Installation and operating manual GB/en

Fire damper

FKR-EU

according to Declaration of Performance
DoP / FKR-EU / DE / 004

TROX® TECHNIK
The art of handling air

Read the instructions prior to performing any task!

TROX GmbH
Heinrich-Trox-Platz
47504 Neukirchen-Vluyn, Germany
Germany
Phone: +49 (0) 2845 2020
Fax: +49 (0) 2845 202-265
E-mail: trox-de@troxgroup.de
Internet: http://www.troxtechnik.com

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General information

About this manual

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

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

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

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

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

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

Copyright

TROX Technical Service

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

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

Online	*www.troxtechnik.com*
Phone	+49 2845 202-400

Limitation of liability

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

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

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

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

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

We reserve the right to make technical changes.

Warranty claims

The provisions of the respective general delivery terms apply to warranty claims. For purchase orders placed with TROX GmbH, these are the regulations in section "VI. Warranty claims" of the Delivery Terms of TROX GmbH, see *www.trox.de/en/* .

Safety notes

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

Comply with all safety instructions and proceed carefully to avoid accidents, injuries and damage to property.

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

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

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

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

ENVIRONMENT!
Environmental pollution hazard.

Tips and recommendations

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

Safety notes as part of instructions

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

Example:

1. Loosen the screw.
2. **CAUTION!**
   Danger of finger entrapment when closing the lid.
   Be careful when closing the lid.
3. Tighten the screw.

Specific safety notes

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

Warning signs	Type of danger
⚠	Warning – danger zone.

1 Safety

1.1 General safety notes

Sharp edges, sharp corners and thin sheet metal parts

⚠ CAUTION!

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

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

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

Electrical voltage

⚠ DANGER!

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

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

1.2 Correct use

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

If this fire damper is used in Germany:

- Do not use it in extract air systems in commercial kitchens.
- Not to be used as an air transfer damper.
- Do not use in combined penetration seal.
- Do not use in fire protection block bulkhead.
- Approvals under building regulations may be required for the use of upstream shutters for air transfer units. This must be checked and applied for by others.
- Flame-resistant, non-dripping building materials (elastomeric foams) must at least correspond to fire rating class C - s2, d0 according to the specifications of MVV TB (since 2019/1). The applicable local building regulations must be observed.

Incorrect use

⚠ WARNING!

Danger due to incorrect use!

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

Never use the fire damper

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

1.3 Qualified staff

WARNING!

Danger of injury due to insufficiently qualified individuals!

Incorrect use may cause considerable injury or damage to property.

– Only specialist personnel must carry out work.

Personnel:

- Skilled qualified electrician
- Specialist personnel

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

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

2 Technical data

2.1 General data

Nominal sizes	315 – 800 mm
Casing lengths L	495 and 550 mm
Volume flow rate range	Up to 6000 l/s / up to 21600 m³/h (at 12 m/s)
Differential pressure range	Up to 2000 Pa
Temperature range [1, 3, 4]	-20 °C to 50 °C
Release temperature [4]	72 °C or 95 °C (for warm air ventilation systems)
Upstream velocity [2, 4]	≤ 8 m/s with fusible link, ≤ 12 m/s with spring return actuator
Closed damper blade air leakage	EN 1751, Class 4
Casing leakage	EN 1751, Class C
EC conformity	■ Construction Products Regulation (EU) Nr. 305/2011 ■ EN 15650 – Ventilation for buildings – Fire dampers ■ EN 13501-3 – Classification: Fire resistant ducts and fire dampers ■ EN 1366-2 – Fire resistance tests for installations: Fire dampers [5] ■ EN 1751 Ventilation for buildings – Air terminal devices ■ 2006/42/EC - Machinery Directive
Declaration of performance	DoP / FKR-EU / DE / 004

[1] Temperatures may differ for units with attachments. Details for other applications are available on request.

[2] Data applies to uniform upstream and downstream conditions for the fire dampers.

[3] Condensation and the intake of humid fresh air have to be avoided as otherwise operation will be impaired or not possible.

[4] For FKR-EU in Ex construction, see the supplementary operating manual.

[5] Leakage rate of the fire damper system tested at 300 Pa negative pressure.

Product sticker

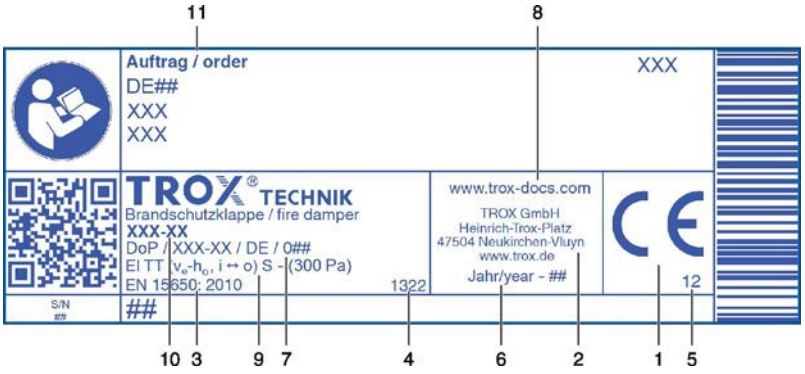


Fig. 1: Product sticker (example)

1 CE mark
2 Manufacturer's address
3 Number of the European standard and year of its publication
4 Notified body
5 The last two digits of the year in which the CE marking was affixed
6 Year of manufacture
7 No. of the declaration of performance
8 Website from which the DoP can be downloaded
9 Regulated characteristics; the fire resistance class depends on the application and may vary
↳ *Chapter 5.1 'Installation situations' on page 24*
10 Type
11 Order number

2.2 FKR-EU with fusible link

Dimensions and weight

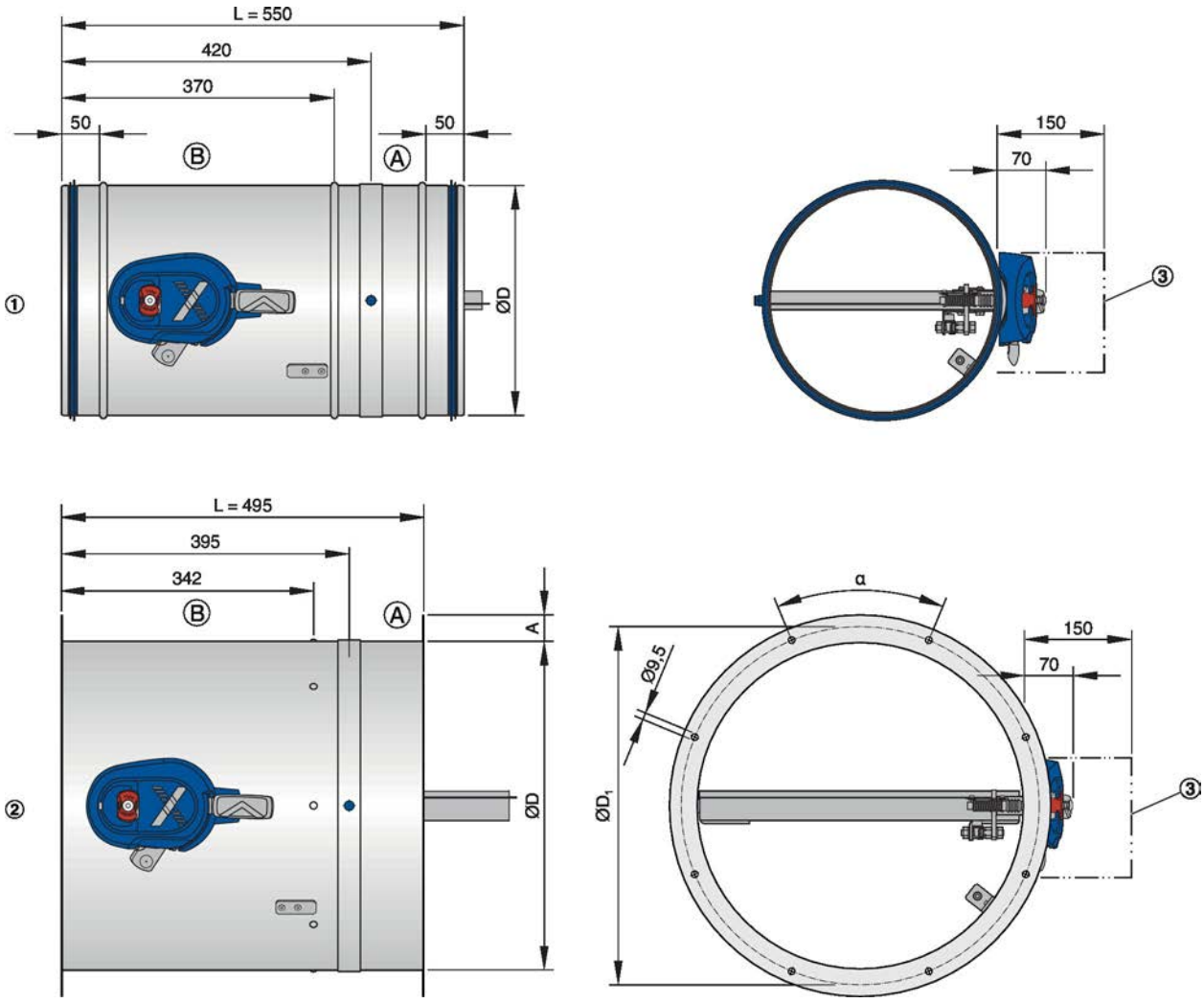


Fig. 2: FKR-EU with fusible link

1 Spigot construction
2 Flange construction
3 Keep clear to provide access for operation

A Installation side
B Operating side

- Weight of FKR-EU with fusible link, see table ↳ *12* .

Limit switch	
Connecting cable length / cross section	1 m / 3 × 0.34 mm²
Protection level	IP 66
Type of contact	1 changeover contact, gold-plated
Maximum switching current	0.5 A
Maximum switching voltage	30 V DC, 250 V AC
Contact resistance	approx. 30 mΩ

Dimensions [mm] / Weight [kg]									
Nominal size DN	**315**	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
ØD	314	354	399	449	499	559	629	709	799
A		31				36			
ØD_1	352	392	438	488	538	600	670	750	840
α			45 °				30 °		22.5 °
No. of holes			8				12		16
Weight of FKR-EU	6.8	7.3	8.5	14.1	16.4	18	21.3	25.7	28.6
Weight of FKR-EU with spigot and installation kit TQ	19.5	21.8	25	33.1	37.8	42.6	49.7	58.7	67.3

2.3 FKR-EU with spring return actuator

Dimensions and weight

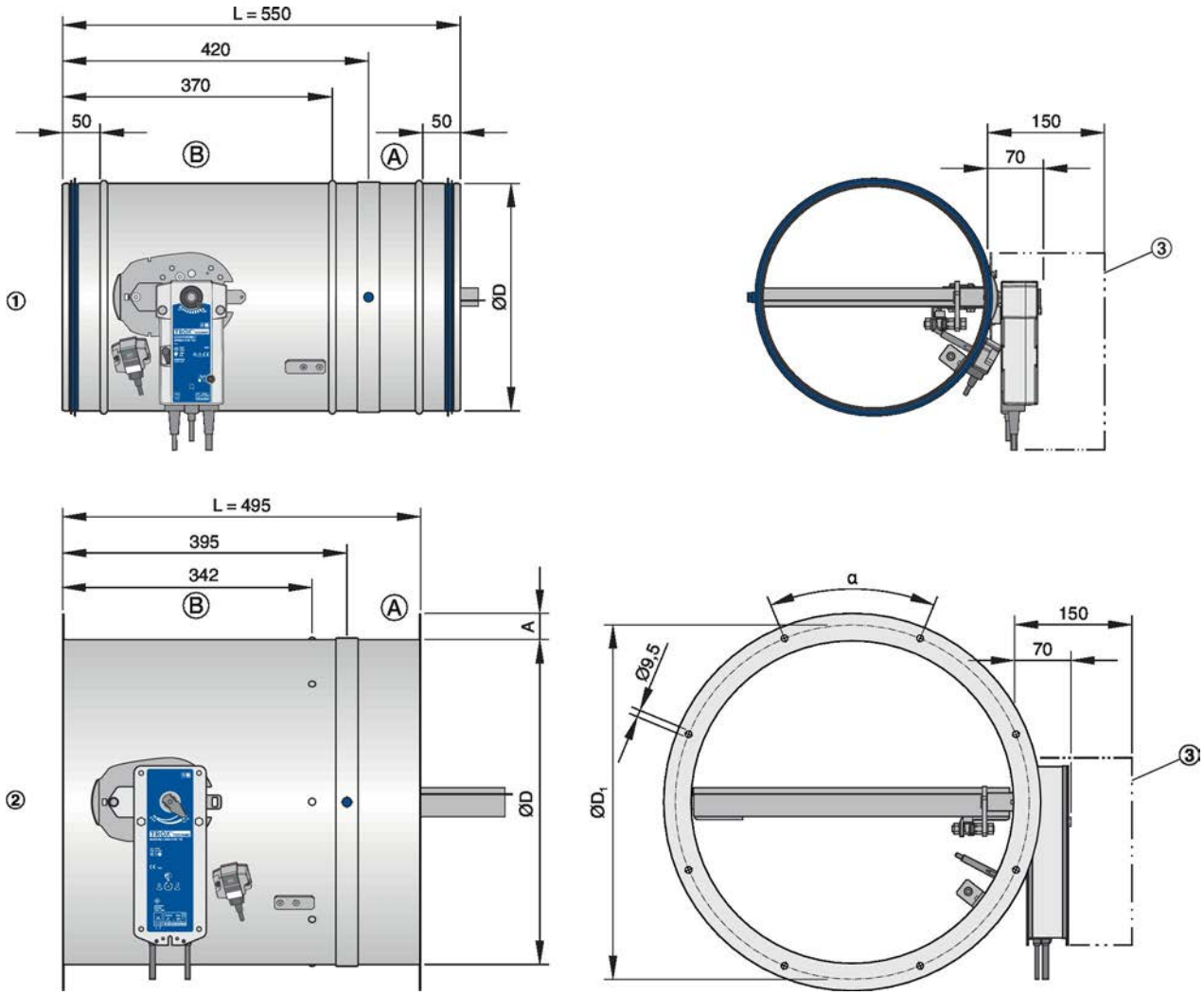


Fig. 3: FKR-EU with Belimo spring return actuator

1 Spigot construction
2 Flange construction
3 Keep clear to provide access for operation
A Installation side
B Operating side

- Weight of FKR-EU with fusible link + approx. 1 kg (BFN...) or 3 kg (BF...), see table *12* .

Spring return actuator BFN...			
Construction		**230-T TR**	**24-T-ST TR**
Supply voltage		230 V AC, 50/60 Hz	24 V AC/DC, 50/60 Hz
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 21.6 – 28.8 V DC
Power rating	Spring winding mechanism / hold position	5 W / 2.1 W	4 W / 1.4 W
	Rating	10 VA (Imax 4 A @ 5 ms)	6 VA (Imax 8.3 A @ 5 ms)
Run time	Actuator / spring return	< 60 s / < 20 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 3 (0.5 inductive) A	
	Contact resistance	< 1 Ω (when new)	
IEC protection class / IP protection		II / IP 54	
Storage temperature / ambient temperature		-40 to 55 °C / -30 to 55 °C [1]	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm² / 1 m, 6 × 0.75 mm² (free of halogens)	

Spring return actuator type BFN... Nominal sizes: nominal width 315 – 400 mm.

[1] Up to 75 °C the safe position will definitely be reached.

Spring return actuator BF...			
Construction		**BF230-TN-2 TR**	**BF24-TN-ST-2 TR**
Supply voltage		230 V AC, 50/60 Hz	24 V AC/DC, 50/60 Hz
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 21.6 – 28.8 V DC
Power rating	Spring winding mechanism / hold position	8.5 W / 3 W	7 W / 2 W
	Rating	11 VA	10 VA
Run time	Actuator / spring return	< 120 s / approx. 16 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA ... 6 A	
	Contact resistance	< 100 mΩ	
IEC protection class / IP protection		II / IP 54	III / IP 54
Storage temperature / ambient temperature		-40 to 50 °C / -30 to 50 °C [1]	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm² / 1 m, 6 × 0.75 mm² (free of halogens)	

Spring return actuator type BF... for nominal sizes: nominal width 450 – 800 mm.

[1] Up to 75 °C the safe position will definitely be reached.

Dimensions and weight

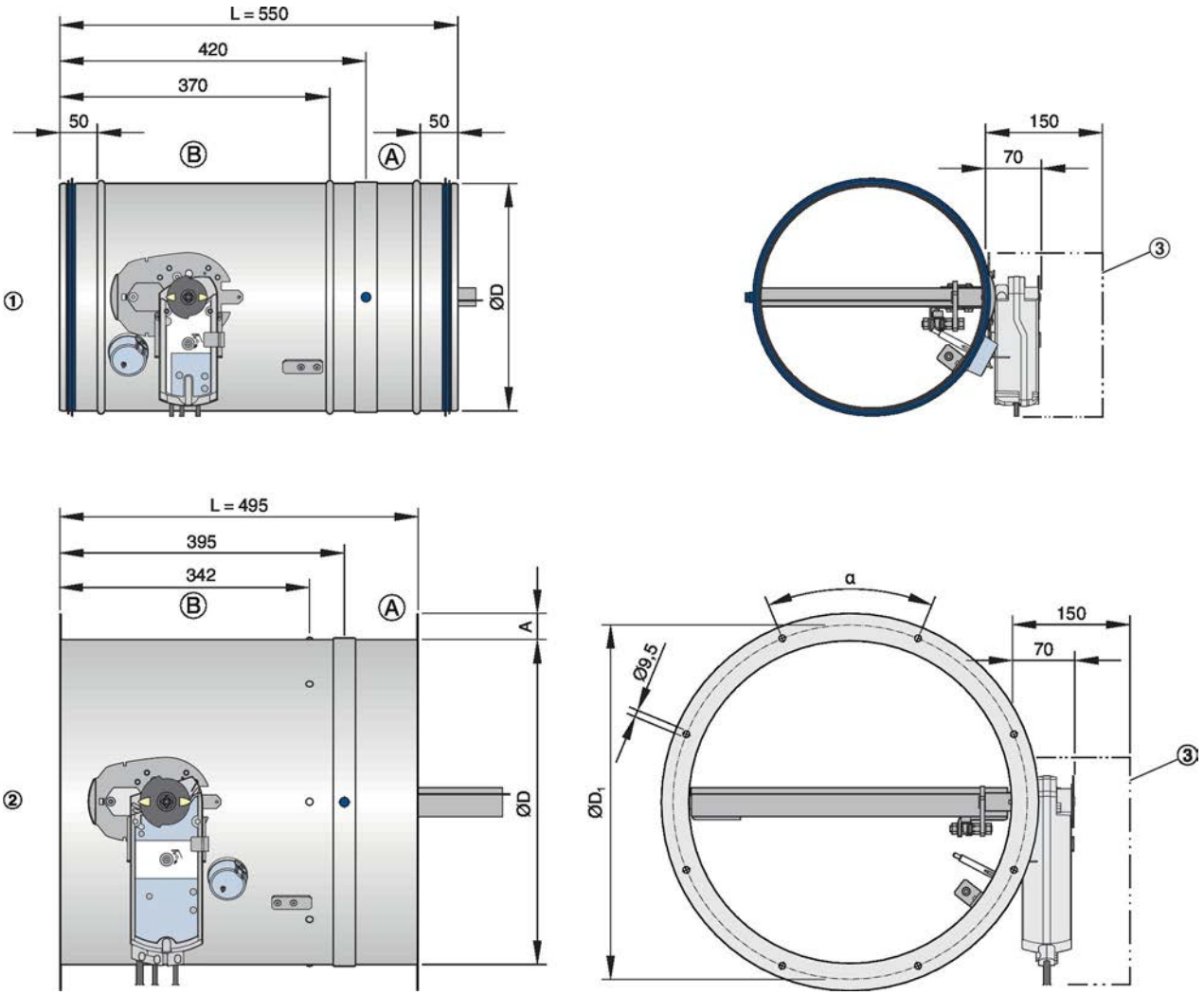


Fig. 4: FKR-EU with Siemens spring return actuator

1 Spigot construction
2 Flange construction
3 Keep clear to provide access for operation

A Installation side
B Operating side

- Weight of FKR-EU with fusible link + approx. 1.4 kg (GNA...) or 2.5 kg (GGA...), see table *12* .

Spring return actuator GNA...			
Construction		**326.1E**	**126.1E**
Supply voltage		230 V AC, 50/60 Hz	24 V AC, 50/60 Hz / 24 – 48 V DC
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 19.2 – 57.6 V DC
Power rating	Spring winding mechanism	7 VA / 4.5 W	5 VA / 3.5 W
	Hold position	3.5 W	2 W
Run time	Actuator / spring return	90 s / 15 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	24 – 230 V AC / 12 – 30 V DC	
	Switching current	AC: 6 A (inductive 2 A) / DC: 2 A	
IEC protection class / IP protection		II / IP 42 or IP 54*	III / IP 42 or IP 54*
Storage temperature / ambient temperature		-20 to 50 °C / -20 to 50 °C	
Ambient humidity		< 95% rh, no condensation	
Connecting cable	Actuator / limit switch	0.9 m, 2 × 0.75 mm² / 1 m, 6 × 0.75 mm² (free of halogens)	

Spring return actuator type GNA... Nominal sizes: nominal width 315 – 400 mm.

*Connecting cable at the bottom

Spring return actuator GGA...			
Construction		**326.1E**	**126.1E**
Supply voltage		230 V AC, 50/60 Hz	24 V AC, 50/60 Hz / 24 – 48 V DC
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 19.2 – 57.6 V DC
Power rating	Spring winding mechanism	8 VA / 6 W	7 VA / 5 W
	Hold position	4 W	3 W
Run time	Actuator / spring return	90 s / 15 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	24 – 230 V AC / 12 – 30 V DC	
	Switching current	AC: 6 A (inductive 2 A) / DC: 2 A	
IEC protection class / IP protection		II / IP 42 or IP 54*	III / IP 42 or IP 54*
Storage temperature / ambient temperature		-20 to 50 °C / -20 to 50 °C	
Ambient humidity		< 95% rh, no condensation	
Connecting cable	Actuator / limit switch	0.9 m, 2 × 0.75 mm² / 1 m, 6 × 0.75 mm² (free of halogens)	

Spring return actuator type GGA... for nominal sizes: nominal width 450 – 800 mm.

*Connecting cable at the bottom

FKR-EU with Schischek explosion-proof spring return actuator

The FKR-EU can also be supplied with Schischek explosion-proof spring return actuator on request:

- ExMax-15-BF-TR
- RedMax-15-BF-TR

For further information, see "Supplementary operating manual for explosion-proof fire dampers Type FKR-EU".

2.4 FKR-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit

Dimensions and weight

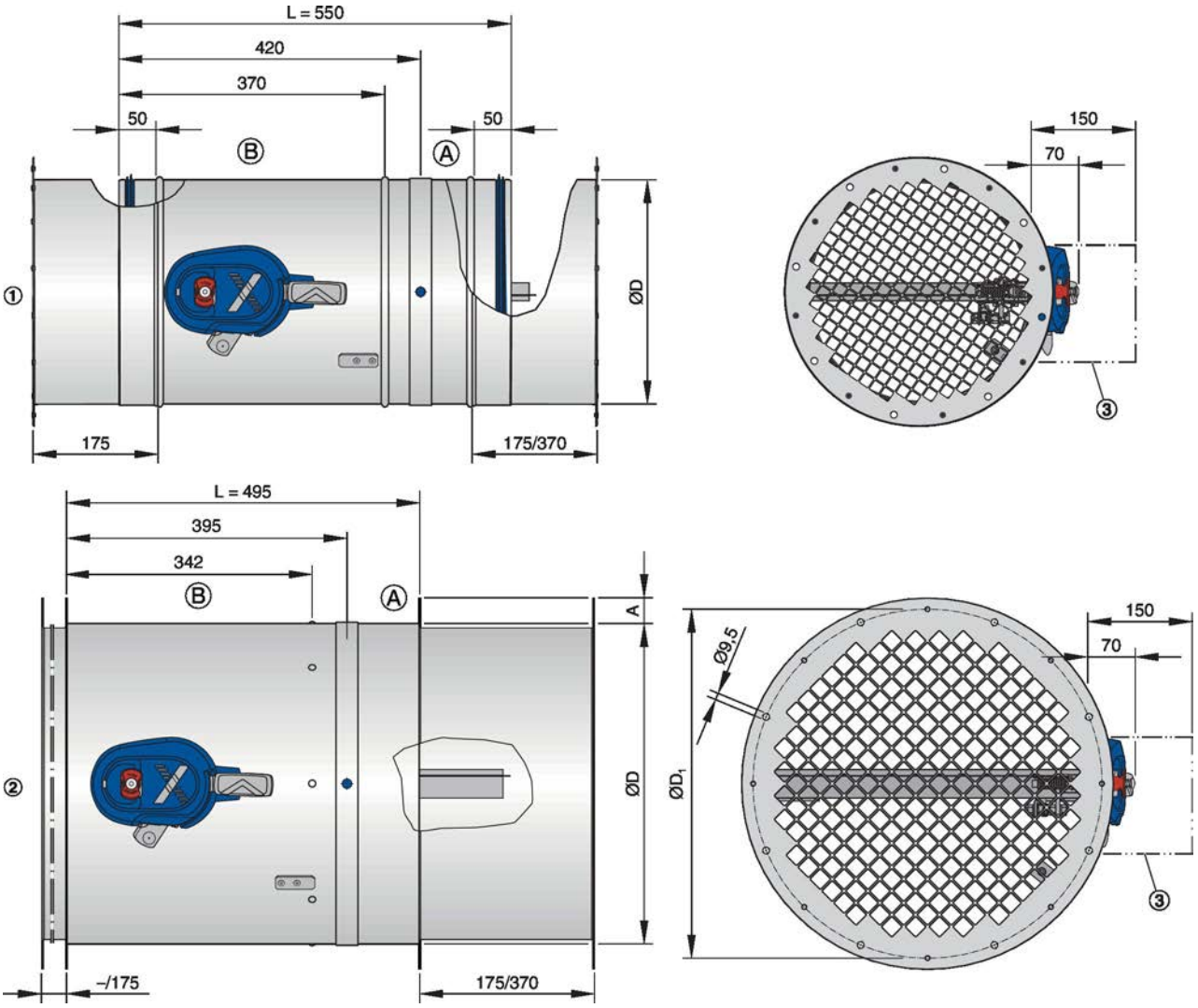


Fig. 5: FKR-EU with fusible link

1 Spigot construction
2 Flange construction
3 Keep clear to provide access for operation

A Installation side
B Operating side

- Weight of FKR-EU with fusible link, see table ↳ *12* .

Note: Approvals under building regulations may be required for the use of air transfer units. This must be checked and applied for by others.

3 Supply package, transport and storage

Supply package

If attachments and accessories are supplied from the factory with the fire dampers, they are already taken into account in the order code.

Depending on the installation situation, supplementary materials for assembly and fixing may be needed to ensure proper installation, e.g. mortar, screws, mineral wool, etc.

Such materials are not included in the supply package, unless they are expressly described as included in the supply package.

The selection of additional attachments or accessories as well as the identification and provision of materials for assembly and fixing is the responsibility of those involved in the building project and must be done taking into account the required classification.

Delivery check

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

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

Colour hues on the damper blade

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

Transport on site

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

Bearing

For temporary storage please note:

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

Packaging

Properly dispose of packaging material.

4 Parts and function

4.1 Function in the ventilation system

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

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

4.2 FKR-EU with fusible link

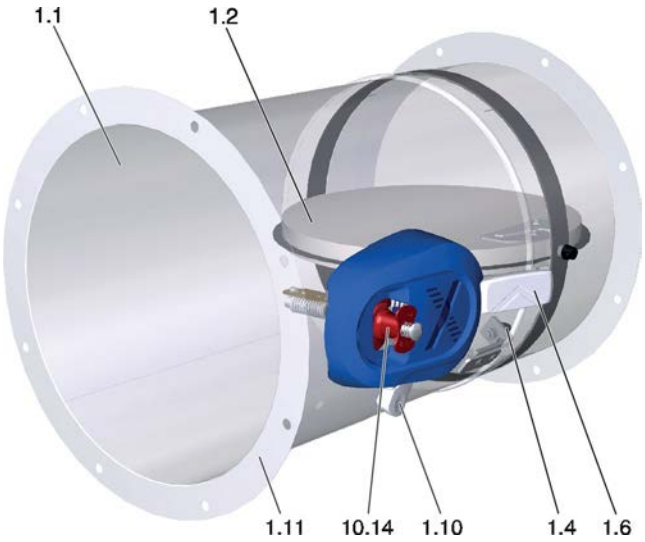


Fig. 6: FKR-EU with fusible link
(Fig. Flange construction)

1.1 Casing
1.2 Damper blade with seal
1.4 Travel stop for CLOSED position
1.6 Handle
1.10 Release tab
1.11 Flange
10.14 Thermal release mechanism with fusible link

Functional description

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

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

4.3 FKR-EU with spring return actuator

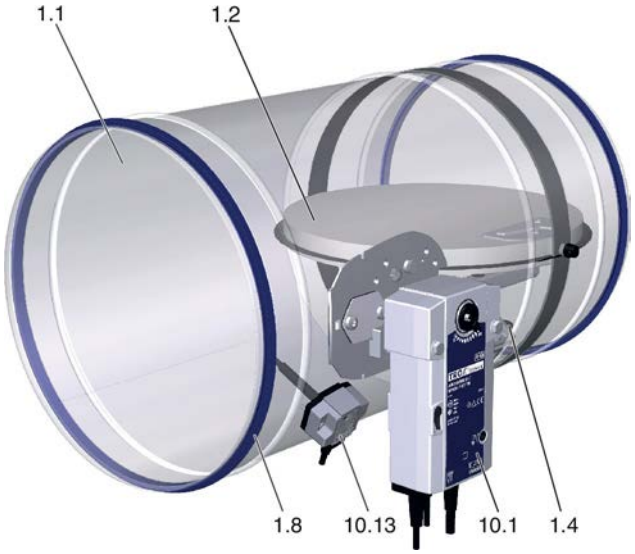


Fig. 7: FKR-EU with spring return actuator
(Fig. Spigot construction)

1.1 Casing
1.2 Damper blade with seal
1.4 Travel stop for CLOSED position
1.8 Lip seal
10.1 Spring return actuator
10.13 Thermoelectric release mechanism with temperature sensor

Functional description

The spring return actuator enables the motorised opening and closing of the damper blade; it can be activated by the central BMS. Motorised fire dampers can be used to shut off ducts on a regular basis. As long as power is supplied to the actuator, the damper blade remains open. The spring return actuator closes the fire damper when one of the following events occur:

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

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

4.4 FKR-EU with spring return actuator and duct smoke detector

FKR-EU with spring return actuator can optionally also be controlled by a duct smoke detector approved by the building authorities, e.g. RM-O-3-D.

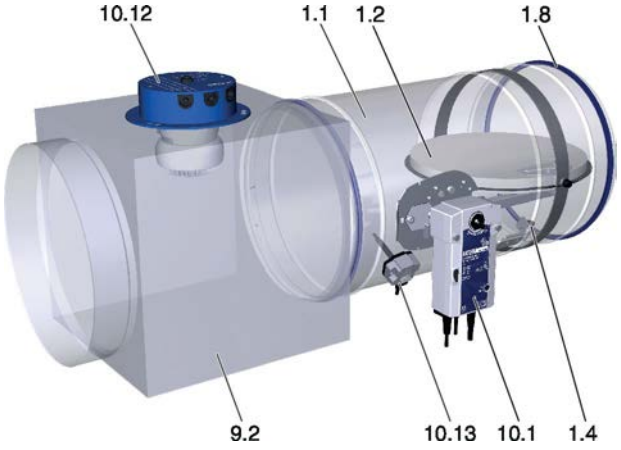


Fig. 8: FKR-EU with spring return actuator and duct smoke detector in a rectangular duct

1.1 Casing
1.2 Damper blade with seal
1.4 Travel stop for CLOSED position
1.8 Lip seal
9.2 Rectangular duct, by others
10.1 Spring return actuator
10.12 Duct smoke detector RM-O-3-D
10.13 Thermoelectric release mechanism with temperature sensor

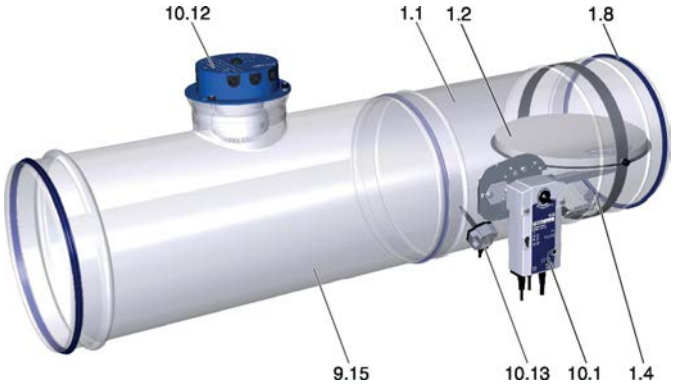


Fig. 9: FKR-EU with spring return actuator and duct smoke detector in a circular duct

1.1 Casing
1.2 Damper blade with seal
1.4 Travel stop for CLOSED position
1.8 Lip seal
9.15 T-piece or saddle connector, by others
10.1 Spring return actuator
10.12 Duct smoke detector RM-O-3-D
10.13 Thermoelectric release mechanism with temperature sensor

Functional description

If the duct smoke detector detects smoke, the spring return actuator closes the damper blade. This prevents smoke from being transferred via ductwork into adjacent fire compartments even before it reaches a temperature that would trigger the thermoelectric release mechanism.

As long as power is supplied to the actuator, the damper blade remains open. The spring return actuator closes the fire damper when one of the following events occur:

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

The duct smoke detector must be installed by others in a rectangular duct. Alternatively, the installation can be carried out on site in a circular duct, in a T-piece.
The duct smoke detector must always be placed at the top. Deviating arrangements are possible, provided that the specifications of the general building inspectorate licence of the duct smoke detector are observed.

4.5 FK-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit

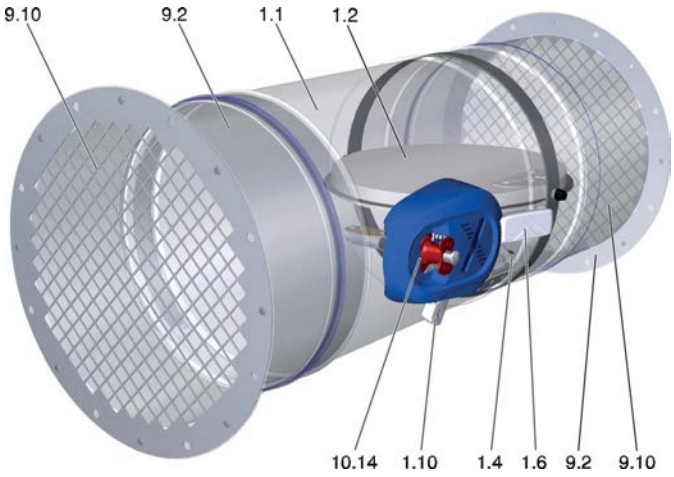


Fig. 10: FKR-EU with fusible link and cover grille as an upstream shutter for the air transfer unit (Fig. Spigot construction)

1.1 Casing
1.2 Damper blade with seal
1.4 Travel stop for CLOSED position
1.6 Handle
1.10 Release tab
9.2 Extension piece
9.10 Cover grilles
10.14 Thermal release mechanism with fusible link

Functional description

Upstream shutters of air transfer units prevent fire and smoke from spreading in buildings. The thermal release mechanism closes the upstream shutter of the air transfer unit when the release temperature of 72°C is reached. Smoke can, however, spread below this temperature.

The upstream shutter of the air transfer unit consists of the FKR-EU fire damper with a thermal release mechanism for 72°C and with cover grilles on both sides, but without a duct smoke detector.

The following applies to Germany:
If fire dampers with a purely mechanical shut-off element are to be used as an upstream shutter of an air transfer unit, the local building regulations must be observed. Usually the use of such upstream shutters of air transfer units is restricted to pressure differential systems.

5 Installation

5.1 Installation situations

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

Installation situations					
Supporting construction	**Installation location**	**Minimum thickness [mm]**	**Class of performance EI TT (v_e–h_o, i ↔ o) S up to**	**Installation type**	**Chapter**
Solid walls	in	100	EI 120 S	N	*39*
		80 [1]	EI 90 S	N	*39*
	in, combined assembly	100	EI 90 S	N	*41*
	in, multiple mounting	100	EI 90 S	N	*43*
	in, fire batt	100	EI 60 S	W	*45*
Metal stud walls	in	94	EI 90 S	N [2]	*54*
		80	EI 60 S	N [2]	*54*
		75	EI 30 S	N [2]	*54*
	in, combined assembly	94	EI 90 S	N [2]	*57*
	in, multiple mounting	94	EI 90 S	N	*59*
	in, installation kit TQ	94	EI 90 S	E	*62*
		80	EI 60 S	E	*62*
		75	EI 30 S	E	*62*
	in, fire batt	80	EI 60 S	W	*66*
		75	EI 30 S	W	*66*
	in, without installation kit	94	EI 60 S	T	*65*
Timber stud walls	in	130	EI 90 S	N	*74*
		110	EI 60 S	N	*74*
		105	EI 30 S	N	*74*
	in, combined assembly	130	EI 90 S	N	*74*
	in, multiple mounting	130	EI 90 S	N	*81*
	in, installation kit TQ	130	EI 90 S	E	*85*
		110	EI 60 S	E	*85*
		105	EI 30 S	E	*85*

[1] Gypsum wall boards EN12859
[2] The class of performance depends on the installation details
[3] Thickness increased near the installation opening
[4] Cadolto system
[5] Depending on local conditions

N = Mortar-based installation
E = Installation kit
W = Fire batt
E = Dry mortarless installation

Installation situations					
Supporting construction	**Installation location**	**Minimum thickness [mm]**	**Class of performance EI TT (v_e–h_o, i ↔ o) S up to**	**Installation type**	**Chapter**
	in, fire batt	110	EI 60 S	W	87
		105	EI 30 S	W	87
Half-timbered constructions	in	140	EI 90 S	N	74
		110	EI 30 S	N	74
	in, combined assembly	140	EI 90 S	N	76
	in, multiple mounting	140	EI 90 S	N	81
	in, installation kit TQ	140	EI 90 S	E	85
		110	EI 30 S	E	85
	in, fire batt	140	EI 60 S	W	87
		110	EI 30 S	W	87
Solid wood / cross laminated timber walls	in	95	EI 90 S	N	93
	in, installation kit TQ	95	EI 90 S	E	95
	in, fire batt	95	EI 60 S	W	96
Shaft wall with metal support structure	in	90	EI 90 S	N	100
		90 [3]	EI 30 S	N	100
		80	EI 90 S	N	100
		75	EI 30 S	N	100
	in, combined assembly	90	EI 90 S	N	101
Shaft wall without metal support structure	in	50	EI 90 S	N	104
Solid ceiling slabs	in	100 (150) [3]	EI 120 S	N	106
		100 (150) [3]	EI 90 S	N	106
	in, combined assembly	150	EI 90 S	N	110
	in, multiple mounting	150	EI 90 S	N	112
	in, with concrete base	100	EI 90 S	N	114
	in, with concrete base	100	EI 120 S	N	114
	in, with concrete base, combined assembly	100	EI 90 S	N	115
	in, with concrete base, multiple mounting	100	EI 90 S	N	117
	in, hollow stone ceilings	150	EI 90 S	N	120
	in, hollow chamber ceilings	150	EI 90 S	N	121

[1] Gypsum wall boards EN12859
[2] The class of performance depends on the installation details
[3] Thickness increased near the installation opening
[4] Cadolto system
[5] Depending on local conditions

N = Mortar-based installation
E = Installation kit
W = Fire batt
E = Dry mortarless installation

Installation situations					
Supporting construction	**Installation location**	**Minimum thickness [mm]**	**Class of performance EI TT (v_e–h_o, i ↔ o) S up to**	**Installation type**	**Chapter**
	in, ribbed ceilings	150 [3]	EI 90 S	N	*122*
	in, composite ceilings	150	EI 90 S	N	*123*
	in, combined with wooden beam ceilings	150	EI 90 S	N	*124*
	in, combined solid wood ceiling	150	EI 90 S	N	*125*
	in, combined lightweight ceiling [4]	150	EI 120 S	N	*126*
Solid wood ceilings	in	140	EI 90 S	N	*127*
		112.5	EI 90 S	N	*127*
	in, installation kit TQ	140	EI 90 S	E	*128*
		112.5	EI 90 S	E	*128*
Wooden beam ceilings	in	167.5	EI 90 S	N	*129*
		155	EI 60 S	N	*129*
		142.5	EI 30 S	N	*129*
	in, installation kit TQ	167.5	EI 90 S	E	*131*
		155	EI 60 S	E	*131*
		142.5	EI 30 S	E	*131*
	in, historical wooden beam ceilings	– [5]	EI 30 S	N	*133*

[1] Gypsum wall boards EN12859
[2] The class of performance depends on the installation details
[3] Thickness increased near the installation opening
[4] Cadolto system
[5] Depending on local conditions

N = Mortar-based installation
E = Installation kit
W = Fire batt
E = Dry mortarless installation

5.2 Safety notes regarding installation

Sharp edges, sharp corners and thin sheet metal parts

CAUTION!

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

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

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

5.3 General installation information

NOTICE!

Risk of damage to the fire damper

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

- Control elements, electric actuator and inspection access panel must remain accessible for maintenance.
- Loads imposed on the casing may impair the function of the fire damper. Install and connect the damper in such a way that no loads will be imposed on the installed damper. Ducts of combustible or non-combustible materials may be connected to fire dampers if the ducts have been installed straight and without any torsion.
- Before installation: Perform a functional test, then close the fire damper *141* .
- The adhesive tape in the installation area must NOT be removed.
- The product label must NOT be removed and must remain visible.
- Protect the fire damper from humidity and condensation as they will damage the fire damper.
- The construction variants with stainless steel or powder-coated casing and additionally with an impregnated damper blade meet more critical requirements for corrosion protection.
- When installing the FKR-EU, the structural properties of the supporting construction (wall / ceiling) must be ensured by others, even in the event of a fire.
- Unless stated otherwise in the respective installation details:
  - Each fire damper must be installed in a separate installation opening. The distance between two fire dampers is ≥ 200 mm.
  - The distance from load-bearing structural elements is ≥ 75 mm.
  - A maximum of two fire dampers must be installed in a single installation opening.
  - Fire dampers are allowed to be in mortar-based installation at a distance of ≥ 40 mm or ≥ 60 mm with installation kit TQ from steel beams, wooden beams or wooden ceilings with fire protection claddings. The fire-resistant cladding (panel material) must be manufactured in accordance with a national or European certificate and must lie against the supporting structure without cavities in the area of the fire damper.
- If several fire dampers are used on the same duct, the following has to be ensured: If one damper closes, the maximum permitted upstream velocity for the other fire dampers that remain open must not be exceeded. This must be ensured by other, e.g., by switching off the fan or by mutual interlocking in the case of the construction with a spring return actuator.
- As ducts may expand and walls may become deformed in the event of a fire, we recommend using flexible connectors for the following installation situations:
  - Lightweight partition walls
  - Lightweight shaft walls
  - Fire batt systems

  The flexible connectors should be installed in such a way that they absorb both tension and compression. Flexible ducts can be used as an alternative.

  Ducting must be installed in such a way that it does not impose any significant loads on the fire damper in the event of a fire. This can be achieved by a non-straight duct, i.e. by bends or elbows, for example. Be sure to comply with the relevant national guidelines and regulations.
- The interior of the fire damper must be accessible for maintenance work and cleaning. Depending on the installation configuration it may be necessary to provide inspection panels in the connecting ducts. As an alternative to the inspection access, we recommend connecting the duct using flexible connectors (fastened with hose clamp) or sliding connectors.
- Load-bearing components
  Solid ceiling slabs and concrete beams, as well as load-bearing solid walls are called load-bearing components.

After installation

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

Connecting duct and extension piece

It is possible to insert screws near the spigot for fixing.

Equipotential bonding

Flange construction

- The flange of the fire damper can be used for equipotential bonding; no holes must be drilled into the damper casing.

Spigot construction

- The equipotential bonding is fixed, for example, with suitable clamps. Alternatively, it is allowable for drilled holes to be made near the spigot.

Thermal insulation

When using thermal insulation, especially for outside or exhaust air, fully bonded panel insulation materials made of elastomeric foams (synthetic rubber) can be used (e.g. Armaflex Ultima from Armacell). Be sure to comply with the relevant national guidelines and regulations for combustible building materials and smoke formation classes.

Insulation is non-hazardous in terms of fire safety if the following requirements are met:

- the insulation does not impair the function of the fire damper,
- The fire damper remains accessible.
- The inspection accesses and product sticker remain accessible.
- The insulation does not penetrate walls or ceilings.

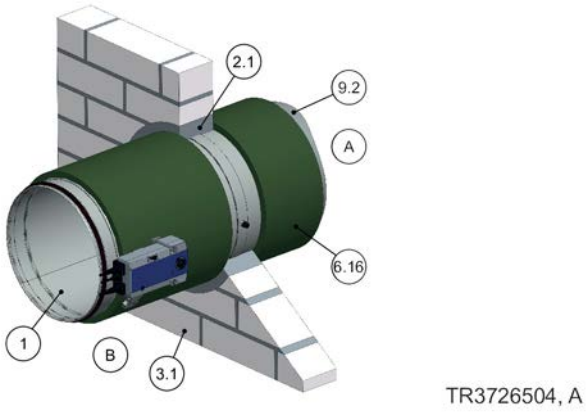


Fig. 11: Thermal insulation

1 FKR-EU
2.1 Mortar
3.1 Solid wall
6.16 Insulation (elastomeric foam, flame-resistant, non-dripping), around the perimeter, actuator and release mechanism, inspection accesses and product sticker must be accessible
9.2 Extension piece or duct
[1] Up to EI 120 S

Note: The installation situation shown is representative of all supporting constructions.

The following applies to Germany:
In Germany, only insulation materials with a fire behaviour of at least C - s2, d0, may be used according to the specifications of the MVV TB (since 2019/1). This requirement is met by Armaflex Ultima insulation material from Armacell, for example. The applicable local building regulations must be observed.
For notes on the use of elastomeric foams, see ↯ *7* .

Extension pieces

To ensure that the fire damper can be connected to the ductwork after installation even if the wall or ceiling is fairly thick, you should extend the fire damper with a suitable extension piece (attachment or extension by others) on the installation side ↯ *Chapter 6 'Accessories' on page 137* .

Installation positions

The fire damper may be installed so that the damper blade shaft is horizontal or vertical or in all intermediate positions (0 – 360°).

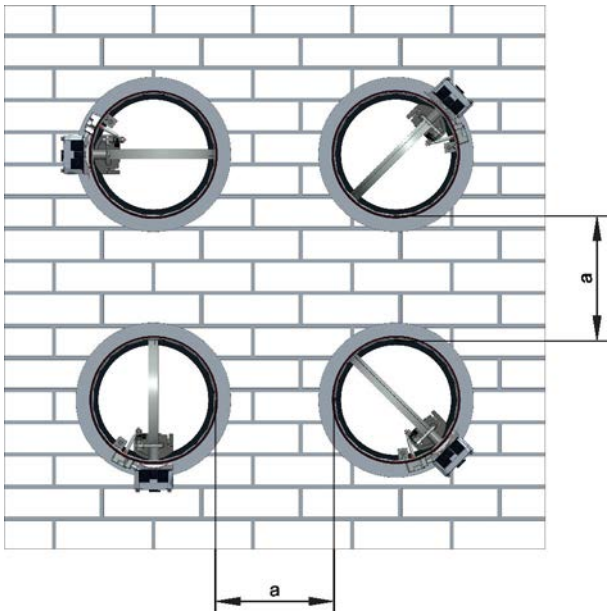


Fig. 12: Installation positions and distances

a Distance between two fire dampers; see ↯ *26* . The distance also depends on the installation situation and is given in the installation details.

If a duct smoke detector is installed in the connected duct, it must be positioned at the top, regardless of the installation position.
Deviating arrangements are possible, provided that the specifications of the general building inspectorate licence of the duct smoke detector are observed.

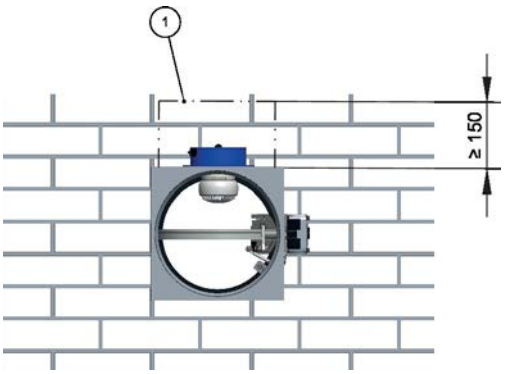


Fig. 13: Any installation position (0 – 360°), duct smoke detector always at top

1 Keep clear to provide access for operation

Distances

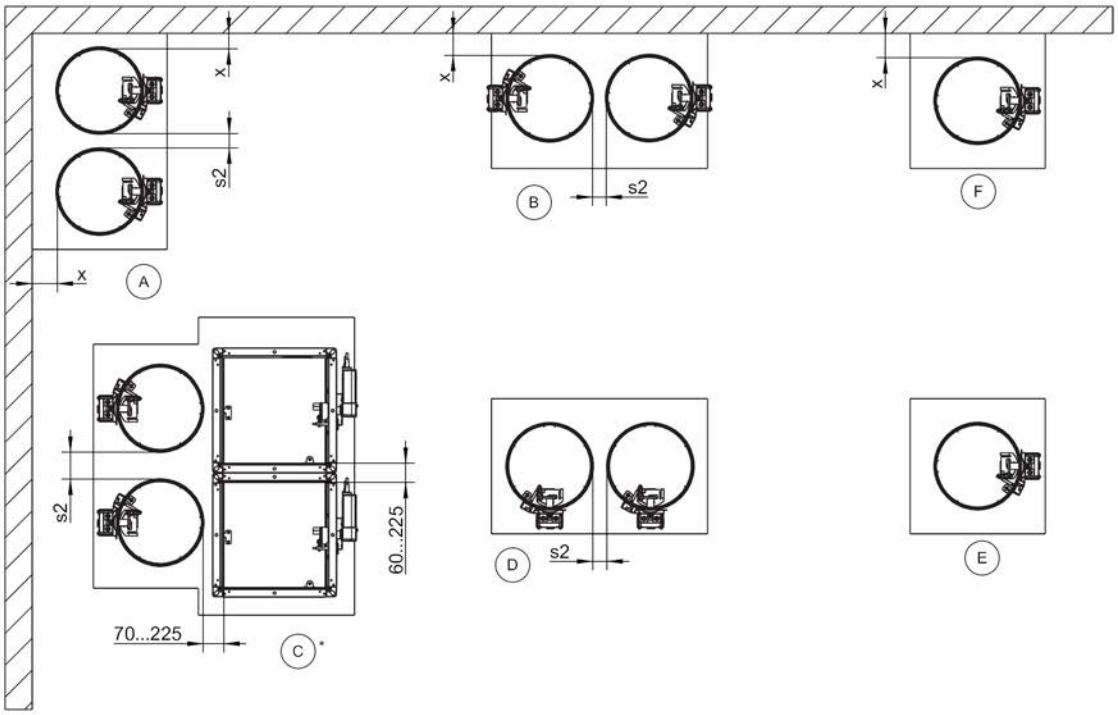


Fig. 14: Overview of distances

x Distance to load-bearing components (solid walls and ceiling slabs, concrete beams as well as steel girders, wooden beams and solid wood ceilings with fire-rated cladding)
s2 Distance between the fire dampers
* Mixed installation with fire damper type FK2-EU

Distances (unless otherwise specified in the respective installation details)

Installation type	x [mm]	s2 [mm]
Mortar-based installation	40 – 225	40 – 225 [5]
Dry mortarless installation with installation kit TQ [1, 2]	100 / 60 [3]	≥ 200 [4]
Dry mortarless installation with fire batt	40 – 600	40 – 600 [5]

[1] See "Installation openings" table under the respective installation details
[2] Installation into separate installation openings
[3] With shortened cover plate
[4] Separate installation opening
[5] 80 – 225 mm and/or 80 – 600 mm with flange construction

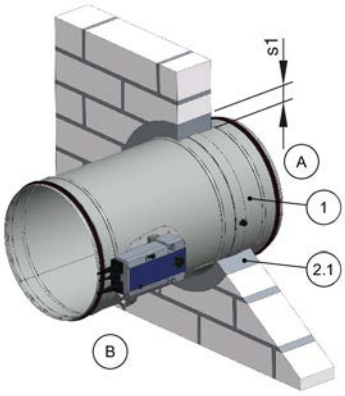
The perimeter gap is ≤ 225 mm with mortar-based installation and 40 – 600 mm with fire batt.

Installation orientations (see installation details for fire resistance properties)

Supporting construction	Installation type		
	Mortar-based installation	Dry mortarless installation	Fire batt installation
Solid wall	A – F		A, B, D – F
Gypsum wall boards	E, F		
Lightweight partition walls / compartment walls with metal support structure	A – F	E, F	A, B, D – F
Timber stud wall or half-timbered construction	A – F	E, F	A, B, D – F
Solid wood wall / cross-laminated timber wall	A, B, D – F	E, F	A, B, D – F
Shaft wall with metal support structure	C, E, F		
Shaft wall without metal support structure	E, F		
Solid ceiling slab	A – F		
Hollow chamber ceiling, hollow stone ceiling, composite ceiling, ribbed ceiling	E, F		
In combination with lightweight ceiling (Cadolto system)	A, B, D – F		
In / in combination with solid wood ceiling	E / A, B, D – F	E / –	
In / in combination with wooden beam ceiling	E / A, B, D – F	E / –	
Historical wooden beam ceilings	E		

Perimeter gap "s1"

- With mortar-based installation the perimeter gap "s1" must not exceed 225 mm (wall and ceiling). The perimeter gap »s« must be large enough so that mortar can be filled in even in case of thicker walls or ceilings. Be sure to close larger wall openings or holes beforehand and in a suitable way, i.e. depending on the type of wall. When there are larger openings in the solid ceiling slabs, the dampers must be encased in concrete when the ceiling section is created. The gap must be large enough so that mortar can be filled in. We recommend a gap of at least 20 mm (note the constructively required minimum installation opening size, e.g., for the flange construction). Reinforcement should meet structural requirements.



TR3724394, A

Fig. 15: Perimeter gap

1 FKR-EU
2.1 Mortar
s1 Perimeter gap

Maximum gap widths are based on EN 15882-2. Larger gaps do not have an adverse effect with regard to fire protection and are in our opinion not critical.

Mortar-based installation

- Cover all openings and control elements of the fire damper (e.g. with plastic) to protect them from contamination.
- If the wall thickness is >115 mm , extend the fire damper on the installation side with an extension piece or a spiral duct.
- Push the fire dampers into the installation opening in a centred manner and secure them. The distance from the operating side to the wall/ceiling slab is 370 mm for the spigot construction and 342 mm for the flange construction. Connect extension piece or duct if required.
- In case of mortar-based installation, the open spaces between the fire damper casing and the wall or ceiling slab must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth should be equal to the thickness of the wall but must be at least 100 mm.
- If you install the fire damper as the solid wall or ceiling slab is being completed, perimeter gap »s1« is not required. The open spaces between the fire damper and the wall must be closed off with mortar; for installation into solid ceiling slabs, concrete can be used. Reinforcements should meet structural requirements.
- The mortar bed depth should be equal to the thickness of the wall. If trim panels with appropriate fire resistance are used, a mortar bed depth of 100 mm suffices.

Mortar

- DIN 1053: Groups II, IIa, III, IIIa; fire protection mortar of groups II, III
- EN 998-2: Classes M 2.5 to M 20 or fire protection mortar of classes M 2.5 to M 20
- Equivalent mortars that meet the requirements of the above standards, gypsum mortar or concrete

Mineral wool as filling material

Unless otherwise stated in the installation details, mineral wool with a gross density of ≥ 80 kg/m³ and a melting point of ≥ 1000 °C must be used.

Installation with installation kit

- For installation without a mortar-mix, the installation kit TQ can be used (only FKR-EU in spigot construction).
  The installation kit is assembled on the fire damper at the factory. Fixing to the wall / ceiling slab is carried out according to the respective installation details.
- The installation is carried out centred in the installation opening.
- For installation near the floor or ceiling, professionally shorten the cover plate of the installation kit on one side.
- Fixing to the wall / ceiling slab is carried out according to the respective installation details.

Installation with fire batt

- The distance from the operating side flange to the wall or ceiling has to be 370 mm for the spigot construction and
  Flange construction 342 mm.
- Fire batt systems consist of two layers of mineral wool slabs, gross density ≥ 140 kg/m³.
- Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the installation opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant or coating. Use only sealant or coating that is suitable for the fire batt system.
- Apply ablative coating to the mineral wool slabs, joints, transitions and any imperfections on the coated mineral wool slabs; coating thickness ≥ 2.5 mm.
- Fix fire dampers on both sides of the wall, see *136* .
- If the wall/ceiling is fairly thick, you must use additional layers of mineral wool slabs on side A.
- Fire batt systems are not suitable for use below flexible ceiling joints.

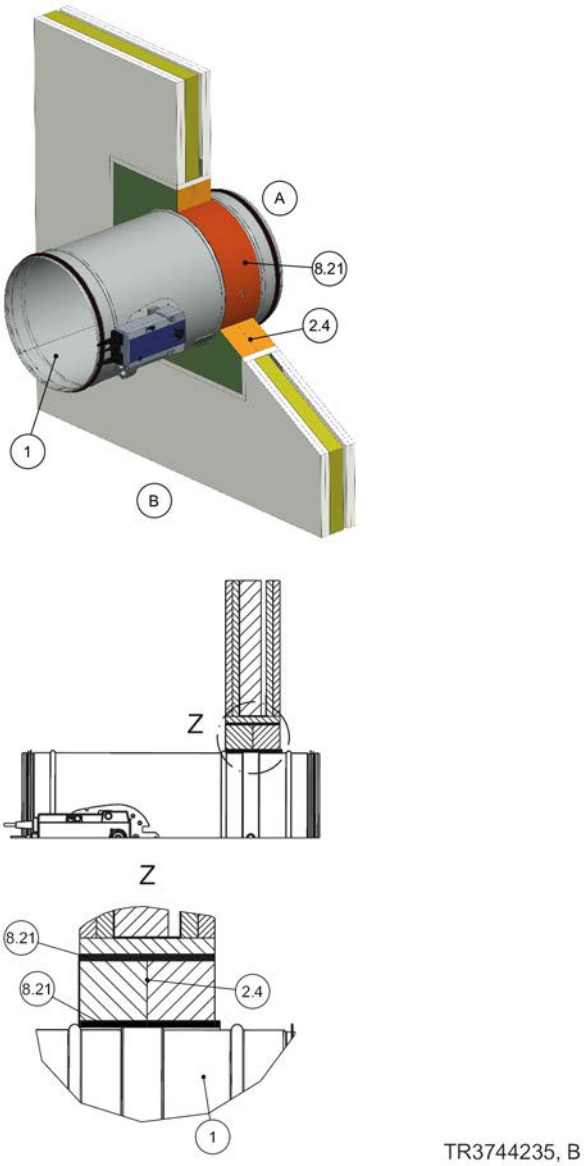


Fig. 16: Fire-resistant sealant

1 FKR-EU
2.4 Coated board system
8.21 Firestop sealant

Fire batt systems

The following fire batt systems are acceptable (fire batt systems have to be provided by others). As for mineral wool slabs, all slabs that are part of the system and have been approved by the manufacturer may be used.

Promat®

- Ablative coating Promastop®-CC
- Ablative coating Promastop®-I
- Ablative coating Intumex-CSP
- Ablative coating Intumex-AC

Hilti

- Ablative coating CFS-CT
- Ablative coating CP 673
- Fire-resistant sealant CFS-S ACR

HENSEL

- Ablative coating HENSOMASTIK® 5 KS Farbe
- Fire-resistant sealant HENSOMASTIK® 5 KS Spachtel

SVT

- Ablative coating PYRO-SAFE FLAMMOTECT-A Farbe
- Fire-resistant sealant PYRO-SAFE FLAMMOTECT-A Spachtel

OBO Bettermann

- Ablative coating PYROCOAT® ASX Farbe
- Fire-resistant sealant PYROCOAT® ASX Spachtel

Würth

- Ablative coating Würth Ablationsbeschichtung I ('Ablation coating I')

AGI

- Ablative coating PYRO-SAFE Flammotect Combi S90
- Fire-resistant sealant AGI Flammotect COMBI S90

Dimensions and distances for fire batt systems for wall installation

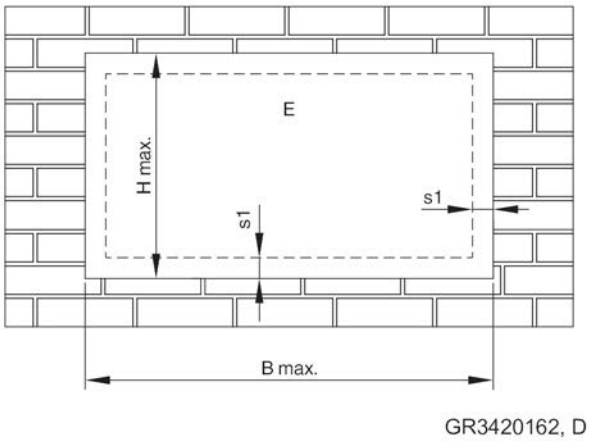


Fig. 17: Fire batt – installation in solid walls and ceiling slabs, lightweight partition, timber stud wall, half-timbered construction and solid wood walls

E Installation area

Coated board system	B max. [mm]	H max. [mm]
Promat®	≤ 3750	≤ 1840
Hilti	≤ 3000	≤ 2115
Hensel	≤ 1900	≤ 1400
SVT		
OBO Bettermann		
Würth		
AGI		

Damper combination up to EI 90 S	s1 min. [mm]	s1 max. [mm]
FKR-EU	40	600

Requirements for wall and ceiling systems

FKR-EU fire dampers must be installed in wall and ceiling systems if these walls and ceiling slabs have been erected in compliance with the relevant regulations and according to the manufacturers' instructions, and if the information on the respective installation situation applies and the following requirements are met.

Provide any installation openings according to the installation details in this manual.

Solid walls

- Solid walls or compartment walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density ≥ 350 kg/m³.
- Wall thickness W ≥ 100 mm, solid gypsum wallboards W ≥ 80 mm.
- Provide each installation opening and core drilled holes according to the local and structural conditions and with regard to the dimensions of the fire damper.

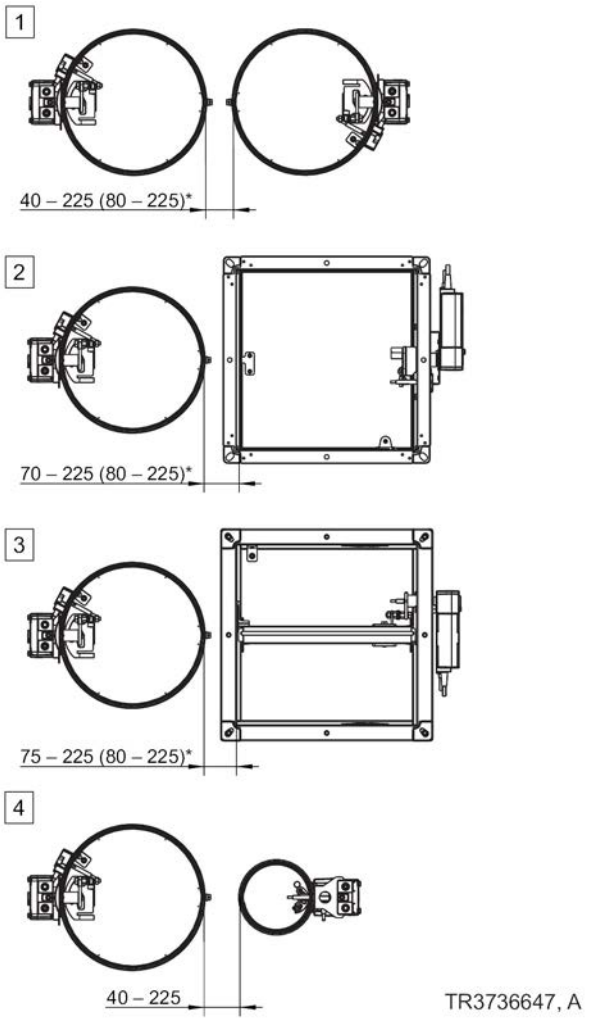


Fig. 18: Distance from the FKR-EU to other TROX fire dampers in mortar-based installation

* For flange construction

Distance between different TROX fire dampers in mortar-based installation in solid walls (one installation opening)

Item no.	Damper combination up to EI 90 S
1	FKR-EU / FKR-EU
2	FKR-EU – FK2-EU
3	FKR-EU – FK-EU
3	FKR-EU – FKRS-EU

Lightweight partition walls with metal support structure

- Lightweight partition walls, safety partition walls or walls to provide radiation protection, with metal support structure or steel support structure (box sections), with European classification to EN 13501-2 or equivalent national classification.
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Wall thickness W ≥ 94 mm, for compartment walls or safety partition walls W ≥ 100 mm.
- Distance between metal support structures ≤ 625 mm; distance between metal support structures in compartment walls ≤ 312.5 mm.
- Compartment walls and safety partition walls may be provided with sheet steel inserts and may require less space between the metal studs.
- Create an installation opening with trimmers (studs and noggings).
- If necessary, provide trim panels and screw-fix them to the support structure
- Additional layers of cladding (if stated in the usability certificate for the wall) or double stud constructions are approved.
- Connect the metal sections near the installation opening according to the installation details in this manual.
- If reinforcing boards are required, they must be screwed to the metal support structure at intervals of approx. 100 mm.
- Installation only permitted in non-load-bearing walls (load-bearing wall constructions on request).
- The structural properties of the wall must be ensured by others and any necessary compensation measures, especially with large installation openings, must be checked and taken into account by others.

Lightweight partition walls with timber support structure / half-timbered construction

- Lightweight partition walls, either timber stud walls or half-timbered constructions, with European classification to EN 13501-2 or equivalent national classification.
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Wall thickness W ≥ 130 mm (W ≥ 110 for F60, W ≥ 105 for F30); wall thickness of half-timbered constructions W ≥ 140 mm (W ≥ 110 for F30).
- Erect the timber stud wall or half-timbered construction according to the manufacturer's instructions.
- Additional layers of cladding (if stated in the usability certificate for the wall) or double stud constructions are approved.
- Create an opening in the timber support structure with studs and trimmers.
- Trim panels and reinforcing boards have to be made of cladding material and have to be fixed to the frame at a distance of about 100 mm.
- The structural properties of the wall must be ensured by others and any necessary compensation measures, especially with large installation openings, must be checked and taken into account by others.

Solid wood walls

- Fire-resistant solid wood walls or cross laminated timber walls with European or national certificate.
- Wall thickness W ≥ 95 mm (with reinforcing board W ≥ 100 mm near the installation opening).
- If required, additional gypsum bonded or cement bonded panel materials or fibre-reinforced gypsum board are permitted.

Shaft walls with metal support structure

- Shaft walls or additional leaves with metal support structure or steel support structure (box sections), with European classification to EN 13501-2 or equivalent national classification.
- Cladding on one side made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Wall thickness W ≥ 90 mm (W ≥ 75 for F30); cladding / reinforcing boards according to installation details.
- ≤ 625 mm distance between metal studs.
- Be sure to follow the manufacturers' instructions for the height, width and thickness of walls.
- Create an installation opening with trimmers (studs and noggings).
- If necessary, provide trim panels and screw-fix them to the support structure
- Installation is carried out with the actuator on the outside of the shaft.
- If reinforcing boards are required, they must be screwed to the metal support structure at intervals of approx. 100 mm.
- The structural properties of the wall must be ensured by others and any necessary compensation measures, especially with large installation openings, must be checked and taken into account by others.

Shaft walls without metal support structure

- Shaft walls without metal support structure, with European classification according to EN 13501-2 or equivalent national classification.
- Cladding on one side made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Shaft wall between two solid walls, without corner formation
- Wall thickness W ≥ 50 mm.
- If reinforcing boards are required, they must be screwed on at intervals of approx. 100 mm.

Solid ceiling slabs

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density ≥ 450 kg/m³.
- Ceiling thickness D ≥ 100 mm, thickness increased to D ≥ 150 mm.
- Partial solid ceiling slab thickness ≥ 150 mm as combination with fire-resistant wooden beam ceilings (gluelam also), solid wood ceilings and lightweight ceilings (Cadolto module ceiling system only).
- Provide each installation opening and core drilled holes according to the local and structural conditions and with regard to the dimensions of the fire damper.
- Other ceiling types:
  - Hollow stone ceilings, D ≥ 150 mm
  - Hollow chamber ceilings, D ≥ 150 mm
  - Ribbed ceilings, thickness increased to D ≥ 150 mm
  - Composite ceilings, D ≥ 150 mm
- The structural properties of the ceiling and the connection of the mortar/concrete grout to the ceiling or any necessary reinforcement must be checked and taken into account by others.

Solid wood ceilings

- Solid wood or cross-laminated timber ceilings.
- Ceiling thickness D ≥ 140 mm or D ≥ 112.5 mm with supplementary fire-resistant cladding.

Wooden beam ceilings

- Wooden beam or gluelam construction.
- Ceiling thickness D ≥ 142.5 mm (ceiling-dependent) with supplementary fire-resistant cladding.
- Historical wooden beam ceilings F30.

5.4 Installation kits

5.4.1 Installation kit TQ for dry mortarless installation

The installation kit TQ is an integral component of the fire damper and must be ordered together with the damper.

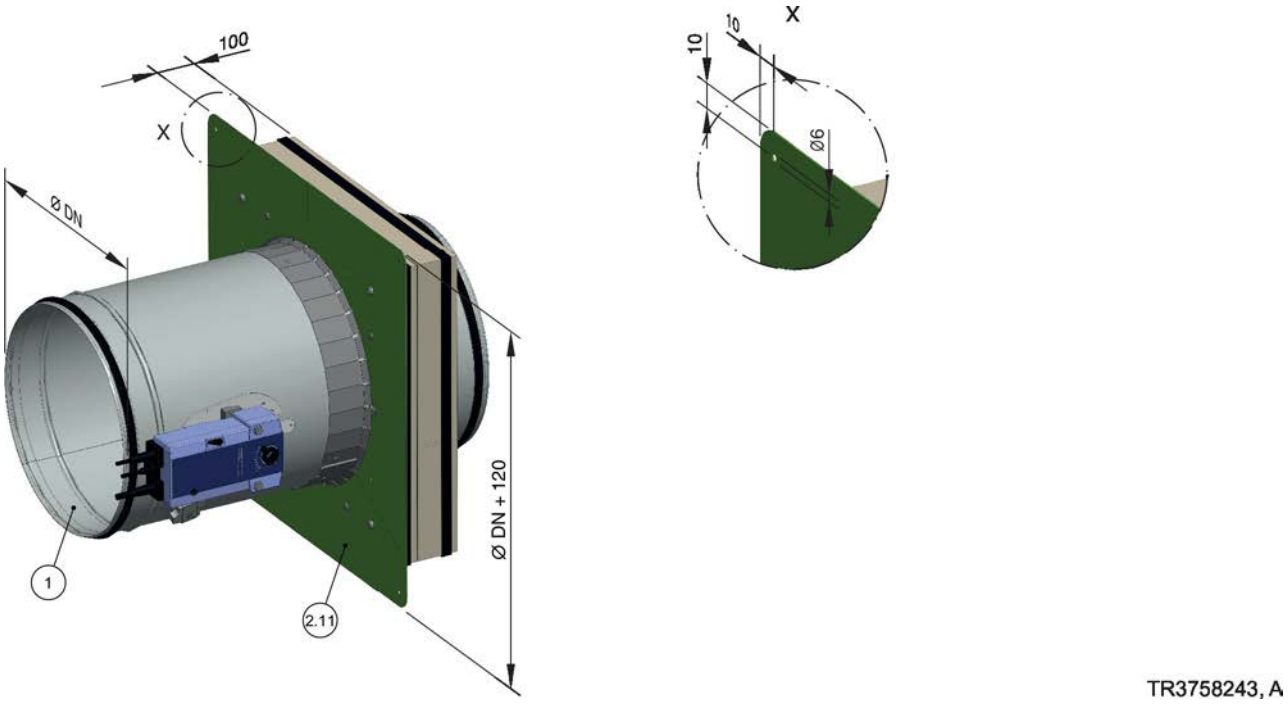


Fig. 19: Supply package and installation of installation kit TQ for dry mortarless installation

1 FKR-EU in spigot construction
2.11 Installation kit TQ with cover plate and intumescent seal

5.5 Solid walls

5.5.1 General

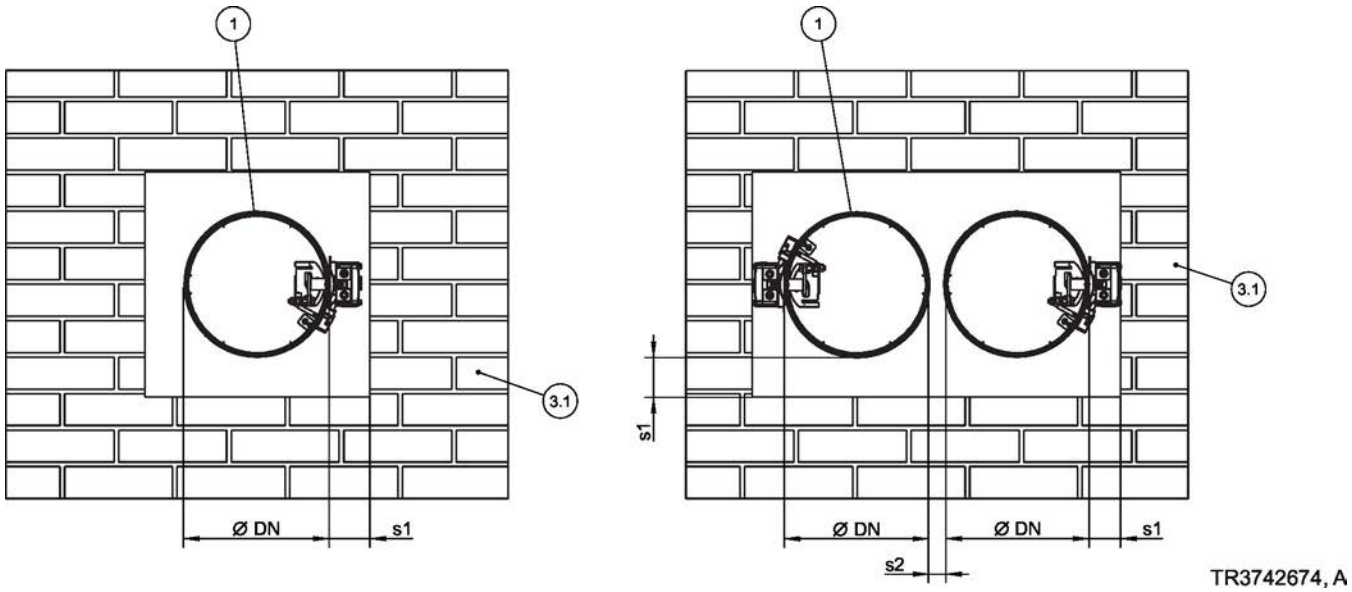


Fig. 20: Solid walls – arrangement / distances, side by side arrangement also applies to arrangement under one another

1 FKR-EU
3.1 Solid wall
s1 Perimeter gap
s2 Distance between the fire dampers
Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm

Installation type	Installation opening [mm]	Distance [mm]	
		s1	s2
Mortar-based installation	∅nominal width + max. 450 mm	≤ 225	40 – 225 [2]
Dry mortarless installation with fire batt [1]	∅nominal width + max. 1200 mm	40 – 600	40 – 600 [2]

[1] Observe maximum permitted size of the fire batt!
[2] Flange construction 80 – 225 mm or 80 – 600 mm

Additional requirements: solid walls

- Solid wall *on page 34*
- Distances and installation orientations, *'Distances' on page 29*

5.5.2 Mortar-based installation

Mortar-based installation into a solid wall

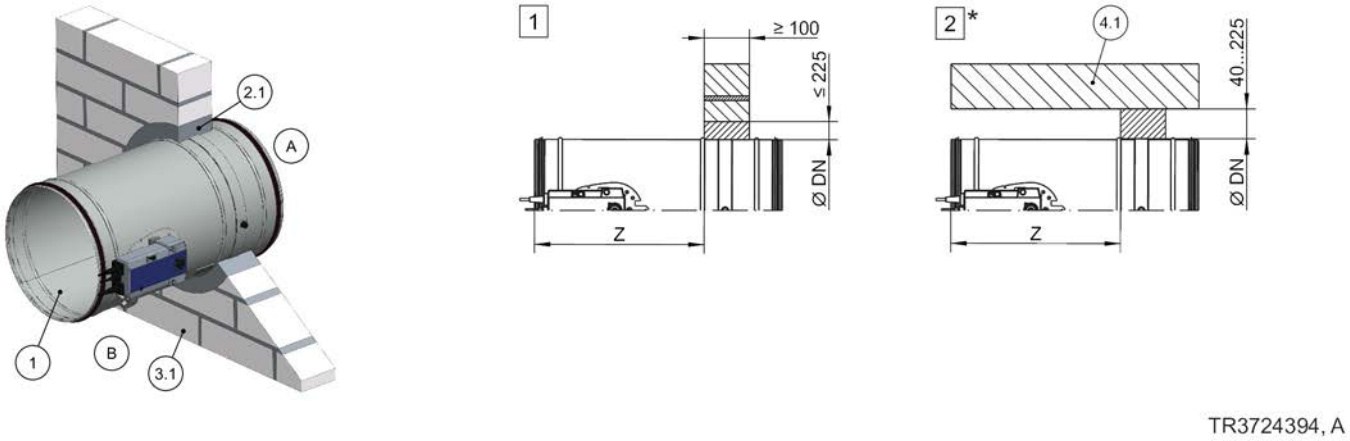


Fig. 21: Mortar-based installation into a solid wall

1	FKR-EU	Z	Spigot construction 370 mm
2.1	Mortar		Flange construction 342 mm
3.1	Solid wall	*	Installation near the floor analogous to 2
4.1	Solid ceiling slab / solid floor	1 2	Up to EI 120 S

Mortar-based installation in solid wall, "flange to flange"

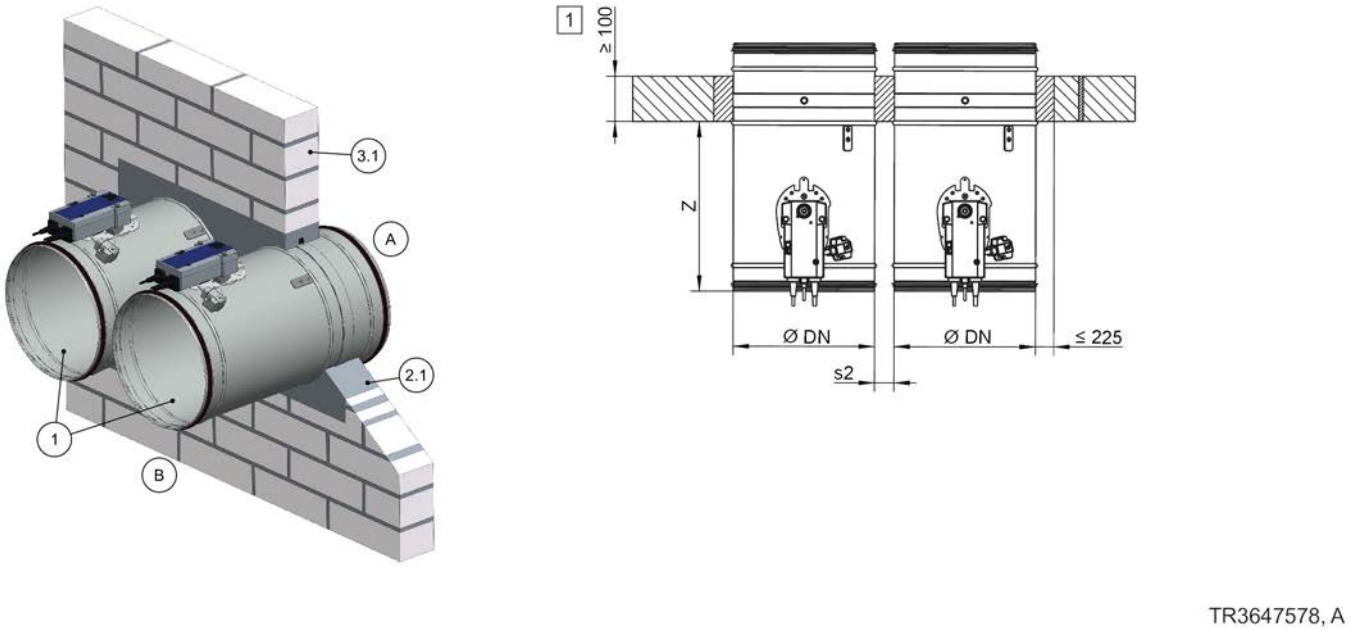


Fig. 22: Mortar-based installation into a solid wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU		Flange construction 342 mm
2.1	Mortar	s2	Spigot construction 40 – 225 mm
3.1	Solid wall		Flange construction 80 – 225 mm
Z	Spigot construction 370 mm	1	Up to EI 120

Mortar-based installation into a solid wall made of gypsum wall boards

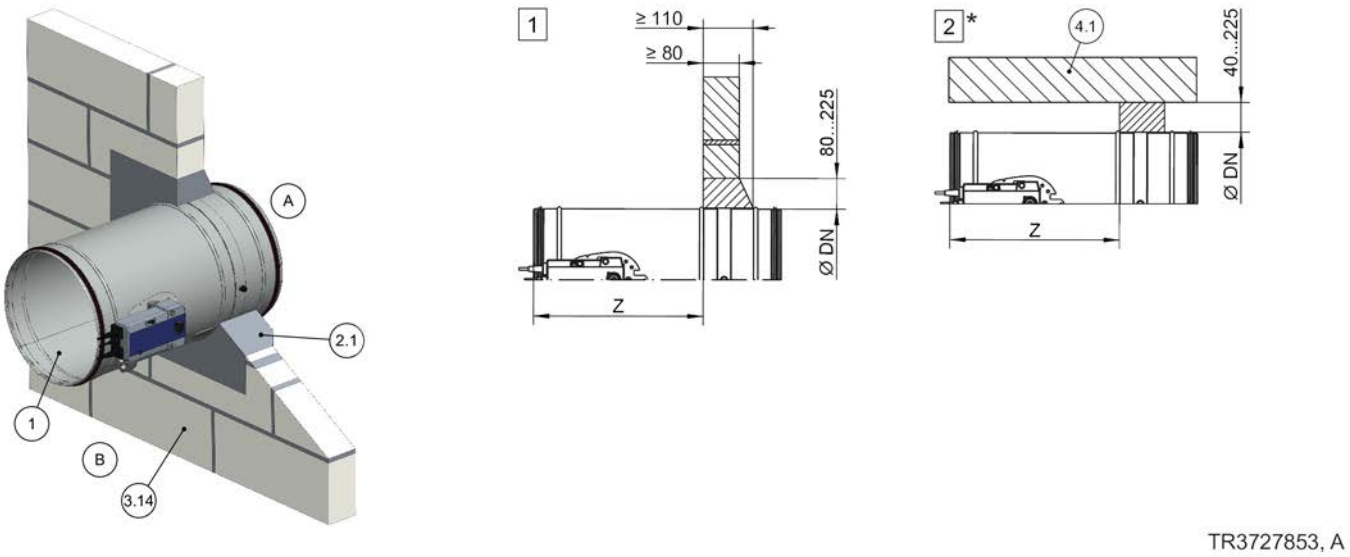


Fig. 23: Mortar-based installation into a solid wall made of gypsum wall boards

1	FKR-EU	Z	Spigot construction 370 mm
2.1	Mortar		Flange construction 342 mm
3.14	Solid wall made of gypsum ball boards EN 12859 (formerly DIN 18163)	*	Installation near the floor analogous to 2
4.1	Solid ceiling slab	1 2	Up to EI 90 S

Mortar-based installation into a solid wall, FKR-EU and FK2-EU combined

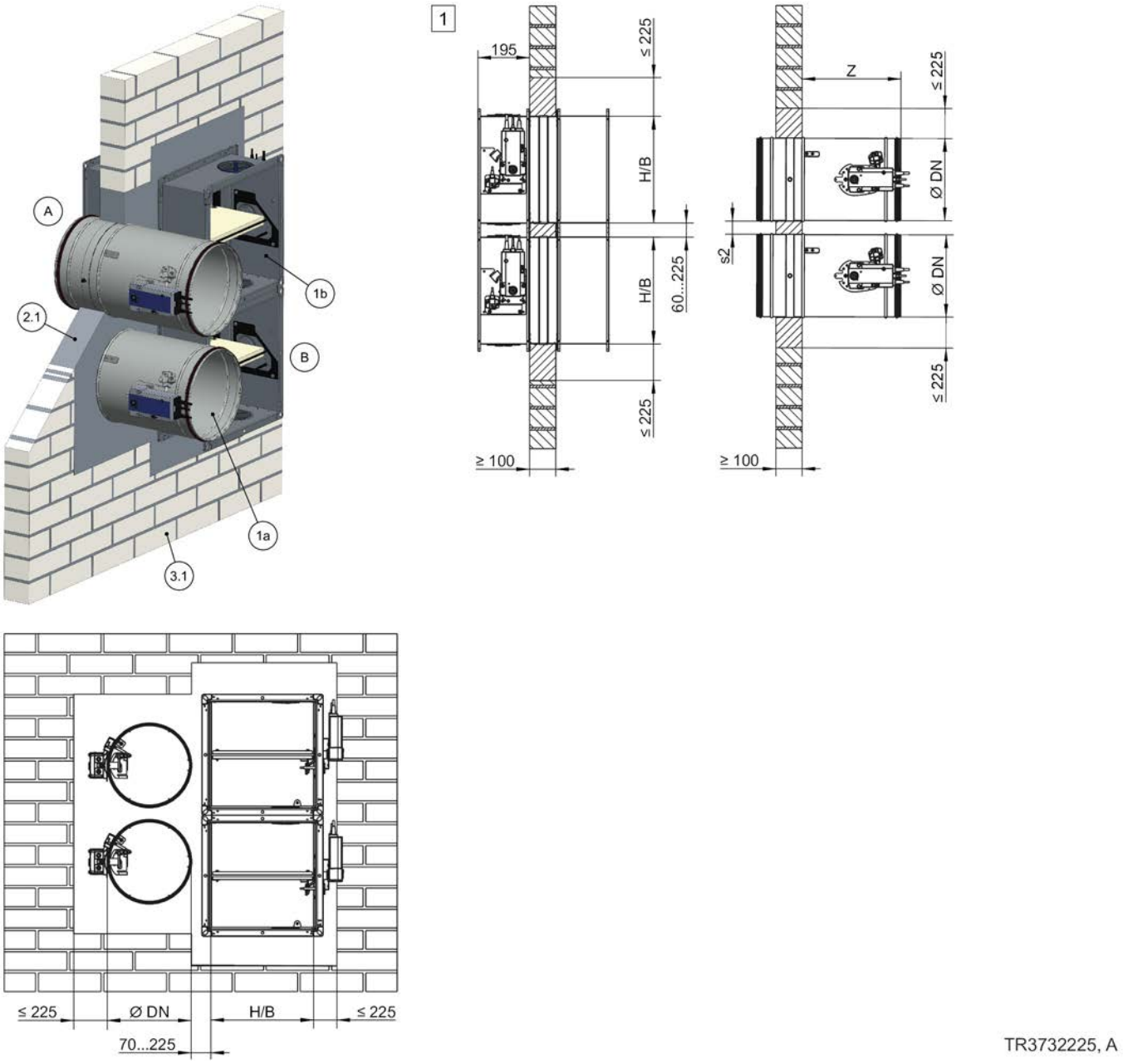


Fig. 24: Mortar-based installation into a solid wall, FKR-EU and FK2-EU combined

1a FKR-EU
1b FK2-EU up to B × H ≤ 800 × 400 mm
2.1 Mortar
3.1 Solid wall
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
1 Up to EI 90 S

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Distance to load-bearing structural elements ≥ 40 mm
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Mortar-based installation into a solid wall with flexible ceiling joint

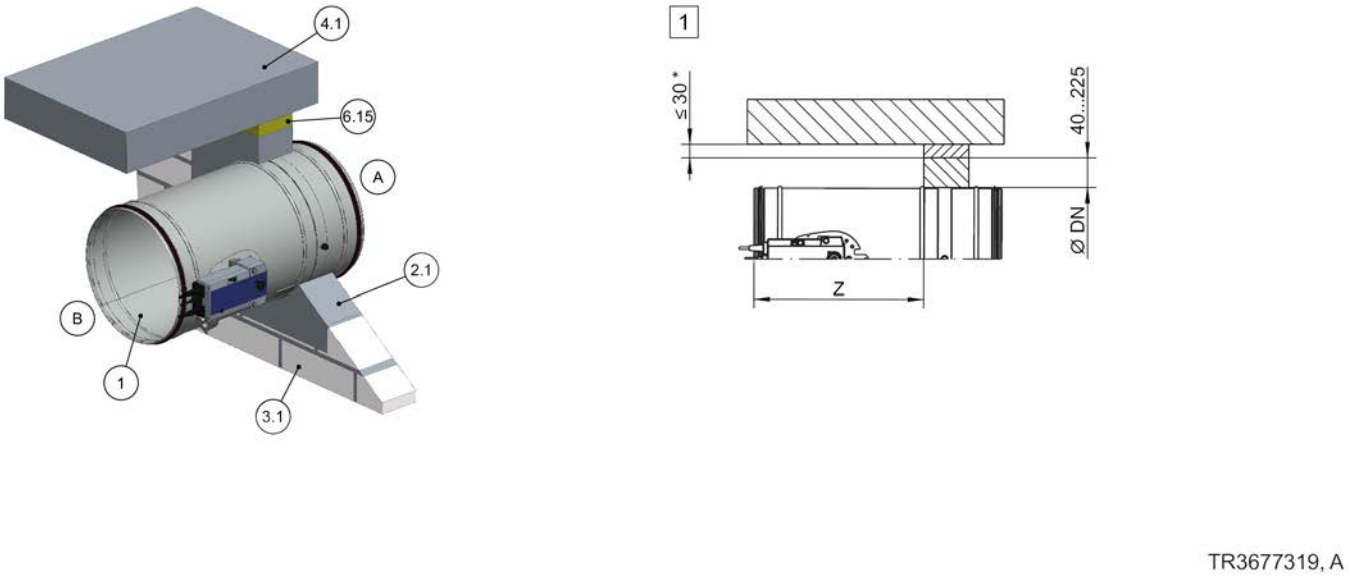


Fig. 25: Mortar-based installation into a solid wall with flexible ceiling joint

1	FKR-EU
2.1	Mortar
3.1	Solid wall
4.1	Solid ceiling slab
6.15	Mineral wool, depending on the flexible ceiling joint
Z	Spigot construction 370 mm Flange construction 342 mm
1	Up to EI 120 S
*	After subsidence of the ceiling slab

Note on flexible ceiling joint: representative illustration. The distance to the ceiling depends on the design of the flexible ceiling joint, the expected ceiling subsidence and the specifications of the wall manufacturer.

Additional requirements: mortar-based installation into solid walls

- Solid wall *on page 34*

5.5.3 Mortar-based installation – multiple occupancy of an installation opening

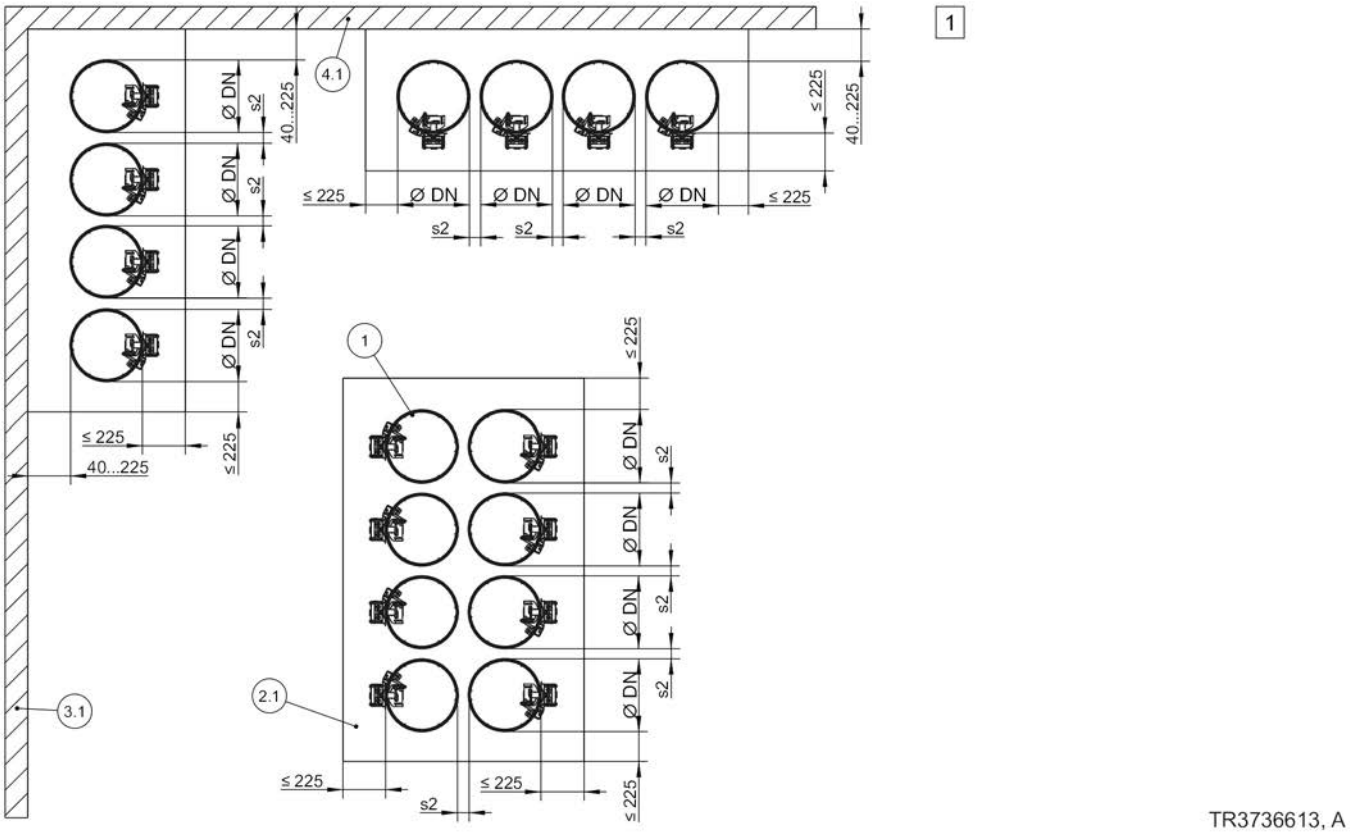


Fig. 26: Mortar-based installation – multiple occupancy of an installation opening

1	FKR-EU	4.1	Solid ceiling slab (load-bearing component)
2.1	Mortar	s2	Spigot construction 40 – 225 mm
2.2	Concrete		Flange construction 80 – 225 mm
3.1	Solid wall (load-bearing component)	1	Up to EI 90 S

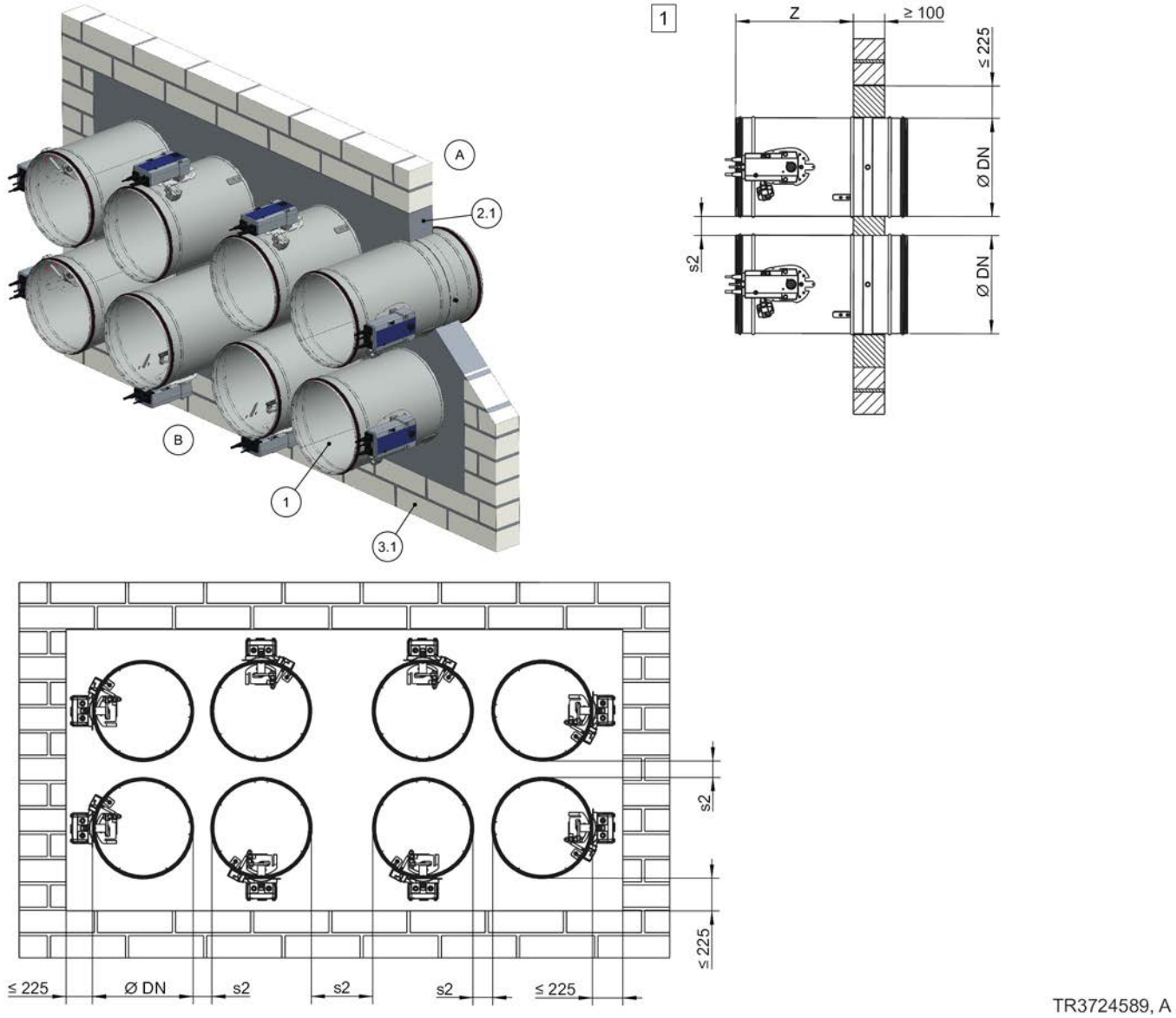


Fig. 27: Mortar-based installation – multiple occupancy of an installation opening

1 FKR-EU
2.1 Mortar
3.1 Solid wall
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
1 Up to EI 90 S

Additional requirements: mortar-based installation – multiple occupancy of an installation opening

- Solid wall, *on page 34*
- Total fire damper area (∅ nominal width) ≤ 4.8 m²
- The number of fire dampers in an installation opening is limited by their damper size (∅ nominal width) and the overall area of the fire dampers (4.8 m²).
- The dampers can be arranged in one or two rows.
- Distance to load-bearing structural elements ≥ 40 mm
- If the actuators are located between the fire dampers, sufficient free space for inspection must be provided.
- The mortar bed width is not allowed to exceed 225 mm, provide brick partition or lintel if necessary.

5.5.4 Dry mortarless installation with fire batt

Dry mortarless installation with fire batt into a solid wall

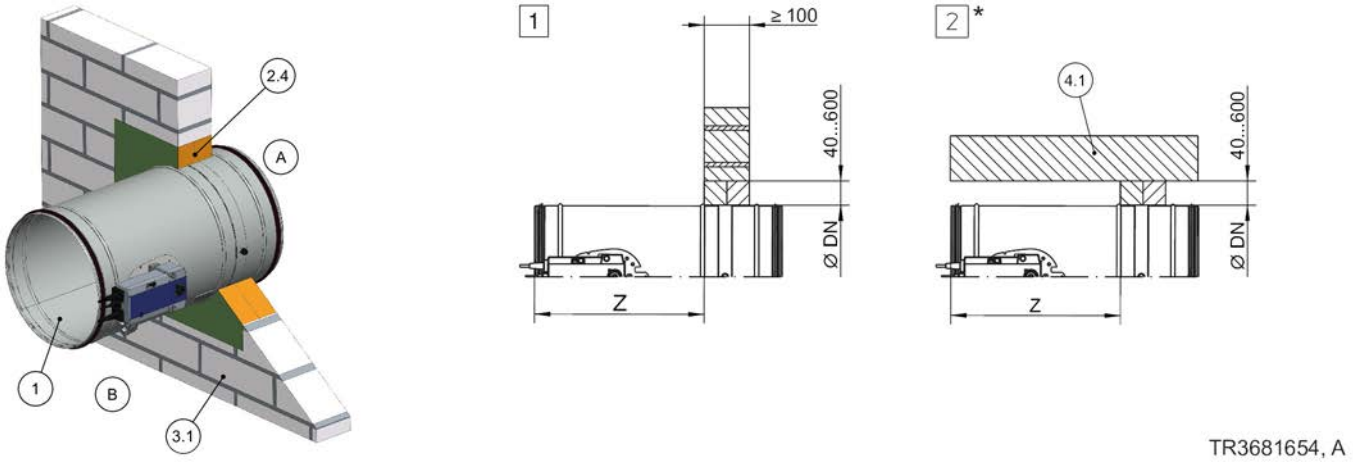


Fig. 28: Dry mortarless installation with fire batt into a solid wall

1	FKR-EU	Z	Spigot construction 370 mm
2.4	Coated board system		Flange construction 342 mm
3.1	Solid wall	*	Installation near the floor analogous to 2
4.1	Solid ceiling slab	1 2	Up to EI 60 S

Dry mortarless installation with fire batt in solid wall, "flange to flange"

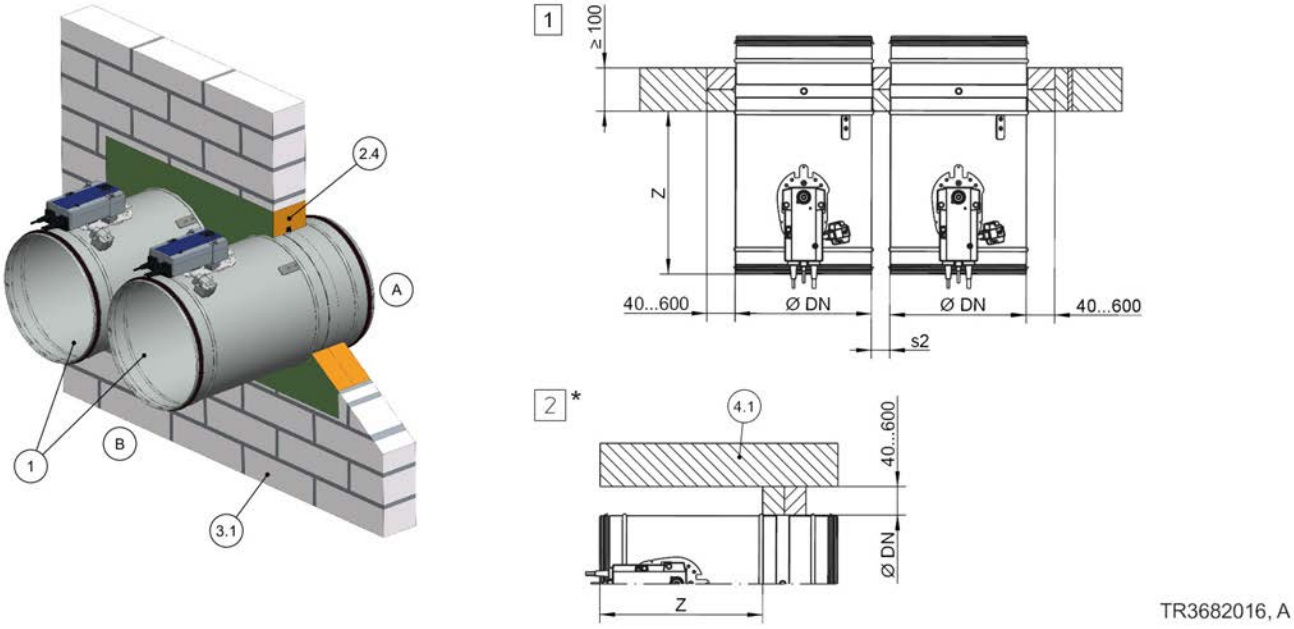


Fig. 29: Dry mortarless installation into a solid wall, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU		Flange construction 342 mm
2.4	Coated board system	s2	Spigot construction 40 – 600 mm
3.1	Solid wall		Flange construction 80 – 600 mm
4.1	Solid ceiling slab	*	Installation near the floor analogous to 2
Z	Spigot construction 370 mm	1 2	Up to EI 60 S

Additional requirements: dry mortarless installation with fire batt in solid walls

- Solid wall ↳ *on page 34*
- Fire batt systems, installation details, distances / dimensions ↳ *on page 32*
- Suspension and fixing ↳ *Chapter 5.14 'Fixing the fire damper' on page 135*

5.6 Lightweight partition walls

5.6.1 General

Lightweight partition wall with metal support structure and cladding on both sides

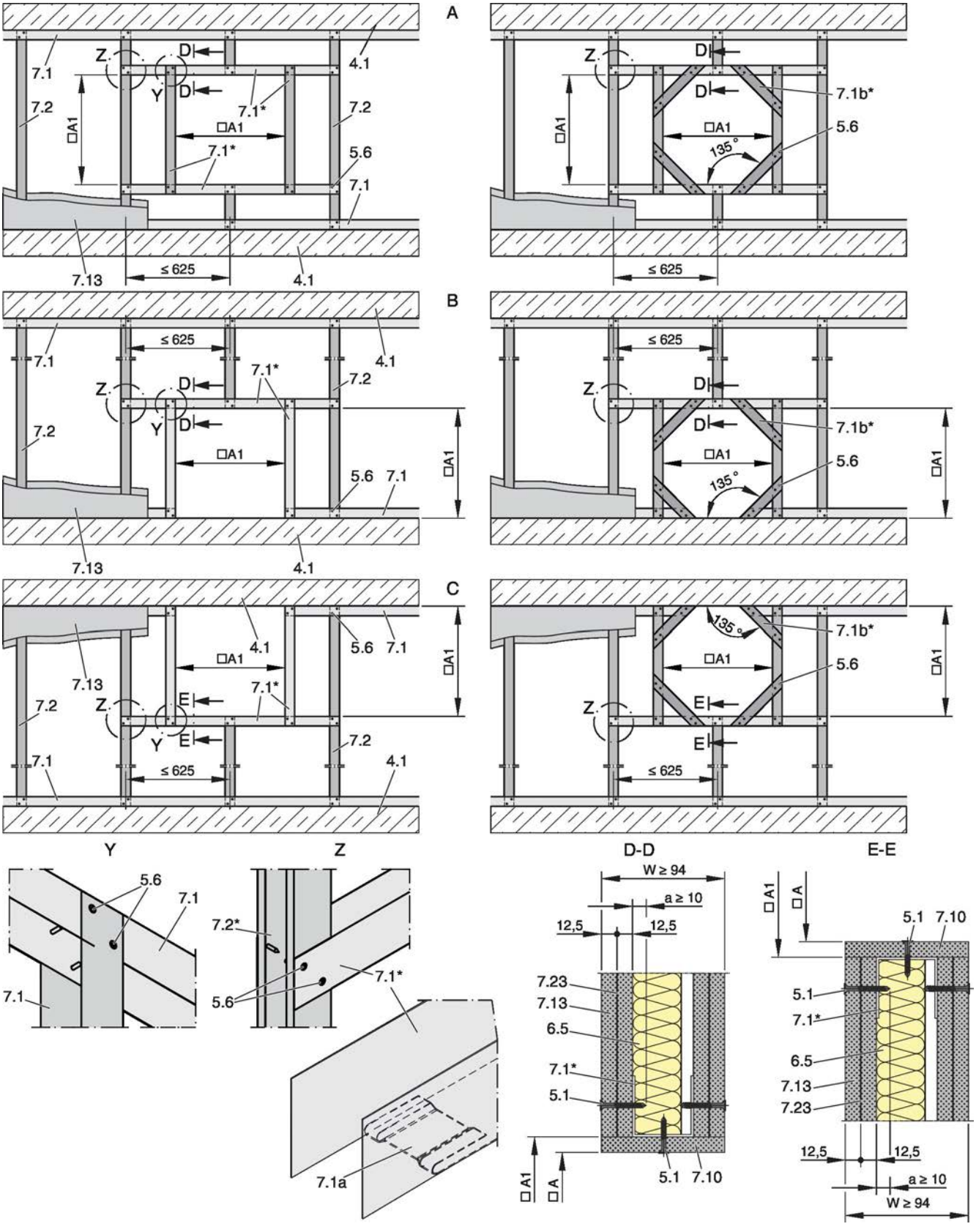


Fig. 30: Lightweight partition wall with metal support structure and cladding on both sides, caption ↳ Fig. 33

Lightweight partition wall "flange to flange"

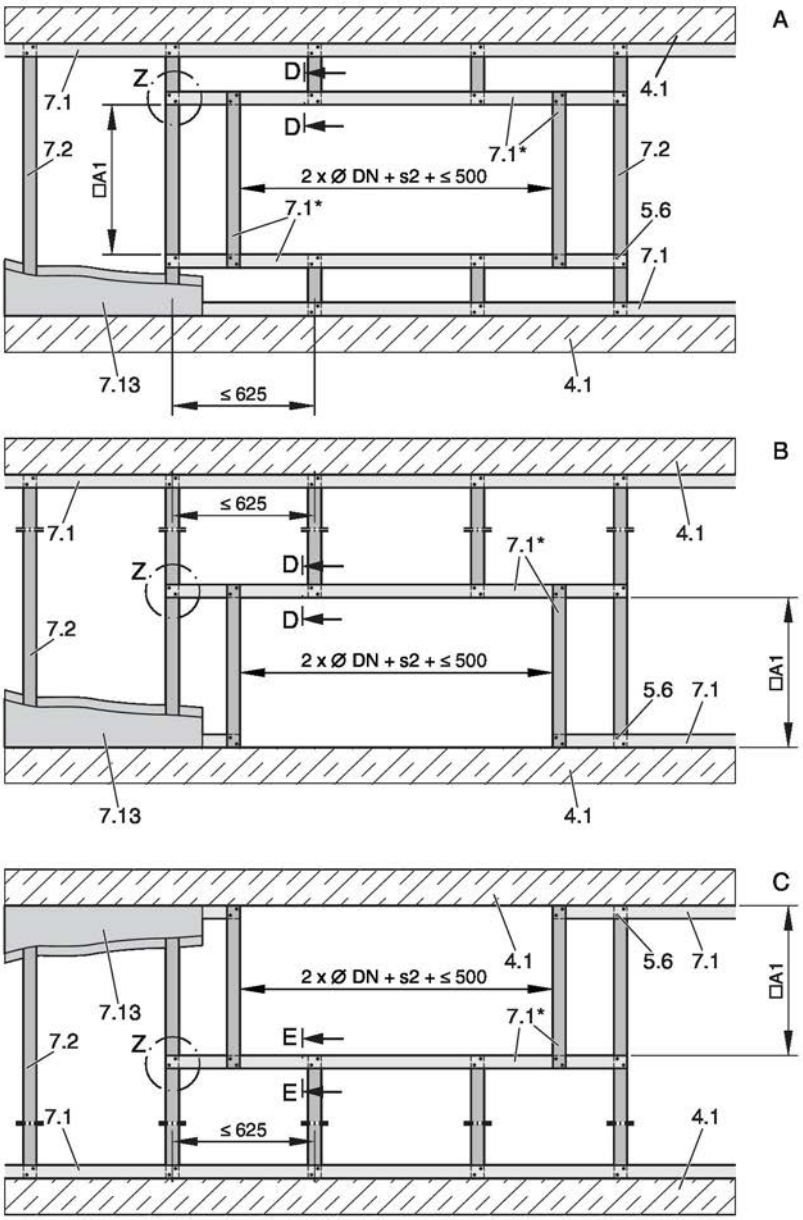


Fig. 31: Lightweight partition wall with metal support structure and cladding on both sides, flange to flange, ∅ nominal width 315 – 400, caption Fig. 33

For details see Fig. 30

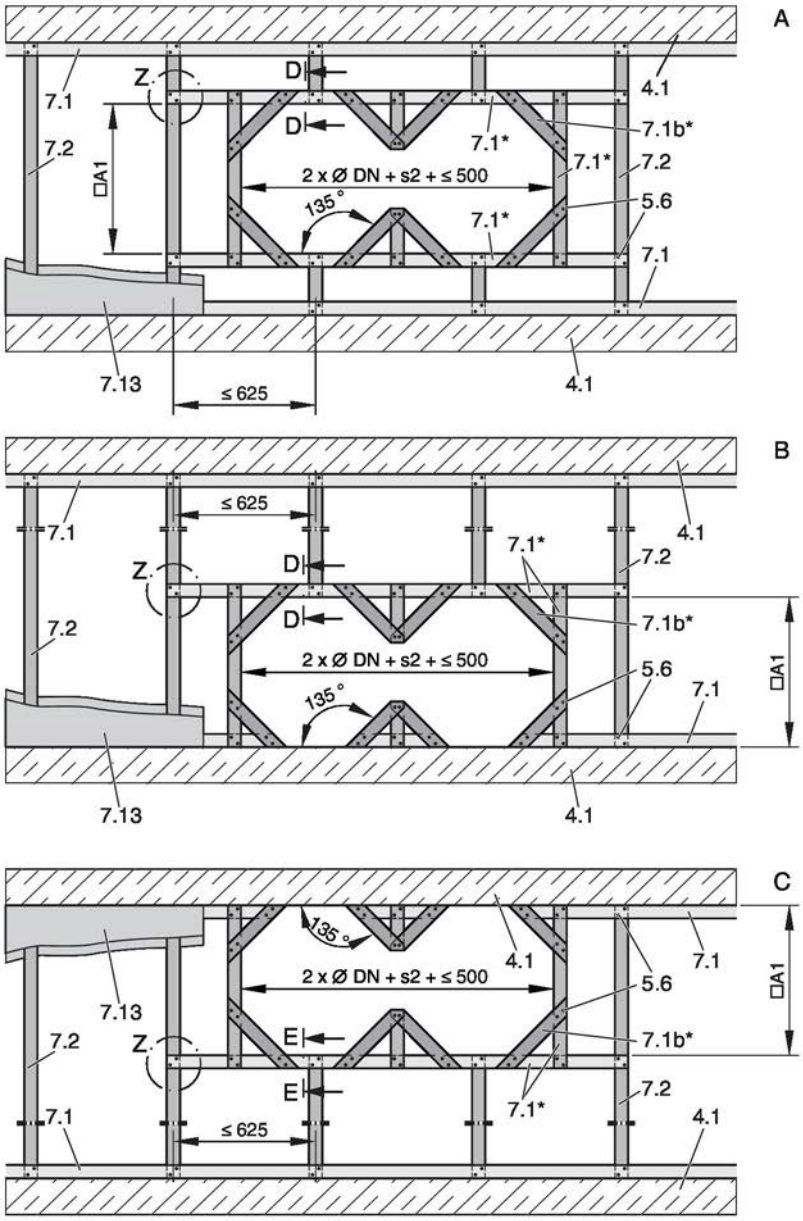


Fig. 32: Lightweight partition wall with metal support structure and cladding on both sides, flange to flange, ∅ nominal width 450 – 800, caption ↳ Fig. 33

For details see Fig. 30

Compartment wall

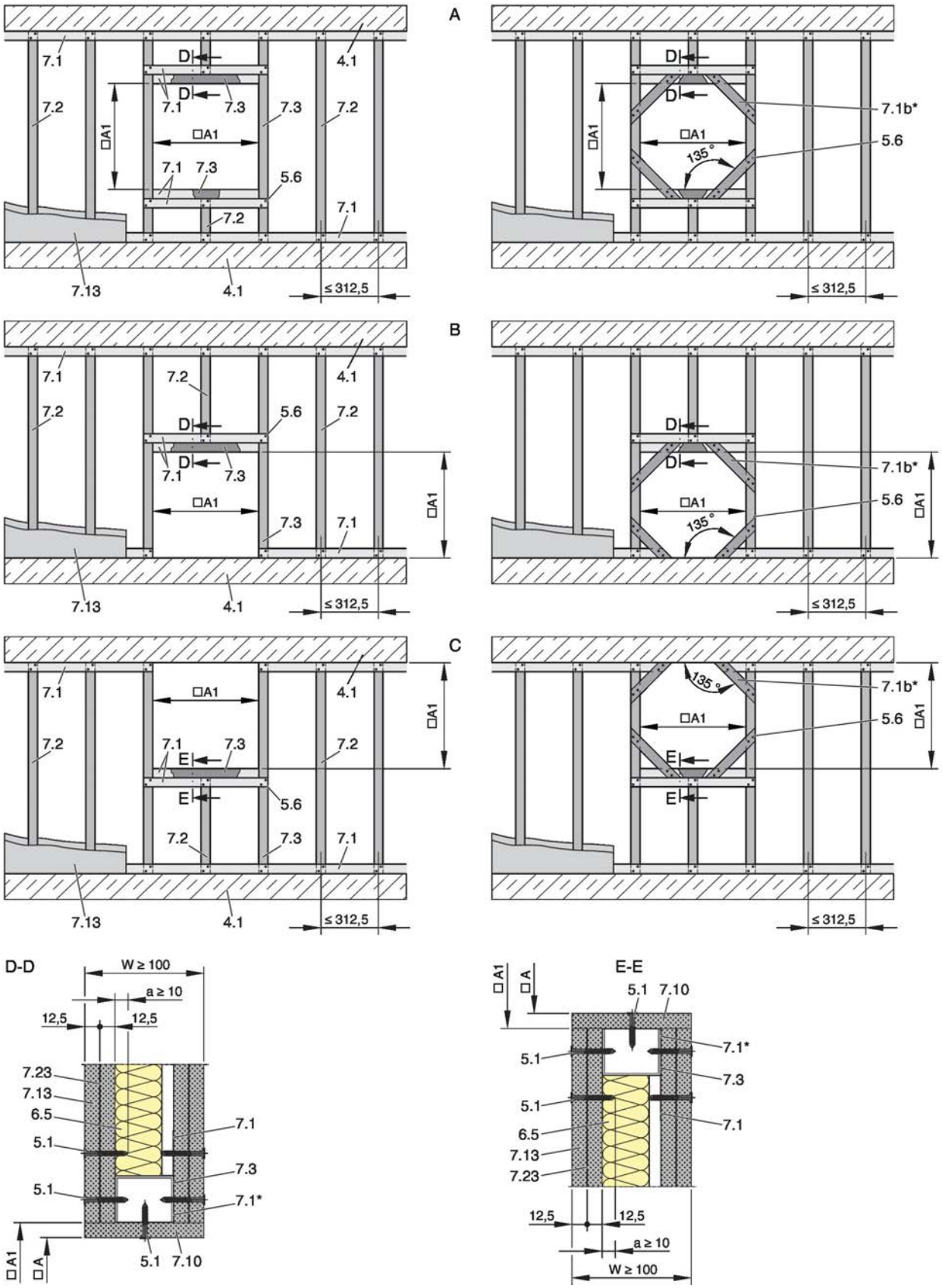


Fig. 33: Compartment wall with metal support structure and cladding on both sides

A	Lightweight partition wall with metal support structure or steel support structure / compartment wall / safety partition wall
B	Lightweight partition wall with metal support structure or steel support structure / compartment wall / safety partition wall, installation near the floor
C	Lightweight partition wall with metal support structure or steel support structure / compartment wall / safety partition wall, installation near the ceiling
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw
5.6	Screw or steel rivet
6.5	Mineral wool (depending on wall construction)
7.1	UW section
7.1a	UW section, cut in and bent or cut off
7.1b	UW section, only for mortar-based installation, nominal sizes ∅ nominal width 450 - 800
7.2	CW section
7.3	UA section
7.10	Trim panels according to installation details
7.13	Cladding
7.23	Sheet steel layer depending on wall manufacturer (if any)
☐A	Installation opening
☐A1	Opening in the metal support structure (without trim panels: ☐A =☐A1)
*	Closed side of metal section must face the installation opening

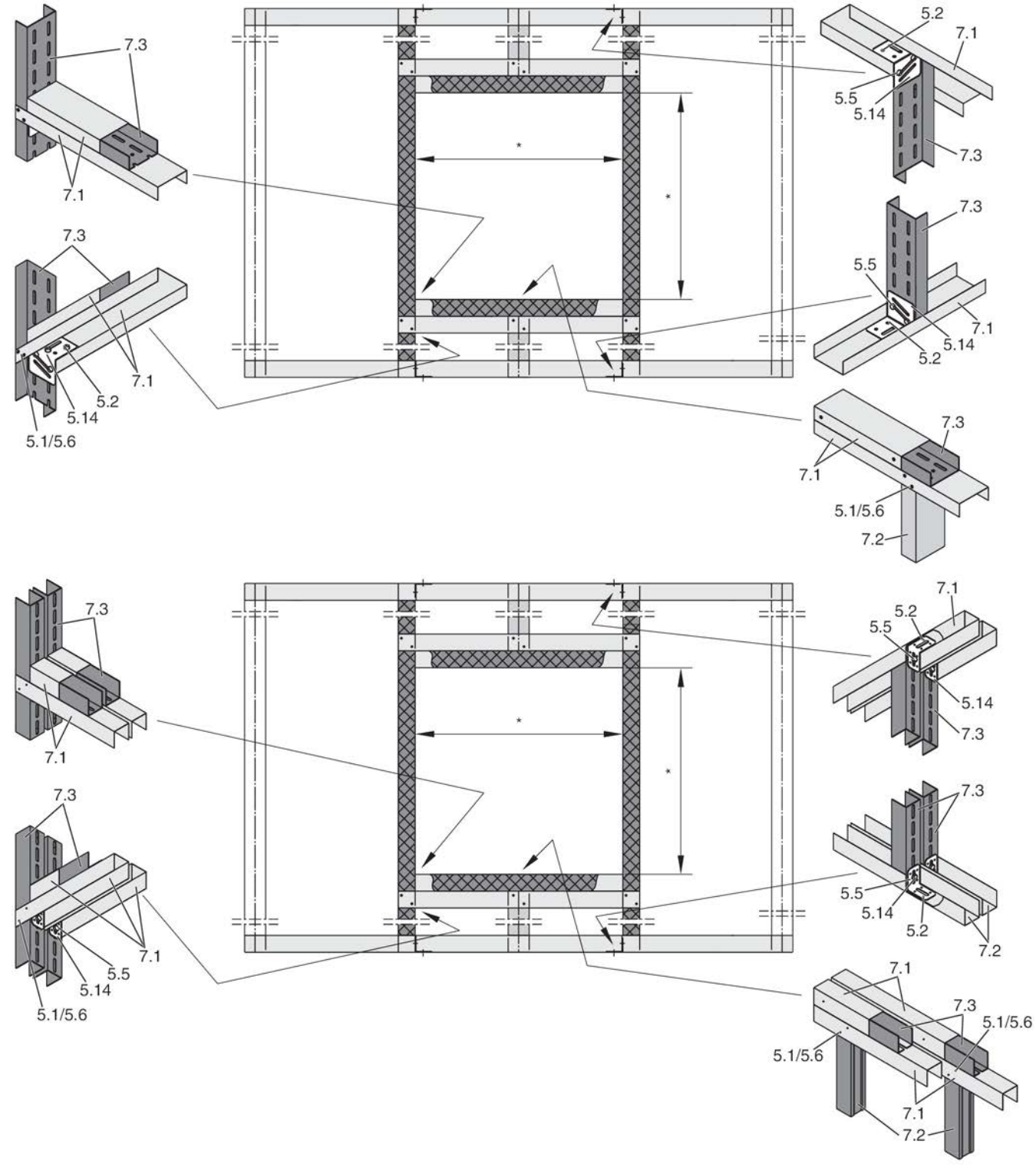


Fig. 34: Metal support structure of compartment wall, single and double stud system

5.1	Dry wall screw	7.1	UW section
5.2	Hexagon head screw M6	7.2	CW section
5.5	Carriage bolt, L ≤ 50 mm, with washer and nut	7.3	UA section
5.6	Steel rivet	*	Installation opening according to installation details
5.14	Angle bracket		

Installation opening □A [mm]									
Installation type	**Nominal size ∅nominal width**								
	315	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
Mortar-based installation [1]	□A = ∅nominal width + max. 450 mm □A1 = □A + (2 × trim panels)								
Dry mortarless installation with installation kit TQ [1, 2, 3]	435	475	520	570	620	680	750	830	920
Dry mortarless installation with fire batt [4]	□A = ∅nominal width + 80 – 1200 mm □A1 = □A + (2 × trim panels / 4 × trim panels)								

[1)] Optional trim panels (max. 25 mm)
[2)] Installation opening tolerance ± 2 mm
[3)] Installation kit TQ is available only for FKR-EU with spigot
[4)] Trim panels according to installation details required

Additional requirements: lightweight partition walls and compartment walls with metal support structure

- Lightweight partition wall or compartment wall,
  on page 34

Erecting a wall and creating an installation opening

- Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening
  - Variant 1: Provide the installation opening in the metal support structure with suitable metal sections, then clad the wall.
  - Variant 2: After cladding the wall, create a square wall opening (clear installation opening ≤ 475 mm) between the regular studs and brace it with a perimeter metal section. Screw metal sections onto both sides over the cladding, spaced approx. 100 mm apart.
  - In case of mortar-based installation of fire dampers from nominal size ∅450, install four additional sections 7.1b at an angle of 45° in order to reinforce the metal support structure.

5.6.2 Mortar-based installation

Mortar-based installation into a lightweight partition wall, compartment wall or safety partition wall

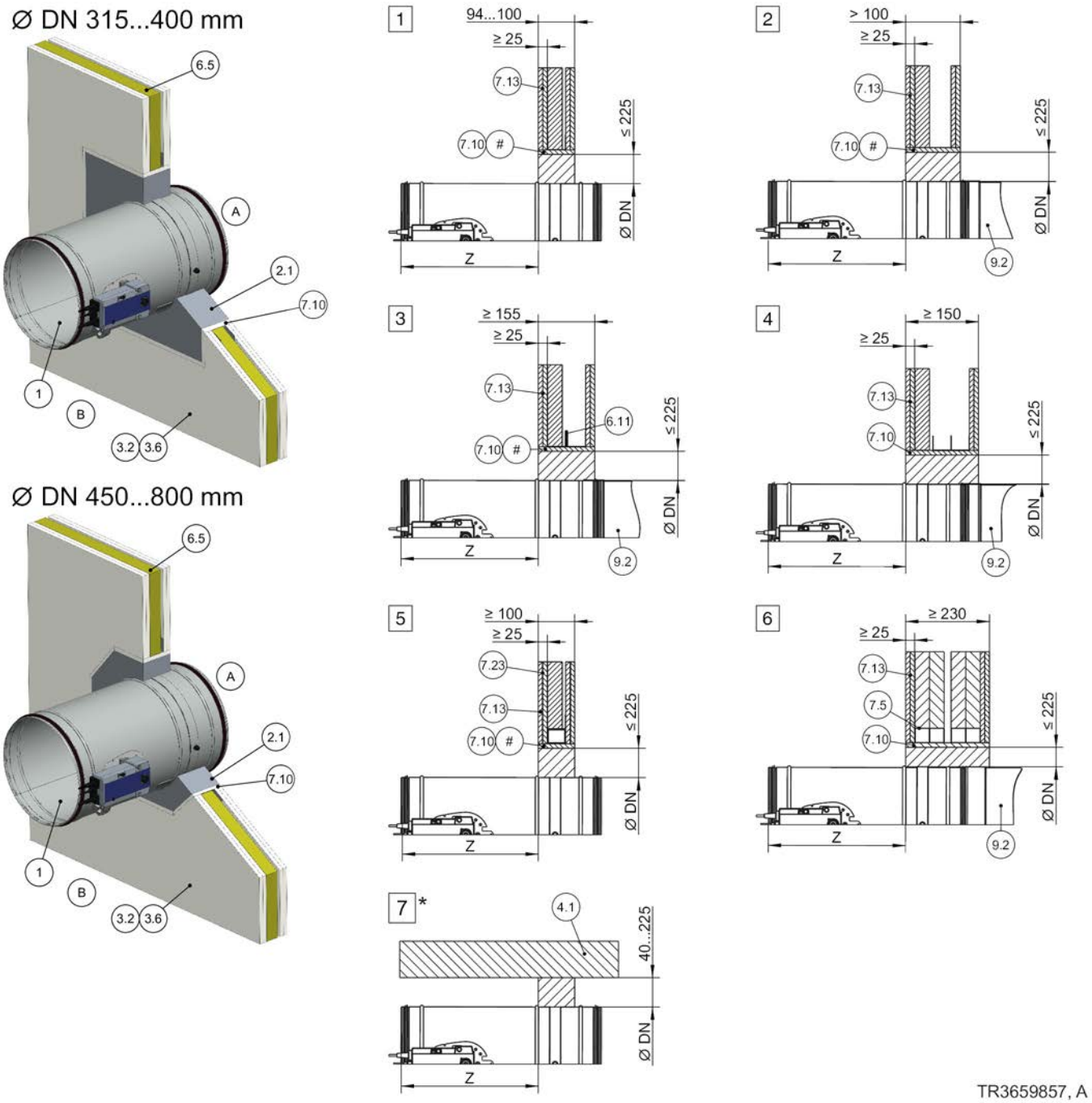


Fig. 35: Mortar-based installation into a lightweight partition wall, compartment wall or safety partition wall

1	FKR-EU	7.13	Cladding
2.1	Mortar	7.23	Sheet steel insert depending on wall manufacturer
3.2	Lightweight partition wall with metal support structure, cladding on both sides	9.2	Extension piece or duct
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides	Z	Spigot construction 370 mm Flange construction 342 mm
4.1	Solid ceiling slab	*	Installation near the floor analogous to 7
6.5	Mineral wool (depending on wall construction)	#	optional
6.11	Insulating strip (depending on wall construction)	1 – 7	Up to EI 90 S
7.5	Steel support structure (box section)		

7.10 Trim panels (screw-fixed to metal support structure)

Mortar-based installation into a lightweight partition wall

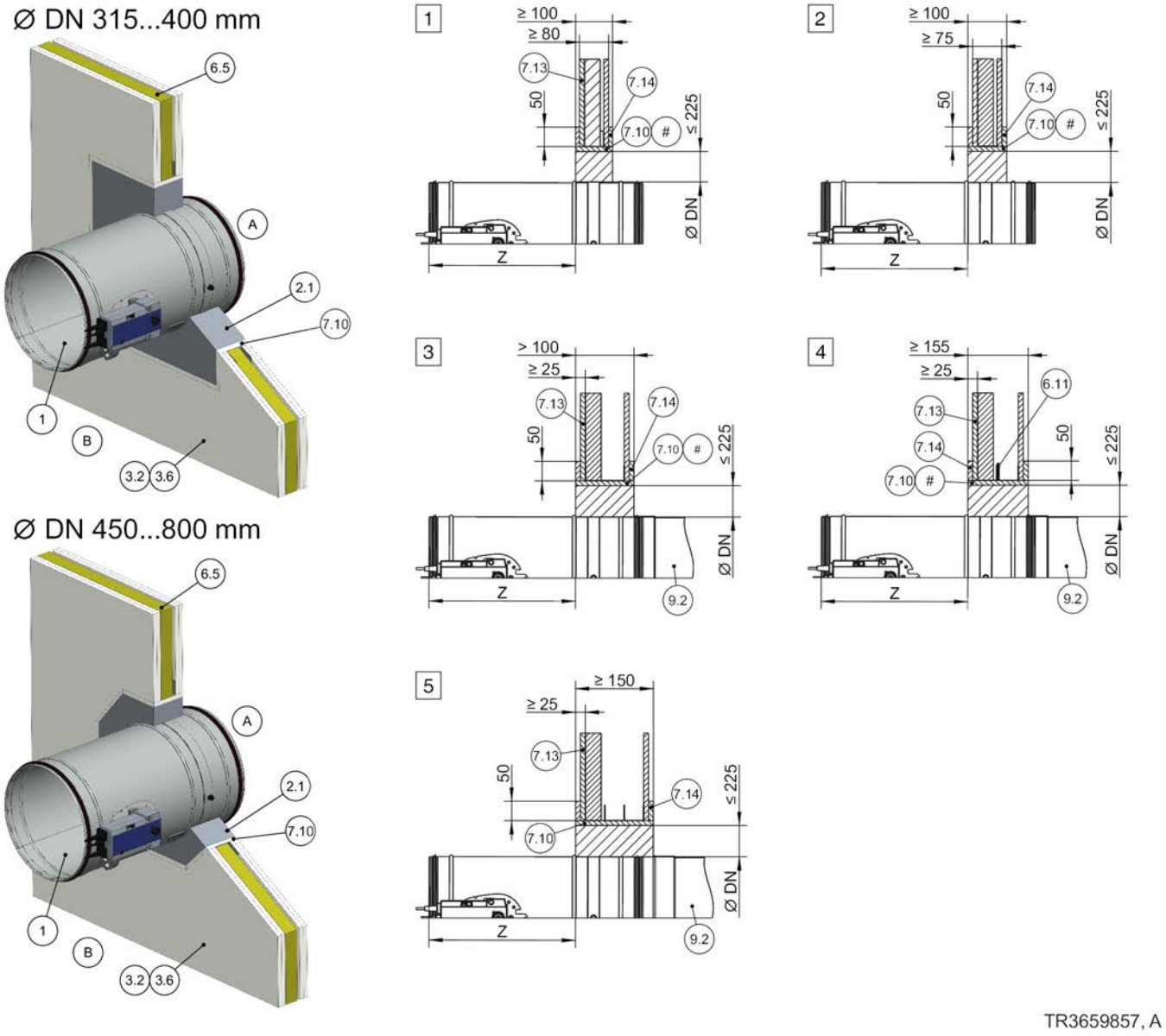


Fig. 36: Mortar-based installation into a lightweight partition wall

1 FKR-EU
2.1 Mortar
3.2 Lightweight partition wall with metal support structure, cladding on both sides
3.6 Compartment wall or safety wall with metal support structure, cladding on both sides
6.5 Mineral wool (depending on wall construction)
6.11 Insulating strip (depending on wall construction)
7.10 Trim panels (screw-fixed to metal support structure)
7.13 Cladding
7.14 Reinforcing board of the same material as the wall
9.2 Extension piece or duct
Z Spigot construction 370 mm
Flange construction 342 mm
optional
1 Up to EI 60 S
2 – 5 EI 30 S

Mortar-based installation in lightweight partition wall, "flange to flange

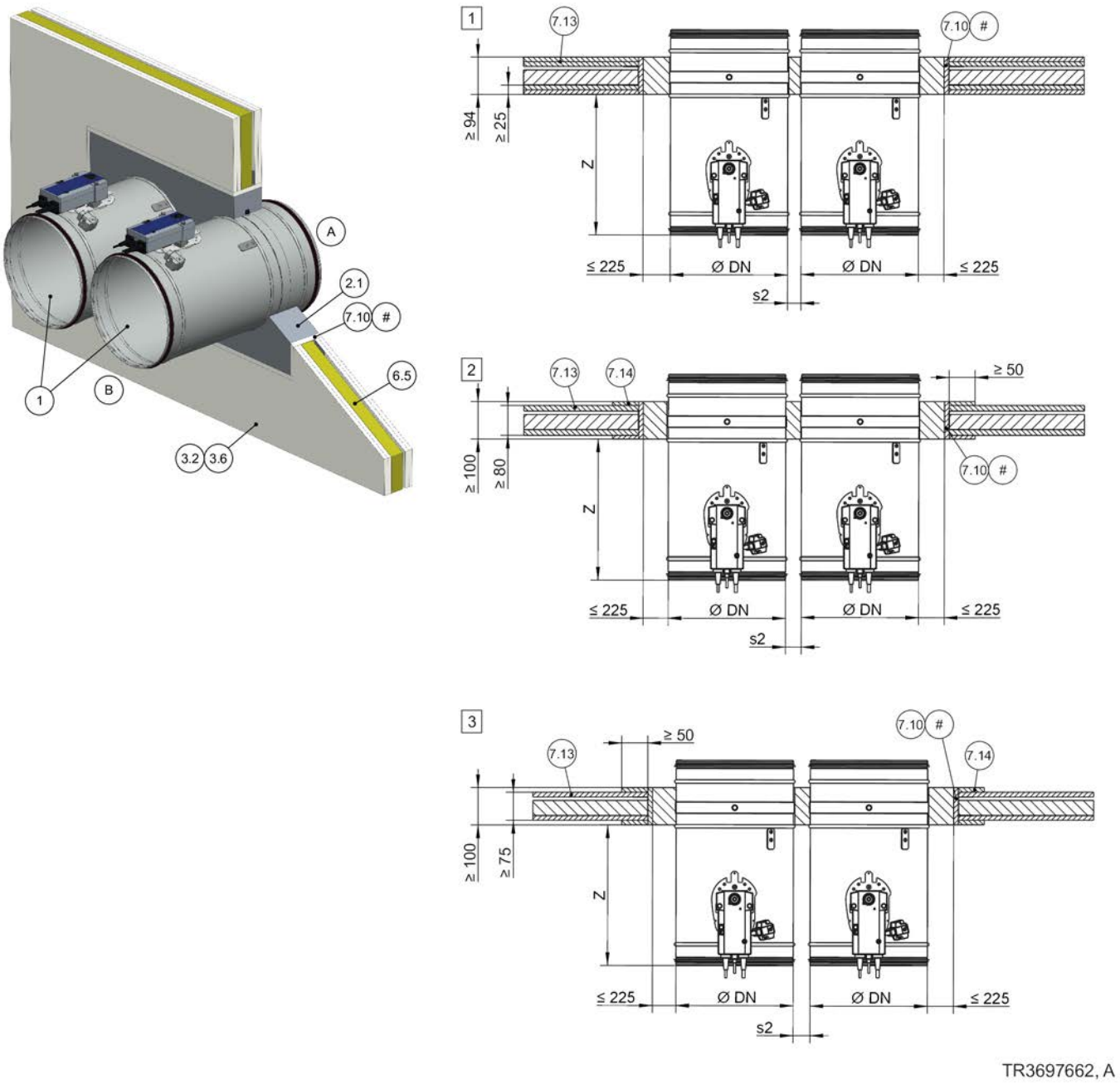


Fig. 37: Mortar-based installation into a lightweight partition wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU
2.1	Mortar
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
6.5	Mineral wool (depending on wall construction)
7.10	Trim panels
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
#	Depending on the wall structure
1	Up to EI 90 S
2	Up to EI 60 S
3	EI 30 S

Mortar-based installation into a lightweight partition wall, FKR-EU and FK2-EU combined

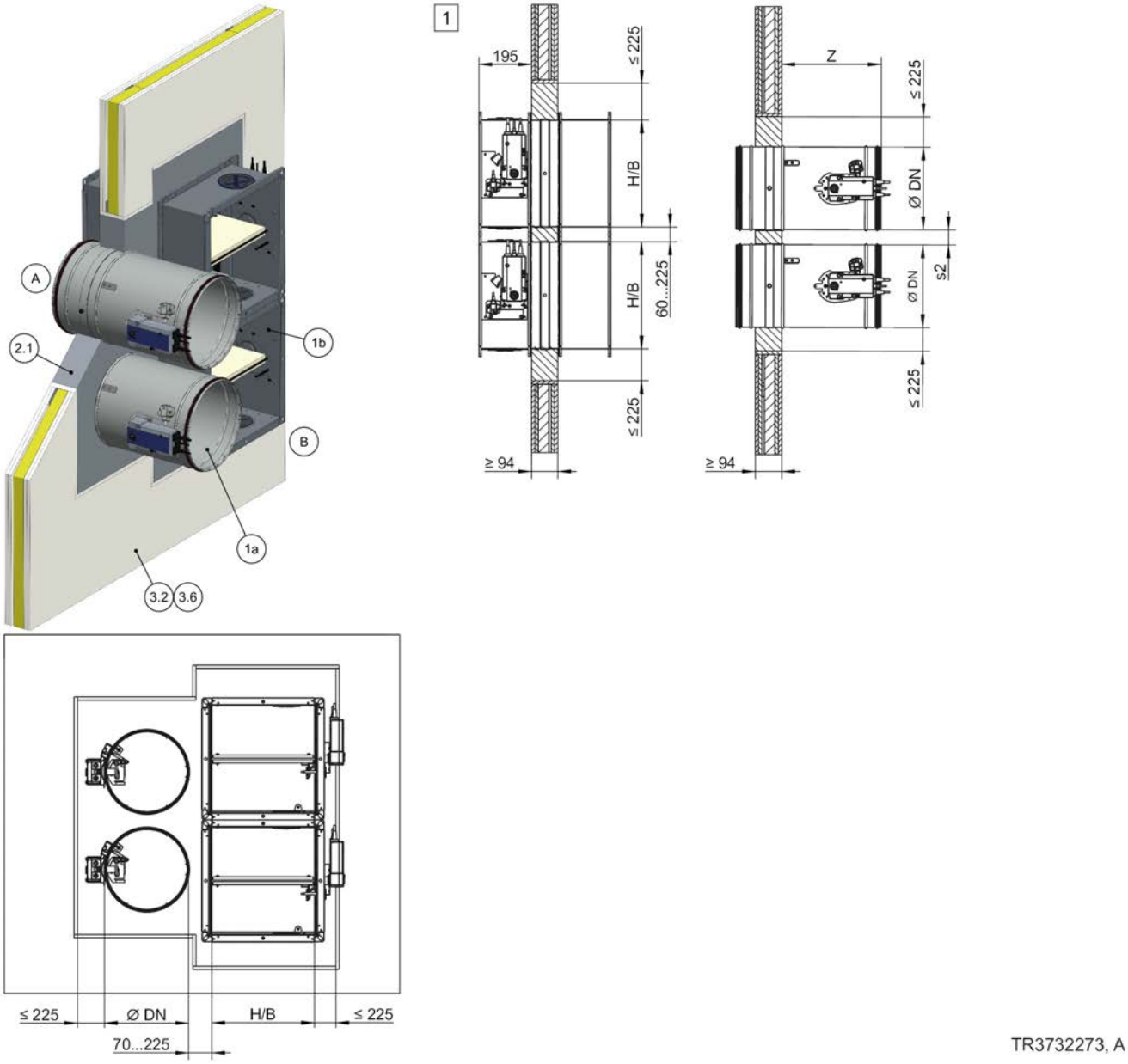


Fig. 38: Mortar-based installation into a lightweight partition wall, FKR-EU and FK2-EU combined

1a FKR-EU
1b FK2-EU up to B × H ≤ 800 × 400 mm
2.1 Mortar
3.2 Lightweight partition wall with metal support structure or steel support structure, cladding on both sides
3.6 Compartment wall or safety wall with metal support structure, cladding on both sides
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Distance to load-bearing structural elements ≥ 40 mm

- Frame construction, size-dependent, *Chapter 5.6.1 'General' on page 47*
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Mortar-based installation into a lightweight partition wall, below a flexible ceiling joint

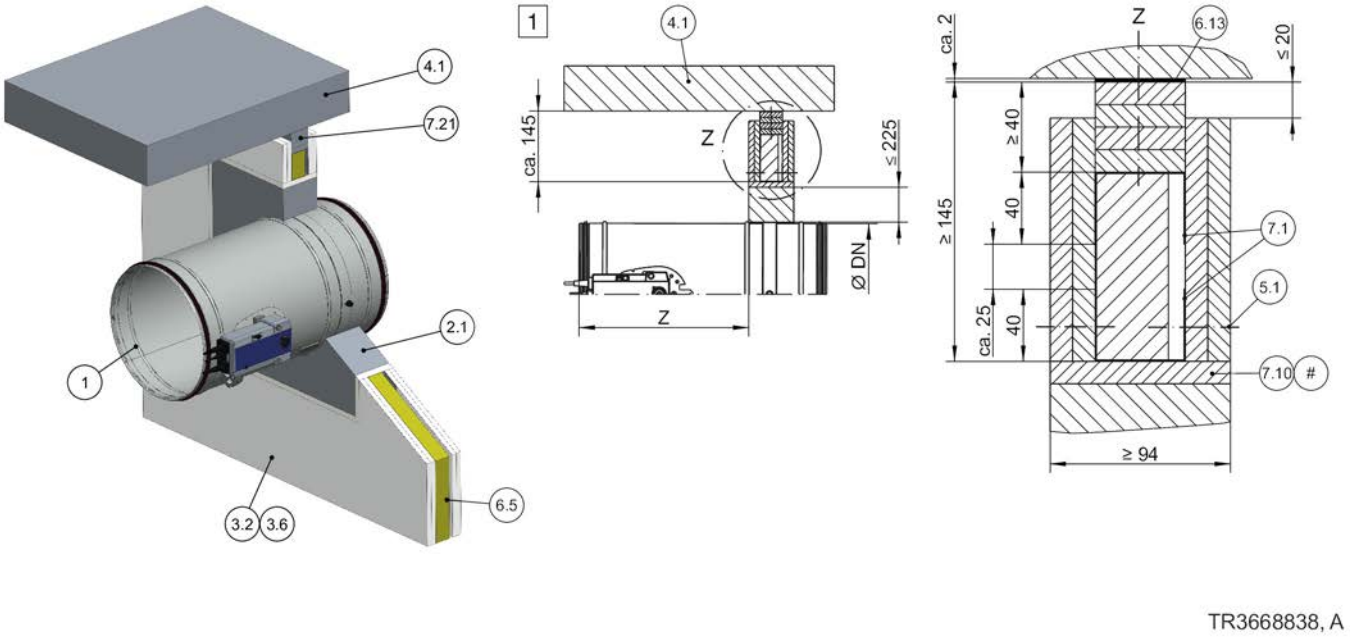


Fig. 39: Mortar-based installation into a lightweight partition wall, below a flexible ceiling joint

1	FKR-EU
2.1	Mortar
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
4.1	Solid ceiling slab
5.1	Dry wall screw
6.5	Mineral wool (depending on wall construction)
6.13	Mineral wool strips, filler as an alternative (if required to even out an uneven wall)
7.1	UW section
7.10	Trim panels
7.21	Ceiling joint strips (e.g. 4 × ≥ 10 mm)
Z	Spigot construction 370 mm Flange construction 342 mm
#	Depending on the wall structure
1	Up to EI 90 S

Note: representative illustration. The distance to the ceiling depends on the design of the flexible ceiling joint, the expected ceiling subsidence and the specifications of the wall manufacturer.

Additional requirements: mortar-based installation into lightweight partition and compartment walls

- Lightweight partition wall or compartment wall,
  on page 34

5.6.3 Mortar-based installation – multiple occupancy of an installation opening

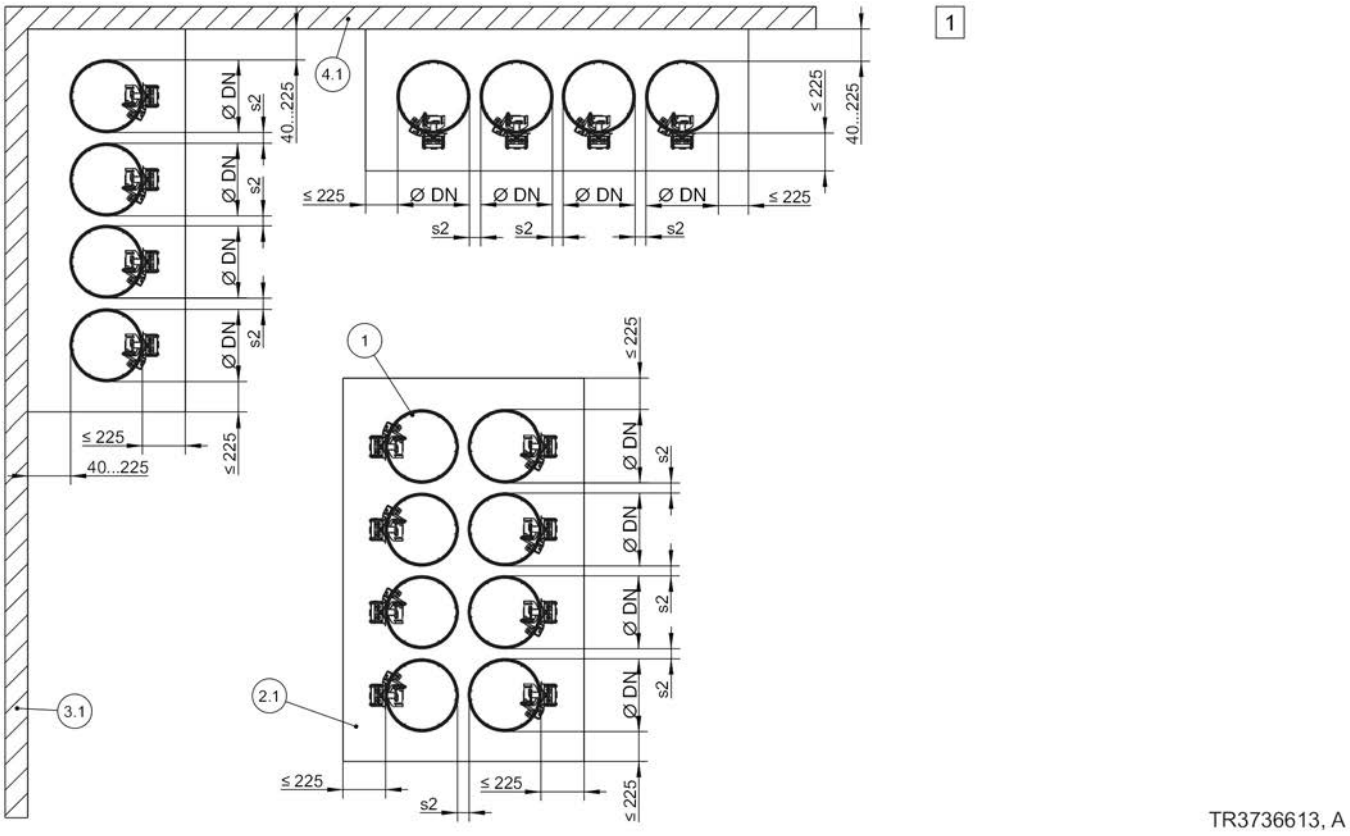


Fig. 40: Mortar-based installation – multiple occupancy of an installation opening

1	FKR-EU	3.1	Solid wall (load-bearing component)
2.1	Mortar	4.1	Solid ceiling slab (load-bearing component)
2.2	Concrete	1	Up to EI 90 S

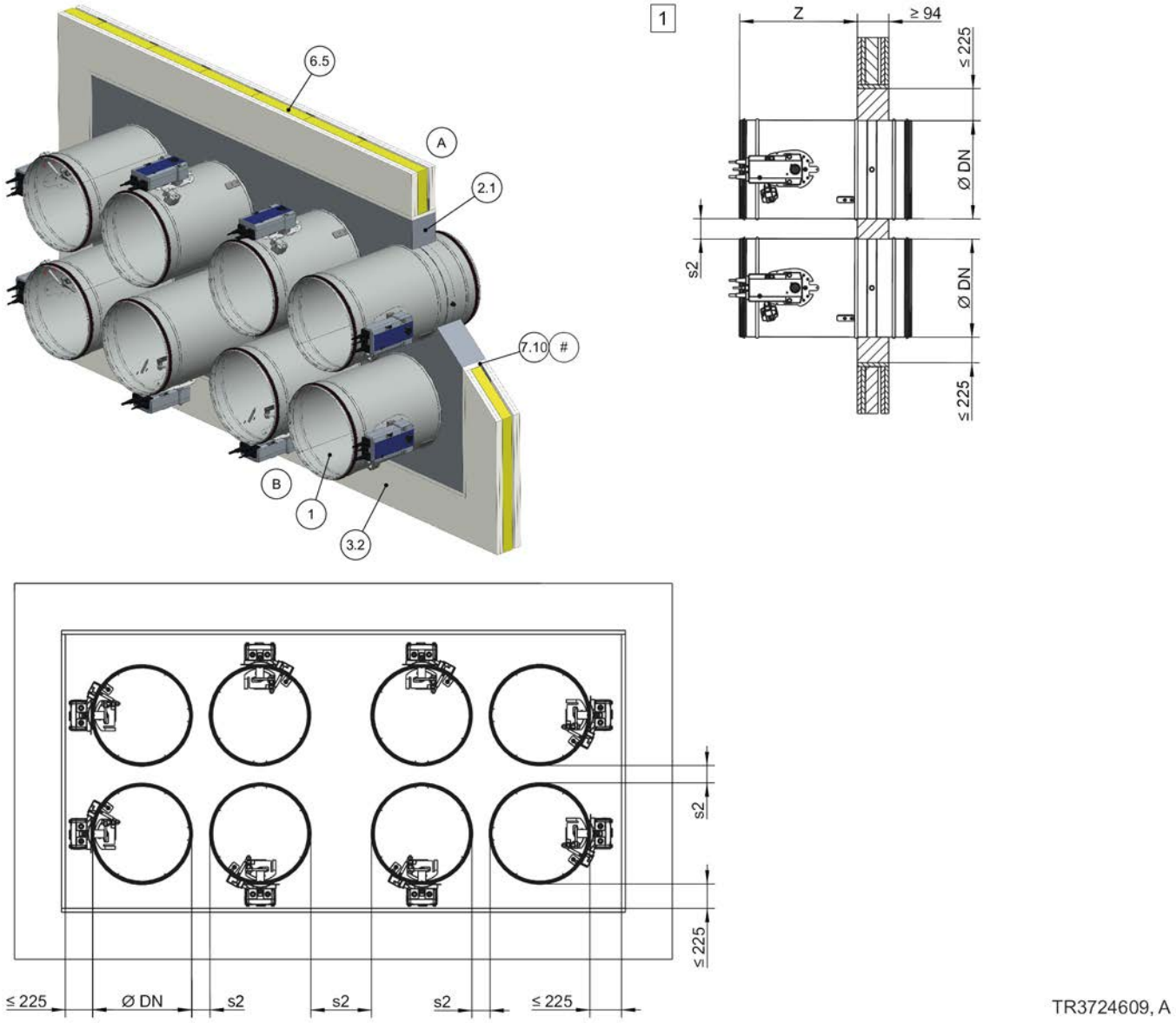


Fig. 41: Mortar-based installation – multiple occupancy of an installation opening

1	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
2.1	Mortar	s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
3.2	Lightweight partition wall with metal support structure, cladding on both sides	#	Depending on the wall structure
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides	1	Up to EI 90 S
6.5	Mineral wool (depending on wall construction)		
7.10	Trim panels		

Additional requirements: mortar-based installation – multiple occupancy of an installation opening

- Lightweight partition wall or compartment wall, ↳ *on page 34*
- Total fire damper area (∅ nominal width) ≤ 4.8 m^2
- The number of fire dampers in an installation opening is limited by their damper size (∅ nominal width) and the overall area of the fire dampers (4.8 m^2).
- The dampers can be arranged in one or two rows.
- Distance to load-bearing structural elements ≥ 40 mm
- If the actuators are located between the fire dampers, sufficient free space for inspection must be provided.
- The mortar bed width is not allowed to exceed 225 mm, provide separate trimmers if necessary.

5.6.4 Dry mortarless installation with installation kit TQ

Dry mortarless installation into a lightweight partition wall, with installation kit TQ

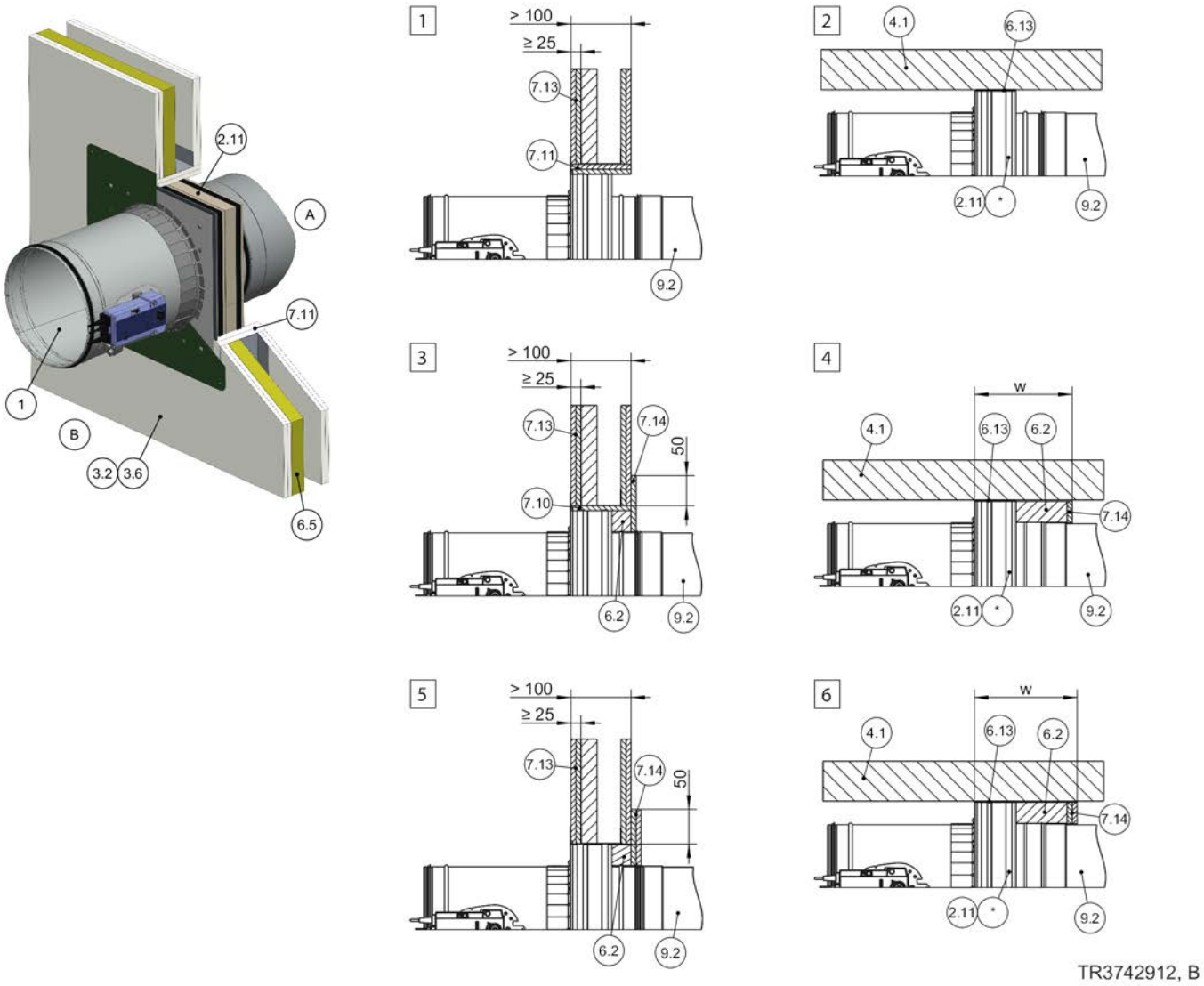


Fig. 42: Dry mortarless installation into a lightweight partition wall, with installation kit TQ

1	FKR-EU	7.10	Trim panels
2.11	Installation kit TQ (factory assembled)	7.11	Trim panels, fire-resistant, 2-ply, max. 25 mm (alternative to 6.2 and 7.14)
3.2	Lightweight partition wall with metal support structure, cladding on both sides	7.13	Cladding
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides	7.14	Reinforcing board, made of wall panels (up to the fire damper casing)
4.1	Solid ceiling slab	9.2	Extension piece or duct
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³	*	Cover plate, shortened by others
6.5	Mineral wool (depending on wall construction)	1 – 6	Up to EI 90 S
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative		

Note: 1 – 4 valid for all wall constructions and wall thicknesses.
5 and 6 valid for all wall thicknesses with a single stud frame.

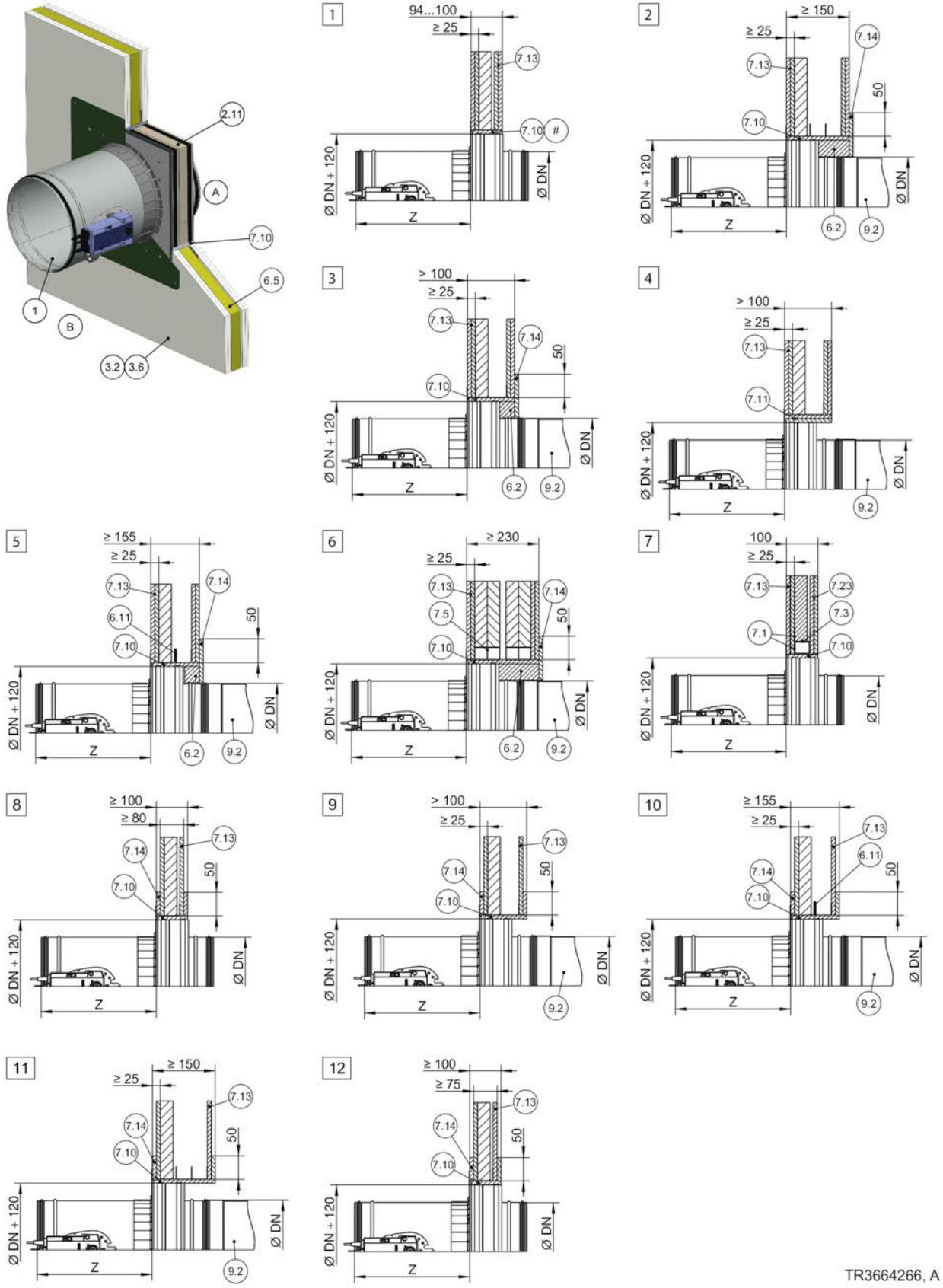


Fig. 43: Dry mortarless installation into a lightweight partition wall, with installation kit TQ

1	FKR-EU	7.13	Cladding
2.11	Installation kit TQ (factory assembled)	7.14	Reinforcing board made of wall panels (reinforcing board or alternatively wall cladding on the back, up to the fire damper casing)
3.2	Lightweight partition wall with metal support structure, cladding on both sides		

3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
6.5	Mineral wool (depending on wall construction)
6.11	Insulating strip (depending on wall construction)
7.1	UW section
7.3	UA section
7.5	Steel support structure
7.10	Trim panels *
7.11	Trim panels, fire-resistant, 2-ply, max. 25 mm (alternative to 6.2 and 7.14)
7.23	Sheet steel insert depending on wall manufacturer
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
*	The total thickness of the trim panels must not exceed 25 mm
#	optional
1 – 7	Up to EI 90 S
8	Up to EI 60S
9 – 12	EI 30 S

Dry mortarless installation into a lightweight partition wall, below a flexible ceiling joint with installation kit TQ

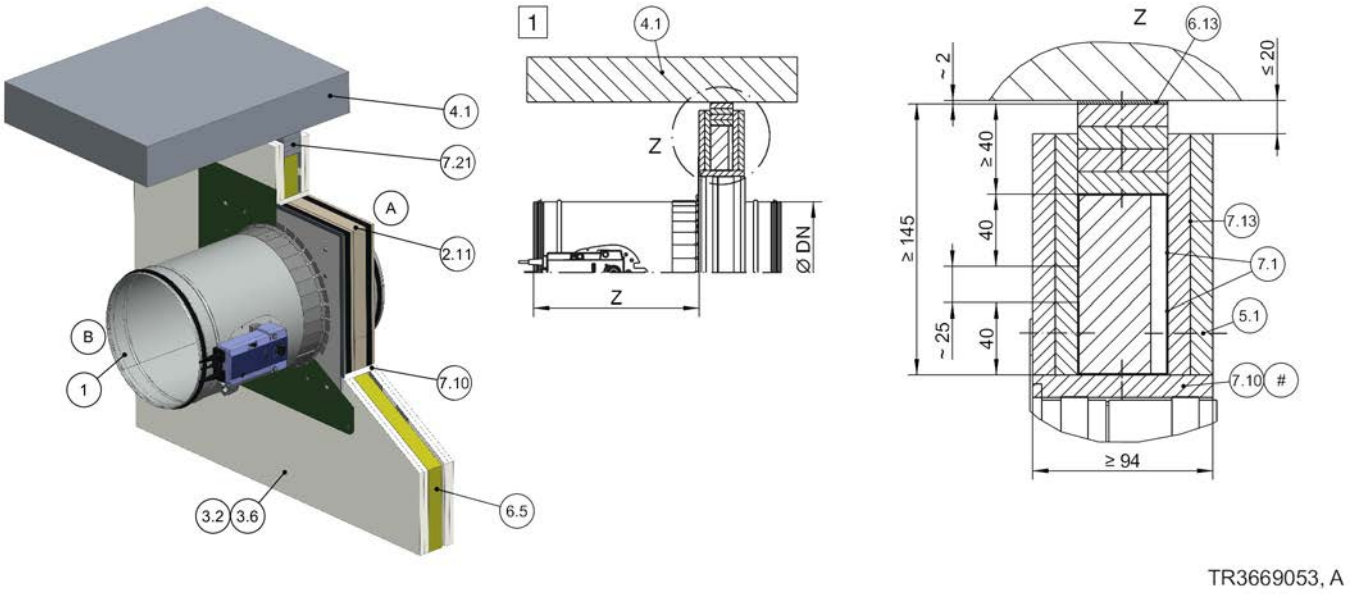


Fig. 44: Dry mortarless installation into a lightweight partition wall, below a flexible ceiling joint with installation kit TQ

1	FKR-EU
2.11	Installation kit TQ (factory assembled)
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
4.1	Solid ceiling slab
5.1	Dry wall screw
6.5	Mineral wool (depending on wall construction)
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative
7.1	UW section
7.10	Trim panels
7.13	Cladding
7.21	Ceiling joint strips (e.g. 4 × ≥ 10 mm)
Z	Spigot construction 370 mm Flange construction 342 mm
#	Depending on the wall structure
1	Up to EI 90 S

Note: representative illustration. The distance to the ceiling depends on the design of the flexible ceiling joint, the expected ceiling subsidence and the specifications of the wall manufacturer.

Additional requirements: dry mortarless installation with installation kit TQ in lightweight partition walls

- Lightweight partition wall or compartment wall, *on page 34*
- Installation kit TQ, *on page 32*
- ≥ 200 mm distance between two fire dampers in separate installation openings
- Fasten the cover plate with 4 (for nominal widths up to 400 mm) or 12 (for nominal widths from 450 mm) dry wall screws ∅ ≥ 4.2 mm to the metal support structure

5.6.5 Dry mortarless installation without installation kit

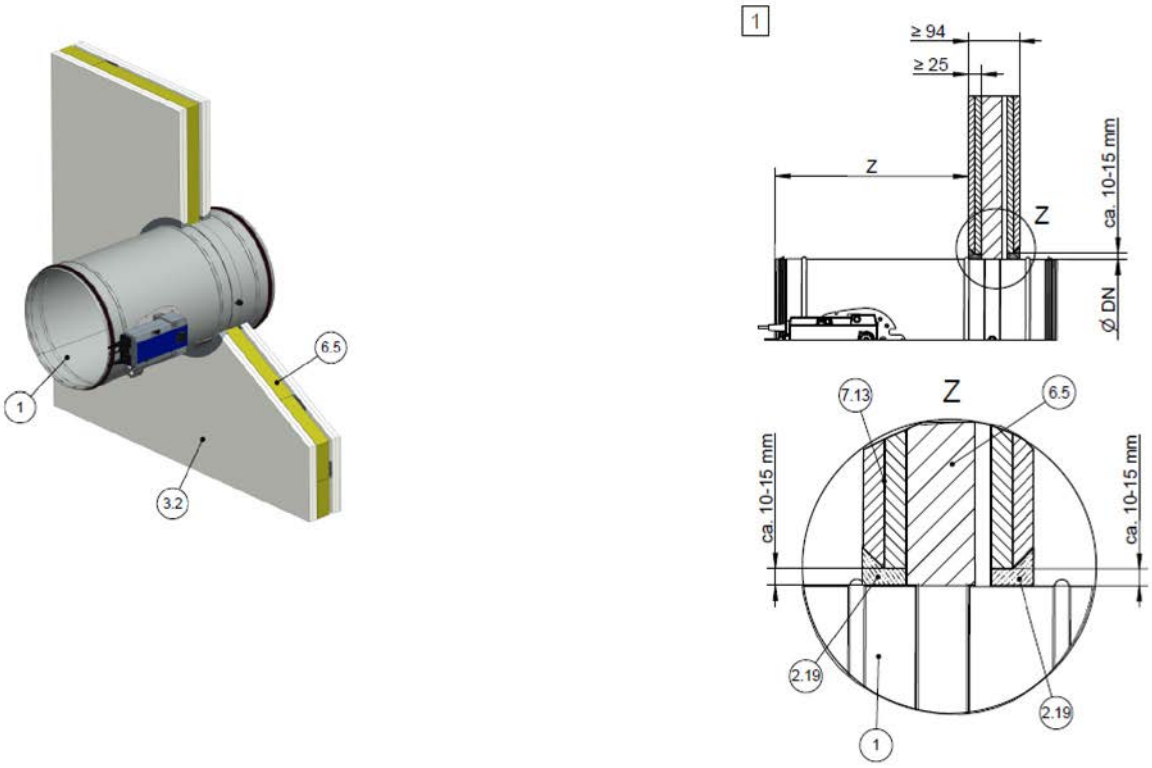


Fig. 45: Dry mortarless installation into a lightweight partition wall, without installation kit

1	FKR-EU
2.19	Joint filler (ready-to-use putty or equivalent)
3.2	Lightweight partition wall with metal support structure, cladding on both sides
6.5	Mineral wool (depending on wall construction)
7.13	Cladding
1 – 5	Up to EI 60 S
B	Operating side

Additional requirements: dry mortarless installation into lightweight partition walls without installation kit

- Lightweight partition wall, *on page 34*
- ≥200 mm distance between two fire dampers
- ≥ 75 mm distance from fire damper to load-bearing structural elements

1. Create a circular installation opening with nominal width +20 mm.
2. Chamfer the outer layer of the cladding all round on both sides and completely close off the surrounding gap on both sides with joint filler to the depth of the cladding.

5.6.6 Dry mortarless installation with fire batt

Dry mortarless installation into a lightweight partition wall, with a fire batt

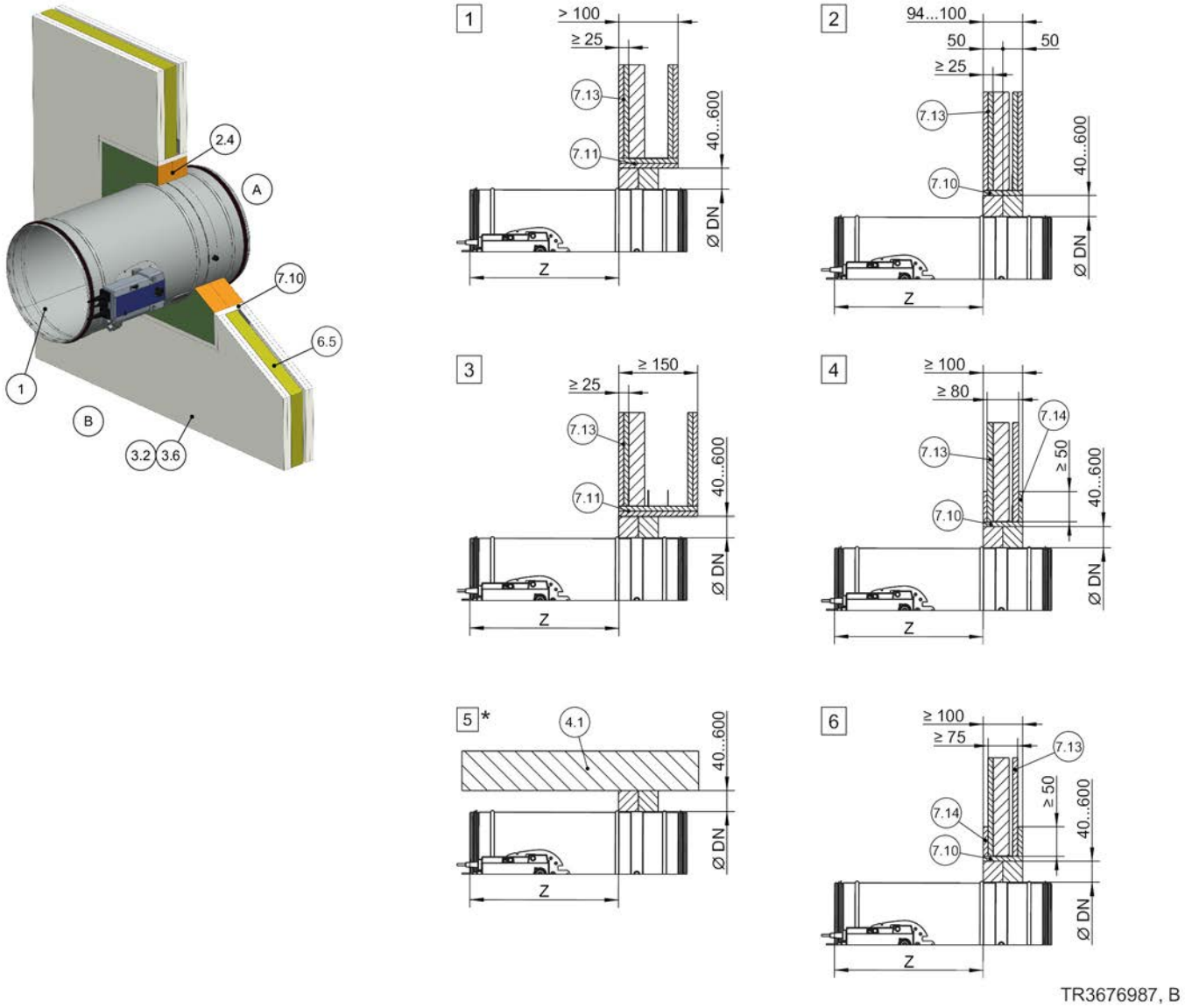


Fig. 46: Dry mortarless installation into a lightweight partition wall, with a fire batt

1	FKR-EU
2.4	Coated board system
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
4.1	Solid ceiling slab
6.5	Mineral wool (depending on wall construction)
7.10	Trim panels
7.11	Fire-resistant trim panels, double, in case of W > 100 mm
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 5
1 – 5	Up to EI 60 S
6	EI 30 S

Dry mortarless installation with fire batt, "flange to flange"

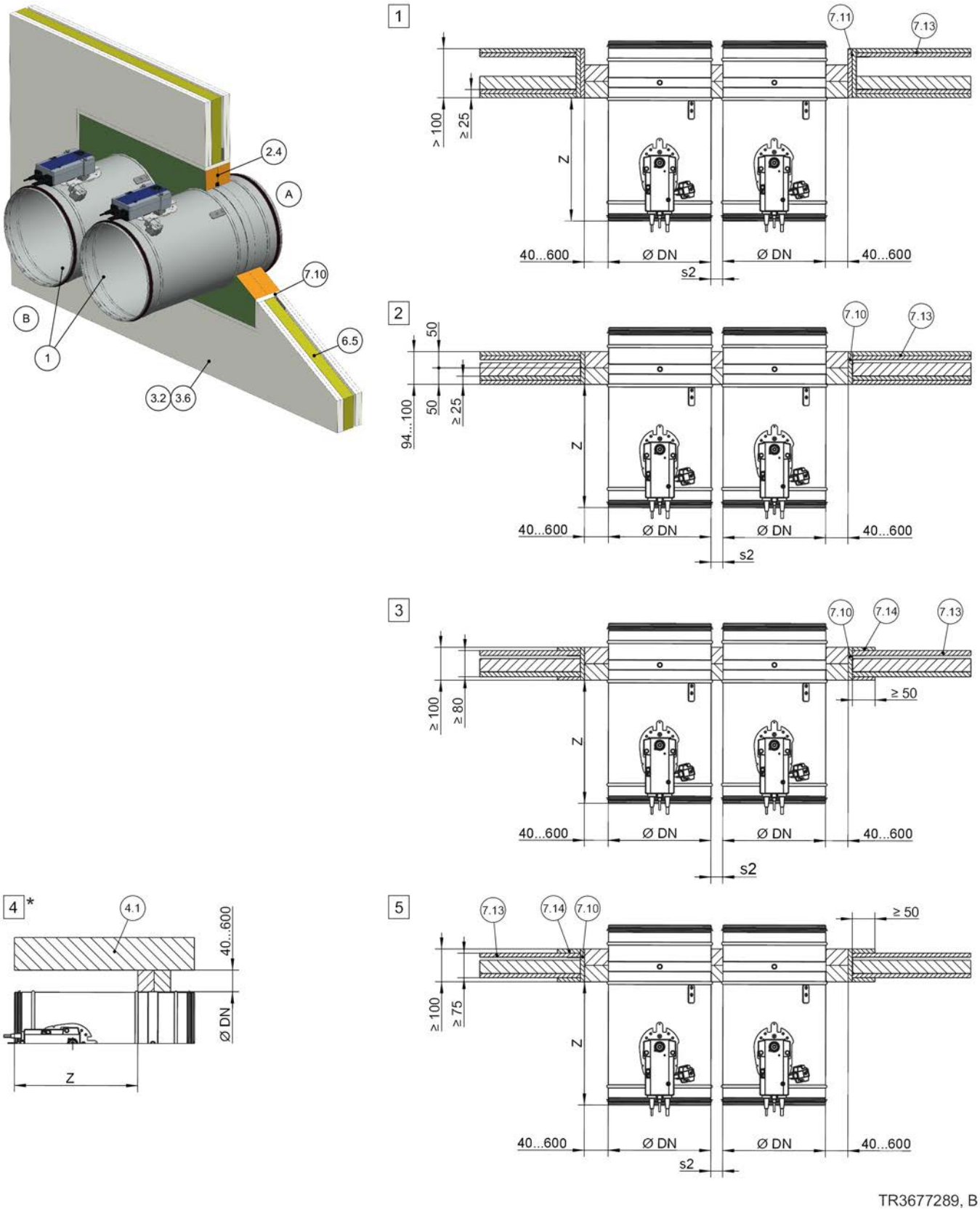


Fig. 47: Dry mortarless installation into a lightweight partition wall, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU
2.4	Coated board system
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.6	Compartment wall or safety wall with metal support structure, cladding on both sides
4.1	Solid ceiling slab
6.5	Mineral wool (depending on wall construction)
7.10	Trim panels
7.11	Fire-resistant trim panels, double, in case of W > 100 mm
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 600 mm Flange construction 80 – 600 mm
*	Installation near the floor analogous to 4
1 – 4	Up to EI 60 S
5	EI 30 S

Approved combinations for thicker walls

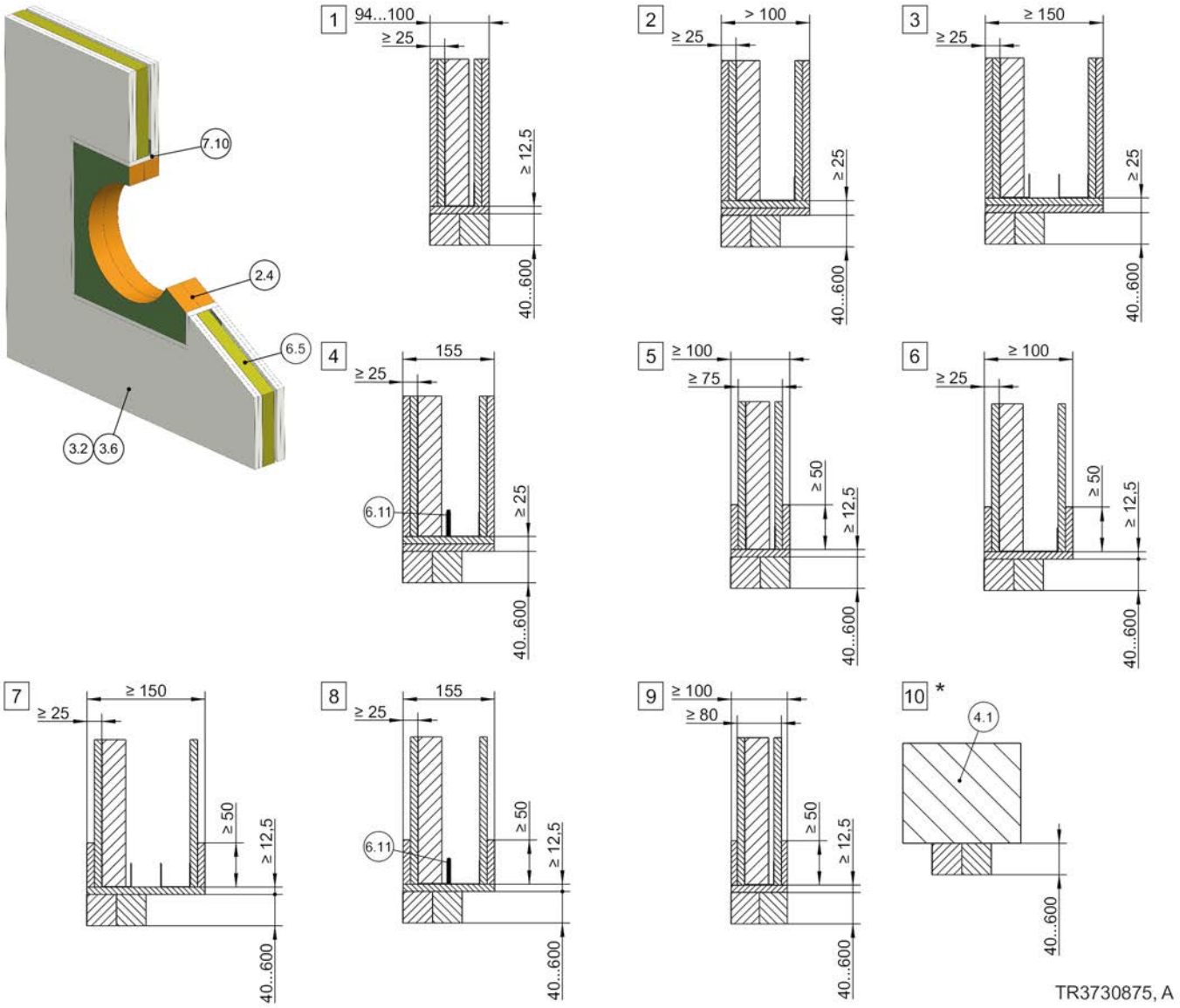


Fig. 48: Dry mortarless installation into a lightweight partition wall, with a fire batt, approved combinations for thicker walls

2.4 Coated board system
3.2 Lightweight partition wall or compartment wall with metal support structure or steel support structure, cladding on both sides
3.6 Compartment wall or safety wall with metal support structure, cladding on both sides
4.1 Solid ceiling slab / solid floor
6.5 Mineral wool (depending on wall construction)
6.11 Insulating strip (depending on wall construction)
7.10 Trim panels (for W ≤ 100 mm, single-layer, from W > 100 mm and EI 60 S, double-layer)
* Installation near the floor analogous to 10
1 – 4 EI 60 S
5 – 8 EI 30 S
9 EI 60 S
10 EI 30 S to EI 60 S

Additional requirements: dry mortarless installation into lightweight partition walls, with fire batt

- Lightweight partition wall, ↳ *on page 34*
- Fire batt systems, installation details, distances / dimensions, ↳ *on page 32*
- Suspension and fixing, ↳ *Chapter 5.14 'Fixing the fire damper' on page 135*

5.7 Lightweight partition walls with timber support structure or half-timbered constructions

5.7.1 General

Lightweight partition wall with timber support structure and cladding on both sides

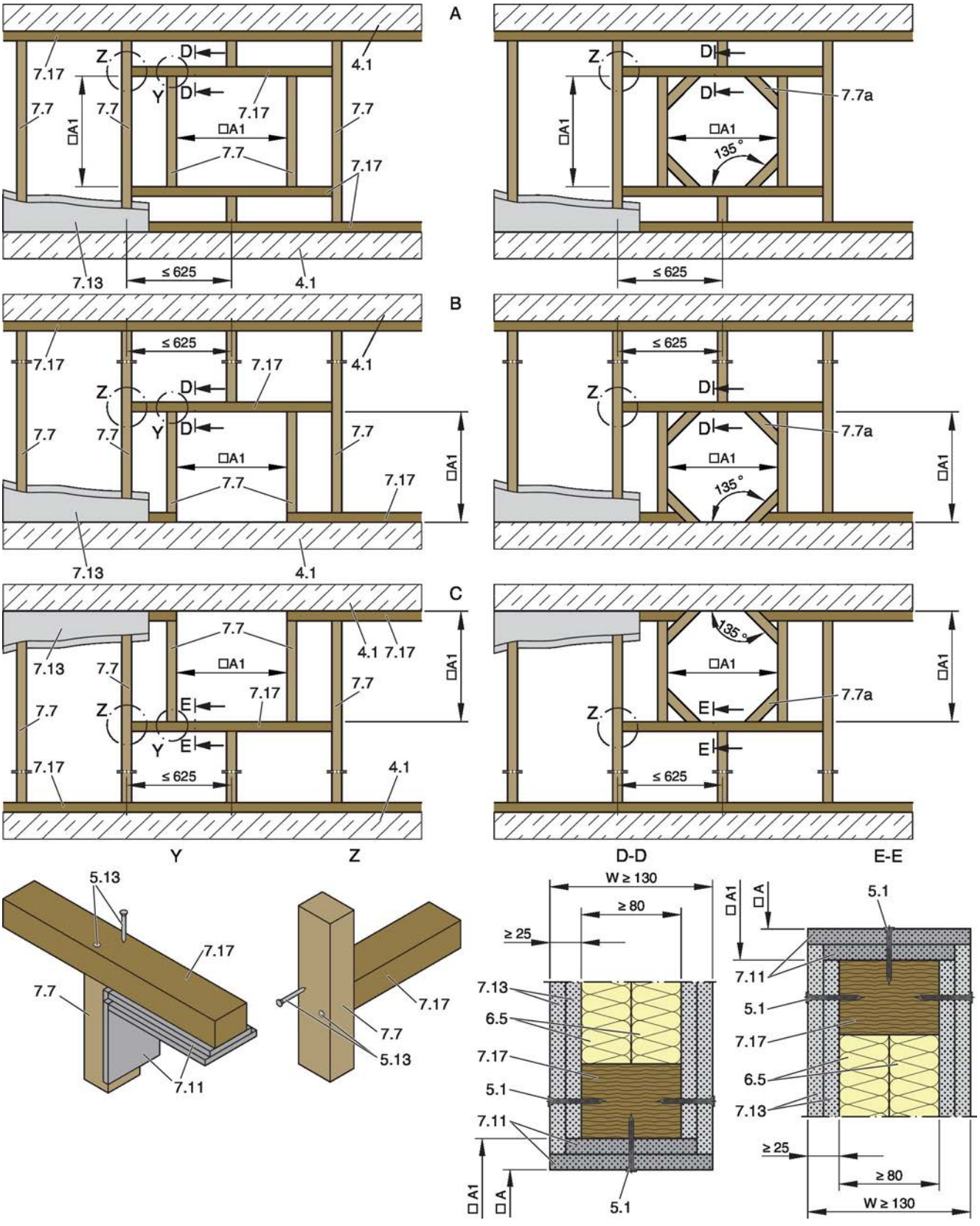


Fig. 49: Lightweight partition wall with timber support structure and cladding on both sides, illustration caption Fig. 51

Lightweight partition wall with timber support structure, "flange to flange"

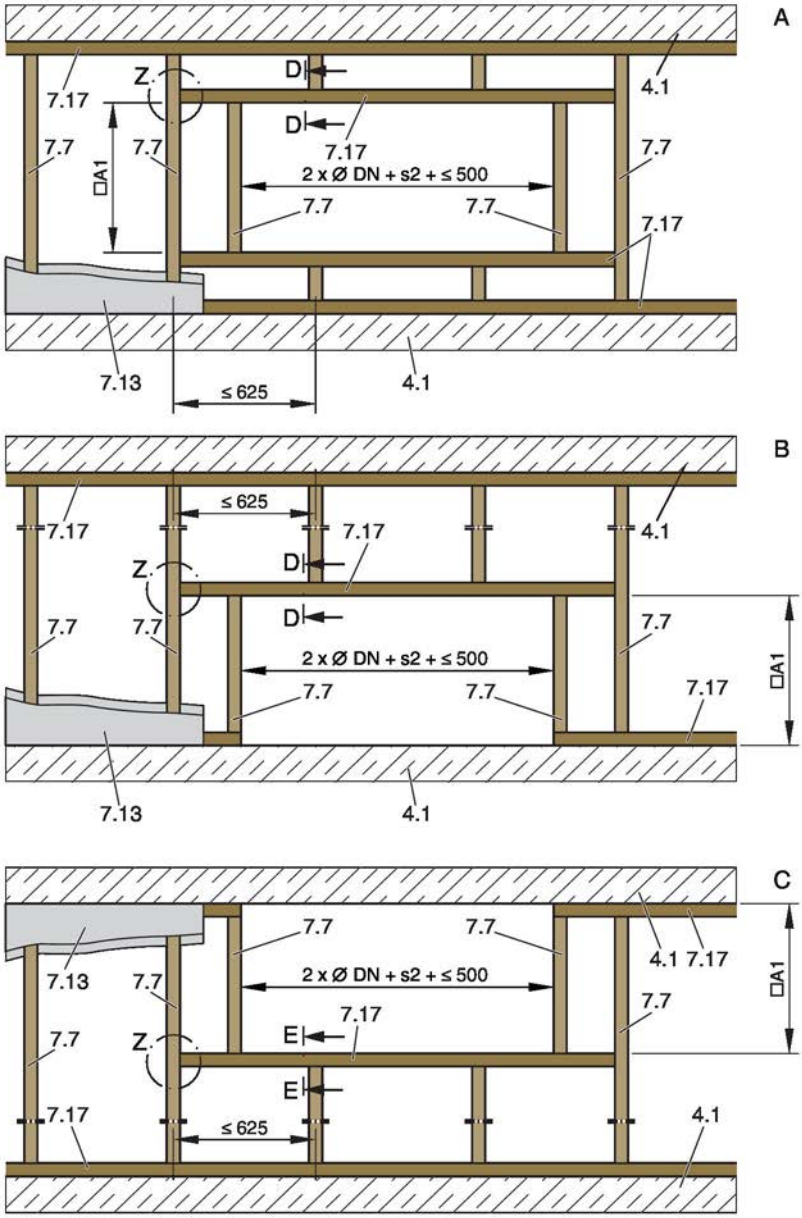


Fig. 50: Lightweight partition wall with timber support structure and cladding on both sides, flange to flange, nominal sizes: ∅ nominal width 315 – 400, caption Fig. 51

For details see Fig. 49

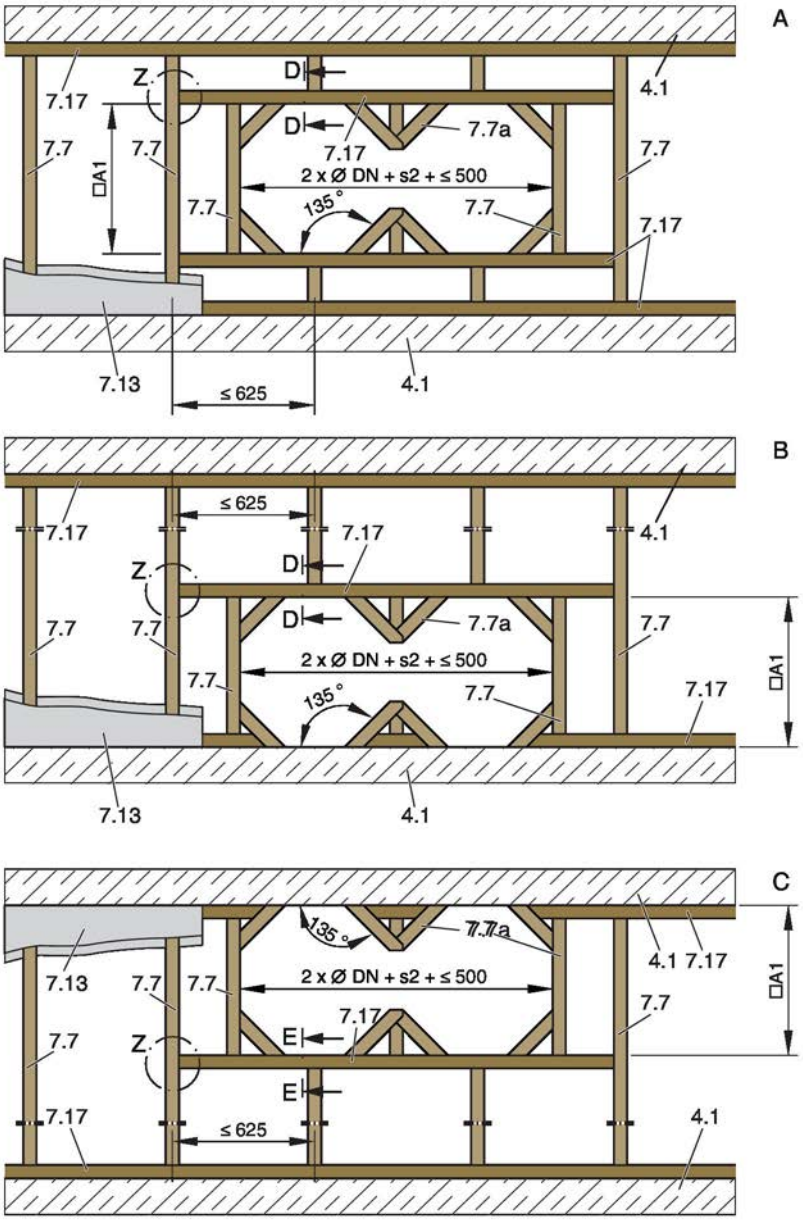


Fig. 51: Lightweight partition wall with timber support structure and cladding on both sides, flange to flange, nominal sizes: ∅ nominal width 450 – 800

A	Timber stud wall
B	Timber stud wall, installation near the floor
C	Timber stud wall, installation near the ceiling
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw
5.13	Wood screw or pin
6.5	Mineral wool (depending on wall construction)
7.7	Timber stud, at least 60 × 80 mm
7.7a	Timber support structure, min. 60 × 80 mm, only for mortar-based installation, nominal sizes: ∅ nominal width 450 – 800
7.11	Trim panels, double layer, staggered joints
7.13	Cladding
7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm
□A	Clear installation opening
□A1	Opening in the timber support structure, □A1 = □A + (4 × trim panels)

For details see Fig. 49

Lightweight partition wall, half-timbered construction with cladding on both sides

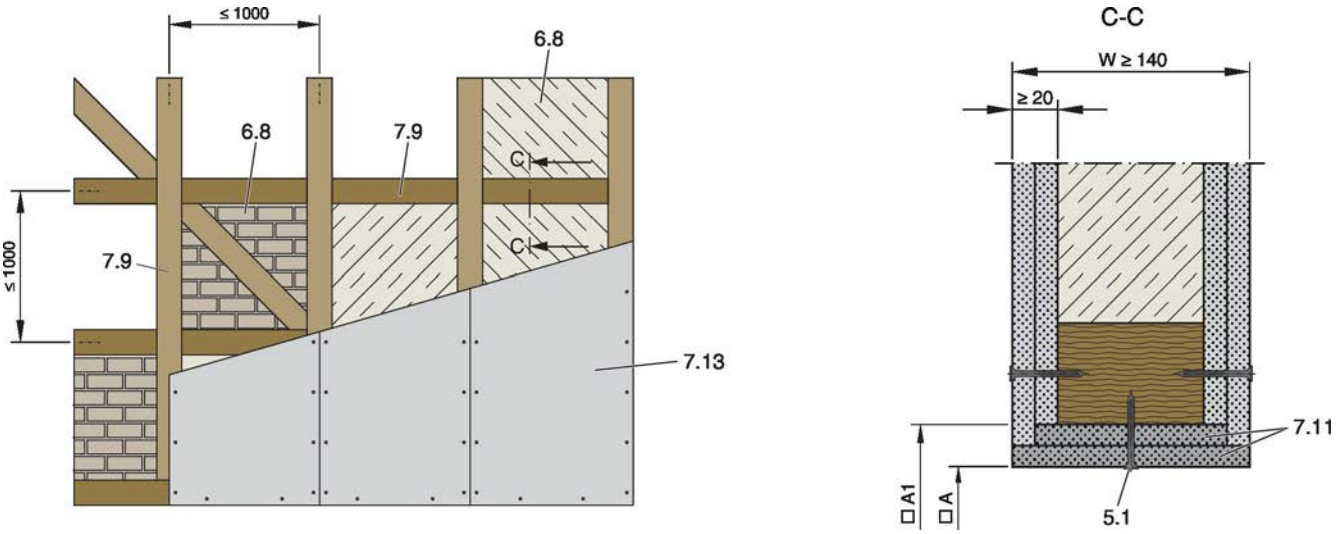


Fig. 52: Lightweight partition wall, half-timbered construction with cladding on both sides

5.1 Dry wall screw
6.8 Infill*
7.9 Timber structure
7.11 Trim panels, double layer, staggered joints
7.13 Cladding
* Cavities completely filled with mineral wool ≥ 50 kg/m³, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay
□A Clear installation opening
□A1 Opening in the half-timbered construction, □A1 = □A + (4 × trim panels)

Additional requirements: lightweight partition walls with timber support structure / half-timbered construction

- Timber stud wall or half-timbered construction, *on page 35*

Installation opening □A [mm]									
Installation type	**Nominal size ∅nominal width**								
	315	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
Mortar-based installation	□A = ∅nominal width + max. 450 mm □A1 = □A + (4 × trim panels)								
Dry mortarless installation with installation kit TQ[1, 2]	435	475	520	570	620	680	750	830	920
Dry mortarless installation with fire batt	□A = ∅nominal width + 80 – 1200 mm								

[1)] Installation opening tolerance ± 2 mm

[2)] Installation kit TQ is available only for FKR-EU with spigot

5.7.2 Mortar-based installation

Timber studs

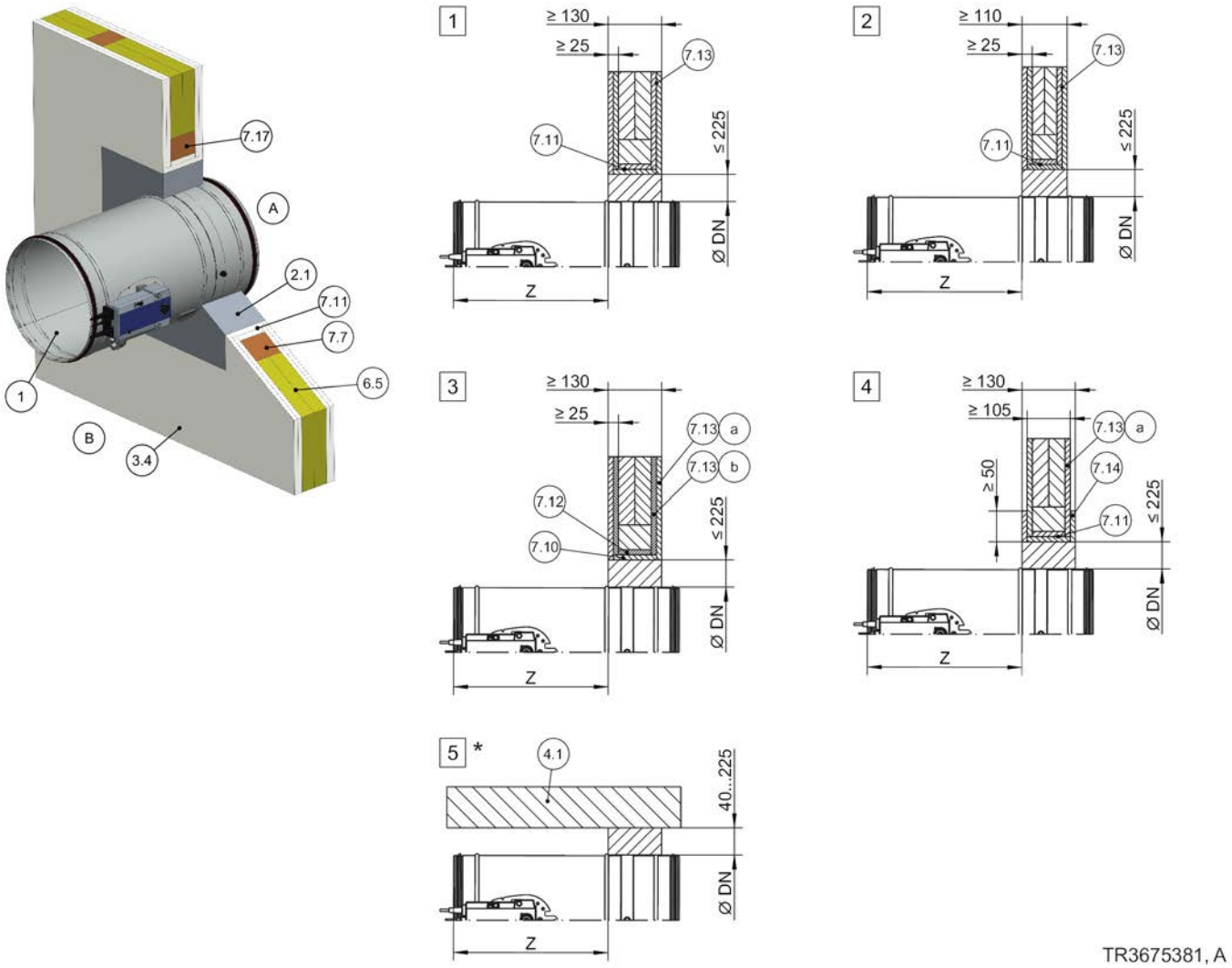


Fig. 53: Mortar-based installation into a lightweight partition wall with timber support structure

1	FKR-EU
2.1	Mortar
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
6.5	Mineral wool (depending on wall construction)
7.7	Timber support structure, min. 60 × 80 mm (min. 60 × 60 mm with F60)
7.10	Trim panels (fire-resistant)
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13	Cladding
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber support structure / nogging, at least 60 × 80 mm (min. 60 × 60 mm with F60)
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 5
1	Up to EI 90 S
2	Up to EI 60 S
3 4	EI 30 S
5	EI 30 to EI 90 S

Timber support structure, "flange to flange"

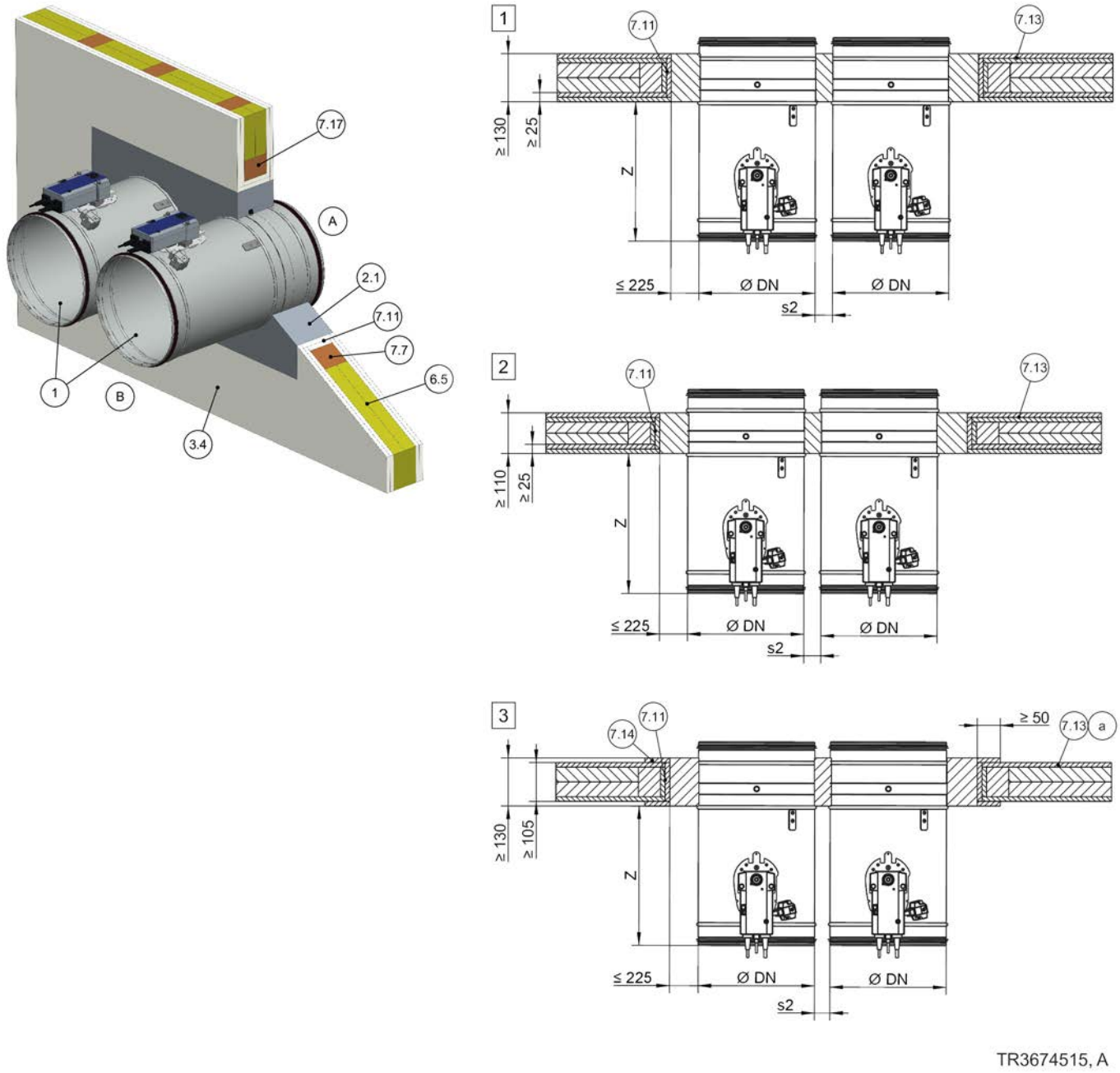


Fig. 54: Mortar-based installation into a lightweight partition wall with timber support structure, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU
2.1	Mortar
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
6.5	Mineral wool (depending on wall construction)
7.7	Timber support structure / nogging, at least 60 × 80 mm (at least 60 × 60 mm with F60)
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.13	Cladding
7.13a	Cladding, fire-resistant
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber support structure / nogging, at least 60 × 80 mm (min. 60 × 60 mm with F60)
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
1	Up to EI 90 S
2	Up to EI 60 S
3	EI 30 S

Timber support structure, combined, FKR-EU and FK2-EU

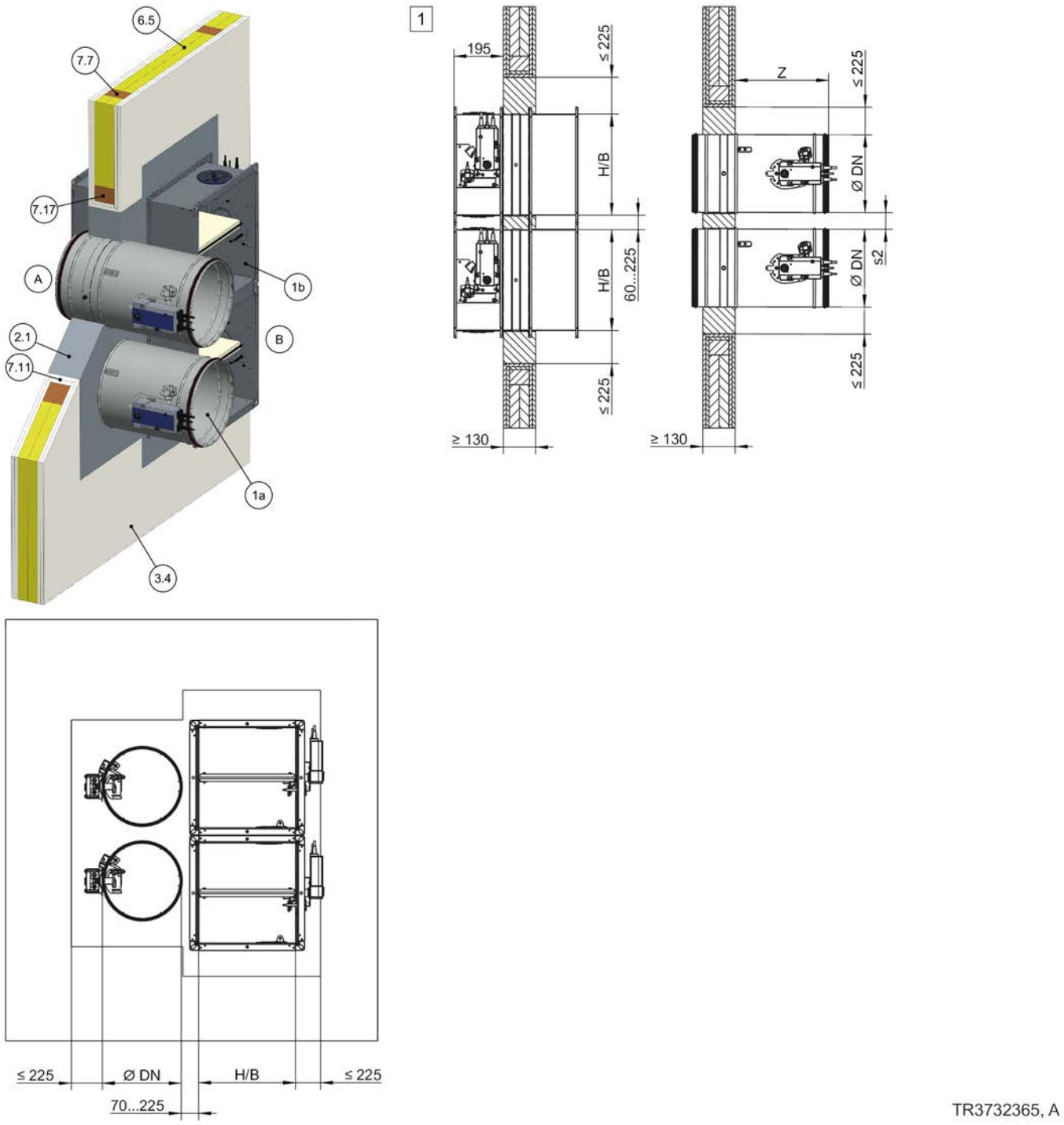


Fig. 55: Mortar-based installation into a lightweight partition wall with timber support structure, FK2-EU and FKR-EU combined

1a FKR-EU
1b FK2-EU up to B × H ≤ 800 × 400 mm
2.1 Mortar
3.4 Timber stud wall (also timber panel constructions), cladding on both sides
6.5 Mineral wool (depending on wall construction)
7.7 Timber support structure / nogging, at least 60 × 80 mm (at least 60 × 60 mm with F60)
7.17 Trimmers, timber support structure / nogging, at least 60 × 80 mm (min. 60 × 60 mm with F60)
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

7.11 Trim panels, double layer with staggered joints, fire-resistant

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Distance to load-bearing structural elements ≥ 40 mm
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Timber structure

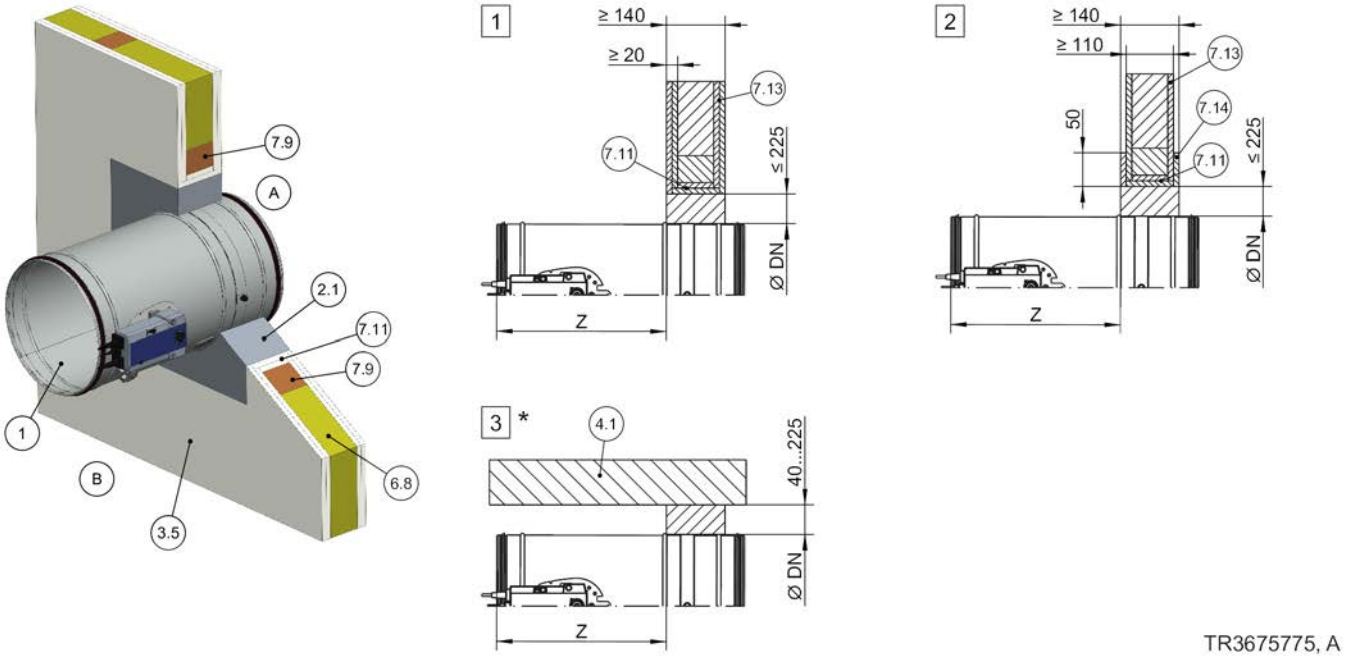


Fig. 56: Mortar-based installation into a lightweight partition wall, half-timbered construction

1 FKR-EU
2.1 Mortar
3.5 Half-timbered construction, cladding on both sides
4.1 Solid ceiling slab / solid floor
6.8 Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9 Timber structure
7.11 Trim panels, double layer with staggered joints, fire-resistant
7.13 Cladding
7.14 Reinforcing board of the same material as the wall
Z Spigot construction 370 mm
Flange construction 342 mm
* Installation near the floor analogous to 3
1 Up to EI 90 S
2 EI 30 S
3 EI 30 S to EI 90 S

Half-timbered construction, "flange to flange"

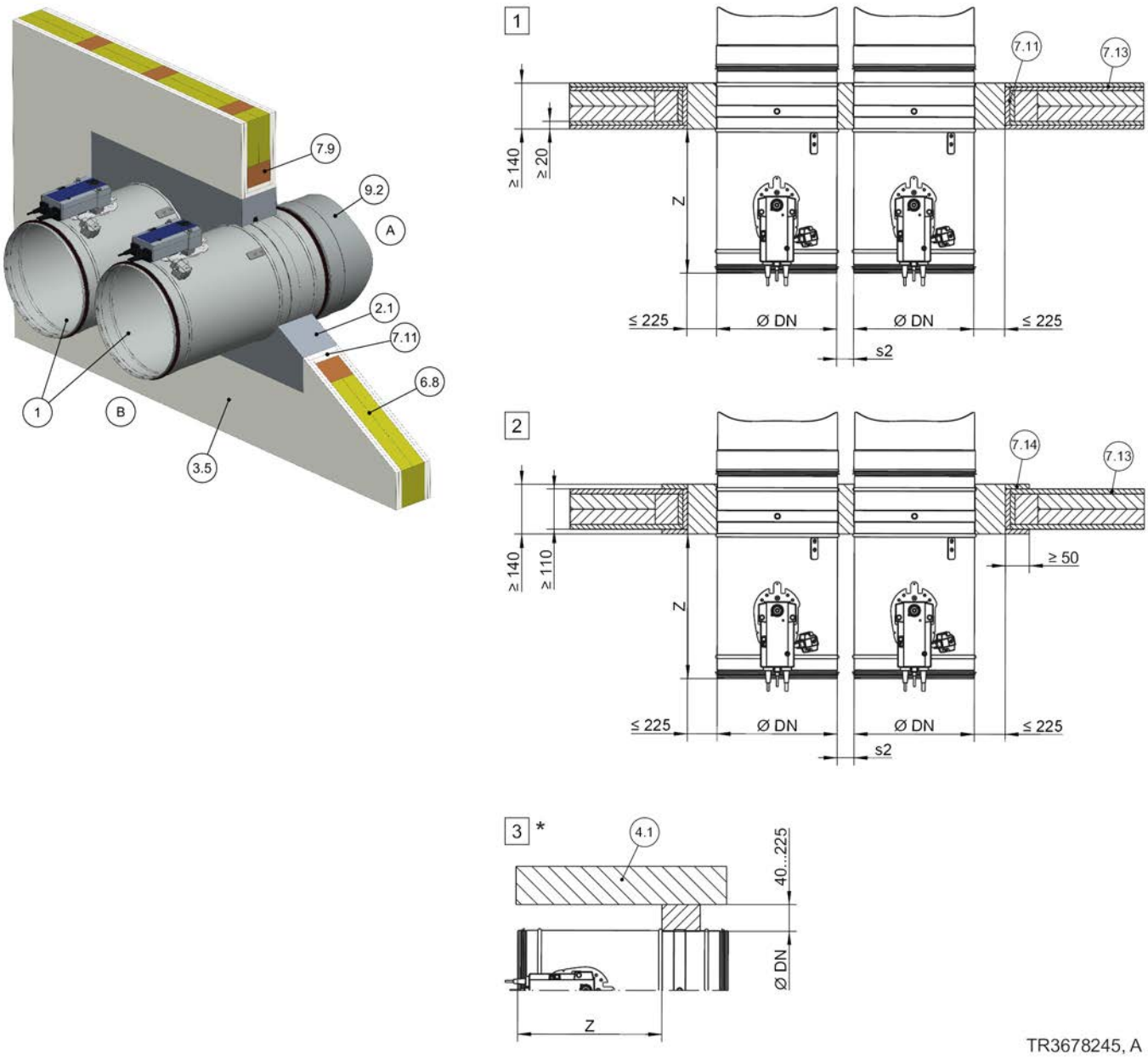


Fig. 57: Mortar-based installation into a lightweight partition wall with half-timbered construction, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1 FKR-EU
2.1 Mortar
3.5 Half-timbered construction, cladding on both sides
4.1 Solid ceiling slab / solid floor
6.8 Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9 Timber structure
7.11 Trim panels, double layer with staggered joints, fire-resistant
7.13 Cladding
7.14 Reinforcing board of the same material as the wall
9.2 Extension piece or duct
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
* Installation near the floor analogous to 3
1 Up to EI 90 S
2 EI 30 S
3 EI 30 to EI 90 S

Half-timbered construction, combined, FKR-EU and FK2-EU

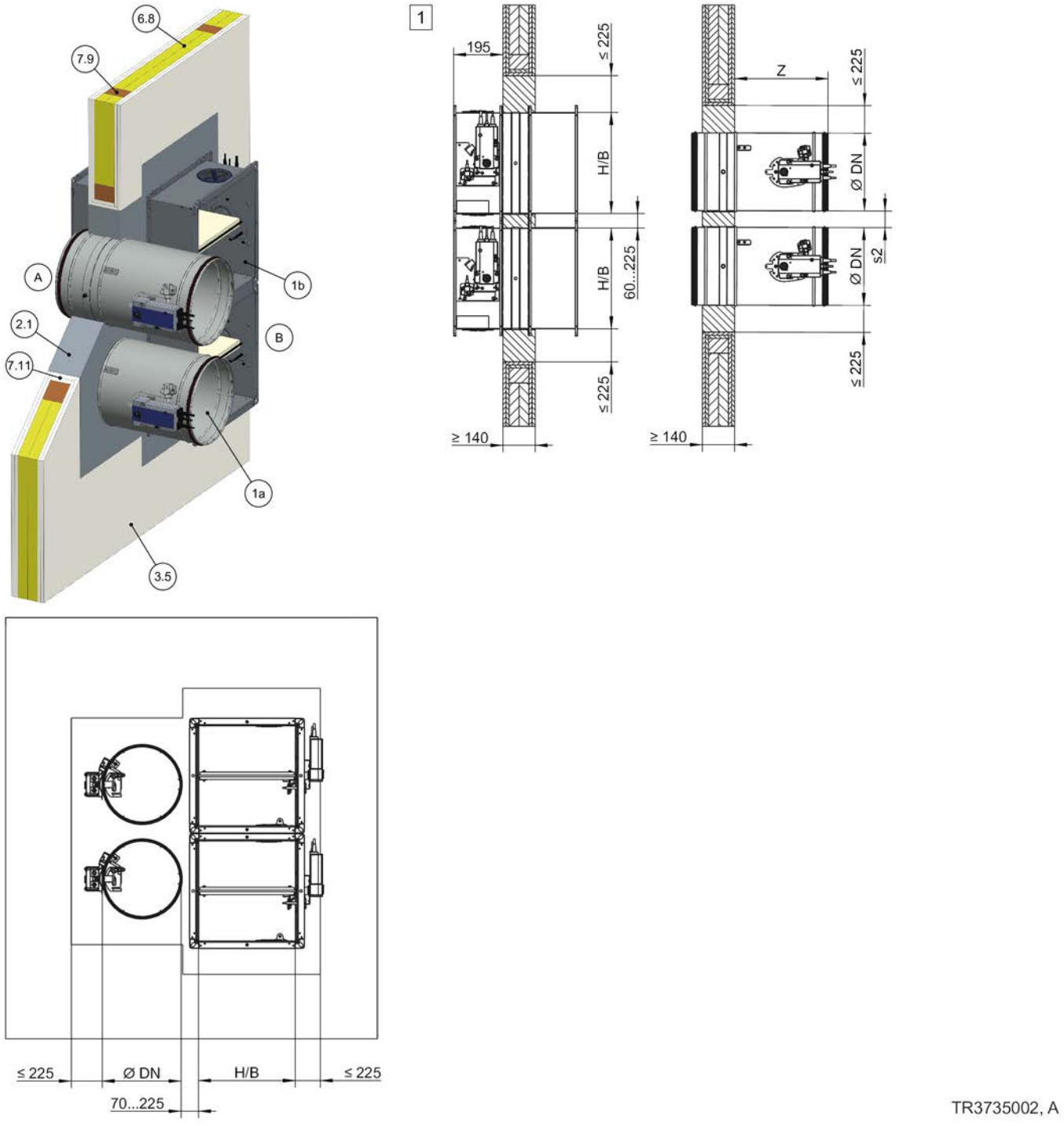


Fig. 58: Mortar-based installation into a lightweight partition wall with half-timbered construction, FK2-EU and FKR-EU combined

1a FKR-EU
1b FK2-EU up to B × H ≤ 800 × 400 mm
2.1 Mortar
3.5 Half-timbered construction, cladding on both sides
6.8 Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9 Timber structure
7.11 Trim panels, double layer with staggered joints, fire-resistant
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Distance to load-bearing structural elements ≥ 40 mm
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Additional requirements: mortar-based installation in lightweight partition wall with timber support structure / half-timbered construction

- Timber stud wall or half-timbered construction,
  ↳ *on page 35*

5.7.3 Mortar-based installation – multiple occupancy of an installation opening

Timber stud wall

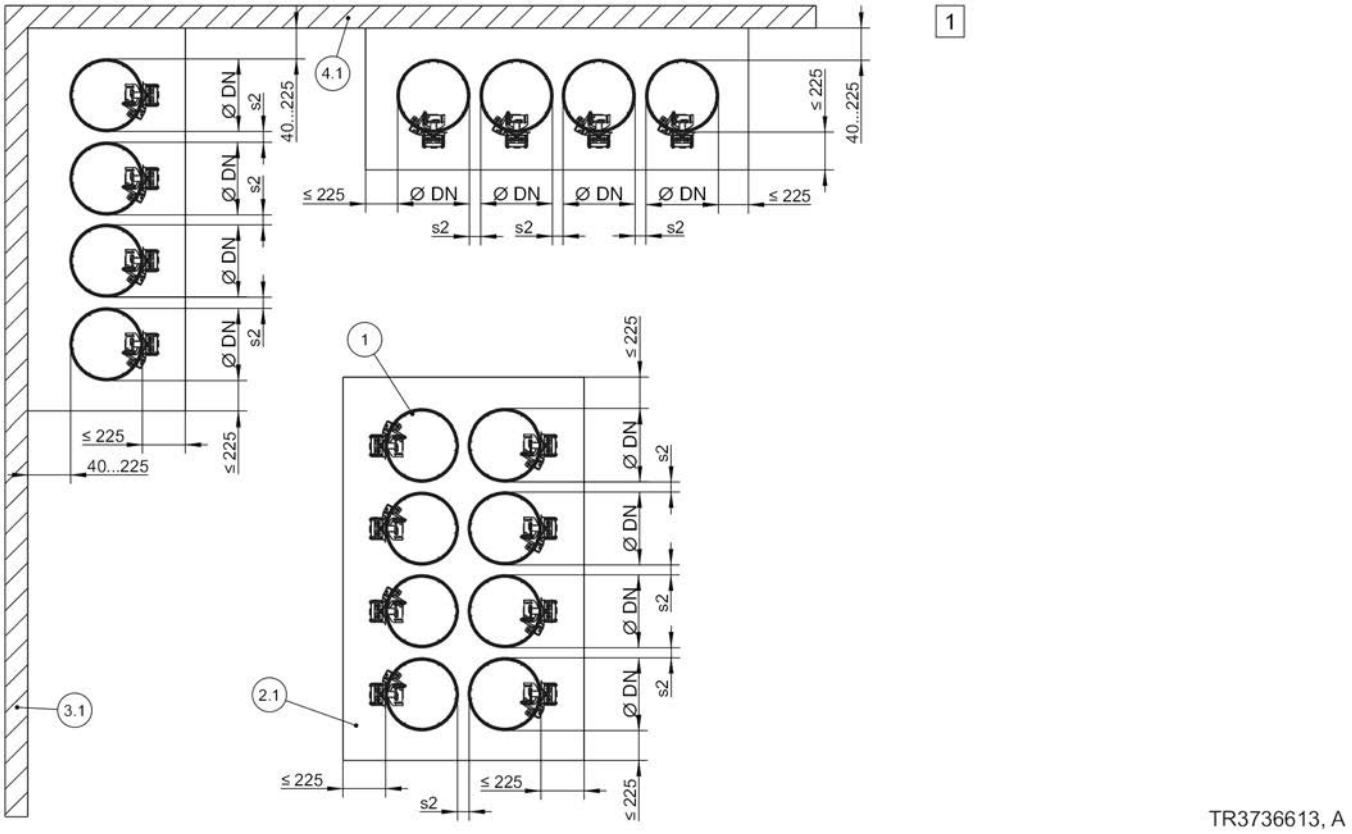


Fig. 59: Mortar-based installation – multiple occupancy of an installation opening

1 FKR-EU
2.1 Mortar
2.2 Concrete
3.1 Solid wall (load-bearing component)
4.1 Solid ceiling slab (load-bearing component)
[1] Up to EI 90 S

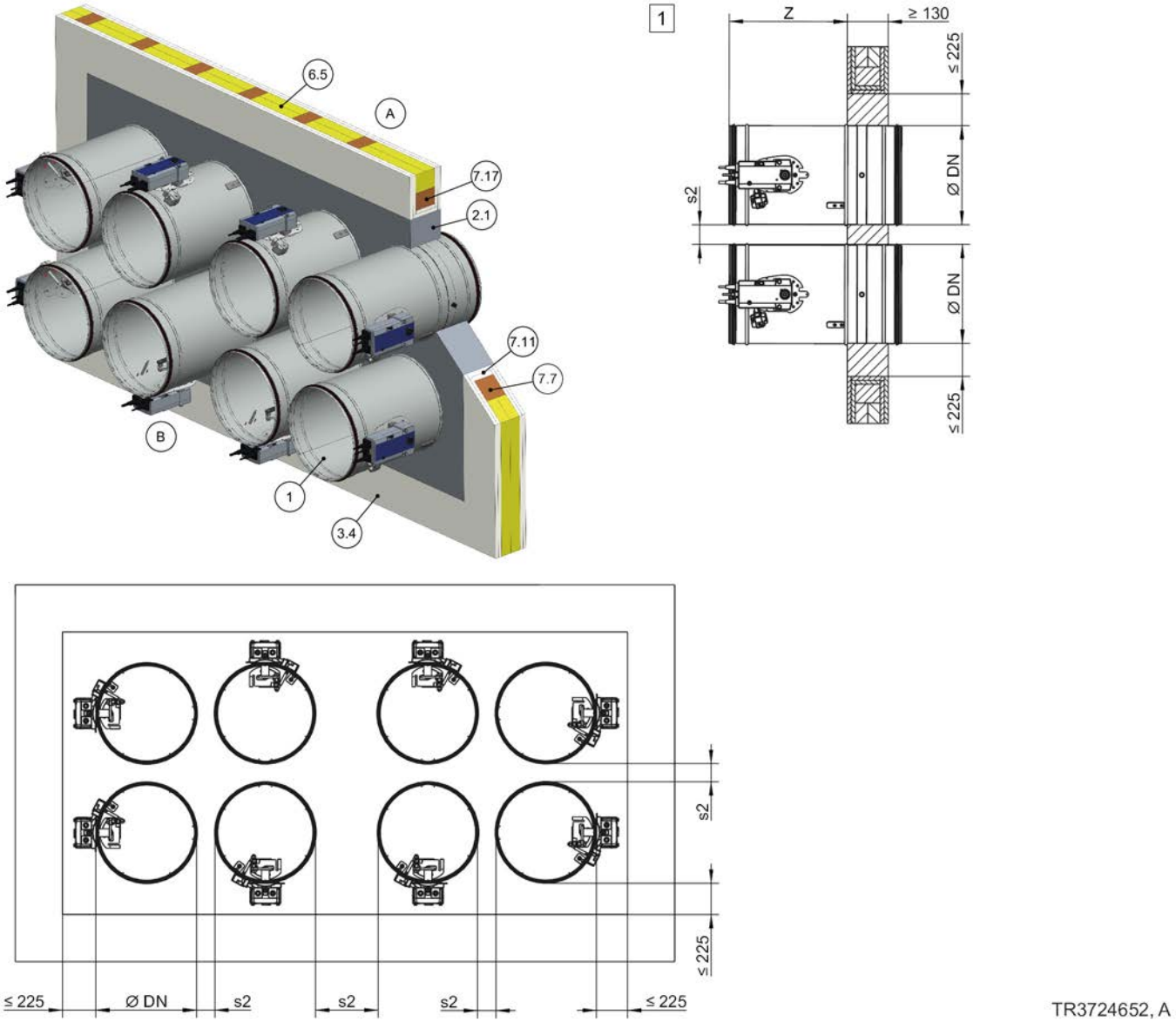


Fig. 60: Mortar-based installation – multiple occupancy of an installation opening in timber stud wall

1	FKR-EU
2.1	Mortar
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
6.5	Mineral wool (depending on wall construction)
7.7	Timber support structure, min. 60 × 80 mm (min. 60 × 60 mm with F60)
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.17	Trimmers, timber support structure / nogging, at least 60 × 80 mm (min. 60 × 60 mm with F60)
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
1	Up to EI 90 S

Half-timbered wall

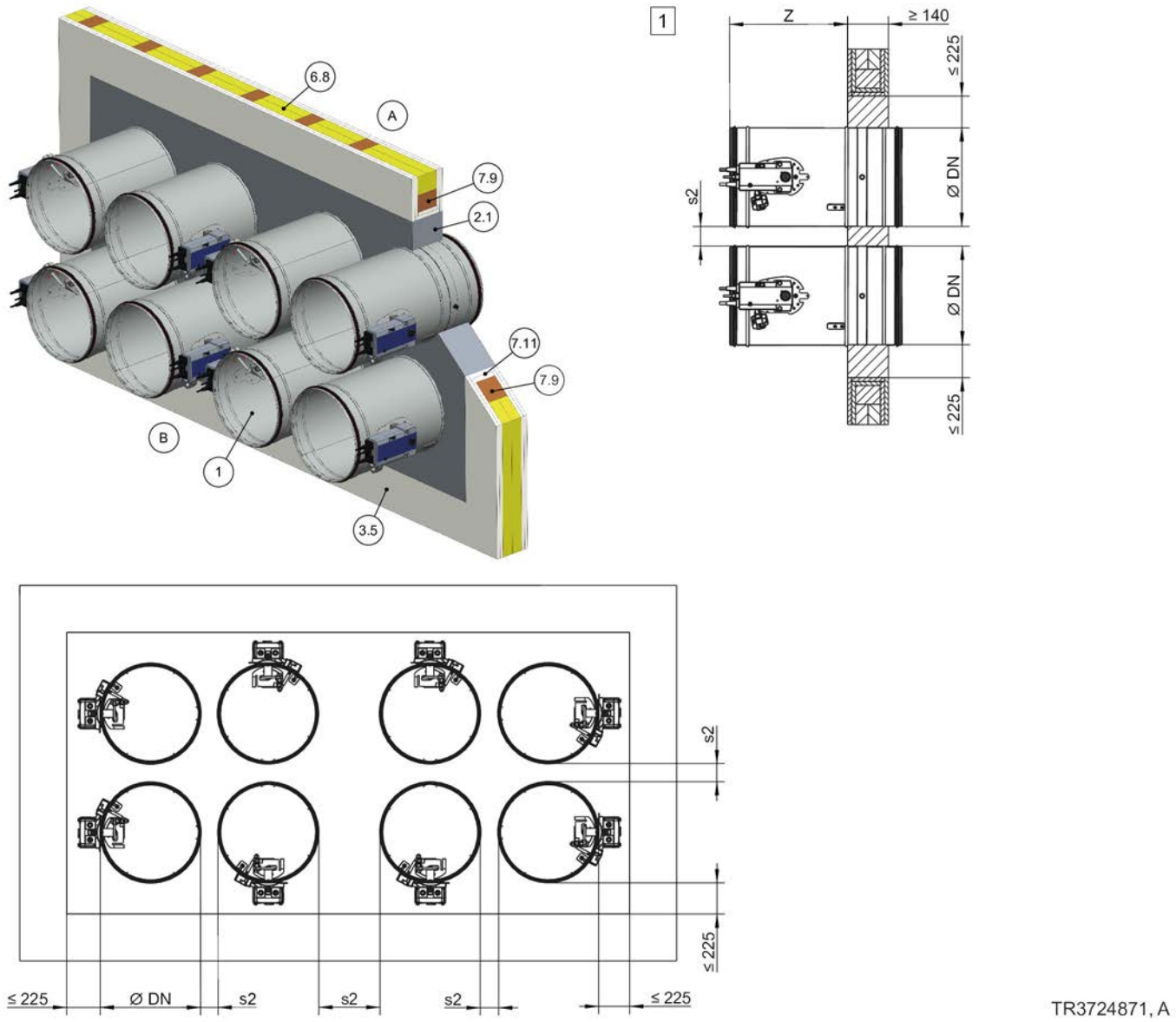


Fig. 61: Mortar-based installation – multiple occupancy of an installation opening in half-timbered construction

1 FKR-EU
2.1 Mortar
3.5 Half-timbered construction, cladding on both sides
6.8 Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9 Timber structure
7.11 Trim panels, double layer with staggered joints, fire-resistant
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

Additional requirements: mortar-based installation – multiple occupancy of an installation opening

- Timber stud wall or half-timbered construction, ↳ *on page 35*
- Total fire damper area (∅ nominal width) ≤ 4.8 m^2
- The number of fire dampers in an installation opening is limited by their damper size (∅ nominal width) and the overall area of the fire dampers (4.8 m^2)
- The dampers can be arranged in one or two rows.
- Distance to load-bearing structural elements ≥ 40 mm
- If the actuators are located between the fire dampers, sufficient free space for inspection must be provided.
- The mortar bed width is not allowed to exceed 225 mm, provide separate trimmers if necessary.

5.7.4 Dry mortarless installation with installation kit TQ

Timber studs

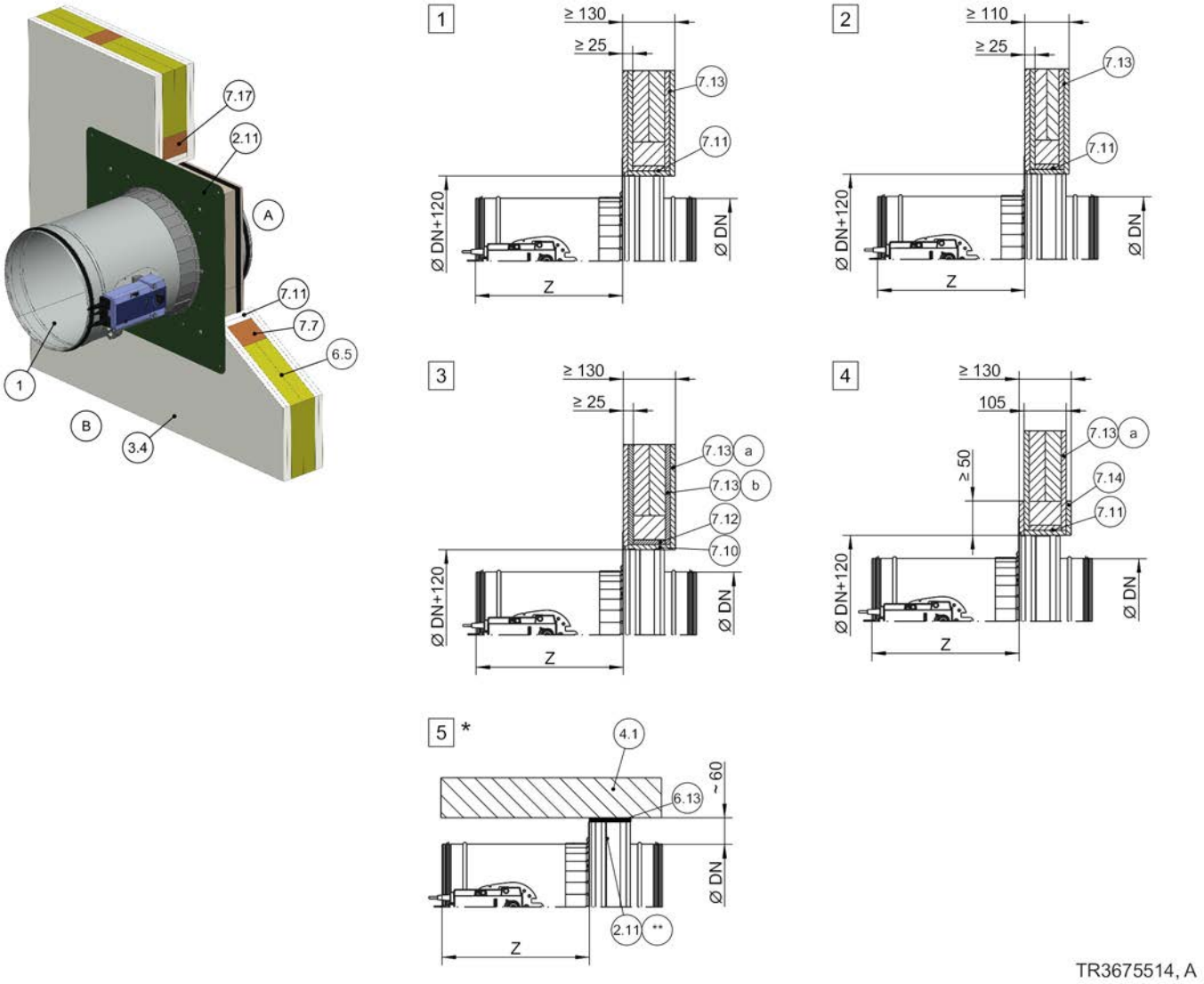


Fig. 62: Dry mortarless installation into a lightweight partition wall with timber support structure, with installation kit TQ

1	FKR-EU
2.11	Installation kit TQ (factory assembled)
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
6.5	Mineral wool (depending on wall construction)
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative
7.7	Timber support structure / nogging, at least 60 × 80 mm (at least 60 × 60 mm with F60)
7.10	Trim panels, 12.5 mm, fire-resistant
7.11	Trim panels, double layer, 2 × 12.5 mm with staggered joints, fire-resistant
7.12	Trim panels, wood sheet, max. 12.5 mm, at least 600 kg/³
7.13	Cladding
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber support structure / nogging, at least 60 × 80 mm (min. 60 × 60 mm with F60)
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 5
**	Cover plate, shortened by others
1	Up to EI 90 S
2	Up to EI 60 S
3 4	EI 30 S
5	EI 30 to EI 90 S

Timber structure

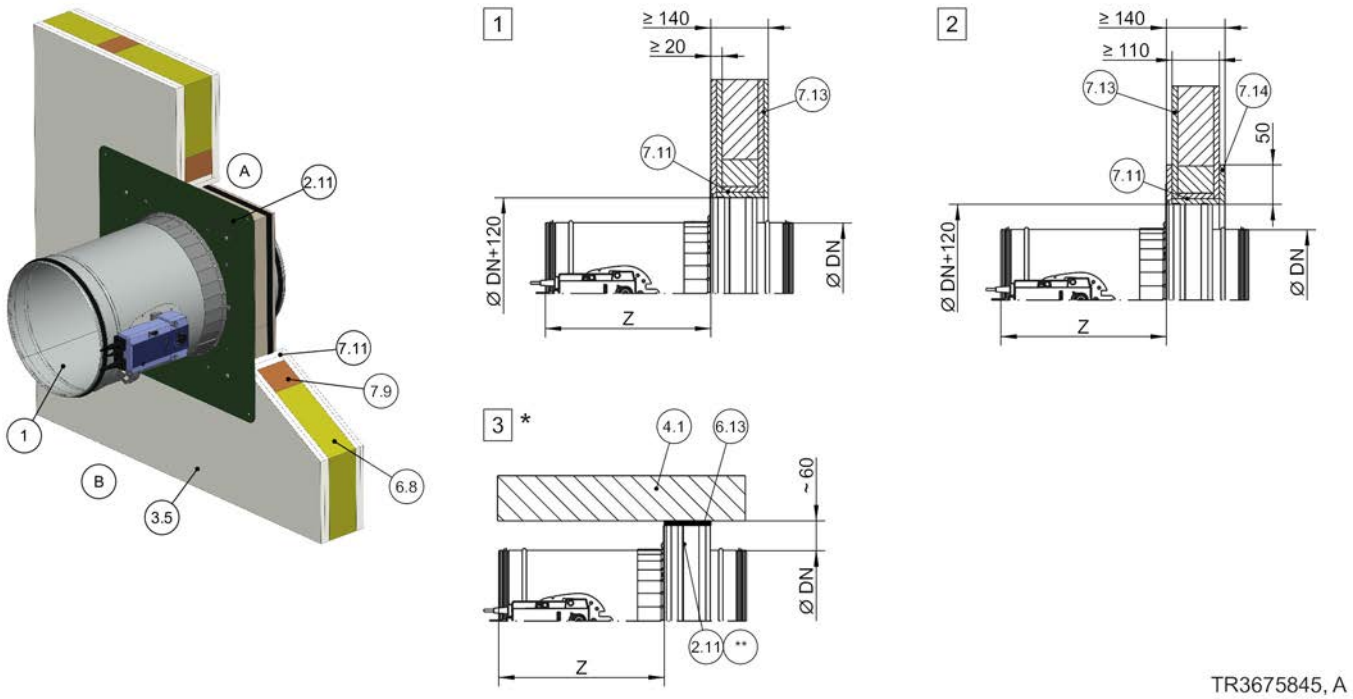


Fig. 63: Dry mortarless installation into a lightweight partition wall, half-timbered construction, using installation kit TQ

1	FKR-EU
2.11	Installation kit TQ (factory assembled)
3.5	Half-timbered construction, cladding on both sides
4.1	Solid ceiling slab / solid floor
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative
7.9	Timber structure
7.11	Trim panels, double layer, 2 × 12.5 mm with staggered joints, fire-resistant
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 3
**	Cover plate, shortened by others
1 3	Up to EI 90 S
2	EI 30 S

Additional requirements: dry mortarless installation with installation kit TQ into lightweight partition walls with timber support structure / half-timbered construction

- Timber stud wall or half-timbered construction, ↬ *on page 35*
- Installation kit TQ, ↬ *on page 32*
- ≥ 200 mm distance between two fire dampers in separate installation openings
- The total thickness of the trim panels must not exceed 25 mm
- Fix the cover plate with dry wall screws ∅ ≥ 4.2 mm to the timber support structure all round; nominal width up to 400 mm: 4 screws; nominal width from 450 mm: 12 screws

5.7.5 Dry mortarless installation with fire batt

Timber studs

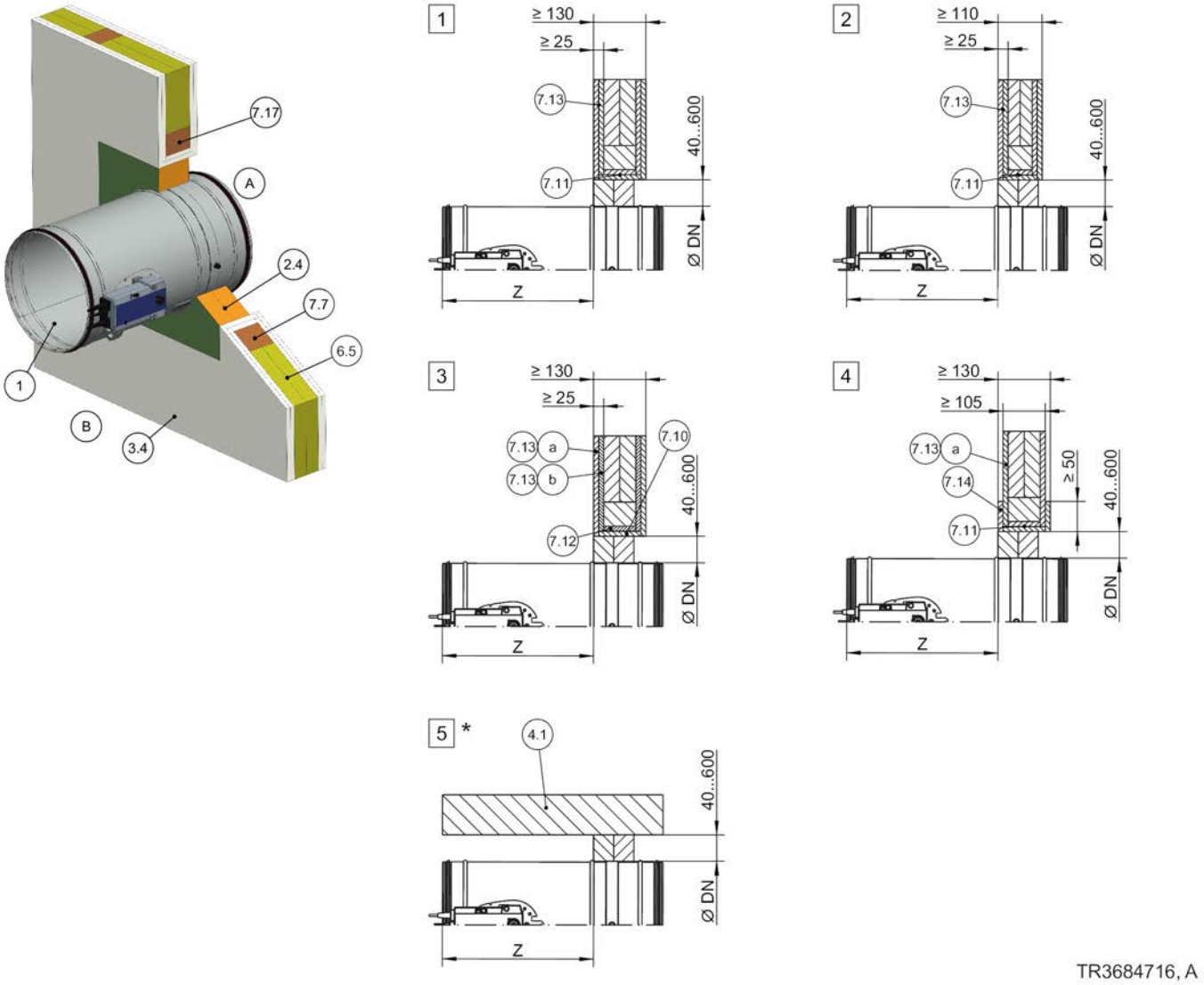


Fig. 64: Dry mortarless installation with fire batt into a lightweight partition wall with timber support structure

1	FKR-EU
2.4	Coated board system
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
6.5	Mineral wool (depending on wall construction)
7.7	Timber stud / nogging, at least 60 × 60 mm
7.10	Trim panels (fire-resistant)
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13	Cladding
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber stud / nogging, at least 60 × 60 mm
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 5
1 2	Up to EI 60 S
3 4	EI 30 S
5	EI 30 to EI 60 S

Timber support structure "flange to flange"

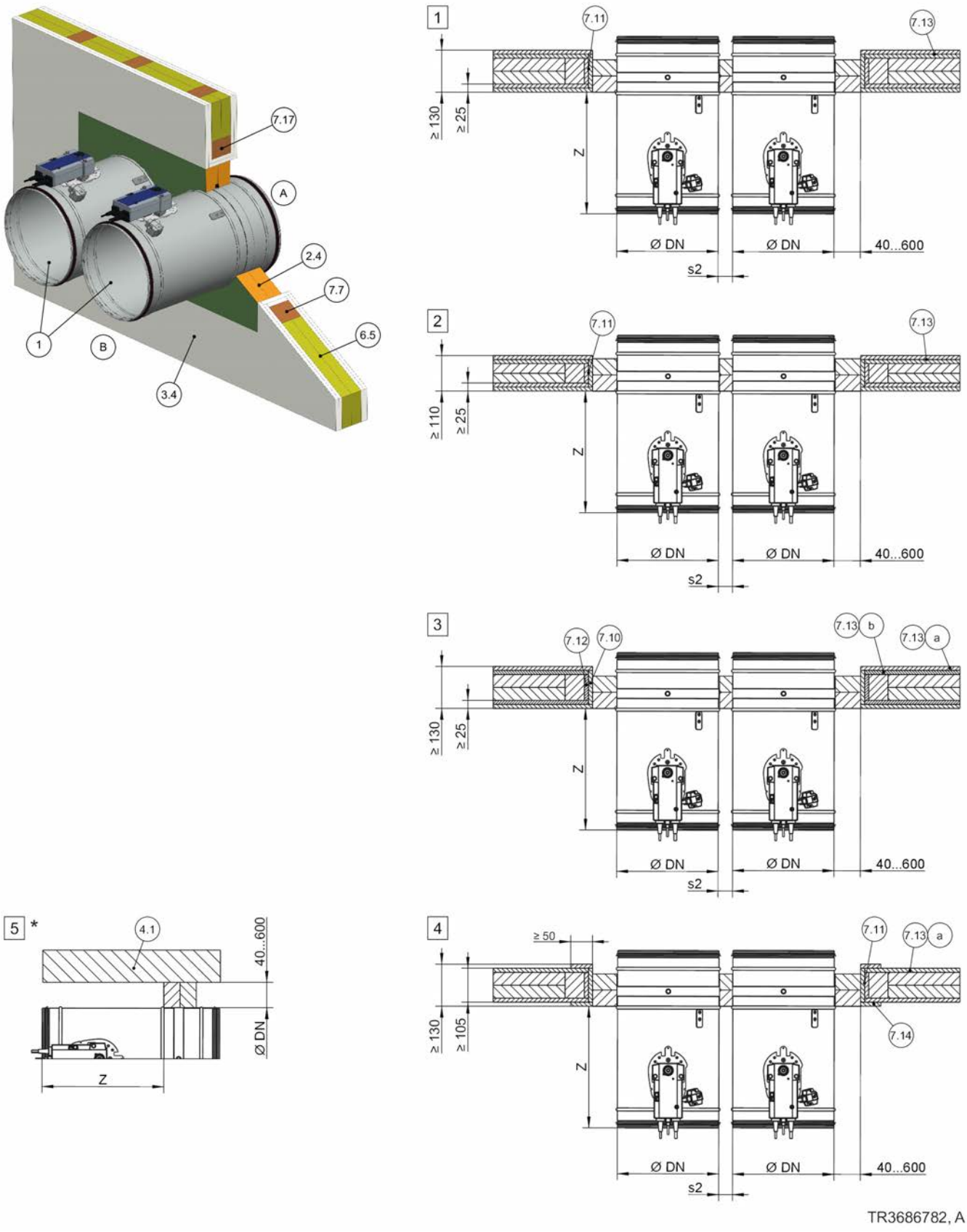


Fig. 65: Dry mortarless installation into a lightweight partition wall with timber support structure, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU
2.4	Coated board system
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
6.5	Mineral wool (depending on wall construction)
7.7	Timber stud / nogging, at least 60 × 60 mm
7.10	Trim panels (fire-resistant)
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13	Cladding
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber stud / nogging, at least 60 × 60 mm
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 600 mm Flange construction 80 – 600 mm
*	Installation near the floor analogous to 5
1 2	Up to EI 60 S
3 4	EI 30 S
5	EI 30 S to EI 60 S

Timber structure

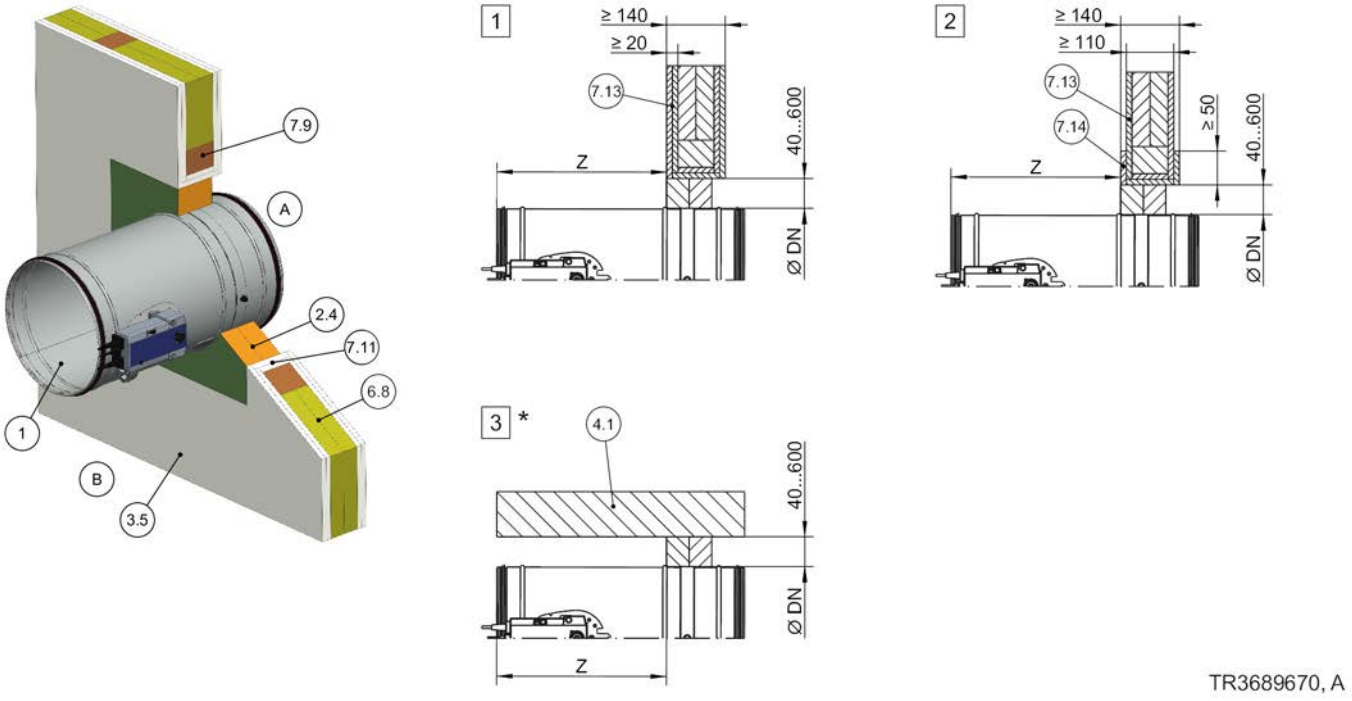


Fig. 66: Dry mortarless installation with fire batt into a half-timbered construction

1	FKR-EU
2.4	Coated board system
3.5	Half-timbered construction, cladding on both sides
4.1	Solid ceiling slab / solid floor
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9	Timber structure
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 3
1 3	Up to EI 60 S
2	EI 30 S

Half-timbered construction "flange to flange"

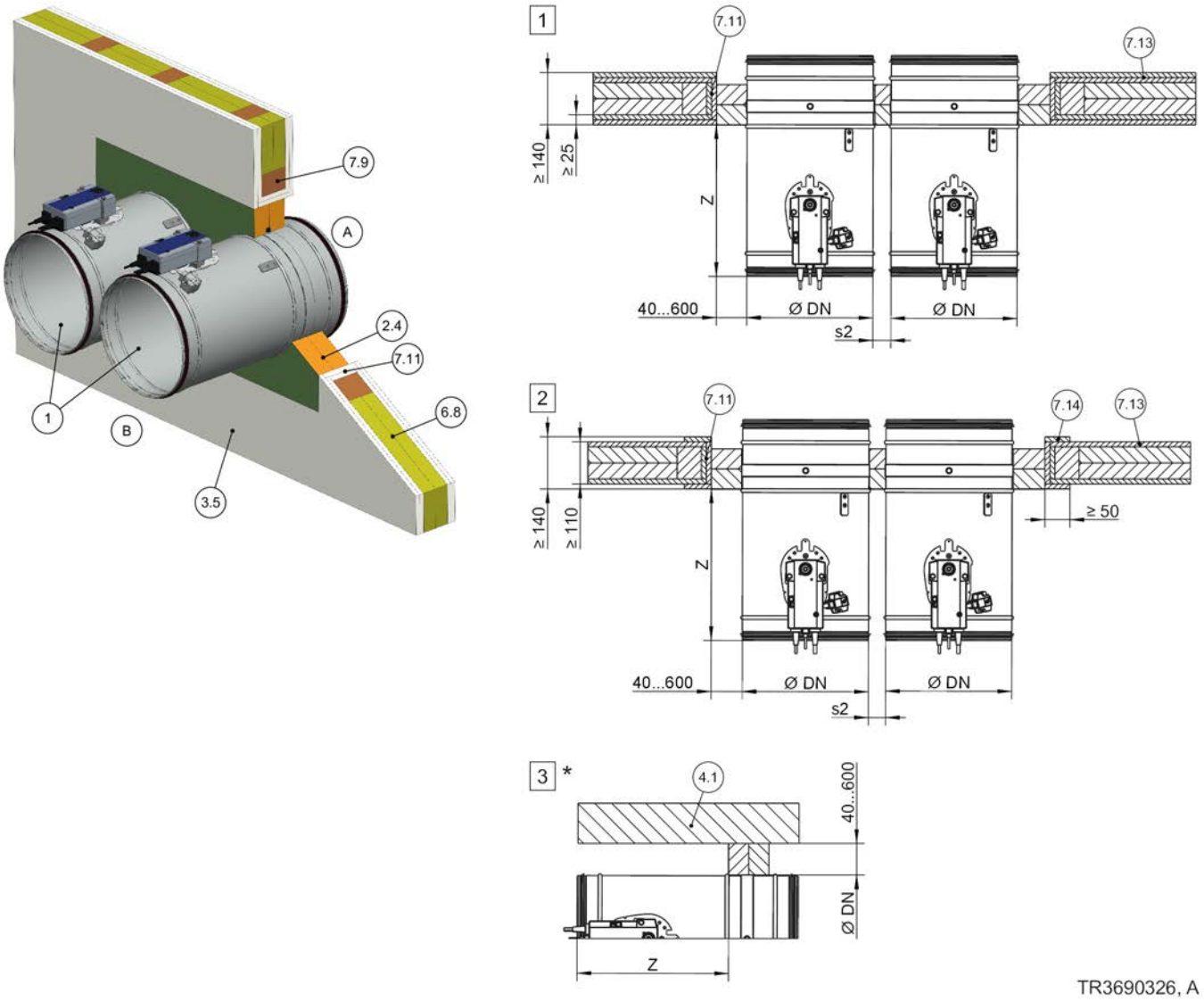


Fig. 67: Dry mortarless installation into a half-timbered construction, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU
2.4	Coated board system
3.5	Half-timbered construction, cladding on both sides
4.1	Solid ceiling slab / solid floor
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9	Timber structure
7.11	Trim panels, double layer with staggered joints, fire-resistant
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 600 mm Flange construction 80 – 600 mm
*	Installation near the floor analogous to 3
1 3	Up to EI 60 S
2	EI 30 S

Additional requirements: dry mortarless installation with fire batt into lightweight partition walls with timber support structure

- Timber stud wall or half-timbered construction, ↳ *on page 35*
- Fire batt systems, installation details, distances / dimensions, ↳ *on page 32* f
- Suspension and fixing ↳ *Chapter 5.14 'Fixing the fire damper' on page 135*

5.8 Solid wood walls

5.8.1 General

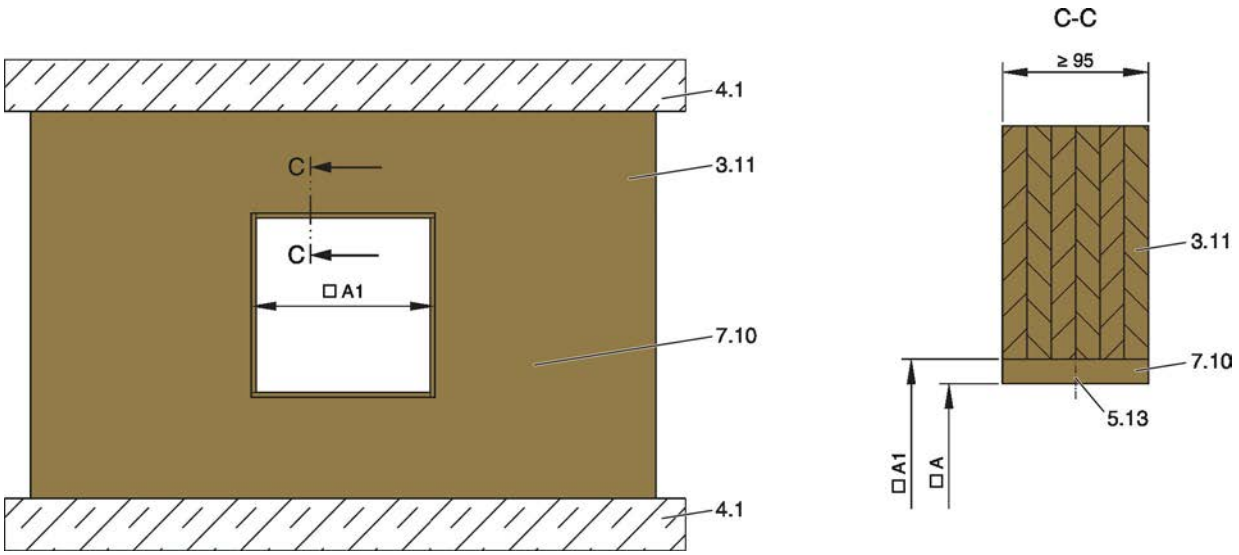


Fig. 68: Solid wood wall

3.11 Solid wood wall / CLT wall
4.1 Solid ceiling slab / solid floor
5.13 Wood screw or pin
7.10 Trim panels (optional)
□A Clear installation opening
□A1 Opening in a solid wood wall / CLT wall (without trim panels: □A1 = □A)

Additional requirements: solid wood walls

- Solid wood wall or CLT wall, *on page 35*

Installation opening □A [mm]									
Installation type	**Nominal size Ønominal width**								
	315	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
Mortar-based installation	□A = Ønominal width + max. 450 mm □A1 = □A + (4 × trim panels)								
Dry mortarless installation with installation kit TQ[1, 2]	435	475	520	570	620	680	750	830	920
Dry mortarless installation with fire batt	□A = Ønominal width + 80 – 1200 mm								

[1] Installation opening tolerance + 2 mm

[2] Installation kit TQ is available only for FKR-EU with spigot

5.8.2 Mortar-based installation

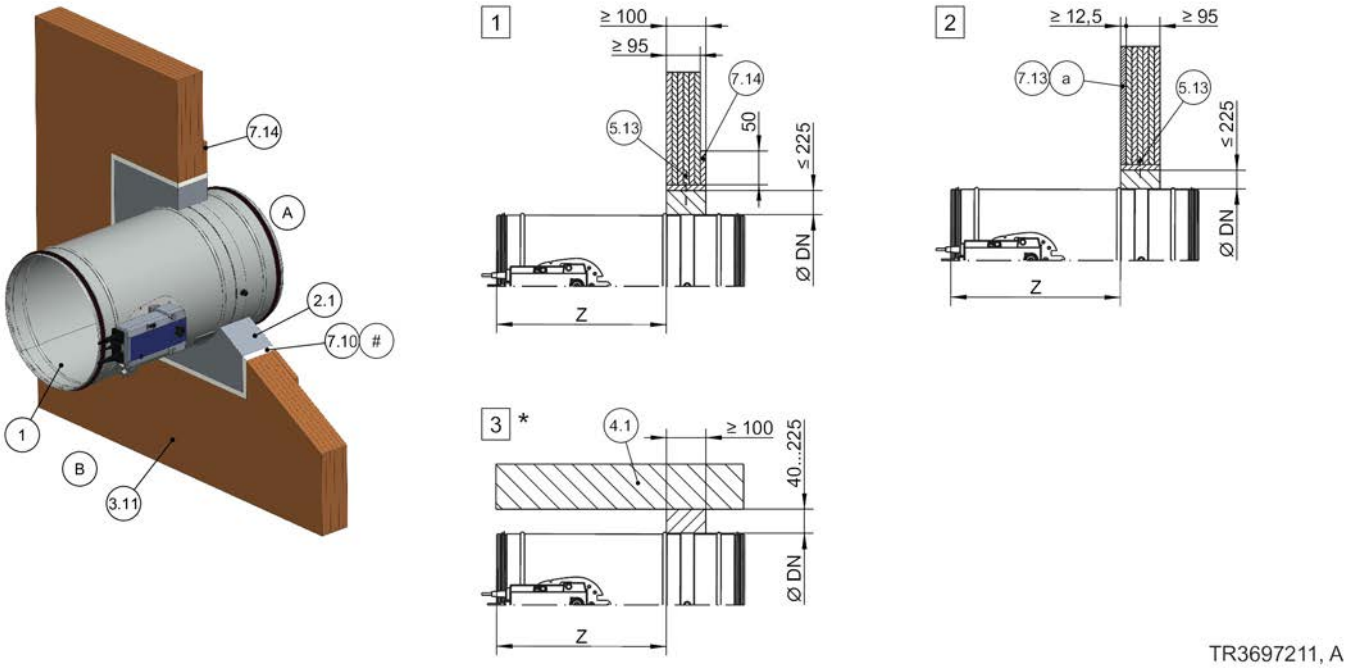


Fig. 69: Mortar-based installation into a solid wood wall or CLT wall

1	FKR-EU	7.14	Reinforcing board of the same material (required for W < 100 mm, optionally on the operating or installation side)
2.1	Mortar		
3.11	Solid wood wall / CLT wall		
4.1	Solid ceiling slab / solid floor	Z	Spigot construction 370 mm Flange construction 342 mm
5.13	Wood screw or pin		
7.10	Trim panels	*	Installation near the floor analogous to 3
7.13a	Cladding, single-layer, fire-resistant	#	optional
		1 – 3	Up to EI 90 S

Solid wood wall/CLT wall, "flange to flange"

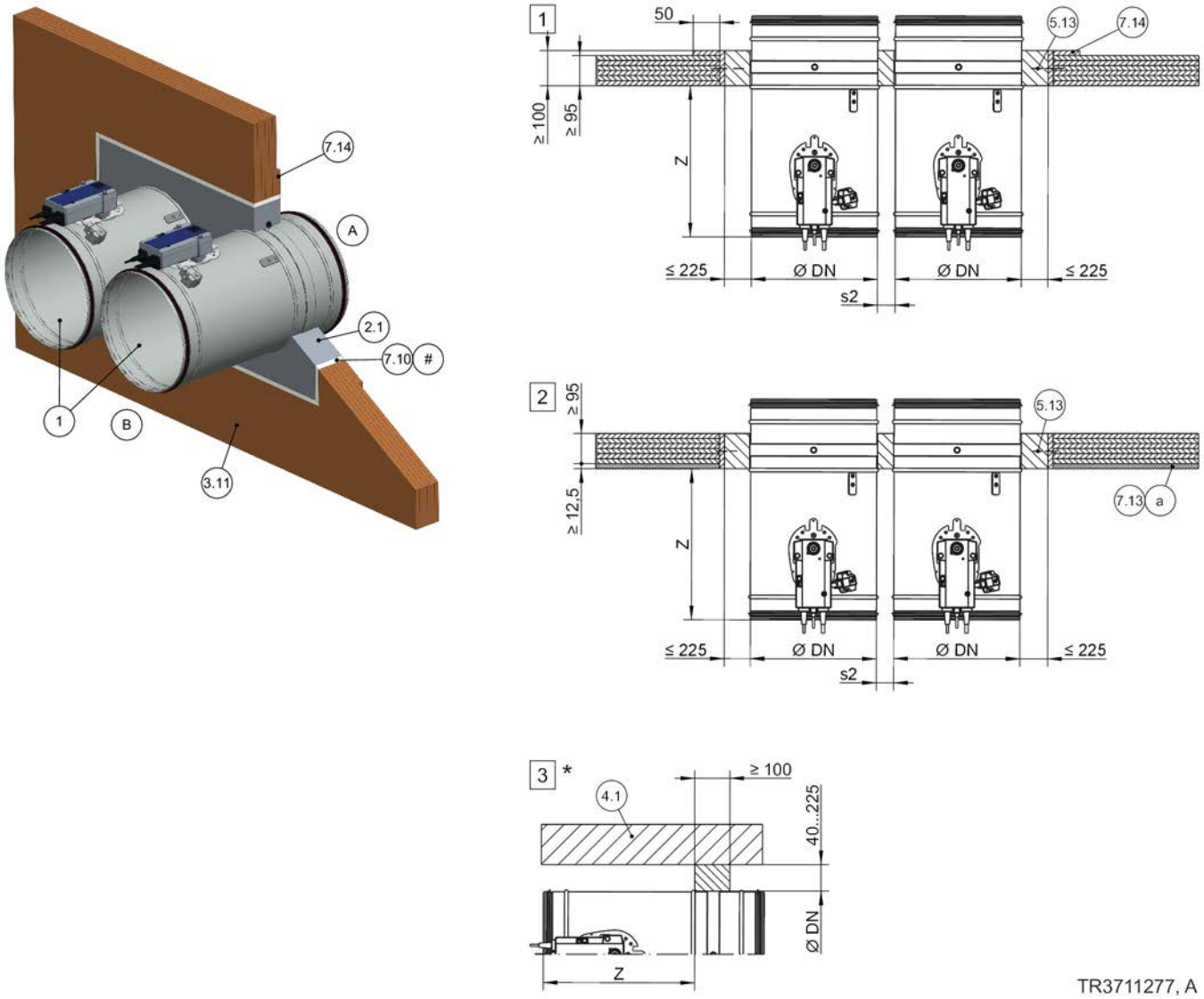


Fig. 70: Mortar-based installation into a solid wood wall or CLT wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
2.1	Mortar		
3.11	Solid wood wall / CLT wall	s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
4.1	Solid ceiling slab / solid floor		
5.13	Wood screw or pin	*	Installation near the floor analogous to 3
7.10	Trim panels	#	optional
7.13a	Cladding, single-layer, fire-resistant	1 – 3	Up to EI 90 S
7.14	Reinforcing board of the same material (required for W < 100 mm, optionally on the operating or installation side)		

Additional requirements: mortar-based installation into solid wood walls

- Solid wood wall or CLT wall, *on page 35*

5.8.3 Dry mortarless installation with installation kit TQ

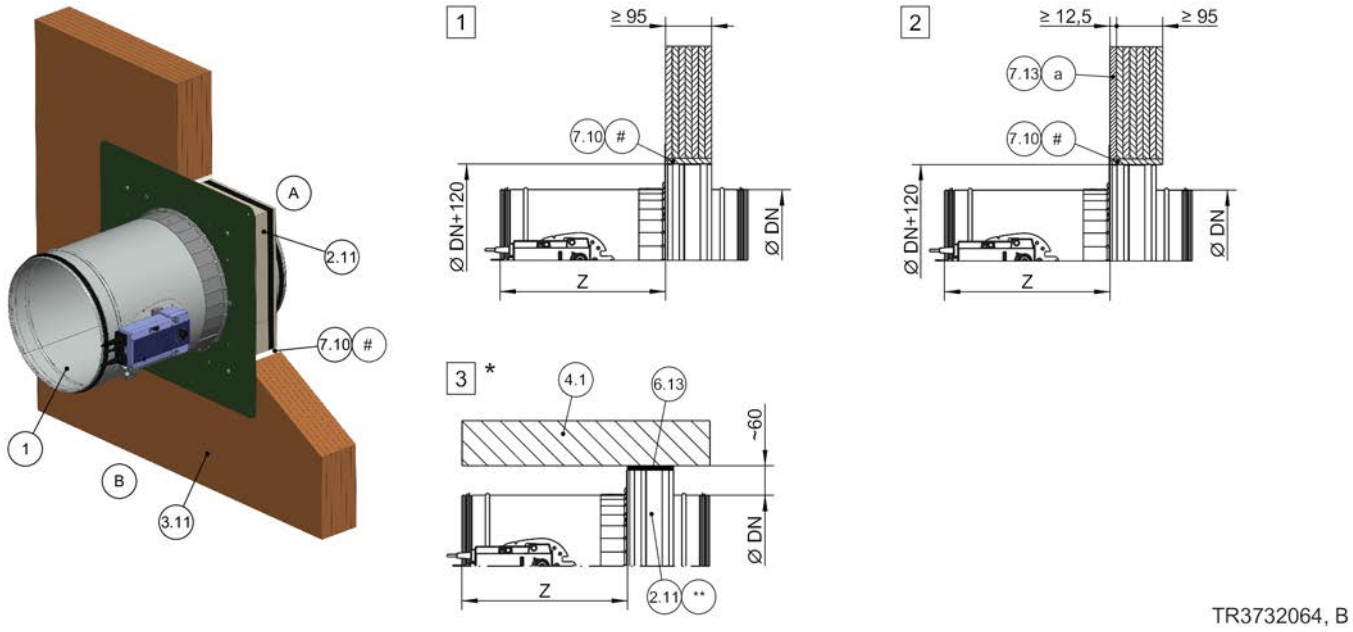


Fig. 71: Dry mortarless installation into a solid wood wall or CLT wall, with installation kit TQ

1	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
2.11	Installation kit TQ (factory assembled)		
3.11	Solid wood wall / CLT wall	*	Installation near the floor analogous to 3
4.1	Solid ceiling slab / solid floor	**	Cover plate, shortened by others
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative	#	optional
		1 – 3	Up to EI 90 S
7.10	Trim panels (fire-resistant)		
7.13a	Cladding, single-layer, fire-resistant		

Additional requirements: dry mortarless installation with installation kit TQ in solid wood walls

- Solid wood wall or CLT wall, *on page 35*
- Installation kit TQ, *on page 32*
- ≥ 200 mm distance between two fire dampers in separate installation openings
- Fasten the cover plate to the solid wood or CLT wall with 4 (for nominal widths up to 400 mm) or 12 (for nominal widths from 450 mm) dry wall screws ∅ ≥ 4.2 mm

5.8.4 Dry mortarless installation with fire batt

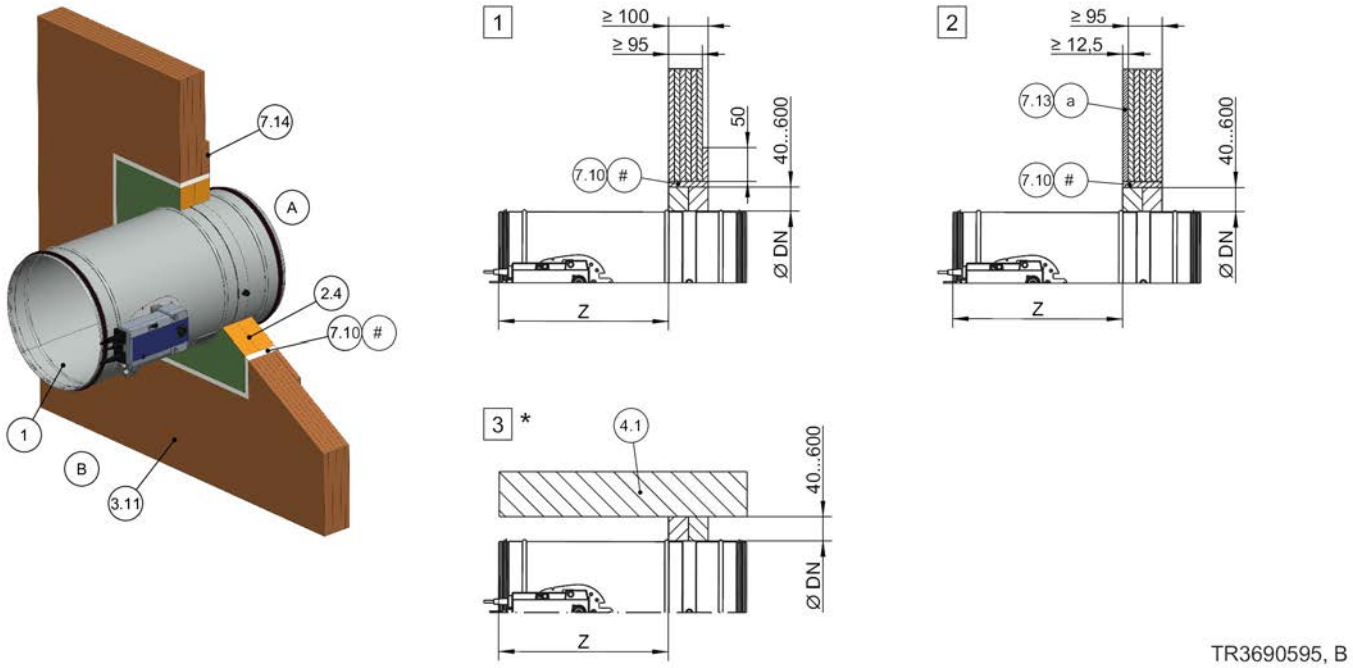


Fig. 72: Dry mortarless installation into a timber wall or CLT wall, with a fire batt

1	FKR-EU
2.4	Coated board system
3.11	Solid wood wall / CLT wall
4.1	Solid ceiling slab / solid floor
7.10	Trim panels (fire-resistant)
7.13a	Cladding, single-layer, fire-resistant
7.14	Reinforcing board of the same material as the wall
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 3
#	optional
1 – 3	Up to EI 60 S

Solid wood wall/CLT wall, "flange to flange"

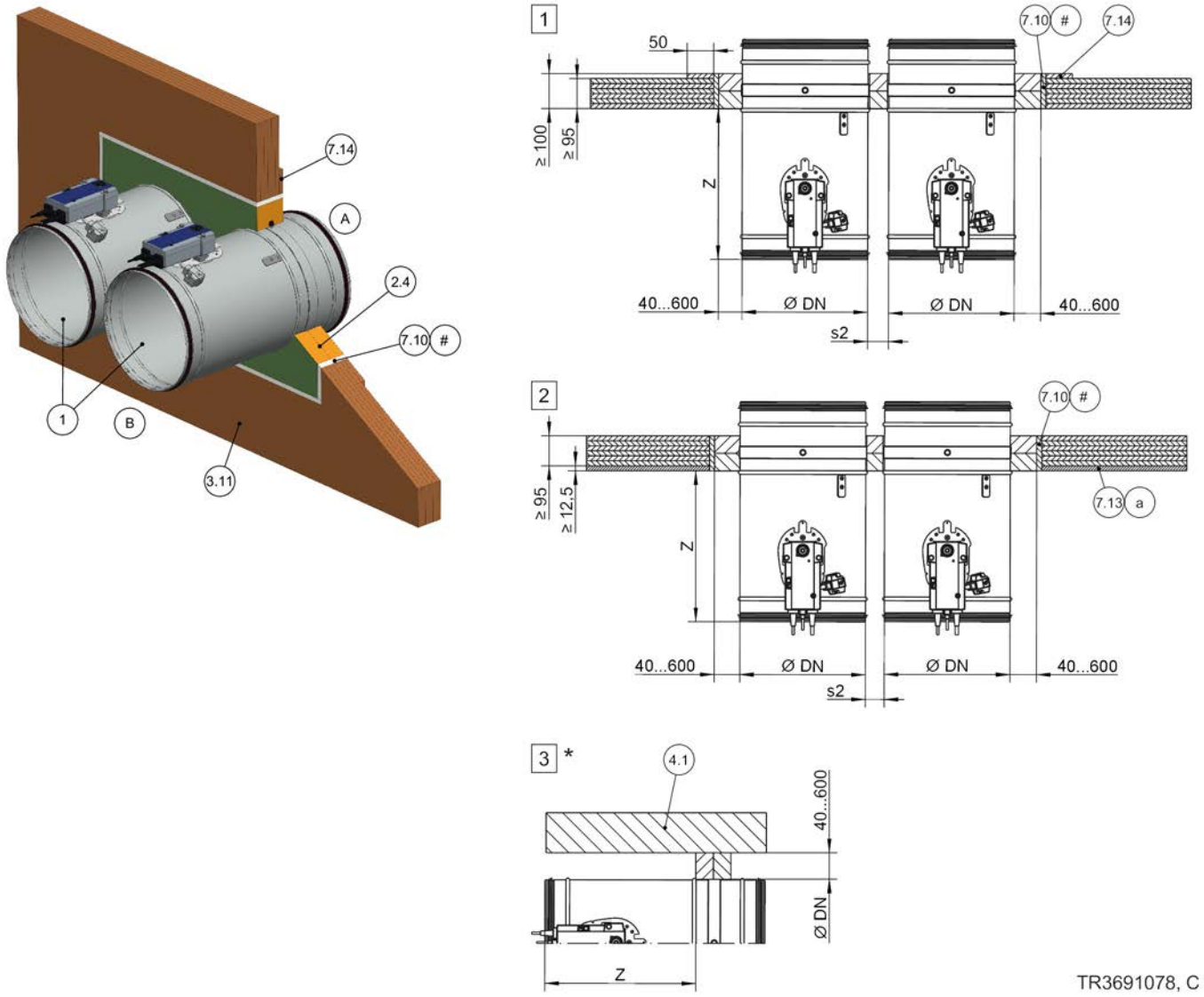


Fig. 73: Dry mortarless installation into a solid wood wall or CLT wall, with a fire batt, "flange to flange"

1	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
2.4	Coated board system		
3.11	Solid wood wall / CLT wall	s2	Spigot construction 40 – 600 mm Flange construction 80 – 600 mm
4.1	Solid ceiling slab / solid floor		
7.10	Trim panels (fire-resistant)	*	Installation near the floor analogous to 3
7.13a	Cladding, single-layer, fire-resistant	#	optional
7.14	Reinforcing board of the same material as the wall	1 – 3	Up to EI 60 S

Additional requirements: dry mortarless installation with fire batt in solid wood walls

- Solid wood wall or CLT wall, ↬ *on page 35*
- Fire batt systems, installation details, distances / dimensions, ↬ *on page 32* f
- Suspension and fixing ↬ *Chapter 5.14 'Fixing the fire damper' on page 135*

5.9 Shaft walls with metal support structure

5.9.1 General

Shaft walls with metal support structure and cladding on one side

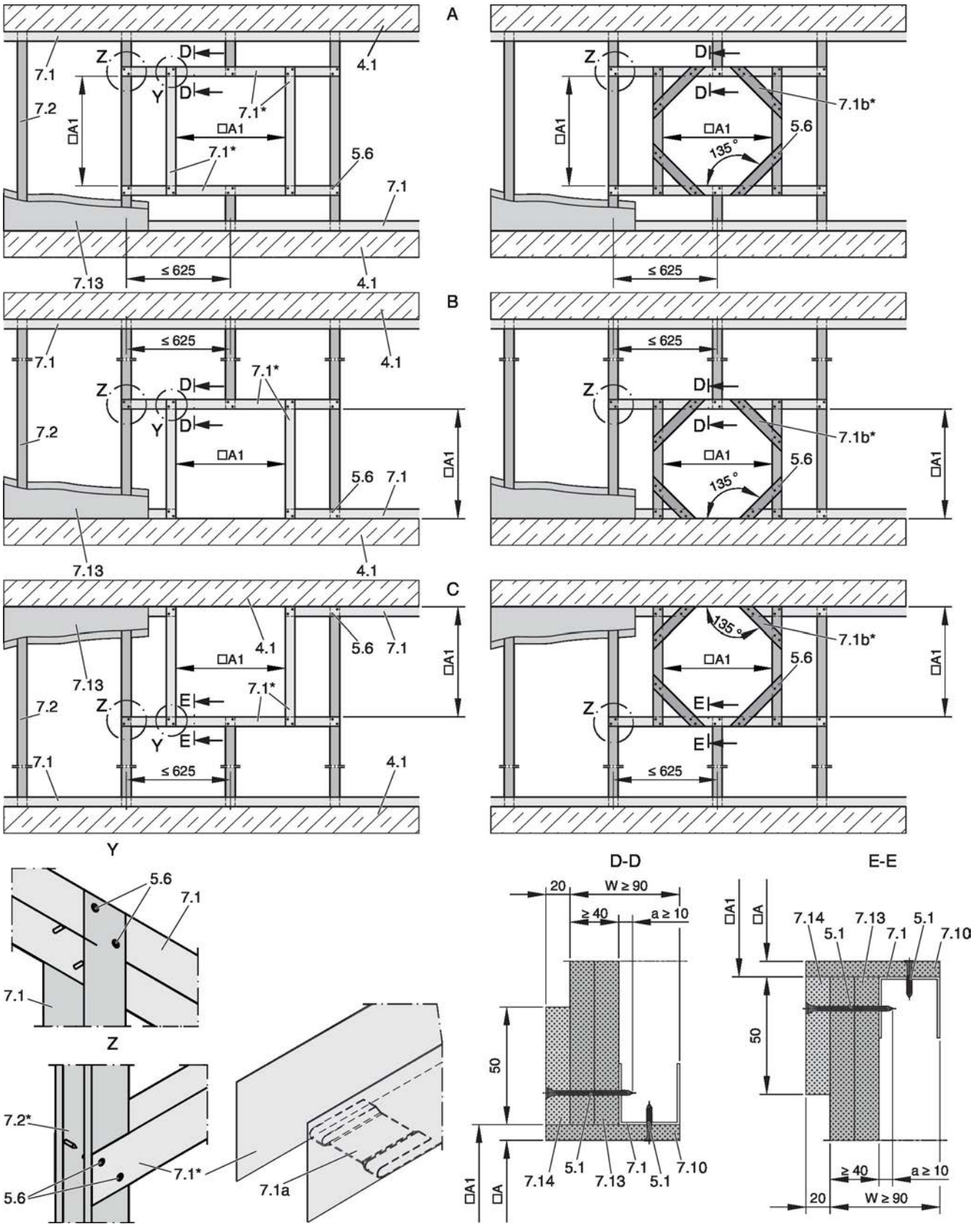


Fig. 74: Shaft walls with metal support structure and cladding on one side

A	Shaft wall
B	Shaft wall, installation near the floor
C	Shaft wall, installation near the ceiling
5.1	Dry wall screw
5.6	Screw or steel rivet
7.1	UW section
7.1a	Fold the tab inward or cut it off
7.1b	UW section, nominal sizes: ∅ nominal width 450 - 800
7.2	CW section
7.10	Optional trim panels
7.13	Double layer cladding, on one side of the metal stud system
7.14	Reinforcing strip
☐A	Installation opening
☐A1	Opening in the metal support structure (without trim panels: ☐A =☐A1)
*	Closed side of metal section must face the installation opening

Additional requirements: shaft walls with metal support structure

- Shaft wall with metal support structure, *on page 35*

Erecting a wall and creating an installation opening

- Erect the shaft wall according to the manufacturer's instructions and create an installation opening, see Fig. 74
  - Provide the installation opening in the metal support structure with support sections.
  - In case of mortar-based installation of fire dampers from nominal size ∅nominal width 450, install four additional sections 7.1b at an angle of 45° in order to reinforce the metal support structure.

Installation opening ☐A [mm]									
Installation type	**Nominal size ∅nominal width**								
	315	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
Mortar-based installation [1]	☐A = ∅nominal width + max. 450 mm ☐A1 = ☐A + (2 × trim panels)								

[1] Optional trim panels

5.9.2 Mortar-based installation

Mortar-based installation into shaft wall with metal support structure

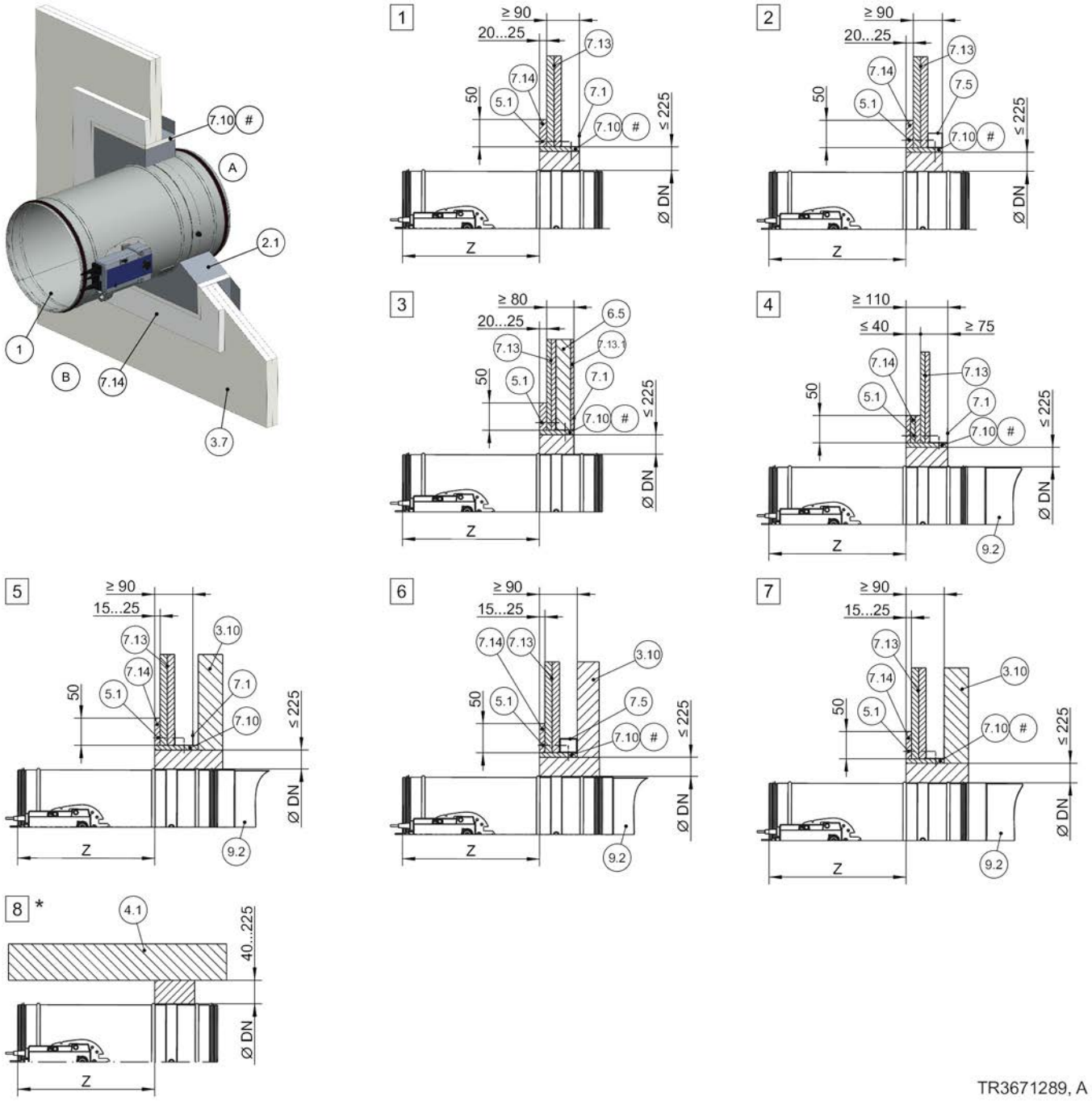


Fig. 75: Mortar-based installation into shaft wall with metal support structure

1	FKR-EU
2.1	Mortar
3.7	Shaft wall with metal support structure, cladding on one side
3.10	Wall without adequate fire resistance rating
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw
6.5	Mineral wool (depending on wall construction)
7.1	UW section
7.5	Steel support structure (box section)
7.10	Trim panels
7.13.1	Cladding, single-layer, adjusted
7.14	Reinforcing board of the same material as the wall
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
*	Installation near the floor analogous to 8
#	optional
1 – 3	Up to EI 90 S
4 – 7	EI 30 S
8	EI 30 S – EI 90 S

7.13 Cladding, double layer, fire-resistant

Mortar-based installation into a shaft wall, FKR-EU and FK2-EU combined

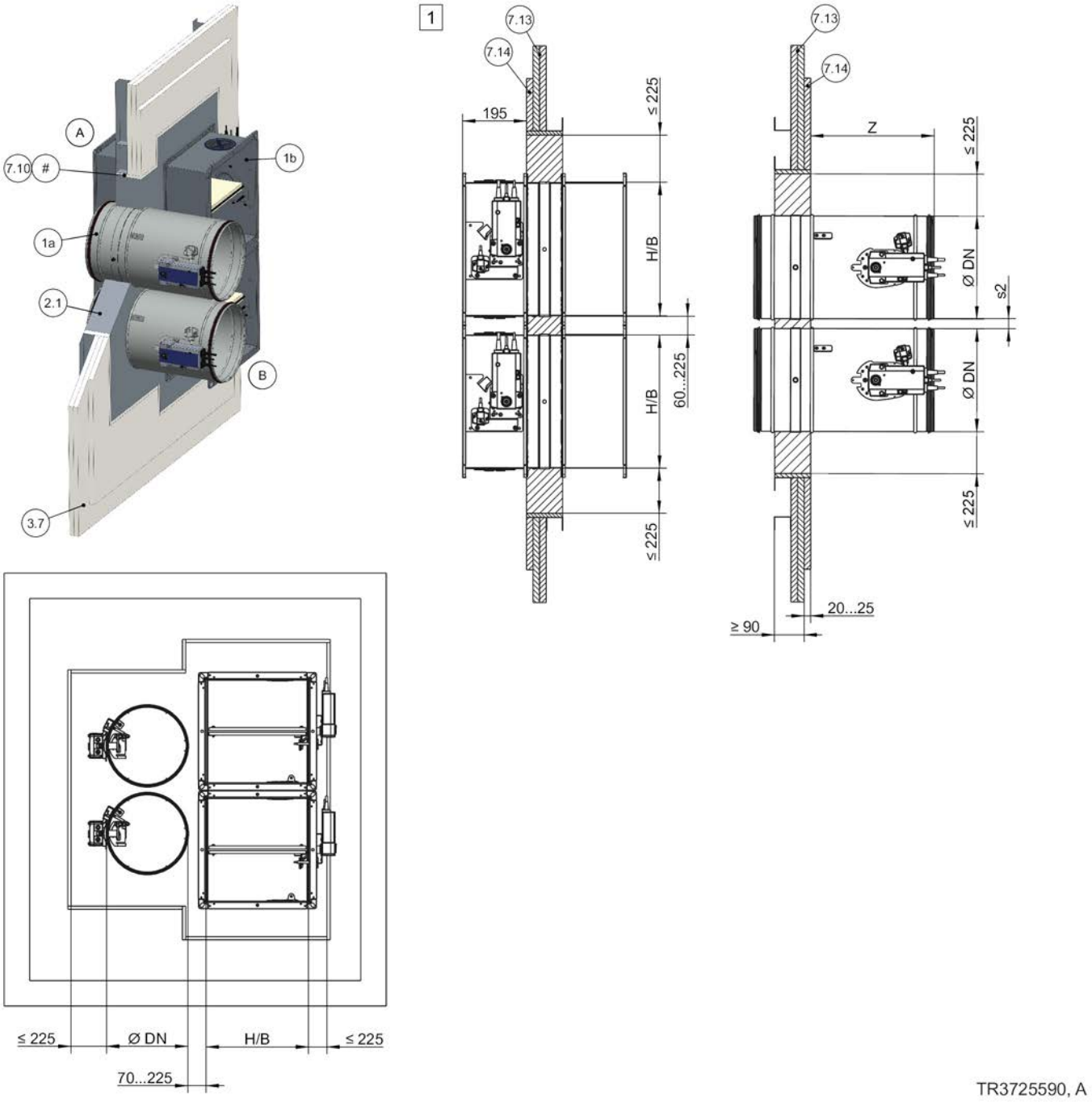


Fig. 76: Mortar-based installation into a shaft wall, FKR-EU and FK2-EU combined

1a	FKR-EU
1b	FK2-EU up to B × H ≤ 800 × 400 mm
2.1	Mortar
3.7	Shaft wall with metal support structure, cladding on one side
7.10	Trim panels
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
#	optional
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
1	Up to EI 90 S

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Distance to load-bearing structural elements ≥ 40 mm
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Additional requirements: mortar-based installation into shaft walls with metal support structure

- Shaft wall with metal support structure,
  ↳ *on page 35*
- ≥ 200 mm distance between two fire dampers (installation of each fire damper in separate installation openings, exception combined installation)

5.10 Shaft walls without metal support structure

5.10.1 General

Shaft wall without metal support structure and with cladding on one side

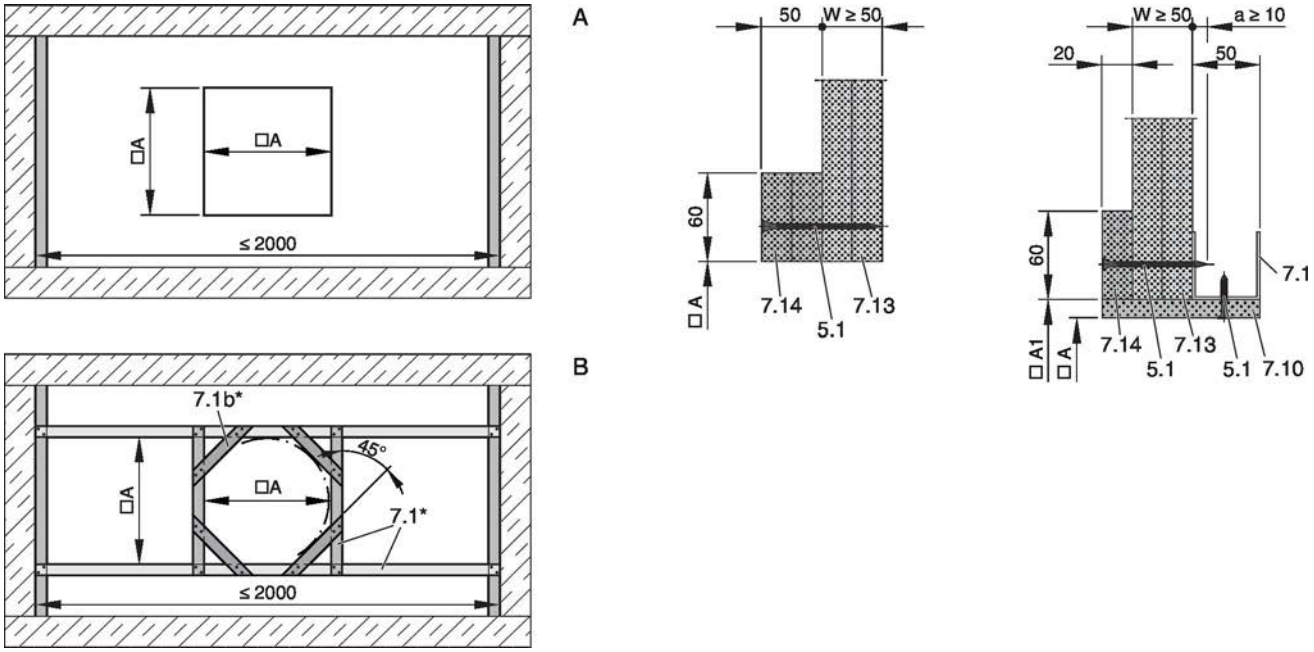


Fig. 77: Shaft wall without metal support structure and with cladding on one side

A	Wall construction for nominal sizes ∅ 315 – 400 mm
B	Wall construction for nominal sizes ∅ 450 – 800 mm
5.1	Dry wall screw
7.1	UW section
7.1b	UW section, for nominal sizes ∅nominal width 450 - 800
7.10	Optional trim panels
7.13	Double layer cladding, on one side of the metal stud system
7.14	Reinforcing strip
□A	Installation opening
□A1	Opening (without trim panels: □A =□A1)
*	Closed side of metal section must face the installation opening

Additional requirements: shaft walls without metal support structure

- Shaft wall without metal support structure, *on page 35*

Erecting a wall and creating an installation opening

- Erect the shaft wall according to the manufacturer's instructions and create an installation opening with reinforcing strips, see Fig. 77
- – Option A: Create an opening in the cladding and reinforce it along the perimeter.
  – Option B: Provide the installation opening in the metal support structure with support sections. Install four additional sections at an angle of 45° in order to reinforce the metal support structure.
  Fix the cladding and reinforce the installation opening along the perimeter.

Installation opening □A [mm]									
Installation type	**Nominal size ∅nominal width**								
	315	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
Mortar-based installation [1]	□A = ∅nominal width + max. 450 mm □A1 = □A + (2 × trim panels)								

[1)] Optional trim panels

5.10.2 Mortar-based installation

Mortar-based installation into shaft wall without metal support structure

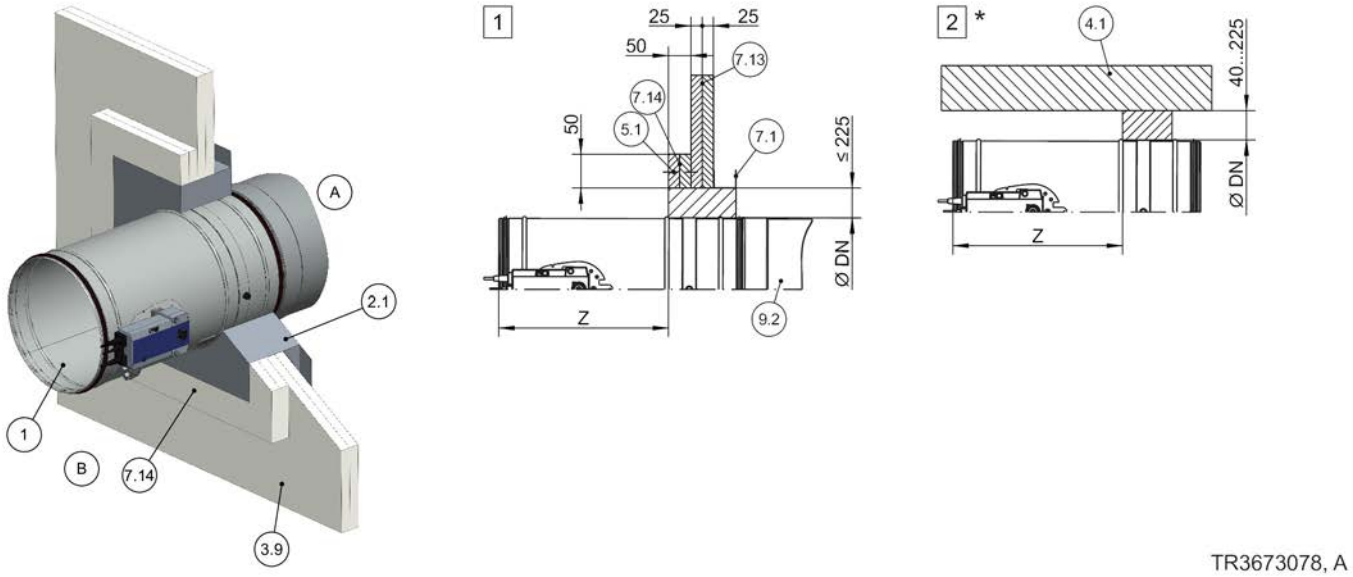


Fig. 78: Mortar-based installation into shaft wall without metal support structure

1	FKR-EU	7.14	Reinforcing board of the same material as the wall
2.1	Mortar	9.2	Extension piece or duct
3.9	Shaft wall without metal support structure, cladding on one side	Z	Spigot construction 370 mm Flange construction 342 mm
4.1	Solid ceiling slab / solid floor	*	Installation near the floor analogous to 2
5.1	Dry wall screw	1 2	Up to EI 90 S
7.1	UW section		
7.13	Cladding, double layer, fire-resistant		

Additional requirements: mortar-based installation into shaft walls without metal support structure

- Shaft wall, *on page 35*

5.11 Solid ceiling slabs

5.11.1 General

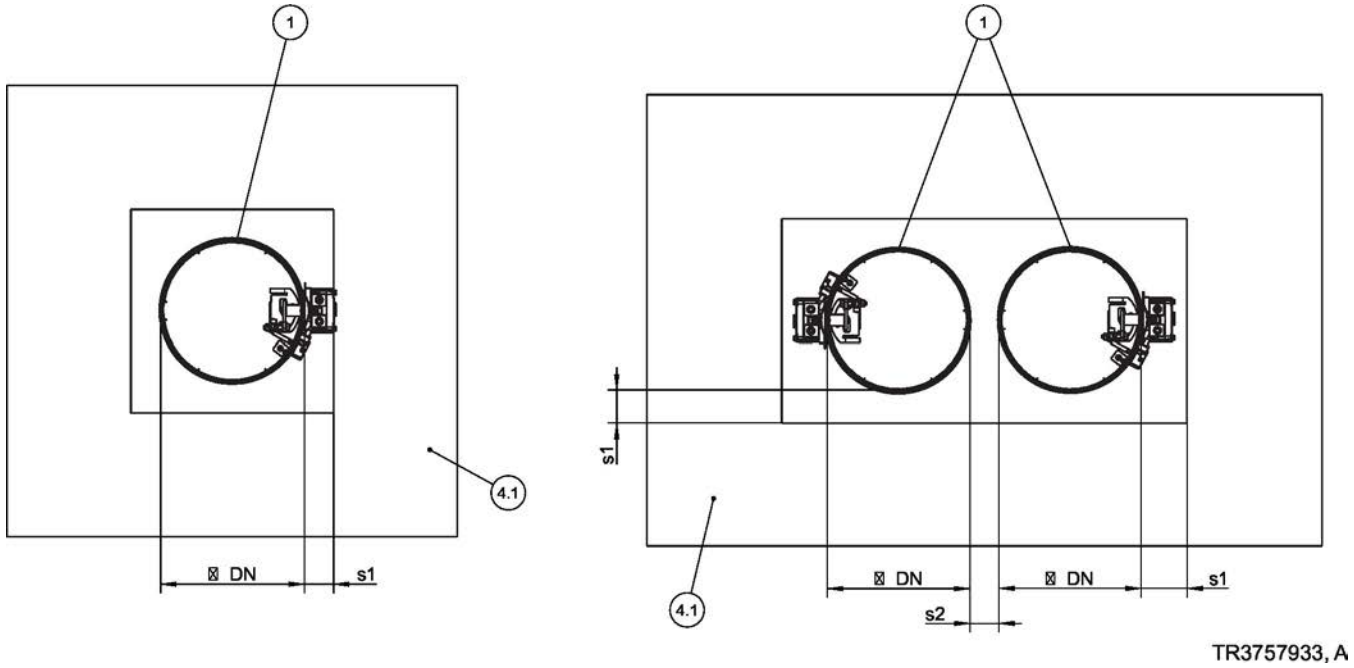


Fig. 79: Solid ceilings – arrangement / distances, side-by-side arrangement by way of example

1 FKR-EU
4.1 Solid ceiling slab
s1 Perimeter gap, ↳ *on page 31*
s2 Distance between the fire dampers, ↳ *'Distances' on page 29*

Installation type	Installation opening [mm]	Distance [mm]	
		s1	s2
Mortar-based installation	∅nominal width + max. 450 mm	≤ 225	40 – 225 [1]

[1] Spigot construction, with flange construction 80 – 225 mm

Additional requirements: solid ceiling slabs

- Solid ceiling slab, ↳ *on page 36*
- Distances and installation orientations, ↳ *'Distances' on page 29*

5.11.2 Mortar-based installation into solid ceiling slabs

Mortar-based installation into a solid ceiling slab, suspended or upright

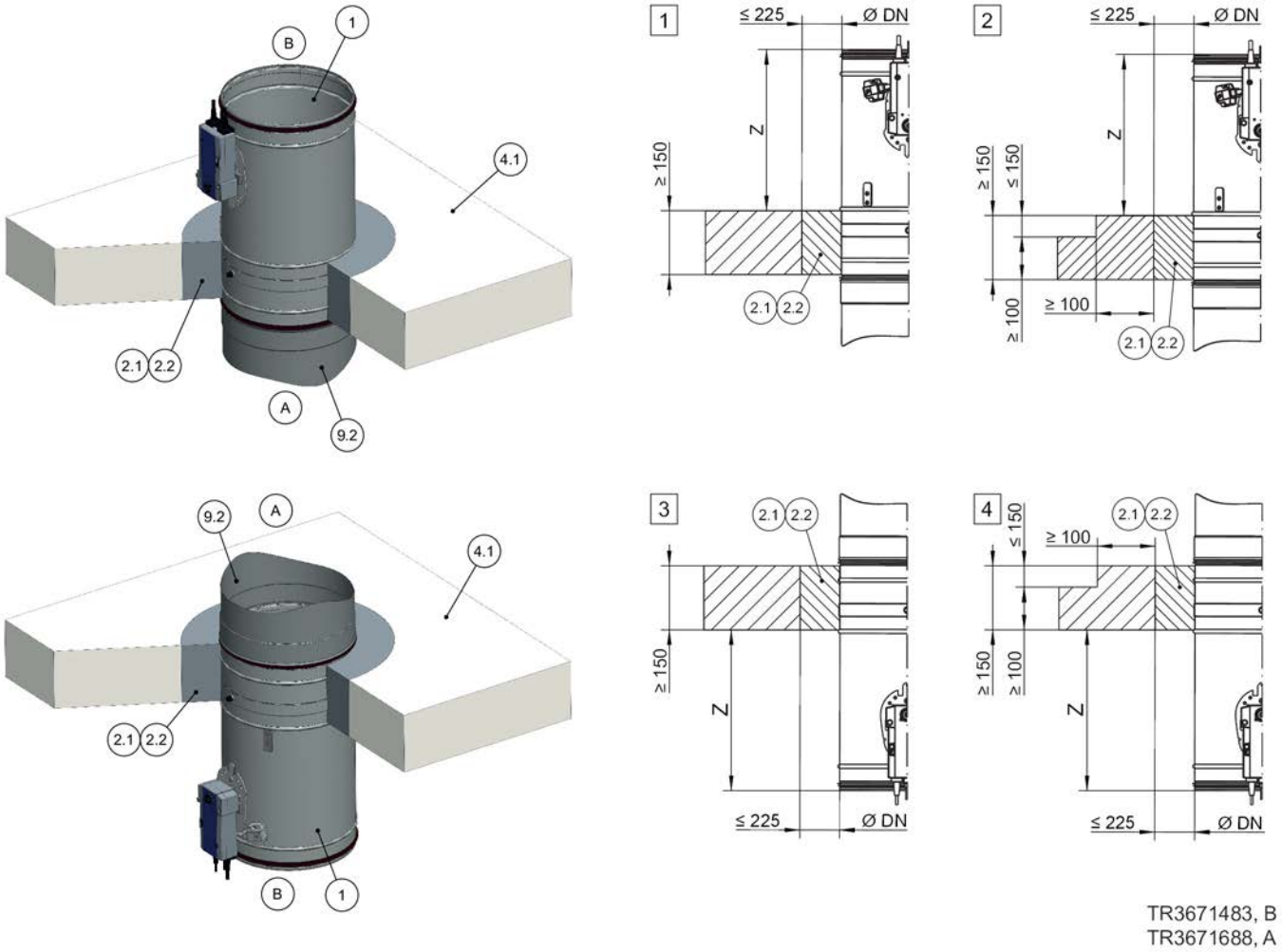


Fig. 80: Mortar-based installation into a solid ceiling slab, suspended or upright

1	FKR-EU	9.2	Extension piece or duct
2.1	Mortar	Z	Spigot construction 370 mm Flange construction 342 mm
2.2	Reinforced concrete		
4.1	Solid ceiling slab	1 – 4	Up to EI 120 S

Mortar-based installation into a solid ceiling slab with screed and footfall sound insulation, suspended or upright

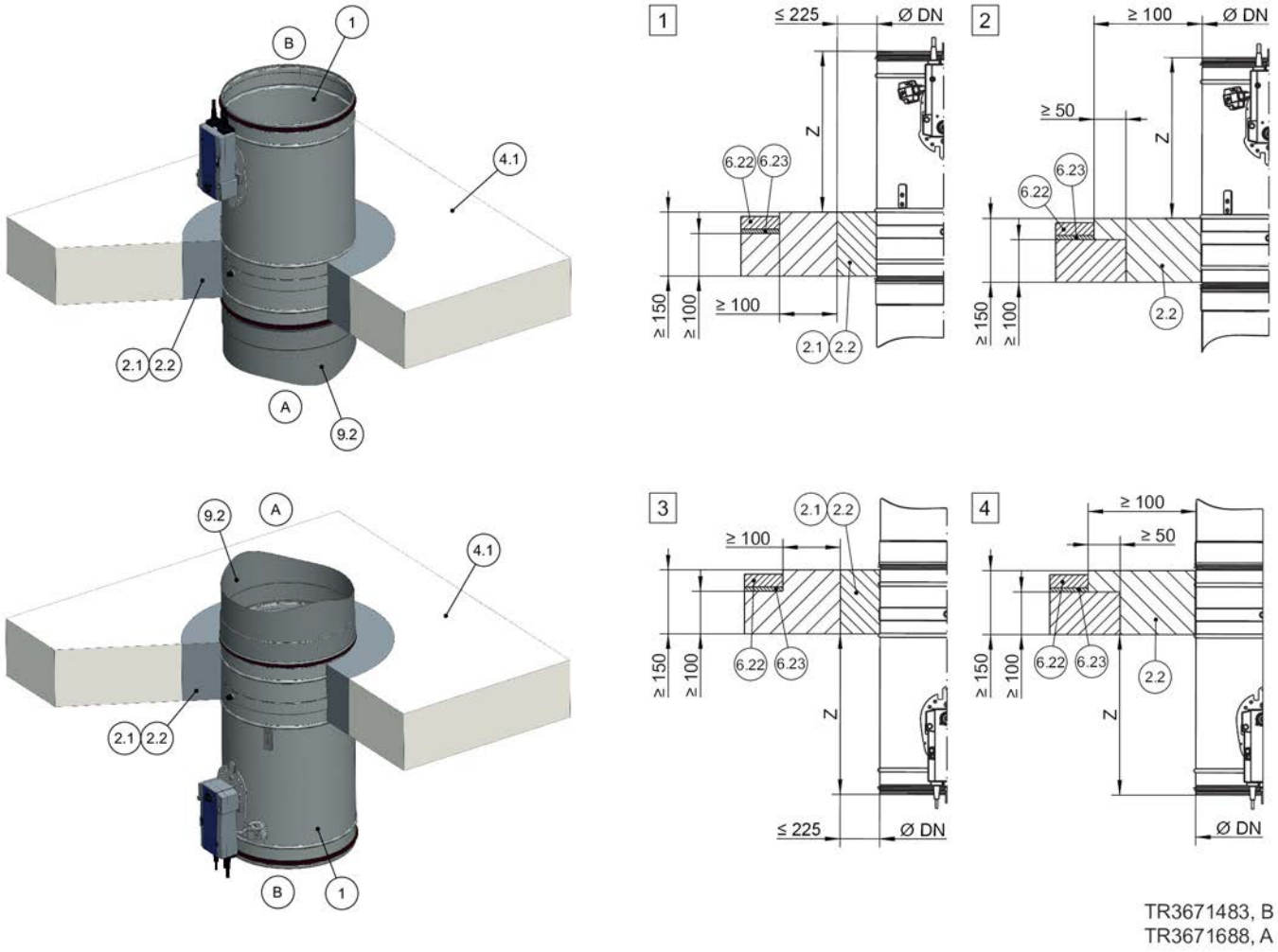


Fig. 81: Mortar-based installation into a solid ceiling slab with screed and footfall sound insulation, suspended or upright

1	FKR-EU
2.1	Mortar
2.2	Reinforced concrete
4.1	Solid ceiling slab
6.22	Screed
6.23	Footfall sound insulation
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1 – 4	Up to EI 120 S

Mortar-based installation into solid ceiling slab, "flange to flange"

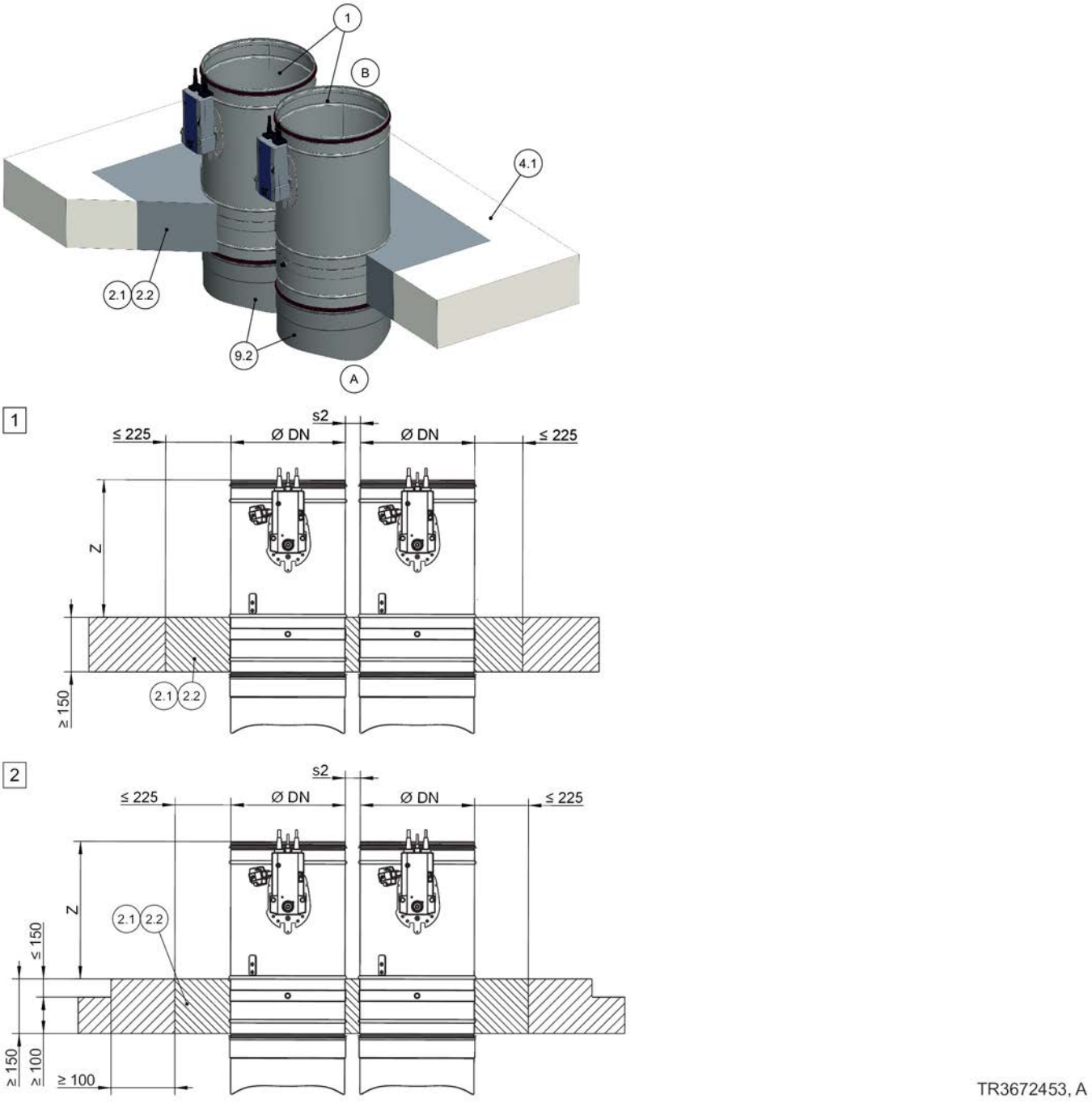


Fig. 82: Mortar-based installation in solid ceiling slab, "flange to flange", shown upright (also applicable for suspended arrangement)

1	FKR-EU	Z	Spigot construction 370 mm
2.1	Mortar		Flange construction 342 mm
2.2	Reinforced concrete	s2	Spigot construction 40 – 225 mm
4.1	Solid ceiling slab		Flange construction 80 – 225 mm
9.2	Extension piece or duct	1 2	Up to EI 120 S

Mortar-based installation into a solid ceiling slab with screed and footfall sound insulation, "flange to flange"

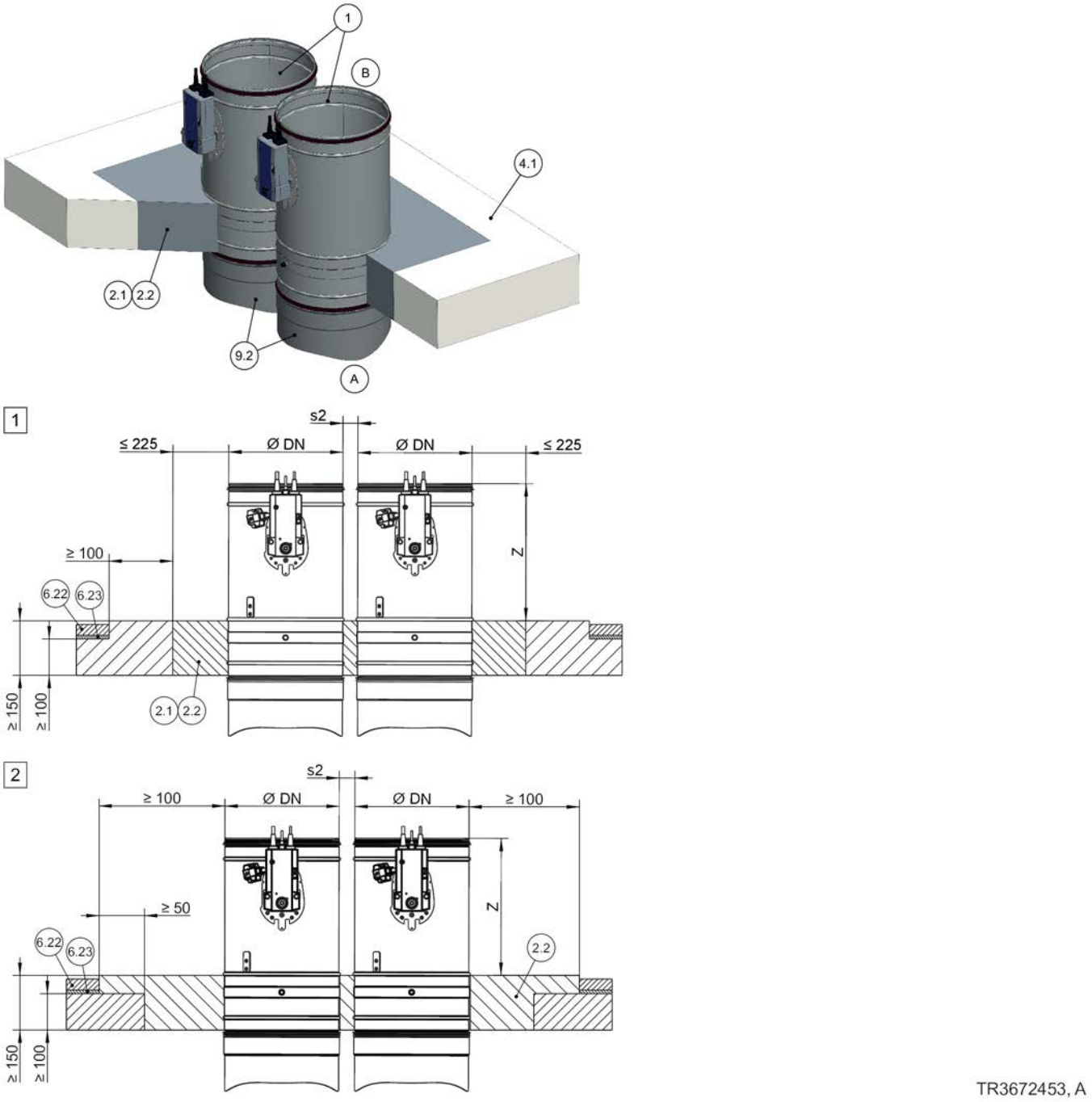


Fig. 83: Mortar-based installation in solid ceiling slab with screed and footfall sound insulation, "flange to flange", shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Reinforced concrete
4.1	Solid ceiling slab
6.22	Screed
6.23	Footfall sound insulation
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
1 2	Up to EI 120 S

Mortar-based installation into a solid ceiling slab, FKR-EU and FK2-EU combined

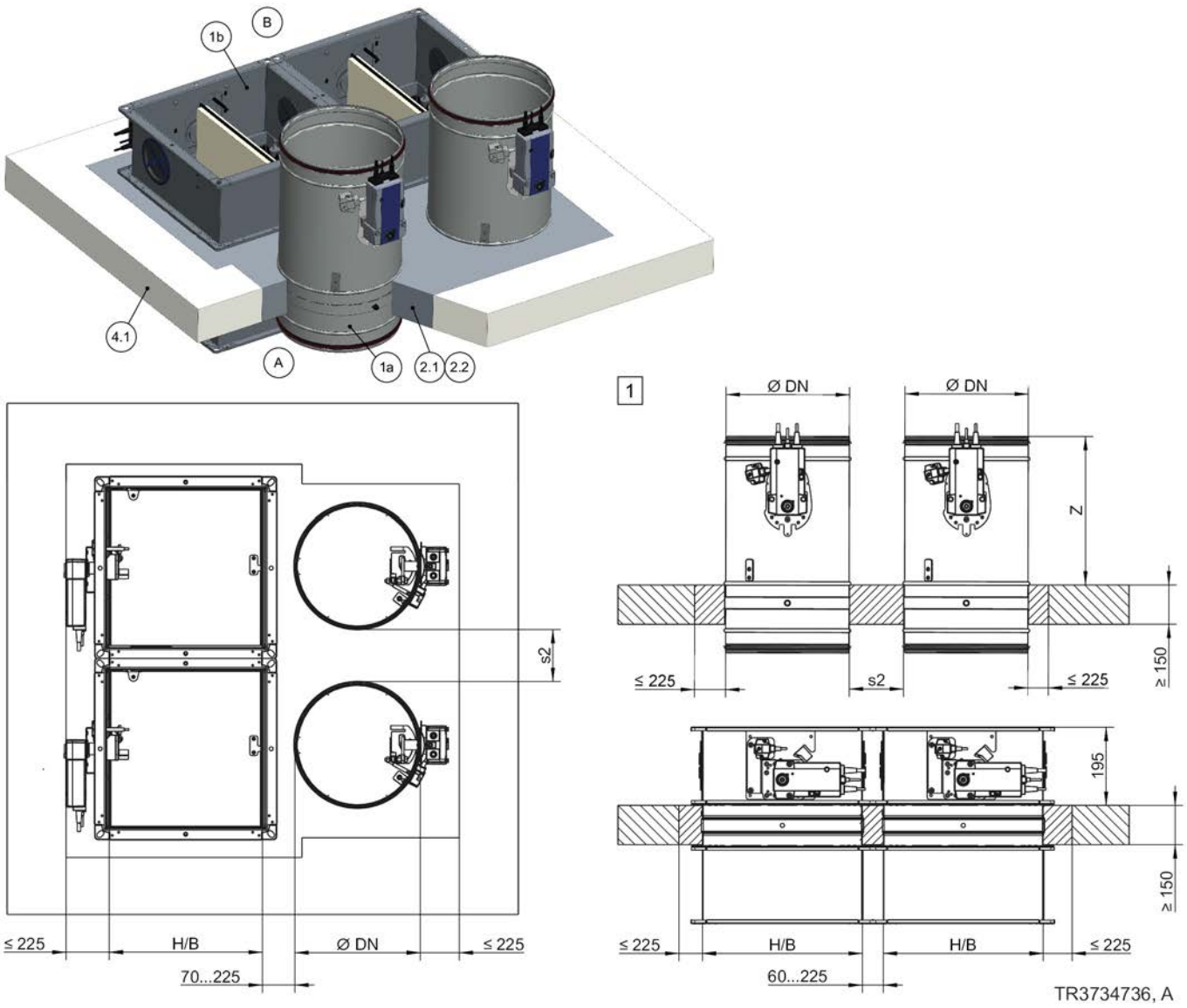


Fig. 84: Mortar-based installation in solid ceiling slab, combined, FKR-EU and FK2-EU, shown upright (also applicable for suspended arrangement)

1b	FKR-EU
1a	FK2-EU up to B × H ≤ 800 × 400 mm
2.1	Mortar
2.2	Concrete
4.1	Solid ceiling slab
Z	Spigot construction 370 mm Flange construction 342 mm
s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
1	Up to EI 90 S

Note on combined installation:

- Total fire damper surface area ≤ 1.2 m².
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side possible. Details are available upon request.
  For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Structural properties of the ceiling construction, including the attachment to the mortar/concrete or any required reinforcement, have to be evaluated and ensured by others.
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

Additional requirements: mortar-based installation into solid ceiling slabs

- Solid ceiling slab, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements

5.11.3 Mortar-based installation – multiple occupancy of an installation opening

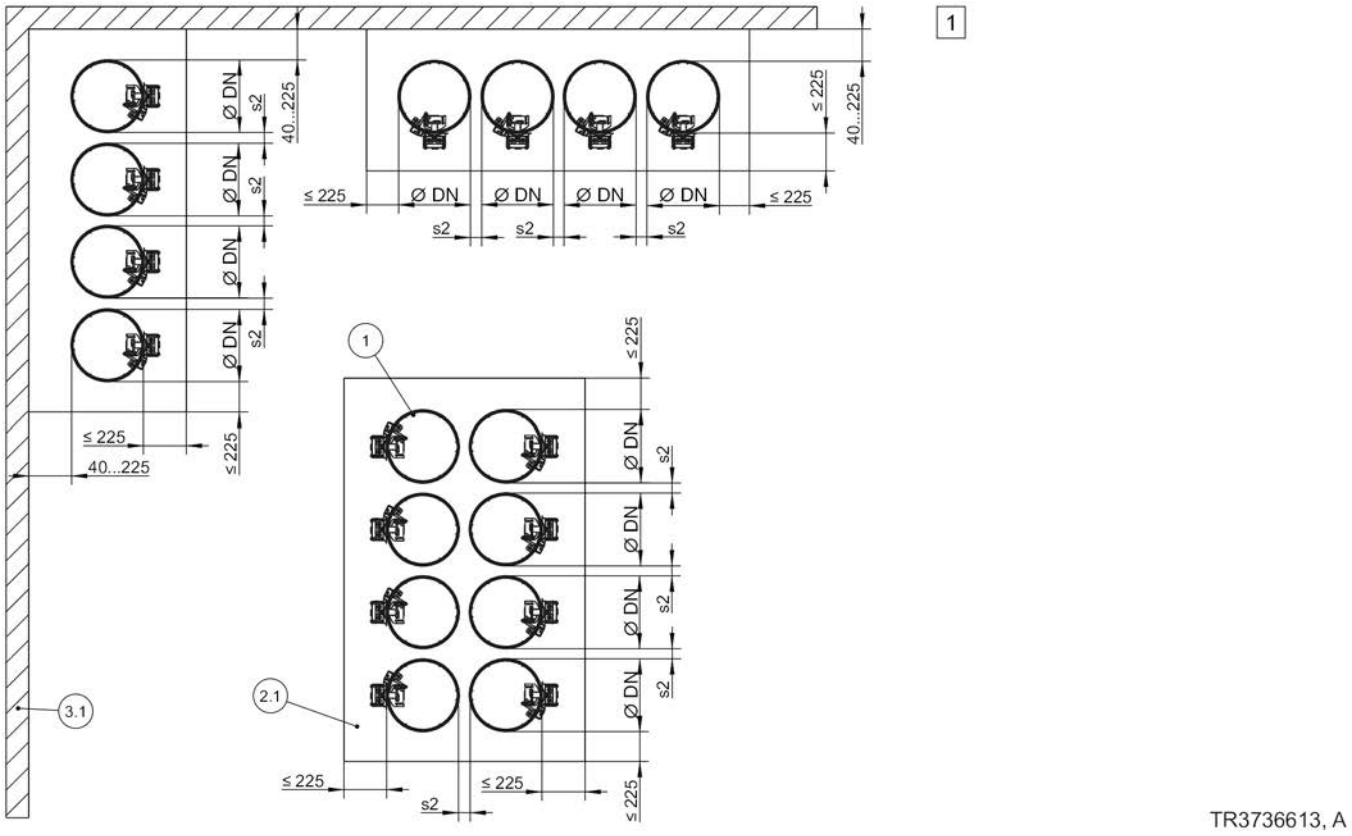


Fig. 85: Mortar-based installation – multiple occupancy of an installation opening

1 FKR-EU
2.1 Mortar
2.2 Concrete
3.1 Solid wall (load-bearing component)
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

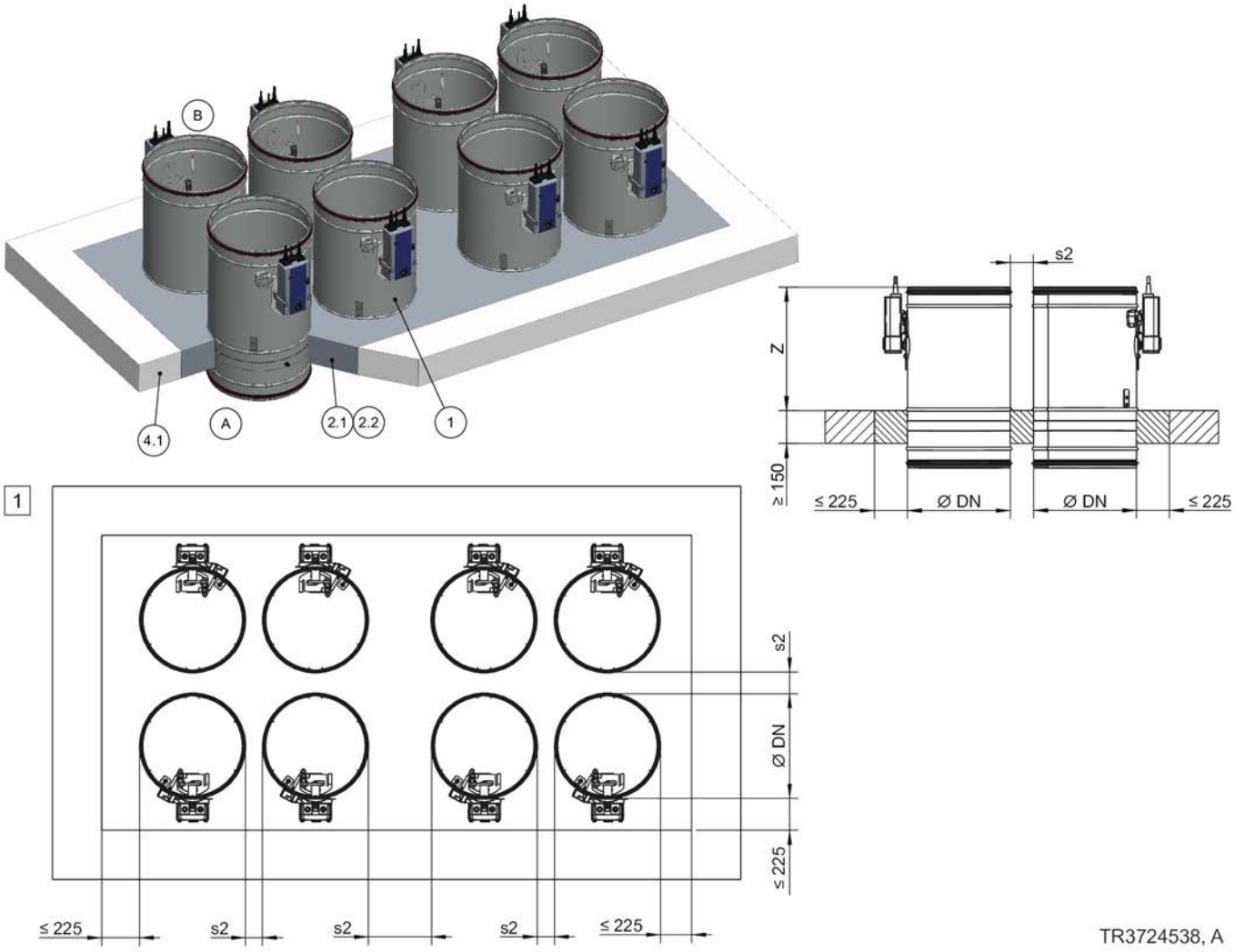


Fig. 86: Mortar-based installation – multiple occupancy of one installation opening, shown upright (also applicable for suspended arrangement)

1 FKR-EU
2.1 Mortar
2.2 Concrete
4.1 Solid ceiling slab
Z Spigot construction 370 mm
Flange construction 342 mm
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
1 Up to EI 90 S

Additional requirements: mortar-based installation – multiple occupancy of an installation opening

- Solid ceiling slab, ↳ *on page 36*
- Total fire damper area (∅ nominal width) ≤ 4.8 m²
- The number of fire dampers in an installation opening is limited by their damper size (∅ nominal width) and the overall area of the fire dampers (4.8 m²).
- Structural properties of the ceiling construction, including the attachment to the mortar/concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.4 Mortar-based installation into a concrete base

Mortar-based installation with concrete base into a solid ceiling slab, upright

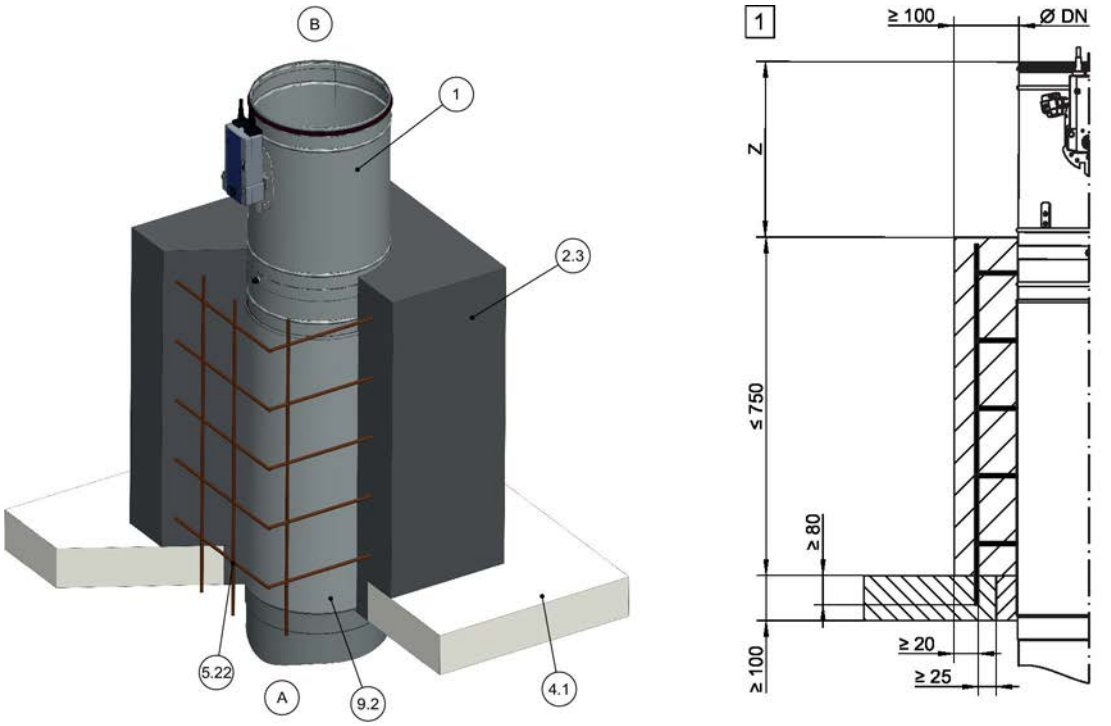


Fig. 87: Mortar-based installation with concrete base into a solid ceiling slab, upright

1	FKR-EU	9.2	Extension piece or duct
2.3	Concrete base	Z	Spigot construction 370 mm Flange construction 342 mm
4.1	Solid ceiling slab		
5.22	Steel fabric, ∅ ≥ 8 mm, mesh aperture 150 mm, or equivalent, for number of fixing points see table *114*	1	Up to EI 120 S

Note: EI 120 S also for two FKR-EU with spacing of 60 – 225 mm.

Minimum number of fixing points in the bare ceiling

B	A		
	≥ Ø 315	≥ Ø 500	Ø 800
≥ Ø 315	4	6	8
≥ Ø 500	6	8	10
≥ Ø 800	8	10	12

Mortar-based installation with concrete base into a solid ceiling slab, upright, combined, FKR-EU and FK2-EU

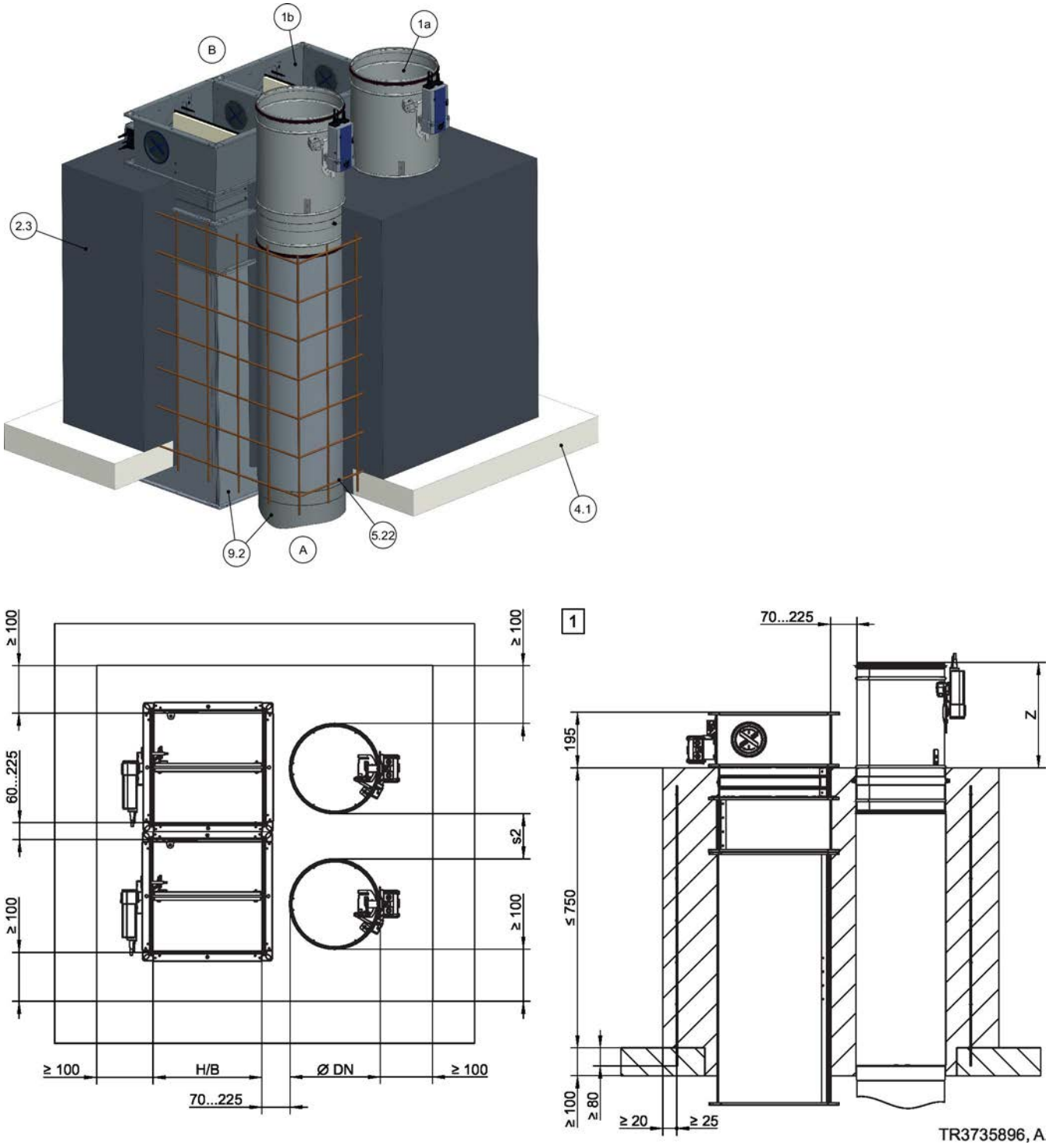


Fig. 88: Mortar-based installation with concrete base into a solid ceiling slab, upright, combined, FKR-EU and FK2-EU

1a	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
1b	FK2-EU up to B × H ≤ 800 × 400 mm	s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
2.3	Concrete base	1	Up to EI 90 S
4.1	Solid ceiling slab		
5.22	Steel fabric, ∅ ≥ 8 mm, mesh aperture 150 mm, or equivalent, for number of fixing points see table *114*		
9.2	Extension piece or duct		

Note on combined installation:

- Combined configuration up to 1.2 m² fire damper area.
- The number of fire dampers in an installation opening is limited by their size (B × H for FK2-EU and /or ∅ nominal width for FKR-EU) and the overall area of the fire dampers (1.2 m²).
- Alternative installation orientations of side-by-side possible. Details are available upon request. For installation details FK2-EU, see the installation and operating manual for this fire damper type.
- Structural properties of the ceiling construction, including the attachment to the mortar/concrete or any required reinforcement, have to be evaluated and ensured by others.

Minimum number of fixing points in the bare ceiling

H	B				
	≥ 200	≥ 500	≥ 800	≥ 1100	≥ 1400
≥ 100	4	6	8	10	12
≥ 400	6	8	10	12	14
≥ 700	8	10	12	14	16

Additional requirements: mortar-based installation into solid ceiling slab with concrete base

- Solid ceiling slab, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- If the distance to adjacent solid walls is < 150 mm and if the concrete base has been correctly attached, no reinforcement is required on the wall side.
- Concrete bases H ≤ 150 mm do not require reinforcement
- Distance of ≥ 40 mm between two FKR-EU units, ≥ 80 mm for flange construction
- Distance to fire dampers FK2-EU ≥ 70 – 225 mm
- Distance of FKR-EU to a FK-EU 75 – 225 mm (flange construction 80 – 225 mm)

1. ▸ Screw the fire damper to the existing, dysfunctional fire damper or to the ducting.
2. ▸ Create a concrete base according to Fig. 87 to Fig. 88 or equivalent.
3. ▸ Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.5 Mortar-based installation into the concrete base – multiple occupancy of an installation opening

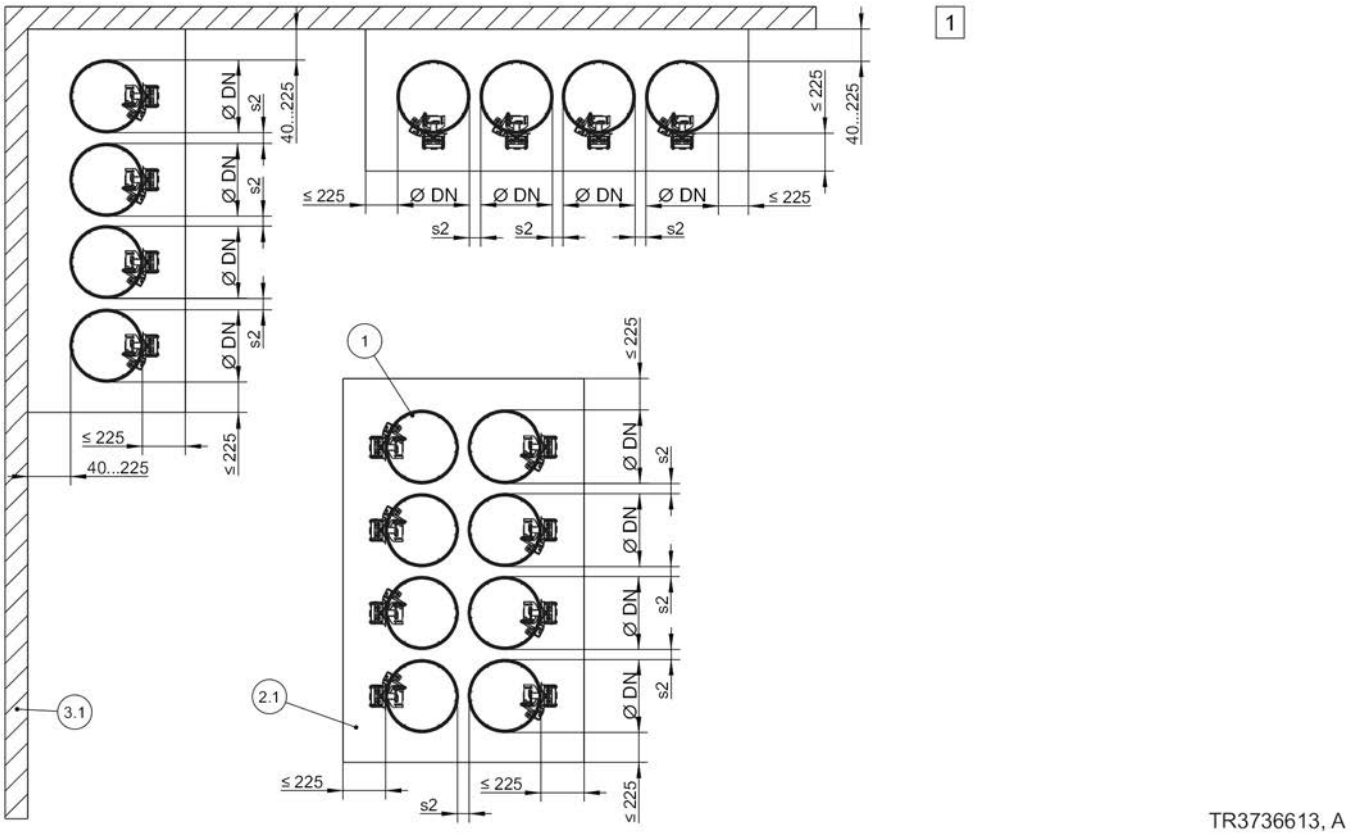


Fig. 89: Mortar-based installation into the concrete base – multiple occupancy of an installation opening

1 FKR-EU
2.1 Mortar
2.2 Concrete
3.1 Solid wall (load-bearing component)
s2 Spigot construction 40 – 225 mm
Flange construction 80 – 225 mm
[1] Up to EI 90 S

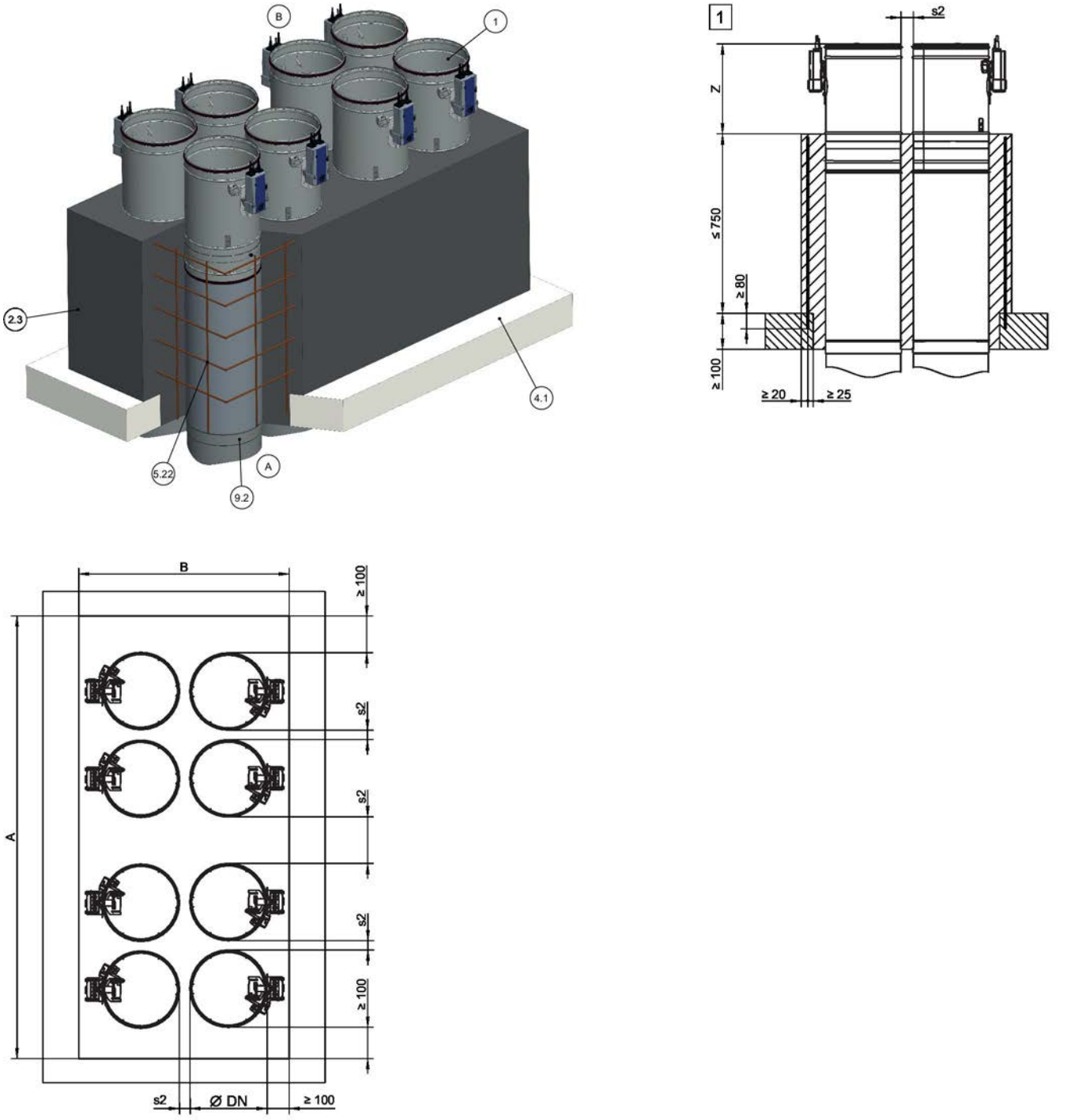


Fig. 90: Mortar-based installation with concrete base into a solid ceiling slab, upright, multiple occupancy of an installation opening

1	FKR-EU	Z	Spigot construction 370 mm Flange construction 342 mm
2.3	Concrete base		
4.1	Solid ceiling slab	s2	Spigot construction 40 – 225 mm Flange construction 80 – 225 mm
5.22	Steel fabric, ∅ ≥ 8 mm, mesh aperture 150 mm, or equivalent, for number of fixing points see table *114*	1	Up to EI 90 S
9.2	Extension piece or duct		

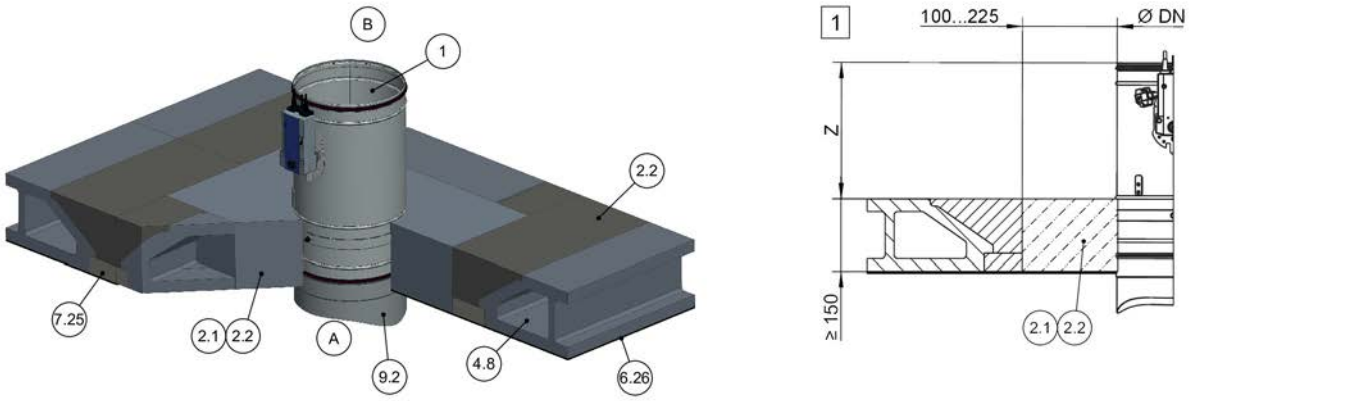
Minimum number of fixing points in the bare ceiling

B	A						
	≥ 315	≥ 500	≥ 800	≥ 1100	≥ 1400	≥ 1700	≥ 2000
≥ 315	4	6	8	10	12	14	16
≥ 500	6	8	10	12	14	16	18
≥ 800	8	10	12	14	16	18	20
≥ 1100	10	12	14	16	18	20	22
≥ 1400	12	14	16	18	20	22	24
≥ 1700	14	16	18	20	22	24	26
≥ 2000	16	18	20	22	24	26	28

Additional requirements: mortar-based installation into solid ceiling slab with concrete base – multiple occupancy of an installation opening

- Solid ceiling slab, ↬ *on page 36*
- Total fire damper area (∅ nominal width) ≤ 4.8 m^2
- The number of fire dampers in an installation opening is limited by their damper size (∅ nominal width) and the overall area of the fire dampers (4.8 m^2).
- The dampers can be arranged in one or two rows.
- Structural properties of the ceiling construction, including the attachment to the mortar/concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.6 Mortar-based installation into hollow stone ceilings



TR3744045, B

Fig. 91: Mortar-based installation into hollow stone ceilings, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Concrete
4.8	Hollow stone ceiling*
6.26	Plaster*
7.25	Reinforced concrete support*
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1	Up to EI 90 S
*	Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers

Additional requirements: mortar-based installation into hollow stone ceilings

- Hollow stone ceiling, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.7 Mortar-based installation into hollow chamber ceilings

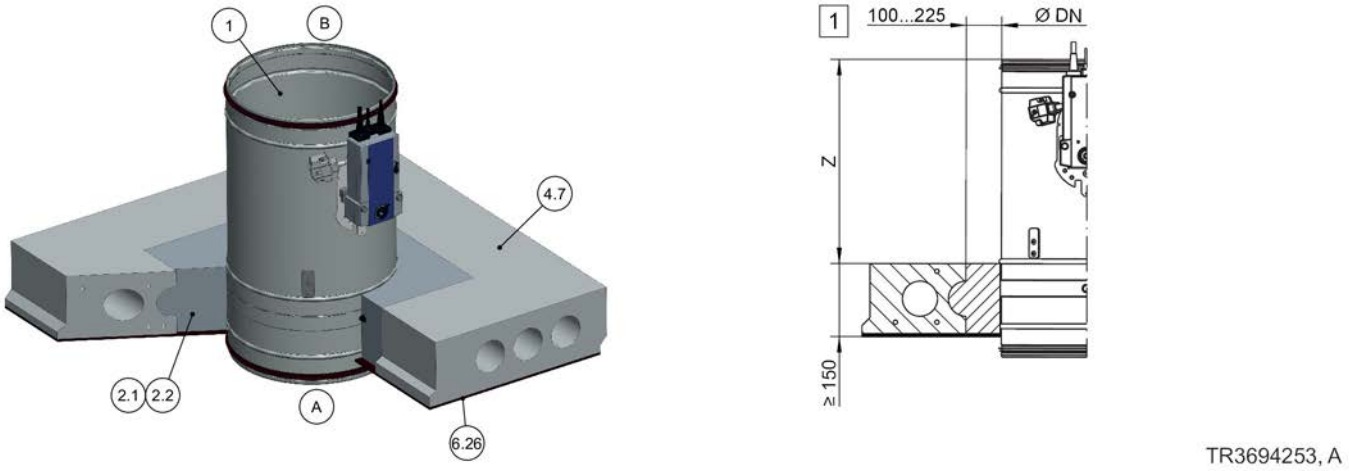


Fig. 92: Mortar-based installation into hollow chamber ceilings, shown upright (also applicable for suspended arrangement)

1 FKR-EU
2.1 Mortar
2.2 Concrete
4.7 Reinforced hollow chamber ceiling*
6.26 Plaster*
Z Spigot construction 370 mm
Flange construction 342 mm
1 Up to EI 90 S
* Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers

Additional requirements: mortar-based installation into hollow chamber ceilings

- Hollow chamber ceiling, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings
  - After the installation opening has been created, the adjacent open spaces must be partially closed off all the way round (in relation to the depth) by at least 100 mm.

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.8 Mortar-based installation into ribbed ceilings

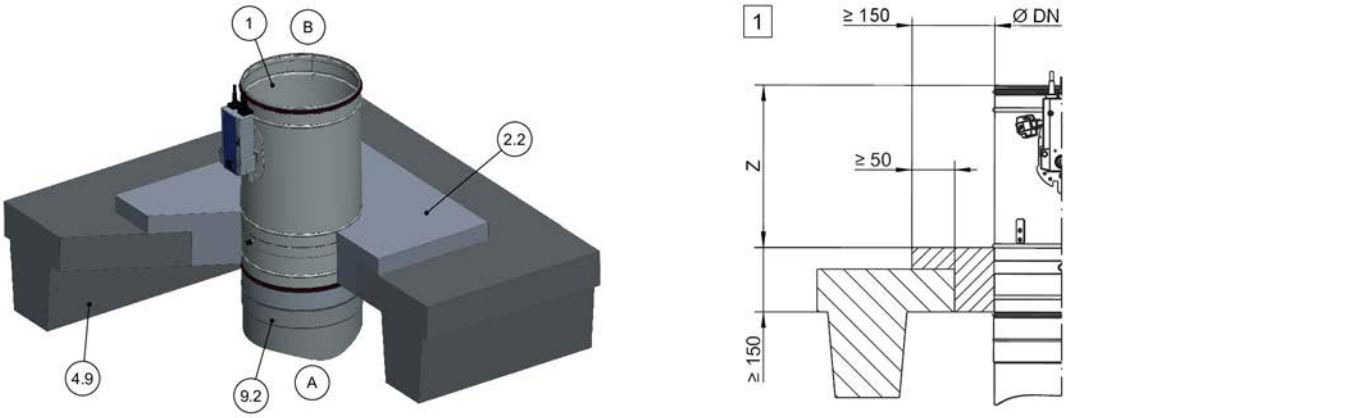


Fig. 93: Mortar-based installation into ribbed ceilings, shown upright (also applicable for suspended arrangement)

1 FKR-EU
2.2 Concrete
4.9 Reinforced ribbed ceiling*
9.2 Extension piece or duct
Z Spigot construction 370 mm
Flange construction 342 mm
1 Up to EI 90 S
* Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers

Additional requirements: mortar-based installation into ribbed ceilings

- Ribbed ceiling, *on page 36*
- Concrete bases H < 150 mm do not require reinforcement
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.9 Mortar-based installation into composite ceilings

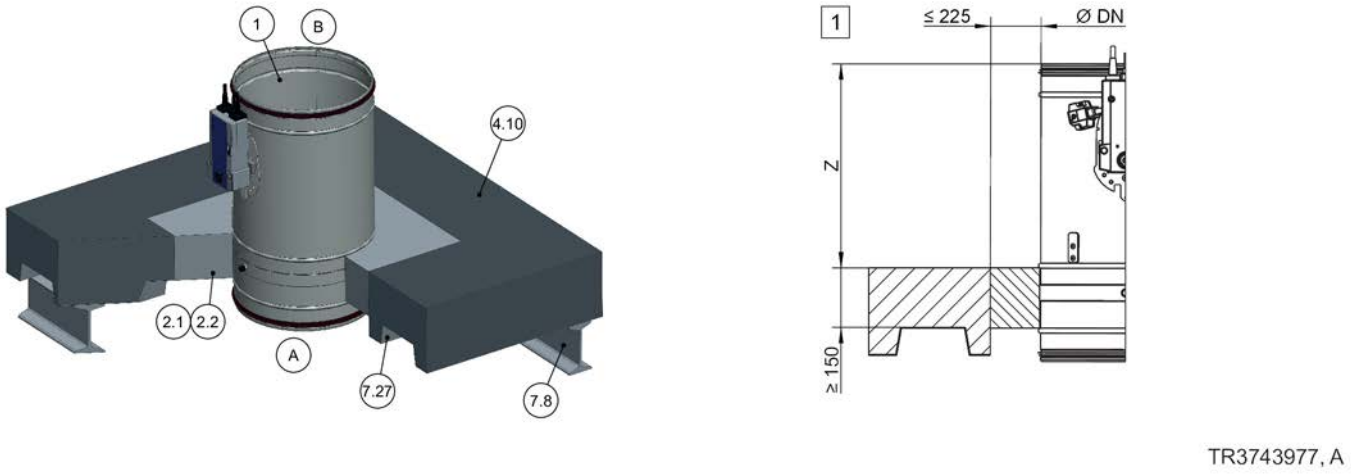


Fig. 94: Mortar-based installation into composite ceilings, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Concrete
4.10	Composite ceiling* (concrete)
7.8	Steel girder
7.27	Profile sheet metal
Z	Spigot construction 370 mm Flange construction 342 mm
1	Up to EI 90 S
*	Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers

Additional requirements: mortar-based installation into composite ceilings

- Composite ceiling, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.10 Mortar-based installation in conjunction with wooden beam ceilings

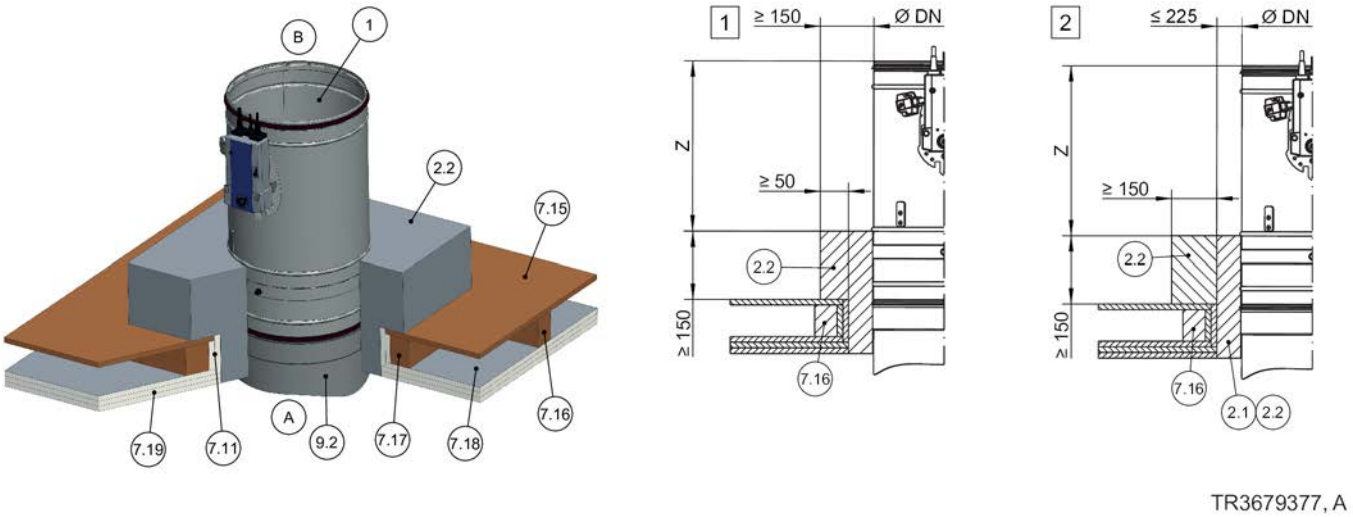


Fig. 95: Mortar-based installation into solid ceiling slab in conjunction with wooden beam / laminated beam ceilings, shown upright (also applicable for suspended arrangement)

1 FKR-EU
2.1 Mortar
2.2 Reinforced concrete
7.11 Trim panel, same construction as 7.19
7.15 Wooden floorboard / floor tiles (different ceiling construction may be possible)
7.16 Wooden beam / gluelam (reduce distances between wooden beams to the size of the installation opening)
7.17 Trimmers, wooden beam / gluelam
7.18 Formwork
7.19 Fire-resistant cladding (ceiling-dependent)
9.2 Extension piece or duct
Z Spigot construction 370 mm
Flange construction 342 mm
[1] [2] Up to EI 90 S

Additional requirements: mortar-based installation into solid ceiling slabs in conjunction with wooden beam / laminated beam ceilings

- Wooden beam ceiling, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- Distance of ≥ 40 mm between two fire dampers (80 mm for flange construction). When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured. Professionally connect the trimmers.
2. Create a partial concrete ceiling around the fire damper, ≥ 150 mm, ≥ 150 mm thick.

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.11 Mortar-based installation in conjunction with solid wood ceilings

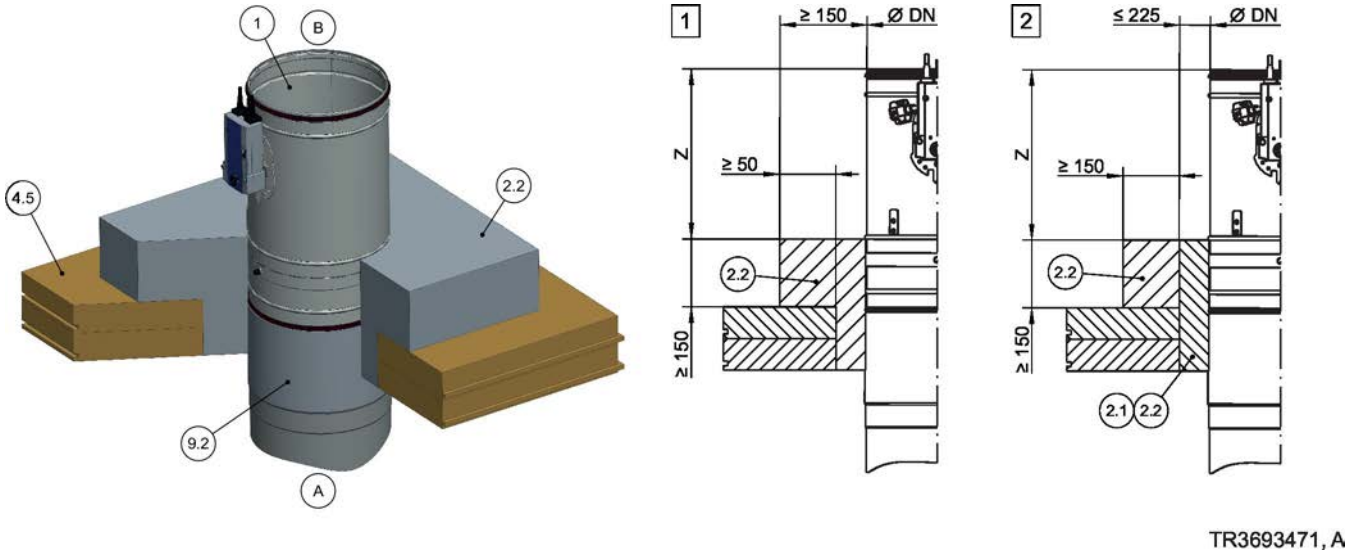


Fig. 96: Mortar-based installation into solid ceiling slab in conjunction with solid wood ceiling, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Reinforced concrete
4.5	Solid wood ceiling
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1 2	Up to EI 90 S

Additional requirements: mortar-based installation into solid ceiling slabs in conjunction with solid wood ceilings

- Solid wood ceiling, *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- Distance of ≥ 40 mm between two fire dampers (80 mm for flange construction). When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured.
2. Create a partial concrete ceiling around the fire damper, ≥ 150 mm, ≥ 150 mm thick.

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.11.12 Mortar-based installation in conjunction with lightweight ceilings

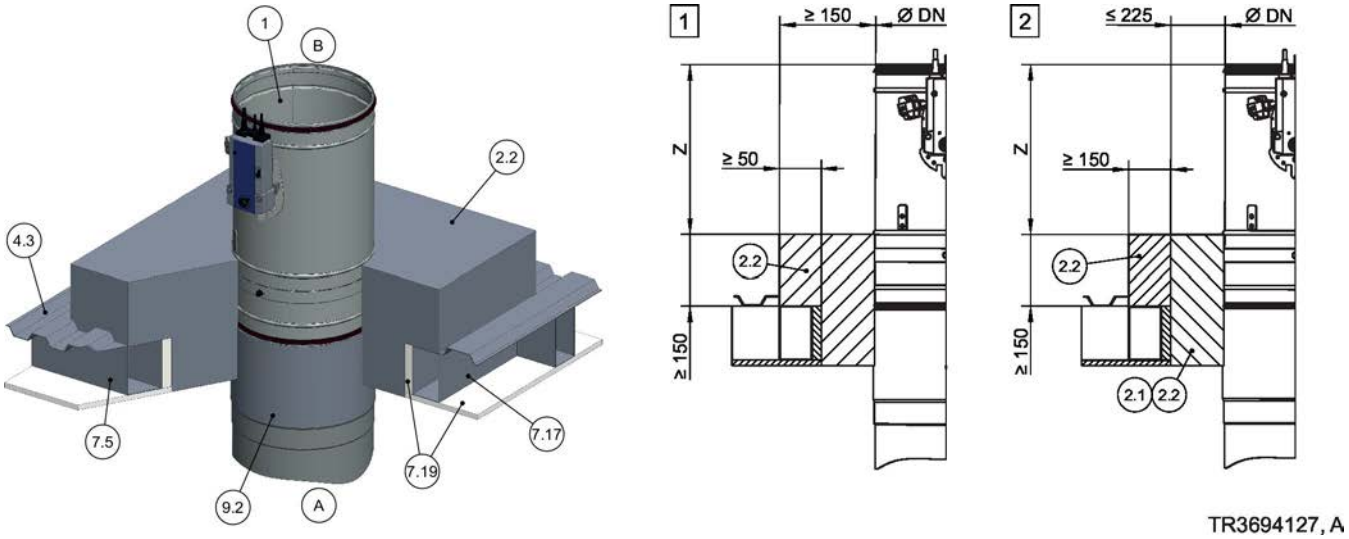


Fig. 97: Mortar-based installation into solid ceiling slab in conjunction with lightweight ceiling (Cadolto system), shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Reinforced concrete
4.3	Modular ceiling (Cadolto system), installation according to manufacturer's instructions and general appraisal certificate
7.5	Steel support structure
7.17	Trimmers, steel support structure
7.19	Fire-resistant cladding
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1 2	Up to EI 120 S

Additional requirements: mortar-based installation into solid ceiling slabs in conjunction with lightweight ceilings

- Modular ceiling, (Cadolto system), *on page 36*
- ≥ 40 mm distance from fire damper to load-bearing structural elements
- Distance of ≥ 40 mm between two fire dampers (80 mm for flange construction). When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured.
2. Create a partial concrete ceiling around the fire damper, ≥ 150 mm, ≥ 150 mm thick.

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.12 Solid wood ceilings

5.12.1 Mortar-based installation into solid wood ceilings

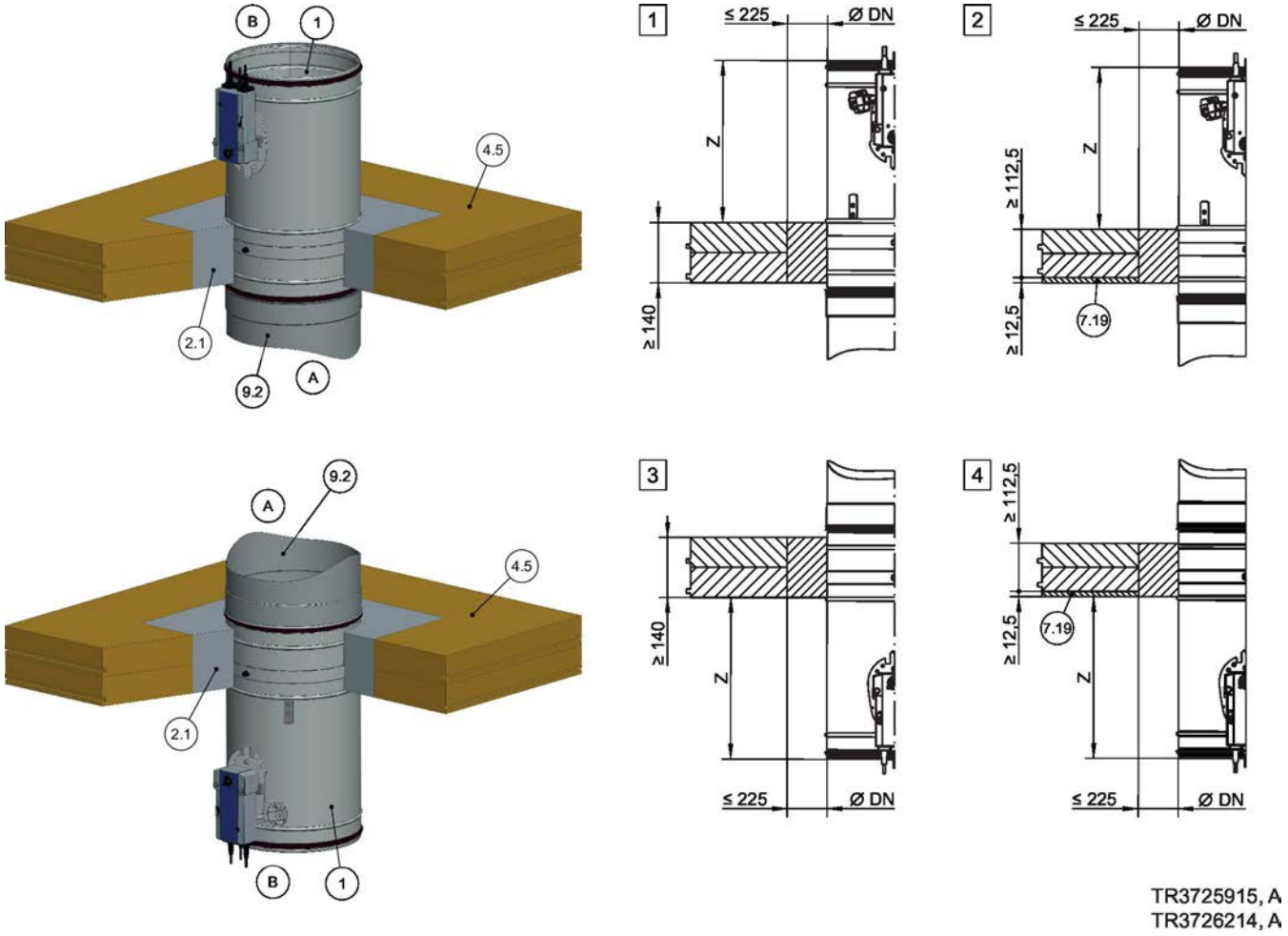


Fig. 98: Mortar-based installation into a solid wood ceiling, suspended or upright

1	FKR-EU
2.1	Mortar
4.5	Solid wood ceiling
7.19	Fire-resistant cladding
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1 – 4	Up to EI 90 S

Additional requirements: mortar-based installation into solid wood ceilings

- Solid wood ceiling, *on page 36*
- ≥ 75 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.12.2 Dry mortarless installation with installation kit TQ into solid wood ceilings

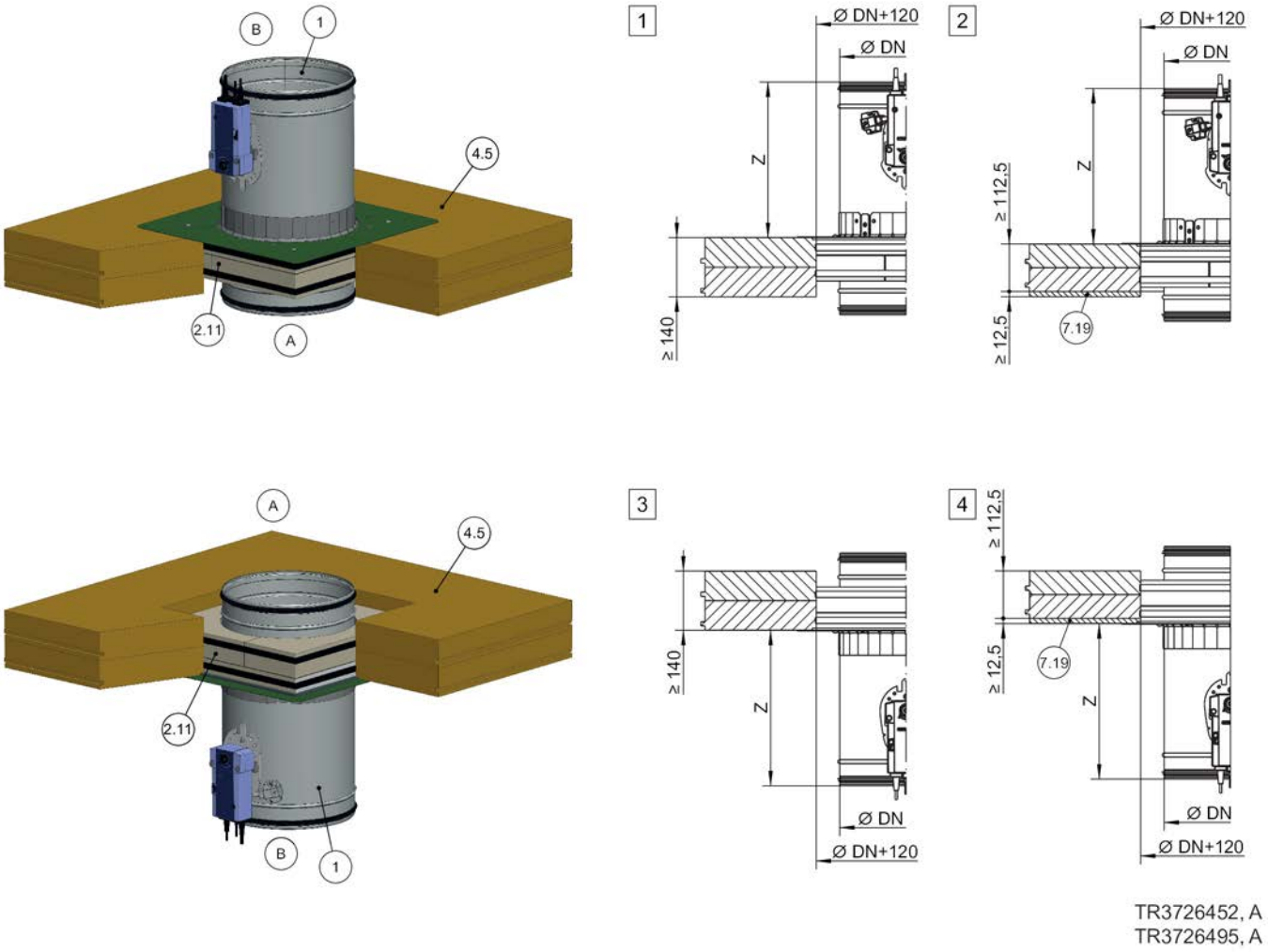


Fig. 99: Dry mortarless installation with installation kit TQ into solid wood ceiling, upright and suspended

1 FKR-EU
2.11 Installation kit TQ (factory assembled)
4.5 Solid wood ceiling
7.19 Fire-resistant cladding
Z Spigot construction 370 mm
Flange construction 342 mm
1 – 4 Up to EI 90 S

Additional requirements: dry mortarless installation with installation kit TQ in solid wood ceilings

- Solid wood ceiling, *on page 36*
- Installation kit TQ, *on page 32*
- ≥ 75 mm distance from the fire damper to load-bearing structural elements (structure 100 mm)
- ≥ 200 mm distance between two fire dampers in separate installation openings
- Fasten the cover plate to the solid wood ceiling with 4 (for nominal widths up to 400 mm) or 12 (for nominal widths from 450 mm) dry wall screws ∅ ≥ 4.2 mm

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.13 Wooden beam ceilings

5.13.1 Mortar-based installation into wooden beam ceilings

Mortar-based installation in wooden beam / laminated beam ceiling, upright

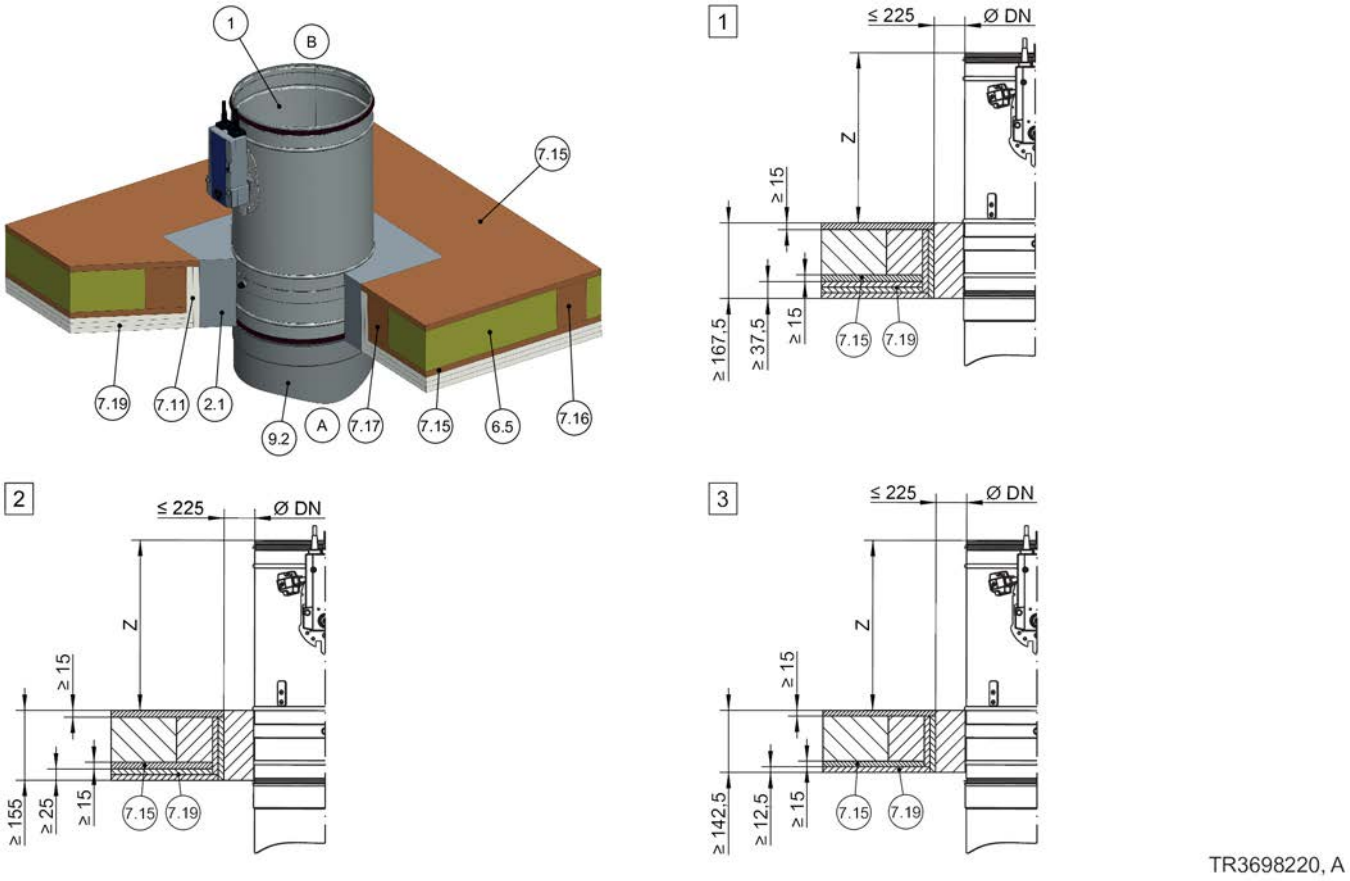


Fig. 100: Mortar-based installation into wooden beam / laminated beam ceiling, upright (illustration representative, alternative ceiling construction possible on request)

1 FKR-EU
2.1 Mortar
6.5 Mineral wool fill if required
7.11 Trim panel, same construction as 7.19
7.15 Wood sheet, min. 600 kg/m³
7.16 Wooden beam / gluelam min. 100 × 80 mm (reduce distances between wooden beams to the size of the installation opening)
7.17 Trimmers, wooden beam / glued laminated timber min. 100 × 80 mm
7.19 Fire-resistant cladding (ceiling-dependent)
9.2 Extension piece or duct
Z Spigot construction 370 mm
Flange construction 342 mm
1 Up to EI 90 S
2 Up to EI 60 S
3 EI 30 S

Mortar-based installation in wooden beam / laminated beam ceiling, suspended

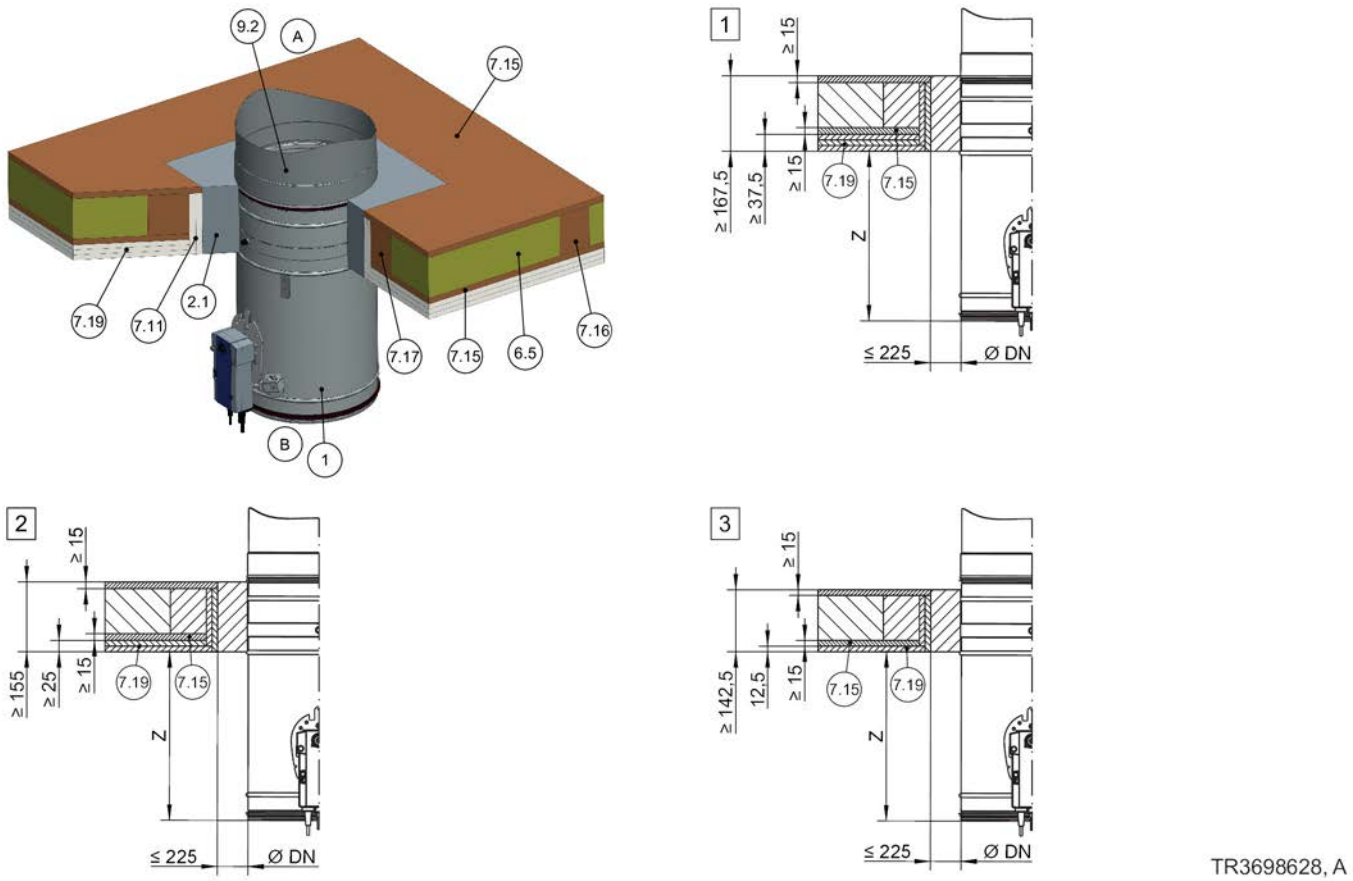


Fig. 101: Mortar-based installation into wooden beam / laminated beam ceiling, suspended (illustration representative, alternative ceiling construction possible on request)

1	FKR-EU
2.1	Mortar
6.5	Mineral wool fill if required
7.11	Trim panel, same construction as 7.19
7.15	Wood sheet, min. 600 kg/m³
7.16	Wooden beam / gluelam min. 100 × 80 mm (reduce distances between wooden beams to the size of the installation opening)
7.17	Trimmers, wooden beam / glued laminated timber min. 100 × 80 mm
7.19	Fire-resistant cladding (ceiling-dependent)
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
1	Up to EI 90 S
2	Up to EI 60 S
3	EI 30 S

Additional requirements: mortar-based installation into wooden beam / laminated beam ceilings

- Wooden beam ceiling, *on page 36*
- ≥ 75 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.13.2 Dry mortarless installation with installation kit TQ into wooden beam ceilings

Dry mortarless installation with installation kit TQ in wooden beam / laminated beam ceiling, upright

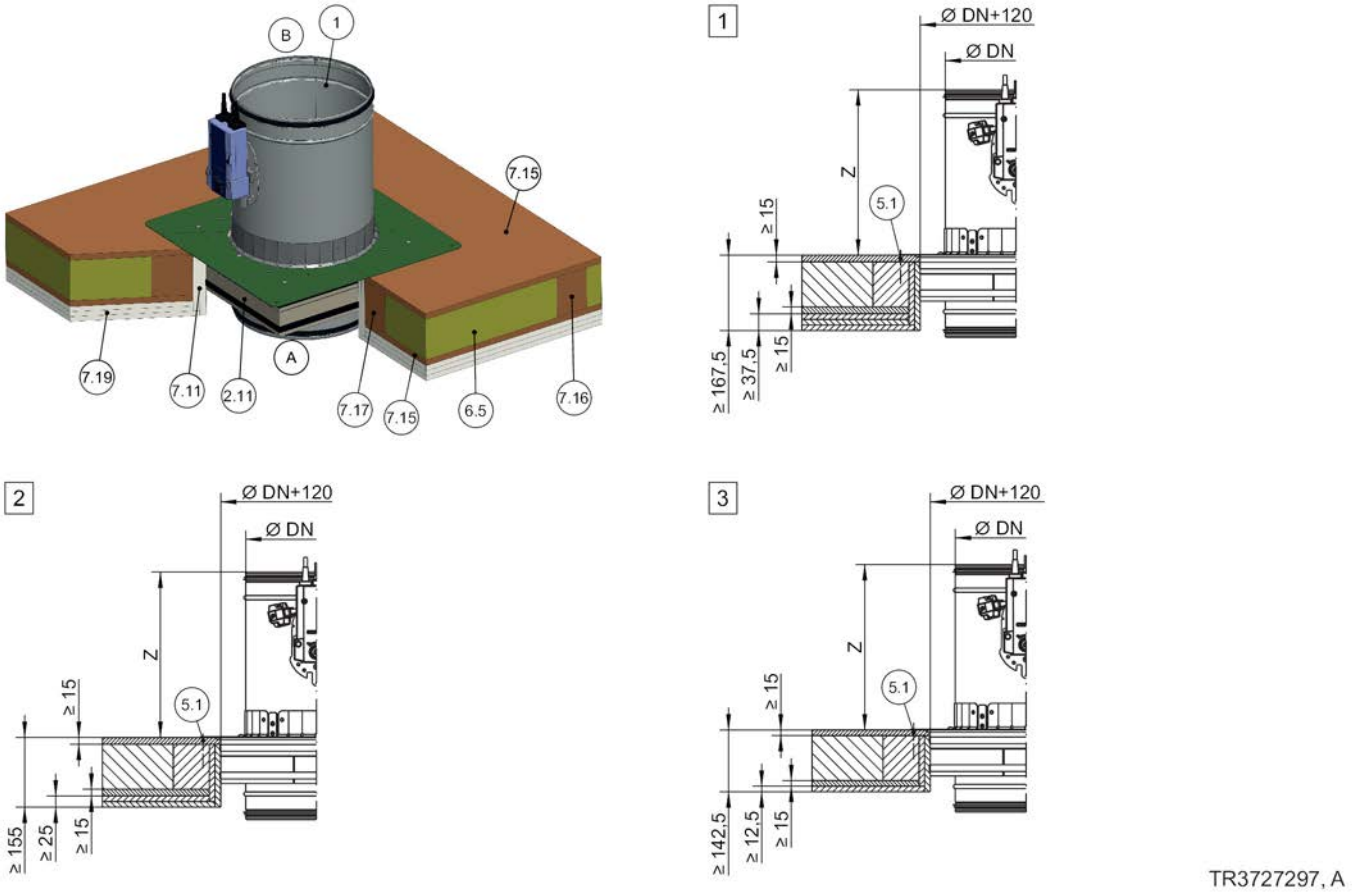


Fig. 102: Dry mortarless installation with installation kit TQ into wooden beam / laminated beam ceiling, upright (illustration representative, alternative ceiling construction possible on request)

1 FKR-EU
2.11 Installation kit TQ (factory assembled)
5.1 Dry wall screw
6.5 Mineral wool filling depending on ceiling construction
7.11 Trim panel, same construction as 7.19
7.15 Wood sheet, min. 600 kg/m³
7.16 Wooden beam / gluelam min. 100 × 80 mm (reduce distances between wooden beams to the size of the installation opening)
7.17 Trimmers, wooden beam / glued laminated timber min. 100 × 80 mm
7.19 Fire-resistant cladding (ceiling-dependent)
Z Spigot construction 370 mm
Flange construction 342 mm
1 Up to EI 90 S
2 Up to EI 60 S
3 EI 30 S

Dry mortarless installation with installation kit TQ in wooden beam / laminated beam ceiling, suspended

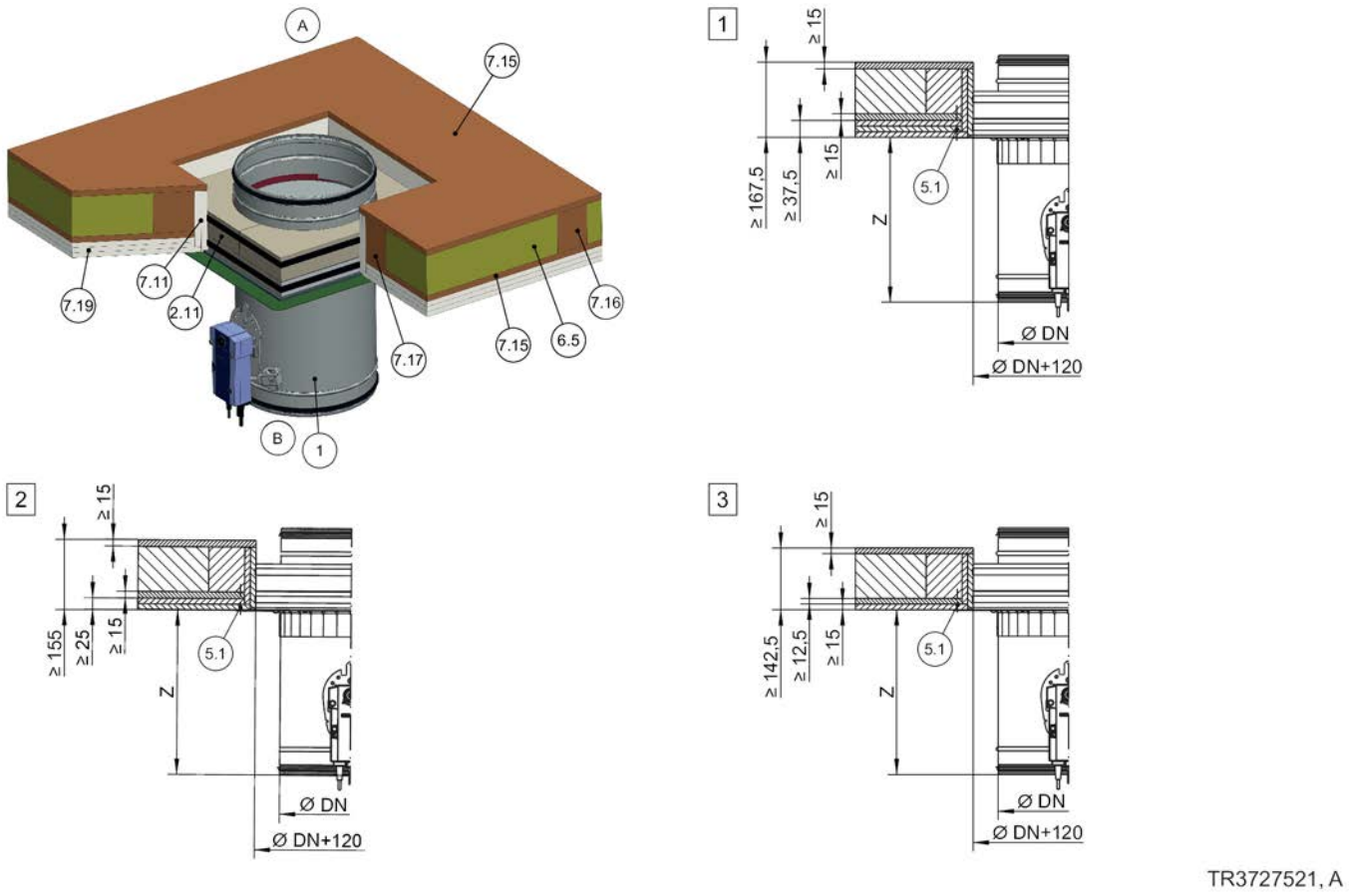


Fig. 103: Dry mortarless installation with installation kit TQ into wooden beam / laminated beam ceiling, suspended (illustration representative, alternative ceiling construction possible on request)

1 FKR-EU
2.11 Installation kit TQ (factory assembled)
5.1 Dry wall screw
6.5 Mineral wool filling depending on ceiling construction
7.11 Trim panel, same construction as 7.19
7.15 Wood sheet, min. 600 kg/m³
7.16 Wooden beam / gluelam min. 100 × 80 mm (reduce distances between wooden beams to the size of the installation opening)
7.17 Trimmers, wooden beam / glued laminated timber min. 100 × 80 mm
7.19 Fire-resistant cladding (ceiling-dependent)
Z Spigot construction 370 mm
Flange construction 342 mm
[1] Up to EI 90 S
[2] Up to EI 60 S
[3] EI 30 S

Additional requirements: dry mortarless installation with installation kit TQ into wooden beam / laminated beam ceilings

- Wooden beam ceiling, *on page 36*
- Installation kit TQ, *on page 32*
- ≥ 75 mm distance from the fire damper to load-bearing structural elements (structure 100 mm)
- ≥ 200 mm distance between two fire dampers in separate installation openings
- Fasten the cover plate to the wooden beam / glue-laminated beam ceiling with 4 (for nominal widths up to 400 mm) or 12 (for nominal widths from 450 mm) dry wall screws ∅ ≥ 4.2 mm

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.13.3 Mortar-based installation into historical wooden beam ceilings

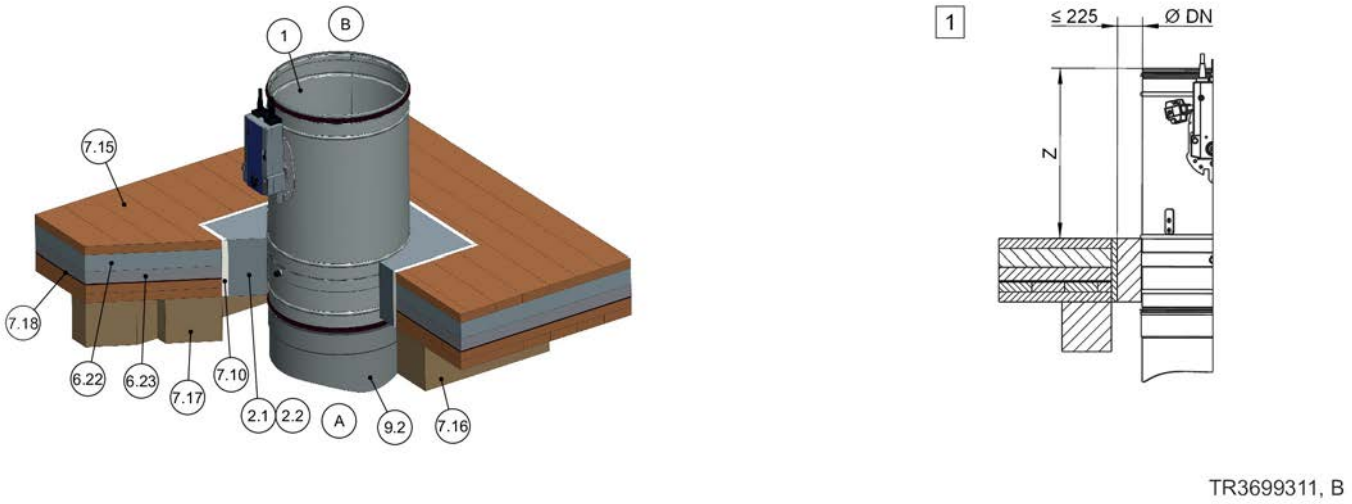


Fig. 104: Mortar-based installation into historical wooden beam ceilings, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Concrete
6.22	Screed*
6.23	Footfall sound insulation*
7.10	Trim panels (fire-resistant)
7.15	Wooden floorboard / floor covering*
7.16	Wooden beam
7.17	Trimmers, wooden beam
7.18	Formwork*
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
*	Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers
1	EI 30 S

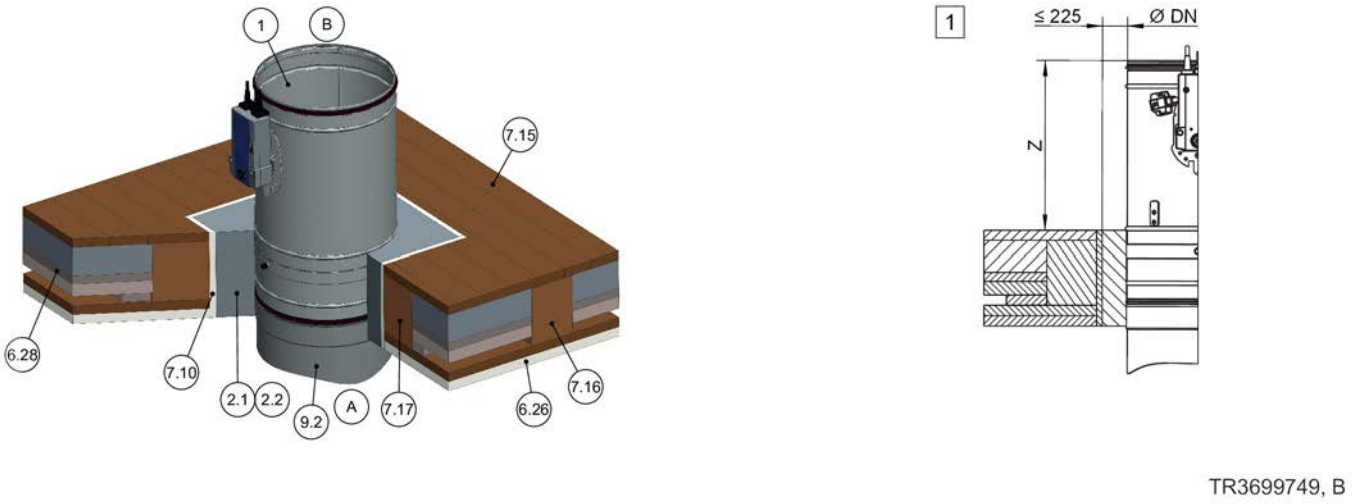


Fig. 105: Mortar-based installation into historical wooden beam ceilings, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Concrete
6.26	Plaster*
6.28	Ceiling fill*
7.10	Trim panels (fire-resistant)
7.15	Wooden floorboard / floor covering*
7.16	Wooden beam
7.17	Trimmers, wooden beam
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
*	Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers
1	EI 30 S

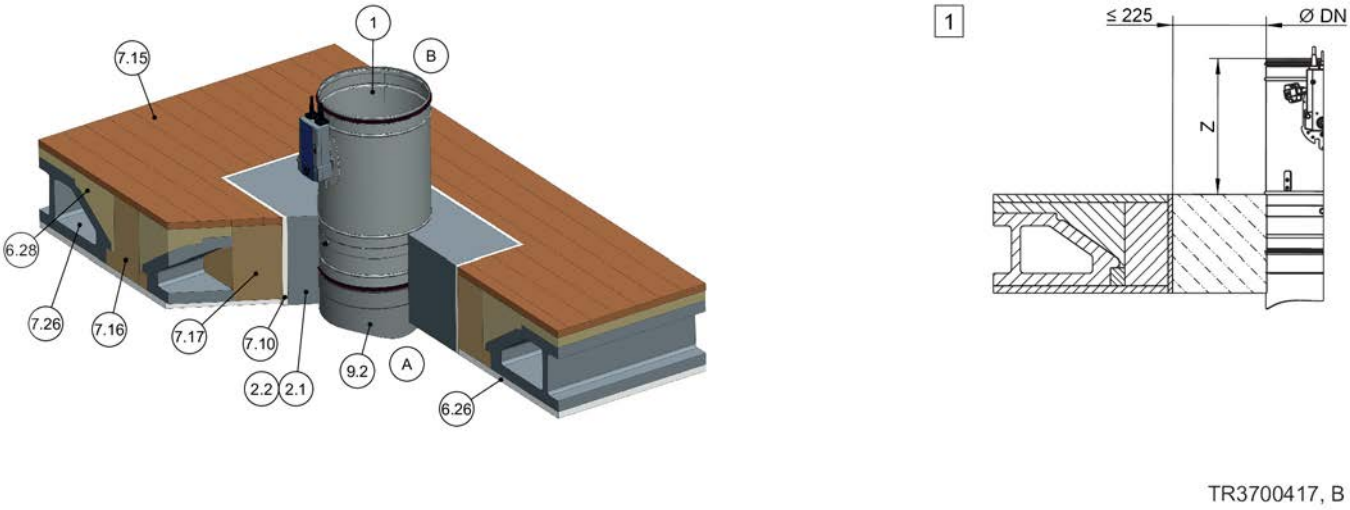


Fig. 106: Mortar-based installation into historical wooden beam ceilings, shown upright (also applicable for suspended arrangement)

1	FKR-EU
2.1	Mortar
2.2	Concrete
6.26	Plaster*
6.28	Ceiling fill*
7.10	Trim panels (fire-resistant)
7.15	Wooden floorboard / floor covering*
7.16	Wooden beam
7.17	Trimmers, wooden beam
7.26	Hollow stone*
9.2	Extension piece or duct
Z	Spigot construction 370 mm Flange construction 342 mm
*	Illustration representative, other ceiling constructions possible according to local conditions and ceiling manufacturers
[1]	EI 30 S

Additional requirements: mortar-based installation into historical wooden beam ceilings

- Historical wooden beam ceiling, *on page 36*
- ≥ 75 mm distance from fire damper to load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

Note:

Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete or any required reinforcement, have to be evaluated and ensured by others.

5.14 Fixing the fire damper

5.14.1 General

For installation with fire batt, the fire dampers must be suspended with steel threaded rods (M10 – M12).

The rods have to be fixed to the ceiling slab; the required fire resistance must not be compromised. Use only fire-rated steel anchors with suitability certificate. Instead of anchors, you can use threaded rods and secure them using nuts and washers. Secure the threaded rods above the ceiling using steel nuts and washers. Threaded rods up to 1.50 m long do not require any insulation; longer rods do require insulation (according to Promat® work sheet 478, for example). Load the suspension system only with the weight of the fire damper, ducting must be suspended separately.

Weight [kg]: ↳ *Chapter 2.2 'FKR-EU with fusible link' on page 11* ↳ *Chapter 2.3 'FKR-EU with spring return actuator' on page 13* ↳ *Chapter 2.4 'FKR-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit' on page 19* .

In addition to the fixing systems described in this manual, you may also use fixing systems that have been approved by accredited testing institutes. This applies in particular to the fire damper installation near a wall or in a corner (when angle sections or mounting plates are used).

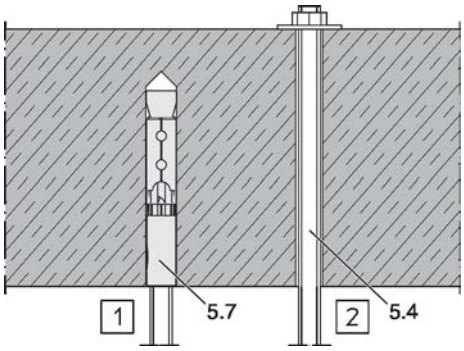


Fig. 107: Fixing to the ceiling slab

5.4 Threaded rod
5.7 Fire-rated anchor (with suitability certificate)
1 Fixing with wallplugs with suitability certificate for fire safety engineering
2 Fixing with threaded rod and push through installation

5.14.2 Fixing the damper when a fire batt is used

5.14.2.1 Horizontal duct

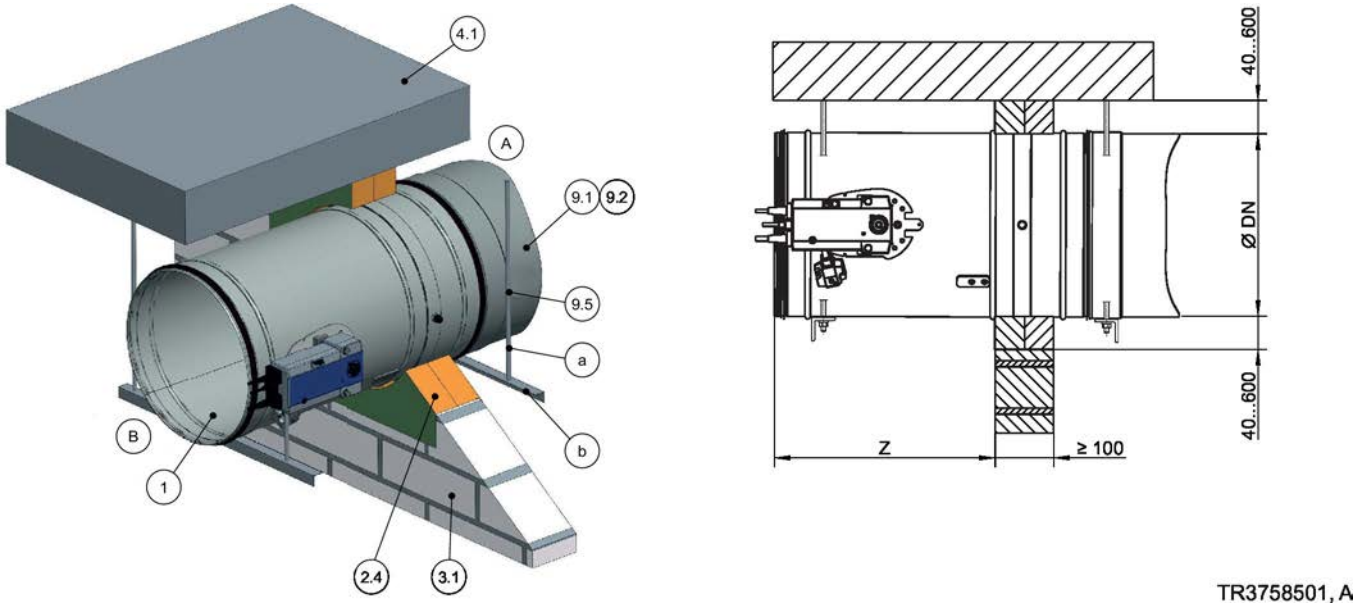


Fig. 108: Suspension system, horizontal duct

1 FKR-EU
2.4 Coated board system
3.1 Solid wall
4.1 Solid ceiling slab
9.1 Flexible connector (recommended)
9.2 Extension piece
9.5 Suspension system (by others) consisting of:
a Threaded rod min. M10 with washer and nut
b Steel angle section to EN 10056-1, $L \geq 40 \times 40 \times 5$ mm, galvanised or painted, or equivalent

Note: Each fire damper has to be suspended both on the operating side and on the installation side.
As an alternative to suspension with cross bars, suspension on both sides with suitable pipe clamps is permissible.

6 Accessories

Extension pieces

When there are cover grilles, flexible connectors, circular duct bends, etc., you may have to use an extension piece for certain nominal sizes. See the table for the required lengths.

Arrangement and length of extension pieces for the attachment of the flexible connector [mm]									
Nominal size DN	**315**	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
	FKR-EU with spigot								
Operating side	–	–	–	–	–	–	–	–	175
Installation side	175	175	175	175	175	370	370	370	370
	FKR-EU with flange								
Operating side	–	–	–	–	–	–	–	175	175
Installation side	175	175	175	175	370	370	370	370	370

Arrangement and length of extension pieces for the attachment of the cover grill [mm]									
Nominal size DN	**315**	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
	FKR-EU with spigot								
Operating side	175	175	175	175	175	175	175	175	175
Installation side	175	175	175	175	175	370	370	370	370
	FKR-EU with flange								
Operating side	–	–	–	–	–	–	–	–	175
Installation side	175	175	175	175	370	370	370	370	370

Open blade protrusion

Open blade protrusion [mm]									
Nominal size DN	**315**	**355**	**400**	**450**	**500**	**560**	**630**	**710**	**800**
	FKR-EU with spigot								
x	-270	-250	-230	-200	-175	-145	-110	-70	-25
y	25	45	70	90	115	145	180	220	265
	FKR-EU with flange								
x	-240	-220	-200	-170	-145	-115	-80	-40	5
y	55	75	100	125	150	180	215	255	300

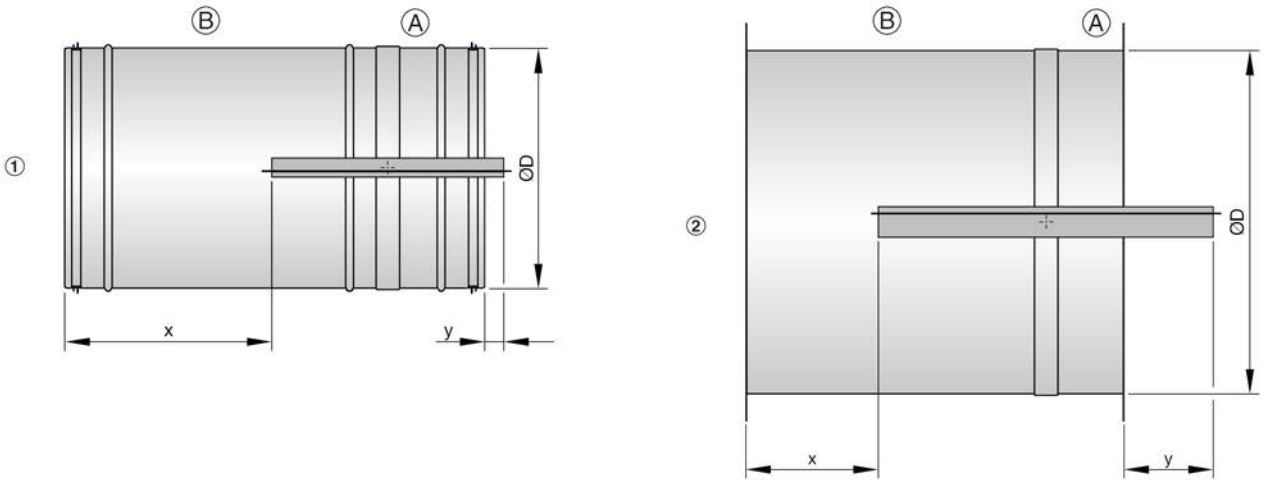


Fig. 109: Open blade protrusion

1 Spigot construction
2 Flange construction
A Installation side
B Operating side

Note

The movement of the damper blade must not be obstructed by any accessory. The minimum distance between the tip of the open damper blade and any accessory must be at least 50 mm.

Flexible connectors

Flexible connectors are used to avoid both tension and compression.

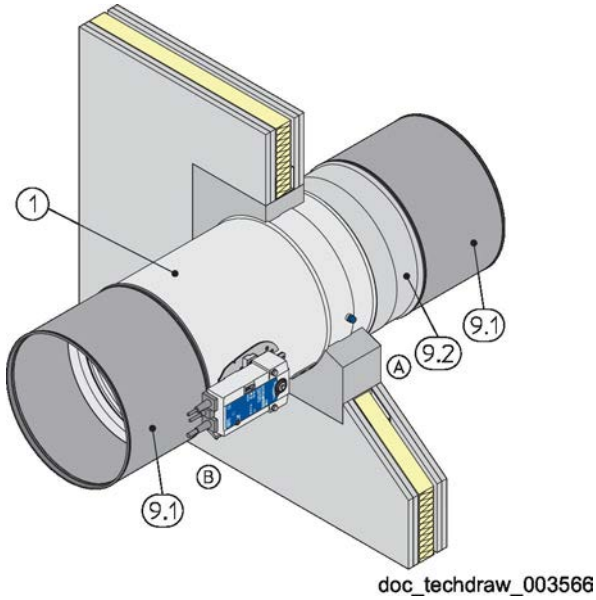


Fig. 110: Fire damper with flexible connectors

1 FKR-EU
9.1 Flexible connector
9.2 Extension piece or duct

Cover grilles

Cover grilles are used on non-ducted ends of fire dampers.

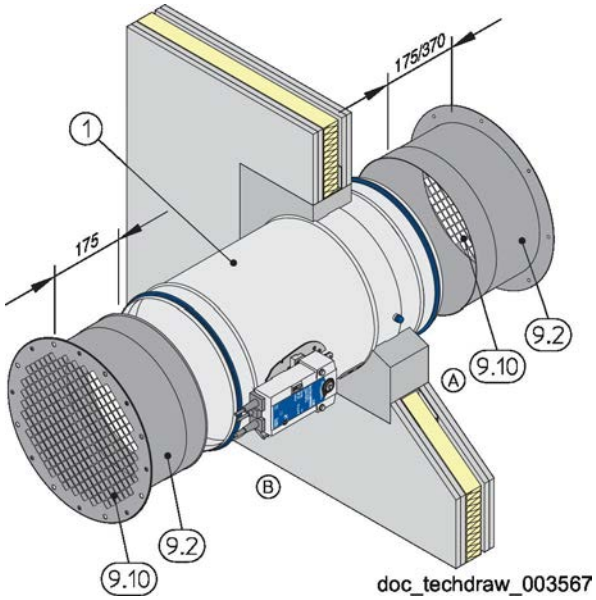


Fig. 111: Fire damper with cover grille

1 FKR-EU
9.2 Extension piece or duct
9.10 Cover grille, galvanised steel, mesh aperture 10 mm, optionally on installation or operating side

If only one end is to be ducted on site, the other end must have a cover grille.

7 Electrical connection

7.1 General safety notes

DANGER!

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

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

The connecting cables are sized by others depending on the supply voltage (230 V or 24 V), the cable length and the power consumption and number of actuators.

7.2 Limit switches (fire dampers with fusible link)

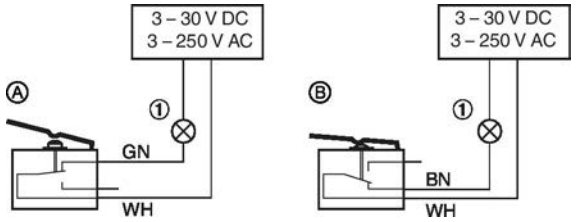


Fig. 112: Wiring of limit switches, example

1 Indicator light or relay, to be provided by others
A Type of connection normally closed
B Type of connection normally open

- The limit switches must be connected according to the wiring example Fig. 112
- Indicator lights or relays may be connected as long as the performance specifications are taken into consideration.
- Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

Type of connection	Limit switch	Damper blade	Electric circuit
A	Not actuated	CLOSED or OPEN position not reached	Closed
B	actuated	CLOSED or OPEN position reached	Closed

Note: For wiring explosion-proof limit switch, see "Supplementary operating manual for explosion-proof fire dampers Type FKR-EU".

7.3 Spring return actuator

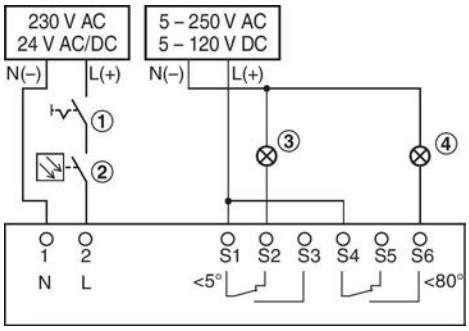


Fig. 113: Actuator connection, example

1 Switch for opening and closing, to be provided by others
2 Optional release mechanism, e.g. TROX duct smoke detector Type RM-O-3-D or RM-O-VS-D
3 Indicator light for CLOSED position, to be provided by others
4 Indicator light for OPEN position, to be provided by others

- The fire damper may be equipped with a spring return actuator for a supply voltage of 230 V AC or 24 V AC/DC. See the performance data on the actuator rating plate.
- The spring return actuator must be connected according to the wiring example shown. Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.
- Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

Note: For wiring explosion-proof spring return actuator see "Supplementary operating manual for explosion-proof fire dampers Type FKR-EU".

Actuators with 24 V AC/DC

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

7.4 Spring return actuator and duct smoke detector RM-O-3-D

Note: For connection examples and further details see the RM-O-3-D operating and installation manual

8 Functional test

8.1 General

General

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

⚠ CAUTION!

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

8.2 Functional test with automatic control unit

Functional test with automatic control unit

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

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

TROXNETCOM systems such as TNC-EASYCONTROL or AS-interface meet all these requirements. For more informationen see *www.troxtechnik.com* .

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

8.3 Fire damper with fusible link

damper blade position indicator

The position of the damper blade is indicated by the position of the handle (1.6).

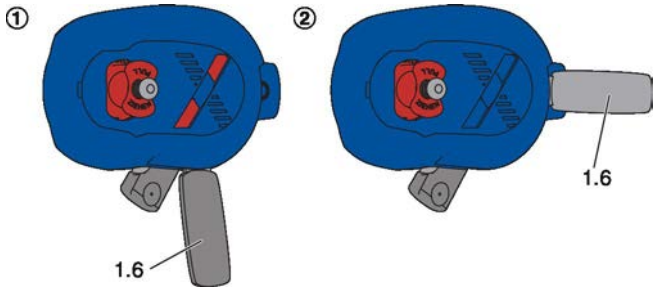


Fig. 114: damper blade position indicator

1. ▸ Damper blade is closed
2. ▸ Damper blade is open.

Close the damper blade

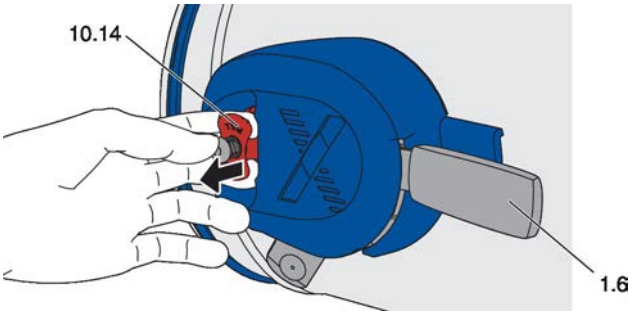


Fig. 115: Close the damper blade

Requirement

- Fire damper is open.

1. ▸ Grasp the thermal release mechanism (10.14) as shown with the thumb and middle fingers.
2. ▸ Pull the thermal release mechanism (10.14) towards you with both fingers.
   ⇨ The damper blade closes and the handle (1.6) locks into the CLOSED position, thereby locking the damper blade.

Opening the damper blade

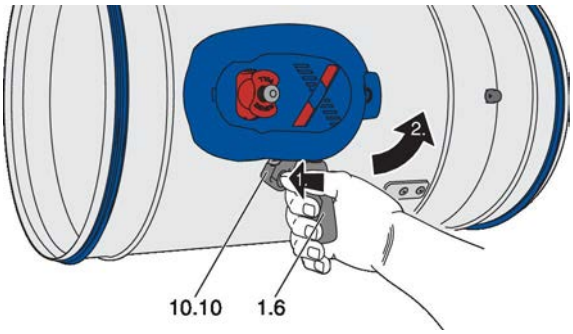


Fig. 116: Opening the damper blade

Requirement

- The fire damper is closed.

1. ▸ With your right hand, grasp the handle (1.6) as shown and press down the release tab (1.10) with your thumb, pull it forward and hold it in place.
2. ▸ Then turn the handle (1.6) anti-clockwise to the travel stop.
   ⇨ The handle (1.6) locks into the OPEN position and the damper blade is open.

8.4 Fire damper with spring return actuator

8.4.1 Spring return actuator BFN...

Status indicator

Fig. 117: Thermoelectric release mechanism BAT

1 Push button for functional test
2 Indicator light

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

- Power is being supplied.
- The thermal fuses are intact.
- The push button is not being pushed.

damper blade position indicator

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

Fig. 118: damper blade position indicator

1 Damper blade is closed
2 Damper blade is open

Closing/opening the damper blade with spring return actuator

Fig. 119: Functional test (FKR-EU with BFN actuator shown in OPEN position)

CAUTION!

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

Requirement

- Power is being supplied

1. ▸ Push the push button (1) and keep it pushed.
   ⇨ This interrupts the power supply, and the damper blade closes.
2. ▸ Check if the damper blade is CLOSED, check run time.
3. ▸ Release the push button (1).
   ⇨ Power is supplied again, and the damper blade opens.
4. ▸ Check if the damper blade is OPEN, check run time.

Opening the damper blade using the crank handle

Fig. 120: Functional test (without power supply)

DANGER!

Danger due to malfunction of the fire damper.

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

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

Requirement

- The damper blade is CLOSED

1. Insert the crank handle (1) into the opening for the spring winding mechanism.
2. Turn the crank handle in the direction of the arrow (2) to just short of the travel stop and hold it.
3. Set the interlock (3) to "Lock closed"

   ⇨ The damper blade remains in the OPEN position.
4. Remove the crank handle.

Close the fire damper

Fig. 121: Functional test (without power supply)

CAUTION!

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

Requirement

- The damper blade is OPEN

Set the interlock (3) to "Lock opened"

⇨ The damper blade is released and closes.

8.4.2 Spring return actuator BF...

Status indicator

Fig. 122: Thermoelectric release mechanism BAT

1 Push button for functional test
2 Indicator light

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

- Power is being supplied.
- The thermal fuses are intact.
- The push button is not being pushed.

Damper blade position indicator

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

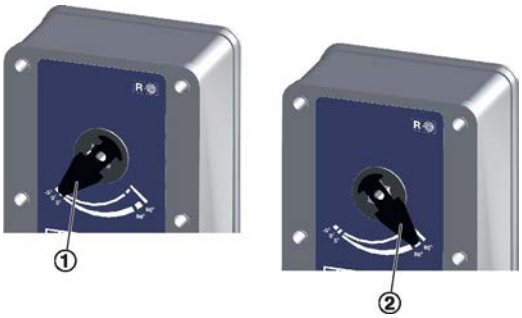


Fig. 123: Damper blade position indicator

1 Damper blade is closed
2 Damper blade is open

Closing/opening the damper blade with spring return actuator

Fig. 124: Functional test (FKR-EU with BF actuator shown in OPEN position)

CAUTION!

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

Requirement

- Power is being supplied

1. ▸ Push the push button (1) and keep it pushed.
   ⇨ This interrupts the power supply, and the damper blade closes.
2. ▸ Check if the damper blade is CLOSED, check run time.
3. ▸ Release the push button (1).
   ⇨ Power is supplied again, and the damper blade opens.
4. ▸ Check if the damper blade is OPEN, check run time.

Opening the damper blade using the crank handle

Fig. 125: Functional test (without power supply)

DANGER!

Danger due to malfunction of the fire damper.

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

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

Requirement

- The damper blade is CLOSED

1. Insert the crank handle (1) into the opening for the spring winding mechanism (the crank handle is clip-fixed to the connecting cable).
2. Turn the crank handle in the direction of the arrow (2) to just short of the travel stop.
3. Then quickly rotate the crank handle by approx. 90° towards the 'lock' position.

   ⇨ The damper blade remains in the OPEN position.
4. Remove the crank handle.

Closing the damper blade using the crank handle

Fig. 126: Functional test (without power supply)

CAUTION!

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

Requirement

- The damper blade is OPEN

1. Insert the crank handle (1) into the opening for the spring winding mechanism (the crank handle is clip-fixed to the connecting cable).
2. Rotate the crank handle by approx. 90° towards the 'unlock' position until a click can be heard.

   ⇨ The damper blade is released and closes.
3. Remove the crank handle.

9 Commissioning

Before commissioning

Before commissioning, each fire damper must be inspected to determine and assess its actual condition.

The inspection measures to be taken are listed in the ↬ *Chapter 10.3 'Inspection, maintenance and repair measures' on page 151* .

Operation

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

If the temperature in the duct (≥ 72 °C / ≥ 95 °C in warm air ventilation systems) or the ambient temperature (≥ 72 °C) rises in the event of a fire, the thermal release mechanism is triggered. This action closes the damper blade.

CLOSED fire dampers

Fire dampers which close while the ventilation and air conditioning system is running must be inspected before they are opened again in order to ensure their correct function ↬ *'Inspection' on page 148* .

10 Maintenance

10.1 General

General safety notes

DANGER!

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

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

CAUTION!

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

Make sure that the damper blade cannot be released inadvertently.

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

The system owner is responsible for the maintenance of the fire damper.

The system owner is responsible for creating a maintenance plan, for defining the maintenance goals, and for the functional reliability of the equipment.

Functional test

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

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

- EN 13306
- DIN 31051
- EN 15423

The function of fire dampers with a spring return actuator can also be tested with an automatic control unit *'Functional test with automatic control unit' on page 141*.

Maintenance

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

Cleaning

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

Hygiene

Hygienic requirements are fulfilled in accordance with VDI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 13779 as well as the Önorm H 6020 and H 6021 and SWKI. The fire damper building materials were tested for resistance to fungi and bacteria in a test of their microbial metabolic potential in accordance with DIN EN ISO 846. The building materials do not promote the growth of microorganisms (fungi, bacteria), thus reducing the risks of infection for people. The fire dampers are resistant to disinfectants[1] and are thus suitable for hospitals and comparable institutions. Disinfection and cleaning is very straightforward. Verification of corrosion resistance was provided in accordance with EN 15650.

[1] Resistance to disinfectants was tested with the disinfectant groups of active substances alcohol and quaternary compounds. These disinfectants correspond with the list from the Robert Koch Institute and were used in accordance with the specifications of the Disinfectant List of the Disinfectant Commission in the Association for Applied Hygiene (VAH).

Inspection

The fire damper must be inspected before commissioning. After commissioning, the function has to be tested in regular intervals. Local requirements and building regulations must be complied with. The inspection measures to be taken are listed in *on page 151*. The test of each fire damper must be documented and evaluated. If the requirements are not fully met, suitable remedial action must be taken.

Repair

For safety reasons, repair work must only be carried out by expert qualified personnel or the manufacturer. Only original replacement parts are to be used. A functional test is required after any repair work *141*.

10.2 Replacing the fusible link

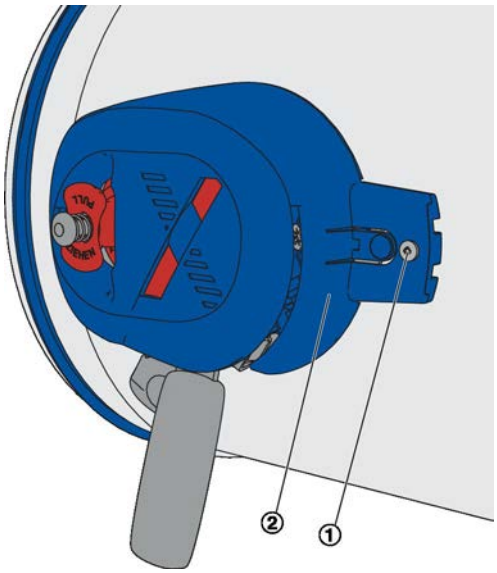


Fig. 127: Removing the cover

1. Close the damper blade.
2. Loosen the screw (1) on the cover (2).

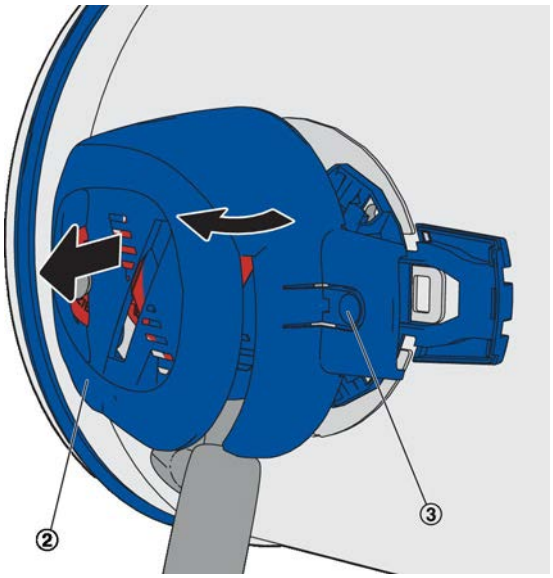


Fig. 128: Removing the cover

3. Press the button (3) on the cover (2) and turn the cover into the direction of the arrow. Remove the cover by pulling it towards you.

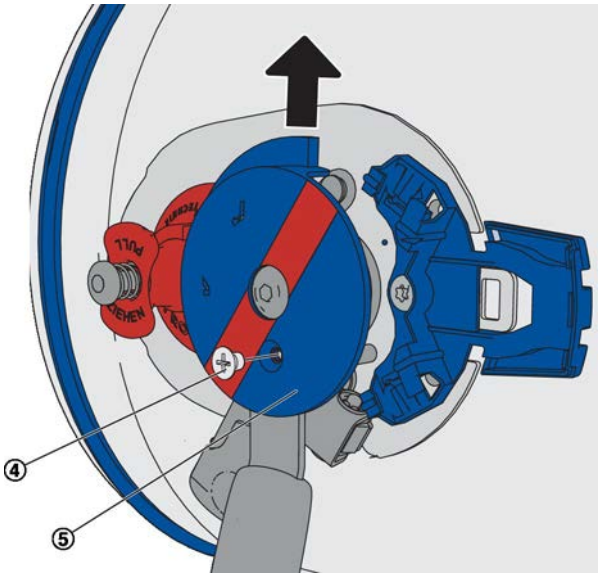


Fig. 129: Removing the indicator disc

4. Loosen the screw (4) and pull off the indicator disc (5) from above

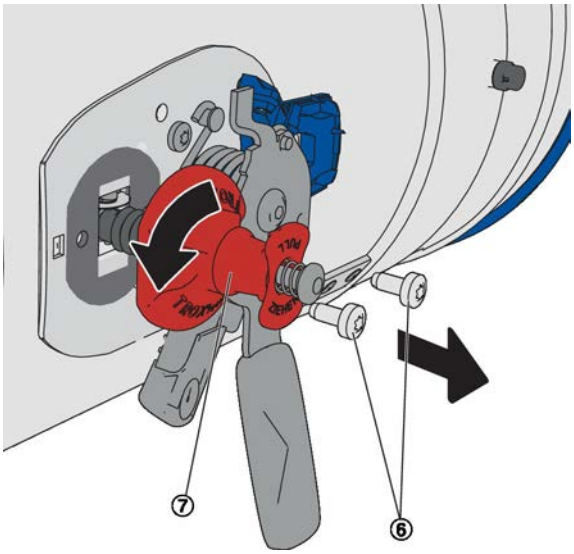


Fig. 130: Demounting the release mechanism

5. Loosen and remove the screws (6) of the release mechanism (7); pull the release mechanism towards you while at the same time turning it by 90°.

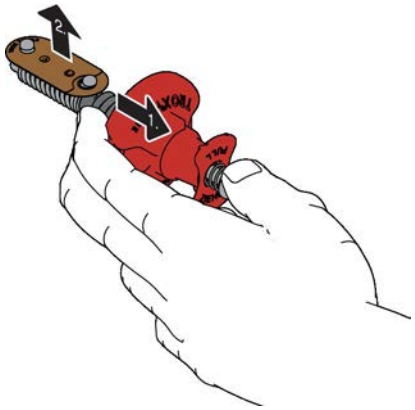


Fig. 131: Replacing the fusible link

6. Grasp the release mechanism as shown. Move your middle fingers into the direction of the arrow.
7. Remove the used fusible link.
8. Insert the new fusible link.
9. Push the release mechanism back into the fire damper and fix it with the screws (6).

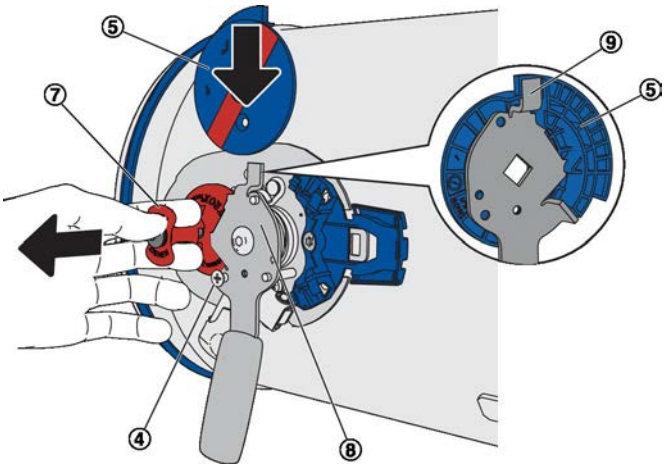


Fig. 132: Mounting the indicator disc

10. Pull the release mechanism (7) towards you and hold it. Slide the indicator disc (5) from above onto the lever (8). Make sure that the indicator disc engages in the tab (9). Fix the indicator disc with the screw (4).

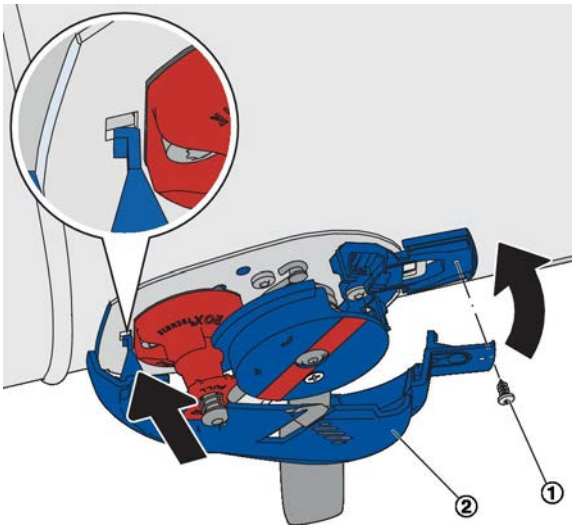


Fig. 133: Mounting the cover

11. Hook the cover (2) into place and turn it into the direction of the arrow. The cover locks into place. Fix the cover with the screw (1).
12. Carry out functional test.

10.3 Inspection, maintenance and repair measures

Interval	Measure	Staff
A	Access to the fire damper ■ Internal and external accessibility – Provide access	Specialist personnel
	Installation of the fire damper ■ Installation according to the operating manual *26* – Install the fire damper correctly.	Specialist personnel
	Transport and installation protection, if any ■ Transport/installation protection has been removed – Remove transport/installation protection	Specialist personnel
	Connection of ductwork/cover grille/flexible connector *Chapter 6 'Accessories' on page 137* ■ Connection according to this manual – Establish correct connection	Specialist personnel
	Power supply to the spring return actuator ■ Power supply according to spring return actuator rating plate – Provide correct voltage	Skilled qualified electrician
A / B	Check fire damper for damage ■ Fire damper, damper blade and seal must be intact – Replace the damper blade – Repair or replace the fire damper.	Specialist personnel
	Function of the release mechanism ■ Function OK ■ Fusible link intact/no corrosion – Replace the fusible link – Replace the release mechanism	Specialist personnel
	Functional test of the fire damper with fusible link *142* ■ Fire damper can be opened manually ■ Handle can be locked in the OPEN position ■ Damper blade closes when triggered manually – Determine and eliminate the cause of the fault – Repair or replace the fire damper. – Replace the release mechanism	Specialist personnel
	Functional test of the fire damper with spring return actuator *143* ■ Actuator function OK ■ Damper blade closes ■ Damper blade opens – Determine and eliminate the cause of the fault – Replace the spring return actuator – Repair or replace the fire damper.	Specialist personnel
	Function of external duct smoke detector ■ Function OK ■ Fire damper closes when triggered manually or when smoke is detected ■ Fire damper opens after reset – Determine and eliminate the cause of the fault – Repair or replace duct smoke detector	Specialist personnel

Interval	Measure	Staff
C	Cleaning the fire damper ■ No contamination in the interior or on the exterior of the fire damper ■ No corrosion – Remove contamination with a damp cloth – Remove corrosion or replace part	Specialist personnel
	Function of limit switches ■ Function OK – Replace the limit switches	Specialist personnel
	Function of the external signalling (damper blade position indicator) ■ Function OK – Determine and eliminate the cause of the fault	Specialist personnel

Interval

A = Commissioning

B = Regularly

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

C = as required

Item to be checked

- Required condition
  – Remedial action if necessary

11 Decommissioning, removal and disposal

Final decommissioning

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

Removal

DANGER!

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

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

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

Disposal

For disposal, the fire damper must be disassembled.

ENVIRONMENT!

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

12 Nomenclature

For various installation situations described in this manual, you have various options, e.g. 6.2 6.16 , either (6.2) or (6.16).

Item no.	Description
1	**Fire damper**
1.1	Casing
1.2	Damper blade (with or without lip seal)
1.3	Travel stop for OPEN position
1.4	Travel stop for CLOSED position
1.5	Inspection access
1.6	Handle/damper blade position indicator
1.7	Interlock
1.8	Lip seal
1.9	Cover
1.10	Release tab
1.11	Flange

Item no.	Description
2	**Materials for fire damper installation**
2.1	Mortar or gypsum mortar
2.2	Reinforced concrete / Non-reinforced concrete
2.3	Reinforced concrete base
2.4	Coated board system
2.5	Installation kit WA / WA2
2.6	Installation kit WE / WE2
2.7	Installation kit WV
2.8	Installation kit E1 / E2 / E3
2.9	Installation kit ES
2.10	Installation kit GM
2.11	Installation kit TQ / TQ2
2.12	Installation kit GL / GL2
2.13	Installation kit GL100
2.14	Lintel
2.15	
2.16	Installation subframe
2.17	Hilti CFS-BL fire stop block
2.18	Installation block ER with cover plate

Item no.	Description
2	**Materials for fire damper installation**
2.19	Joint filler (Promat® filler, Promat® ready-to-use putty; mineral wool ≥ 80 kg / m³, ≥ 1000 °C or mortar)

Item no.	Description
3	**Walls**
3.1	Solid wall
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.3	Lightweight partition wall with steel support structure, cladding on both sides
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
3.5	Half-timbered construction, cladding on both sides
3.6	Compartment wall with metal support structure, cladding on both sides
3.7	Shaft wall with metal support structure, cladding on one side
3.8	Shaft wall with steel support structure, cladding on one side
3.9	Shaft wall without metal support structure, cladding on one side
3.10	Wall without adequate fire resistance rating
3.11	Solid wood wall / CLT wall
3.12	Sandwich panel wall
3.13	Additional leaf with metal support structure
3.14	Solid wall made of gypsum wallboard

Item no.	Description
4	**Ceilings**
4.1	Solid ceiling slab / solid floor
4.2	Wooden beam ceiling
4.3	Modular ceiling, Cadolto system
4.4	Partial concrete ceiling with reinforcement
4.5	Solid wood ceiling
4.6	False ceiling
4.7	Reinforced hollow chamber ceiling
4.8	Hollow stone ceiling
4.9	Ribbed ceiling

Item no.	Description
4	**Ceilings**
4.10	Composite ceiling
4.11	Historical wooden beam ceiling, fire resistance properties ≥ F 30
4.12	Panelled ceiling

Item no.	Description
5	**Fixing material**
5.1	Dry wall screw
5.2	Hexagon head screws, washers, nuts (see installation details)
5.3	Chipboard screw
5.3a	Chipboard screw 5 × 80 mm
5.3b	Chipboard screw 5 × 100 mm
5.3c	Chipboard screw 5 × 60 mm
5.3d	Chipboard screw 5 × 50 mm (4 - 8 pieces, depending on the damper size)
5.3e	Chipboard screw 5 × 70 mm (16 - 28 pieces, depending on the damper size)
5.4	Threaded rod, galvanised steel (see installation details)
5.5	Carriage bolt L ≤ 50 mm with washer and nut
5.6	Screw or rivet, galvanised steel (see installation details)
5.7	Wallplugs with fire suitability certificate for fire resistance
5.8	Anchor M8 – M12
5.9	Steel bracket
5.10	Fixing tab
5.11	Floor mounting plate
5.12	Cover plate
5.13	Wood screw or pin
5.14	Angle bracket
5.15	Bracket
5.16	Wall connection frame
5.17	Anchor bolt
5.18	L-bracket according to EN 10056-1 galvanised, painted or similar, according to installation detail
5.19	Connecting clip

Item no.	Description
5	**Fixing material**
5.20	Screw Fischer® FFS 7.5 × 82 mm or equivalent
5.21	Screw / wallplug
5.22	Steel fabric, ∅ ≥ 8 mm, mesh aperture 150 mm or equivalent
5.23	Clamp, e.g. Hilti MP-MX, Valraven BIS HD 500, or equivalent
5.24	Sheet-metal strip
5.25	Plasterboard screw
5.26	Steel wire clip

Item no.	Description
6	**Filling and coating material**
6.1	Mineral wool ≥ 1000 °C, ≥ 40 kg/m³
6.2	Mineral wool ≥ 1000 °C, ≥ 80 kg/m³
6.3	Mineral wool ≥ 1000 °C, ≥ 100 kg/m³
6.4	Mineral wool ≥ 1000 °C, ≥ 140 kg/m³
6.5	Mineral wool (depending on wall construction) / ceiling construction, mineral wool filling on request
6.6	
6.7	Fire batt
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
6.9	Fire-resistant sealant suitable for the fire batt system used
6.10	Ablative coating around the perimeter, thickness 2.5 mm
6.11	Insulating strip (depending on wall construction)
6.12	Intumescent seal
6.13	Mineral wool strips A1, ≤ 5 mm thick, ≤ 1000°C, filler as an alternative
6.14	Armaflex
6.15	Mineral wool (depending on the flexible ceiling joint)
6.16	Armaflex AF / Armaflex Ultima
6.17	Fire batt (Hensel)
6.18	

Item no.	Description
6	**Filling and coating material**
6.19	Mineral wool > 1000°C, > 80 kg/m³, panel material around the perimeter, leave out the actuator and release mechanism; inspection accesses must remain accessible
6.20	Sleeve (can be ordered separately)
6.21	Kerafix 2000 sealing tape
6.22	Screed
6.23	Footfall sound insulation
6.24	Elastomer foam (synthetic rubber) of fire rating class B-S3, D0
6.25	Mineral wool or glass wool fill
6.26	Plaster
6.27	Holding plate on both sides, 90 × 140 × 1.5 mm
6.28	Ceiling fill
6.29	Mineral wool Paroc HVAC Fire Mat
6.30	Double layer mineral wool Paroc HVAC Fire Mat 80BLC (80 kg/m³)
6.31	Fire-rated plasterboard strip, d = 12.5 mm
6.32	Fire-rated plasterboard strip, d = 20 mm
6.33	Fire-rated plasterboard strip, d = 15 mm

Item no.	Description
7	**Supporting construction**
7.1	UW section
7.1a	UW section, cut and bent
7.2	CW section (metal support structure)
7.3	UA section
7.4	U50 channel
7.5	Steel support structure
7.6	Perimeter metal section
7.7	Timber stud, at least 60 × 80 mm
7.8	Steel girder
7.9	Timber structure
7.10	Trim panels (optional)
7.11	Trim panels, double layer, staggered joints
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13	Cladding / wall cladding
7.13a	Cladding, fire-resistant

Item no.	Description
7	**Supporting construction**
7.13b	Cladding, wood sheet, at least 600 kg/³
7.13.1	Cladding, single-layer, adjusted
7.14	Reinforcing strip
7.15	Wooden floorboard / floor tile / wood sheet min. 600 kg/m³
7.16	Wooden beam / glued laminated timber
7.17	Trimmers in general
7.18	Formwork
7.19	Fire-resistant cladding
7.20	U-channel
7.21	Ceiling joint strips
7.22	Ceiling joint section
7.23	Sheet steel insert depending on wall manufacturer
7.24	Ceiling design
7.25	Reinforced concrete support
7.26	Hollow stone
7.27	Profile sheet metal

Item no.	Description
8	**Material for extended applications**
8.1	PROMATECT®-H strips, d = 10 mm
8.2	PROMATECT®-H strips, d = 20 mm
8.3	PROMATECT®-LS board d = 35 mm
8.4	Hilti mounting rail MQ 41 × 3 or equivalent
8.5	Hilti drilled plate MQZ L13 or equivalent
8.6	Hilti fixing band LB26 or equivalent
8.7	Mounting rail, Würth Varifix 36 × 36 × 2.5 or Müpro MPC 38/40 or equivalent
8.8	Fixing bracket, Varifix or Müpro MPC or equivalent
8.9	Bracket, Varifix ANSHWNKL-PRFL36-90GRAD or Müpro mounting bracket 90°, galvanised, or equivalent
8.10	Large gears
8.11	Actuator
8.12	Actuator mounting plate
8.13	Small gears
8.14	Connecting cable

Item no.	Description
8	**Material for extended applications**
8.15	Adjustment screws
8.16	Actuator mounting plate
8.17	Cover
8.18	Junction box
8.19	Outlay from 8.3
8.20	Promaseal®-Mastic intumescent sealant
8.21	Fire-resistant sealant CFS-S ACR CW
8.22	Calcium silicate board, or alternatively mineral wool ≥ 1000°C, ≥ 140 kg/m³
8.23	Foam rubber seal
8.24	Retaining plate on both sides, sheet steel ≥ 1 mm thick
8.25	Bracket, e.g. Hilti MM-B-30 or equivalent
8.26	Blanking plate, t = 1 mm
8.27	Seal
8.28	PROMATECT®-H strips, d = 15 mm
8.29	PROMATECT®-H strips, d = 25 mm
8.30	PROMATECT®-AD, d = 40 mm
8.31	PROMATECT®-L500, d = 50 mm
8.32	Outlay from 8.30
8.33	Outlay from 8.31
8.34	Sealing tape type Flexan
8.35	Intumescent material
8.36	Promaxon® construction plate type A, d = 20 mm
8.37	Steel bracket
8.38	OWA adhesive
8.39	Spigots, comprising spiral duct and 2 × raised edge

Item no.	Description
9	**Accessories**
9.1	Flexible connector
9.2	Extension piece or duct
9.3	Prop
9.4	Sheet steel duct with fire-resistant cladding and suspension system according to Promat® manual, construction 478, latest edition

Item no.	Description
9	**Accessories**
9.5	Suspension
9.6	Repair damper blade
9.7	Damper blade
9.8	Rivet axis
9.9	Plate
9.10	Cover grilles
9.11	Circular spigot
9.12	Clamping ring
9.13	Reinforcement bracket
9.14	Profile connecting frame
9.15	T-piece

Item no.	Description
10	**Release mechanisms**
10.1	Spring return actuator
10.2	Spring return actuator Belimo BLF
10.3	Spring return actuator Belimo BF
10.4	Spring return actuator Belimo BFN
10.5	Spring return actuator Belimo BFL
10.6	Spring return actuator Schischek ExMax (yellow)
10.7	Spring return actuator Schischek RedMax (magenta)
10.8	Spring return actuator Siemens GGA
10.9	Spring return actuator Siemens GRA
10.10	Spring return actuator Siemens GNA
10.11	Spring return actuator Joventa SFR
10.12	Duct smoke detector RM-O-3-D (fixed with adapter metal sheet)
10.13	Thermoelectric release mechanism with temperature sensor
10.14	Thermal release mechanism with fusible link, 72 °C / 95 °C
10.15	Fusible link holder
10.16	Fusible link holder rocker
10.17	Screw
10.18	Fusible link
10.19	Cover

Item no.	Description
10	**Release mechanisms**
10.20	Spring
10.21	Z-sheet

Item no.	Description
11	**Additions**
11.1	Cable tray
11.2	Cable set
11.3	Pipe collar
11.4	Underlay material, non-combustible, to be provided by others
11.5	Base, to be provided by others
11.6	Cable penetration

13 Change history

Changes to this document are listed in this table.

Version no.	Date	Author	Note / change
1	2022-01-28	CS	■ New use: – Installation – lightweight partition walls – dry mortarless installation without installation kit, *5.6.5 'Dry mortarless installation without installation kit' on page 65* ■ New document ID – M375DE3 Version 6 –> A00000092704 Version 1 ■ Smaller corrections

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