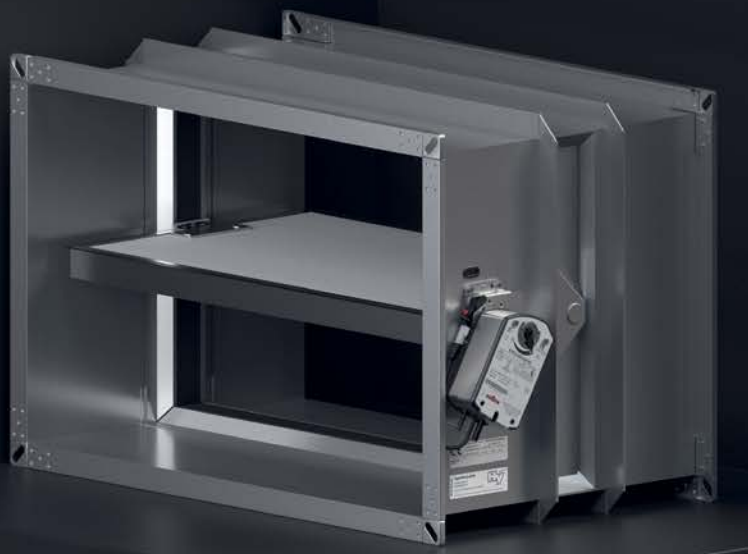
USER MANUAL

FIRE PROTECTION AND SMOKE EXTRACTION

# FK90
# Fire damper



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## Contents

## 1 Product overview

The square FK90 fire dampers of the FK92 series meet the requirements of the European product standard EN 15650, and are tested according to EN 1366-2. FK90 fire dampers are connected to ventilation ducts in fire-resistant separating elements or installed in air transfer applications, and thus separate fire compartments from each other in the event of a fire. The airtight casing of the class ATC 3 FK90 fire damper in accordance with DIN EN 1751 is made of galvanized steel and has a wear-resistant and replaceable calcium silicate damper blade with a galvanized metal frame. The enclosed release element triggers the mechanism at a nominal temperature of 70 °C or 95 °C. The operation units can be actuated manually, pneumatically or electrically, and are also available in an explosion-protected design.

With a protective grille on both sides in conjunction with an OR4 / OR32 smoke detector, the FK90 fire damper can also be used to seal air transfer applications (Ü-FK).

For more details on Ü-FK air transfer applications and OR4 / OR32 smoke detectors, see:

- 5.14 User manual for the OR4 smoke detector
- 5.11 User manual for the OR32 smoke detector

- Sizes: Widths: 200 … 1500 mm, 5-mm increments<br>Heights: 200 … 1000 mm, 5-mm increments<br>*Possible width and height combinations* ▸ page 4<br>Length: 400 mm, 500 mm<br>Short length: 346 mm, 355 mm
- Declaration of performance: DoP No. CPR/FK90/003
- Reaction to fire certificate: MPA-BS 6000/593/18
- Environmental product declaration: EPD-WWB-20240381-ICC1-DE
- Hygiene certificate: Issued by the Ruhr District Institute of Hygiene
- General type approval for air transfer applications: Z-6.50-2132
- Leaktightness according to DIN EN 1751: ATC 3 casing class (formerly C)<br>Class 3 damper element
- Max. flow rate: 50000 m³/h
- Power supply to the actuators: 24 V AC/DC | 230 V AC
- With all-round enclosed thermal release element: 70 °C (also with corrosion protection), 95 °C
- Approved for use in explosive atmospheres (in accordance with Directive 2014/34/EU)
- With thermal-mechanical release mechanism or electric actuators, also explosion-protected
- Maintenance-free: The operation unit, release mechanism and release element are fully enclosed, meaning that no cleaning, regular lubrication or adjustment is needed to maintain function. Simple functional check by opening / closing, also remote-controlled (▸ page 73)
- Installation position with horizontal or vertical shaft position

Options:

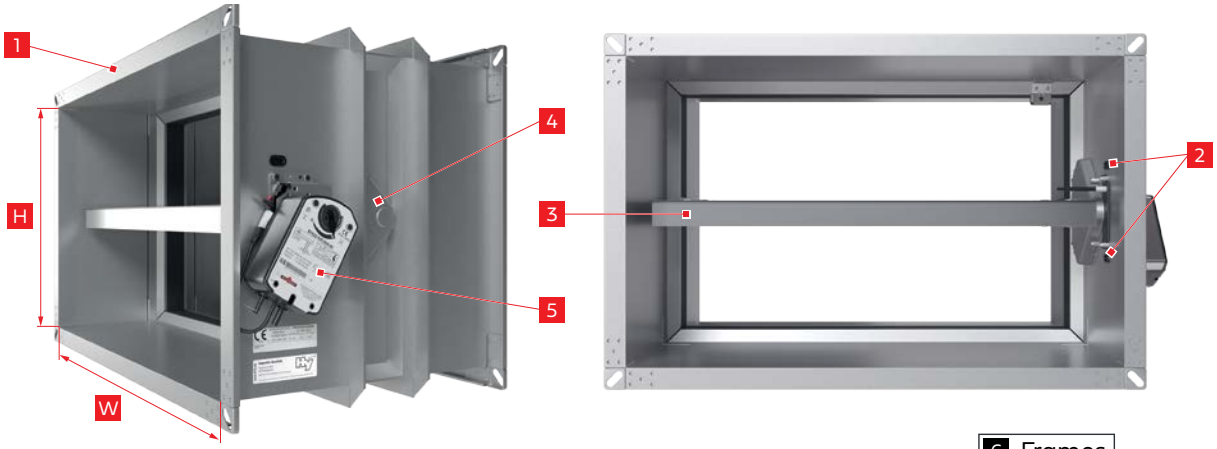
- With powder coating for increased corrosion protection

**Classification:**
**EI 30/60/90/120 (ve - ho, i ⇔ o) S $C_{10000}$**

| | |
|---|---|
| EI 30/60/90/120 | 30/60/90/120 minutes fire resistance period (depending on the installation scenario) |
| $v_e$ | Vertical alignment – designed for installation in walls |
| $h_o$ | Horizontal alignment – designed for installation in ceilings |
| i ⇔ o | Fire exposure – verified on both sides |
| S | Smoke leakage |
| $C_{10000}$ | Operational safety – the test is performed with 10000 cycles (opening and closing) |

Further information ▸ page 8.

## 2 Product features




6 Frames

### Dimensions

Intermediate dimensions are possible within the specified increments.

| | |
|---|---|
| **Lengths (L):** | 400 mm, 500 mm |
| **Short lengths (L):** | 346 mm, 355 mm |
| **Nominal width (W):** | 200 ... 1500 mm, increments of 5 mm |
| **Nominal height (H):** | 200 ... 1000 mm, increments 5 mm |

Nominal widths and nominal heights can be combined as follows:

- Heights of 200 ... 800 mm with widths of 200 ... 1500 mm
- Heights of 200 ... 1000 mm with widths of 200 ... 1000 mm

### 1 Casing

Single-piece airtight and smoke-tight sheet steel casing, galvanized, pressurised and extremely stable. Leaktightness according to DIN EN 1751: ATC 3 casing class (formerly C). Optional with epoxy resin powder coating.

### 2 Control openings/inspection openings

Make it possible to view the damper blade from both sides.

### 3 Damper blade

Replaceable, break-resistant damper blade with galvanized metal frame and elastomer lip seal (frictionless sealing). Optional design with metal cover made of galvanized steel, with metal cover and metal frame made of galvanized steel, with metal frame made of 1.4301 stainless steel or with metal casing and metal frame made of 1.4301 stainless steel.

### 4 Operation unit, enclosed

Fully enclosed drive mechanism with self-locking gear unit, sealed drive axles made of stainless steel and gunmetal bearings.

### 5 Release mechanisms and actuators

**Thermal-mechanical release mechanism (TMA)** for manual single-handed operation


- Protection rating IP54 (fully enclosed)

**Release element (standard 70 °C)**

Optional:

- Coated 95 °C
- Coated 70 °C

Limit switch (standard without)

Optional:

- **E-AUF** with limit switch OPEN
- **E-ZU** with limit switch CLOSED

Details on thermal-mechanical release mechanism ▸ page 9.

Option:
**TMA with explosion-protected design**
Optional with: **Limit switch with explosion protection**
- **E-EX** with opener and closer for 6 A at ≤ 250 V AC or 0.25 A at ≤ 230 V DC; protection rating IP65; 2 m connection cable 4 x 0.75 mm²

Single or two EX-protected limit switches can be installed for the OPEN and/or CLOSE position indicator.

Option:
**TMA with remote release** using the **open circuit principle**

- **G24** with lifting solenoid 24 V DC, 3.5 W; 100 % ED; IP42
- **W220** with lifting solenoid 230 V AC, 5.5 VA; 100 % ED; IP42
- **P** with lift cylinder 4 ... 8 bar
- **P2** with lift cylinder 1.2 ... 8 bar

Option:
**TMA with remote release** using the **closed circuit principle**

- **GU24** with magnetic clamp 24 V DC, 1.6 W; 100 % ED; IP42
- **WU220** with magnetic clamp 230 V AC, 4 VA; 100 % ED; IP42

**Electric spring return actuators** (shown as operation units including bracket for mounting)

**M220-9/H** and **M24-9/H**
Standard
- 230 V AC, 9.2 VA; $I_{max \le 2\,ms}$ = 0.27 A or 24 V AC/DC, 6.1 VA; 3.5 W; $I_{max \le 2\,ms}$ = 3.5 A
- Torque 8 Nm
- Protection rating IP54
- Runtime: Opening ≈ 60 s, closing ≈ 21 s
- CLOSED/OPEN position indicators via limit switches for 5 A at ≤ 240 V AC
- Halogen-free connection cable 0.9 m in length, 2 x 0.75 mm² and 6 x 0.75 mm² The AMP connector plugs are detachable
- 70 °C release element (standard)

Optional:
- 95 °C release element

**M220-11/H** and **M24-11/H**
(Special actuator for all sizes)
- 230 V AC, 5 W; 10 VA; $I_{max \le 5\,ms}$ = 4 A or 24 V AC/DC, 4 W; 6 VA; $I_{max \le 5\,ms}$ = 8.3 A
- Torque 9 Nm
- Protection rating IP54
- Runtime: Opening ≈ 60 s, closing ≈ 20 s
- Halogen-free connection cable 1 m in length, 2 x 0.75 mm² and 6 x 0.75 mm² The AMP connector plugs are detachable
- 70 °C release element (standard)

Optional:
- 95 °C release element
- Additional bracket for horizontal position

**M220-10/H** and **M24-10/H**
**only for sizes W ≤ 800 mm / H ≤ 450 mm**
- 230 V AC, 6.5 VA; 3.5 W; $I_{max \le 5\,ms}$ = 4 A or 24 V AC/DC, 4 VA; 2.5 W; $I_{max \le 5\,ms}$ = 8.3 A
- Torque 4 Nm
- Protection rating IP54
- Runtime: Opening ≈ 60 s, closing ≈ 20 s
- OPEN/CLOSED position indicators via limit switches for 0.5 A at ≤ 250 V AC or for 1 mA up to 3 A at 5 up to 250 V DC
- Halogen-free connection cable 1 m in length, 2 x 0.75 mm² and 6 x 0.75 mm² The AMP connector plugs are detachable
- 70 °C release element (standard)

Optional:
- 95 °C release element
- Additional bracket for horizontal position

**Explosion-protected design**:
**EM-1/RM-1** (standard)**/ EM-2**
- 24 to 240 V AC/DC, 20 W (incl. heater); $I_{Nom}$ ≈ 0.7 A $I_{max \le 1\,ms}$ ≈ 2.5 A
- Torque 10 Nm (EM-1/RM-1), 15 Nm (EM-2)
- Protection rating IP66
- Runtime: Opening ≈ 30 s, closing ≈ 10 s
- CLOSED/OPEN position indicators via limit switches for ≤ 3 A at ≤ 24 V AC and ≤ 0.25 A at 250 V DC, at least 5 V, 10 mA
- Halogen-free connection cable 12 x 0.5 mm². The cable must be wired in the terminal box. All of the contained voltages must be the same
- 70 °C release element
- Terminal box


Further information on electric spring return actuators ▸ page 10.
Wiring of the electric spring return actuators ▸ page 83.
Details on use of the explosion-protected versions ▸ page 10.

## 6 Frame

All installation subframes and mounting frames can be used for nominal heights of H ≤ 800 mm and a fire resistance period of ≤ 90 minutes.

**ER1**
Installation subframe made of calcium silicate for simplified dry installation in metal stud walls with cladding on both sides and in shaft walls with and without metal studs.

- Lengths L = 400 mm, 500 mm
- Delivery factory-mounted or for retrofitting on site
- Scope of delivery: required FK90 connection brackets and drywall screws 3.9 x 45 mm for screwing the FK90 connection brackets to metal stud walls


Dimensions ▸ page 74
Installation ▸ page 35 ff.


**ER2**
Installation subframe made from sheet steel for rigid walls and ceilings.

- Short length L = 355 mm (for insertion in ER2 installation subframe)


Dimensions ▸ page 74
Installation ▸ page 22


**ER3**
Installation subframe made of calcium silicate for metal stud walls clad on both sides and shaft walls with and without metal studs.

- Short length L = 355 mm (for insertion in ER3 installation subframe)
- Scope of delivery: required FK90 connection brackets and drywall screws 3.9 x 45 mm for screwing the FK90 connection brackets to metal stud walls


Dimensions ▸ page 74
Installation ▸ page 35 ff.


**ER4**
Installation subframes made of calcium silicate for sliding ceiling connection with a drop of up to 40 mm in metal stud walls with cladding on both sides.

- Length L = 500 mm
- Factory-mounted delivery
- Scope of delivery: threaded rods and plugs for fastening


Dimensions ▸ page 74
Installation ▸ page 41 ff.

**ER8**
Installation subframes made of calcium silicate for dry installation in wooden walls, in wooden ceilings and for ceilings with steel frames.

- Lengths L = 400 mm, 500 mm
- Delivery factory-mounted or for retrofitting on site
- Scope of delivery: required ER8 connection brackets, ER8 angle brackets, ER8 stop plates, 3.9 x 25 mm self-drilling screws and 3.9 x 45 mm drywall screws required for screwing the ER8 connection brackets to wooden walls and ceilings and to ceilings with steel frames


Dimensions ▸ page 74
Installation ▸ page 49 ff.


**AR2**
Mounting frame made of calcium silicate for connection to ventilation ducts with fire resistance period.
Especially for installation remote from rigid walls and ceilings and remote from metal stud walls clad on both sides.

- Lengths L = 400 mm, 500 mm
- Factory-mounted delivery
- Scope of delivery: AR2 suspension brackets, connection brackets, FK90 support brackets for W ≥ 740, mounting brackets and fixing screws


Dimensions ▸ page 74
Installation ▸ page 62 ff.


**AR1**
Mounting frame made of calcium silicate for screwing onto rigid walls and ceilings.
Particularly well-suited for restoring missing fire dampers.

- Short length L = 346 mm
- Factory-mounted delivery
- Scope of delivery: flat M10 fixing nuts for fixing the threaded rods
- To be provided by the user: screws, threaded rods, washers, nuts and dowels


Dimensions ▸ page 74
Installation ▸ page 25 ff.

## 3 Product description

| Maintenance-free FK90 fire damper according to EN 15650 | |
|---|---|
| Fire classifications | EI 30/60/90/120 ($v_e$ - $h_o$, i ⇔ o) S $C_{10000}$ |
| Fire resistance period | 30, 60, 90 or 120 minutes |
| Declaration of performance DoP no. | CPR/FK90/003 |
| Environmental Product Declaration according to ISO 14025, EN 15804 | EPD-WIL-20240381-ICC1-DE |
| Hygiene certification in accordance with | VDI 6022-1, VDI 3803-1, DIN 1946-4 |
| EU Declaration of Conformity according to Directive 2014/34/EU for use in potentially explosive atmospheres | |

Supplementary national certificates and general type approval in Germany:

- Reaction to fire:
  Certificate MPA-BS 6000/593/18
  FK90 fire dampers are essentially made from non-combustible building materials
- Air transfer applications:
  General type approval: Z-6.50-2132

All-round single-piece, pressurised casing made of galvanized sheet steel. Casing tightness class ATC 3 per DIN EN 1751. Formed connection flanges, outer beading and tapered inner beading ensure stability, freedom of damper blade movement, minimum pressure drop and low noise level.

Replaceable damper blade made from high-temperature-resistant, abrasion-proof and corrosion-resistant calcium silicate with galvanized metal frame and folded, wear-resistant elastomer lip seals.

Fully enclosed, maintenance-free slider crank transmission in the area of the casing wall, as a self-locking drive mechanism for break-proof torque transmission. Sealed drive axles made of stainless steel, with gunmetal bearings. Thermal release mechanisms for 70 °C or 95 °C nominal temperature. The operation units can be actuated manually or electrically (▸ page 9 ff.).

Release mechanisms, operation units and electric actuators are enclosed and equipped with a spring return. They can also be connected in a form-locking or force-fitting manner, are easy to replace and can be easily retrofitted as required. Thanks to the enclosure and suitable materials, the fire dampers are maintenance-free, i.e. there is no requirement for cleaning or regular lubrication or adjustment to maintain function.

For installation with horizontal or vertical damper blade axles. Air inflow from any connection side. Connection to ventilation ducts made of non-combustible or combustible materials, including protective grilles.

FK90 fire dampers permanently perform their function under highly corrosive conditions. This was tested according to EN 15650, annex B with 20% saline solution.

Option: **Special version, damper blade**

- with metal cover made from galvanized steel
- with metal frame made from 1.4301 stainless steel
- with metal frame and metal cover made from galvanized steel
- with metal frame and metal cover made from 1.4301 stainless steel

Option: **Casing with powder coating**

Casing for the FK90 fire dampers, with inner and outer epoxy resin coating. The following can be used for this purpose:

- damper blades with metal frame made from galvanized steel; or
- damper blades with metal frame and metal casing made from galvanized steel (for environments with chlorinated air, such as swimming pools); or
- damper blades with metal frame made from 1.4301 stainless steel; or
- damper blade with metal frame and metal cover made from 1.4301 stainless steel; and
- thermal-mechanical release mechanisms with coated release element 70 °C

As a result, additional corrosion protection for higher exposures can be achieved.
The ER2 installation subframes and the connection frames from the ER3 installation subframes are included in the powder coating of the casing.

**Additional casing openings**

Optionally with additional openings on the side of the operation unit in the casing:

- 132 mm Ø with cover (mounting position: top / bottom / top + bottom)
- Additional opening for installing the OR32 smoke detector (not possible in combination with ER4 installation subframe)

### Hygiene

FK90 fire dampers

- meet the hygiene requirements according to VDI 6022-1, VDI 3803-1, DIN 1946-4
- do not promote the growth of microorganisms[1] (fungi, bacteria). This reduces the risk of infection for people and also the necessary cleaning and disinfection work
- are resistant to disinfectant[2]
- are suitable for use in hospitals and comparable facilities

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[1] The corresponding resistance of the materials to fungi and bacteria was verified by testing the microbial metabolic potential according to DIN EN ISO 846 for all materials in the FK90 fire dampers.

[2] The resistance to disinfectants of the materials in the FK90 fire dampers was tested with the disinfectant groups of active ingredients alcohol and quaternary compounds. These disinfectants are on the list by the Robert Koch Institute, and were used in accordance with the specifications in the list of disinfectants by the Disinfectants Commission in the German Association for Applied Hygiene (VAH). Verification was provided that FK90 fire dampers are resistant to typical use of disinfectant and disinfectant processes.

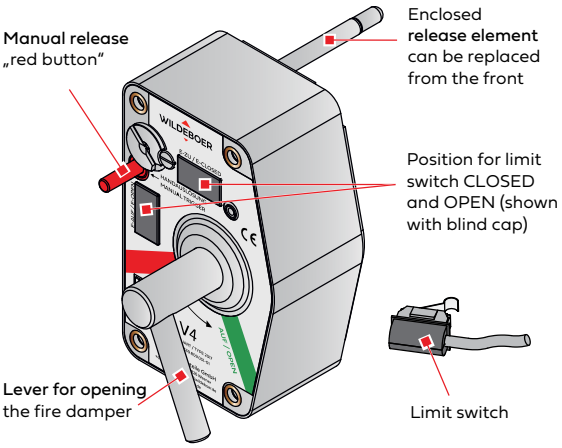
### Release mechanisms and actuators

FK90 fire dampers of the FK92 series are fitted with maintenance-free thermal-mechanical release mechanisms or with thermal-electrical release mechanisms on the spring return actuators. **Release** occurs at **70 °C** or **95 °C** nominal temperature. Coated release elements provide increased corrosion protection.

Electric spring return actuators close the fire dampers even when the voltage supply is interrupted. With the prerequisite that the release element is intact, the spring return actuator opens the fire damper as soon as the voltage supply is restored.

Release mechanisms and actuators can be replaced on site.

i In Germany, release mechanisms for a nominal temperature 95 °C are admissible for warm air heating systems, and also for building areas with sprinkler systems in some cases.




### Thermal-mechanical release mechanism (TMA)

Optionally, in place of the blind caps, one or two limit switches for indicating the position OPEN and/or CLOSED can be inserted in the thermal-mechanical release mechanism. The limit switches have a protection rating of IP67, have a changeover with gold-plated contacts for 5 A at 250 V AC or 24 V DC, and have a 1 m-long silicone-free connection cable 3 x 0.34 mm².

Thermal-mechanical release mechanisms can be equipped with an optional additional remote release. Depending on the application, one of two different operating modes can be selected:

- Closed circuit principle: The fire damper must be opened manually. A magnetic clamp holds the lever of the release mechanism in the opened position. The fire damper closes as soon as the electric voltage supply of the magnet is interrupted, ▸ page 5.
- Open circuit principle: The fire damper must be opened manually. It closes as soon as a lifting solenoid is actuated by an electrical impulse or a lift cylinder is actuated by a pneumatic impulse, respectively, in order to move the lever of the release mechanism into the closed position, ▸ page 5.

Thermal-mechanical release devices are labelled V1, V2, V4 and mounted in line with width B and height H of the FK90 fire damper. The size-dependent allocations must not be changed on site.

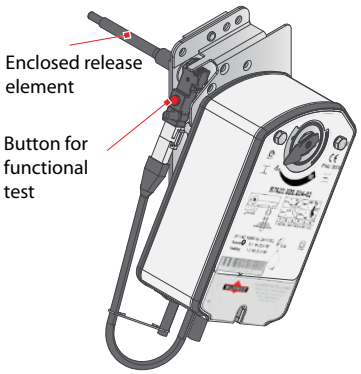
| Height H [mm] | Width B [mm] | | |
|---|---|---|---|
| | ≤ 400 | > 400 … ≤ 750 | > 750 |
| ≤ 300 | V2 | V4 | V1 |
| > 300 … ≤ 1000 | V4 | | |

**Electric spring return actuator**

When the nominal temperature is reached on the release element, the electric spring return actuator closes the fire damper. A functional check can be performed by pressing a button on the casing of the actuator. Moreover, electric spring return actuators can also be integrated into a building management system. That way, the fire damper can also be controlled remotely to carry out a functional check, for example, and can open and close automatically. The spring in the actuator casing guarantees that the flap is moved into the "closed" safety position in case of power failure.

The design of the actuator depends on the size of the FK90 fire damper.

Further information on electric spring return actuators ▸ page 5.




## 3.1 Information on use

i For use of the FK90 fire damper, the national statutory regulations must be observed.

**Information on the flow direction**

FK90 fire dampers are quick-closing, except for the electric actuator designs. Due to the fluid dynamics, release at high inflow velocities may bring about pressure surges with multiplication of the operating pressures, which in turn may cause considerable damage to ventilation and air conditioning systems. When shut-off dampers are closed, the flow rates are distributed around other parallel dampers that remain open. This may lead to excessive stress, in particular at high operating pressures, large flow rates and larger cross-sections. Electric actuators should be used under such conditions. They close fire dampers relatively slowly, and optionally allow for the fans to be shut off using the OPEN limit switch.

Moreover, the following points must be observed:

- The application limits marked in the nomograms must be observed ▸ page 77 ff.
- For large fire dampers that are subjected to an unfavourable flow, the use of actuators with large torques can be necessary in order to open the fire dampers when the fan is running and there are very large volume flows. These actuators are available on request. Alternatively, it is also possible to switch on the fans once the fire dampers are fully open.
- It must be ensured that the inflows and outflows at the fire dampers are as even as possible.

**Further possible applications**

Volumetric flow control

FK90 fire dampers with electric actuator can be used to regulate the flow rate in sections. To do so, the damper blade is either moved into the OPEN or into the CLOSED position.

Sealing air transfer applications

When combined with an OR4 or OR32 smoke detector, FK90 fire dampers can be used to seal air transfer applications in the event of a fire.

For more details on air transfer applications (Ü-FK/Ü-FR) and smoke detectors, see:
- 5.14 OR4 smoke detector user manual
- 5.11 OR32 smoke detector user manual

**Areas with explosion protection**

| Building area in which a dangerous, potentially explosive atmosphere ... | | ... as a mixture of air and combustible gases, mists or vapours... | | ... in the form of a cloud of combustible dust contained in the air ... | |
|---|---|---|---|---|---|
| | | ... can occasionally arise. | ... does not occur or only briefly occurs. | ... can occasionally arise. | ... does not occur or only briefly occurs. |
| Zone | | 1 | 2 | 21 | 22 |
| Identification of the fire damper | | II 2 G Ex h IIC T6 / T5 | II 3 G Ex h IIC T6 / T5 | II -/2 D Ex h IIIC T80 °C / T95 °C | II -/3 D Ex h IIIC T80 °C / T95 °C |
| Thermal-mechanical release mechanism without or with explosion protection limit switch | | X | X[1)] | X | X[1)] |
| Motor drive | EM-1 or EM-2 | X | X[1)] | X | X[1)] |
| | RM-1 | - | X | - | X |

Ambient temperatures: -20 ... +40 °C for T6 and T80 °C / -20 ... +50 °C for T5 and T95 °C

[1)] Can also be used in this zone

Explosive atmospheres are classified in the respective zones depending on the frequency and duration of occurrence of the dangerous explosive atmosphere. The operating company is responsible for determining the Ex zone.

## 3.2 Accessories

**Wildeboer-Net communication system**

Communication system for control and monitoring of interconnected fire dampers and smoke protection dampers, and electronic flow rate and pressure controller in ventilation and air conditioning systems.

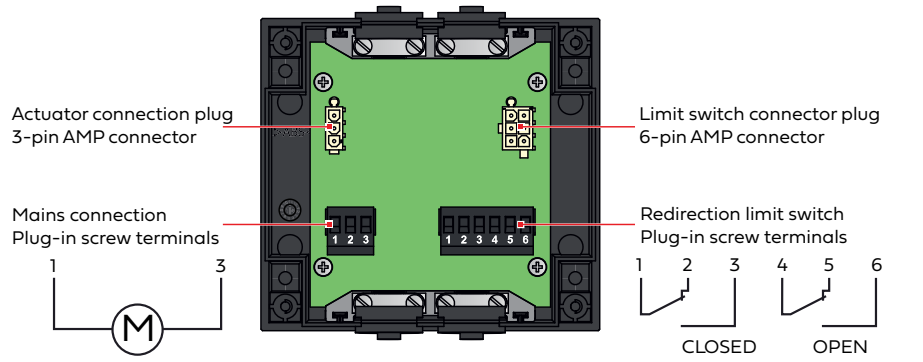
Further information at www.wildeboer.de.

**AB-01 | AB-02 connection box**

Connection box for simplified connection of fire dampers with electric spring return actuator (factory-mounted or as loose accessories).

The electrical connections are made in the connection box using plug-in screw terminals. Motor connection lines are fitted with AMP connectors as standard and cannot be accidentally reversed.

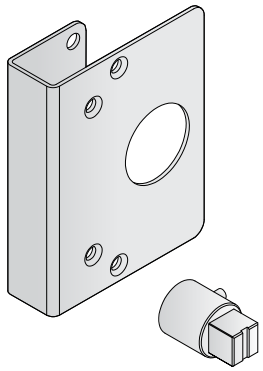
Plastic casing (W x H x D) 140 x 110 x 67 mm, protection class II, protection rating IP40.




The illustration shows the de-energised operating position where the fire dampers are closed.

- **AB-01** for spring return actuators: M24-9/H, M24-10/H, M24-11/H
- **AB-02** for spring return actuators: M220-9/H, M220-10/H, M220-11/H

**Additional bracket for actuators**

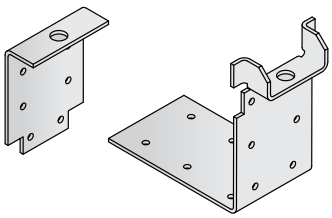


Additional bracket for actuators for positioning actuators M220-10/H, M24-10/H, M22-11/H and M24-11/H horizontally above the flange.

To make it easier to install the fire damper near the ceiling, if the damper height H is ≤ 250 mm, if the fire damper is installed in a horizontal position and the actuator is on the left, the use of the additional bracket is recommended. In combination with ER4 installation subframes for sliding ceiling connections, the additional bracket must be used for the previously mentioned installation positions.

Packaging unit with additional bracket, shaft extension and screws.

**AW suspension bracket**

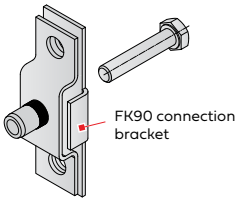


Suspension bracket for suspension on butt joints.

Pack:

- 4 pcs. for corner joints
- 2 pcs. for mounting directly under ceilings
- including screws

### Connecting brackets

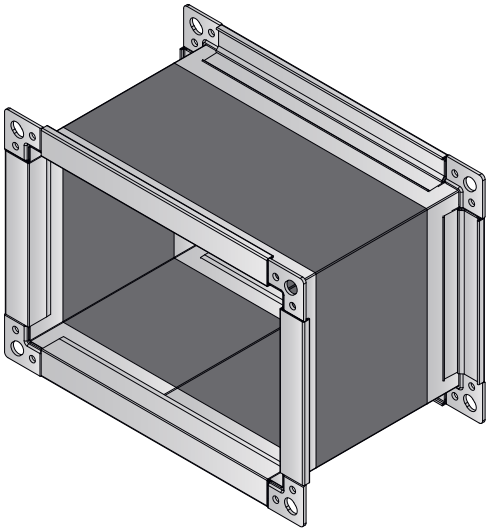



Connecting brackets for assembling two FK90 fire dampers.

Pack:

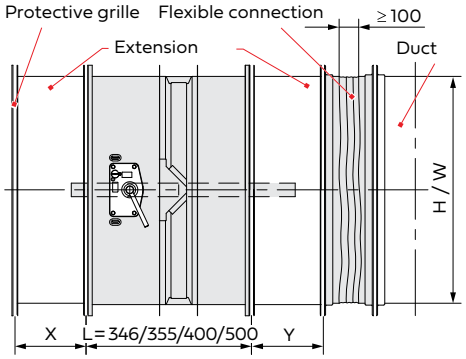
- 4 pcs.
- including screws

### Flexible connectors

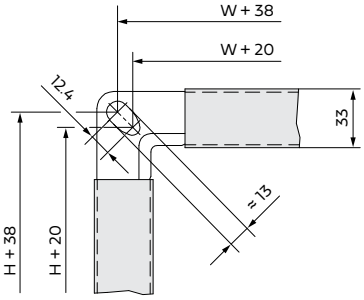


Flexible connectors made of PVC-coated polyester fabric, cadmium-free, at least 100 mm expansion absorption, 210 mm stretched length, with galvanized connection frame with 33-mm-high V10 profile. With hygiene certificate. Building material class B1 according to DIN 4102. Temperature-resistant: -20 ... +70 °C.

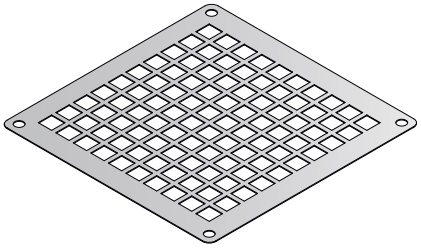
Available dimensions: W ≤ 1500 x H ≤ 800 mm
(*Width* W x *height* H *are available in 5-mm increments)*

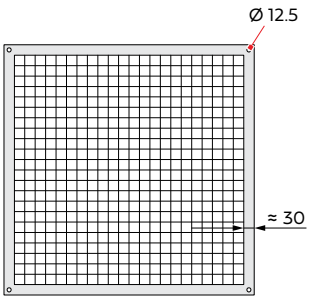



*Frame profile connection*




### Protective grille

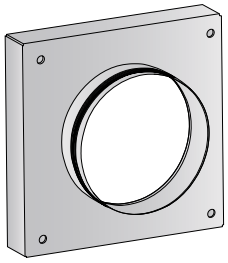


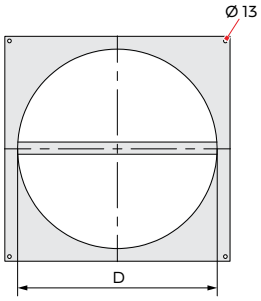



Protective grille, pressed from 1-mm-thick galvanized sheet steel, 20 mm mesh size, ≈ 70 % free cross-section.

Available dimensions:
W ≤ 1500 mm x H ≤ 800 mm
(*Width* B x *height* H *are available in 5-mm increments)*

### Pipe connectors





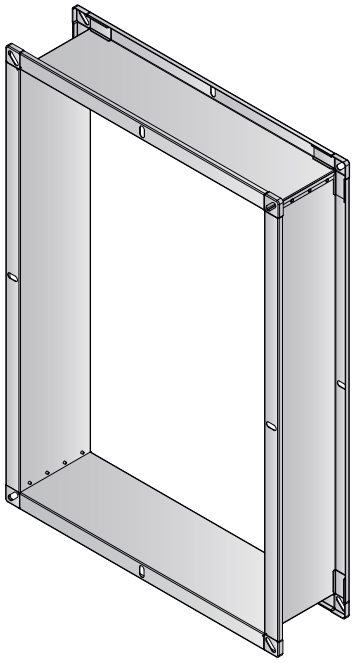

Pipe connectors made of galvanized steel.

Available dimensions:

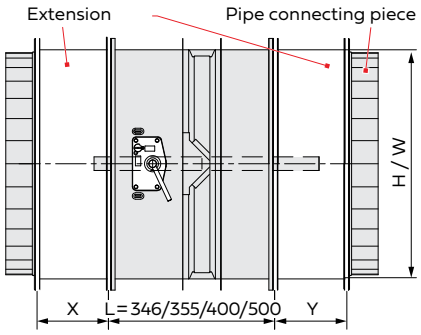
| Connector diameter D [mm] | Width W x height H [mm] | |
|---|---|---|
| 158 | 200 x 200 | - |
| 198 | 200 x 200 | 225 x 225 |
| 248 | 250 x 250 | 275 x 275 |
| 298 | 300 x 300 | 325 x 325 |
| 313 | 325 x 325 | 350 x 350 |
| 353 | 375 x 375 | - |

All dimensions in mm

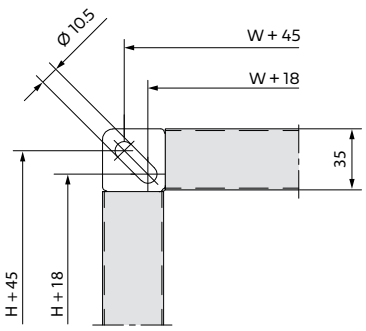
## Extensions



Galvanized steel extensions for bridging large thicknesses in walls and ceilings, as well as for allowing damper blades to move freely in cover grilles, pipe connectors and flexible connectors.
Length 175 mm. Also available with epoxy resin coating.
Available dimensions: W ≤ 1500 x H ≤ 800 mm
(*Width* **B** *x height* **H** *are available in 5-mm increments)*




*Frame profile connection*




Minimum construction lengths [mm] for extensions when fitting:

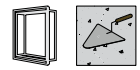
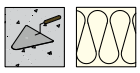
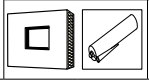
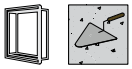
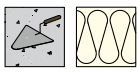
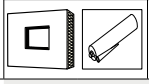
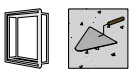
| Height H | Protective grilles | | | | | Pipe connectors | | | | | Flexible connectors | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $X^{1)}$ | $Y_{400}{}^{1)}$ | $Y_{500}{}^{1)}$ | $Y_{355}{}^{1)}$ | $Y_{346}{}^{1)2)}$ | $X^{1)}$ | $Y_{400}{}^{1)}$ | $Y_{500}{}^{1)}$ | $Y_{355}{}^{1)}$ | $Y_{346}{}^{1)2)}$ | $X^{1)}$ | $Y_{400}{}^{1)}$ | $Y_{500}{}^{1)}$ | $Y_{355}{}^{1)}$ | $Y_{346}{}^{1)2)}$ |
| 200 | - | 17 | - | 66 | 75 | - | - | - | 31 | 40 | - | - | - | 36 | 45 |
| 225 | - | 29 | - | 78 | 87 | - | - | - | 43 | 52 | - | - | - | 48 | 57 |
| 250 | - | 42 | - | 91 | 100 | - | 7 | - | 56 | 65 | - | 12 | - | 61 | 70 |
| 275 | - | 54 | - | 103 | 112 | - | 19 | - | 68 | 77 | - | 24 | - | 73 | 82 |
| 300 | - | 67 | - | 116 | 125 | - | 32 | - | 81 | 90 | - | 37 | - | 86 | 95 |
| 325 | - | 79 | - | 128 | 137 | - | 44 | - | 93 | 102 | - | 49 | - | 98 | 107 |
| 350 | - | 92 | - | 141 | 150 | - | 57 | - | 106 | 115 | - | 62 | - | 111 | 120 |
| 375 | - | 104 | 4 | 153 | 162 | - | 69 | - | 118 | 127 | - | 74 | - | 123 | 132 |
| 400 | - | 117 | 17 | 166 | 175 | - | 82 | - | 131 | 140 | - | 87 | - | 136 | 145 |
| 450 | - | 142 | 42 | 191 | 200 | - | 107 | 7 | 156 | 165 | - | 112 | 12 | 161 | 170 |
| 500 | 7 | 167 | 67 | 216 | 225 | - | 132 | 32 | 181 | 190 | - | 137 | 37 | 186 | 195 |
| 550 | 32 | 192 | 92 | 241 | 250 | - | 157 | 57 | 206 | 215 | 2 | 162 | 62 | 211 | 220 |
| 600 | 57 | 217 | 117 | 266 | 275 | 22 | 182 | 82 | 231 | 240 | 27 | 187 | 87 | 236 | 245 |
| 650 | 82 | 242 | 142 | 291 | 300 | 47 | 207 | 107 | 256 | 265 | 52 | 212 | 112 | 261 | 270 |
| 700 | 107 | 267 | 167 | 316 | 325 | 72 | 232 | 132 | 281 | 290 | 77 | 237 | 137 | 286 | 295 |
| 750 | 132 | 292 | 192 | 341 | 350 | 97 | 257 | 157 | 306 | 315 | 102 | 262 | 162 | 311 | 320 |
| 800 | 157 | 317 | 217 | 366 | 375 | 122 | 282 | 182 | 331 | 340 | 127 | 287 | 187 | 336 | 345 |
| 850 | 182 | 342 | 242 | 391 | 400 | 147 | 307 | 207 | 356 | 365 | 152 | 312 | 212 | 361 | 370 |
| 900 | 207 | 367 | 267 | 416 | 425 | 172 | 332 | 232 | 381 | 390 | 177 | 337 | 237 | 386 | 395 |
| 950 | 232 | 392 | 292 | 441 | 450 | 197 | 357 | 257 | 406 | 415 | 202 | 362 | 262 | 411 | 420 |
| 1000 | 257 | 417 | 317 | 466 | 475 | 222 | 382 | 282 | 431 | 440 | 227 | 387 | 287 | 436 | 445 |

[1] The dimensions X, $Y_{400}$, $Y_{500}$, $Y_{355}$, $Y_{346}$ include 50 mm for freedom of damper blade movement. ▶ page 18
[2] The actual necessary $Y_{346}$ dimension may be smaller depending on the specific thickness of the wall or ceiling.

All dimensions in mm

## 4 Installation overview

**Rigid walls and ceilings**

| Type of installation | Wall/ceiling type | Installation material | Minimum thickness [mm] | Fire resistance period | Details |
|---|---|---|---|---|---|
| In | Rigid wall |  | 70 / 95 / 100 | 60 / 90 / 120 | Page 19 |
| | |  | 70 / 95 | 60 / 90 | Page 22 |
| | |  | 70 / 95 | 60 / 90 | Page 21 |
| | |  | 100 | 120 | Page 23 |
| In | Rigid wall made of gypsum blocks |  | 80 | 120 | Page 19 |
| In | Non-load-bearing rigid wall underneath settlement joint |  | 70 / 95 | 60 / 90 | Page 21 |
| Directly on | Rigid wall |  | 100 | 90 | Page 25 |
| Remote from | Rigid wall |  | 100 | 90 | Page 64 |
| Remote from | Rigid wall underneath rigid ceiling |  | 100 | 90 | Page 68 |
| Removed from and hanging horizontally under | Rigid ceiling |  | 100 | 90 | Page 67 |
| In | Rigid ceiling |  | 100 / 115 | 90 / 120 | Page 19 |
| | |  | 100 | 90 | Page 22 |
| | |  | 100 | 90 | Page 21 |
| | |  | 100 | 90 | Page 23 |
| Directly on | Rigid ceiling |  | 100 | 90 | Page 25 |
| On | Rigid ceiling with concrete base |  | 100 | 90 | Page 27 |
| | |  | 100 | 90 | Page 27 |
| Remote from | Rigid ceiling |  | 100 | 90 | Page 66 |

**Metal stud walls**
**including fire and safety partition walls and shaft walls with and without metal studs**

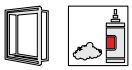
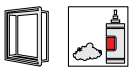
| Type of installation | Wall/ceiling type | Installation material | Minimum thickness [mm] | Fire resistance period | Details |
|---|---|---|---|---|---|
| In | Metal stud wall with 1-layer cladding on both sides |  | 70 | 60 | Page 35 |
| | Metal stud wall with 1-layer cladding on both sides Installation with fillings |  | 70 | 60 | Page 33 |
| | Metal stud wall with 2-layer cladding on both sides |  | 94 | 120 | Page 30 |
| | |  | 94 | 90 | Page 35 |
| | |  | 100 | 120 | Page 39 |
| | Metal stud wall with 2-layer cladding on both sides Installation with fillings |  | 100 | 90 | Page 33 |
| In | Metal stud wall underneath sliding ceiling connection |  | 95 | 90 | Page 41 |
| In | Shaft wall with 2-layer cladding on one side and with metal studs |  | 90 | 90 | Page 44 |
| | Shaft wall with 2-layer cladding on one side and without metal studs |  | 40 | 90 | Page 44 |
| Remote from | Metal stud wall |  | 95 | 90 | Page 70 |
| Remote from | Metal stud wall underneath rigid ceiling |  | 95 | 90 | Page 72 |

▸ Overview continued on the following page.

# Installation overview

FK90 fire damper

### Wooden walls and wooden ceilings

| Type of installation | Wall/ceiling type | Installation material | Minimum thickness [mm] | Fire resistance period | Details |
|---|---|---|---|---|---|
| In | Rigid wooden wall |  | 90 / 95 | 60 / 90 | Page 48 |
| | |  | 90 / 110 | 60 / 90 | Page 49 |
| | |  | 90 / 110 | 60 / 90 | Page 51 |
| | Rigid wooden wall with 1-layer cladding on both sides |  | 124 | 90 | Page 50 |
| In | Rigid wooden ceiling |  | 100 / 130 | 60 / 90 | Page 48 |
| | |  | 100 / 130 | 60 / 90 | Page 49 |
| | |  | 100 / 130 | 60 / 90 | Page 51 |
| In | Wall with timber frame construction |  | 85 / 110 | 60 / 90 | Page 52 |
| | |  | 85 / 110 | 60 / 90 | Page 53 |
| In | Ceiling with wooden beam construction |  | 100 | 90 | Page 53 |
| In | Historical wooden beam ceiling |  | 100 | 60 | Page 60 |
| In | Wall with timber frame construction with clay panel cladding |  | 104 / 124 | 60 / 90 | Page 55 |
| | |  | 104 / 124 | 60 / 90 | Page 56 |
| | |  | 104 / 124 | 60 / 90 | Page 57 |

### Ceilings with steel frames

| Type of installation | Wall/ceiling type | Installation material | Minimum thickness [mm] | Fire resistance period | Details |
|---|---|---|---|---|---|
| In | Ceiling construction with steel frame on both sides |  | 222 | 90 | Page 58 |

### Nomenclature

| Installation material | | | | | |
|---|---|---|---|---|---|
|  | Mortar |  | Clay plaster mortar |  | Fire batt system |
|  | Installation subframe/mounting frame/ connecting frame |  | Wall building materials |  | Mineral wool |
|  | Fireproof foam | | | | |

## 5 Installation

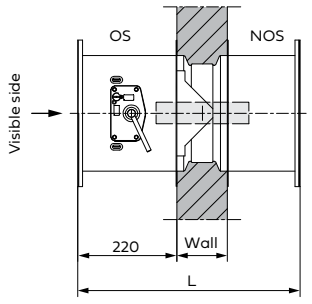
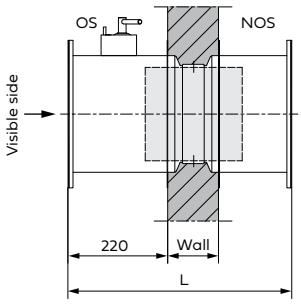
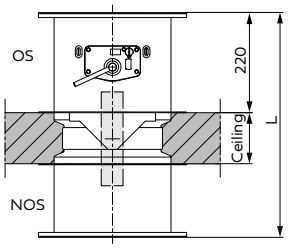
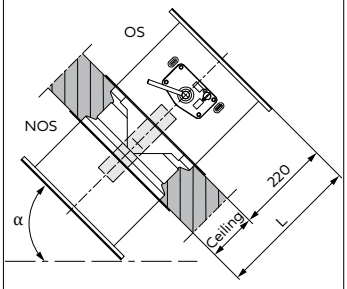
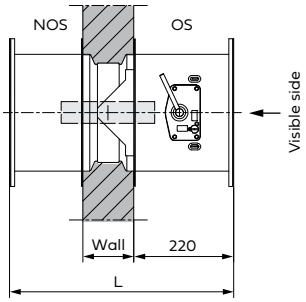
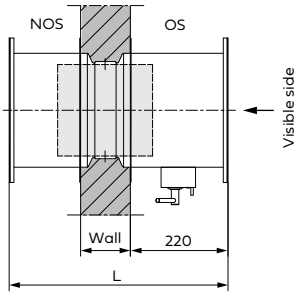
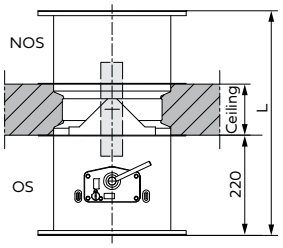
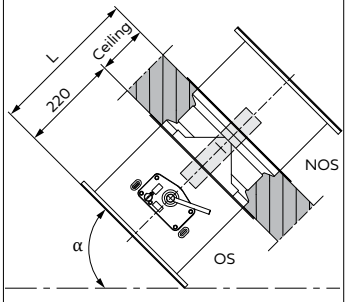
FK90 fire dampers achieve a fire resistance period of up to 120 minutes if they are installed in accordance with the following specifications. Installation types in, on and remote from rigid walls and ceilings or metal stud walls and shaft walls with and without metal studs, in walls and ceilings made of wood, in walls with clay construction boards, in ceilings with steel frames and in ceilings with a minimum thickness and fire resistance period are possible.
If the fire resistance period of the walls or ceilings is under 120, 90, 60 or 30 minutes, the fire resistance period of the FK90 fire damper is reduced accordingly.

- FK90 fire dampers must be installed based on the instructions in this user manual.
  Structural requirements in terms of the walls, ceilings, ventilation ducts etc. must be met on site.
  The general technical regulations and national statutory regulations must be observed during installation.
  In Germany, this relates specifically to the "Guideline on fire protection requirements pertaining to ventilation systems" (*Lüftungsanlagenrichtlinie* - LüAR).
- FK90 fire dampers can be connected to ventilation ducts made from combustible and non-combustible materials, as well as to flexible connectors.
  Thermal expansions must not exert significant forces in the event of fire. Compensatory measures must be provided as required, for example, using suitable routing of ducts or by installing flexible connectors made of combustible material.

- FK90 fire dampers
  - do not need spacing to separate from combustible materials.
  - are suitable for all installation positions.
  - may be installed “flange-to-flange”, even in metal stud walls.
  - must be installed with smoke detectors in air transfer applications (Ü-FK).

### 5.1 Installation positions

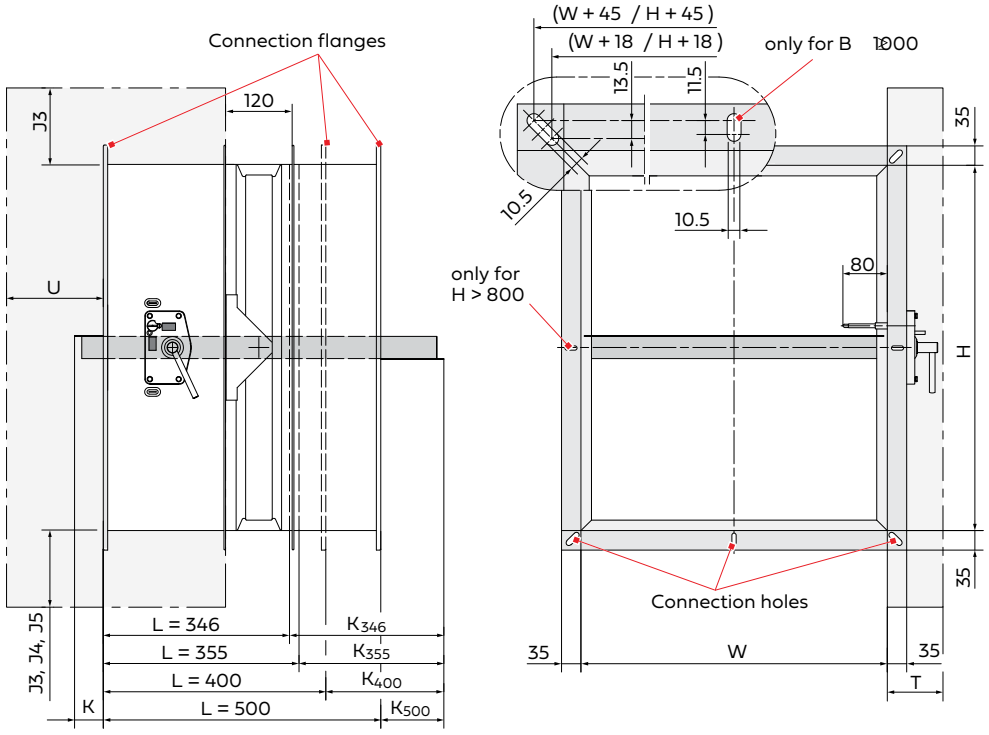
The operation unit positions (right, left, up and down) all relate to the visible side of the fire damper.
Release mechanisms and actuators are always located on the side of the fire damper casing specified as height H.

| Horizontal installation position | | Vertical installation position | Inclined installation position |
|---|---|---|---|
| Horizontal axle position | Vertical axle position | Horizontal axle position | Inclined axle position |
|  |  |  |  |
| *Actuator right* | *Actuator above* | *Actuator above the ceiling* | *Actuator above the ceiling* |
|  |  |  |  |
| *Actuator left* | *Actuator below* | *Actuator beneath the ceiling* | *Actuator beneath the ceiling* |

AS = operation side. NAS = non-operation side. All dimensions in mm

## 5.2 Maximum excess lengths

Additional space must be provided for assembly, electrical connections and servicing; pay attention to the cable entry points. In addition to the **"T" measurement**, it is recommended that a spacing of 400 mm be kept from adjacent walls, ceilings or other fire dampers, in order to ensure that the release mechanisms and actuators can be accessed for operational purposes. Connection flanges are fitted with connection holes. If additional holes are required for duct connection, these can be added on site.




**Height-dependent excess lengths: Damper blade**

| H | K | $K_{400}$ | $K_{500}$ | $K_{355}$ | $K_{346}$ |
|---|---|---|---|---|---|
| 200 | - | - | - | 16 | 25 |
| 225 | - | - | - | 28 | 37 |
| 250 | - | - | - | 41 | 50 |
| 275 | - | 4 | - | 53 | 62 |
| 300 | - | 17 | - | 66 | 75 |
| 325 | - | 29 | - | 78 | 87 |
| 350 | - | 42 | - | 91 | 100 |
| 375 | - | 54 | - | 103 | 112 |
| 400 | - | 67 | - | 116 | 125 |
| 450 | - | 92 | - | 141 | 150 |
| 500 | - | 117 | 17 | 166 | 175 |
| 550 | - | 142 | 42 | 191 | 200 |
| 600 | 7 | 167 | 67 | 216 | 225 |
| 650 | 32 | 192 | 92 | 241 | 250 |
| 700 | 57 | 217 | 117 | 266 | 275 |
| 750 | 82 | 242 | 142 | 291 | 300 |
| 800 | 107 | 267 | 167 | 316 | 325 |
| 850 | 132 | 292 | 192 | - | - |
| 900 | 157 | 317 | 217 | - | - |
| 950 | 182 | 342 | 242 | - | - |
| 1000 | 207 | 367 | 267 | - | - |

**Height-dependent excess lengths: Electric actuators**

| H | J3 | J4 | J5 |
|---|---|---|---|
| 200 | 170 | 40 | 60 |
| 225 | 160 | 30 | 50 |
| 250 | 145 | 15 | 35 |
| 275 | 135 | 5 | 25 |
| 300 | 120 | - | 10 |
| 325 | 110 | - | - |
| 350 | 95 | - | - |
| 375 | 85 | - | - |
| 400 | 70 | - | - |
| 450 | 45 | - | - |
| 500 | 20 | - | - |
| 550 | - | - | - |
| 600 | - | - | - |
| 650 | - | - | - |
| 700 | - | - | - |
| 750 | - | - | - |
| 800 | - | - | - |
| 850 | - | - | - |
| 900 | - | - | - |
| 950 | - | - | - |
| 1000 | - | - | - |

**Excess lengths: Actuators**

| Excess lengths | T | U | J |
|---|---|---|---|
| Thermal-mechanical release mechanism | 95 | - | - |
| · With W220, WU220 | 120 | - | - |
| · With G24, GU24 | 120 | - | - |
| · With P, P2 | 105 | - | - |
| · With E-Ex limit switch | 105 | - | - |
| M220-9/H, M24-9/H | 90 | - | - |
| M220-10/H, M24-10/H | | | |
| · Mounted vertically | 75 | - | J4 |
| · Mounted horizontally | 95 | 20 | - |
| M220-11/H, M24-11/H | | | |
| · Mounted vertically | 80 | - | J5 |
| · Mounted horizontally | 100 | 35 | - |
| EM-1, EM-2, RM-1 | | | |
| · Mounted horizontally | 245 | 150 | - |
| · Mounted vertically | 245 | - | J3 |

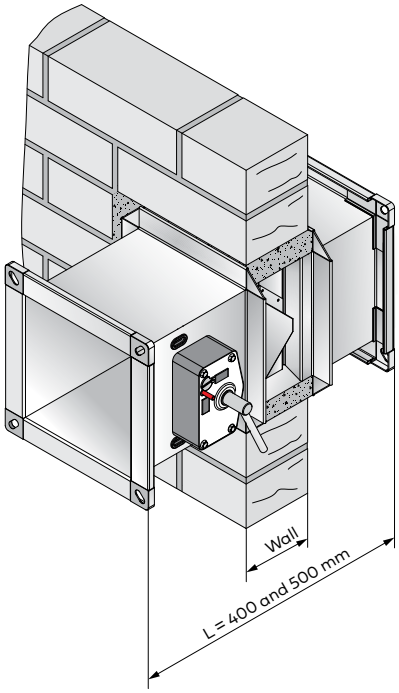
All dimensions in mm

Operation side: K
Non-operation side:
- $K_{400}$ = Length 400 mm
- $K_{500}$ = Length 500 mm
- $K_{355}$ = Length 355 mm for insertion
- $K_{346}$ = Length 346 mm with AR1 mounting frame

T = horizontal operation side
U = horizontal visible side
J = vertical
- J3 = EM-1, EM-2, RM-1
- J4 = M220-10/H, M24-10/H (delivery condition)
- J5 = M220-11/H, M24-11/H (delivery condition)

## 5.3 Rigid walls and ceilings

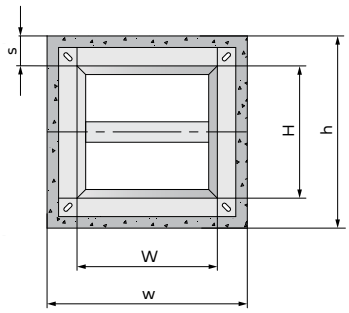
### 5.3.1 Wet installation with mortar



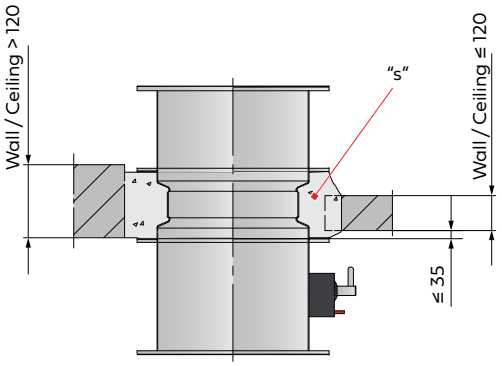

| Minimum thicknesses Wall/Ceiling **[mm]** | | | | |
|---|---|---|---|---|
| **Description of the wall/ceiling** | | **Fire resistance period** | | |
| | | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** | 30 min<br>60 min<br>90 min<br>**120 min** |
| Rigid wall made of | masonry, concrete or equivalent for FK90 fire dampers<br>H ≤ 1000 and L = 400 or 500 mm | **70** | **95** | **100** |
| | Gypsum boards<br>according to EN 12859 (formerly DIN 18163)<br>for FK90 fire dampers<br>H ≤ 800 and L = 400 or 500 mm | - | - | **80** |
| Rigid ceiling for | FK90 fire dampers H ≤ 800 mm | - | **100** | **115** |
| | FK90 fire dampers H > 800 mm | - | - | |

- Installation is possible for heights H up to 1000 mm.
- Installation in rigid walls and ceilings made of concrete, lightweight concrete, aerated concrete (porous concrete) with a gross weight of ≥ 450 kg/m³ must be carried out with mortar from groups II or III according to DIN 1053 or classes M2.5, M5, M10 or M20 according to EN 998-2; or with appropriate fire protection mortar or gypsum mortar.
- Installation in rigid walls made of gypsum boards without hollow spaces and with a gross weight of ≥ 850 kg/m³ must be carried out with filler or frame plaster in accordance with EN 13279-1.
- Walls can be designed as fire walls, shaft walls or shafts, walls and ceilings can also be designed as ducts.
- Installation can be carried out on adjacent walls or ceilings or directly next to each other.

**Installation opening**

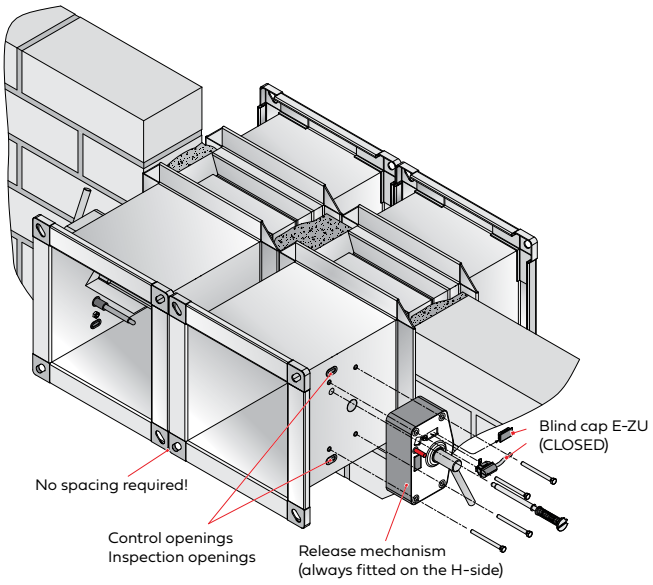



- **Installation opening:**
  w x h = (W + 75 ... 450 mm) x (H + 75 ... 450 mm)
- **Gap size** (see also drawing below):
  s = 40 ... 225 mm
- To simplify mortaring, we recommend making the opening 50 mm larger than the minimum dimension.
- Installation when creating the wall or ceiling does not require any specific installation opening.



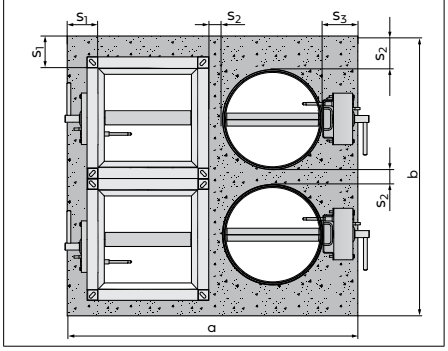

All dimensions in mm

### 5.3.1.1 Multiple installation with mortar



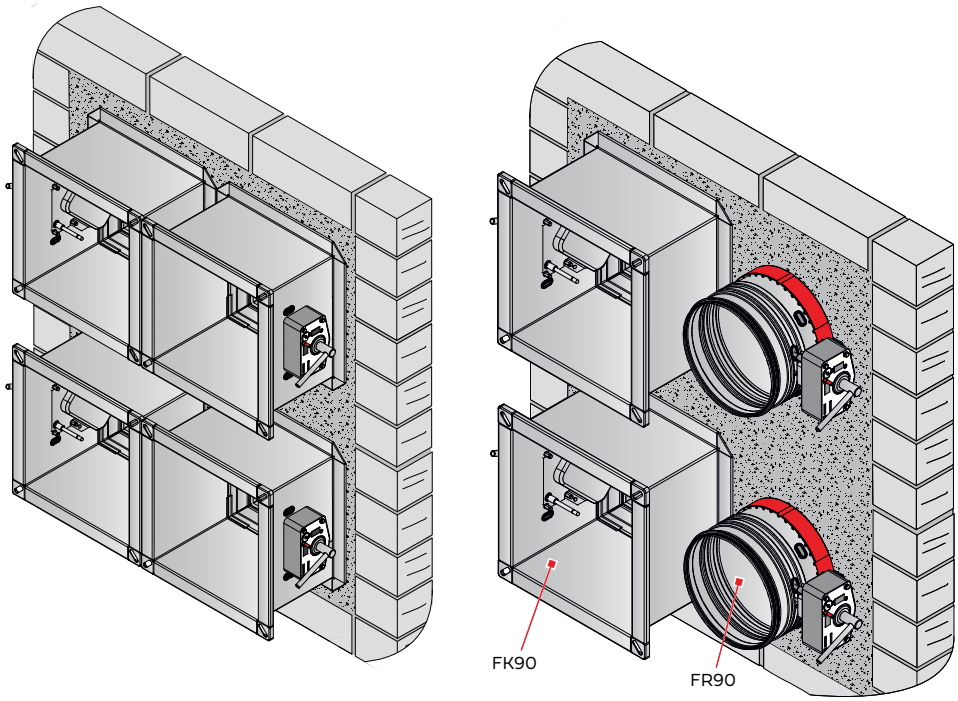

- Installation is possible for heights H up to 800 mm.
- Multiple installation of up to 4 pcs. FK90 fire dampers of the same size side-by-side, above each other or combined with FR90 fire dampers is possible.
- Illustration on the left: Installation flange-to-flange in masonry wall.
- Filling gaps ≥ 70 mm wide between the FK90 fire dampers can be done manually or mechanically. Mineral wool can also be used as an alternative (▸ page 21).

**Installation opening**

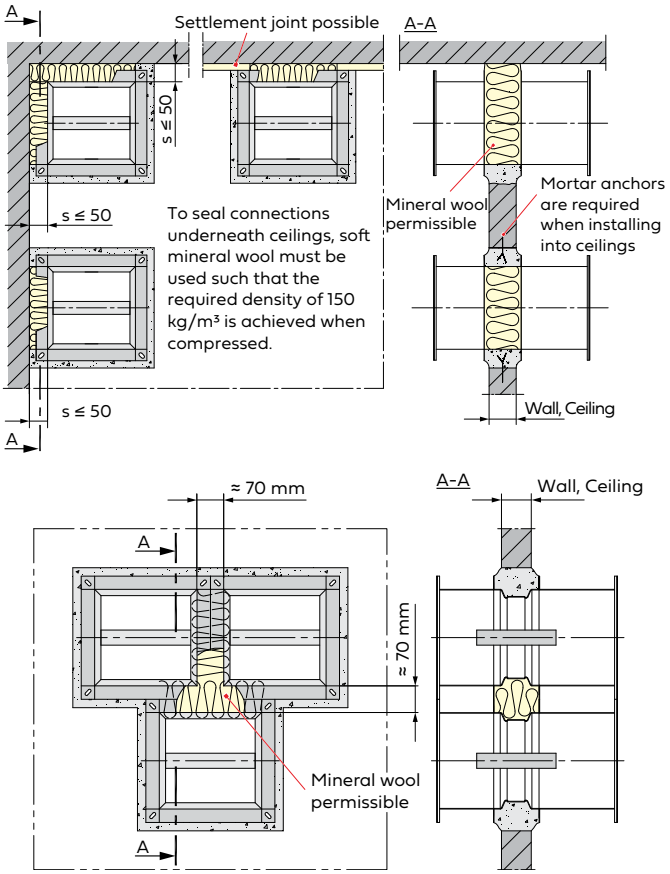



- **Installation opening**:
  a x b = max. 4.2 m²
- **Gap sizes**
  All-round gap in relation to all installed fire dampers = max. 225 mm
  - $s_1$ ≥ 37.5 mm
  - $s_2$ ≥ 15 mm
  - $s_3$ ≥ 50 mm

***Installation example***



### 5.3.1.2 Installation in rigid walls and ceilings in corners which are difficult to access, and directly on walls and ceilings

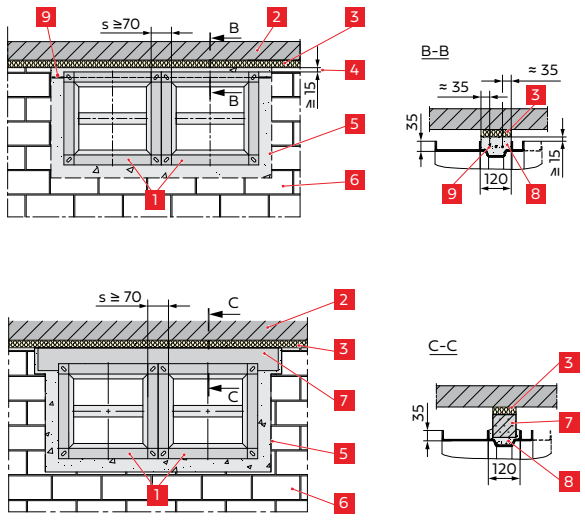



| Minimum thicknesses Wall/Ceiling [mm] | | |
|---|---|---|
| **Description of the wall and ceiling** | **Fire resistance period** | |
| | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** |
| Rigid wall | **70** | **95** |
| Rigid ceiling | - | **100** |

i Types of rigid walls and ceilings ▸ page 19.

- Installation is possible for heights H up to 800 mm.
- In corners that are difficult to access and directly on walls and ceilings, installing FK90 fire dampers in rigid walls and ceilings is also possible as a partial mortar lining with **minimum thicknesses for walls and ceilings** [mm] in accordance with the table.
- The gap "s" must be filled with 120 mm wide strips of mineral wool "Conlit® Steelprotect Board", "Knauf Insulation TPD" or equivalent and fixed with non-flammable adhesive.
- Mortaring in ceilings must be secured against falling out by roughening the reveals or using mortar anchors.
- For "flange-to-flange" casings between 400 mm and 500 mm long, fillings with mineral wool are possible as above.

### 5.3.1.3 Installation in rigid walls with settlement joints underneath rigid ceilings ("Sliding ceiling connection")




| Minimum thicknesses Wall [mm] | | |
|---|---|---|
| **Description of the wall** | **Fire resistance period** | |
| | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** |
| Rigid wall | **70** | **95** |

i Types of rigid walls ▸ page 19.

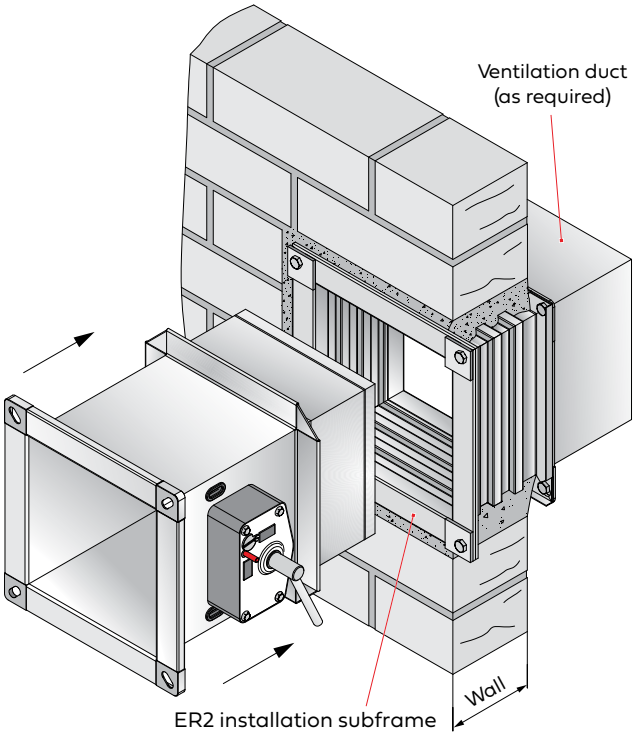
- Installation is possible for heights H up to 800 mm.
- Settlement joints above non-load-bearing rigid walls and under ceilings are filled on site, with, for example, mineral wool. The illustration shows the installation of FK90 fire dampers immediately under such settlement joints.
- A reinforcement should be inserted into the mortar bed or a statically dimensioned lintel to prevent cracks from forming later. Lintels should be ≥ 50 mm in height.
  A reinforcement consisting of at least 3 pcs. concrete reinforcement bars B500B with a diameter of 8 mm must be inserted into the 120 mm deep mortar bed.

**Nomenclature**

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper | 6 | Non-load-bearing rigid wall |
| 2 | Rigid ceiling | 7 | Lintel ≥ 50 mm height |
| 3 | Settlement joint | 8 | Mortar |
| 4 | Overlap | 9 | Reinforcement |
| 5 | Installation opening | | |

All dimensions in mm

## 5.3.2 Wet installation in short length with ER2 installation subframe

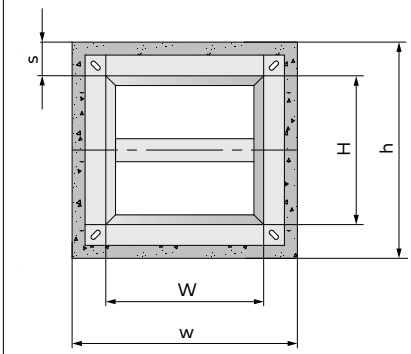



| Minimum thicknesses Wall/**Ceiling [mm]** | | |
|---|---|---|
| **Description of the wall and ceiling** | **Fire resistance period** | |
| | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** |
| Rigid wall | **70** | **95** |
| Rigid ceiling | - | **100** |

i Types of rigid walls and ceilings ▸ page 19.

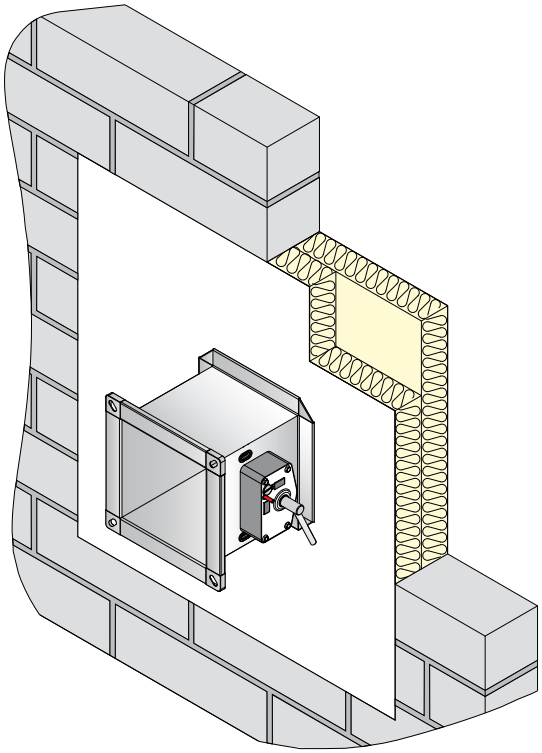
- FK90 fire damper in short length L = 355 mm with ER2 installation subframe.
- Installation is possible for heights H up to 800 mm.
- Particularly suitable for **retrofitting**.
- Insert the installation subframe with mortar into rigid walls or ceilings as described above.
- The fire damper should be inserted and fastened with the associated connection brackets on both sides.

**Installation opening**




- **Installation opening:**
  w x h = (W + 75 … 150 mm) x (H + 75 … 150 mm)
- Installation when creating the wall or ceiling does not require any specific installation opening.

### 5.3.3 Dry installation with fire batt system

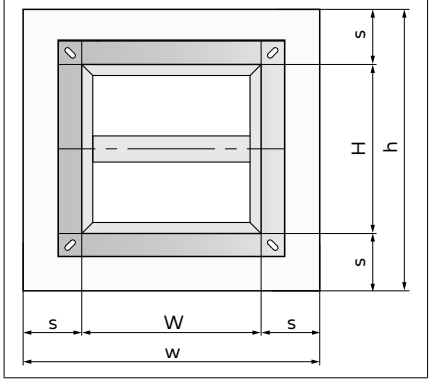


| Minimum thicknesses Wall/Ceiling [mm] | |
|---|---|
| **Description of the wall and ceiling** | **Fire resistance period**<br>30 min<br>60 min<br>90 min<br>**120 min** |
| Rigid wall / ceiling | **100** |

i Types of rigid walls and ceilings ▸ page 19.

- Installation is possible in heights H up to 800 mm and lengths L of 400 mm or 500 mm.
- The fire damper is suspended on both sides using the suspension of the connected ventilation duct. Special fire protection fastenings or suspensions for the fire damper are not required.
- The weight of the fire damper (size-dependent weight table ▸ page 76) must also be borne by the connected ventilation duct.
- When using flexible connectors or without a ventilation duct connection, suspension can also be performed directly on the fire damper, e.g. using ventilation connectors.

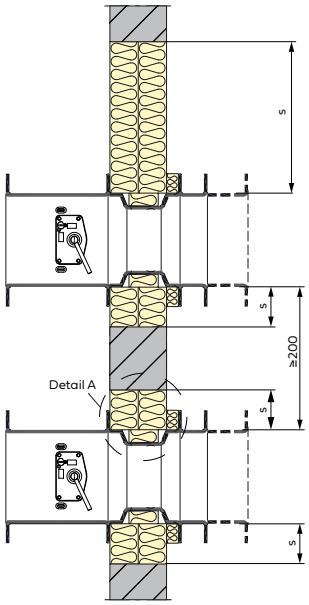
**Installation opening**




- **Installation opening**:
  w x h = (W + 100 ... 1200 mm) x (H + 100 ... 1200 mm)
- **Gap size s** see next page

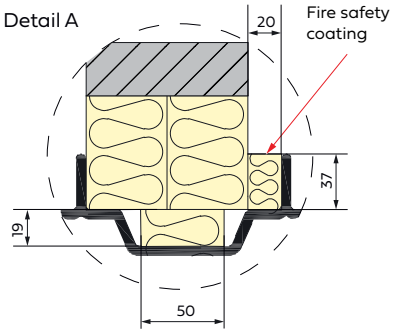
**Installation**

The board material must be cut to size to suit the installation opening and contour of the fire damper so that it rests firmly in placed after installation. Coated edges must be chamfered. The cut surfaces of the board material and the reveal in the installation opening must be brushed with the coating putty or the filler of the specific system. Insert the first layer of board material, make sure that the surface coated in the factory faces outwards. Insert the second layer of board material. In this case, too, have the coated surface face outwards, and arrange the butt joints offset from one another. Seal all butt joints, including those on supporting structures and the fire damper, completely on both sides of the wall with the coating putty or filler and brush them with the fire safety coating.

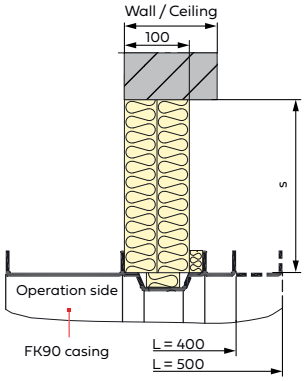



- Only one fire damper may be installed per fire batt system.
- Clearance between FK90 fire dampers ≥ 200 mm (Austria: ≥ 100 mm according to ÖNORM H 6025).

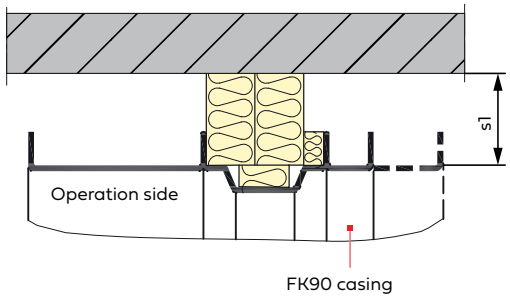
| s | s1 | s1 (Austria) |
|---|---|---|
| 50 ... 600 mm | 75 ... 600 mm | 40 ... 600 mm |




**Installation example** for walls and ceilings ≥ 100 mm
(shown: wall/ceiling = 150 mm and fire batt system = 100 mm)




Installation directly on walls or ceilings




**Overview of fire batt systems**

All dimensions in mm

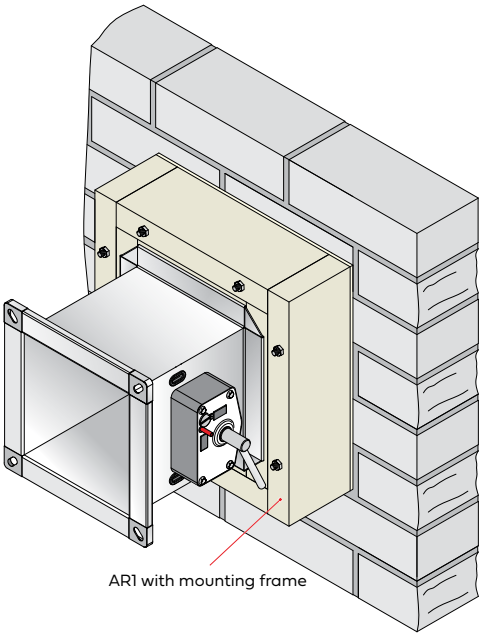
| Manufacturer | Fire safety coating | Fire safety sealing compound | Board material |
|---|---|---|---|
| FLAMRO® | Flammotect®-A Colour | Flammotect®-A Filler | Flammotect®-A Pre-coated mineral fibre board |
| | Flamro® BML / BMA | Flamro® BMS | Coated mineral fibre board (BMA) |
| Hensel® | Hensomastik® 5 KS Viscose | Hensomastik® 5 KS Viscose | Hensomastik® 5 KS Pre-coated mineral fibre board |
| Hilti® | Hilti® CFS-CT | Hilti® CFS-S ACR | Hilti® CFS-CT B |
| | Hilti® CP 673 | Hilti® CP 673 | Hilti® CP 673 |
| OBO Bettermann® | Pyrocoat® ASX Colour | Pyrocoat® ASX Filler | According to manufacturer's instructions |
| Promat® | Promastop®-CC | Promastop®-CC | Promat® mineral wool board, pre-coated, type CC |
| | Promastop®-CA | Promastop®-CA | Promat® mineral wool board, pre-coated, type CC |
| SVT® | Pyro-Safe® Flammotect®-A Colour | Pyro-Safe® Flammotect®-A Filler | Pyro-Safe® Flammotect®-A Mineral fibre board |
| | BML / BMA | BMS | BMA coated mineral fibre board |
| Würth® | Würth® Ablative coating 1 | Würth® Ablative coating 1 | Würth® Mineral fibre board AB pre-coated |

The material stipulated by the respective manufacturer must be used.

In addition, all fire batt systems can be used with ablative coatings if they meet the following requirements:

- Board material non-flammable, melting point ≥ 1000 °C, minimum thickness 50 mm
- Density of the board material at least 140 kg/m³
- Ablative coating, reaction to fire at least class E, in accordance with EN 13501-1
- Test certificate according to EN 1366-3 (submission of a valid ETA is sufficient as proof of suitability as long as the required specifications are observed). The user is responsible for verifying the suitability of the fire batt systems in relation to fire resistance.

## 5.3.4 Installation in short length with AR1 mounting frame



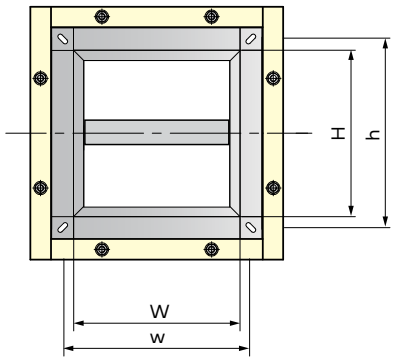

| Minimum thicknesses Wall/Ceiling [mm] | |
|---|---|
| **Description of the wall and ceiling** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Rigid wall/ceiling | **100** |

i Types of rigid walls and ceilings ▸ page 19.

**All diagrams apply accordingly to mounting onto or underneath rigid ceilings.**

- FK90 fire damper in short length L = 346 mm with AR1 mounting frame.
- Installation is possible for heights H up to 800 mm.
- **Fastening:**
  - Use M10 screws or threaded rods, washers and nuts for fastening.
  - Plugs with verification of fire protection suitability can be used in suitable walls and ceilings.
  - Otherwise, pass-through fastenings must be used.
  - Factory-produced holes in the frame indicate the quantity and positioning of the fastenings.
  - Screws, threaded rods, washers, nuts and dowels must be provided on site.
- **Ventilation ducts:**
  On the non-operation side of the FK90 fire damper, ventilation ducts can be guided until they are in the reveal of the wall or ceiling being protected. They must lie flush, and must be fastened or supported to protect against denting. Free movement of the damper blade must be guaranteed (▸ page 18 and ▸ page 12).
- AR1 mounting frames can be installed directly next to one another and on adjacent walls or ceilings, and in corners.
- **Installation opening:** w x h ≤ (W + 10 mm) x ≤ (H + 10 mm)

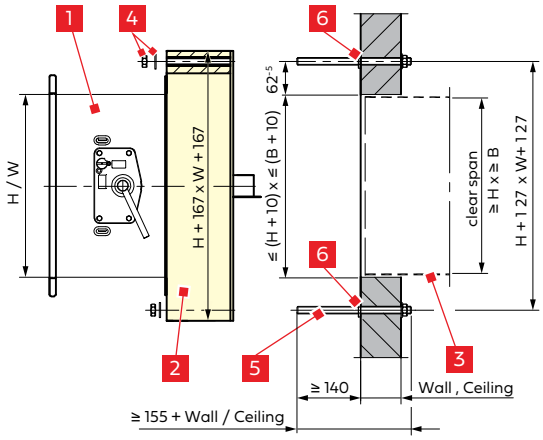
**Installation opening**

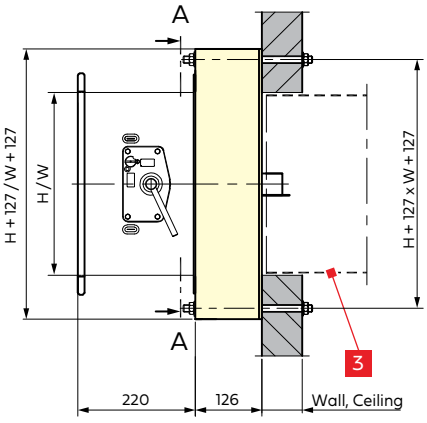


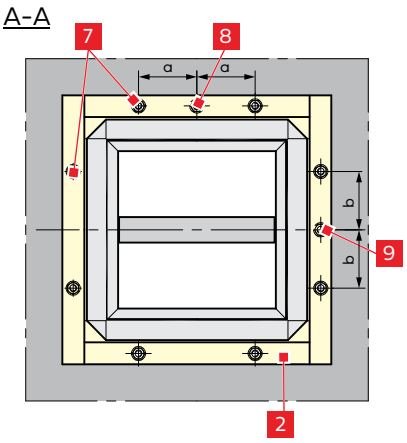

**Restorations:**

The ventilation ducts may be the casings of “old” fire dampers. There are no requirements in terms of mortaring these in the wall or ceiling. Alternatively, the ventilation duct can be screwed onto the wall or ceiling being protected.

**Mounting on rigid wall / ceiling**




Number of fastenings per side

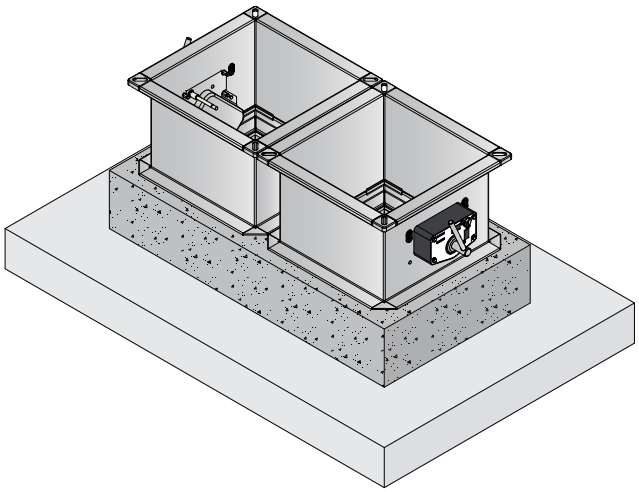
| W / H [mm] | Number W / H |
|---|---|
| Up to 495 | 1 / 1 |
| 500 to 945 | 2 / 2 |
| 950 to 1500 | 3 / 2 |

Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper | 6 | Flat fixing nuts for easier installation. Included in scope of delivery. **May only be used in the position on the threaded rods shown in the diagram** |
| 2 | AR1 mounting frame | | |
| 3 | Ventilation duct, if present | 7 | Fastening |
| 4 | Nut DIN EN 24032 and washer DIN 9021 | 8 | For W < 500 and from W ≥ 950 |
| 5 | Continuous threaded bolt M10 or plug | 9 | For H < 500 |

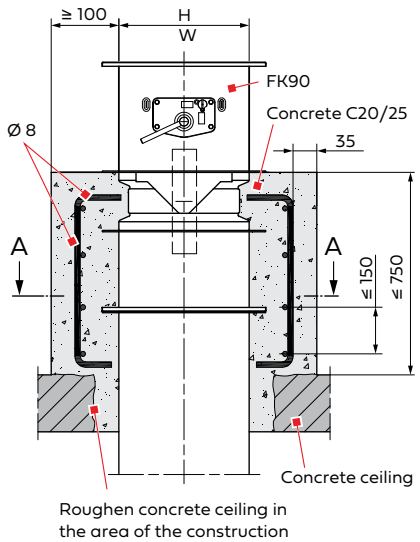
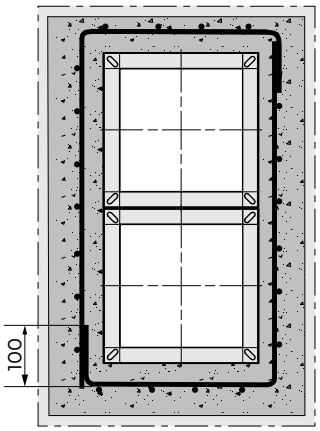
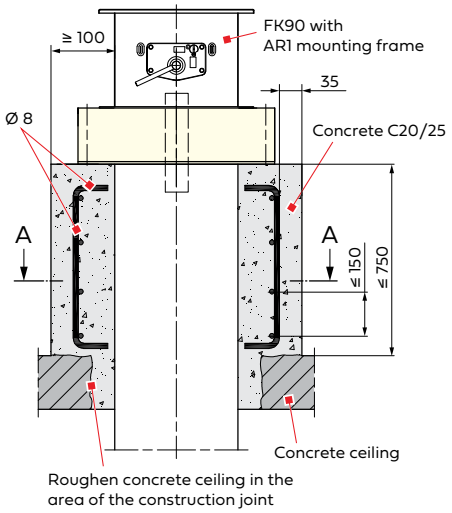
## 5.3.5 Wet installation in base on rigid ceilings

***Installation example with two FK90 fire dampers***



| Minimum thicknesses Ceiling [mm] | |
|---|---|
| **Description of the ceiling** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Rigid concrete ceiling | **100** |

- Installation is possible for heights H up to 800 mm.
- Manufacture in accordance with the general rules of structural engineering. Dimensioning according to DIN 1045 and DIN 4102-4.
  - Cover made of concrete C 20/25, ≥ 100 mm in thickness, ≤ 750 mm in height.
  - Reinforcement made of reinforcing steel Ø ≥ 8 mm. Vertical spacing ≤ 150 mm, horizontal circumferentially sealed spacing ≤ 150 mm.
    Alternative: welded steel wire mesh Q 335 A.
  - Reinforcing steel overlap $C_{nom}$ ≥ 35 mm for environments with up to moderate humidity (exposure class XC3).
  - To bond the concrete, it is generally necessary to roughen the concrete ceiling and, where applicable, the reveal.

| Installation remote from and above rigid ceilings in ventilation duct made of concrete | Section A-A | Mounting with AR1 mounting frame on ventilation ducts made of concrete |
|---|---|---|
| *Lengths 400 mm and 500 mm* | | *346 mm mounting length* |
|  |  |  |
| | | Details on the mounting frame ▸ page 25. |

All dimensions in mm

## 5.4 Metal stud walls

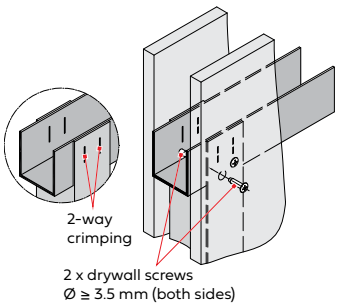
The walls, shaft walls, facings, fire walls etc. must be manufactured in accordance with the manufacturer's specifications and the valid standards. General building authority test certificates (abP) must be observed in Germany.

The stipulations for the design, fire resistance period and fire safety classification, specified wall widths, wall heights and wall thicknesses, and also dimensioning for the framework and cladding must be observed.

- Flexible walls with a metal stud wall design can feature cladding on one side or both sides. The cladding may be single-layer or multi-layer, depending on the fire resistance period.
  In general, shaft walls and facings should be clad on one side. Shaft walls without metal studs are only fastened at the side ▸ page 44 ff.
- Fire walls and safety partition walls are metal stud walls with multi-layer cladding on both sides, and can contain inlays made from sheet steel. The walls must be classified as EI 60-M or higher according to DIN EN 13501-2, or be designed in accordance with a general building authority test certificate (abP). For structural reasons, additional reinforcements may be required for wall heights > 5000 mm.

  i The details on installation specified in the following sections also apply to fire walls and safety partition walls. For fire walls and safety partition walls, studs, bay rails and reinforcements adjacent to the FK90 fire dampers can be produced from UA profiles. The manufacturer's specifications regarding this installation must be observed.

- Metal stud walls can be produced with or without mineral wool between the metal studs.
- Claddings made of gypsum boards DF according to EN 520 or equivalent boards (gypsum board fire safety panels, cement-bound boards, calcium silicate boards etc.) must be fastened to suit the specific wall.
  In the perimeter area of the FK90 fire dampers, they must be secured with drywall screws of a suitable length and ≥ 3.9 mm in diameter at spacings of ≤ 200 mm or ≤ 150 mm ▸ page 30.
- DIN 18182 and EN 14195, constructions in DIN 18183 describe the profiles for metal stud walls.
- FK90 fire dampers may be installed in metal stud walls with up to 1000-mm metal stud spacing (span), and have been tested accordingly.
- The required bay rails and stiffeners should be used for installing FK90 fire dampers in metal stud walls so as to produce circumferential frames. Intersections must be connected with two blind rivets made from steel of 4 mm to 5 mm diameter or with drywall screws of ≥ 3.5 mm diameter and ≥ 10 mm length.
  Prefixing can also be performed using clinching (crimping), as is typical in dry construction. The joining points should be set twice.
  Furthermore, the claddings in the intersections must be connected to the metal studding using the usual double-connected screw fastenings.




- Installation openings without the use of installation subframes can be filled in the following way:
  Fillings can be filled with mortar of group II or III according to DIN 1053 or with the classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire protection mortar or gypsum mortar. Mechanical filling may be carried out thanks to the all-round design of the gaps.
  It is possible to use mineral wool as panel strips of approx. 120 mm in width, using "Conlit® Steelprotect Board" or "Knauf Insulation TPD" with an overall thickness of approx. 60 mm. The mineral wool can be made up of several layers. Darning wool with a density of ≥ 180 kg/m³ and a melting point of ≥ 1000 °C can also be used ▸ page 33.
  In addition to the types of mortar mentioned above, fillers made of wall-building materials can be used with the corresponding joint filler. Strips of gypsum board in accordance with EN 520 are an example.
- For a "partial mortaring", 120 mm wide strips of mineral wool should be used; e.g. "Conlit® Steelprotect Board", "Knauf Insulation TPD" or darning wool with a density of ≥ 150 kg/m³ and a melting point of ≥ 1000 °C. Gaps must be designed so that s ≤ 50 mm. The mineral wool thickness is s + 5 mm plus 20 mm for filling the beading.

**Minimum thicknesses[1] [in mm] of metal stud walls for the installation of FK90 fire dampers**

| Description of the wall | | Fire resistance period | | |
|---|---|---|---|---|
| | | 30 min **60 min** | 30 min 60 min **90 min** | 30 min 60 min 90 min **120 min** |
| Metal stud walls with cladding on both sides | ≥ 1-layer cladding | **70** | - | - |
| | ≥ 2-layer cladding | - | **94** | **94** |
| Shaft walls made of wall boards, at least 2-layer | with metal studs | - | **90** | - |
| | without metal studs | - | **40** | - |

[1] Depending on the installation situation, the minimum thicknesses may deviate from the values in this table.

**Installation openings** for FK90 fire dampers require cutouts in the cladding. Trimmers or special arrangements can be required in metal studs.

Sub-structures of metal stud walls consist of CW profiles as supports. These should be set on the floor and on the ceiling in UW profiles fastened to the floor and ceiling. Supports adjacent to rigid walls then have to be fastened to them.

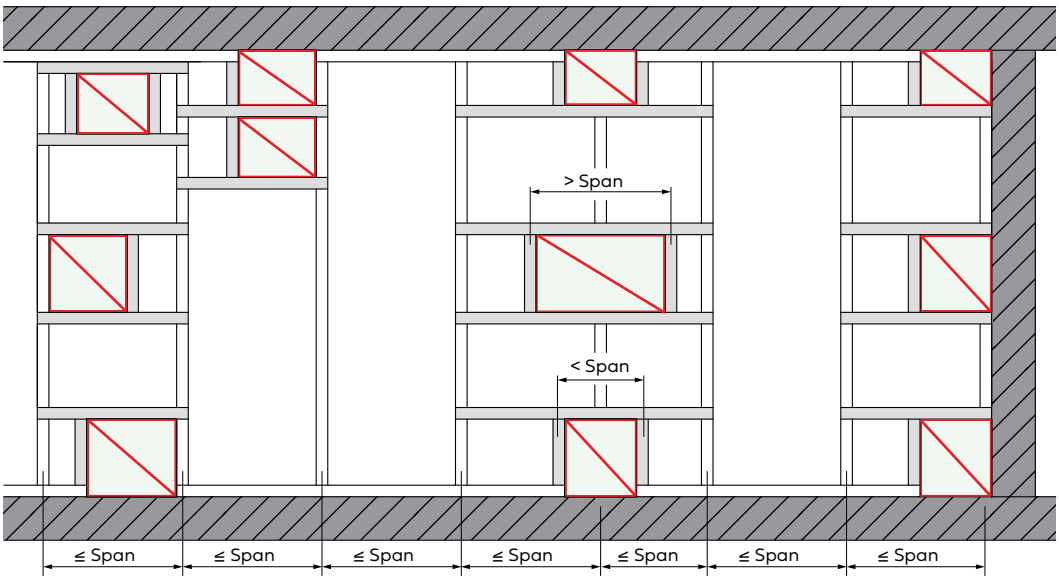
Installation openings for FK90 fire dampers should be produced, as described above, as circumferentially sealed frames made of profiles. Sealed profile webs are possible, if required, using box-shaped nesting. These are adjoined by fillings made of mineral wool or mortar or ER1 or ER3 installation subframes of the fire dampers. Exceptions are possible with installation openings which have an accurate fit.

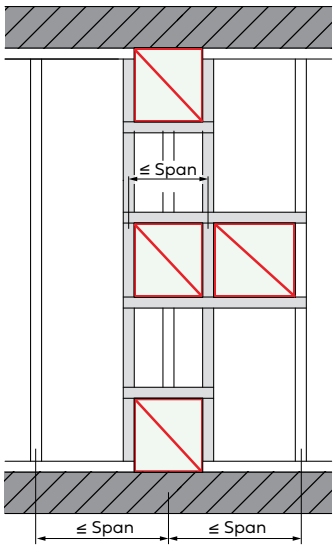
Severed supports will require trimmers which can simultaneously serve as the frame for the installation openings.

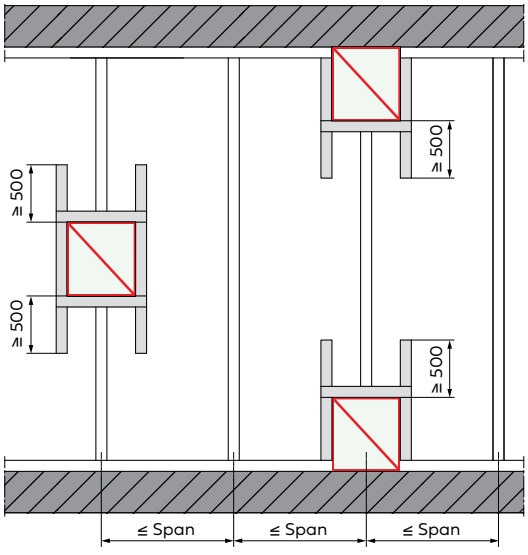
Trimmers are needed for installation openings with widths larger than the spans.

In walls with cladding on both sides, it is possible to install two fire dampers in the same installation opening without a trimmer ▸ page 38 ff.

**Depending on the wall in question, suitable connections are possible in order to break up profiles on ceilings and floors** for the purpose of installing FK90 fire dampers ▸ page 31 ff.



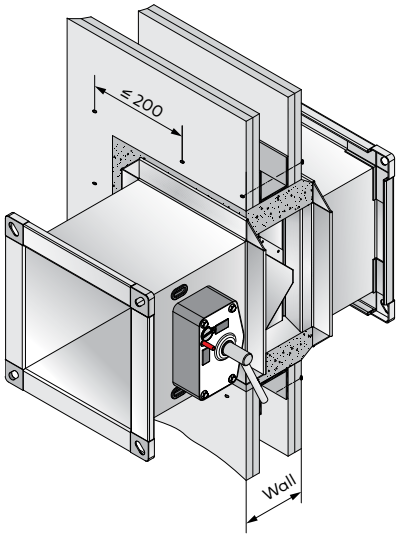




Trimmers, as shown for retroactive installation, require additional metal studs on the left and right. These should be set in the floor and ceiling profiles.

For this purpose, the wall can be cut open and new openings created. New claddings must then be attached to the added and existing studs, making sure to maintain the necessary overlaps. Surplus studs can be removed as long as the intended spans are not exceeded.

For **H-trimmers** with horizontal profiles above and below the installation opening and with vertical profiles on the right and left edge, non-adjacent vertical profiles must be ≥ 500 mm longer. Claddings must be screwed to them with spacing of ≤ 200 mm.

## 5.4.1 Wet installation with mortar

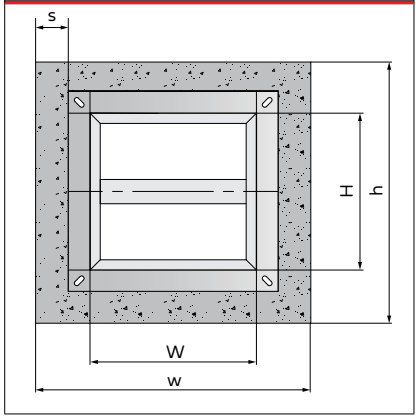



| Minimum thicknesses Wall [mm] | |
|---|---|
| **Description of the wall** | **Fire resistance period**<br>30 min<br>60 min<br>90 min<br>**120 min** |
| Metal stud wall with ≥ 2-layer cladding on both sides | **94** |

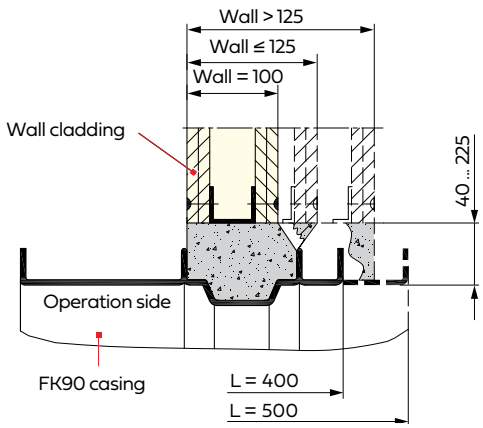
i Further information on: Walls and wall construction ▸ page 28 ff.
Mortar filling ▸ page 28.
Crimping the metal studs ▸ page 28.

- Installation is possible for heights H up to 1000 mm.
- **Statics:**
  Structural wall requirements must be met on site.
- **Preparation:**
  Perforations in the circumferential profiles for the purpose of surrounding the installation openings can be covered with film.
- **Shear protection:**
  Mortar fillings need to be bonded with the wall profiles in order to prevent sliding out, e.g. using the beading in CW profiles or with a mortar anchor, e.g. made from perforated tape. In reveals, drywall screws protruding by around 5 mm, with spacing of 200 mm, are sufficient.
- **Double-studded structure:**
  Walls with a double-studded structure with a gap (e.g. installation walls) require suitable reveals made from wall-building materials. Large wall thicknesses reduce the required depth of mortaring to 100 mm to 120 mm, thereby also bringing about reductions in weight.
- **Installation opening:** w x h = (W + 80 ... 450 mm) x (H + 80 ... 450 mm)
- **Gap size (all-round)**: s = 40 ... 225 mm

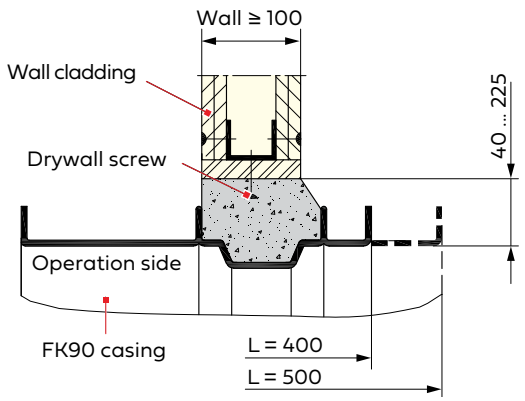
**Installation opening**




**Installation in opening without reveals**
*Mortaring over wall thickness*

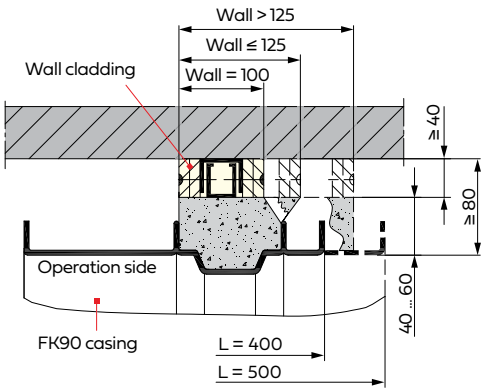



**Installation in opening with reveals**
*Mortaring 100 mm to 120 mm deep*

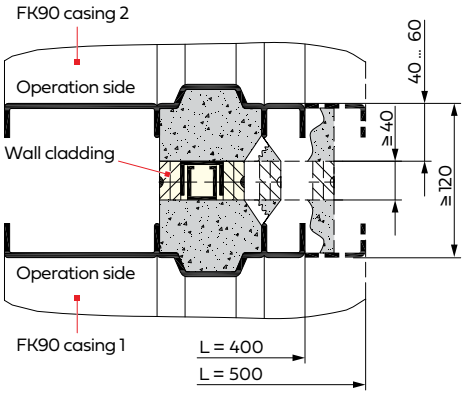



All dimensions in mm

**Connections directly on rigid walls, ceilings or floors**

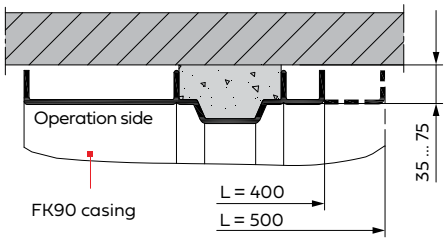


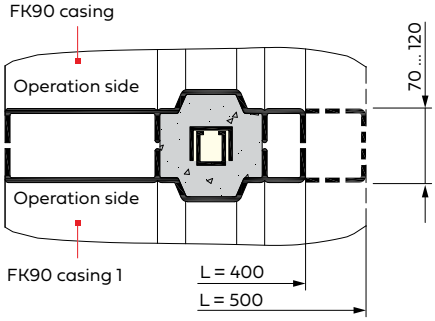

**Installation next to each other or one on top of the other**



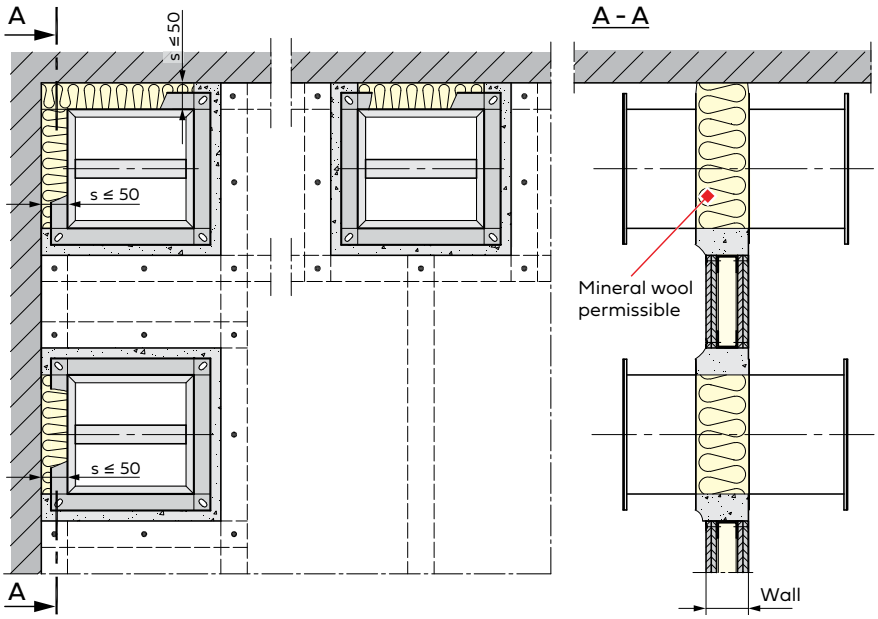

**Alternative installation options**

in walls of 100 mm to 125 mm in thickness without reveals or in walls of ≥ 100 mm in thickness with 2-sided or 3-sided reveals.



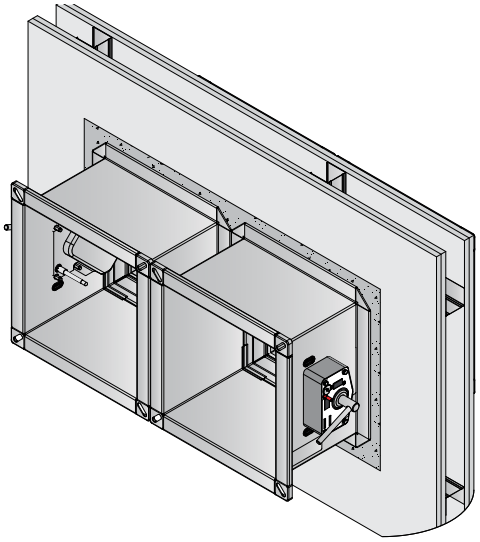

**Partial mortaring** (fire resistance period of up to 90 mins) **– Installation H ≤ 800 mm**
in corners and directly on rigid walls and ceilings




- Use 120 mm wide strips of mineral wool, more details ▸ page 28.
- Design gaps so that s ≤ 50 mm.
- Mineral wool thickness s + 5 mm plus 20 mm for filling the beading. Further information on mineral wool ▸ page 28.

All dimensions in mm

## 5.4.2 Multiple installation with mortar



| Minimum thicknesses Wall [mm] | |
|---|---|
| **Description of the wall** | **Fire resistance period**<br>30 min<br>60 min<br>90 min<br>**120 min** |
| Metal stud wall with ≥ 2-layer cladding on both sides | **94** |

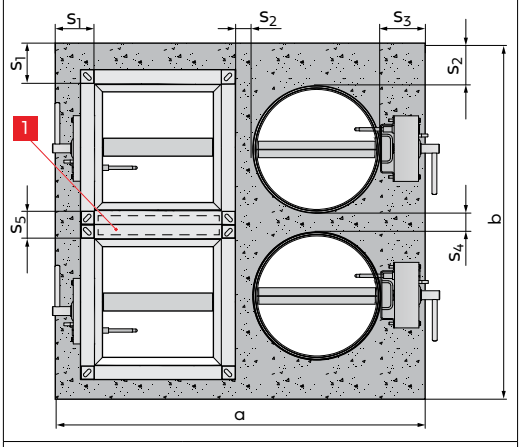
i Further information on walls and wall construction ▸ page 28 ff.

- Multiple installation of up to 4 pcs. FK90 fire dampers of the same size side-by-side, above each other or combined with FR90 fire dampers is possible.
- Structural wall requirements must be met on site. The specifications of the wall manufacturer and the general building regulations must be observed here.
- **Gap sizes**
  All-round gap in relation to all installed fire dampers = max. 225 mm

| | Description | Gap dimension |
|---|---|---|
| $s_1$ | Minimum gap FK90 - installation opening | ≥ 40 mm |
| $s_2$ | Minimum gap around FR90 | ≥ 15 mm |
| $s_3$ | Minimum gap, operation side FR90 - installation opening | ≥ 50 mm |

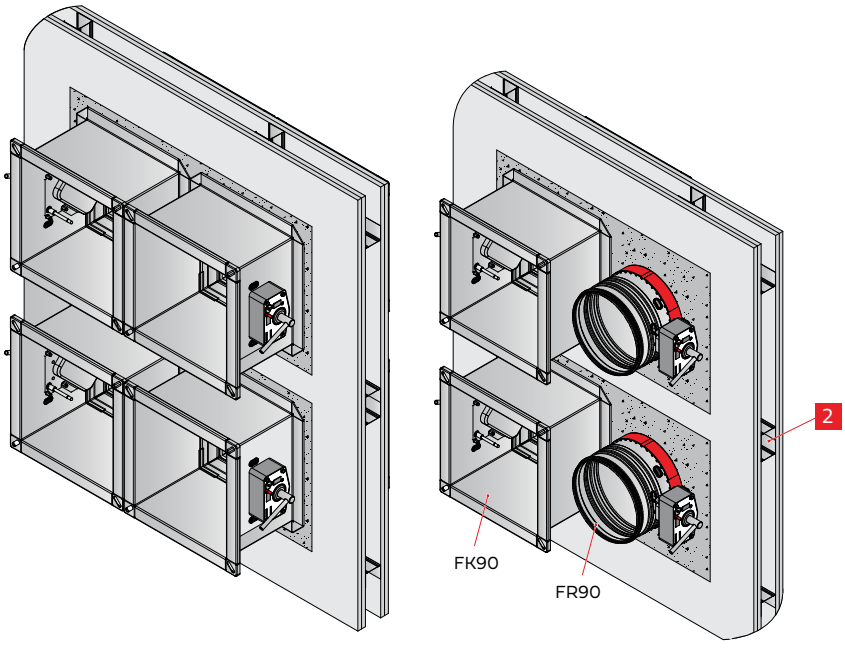
- An **interlocking profile** 1 is used between FK90 fire dampers installed one above the other (▸ page 31).
- A **cross rail** 2 must be used between the upper and lower fire dampers in a common installation opening if the following gap dimensions are exceeded:
  - vertical gap between FR90 and FR90 $s_4$ > 30 mm or
  - vertical gap between FK90 and FK90 $s_5$ > 120 mm

**Installation opening**

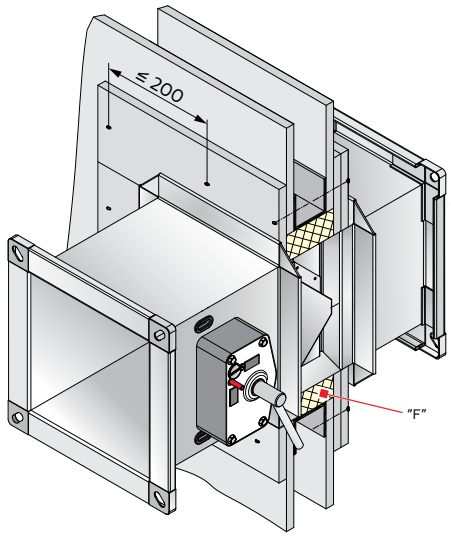



a x b = max. 4.2 m²

***Installation example***



## 5.4.3 Dry installation with fillings

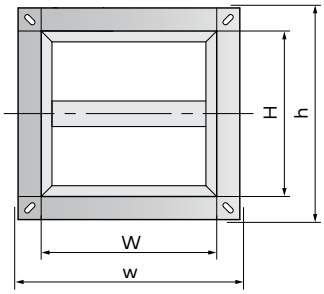



| Minimum thicknesses Wall [mm] | | | |
|---|---|---|---|
| **Description of the wall** | | **Fire resistance period** | |
| | | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** |
| Metal stud wall with cladding on both sides | ≥ 1-layer cladding | **70** | - |
| | ≥ 2-layer cladding | - | **100** |

i For further information on walls, wall construction, crimping the metal studs and filling material "F", see ▸ page 28 ff.
Information on fire and safety partition walls ▸ page 28.

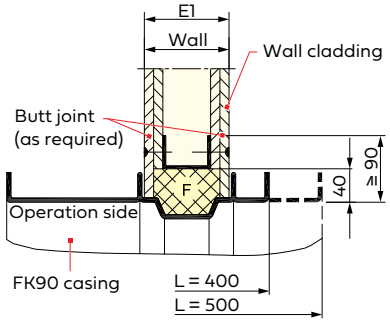
- Installation is possible in heights H up to 800 mm and lengths L of 400 mm or 500 mm.
- **Design:**
  - **Wall thicknesses of up to 120 mm:**
    Add additional cladding if wall < 110 mm so that E1 ≈ 120 mm, or at least E1 = 110 mm.
  - **Wall thicknesses > 120 mm** bridge the beading on the non-operation side. Additional cladding can be added to walls so that E2 ≥ 130 mm if required; special example for wall = 125 mm.
  - **Metal studs** in walls > 125 mm thick should preferably be fitted with **reveals** made of wall-building materials.
  - **Walls of other thicknesses** must be designed accordingly.
- Butt joints and additional cladding on the claddings are possible and can be fitted in combination with one another.

**Installation opening**

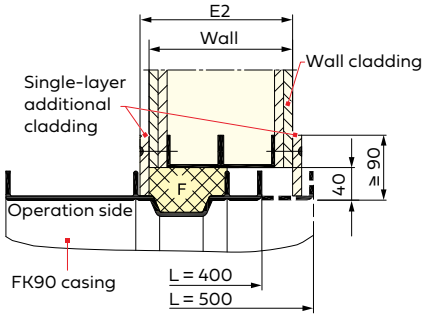


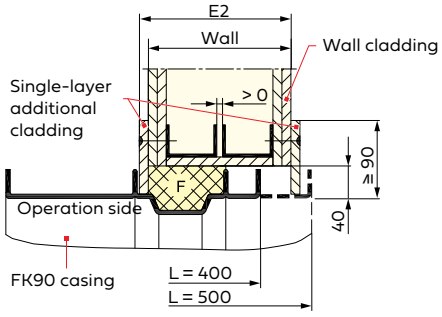

w x h = (W + 80 mm) x (H + 80 mm)

**Wall cladding (two-layer and multi-layer)**

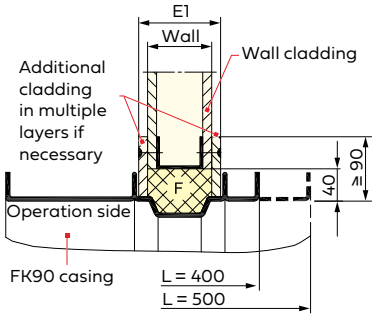


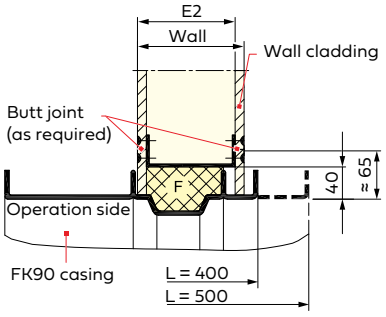

**Double-studded walls (installation walls)**

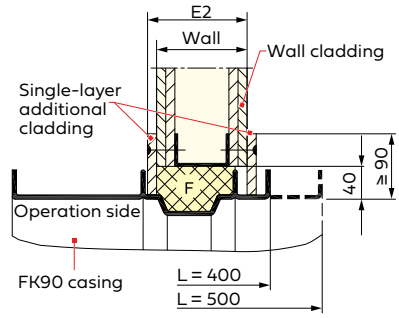


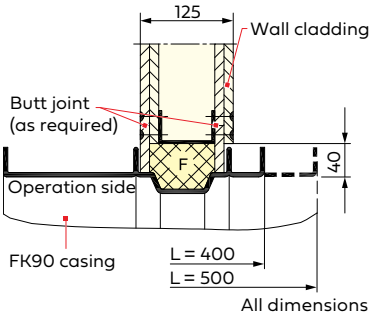




**Wall cladding (single layer)**



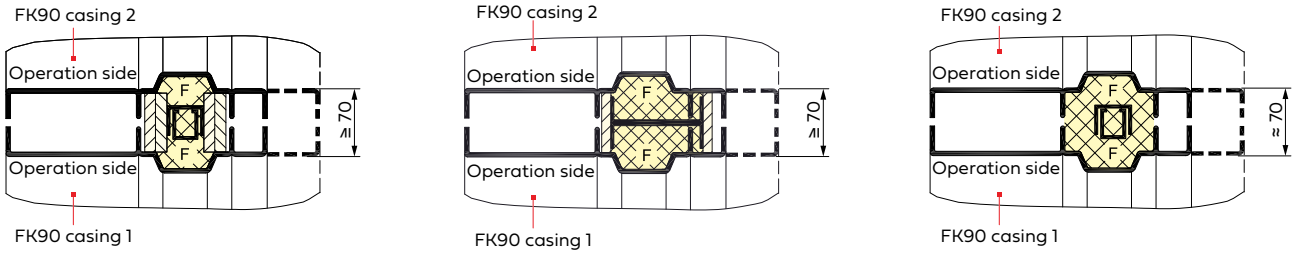



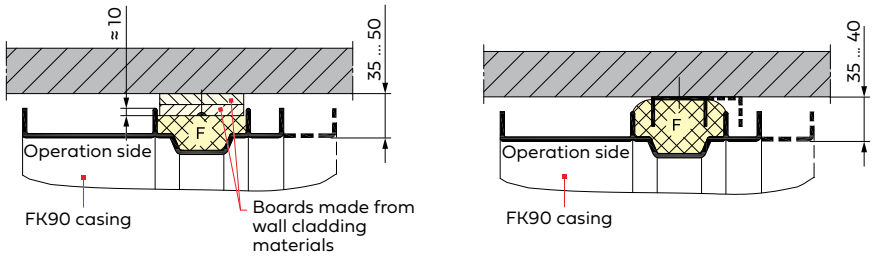




All dimensions in mm

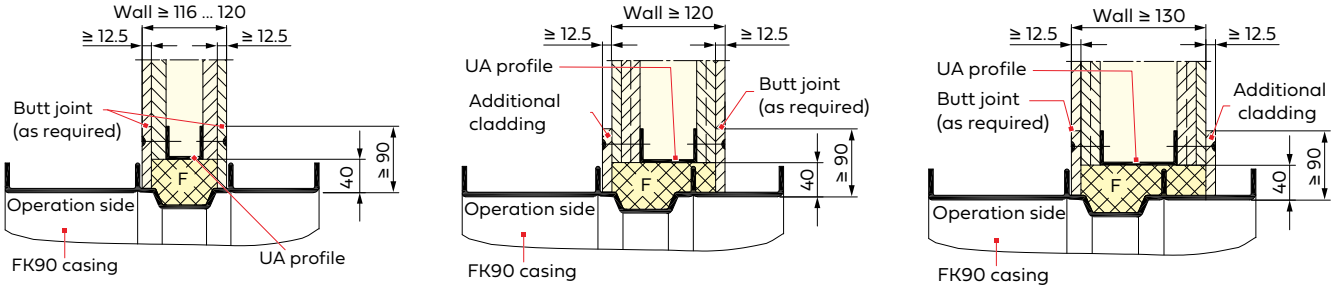
### Installation with short spacings




### Connections directly on rigid walls, ceilings (floors)



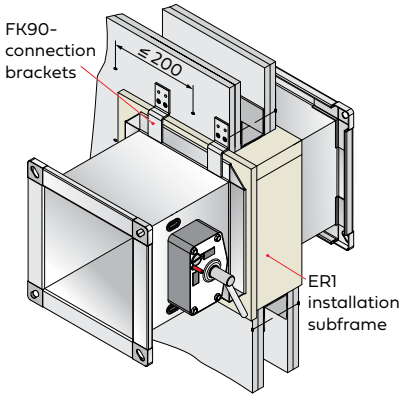

### Installation in fire walls and safety partitions




- Filling areas “F” in fire walls and safety partition walls must be filled with building materials from the wall cladding and with joint filler, ▸ page 28 ff.

All dimensions in mm

## 5.4.4 Dry installation with ER1 and ER3 installation subframe

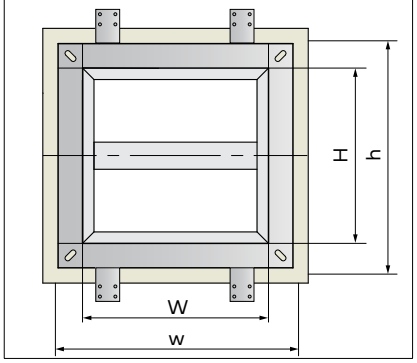



| Minimum thicknesses Wall [mm] | | | | |
|---|---|---|---|---|
| **Description of the wall** | | **Installation subframe** | **Fire resistance period** | |
| | | | 30 min<br>**60 min** | 30 min<br>60 min<br>**90 min** |
| Metal stud wall with cladding on both sides | ≥ 1-layer cladding | **ER1** | **70** | - |
| | ≥ 2-layer cladding | **ER1** | - | **94** |
| | ≥ 2-layer cladding | **ER3** | - | **100** |

i Further information on walls and wall construction ▸ page 28 ff.

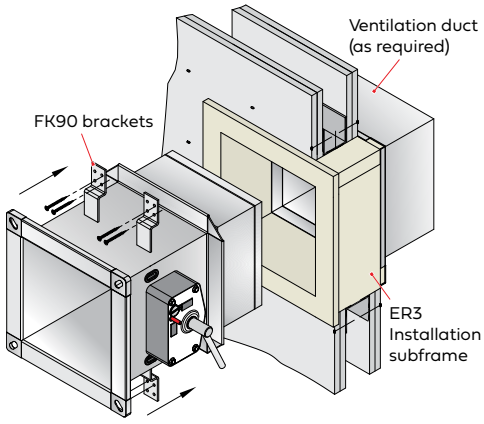
- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm (ER1) or L = 355 mm (ER3).
- The diagram shows 2-layer claddings; adjust accordingly for 1-layer or other claddings.
- Where reveal protection is required, the thickness of the reveals should correspond to at least one cladding layer, ▸ page 36.

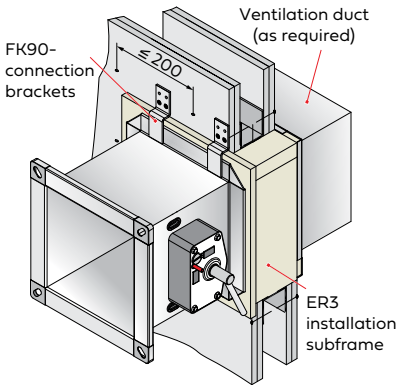
**Installation opening**



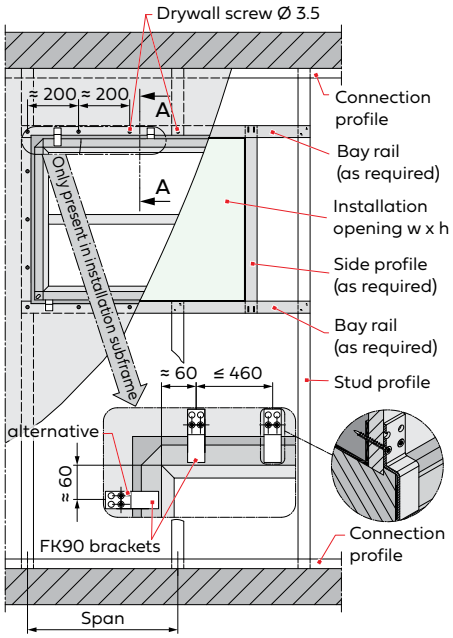

- **Installation opening:** w x h = (W + 80$^{+3}$ mm) x (H + 80$^{+3}$ mm)

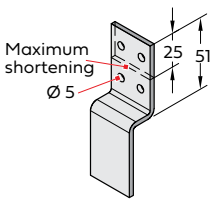
*Installation example with ER3 installation subframe*




**Fastening**




- **Cross-sections A-A** should be designed based on the wall type and the connection, see ▸ page 28.
- FK90 connection brackets are sufficient on one side of the wall and are screwed into the all-round profile around the frame above and below the fire damper (in equal numbers above and below. Alternatively, the connection brackets can also be attached to the side).

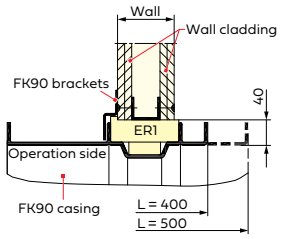
Number of connection brackets according to width W of the FK90 fire damper:

| ≤ 580 | ≤ 1040 | > 1040 |
|---|---|---|
| 4 | 6 | 8 |

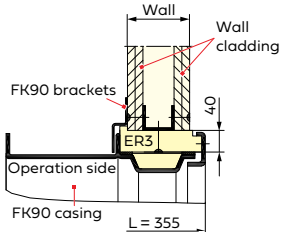
- **FK90 connection brackets** are shortened on site by max. 25 mm.

All dimensions in mm

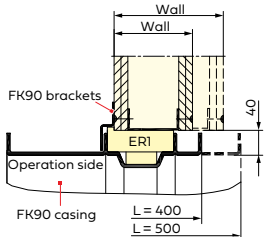
*ER1: Wall thicknesses ≤ 120 mm without reveal*



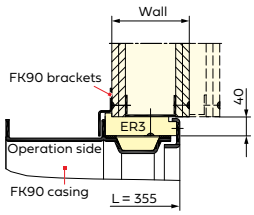

*ER3: Wall thicknesses ≤ 120 mm without reveal*



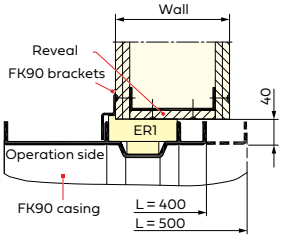

*ER1: Wall thicknesses > 120 mm without reveal*



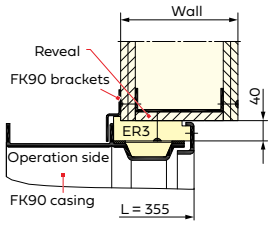

*ER3: Wall thicknesses 120 mm without reveal*



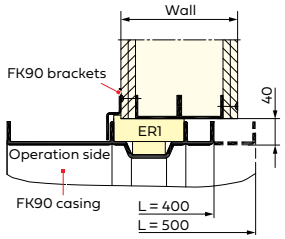

*ER1 wall thicknesses > 120 mm with reveal*



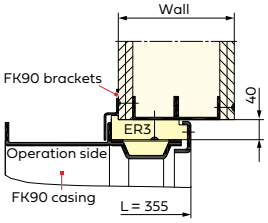

*ER3 wall thicknesses > 120 mm with reveal*



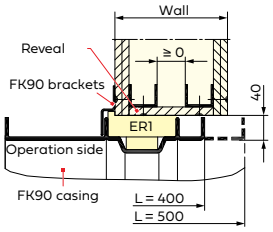

*ER1 wall thicknesses > 120 mm Double stud wall without reveal*



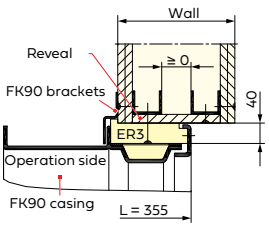

*ER3 wall thicknesses > 120 mm Double stud wall without reveal*



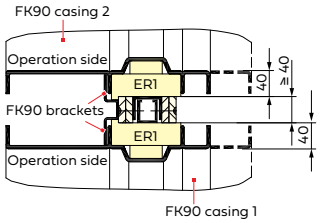

*ER1 wall thicknesses > 120 mm Double stud wall with reveal*



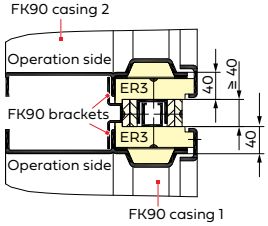

*ER3 wall thicknesses > 120 mm Double stud wall with reveal*




*ER1: Installation with short spacings*

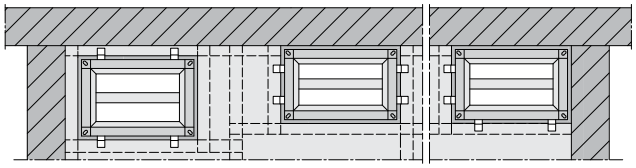



*ER3: Installation with short spacings*




All dimensions in mm

## Connections directly on rigid walls, ceilings (floors)

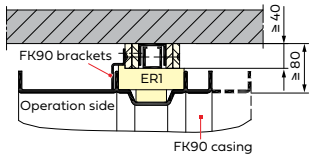


FK90 connection brackets - top and bottom

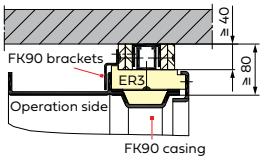
FK90 connection brackets - side

FK90 connection brackets - side and bottom

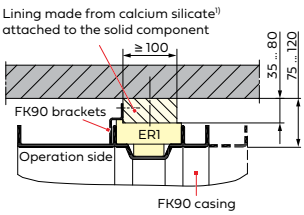
*ER1: Direct to rigid walls, ceilings (floors)*



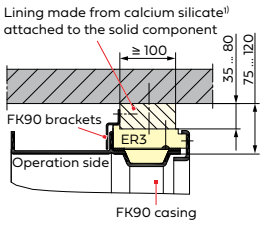

*ER3: Direct to rigid walls, ceilings (floors)*



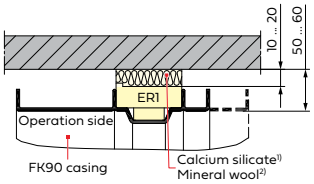

*ER1: Direct to rigid walls, ceilings (floors) with lining*




*ER3: Direct to rigid walls, ceilings (floors) with lining*




*ER1: Direct to rigid walls, ceilings (floors) with lining*

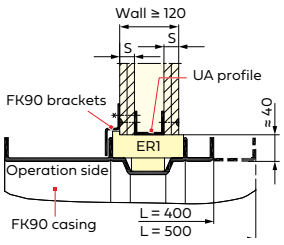



[1] Calcium silicate boards ≥ 500 kg/m³

[2] Mineral wool filling ▶ page 33

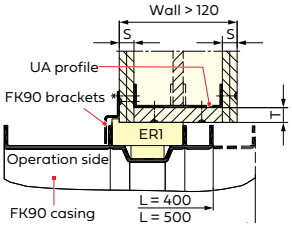
## Installation in fire walls and safety partitions

*ER1: Installation in fire and safety partitions ≤ 120*

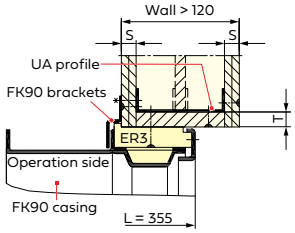



- Reveals in fire and safety partitions with T ≥ 20 mm thick calcium silicate boards or with T ≥ S thick boards made from wall cladding materials.

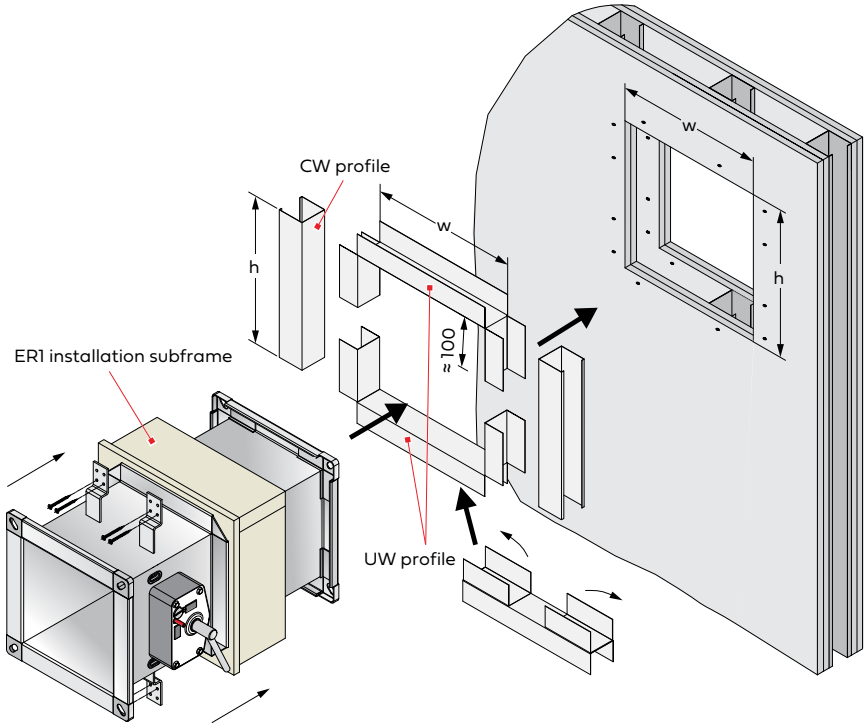
*ER1: Installation in fire and safety partitions > 120*




*ER3: Installation in fire and safety partitions > 120*

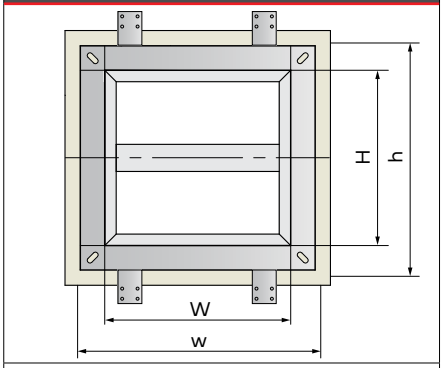


### 5.4.4.1 Installation with ER1 installation subframe in retrofitted installation openings




| Minimum thicknesses Wall [mm] | |
|---|---|
| **Description of the wall** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Metal stud wall with ≥ 2-layer cladding on both sides | **94** |

**Installation opening**



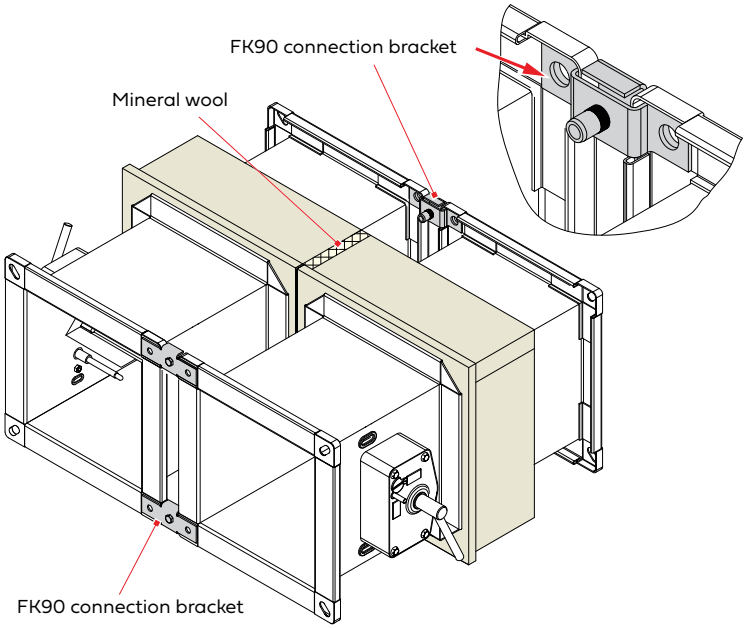

w x h = (W + 80$^{+3}$ mm) x (H + 80$^{+3}$ mm)

i Further information on walls and wall construction ▸ page 28 ff.

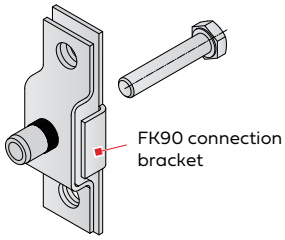
- Installation is possible in heights H up to 800 mm and lengths L of 400 mm or 500 mm.
- For walls with W ≥ 94 mm thickness and with a 90-minute fire resistance period.
- **Installation opening:**
  Cut an installation opening in the wall. Two adjacent metal studs may be severed and removed for this purpose ▸ page 29.
- **Reinforcement:**
  - Reinforcing frames of the same size should be inserted into the installation opening. Two CW profiles with cutting length "h" must be fitted at the side and screwed onto the wall cladding. Two UW profiles with cutting length "w" +2 x 100 mm should then be inserted and screwed on. This can be achieved by firstly bending the profile ends 180°.
  - The ends of the severed metal studs must be slid into the UW profiles of the reinforcing frames and screwed to the claddings.
- **Screw connection:**
  Screwing into the wall claddings must be performed at spacings of ≤ 200 mm, using drywall screws of a suitable length and ≥ 3.5 mm in diameter, ▸ page 28.
  Wall profile overlaps must be at least double-screwed.
- **Inserting the fire damper:**
  Slide the FK90 fire damper with ER1 installation subframe into the installation opening and secure with FK90 connection brackets as specified, ▸ page 35.

All dimensions in mm

### 5.4.4.2 Double installation in a single installation opening




- Create installation opening w x h (▸ page 28) or cut into the wall afterwards (▸ page 37).
- Information on the frames around the installation openings ▸ page 35 ff. and on the reinforcing frames ▸ page 37.
- Assemble FK90 fire dampers with 4 x FK90 connection brackets. The spacing between the two ER1 installation subframes must be filled with mineral wool of 20 mm in thickness, 100 mm in width and with a length that corresponds to the w or h dimensions. More information on mineral wool ▸ page 28.
- The multiple fire dampers assembled in the package must be installed as a single fire damper. The frames are inserted accordingly and fixed to the wall using the supplied FK90 connection brackets.
  For further details on assembly, see ▸ page 35.



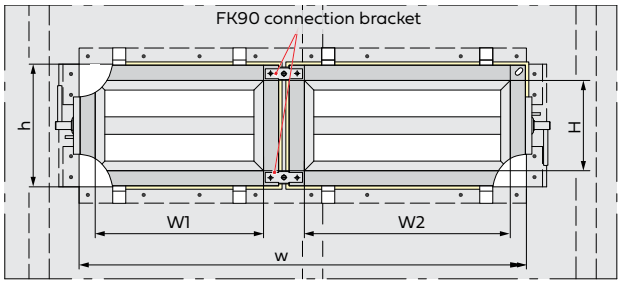

**FK90 connecting bracket** for assembling the same heights next to each other and the same widths on top of each other.

*Same heights H next to each other:*

w x h = (W1 + W2 + 175$^{+3}$ mm) x (H + 80$^{+3}$ mm)

Limitation:

- (Width W1 + width W2) ≤ 920 mm

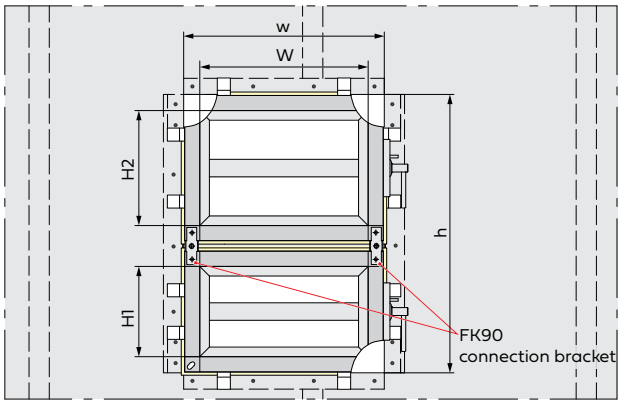



*Same widths B one on top of the other:*

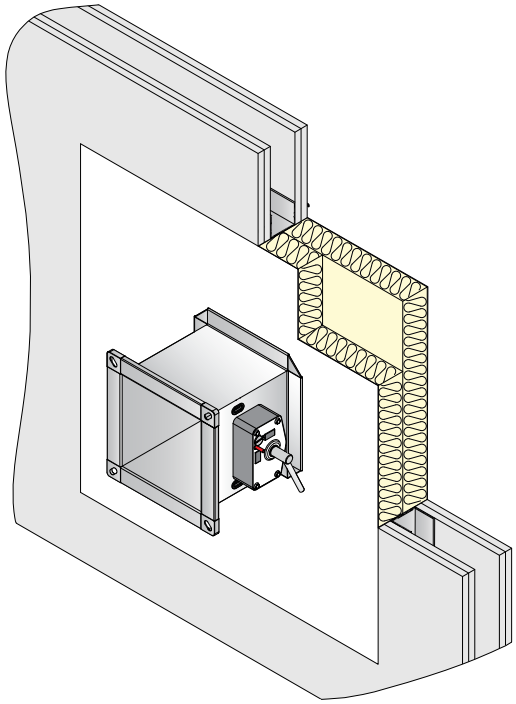
w x h = (H1 + H2 + 175$^{+3}$ mm) x (W + 80$^{+3}$ mm)

Limitations:

- (Height H1 + height H2) ≤ 920 mm
- Width W ≤ 1020 mm



## 5.4.5 Dry installation with fire batt system

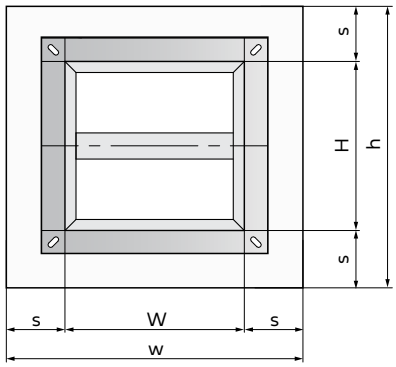


| Minimum thicknesses Wall [mm] | |
|---|---|
| **Description of the wall** | **Fire resistance period**<br>30 min<br>60 min<br>90 min<br>**120 min** |
| Metal stud wall with ≥ 2-layer cladding on both sides | **100** |

i Further information on walls and wall construction ▸ page 28 ff.

- Installation is possible in heights H up to 800 mm and lengths L of 400 mm or 500 mm.
- The fire damper is suspended on both sides using the suspension of the connected ventilation duct. Special fire protection fastenings or suspensions for the fire damper are not required.
- The weight of the fire damper (size-dependent weight table ▸ page 76) must also be borne by the connected ventilation duct.
- When using flexible connectors or without a ventilation duct connection, suspension can also be performed directly on the fire damper, e.g. using ventilation connectors.

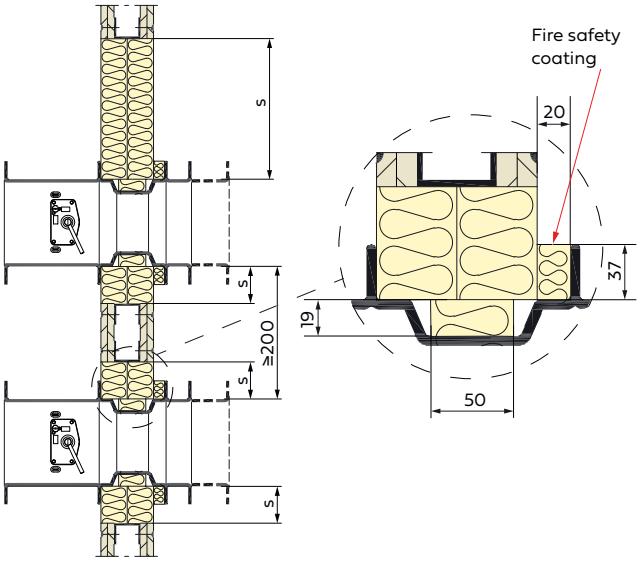
**Installation opening**




- **Installation opening**:
  w x h = (W + 100 ... 1200 mm) x (H + 100 ... 1200 mm)
- **Gap size s** see next page

**Installation**

The board material must be cut to size to suit the installation opening and contour of the fire damper so that it rests firmly in placed after installation. Coated edges must be chamfered. The cut surfaces of the board material and the reveal in the installation opening must be brushed with the coating putty or the filler of the specific system. Insert the first layer of board material, make sure that the surface coated in the factory faces outwards. Insert the second layer of board material. In this case, too, have the coated surface face outwards, and arrange the butt joints offset from one another. Seal all butt joints, including those on supporting structures and the fire damper, completely on both sides of the wall with the coating putty or filler and brush them with the fire safety coating.

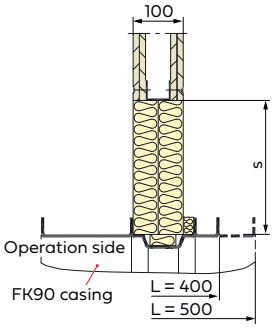



- Only one fire damper may be installed per fire batt system.
- Clearance between FK90 fire dampers ≥ 200 mm (Austria: ≥ 100 mm according to ÖNORM H 6025).

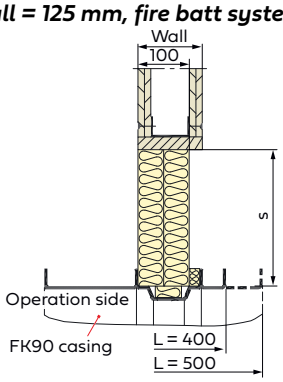
| s | s1 | s1 (Austria) |
|---|---|---|
| 50 ... 600 mm | 75 ... 600 mm | 40 ... 600 mm |

***Installation examples***

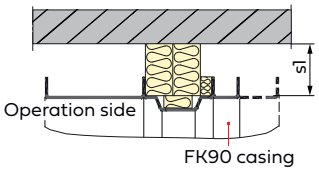
***Wall = 100 mm, fire batt system = 100 mm***




***Wall 100 mm (shown: wall = 125 mm, fire batt system = 100 mm)***




***Installation directly on walls or ceilings***




**Overview of fire batt systems**

| Manufacturer | Fire safety coating | Fire safety sealing compound | Board material |
|---|---|---|---|
| FLAMRO® | Flammotect®-A Colour | Flammotect®-A Filler | Flammotect®-A Pre-coated mineral fibre board |
| | Flamro® BML / BMA | Flamro® BMS | Coated mineral fibre board (BMA) |
| Hensel® | Hensomastik® 5 KS Viscose | Hensomastik® 5 KS Viscose | Hensomastik® 5 KS Pre-coated mineral fibre board |
| Hilti® | Hilti® CFS-CT | Hilti® CFS-S ACR | Hilti® CFS-CT B |
| | Hilti® CP 673 | Hilti® CP 673 | Hilti® CP 673 |
| OBO Bettermann® | Pyrocoat® ASX Colour | Pyrocoat® ASX Filler | According to manufacturer's instructions |
| Promat® | Promastop®-CC | Promastop®-CC | Promat® mineral wool board, pre-coated, type CC |
| | Promastop®-CA | Promastop®-CA | Promat® mineral wool board, pre-coated, type CC |
| SVT® | Pyro-Safe® Flammotect®-A Colour | Pyro-Safe® Flammotect®-A Filler | Pyro-Safe® Flammotect®-A Mineral fibre board |
| | BML / BMA | BMS | BMA coated mineral fibre board |
| Würth® | Würth® Ablative coating 1 | Würth® Ablative coating 1 | Würth® Mineral fibre board AB pre-coated |

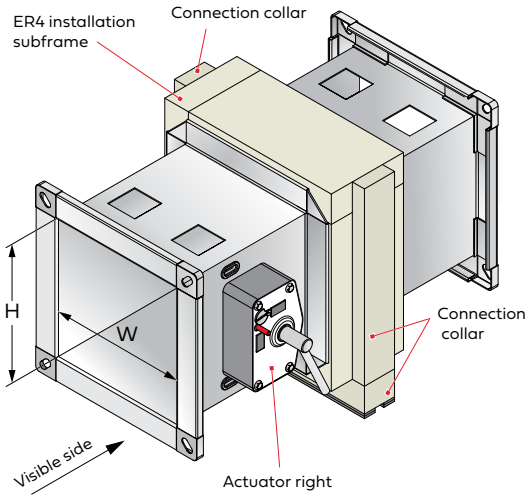
The material stipulated by the respective manufacturer must be used.

In addition, all fire batt systems can be used with ablative coatings if they meet the following requirements:

- Board material non-flammable, melting point ≥ 1000 °C, minimum thickness 50 mm
- Density of the board material at least 140 kg/m³
- Ablative coating, reaction to fire at least class E, in accordance with EN 13501-1
- Test certificate according to EN 1366-3 (submission of a valid ETA is sufficient as proof of suitability as long as the required specifications are observed). The user is responsible for verifying the suitability of the fire batt systems in relation to fire resistance.

All dimensions in mm

## 5.4.6 Installation with sliding ceiling connection




| Minimum thicknesses Wall [mm] | |
|---|---|
| **Description of the wall** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Metal stud wall with ≥ 2-layer cladding on both sides | **95** |

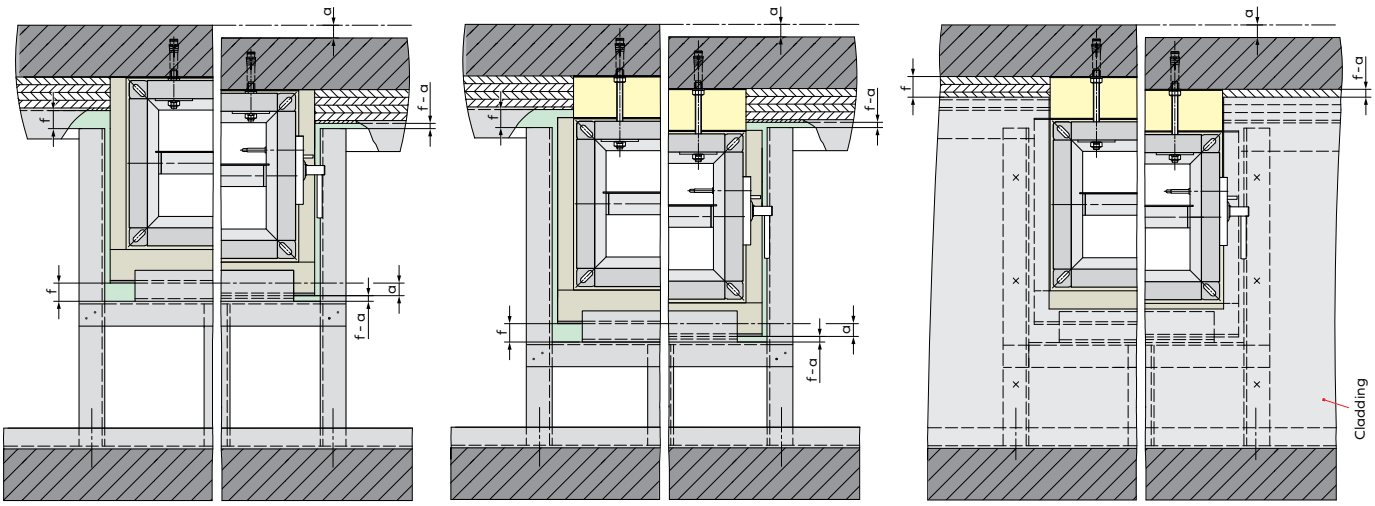
i Further information on walls and wall construction ▸ page 28 ff.

- Installation is possible in heights H up to 800 mm and lengths L = 500 mm.
- With the expected ceiling drops of f ≥ 10 mm, it is necessary to produce a sliding ceiling connection for the metal stud wall.
- The designs of expansion joints for ceiling drops f ≤ 20 mm are described in DIN 4102-4. Designs for f ≤ 40 mm, for example, are included in the general building authority test certificates (abP). Conventional installation of fire dampers is only possible in a wall area that is far below the ceiling connections of up to 200 mm in height.
- In metal stud walls with cladding on both sides, FK90 fire dampers can be installed with an ER4 installation subframe directly or with 30 … 80 mm spacing below rigid ceilings. The ER4 installation subframes guide the sliding ceiling connection around the FK90 fire damper. This is fastened in such a way that it lowers together with the ceiling and the ventilation ducts.
- FK90 fire dampers up to width B = 800 mm can also be installed upright with “actuator below”.
- When ordering, the following information must be provided:
  - Operation position: left or right (as shown) or down
  - Stud profile depths S = 50, 60, 75, 85, 100, 125 mm

**Function of the sliding ceiling connection**

**Installation without lining** | **Installation with lining k ≤ 80 mm**

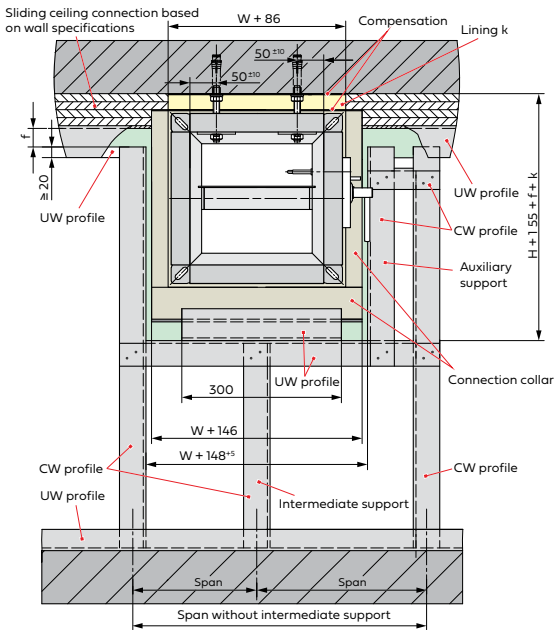
*Function and installation principle* | *Without wall cladding* | *With wall cladding*



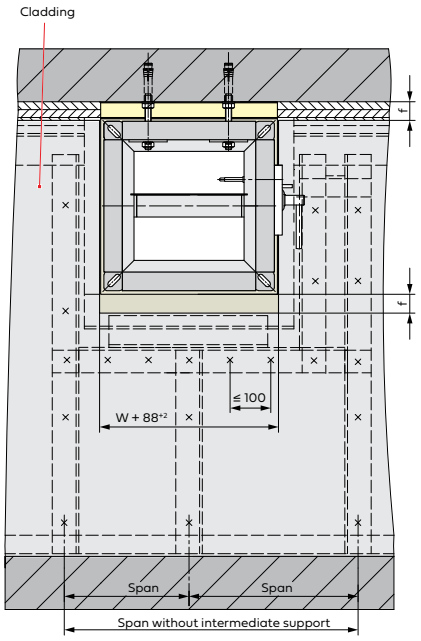

*Installed state* | *Lowered state* $a \leq f \leq 40$ mm | *Installed state* | *Lowered state* $a \leq f \leq 40$ mm | *Installed state* | *Lowered state* $a \leq f \leq 40$ mm

## Installation and arrangement of the metal studs

*Non-cladded wall*

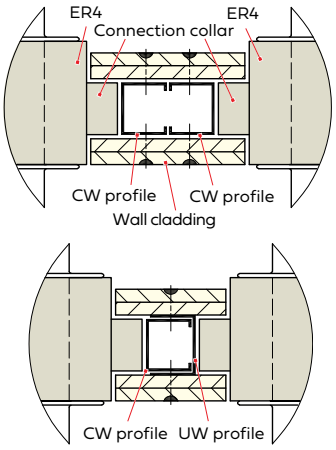



*Cladded wall*

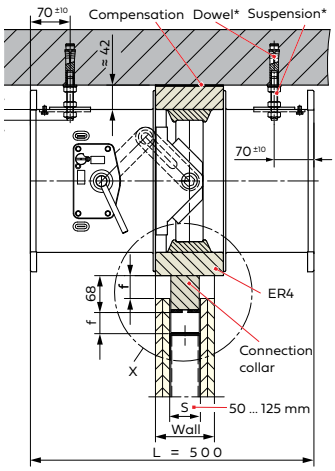



### Examples of installation of two FK90 fire dampers next to each other

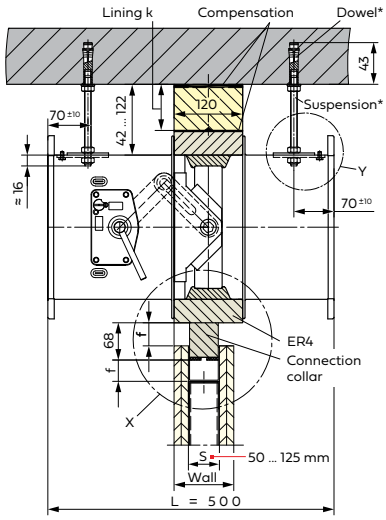
- An installation opening is required for each fire damper.
- The respective profiles can be inserted in each other



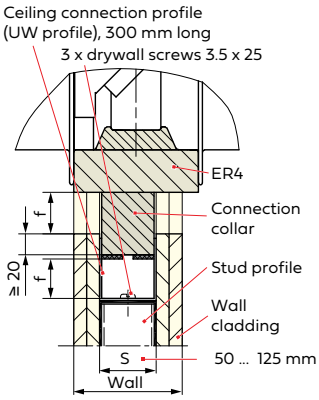

*Installation without lining*



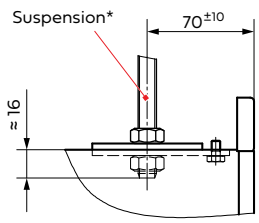

*Installation with lining k = 30 ... 80 mm (including compensation)*




*Detail X*




*Detail Y*



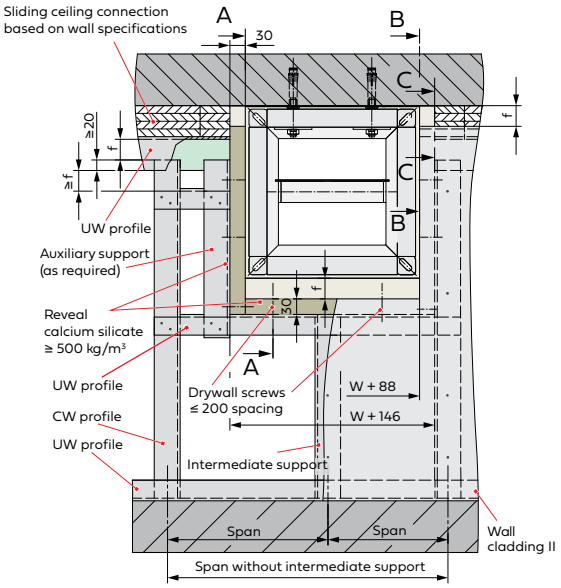

*) Is included in the scope of delivery of the ER4 installation subframes. Adhere to the installation instructions for the plugs. The Zykon drills with drive-in mandrels needed for installation can be supplied as optional items.

- ER4 installation subframes must match the stud profile depth S of the metal studs.
- ER4 installation subframes can be installed directly below rigid ceilings or with 30 ... 80 mm spacing. The spacing must be sealed with a lining k attached to the ceiling and made from 120-mm-wide strips of calcium silicate boards with a bulk density of ≥ 500 kg/m³.
- The surfaces of the ceilings must be smooth and even. If necessary, evening measures must be taken (rendering, smoothing etc.). Gaps and joints between the ER4 installation subframe, the lining k and the ceiling must be levelled off and sealed in a manner appropriate to the wall in question. Any openings remaining in the reveal between connection collars and ceiling connection profiles should be sealed. This is done either with strips of wallboard and/or gypsum filler or with mineral wool strips (melting point ≥ 1000 °C and ≥ 80 kg/m³ bulk density) and non-flammable adhesive.
- Fire dampers with ER4 installation subframes should be screwed onto the rigid ceiling using the M12 suspension components provided, and should then be aligned.
- The metal studs can then be positioned, whereby intermediate supports and lateral auxiliary supports must be fitted underneath the FK90 fire dampers if required due to the spans.
- There must also be clearances for incorporating the planned ceiling drop below the attached FK90 fire dampers in the area of the CW profiles, any CW intermediate supports, U profiles and claddings.
- Wall claddings must be attached according to general building authority test certificates and technical standards.

All dimensions in mm

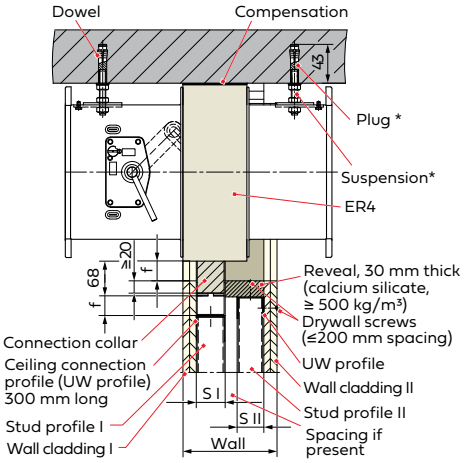
## 5.4.6.1 Sliding ceiling connection in double-studded walls

### Installation directly under ceilings

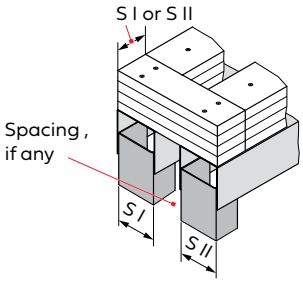



- ER4 installation subframes must fit the stud profile depth S I of the metal studs I, which should have profiles with the corresponding stud profile depths.
- The metal studs II contain a recess that is framed by the wall profiles. Accordingly, the strips of wall cladding material (e.g. plasterboard) attached to the ceiling are interrupted and sealed at the front (sections C-C).
- The profiles surrounding the recess on the metal studs II have reveals made from 30-mm-thick calcium silicate boards. These are guided to the ceiling up to the spacing f from the drop (sections B-B) and are attached to the metal stud profiles using drywall screws at spacings of ≤ 200 mm.
- If the metal studs have claddings on both sides, the sliding joint for the connection collar of the ER4 installation subframe rests between cladding I and the reveal adjacent to the cladding II (sections B-B).
- Joints should be filled according to standard practice in wall construction
- For further details, see ▸ page 74.

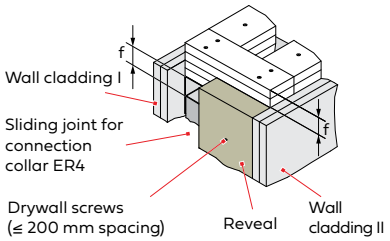
*A-A*




*B-B (without connection collar)*

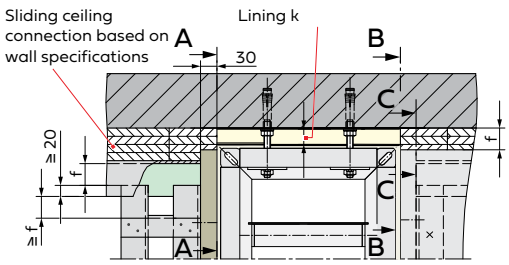



*C-C*

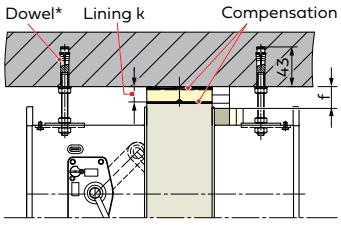



*) Is included in the scope of delivery of the ER6 installation subframes

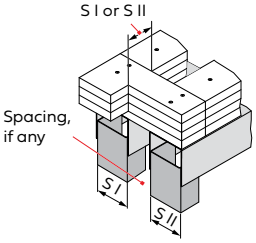
### Installation with lining for spacing of ≤ 80 mm from ceilings



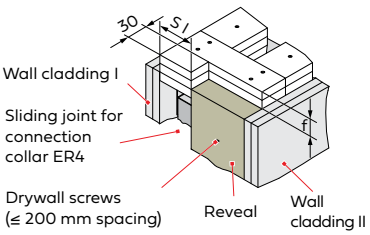

*A-A*




*B-B (without connection collar)*

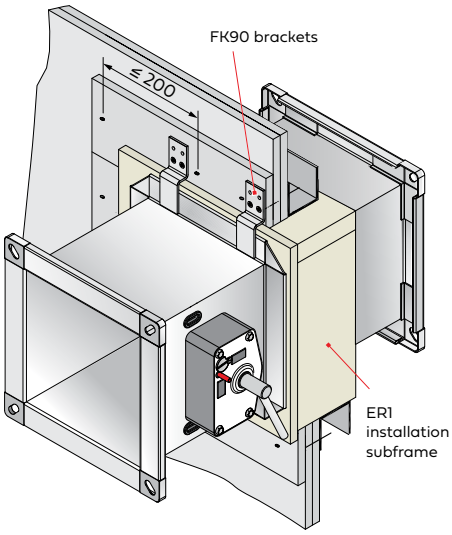



*C-C*




All dimensions in mm

## 5.4.7 Installation in shaft walls with and without metal studs

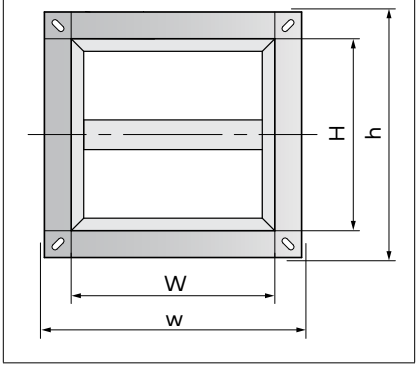



| Minimum thicknesses Wall [mm] | | |
|---|---|---|
| **Description of the wall** | | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Shaft wall made of wall boards, with at least 2-layer cladding on one side | With metal studs | **90** |
| | without metal studs | **40** |

i Further information on walls and wall construction ▸ page 28 ff.

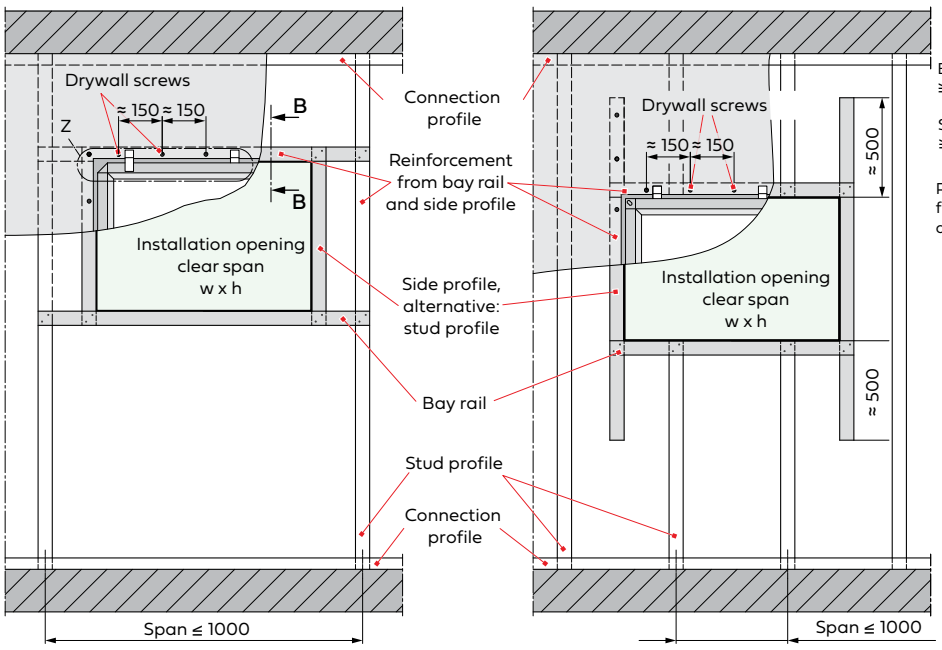
- Installation is possible for heights H up to 800 mm.
- Installation is carried out with ER1 or ER3 installation subframes in walls with cladding on one side.
- Installation with ER1 installation subframe and metal studs is shown.
- If the span of the framework is smaller than the width of the fire damper (with a horizontal axis, or the height with a vertical axis), then the side profiles should be fitted with a 500 mm excess length (bottom centre image). If smaller dimensions are available, the side profiles must be guided onto the connection profiles (bottom left image) and fastened there in a manner which is usual for the wall in question. Stud profiles (supports) can replace side profiles.
- For FK90 fire dampers with dimensions within the span of the studding, the bay rails should be connected to the stud profiles according to standard practice in wall construction.
- Walls without framework require laterally adjoining rigid walls with bracket profiles to which the freely tensioned, multi-layered wall cladding and extended bay rails of the all-round frame of the FK90 fire dampers are to be attached.
- Fixed by means of 2-way crimping ▸ page 28.

**Installation opening**

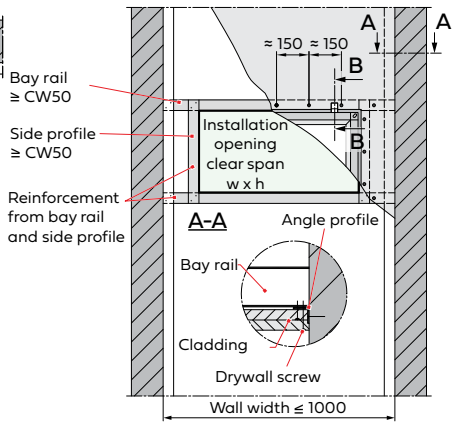



- **Installation opening:** w x h = (W + 80$^{+3}$ mm) x (H + 80$^{+3}$ mm)
- Installation openings are produced right when the walls are being built, but they can in part also be cut in afterwards.

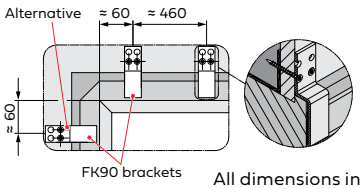
***With metal studs*** *(metal stud wall with cladding on one side)*




***Without metal studs***




***Detail Z***
*(Valid for all installation diagrams)*




All dimensions in mm

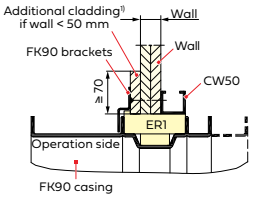
| | Widths | Heights |
|---|---|---|
| With metal studs | Unlimited | According to manufacturer |
| Without metal studs | Limited to ≤ 2 m, according to manufacturer | According to manufacturer |

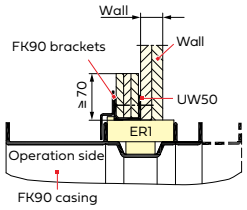
**Width and height of the shaft walls**

Limited dimensions can be found in the manufacturer's specifications. They depend on the profiles for the studding or on the boundary fixations, and are based on the type and thickness of the cladding.

***Installation of lengths 400 mm and 500 mm with ER1 installation subframe in walls with cladding on one side, with or without metal studs***

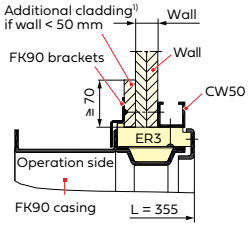
*Cross-sections B-B*

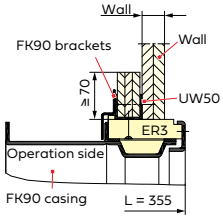



***Installation of 355 mm short length with ER3 installation subframe in walls with cladding on one side, with or without metal studs***

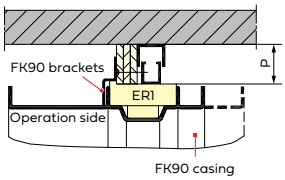
*Cross-sections B-B*

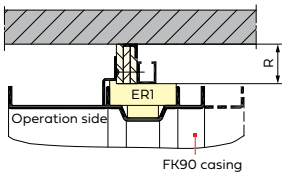


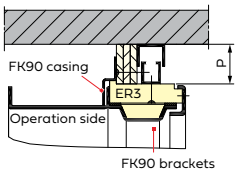



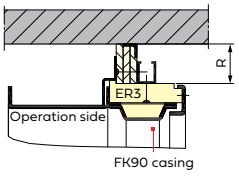

***Connections directly on rigid walls and ceilings (floors)***

*Cross-sections B-B*



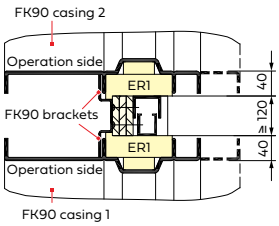



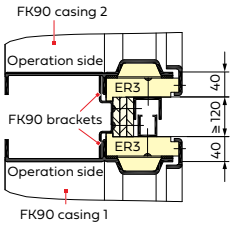




***Installation with short spacings***

*Cross-sections B-B*




**Left-hand-side cross-sections B-B** show the installation of FK90 fire dampers with the operation side on the visible side of the wall.

**Right-hand-side cross-sections B-B** show the installation of FK90 fire dampers with the operation side on the shaft side of the wall. The UW profiles of the circumferential frame must be completely filled ≥ 70 mm high with strips of wall cladding materials, or with construction boards made from calcium silicate, ≥ 500 kg/m³. FK90 connection brackets must be attached.
All joints must be levelled according to standard wall practice, as usual.

[1] **Wall thicknesses W < 50 mm** are ≥ 70 mm wide and to be doubled to ≥ 60 mm thickness.

Minimum spacings:

| Wall thickness | P | R |
|---|---|---|
| < 50 mm[2] | ≥ 70 mm | ≥ 70 mm |
| ≥ 50 mm | ≥ 40 mm | ≥ 35 mm |

[2] Add additional cladding as above.

FK90 connection brackets may be shortened by max. 25 mm in order to maintain the minimum spacings, see ▸ page 35.
Joints must be levelled according to standard wall practice, as usual.

When installing FK90 fire dampers with the operation side on the unclad wall side (metal stud side), the profiles running round the back must be filled with wall cladding material, see ▸ cross-sections B-B.

All dimensions in mm

## 5.5 Walls and ceilings in solid timber and timber frame construction

**Walls and ceilings in timber frame construction**

- **Solid timber construction** is a construction type with generally large-format, rigid wall and ceiling elements made of wood, mostly cross-laminated timber. The board layers can be bonded with adhesive and joined with wooden plugs or wire nails. Claddings with gypsum boards are possible.
- **Timber frame construction** is a construction type with wooden frames and crossbeams in walls or with wooden beams in ceilings. Claddings are generally implemented with gypsum boards, reinforcements with wooden material boards. Gaps can be filled with insulating materials.

The walls and ceilings are produced in accordance with European technical approvals and European Technical Assessments (ETA) or in accordance with building inspectorate approvals (abZ) and test certificates (abP).

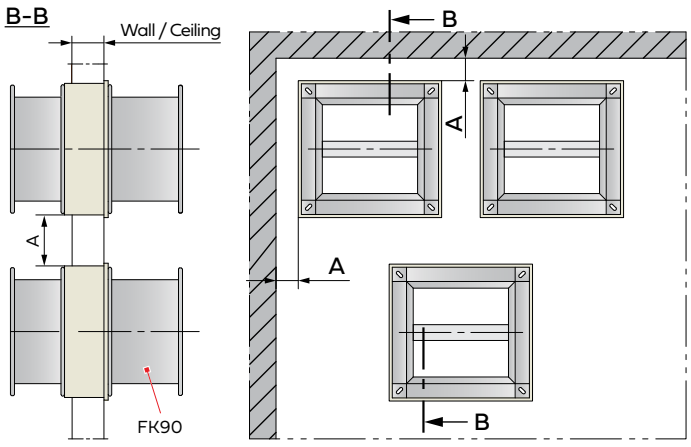
If claddings are required, gypsum boards DF according to EN 520 or gypsum board fire safety panels are generally used.

The installation of fire dampers for ventilation ducts requires fire resistance tests together with walls and ceilings in timber frame construction. The appropriate test certificates, declarations of performance and CE markings are available for FK90 fire dampers of the FK92 series.

Dry installation with installation subframes in wall or ceiling, dry installation with frames and fireproof foam for high installation tolerances, and wet installation with mortar are possible. That way, the reveals of the installation openings are protected from increased mass burning. Additional reveal protection in walls and ceilings is possible, but it is only required for specific requirements (e.g. double-studded walls).

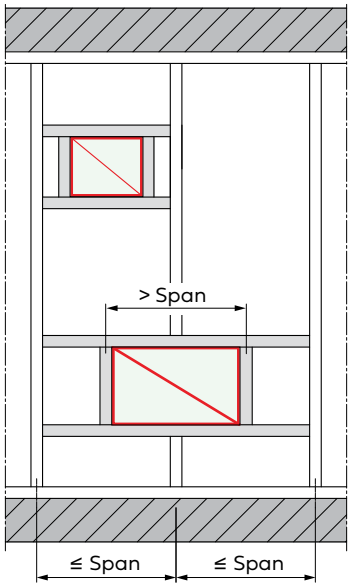
The fire resistance period of the fire dampers is up to 120 minutes. It is reduced to the fire resistance period of the wall or ceiling if it is lower. The following table specifies the minimum dimensions:

| Wall or ceiling | Building material of the wall/ceiling | Cladding of the wall/ceiling | Type of installation | Minimum thickness of the (cladded) wall/ceiling | Minimum dimension of wooden frames width x depth | Fire resistance period of the wall/ceiling/fire damper in minutes |
|---|---|---|---|---|---|---|
| Wall | Rigid boards made of cross-laminated timber ≥ 350 kg/m³ | Without | Installation subframe/ mortar | 90 mm | - | 30 / **60** |
| | | Without | Mortar | 95 mm | - | 30 / 60 / **90** |
| | | Without | Installation subframes | 110 mm | - | 30 / 60 / **90** |
| | | on both sides with 1 x 15 mm gypsum boards | Installation subframe/ mortar | 124 mm | - | 30 / 60 / **90** |
| Ceiling | | Without | Installation subframe/ mortar | 100 mm | - | 30 / **60** |
| | | Without | Installation subframe/ mortar | 130 mm | - | 30 / 60 / **90** |
| Wall | Wooden framework/ wooden beams with insulating material fillings | on both sides with 1 x 12.5 mm gypsum boards | Installation subframe/ mortar | 85 mm | 40 mm x 60 mm | 30 / **60** |
| | | on both sides with 2 x 12.5 mm gypsum boards | Installation subframe/ mortar | 110 mm | 60 mm x 60 mm | 30 / 60 / **90** |
| Ceiling | | on the bottom with 2 x 12.5 mm gypsum boards | Installation subframes | 100 mm | 60 mm x 60 mm | 30 / 60 / **90** |



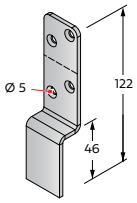
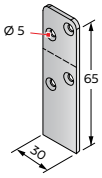
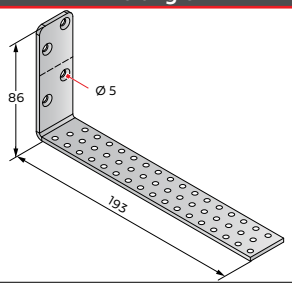

- Spacings “A” between FK90 fire dampers and to adjacent walls and ceilings are only required for specific requirements, for example, for installing the fastenings.
- The user must make sure that the walls and ceilings meet the structural and fire safety requirements. Installation openings must be arranged accordingly.

### Details on timber frame construction for walls and ceilings




- Stud spacing in walls or beam spacing in ceilings ≤ 625 mm (span), see example for installation openings on the left.
- Minimum dimensions for studs and beams ▸ table on page 46.
- Installation of the FK90 fire dampers with ER8 installation subframe ▸ page 49 ff.
- Installation openings are required with all-round frames made of wooden building materials.
- Installation openings can additionally be fitted with reveals made of wall-building materials, e.g. if the classification of the wall requires it, or if the installation opening is to be reduced in size subsequently. A suitable bond with the frame must be established to prevent the reveal from sliding out.
- Walls can be constructed single- and double-studded.
- Further information ▸ page 46.

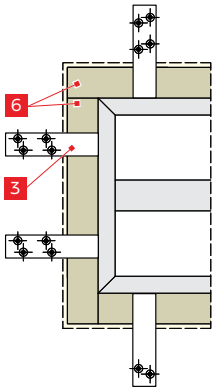
### Connection brackets and angle brackets for installation of the ER8 installation subframe

| ER8 bracket | ER8 stop plate | ER8 angle |
|---|---|---|
|  |  |  |

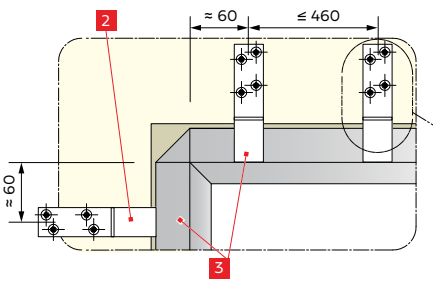


- Connection brackets, angle brackets and stop plates can be shortened on site if required.

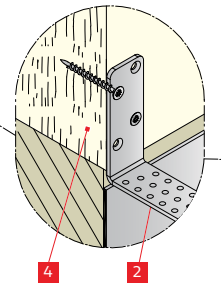
### Fastening with ER8 brackets and arrangement of ER8 stop plates



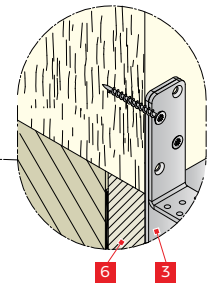

*Stop plate arrangement*




*Non-operation side (rear)*




***Wall ≤ 115 mm***




***Wall > 115 mm***

ER8 installation frames are fixed on the side of the wall / ceiling on which the fire damper actuator is located using FK90 connection brackets and on the other side using the same number of FK90 brackets (width W ≤ 580: 2 x 2 pcs., W ≤ 1040: 2 x 3 pcs., W > 1040: 2 x 4 pcs.).

### Nomenclature

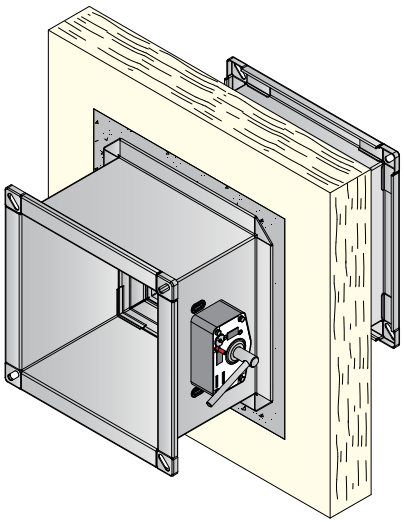
All dimensions in mm

| No. | Description | No. | Description |
|---|---|---|---|
| 2 | ER8 angle bracket for the non-operation side[1)] | 4 | Drywall screw 3.9 x 45 DIN 18182-2[1)] |
| 3 | ER8 stop plate for the non-operation side[1)] | 6 | Filling made of 35 mm Promatect® LS fire protection boards or 2 x 18 mm gypsum fire retardant boards |

[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

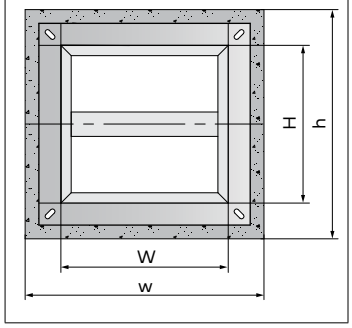
## 5.5.1 Walls and ceilings in solid timber construction

### 5.5.1.1 Wet installation with mortar



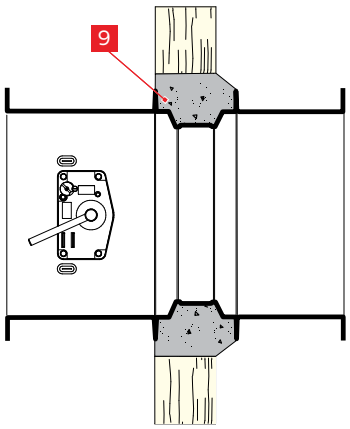
- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm.
- Fillings or gaps must be filled with mortar of group II or III according to DIN 1053 or with the classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire protection mortar or gypsum mortar.
- When installing the ceiling, mortar fillings require a bond with the cross-laminated timber using 1 mortar anchor per side of the cutout, to prevent sliding out.

**Installation opening**

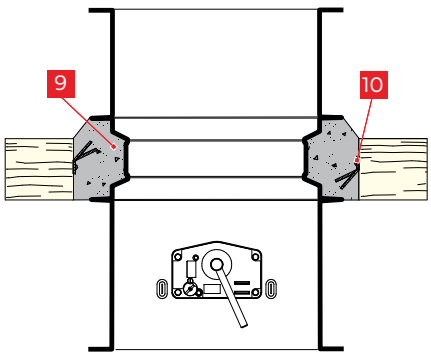



- **Installation opening**: w x h = (W + 90 ... 300 mm) x (H + 90 ... 300 mm)
- **Mortar gap**: 45 ... 150 mm

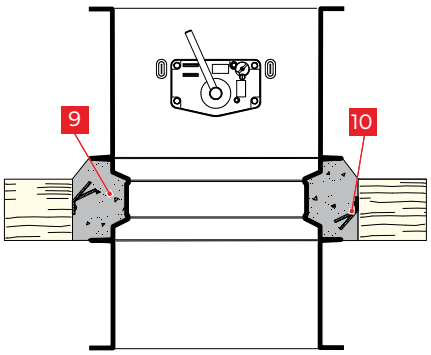
*Installation example wall 90 mm, mortar depth 90 mm, gap width 65 mm*




*Installation example ceiling 100 mm, actuator below, mortar depth 100 mm, gap width 65 mm*




*Installation example ceiling 100 mm, actuator above, mortar depth 100 mm, gap width 65 mm*



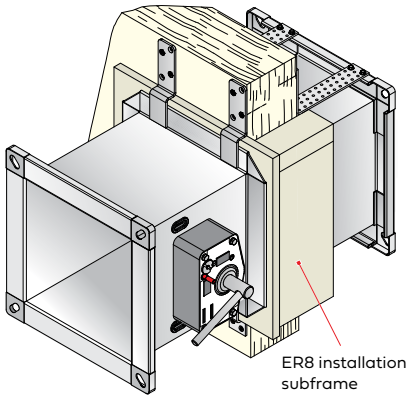

Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 9 | Mortar | 10 | Mortar anchor |

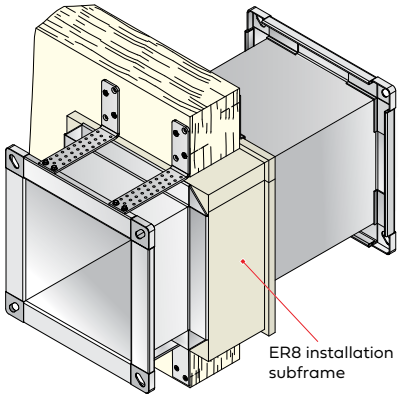
### 5.5.1.2 Dry installation with installation subframe

**Installation of lengths 400 mm and 500 mm with ER8 installation subframe in walls and ceilings without cladding**

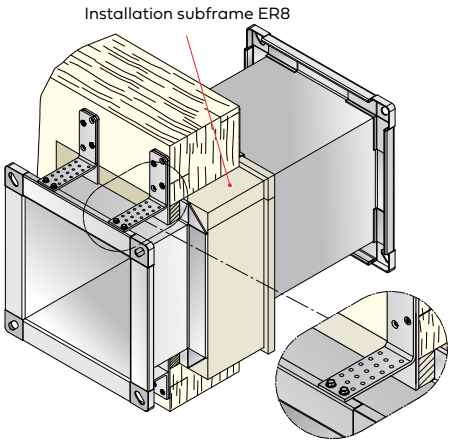
*Installation example, wall = 95 mm*
*Operation side*




*Installation example, wall = 95 mm*
*Non-operation side (rear)*

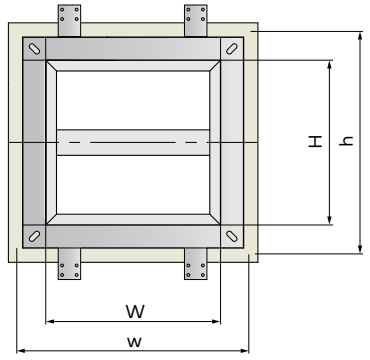



*Installation example, wall = 145 mm*
*Non-operation side (rear)*




Connection bracket arrangement and fastening ▸ page 47

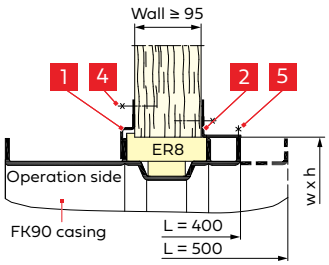
**Installation opening**



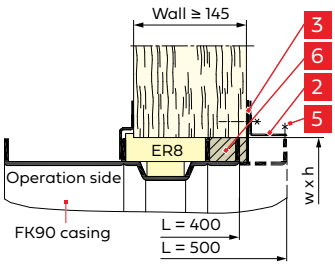

w x h =
(W + 82$^{+2}$ mm) x (H + 82$^{+2}$ mm)

- Installation is possible for heights H up to 800 mm.
- FK90 fire dampers, series FK92 are suitable for dry installation in rigid wooden walls and ceilings.
- Fastened to both sides of the wall or ceiling with a spacing of ≤ 460 mm using special connection brackets (▸ page 47). These are included as an accessory kit in the scope of delivery of the fire dampers with ER8 installation subframe for W ≤ 580 mm or for W > 580 mm.
- Connection brackets can be moved to the H sides, especially if H > W.
- ER8 connection brackets 1 must be used on the operation side. If the depth of the frame is less than the wall thickness, it may be necessary to protect exposed reveals on the non-operation side, particularly in the case of walls and ceilings with cladding.
- Fillings 6 on the non-operation side are each held on the B and H sides by two ER8 stop plates 3. They are screwed together or individually using the ER8 angle brackets 2.
- For ER8 connection brackets 1 and ER8 angle brackets 2, drywall screws 4 are to be used.
- ER8 brackets 2 on the non-operation side must be shortened to the required length and fastened 5 to the flange of the fire damper casing using two self-drilling screws each.

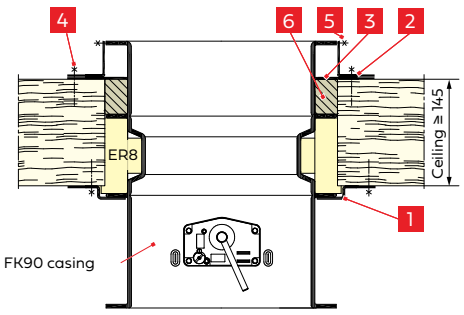
*Installation example, wall ≥ 95 mm*
*shown: wall = 95 mm*




*Installation example, wall ≥ 145 mm*
*shown: wall = 200 mm*




*Installation example, ceiling ≥ 145 mm*
*shown: ceiling = 200 mm,*
*actuator beneath the ceiling*




### Nomenclature

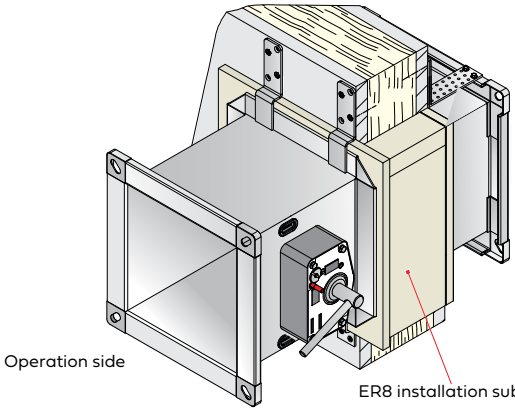
All dimensions in mm

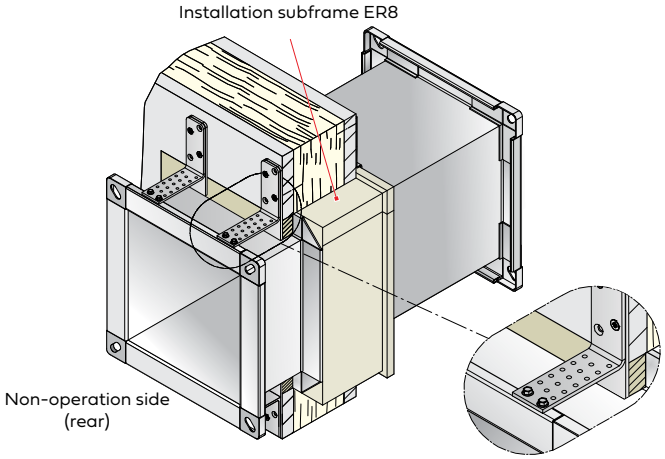
| No. | Description | No. | Description |
|---|---|---|---|
| 1 | ER8 bracket for the operation side[1)] | 4 | Drywall screw 3.9 x 45 DIN 18182-2[1)] |
| 2 | ER8 angle bracket for the non-operation side[1)] | 5 | Self-drilling screw 3.9 x 25 DIN 7504, shape K [1)] |
| 3 | ER8 stop plate for the non-operation side[1)] | 6 | Filling made of 35 mm Promatect® LS fire protection boards or 2 x 18 mm gypsum fire retardant boards |

[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

**Installation of lengths 400 mm and 500 mm with ER8 installation subframe in walls and ceilings with cladding**

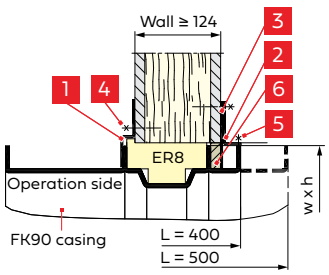
*Installation example for wall ≥ 124 mm, shown: wall = 124 mm*



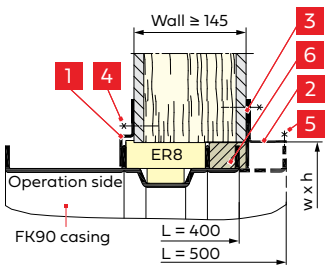




- Connection bracket arrangement and fastening ▸ page 47.
- Installation is possible for heights H up to 800 mm.
- Information on fastening the frames ▸ page 49.
- The cladding of the wooden walls and wooden ceilings must be fastened properly. This is normally carried out at ≤ 250 mm spacings with ≥ 35 mm long drywall screws Ø ≥ 3.5 mm.

*Installation example for wall ≥ 124 mm*
*shown: wall = 124 mm*




*Installation example for wall ≥ 145 mm*
*shown: wall = 200 mm*



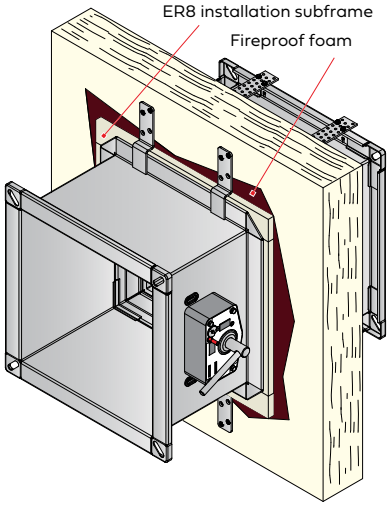

All dimensions in mm

## Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | ER8 bracket for the operation side[1)] | 4 | Drywall screw 3.9 x 45 DIN 18182-2[1)] |
| 2 | ER8 angle bracket for the non-operation side[1)] | 5 | Self-drilling screw 3.9 x 25 DIN 7504, shape K [1)] |
| 3 | ER8 stop plate for the non-operation side[1)] | 6 | Filling made of 35 mm Promatect® LS fire protection boards or 2 x 18 mm gypsum fire retardant boards |

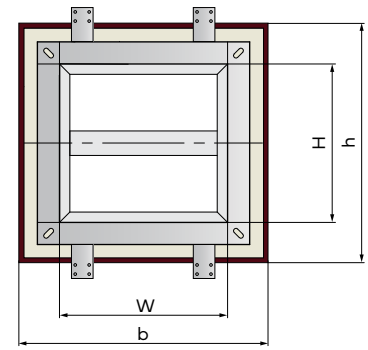
[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

### 5.5.1.3 Dry installation with ER8 installation subframe and fireproof foam



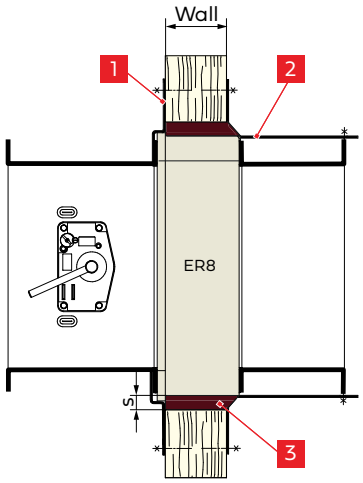

- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm.
- Fireproof foam can also be used to completely seal uneven and non-straight gaps around the ER8 installation subframe.
- The gaps must be at least wide enough so that the entire depth of the installation subframe is filled, and they must be filled with fireproof foam in accordance with the manufacturer's instructions.

**Installation opening**

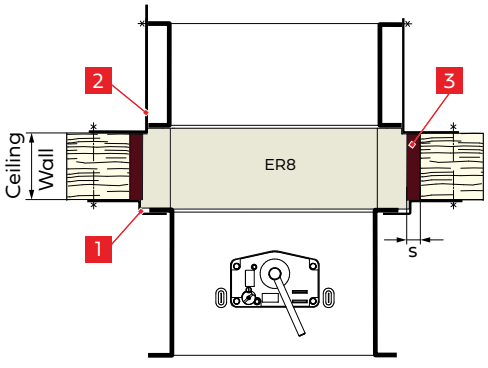



- **Installation opening** when filling gaps with fireproof foam: w x h = (W + 88 ... 168 mm) x (H + 88 ... 168 mm)
- **Gap size** between wall / ceiling and frame: 5 ... 45 mm

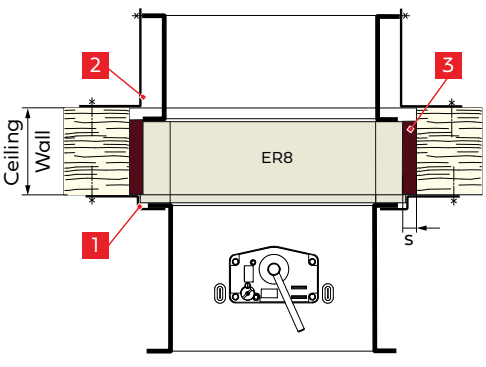
*Installation example, wall = 90 mm, gap width, foam s = 20 mm*




*Installation example, ceiling = 100 mm, gap width, foam s = 20 mm*




*Installation example, ceiling = 130 mm, gap width, foam s = 20 mm*




### Nomenclature

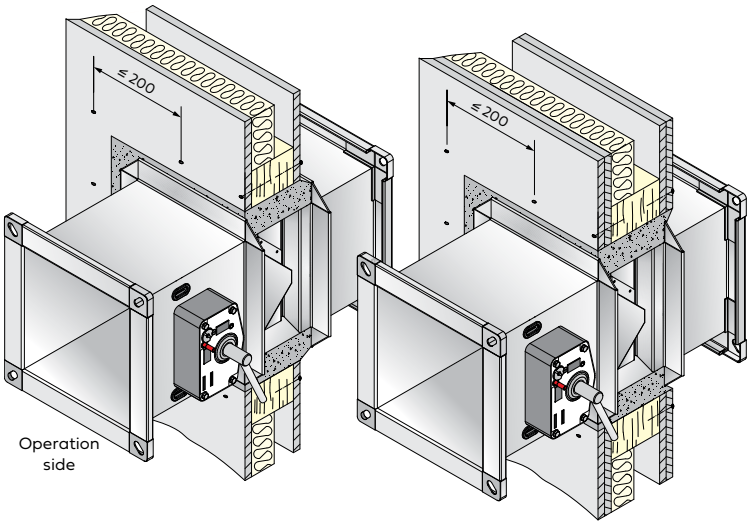
| No. | Description | No. | Description |
|---|---|---|---|
| 1 | ER8 bracket[1)] | 3 | Fireproof foam (Hilti® CFS-F FX fireproof foam, Würth® Kombi fireproof foam or Zapp Zimmermann ZZ® 330 fireproof foam) |
| 2 | ER8 angle bracket[1)] | | |

[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

## 5.5.2 Walls and ceilings in timber frame construction

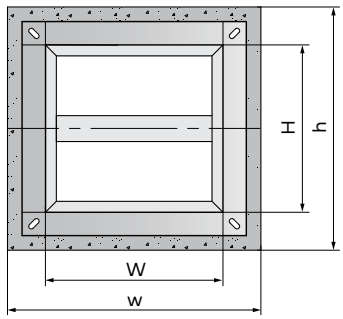
### 5.5.2.1 Wet installation with mortar

**Installation of lengths 400 mm and 500 mm with mortar in walls with cladding**



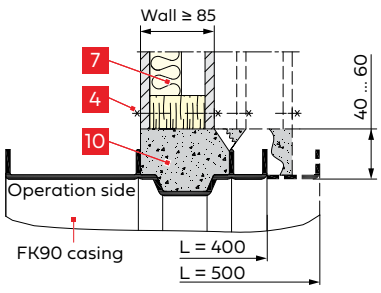

- Installation is possible for heights H up to 800 mm.
- Fillings or gaps must be filled with mortar of group II or III according to DIN 1053 or with the classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire protection mortar or gypsum mortar.
- Mortar fillings require a bond with the wooden reveal. If necessary, support measures such as mortar anchors must be provided on site.
- Walls with double-studding installed with spacing require suitable reveals made of wall-building materials.
  Larger wall thicknesses reduce the required depth of mortaring to 100 mm to 120 mm, thereby also bringing about reductions in weight.

**Installation opening**

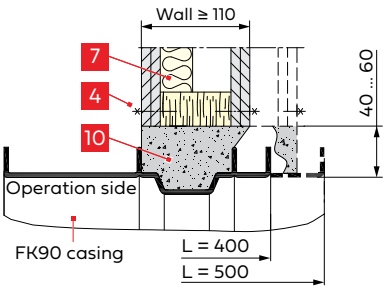



- **Installation opening:**
  w x h = (W + 80$^{+40}$ mm) x (H + 80$^{+40}$ mm)

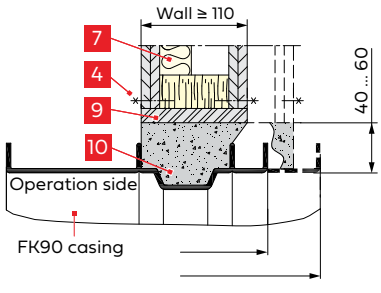
*Installation example, wall ≥ 85 mm*
*shown: wall = 85*




*Installation example, wall ≥ 110 mm*
*shown: wall = 130*




*Installation example, wall ≥ 110 mm*
*Shown with additional reveal made of wall-building materials*




All dimensions in mm

### Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 4 | Drywall screw 3.9 x 45 DIN 18182-2[1)] | 9 | Reveal made of wall-building materials |
| 7 | Insulation material (wall-specific) | 10 | Mortar |

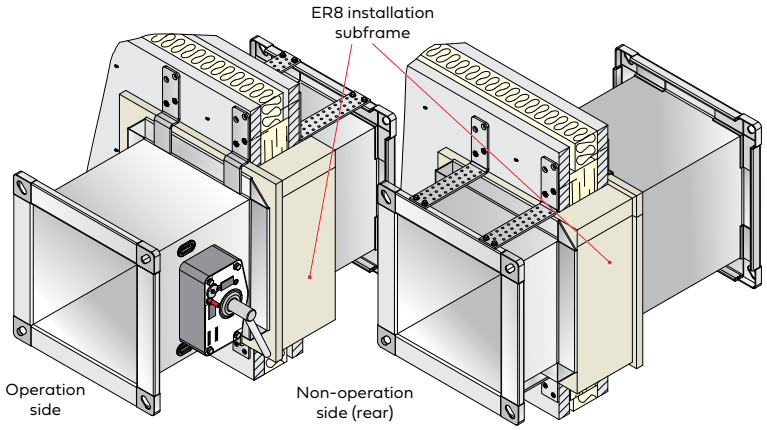
[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

### 5.5.2.2 Dry installation with installation subframe

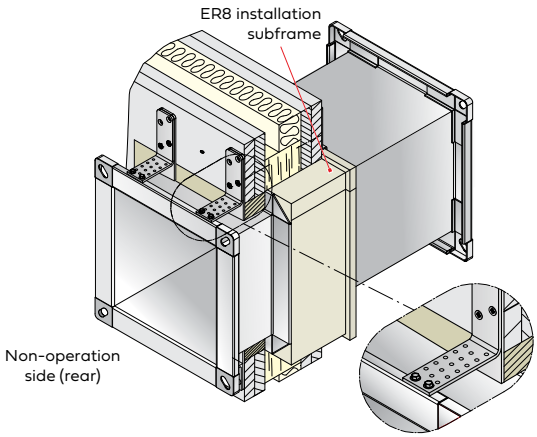
**Installation of lengths 400 mm and 500 mm with ER8 installation subframe in walls and ceilings with cladding**

- Installation is possible for heights H up to 800 mm.

*Installation example, wall = 85 mm*
*Operation-side and non-operation side (rear)*

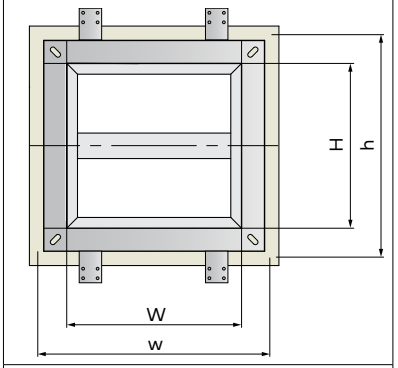



*Installation example, wall = 145 mm*
*Non-operation side (rear)*



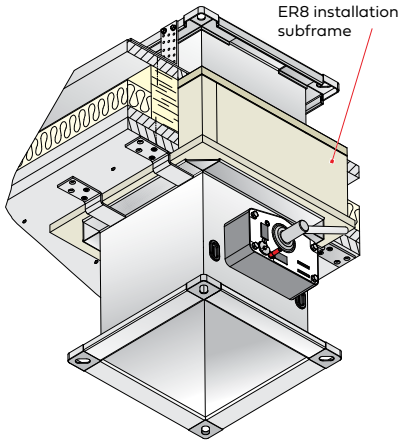

Connection bracket arrangement and fastening ▸ page 47

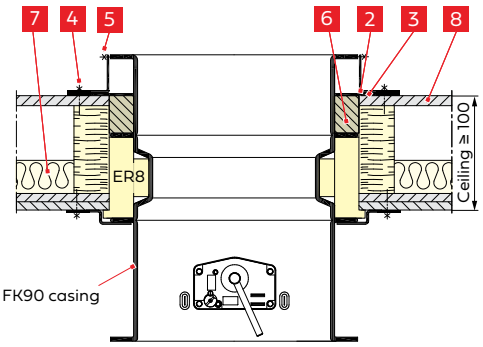
**Installation opening**



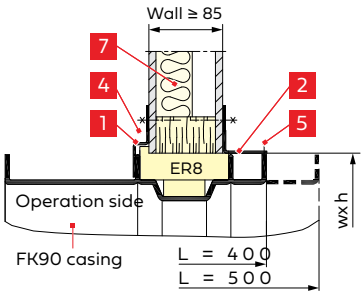

w x h =
(W + 82$^{+2}$ mm) x (H + 82$^{+2}$ mm)

*Installation example, wooden ceiling = 200 mm, actuator beneath the ceiling*

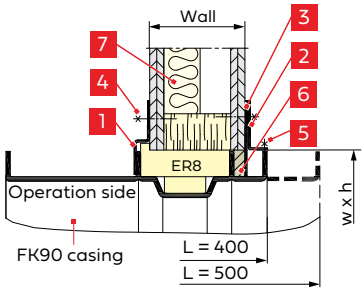


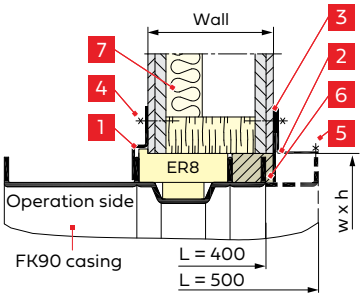

*Installation example, wall ≥ 85 mm*
*shown: wall = 85 mm*




*Installation example, wall = 125 mm*




*Installation example, wall = 200 mm*




- The reveals can optionally be cladded with wall-building materials.

All dimensions in mm

Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | ER8 bracket for the operation side[1)] | 5 | Self-drilling screw 3.9 x 25 DIN 7504, shape K [1)] |
| 2 | ER8 angle bracket for the non-operation side[1)] | 6 | Filling made of 35 mm Promatect® LS fire protection boards or 2 x 18 mm gypsum fire retardant boards |
| 3 | ER8 stop plate for the non-operation side[1)] | 7 | Insulating material (specific to the wall / ceiling) |
| 4 | Drywall screw 3.9 x 45 DIN 18182-2[1)] | 8 | Wooden material board density ≥ 600 kg/m³ or equivalent specific to the wall or ceiling |

[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

## 5.6 Walls with timber frame construction with clay panel cladding and wood fibre insulation

Walls in timber frame construction with clay panel cladding must be produced in accordance with the specifications of the manufacturer. Specifications on the design, fire resistance period and fire safety classification, wall heights and wall thicknesses must be observed.

If the installation position of the fire damper is in the area of supports within the wall, trimmers have to be installed in these areas of the wall. Trimmers are required for installation openings which are wider than the span of the wall. The structural stability of the wall must be verified by the user.

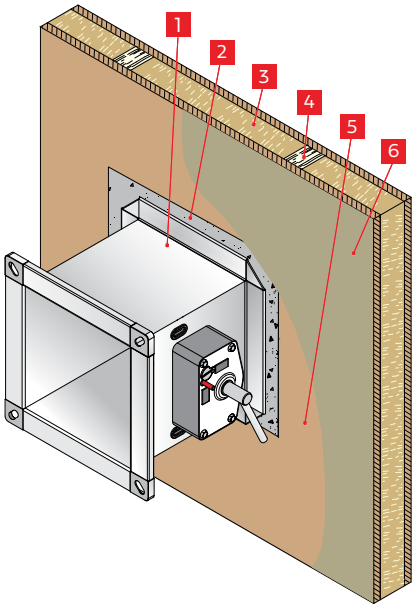
The substructures of the walls are made up of squared timbers with a format of 60 x 60 mm or 80 x 60 m which act as supports. They are set up with a span ≤ 625 mm. Installation openings for FK90 fire dampers must be produced as all-round closed frames made of squared timbers. The fillings of wood fibre boards with a raw density ≥ 50 kg/m³ are adjacent to them. The clay boards with a thickness of 22 mm attached for cladding must be fastened in accordance with the manufacturer's instructions.

Wall surfaces and transitions to the mortar sealings can be covered with reinforcement fabric and then rendered with fine clay plaster according to DIN 18947.

The fire resistance period of the fire dampers is up to 90 minutes. It is reduced to the fire resistance period of the wall if it is lower. The following table specifies the minimum dimensions:

| Building material of the wall | Cladding of the wall | Infill of the wall | Type of installation | Minimum thickness of the cladded wall | Minimum dimension of wooden frames width x depth | Fire resistance period of the wall/ fire damper in minutes |
|---|---|---|---|---|---|---|
| Wooden framework with insulation material filling made of wood fibre boards | on both sides with 1 x 22 mm clay boards | Wood fibre insulation board, raw density ≥ 50 kg/m³ | Mortar | 104 mm | 60 mm x 60 mm | 30 / **60** |
| | | | | 124 mm | 80 mm x 60 mm | 30 / 60 / **90** |
| | | | Clay plaster mortar with fibre content | 104 mm | 60 mm x 60 mm | 30 / **60** |
| | | | | 124 mm | 80 mm x 60 mm | 30 / 60 / **90** |
| | | | Installation subframe | 104 mm | 60 mm x 60 mm | 30 / **60** |
| | | | | 124 mm | 80 mm x 60 mm | 30 / 60 / **90** |

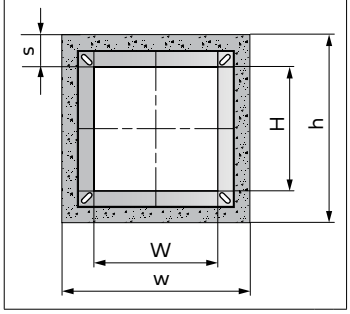
## 5.6.1 Wet installation with mortar




i Further information on wall construction and wall surfaces ▸ page 54.

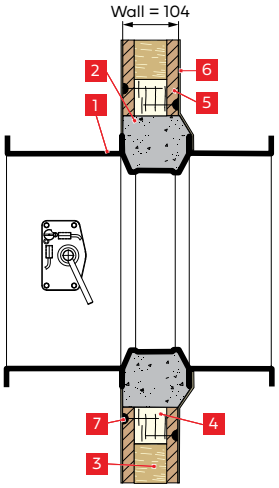
- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm.
- Mortar fillings require a bond with the wooden reveal. If necessary, support measures, for example mortar anchors, must be provided by the operating company.
- Fillings or gaps must be filled with mortar of group II or III according to DIN 1053 or with the classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire protection mortar or gypsum mortar.

**Installation opening**

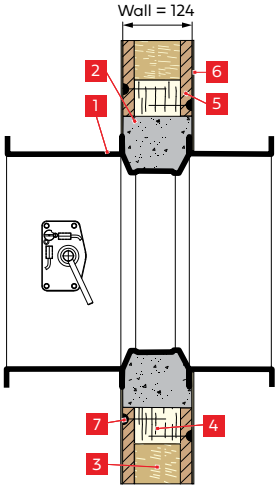



- **Installation opening**: w x h = (W + 80 ... 450 mm) x (H + 80 ... 450 mm)
- **Gap size:** s = 40 ... 225 mm

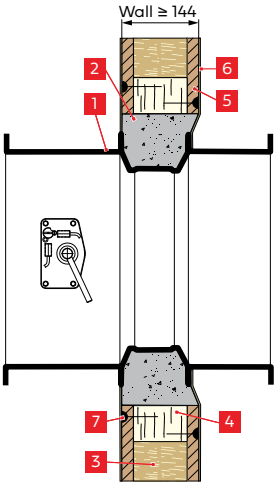
*Installation example wall = 104*




*Installation example wall = 124*




*Installation example wall ≥ 144*

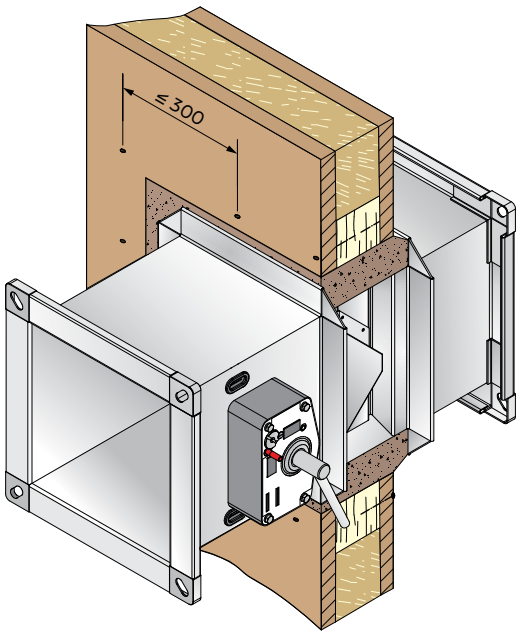



Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper | 5 | Clay board according to DIN 18948 |
| 2 | Mortar | 6 | Fine clay plaster according to DIN 18947 (as required with reinforcement fabric) |
| 3 | Wood fibre insulation board, raw density ≥ 50 kg/m³ | 7 | Clay board screws, 5 x 60 mm |
| 4 | Wooden frame construction | | |

All dimensions in mm

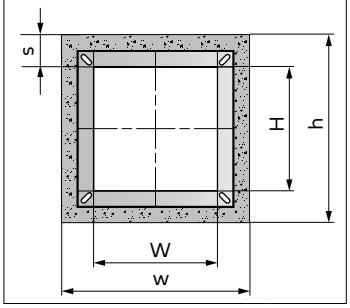
## 5.6.2 Wet installation with clay plaster mortar




i Further information on wall construction and wall surfaces ▸ page 54.

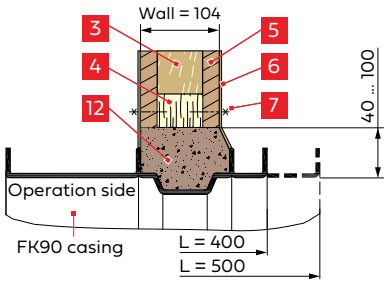
- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm.
- Mortar fillings require a bond with the wooden reveal. If necessary, support measures, for example mortar anchors, must be provided by the operating company.
- Fillings for gaps must be made with clay plaster mortar with fibre content in accordance with DIN 18947 - LPM 0/4 f - S II - 1.8. It consists of construction clay, sand and fibre content, for example, straw.
- The transitions between the clay plaster mortar and the clay board are filled with fine clay plaster in accordance with DIN 18947 - LPM 0/1 f - S II-1.8. It consists of construction clay, sand and plant fibres.

**Installation opening**

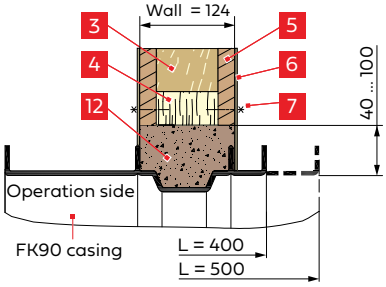



- **Installation opening**: w x h = (W + 80 ... 200 mm) x (H + 80 ... 200 mm)
- **Gap size**: s = 40 ... 100 mm

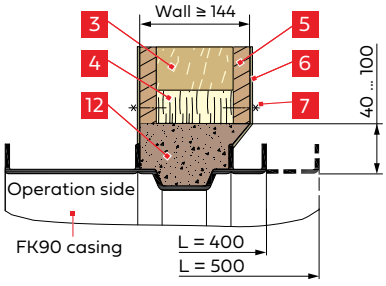
*Installation example wall = 104*




*Installation example wall = 124*




*Installation example wall ≥ 144*

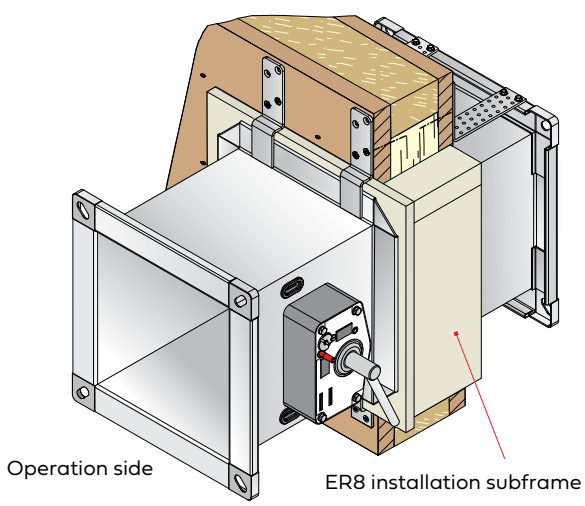


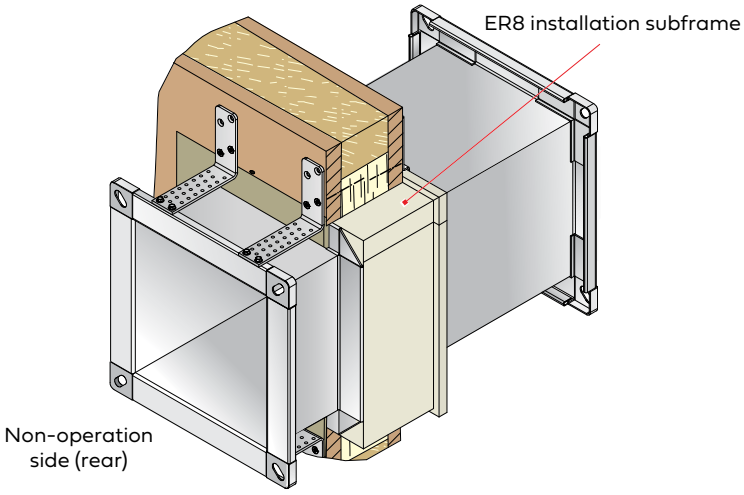

Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 3 | Wood fibre insulation board, raw density ≥ 50 kg/m³ | 6 | Fine clay plaster according to DIN 18947 (as required with reinforcement fabric) |
| 4 | Wooden frame construction | 7 | Clay board screws, 5 x 60 mm |
| 5 | Clay board according to DIN 18948 | 12 | Clay plaster mortar with fibre content according to DIN 18947 |

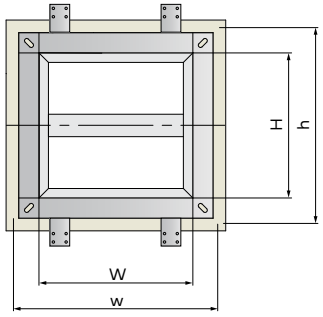
All dimensions in mm

## 5.6.3 Dry installation with ER8 installation subframe




**Installation opening**

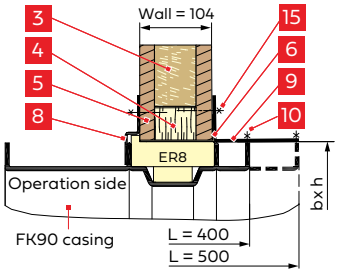



w x h = (W + 82$^{+20}$ mm) x (H + 82$^{+20}$ mm)

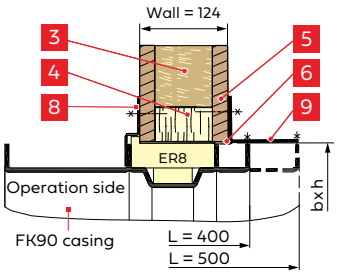
i Further information on wall construction and wall surfaces ▸ page 54.

- Installation is possible in heights H up to 800 mm and lengths L = 400 mm or 500 mm.
- Spacings between the ER8 installation subframe and the supporting structure may be a maximum of 10 mm and filled with fine clay plaster in accordance with DIN 18947 – LPM 0/1 f – p. II-1.8.
- The ER8 installation subframe is fastened in the same way as for installation in walls with cladding in wooden frame construction ▸ page 49.
- To protect the wooden frame, for wall thicknesses > 124 mm, the reveal must be lined with clay panels or a filling of fire protection boards must be provided.

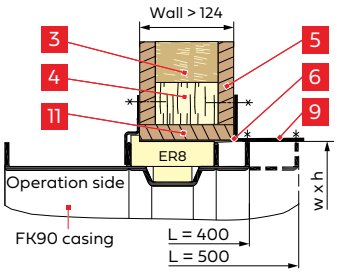
*Installation example wall = 104*



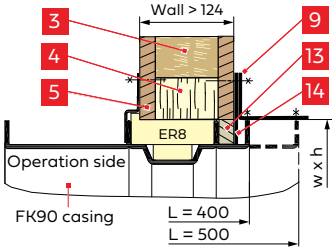

*Installation example wall = 124*




*Installation example wall > 124 with reveal protection*




*Installation example wall > 124 with filling*




### Nomenclature

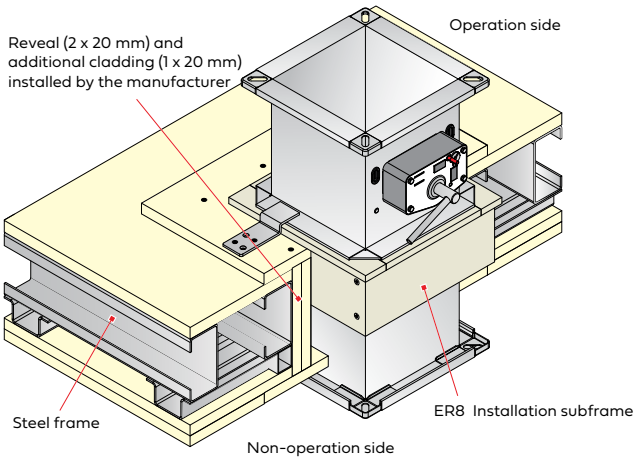
| No. | Description | No. | Description |
|---|---|---|---|
| 3 | Wood fibre insulation board, raw density ≥ 50 kg/m³ | 10 | Self-drilling screw 3.9 x 25 DIN 7504, shape K [1] |
| 4 | Wooden frame construction | 11 | Reveal protection consisting of clay board 5 according to DIN 18948 |
| 5 | Clay board according to DIN 18948 | 13 | Filling made of Promatect® LS fire protection boards or strips of clay boards in accordance with DIN 18948 |
| 6 | Fine clay plaster according to DIN 18947 | | |
| 8 | ER8 bracket for the operation side[1] | 14 | ER8 stop plate for the non-operation side[1] |
| 9 | ER8 angle bracket for the non-operation side[1] | 15 | Drywall screw 3.9 x 45 DIN 18182-2[1] |

1) Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

All dimensions in mm

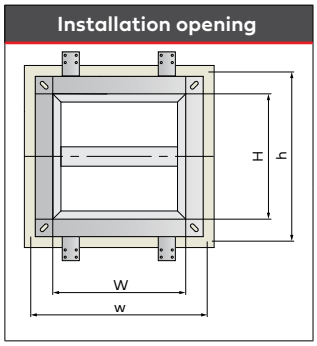
## 5.7 Ceilings with steel frames

### 5.7.1 Dry installation in ceiling and roof constructions



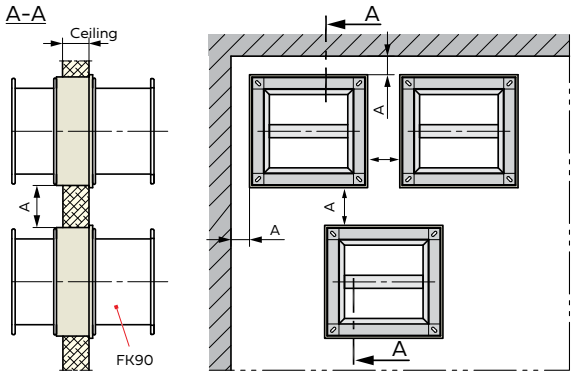

| Minimum thicknesses Ceiling [mm] | |
|---|---|
| **Description of the ceiling** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Ceiling construction made of cladded steel frames | **222** |

- Installation is possible for heights H up to 800 mm.
- The modular construction system by KLEUSBERG comprises cladded steel frames and is installed as a building.
- FK90 fire dampers in lengths of 400 mm or 500 mm with ER8 installation subframe can be installed. They are inserted into installation openings which are clad all-round with reveals made of fire protection boards, and fastened with ER8 connection brackets 1 and ER8 angle brackets 2.
- The operation side of the fire dampers can be positioned above or below the ceilings.




- **Manufacturer:**
  KLEUSBERG GmbH & Co. KG,
  06184 Kabelsketal-Dölbau,
  Germany
- **Classification report:**
  KB 3.2/17-006-2

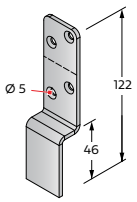
- **Installation opening**:
  w x h = (W + 80$^{+4}$ mm) x (H + 80$^{+4}$ mm)



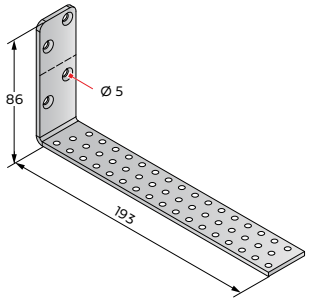

### Spacings

- Installation spacings “A” between FK90 fire dampers and to adjacent walls are only required for specific requirements, for example, for installing the reveals and fastenings.
- The user must make sure that the ceilings meet the structural and fire safety requirements. Installation openings must be arranged accordingly.

*Operation-side*
*ER8 connection bracket* 1




*Non-operation side*
*ER8 angle bracket* 2



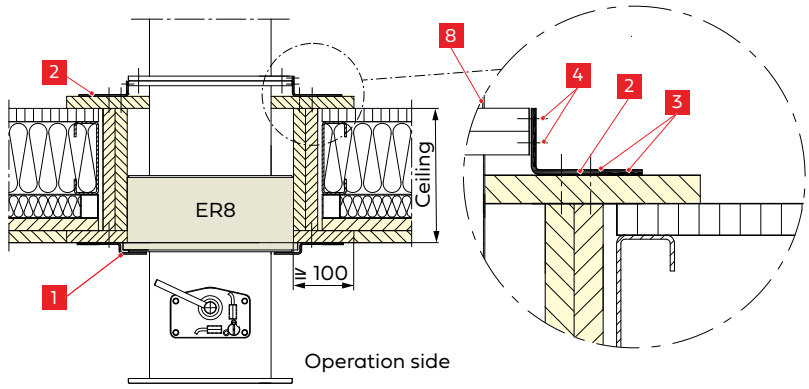

### Fastening

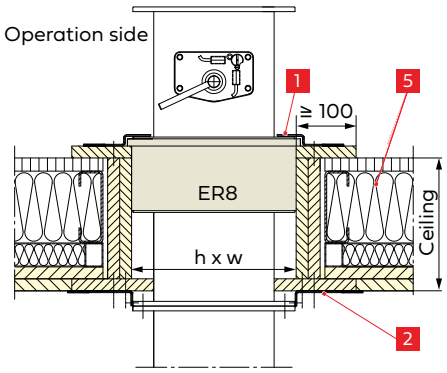
The installation subframe is fastened to the ceiling with ER8 connection brackets on the operation side of the fire damper, and with ER8 angle brackets on the non-operation side.
ER8 connection brackets and ER8 angle brackets are screwed together with a specified number of drywall screws:

- W ≤ 580: 2 x 2 pcs.,
- W ≤ 1040: 2 x 3 pcs.
- W > 1040: 2 x 4 pcs.

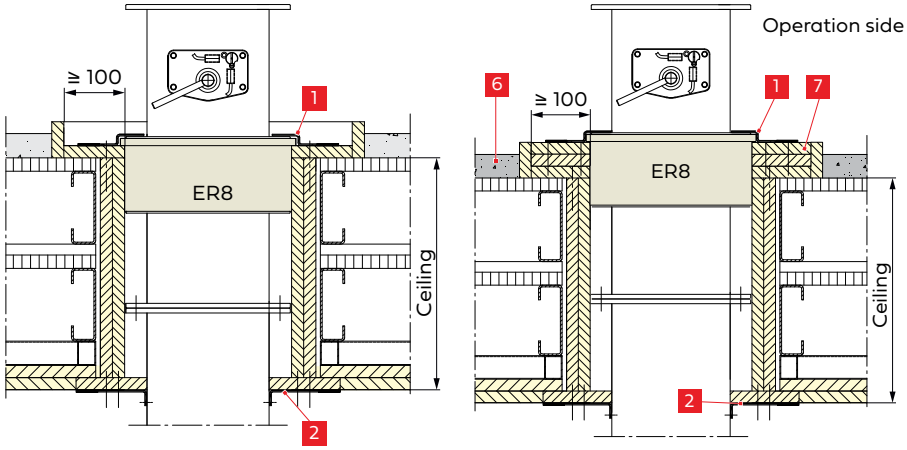
All dimensions in mm

### Installation in roof constructions



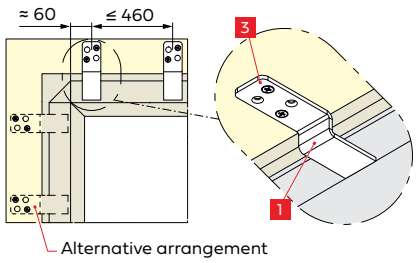

### Installation in ceiling constructions



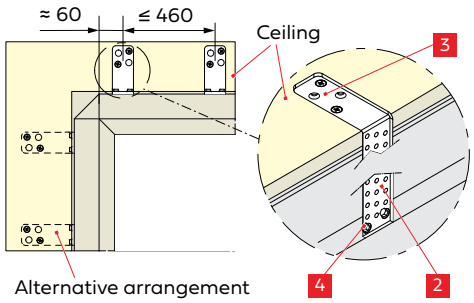

**Installation instructions**

- Fastenings must be implemented on both sides of the ceiling and roof constructions.
- Attention must be paid to excess lengths or mechanical and electrical components.
- Fire dampers installed in or on roof constructions require weather protection which also guarantees accessibility.

Illustration above: FK90 fire damper on a ceiling on the top of which a floor and a formwork (in two different designs) made of fire protection boards for installation of screed have been attached.




Fasten ER8 connection brackets 1 on the operation side to the ceiling cladding using drywall screws 3.




Fasten ER8 angle brackets 2 on the non-operation side to the flange 4 of the fire damper casing or to the ventilation duct using self-drilling screws.
ER8 angle brackets can be shortened to the required lengths for this purpose.

**ER8 connection brackets** and **ER8 angle brackets** must be arranged at ≤ 460 mm spacings. Fastenings should preferably be installed on the W-side. H-side if H > W.
Mixed W- and H-side arrangements are also possible.
Fastening to ceiling cladding must be carried out with drywall screws Ø 3.9 x 45 mm, to the flange of the fire damper casing with self-drilling screws Ø 3.9 x 25 mm, as well as to ventilation ducts.

### Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | ER8 bracket for the operation side[1)] | 5 | Insulating material for roof construction |
| 2 | ER8 angle bracket for the non-operation side[1)] | 6 | Screed |
| 3 | Drywall screw Ø 3.9 x 45, DIN 18182-2[1)] | 7 | Formwork made of fire protection boards |
| 4 | Self-drilling screw Ø 3.9 x 25, DIN 7504, shape K [1)] | 8 | Ventilation duct |

[1)] Included in the scope of delivery of the fire damper with ER8 installation subframe. Therefore, it could be superfluous depending on the installation scenario.

All dimensions in mm

## 5.8 Historical wooden beam ceilings

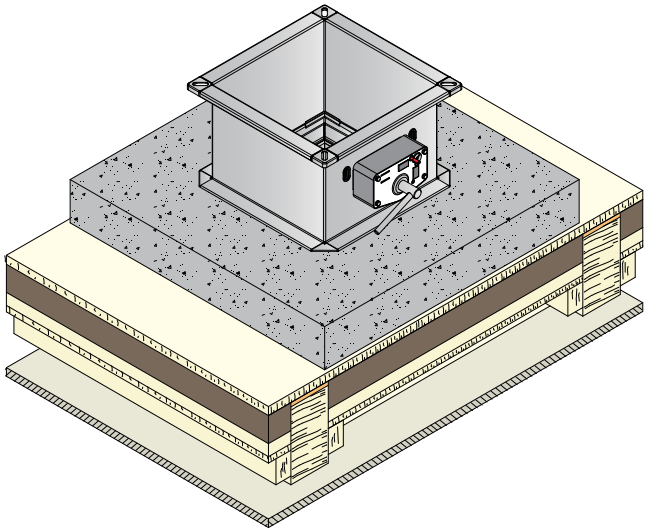
The construction of historical wooden beam ceilings is generally made up of the wooden beams with a floor made of edged boards inserted between them. On the inserted floors, there is an infill made of daub, clay or cob filling, sand filling or similar. Finally, timber floor boards are laid on the wooden beams.

The respective building supervisory authority or fire safety officer must be consulted before installing fire dampers. The technical expert must include aspects, for example the ceiling construction, connections, trimmers, insulation and the integration of the trimmers into the historical ceiling in his/her assessment. For new constructions of the wooden beams inserted at a later date, the minimum requirements for wooden ceiling installation in accordance with "5.5 Walls and ceilings in solid timber and timber frame construction" on ▸ page 46 apply.

In order to prevent a high weight load on the historical ceiling construction, the spacing filled with concrete between the fire damper and the reveal in the ceiling must only be made as large as genuinely necessary. Alternatively, the fire damper can also be installed with an ER8 installation subframe. To do so, installation in wooden beam ceilings must be implemented in accordance with "5.5 Walls and ceilings in solid timber and timber frame construction".

### 5.8.1 Wet installation with mortar

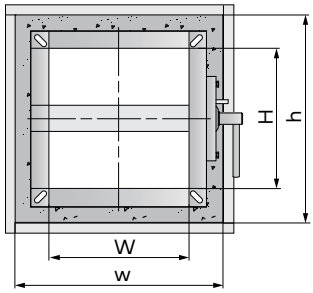
*Installation example, fire resistance period 30 minutes*



| Minimum thicknesses Ceiling [mm] | |
|---|---|
| **Description of the ceiling** | **Fire resistance period**<br>30 min<br>**60 min** |
| Wooden beam ceiling with inserted floors | **100** |

- The installation opening is clad all-round with suitable fire-resistant construction boards.
- A bond with the ceiling construction must be created in the reveal area, e.g. using mortar anchors.
- They are installed in a concrete base at least 100 mm high. The width of the base should be at least 100 mm on all sides from the fire damper casing. The FK90 fire damper is positioned after the formwork has been installed and cast together with the concrete base. The concrete base must rest at least 50 mm on the ceiling around the installation opening.
  General structural engineering regulations must be observed when producing the concrete base. Dimensioning must be in accordance with DIN 1045 and DIN 4102-4.
- The user must make sure that the ceilings meet the structural and fire safety requirements.

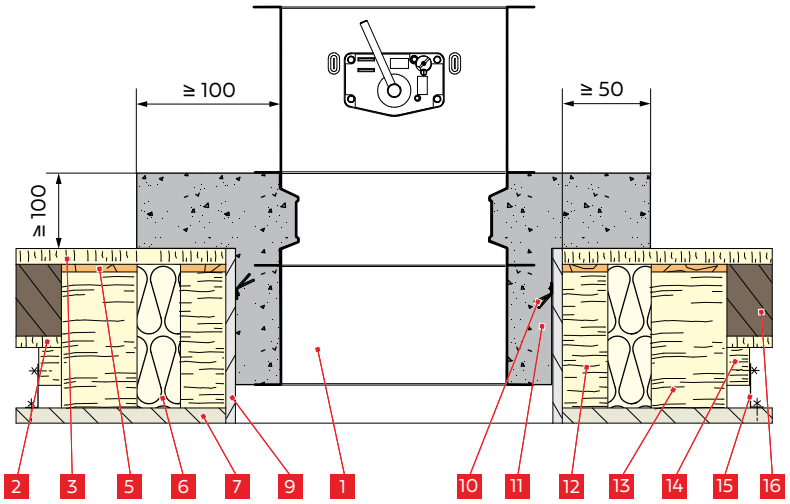
**Installation opening**



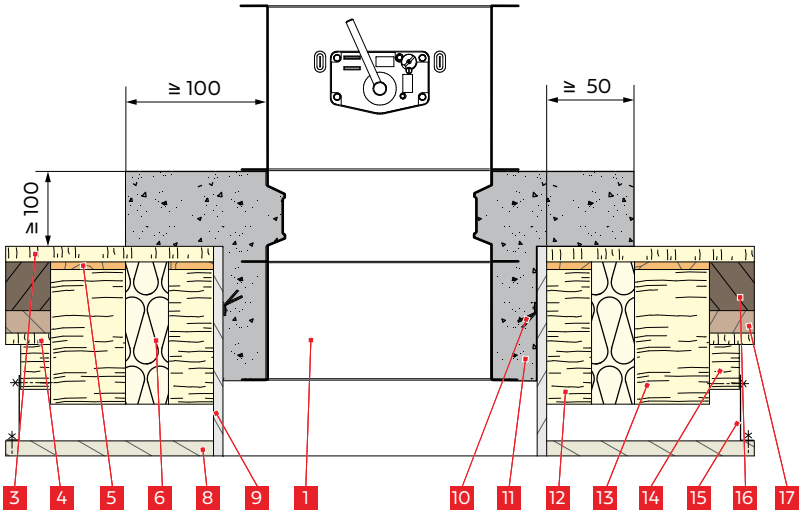

- **Installation opening**: a x b = DN + 60 ... 150 mm

The illustrations on this page represent an example ceiling configuration. The conditions on site can differ from this configuration.

*Installation example, fire resistance period 30 minutes*




*Installation example, fire resistance period 60 minutes*




## Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper | 10 | Mortar anchor[2)] |
| 2 | Intermediate floor[1)] | 11 | Concrete[2)] |
| 3 | Planed boards[1)] | 12 | Wooden beam[2)] |
| 4 | Inserted floor[1)] | 13 | Wooden beam[1)] |
| 5 | Silane strip[1)] | 14 | Flooring sleeper[1)] |
| 6 | Mineral wool[2)] | 15 | Suspension[1)] |
| 7 | Pipe matting with lime-gypsum-sand rendering[1)] | 16 | Fill of burnt sand[1)] |
| 8 | Ribbed drawn metal with lime-gypsum-sand rendering[1)] | 17 | Daub[1)] |
| 9 | Cladding made of gypsum board fire safety panels[2)] | | |

[1)] Existing component of the historical ceiling

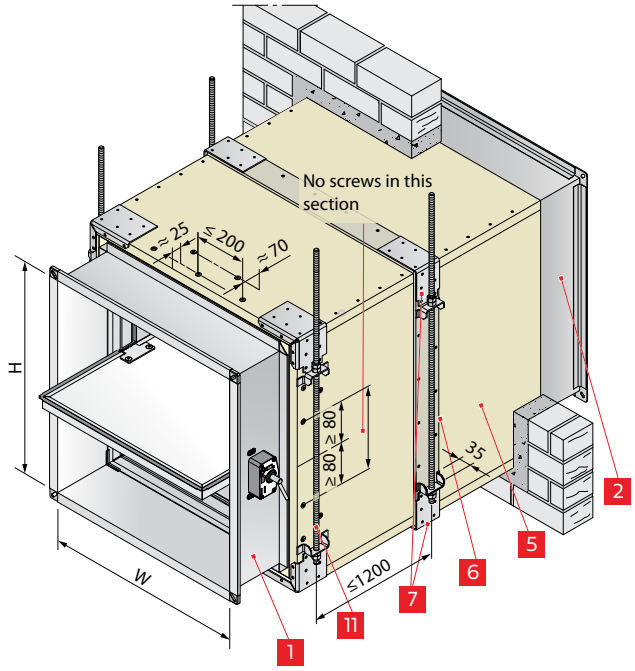
[2)] To be installed by the user

All dimensions in mm

## 5.9 Installation remote from walls and ceilings

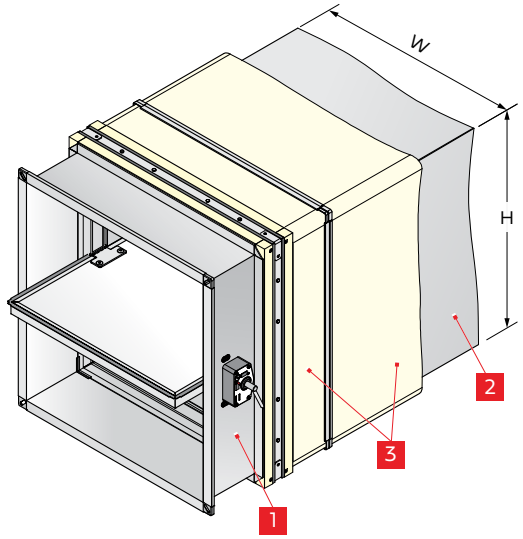
### 5.9.1 Installation remote from rigid walls and ceilings

*Example: Cladded ventilation duct routed through rigid wall*




| Minimum thicknesses Wall/Ceiling [mm] | |
|---|---|
| **Description of the wall and ceiling** | **Fire resistance period**<br>30 min<br>60 min<br>**90 min** |
| Rigid wall and ceiling | **100** |

- Installation is possible for heights H up to 800 mm.
- An AR2 mounting frame is used for installation of the FK90 fire damper remote from walls and ceilings in a ventilation duct with cladding. The installed FK90 fire damper is suspended using threaded rods (▸ page 63).
- Optionally, the butt joints of the cladding can be produced using AW suspension brackets which are available as accessories (see illustration on the left). To do so, glue the additional cladding to the cladding 7 with Promat® K84 adhesive, and screw in place with drywall screws. Butt joints must be produced in accordance with the manufacturer's instructions (e.g. according to Promat® construction 478).
- Screws, mortar anchors and rivets should generally be installed with spacings of ≤ 200 mm.
- Connection joints should be sealed in a suitable manner.
- Details on configuration of walls and ceilings ▸ page 19.

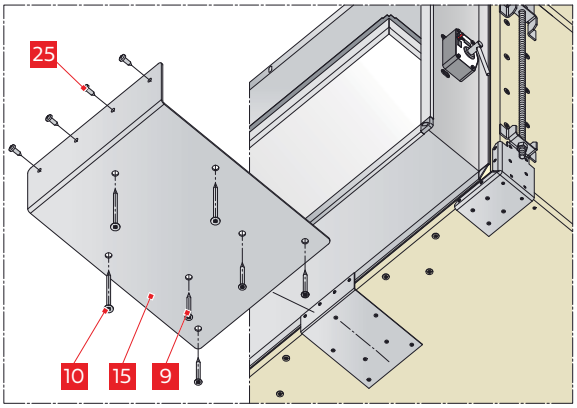


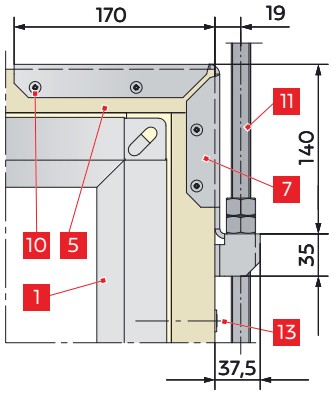

The illustration on the left shows an FK90 fire damper with AR2 mounting frame 1 on a ventilation duct 2 wrapped with mineral wool 3 – shown without cladding and suspension.

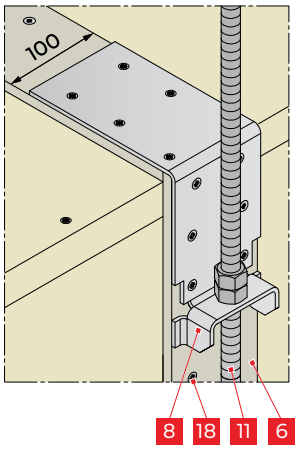
Nomenclature

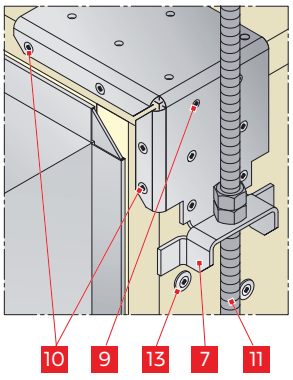
| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper with AR2 mounting frame | 6 | Option: 100-mm-wide additional cladding made from Promatect® H boards, 10 mm thick. Bond to 5 with Promat® K84 adhesive and screw in place with drywall screws 3.9 x 35 mm |
| 2 | Sheet steel ventilation duct | | |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 7 | AW suspension bracket |
| 5 | Cladding made of 35 mm thick Promatect® LS fire protection boards. Cladding must be produced according to the Promat® worksheet 478 | 11 | Threaded rod with secured nuts |

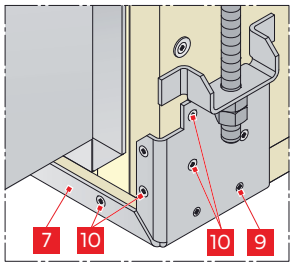
All dimensions in mm




### Support bracket

For horizontal installation remote from walls and a width W ≥ 740 mm, FK90 support brackets must be fitted to the underside of the FK90 fire damper 15.

### Suspension with threaded rods

The fire damper is suspended with steel threaded rods arranged in pairs.
They must be fastened to ceilings in accordance with the fire resistance period. Tighten the nuts used for this purpose (4 pcs. M8 for DN ≤ 315, otherwise 4 pcs. M12) or use all-steel lock nuts. Threaded rods that end above the ceilings can be secured there with nuts and washers made of steel. If plugs are used for fastening to ceilings, follow the manufacturer's specifications.
End plates can be used to distribute the load acting on the threaded rod across multiple fastenings.
Threaded rods of up to 1.50 m in length can be left unclad. Cladding is required for longer threaded rods (e.g. according to Promat® construction 476).

With FK90 fire dampers installed remote from ceilings, the weight forces are transferred into the ceiling via the sheet steel ventilation duct. Information on the weight of the FK90 fire damper ▸ page 76. The weights of the suspension, ventilation duct, insulation and cladding etc. must be added.

Permissible weights for suspensions with steel threaded rods (with a fire resistance period of 90 minutes):

| Size | $A_s$ [mm²] Stress cross-section according to DIN 13 | Weight [kg] | |
|---|---|---|---|
| | | 1 pc. | 1 pair |
| M8 | 36.6 | 22 | 44 |
| M10 | 58.0 | 35 | 70 |
| M12 | 84.3 | 52 | 104 |
| M14 | 115 | 70 | 140 |
| M16 | 157 | 96 | 192 |
| M18 | 192 | 117 | 234 |
| M20 | 245 | 150 | 300 |

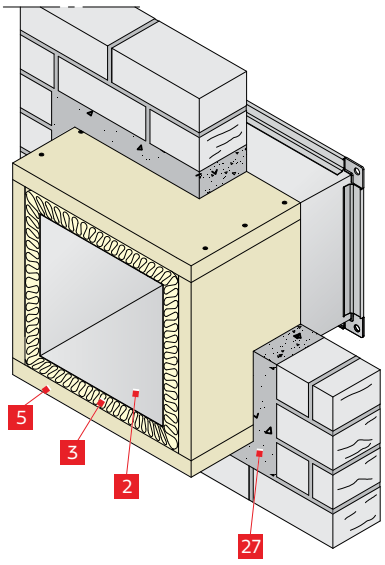
### Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper with AR2 mounting frame | 9 | Round head chipboard screw 4 x 45 mm[1)] |
| 5 | Cladding made of 35 mm thick Promatect® LS fire protection boards. Cladding must be produced according to the Promat® worksheet 478 | 10 | Round head chipboard screw 5 x 70 mm[1)] |
| | | 11 | Threaded rod with secured nuts |
| 6 | 100-mm-wide additional cladding made from Promatect® H boards, 10 mm thick. Bond to 5 with Promat® K84 adhesive and screw in place with drywall screws 3.9 x 35 mm | 13 | Chipboard screws 4.5 x 70 mm with DIN 9021 washers |
| | | 15 | FK90 support brackets for W ≥ 740 mm[1)] |
| 7 | AR2 suspension bracket[1)] | 18 | Drywall screw 3.9 x 35 mm |
| 8 | AW suspension bracket (accessory ▸ page 11) | 25 | Self-tapping screw 4.2 x 13 mm[1)] |

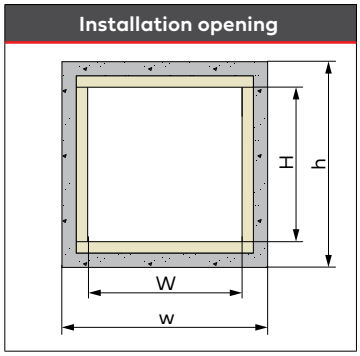
[1)] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

All dimensions in mm

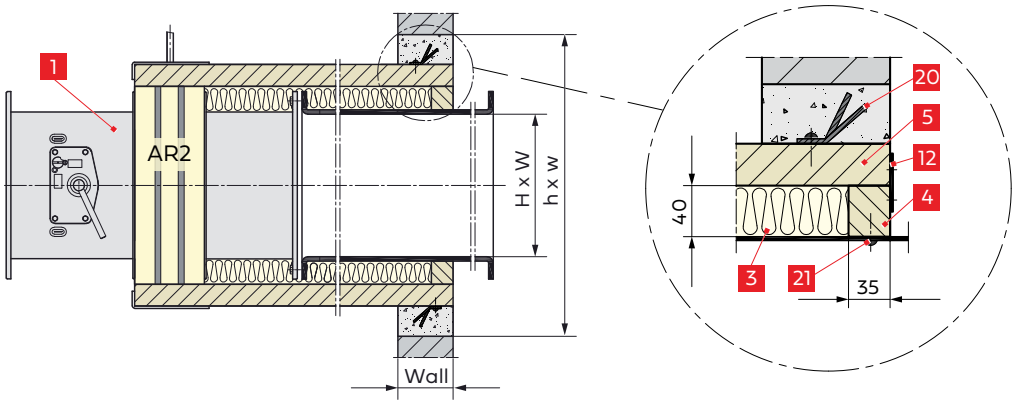
**Routing cladding of the ventilation duct through rigid wall**




- Installation is possible for heights H up to 800 mm.
- Insert mortar anchors or suitable concrete screws with spacing of ≤ 200 mm.




- **Installation opening**:
  w x h ≈ (W + 155 mm) x (H + 155 mm)
  + mortar gap as required




## Nomenclature

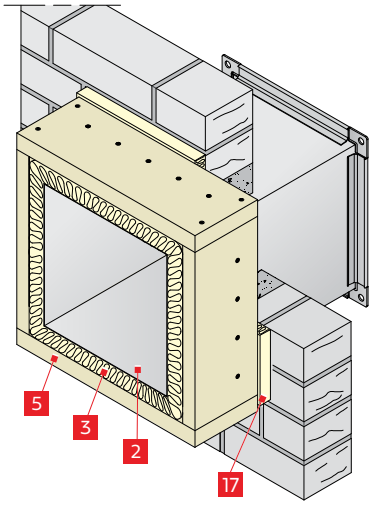
| No. | Description |
|---|---|
| 1 | FK90 fire damper with AR2 mounting frame |
| 2 | Sheet steel ventilation duct |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 |

| No. | Description |
|---|---|
| 12 | Connection bracket [1] with screws 21 [1] for connecting 4 with 5<br>Number of brackets per W-side:<br>2 x 1 pcs., if W ≥ 250 mm<br>2 x 2 pcs., if W ³ 500 mm |
| 20 | Mortar anchor or concrete screws |
| 21 | Drill screw 3.9 x 25 mm |
| 27 | Mortar gap |

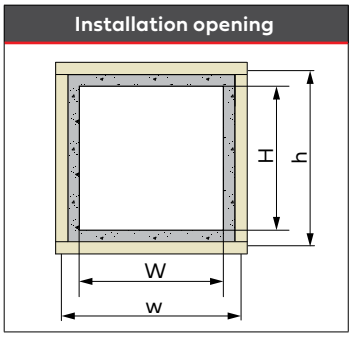
[1] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

All dimensions in mm

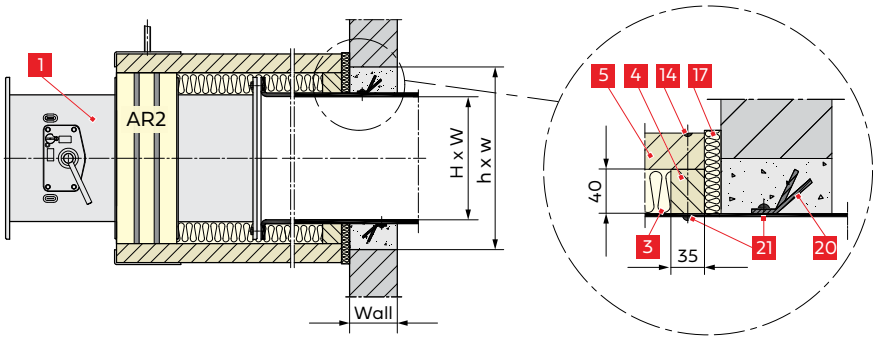
### Connecting cladding of the ventilation duct to rigid wall



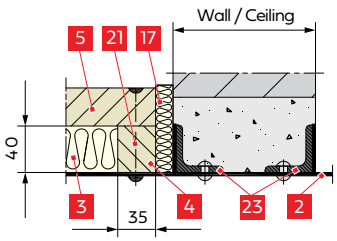

- Installation is possible for heights H up to 800 mm.
- Insert mortar anchors or suitable concrete screws with spacing of ≤ 200 mm.




- **Installation opening**:
  w x h » (W + 5 mm) x (H + 5 mm)
  + mortar gap as required




*Alternative method for installing the ventilation duct 2 with angled steel frame 23*



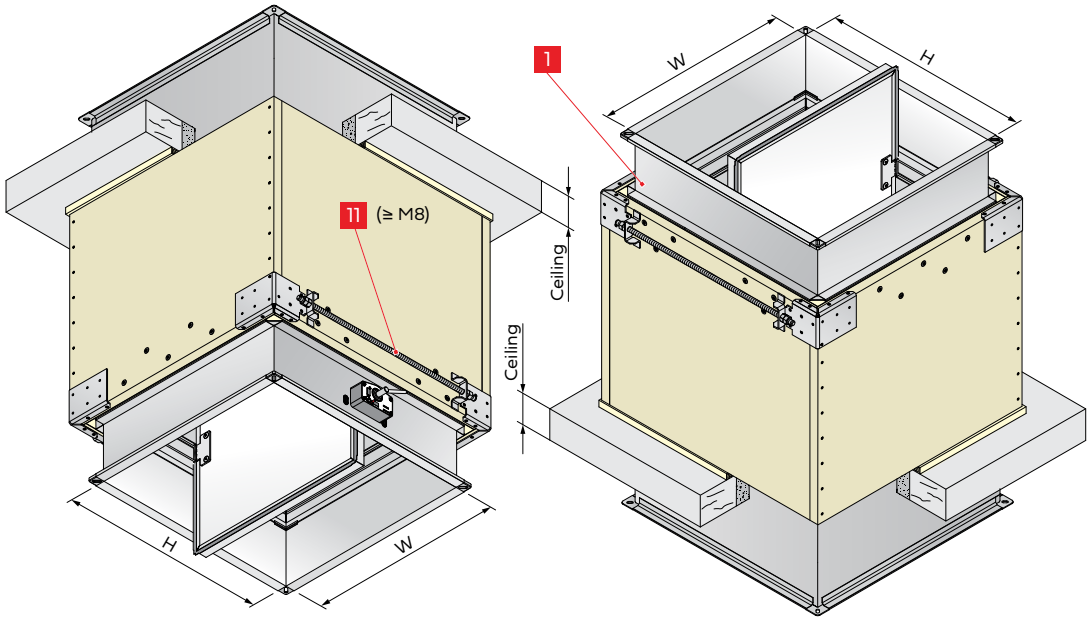

### Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper with AR2 mounting frame | 14 | Chipboard screws 4 x 60 mm |
| 2 | Sheet steel ventilation duct | 17 | Sealing with mineral wool 3.<br>It must be compressed to around 16 mm |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 20 | Mortar anchor or concrete screws |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 21 | Drill screw 3.9 x 25 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | 23 | Fasten angular steel frame ≥ 30 x 30 x 4 with solid rivets 4.8 mm or with M6 screws to 2 |

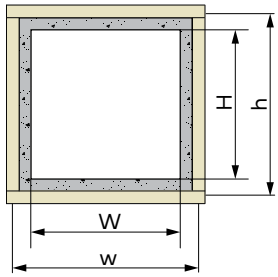
All dimensions in mm

### Connecting cladding to rigid ceiling

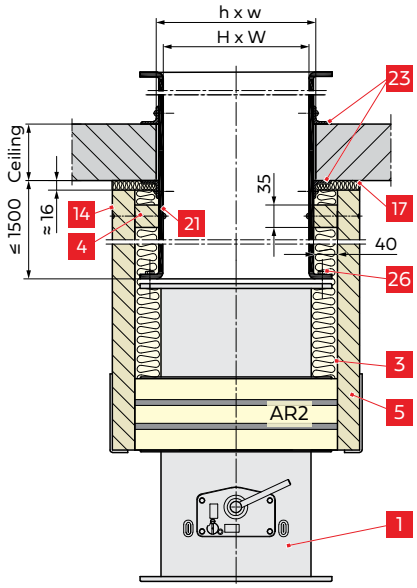
*Installation examples suspended under rigid ceilings (left) and standing on rigid ceilings (right).*

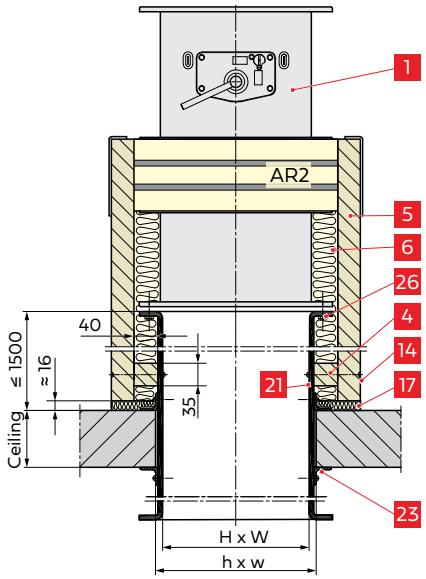



**Installation opening**




w x h ≈ (W + 5) x (H + 5)



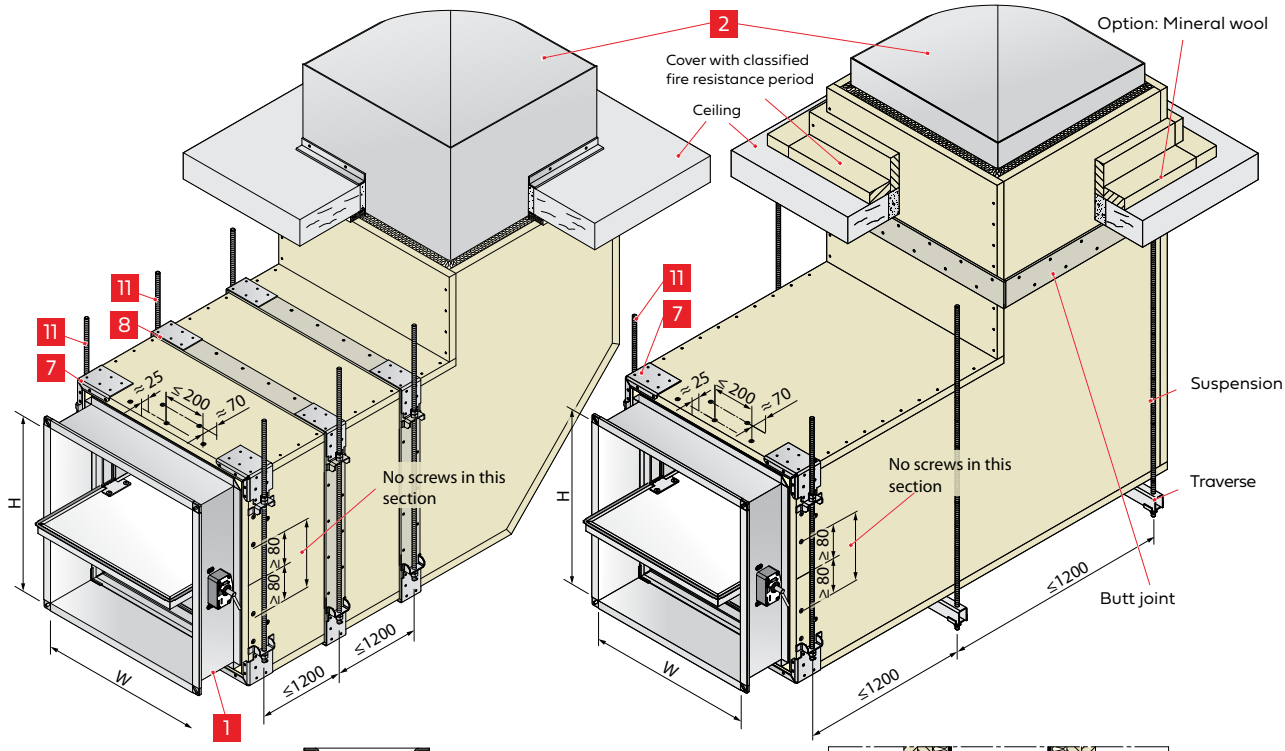

- Installation is possible for heights H up to 800 mm.
- Tighten the nuts on the threaded rods for fastening and suspension, or use all-steel lock nuts.
- Screws, mortar anchors and rivets should generally be installed with spacings of ≤ 200 mm.
- Alternative method for installing the ventilation duct with angular steel frame in rigid ceilings ▸ page 65.
- Further details on assembly ▸ page 62 ff.

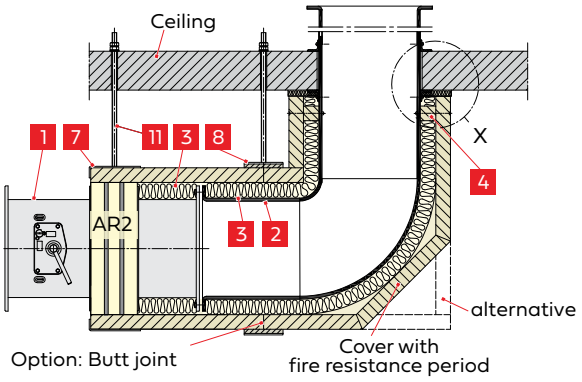
Nomenclature

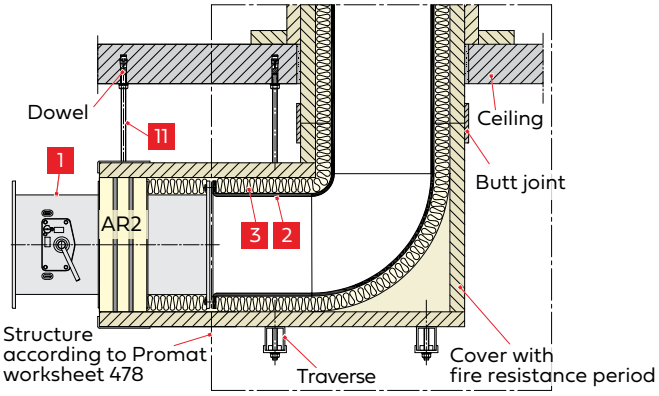
| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper with AR2 mounting frame | 6 | 100-mm-wide additional cladding made from Promatect® H boards, 10 mm thick. Bond to 5 with Promat® K84 adhesive and screw in place with drywall screws 3.9 x 35 mm |
| 3 | Mineral wool, 40 mm, ≧ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 17 | Sealing with mineral wool 3. It must be compressed to around 16 mm |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 21 | Drill screw 3.9 x 25 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | 23 | Fasten angular steel frame ≧ 30 x 30 x 4 with solid rivets 4.8 mm or with M6 screws to 2 |
| 14 | Chipboard screws 4 x 60 mm | 26 | Screw connection M10 |

All dimensions in mm

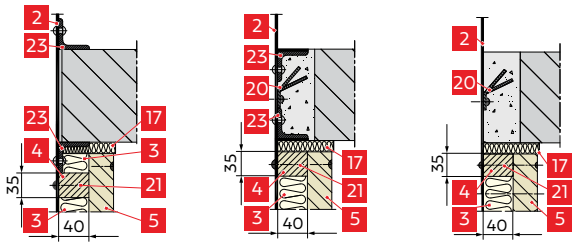
**Installation horizontally suspended below a rigid ceiling**




*Detail x – ceiling connections*



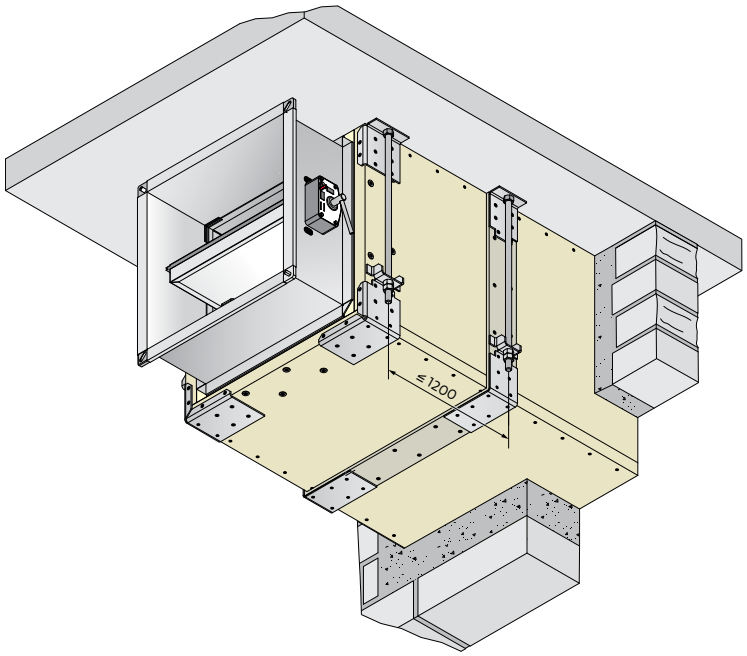

- FK90 fire dampers with a height H of up to 800 mm can be installed.
- Information on installing the FK90 fire damper with AR2 mounting frame ▸ page 62 ff.
- Ventilation ducts, claddings, suspensions, fastenings and openings through ceilings can also be installed according to the specifications of the manufacturer of the ducts; for example, according to the Promat® worksheet 478.

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | FK90 fire damper with AR2 mounting frame | 7 | AR2 suspension bracket[1)] |
| 2 | Sheet steel ventilation duct | 8 | AW suspension bracket (accessory ▸ page 11) |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 11 | Threaded rod with secured nuts |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 17 | Sealing with mineral wool 3<br>This is to be compressed to about 16 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | 20 | Mortar anchor or concrete screws |
| | | 21 | Drill screw 3.9 x 25 mm |
| | | 23 | Fasten angular steel frame ≥ 30 x 30 x 4 with solid rivets 4.8 mm or with M6 screws to 2 |

[1)] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

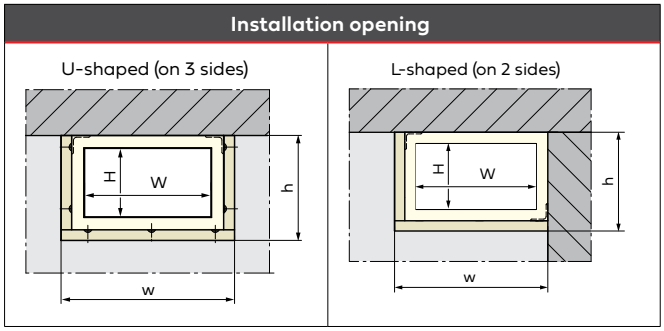
All dimensions in mm

**Installation remote from walls adjacent to rigid wall/ceiling**



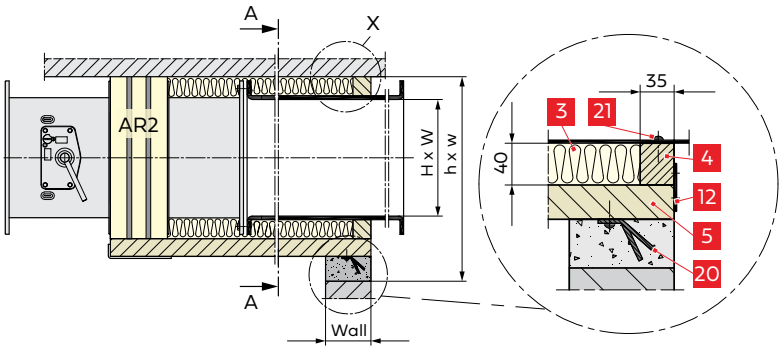

- The fire damper can also be installed remote from rigid walls. In the process, adjacent rigid walls or ceilings partially replace the fire-resistant claddings for the ventilation ducts:
  The remaining fire-resistant claddings then surround the ventilation ducts in a U shape (on 3 sides) or in an L shape (on 2 sides), see illustrations of installation opening.
- Tighten the nuts on the threaded rods for fastening and suspension, or use all-steel lock nuts.
- Installation of FK90 fire damper with AR2 mounting frame ▸ page 64 ff.
- Suspension and fastening ▸ page 63 and page 69.
- The illustration on the left shows a ventilation duct routed through the rigid wall which requires protection, which has U-shaped cladding and is adjacent to a rigid ceiling on the side without cladding.

**Installation opening**

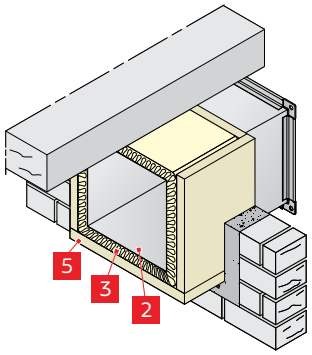



- **Installation opening**:
  - U-shaped: w x h ≈ (W + 155 mm) x (H + 118 mm)
  - L-shaped: w x h ≈ (W + 118 mm) x (H + 118 mm)

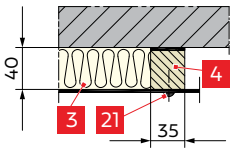
*Feed cladding through rigid wall*




*A-A*




*Detail X*



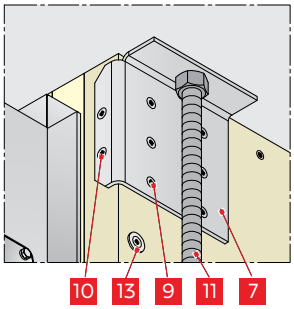

**Nomenclature**

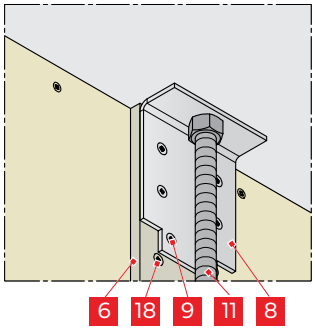
| No. | Description | No. | Description |
|---|---|---|---|
| 2 | Sheet steel ventilation duct | 12 | Connection bracket [1] with screws 21 [1] for connecting 4 with 5<br>Number of brackets per W-side:<br>2 x 1 pcs., if W ≥ 250 mm<br>2 x 2 pcs., if W ³ 500 mm |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 20 | Mortar anchor or concrete screws |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 21 | Drill screw 3.9 x 25 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | | |

[1] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

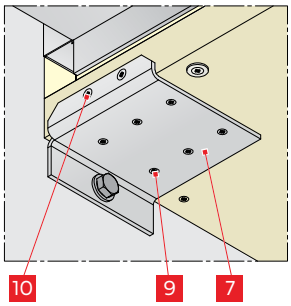
All dimensions in mm

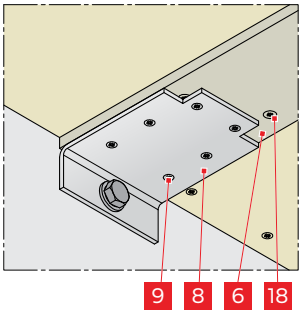
### Suspension from rigid ceilings



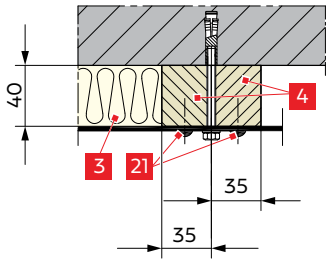



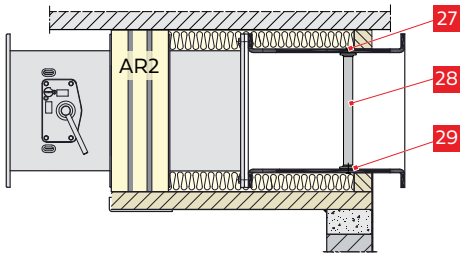

### Fastening to rigid walls




### Alternative ceiling fastening




From a width W > 500 mm, supports in accordance with DIN 4102-4 must be used in the ventilation duct. Attention must be paid to damper blade freewheeling ▸ page 18.

### Nomenclature

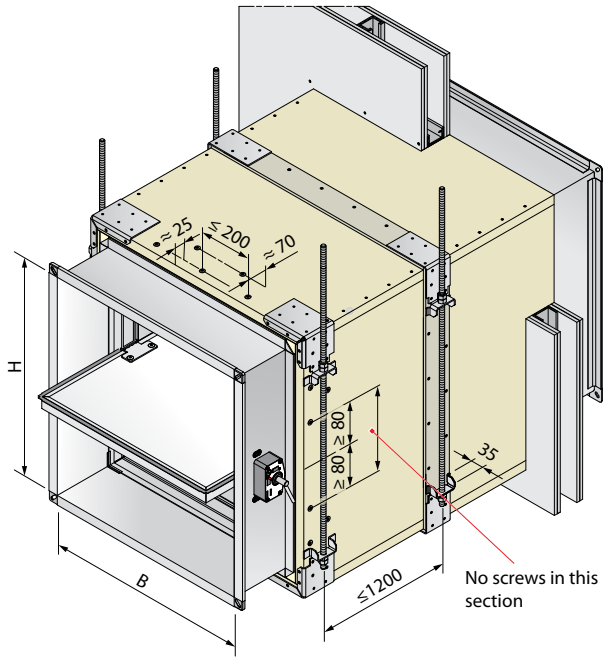
| No. | Description | No. | Description |
|---|---|---|---|
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 9 | Round head chipboard screw 4 x 45 mm[1)] |
| | | 10 | Round head chipboard screw 5 x 70 mm[1)] |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding to the ventilation duct. For this, bond 4 and cladding using Promat® K84 adhesive | 11 | Threaded rod with secured nuts |
| | | 13 | Chipboard screws 4.5 x 70 mm with DIN 9021 washers |
| 6 | 100-mm-wide additional cladding made from Promatect® H boards, 10 mm thick. Bond to cladding with Promat® K84 adhesive and screw in place with drywall screws 3.9 x 35 mm | 18 | Drywall screw 3.9 x 35 mm |
| | | 21 | Drill screw 3.9 x 25 mm |
| 7 | AR2 suspension bracket[1)] | 27 | Blind rivets |
| 8 | AW suspension bracket (accessory ▸ page 11) | 28 | Steel tube support |
| | | 29 | Steel plate |

[1)] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

All dimensions in mm

## 5.9.2 Installation remote from metal stud walls

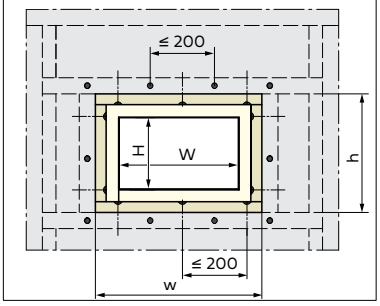
**Routing cladding of the ventilation duct through metal stud wall**

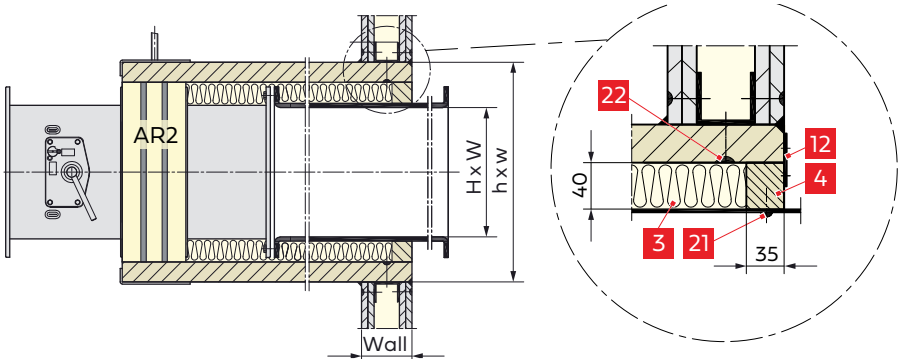



| Minimum thicknesses Wall [mm] | |
|---|---|
| Description of the wall | Fire resistance period<br>30 min<br>60 min<br>**90 min** |
| Metal stud wall with cladding on both sides | **95** |

- Installation is possible for heights H up to 800 mm.
- FK90 fire dampers installed remote from walls are generally suspended using steel threaded rods arranged in pairs. Details on the **suspension**, threaded rods and permitted weights ▸ page 63 ff.
- Optionally, the butt joints of the cladding can be produced using AW suspension brackets which are available as accessories (see illustration on the left). To do this, bond the additional cladding to the cladding with Promat® K84 adhesive, and screw in place with drywall screws. Butt joints must be produced in accordance with the manufacturer's instructions (e.g. according to Promat® construction 478).
- Screws and rivets generally have to be installed with spacings of ≤ 200 mm.
- Metal stud walls must be clad with at least 2 layers of 12.5 mm DF gypsum board in accordance with EN 520 and can be filled with or without mineral wool. The installation openings b x h feature circumferential frames consisting of wall profiles, which should be connected to the wall stud profiles (CW profiles). Details on the configuration of the walls and ceilings ▸ page 28 ff.
- Illustration of the ventilation duct without cladding and suspension ▸ page 62.
- **Installation opening**: w x h = (W + 155 mm) x (H + 155 mm)

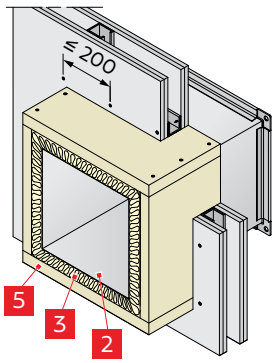
**Installation opening**







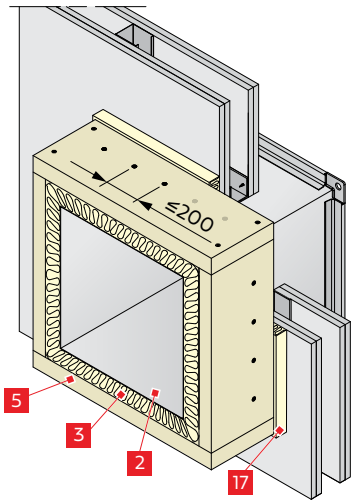


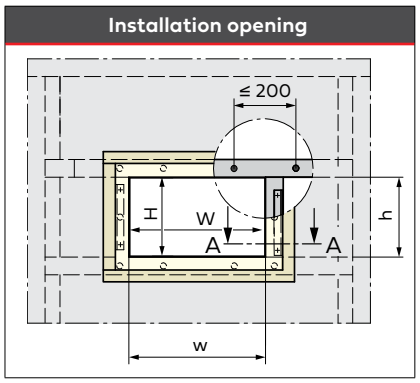

Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 2 | Sheet steel ventilation duct | 12 | Connection bracket[1] with screws[1] 21 for connecting 4 with 5<br>Number of brackets per W-side:<br>2 x 1 pcs., if W ≥ 250 mm<br>2 x 2 pcs., if W ≥ 500 mm |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 21 | Drill screw 3.9 x 25 mm |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 22 | Drywall screw 3.9 x 55 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | | |

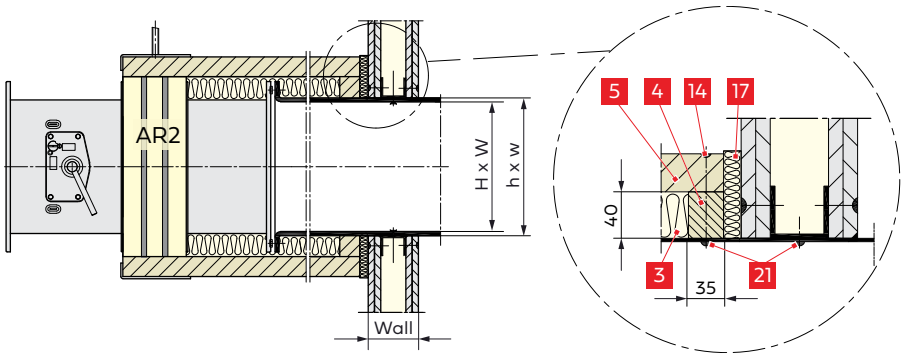
All dimensions in mm

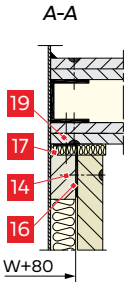
### Connecting cladding of the ventilation duct to metal stud wall



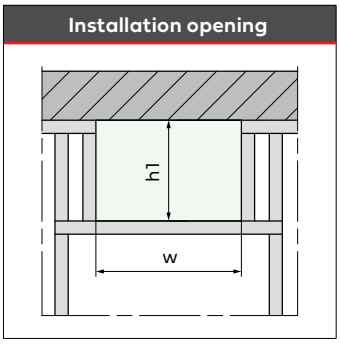



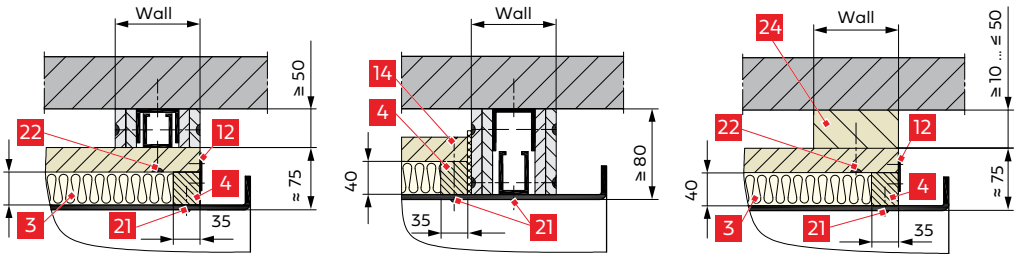

- Installation is possible for heights H up to 800 mm.
- **Installation opening**: w x h = (W + 5 mm) x (H + 5 mm)




### Connections underneath rigid ceilings




- **Installation opening**: w x h1 = (W + 155 mm) x (H + 155 mm + ceiling distance)

### Nomenclature

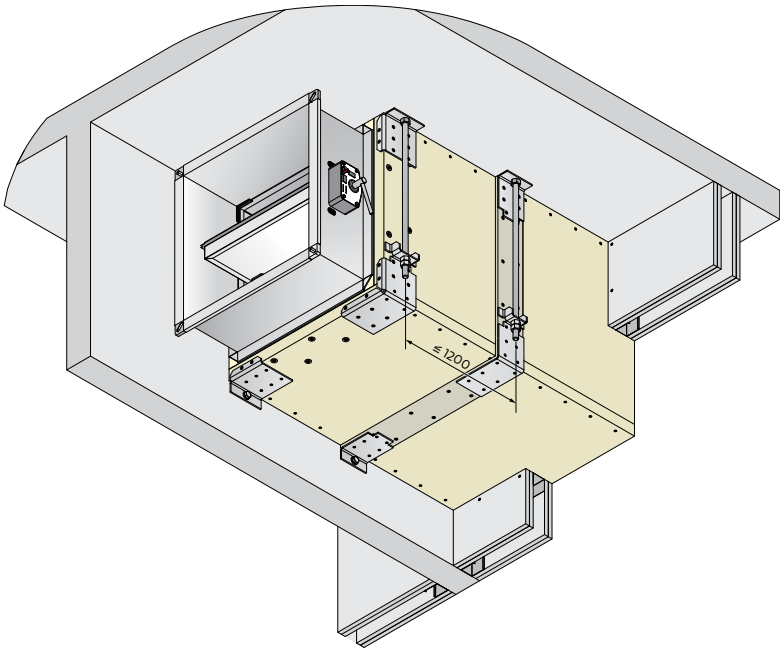
| No. | Description | No. | Description |
|---|---|---|---|
| 2 | Sheet steel ventilation duct | 14 | Chipboard screws 4 x 60 mm |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil | 16 | Mounting bracket[1)] |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive | 17 | Sealing with mineral wool 3. It must be compressed to around 16 mm |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 | 19 | Drywall screw ≥ 3.5 mm |
| 12 | Connection bracket [1)] with screws 21[1)] for connecting 4 with 5 Number of brackets per W-side: 2 x 1 pcs., if W ≥ 250 mm 2 x 2 pcs., if W ³ 500 mm | 21 | Drill screw 3.9 x 25 mm |
| | | 22 | Drywall screw 3.9 x 55 mm |
| | | 24 | Filling attached to the ceiling, consisting of calcium silicate boards, density ≥ 500 kg/m³ |

[1)] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

All dimensions in mm

**Installation remote from walls adjacent to rigid wall / ceiling**

*Example: Cladding guided through metal stud wall*

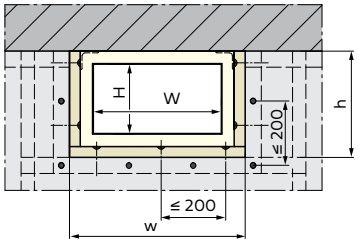



- The fire damper can also be installed remote from metal stud walls. In the process, adjacent rigid walls or ceilings partially replace the fire-resistant claddings for the ventilation ducts. The remaining fire-resistant claddings then surround the ventilation ducts in a U shape (on 3 sides) or in an L shape (on 2 sides), see illustrations of installation opening.
- Tighten the nuts on the threaded rods for fastening and suspension, or use all-steel lock nuts.
- Installation of FK90 fire damper with AR2 mounting frame ▸ page 64 ff.
- Suspension and fastening ▸ page 63 and page 69.
- Ceiling fastening from width W > 500 ▸ page 69.

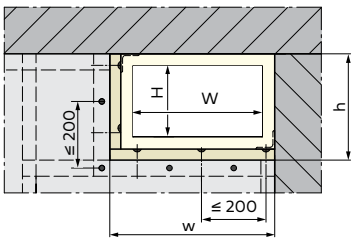
The illustration on the left shows a ventilation duct routed through the metal stud wall which requires protection, which has L-shaped cladding and is adjacent to a rigid wall and ceiling on the non-cladded sides.

**Installation opening**

U-shaped (on 3 sides)

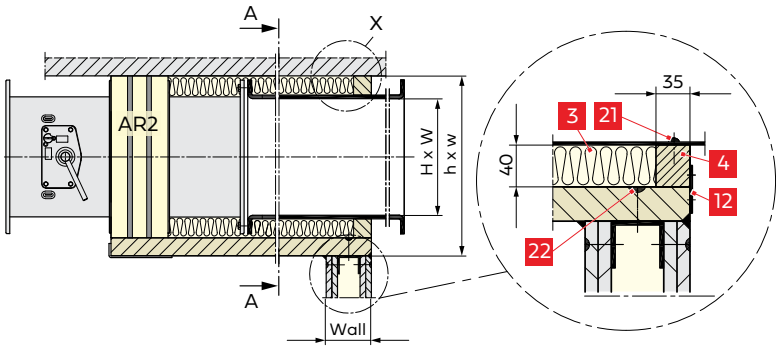



L-shaped (on 2 sides)

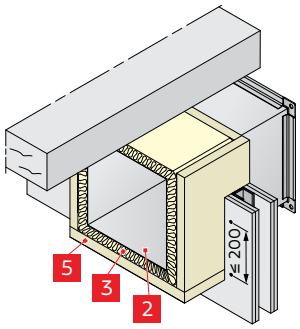



- **Installation opening**:
  - U-shaped: w x h ≈ (W + 155 mm) x (H + 118 mm)
  - L-shaped: w x h ≈ (W + 118 mm) x (H + 118 mm)

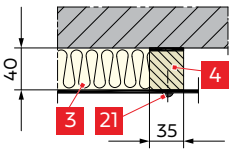
**Guide cladding through metal stud wall**




*A-A*




*Detail X*




**Nomenclature**

| No. | Description |
|---|---|
| 2 | Sheet steel ventilation duct |
| 3 | Mineral wool, 40 mm, ≥ 40 kg/m³, > 1000 °C melting point, clad in aluminium foil |
| 4 | Frame made from 35 mm Promatect® LS fire protection boards for connecting the cladding 5 to the ventilation duct 2. For this, bond 4 and 5 using Promat® K84 adhesive |
| 5 | Cladding made of 35 mm Promatect® LS fire protection boards. Production according to Promat® construction 478 |

| No. | Description |
|---|---|
| 12 | Connection bracket [1] with screws 21 [1] for connecting 4 with 5<br>Number of brackets per W-side:<br>2 x 1 pcs., if W ≥ 250 mm<br>2 x 2 pcs., if W ³ 500 mm |
| 21 | Drill screw 3.9 x 25 mm |
| 22 | Drywall screw 3.9 x 55 mm |

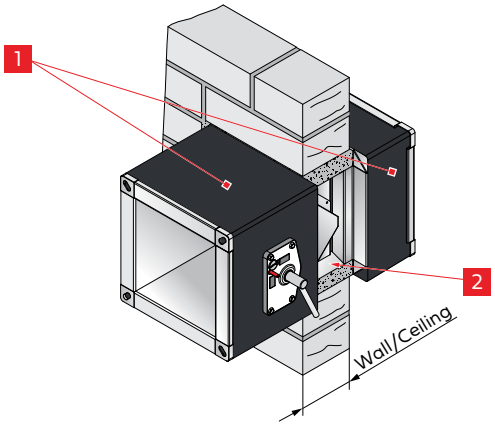
[1] Included in the scope of delivery of the FK90 fire damper with AR2 mounting frames.

All dimensions in mm

## 6 Installation

- Information on installation ▸ page 17.
- **Electrical wiring** must be installed by the user.
- **Equipotential bonding cables** for bridging flexible connectors on fire dampers can be fastened with metal screws if they are made of copper with a cross section of up to 6 mm² or are made of aluminium.
- Fire dampers must be properly earthed when used in an explosive atmosphere.

  i For further information on the electrical connection, see ▸ page 82 ff.
- Connection areas 1 of the FK90 fire dampers can be insulated thermally, for example, to prevent **condensation** in outdoor air suction systems. For insulation, flame-retardant, closed-cell foam can be used, for example from Armaflex. Otherwise, clad mineral wool must be used.




1 Connection areas (insulated)

2 Installation area in wall / ceiling thickness must remain non-insulated

## 7 Servicing

**Functional test**

- Fire dampers must be serviced by the operating company or owner. The function should be tested periodically, see VDMA standard sheet 24000. The intervals largely depend on the system operation. Relevant regulations should be followed.
- Functional checks are limited to the release and re-opening of the FK90 fire dampers. This can be performed remotely with an electric actuator.
- Repair or service work is required in the event of malfunctions. Original spare parts must be used for this purpose.
- Cleaning work required in ventilation systems for hygiene reasons must be performed in an operation-dependent manner, and also includes the fire dampers.

**Information on maintenance-free items**

- FK90 fire dampers, series FK92, are maintenance-free due to fully enclosed components, corrosion-resistant materials and precise manufacture.

  The drive mechanism is made of stainless steels and housed in enclosed casings, which means it is not directly in the air stream. The release mechanisms and actuators are also configured accordingly.

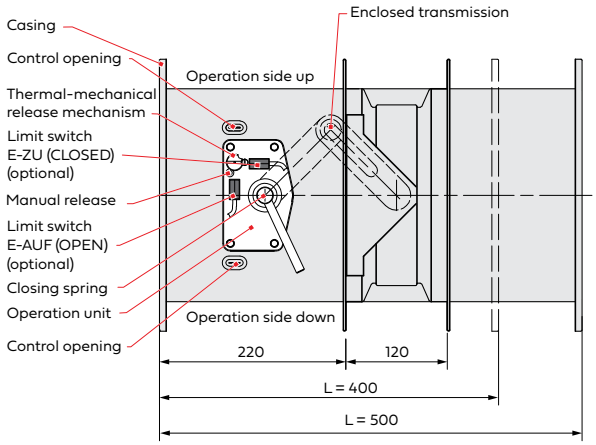
  There is no requirement for continuous recurring cleaning and lubrication which is otherwise required.

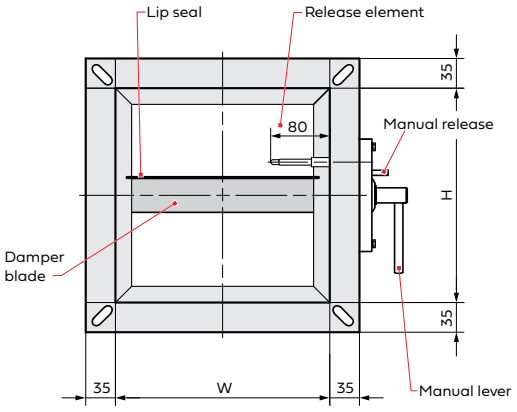
  Damper blades are break-proof. Sealants and all other materials are designed durably and for a long service life.
- The reliability of the FK90 fire dampers is due to the special drive mechanism with dead-centre positions in the opened and closed positions. This facilitates reliable closing, locking and signalling of the limit positions.
  This is the only way to ensure the reliability of remote-controlled functional checks and their automation.
- Manual functional checks are limited to the closing and opening of the FK90 fire dampers.
- Two control openings are provided for inspecting the interior of the fire dampers, one above and one below the damper blade. The position and size of these openings are specially adapted to the FK90 fire dampers and are fully adequate. FK90 fire dampers are largely insensitive to dust and dirt.
- For further information, see ⇒ Operating instructions for FK90 fire dampers.

# 8 Technical Data

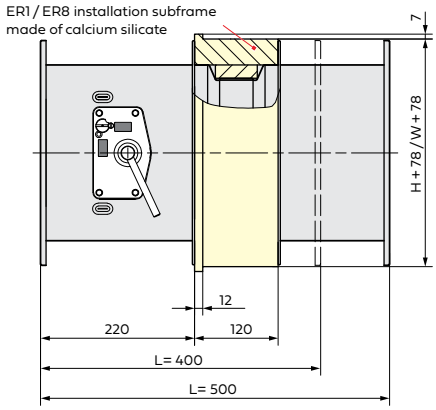
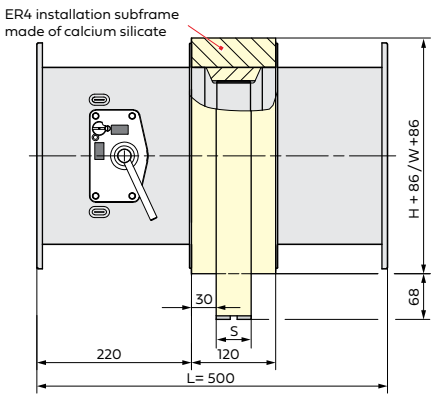
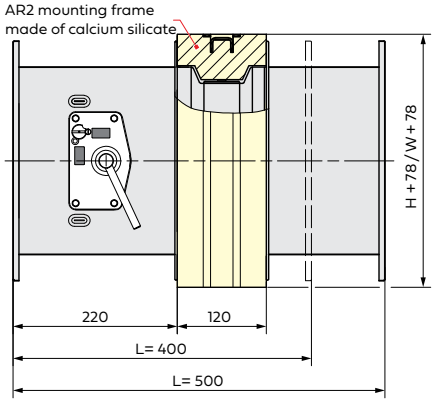
## 8.1 Dimensions

### Design with lengths L = 400 mm and 500 mm without installation subframe

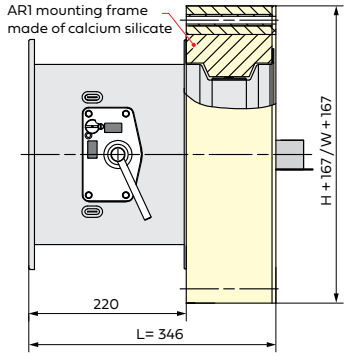
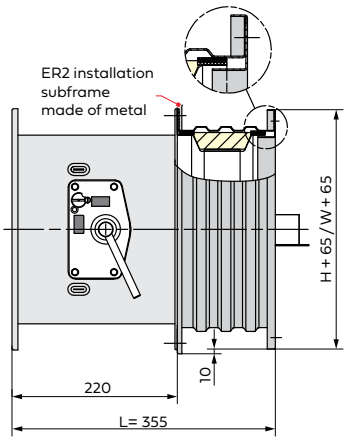
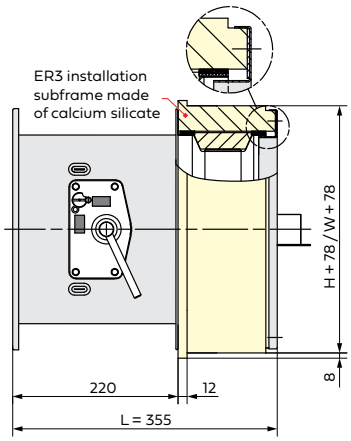



### Lengths L = 400 mm and 500 mm with ER1, ER8, ER4 installation subframe and with AR2 mounting frame

| ER1 and ER8 | ER4 (only for L = 500) | AR2 |
|---|---|---|
|   |   |   |
| ER1 ▸ page 6, page 35 ff. and page 44 ff.<br>ER8 ▸ page 7, page 49 ff., page 57 and page 58 ff. | ER4 ▸ page 6 and page 41.<br>Stud profile depths S = 50 ... 125 mm. | AR2 ▸ page 7 and page 62 ff. |

### Short lengths L = 346 mm and 355 mm with AR1 mounting frame and with ER2, ER3 installation subframe

| Short length with AR1 | Short length with ER2 | Short length with ER3 |
|---|---|---|
|   |   |   |
| AR1 ▸ page 7 and page 25. | ER2 ▸ page 6 and page 22. | ER3 ▸ page 6 and page 35 ff. |

All dimensions in mm

## 8.2 Free cross-sections

Free cross-sections $A_{free}$ (in m²)

| Width [mm] \ Height [mm] | 200 | 225 | 250 | 275 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 900 | 1000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 0.018 | 0.022 | 0.026 | 0.03 | 0.034 | 0.041 | 0.049 | 0.057 | 0.065 | 0.073 | 0.080 | 0.088 | 0.096 | 0.104 | 0.112 | 0.127 | 0.143 |
| 225 | 0.021 | 0.026 | 0.030 | 0.035 | 0.039 | 0.048 | 0.057 | 0.066 | 0.075 | 0.084 | 0.093 | 0.102 | 0.111 | 0.121 | 0.130 | 0.148 | 0.166 |
| 250 | 0.024 | 0.029 | 0.034 | 0.039 | 0.044 | 0.055 | 0.065 | 0.075 | 0.086 | 0.096 | 0.106 | 0.117 | 0.127 | 0.137 | 0.147 | 0.168 | 0.189 |
| 275 | 0.027 | 0.033 | 0.038 | 0.044 | 0.050 | 0.061 | 0.073 | 0.085 | 0.096 | 0.108 | 0.119 | 0.131 | 0.142 | 0.154 | 0.165 | 0.188 | 0.212 |
| 300 | 0.030 | 0.036 | 0.042 | 0.049 | 0.055 | 0.068 | 0.081 | 0.094 | 0.106 | 0.119 | 0.132 | 0.145 | 0.159 | 0.170 | 0.183 | 0.209 | 0.234 |
| 325 | 0.033 | 0.040 | 0.047 | 0.054 | 0.061 | 0.075 | 0.089 | 0.103 | 0.117 | 0.131 | 0.145 | 0.159 | 0.173 | 0.187 | 0.201 | 0.229 | 0.257 |
| 350 | 0.035 | 0.043 | 0.051 | 0.058 | 0.066 | 0.081 | 0.097 | 0.112 | 0.127 | 0.143 | 0.158 | 0.173 | 0.188 | 0.204 | 0.219 | 0.250 | 0.280 |
| 375 | 0.038 | 0.047 | 0.055 | 0.063 | 0.071 | 0.088 | 0.105 | 0.121 | 0.138 | 0.154 | 0.171 | 0.187 | 0.204 | 0.220 | 0.237 | 0.270 | 0.303 |
| 400 | 0.041 | 0.050 | 0.059 | 0.068 | 0.077 | 0.095 | 0.112 | 0.130 | 0.148 | 0.166 | 0.184 | 0.201 | 0.219 | 0.237 | 0.255 | 0.290 | 0.326 |
| 450 | 0.047 | 0.057 | 0.067 | 0.078 | 0.088 | 0.108 | 0.128 | 0.149 | 0.169 | 0.189 | 0.209 | 0.230 | 0.250 | 0.270 | 0.291 | 0.331 | 0.372 |
| 500 | 0.053 | 0.064 | 0.076 | 0.087 | 0.098 | 0.121 | 0.144 | 0.167 | 0.190 | 0.212 | 0.235 | 0.258 | 0.281 | 0.304 | 0.326 | 0.372 | 0.418 |
| 550 | 0.059 | 0.071 | 0.084 | 0.097 | 0.109 | 0.135 | 0.160 | 0.185 | 0.210 | 0.236 | 0.261 | 0.286 | 0.312 | 0.337 | 0.362 | 0.413 | 0.463 |
| 600 | 0.064 | 0.078 | 0.092 | 0.106 | 0.120 | 0.148 | 0.176 | 0.203 | 0.231 | 0.259 | 0.287 | 0.315 | 0.342 | 0.370 | 0.398 | 0.454 | 0.509 |
| 650 | 0.070 | 0.085 | 0.101 | 0.116 | 0.131 | 0.161 | 0.191 | 0.222 | 0.252 | 0.282 | 0.313 | 0.343 | 0.373 | 0.404 | 0.434 | 0.494 | 0.555 |
| 700 | 0.076 | 0.092 | 0.109 | 0.125 | 0.142 | 0.174 | 0.207 | 0.240 | 0.273 | 0.306 | 0.338 | 0.371 | 0.404 | 0.437 | 0.470 | 0.535 | 0.601 |
| 750 | 0.082 | 0.100 | 0.117 | 0.135 | 0.152 | 0.188 | 0.223 | 0.258 | 0.294 | 0.329 | 0.364 | 0.400 | 0.435 | 0.470 | 0.505 | 0.576 | 0.647 |
| 800 | 0.088 | 0.107 | 0.125 | 0.144 | 0.163 | 0.201 | 0.239 | 0.277 | 0.314 | 0.352 | 0.390 | 0.428 | 0.466 | 0.503 | 0.541 | 0.617 | 0.692 |
| 850 | 0.093 | 0.114 | 0.134 | 0.154 | 0.174 | 0.214 | 0.255 | 0.295 | 0.335 | 0.376 | 0.416 | 0.456 | 0.496 | 0.537 | 0.577 | 0.658 | 0.738 |
| 900 | 0.099 | 0.121 | 0.142 | 0.163 | 0.185 | 0.228 | 0.270 | 0.313 | 0.356 | 0.399 | 0.442 | 0.484 | 0.527 | 0.570 | 0.613 | 0.698 | 0.784 |
| 950 | 0.105 | 0.128 | 0.150 | 0.173 | 0.196 | 0.241 | 0.286 | 0.332 | 0.377 | 0.422 | 0.467 | 0.513 | 0.558 | 0.603 | 0.649 | 0.739 | 0.830 |
| 1000 | 0.111 | 0.135 | 0.159 | 0.183 | 0.206 | 0.254 | 0.302 | 0.350 | 0.398 | 0.445 | 0.493 | 0.541 | 0.589 | 0.637 | 0.684 | 0.780 | 0.876 |
| 1050 | 0.117 | 0.142 | 0.167 | 0.192 | 0.217 | 0.268 | 0.318 | 0.368 | 0.418 | 0.469 | 0.519 | 0.569 | 0.620 | 0.670 | 0.720 | | |
| 1100 | 0.122 | 0.149 | 0.175 | 0.202 | 0.228 | 0.281 | 0.334 | 0.386 | 0.439 | 0.492 | 0.545 | 0.598 | 0.650 | 0.703 | 0.756 | | |
| 1150 | 0.128 | 0.156 | 0.184 | 0.211 | 0.239 | 0.294 | 0.349 | 0.405 | 0.460 | 0.515 | 0.571 | 0.626 | 0.681 | 0.737 | 0.792 | | |
| 1200 | 0.134 | 0.163 | 0.192 | 0.221 | 0.250 | 0.307 | 0.365 | 0.423 | 0.481 | 0.539 | 0.596 | 0.654 | 0.712 | 0.770 | 0.828 | | |
| 1250 | 0.140 | 0.170 | 0.200 | 0.230 | 0.260 | 0.321 | 0.381 | 0.441 | 0.502 | 0.562 | 0.622 | 0.683 | 0.743 | 0.803 | 0.863 | | |
| 1300 | 0.146 | 0.177 | 0.208 | 0.240 | 0.271 | 0.334 | 0.397 | 0.460 | 0.522 | 0.585 | 0.648 | 0.711 | 0.774 | 0.836 | 0.899 | | |
| 1400 | 0.157 | 0.191 | 0.225 | 0.259 | 0.293 | 0.361 | 0.428 | 0.496 | 0.564 | 0.632 | 0.700 | 0.767 | 0.835 | 0.903 | 0.971 | | |
| 1500 | 0.169 | 0.205 | 0.242 | 0.278 | 0.314 | 0.387 | 0.460 | 0.533 | 0.606 | 0.678 | 0.751 | 0.824 | 0.897 | 0.970 | 1.042 | | |

## 8.3 Weights

**Fire damper with thermal-mechanical release mechanism** (Weight in kg)

| Width [mm] \ Height [mm] | 200 | 225 | 250 | 275 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 900 | 1000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 15 | 15 | 16 | 17 | 18 | 19 | 19 | 20 | 22 | 24 |
| 225 | 11 | 11 | 12 | 12 | 13 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 19 | 20 | 21 | 23 | 24 |
| 250 | 11 | 12 | 12 | 13 | 13 | 14 | 15 | 16 | 17 | 17 | 18 | 19 | 20 | 21 | 22 | 24 | 25 |
| 275 | 12 | 12 | 13 | 13 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 26 |
| 300 | 12 | 13 | 13 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 22 | 23 | 25 | 27 |
| 325 | 12 | 13 | 13 | 14 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 26 | 28 |
| 350 | 13 | 13 | 14 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 27 | 29 |
| 375 | 13 | 14 | 14 | 15 | 15 | 16 | 17 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 28 | 30 |
| 400 | 14 | 14 | 15 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 26 | 27 | 29 | 31 |
| 450 | 15 | 15 | 16 | 16 | 17 | 18 | 19 | 20 | 21 | 23 | 24 | 25 | 26 | 27 | 28 | 30 | 33 |
| 500 | 15 | 16 | 17 | 17 | 18 | 19 | 20 | 21 | 23 | 24 | 25 | 26 | 27 | 29 | 30 | 32 | 35 |
| 550 | 16 | 17 | 17 | 18 | 19 | 20 | 21 | 23 | 24 | 25 | 26 | 28 | 29 | 30 | 31 | 34 | 36 |
| 600 | 17 | 18 | 18 | 19 | 20 | 21 | 22 | 24 | 25 | 26 | 28 | 29 | 30 | 32 | 33 | 36 | 38 |
| 650 | 18 | 19 | 19 | 20 | 21 | 22 | 23 | 25 | 26 | 28 | 29 | 30 | 32 | 33 | 35 | 37 | 40 |
| 700 | 19 | 19 | 20 | 21 | 22 | 23 | 24 | 26 | 27 | 29 | 30 | 32 | 33 | 35 | 36 | 39 | 42 |
| 750 | 19 | 20 | 21 | 22 | 22 | 24 | 26 | 27 | 29 | 30 | 32 | 33 | 35 | 36 | 38 | 41 | 44 |
| 800 | 20 | 21 | 22 | 23 | 23 | 25 | 27 | 28 | 30 | 31 | 33 | 35 | 36 | 38 | 39 | 42 | 46 |
| 850 | 21 | 22 | 23 | 24 | 24 | 26 | 28 | 29 | 31 | 33 | 34 | 36 | 38 | 39 | 41 | 44 | 48 |
| 900 | 22 | 23 | 24 | 24 | 25 | 27 | 29 | 30 | 32 | 34 | 36 | 37 | 39 | 41 | 42 | 46 | 49 |
| 950 | 23 | 24 | 25 | 25 | 26 | 28 | 30 | 32 | 33 | 35 | 37 | 39 | 41 | 42 | 44 | 48 | 51 |
| 1000 | 24 | 24 | 25 | 26 | 27 | 29 | 31 | 33 | 35 | 36 | 38 | 40 | 42 | 44 | 46 | 49 | 53 |
| 1050 | 24 | 25 | 26 | 27 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 43 | 45 | 47 | | |
| 1100 | 25 | 26 | 27 | 28 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | | |
| 1150 | 26 | 27 | 28 | 29 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | | |
| 1200 | 27 | 28 | 29 | 30 | 31 | 33 | 35 | 37 | 39 | 42 | 44 | 46 | 48 | 50 | 52 | | |
| 1250 | 28 | 29 | 30 | 31 | 32 | 34 | 36 | 38 | 41 | 43 | 45 | 47 | 49 | 51 | 54 | | |
| 1300 | 28 | 30 | 31 | 32 | 33 | 35 | 37 | 40 | 42 | 44 | 46 | 49 | 51 | 53 | 55 | | |
| 1400 | 30 | 31 | 32 | 34 | 35 | 37 | 40 | 42 | 44 | 47 | 49 | 51 | 54 | 56 | 58 | | |
| 1500 | 32 | 33 | 34 | 35 | 37 | 39 | 42 | 44 | 47 | 49 | 52 | 54 | 57 | 59 | 62 | | |

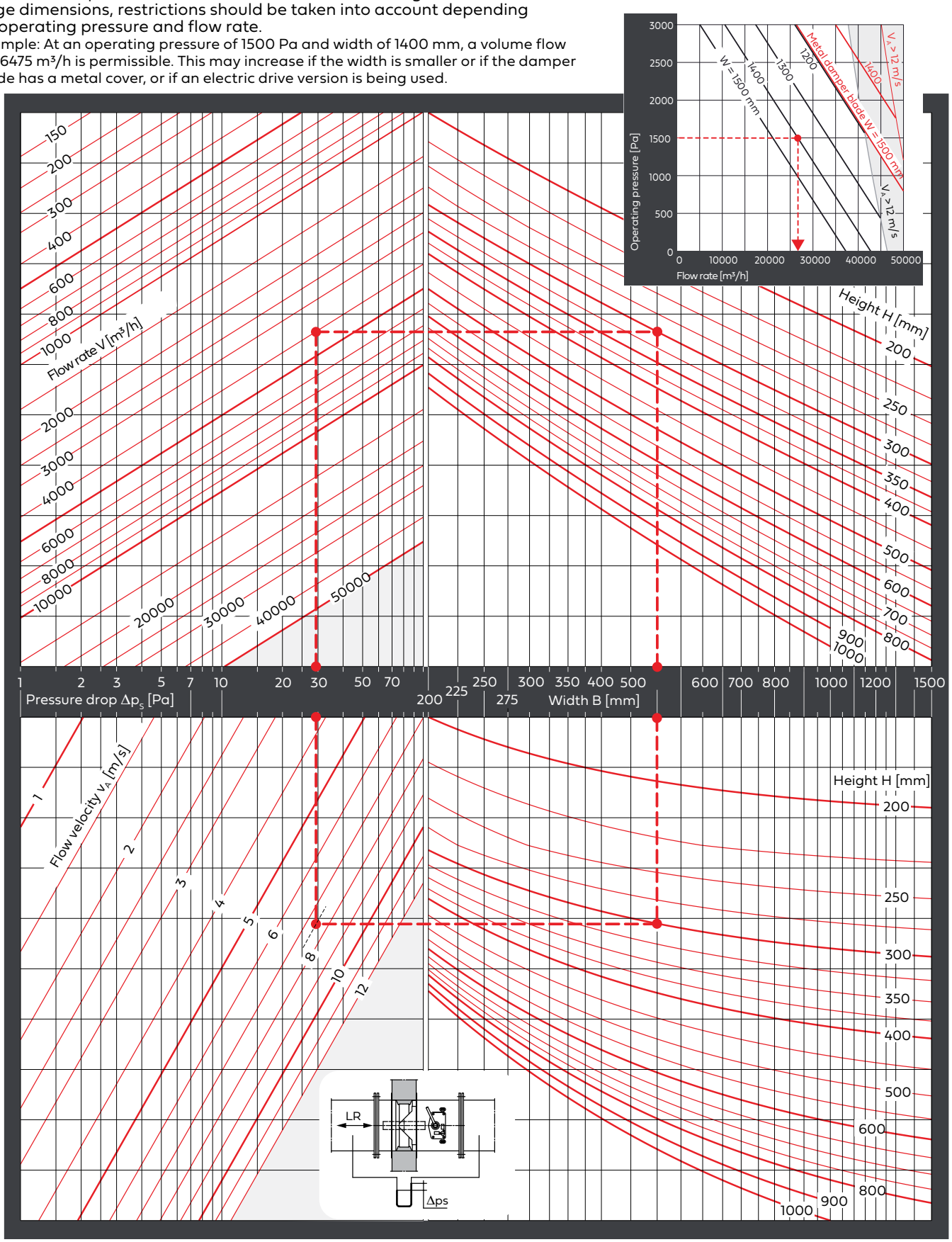
**Weight / add-ons to be added:**

| Attachments | Weight / add-on |
|---|---|
| Damper blade with metal cover | 10 % |
| ER1, ER3, ER8 installation subframe | 40 % |
| ER4 installation subframe | 85 % |
| AR1, AR2 mounting frame | 100 % |
| **Actuators** | |
| M220-9/H, M24-9/H | 1.3 kg |
| M220-10/H, M24-10/H | 0.5 kg |
| M220-11/H, M24-11/H | 0.8 kg |
| EM-1, EM-2, RM-1 | 4.1 kg |

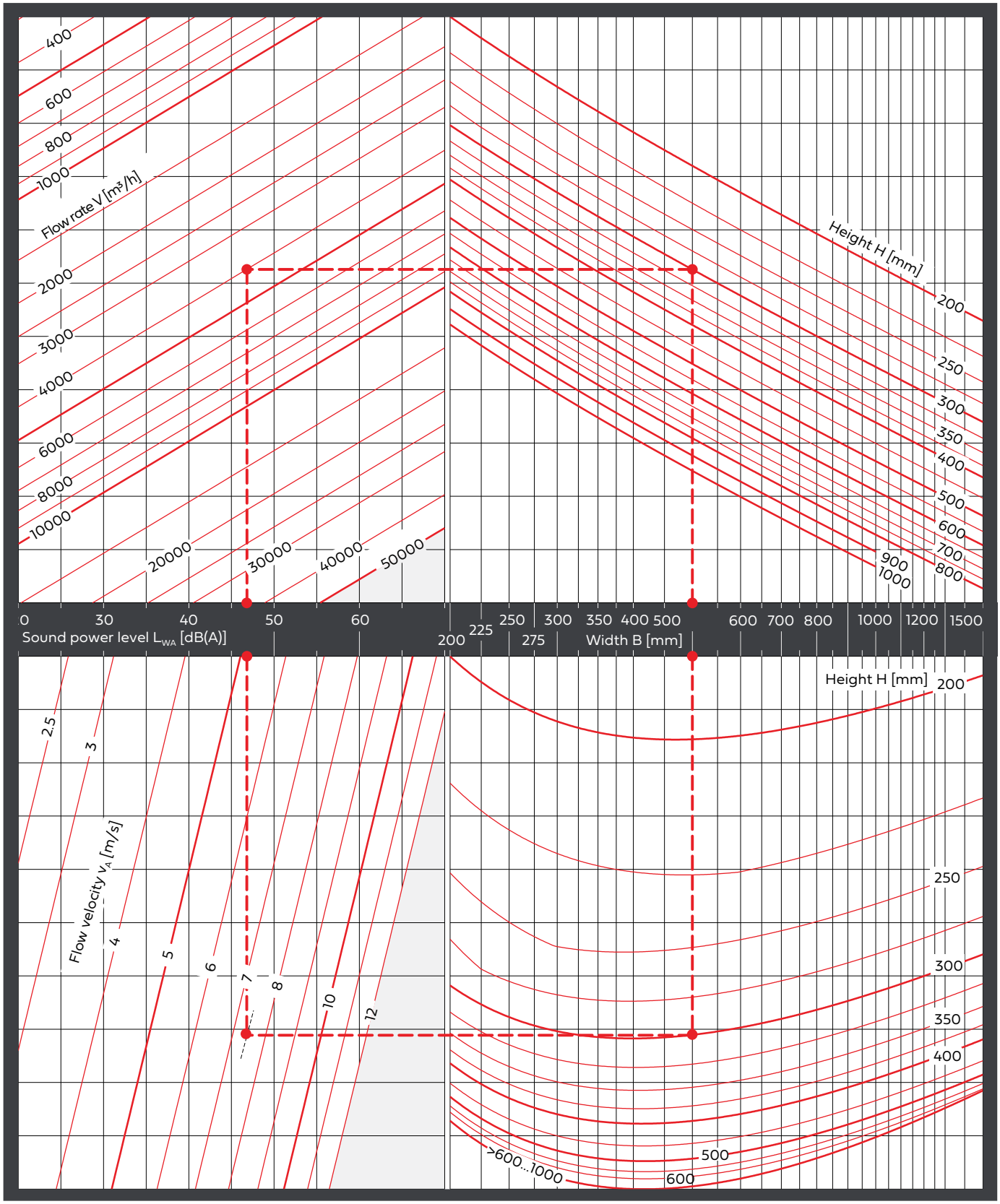
## 8.4 Pressure drop, sound power level and flow velocity

### Pressure drop with ventilation duct connection on both sides

FK90 fire dampers can be used in the area of the nomograms. With large dimensions, restrictions should be taken into account depending on operating pressure and flow rate.
Example: At an operating pressure of 1500 Pa and width of 1400 mm, a volume flow of 26475 m³/h is permissible. This may increase if the width is smaller or if the damper blade has a metal cover, or if an electric drive version is being used.

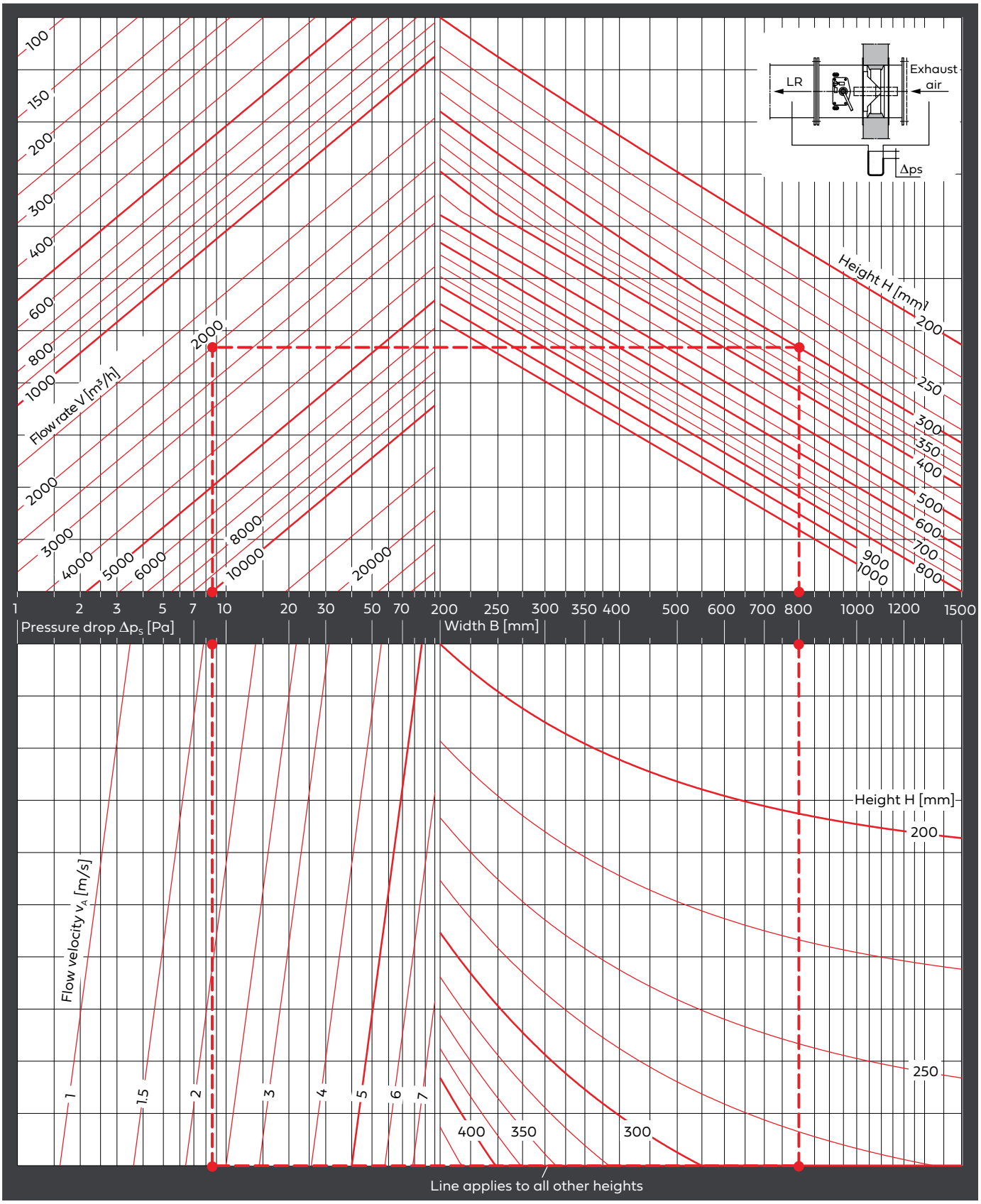


**Sound power level with ventilation duct connection on both sides**

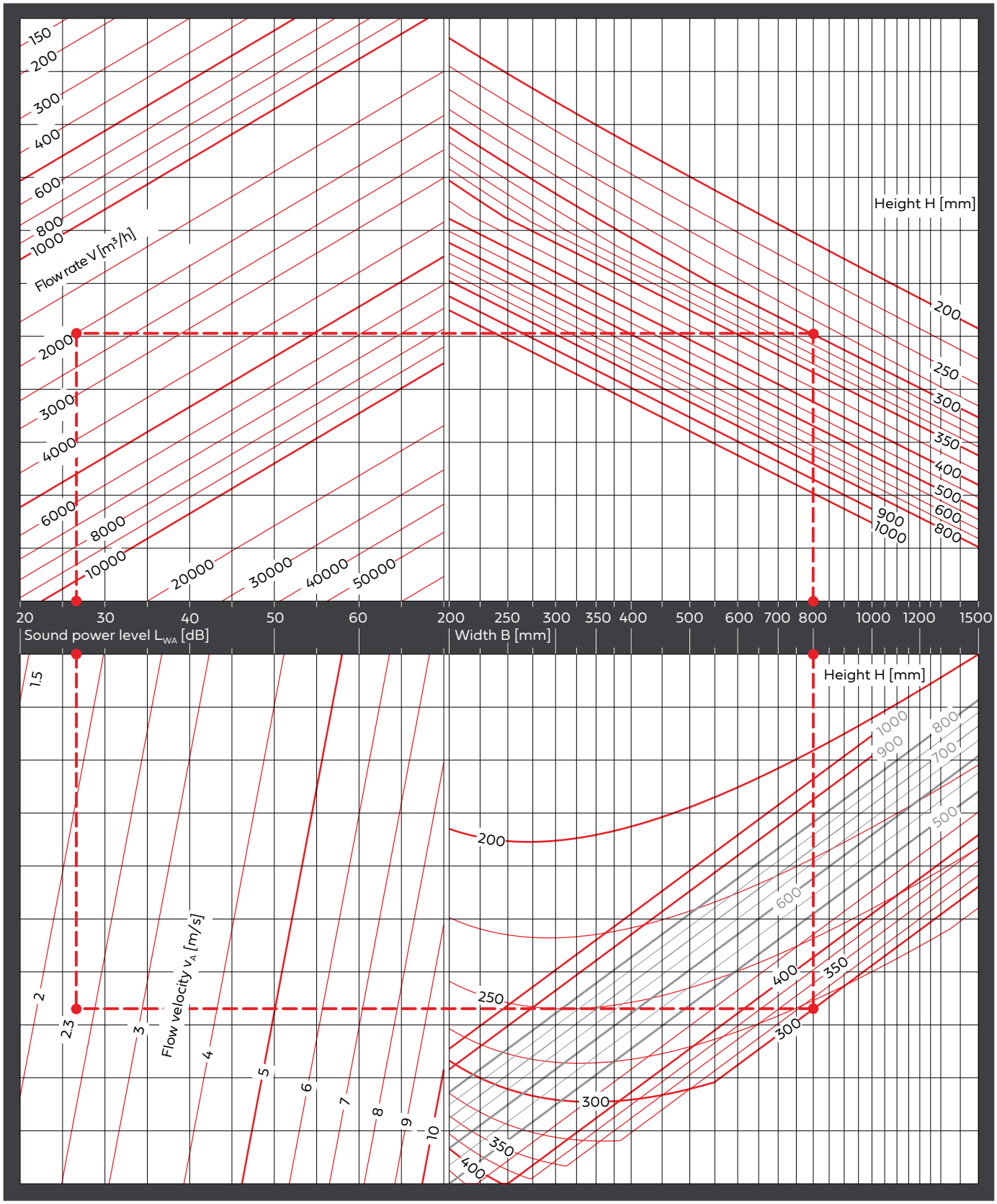



Example ▸ page 81.

**Pressure drop with ventilation duct connection on one side, and free incoming flow with protective grille**



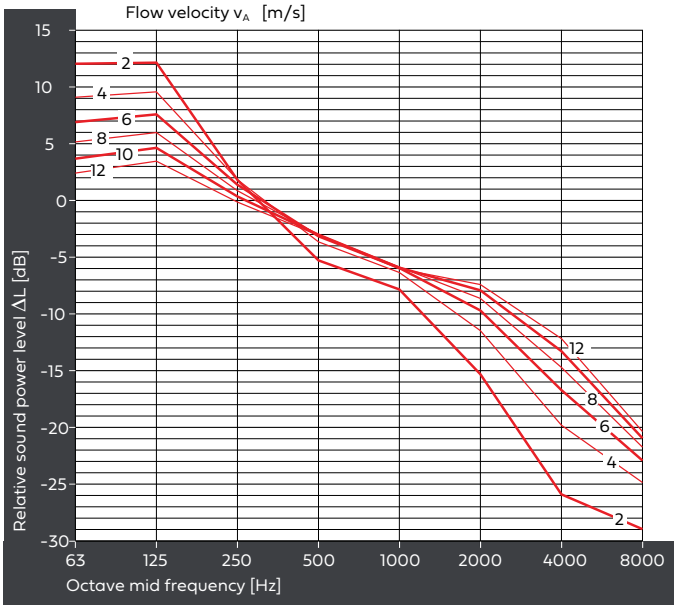
Sound power level with ventilation duct connection on one side, and free incoming flow with protective grille




Example ▸ page 81.

### Relative sound power level

- With ventilation duct connection on both sides

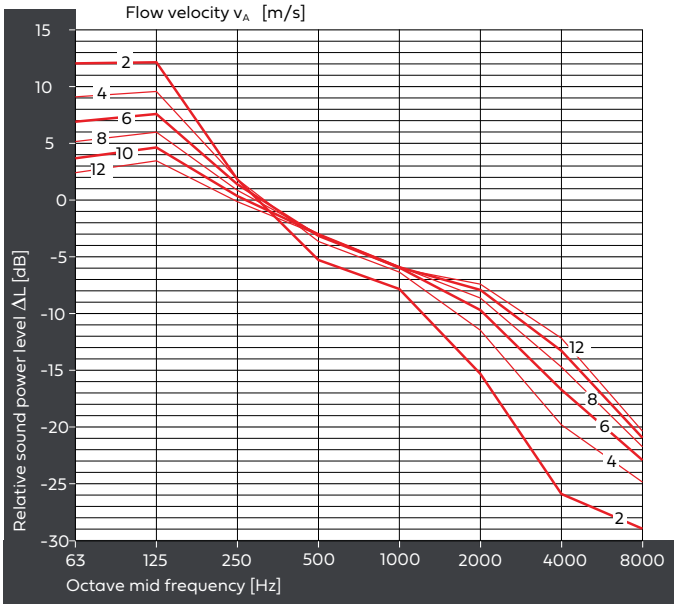



**Example: Both sides with ventilation duct connection**

V = 4000 m³/h
W = 500 mm
H = 300 mm
$A_A$ = 0.150 m²
$A_{free}$ = 0.098 m²
$\Delta p_s$ = 29 Pa
$v_A$ = 7.4 m/s
$L_{WA}$ = 47 db(A)

| Sound power level $L_{W\text{-}Oct}$ for the octave mid frequencies | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f | [Hz] | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| LWA | [dB(A)] | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| $\Delta L_{7.4\ m/s}$ | [dB] | +5 | +6 | +1 | -3 | -6 | -9 | -15 | -22 |
| $L_{W\text{-}OCT}$ | [dB] | 52 | 53 | 48 | 44 | 41 | 38 | 32 | 25 |

- With ventilation duct connection on one side, and free incoming flow with protective grille




**Example: Free incoming flow with protective grille**

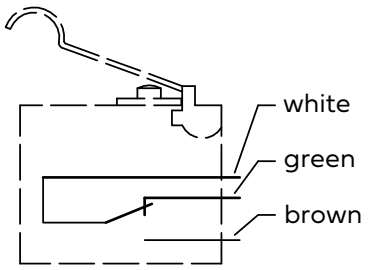
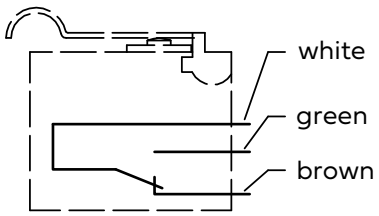
V = 2000 m³/h
W = 800 mm
H = 300 mm
$A_A$ = 0.240 m²
$A_{free}$ = 0.163 m²
$\Delta p_s$ = 8.6 Pa
$v_A$ = 2.3 m/s
$L_{WA}$ = 26 db(A)

| Sound power level $L_{W\text{-}Oct}$ for the octave mid frequencies | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| f | [Hz] | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| LWA | [dB(A)] | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| $\Delta L_{2.3\ m/s}$ | [dB] | +9 | +1 | +1 | -2 | -5 | -9 | -17 | -20 |
| $L_{W\text{-}OCT}$ | [dB] | 35 | 27 | 27 | 24 | 21 | 17 | 9 | 6 |

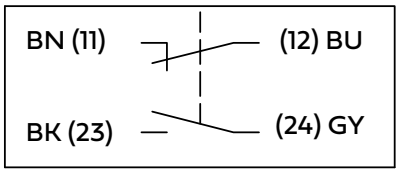
| Nomenclature page 77 to 81 | | | | | |
|---|---|---|---|---|---|
| W | [mm] | Width | $\Delta p_s$ | [Pa] | Static pressure drop |
| H | [mm] | Height | $L_{WA}$ | [dB(A)] | A-weighted, area-corrected sound power level |
| $A_A$ | [m²] | Inflow cross-section | $L_{W\text{-}Oct}$ | [dB] | Octave sound power level $L_{W\text{-}Oct} = L_{WA} + \Delta L$ |
| $A_{free}$ | [m²] | Free cross-section | ΔL | [dB] | Relative sound power level to $L_{WA}$ |
| V | [m³/h] | Flow rate | f | [Hz] | Octave mid frequency |
| $v_A$ | [m/s] | Flow velocity in inflow cross-section | LR | | Direction of air flow |

## 8.5 Electrical connections

**Limit switches on thermal-mechanical release mechanisms**

| Connection cable colour coding | |
|---|---|
|  |  |
| ***Limit switch not actuated*** | ***Limit switch actuated*** |

**E-Ex limit switch**

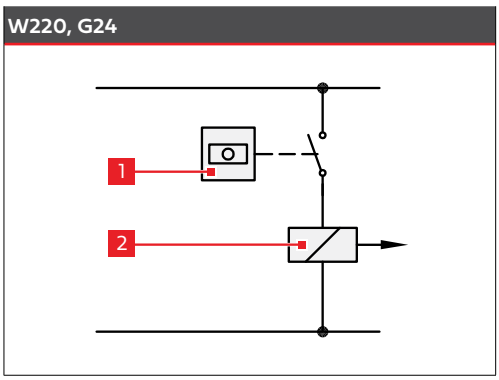
| E-Ex limit switch |
|---|
|  |
| ***Limit switch not actuated*** |

**Remote release**

***Control voltages 230 V AC or 24 V DC***

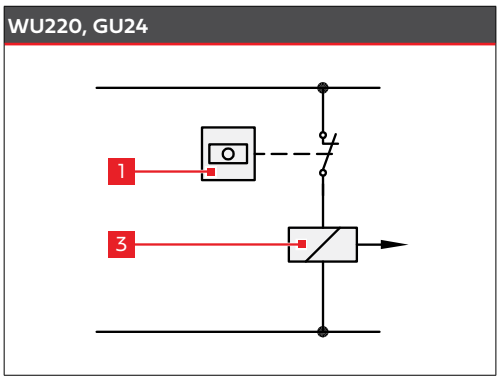
***Open circuit principle***

W220, G24




***Closed circuit principle***

WU220, GU24

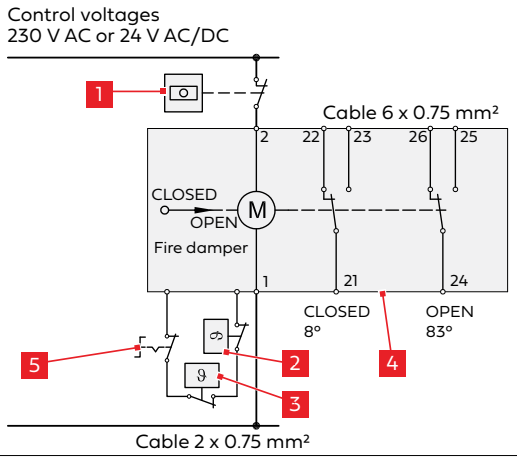



Nomenclature

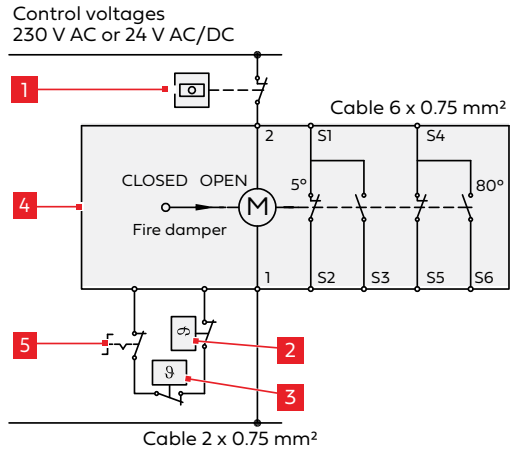
| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Thermostats, smoke detectors and switches must only be installed if required. On site delivery. | 2 | Lifting solenoid |
| | | 3 | Magnetic clamp |

## Spring return actuators

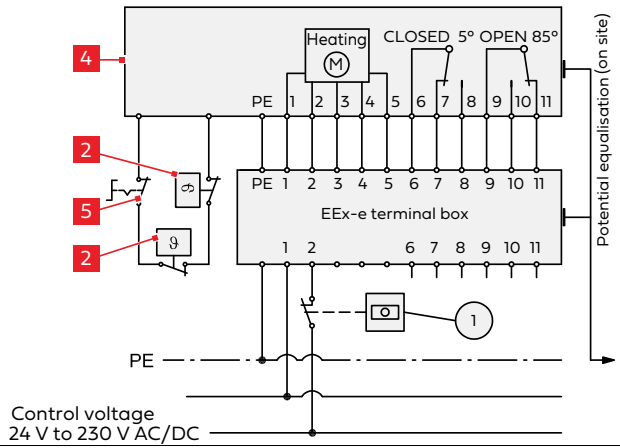
### M220-9/H, M24-9/H




### M220-10/H, M24-10/H, M220-11/H, M24-11/H




### EM-1, EM-2 and RM-1




## Nomenclature

| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Thermostats, smoke detectors and switches must only be installed if required. On site delivery. | 4 | Electric actuator with limit switches for OPEN-CLOSED position indicator.<br>The illustration shows the de-energised operating position where the fire dampers are closed. |
| 2 | Thermal-electrical release element 70 °C or 95 °C within the casing of the fire damper; EM-1, EM-2 and RM-1 only 70 °C. | 5 | Button for functional check |
| 3 | Thermal cut-off approx. 70 °C outside the casing of the fire damper. | | |

## 9 Specification text

**Maintenance-free fire damper according to EN 15650 with declaration of performance and CE marking up to 120 minutes fire resistance period and fire resistance classes EI 30/60/90/120 (ve - ho, i ↔ o) S C 10000. Maintenance-free: The operation unit, release mechanism and release element are fully enclosed, meaning that no cleaning, regular lubrication or adjustment is needed to maintain function. Straightforward functional check (opening and closing) using external operation and position indicator. Airtight casing, leak tightness class ATC 3 in accordance with DIN EN 1751, made of galvanized steel, edged all round in one piece and pressure-joined, chamfered inner bead for the damper blade freewheel, outer beads to ensure full stability and with connection flanges.** Casing with epoxy resin powder coating. **Replaceable damper blade made of abrasion-proof calcium silicate, with folded, wear-resistant elastomer lip seals on a profile frame** made of galvanized steel / stainless steel and full cover made of galvanized steel / stainless steel. **Fully enclosed, maintenance-free slider crank transmission in the area of the casing wall, as a self-locking drive mechanism for break-proof torque transmission. Sealed drive axles made of stainless steel, with gunmetal bearings. Suitable for installation without minimum spacing and with horizontal or vertical damper blade axes, even installed as part of a package with up to 4 fire dampers of the same size next to each other, one above the other or a combination. Installation is also possible in, on and remote from rigid walls and ceilings, in hard-to-access installation openings, or flange-to-flange installation, even with mineral wool, in and remote from metal stud walls, and on shaft walls with and without metal studs, in walls and ceilings in rigid wooden construction, here also with fire protection foam when using installation subframes, as well as walls and ceilings in wooden frame construction, in wooden stud construction with cladding made of clay cladding and in ceilings with steel frames. Fire batt system installation in rigid walls and ceilings and in metal stud walls. Direct connection to ventilation ducts made of non-combustible or combustible materials, or with protective grilles.**

**Enclosed, maintenance-free thermal release** 70 °C / 95 °C

- For manual single-handed operation
  - Corrosion-resistant release element 70 °C
  - With (two) electrical limit switch(es) for signalling the damper blade positions CLOSED, OPEN, CLOSED AND OPEN
  - With remote release via magnetic clamp 230 V AC or 24 V DC / lifting solenoid 230 V AC or 24 V DC / pneumatic cylinder 4 to 8 bar / 1.2 to 8 bar.
- With electric actuator 230 V AC or 24 V AC/DC for remote control and functional checks
- Explosion-protected for zones 1, 2, 21, 22
  - With (two) explosion-protected electrical limit switch(es) for signalling the damper blade positions CLOSED/OPEN
  - With explosion-protected electric drive for 24 V to 240 V AC/DC.
- With
  - ER1 installation subframe for installation in metal stud walls and shaft walls with and without metal studs
  - ER4 installation subframe for sliding ceiling connections in metal stud walls
  - ER2 installation subframe as short version for installation in rigid walls and ceilings
  - ER3 installation subframe as short version for installation in metal stud walls and shaft walls with and without metal studs
  - ER8 installation subframe for installation in wooden walls and ceilings and in ceilings with steel frames
  - AR1 mounting frame for mounting on rigid walls and ceilings
  - AR2 mounting frame for installation remote from rigid walls and ceilings and metal stud walls

**Tested according to EN 15650, annex B, with 20 % saline solution, for verification of permanent functioning under highly corrosive conditions.**

**In compliance with the hygiene requirements in accordance with VDI 6022-1, VDI 3803-1, DIN 1946-4, verification of the necessary resistance of all materials to microorganisms (fungi, bacteria) and disinfectant resistance.**

**With Environmental Product Declaration according to ISO 14025 and EN 15804.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **Width:** | ..... | **mm** | | |
| | | **Height:** | ..... | **mm** | | |
| | | **Length:** | 400, 500, 355, 346 | **mm** | | |
| | | **Volume flow:** | ..... | **m³/h** | | |
| | | **Pressure drop:** | ..... | **Pa** | | |
| | | **Sound power level:** | ..... | **dB(A)** | | |
| | | **Manufacturer:** | **WILDEBOER** | | | |
| | | **Type/series: FK90 / FK92** | | | | |
| | | | | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

**Casing extensions for fire dampers for bridging larger wall thicknesses or for creating the damper blade clearance for protective grilles, pipe connectors and flexible connectors. Made of galvanized steel with** powder-coated epoxy resin **175 mm long.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **Width:** | ..... | **mm** | | |
| | | **Height:** | ..... | **mm** | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

**Pipe connectors for fire dampers for connecting round pipes to the square casing cross-section. Made of galvanized steel.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **Width:** | ..... | **mm** | | |
| | | **Height:** | ..... | **mm** | | |
| | | **Pipe Ø:** | ..... | **mm** | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

**Protective grille for fire dampers without connecting ducts for protecting flow-through openings. Pressed with 20 mm mesh size made from at least 1-mm-thick galvanized steel.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **Width:** | ..... | **mm** | | |
| | | **Height:** | ..... | **mm** | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

**Flexible connectors for fire dampers, made from polyester with a cadmium-free coating, with connecting frame. Stretched length around 210 mm, at least 100 mm axial expansion absorption, building material class B1 according to DIN 4102. With certificate for hygiene conformity test as proof of compliance in accordance with VDI 6022-1, VDI 3803-1, DIN 1946-4, ÖNorm H 6020, SWKI VA 104-01, SWKI VA 105-01.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **Width:** | ..... | **mm** | | |
| | | **Height:** | ..... | **mm** | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

**Connection box for spring return actuators with AMP connector on connecting lines for transmission via plug-in screw terminals to on-site line. Plastic casing IP40.**

| | | | | | | |
|---|---|---|---|---|---|---|
| ..... | **pcs.** | **AB-01 for 24 V AC/DC** | | | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |
| ..... | **pcs.** | **AB-02 for 230 V AC** | | | | |
| | | **Manufacturer:** | **WILDEBOER** | | **deliver:** | ..... |
| | | | | | **install:** | ..... |

Delete text not printed in bold as required!

# 10 Wildeboer makes it easy

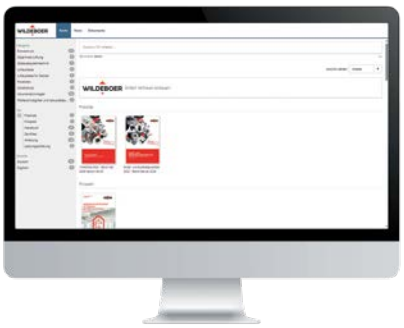
## 10.1 Wildeboer Connect

- High-performance configurator with customer-specific net prices
  - Quick, intuitive product configuration of Wildeboer products
  - Access to prices and unique version keys for ordering products
  - Easy calculation of operating point data for configured products
  - Interface to Autodesk Revit and AutoCAD for transferring CAD geometries
  - Download of CAD data, data sheets, specification texts and further product documents in common data formats
- Transparent real-time order tracking
  - Detailed order information
  - Access to order documents
  - Access to shipment tracking

## 10.2 WiDim dimensioning software

- Functional, modern and intuitive dimensioning of Wildeboer products
- Conveniently collect operating point data, 3D product views, suitable accessories and current revision documents in a single project
- Project can be output in various formats
- A GAEB interface and an interface based on VDI 3805 facilitate a continuous planning process

## 10.3 Documents online



- Paperless and environmentally friendly online access to Wildeboer documents
- All documents in one central location and always up to date
- Supporting interactive formats and content

## 10.4 Documents for acceptance

The following list contains the documents required for the approval of an FK90 fire damper.

**FK90 in ventilation systems**

| | |
|---|---|
| ☐ FK90 fire damper user manual | |
| ☐ Declaration of performance | DoP No. CPR/FK90/003 |
| ☐ Reaction to fire certificate | MPA-BS 6000/593/18 |
| ☐ CE marking with necessary manufacturer information | Applied to fire damper in the factory. Please remove before mortaring. |
| ☐ Approval Z-78.6-250 OR4 smoke detector (if installed in ventilation system) | |
| ☐ ATEX EU declaration (if applicable) | |

**FK90 as air transfer applications (Ü-FK)**

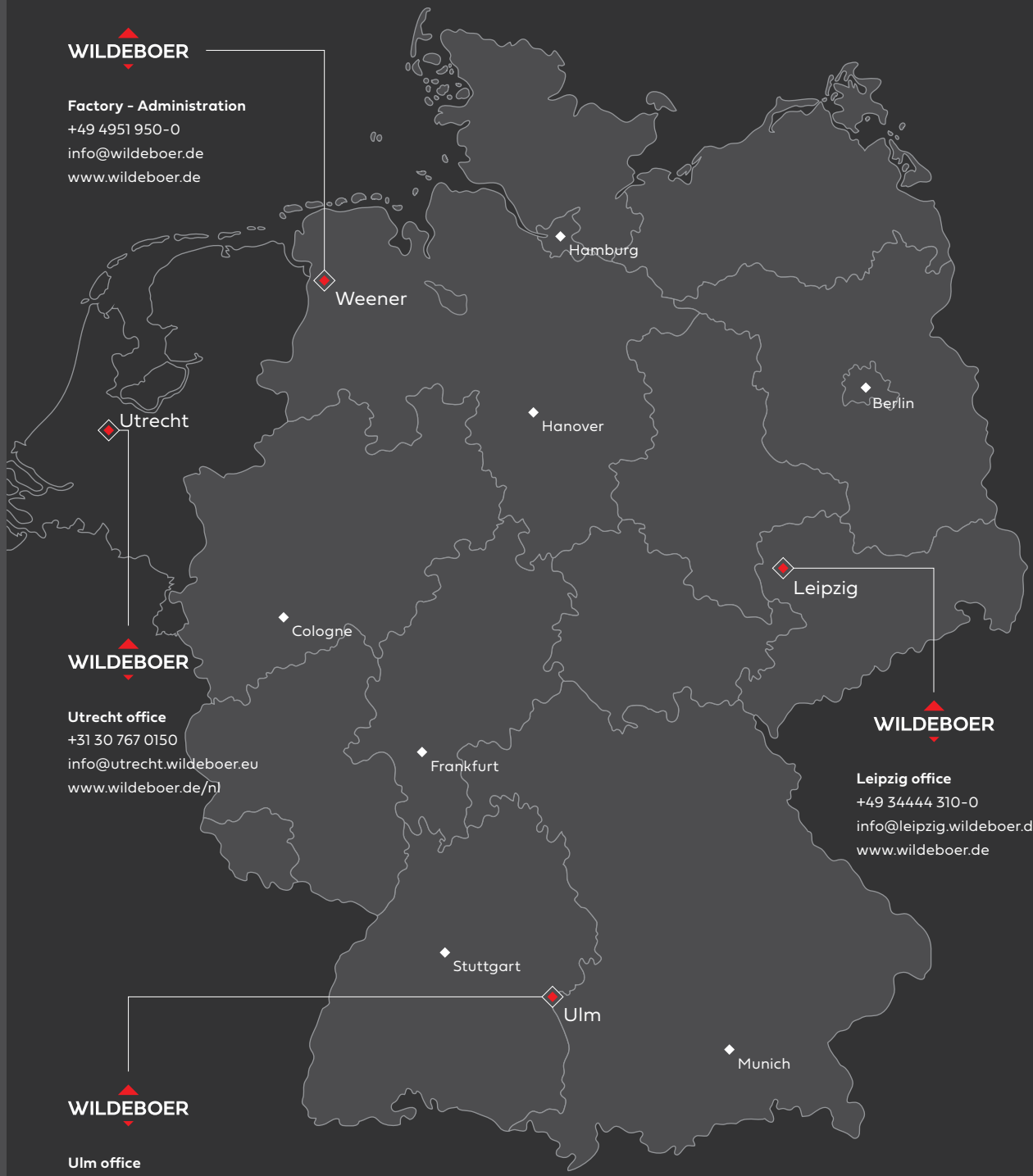
| | |
|---|---|
| ☐ FK90 fire damper user manual | |
| ☐ Declaration of performance | DoP No. CPR/FK90/003 |
| ☐ Reaction to fire certificate | MPA-BS 6000/593/18 |
| ☐ CE marking with necessary manufacturer information | Applied to fire damper in the factory. Please remove before mortaring. |
| ☐ User manual for Ü-FK \| Ü-FR (OR4 series) *or* user manual for Ü-FK \| Ü-FR (OR32 series) | |
| ☐ Type approval for Ü-FK (OR32 and OR4 series) | Z-6.50-2132 |
| ☐ Declaration of conformity Ü-FK | |

***Supplementary documents for completion of the documentation***

- Installation and operating instructions
- Hygiene certificate
- Environment product declaration

# Always there for you

## Locations & contact

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Find out more at
**www.wildeboer.de/downloads**

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As at: 2025-03
Subject to change.