



**LOW-LEAKAGE STEEL DOOR, VARIANT ST-R/Z15**

Steel door with inspection window, pressure relief valve and cylinder rim lock (Profile cylinder on the opening side, cylinder rim lock on the closing side)



**INSPECTION WINDOW**



**CYLINDER RIM LOCK**



**PRESSURE RELIEF VALVE**



## TYPE ST

### SINGLE AND DOUBLE LEAF HINGED DOORS FOR PLANT ROOMS, STORAGE ROOMS, AIR HANDLING UNITS, FILTER CHAMBERS, OR ENCLOSURES FOR MACHINERY OR ELECTRICAL EQUIPMENT

Rectangular single leaf or double leaf doors that are robust and ensure only minimal leakage even in case of large differential pressures

- Maximum width of 1100 mm, maximum height of 2115 mm
- Maximum pressure loading of 1000 Pa, in closing direction; reinforced construction for up to 2000 Pa
- Air leakage rate of approx. 0.6 l/s or 2 m<sup>3</sup>/h at 1000 Pa (for each door leaf)
- Double skin door leaf made of galvanised sheet steel and with mineral wool infill
- Door frame made of angle sections or U-channel sections
- Two double lever locking devices, can be operated from both sides
- APT rubber seal, temperature resistant up to 90 °C
- Available in standard sizes and many intermediate sizes

#### Optional equipment and accessories

- Sound insulating lining
- Reinforced construction
- Any combination of cylinder rim lock, mortice lock, pressure relief valve, inspection window and removable exterior locking levers
- Powder-coated for outdoor installation

REMOVABLE FRONT  
LOCKING LEVER (OF  
DOUBLE LEVER LOCKING  
DEVICE)

DOUBLE LEVER LOCKING  
DEVICE (INTERIOR LEVER,  
DOUBLE LEAF DOOR)

## Application

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### Application

- Low-leakage steel doors of Type ST are used as separating elements for walk-in plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment.
- Robust construction with very low air leakage rate even in case of large differential pressures
- Powder-coated construction with increased corrosion resistance
- Maximum pressure on the opening side is 1000 Pa (2000 Pa for reinforced construction)

### Special characteristics

- Variants with additional sound insulating lining (X construction variants) provide good sound absorption
- U-value: 1.02 W/(m<sup>2</sup>K) at 8 W/(m<sup>2</sup>K) for internal spaces (air not in motion) and 25 W/(m<sup>2</sup>K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

### Nominal sizes

ST (single leaf)

- B: 500, 600, 800 and 940 mm (intermediate sizes 400 – 1100 mm in increments of 1 mm)
- H: 1500, 1600, 1800 and 1940 mm (intermediate sizes 800 – 2115 mm in increments of 1 mm)
- Any combination of B × H

ST-D (double leaf)

- B: 1080, 1280, 1680 and 1960 mm (intermediate sizes 1080 – 2280 mm in increments of 1 mm)
- H: 1500, 1600, 1800 and 1940 mm (intermediate sizes 800 – 2115 mm in increments of 1 mm)

Any combination of B × H

## Description

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### Variants

- ST: Low-leakage steel door
- ST-V: Low-leakage steel door with reinforced leaf
- ST-X: Low-leakage steel door with sound insulating lining
- ST-X-V: Low-leakage steel door with sound insulating lining and reinforcing elements
- ST-D: Double leaf low-leakage steel door
- ST-D-V: Double leaf low-leakage steel door with reinforced leaves
- ST-D-X: Double leaf low-leakage steel door with sound insulating lining
- ST-D-X-V: Double leaf low-leakage steel door with sound insulating lining and reinforcing elements
- R: Right hinge
- L: Left hinge

### Parts and characteristics

- Door with perimeter seal
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

### Attachments

- 11: Angle section frame with welded fixing tabs
- 13: U-channel frame 115 × 40 × 4 mm
- 15: U-channel frame 240 × 40 × 4 mm with welded fixing tabs
- 21: Angle section frame without fixing tabs
- Locks, inspection window, pressure relief valve, front locking lever: for the improvement and extension of the range of applications

### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction

### Materials and surfaces

- Door leaf and stiffeners made of galvanised sheet steel
- Reinforced construction (V): Screw-fixed stiffeners
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- Sound absorbing Bitumen K57 slabs
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

### Mineral wool

- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EC
- Inert to fungal and bacterial growth

### Maintenance

- Maintenance-free as construction and materials are not subject to wear
- Contamination should be removed as it may lead to corrosion and to increased closed door air leakage

## TECHNICAL INFORMATION

Function, Technical data, Specification text, Order code, Related products

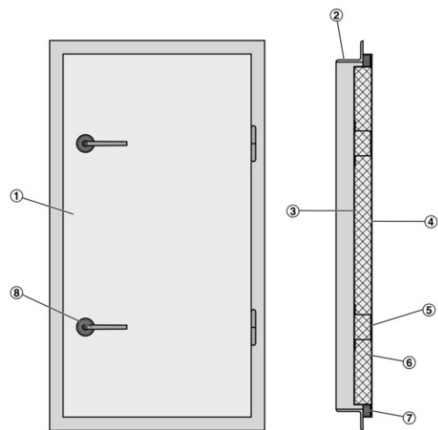


### Functional description

Low-leakage steel doors are low-leakage separating elements for rooms or other enclosures.

When the door is being closed, i.e. when the double locking levers are being turned, the perimeter seal is fully pressed against the frame. As a consequence, the air leakage rate is extremely low even in case of high differential pressures.

### Schematic illustration of ST



- ① Door
- ② Door frame (angle section 50 × 50 × 4)
- ③ Skin thickness 1 mm
- ④ Skin thickness 1.25 mm
- ⑤ Stiffener (additional central stiffener from H = 1800 mm)
- ⑥ Absorption material
- ⑦ Seal
- ⑧ Double lever locking device

Nominal sizes (single leaf)	400 × 800 to 1100 × 2115 mm
Nominal sizes (double leaf)	1080 × 800 to 2280 × 2115 mm
Maximum pressure on the opening side	1000 Pa (reinforced construction: 2000 Pa)
Weighted sound reduction index (with sound absorbing infill)	Single leaf door 43 – 46 dB, double leaf door 44 – 47 dB, doors on both sides of the wall opening 58 – 61 dB

**Weighted sound reduction index**

Variant	Centre frequency $f_m$ [Hz]				
	125	250	500	1000	2000
Variant	R <sub>w</sub>				
	dB				
ST-X, ST-X-V	26	38	44	46	46
ST-D-X, ST-D-X-V	28	41	45	49	46
2 × ST-X, ST-X-V, doors on both sides of the wall opening	48	52	59	62	65

Low-leakage steel doors as separating elements for walk-in plant rooms, storage rooms, air handling units, filter chambers, or enclosures for machinery or electrical equipment.

Ready-to-install component that consists of a door leaf with double lever locking devices, absorption material, seal and hinges, and a frame.

Air leakage rate on the opening side is approx. 0.6 l/s or 2 m³/h at 1000 Pa (single leaf door).

**Special characteristics**

- Variants with additional sound insulating lining (X construction variants) provide good sound absorption
- U-value: 1.02 W/(m²K) at 8 W/(m²K) for internal spaces (air not in motion) and 25 W/(m²K) for outside (air in motion)
- Optional door frame without fixing tabs (-21) but with flange holes

**Materials and surfaces**

- Door leaf and stiffeners made of galvanised sheet steel
- Reinforced construction (V): Screw-fixed stiffeners
- Absorption material is mineral wool
- Door frame made of galvanised steel
- Double lever locking devices made of aluminium diecast
- APT rubber seal
- Sound absorbing Bitumen K57 slabs
- P1: Powder-coated, RAL CLASSIC colour
- PS: Powder-coated, NCS or DB colour

**Mineral wool**

- To DIN 4102, fire rating class A2, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EC
- Inert to fungal and bacterial growth

**Technical data**

- Nominal sizes (single leaf): 400 × 800 – 1100 × 2115 mm
- Nominal sizes (double leaf): 1080 × 800 – 2280 × 2115 mm
- Maximum pressure on the opening side: 1000 Pa (reinforced construction: 2000 Pa)
- Weighted sound reduction index (with sound absorbing infill): single leaf door 43 – 46 dB, double leaf door 44 – 47 dB, on the left and right of the wall opening 58 – 61 dB

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

**Order example: ST-R/800×1800/21/Z06**

Hinge	Right side
Sound insulating lining	Without
Construction of door	Standard construction
Nominal size	800 × 1800 mm
Door frame	Angle section, without fixing tabs
Attachments	Standard construction with inspection window and cylinder rim lock
Surface	Standard construction

**Order example: ST-D/1680×1800/21/Z06**

Number of door leaves	Double leaf low-leakage steel door
Sound insulating lining	Without
Construction of door	Standard construction
Nominal size	1680 × 1800 mm
Door frame	Angle section, without fixing tabs
Attachments	Standard construction with inspection window and cylinder rim lock
Surface	Standard construction

### ST - R - X - V / 500×1500 / 11 / Z01 / P1 - RAL ...



#### 1 Type

ST Low-leakage steel door

#### 5 Nominal size [mm]

B × H

#### 2 Hinge

R Right side  
L Left side

#### 6 Door frame

11 Angle section 50/50/4, with welded fixing tabs  
13 U-channel 115/40/4, with welded fixing tabs  
15 U-channel 240/40/4, with welded fixing tabs  
21 Angle section, without welded fixing tabs (alternatively with flange holes, surcharge)

#### 3 Sound insulating lining

No entry: none  
X With

#### 7 Attachments

No entry: none  
Z01 - Z23

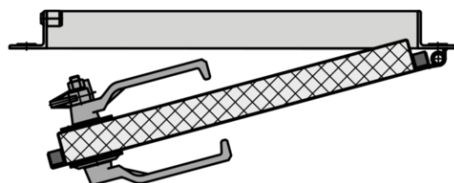
#### 4 Construction of door

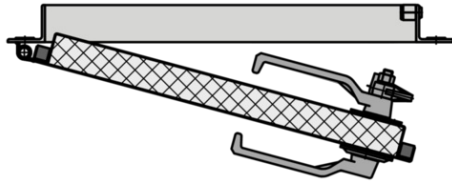
No entry: standard construction  
V Reinforced door leaf

#### 8 Surface

No entry: standard construction  
P1 Powder-coated, RAL CLASSIC colour  
PS Powder-coated, DB colour

Gloss level  
RAL 9010 50 %  
RAL 9006 30 %  
All other RAL colours 70 %





**ST - D - X - V / 1080x1500 / 11 / Z01 / P1 - RAL ...**

1 2 3 4 5 6 7 8

**1** Type

ST Low-leakage steel door

**5** Nominal size [mm]

B x H

**2** Number of door leaves

D Double leaf low-leakage steel door

**6** Door frame

11 Angle section 50/50/4, with welded fixing tabs  
 13 U-channel 115/40/4, with welded fixing tabs  
 15 U-channel 240/40/4, with welded fixing tabs  
 21 Angle section, without welded fixing tabs (alternatively with flange holes)

**3** Sound insulating lining

No entry: none  
 X With

**7** Attachments

No entry: none  
 Z01 - Z23

**4** Construction of door

No entry: standard construction  
 V Reinforced door leaf

**8** Surface

No entry: standard construction  
 P1 Powder-coated, RAL CLASSIC colour  
 PS Powder coated, DB ... colour

Gloss level  
 RAL 9010 50 %  
 RAL 9006 30 %  
 All other RAL colours 70 %

Variants, Dimensions and weight, Product details



ST

Variant

- Low-leakage steel door

Parts and characteristics

- Door with perimeter seal
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 0.6 l/s or 2 m³/h

## ST-V

### Variant

- Low-leakage steel door with reinforced leaf

### Parts and characteristics

- Reinforced door leaf with perimeter seal
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m³/h

## ST-X

### Variant

- Low-leakage steel door with sound insulating lining

### Parts and characteristics

- Door with perimeter seal
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 0.6 l/s or 2 m³/h

## ST-X-V

### Variant

- Low-leakage steel door with sound insulating lining and reinforcing elements

### Parts and characteristics

- Reinforced door leaf with perimeter seal
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins



- Hinges
- Door frame

#### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m³/h

#### ST-D

##### Variant

- Double leaf low-leakage steel door

#### Parts and characteristics

- Two door leaves, both with a perimeter seal
- Centre mullion
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

#### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m³/h

#### ST-D-V

##### Variant

- Double leaf low-leakage steel door with reinforced leaves

#### Parts and characteristics

- Two door leaves, both with reinforcing elements and a perimeter seal
- Centre mullion
- Double lever locking devices
- Absorption material
- Hinges
- Door frame

#### Construction features

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 2.2 l/s or 8 m³/h

#### ST-D-X

##### Variant

- Double leaf low-leakage steel door with sound insulating lining

#### **Parts and characteristics**

- Two door leaves, both with a perimeter seal
- Centre mullion
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

#### **Construction features**

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 1000 Pa, in closing direction); air leakage rate of 1.1 l/s or 4 m<sup>3</sup>/h

#### **ST-D-X-V**

##### **Variant**

- Double leaf low-leakage steel door with sound insulating lining and reinforcing elements

#### **Parts and characteristics**

- Two door leaves, both with reinforcing elements and a perimeter seal
- Centre mullion
- Double lever locking devices
- Absorption material
- Sound insulating boards fitted to the inside of the door skins
- Hinges
- Door frame

#### **Construction features**

- Double skin door leaf; skin thickness of 1 mm and 1.25 mm (opening side), respectively
- Stiffeners at the level of the double lever locking devices
- Additional central stiffener from H = 1800 mm
- Screw-fixed stiffeners
- Double lever locking devices can be operated from both sides
- Seal is temperature resistant up to 90 °C
- Maximum pressure loading of 2000 Pa, in closing direction); air leakage rate of 2.2 l/s or 8 m<sup>3</sup>/h

#### **Low-leakage steel door, variant ST-R/Z15**



Steel door with inspection window, pressure relief valve and cylinder rim lock(Profile cylinder on the opening side, cylinder rim lock on the closing side)

Low-leakage steel door, variant ST-D/Z15



Two leaf hinged steel door with inspection window, pressure relief valve and cylinder rim lock(Profile cylinder on the opening side, cylinder rim lock on the closing side)

**ST, width, dimensions**

B	B <sub>1</sub>
mm	
<500	B + 30
500	530
600	630
800	830
940	970

**ST, height, dimensions**

H	H <sub>1</sub>	X
mm		
<1500	H + 30	249.5
1500	1530	349.5
1600	1630	349.5
1800	1830	349.5
1940	1970	349.5

**ST-D, width, dimensions**

B	B <sub>1</sub>	B <sub>2</sub>
mm		
B < 1080	$(B - 20)/2$	B + 30
1080	530	1110
1280	630	1310
1680	830	1710
1960	970	1990

**ST, ST-V, weights**

H	B [mm]			
	500	600	800	940
mm	kg			
1500	33	40	53	62
1600	34	41	54	64
1800	35	42	56	66
1940	36	43	57	67

**ST-X, ST-X-V, weights**

H	B [mm]			
	500	600	800	940
mm	kg			
1500	36	43	58	68
1600	37	44	59	70
1800	38	46	61	71
1940	39	46	62	73

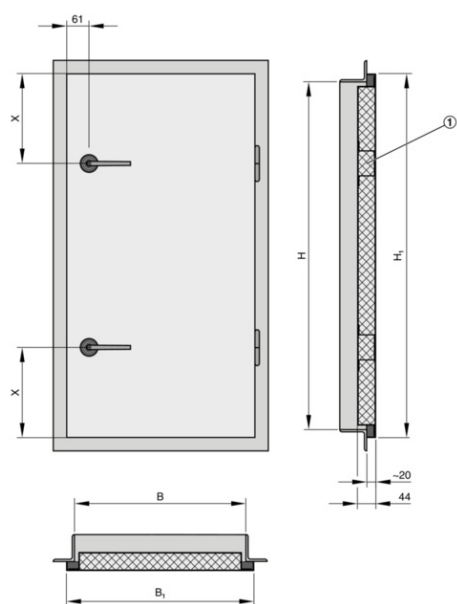
**ST-D, ST-D-V, weights**

H	B [mm]			
	1080	1280	1680	1960
mm	kg			
1500	66	78	102	120
1600	68	81	106	123
1800	70	83	109	127
1940	72	86	113	131

**ST-D-X, ST-D-X-V, weights**

H	B [mm]			
	1080	1280	1680	1960
mm	kg			
1500	72	86	113	131
1600	75	88	116	135
1800	77	91	119	139
1940	80	95	124	145

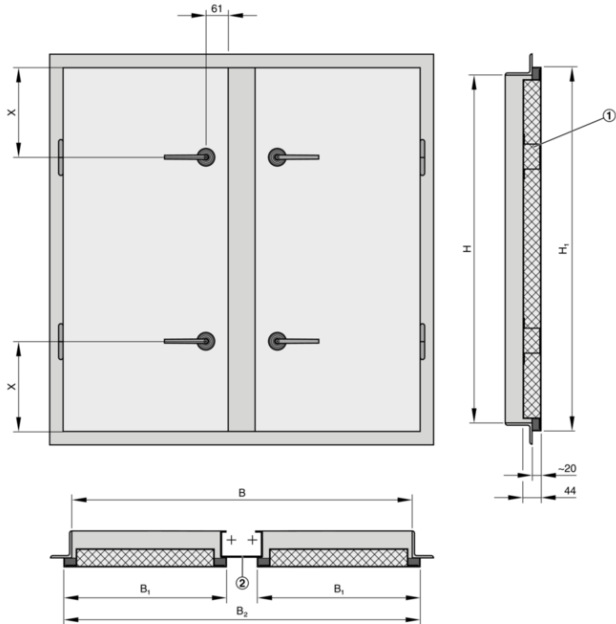
ST



① Stiffeners (additional central stiffener from H = 1800 mm)

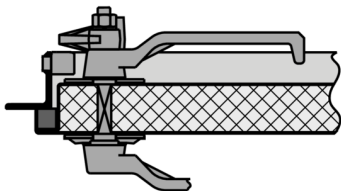
Illustration shows right hinge

ST-D



- ① Stiffeners (additional central stiffener from H = 1800 mm)
- ② Screw-fixed centre mullion

#### Double lever locking device on angle section door frame



### Installation details



#### Installation and commissioning

- Align the frame precisely before mortaring it in
- When the door is closed, the perimeter seal must be in full contact with the frame

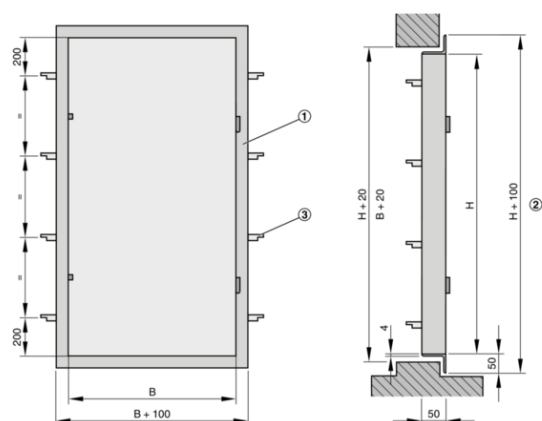
#### Angle section frame, no. of fixing tabs or flange holes

H	ST	ST-D
mm	–	
1500	6	8
1600	6	8
1800	8	10
1940	8	10

#### U-channel door frame, dimensions

Order code detail	A
	mm
13	115
15	240

#### Installation of angle section door frame

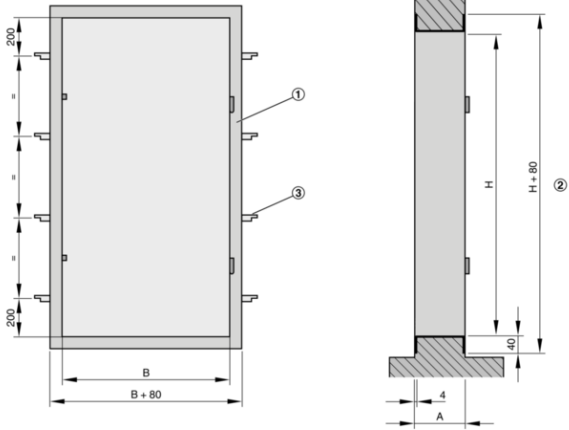


- ① Angle section door frame
- ② Opening side
- ③ Fixing tabs (flange holes as an alternative)

Illustration shows right hinge

#### Installation of U-channel frame





- ① U-channel door frame
- ② Opening side
- ③ Fixing tab

Illustration shows right hinge

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