



Maintenance-free

FR90 fire dampers

- Sizes Ø 100 mm to Ø 800 mm
- For universal use with a wide range of applications
- Fire classification: EI 30/60/90/120 ($v_e - h_o, i \leftrightarrow o$) S C₁₀₀₀₀
- Hygiene certificate
- Environmental Product Declaration according to ISO 14025 and EN 15804

FR90 fire dampers

Features and characteristics

Single-piece sheet steel casing

galvanized - longitudinal seam welded - extremely robust

airtight, smoke-proof

Leak tightness class C according to EN 1751

Option: Epoxy resin powder coating

Nominal sizes [mm]

DN 100 to DN 800

Maintenance-free

⇒ see page 34

Break-resistant

Damper blade

with elastomer lip seal

airtight, leak tightness class 3 according to EN 1751

Options:

- Metal cover made of galvanized steel
- Metal cover made of 1.4301 stainless steel

Two control openings (inspection openings) for viewing both sides of the damper blade

Large free cross-section

Maximum volume flows

Minimum pressure drop

Extremely low sound power level

Release mechanism and axis of the damper blade **rotatable 360°**

Fully enclosed:

- Operation unit
- Release mechanism
- Release element

Thermal-mechanical release mechanism for manual single-handed operation

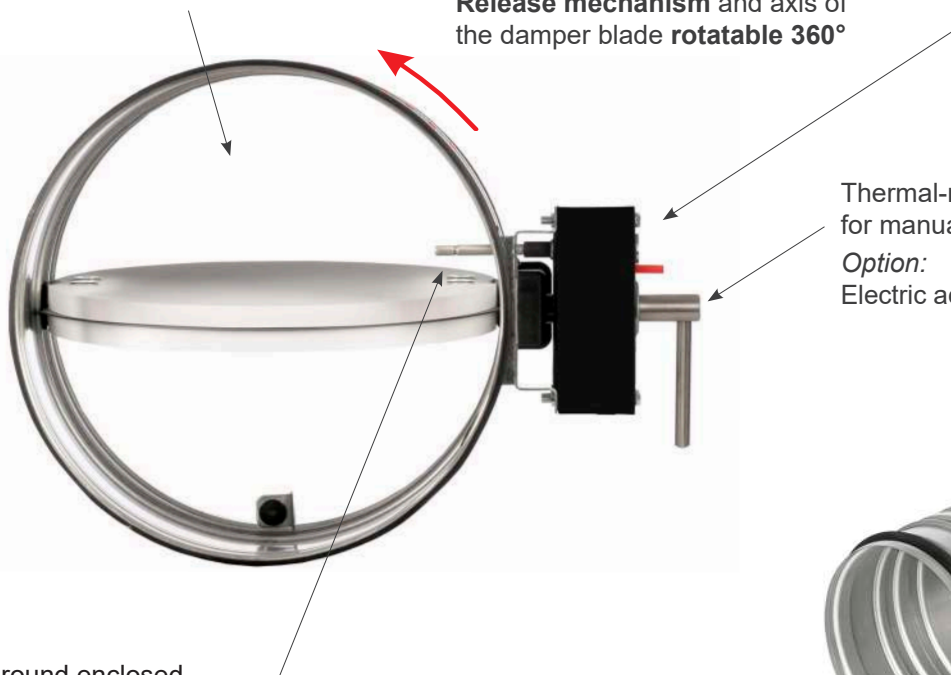
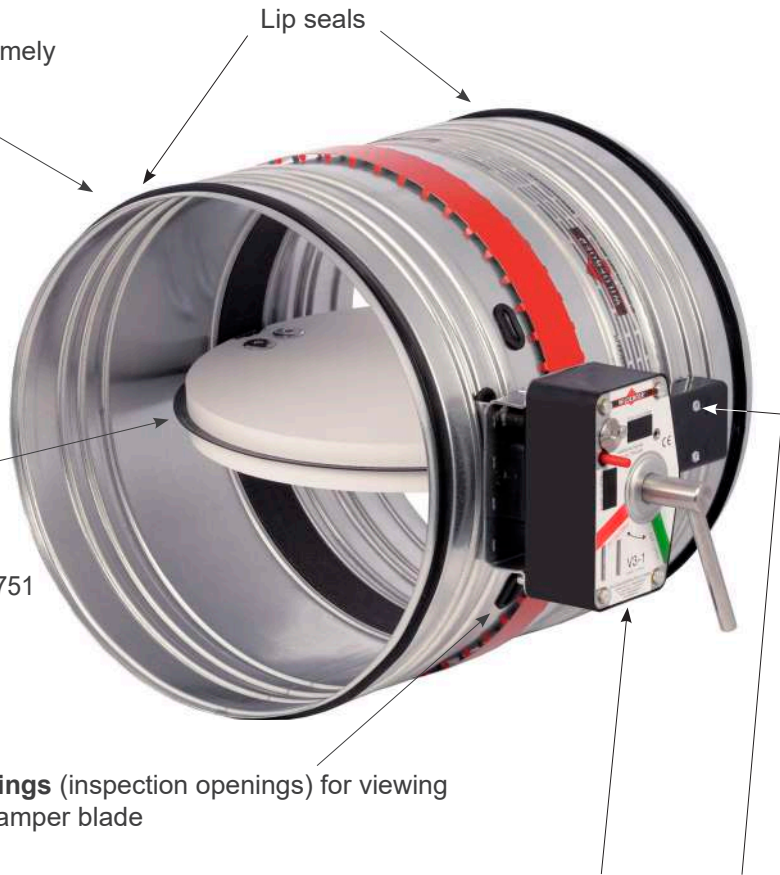
Option:

Electric actuators, also explosion-protected

All-round enclosed

thermal release elements 70°C or 95°C

Option: Corrosion-resistant release element 70°C



FR90 fire dampers

Description

Maintenance-free FR90 fire dampers according to EN 15650

Fire classifications: **EI 30/60/90/120 (v_e - h_o, i ↔ o) S C₁₀₀₀₀** ⇒ see page 11

Declaration of performance: **DoP no.: CPR/FR90/003**

EU Declaration of Conformity according to Directive 2014/34/EU
for **use in potentially explosive atmospheres**

Environmental Product Declaration ISO 14025, EN 15804:
EPD-WWB-20130082-IBA1-DE

Casing with all-round single-piece design, made of galvanized sheet steel, leak tightness class C according to EN 1751. Moulded push-fit connections for spiral lockseam duct according to DIN 24145, for flexible pipe and for similar ducts of ventilation and air conditioning systems. All-round press-moulded beading over the whole length of casing ensures necessary strength and free movement of the damper blade even with large dimensions. Extremely low pressure drop and a very low noise level are thus achieved.

Push-fit connections are provided as standard with lip seals.

Option: Casing with epoxy resin powder coating.

Damper blade made of high-temperature-resistant, abrasion-proof calcium silicate with wear-resistant elastomer lip seals. Leak tightness 3 according to EN 1751.

Option: Damper blade with metal cover made of galvanized steel or 1.4301 stainless steel.

Damper blades without metal cover are exchangeable.

Enclosed, maintenance-free drive mechanism in the area of the casing wall as a self-locking transmission for break-proof torque transmission. Sealed drive axles made of stainless steel, with red metal bearings. Thermal release mechanisms for 70°C or 95°C nominal temperature. The operation units can be actuated manually or electrically. ⇒ see pages 5 and 6

Release mechanisms, operation units and electric actuators are enclosed and fitted with a spring return. They are maintenance-free, can be connected in a form-locking or force-fitting manner, are easy to replace and can be easily retrofitted as required.

Additional national approvals

- Germany:

Building materials: Z-56.4212-993

Air transfer applications: Z-6.50-2133

Z-19.18-2241

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

Installation clearances from 15 mm are possible!

Nominal sizes [mm] DN:

100 - 125 - 140 - 160 - 180 - 200 - 224 - 250 - 280
315 - 355 - 400 - 450 - 500 - 560 - 630 - 710 - 800

Options:

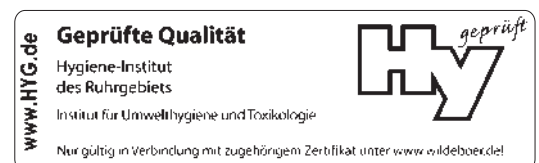
- Circular **installation subframe RR** (RR100, RR150) for easy installation in openings such as core holes in rigid walls and ceilings or holes in metal stud walls with cladding on both sides. Only up to DN 315! ⇒ see pages 4, 7, 14, 22, 35, 36
- Rectangular **installation subframe RE** (RE100, RE150) for easy – also multiple – installation in rigid walls and ceilings and in metal stud walls with cladding on both sides. ⇒ see pages 4, 7, 13, 20 to 22, 35, 36
- **Mounting frame AE** for mounting on rigid walls and ceilings and walls with cladding on one side and with or without metal studs. ⇒ see pages 4, 7, 15, 26, 27, 32, 35, 36
- **Installation subframe ER6** for sliding ceiling connections with drops of up to 40 mm in metal stud walls with cladding on both sides. ⇒ see pages 4, 7, 23 to 25, 35
- **Mounting frame RV** for connection to ventilation ducts with fire resistance period. Installation remote from rigid walls and ceilings and metal stud walls. ⇒ see pages 4, 7, 28 to 31, 35, 36

FR90 fire dampers

- meet the **hygiene requirements** according to VDI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 13779
- 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 disinfectants**²⁾
- are suitable for use in hospitals and similar facilities!
- **permanently fulfil their function under high corrosion conditions.** Tested according to EN 15650, annex B with 20% saline solution.

¹⁾ The corresponding **resistance of the materials to fungi and bacteria** was verified by testing the microbial metabolic potential under DIN EN ISO 846 for all materials in the FR90 fire dampers.

²⁾ The **resistance to disinfectants** of the materials in the FR90 fire dampers was tested with the disinfectant groups of active ingredients **alcohol** and the **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). It has been verified that FR90 fire dampers can withstand normal use of disinfectants and disinfection methods.



FR90 fire dampers

Installation subframes / mounting frames



Option:

With circular **installation subframe RR100** or **RR150** for easy installation in circular openings such as core holes in rigid walls and ceilings or holes in metal stud walls with cladding on both sides. Only up to DN 315!

⇒ see pages 7, 14, 22, 35, 36



Option:

Rectangular **installation subframe RE100** or **RE150** for easy – also multiple – installation in rigid walls and ceilings and in metal stud walls with cladding on both sides. ⇒ see pages 7, 13, 20 to 22, 35, 36



Option:

With **mounting frame AE** for mounting on rigid walls and ceilings and on walls with cladding on one side (shaft walls) and with and without metal studs.

⇒ see pages 7, 15, 26, 27, 32, 35, 36



Option:

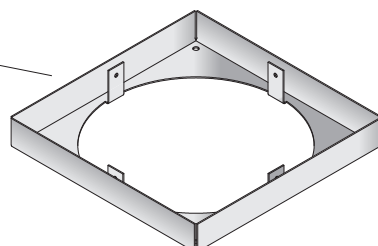
With **installation subframe ER6** for sliding ceiling connections with drops of up to 40 mm in metal stud walls with cladding on both sides. The drop can be single or recurring (settlement and changing loads).

⇒ see pages 7, 23 to 25, 35



Option:

With **Mounting frame RV** for connection to ventilation ducts with fire resistance period. Installation remote from rigid walls and ceilings and metal stud walls. ⇒ see pages 7, 28 to 31, 35, 36



Accessories for mounting frame:

Connecting frame for attaching the ventilation duct with fire resistance period to walls and ceilings.

⇒ see pages 7, 28 to 31, 35, 36

Featured: Size for DN ≤ 315

FR90 fire dampers

Release mechanisms and actuators (1)

FR90 fire dampers, series FR92, are fitted with maintenance-free thermal-mechanical release mechanisms or with thermal-electrical release mechanisms on the spring return actuators. **Release** occurs at a nominal temperature of **70°C** or **95°C**. Coated release elements provide increased corrosion protection.

Electric spring return actuators also close the fire dampers if the supply voltage is interrupted. They reopen the fire dampers as soon as the voltage is present again.

Release mechanisms and operation units can be replaced on site!

Thermal-mechanical release mechanism - standard - with 70°C release element.

Option: with coated 70°C release element.

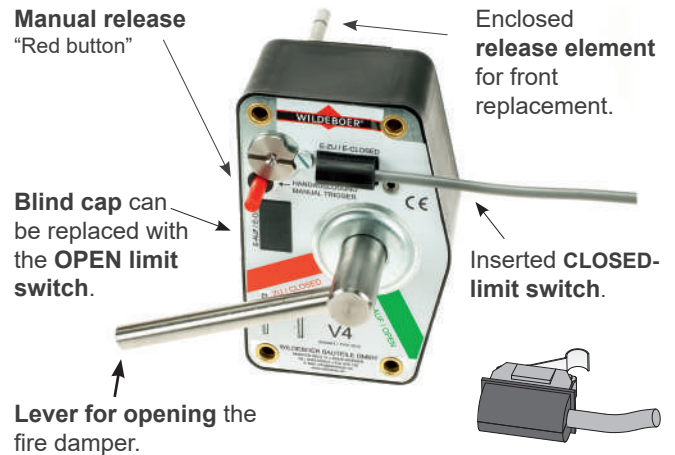
Option: with coated 95°C release element.

Option: with limit switch

E Changeover with gold-plated contacts for 5 A at 250 V AC or 24 V DC; IP67;

1 m silicone free connection cable 3 x 0.34 mm².

One or two can be plugged in for the CLOSED and/or OPEN position indicator instead of blind caps.



Option: with additional remote release based on the:

Closed circuit principle. The fire dampers must be opened manually, and close after the electrical supply voltage is interrupted.

GU24 with magnetic clamp 24 V DC; 1.6 W; 100% duty cycle; IP42.

WU220 with magnetic clamp 230 V AC; 4 VA; 100% duty cycle; IP42.

Open circuit principle. The fire dampers must be opened manually, and close by means of electrical or pneumatic stimulus.

G24 with lifting solenoid 24 V DC; 3.5 W; 100% duty cycle; IP42.

W220 with lifting solenoid 230 V AC; 5.5 VA; 100% duty cycle; IP42.

P with lift cylinder 4 to 8 bar.

P2 with lift cylinder 1.2 to 8 bar.



Release mechanism and remote release with lifting solenoid

Option: Electric spring return actuator- Standard up to DN 315 - only for sizes DN ≤ 315 mm

with 70°C release element; IP54.

M220-10/F 230 V AC; 6.5 VA / 3 W; $I_{max \leq 5ms} = 4 A$

M24-10/F 24 V AC/DC; 4 VA / 2.5 W; $I_{max \leq 5ms} = 8.3 A$

Runtime: Opening < 60 s, closing ≈ 20 s

CLOSED/OPEN 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 long; 2 x 0.75 mm² and 6 x 0.75 mm². The AMP connector plugs are detachable.

Option: with 95°C release element.

Button for function check



Figure shows M220-10/F or M24-10/F.

FR90 fire dampers

Release mechanisms and actuators (2)

Option: Electric spring return actuator

- Standard from DN 355 -

with 70°C release element; IP54.

M220-9/H 230 V AC; 9.2 VA; $I_{\max \leq 2 \text{ ms}} = 0.27 \text{ A}$.

M24-9/H 24 V AC/DC; 6.1 VA / 3.5 W; $I_{\max \leq 2 \text{ ms}} = 3.5 \text{ A}$.

Runtime: Opening $\approx 60 \text{ s}$, closing $\approx 21 \text{ s}$.

CLOSED/OPEN position indicators via limit switch for 5 A at $\leq 240 \text{ V AC}$.

Halogen-free connection cable; 0.9 m long; 2 x 0.75 mm² and 6 x 0.75 mm². The AMP connector plugs are detachable.

Option: with 95°C release element.

Enclosed release element
Button for function check



Ex - designs

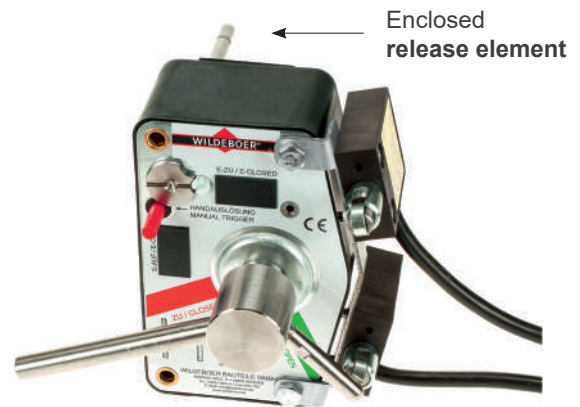
Thermal-mechanical release mechanism with 70°C release element.

Option: with coated 70°C release element.

Option: with **explosion-protected limit switch**

E-Ex with normally open contact and normally closed contact for 6 A at $\leq 250 \text{ V AC}$ or 0.25 A at $\leq 230 \text{ V DC}$; IP65; 2-m connection cable 4 x 0.75 mm².

One or two can be attached for the CLOSED and/or OPEN position indicator.



Option: **Electric spring return actuator** with 70°C release element and terminal box.

EM-1 10 Nm }
EM-2 15 Nm } 24 to 240 V AC/DC; IP 66.
RM-1 10 Nm }

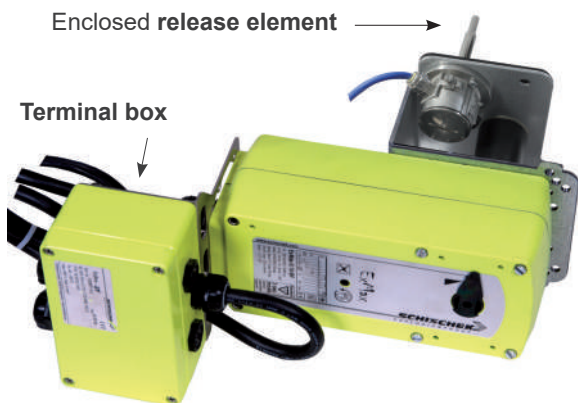
Power consumption up to 20 W including heating;

$I_{\text{nominal}} \leq 0.7 \text{ A}$; $I_{\max \leq 1 \text{ s}} \approx 2.5 \text{ A}$

Runtime: Opening $\approx 30 \text{ s}$, closing $\approx 10 \text{ s}$.

CLOSED/OPEN position indicators via limit switches for $\leq 3 \text{ A}$ at 24 V AC/DC and $\leq 0.25 \text{ A}$ at 250 V AC/DC; at least 5 V, 10 mA.

The 12 x 0.5 mm² halogen-free connection cable must be wired in the terminal box! All of the contained voltages must be the same!



The actuators can be rotated into suspended and vertical positions on site.

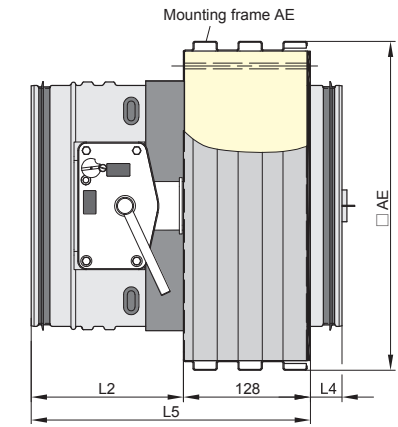
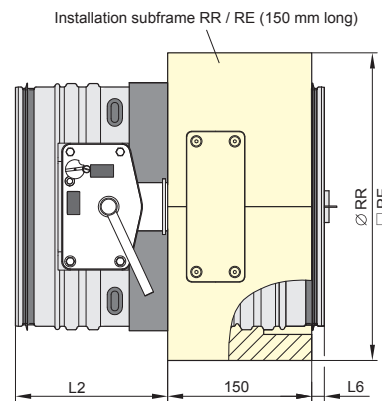
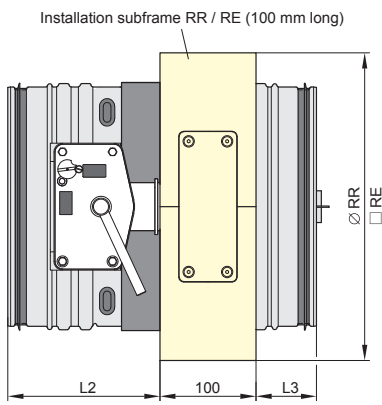
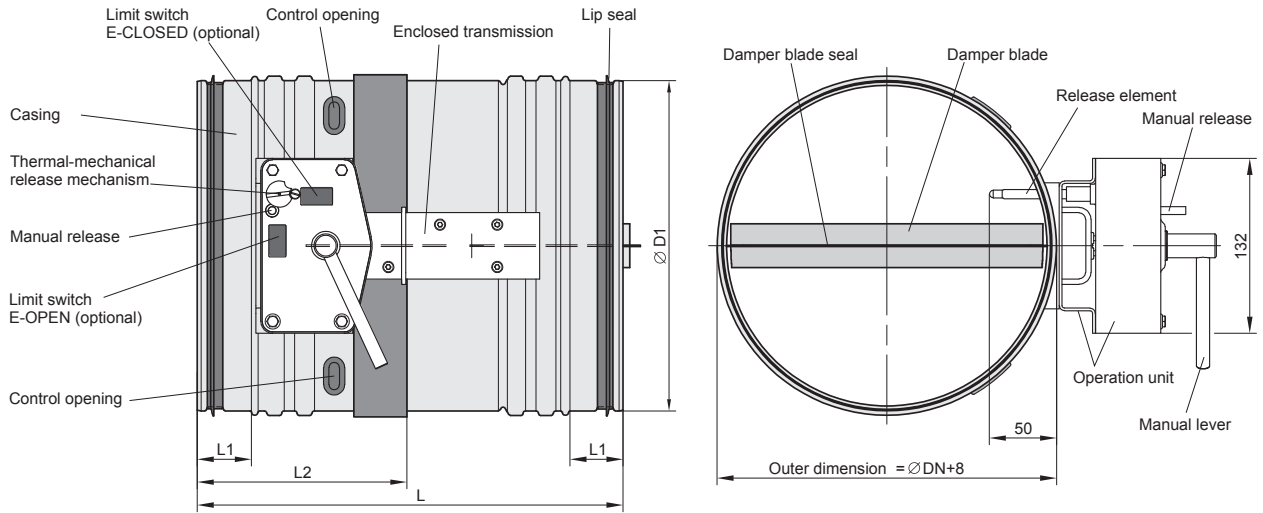
Use of explosion-protected designs

Building area where a dangerous, potentially explosive atmosphere may occur in normal operation...	... 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 form occasionally.	... occurs temporarily or not at all.	... can form occasionally.	... occurs temporarily or not at all.
Zone	1	2	21	22
Identification of the fire damper	II 2 G c IIc T6/T5	II 3 G c IIc T6/T5	II -/2 D c T80°C / T95°C	II -/3 D c T80°C / T95°C
Thermal-mechanical release mechanism with or without explosion-protected limit switch	X	X *)	X	X *)
Motor drive	EM-1 or EM-2	X	X	X *)
	RM-1	-	X	X

Ambient temperatures: -20°C ... +40°C for T6 and T80°C / -20°C ... +50°C for T5 and T95°C *) Can also be used in this zone!

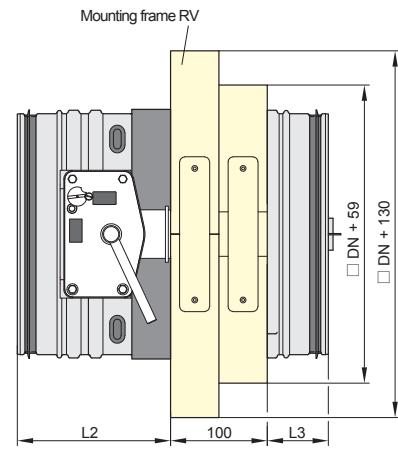
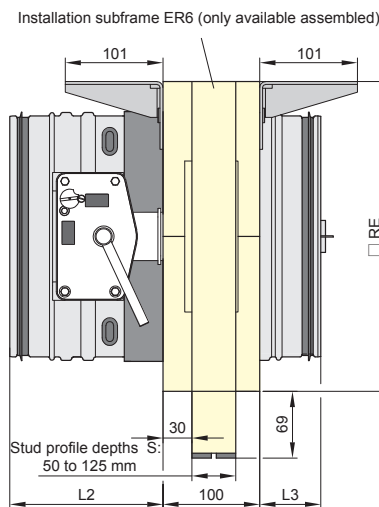
FR90 fire dampers

Data sheet (1)



With installation subframe RR100, RR150 (circular) or RE100, RE150 (rectangular)
Installation lengths 100 mm and 150 mm. ⇒ see pages 3, 4, 13, 14, 20 to 22, 35, 36

With mounting frame AE.
 ⇒ see pages 3, 4, 15, 26, 27, 32, 35, 36



DN from	100	355
to	315	800
Ø D1	DN - 1	DN - 1
Ø RR	DN + 99	-
RE	DN + 89	DN + 99
AE	DN + 110	DN + 120
L	320	340
L1	40	50
L2	155	160
L3	65	80
L4	37	52
L5	283	288
L6	15	30

With installation subframe ER6
 ⇒ see pages 3, 4, 23 to 25, 35

With mounting frame RV
 ⇒ see pages 3, 4, 28 to 31, 35, 36

All dimensions in mm

FR90 fire dampers

Data sheet (2)

Maximum excess lengths of mechanical and electrical equipment parts.

Additional space must be provided for assembly, electrical connections and maintenance; observe the “T” measurement; in addition to the “T” measurement, it is recommended that a distance 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.

Damper blade

Operation side: X

Non-operation side: Y

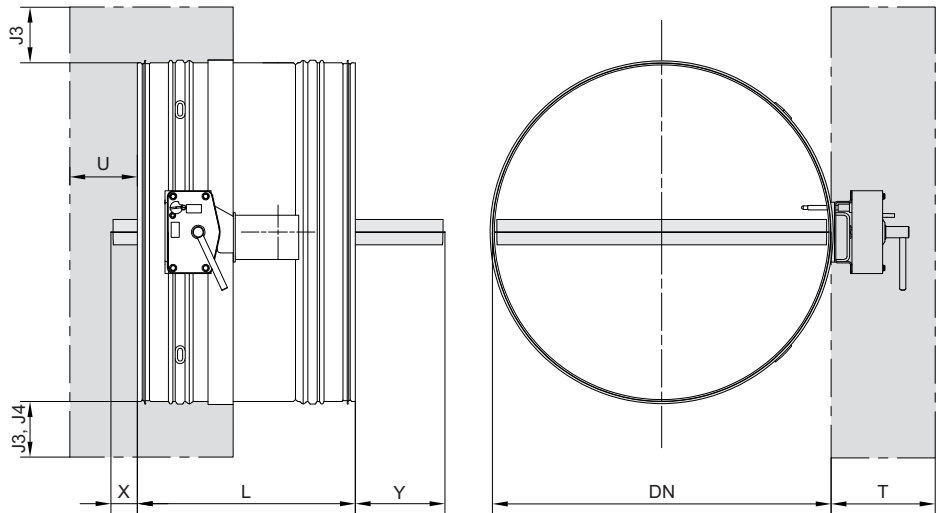
Actuators

U Horizontal (delivery condition)

J Vertical

J3 EM-1, RM-1, EM-2 rotated to vertical or suspended position

J4 M220-11/H, M24-11/H rotated to suspended position



All dimensions in mm

Size-independent excess lengths

	T	U
Thermal-mechanical release mechanism with:	130	-
• W220, WU220	155	-
• G24, GU24	155	-
• P, P2	140	-
• E-Ex limit switch	140	-
M220-9/H, M24-9/H	125	60
M220-10/F, M24-10/F	85	80
M220-11/H, M24-11/H	110	110
EM-1, EM-2, RM-1	310	216

Size-dependent excess lengths

DN	Ø D1	L	J3	J4	X	Y
100	99	320	220	160	-	-
125	124	320	210	150	-	-
140	139	320	200	140	-	-
160	159	320	190	130	-	-
180	179	320	180	120	-	-
200	199	320	170	110	-	-
224	223	320	160	100	-	-
250	249	320	150	90	-	10
280	279	320	130	70	-	25
315	314	320	115	55	-	43
355	354	340	95	35	-	52
400	399	340	70	10	-	75
450	449	340	45	-	12	100
500	499	340	20	-	37	126
560	559	340	-	-	68	156
630	629	340	-	-	104	192
710	709	340	-	-	144	233
800	799	340	-	-	190	279

Powder coating with epoxy resin

Casings coated internally and externally are recommended:

- damper blades with **metal cover made of 1.4301 stainless steel**
- thermal-mechanical release mechanisms with **corrosion-resistant (coated) release element 70°C**.

These combinations allow additional corrosion protection for harsh service conditions.

Operating area, closing and opening

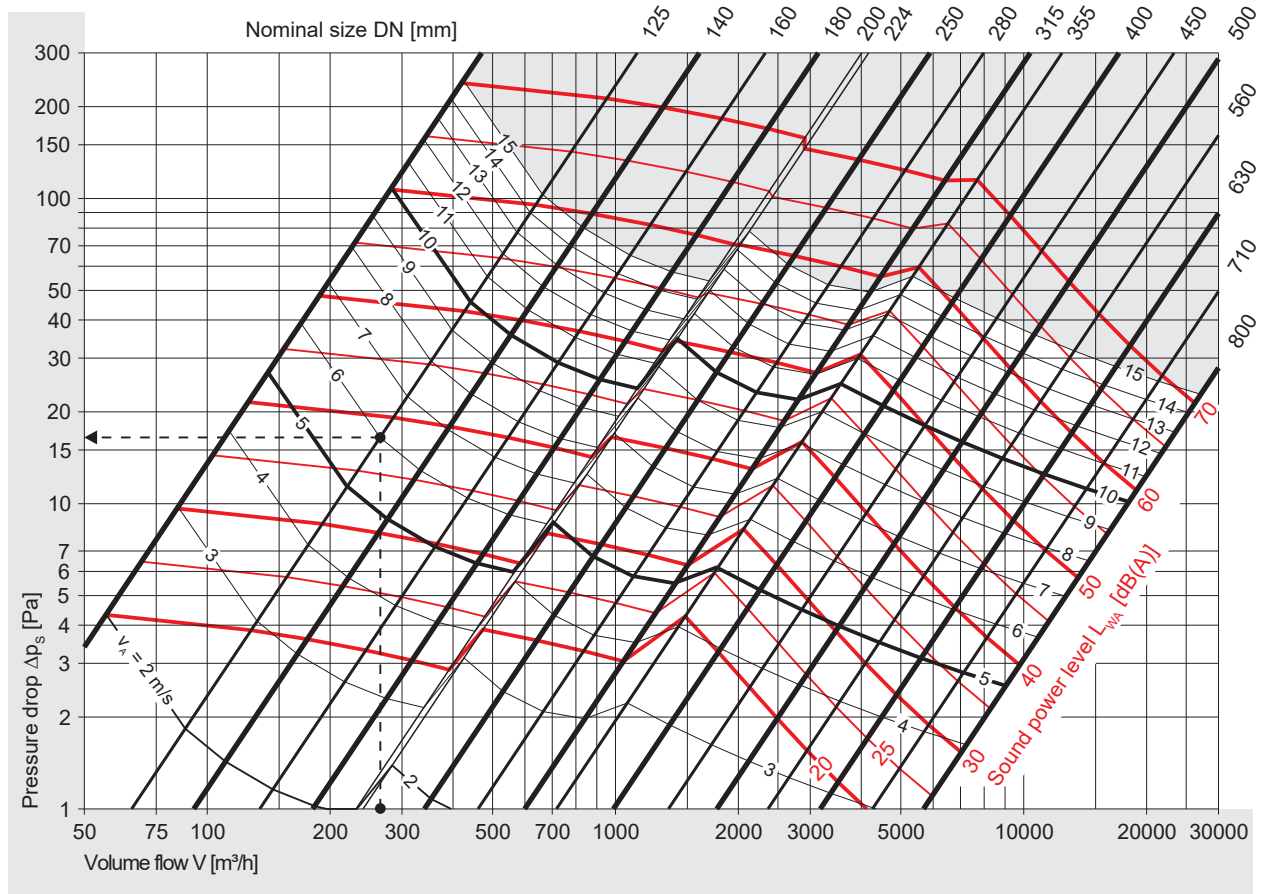
- FR90 fire dampers are quick-closing, apart from the versions with electric actuators. Due to the flow dynamics, if the fire damper is triggered at high inflow velocities, this may cause pressure surges accompanied by multiplication of operating pressures, which in turn may lead to considerable damage to the ventilation and air conditioning system. When shut-off dampers are closed, the volume flows are distributed to other parallel dampers that are still open. This may lead to excessive stress, in particular at high operating pressures, large volume flows and large cross-sections. Electric actuators should be used under such conditions. They close fire dampers relatively slowly. In addition, the fan switch-off can also be triggered via the OPEN limit switch.
- The application limits marked in the nomograms must be complied with! ⇒ see page 9
- For large fire dampers that are subjected to an unfavourable flow, actuators with large torques may 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 ventilators once the fire dampers are fully open.
- It must be ensured that the inflows and outflows are as equal as possible.
- FR90 Fire dampers with electric actuator can be used for OPEN/CLOSED volume flow control.

Thermal-mechanical release mechanisms are marked with V3-1, V4, V5-1. The allocations dependent on DN nominal sizes must not be changed!

DN	
≤ 200	V5-1
≥ 224 up to ≤ 315	V3-1
≥ 355	V4

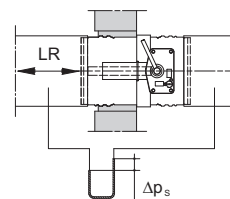
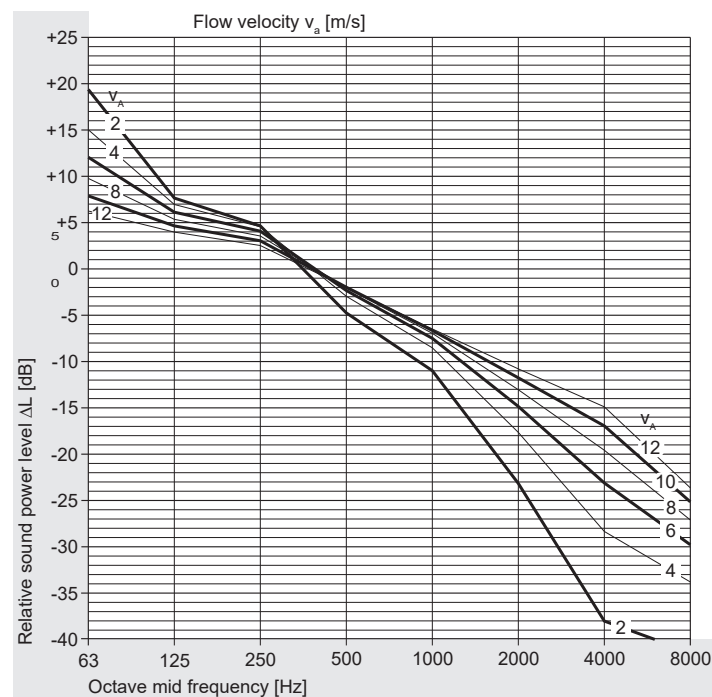
FR90 fire dampers

Dimensioning (1) Pressure drop, sound power level with ventilation duct connection on both sides



FR90 fire dampers can be used up to 15 m/s velocity in the inflow cross-section A_A and up to 2500 Pa operating pressure.

Relative sound power level



Example: Both sides with ventilation duct connection

- $V = 265 \text{ m}^3/\text{h}$
- $DN = 125 \text{ mm}$
- $v_A = 6 \text{ m/s}$
- $\Delta p_s = 16 \text{ Pa}$
- $L_{WA} = 38 \text{ dB(A)}$

Sound power level L_{W-Oct} for the octave mid frequencies

f [Hz]	63	125	250	500	1000	2000	4000	8000
L_{WA} [dB(A)]	38	38	38	38	38	38	38	38
$\Delta L_{6 m/s}$ [dB]	+12	+6	+4	-2	-7	-15	-23	-30
L_{W-Oct} [dB]	50	44	42	36	31	23	-	-

Nomenclature ⇒ see page 10

FR90 fire dampers

Dimensioning (2) Free cross-sections, weights, nomenclature

Free cross-sections A_{free} [m²], weights [kg]

DN	A_{free} [m ²]	Fire damper	Installation subframe				Mounting frame	Installation subframe	Mounting frame
		FR90	RE100	RE150	RR100	RR150	AE	ER6	RV
100	0.0047	2.3	2.0	3.0	1.4	2.2	3.5	4.9	2.1
125	0.0082	2.5	2.4	3.6	1.7	2.5	4.1	5.7	2.5
140	0.0108	2.6	2.6	3.9	1.8	2.7	4.5	6.1	2.7
160	0.0149	2.7	3.0	4.5	2.0	3.0	5.0	6.8	3.1
180	0.0195	2.9	3.3	5.0	2.2	3.3	5.5	7.4	3.4
200	0.0248	3.1	3.7	5.5	2.4	3.6	6.1	8.1	3.8
224	0.0298	3.6	4.1	6.2	2.7	4.0	6.8	8.2	4.2
250	0.0383	3.9	4.7	7.0	2.9	4.4	7.6	9.0	4.8
280	0.0494	4.3	5.3	7.9	3.2	4.8	8.5	9.9	5.4
315	0.0642	4.9	6.0	9.0	3.6	5.3	9.6	11.0	6.1
355	0.0806	7.9	7.6	11.4	-	-	11.8	14.3	7.0
400	0.1051	9.0	8.7	13.1	-	-	13.4	16.2	8.1
450	0.1356	10.4	10.0	15.1	-	-	15.3	18.5	9.4
500	0.1702	11.8	11.5	17.2	-	-	17.3	20.9	10.7
560	0.2169	13.7	13.3	19.9	-	-	19.9	23.9	12.4
630	0.2786	16.1	15.5	23.2	-	-	23.0	27.7	14.6
710	0.3584	19.1	18.2	27.3	-	-	26.8	32.3	17.2
800	0.4603	22.8	21.5	32.3	-	-	31.3	37.9	20.3

The weight of the fire dampers must factor in the weight of the

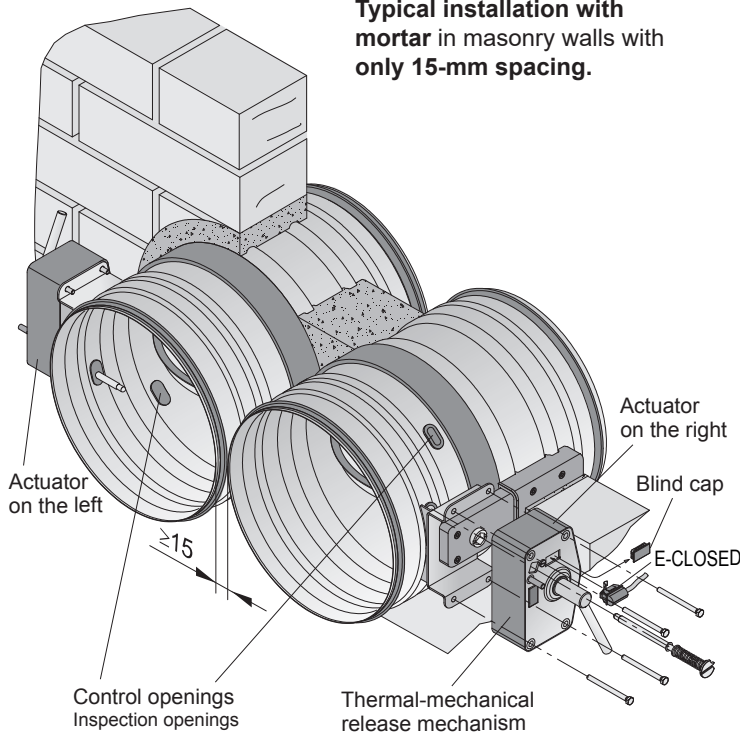
- installation subframes RE, RR, ER6, the mounting frame AE or the mounting frame RV;
- The following must be added for actuators:
 - M220-10/F; M24-10/F: 1.5 kg
 - M220-9/H; M24-9/H: 2 kg
 - M220-11/H; M24-11/H: 2 kg
 - EM-1, RM-1; EM-2: 5 kg

Nomenclature

DN	[mm]	Nominal size
A_A	[m ²]	Inflow cross-section
A_{free}	[m ²]	Free cross-section
V	[m ³ /h]	Volume flow
v_A	[m/s]	Flow velocity in inflow cross-section (inflow velocity)
Δp_s	[Pa]	Static pressure drop
L_{W-Oct}	[dB]	Octave sound power level $L_{W-Oct} = L_{WA} + DL$
ΔL	[dB]	Relative sound power level to L_{WA}
f	[Hz]	Octave mid frequency
L_{WA}	[dB(A)]	A-weighted, area-corrected sound power level

FR90 fire dampers

Installation in general



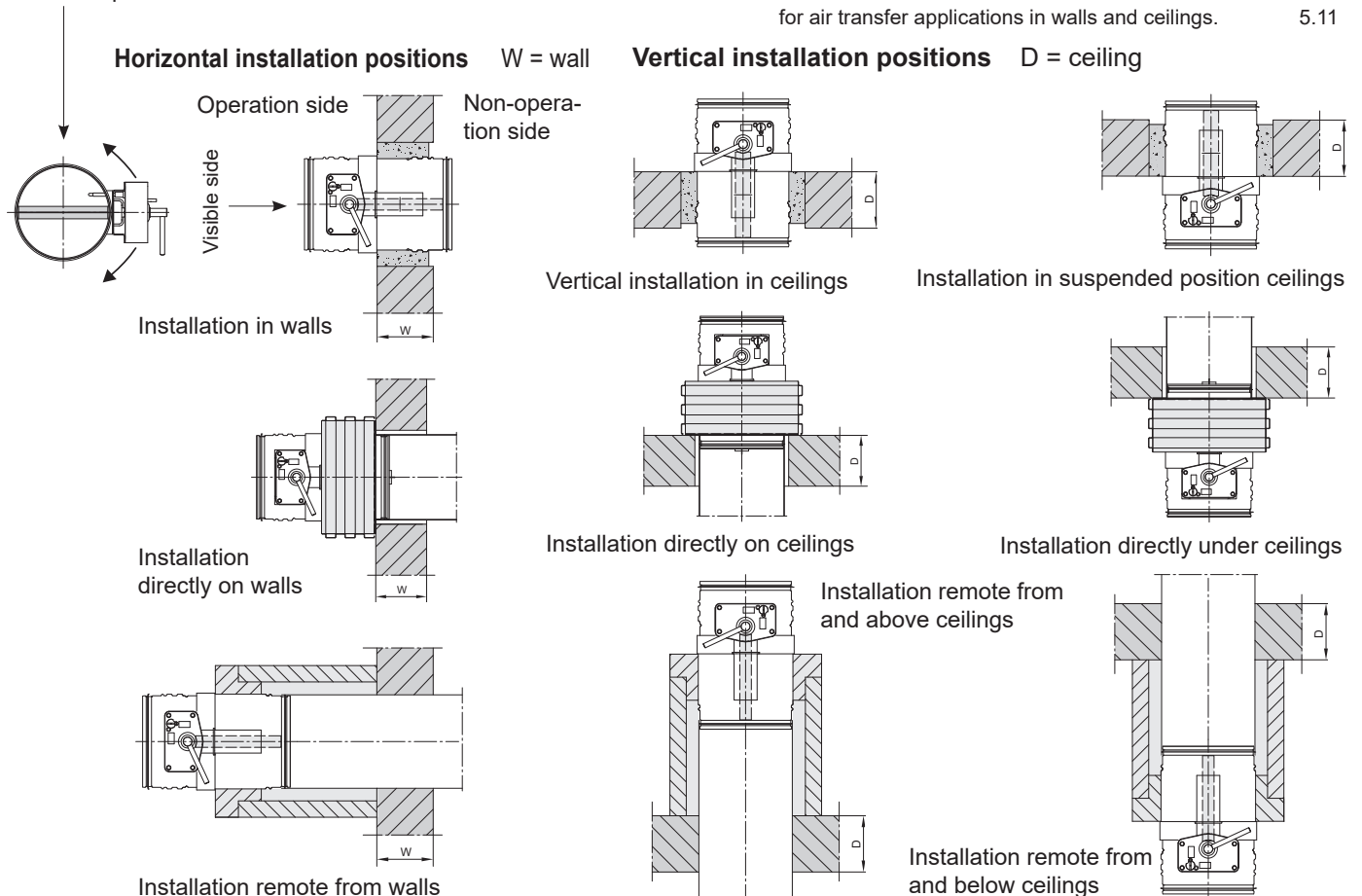
Typical installation with mortar in masonry walls with only 15-mm spacing.

FR90 fire dampers achieve a fire resistance period (fire-resistant) of 90 minutes if they are installed in, on or remote from rigid walls or ceilings or metal stud walls (various designs of flexible walls) with the same fire resistance period and a defined minimum thickness.

If a wall or ceiling has a fire resistance period of 60 minutes (highly fire-retardant) or 30 minutes (fire-retardant), the fire resistance period of the FR90 fire damper reduces accordingly, and to some extent with reduced minimum thickness.

	⇒ see pages
Installation in rigid walls and ceilings	12 to 14
Mounting on rigid walls and ceilings	15
Installation in metal stud walls	16 to 22
Sliding ceiling connection in metal stud walls	23 to 25
Mounting on shaft walls	26 to 27
Installation remote from rigid walls and ceilings and metal stud walls.	28 to 31
Base installation on rigid ceilings	32
Metal stud walls as fire walls	32

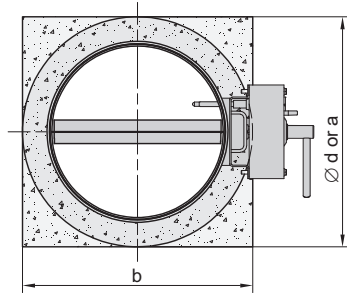
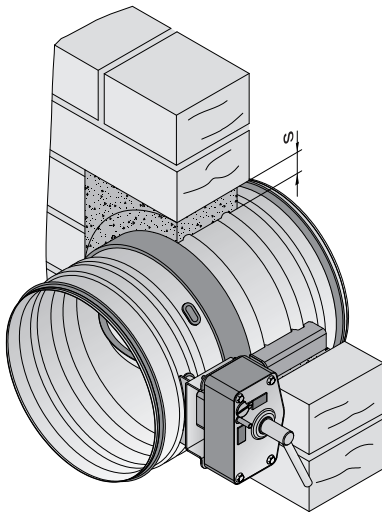
Damper blade axle and drive can be installed to rotate up to 360°!



For additional installation types, see the user manual:
 Installation in wooden walls and wooden ceilings 5.0-3
 Installation with smoke detectors for air transfer applications in walls and ceilings. 5.11

FR90 fire dampers

Installation in rigid walls and ceilings (1)

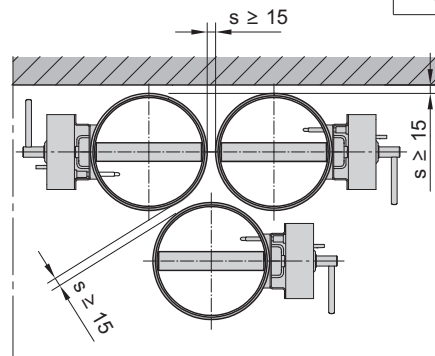


Installation with mortar

Construction types: The rigid walls and ceilings can be made of concrete, lightweight concrete, porous concrete (aerated concrete) or plaster. The walls can be a masonry or wallboard construction and must have a bulk density of $\geq 450 \text{ kg/m}^3$. Walls may also be configured as fire walls, shaft walls, shafts or ducts.

The **minimum thicknesses W, D [mm]** shown opposite are required to install the FR90 fire dampers:

Fire resistance period in minutes	30	30
	60	60
	90	120
Rigid walls	95	
Rigid ceilings	100	115



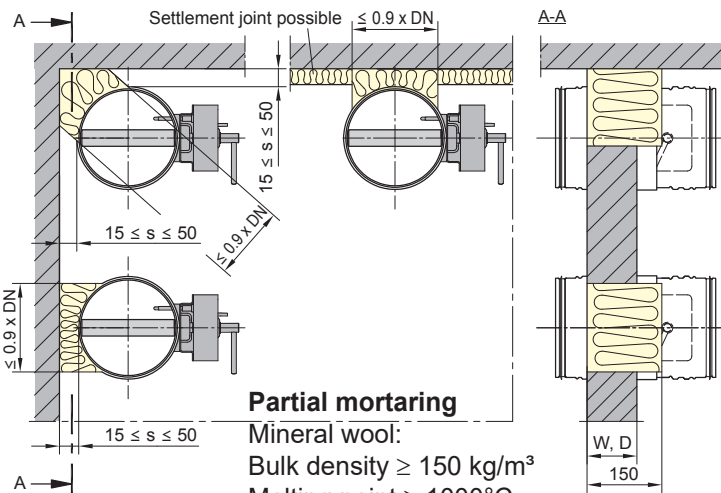
The gap "s" if $\geq 15 \text{ mm}$ wide should be **filled** manually or mechanically with **mortar** of group II or III according to DIN 1053 or classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire-protection mortar or gypsum mortar.

With **partial mortaring** in hard-to-reach corners and on walls and ceilings, the gaps "s" must be filled in two layers and 150 mm deep with **mineral wool** "Knauf

Installation opening a x b or Ø d
 $a \geq DN + 30 \text{ mm}$, $b \geq DN + 75 \text{ mm}$,
 $d \geq DN + 75 \text{ mm}$

Clearance between FR90 fire dampers $\geq 15 \text{ mm}$.

Installation does not require a specific opening when the wall or ceiling is built.



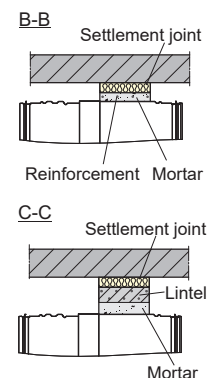
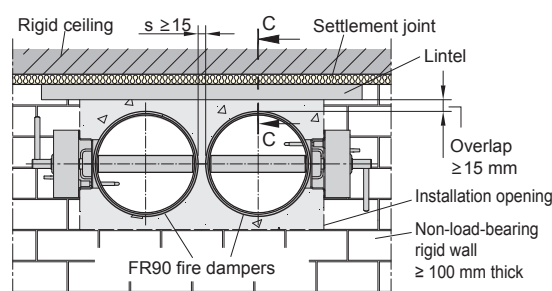
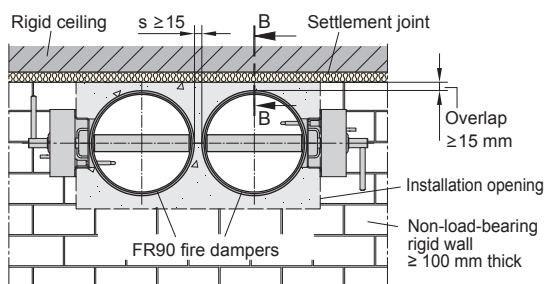
Partial mortaring
 Mineral wool:
 Bulk density $\geq 150 \text{ kg/m}^3$
 Melting point $\geq 1000^\circ\text{C}$
 Adhesive \Rightarrow see page 36

Insulation TPD" or equivalent and fixed with non-combustible adhesive.

A sheet metal cover is recommended when using **darning wool!**

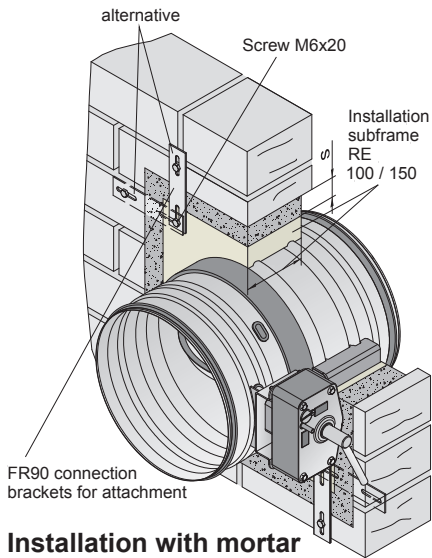
Mortaring in **ceilings** must be prevented from falling out by roughening the reveals or using mortar anchors!

Settlement joints (sliding ceiling connection) above non-load-bearing rigid walls and under ceilings are filled on site, with, for example, mineral wool. The illustration shows the installation of FR90 fire dampers immediately under such settlement joints. A reinforcement should be inserted into the mortar bed or a lintel to prevent cracks from forming later.

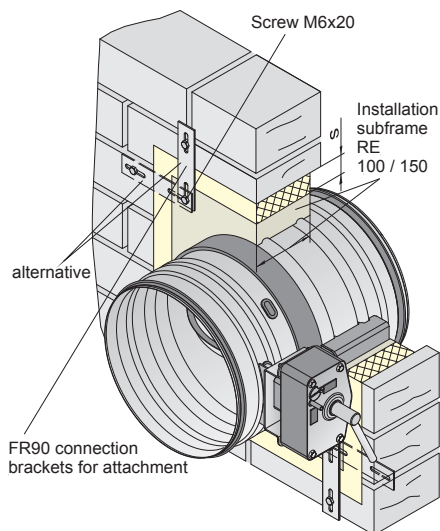


FR90 fire dampers

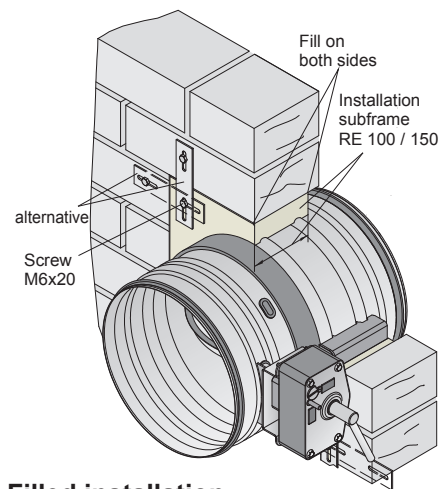
Installation in rigid walls and ceilings (2)



Installation with mortar



Installation with mineral wool



Filled installation

Installation with rectangular installation subframes RE100 and RE150

Types of walls and ceilings ⇒ see page 12

The **minimum thicknesses W, D [mm]** shown opposite are required to install the FR90 fire dampers:

Fire resistance period in minutes	30	30
	60	60
Rigid walls	70*)	100
Rigid ceilings	-	100

*)This installation must be performed with installation subframe RE100

Installation openings

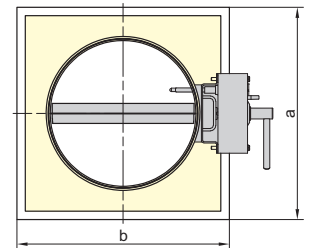
• Installation with mortar

DN ≤ 315: a x b = DN + 120 up to 190 mm

DN ≥ 355: a x b = DN + 130 up to 200 mm

Gap "s" should be filled with mortar! ⇒ see page 12

Mortaring in ceilings must be secured from falling out by roughening the reveals or using mortar anchors!



• Installation with mineral wool

DN ≥ 315: a x b = DN + 110 up to 130 mm

DN ≥ 355: a x b = DN + 120 up to 140 mm

Gap "s" should be designed ≤ 20 mm and filled with mineral wool! ⇒ see page 12

Mineral wool should be prevented from falling out by using a non-combustible adhesive. A sheet metal cover is recommended when using mineral wool!

The installation does not require a specific opening when the wall or ceiling is built!

Spacings "c" between sub-frames RE that are not directly next to each other depend on the structural properties of the wall or ceiling. c ≥ 50 mm is normally sufficient.

• Filled installation

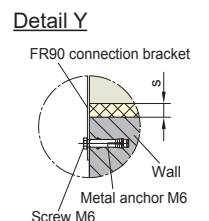
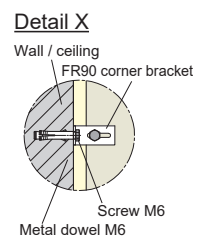
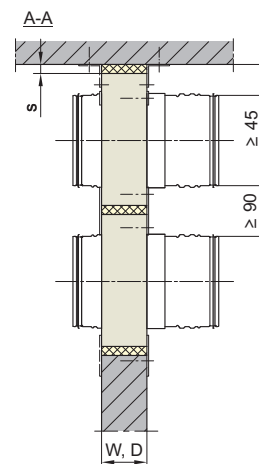
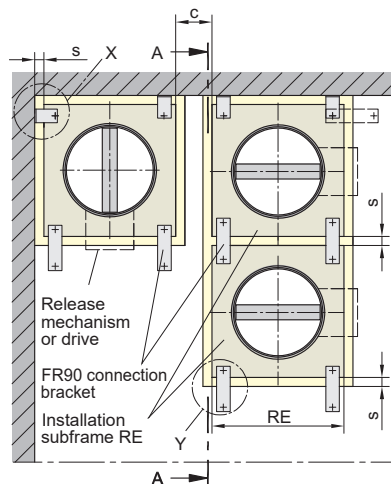
DN ≤ 315: a x b = DN + 93 mm

DN ≥ 355: a x b = DN + 103 mm

Joints must be designed approx. 2 mm and sealed on both sides of the wall or ceiling with gypsum filler or with non-combustible adhesive!

For installation in walls, 4 x FR90 connection brackets or FR90 corner brackets are required on one side; for installation in ceilings, they are necessary on both sides (8 x).

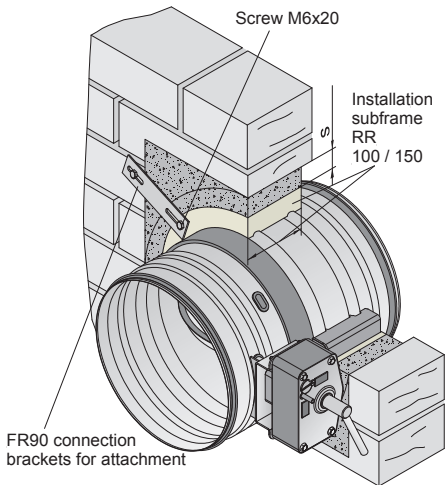
Adhesive ⇒ see page 36



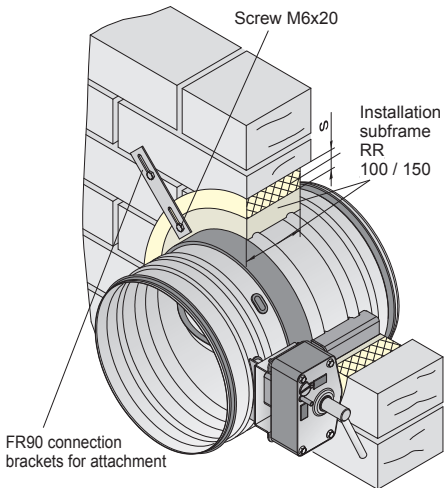
Multiple installation of up to 4 x FR90 fire dampers of the same size side-by-side, above each other or in a combined manner is possible without any weight restriction. Assembly of frames RE ⇒ see page 21

FR90 fire dampers

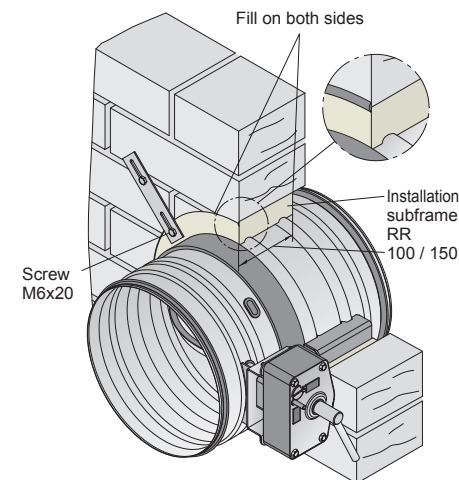
Installation in rigid walls and ceilings (3)



Installation with mortar



Installation with mineral wool



Filled installation

Installation with circular installation subframes RR100 and RR150 (DN ≤ 315 mm)

Types of walls and ceilings → see page 12

The **minimum thicknesses W, D [mm]** shown opposite are required to install the FR90 fire dampers:

Fire resistance period in minutes	30	30
	60	60
Rigid walls	70*	100
Rigid ceilings	-	100

*This installation must be performed with installation subframe RR100

Installation openings

- **Installation with mortar**

DN ≤ 315: $\varnothing d = DN + 130$ up to 170 mm

DN ≤ 200: $a \times b = DN + 130$ mm

Gap "s" should be filled with mortar!

→ see page 12

Mortaring in ceilings must be secured from falling out by roughening the reveals or using mortar anchors!

- **Installation with mineral wool**

DN ≤ 315: $\varnothing d = DN + 120$ up to 140 mm

Gap "s" should be designed ≤ 20 mm and filled with mineral wool! → see page 12

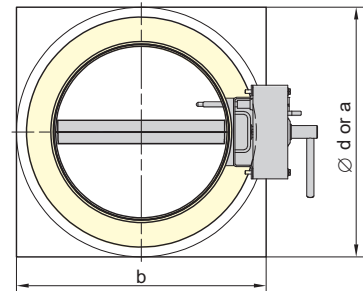
Mineral wool should be prevented from falling out by using a non-combustible adhesive. A sheet metal cover is recommended when using mineral wool!

- **Filled installation**

DN ≤ 315: $\varnothing d = DN + 103$ mm

Joints must be designed approx. 2 mm and sealed on both sides of the wall or ceiling with **gypsum filler** or with non-combustible **adhesive!**

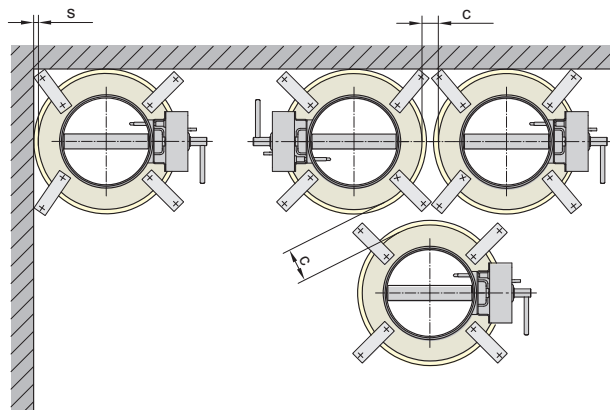
Adhesive → see page 36



The installation does not require a specific opening when the wall or ceiling is built!

Spacings "c" between subframes RE that are not directly next to each other depend on the structural properties of the wall or ceiling. $c \geq 50$ mm is normally sufficient.

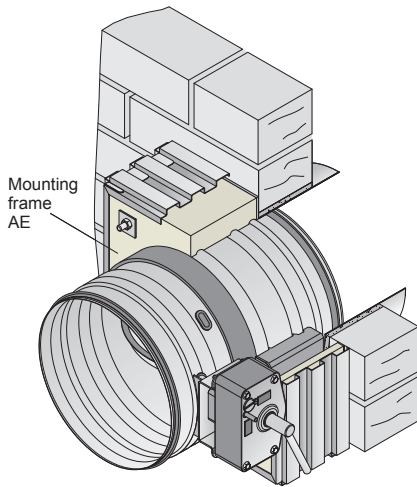
For installation in walls, 4 x **FR90 connection brackets** are required on one side; for installation in ceilings, they are necessary on both sides (8 x).



All dimensions in mm

FR90 fire dampers

Mounting on rigid walls and ceilings



Mounting on masonry (example)

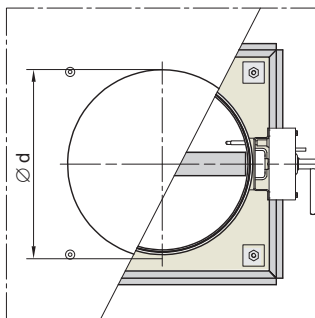
Mounting frames AE should be secured with threaded rods which pass through the wall or ceiling, and washers and nuts on both sides.

Dowels with verification of fire protection suitability can be used in suitable walls and ceilings.

⇒ see "Dowel recommendation" at www.wildeboer.de/downloads.

Factory-produced holes in the mounting frames AE indicate the number of the fastenings.

DN [mm]	Pc per corner	Pc in total
≤ 315	1	4
≥ 355	2	8



Installation opening

$\varnothing d = DN + 10$ to 15 mm

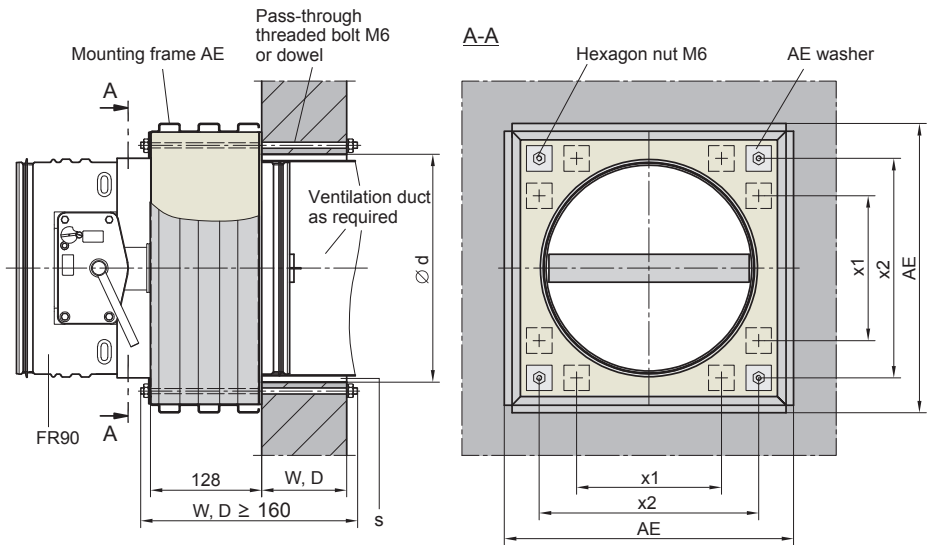
The gap between ventilation duct and wall or ceiling does not need to be filled.

Mounting with mounting frame AE

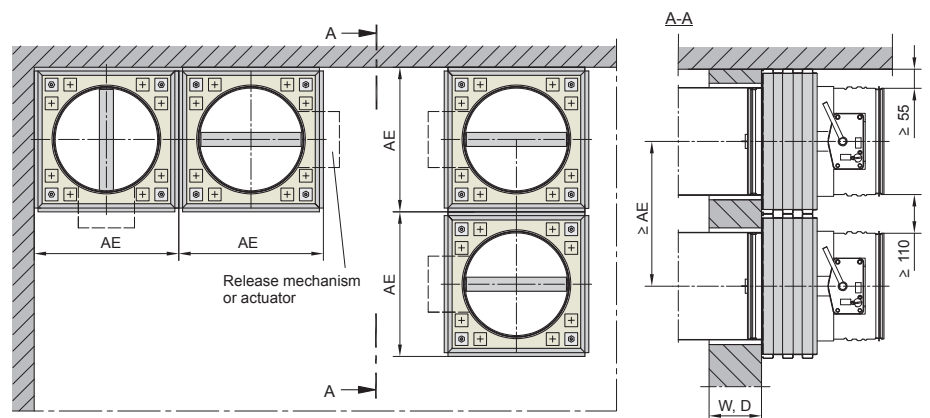
Types of walls and ceilings ⇒ see page 12

The **minimum thicknesses W, D [mm]** shown opposite are required for mounting the FR90 fire dampers:

Fire resistance period in minutes	30
	60
	90
Rigid walls and ceilings	100



DN	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800	
AE	210	235	250	270	290	310	334	360	390	425	475	520	570	620	680	750	830	920	
x1	-	-	-	-	-	-	-	-	-	-	-	228	250	275	300	330	365	405	450
x2	120	145	160	180	200	220	244	270	300	335	385	430	480	530	590	660	740	830	



Spacing between the mounting frames AE of the FR90 fire dampers and from the adjacent walls and ceilings is not required.

Ventilation ducts on the non-operation side of the FR90 fire damper can be fed through the wall or ceiling and should lie flush. The connection of the FR90 fire damper on the non-operation side can be fully inserted in these.

Connections can be made to the casing of missing fire dampers if it is ensured that the damper blade can move freely! ⇒ see page 8

All dimensions in mm

FR90 fire dampers

Installation in metal stud walls (1a) General

Wall types

The walls, shaft walls, facings, fire walls etc. must be produced according to the manufacturer's specifications or technical standards. General building authority test certificates (AbP) must be observed in Germany.

Consideration must be given to specifications for design, fire resistance period and fire safety classification, specified wall widths, wall heights and wall thicknesses, and dimensionings for studding and cladding.

- Flexible walls of the "metal stud wall" type can be clad 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 should only be fastened at the side. ⇒ see pages 26 to 27

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. ⇒ see page 32

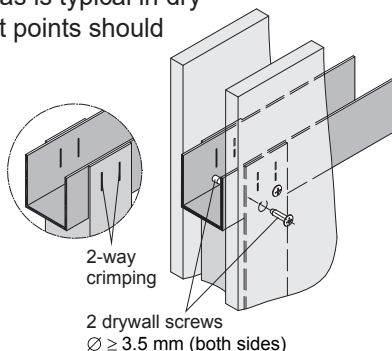
- Metal stud walls can be produced with or without mineral wool between the metal studs.
- Cladding made of DF type gypsum boards according to EN 520 or equivalent cladding material (fire-resistant plasterboards, cement-bound boards, calcium silicate boards, etc.) must be fixed in a manner appropriate to the wall in question.

In the perimeter area of the FR90 fire dampers, cladding must be secured with drywall screws of a suitable length and ≥ 3.9 mm in diameter at spacings of ≤ 200 mm or ≤ 150 mm. ⇒ see pages 18 to 27 and 32

- Profiles for metal stud walls are described by DIN 18182 and EN 14195, and constructions by DIN 18183.
- FR90 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 FR90 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.

Two-way prefixing may also be performed by means of clinching (**crimping**), as is typical in dry construction. Two joint points should be used.

In addition, the claddings must be connected to the metal framework at the intersections using double-connected screw fastenings.



The following **minimum thickness W [mm]** is required for installing FR90 fire dampers:

Fire resistance period in minutes		30	30	30
		60	60	60
Metal stud walls with cladding on both sides	≥ 1-layer cladding	70	-	-
	≥ 2-layer cladding	-	95	95
Shaft walls made of wall boards, at least 2-layer	with metal studs	-	90	-
	without metal studs	-	40	-

- **Fillings** suitable for gap "s":

Openings in the gap "s" can be **filled** manually or mechanically with mortar of group II or III according to DIN 1053 or classes M2.5, M5, M10 or M20 according to EN 998-2, or with the corresponding fire protection mortar or gypsum mortar.

The minimum thickness (W) of the wall is generally sufficient as the depth of mortaring.

"Knauf Insulation TPD" **mineral wool** or equivalent with bulk density ≥ 150*) kg/m³, building material class A according to DIN 4102 or according to EN 13501-01 and melting point ≥ 1000°C must be used; darning wool as well.

Mineral wool should be fixed to prevent it falling out by using a non-combustible **adhesive**. **Adhesive** ⇒ see page 36

In the case of **installation subframes RE** in metal stud walls, the gap can also be filled with cladding panels made of wall-building materials, construction boards made from calcium silicate, mats made of calcium-magnesium silicate or with ceramic fibre; the building material class A and ≥ 1000°C melting point is always required.

*) Lower bulk densities are possible for shorter fire resistance periods of less than 90 minutes! ⇒ see page 19

FR90 fire dampers

Installation in metal stud walls (1b) Metal framework

Installation openings for FR90 fire dampers require cutouts in cladding, and trimmers or particular arrangements may be required in metal studs.

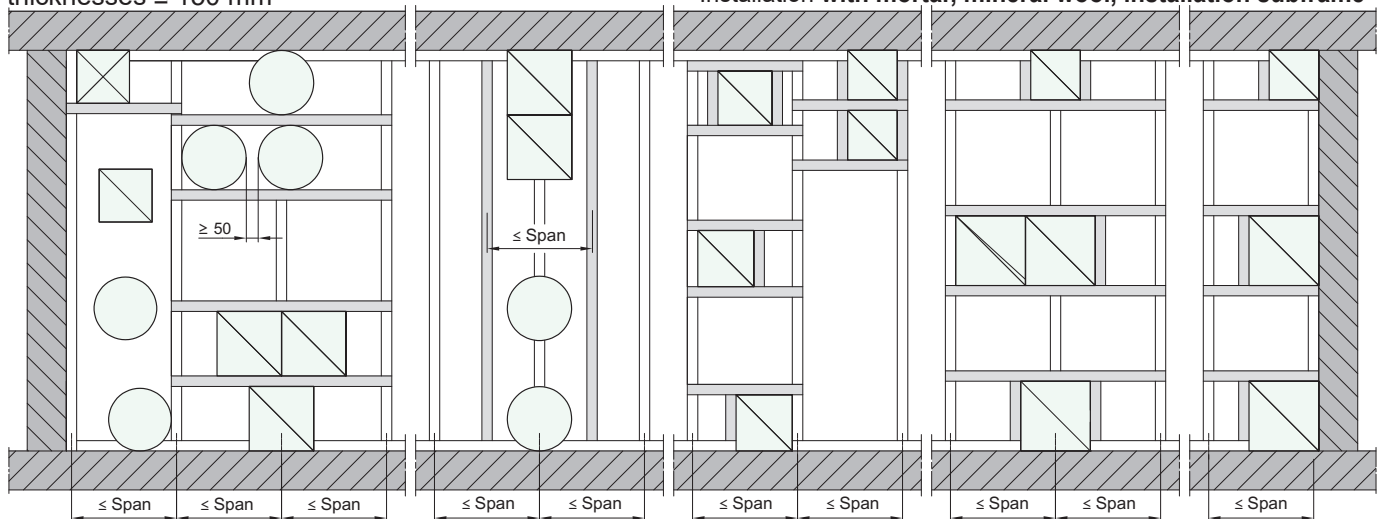
Sub-structures of metal stud walls consist of CW profiles as supports. These should be set on the floor and on the ceiling in UW profiles fastened to the floor and ceiling. Supports adjoining rigid walls are then attached to these profiles.

Installation openings for FR90 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 installation subframes RE 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.

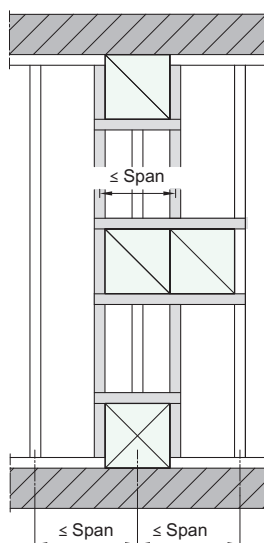
Examples of installation openings

Installation **with installation subframes** in wall thicknesses ≤ 150 mm



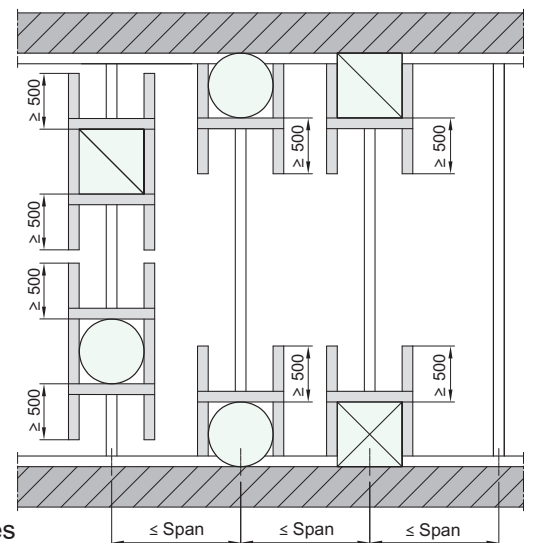
Depending on the type of wall, suitable connections can be used to **interrupt profiles on ceilings and floors** for the purpose of installing FR90 fire dampers. → see pages 18 to 22, 26 to 27

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.



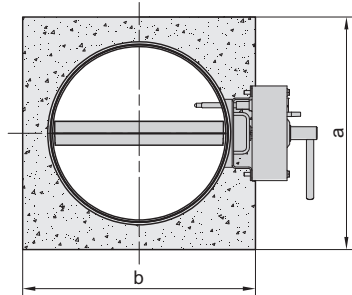
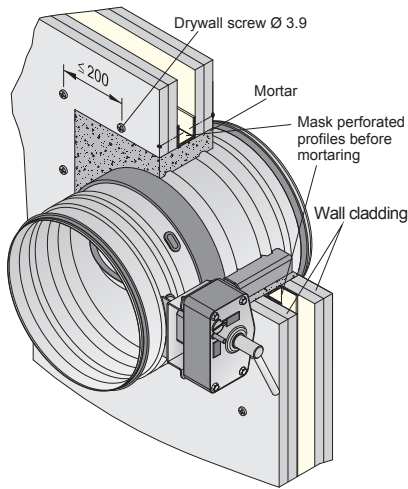
For this purpose, the wall can be cut and new openings created. New claddings must then be attached to the added and existing studs, making sure to maintain the necessary overlaps. Surplus studs can be removed as long as the intended spans are not exceeded.

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. Cladding for these profiles must be screwed on with spacing of ≤ 200 mm. → see pages 18, 19, 20, 27.



FR90 fire dampers

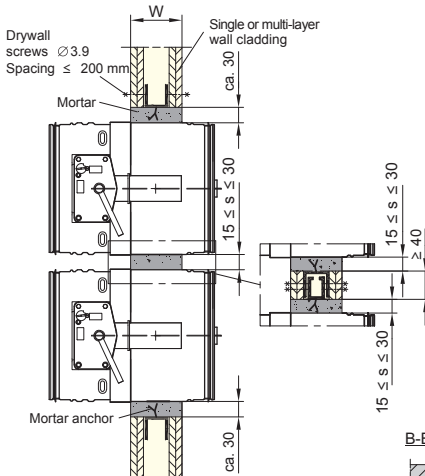
Installation in metal stud walls (2)



Installation openings

a x b or $\varnothing d \geq DN + \text{approx. } 60 \text{ mm}$

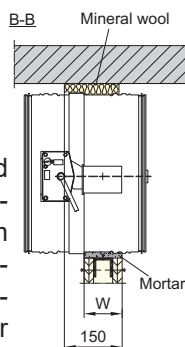
Connections within the wall



Partial mortaring

(up to fire resistance class EI 90)

Gap "s" = 15 mm to 50 mm should be filled 150 mm deep with mineral wool in two-layer cut-outs from boards and fixed in place to prevent falling out using non-combustible adhesive. A sheet metal cover is recommended when using mineral wool!



Installation with mortar

Types of metal stud walls with cladding on both sides → see pages 16 and 17

The **minimum thicknesses W [mm]** shown opposite are required for installing the FR90 fire dampers:

Fire resistance period in minutes	30
	60
	90
	120
Walls with ≥ 2 -layer cladding on both sides	95

Weight limit

FR90 fire dampers with a **total weight of $\leq 90 \text{ kg}$ including mortar** (approx. 2200 kg/m^3) may be installed between two metal studs!

Total weight [kg] of fire damper incl. mortar with W = 100 mm*)

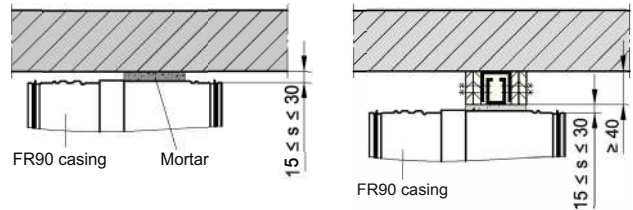
DN	100	125	140	160	180	200	224	250	280
[kg]	6	7	8	9	10	11	13	14	16
DN	315	355	400	450	500	560	630	710	800
[kg]	19	24	28	33	37	44	52	62	75

The table applies for installation openings of the size DN+ 60 mm.

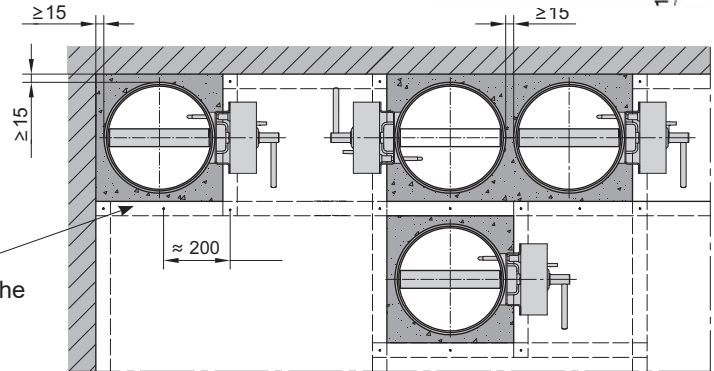
*) the weights should be multiplied by 1.35 for W = 150 mm.

Mortar anchors made from, for example, riveted perforated tape must be attached to the metal profiles of the wall, at least one piece per side, with approx. 200-mm spacing. Openings in perforated metal profiles must be masked with adhesive film before mortaring.

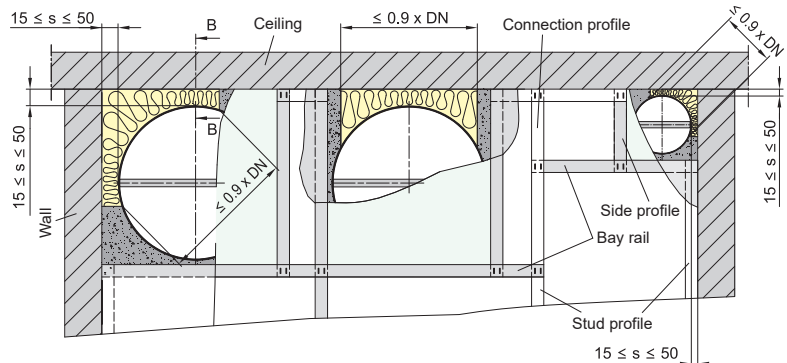
Connections to rigid walls, ceilings, floors:



Distances between FR90 fire dampers and adjacent walls and ceilings



Bay rail between the fire dampers

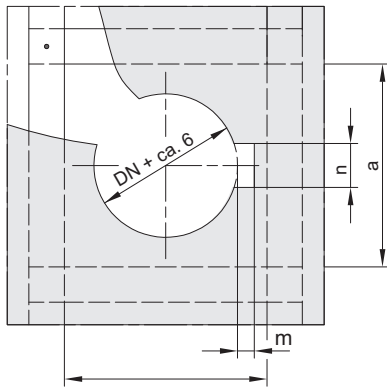
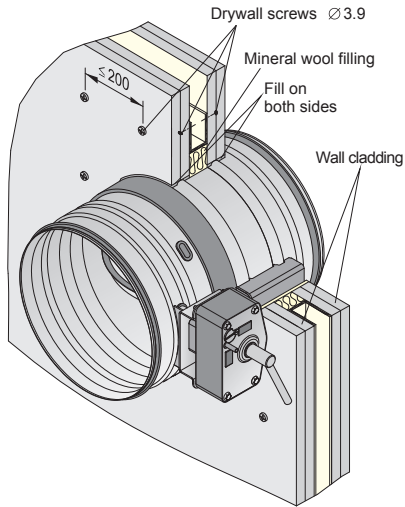


Mortar, mineral wool → see page 16

Adhesive → see page 36

FR90 fire dampers

Installation in metal stud walls (3)



Installation openings

• Metal studs

$a \times b \geq DN + \text{approx. } 60 \text{ mm}$

• Cladding

The notch $m \times n$ is required on the operation side. On the non-operation side it is only needed if the dimension "o" on the non-operation side is greater than the wall thickness (W), minus the thickness of the cladding.

	m	n	o
DN ≤ 315	26	62	107
DN ≥ 355	31	98	116

• Mineral wool filling

The bulk density of the mineral wool filling around the casing of the FR90 fire damper for a fire resistance period of 90 minutes must be $\geq 150 \text{ kg/m}^3$; for 60 minutes $\geq 100 \text{ kg/m}^3$ is sufficient and for 30 minutes $\geq 50 \text{ kg/m}^3$ is sufficient.

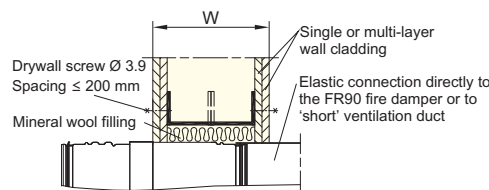
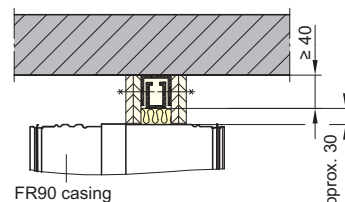
Installation with mineral wool

Types of metal stud walls with cladding on both sides → see pages 16 and 17

The **minimum thickness W [mm]** shown opposite is required for installing the FR90 fire dampers:

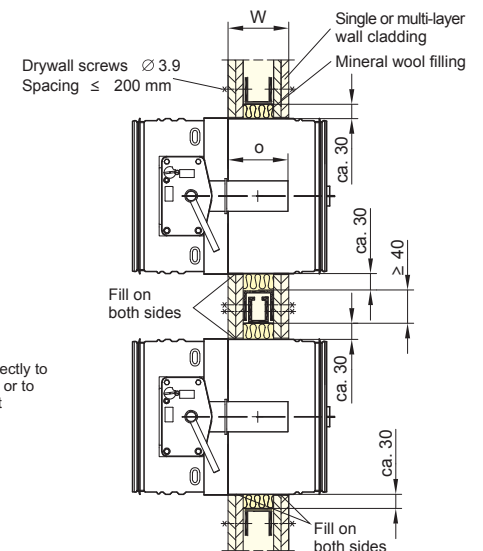
Fire resistance period in minutes	30
	60
	90
	120
Walls with ≥ 2 -layer cladding on both sides	95

Connection to rigid walls, ceilings, floors

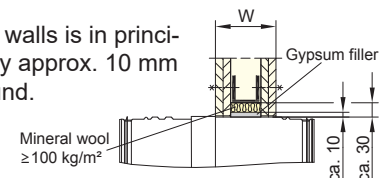


Example for thicker wall

Connection within the wall



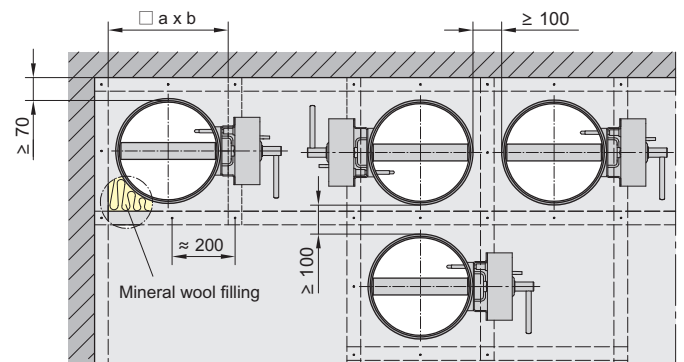
Installation in EI 120 walls is in principle unchanged. Apply approx. 10 mm gypsum filler all around.



Spacings

between the FR90 fire dampers and from adjacent walls and ceilings.

⇒ see pages 11 and 12



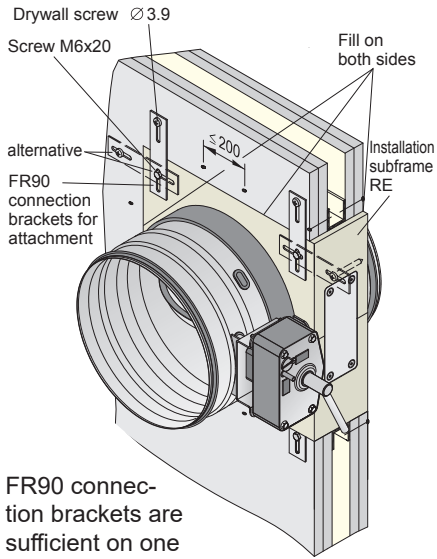
Installation Recommendation

- Construct metal studding with an installation opening and apply cladding on the one side.
- Fill installation opening with mineral wool and apply a second cladding.
- Cut installation opening in claddings and mineral wool filling and chamfer them all around.
- Insert and align fire damper.
- Seal remaining joints with gypsum filler or equivalent.

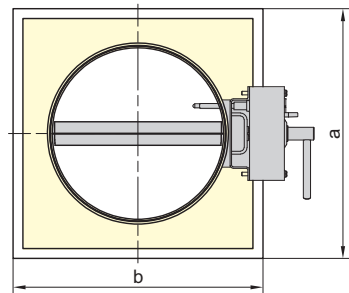
All dimensions in mm

FR90 fire dampers

Installation in metal stud walls (4a)

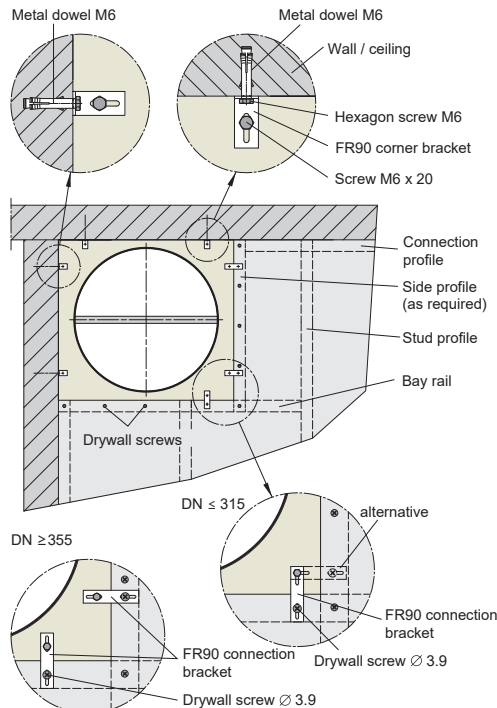


FR90 connection brackets are sufficient on one side of the wall.



Installation opening

- DN ≤ 315: a x b = DN + 91⁺³ mm
- DN ≥ 355: a x b = DN + 101⁺³ mm



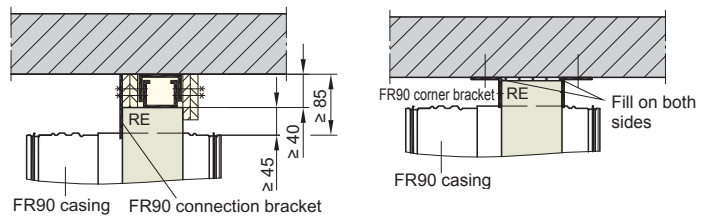
Installation with rectangular installation subframe RE

Types of metal stud walls with cladding on both sides ⇒ see pages 16 and 17

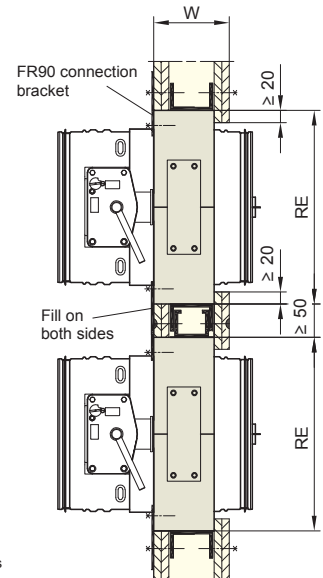
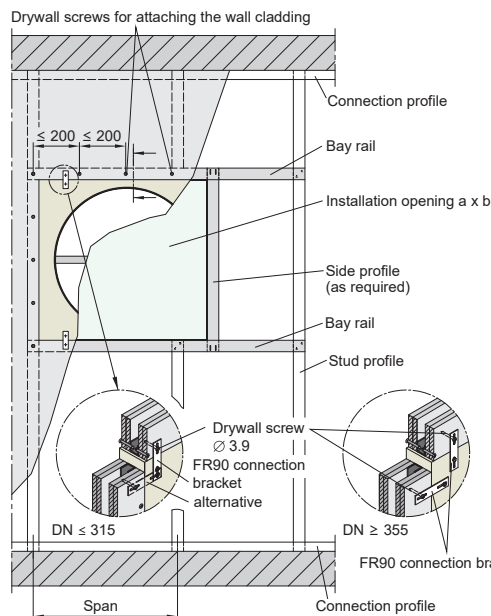
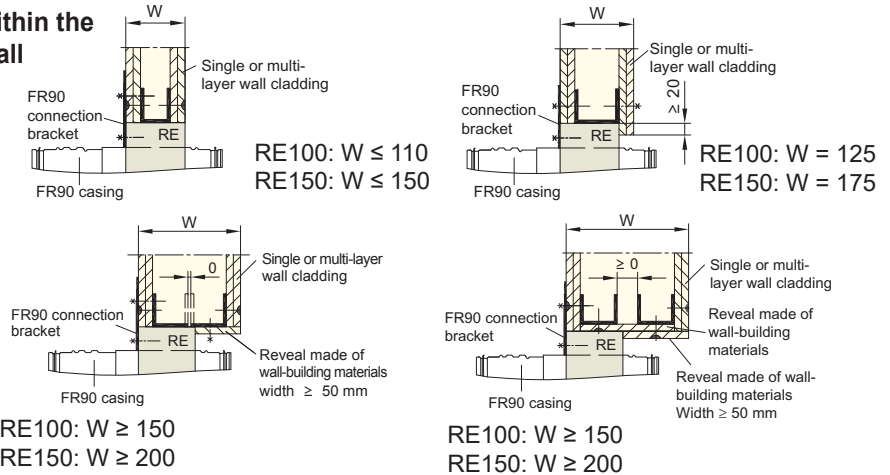
The **minimum thicknesses W [mm]** shown opposite are required for installing the FR90 fire dampers:

Fire resistance period in minutes	30	30
	60	60
Walls with cladding on both sides	≥ 1-layer cladding	70
	≥ 2-layer cladding	95

Connections to rigid walls, ceilings, floors



Connections within the wall



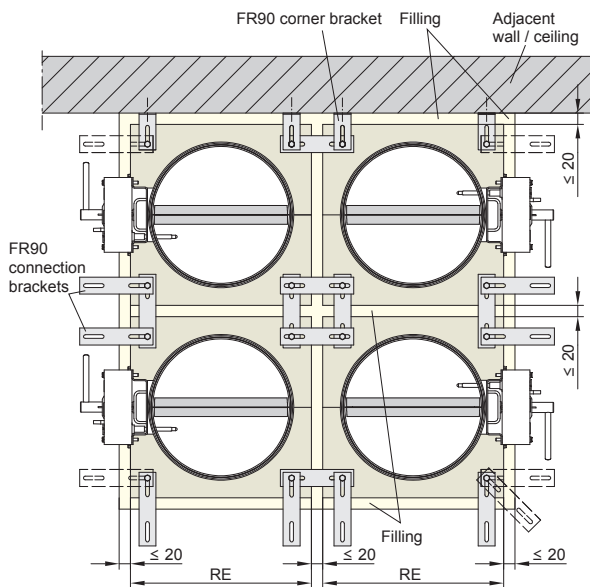
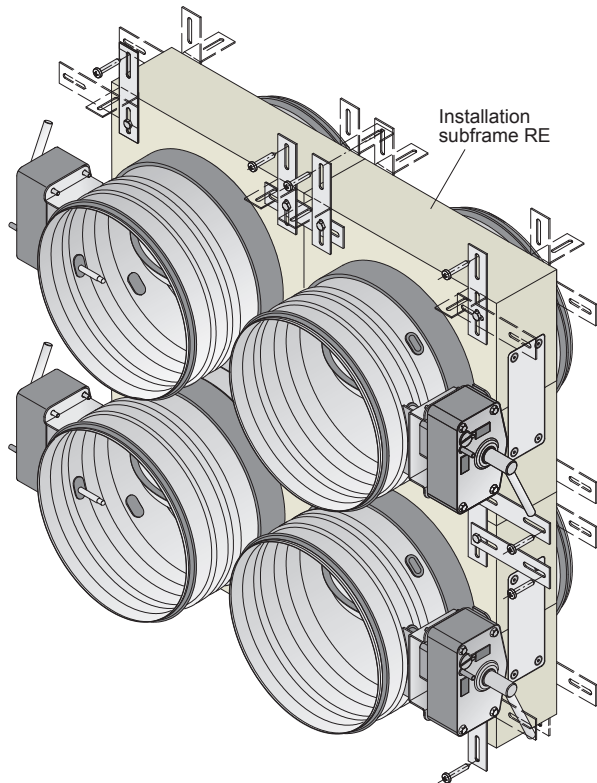
≥ 50-mm spacing is required between the frames of the FR90 fire dampers.

Fire walls and safety partition walls ⇒ see page 32

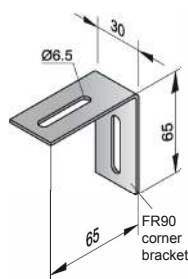
All dimensions in mm

FR90 fire dampers

Installation in metal stud walls (4b)



FR90 connection bracket



FR90 corner bracket

Multiple installation with rectangular installation subframe RE

Types of metal stud walls with cladding on both sides

⇒ see pages 16 and 17

The following **minimum thickness W [mm]** is required for installation of FR90 fire dampers:

Fire resistance period in minutes	30 60 90
Walls with ≥ 2-layer cladding on both sides	95

Up to 4 of the same nominal sizes may be installed side-by-side, above each other or in a combined manner.

They should be connected together using FR90 connection brackets and screws M6 x 20. They should be screwed on both sides of the installation subframe into the factory-produced threaded sockets provided.

Reveals of the installation subframe must be filled with **gypsum filler** or non-combustible **adhesive**; **mineral wool** is possible!

⇒ see page 16

Accordingly, there are **spacings of ≤ 2 mm or ≤ 20 mm** between the installation subframes.

- Installation with circumferential metal profiles ⇒ see page 20

Weight limit ≤ 90 kg

Installation possible together:

Pc:	2	3	4
RE100	≤ DN 800	≤ DN 560	≤ DN 450
RE150	≤ DN 630	≤ DN 500	≤ DN 400

- Installation without circumferential metal profiles ⇒ see page 22

Weight limit ≤ 50 kg

Installation possible together:

Pc:	2	3	4
RE100	≤ DN 500	≤ DN 355	≤ DN 315
RE150	≤ DN 400	≤ DN 315	≤ DN 280

FR90 connection brackets are used for fastening in metal stud walls, and FR90 corner brackets are used for fastening to adjoining rigid walls and ceilings. Factory-produced threaded sockets in the installation subframes are provided for the M6 x 20 screws.

Assembled multiple fire dampers should be installed in the same way as a single fire damper. This and the other fastening is given under the wall type, as well as the sealing of the reveal.
⇒ see page 20

Installation subframes RE can be installed immediately next to each other. Other installation spacings depend on the thickness of the filling used.

Adhesive ⇒ see page 36

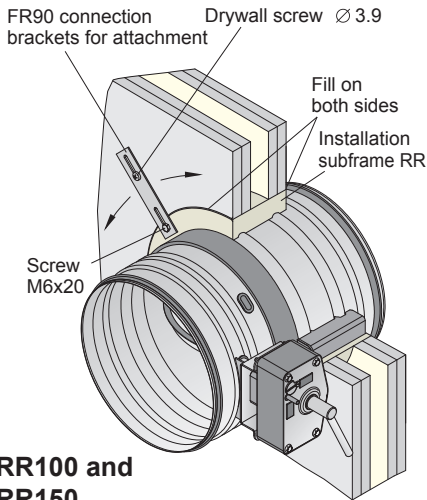
Ventilation ducts must be connected flexibly!

⇒ see page 34, 36

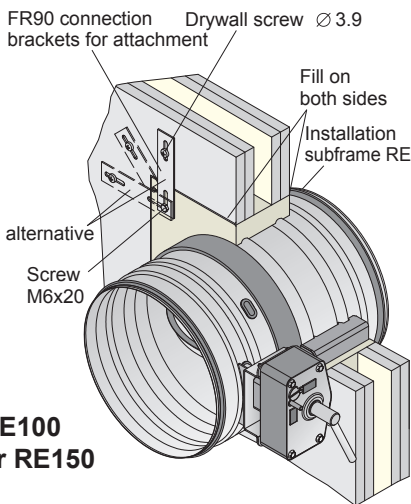
All dimensions in mm

FR90 fire dampers

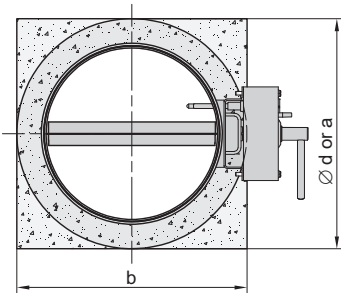
Installation in metal stud walls (5)



RR100 and RR150



RE100 or RE150



Installation opening

- DN ≤ 315: $\text{Ø}d = \text{DN} + 101$ ⁺³ mm
 $a \times b = \text{DN} + 91$ ⁺³ mm
- DN ≥ 355: $a \times b = \text{DN} + 101$ ⁺³ mm

Installation

- The thickness of the installation subframes RR or RE (100 or 150 mm) should always be chosen equal to or larger than the wall thickness!
- An installation opening should be

cut through the clad wall.

- The damper should be inserted and fastened with FR90 connection brackets on both sides.
- Remaining joints should be sealed on both sides with gypsum filler as usual for this type of wall.

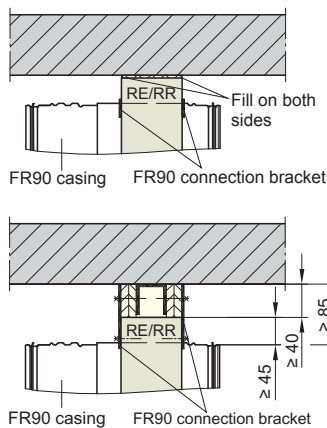
Installation with circular installation subframes RR (DN ≤ 315 mm) and with rectangular installation subframes RE. **No profiles are required circumferentially in the wall.**

Types of metal stud walls with cladding on both sides → see pages 16 and 17

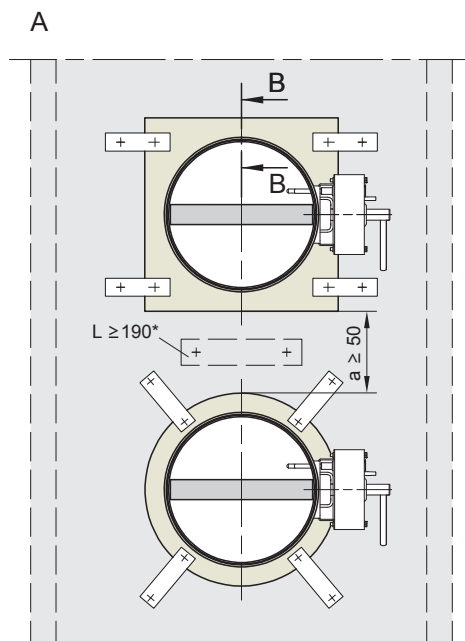
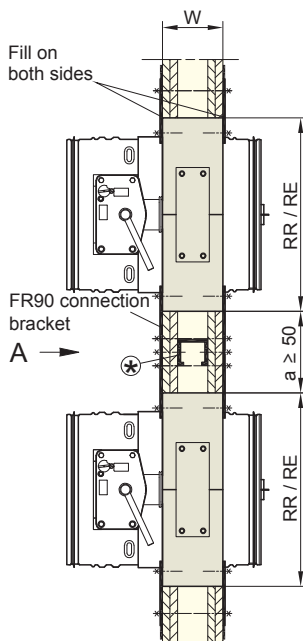
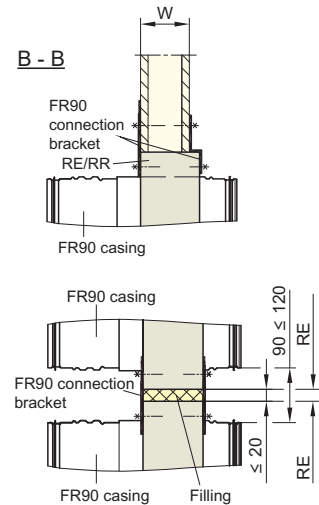
The **minimum thickness W [mm]** shown opposite is required for installing the FR90 fire dampers:

Fire resistance period in minutes	30
	60
	90
Walls with ≥ 2-layer cladding on both sides	95

Connections to rigid walls, ceilings, floors



Connections within the wall

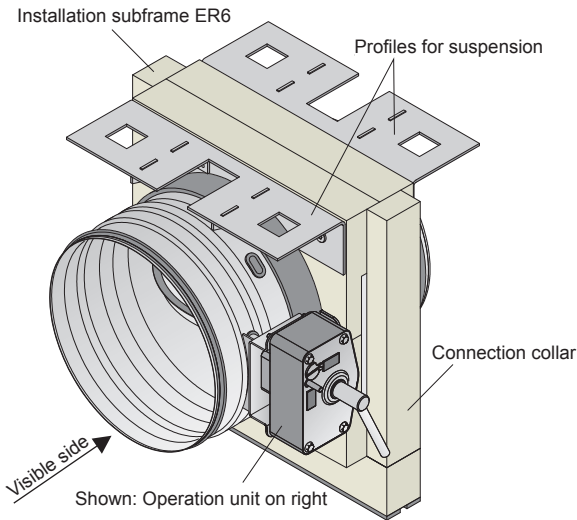


(*) Spacings $a = 50$ mm to 100 mm between installation subframes RR and RE require a ≥ 190 -mm-long stud profile in the wall for stiffening. It is inserted via the installation openings into the wall cavity and fastened to the claddings with two drywall screws.

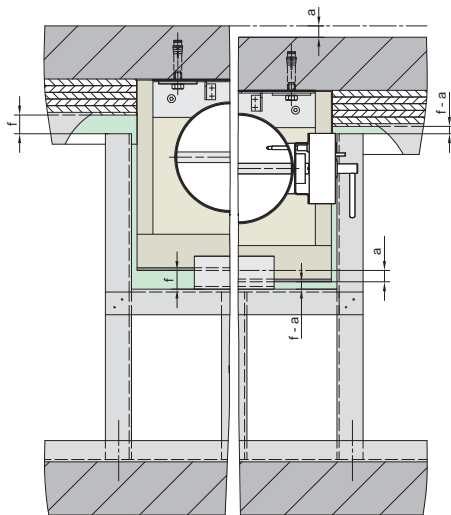
All dimensions in mm

FR90 fire dampers

Installation in metal stud walls (6a) Sliding ceiling connection



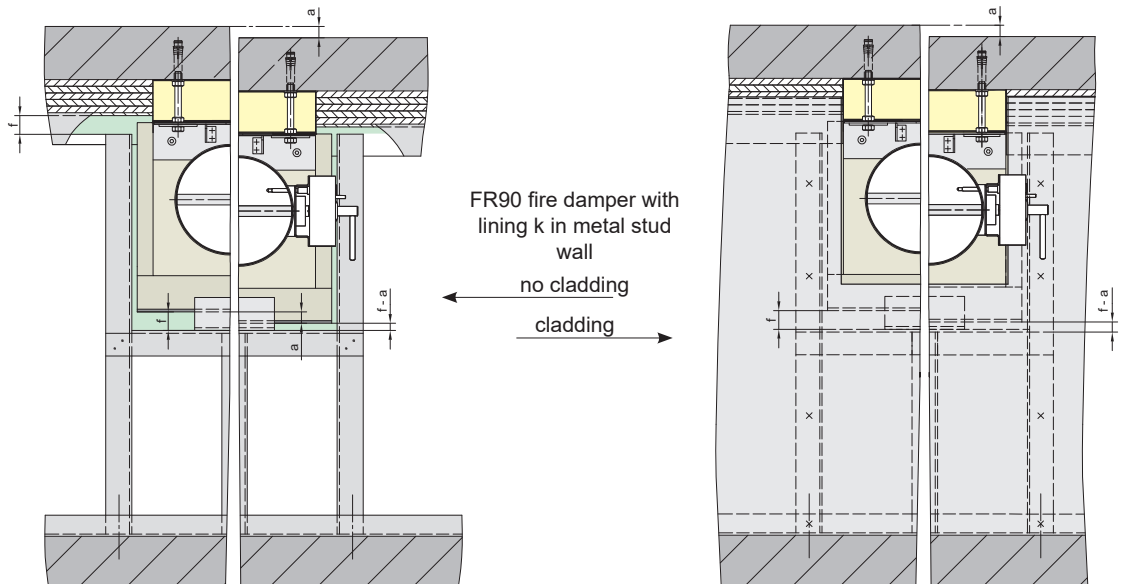
FR90 fire damper with installation subframe ER6



Function and installation principle

The half-section on the left shows the situation when installed, and the half-section on the right shows the situation when lowered by the dimension $a \leq f \leq 40$ mm.

Installation with lining k of up to 80 mm in thickness underneath a rigid ceiling.



Installation with ER6 installation frame for sliding ceiling connection.

Types of metal stud walls with cladding on both sides
 ⇒ see pages 16 and 17

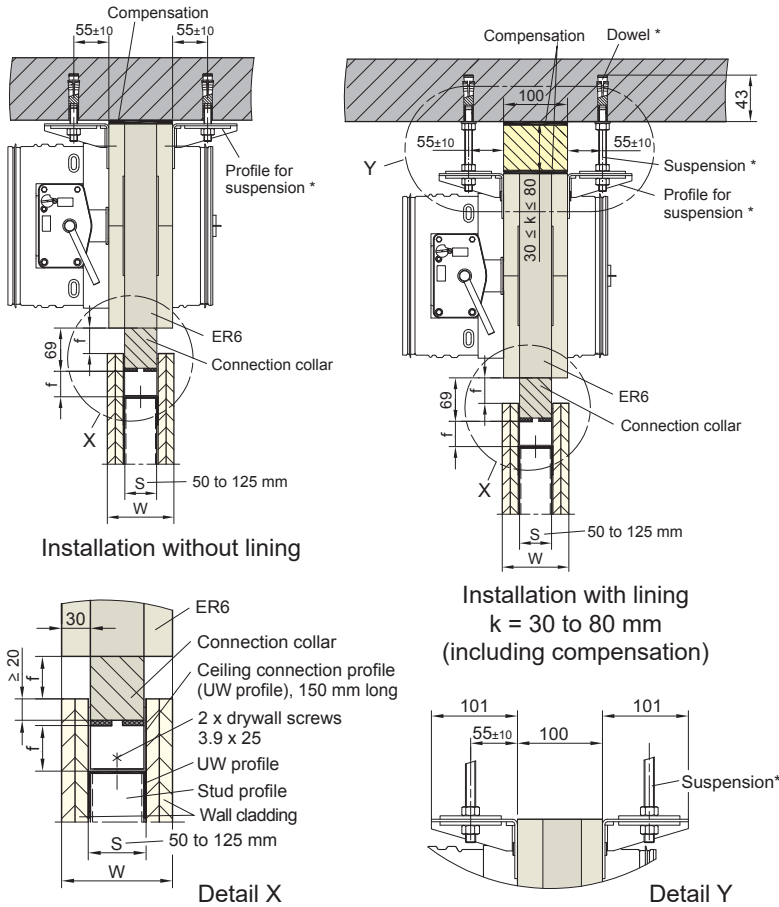
The following **minimum thickness W [mm]** is required for installation of FR90 fire dampers:

Fire resistance period in minutes	30 60 90
Walls with ≥ 2 -layer cladding on both sides	95

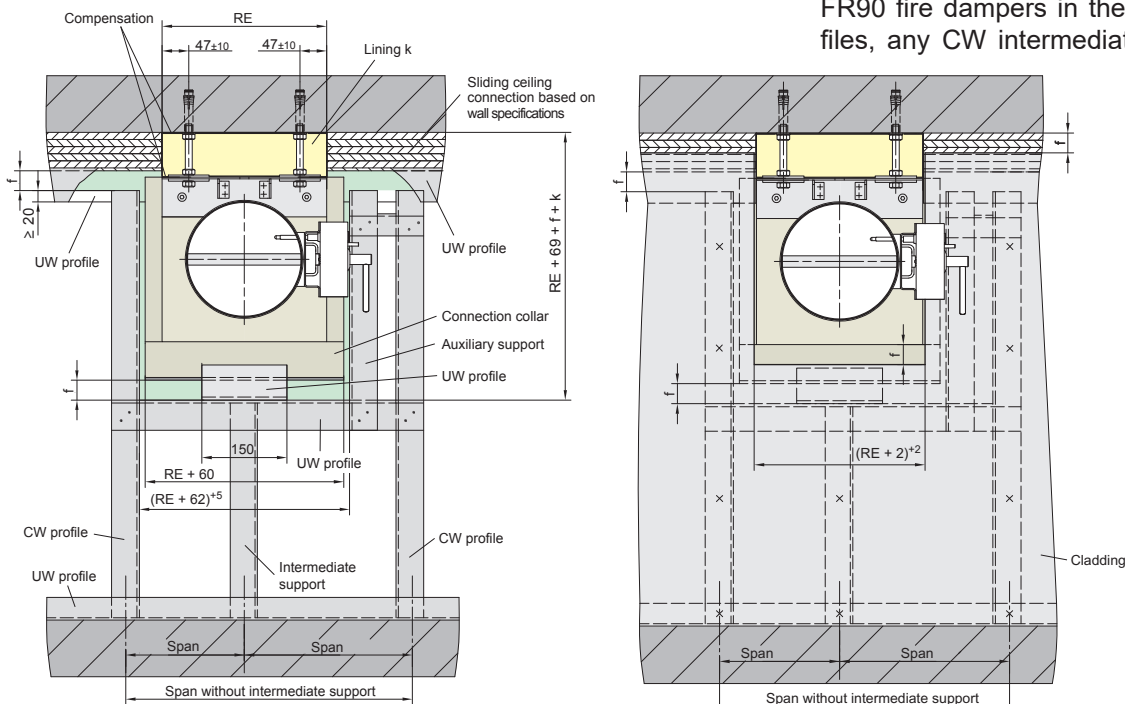
- Sliding ceiling connections are required where a ceiling drop of $f \geq 10$ mm is expected. The designs of the expansion joints are described in DIN 4102-4 for a drop of $f \leq 20$ mm. Designs for $f \leq 40$ mm, for instance, include general building authority test certificates (AbP). Conventional 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.
- FR90 fire dampers with installation subframes ER6, on the other hand, can be fitted directly below rigid ceilings, or with a clearance of 30 mm to 80 mm. They guide the sliding ceiling connection around the FR90 fire damper. This is fastened in such a way that it lowers together with the ceiling and the ventilation ducts. As shear forces can also be absorbed, the ventilation ducts do not have to be flexibly connected with the elastic supports.
- Order information:
 “Operation unit on left”, “Operation unit on right” (shown), “Operation unit below”
 Stud profile depths $S = 50, 60, 75, 85, 100, 125$ mm
 ⇒ see pages 4, 7, 24 and 25

FR90 fire dampers

Installation in metal stud walls (6b) Sliding ceiling connection



*) Supplied together with installation subframe ER6. The installation instructions for the plugs must be observed! The Zykon drills with drive-in mandrels needed for installation can be supplied as optional items.



Installation

- Installation subframes ER6 must fit the web height “S” of the metal studs.
- Installation subframes ER6 can be installed directly below rigid ceilings or with a space of 30 to 80 mm. The space must be sealed with a lining k attached to the ceiling and made from 100-mm-wide strips of calcium silicate board with a bulk density of $\geq 500 \text{ kg/m}^3$.
- **The surfaces of the ceilings must be smooth and even!** If required, levelling work should also be performed (plastering, smoothing etc.). Gaps and joints between the installation subframe ER6, the lining k and the ceiling must be levelled out and sealed in a manner appropriate to the wall in question. Any gaps remaining in the reveal between the connection collar and ceiling connection profiles must be sealed; either using strips made of wallboard and/or gypsum filler or with mineral wool strips (melting point $\geq 1000^\circ\text{C}$ and $\geq 80 \text{ kg/m}^3$ bulk density) and non-combustible adhesive.
- Fire dampers with installation subframes ER6 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 FR90 fire dampers if required due to the spans. There must also be clearances for incorporating the planned ceiling drop below the attached FR90 fire dampers in the area of the CW profiles, any CW intermediate supports, UW profiles and claddings.

- Wall claddings must be attached according to general building authority test certificates and technical standards.

Installation and arrangement of the metal studs

Cladded wall

All dimensions in mm

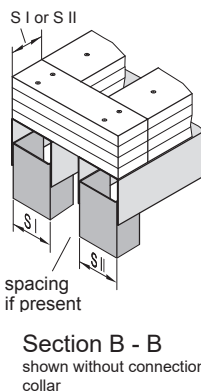
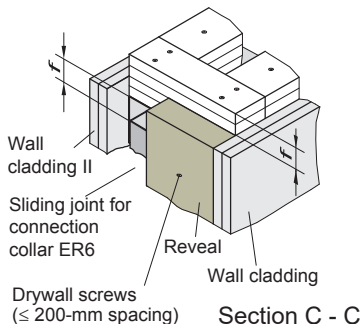
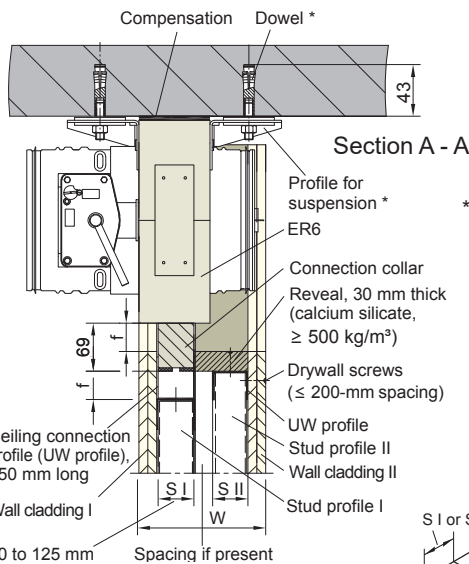
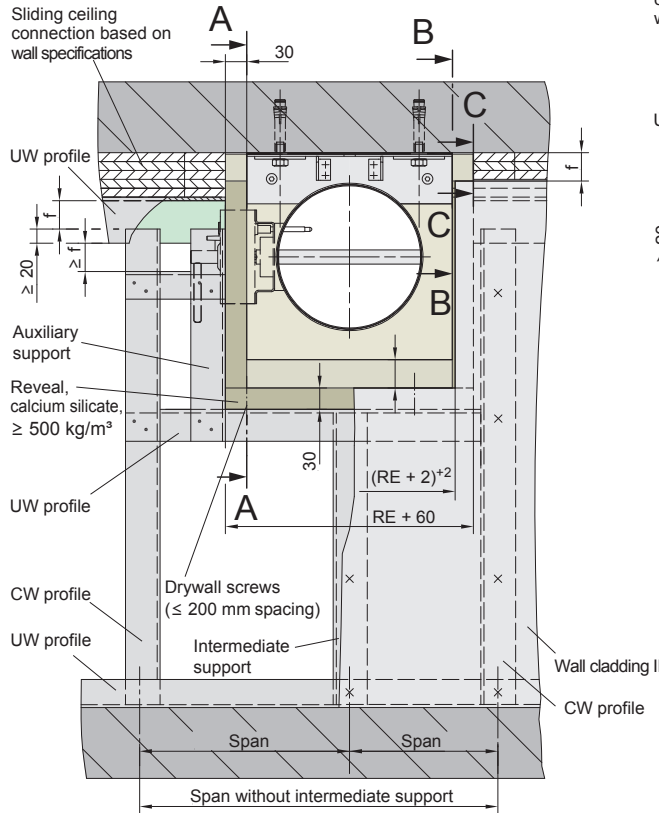
FR90 fire dampers

Installation in metal stud walls (6c) Sliding ceiling connection

These views relate to the back of the wall or the non-operation side of the FR90 fire damper!

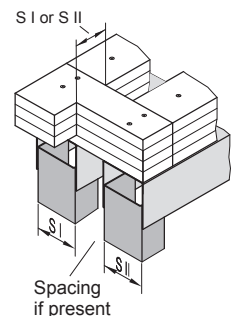
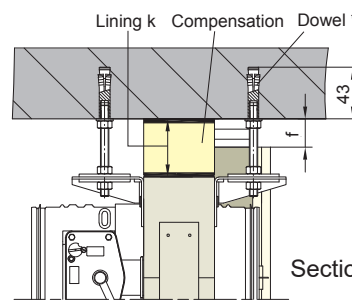
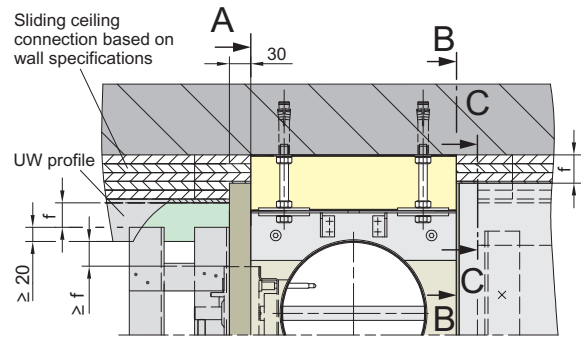
Installation in double-studded walls

• Directly underneath ceilings

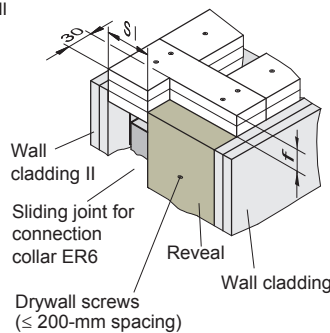


*) Supplied together with installation subframe ER6.

• With lining for spacing of ≤ 80 mm from ceilings



Section A - A



n C - C

Section B - B shown without connection collar

• The installation of FR90 fire dampers is in principle unchanged.
⇒ see page 24

- Installation subframes ER6 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 severed and sealed at the front (section C - C).
- The profiles surrounding the recess on the metal studs II are given a reveal made from 30-mm-thick calcium silicate board. These are held up to the ceiling leaving a gap f for the drop (section 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, then the sliding joint for the connection collar of the installation subframe ER6 will lie between cladding I and the reveal adjoining cladding II (section B - B).
- Joints should be filled as usual for this type of wall.

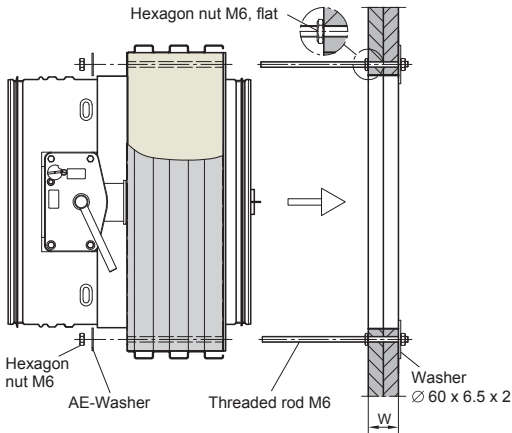
All dimensions in mm

FR90 fire dampers

Mounting on shaft walls with and without metal studs (1)

Mounting with mounting frame AE

Types of walls ⇒ see page 16



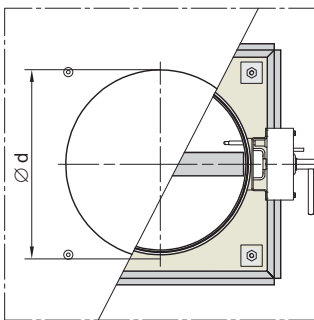
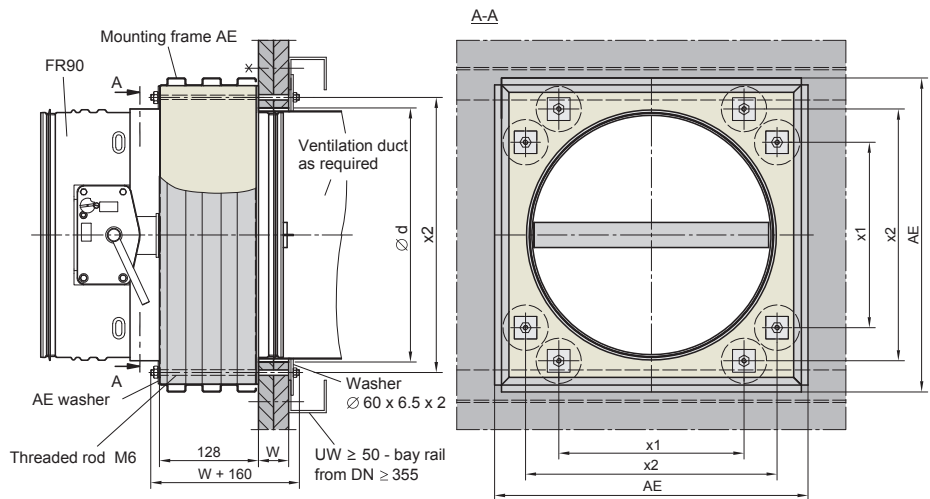
The **minimum thicknesses W [mm]** shown opposite are required for installing the FR90 fire dampers:

Fire resistance period in minutes		30
		60
		90
Shaft walls made of wall boards, at least 2-layer	with metal studs	90
	without metal studs	40

Mounting frames AE should be attached with threaded rods which pass through the wall, and washers and nuts on both ends.

Factory-produced holes in the mounting frames AE indicate the number of the fastenings.

DN [mm]	Pc per corner	Pc in total
≤ 315	1	4
≥ 355	2	8

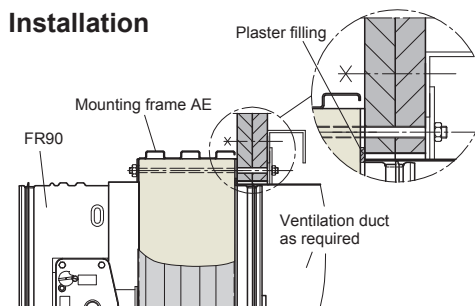


Installation opening

$\text{Ø}d = \text{DN} + 6 \text{ to } 8 \text{ mm}$

DN	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800
AE	210	235	250	270	290	310	334	360	390	425	475	520	570	620	680	750	830	920
x1	-	-	-	-	-	-	-	-	-	-	228	250	275	300	330	365	405	450
x2	120	145	160	180	200	220	244	270	300	335	385	430	480	530	590	660	740	830

Installation



The **spacing** between two FR90 fire dampers must be $\geq 200 \text{ mm}$. No spacing is required with respect to adjacent walls or ceilings.

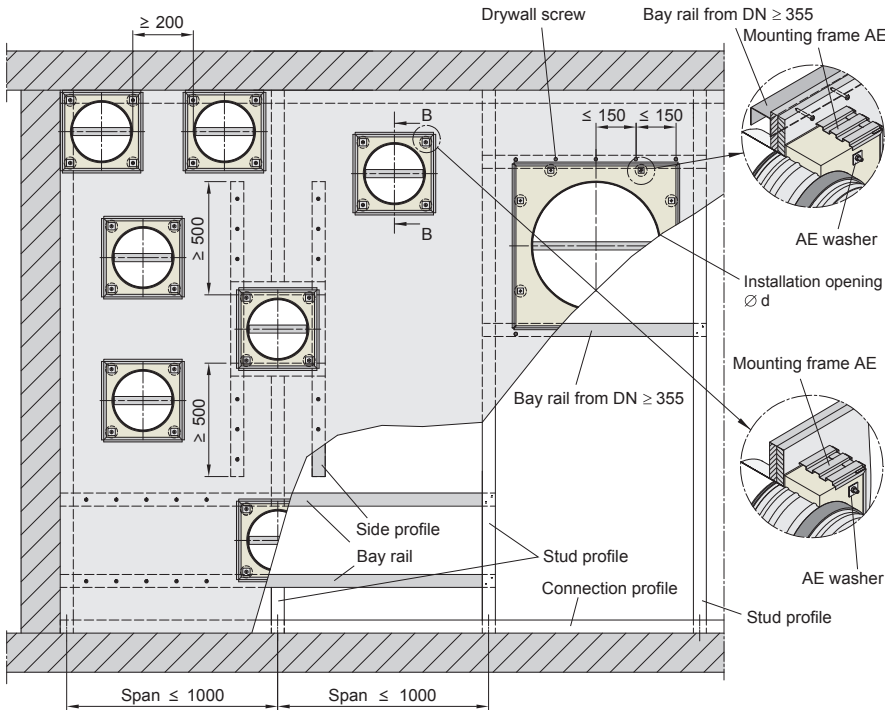
Ventilation ducts must be connected flexibly! ⇒ see page 34, 36

All dimensions in mm

FR90 fire dampers

Mounting on shaft walls with and without metal studs (2)

Mounting on shaft walls with metal studs (example)

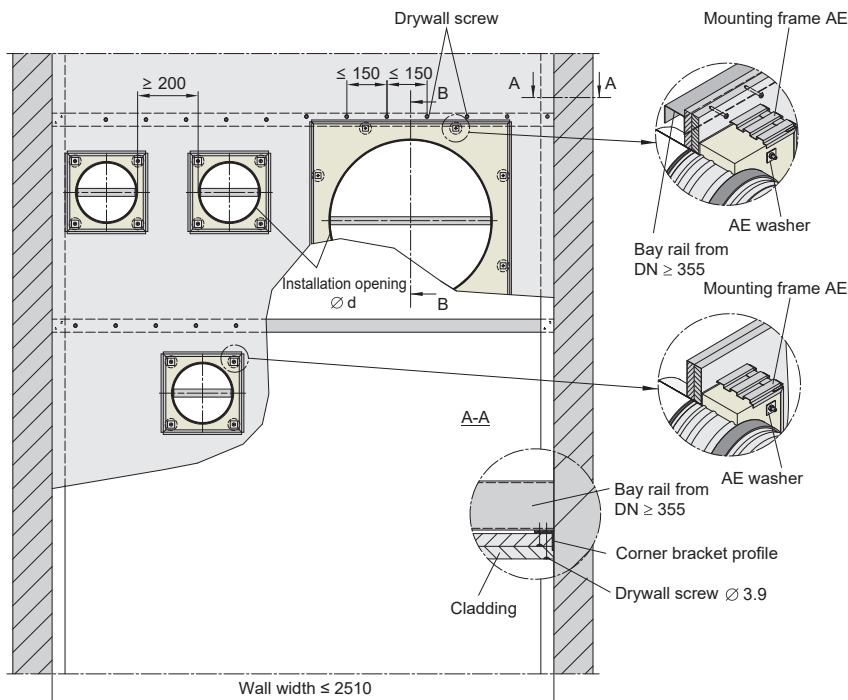


If the spans of the studding are smaller than the installation opening, they require bay rails and lateral profiles with a 500-mm excess length. If smaller dimensions are available, then the side profiles should be butted up against the connection profiles and secured as usual for this type of wall. Stud profiles (supports) can replace side profiles.

For installation openings with dimensions within the span of the studding, the bay rails should be connected to the stud profiles as usual for this type of wall.

Bay rails made from UW profiles with stud profile depth of ≥ 50 mm are required for installing FR90 fire dampers of sizes $DN \geq 355$. They should be installed in such a way that the washers $\varnothing 60$ mm grip over the UW profiles and clamp them. These bay rails should be screwed to the wall cladding with spacing of ≤ 150 mm.

Mounting on shaft walls without metal studs (example)



Walls without studding laterally adjoin rigid walls and ceilings. The two-layer wall material, which can be free-span, is fastened to these with connection profiles (angle profiles). There may also be bay rails.

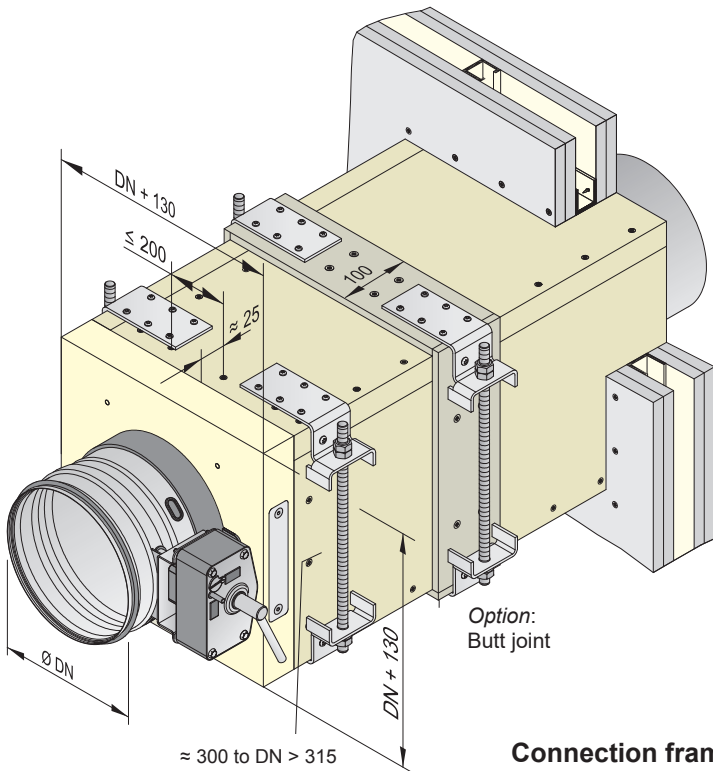
Bay rails made from UW profiles with stud profile depth of ≥ 50 mm are required for installing FR90 fire dampers of sizes $DN \geq 355$. They should be installed in such a way that the washers $\varnothing 60$ mm grip over the UW profiles and clamp them. These bay rails should be screwed to the wall cladding with spacing of ≤ 150 mm.

Connection profiles on walls, ceilings and floors must not be cut or severed.

All dimensions in mm

FR90 fire dampers

Installation remote from (1) rigid walls and ceilings and metal stud walls

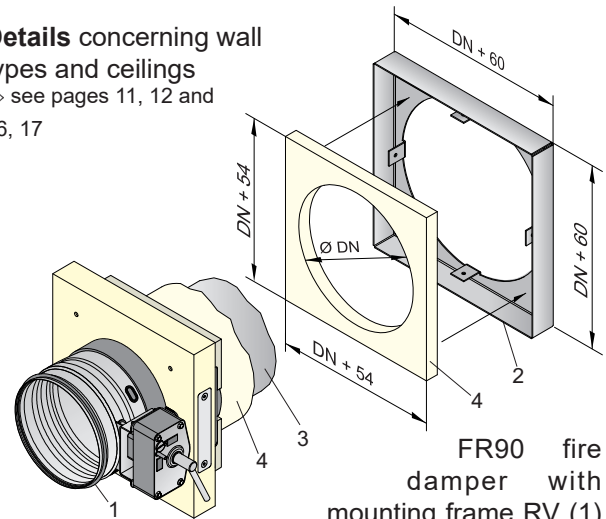


Installation with mounting frame RV on ventilation ducts with a fire resistance period remote from rigid walls and ceilings and metal stud walls.

The following **minimum thicknesses W, D [mm]** are required to install the FR90 fire dampers:

Fire resistance period in minutes	30 60 90
Rigid walls and ceilings	100
Metal stud walls with ≥ 2-layer cladding on both sides	95

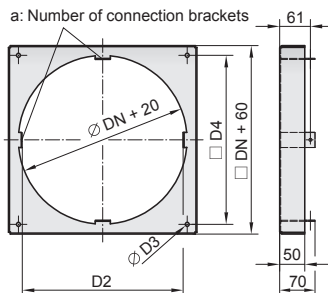
Details concerning wall types and ceilings
⇒ see pages 11, 12 and 16, 17



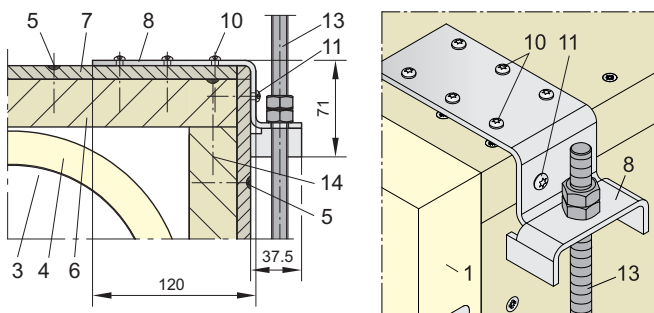
FR90 fire damper with mounting frame RV (1) and connection frame (2) on ventilation duct (3) lagged with mineral wool (4). Shown without claddings or suspension.

DN	100 to 140	160 to 315	355 to 800
D2	DN + 6	DN + 4	DN + 6
Ø D3	9	9	13
□ D4	DN + 20	DN + 20	DN - 20
a	4	4	8

Connection frame



Suspension



Permissible weights for 90-minute fire resistance periods for suspensions comprising **steel threaded rods**:

Size	A _s [mm ²]	Weight G [kg]	
		For 1 unit	For 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

A_s tensile stress cross-section according to DIN 13

FR90 fire dampers installed remote from walls are generally suspended using steel threaded rods arranged in pairs. These should be attached to ceilings according to the fire resistance period. 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 Worksheet 478).

With FR90 fire dampers installed remote from ceilings, the weight forces are transferred into the ceiling via the sheet steel ventilation duct.

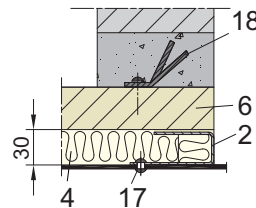
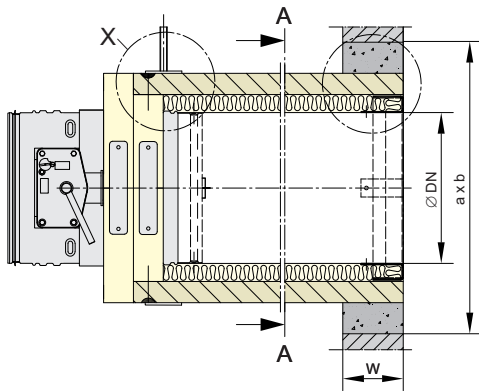
Weight [kg] of FR90 fire dampers ⇒ see page 10.

Weights of the suspension, ventilation duct, insulation, cladding, etc. should be factored in.

FR90 fire dampers

Installation remote from (2) rigid walls and ceilings

Route ventilation duct with cladding through rigid walls



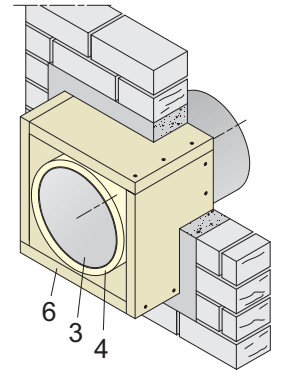
Installation opening:

$a \times b \approx DN + 135 \text{ mm}$

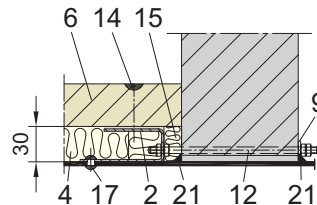
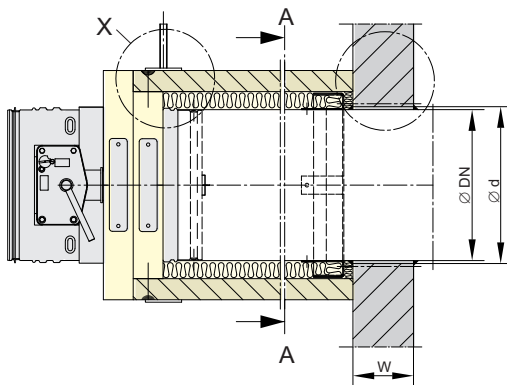
+ mortar gap as required.

Mortar anchors or suitable concrete screws (18) should be inserted with spacing $\leq 200 \text{ mm}$.

View A-A



Attach ventilation duct with cladding to rigid walls

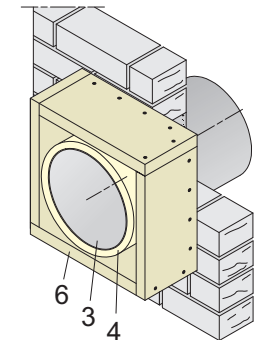


Installation opening:

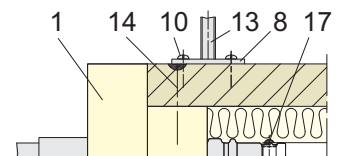
$\varnothing d \approx DN + 5 \text{ mm}$

Detail X for fastening

View A-A



If the top installation side is inaccessible, the FR90 corner brackets, connection frames and RV frames do not have to be screwed to the cladding on this side.



Parts list on pages 28 to 31:

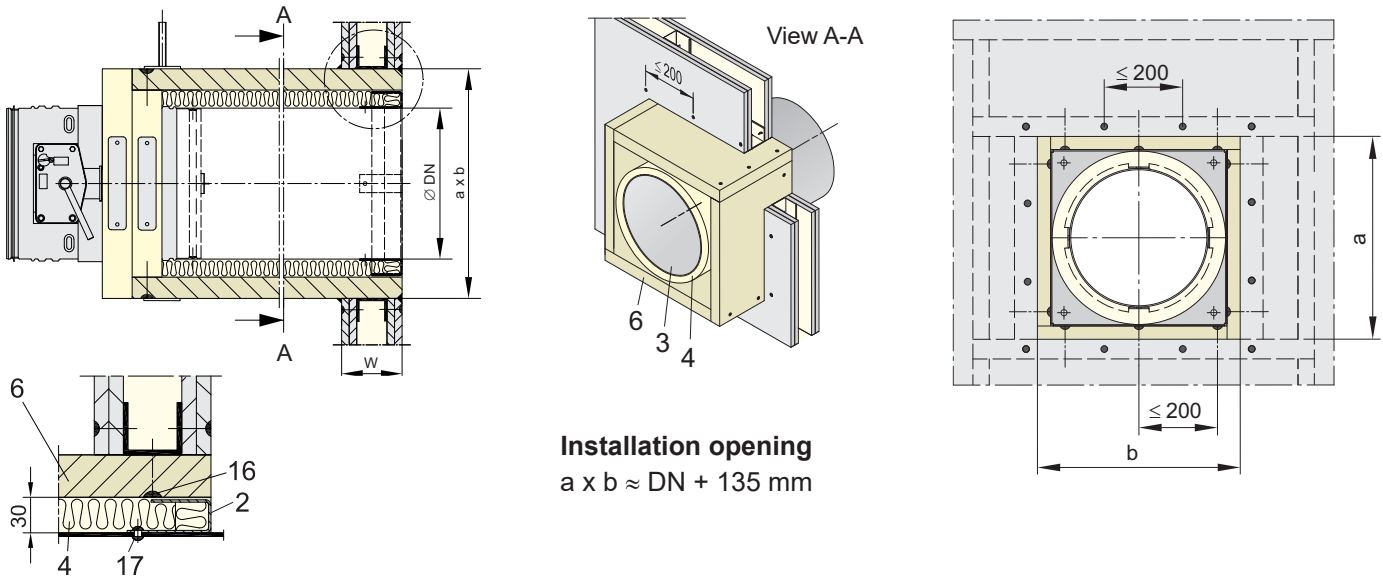
- | | | |
|---|--|--|
| 1 Fire damper with mounting frame RV. | 8 FR90 / FK90K corner bracket ^{*)+)} . | wise 8 x. |
| 2 Connection frame. | 9 Washer for RV / L6 ^{*)} . | 18 Mortar anchor or concrete screws. |
| 3 Ventilation duct made from sheet steel. | 10 Round head chipboard screw 4 x 45 mm ^{*)} . | 19 Only if DN > 200: Tapping screw $\geq 4.2 \text{ mm}$. |
| 4 Mineral wool clad, 30 mm, $\geq 40 \text{ kg/m}^3$, melting point $>1000^\circ\text{C}$ and clad with aluminium foil. | 11 Round head chipboard screw 5 x 70 mm ^{*)} . | 20 Calcium silicate boards fastened to ceiling $\geq 500 \text{ kg/m}^3$. |
| 5 Drywall screw 3.9 x 35 mm. | 12 Threaded rods for fastening with secured nuts ^{**))} . 4 x M8 with DN ≤ 315 , otherwise 4 x M12. | 21 Sealings with Promaseal® Mastic Brandschutzkitt (fireproof sealant).
⇒ see page 37 |
| 6 Cladding made from 35-mm-thick Promatect® LS fire protection boards. Cladding must be produced according to the Promat® worksheet 478. | 13 Threaded rods for suspending with secured nuts ^{**))} . | |
| 7 100-mm-wide additional cladding made from Promatect® H boards, 10 mm thick. Bond to (6) with Promat® K84 adhesive and screw with (5). | 14 Chipboard screws 4 x 60 mm. Pre-drill a $\varnothing 3\text{-mm}$ hole in (2). | ^{*)} Supplied together with FR90 fire dampers with mounting frame RV. |
| | 15 Sealing with mineral wool (4). This should be compressed to around 12 mm. | ^{+))} Order additional FR90 / FK90K corner brackets. ⇒ see page 37 |
| | 16 Drywall screw 3.9 x 55 mm. | ^{**))} or all-steel lock nuts |
| | 17 Circumferentially arranged steel sealed rivets 4.8 mm or tapping screws, 4 x if DN ≤ 315 , other- | |

Screws, mortar anchors and rivets should in general be installed at $\leq 200 \text{ mm}$ centres.

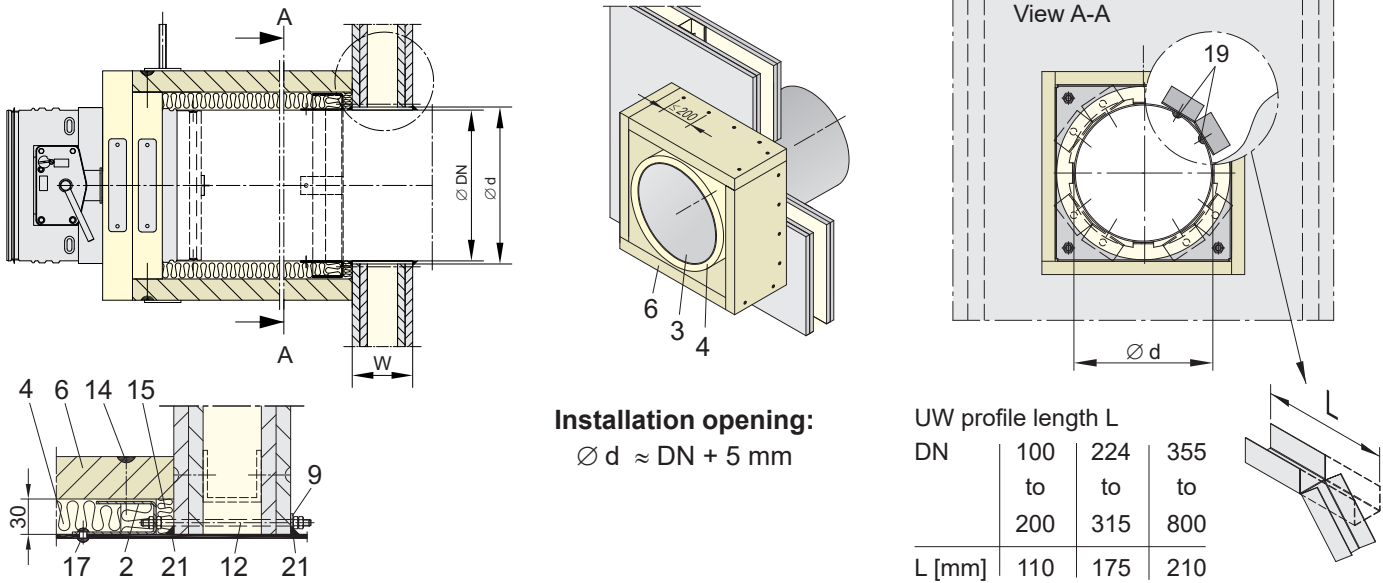
FR90 fire dampers

Installation remote from (3) metal stud walls

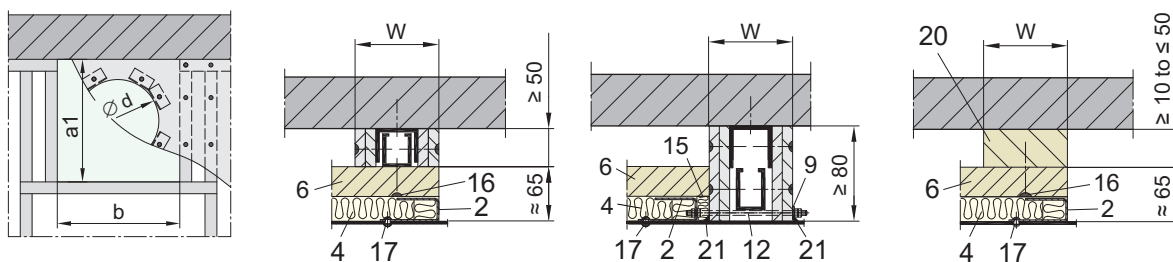
Route ventilation duct with cladding through metal stud walls



Attach ventilation duct with cladding to metal stud walls



Connections to rigid ceilings



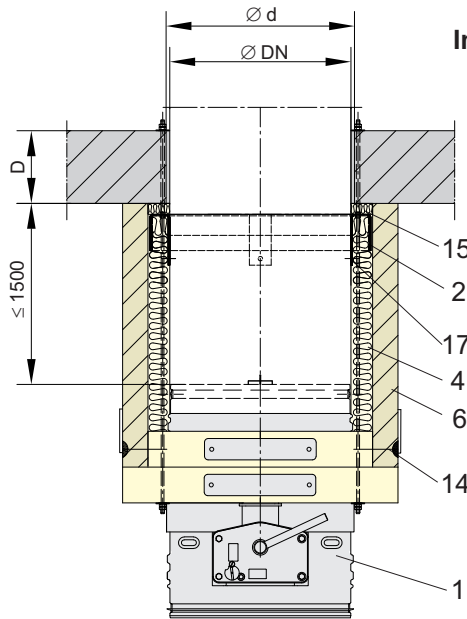
Installation opening: $a1 \times b \approx (DN + 135 \text{ mm} + \text{ceiling spacing}) \times (DN + 135 \text{ mm})$
 $\varnothing d \approx (DN + 5 \text{ mm} + \text{ceiling spacing})$

Parts list → see page 29

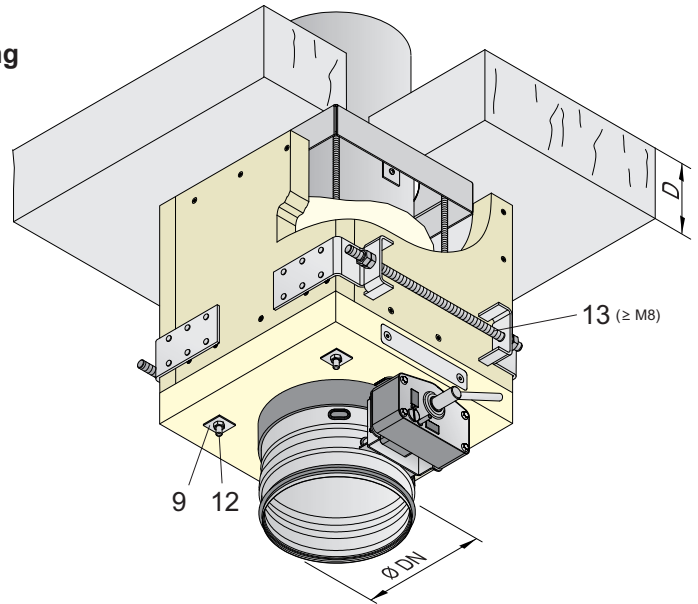
FR90 fire dampers

Installation remote from (4) rigid ceilings

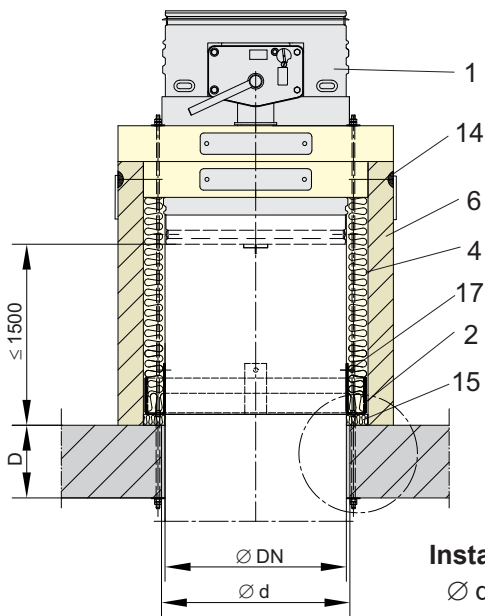
FR90 fire damper below the ceiling



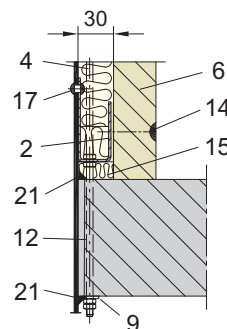
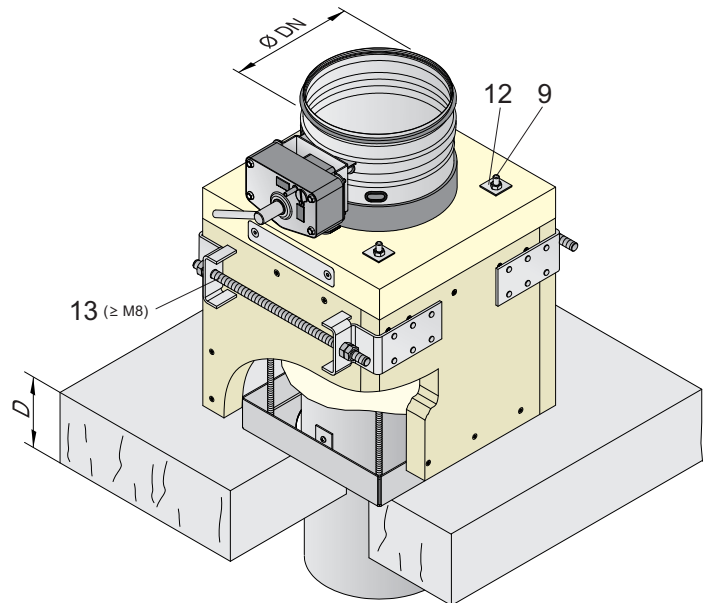
Installation opening
 $\varnothing d \approx DN + 5 \text{ mm}$



FR90 fire damper above the ceiling



Installation opening
 $\varnothing d \approx DN + 5 \text{ mm}$

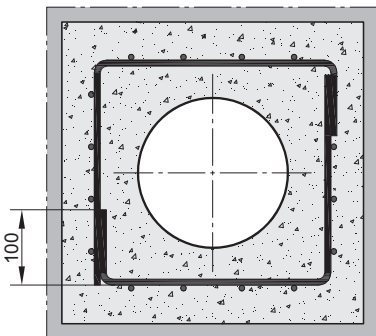
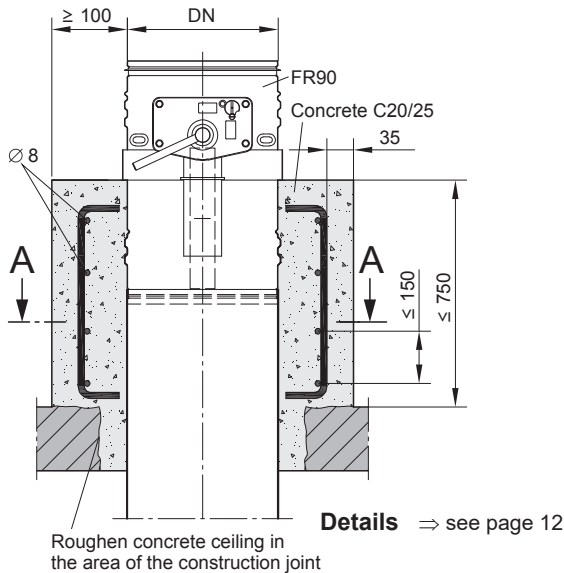


Parts list → see page 29

FR90 fire dampers

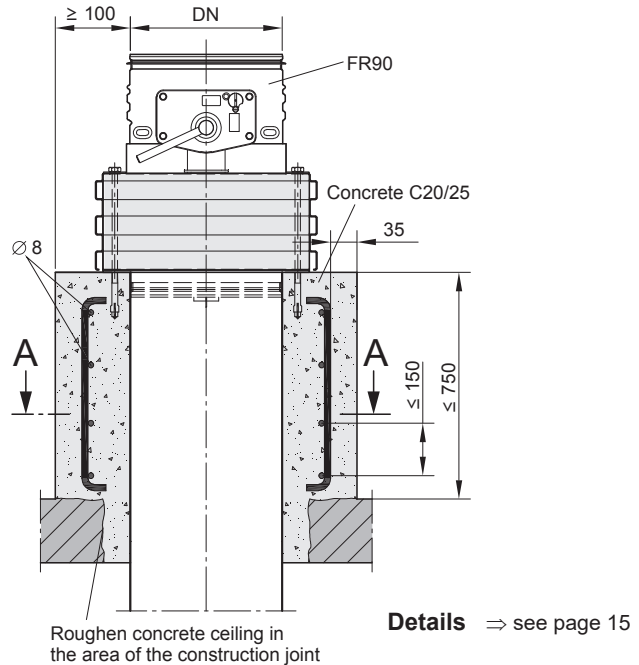
Base installation on ceilings / metal stud walls as fire walls

Installation remote from and above rigid ceilings in ventilation ducts made of concrete



Section A-A

Mounting with mounting frame AE on ventilation ducts made of concrete



Production according to general construction rules.

Dimensioning according to DIN 1045 and DIN 4102-4.

- Fire resistance period 90 minutes.
- Cover made of concrete C 20/25, ≥ 100 mm thick, ≤ 750 mm high.
- Reinforcement made of reinforcing steel $\varnothing \geq 8$ mm. Vertical spacing ≤ 150 mm, horizontal circumferentially sealed ≤ 150 mm. Alternative: welded steel wire mesh Q 335 A
- Reinforcing steel overlap $C_{nom} \geq 35$ 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.

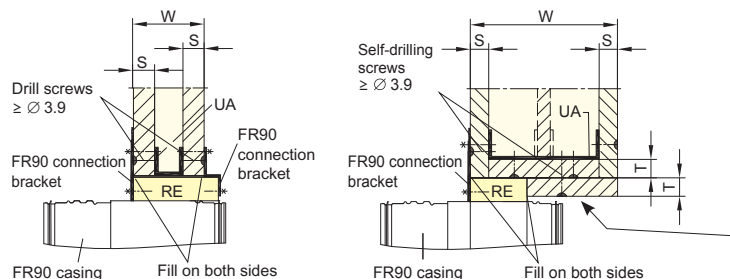
Installation with installation subframe RE in metal stud walls of the fire wall or safety partition wall type with cladding on both sides ⇒ see page 20

Walls of this type should be built according to general building authority test certificates (AbP) as metal stud walls with at least two layers of cladding on both sides and a 90-minute fire resistance period. The claddings can incorporate steel stiffening plates.

FR90 fire dampers are installed with RE installation frame. ⇒ see pages 16, 17, 20

The following are needed:

- Wall thickness $W \geq 100$ mm
- Wall height ≤ 5000 mm.
- The studs, bay rails and reinforcements adjacent to the FR90 fire dampers must be produced from UA profiles.



Wall connections

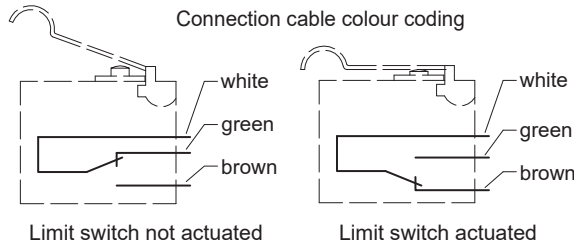
Reveal with $T \geq 20$ -mm-thick calcium silicate boards or with $T \geq S$ thick boards made from wall cladding materials!

FR90 fire dampers

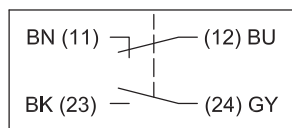
Electrical connections

Limit switches on thermal-mechanical release mechanisms

The CLOSED limit switches are actuated when the fire damper is closed, and the OPEN limit switches are actuated when the fire damper is open.



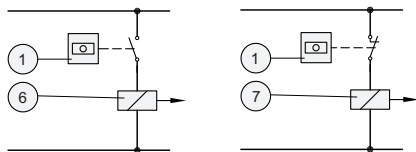
E-Ex limit switch



Limit switch not actuated

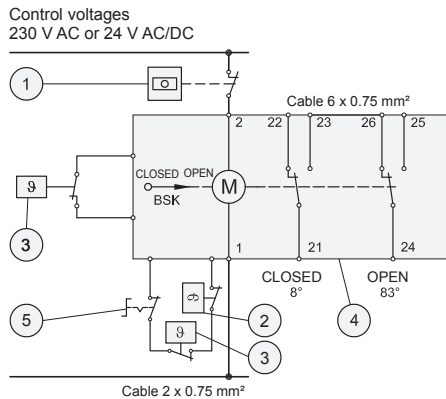
Remote release

W220, G24 **WU220, GU24**
Closed during current flow Closed during power interruption

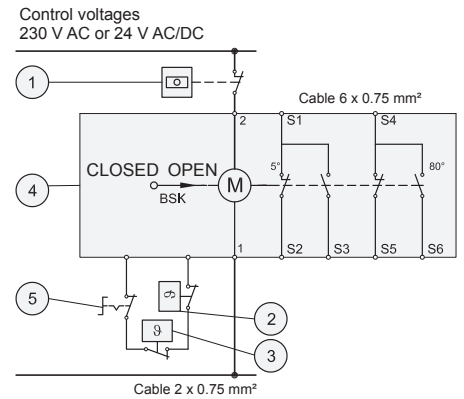


Control voltages 230 V AC or 24 V DC

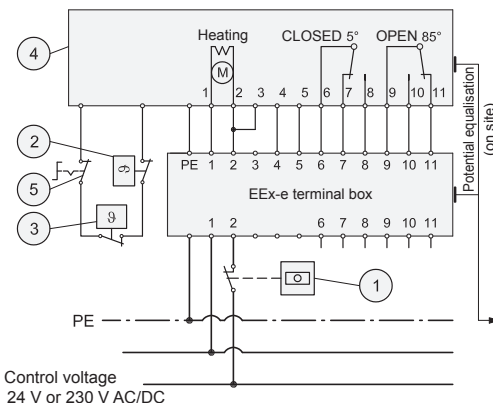
Actuators M220-9/H, M24-9/H



Actuators M220-10/F, M24-10/F, M220-11/H, M24-11/H



Actuators EM-1, EM-2 and RM-1



1 Thermostats, smoke detectors and switches must only be installed if required.
On site delivery.

2 Thermal-electric release element 70°C or 95°C inside the fire damper casing; EM-1, EM-2 und RM-1 only 70°C!

3 Temperature cut-off approx. 70°C outside the fire damper casing.

4 Electric actuator with limit switches for OPEN-CLOSED position indicator.

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

- The switches on the connection cables can be removed if they are not being used.

- Due to their in-built thermal release elements, all actuators must be stored at temperatures not exceeding 50°C!

5 Button for function check

6 Lifting solenoid

7 Magnetic clamp

The right to allow for delivery variations from the versions shown remains reserved.

Connection box for fire dampers with electric spring return actuators

**M220-10/F, M24-10/F,
M220-9/H, M24-9/H,
M220-11/H, M24-11/H**

⇒ see pages 37 and 39

FR90 fire dampers

Installation, maintenance-free, functional test and servicing

Installation

- FR90 fire dampers must be installed based on the instructions in this user manual.

Structural requirements for walls, ceilings, ventilation ducts etc. must be met by the customer!

The technical regulations and national statutory regulations must be observed during installation.

In Germany, this means the "Technical Building Regulations" (VV TB) and the "Guideline on Fire Protection Requirements Pertaining to Ventilation Systems" (Lüftungsanlagenrichtlinie - LÜAR).

FR90 fire dampers meet these requirements and generally recognised technical regulations.

- FR90 fire dampers are to be connected on at least one side to ventilation ducts made of non-combustible or combustible materials; flexible connectors are possible. Thermal expansions must not exert significant forces in the event of fire. Compensatory measures should be provided as required. In general, the compensation can be achieved by suitably routing ducts.

Flexible connectors made of combustible materials or "Aluflex" are possible. ⇒ see pages 36 and 39

The installation of flexible connectors may be mandatory in the case of thin, lightweight walls, metal stud walls, thin shaft walls and installation directly on or remote from walls and ceilings.

Otherwise, the type of measures needed should be decided locally on the basis of expert advice.

- In Germany, **release mechanisms** for a nominal temperature of 95°C are permitted for warm air heating and in some cases for building areas protected by sprinkler systems.
- FR90 fire dampers**
 - Do not need spacing to separate them from combustible materials.
 - Are suitable for all installation positions.
 - May be installed with a minimum distance of 15 mm, also in metal stud walls.
 - May be installed in air transfer applications.
⇒ See user manuals 5.11, 5.12 and approvals for details Z-6. 50-2133, Z-19.18-2241
- Electric wiring** must be performed on site.
- Potential equalisation conductors** to bridge flexible connectors on fire dampers can be fastened with metal screws if they are made of copper and have a cross-section of up to 6 mm², or if they are made of aluminium.
- Fire dampers in **potentially explosive atmospheres** must be grounded in accordance with regulations.

Feature: Maintenance-free

- FR90 fire dampers, series FR92, 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 need for regular cleaning and lubrication, which would otherwise be necessary.

Damper blades are break-proof (⇒ see page 8)

Sealants and all other materials are designed durably and for a long service life.

- The reliability of the FR90 fire dampers is due to the special drive mechanism with dead-centre positions in the opened and closed positions. This ensures secure closing and locking, and reliable signalling of the limit positions.
- These are essential for reliable remotely controlled functional checks and automation of checks.
- Manual functional checks for FR90 fire dampers are limited to closing and opening.
- 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 FR90 fire dampers and are fully adequate.

FR90 fire dampers are largely insensitive to dust and dirt.

Functional testing and servicing

- Fire dampers must be serviced by the owner and tested periodically for correct functioning. The intervals largely depend on the system operation. The relevant regulations should be followed.
- Functional tests on FR90 fire dampers, series FR92, are generally limited to a release and re-opening. This can be performed remotely with electric actuators.
- Repairs or service work are required in the event of malfunctions. Original spare parts must be used for this.
- Cleaning work required in ventilation systems for hygiene reasons must be performed in an operation-dependent manner, and also includes the fire dampers.

The **operating instructions** for FR90 fire dampers are available to download online at www.wildeboer.de.

FR90 fire dampers

Order data for FR90 fire dampers (series FR92)

FR92 - - - - - EI120S

Nominal sizes [mm] DN

- 100 - 125 - 140 - 160 - 180
- 200 - 224 - 250 - 280 - 315 - 355
- 400 - 450 - 500 - 560 - 630 - 710 - 800

Option: Frame

- **RE100 and RE150** for installation in rigid walls and ceilings and in metal stud walls up to 100 mm or 150 mm thickness. ⇒ see ¹⁾ and pages 3, 4 and 7
- **RR100 and RR150** (only available in size ≤ DN 315) for installation in rigid walls and ceilings and in metal stud walls up to 100 mm or 150 mm thickness. ⇒ see ²⁾ and pages 3, 4 and 7
- **AE** for mounting on rigid walls and ceilings and on metal stud walls (shaft walls) with cladding on one side. ⇒ see ³⁾ and pages 3, 4 and 7

• **ER6** sliding ceiling connection

Web heights: 50/60/75/85/100/125

Operation unit: left/right/bottom

⇒ see ⁴⁾ and pages 3, 4 and 7

- **RV** for installation remote from rigid walls and ceilings and metal stud walls. ⇒ see ⁵⁾ and pages 3, 4, 7

Option: Damper blade

- Metal cover made of galvanized steel ⁶⁾
- Metal cover made of 1.4301 stainless steel ⇒ see pages 2, 3 and 7

Option: Casing design

- Casing with inner and outer epoxy resin coating⁷⁾ ⇒ see pages 2, 3 and 7

Option: Nominal temperature

- 95°C ⁸⁾
- 70°C corrosion-resistant ⇒ see pages 2, 3 and 7

Option: Limit switches

- E-CLOSED } also E-CLOSED together with E-OPEN and with the remote releases below
- E-OPEN }

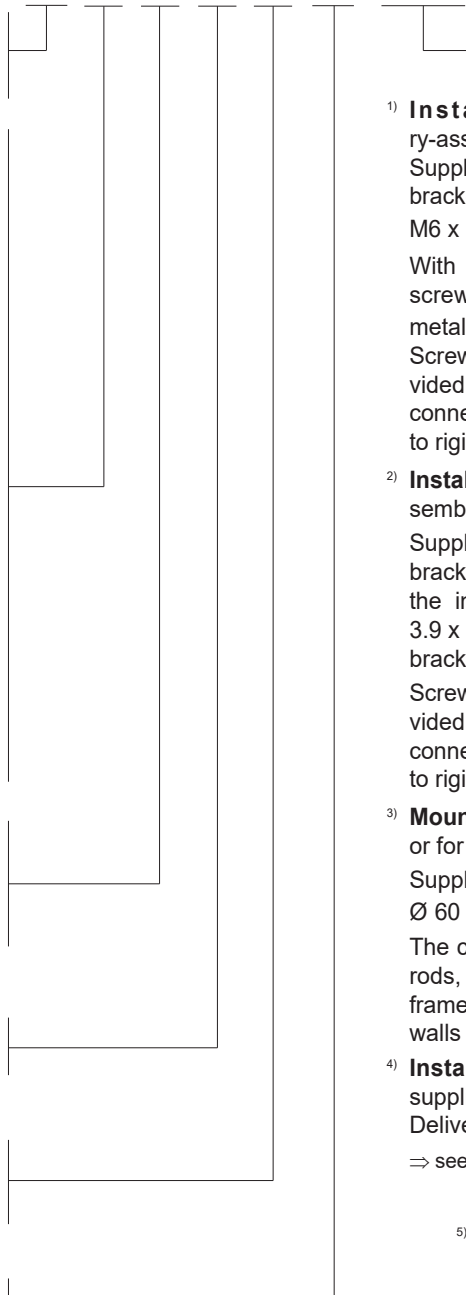
Option: Remote release mounted onto the mechanical release mechanism.

- GU24 } Magnetic clamps
- WU220 }
- G24 } Lifting solenoids
- W220 }
- P } Pneumatic cylinders
- P2 }

Option: Explosion-protected

Option: Explosion-protected limit switch

- EX-CLOSED } also EX-CLOSED together with EX-OPEN
- EX-OPEN }



Fire resistance period of 120 minutes

- ¹⁾ **Installation subframe RE** factory-assembled or for retrofitting on site. Supplied with the required FR90 connection brackets, FR90 corner brackets and screws M6 x 20 for screwing to the installation subframe. With drywall screws 3.9 x 55 mm for screwing FR90 connection brackets to metal stud walls. Screws M6 and metal anchors should be provided by the customer for screwing the FR90 connection brackets and FR90 corner brackets to rigid walls or ceilings.
- ²⁾ **Installation subframe RR** supplied factory-assembled or for retrofitting on site. Supplied with the required FR90 connection brackets and screws M6 x 20 for screwing to the installation subframe. With drywall screws 3.9 x 55 mm for screwing FR90 connection brackets to metal stud walls. Screws M6 and metal anchors should be provided by the customer for screwing the FR90 connection brackets and FR90 corner brackets to rigid walls or ceilings.
- ³⁾ **Mounting frame AE** supplied factory-assembled or for retrofitting on site. Supplied with the maximum required washers Ø 60 x 6.5 x 2 mm and AE washers. The customer needs to provide the M6 threaded rods, nuts and washers to screw the mounting frame AE to rigid walls, ceilings or metal stud walls (shaft walls) with cladding on the one side.
- ⁴⁾ **Installation subframes ER6** are only supplied factory-assembled. Delivery includes screws and plugs for fastening. ⇒ see pages 23 to 25

- ⁵⁾ **Mounting frame RV** supplied factory-assembled or for retrofitting on site. Supplied with FR90 corner bracket, RV washers, chip-board screws and connection frame. The customer needs to provide threaded rods, nuts and metal anchors.

⁶⁾ for DN 100; 125; 160; 200; 250; 315; 355; 400.

⁷⁾ for DN 100; 125; 160; 200; 250; 315; 355; 400 in combination with standard-shut-off damper blade.

For all DN in combination with stainless steel shut-off damper blade 1.4301.

⁸⁾ not for the actuators EM-1, RM-1, EM-2.

⁹⁾ also as a special actuator for smaller sizes.

¹⁰⁾ special actuator for all sizes.

- Option: Electric actuators**
- M220-10/F } Standard up to DN 315
 - M24-10/F }
 - M220-9/H } Standard from DN 355 ⁹⁾
 - M24-9/H }
 - M220-11/H } ¹⁰⁾
 - M24-11/H }
- Option: Electric explosion-protected actuators**
- EM-1 } Standard
 - RM-1 }
 - EM-2 } Explosion-protected, 15 Nm

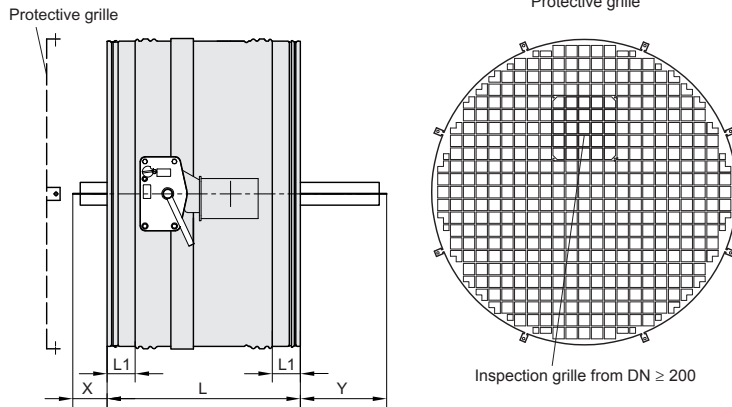
⇒ see pages 5 and 6

Only for thermal-mechanical release mechanisms

FR90 fire dampers

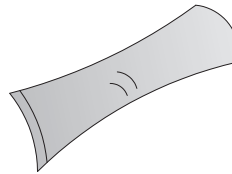
Accessories (1)

Protective grille stamped from ≥ 1 -mm-thick galvanized sheet steel, 20-mm mesh size, $\approx 70\%$ free cross-section. Available in nominal sizes DN.



- A permanent spacing from the protective grille must be provided to allow for free movement of the damper blade. ≥ 50 -mm spacing is recommended. The length should be added to the damper blade excess lengths X and Y.
⇒ see table on page 8: "Size-dependent excess lengths"
- For L1 ⇒ see table on page 7

Mineral, sodium-silicate-based adhesive for bonding and joining installation subframes and mounting frames and for mineral insulating materials. Non-combustible, building material class A1 DIN 4102.



Pack size 2 x 300-g bags

Adhesive for mounting separately ordered installation subframes RR100, RR150, RE100, RE150, mounting frames AE and mounting frames RV to FR90 fire dampers is included.

If adhesive is ordered in addition, approximately the following quantity is required:

DN	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800
[g]	150	165	175	185	200	210	225	245	260	285	310	340	370	400	440	480	530	590

⇒ see pages 12, 15, 16 and 22

Adhesive for filling installation subframes on site and for adhesive bonding of surfaces should always be ordered separately!

- Quantities for filling installation subframe RE on both sides:

DN	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800
[g]	150	170	185	200	215	230	250	270	300	325	365	400	440	480	530	585	650	720

⇒ see pages 12, 15, 16, 20 to 22

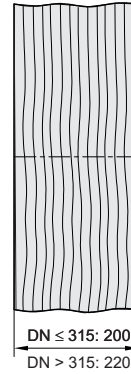
- Quantities for filling installation subframe RR on both sides:

DN	100	125	140	160	180	200	224	250	280	315
[g]	125	140	150	160	175	190	205	220	240	260

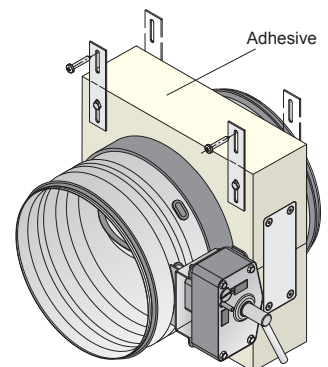
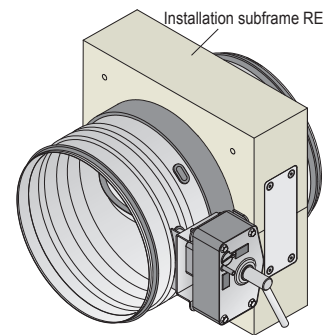
⇒ see pages 14, 20 to 22

- Quantity for **adhesive bonding of surfaces** between assembled installation subframes RE: approx. 1 kg/m² of the area to be bonded.

Flexible connectors made from PVC-coated polyester fabric, cadmium-free, 100-mm expansion compensation. With hygiene certificate. Building material class B1 DIN 4102. Temperature-resistant: -20°C to $+70^{\circ}\text{C}$. Delivery includes 2 pipe clamps. Available in nominal sizes DN.



- The connecting pieces can be installed stretched and directly to the FR90 fire damper. Otherwise, the free movement of the damper blade has to be established by lengthening with ventilation duct parts on site.



FR90 fire dampers

Accessories (2)

Promaseal® Mastic Brandschutzkitt (fireproof sealant)

The following approximate quantities are required for sealing mounting frames RV on both sides:

DN	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800
[ml]	16	20	23	26	29	32	36	40	45	50	57	64	71	79	89	100	112	126

⇒ see parts list page 29, item 21

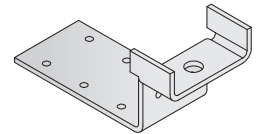
Pack size
Cartridge 310 ml



FR90/FK90K corner brackets for suspending claddings of the ventilation ducts to butt joints on site.

⇒ see parts list page 29, item 8

Pack size
4 x corner brackets, incl. screws.



Simplified electrical connection

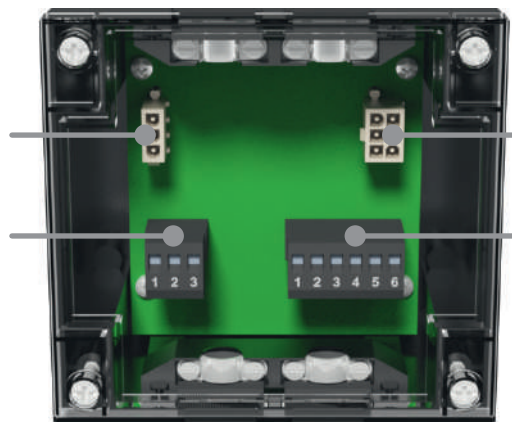
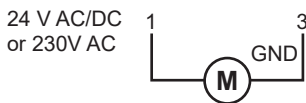
Connection box for fire dampers with spring return actuator.

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 swapped.

Plastic casing 140 mm x 110 mm, 67 m high, protection class II, protection rating IP40.

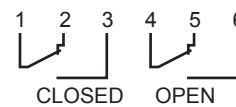
Actuator connection plug
3-pin AMP connector

Mains connection
Plug-in screw terminals



Limit switch connector plug
6-pin AMP connector

Redirection limit switch
Plug-in screw terminals



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

AB-01 for spring return actuators M24-10/F, M24-9/H, M24-11/H

AB-02 for spring return actuators M220-10/F, M220-9/H, M220-11/H

Wildeboer-Net BS2 communication system

⇒ see information on the back page and BS2 User Manual 7.1

FR90 fire dampers

Specification text

Maintenance-free fire dampers according to EN 15650 with 30/60/90/120-minute fire resistance period and fire classifications EI 30/60/90/120 (ve-ho, i↔o) S C 10000. Air-tight casing, class C according to EN 1751, made of galvanized sheet steel with moulded plug connections for spiral lockseam duct, flexible pipe and for similar circular ventilation ducts or air conditioning systems. Casing with lip seals and epoxy resin powder coating on both sides. Replaceable damper blade made of abrasion-proof calcium silicate, with wear-resistant elastomer lip seals / with metal cover made of galvanized steel or 1.4301 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 red metal bearings. Suitable for installation with minimum spacing and with any damper blade axle position in, on and remote from rigid walls and ceilings, in hard-to-access installation openings and also with mineral wool, in and remote from metal stud walls and on shaft walls with and without metal studs. Direct connection to ventilation ducts made of non-combustible or combustible materials, or with protective grilles.

Enclosed maintenance-free thermal release mechanism 70°C / 95°C

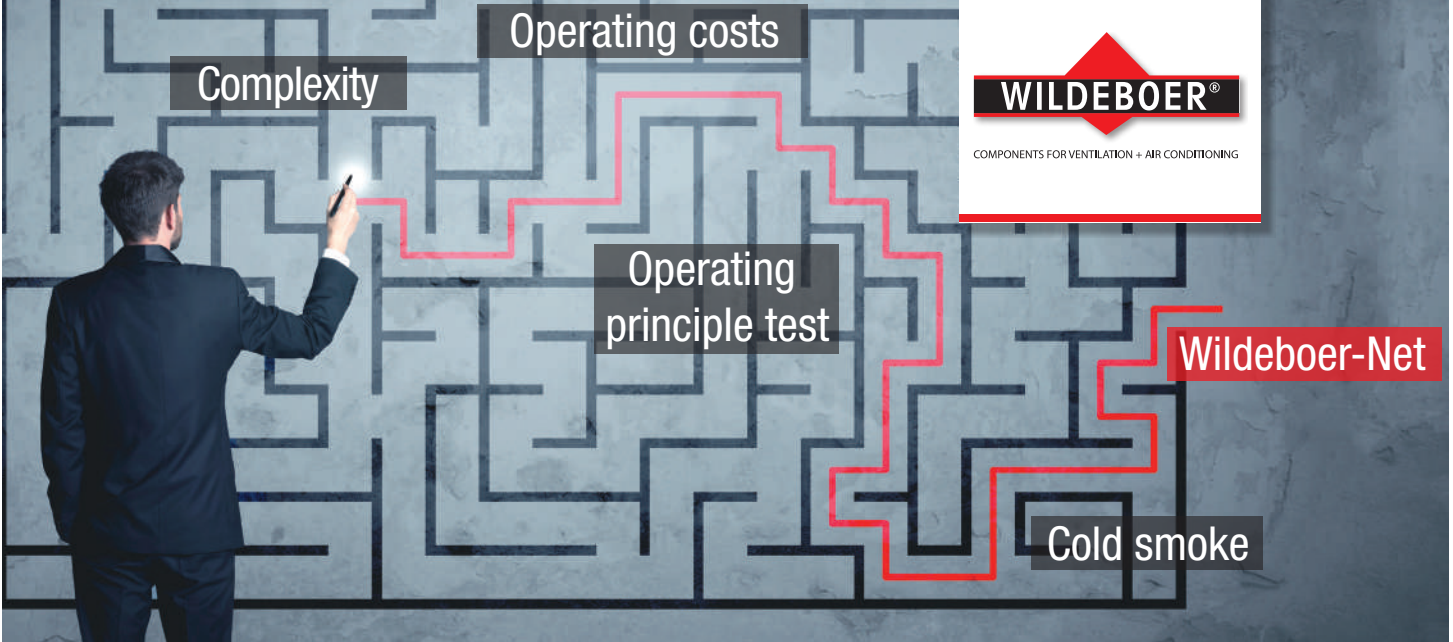
- For manual single-handed operation
 - Corrosion-resistant release element 70°C
 - With (two) electrical limit switch(es) for signalling the damper blade positions CLOSED, OPEN, CLOSED AND OPEN
 - with remote release via magnetic clamp 230 V AC or 24 V DC / lifting solenoid 230 V AC or 24 V DC / pneumatic 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) electric explosion-protected limit switch(es) for signalling the damper blade positions CLOSED/OPEN
 - With explosion-protected electric actuator for 24 V to 240 V AC/DC.
- with
 - Installation subframe RE for installing in rigid walls, ceilings and in metal stud walls.
 - Installation subframe RR for installing in rigid walls, ceilings and in metal stud walls.
 - Mounting frame AE for mounting on rigid walls and ceilings and on walls with cladding on one side (shaft walls) and with and without metal studs.
 - Installation subframe ER6 for sliding ceiling connections in metal stud walls.
 - Mounting frame RV and connection frame for installing 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 order to comply with the hygiene requirements according to DI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 13779, 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.

.....	Pc	Diameter DN:	.....	mm	
		Volume flow:	.....	m ³ /h	
		Pressure drop:	.....	Pa	
		Sound power level:	.....	dB(A)	
		Manufacturer:		WILDEBOER	
		Type/series:		FK90/FK92	
				deliver:	.....
				install:	.....

Select texts not highlighted in bold as required!



Existing problems:

- | The system design, installation, programming and commissioning of conventional control systems in buildings is complex.
- | Preventing smoke spreading is a challenge.
- | Recurring functional tests are time-consuming, affect operation and incur high costs.
- | Fire dampers have to operate reliably. Changes in the building control system always require new operating principle testing.



Our response:

- Special plug-and-play functionality allows control systems for fire dampers to be designed, built and connected in parent hierarchy without any measuring and control expertise.
- Detect smoke and close fire dampers reliably and in good time via flexible release groups.
- The "Wildeboer-Net" BS2 communication system performs functional testing in less than 10 minutes in all.
- The "Wildeboer-Net" BS2 communication system controls and safeguards the functioning of fire dampers. Changes in the building control system have no effect.



The solution:

Wildeboer-Net BS2 communication system

Network your fire protection and significantly minimise the cost of planning, installation and testing. The "Wildeboer-Net" BS2 communication system lays all the groundwork for you. Don't miss out on these benefits. We would be glad to advise you.



Watch explanatory video on YouTube
wildeboer.de/youtube



Wildeboer-Net BS2 communication system
 ■ Optimum system solution combined with our maintenance-free fire dampers

Wildeboer Bauteile GmbH

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