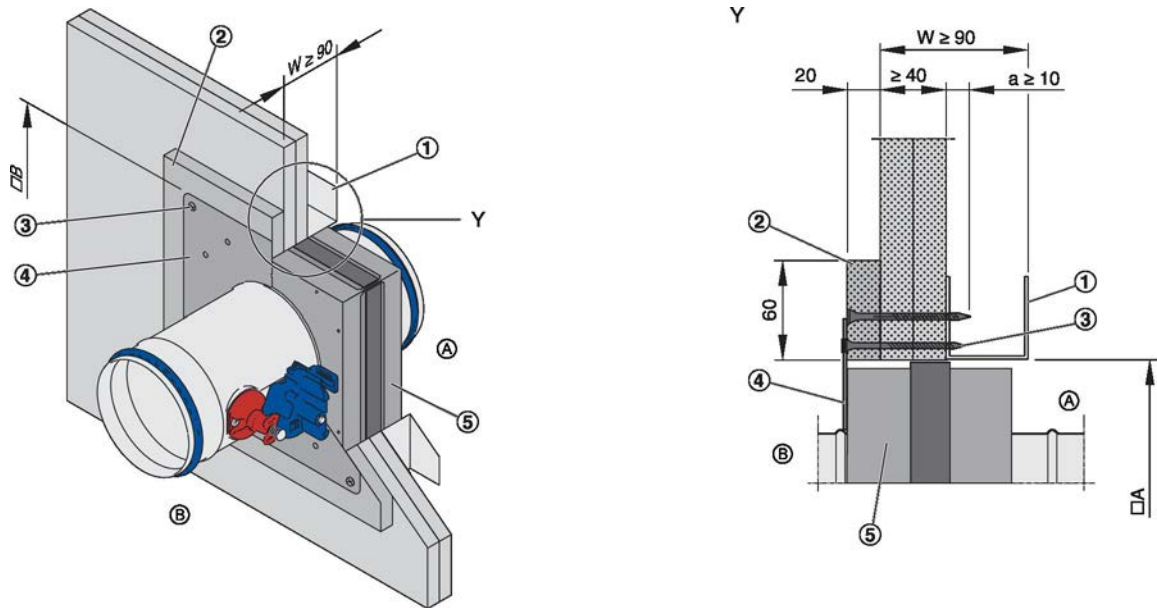


Fig. 57: Dry mortarless installation in shaft wall with metal support structure

- |   |   |    |                           |
|---|---|----|---------------------------|
| 1 | Perimeter metal section                 | Ⓐ  | Installation side         |
| 2 | Reinforcing board                       | Ⓑ  | Operating side            |
| 3 | Dry wall screw                          | □A | Installation opening ↗ 73 |
| 4 | Cover plate                             | □B | Cover plate size ↗ 73     |
| 5 | Installation kit TQ (factory assembled) |    |                           |

### Personnel:

- Specialist personnel

### Requirements

- Performance class up to EI 90 S
  - Shaft walls with metal support structure and cladding on one side,  $W \geq 90$  mm; detailed specification ↗ on page 72
  - Additional reinforcing board near the fire damper, at least 20 mm thick
  - $\geq 75$  mm distance between the installation kit and load-bearing structural elements ( $\geq 100$  mm depending on construction)
  - $\geq 200$  mm distance between two fire dampers
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the fire wall according to the manufacturer's instructions and create an installation opening ↗ on page 72.
  2. ▶ Position the fire damper with the square installation kit in the centre of the installation opening and push it in up to the cover plate.  
If the wall thickness is  $>115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Fix the cover plate with at least four screws (dry wall screws  $\varnothing \geq 4.2$  mm,  $a \geq 10$  mm) to the perimeter metal section.

### 5.9.2 Shaft walls without metal support structure

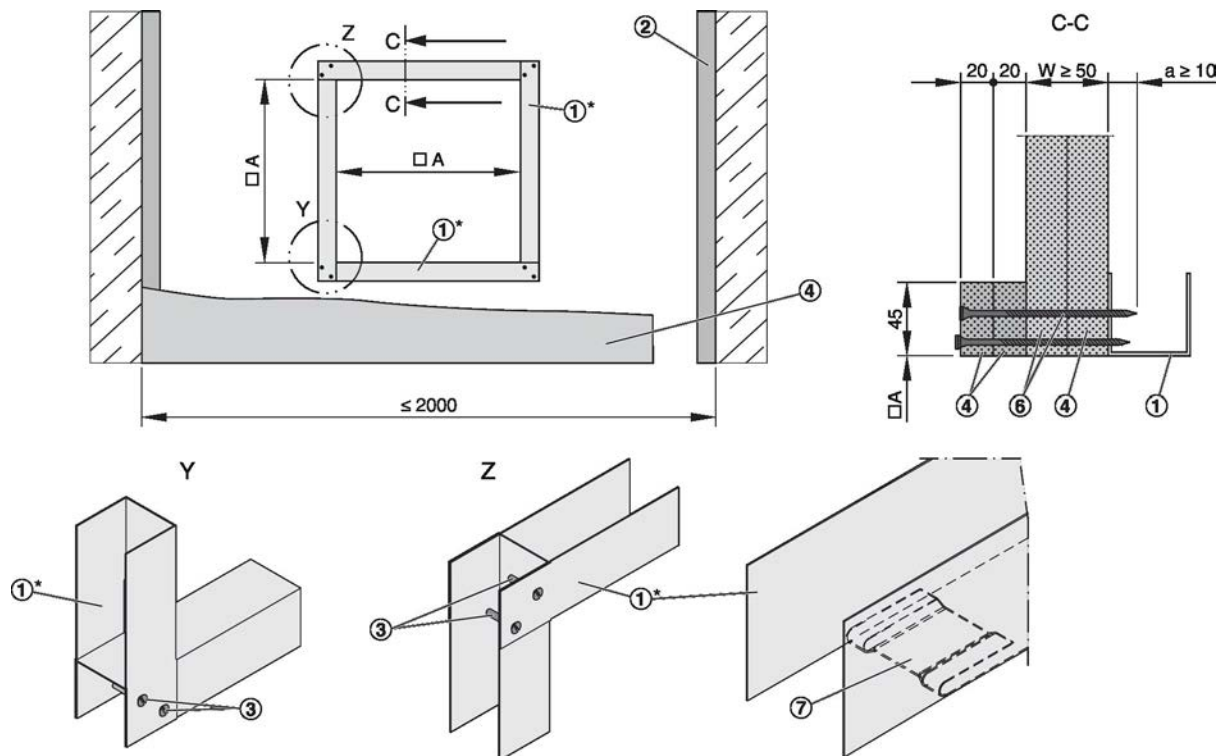


Fig. 58: Shaft wall without metal support structure and cladding on one side

- |   |   |   |  |
|---|---|---|--|
| 1 | UW section  | 5 | Reinforcing board                            |
| 2 | CW section  | 6 | Dry wall screw                               |
| 3 | Screw or steel rivet  | 7 | Fold the tab inward or cut it off            |
| 4 | Double layer cladding, on one side of the metal stud system | * | closed end must face installation opening □A |

#### Requirements

- Shaft walls without metal support structure and cladding on one side, with European classification according to EN 13501-2 or equivalent national classification
- Cladding on one side made of gypsum bonded or cement bonded panel materials, of fibre-reinforced gypsum or of fire-rated calcium silicate boards, wall thickness  $W \geq 50$  mm
- Wall construction according to the manufacturer's instructions
- Wall width  $\leq 2,000$  mm for shaft walls without metal support structure
- Duct connection with flexible connector (recommended)

#### Erecting a wall and creating an installation opening

- Erect the shaft wall according to the manufacturer's instructions and create an installation opening with reinforcing strips, see Fig. 58
- After cladding the wall, create a square wall opening with reinforcing strips and brace it with a perimeter metal section.

Installation opening □A [mm]											
Installation type		Nominal size									
		100	125	150	160	180	200	224	250	280	315
Mortar-based installation		□A = ØDN + 150 mm max.									
Dry mortarless installation with square installation kit TQ <sup>1)</sup>	□A	210	235	260	270	290	310	334	360	390	425
	□B	300	325	350	360	380	400	424	450	480	515

<sup>1)</sup> Installation opening tolerance + 2 mm

### 5.9.2.1 Dry mortarless installation with square installation kit TQ

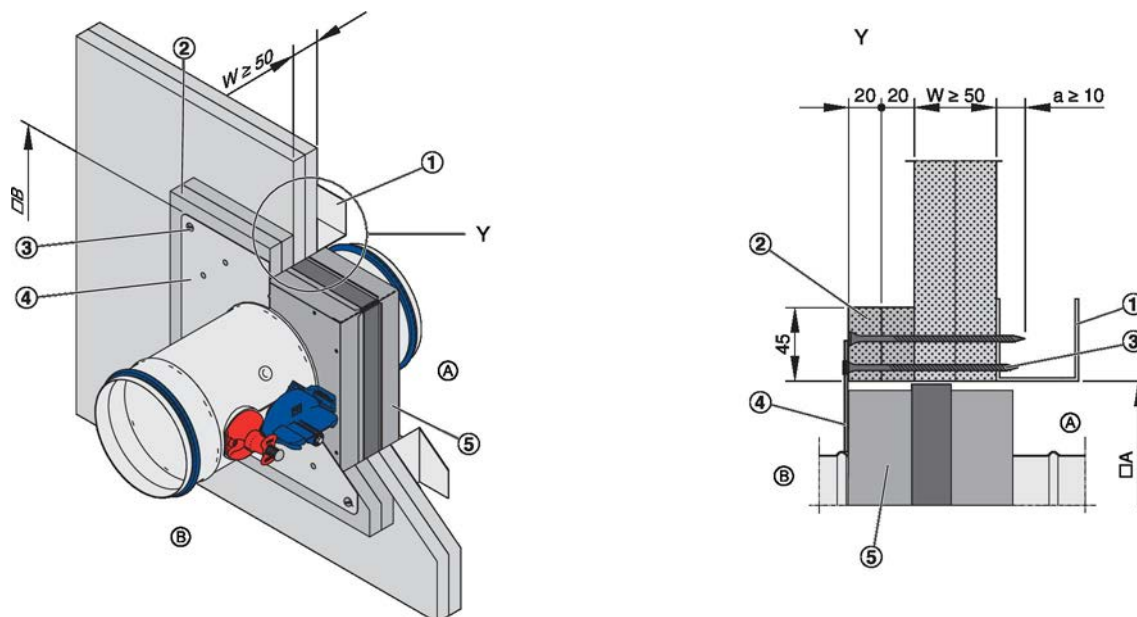


Fig. 59: Dry mortarless installation in shaft wall without metal support structure

- |   |   |    |                           |
|---|---|----|---------------------------|
| 1 | Perimeter metal section                 | Ⓐ  | Installation side         |
| 2 | Reinforcing board                       | Ⓑ  | Operating side            |
| 3 | Dry wall screw                          | □A | Installation opening ↗ 73 |
| 4 | Cover plate                             | □B | Cover plate size ↗ 73     |
| 5 | Installation kit TQ (factory assembled) |    |                           |

#### Personnel:

- Specialist personnel

#### Requirements

- Performance class up to EI 90 S
  - Shaft walls without metal support structure and cladding on one side,  $W \geq 50$  mm; detailed specification ↗ on page 72
  - Additional reinforcing board near the fire damper, at least 2 x 20 mm thick
  - $\geq 75$  mm distance between the installation kit and load-bearing structural elements ( $\geq 100$  mm depending on construction)
  - $\geq 200$  mm distance between two installation kits
  - Duct connection with flexible connector (recommended)
1. ▶ Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening ↗ on page 72.
  2. ▶ Position the fire damper with the square installation kit in the centre of the installation opening and push it in up to the cover plate.  
If the wall thickness is  $>115$  mm, extend the fire damper on the installation side with an extension piece or a spiral duct.
  3. ▶ Fix the cover plate with at least four screws (dry wall screws  $\varnothing \geq 4.2$  mm,  $a \geq 10$  mm) to the perimeter metal section.

## 5.10 Suspended installation of the fire damper

### 5.10.1 General

Fire dampers can be suspended from solid ceiling slabs using adequately sized threaded rods. Load the suspension system only with the weight of the fire damper.

Ducts must be suspended separately.

Suspension systems longer than 1.5 m require fire-resistant insulation.

For suspended installation, the fire damper requires either an extension piece or it has to be connected to the duct before it is suspended.

#### Size of threaded rods

Thread	M8	M10	M12	M14	M16	M20
Fmax (N) per threaded rod	219	348	505	690	942	1470
Maximum loading [kg] per threaded rod	22	35	52	70	96	150

### 5.10.2 Fixing to the ceiling slab

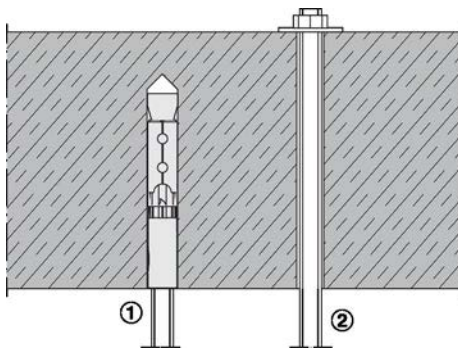


Fig. 60: Fixing to the ceiling slab

- ① Anchor with certified fire protection qualification
- ② Push through installation

Only steel anchors with certified fire protection qualification and suitable for the wall or ceiling must be used. Instead of anchors, threaded rods can be used and can be secured using nuts and washers.

### 5.10.3 Fire dampers with fire batt

#### 5.10.3.1 Horizontal duct

Installation of the fire damper with a fire batt in horizontal ducts requires a suspension system on both sides of the wall.

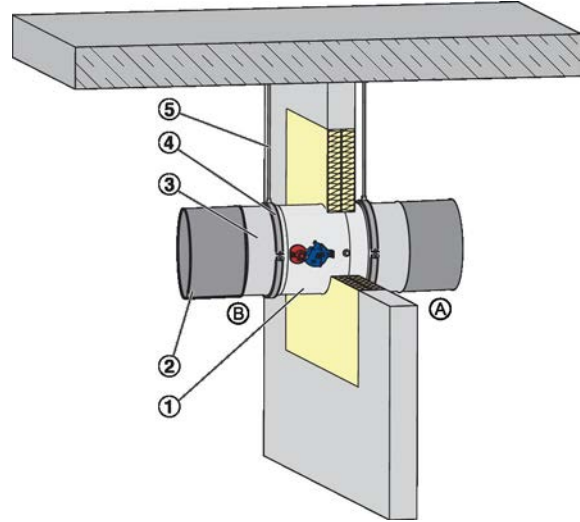


Fig. 61: Suspension system, horizontal duct

- 1 Fire damper
- 2 Flexible connector
- 3 Extension piece
- 4 Clamp
- 5 Threaded rod, at least M8, galvanised steel. Fixing to the ceiling slab & Chapter 5.10.2 'Fixing to the ceiling slab' on page 80. Suspension systems longer than 1.5 m require fire-resistant insulation.
- Ⓐ Installation side
- Ⓑ Operating side

**Note:** Each fire damper has to be suspended both on the operating side and on the installation side.

### 5.10.3.2 Vertical duct

#### Suspended installation of the fire damper

Suspension below the ceiling slab with solid brackets and rivets. Fig. 62/1)

Fixing above and below the ceiling slab with rivets. Fig. 62/2)

Fixing above and below the ceiling slab with heavy duty clamp. Fig. 62/3)

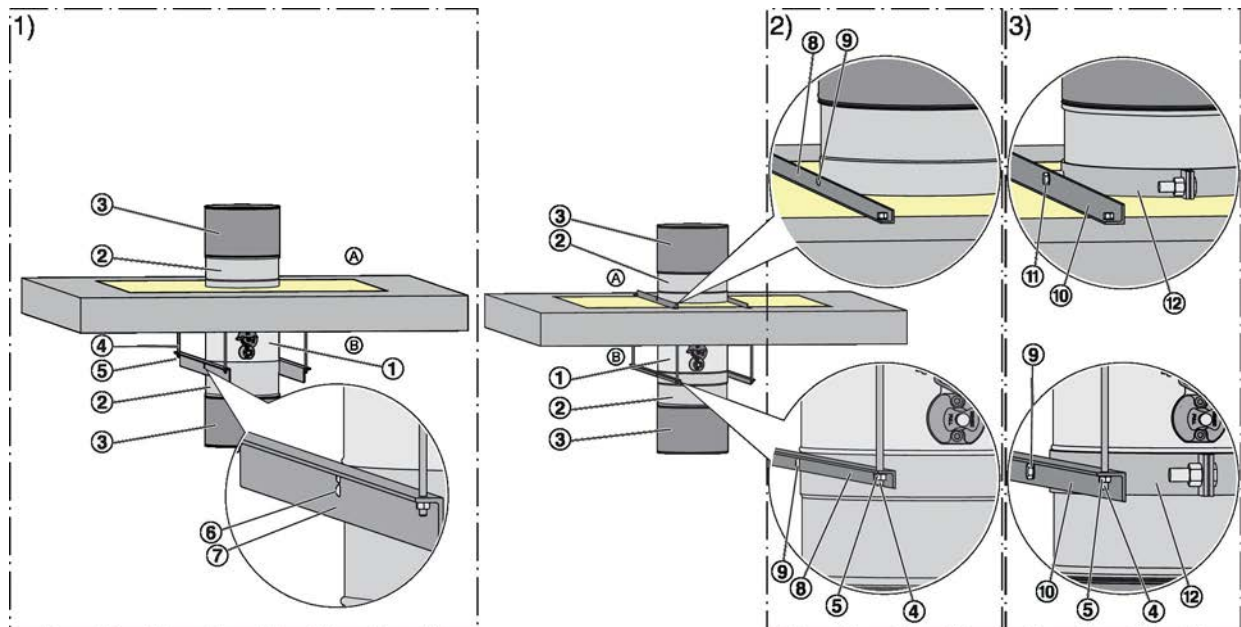


Fig. 62: Suspended installation variants for fire dampers

- |   |  |     |   |
|---|--|-----|---|
| 1 | Fire damper  | 8   | Angle section 20 × 20 × 3 mm to EN 10056-1  |
| 2 | Extension piece  | 9   | 4 steel rivets Ø 6.4 mm clamping range 2 to 20 mm, e.g. cap blind rivets or high strength rivets; the riveted connection must be air-tight. |
| 3 | Flexible connector   | 10  | Angle section 35 × 35 × 4 mm to EN 10056-1  |
| 4 | Threaded rod, at least M8, galvanised steel  | 11  | Screw fixing suitable for the clamp   |
| 5 | Washer and nut suitable for the threaded rod   | 12  | Clamp, e.g. Hilti MP-MX, Valraven BIS HD 500 or equivalent  |
| 6 | 4 steel rivets Ø 6.4 mm, clamping range 2 to 20 mm, e.g. cap blind rivets or high strength rivets. The riveted connection must be air-tight. | (A) | Installation side   |
| 7 | L-section to EN 10056-1 60 × 30 × 5 mm   | (B) | Operating side  |

## Upright installation of the fire damper

Fixing above and below the ceiling slab with rivets. Fig. 63/1)

Fixing above and below the ceiling slab with heavy duty clamp. Fig. 63/2)

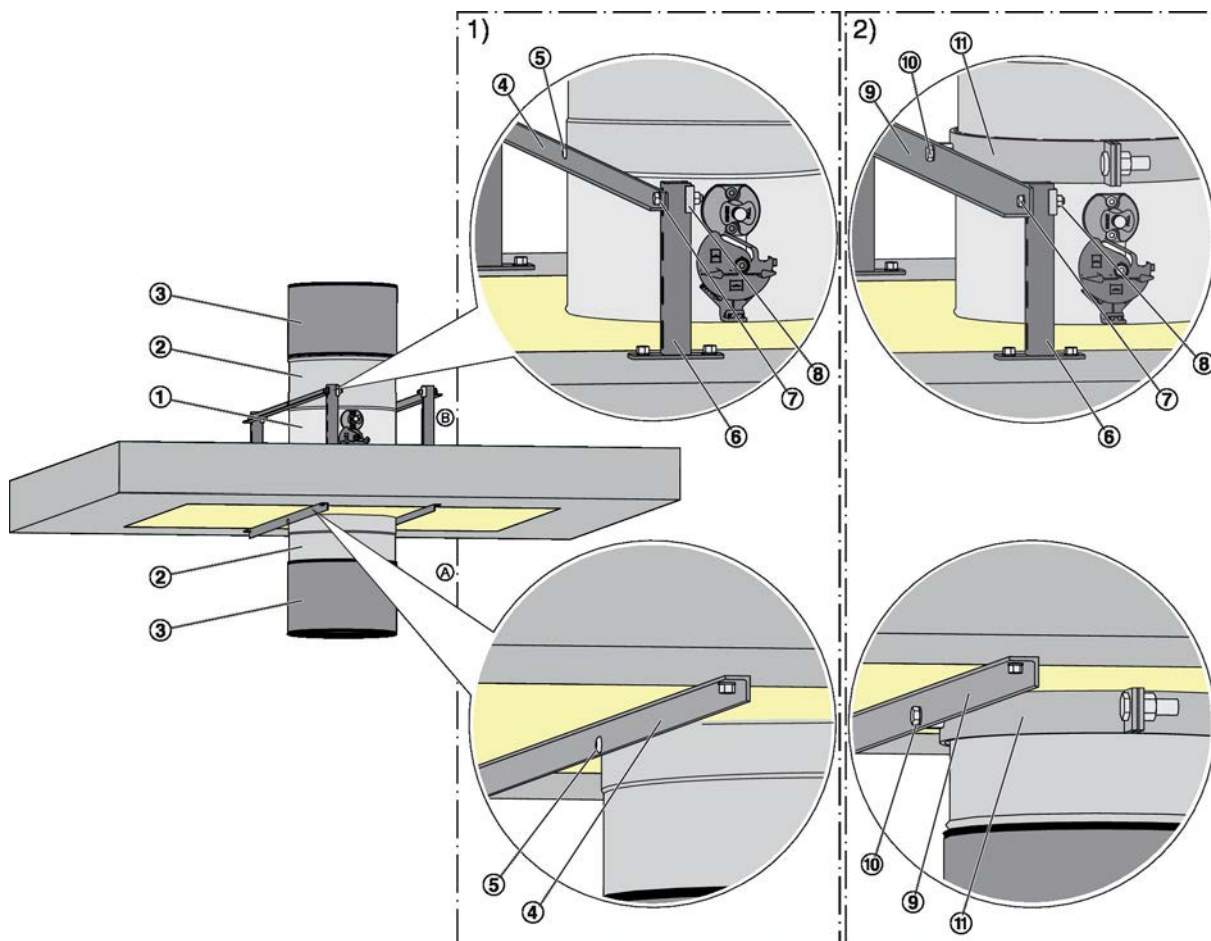


Fig. 63: Upright installation variants for fire dampers

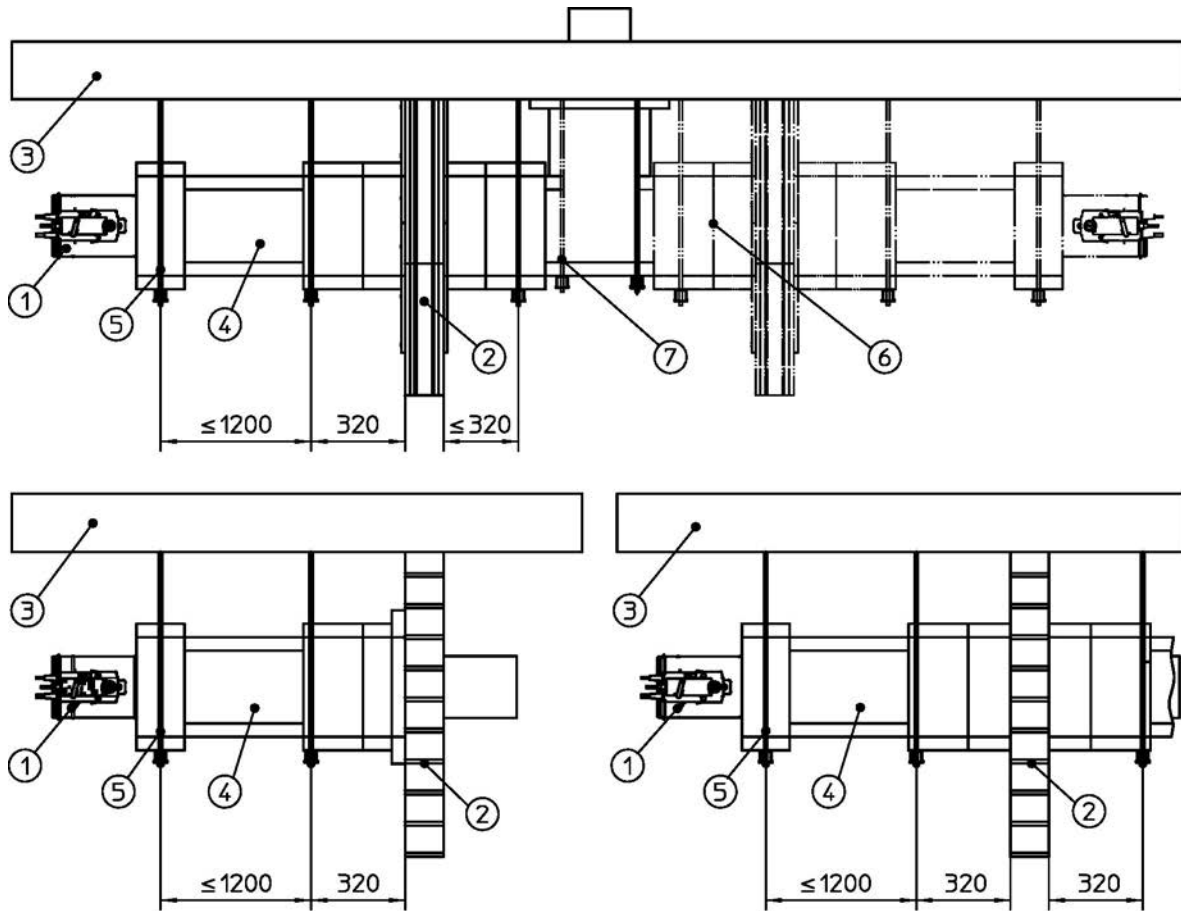
- |  |   |
|--|---|
| 1 Fire damper  | 8 Fixing bracket, Varifix or Müpro MPC or equivalent          |
| 2 Extension piece  | 9 Angle section 35 × 35 × 4 mm to EN 10056-1                  |
| 3 Flexible connector   | 10 Screw fixing suitable for the clamp                        |
| 4 Angle section 20 × 20 × 3 mm to EN 10056-1   | 11 Clamp, e.g. Hilti MP-MX, Valraven BIS HD 500 or equivalent |
| 5 4 steel rivets Ø 6.4 mm, clamping range 2 to 20 mm, e.g. cap blind rivets or high strength rivets; the riveted connection must be air-tight. | Ⓐ Installation side   |
| 6 Bracket, e.g. Hilti MM-B-30 or equivalent  | Ⓑ Operating side  |
| 7 4 screw fixings (M8 screw with 2 washers and nut), suitable for the bracket  |   |

### DANGER!

#### **Danger of falling off! Do not step onto the fire batt!**

The fire batt cannot carry any loads. Adequate means, e.g. a permanent barrier, must be installed to prevent people from stepping onto the fire batt.

#### 5.10.4 Fire damper remote from walls and ceilings



TX2166243

Fig. 64: FKRS-EU in a cladded duct

- |   |   |   |  |
|---|---|---|--|
| 1 | FKRS-EU                                       | 5 | Suspension                             |
| 2 | Solid wall or lightweight partition wall      | 6 | Additional ducting can be used         |
| 3 | Solid ceiling slab                            | 7 | Additional ducting has to be suspended |
| 4 | Sheet steel duct with fire-resistant cladding |   |  |

## 6 Connecting the ductwork

### 6.1 Ducts

Ducts of combustible or non-combustible materials may be connected to fire dampers.

### 6.2 Removing the transport/installation protection

Fire dampers of nominal size 315 and above and without installation block are shipped with a transport/installation protection. In case of mortar-based installation this protection must not be removed until the mortar has hardened. To remove the transport/installation protection, pull it out of the fire damper on the operating side.

### 6.3 Limiting duct expansion

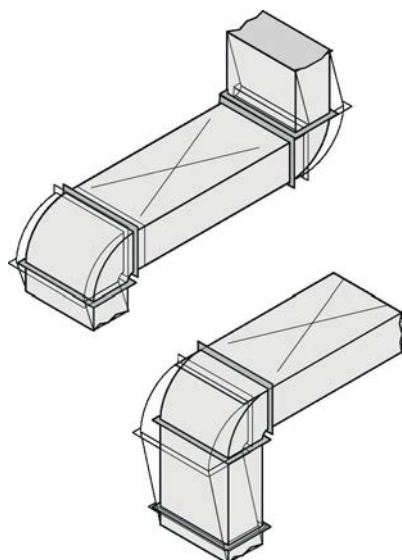


Fig. 65: Limiting loads

Ducting must be installed in such a manner that it does not impose any significant loads on the fire damper in the event of a fire.

The expansion of ducts in the event of a fire can be compensated by brackets and turns, Fig. 65.



#### Note

For further information please refer to the guideline regarding fire protection requirements on ventilation systems (Lüftungsanlagen-Richtlinie, LüAR).

As ducts may expand and walls may become deformed in the event of a fire, we recommend for the following applications using flexible connectors when connecting the fire damper to rigid ducts:

- in lightweight partition walls
- in lightweight shaft walls
- with fire batt

### 6.3.1 Flexible connectors

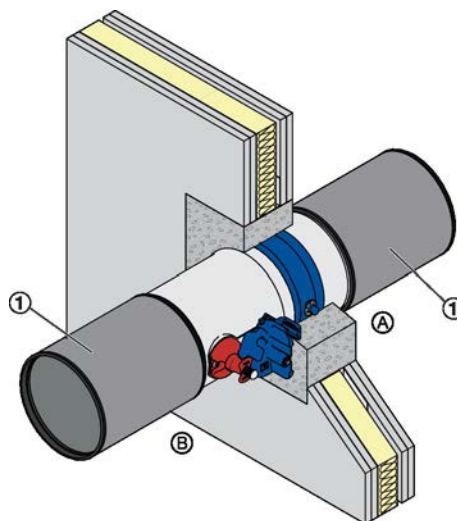


Fig. 66: FKRS-EU with flexible connectors

1 Flexible connector

Ⓐ Installation side

Ⓑ Operating side

The flexible connectors should be installed in such a way that they can compensate both tension and compression. Flexible ducts can be used as an alternative. If flexible connectors are used, equipotential bonding must be ensured → Chapter 7.3 'Equipotential bonding' on page 87.



#### Note

To ensure that the open fire damper blade is contained within the fire damper casing on the installation side, an extension piece is required for nominal size 224 and above.

## 6.4 Cover grille

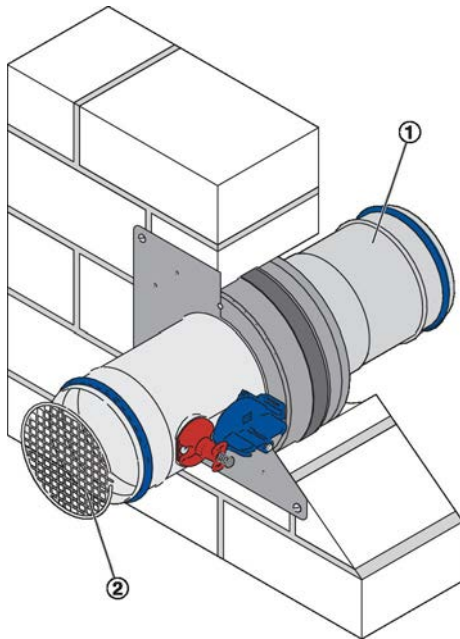


Fig. 67: Fire damper with cover grille

- 1 Extension piece required for nominal size 224 and above
- 2 Cover grille

If only one end is to be ducted on site, the other end must have a cover grille (galvanised steel, mesh aperture  $\leq 20$  mm).



### Note

To ensure that the open fire damper blade is contained within the fire damper casing on the installation side, an extension piece is required for nominal size 224 and above.

## 6.5 Inspection access

Type FKRS-EU fire dampers have an inspection access that is closed with a rubber stopper ↗ *Chapter 4 'Parts and function' on page 13*. The interior of the fire damper should remain accessible for cleaning. Depending on the installation configuration it may be necessary to provide inspection panels in the connecting ducts.

## 7 Making electrical connections

### General safety notes

#### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

### 7.1 Connecting the limit switches (fire dampers with fusible link)

#### Personnel:

- Skilled qualified electrician

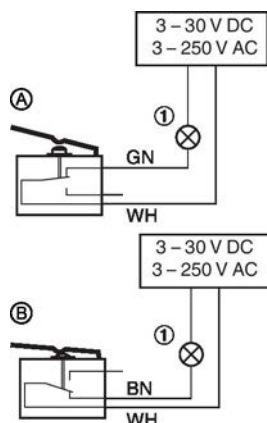


Fig. 68: Wiring of limit switches, example

- 1 Indicator light or relay, to be provided by others
- The limit switches must be connected according to the wiring example Fig. 68
  - Indicator lights or relays may be connected as long as the performance specifications are taken into consideration.
  - Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

Type of connection	Limit switch	Damper blade	Electric circuit
Ⓐ NC contact	not actuated	CLOSED or OPEN position is <u>not</u> reached	closed

Type of connection	Limit switch	Damper blade	Electric circuit
Ⓑ NO contact	actuated	CLOSED or OPEN position is reached	closed

### 7.2 Connecting the spring return actuator

#### Personnel:

- Skilled qualified electrician

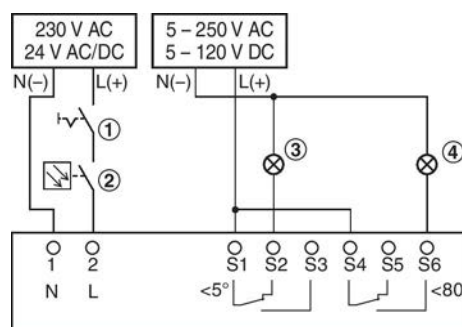


Fig. 69: Actuator connection, example

Colour codes of BFL actuators:

- S1 = violet
- S2 = red
- S3 = white
- S4 = orange
- S5 = pink
- S6 = grey

- 1 Switch for opening and closing, to be provided by others
  - 2 Optional release mechanism, e.g. TROX duct smoke detector Type RM-O-3-D or RM-O-VS-D
  - 3 Indicator light for CLOSED position, to be provided by others
  - 4 Indicator light for OPEN position, to be provided by others
- The fire damper may be equipped with a spring return actuator for a supply voltage of 230 V AC or 24 V AC/DC. See the performance data on the rating plate. 11
  - The spring return actuator must be connected according to the wiring example shown. Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.
  - Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

**Note:** For the wiring of explosion-proof actuators see the additional FKRS-EU-Ex operating manual

**Actuators with 24 V AC/DC**

Safety transformers must be used. The connecting cables are fitted with plugs. This ensures quick and easy connection to the TROX AS-i bus system. For connection to the terminals, shorten the connecting cable.

**7.3 Equipotential bonding**

If equipotential bonding is a requirement, there must be an electrical earth connection from the fire damper to the duct. In the event of a fire, mechanical loads from the equipotential bonding must not affect the fire damper.

- Fire dampers with flange: The flange of the fire damper is used for equipotential bonding; no drilled holes are required in the damper casing.
- Fire dampers without flange (circular): Suitable clamps or similar parts may be used for equipotential bonding. It is possible to make drilled holes near the spigot.

## 8 Functional test

### General

During operation at normal temperatures, the damper blade is open. A functional test involves closing the damper blade and opening it again.

### 8.1 Fire damper with fusible link

#### Closing the damper blade

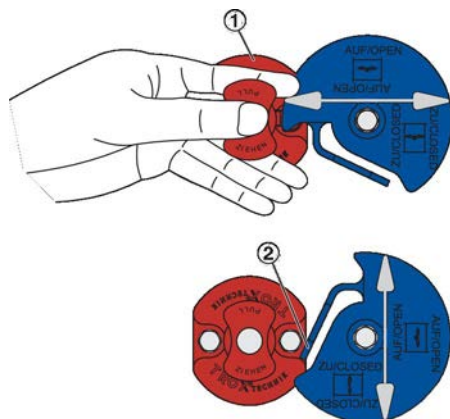


Fig. 70: Closing the damper blade

#### CAUTION!

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

#### Requirement

- The damper blade is OPEN
- 1. ▶ Grasp the release mechanism ① as shown with the thumb and middle fingers.
- 2. ▶ Pull the release mechanism towards you with both fingers.
  - ⇒ The damper blade closes and the tab ② on the handle locks into the CLOSED position.

#### Opening the damper blade

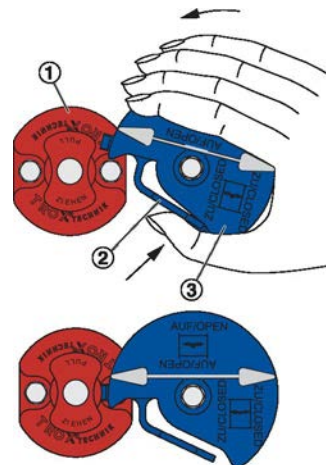


Fig. 71: Opening the damper blade

#### CAUTION!

The handle will break if handled improperly

Be sure to press the tab ② as otherwise the handle ③ will be damaged.

#### Requirement

- The damper blade is CLOSED
- 1. ▶ With your right hand, grasp the handle ③ as shown and press down the tab ② with your thumb.
- 2. ▶ Then turn the handle anti-clockwise to the travel stop.
  - ⇒ The handle locks into the OPEN position.

#### Damper blade position indicator

The position of the damper blade is indicated by the position of the handle.

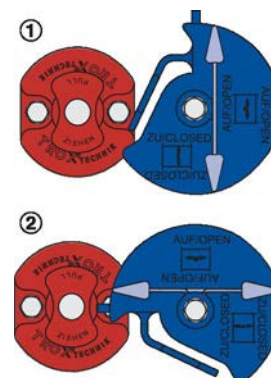


Fig. 72: Damper blade position indicator

- ① Damper blade is closed
- ② Damper blade is open

## 8.2 Fire damper with spring return actuator

### Status indicator

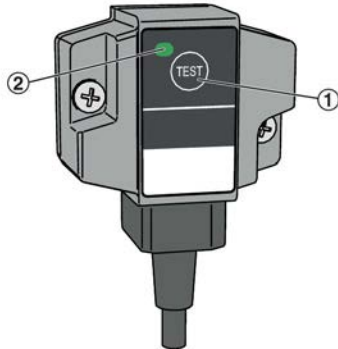


Fig. 73: Thermoelectric release mechanism BAT

- 1 Toggle switch for functional test
- 2 LED

The indicator light ② for the thermoelectric release mechanism is illuminated when all of the following conditions apply:

- Power is supplied.
- The thermoelectric release is in order.
- The toggle switch is not being pushed.

### Damper blade position indicator

The position of the damper is indicated by the pointer on the actuator.

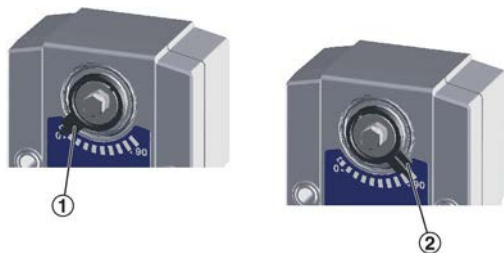


Fig. 74: Damper blade position indicator

- ① Damper blade is closed
- ② Damper blade is open

### Closing/opening the damper blade with spring return actuator

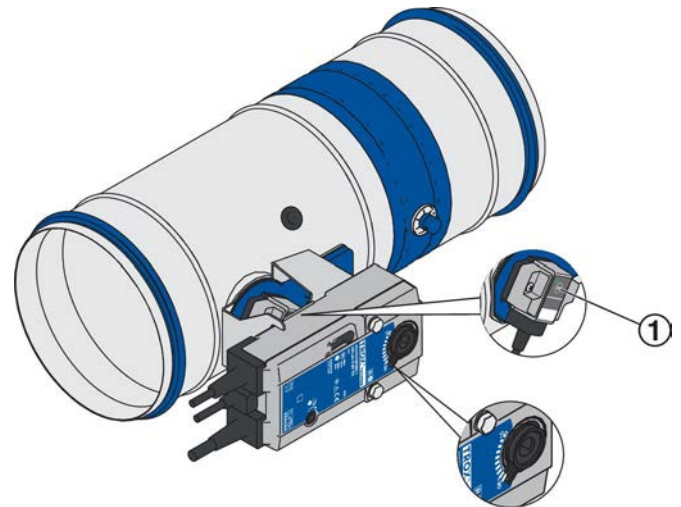


Fig. 75: Functional test



### CAUTION!

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

### Requirement

- Power is being supplied
1. ▶ Push toggle switch ① and keep it pushed.
    - ⇒ This interrupts the power supply, and the damper blade closes.
  2. ▶ Check if the damper blade is CLOSED, check running time.
  3. ▶ Release the toggle switch ①.
    - ⇒ Voltage is supplied again, and the damper blade opens.
  4. ▶ Check if the damper blade is OPEN, check running time.

## Opening the damper blade using the crank handle



Fig. 76: Functional test (without power supply)


### **⚠ DANGER!**

Danger due to malfunction of the fire damper.

If the damper blade has been opened by means of the crank handle (without power supply), it will no longer be triggered by a temperature increase, i.e. in the event of a fire. In other words, the damper blade will not close.

To re-establish its function, connect the power supply.

### Requirement

- The damper blade is CLOSED
- 1. ▶ Insert the crank handle ① into the opening for the spring-winding mechanism.
- 2. ▶ Turn the crank handle into the direction of the arrow ② to just short of the travel stop and hold it.
- 3. ▶ Set the interlock ③ to 
  - ⇒ The damper blade remains in the OPEN position.
- 4. ▶ Remove the crank handle.

## Closing the damper blade




Fig. 77: Functional test (without power supply)

### **⚠ CAUTION!**

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

### Requirement

- The damper blade is OPEN
  - ▶ Set the interlock ③ to 
    - ⇒ The damper blade is released and closes.

### 8.3 Functional test with automatic control unit

#### Functional test with automatic control unit

The function of fire dampers with a spring return actuator can also be tested with an automatic control unit. The control unit should have the following functions:


- Opening and closing fire dampers in regular intervals (intervals to be set by the owner or operator)
- Monitoring of the actuator running times
- Issuing an alarm when the running times are exceeded and when fire dampers close
- Recording the test results

TROXNETCOM systems such as TNC-EASYCONTROL or AS-interface meet all these requirements. For details on these products please refer to the TROX Fire and Smoke Protection catalogue.

TROXNETCOM systems allow for automatic functional tests; they do not replace maintenance and cleaning, which have to be carried out in regular intervals or depending on the condition of the product. The documentation of test results makes trends visible, e.g. the running time of actuators. They may also indicate the need for additional measures which help to maintain the system's function, e.g. cleaning of heavy contamination (dust in extract air systems).

## 9 Commissioning

### Before commissioning

Before commissioning, each fire damper must be inspected to determine and assess its actual condition. The inspection measures to be taken are listed in the table on  on page 95.


### Operation

During normal operation the damper blade is open to enable air passage through the ventilation system.

If the temperature in the duct or the ambient temperature rises in the event of a fire ( $\geq 72\text{ °C}$  /  $\geq 95\text{ °C}$ ), the thermal release mechanism is triggered and closes the damper blade.



#### **CLOSED fire dampers**

*Fire dampers which close while the ventilation and air conditioning system is running must be inspected before they are opened again in order to ensure their correct function  'Inspection' on page 93.*

## 10 Maintenance

### 10.1 General

#### General safety notes

##### DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

##### CAUTION!

Danger due to inadvertently actuating the fire damper. Inadvertent actuation of the damper blade or other parts can lead to injuries.

Make sure that the damper blade cannot be released inadvertently.

Regular care and maintenance ensure operational readiness, functional reliability, and long service life of the fire damper.


The owner or operator of the system is responsible for the maintenance of the fire damper. The operator is responsible for creating a maintenance plan, for defining the maintenance objectives, and for the functional reliability of the fire damper.

#### Functional test

The functional reliability of the fire damper must be tested at least every six months; this has to be arranged by the owner or operator. If two consecutive tests, one 6 months after the other, are successful, the next test can be conducted one year later.

The functional test must be carried out in compliance with the basic maintenance principles of the following standards:

- EN 13306
- DIN 31051
- EN 15423

The function of fire dampers with a spring return actuator can also be tested with an automatic control unit  'Functional test with automatic control unit' on page 91.

#### Maintenance

The fire damper and the spring return actuator are maintenance-free with regard to wear but fire dampers must still be included in the regular cleaning of the ventilation system.


#### Cleaning

The fire damper may be cleaned with a dry or damp cloth. Sticky dirt or contamination may be removed with a commercial, non-aggressive cleaning agent. Do not use abrasive cleaners or tools (e.g. brushes).

#### Inspection

The fire damper must be inspected before commissioning. After commissioning, the function has to be tested in regular intervals. Local requirements and building regulations must be complied with. The inspection measures to be taken are listed under . The test of each fire damper must be documented and evaluated. If the requirements are not fully met, suitable remedial action must be taken.

#### Repair

For safety reasons, repair work must only be carried out by expert qualified personnel or the manufacturer. Only original replacement parts are to be used. A functional test  88 is required after any repair work.

## 10.2 Lubricating points

#### Lubricating points

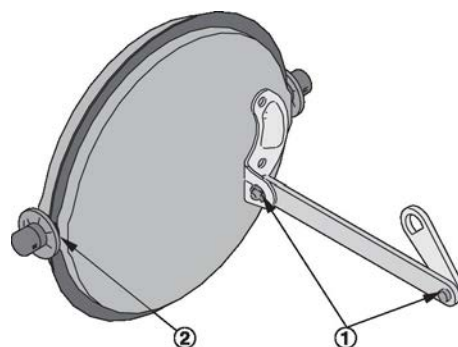
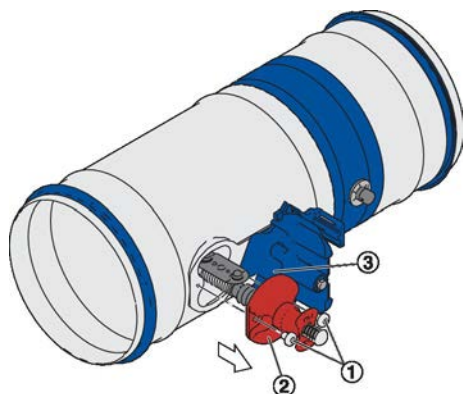


Fig. 78: Lubricating points

- 1 Push rod bearings
- 2 Damper blade bearings (both sides)

Only lubricate the lubricating points if the damper blade cannot be opened or closed easily. Use only oil or grease that is free of resins or acids.

## 10.3 Replacing the fusible link



*Fig. 79: Removing the fusible link holder*

1. ▶ Close the damper blade.
2. ▶ Release screws ① on the fusible link holder ②.
3. ▶ Remove fusible link holder ② from the fire damper. While doing so, slightly press down the tab ③ of the handle.



*Fig. 80: Removing the fusible link holder*

4. ▶ Grasp the fusible link holder as shown. Move your middle fingers into the direction of the arrow.
5. ▶ Remove the used fusible link.
6. ▶ Insert the new fusible link.
7. ▶ Put the fusible link holder back into the fire damper and fix it with screws ①.
8. ▶ Carry out functional test.

## 10.4 Maintenance

Interval	Measure	Personnel
<b>A</b>	Access to the fire damper <ul style="list-style-type: none"> <li>Internal and external accessibility               <ul style="list-style-type: none"> <li>Provide access</li> </ul> </li> </ul>	Specialist personnel
	Installation of the fire damper <ul style="list-style-type: none"> <li>Installation according to the operating manual ↗ 17               <ul style="list-style-type: none"> <li>Install the fire damper correctly.</li> </ul> </li> </ul>	Specialist personnel
	Transport and installation protection, if any <ul style="list-style-type: none"> <li>Transport/installation protection removed               <ul style="list-style-type: none"> <li>Remove transport/installation protection</li> </ul> </li> </ul>	Specialist personnel
	Connection of ductwork/cover grille/flexible connector ↗ 84 <ul style="list-style-type: none"> <li>Connection according to this manual               <ul style="list-style-type: none"> <li>Establish correct connection</li> </ul> </li> </ul>	Specialist personnel
	Power supply to the spring return actuator <ul style="list-style-type: none"> <li>Power supply according to spring return actuator rating plate               <ul style="list-style-type: none"> <li>Provide correct power supply</li> </ul> </li> </ul>	Skilled qualified electrician
<b>A / B</b>	Check fire damper for damage <ul style="list-style-type: none"> <li>Fire damper, damper blade and seal must be intact               <ul style="list-style-type: none"> <li>Replace the damper blade</li> <li>Repair or replace the fire damper.</li> </ul> </li> </ul>	Specialist personnel
	Function of the release mechanism <ul style="list-style-type: none"> <li>Function OK</li> <li>Fusible link intact/no corrosion               <ul style="list-style-type: none"> <li>Replace the fusible link</li> <li>Replace the release mechanism</li> </ul> </li> </ul>	Specialist personnel
	Functional test of the fire damper (with fusible link) ↗ 88 <ul style="list-style-type: none"> <li>Fire damper can be opened manually</li> <li>Handle can be locked in the OPEN position</li> <li>Damper blade closes when triggered manually               <ul style="list-style-type: none"> <li>Determine and eliminate the cause of the fault</li> <li>Repair or replace the fire damper.</li> <li>Replace the release mechanism</li> </ul> </li> </ul>	Specialist personnel
	Functional test of the fire damper (with spring return actuator) ↗ 88 <ul style="list-style-type: none"> <li>Actuator function OK</li> <li>Damper blade closes</li> <li>Damper blade opens               <ul style="list-style-type: none"> <li>Determine and eliminate the cause of the fault</li> <li>Replace the spring return actuator</li> <li>Repair or replace the fire damper.</li> </ul> </li> </ul>	Specialist personnel
	Function of external smoke detector <ul style="list-style-type: none"> <li>Function OK</li> <li>Fire damper closes when triggered manually or when smoke is detected</li> <li>Fire damper opens after reset               <ul style="list-style-type: none"> <li>Determine and eliminate the cause of the fault</li> <li>Repair or replace smoke detector</li> </ul> </li> </ul>	Specialist personnel

Interval	Measure	Personnel
<b>C</b>	Cleaning the fire damper <ul style="list-style-type: none"> <li>■ No contamination in the interior or on the exterior of the fire damper</li> <li>■ No corrosion                             <ul style="list-style-type: none"> <li>– Remove contamination with a damp cloth</li> <li>– Remove corrosion or replace part</li> </ul> </li> </ul>	Specialist personnel
	Function of limit switches <ul style="list-style-type: none"> <li>■ Function OK                             <ul style="list-style-type: none"> <li>– Replace the limit switches</li> </ul> </li> </ul>	Specialist personnel
	Function of the external signalling (damper blade position indicator) <ul style="list-style-type: none"> <li>■ Function OK                             <ul style="list-style-type: none"> <li>– Determine and eliminate the cause of the fault</li> </ul> </li> </ul>	Specialist personnel

Interval	Maintenance work
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## Interval

**A = Commissioning**

**B = Regularly**

The functional reliability of fire dampers must be tested at least every six months. If two consecutive tests are successful, the next test can be conducted one year later. The function of fire dampers with a spring return actuator can also be tested with an automatic control unit (remote controlled). The system owner can then set the intervals for local tests.

**C = As required, depending on the degree of contamination**

## Item to be checked

- Required condition
  - Remedial action if necessary

## 11 Decommissioning, removal and disposal

### Final decommissioning

- Switch off the ventilation system.
- Switch off the power supply.

### Removal



#### **DANGER!**

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

1. ▶ Disconnect the wiring.
2. ▶ Remove the ducts.
3. ▶ Close the damper blade.
4. ▶ Remove the fire damper.

### Disposal

For disposal, the fire damper must be disassembled.



#### **ENVIRONMENT!**

Dispose of electronic components according to the local electronic waste regulations.

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