

Public-law institution jointly founded by the  
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European Technical Assessment Body  
for construction products



## European Technical Assessment

ETA-20/0729  
of 3 February 2025

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

fischer injection system FIS V Plus for masonry

Product family  
to which the construction product belongs

Metal Injection anchors for use in masonry

Manufacturer

fischerwerke GmbH & Co. KG  
Otto-Hahn-Straße 15  
79211 Denzlingen  
DEUTSCHLAND

Manufacturing plant

fischerwerke

This European Technical Assessment  
contains

158 pages including 3 annexes which form an integral  
part of this assessment

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

EAD 330076-01-0604-v01, Edition 03/2024

This version replaces

ETA-20/0729 issued on 31 October 2023

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## Specific part

### 1 Technical description of the product

The fischer injection system FIS V Plus for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS V Plus, FIS VS Plus Low Speed and FIS VW Plus High Speed, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod in the range of M6 to M16. The steel elements are made of zinc coated steel, stainless steel or high corrosion resistant steel.

The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry and mechanical interlock.

The product description is given in Annex A.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastener of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and references to the methods used for its assessment

#### 3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for static and quasi-static loading	See Annexes B4 to B7, B21, B22, C1 to C123
Characteristic resistance and displacements for seismic loading	No performance assessed

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire under tension and shear loading with and without lever arm. Minimum edge distances and spacing	See Annex C124 to C127

#### 3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

### 4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330076-01-0604-v01 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 3 February 2025 by Deutsches Institut für Bautechnik

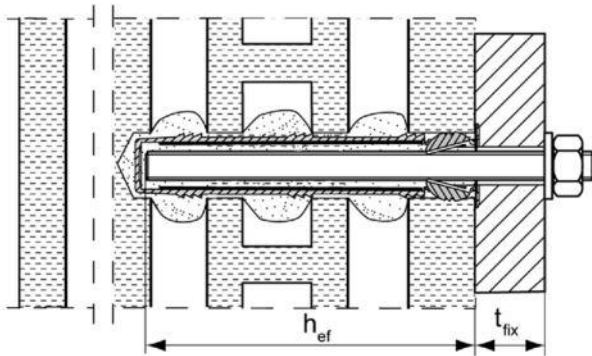
Dipl.-Ing. Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Baderschneider

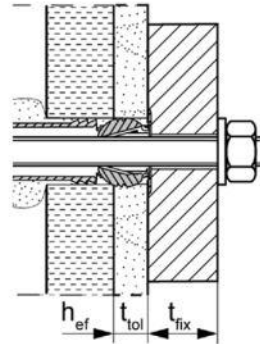
### Installation conditions part 1

#### Anchor rods with perforated sleeve FIS H K; Installation in perforated and solid brick masonry

##### Pre-positioned installation:

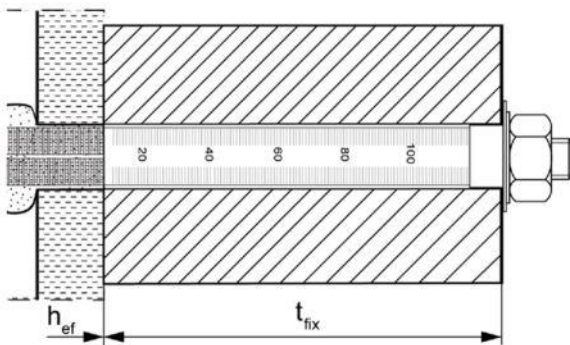


##### Installation with render bridge

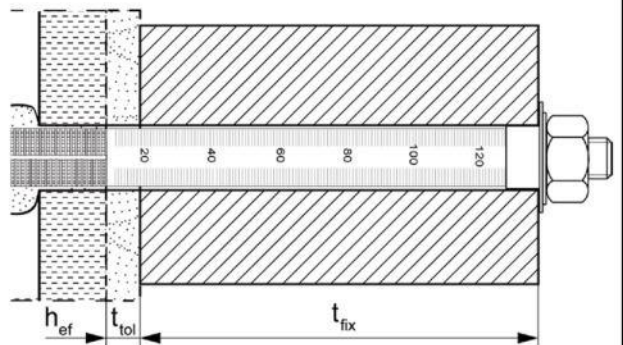


Size of the perforated sleeve: FIS H 12x50 K FIS H 16x85 K FIS H 20x85 K FIS H 20x200 K  
FIS H 12x85 K FIS H 16x130 K FIS H 20x130 K

##### Push through installation:



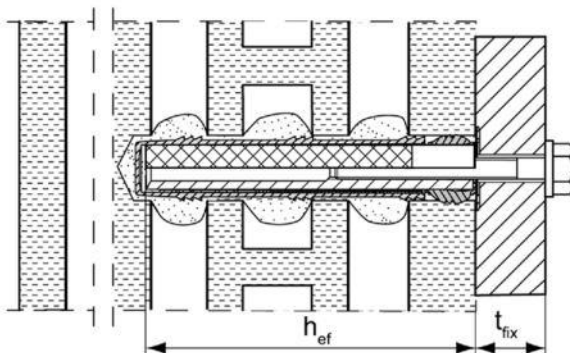
##### Installation with render bridge



Size of the perforated sleeve: FIS H 18x130/200 K FIS H 22x130/200 K

#### Internal threaded anchor FIS E with perforated sleeve FIS H K; Installation in perforated and solid brick masonry

##### Pre-positioned installation:



Figures not to scale

$h_{ef}$  = effective anchorage depth

$t_{tol}$  = thickness of unbearing layer (e.g. plaster)

$t_{fix}$  = thickness of fixture

fischer injection system FIS V Plus for masonry

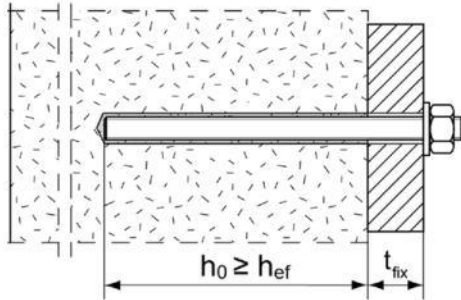
**Product description**  
Installation conditions part 1,  
Anchor rods and internal threaded anchor with perforated sleeve

**Annex A1**

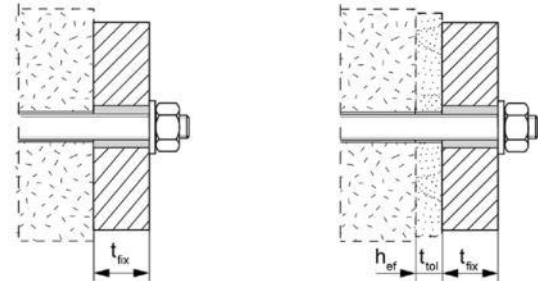
## Installation conditions part 2

**Anchor rods without perforated sleeve FIS H K;  
installation in solid brick masonry and autoclaved aerated concrete**

**Pre-positioned installation:**



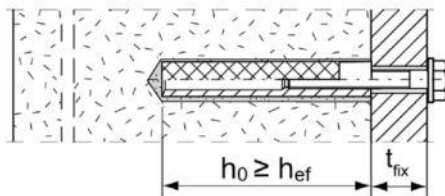
**Push through installation: Annular gap filled with mortar**



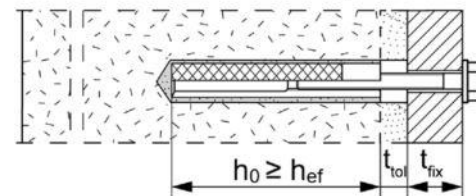
Installation with  
render bridge

**Internal threaded anchors FIS E without perforated sleeve FIS H K;  
installation in solid brick masonry and autoclaved aerated concrete**

**Pre-positioned installation:**



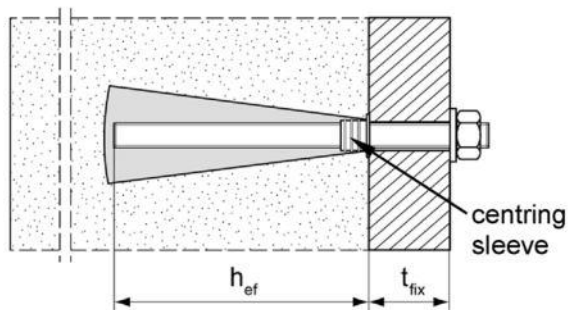
Installation with render bridge



**Anchor rods and internal threaded anchors FIS E without perforated sleeve FIS H K; installation with  
centring sleeve in autoclaved aerated concrete with conical drill hole  
(installation with special conic drill bit PBB)**

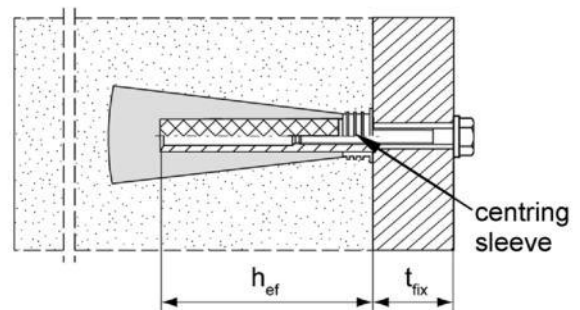
**Pre-positioned installation:**

anchor rods M8, M10, M12



**Pre-positioned installation:**

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

$h_0$  = depth of drill hole

$h_{ef}$  = effective anchorage depth

$t_{tol}$  = thickness of unbearing layer (e.g. plaster)

$t_{fix}$  = thickness of fixture

fischer injection system FIS V Plus for masonry

### Product description

Installation conditions part 2, Anchor rods and internal threaded anchor without perforated sleeve / with centring sleeve

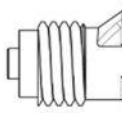
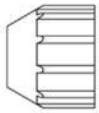
**Annex A2**

## Overview system components part 1

### Mortar cartridge (shuttle cartridge) with sealing cap

①

Size: 360 ml, 825 ml



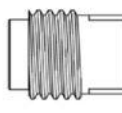
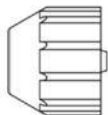
**Imprint:** fischer FIS V Plus or FIS VS Plus Low Speed or FIS VW Plus High Speed, processing notes, shelf-life, hazard code, piston travel scale (optional), curing time and processing time (depending on temperature), size, volume



### Mortar cartridge (coaxial cartridge) with sealing cap

①

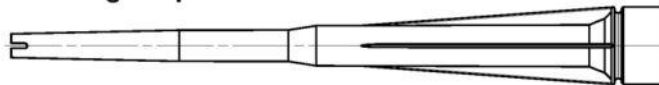
Size: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



**Imprint:** fischer FIS V Plus or FIS VS Plus Low Speed or FIS VW Plus High Speed, processing notes, shelf-life, hazard code, piston travel scale (optional), curing time and processing time (depending on temperature), size, volume



### Static mixer FIS MR Plus for injection cartridges up to 410 ml



### Static mixer FIS JMR for injection cartridges 825 ml



### Extension tube Ø 9 for static mixer FIS MR Plus; Extension tube Ø 9 or Ø 15 for static mixer FIS JMR



### Cleaning brush BS



### Blow-out pump ABG



### compressed-air cleaning tool



Figures not to scale

fischer injection system FIS V Plus for masonry

#### Product description

Overview system components part 1: cartridge / static mixer / cleaning tools

**Annex A3**

## Overview system components part 2

### fischer anchor rod

②



Size: M6, M8, M10, M12, M16

### Internal threaded anchor FIS E

⑤



Size: 11x85 M6 / M8  
15x85 M10 / M12

### Perforated sleeve FIS H K

⑦



Size: FIS H 12x50 K  
FIS H 12x85 K  
FIS H 16x85 K  
FIS H 20x85 K

⑦



Size: FIS H 16x130 K  
FIS H 20x130 K  
FIS H 20x200 K

### Perforated sleeve FIS H K (push through installation)

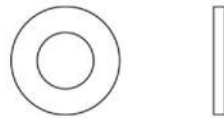
⑦



Size:  
FIS H 18x130/200 K  
FIS H 22x130/200 K

### Washer

③

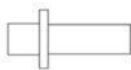


### Hexagon nut

④



### Injection adapter

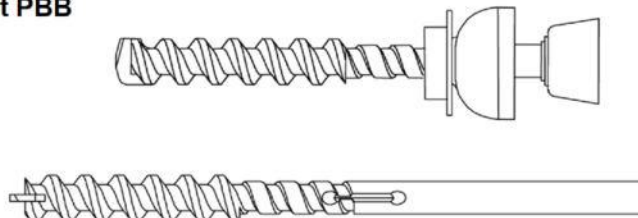


### centring sleeve PBZ

⑦



### Special conic drill bit PBB



Figures not to scale



fischer injection system FIS V Plus for masonry

#### Product description

Overview system components part 2: steel parts / perforated sleeve / conical drill bit / Injection adapter / centring sleeve

**Annex A4**

<b>Table A5.1: Materials</b>				
<b>Part</b>	<b>Designation</b>	<b>Material</b>		
1	Mortar cartridge	Mortar, hardener; filler		
		Steel	Stainless steel R	High corrosion resistant steel HCR
		zinc plated	acc. to EN 10088-1:2023 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2023 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated $\geq 5\mu\text{m}$ , ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1:2023 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4565; 1.4529 EN 10088-1:2023 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated $\geq 5\mu\text{m}$ , ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	1.4565; 1.4529 EN 10088-1:2023
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2022 zinc plated $\geq 5\mu\text{m}$ , ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2023
5	Internal threaded anchor FIS E	Property class 5.8; EN 10277-1:2018 zinc plated $\geq 5\mu\text{m}$ , ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023
6	Commercial standard screw or threaded rod for internal threaded anchor FIS E	Property class 4.6, 5.8 or 8.8; EN ISO 898-1:2013 zinc plated $\geq 5\mu\text{m}$ , ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023
7	Perforated sleeve and centring sleeve	PP / PE		
fischer injection system FIS V Plus for masonry				<b>Annex A5</b>
<b>Product description</b> Materials				

<b>Specifications of intended use part 1</b>		
<b>Table B1.1: Overview use and performance categories</b>		
Anchorages subject to	<b>fischer injection system FIS V Plus for masonry</b>	
Hole drilling with hammer drill mode 	all bricks; without C28 to C48, C75 to C78	
Hole drilling with rotary drill mode 	all bricks	
Hole drilling with special conic drill bit	Only C118 to C122	
Static and quasi static load, in masonry	all bricks	
Exposure to fire under tension and shear loading	C124 to C127 (Applies only to the conditions of dry masonry)	
Installation	Pre-positioned installation	Anchor rod or internal threaded anchor (in solid brick masonry and autoclaved aerated concrete)  Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry)  Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 16x130 K FIS H 20x85 K FIS H 20x130 K FIS H 20x200 K
	Push through installation	Anchor rod; use only in cylindrical drill hole (in solid brick masonry and autoclaved aerated concrete)  Perforated sleeve with anchor rod (in perforated and solid brick masonry)  Size: FIS H 18x130/200 K FIS H 22x130/200 K
Installation and use conditions	conditions d/d (dry/dry)	all bricks
	conditions w/d (wet/dry)	
	conditions w/w (wet/wet)	
Installation direction	D3 (downward and horizontal installation)	
Installation temperature	$T_{i,min} = -10\text{ °C}$ to $T_{i,max} = +40\text{ °C}$	
In-service temperature	Temperature range Tb	-40 °C to +80 °C (max. short term temperature +80 °C max. long term temperature +50 °C)
	Temperature range Tc	-40 °C to +120 °C (max. short term temperature +120 °C; max. long term temperature +72 °C)
fischer injection system FIS V Plus for masonry		<b>Annex B1</b>
<b>Intended Use</b> Specifications part 1		

## Specifications of intended use part 2

### Anchorage subject to:

- Static and quasi-static loads
- Exposure to fire

### Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d), acc. to Annex B13 / B14.
- Hollow brick masonry (base material group c), according to Annex B13 / B14.
- For minimum thickness of masonry member is  $h_{er}+30\text{mm}$ .
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2016.
- For other bricks in solid masonry, hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests (not for bricks under fire exposure) according to EOTA Technical Report TR 053:2022-07 under consideration of the  $\beta$ -factor according to Annex C123, Table C123.1.

Note (only applies to solid bricks and autoclaved aerated concrete):

The characteristic resistance is also valid for larger brick sizes, higher compressive strength and higher raw density of the masonry unit.

### Temperature Range:

- **T<sub>b</sub>**: From -40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- **T<sub>c</sub>**: From -40°C to +120°C (max. short term temperature +120°C and max. long term temperature +72°C)

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel)
- For all other conditions according to EN 1993-1-4:2015 corresponding to corrosion resistance classes to Annex A5, Table A5.1.

fischer injection system FIS V Plus for masonry

**Intended Use**  
Specifications part 2

**Annex B2**

## Specifications of intended use part 3 continued

### Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054:2023-12 (included the dimensioning for fire exposure), Design method A under the responsibility of a designer experienced in anchorages and masonry work.

Applies to all bricks, if no other values are specified:

$$N_{Rk} = N_{Rk,b} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c}$$

$$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$$

For the calculation of pulling out a brick under tension loading  $N_{Rk,pb}$  or

pushing out a brick under shear loading  $V_{Rk,pb}$  see EOTA Technical Report TR 054:2023-12.

$N_{Rk,s}$ ,  $V_{Rk,s}$  and  $M^0_{Rk,s}$  see annexes C1-C3.

Factors for job site tests and displacements see annex C123.

- Verifiable calculation notes and drawings have to be prepared taking into account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is to be indicated on the design drawings.

### Installation:

- Conditions d/d: - Installation and use in dry structures.
- Conditions w/w: - Installation and use in dry and wet structures.
- Conditions w/d: - Installation in wet structures and use in dry structures.
- Hole drilling see Annex C (drilling method).
- In case of aborted hole: The hole shall be filled with injection mortar FIS V Plus.
- Bridging of unbearing layer (e.g., plaster) is permitted for masonry with solid bricks and cylindrical drill hole. At perforated brick masonry see Annex B6, Table B6.1.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Fastening screws or anchor rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E mentioned in Annex A5, Table A5.1.
- Minimum curing time see Annex B8, Table B8.2.
- Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

Material dimensions and mechanical properties of the metal parts according to the specifications are given in Annex A5, Table A5.1

Conformation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204:2004, the documents shall be stored.

Marking of the anchor rod with the envisage embedment depth. This may be done by the manufacturer of the rod or by a person on job site.

fischer injection system FIS V Plus for masonry

**Intended Use**  
Specifications part 3 continued

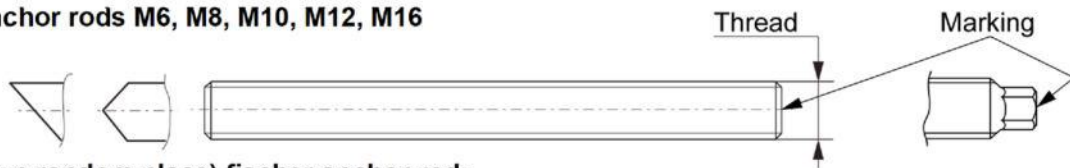
**Annex B3**

**Table B4.1:** Installation parameters for anchor rods in solid bricks and autoclaved aerated concrete without perforated sleeves

Anchor rod	Thread	M6	M8	M10	M12	M16
Nominal drill hole diameter	$d_0$ [mm]	8	10	12	14	18
Effective anchorage depth $h_{ef}^{1)}$ in AAC cylindrical drill hole	$h_{0,min} \geq h_{ef,min}$ [mm]	100				
	$h_{0,max} \geq h_{ef,max}$ [mm]	200				
Effective anchorage depth $h_{ef}$ in AAC conical drill hole	$h_0$ [mm]	-	$h_{ef} + 5$			-
	$h_{ef,1}$ [mm]		75			
	$h_{ef,2}$ [mm]		95			
Effective anchorage depth $h_{ef}^{1)}$ in solid brick (depth of drill hole $h_0 \geq h_{ef}$ )	$h_{ef,min}$ [mm]	50				
	$h_{ef,max}$ [mm]	$h-30, \leq 200$				
Diameter of clearance hole in the fixture	pre-positioning $d_f \leq$ [mm]	7	9	12	14	18
	push through $d_f \leq$ [mm]	9	11	14	16	20
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B8.1				
Maximum installation torque	$T_{inst}$ [Nm]	see parameters of brick				

<sup>1)</sup>  $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$  is possible.

**fischer anchor rods M6, M8, M10, M12, M16**



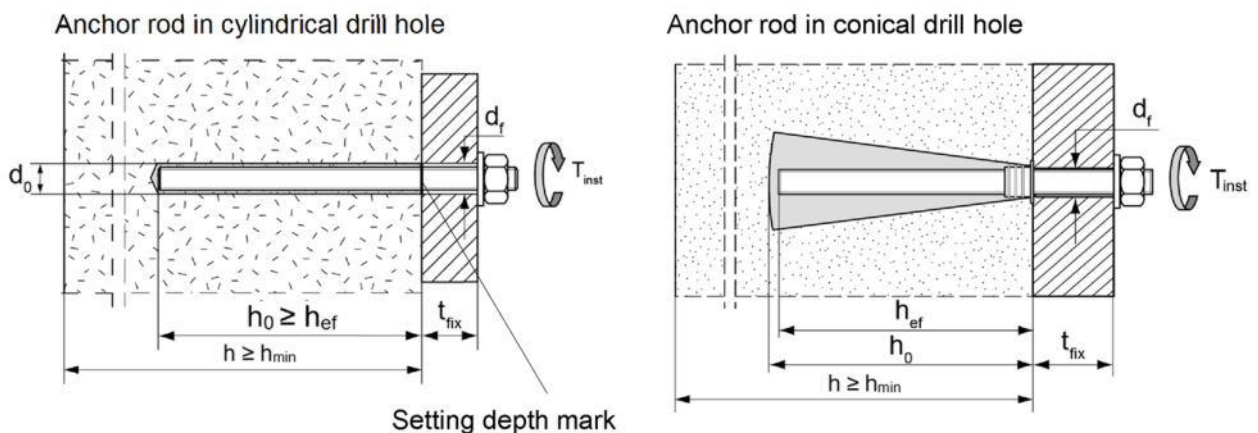
**Marking (on random place) fischer anchor rod:**

Steel zinc plated PC <sup>1)</sup> 8.8	• or +	Steel hot-dip galvanised PC <sup>1)</sup> 8.8	•
High corrosion resistant steel HCR PC <sup>1)</sup> 50	•	High corrosion resistant steel HCR PC <sup>1)</sup> 70	–
High corrosion resistant steel HCR PC <sup>1)</sup> 80	(	Stainless steel R property class 50	~
Stainless steel R property class 80	*		

Alternatively: Colour coding according to DIN 976-1: 2016;  
property class 4.6 marking according to EN ISO 898-1:2013

<sup>1)</sup> PC = property class

**Installation conditions:**



Figures not to scale

fischer injection system FIS V Plus for masonry

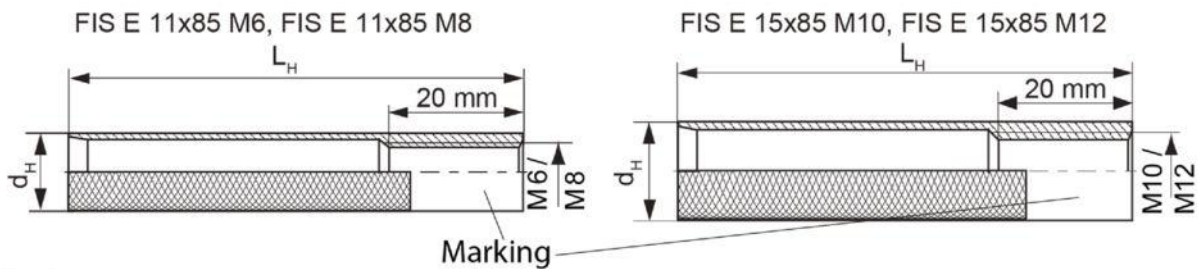
**Intended Use**  
Installation parameters for anchor rods without perforated sleeve

**Annex B4**

**Table B5.1:** Installation parameters for internal threaded anchors FIS E in solid bricks and autoclaved aerated concrete without perforated sleeves

Internal threaded anchor FIS E		11x85 M6	11x85 M8	15x85 M10	15x85 M12
Diameter of anchor	$d_H$ [mm]	11		15	
Nominal drill hole diameter	$d_0$ [mm]	14		18	
Length of anchor	$L_H$ [mm]	85			
Effective anchorage depth	$h_0 \geq h_{ef}$ [mm]	85			
Effective anchorage depth $h_{ef}$ in AAC (conical drill hole)	$h_0$ [mm]	100		-	
	$h_{ef}$ [mm]	85			
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B8.1			
Maximum installation torque	$T_{inst}$ [Nm]	see parameters of brick			
Diameter of clearance hole in the fixture	$d_f$ [mm]	7	9	12	14
Screw-in depth	$l_{E,min}$ [mm]	6	8	10	12
	$l_{E,max}$ [mm]	60			

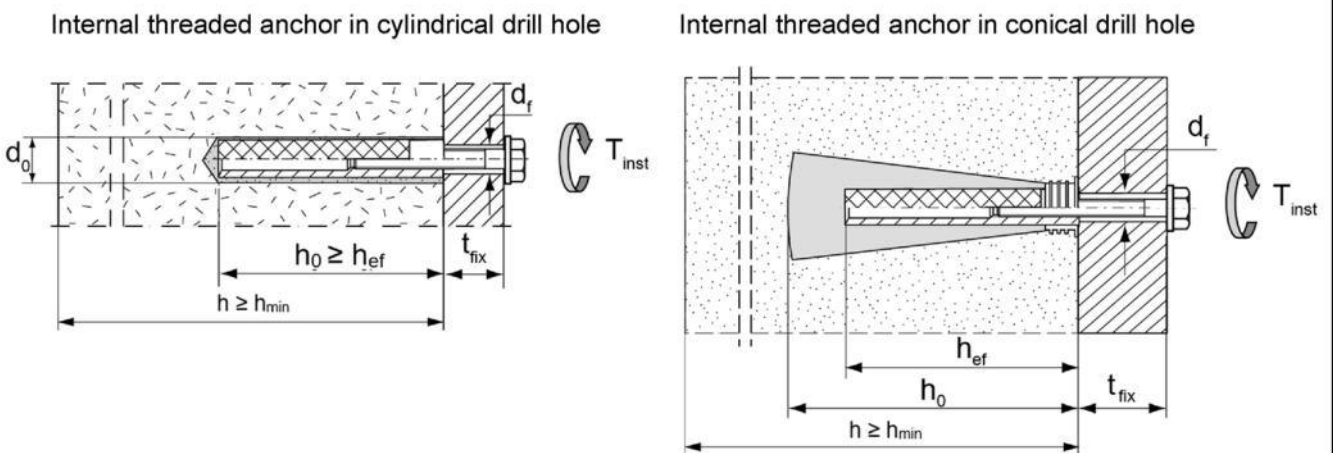
**fischer Internal threaded anchor FIS E**



**Marking:**

Size, e.g. **M8**, Stainless steel: R, e.g. **M8 R**, High corrosion resistant steel: HCR, e.g. **M8 HCR**

**Installation conditions:**



Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**

Installation parameters for internal threaded rods FIS E without perforated sleeve

**Annex B5**

**Table B6.1:** Installation parameters for anchor rods and internal threaded anchors FIS E with perforated sleeves (pre-positioned installation)

perforated sleeve FIS H K		12x50	12x85 <sup>2)</sup>	16x85	16x130 <sup>2)</sup>	20x85	20x130 <sup>2)</sup>	20x200 <sup>2)</sup>
Nominal drill hole diameter $d_0 = D_{\text{sleeve, nom}}$	$d_0$ [mm]	12		16		20		
Depth of drill hole	$h_0$ [mm]	55	90	90	135	90	135	205
Effective anchorage depth	$h_{\text{ef, min}}$ [mm]	50	65	85	110	85	110	180
	$h_{\text{ef, max}}$ [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-]	M6 and M8		M8 and M10		M12 and M16		
Size of internal threaded anchor FIS E		-	-	11x85	-	15x85	-	-
Diameter of cleaning brush <sup>1)</sup>	$d_b \geq$ [mm]	see Table B8.1						
Maximum installation torque	$T_{\text{inst}}$ [Nm]	see parameters of brick						

<sup>1)</sup> Only for solid areas in hollow bricks and solid bricks.

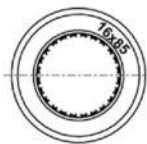
<sup>2)</sup> Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth  $h_{\text{ef, min}}$ , the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of characteristic resistance must be taken.

**Perforated sleeve**

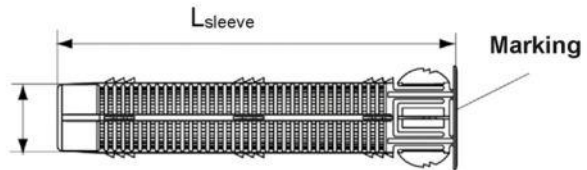
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;  
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

**Marking:**

Size  $D_{\text{sleeve, nom}} \times L_{\text{sleeve}}$   
(e.g.: 16x85)



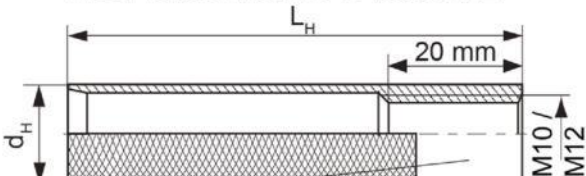
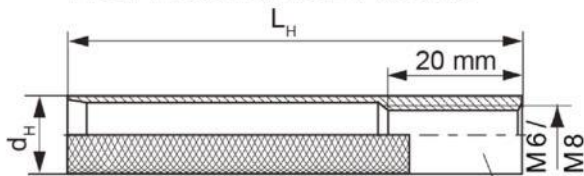
$D_{\text{sleeve, nom}}$



**fischer Internal threaded anchor FIS E**

FIS E 11x85 M6, FIS E 11x85 M8

FIS E 15x85 M10, FIS E 15x85 M12

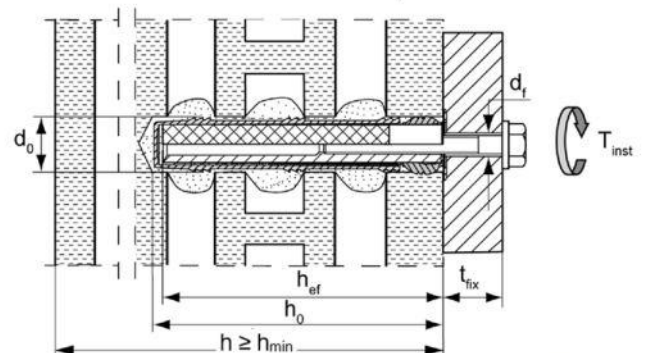
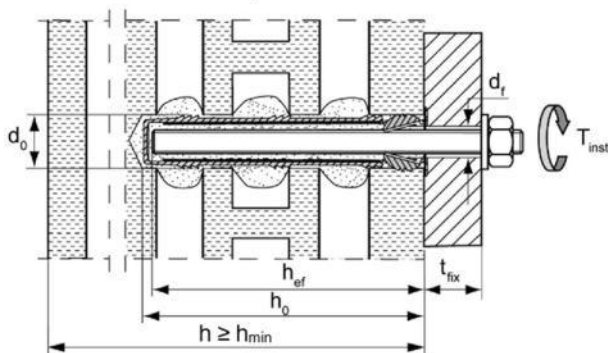


Marking

**Installation conditions:**

Anchor rod with perforated sleeve

Internal threaded anchor with perforated sleeve



Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**

Installation parameters for anchor rods and internal threaded anchors FIS E with perforated sleeve (pre-positioned installation)

**Annex B6**

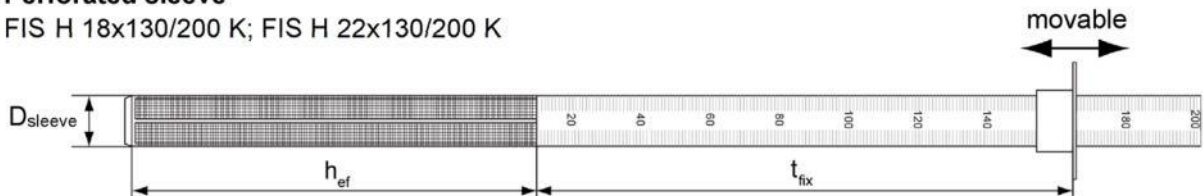
**Table B7.1:** Installation parameters for anchor rods with perforated sleeves (push through installation)

Perforated sleeve FIS H K		18x130/200		22x130/200	
Nominal sleeve diameter	$D_{\text{sleeve,nom}}$ [mm]	16		20	
Nominal drill hole diameter	$d_0$ [mm]	18		22	
Depth of drill hole	$h_0$ [mm]	135			
Effective anchorage depth	$h_{\text{ef}}$ [mm]	$\geq 130$			
Diameter of cleaning brush <sup>1)</sup>	$d_b \geq$ [mm]	see Table B8.1			
Size of threaded rod	[-]	M10	M12	M16	
Maximum installation torque	$T_{\text{inst}}$ [Nm]	see parameters of brick			
Thickness of fixture	$t_{\text{fix,max}}$ [mm]	200			

<sup>1)</sup> Only for solid areas in hollow bricks and solid bricks.

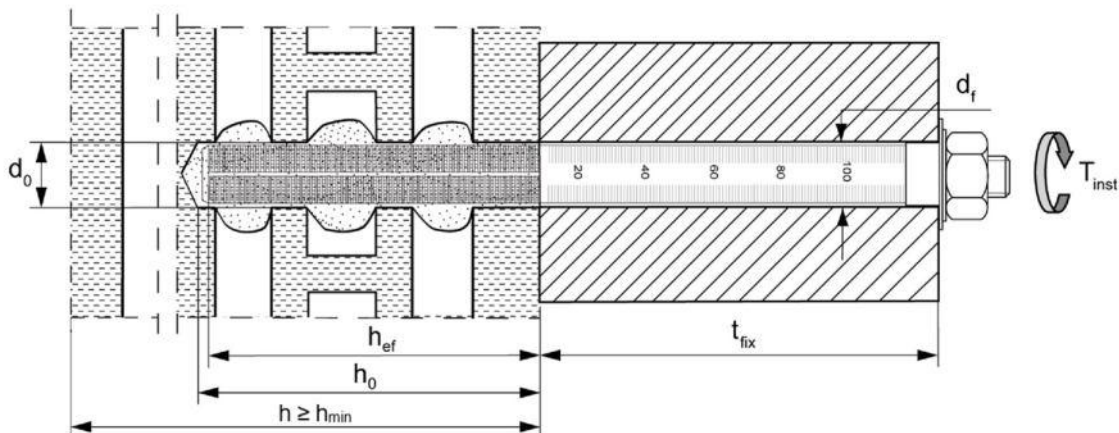
**Perforated sleeve**

FIS H 18x130/200 K; FIS H 22x130/200 K



**Installation conditions:**

Anchor rod with perforated sleeve



Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**

Installation parameters for anchor rods with perforated sleeves (push through installation)

**Annex B7**

**Table B8.1:** Parameters of the cleaning brush BS (steel brush with steel bristles)

The size of the cleaning brush refers to the drill hole diameter

Drill hole diameter	$d_0$ [mm]	8	10	12	14	16	18	20	22
Brush diameter	$d_b$ [mm]	9	11	14	16	20	20	25	25



Only for solid bricks and autoclaved aerated concrete or solid areas of perforated bricks and hollow blocks

**Table B8.2:** Maximum processing times and minimum curing times  
(During the curing time of the mortar the masonry temperature may not fall below the listed minimum temperature)

Temperature at anchoring base [°C]	Maximum processing time <sup>2)</sup> $t_{work}$			Minimum curing time <sup>1), 2)</sup> $t_{cure}$		
	FIS VW Plus High Speed	FIS V Plus	FIS VS Plus Low Speed	FIS VW Plus High Speed	FIS V Plus	FIS VS Plus Low Speed
-10 to -5	-	-	-	12 h	-	-
> -5 to 0	5 min	-	-	3 h	24 h	-
> 0 to 5	5 min	13 min	-	3 h	3 h	6 h
> 5 to 10	3 min	9 min	20 min	50 min	90 min	3 h
> 10 to 20	1 min	5 min	10 min	30 min	60 min	2 h
> 20 to 30	-	4 min	6 min	-	45 min	60 min
> 30 to 40	-	2 min	4 min	-	35 min	30 min

<sup>1)</sup> For wet bricks the curing time must be doubled.

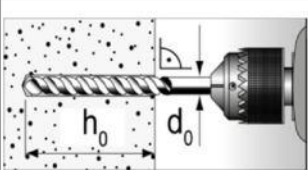
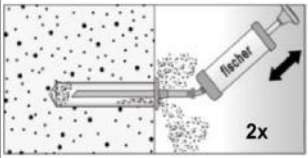
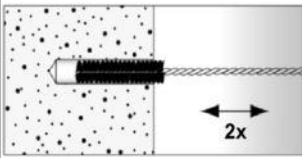
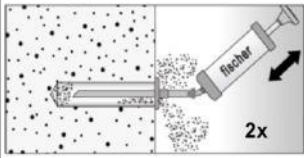
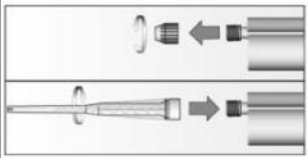


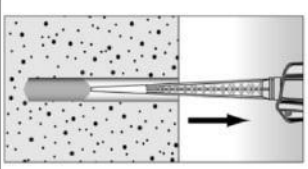
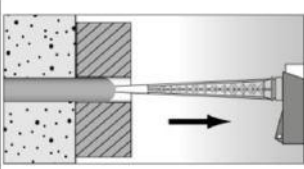
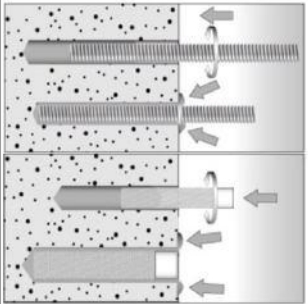

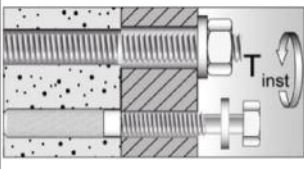
<sup>2)</sup> Minimum cartridge temperature +5°C.

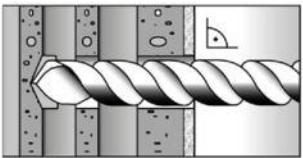
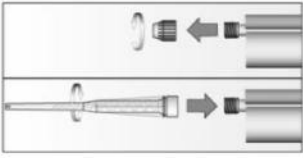


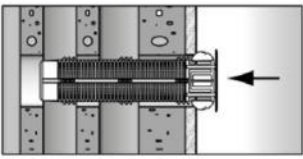
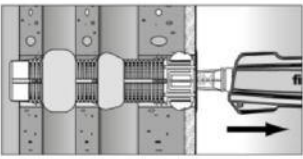
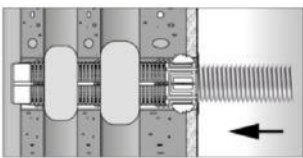

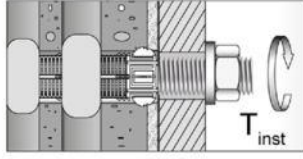
Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**  
Cleaning brush (steel brush)  
Maximum processing times and minimum curing times

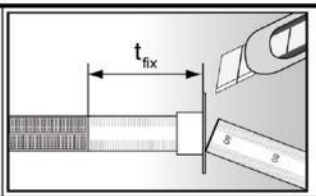
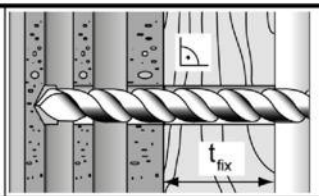
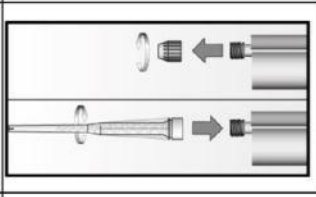
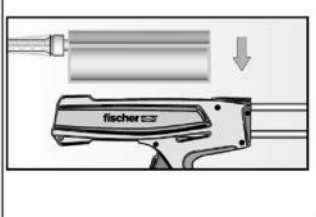
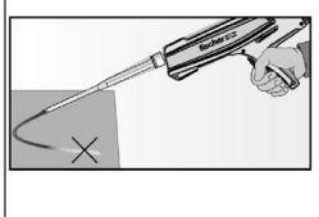
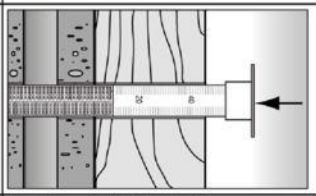
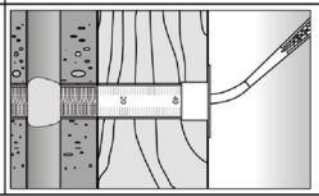
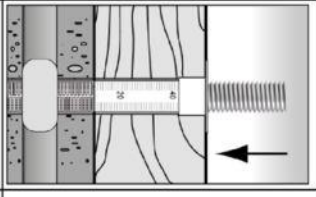

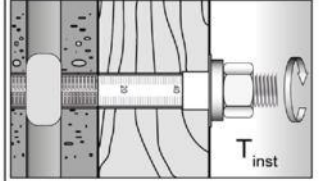
**Annex B8**

Installation instruction part 1				
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)				
1		Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole $h_0$ and drill hole diameter $d_0$ see <b>Table B4.1; B5.1</b> .		
2				Blow out the drill hole twice. Brush twice and blow out twice again.
3		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).		
4			Place the cartridge into a suitable dispenser.	
5			Fill approximately 2/3 of the drill hole with mortar beginning from the bottom of the hole <sup>1)</sup> . Avoid bubbles!	
6		Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.		
7			Do not touch. Minimum curing time see <b>Table B8.2</b> .	
Mounting the fixture. max $T_{inst}$ see parameter of brick in <b>Annex C</b> .				
1) Exact volume of mortar see manufacturer's specification.				
fischer injection system FIS V Plus for masonry				Annex B9
Intended Use Installation instruction (without perforated sleeve) part 1				

<b>Installation instruction part 2</b>				
<b>Installation in perforated or solid brick with perforated sleeve (pre-positioned installation)</b>				
<b>1</b>		Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole $h_0$ and drill hole diameter $d_0$ see <b>Table B6.1</b>	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.	
<b>2</b>		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).		
<b>3</b>		Place the cartridge into a suitable dispenser.		Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.
<b>4</b>		Insert the perforated sleeve flush with the surface of the masonry or plaster.		Fill the perforated sleeve completely with mortar beginning from the bottom of the hole <sup>1)</sup> .
<b>5</b>		Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).		
<b>6</b>		Do not touch. Minimum curing time see <b>Table B8.2</b>		Mounting the fixture. max $T_{inst}$ see parameter of brick in <b>Annex C</b> .
<p><sup>1)</sup> Exact volume of mortar see manufacturer's specification.</p>				
fischer injection system FIS V Plus for masonry			<b>Annex B10</b>	
<b>Intended Use</b> Installation instruction (with perforated sleeve) part 2				

### Installation instruction part 3

#### Installation in perforated or solid brick with perforated sleeve (push through installation)

1		<p>Push the movable stop up to the correct thickness of fixture and cut the overlap.</p>		<p>Drill the hole through the fixture. Depth of drill hole (<math>h_0 + t_{fix}</math>) and drill hole diameter see <b>Table B7.1</b>.</p>
2		<p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p>		
3		<p>Place the cartridge into a suitable dispenser.</p>		<p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p>
4		<p>Insert the perforated sleeve flush with the surface of the fixture into the drill hole.</p>		<p>Fill the sleeve with mortar beginning from the bottom of the hole.<sup>1)</sup> For deep drill holes use an extension tube.</p>
5		<p>Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).</p>		
6		<p>Do not touch. Minimum curing time see <b>Table B8.2</b>.</p>		<p>Mounting the fixture. max <math>T_{inst}</math> see parameter of brick in <b>Annex C</b>.</p>

<sup>1)</sup> Exact volume of mortar see manufacturer's specification.

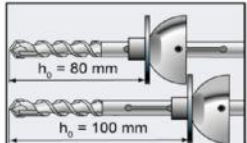
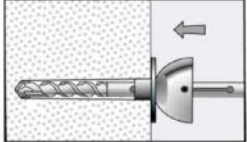
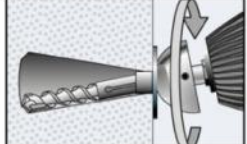
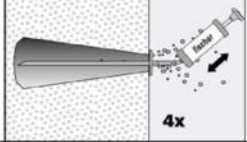
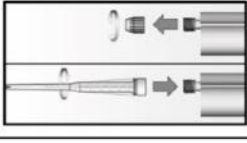
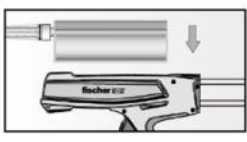

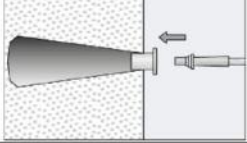
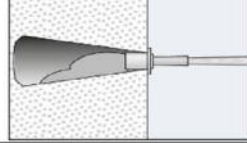
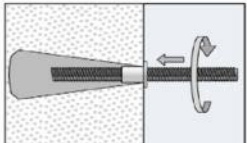
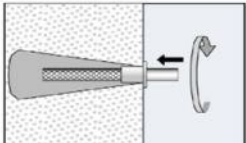

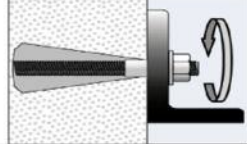
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**Intended Use**  
Installation instruction (with perforated sleeve) part 3

**Annex B11**

### Installation instruction part 4

#### Installation in autoclaved aerated concrete with special conic drill bit PBB (pre-positioned installation)

1		<p>Position the movable drill bit arrester on the used drill hole depth (see <b>Table B4.1</b>). For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw.</p>	
2		<p>Drill the cylindrical hole with rotating drill until the arrester contact the material surface (drilling method see Annex C of the respective brick).</p>	
3		<p>Deviate the working power drill circulate to generate an conic undercut in the material.</p>	
4		<p>Blow out the drill hole four times.</p>	
5		<p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p>	
6		<p>Place the cartridge into a suitable dispenser.</p>	 <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p>
7		<p>Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer.</p>	 <p>Fill the drill hole with injection mortar.</p>
8			<p>Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.</p>
9		<p>Do not touch. Minimum curing time see <b>Table B8.2</b>.</p>	 <p>Mounting the fixture. max <math>T_{inst}</math> see parameter of brick in <b>Annex C</b>.</p>

fischer injection system FIS V Plus for masonry

**Intended Use**

Installation instruction for autoclaved aerated concrete with special conic drill bit PBB  
(pre-positioned installation) part 4

**Annex B12**

Table B13.1: Overview of assessed bricks part 1					
Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm <sup>2</sup> ]	Main country of origin	Mean gross density $\rho$ [kg/dm <sup>3</sup> ]	Annex
<b>Solid brick Mz</b>					
Solid brick Mz	NF $\geq 240 \times 115 \times 71$	15 / 25 / 35	Germany	$\geq 1,8$	C4 – C7
	2DF $\geq 240 \times 115 \times 113$	12,5 / 20	Germany	$\geq 1,8$	C8 / C9
	$\geq 245 \times 118 \times 54$	12,5 / 25	Italy	$\geq 1,8$	C10 / C11
	$\geq 230 \times 108 \times 55$	12,5 / 25	Denmark	$\geq 1,8$	C12 / C13
<b>Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL</b>					
Solid calcium silicate brick KS	NF $\geq 240 \times 115 \times 71$	15 / 25 / 35	Germany	$\geq 2,0$	C14 / C15
	8DF $\geq 250 \times 240 \times 240$	12,5 / 25 / 35	Germany	$\geq 2,0$	C16 / C17
	$\geq 997 \times 214 \times 538$	12,5 / 25 & 45	Netherlands	$\geq 1,8$ & $\geq 2,2$	C18 / C19
	$\geq 240 \times 115 \times 113$	12,5 / 25	Germany	$\geq 1,8$	C20 – C23
Perforated calcium silicate brick KSL	3DF $240 \times 175 \times 113$	10 / 12,5 / 15 / 20 / 25	Germany	$\geq 1,4$	C24 – C27
<b>Vertical perforated brick HLz</b>					
Vertical perforated brick HLz	$370 \times 240 \times 237$	5 / 7,5 / 10 / 12,5 / 15	Germany	$\geq 1,0$	C28 / C29
	$500 \times 175 \times 237$	5 / 7,5 / 10 / 12,5 / 15	Germany	$\geq 1,0$	C28 / C29
	2DF $240 \times 115 \times 113$	7,5 / 12,5 / 20 / 25 / 35	Germany	$\geq 1,4$	C30 / C31
	$248 \times 365 \times 248$	5 / 7,5 / 10	Germany	$\geq 0,6$	C32 – C35
	$248 \times 365 \times 249$	10 / 12,5 / 15	Germany	$\geq 0,7$	C36 – C39
	$248 \times 365 \times 249$	5 / 8	Germany	$\geq 0,5$	C40 – C43
	$248 \times 425 \times 248$	5 / 8 / 10	Germany	$\geq 0,8$	C44 – C47
	$248 \times 425 \times 248$	5 / 7,5 / 10	Germany	$\geq 0,8$	C48 – C51
	$500 \times 200 \times 315$	5 / 7,5 / 10	Germany	$\geq 0,6$	C52 – C55
	$500 \times 200 \times 300$	5 / 7,5 / 10 / 12,5	France	$\geq 0,7$	C56 – C59
	$500 \times 200 \times 315$	2,5 / 5 / 7,5 / 10	France	$\geq 0,7$	C60 – C63
	$560 \times 200 \times 275$	5 / 8 / 10	France	$\geq 0,7$	C64 / C65
	$255 \times 120 \times 118$	2,5 / 5 / 8 / 10 / 12,5 / 15	Italy	$\geq 1,0$	C66 - C68
	$275 \times 130 \times 94$	7,5 / 10 / 15 / 20 / 25	Spain	$\geq 0,8$	C69 / C71
	$220 \times 190 \times 290$	7,5 / 10 / 12,5	Portugal	$\geq 0,7$	C72 – C75
	$253 \times 300 \times 240$	2,5 / 5 / 8	Austria	$\geq 0,8$	C76 – C79
	$250 \times 440 \times 250$	8 / 10 / 12,5	Austria	$\geq 0,7$	C80 – C83
	$230 \times 108 \times 55$	2,5 / 5 / 8 / 10	Denmark	$\geq 1,4$	C84 / C85
	$365 \times 248 \times 245$	10	Austria	$\geq 0,6$	C86 / C89
	$240 \times 175 \times 113$	12,5	Germany	$\geq 0,9$	C90 / C93
fischer injection system FIS V Plus for masonry				<b>Annex B13</b>	
Intended Use Overview of assessed bricks part 1					

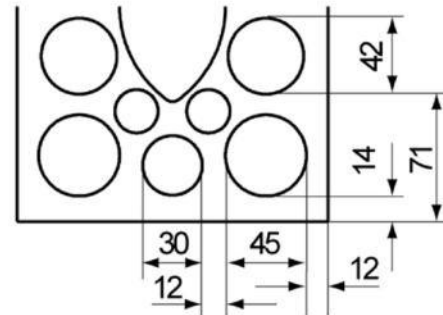
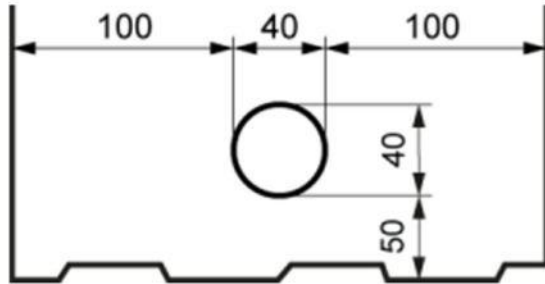
**Table B14.1:** Overview of assessed bricks part 2

Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm <sup>2</sup> ]	Main country of origin	Mean gross density $\rho$ [kg/dm <sup>3</sup> ]	Annex
<b>Horizontal perforated brick LLz</b>					
Horizontal perforated brick LLz	248x78x250	2,5 / 5 / 8	Italy	≥0,7	C94 / C95
	128x88x275	2,5	Spain	≥0,8	C96 / C97
<b>Light-weight concrete hollow block Hbl</b>					
Light-weight concrete hollow block Hbl	362x240x240	2,5 / 5	Germany	≥1,0	C98 – C101
	500x200x200	2,5 / 5 / 8	France	≥1,0	C102 / C103
	440x215x215	5 / 8 / 10 / 12,5	Ireland	≥1,2	C104 – C107
<b>Light-weight concrete solid block Vbl</b>					
Light-weight concrete solid block Vbl	≥ 372x300x254	2,5	Germany	≥0,6	C108 / C109
	≥ 250x240x239	5 / 8 / 10	Germany	≥1,6	C110 – C113
	≥ 440x100x215	5 / 8 / 10 / 12,5	Ireland	≥2,0	C114 / C115
	≥ 440x95x215	7,5 / 10 / 12,5 / 15	England	≥2,0	C116 / C117
<b>Autoclaved aerated concrete (AAC)</b>					
PP2 / AAC	-	2,5	Germany	0,35	C118 – C122
PP4 / AAC	-	5	Germany	0,5	C118 – C122
PP6 / AAC	-	8	Germany	0,65	C118 – C122
fischer injection system FIS V Plus for masonry					<b>Annex B14</b>
<b>Intended Use</b> Overview of assessed bricks part 2					

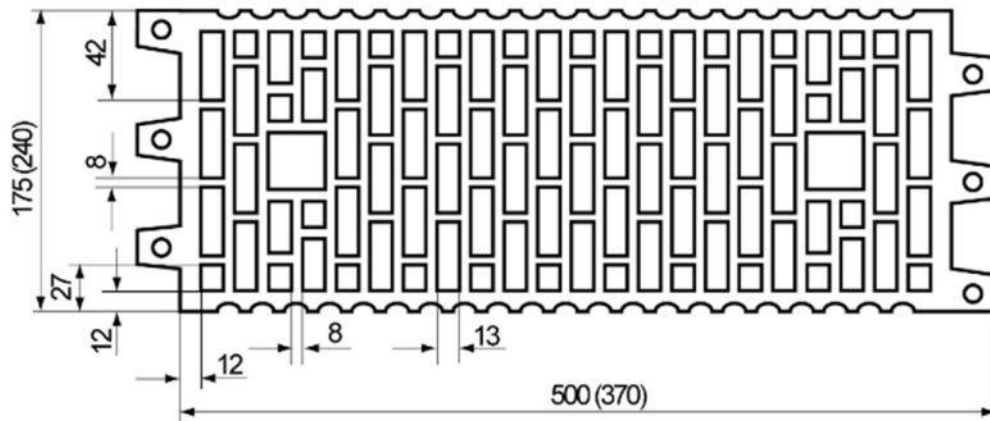
**Table B15.1: Overview dimensions of perforated and hollow bricks part 1**

Solid calcium silicate brick KS, 8DF,  
EN 771-2:2011+A1:2015 according to Annex C16

Perforated calcium silicate brick KSL, 3DF,  
EN 771-2:2011+A1:2015; e.g. KS Wending  
according to Annex C24

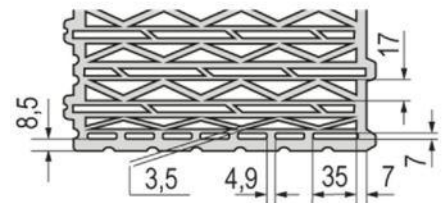
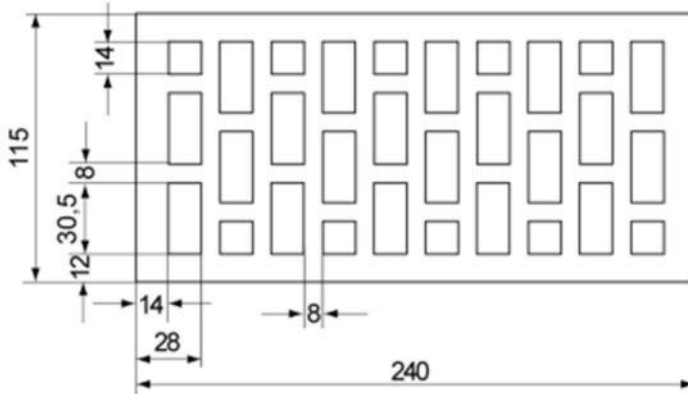


Vertical perforated brick HLz, EN 771-1:2011+A1:2015: e.g. Wienerberger, Poroton according to Annex C28



Vertical perforated brick HLz, 2DF,  
EN 771-1:2011+A1:2015; e.g. Wienerberger  
according to Annex C30

Vertical perforated brick HLz, U8,  
EN 771-1:2011+A1:2015; according to Annex C32



Measures in [mm]  
Figures not to scale

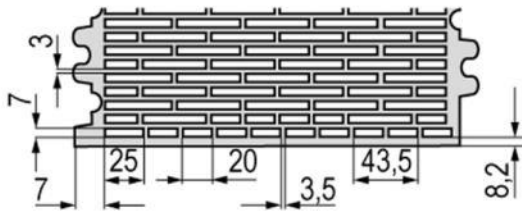
fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 1

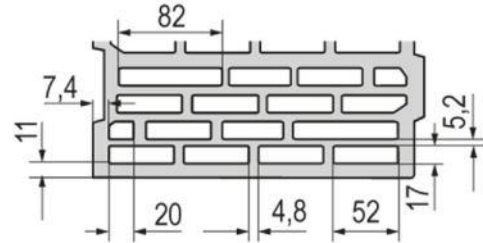
**Annex B15**

**Table B16.1: Overview dimensions of perforated and hollow bricks part 2**

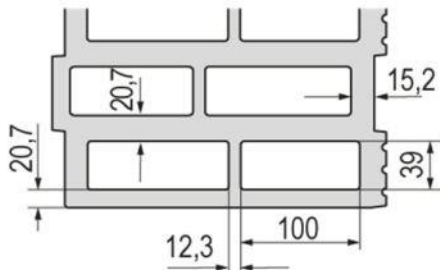
Vertical perforated brick HLz, T10, T11,  
EN 771-1:2011+A1:2015; according to Annex C36



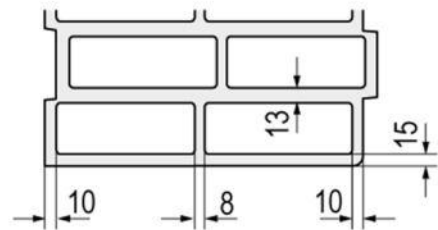
Vertical perforated brick HLz, T7 PF, filled with perlite,  
EN 771-1:2011+A1:2015; according to Annex C40



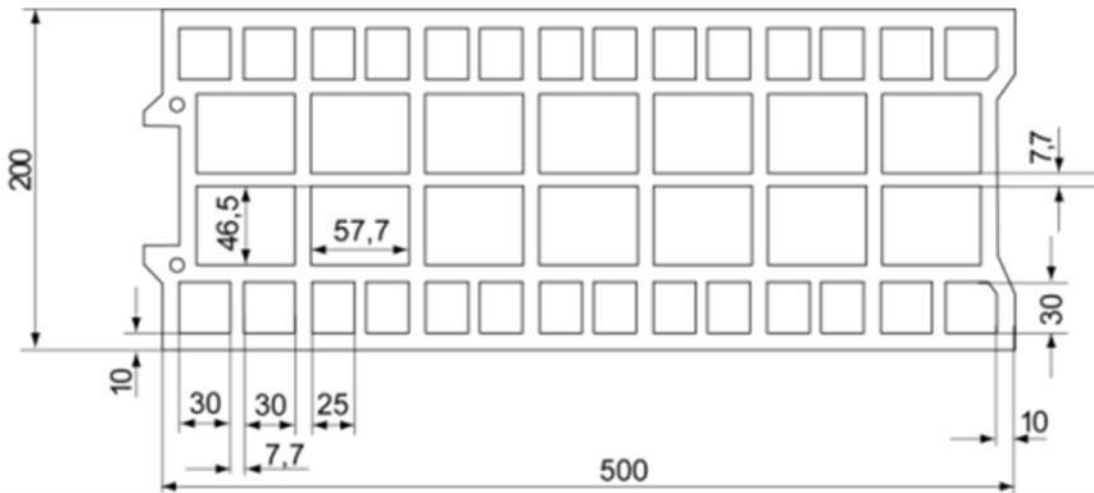
Vertical perforated brick HLz, T9 MW, filled with  
mineral wool, EN 771-1:2011+A1:2015; according to  
Annex C44



Vertical perforated brick HLz, FZ 7, filled with mineral  
wool, EN 771-1:2015; according to Annex C48



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Bouyer Leroux; According to Annex C52



Measures in [mm]  
Figures not to scale

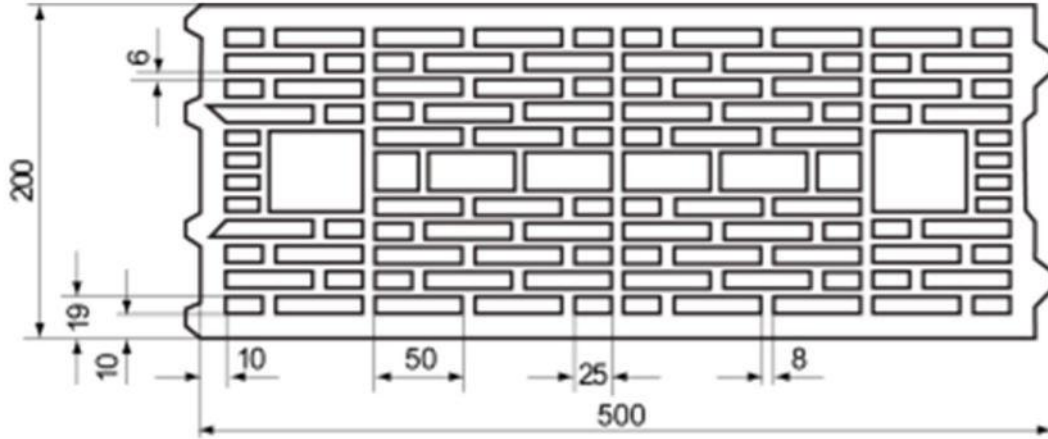
fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 2

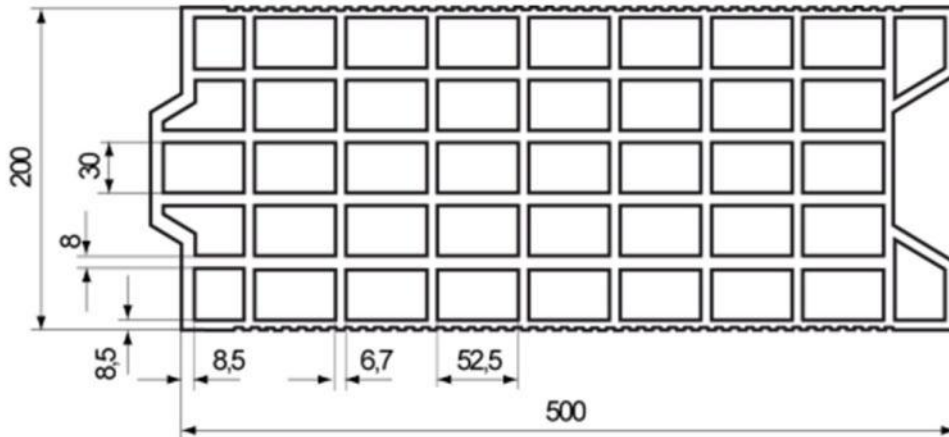
**Annex B16**

**Table B17.1: Overview dimensions of perforated and hollow bricks part 3**

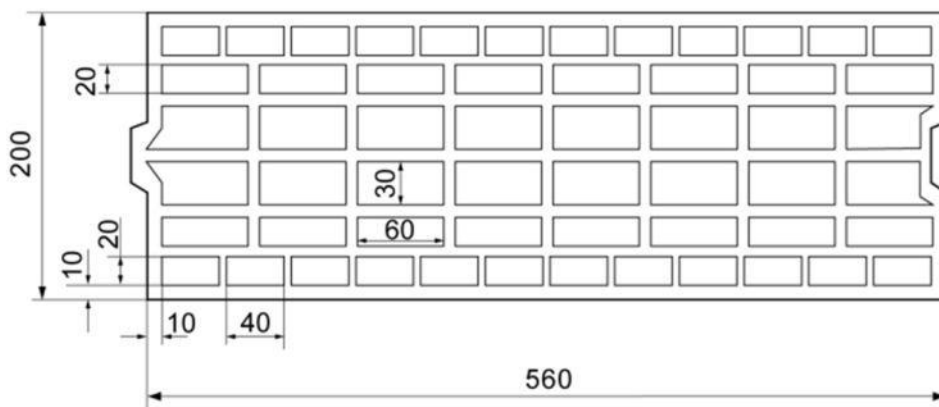
Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C56



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Terreal according to Annex C60



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Imery according to Annex C64



Measures in [mm]  
Figures not to scale

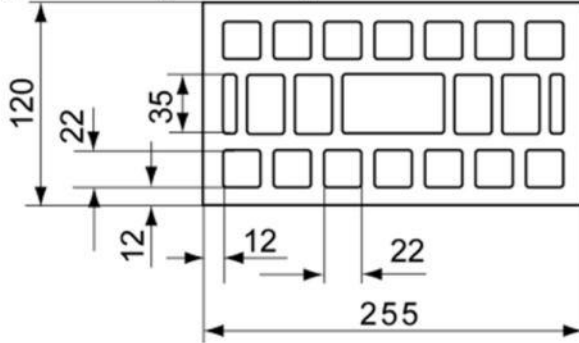
fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 3

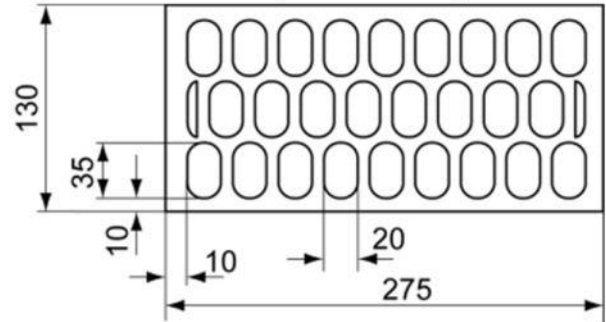
**Annex B17**

**Table B18.1: Overview dimensions of perforated and hollow bricks part 4**

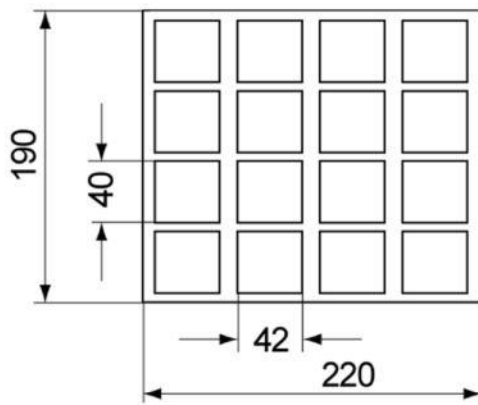
Vertical perforated brick HLz,  
EN 771-1:2011+A1:2015;  
e.g. Wienerberger according to Annex C66



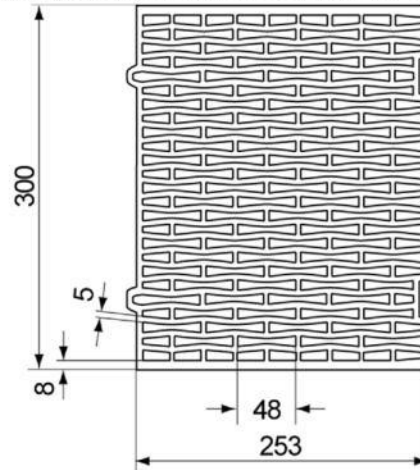
Vertical perforated brick HLz,  
EN 771-1:2011+A1:2015;  
e.g. Ceramica Farreny S.A. according to Annex C69



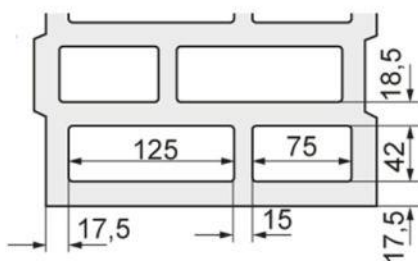
Vertical perforated brick HLz,  
EN 771-1:2011+A1:2015;  
e.g. Perceram according to Annex C72



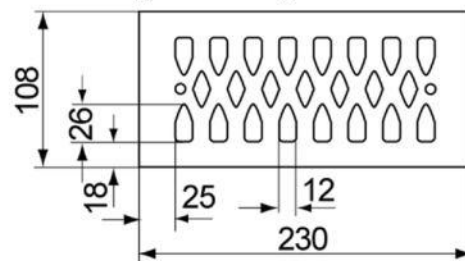
Vertical perforated brick HLz,  
EN 771-1:2011+A1:2015;  
e.g. Ziegelwerk Brenna according to Annex C76



Vertical perforated brick HLz, Porotherm W 44, filled  
with mineral wool, EN 771-1:2011+A1:2015 according  
to Annex C80



Vertical perforated brick HLz,  
EN 771-1:2011+A1:2015;  
e.g. Wienerberger according to Annex C84



Measures in [mm]  
Figures not to scale

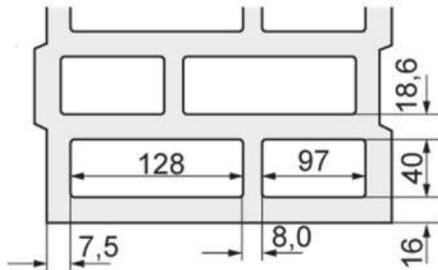
fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 4

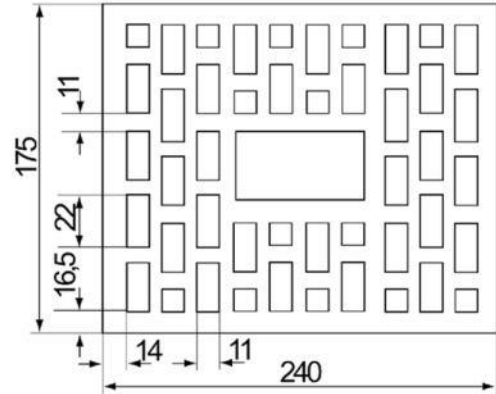
**Annex B18**

**Table B19.1: Overview dimensions of perforated and hollow bricks part 5**

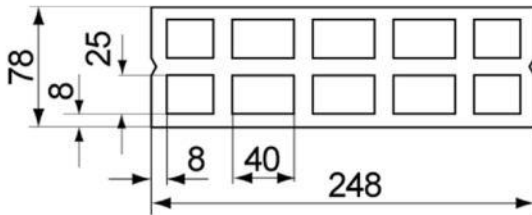
Vertical perforated brick filled with mineral wool,  
EN 771-1:2011+A1:2015; according to Annex C86



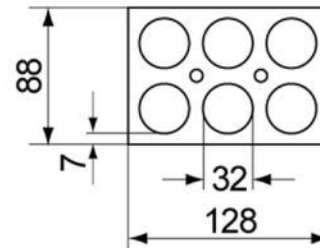
Vertical perforated brick HLZ,  
EN 771-1:2011+A1:2015;  
e.g. Wienerberger according to Annex C90



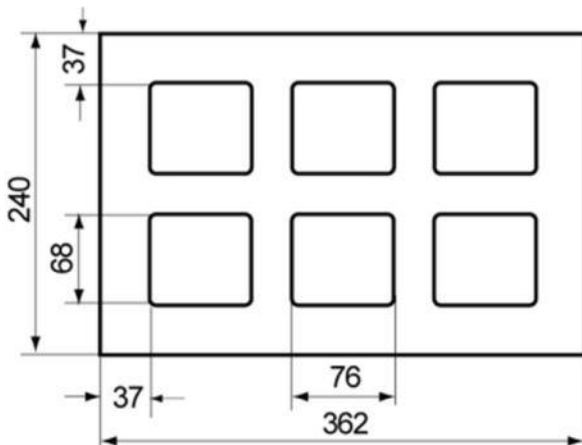
Horizontal perforated brick LLz,  
EN 771-1:2011+A1:2015; according to Annex C94



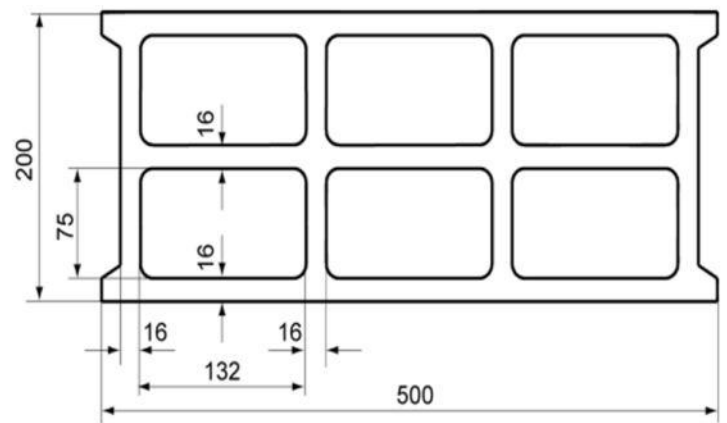
Horizontal perforated brick LLz,  
EN 771-1:2011+A1:2015;  
e.g. Cermanica Farreny S.A according to Annex C96



Light-weight concrete hollow block Hbl,  
EN 771-3:2011+A1:2015; according to Annex C98



Light-weight concrete hollow block Hbl,  
EN 771-3:2011+A1:2015;  
e.g. Sepa according to Annex C102



Measures in [mm]  
Figures not to scale

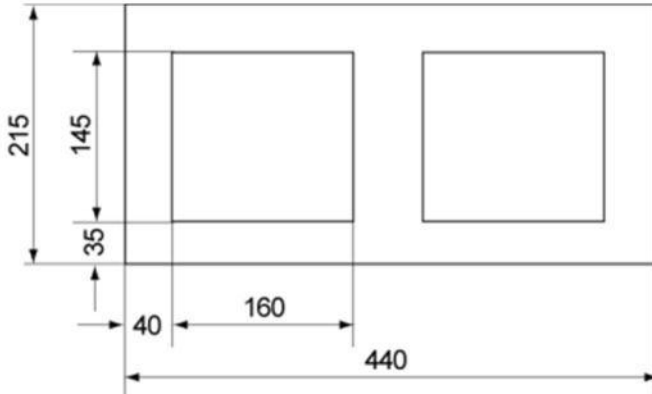
fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 5

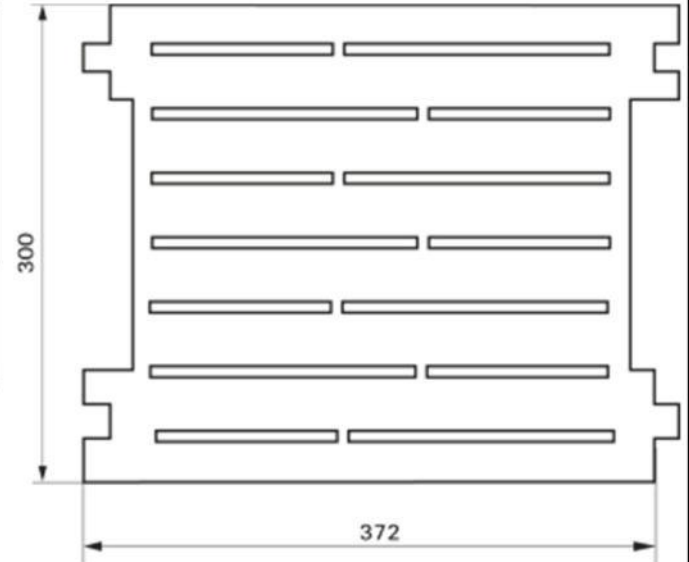
**Annex B19**

**Table B20.1: Overview dimensions of perforated and hollow bricks part 6**

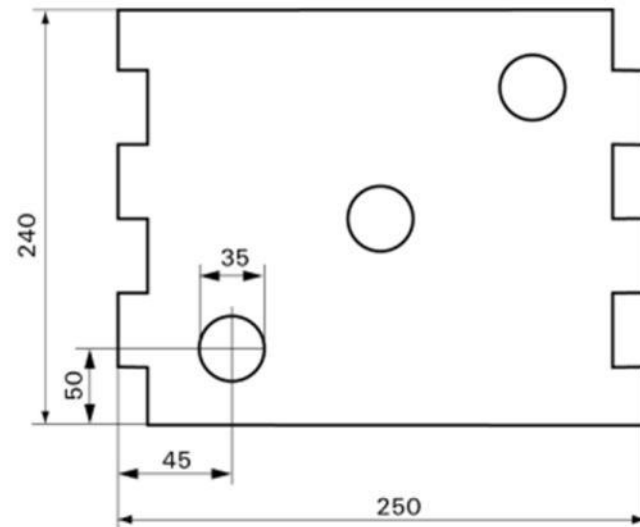
Light-weight concrete hollow block Hbl,  
EN 771-3:2011+A1:2015  
e.g. Roadstone wood according to Annex C104



Light-weight concrete hollow block Hbl,  
EN 771-3:2011+A1:2015  
e.g. Sepa according to Annex C108



Light-weight concrete solid block Vbl,  
EN 771-3:2011+A1:2015;  
e.g. Sepa according to Annex C110



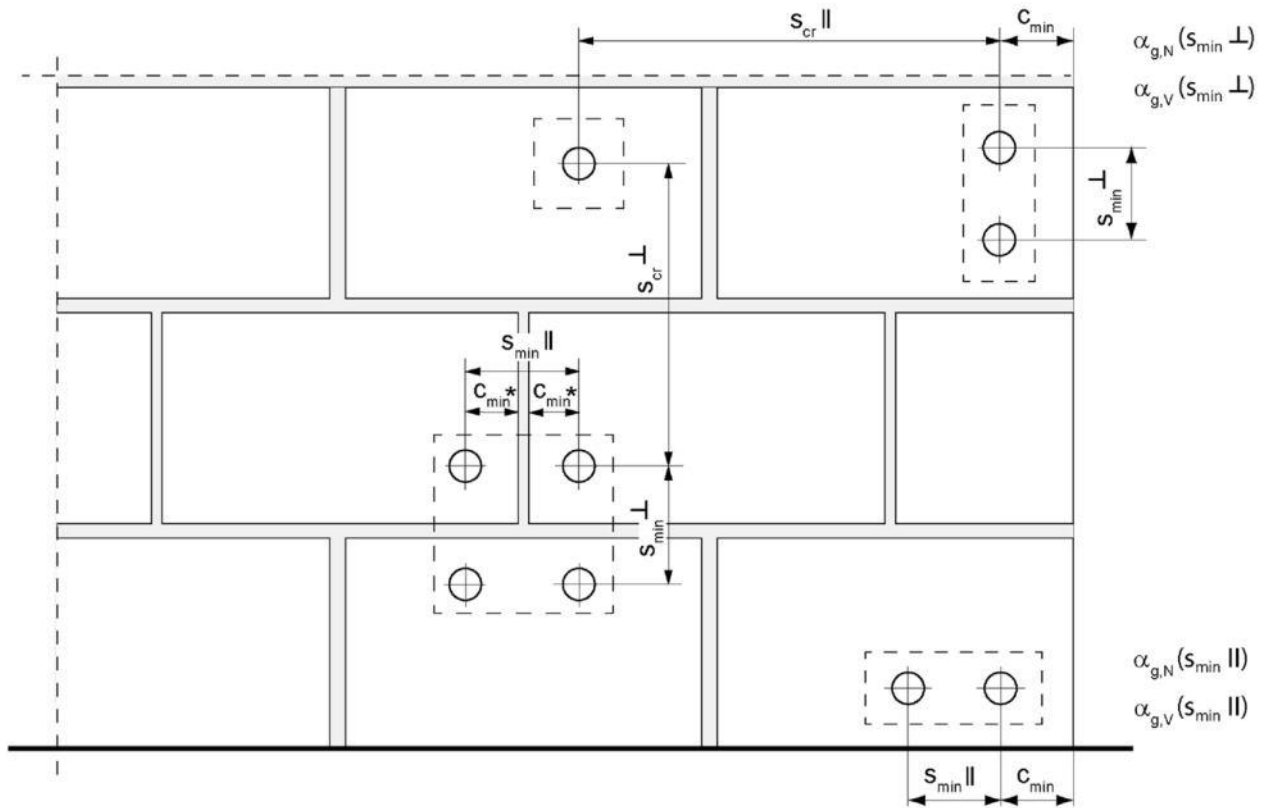
Measures in [mm]  
Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**  
Overview dimensions of perforated and hollow bricks part 6

**Annex B20**

### Spacing and edge distance part 1



\* Only, if vertical joints are not completely filled with mortar

$s_{min II}$	=	Minimum spacing parallel to horizontal joint
$s_{min \perp}$	=	Minimum spacing perpendicular to horizontal joint
$s_{cr II}$	=	Characteristic spacing parallel to horizontal joint
$s_{cr \perp}$	=	Characteristic spacing perpendicular to horizontal joint
$c_{cr} = c_{min}$	=	Edge distance
$\alpha_{g,N}(s_{min II})$	=	Group factor for tension load, anchor group parallel to horizontal joint
$\alpha_{g,V}(s_{min II})$	=	Group factor for shear load, anchor group parallel to horizontal joint
$\alpha_{g,N}(s_{min \perp})$	=	Group factor for tension load, anchor group perpendicular to horizontal joint
$\alpha_{g,V}(s_{min \perp})$	=	Group factor for shear load, anchor group perpendicular to horizontal joint

Figures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**  
Spacing and edge distance part 1

**Annex B21**

## Spacing and edge distance part 2

For  $s \geq s_{cr}$ :  $\alpha_g = 2$

For  $s_{min} \leq s < s_{cr}$ :  $\alpha_g$  according to installation parameters of brick Annex C

Group of 2 anchors

$$N_{Rk}^g = \alpha_{g,N} \cdot N_{Rk}; V_{Rk,b}^g = V_{Rk,c,II}^g = V_{Rk,c,\perp}^g = \alpha_{g,V} \cdot V_{Rk}$$

Group of 4 anchors

$$N_{Rk}^g = \alpha_{g,N}(s_{minII}) \cdot \alpha_{g,N}(s_{min\perp}) \cdot N_{Rk};$$

$$V_{Rk,b}^g = V_{Rk,c,II}^g = V_{Rk,c,\perp}^g = \alpha_{g,V}(s_{minII}) \cdot \alpha_{g,V}(s_{min\perp}) \cdot V_{Rk}$$

with  $N_{Rk}$  and  $\alpha_{g,N}$  depending on  $s_{minII}$  or  $s_{min\perp}$  acc. to Annex C

with  $V_{Rk}$  and  $\alpha_{g,V}$  depending on  $s_{minII}$  or  $s_{min\perp}$  acc. to Annex C

fischer injection system FIS V Plus for masonry

**Intended Use**  
Spacing and edge distance part 2

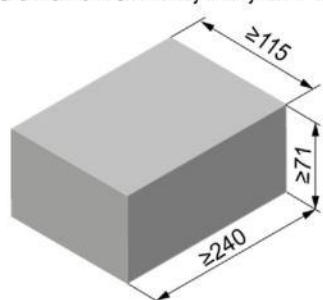
**Annex B22**

Table C1.1: Characteristic resistance to steel failure under tension loading of fischer anchor rods and standard threaded rods								
Anchor rod / standard threaded rod		M6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16		
<b>Characteristic resistance to steel failure under tension loading</b>								
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	4.6	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
		4.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
	Property class	5.8		10,0	18,3(16,6)	29,0(26,8)	42,1	78,5
		8.8		16,0	29,2(26,5)	46,4(42,8)	67,4	125,6
		Stainless steel R and High corrosion resistant steel HCR		50	10,0	18,3	29,0	42,1
	70			14,0	25,6	40,6	59,0	109,9
	80	16,0		29,2	46,4	67,4	125,6	
<b>Partial factors <sup>1)</sup></b>								
Partial factors $\gamma_{Ms,N}$	Steel zinc plated	4.6	[-]	2,00				
		4.8		1,50				
		5.8		1,50				
	Property class	8.8		1,50				
		50		2,86				
	Stainless steel R and High corrosion resistant steel HCR	70		1,50 <sup>2)</sup> / 1,87				
		80		1,60				
<p><sup>1)</sup> In absence of other national regulations</p> <p><sup>2)</sup> Only for fischer FIS A made of high corrosion resistant steel HCR</p> <p><sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area <math>A_s</math> for hot-dip galvanised standard threaded rods according to EN ISO 10684:2004+AC:2009.</p>								
fischer injection system FIS V Plus for masonry							<b>Annex C1</b>	
<b>Performance</b> Characteristic resistance to steel failure under tension loading of fischer anchor rods and standard threaded rods								

<b>Table C2.1: Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods</b>								
Anchor rod / standard threaded rod		M6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16		
<b>Characteristic resistance to steel failure under shear loading</b>								
<b>without lever arm</b>								
Characteristic resistance $V_{Rk,s}$	Steel zinc plated	4.6	[kN]	4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
		4.8		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
	Property class	5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1
		8.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
		Stainless steel R and High corrosion resistant steel HCR		50	5,0	9,1	14,5	21,0
	70			7,0	12,8	20,3	29,5	54,9
	80	8,0		14,6	23,2	33,7	62,8	
<b>with lever arm</b>								
Characteristic resistance $M^0_{Rk,s}$	Steel zinc plated	4.6	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
		4.8		6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
	Property class	5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2
		8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9
		Stainless steel R and High corrosion resistant steel HCR		50	7,6	18,7	37,3	65,4
	70			10,6	26,2	52,3	91,5	232,6
	80	12,2		29,9	59,8	104,6	265,9	
<b>Partial factors<sup>1)</sup></b>								
Partial factors $\gamma_{Ms,V}$	Steel zinc plated	4.6	[-]	1,67				
		4.8		1,25				
	Property class	5.8		1,25				
		8.8		1,25				
		Stainless steel R and High corrosion resistant steel HCR		50	2,38			
	70			1,25 <sup>2)</sup> / 1,56				
	80	1,33						
<p>1) In absence of other national regulations</p> <p>2) Only for fischer FIS A made of high corrosion resistant steel HCR</p> <p>3) Values in brackets are valid for undersized threaded rods with smaller stress area <math>A_s</math> for hot-dip galvanised standard threaded rods (M8 resp. M10) according to EN ISO 10684:2004+AC:2009.</p>								
fischer injection system FIS V Plus for masonry							<b>Annex C2</b>	
<b>Performance</b> Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods								

<b>Table C3.1: Characteristic resistance to steel failure under tension / shear loading of internal threaded anchors FIS E</b>								
<b>fischer internal threaded anchor FIS E</b>				<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	
<b>Characteristic resistance to steel failure under tension loading, decisive values of internal threaded anchor FIS E with screw/threaded rod</b>								
Characteristic resistance	$N_{RK,s}$	Property class 4.6	[kN]	8,0	14,6	23,2	33,7	
		Property class 5.8		10,0	18,3	29,0	42,1	
		Property class 70		R	14,0	25,6	40,6	59,0
		HCR		14,0	25,6	40,6	59,0	
<b>Partial factors<sup>1)</sup></b>								
Partial factors	$\gamma_{Ms,N}$	Property class 4.6	[-]	2,00				
		Property class 5.8		1,50				
		Property class 70		1,87				
		R HCR		1,87				
<b>Characteristic resistance to steel failure under shear loading; decisive values of internal threaded anchor FIS E with screw/threaded rod</b>								
<b>without lever arm</b>								
Characteristic resistance	$V_{RK,s}$	Property class 4.6	[kN]	4,8	8,7	13,9	20,2	
		Property class 5.8		5	9	15	21	
		Property class 70		R	7,0	12,8	20,3	29,5
		HCR		7,0	12,8	20,3	29,5	
<b>with lever arm</b>								
Characteristic resistance	$M^0_{RK,s}$	Property class 4.6	[Nm]	6,1	14,9	29,9	52,3	
		Property class 5.8		7,6	18,7	37,3	65,4	
		Property class 70		R	10,6	26,2	52,3	91,5
		HCR		10,6	26,2	52,3	91,5	
<b>Partial factors<sup>1)</sup></b>								
Partial factors	$\gamma_{Ms,V}$	Property class 4.6	[-]	1,67				
		Property class 5.8		1,25				
		Property class 70		1,56				
		R HCR		1,56				
1) In absence of other national regulations								
fischer injection system FIS V Plus for masonry						<b>Annex C3</b>		
<b>Performance</b> Characteristic resistance to steel failure under tension / shear loading of internal threaded anchors FIS E								

**Solid brick Mz, NF, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 71
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	15 / 12 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-1:2011+A1:2015			

**Table C4.1:** Installation parameters for edge distance  $c=100\text{mm}$

Anchor rod		M6	M8	M10	M12	-		-		
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12	
						11x85		15x85		
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	$h_{ef}$	[mm]	50	50	50	50	85			
			80	80	80	80				
			200	200	200	200				
Max. installation torque	$\max T_{inst}$	[Nm]	4	10			4	10		
General installation parameters										
Edge distance	$c_{min} = c_{cr}$	[mm]	100				100			
Edge distance $h_{ef}=200$	$c_{min} = c_{cr}$		150				- <sup>2)</sup>			
Spacing	$s_{min II,N}$		60				60			
	$h_{ef}=200 s_{min II,N}$		240				- <sup>2)</sup>			
	$s_{min II,V}$		240				240			
	$s_{cr II}$		240				240			
	$s_{cr \perp} = s_{min \perp}$		75				75			

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> No performance assessed

**Table C4.2:** Group factors

Anchor rods		M6	M8	M10	M12	-		-	
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Edge distance	$c_{min}$	[mm]		100					
Group factor	$\alpha_{a,N} (s_{min II})$	[-]		1,5					
	$\alpha_{g,V} (s_{min II})$			2,0					
	$h_{ef}=200 \alpha_{a,N} (s_{min II})$			1,5					
	$h_{ef}=200 \alpha_{g,V} (s_{min II})$			2,0					
	$\alpha_{a,N} (s_{min \perp})$			2,0					
	$\alpha_{g,V} (s_{min \perp})$			2,0					
	$h_{ef}=200 \alpha_{a,N} (s_{min \perp})$			2,0					
	$h_{ef}=200 \alpha_{g,V} (s_{min \perp})$			2,0					

fischer injection system FIS V Plus for masonry

**Performance**

Solid brick Mz, NF, dimensions, installation parameters for edge distance  $c=100\text{mm}$ , Group factors

**Annex C4**

**Solid brick Mz, NF, EN 771-1:211+A1:2015**

**Table C5.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading for edge distance  $c=100\text{mm}$

Anchor rod	M6	M8	M10	M12	-	-		
Internal threaded anchor FIS E	-	-	-	-	M6	M8	M10	M12
					11x85		15x85	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]								
		≥50	≥50	50	80	200	50	80	200	85
15 / 12 N/mm <sup>2</sup>	w/w   w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0	3,5
	d/d	4,0	4,0	3,5	5,0	12,0	3,0	5,5	8,0	5,5
25 / 20 N/mm <sup>2</sup>	w/w   w/d	3,5	3,5	3,0	4,5	11,0	3,0	5,0	7,0	5,0
	d/d	5,5	5,5	5,0	7,0	12,0	4,5	8,0	11,5	8,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ\text{C})} = 0,83 \cdot N_{Rk(50/80^\circ\text{C})}$ .

**Table C5.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading for edge distance  $c=100\text{mm}$

Anchor rod	M6	M8	M10	M12	-	-		
Internal threaded anchor FIS E	-	-	-	-	M6	M8	M10	M12
					11x85		15x85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]						85
		≥50	≥50	≥50	200	≥50	200	
15 / 12 N/mm <sup>2</sup>	w/w   w/d	2,5	2,5	4,0	8,5	4,0	11,5	2,5
	d/d	4,0	4,0	6,0	12,0	5,5	12,0	4,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance  $c=100\text{mm}$

**Annex C5**

Solid brick Mz, NF, EN 771-1:2011+A1:2015										
Table C6.1: Installation parameters for edge distance $c=60\text{mm}$										
Anchor rod			<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-	
Internal threaded anchor FIS E			-	-	-	-	-	<b>M6</b>	<b>M8</b>	
								<b>11x85</b>	<b>15x85</b>	
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	$h_{ef}$	[mm]	50	50	50	50	50	85		
			100	100	100	100	100			
			200	200	200	200	200			
Max. installation torque	$\max T_{inst}$	[Nm]	4	10			4	10		
<b>General installation parameters</b>										
Edge distance	$c_{min} = c_{cr}$		60							
Edge distance	$h_{ef}=200$	$c_{min}$	60							
Spacing	$s_{min}$	[mm]	$s_{min II,N}$	80						
			$h_{ef}=200$ $s_{min II,N}$	80						
			$s_{min II,V}$	80						
			$s_{cr II}$	$3x h_{ef}$						
			$s_{min \perp}$	80						
			$s_{cr \perp}$	$3x h_{ef}$						
<b>Drilling method</b>										
Hammer drilling with hard metal hammer drill										
<b>Table C6.2: Group factors</b>										
Anchor rods			<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-	
Internal threaded anchor FIS E			-	-	-	-	-	<b>M6</b>	<b>M8</b>	
								<b>11x85</b>	<b>15x85</b>	
Edge distance	$c_{min}$	[mm]	60							
Group factor	$\alpha_{g,N}$	[-]	$(s_{min II})$	0,6						
			$(s_{min V})$	1,3						
			$h_{ef}=200$ $(s_{min II})$	1,4						
			$h_{ef}=200$ $(s_{min V})$	1,5						
			$(s_{min \perp})$	0,3						
			$(s_{min \perp V})$	1,3						
			$h_{ef}=200$ $(s_{min \perp})$	2,0						
			$h_{ef}=200$ $(s_{min \perp V})$	1,1						
fischer injection system FIS V Plus for masonry										
<b>Performance</b> Solid brick Mz, NF, dimensions, installation parameters, edge distance $c=60\text{mm}$ , Group factors								<b>Annex C6</b>		

**Solid brick Mz, NF, EN 771-1:2011+A1:2015**

**Table C7.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading for edge distance  $c=60\text{mm}$

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>3)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]												85
		50	100	50	100	50	100	200	50	100	200	50	100	
15 / 12 N/mm <sup>2</sup>	w/w	1,5	2,0	2,0	2,0	2,5	- <sup>2)</sup>	2,0	2,5	- <sup>2)</sup>	2,0	5,5	- <sup>2)</sup>	- <sup>2)</sup>
	d/d	2,5	3,0	4,0	3,0	4,0	9,5	3,0	4,0	9,5	3,0	8,5	9,5	- <sup>2)</sup>
25 / 20 N/mm <sup>2</sup>	w/w	2,0	2,5	3,0	2,5	3,5	- <sup>2)</sup>	3,0	3,5	- <sup>2)</sup>	3,0	7,5	- <sup>2)</sup>	- <sup>2)</sup>
	d/d	3,5	4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12	- <sup>2)</sup>
35 / 28 N/mm <sup>2</sup>	w/w	2,5	3,0	4,0	3,0	4,0	- <sup>2)</sup>	3,5	4,0	- <sup>2)</sup>	3,5	9,0	- <sup>2)</sup>	- <sup>2)</sup>
	d/d	4,0	5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	- <sup>2)</sup>

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> No performance assessed.

<sup>3)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ\text{C})} = 0,83 \cdot N_{Rk(50/80^\circ\text{C})}$ .

**Table C7.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading for edge distance  $c=60\text{mm}$

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]												85	
		50	100	50	100	50	100	200	50	100	200	50	100		200
15 / 12 N/mm <sup>2</sup>	w/w w/d d/d	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	- <sup>2)</sup>
25 / 20 N/mm <sup>2</sup>		1,5	3,5	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	0,9	4,5	6,0	- <sup>2)</sup>
35 / 28 N/mm <sup>2</sup>		2,0	4,0	2,0	5,0	3,5	5,0	3,0	2,5	5,0	5,0	1,2	5,0	7,5	- <sup>2)</sup>

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> No performance assessed.

Factor for job site tests and displacements see annex C123.

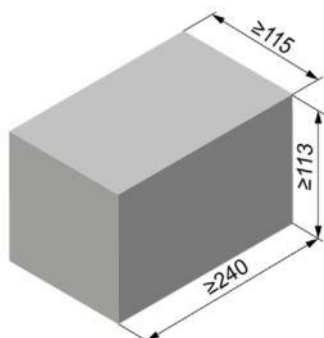
fischer injection system FIS V Plus for masonry

**Performance**

Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance  $c=60\text{mm}$

**Annex C7**

**Solid brick Mz, 2DF, EN 771-1:2011+A1:2015**



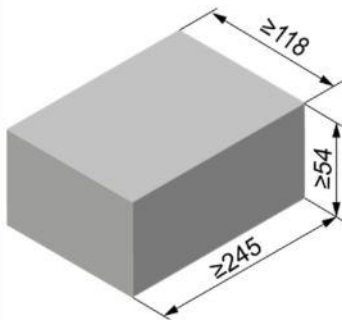
Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 20 / 16		
Standard or annex	EN 771-1:2011+A1:2015			

**Table C8.1: Installation parameters**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-					
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>			
	11x85		15x85									
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>												
Effective anchorage depth $h_{ef}$	[mm]	50	100	50	100	50	100	50	100	50	100	85
Max. installation torque $max T_{inst}$	[Nm]	4		10				4		10		
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K</b>												
Effective anchorage depth $h_{ef}$	[mm]	- <sup>2)</sup>		85		- <sup>2)</sup>		85		- <sup>2)</sup>		
Max. installation torque $max T_{inst}$	[Nm]	- <sup>2)</sup>		10		- <sup>2)</sup>		4		10		
<b>General installation parameters</b>												
Edge distance $c_{min} = c_{cr}$	[mm]	60										
Spacing	$s_{min II}$	120										
	$s_{cr II}$	240										
	$s_{cr \perp} = s_{min \perp}$	115										
<b>Drilling method</b>												
Hammer drilling with hard metal hammer drill												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.												
<sup>2)</sup> No performance assessed.												
<b>Table C8.2: Group factors</b>												
<b>Anchor rods</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-					
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>			
	11x85		15x85									
Group factor	$\alpha_{g,N} (s_{min II})$	[-]	1,5									
	$\alpha_{g,V} (s_{min II})$		1,4									
	$\alpha_{g,N} (s_{min \perp})$		2,0									
	$\alpha_{g,V} (s_{min \perp})$											
fischer injection system FIS V Plus for masonry						<b>Annex C8</b>						
<b>Performance</b> Solid brick Mz, 2DF, dimensions, installation parameters, Group factors												

Solid brick Mz, 2DF, EN 771-1:2011+A1:2015																	
Table C9.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading																	
Anchor rod		M6	M8	M10	M12	M16	-	-	M8	M10	-						
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	-	-	M6	M8			
		11x85		15x85		11x85											
Perforated sleeve FIS H K		-	-	-	-	-	-	-	16x85								
N <sub>Rk</sub> = N <sub>Rk,p</sub> = N <sub>Rk,b</sub> = N <sub>Rk,p,c</sub> = N <sub>Rk,b,c</sub> [kN]; temperature range 50/80°C <sup>2)</sup>																	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>		Use conditions		Effective anchorage depth h <sub>ef</sub> [mm]													
				50	100	50	100	50	100	50	100	50	100	85			
12,5 / 10 N/mm <sup>2</sup>		w/w	w/d	1,5	2,5	1,5	2,5	1,5	3,0	2,0	3,5	2,0	3,5	2,0		1,5	
		d/d		3,0	4,0	3,0	4,0	3,0	4,5	3,0	5,5	3,0	5,5	3,0		3,0	
20 / 16 N/mm <sup>2</sup>		w/w	w/d	2,5	4,0	2,5	4,0	2,5	4,5	3,5	5,5	3,5	5,5	3,5		2,5	
		d/d		4,5	7,0	4,5	7,0	4,5	7,5	5,5	8,0	5,5	8,0	5,5		4,5	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: N <sub>Rk (72/120°C)</sub> = 0,83 · N <sub>Rk (50/80°C)</sub> .																	
Table C9.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading																	
Anchor rod		M6	M8	M10	M12	M16	-	-	M8	M10	-						
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	-	-	M6	M8			
		11x85		15x85		11x85											
Perforated sleeve FIS H K		-	-	-	-	-	-	-	16x85								
V <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [kN]; temperature range 50/80°C and 72/120°C																	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>		Use conditions		Effective anchorage depth h <sub>ef</sub> [mm]													
				≥ 50					85								
12,5 / 10 N/mm <sup>2</sup>		w/w	w/d	2,5	3,0	3,0	3,5	3,0	2,5	3,0	3,0	3,0	3,0	3,5	2,5	3,0	
		d/d		4,0	5,0	5,5	5,5	5,0	4,0	5,0	5,0	5,0	5,0	6,0	4,0	5,0	
20 / 16 N/mm <sup>2</sup>		w/w	w/d	4,0	5,0	5,5	5,5	5,0	4,0	5,0	5,0	5,0	5,0	6,0	4,0	5,0	
		d/d		4,0	5,0	5,5	5,5	5,0	4,0	5,0	5,0	5,0	5,0	6,0	4,0	5,0	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  Factor for job site tests and displacements see annex C123.																	
fischer injection system FIS V Plus for masonry											Annex C9						
<b>Performance</b> Solid brick Mz, 2DF, Characteristic resistance under tension and shear loading																	

**Solid brick Mz, EN 771-1:2011+A1:2015**



Producer	e.g. Nigra			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 245	≥ 118	≥ 54
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015			

**Table C10.1: Installation parameters**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-			
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	
						<b>11x85</b>		<b>15x85</b>		
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>										
Effective anchorage depth $h_{ef}$	[mm]	50	100	50	100	50	100	50	100	85
Max. installation torque $max T_{inst}$	[Nm]	4		10				4		10
<b>General installation parameters</b>										
Edge distance $c_{min} = c_{cr}$	[mm]	60								
Spacing $s_{cr \parallel} = s_{min \parallel}$	[mm]	245								
$s_{cr \perp} = s_{min \perp}$	[mm]	60								
<b>Drilling method</b>										
Hammer drilling with hard metal hammer drill										
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.										

**Table C10.2: Group factors**

<b>Anchor rods</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-		
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>
						<b>11x85</b>		<b>15x85</b>	
Group factor	$\alpha_{g,N} (s_{min \parallel})$ $\alpha_{g,V} (s_{min \parallel})$ $\alpha_{g,N} (s_{min \perp})$ $\alpha_{g,V} (s_{min \perp})$	[-]		2					

fischer injection system FIS V Plus for masonry

**Performance**  
Solid brick Mz, dimensions, installation parameters, Group factors

**Annex C10**

**Solid brick Mz, EN 771-1:2011+A1:2015**

**Table C11.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
	11x85		15x85						
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>									
Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	Effective anchorage depth $h_{ef}$ [mm]							
		≥ 50						85	
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	0,60	0,90	0,75	0,75	0,75	0,60	0,75
	d/d		1,20	1,50	1,20	1,20	1,20	1,20	1,20
25 / 20 N/mm <sup>2</sup>	w/w	w/d	0,90	1,50	1,20	1,20	1,20	0,90	1,20
	d/d		1,50	2,50	2,00	2,00	2,00	1,50	2,00

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .

**Table C11.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M10	M12	M16	-		-			
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12		
	11x85		15x85								
<b><math>V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>											
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	Effective anchorage depth $h_{ef}$ [mm]									
		≥ 50						85			
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
	d/d										
25 / 20 N/mm <sup>2</sup>	w/w	w/d	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5	6,0
	d/d										

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

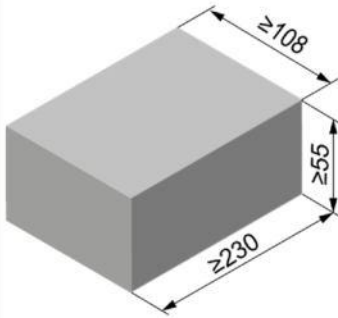
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**  
Solid brick Mz, Characteristic resistance under tension and shear loading

**Annex C11**

**Solid brick Mz, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 230	≥ 108	≥ 55
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015			

**Table C12.1: Installation parameters**

Anchor rod	M6	M8	M10	M12	M16	-	-					
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85					
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>												
Effective anchorage depth $h_{ef}$	[mm]	50	90	50	90	50	90	50	90	50	90	85
Max. installation torque $max T_{inst}$	[Nm]	4		10				4	10			
<b>General installation parameters</b>												
Edge distance $C_{min} = C_{cr}$	[mm]	60										
Spacing $S_{cr \parallel} = s_{min \parallel}$	[mm]	230										
$S_{cr \perp} = s_{min \perp}$	[mm]	60										
<b>Drilling method</b>												
Hammer drilling with hard metal hammer drill												

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C12.2: Group factors**

Anchor rods	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85
Group factor	$\alpha_{g,N} (S_{min \parallel})$	$\alpha_{g,V} (S_{min \parallel})$	$\alpha_{g,N} (S_{min \perp})$	$\alpha_{g,V} (S_{min \perp})$	[-]	2	

fischer injection system FIS V Plus for masonry

**Performance**  
Solid brick Mz, dimensions, installation parameters, Group factors

**Annex C12**

**Solid brick Mz, EN 771-1:2011+A1:2015**

**Table C13.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M10	M12	M16	-	-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
							11x85	15x85	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]								
		≥ 50							85	
12,5 / 10 N/mm <sup>2</sup>	w/w	0,60	0,90	0,75	0,75	0,75	0,75			
	d/d	1,20	1,50	1,20	1,20	1,20	1,20			
25 / 20 N/mm <sup>2</sup>	w/w	0,90	1,50	1,20	1,20	1,20	1,20			
	d/d	1,50	2,50	2,00	2,00	2,00	2,00			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C13.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M10	M12	M16	-	-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
							11x85	15x85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]								
		≥ 50								85
12,5 / 10 N/mm <sup>2</sup>	w/w	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
	d/d									
25 / 20 N/mm <sup>2</sup>	w/w	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5	6,0
	d/d									

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

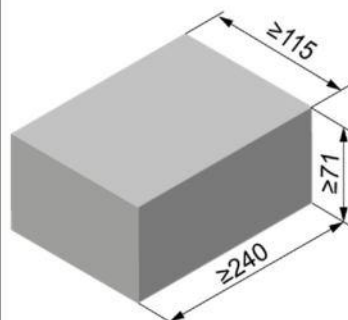
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**  
Solid brick Mz, Characteristic resistance under tension and shear loading

**Annex C13**

**Solid calcium silicate brick KS, NF, EN 771-2:2011+A1:2015**



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 71
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	15 / 12 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-2:2011+A1:2015			

**Table C14.1: Installation parameters**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-		
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>
							<b>11x85</b>	<b>15x85</b>	

<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>														
Effective anchorage depth $h_{ef}$	[mm]	50	100	50	100	50	100	50	100	50	100	85	85	
						200		200		200				
Max. installation torque $\max T_{inst}$	[Nm]	3		5		15		15		25		3	5	15

<b>General installation parameters</b>													
Edge distance $c_{min} = c_{cr}$												60	
Spacing	$s_{min \parallel}$											80	
	$s_{cr \parallel}$											80	
	$s_{min \perp}$											3x $h_{ef}$	
	$s_{cr \perp}$											3x $h_{ef}$	

**Drilling method**  
Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength..

**Table C14.2: Group factors**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-		
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>
							<b>11x85</b>	<b>15x85</b>	
Group factor	$\alpha_{g,N} (s_{min \parallel})$							0,7	
	$\alpha_{g,V} (s_{min \parallel})$							1,3	
	$\alpha_{g,N} (s_{min \perp})$							2,0	
	$\alpha_{g,V} (s_{min \perp})$							2,0	

fischer injection system FIS V Plus for masonry	<b>Annex C14</b>
<b>Performance</b> Solid calcium silicate brick KS, NF, dimensions, installation parameters, Group factors	

**Solid calcium silicate brick KS, NF, EN 771-2:2011+A1:2015**

**Table C15.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6		M8		M10			M12			M16			-		-	
Internal threaded anchor FIS E		-		-		-			-			-			M6	M8	M10	M12
															11x85		15x85	
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>																		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]														85	85	
		50	100	50	100	50	100	200	50	100	200	50	100	200	85			85
15 / 12 N/mm <sup>2</sup>	w/w	2,0	3,0	2,5	4,5	2,5	3,5	7,0	2,5	3,0	6,5	2,5	3,5	8,0	2,5	2,5		
	d/d	4,0	5,5	4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,5	5,5	12	4,0	4,0		
25 / 20 N/mm <sup>2</sup>	w/w	3,0	4,5	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	4,0	5,0	11	3,5	3,5		
	d/d	5,5	7,5	6,0	11	6,0	8,0	12	6,0	6,5	12	6,5	8,0	12	6,0	6,0		
35 / 28 N/mm <sup>2</sup>	w/w	3,5	5,0	4,0	8,0	4,5	5,5	12	4,5	5,0	11	4,5	5,5	12	4,5	4,5		
	d/d	6,5	9,0	7,0	12	7,0	9,0	12	7,0	7,5	12	7,5	9,5	12	7,0	7,0		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  
<sup>2)</sup> For temperature range 72/120°C:  $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .

**Table C15.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6		M8		M10			M12			M16			-		-	
Internal threaded anchor FIS E		-		-		-			-			-			M6	M8	M10	M12
															11x85		15x85	
<b><math>V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>																		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]												85	85			
		50	100	50	100	50	≥100	50	≥100	50	≥100	85	85					
15 / 12 N/mm <sup>2</sup>	w/w	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2			
	d/d																	
25 / 20 N/mm <sup>2</sup>	w/w	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5			
	d/d																	
35 / 28 N/mm <sup>2</sup>	w/w	3,0	4,5	3,0	4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	1,5			
	d/d																	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  
Factor for job site tests and displacements see annex C123.

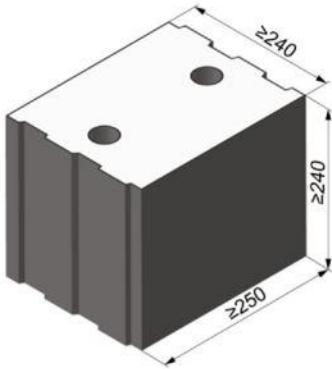
fischer injection system FIS V Plus for masonry

**Performance**

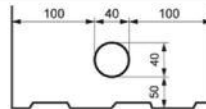
Solid calcium silicate brick KS, NF, Characteristic resistance under tension and shear loading

**Annex C15**

**Solid calcium silicate brick KS, 8DF, EN 771-2:2011+A1:2015**



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 250	≥ 240	≥ 240
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 2,0		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-2:2011+A1:2015			



Dimension see also Annex B15

**Table C16.1: Installation parameters**

Anchor rod	M6	M8	M10	M12	M16	-		-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12	
							11x85		15x85	
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>										
Effective anchorage depth $h_{ef}$	[mm]	50	100	50	100	50	100	50	100	85
Max. installation torque $\max T_{inst}$	[Nm]	4		10				4	10	
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K</b>										
Effective anchorage depth $h_{ef}$	[mm]	- <sup>2)</sup>		85				- <sup>2)</sup>		85
Max. installation torque $\max T_{inst}$	[Nm]	- <sup>2)</sup>		10				4	10	- <sup>2)</sup>
<b>General installation parameters</b>										
Edge distance $c_{min} = c_{cr}$		60								
Spacing	$s_{min \parallel}$	80								
	$s_{cr \parallel}$	3x $h_{ef}$								
	$s_{min \perp}$	80								
	$s_{cr \perp}$	3x $h_{ef}$								
<b>Drilling method</b>										
Hammer drilling with hard metal hammer drill										
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.										
<sup>2)</sup> No performance assessed.										
<b>Table C16.2: Group factors</b>										
Anchor rods	M6	M8	M10	M12	M16	-		-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12	
							11x85		15x85	
Group factors	$\alpha_{a,N} (s_{min \parallel})$	[-]	1,5							
	$\alpha_{a,V} (s_{min \parallel})$		1,2							
	$\alpha_{a,N} (s_{min \perp})$		1,5							
	$\alpha_{a,V} (s_{min \perp})$		1,2							
fischer injection system FIS V Plus for masonry						<b>Annex C16</b>				
<b>Performance</b> Solid calcium silicate brick KS, 8DF, dimensions, installation parameters, Group factors										

**Solid calcium silicate brick KS, 8DF, EN 771-2:2011+A1:2015**

**Table C17.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8	M10	M12	M16	-		-		M8	M10	-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	-	-	M6	M8
							11x85		15x85				11x85	
Perforated sleeve FIS H K		-	-	-	-	-	-		-		16x85			
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]												
		≥ 50						85						
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	3,0	4,0	4,5	4,5	3,5	3,0	3,5		4,5	3,0	4,5	
	d/d		5,0	7,0	7,0	7,0	5,5	5,0	5,5		8,0	5,0	8,0	
25 / 20 N/mm <sup>2</sup>	w/w	w/d	4,5	6,0	6,0	6,0	5,0	4,5	5,0		6,5	4,5	6,5	
	d/d		7,5	10,0	10,0	10,0	7,5	7,5	7,5		11,0	7,5	11	
35 / 28 N/mm <sup>2</sup>	w/w	w/d	5,0	8,0	8,5	8,5	7,0	5,0	7,0		8,5	5,0	8,5	
	d/d		8,5	12,0	12,0	12,0	11,0	8,5	11,0		12,0	8,5	12	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C17.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8	M10	M12	M16	-		-		M8	M10	-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	-	-	M6	M8
							11x85		15x85				11x85	
Perforated sleeve FIS H K		-	-	-	-	-	-		-		16x85			
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]												
		≥ 50						85						
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,5		4,5		2,5		4,5		4,5		2,5 4,5	
	d/d													
25 / 20 N/mm <sup>2</sup>	w/w	w/d	4,0		6,5		4,0		6,5		6,5		4,0 6,5	
	d/d													
35 / 28 N/mm <sup>2</sup>	w/w	w/d	5,0		9,0		5,0		9,0		9,0		5,0 9,0	
	d/d													

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

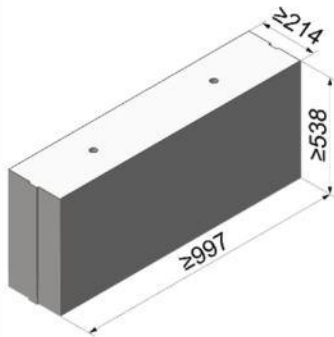
fischer injection system FIS V Plus for masonry

**Performance**

Solid calcium silicate brick KS, 8DF, Characteristic resistance under tension and shear loading

**Annex C17**

**Solid calcium silicate brick KS, EN 771-2:2011+A1:2015**



Producer	e.g. Calduran			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 997	≥ 214	≥ 538
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	1,8		2,2
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 25 / 20		45 / 36
Standard or annex	EN 771-2:2011+A1:2015			



**Table C18.1: Installation parameters**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-		
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>
						<b>11x85</b>	<b>15x85</b>		

**Anchor rod and internal threaded anchor FIS E without perforated sleeve**

Effective anchorage depth $h_{ef}$	[mm]	50	100	50	100	50	100	50	100	50	100	85
Max. installation torque $\max T_{inst}$	[Nm]	4		10						4	10	

**General installation parameters**

Edge distance $c_{min} = c_{cr}$	[mm]	75									
Spacing	$s_{cr \parallel} = s_{min \parallel}$	3x $h_{ef}$									
	$s_{cr \perp} = s_{min \perp}$	3x $h_{ef}$									

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C18.2: Group factors**

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	-	-		
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>
						<b>11x85</b>	<b>15x85</b>		

Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry	<b>Annex C18</b>
<b>Performance</b> Solid calcium silicate brick KS, dimensions, installation parameters, Group factors	

**Solid calcium silicate brick KS, EN 771-2:2011+A1:2015**

**Table C19.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8	M10	M12	M16	-	-			
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	
							11x85		15x85		
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>											
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]									
		50	100	50	100	50	100	50	100	50	100
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	4,0	4,0	7,0	5,0	6,0	5,0	6,0	5,5	7,5	5,5
	d/d	7,0	7,0	12,0	8,0	9,5	8,0	10,0	9,0	11,5	9,0
25 / 20 N/mm <sup>2</sup>	w/w   w/d	5,5	6,0	10,0	7,0	8,5	7,0	9,0	8,0	11,0	8,0
	d/d	8,5	10,5	12,0	11,5	12,0	11,0	12,0	12,0	12,0	12,0
45 / 36 N/mm <sup>2</sup>	w/w   w/d	4,5	8,0	12,0	11,5	12,0	12,0	12,0	12,0	12,0	12,0
	d/d	8,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C19.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8	M10	M12	M16	-	-			
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12	
							11x85		15x85		
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>											
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]									
		≥ 50									
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0	
	d/d										
25 / 20 N/mm <sup>2</sup>	w/w   w/d	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0	
	d/d										
45 / 36 N/mm <sup>2</sup>	w/w   w/d	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0	
	d/d										

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

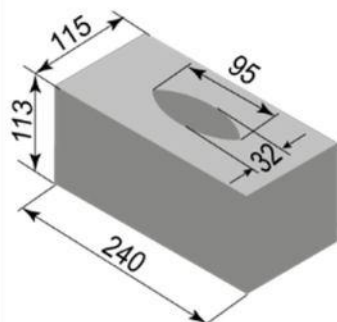
fischer injection system FIS V Plus for masonry

**Performance**

Solid calcium silicate brick KS, Characteristic resistance under tension and shear loading

**Annex C19**

### Solid calcium silicate brick KS, EN 771-2:2011+A1:2015



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	1,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-2:2011+A1:2015			

**Table C20.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6 M8	-		-		M10 M12	-		-	
			11x85					15x85				
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130			
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>												
Max. installation torque	max T <sub>inst</sub> [Nm]	2		4								
<b>General installation parameters</b>												
Edge distance	c <sub>min</sub> = c <sub>cr</sub>	100										
Spacing	s <sub>min</sub>	[mm]										
	s <sub>cr</sub>		255		255		390		255		390	
	s <sub>min</sub> ⊥											
	s <sub>cr</sub> ⊥											
<b>Drilling method</b>												
Hammer drilling with hard metal hammer drill												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.												
<b>Table C20.2: Group factors</b>												
Anchor rod	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16		
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130			
Group factors	$\frac{\alpha_{g,N}(s_{min}   )}{\alpha_{g,V}(s_{min}   )}$ $\frac{\alpha_{g,N}(s_{min} \perp)}{\alpha_{g,V}(s_{min} \perp)}$		[-]		2							
fischer injection system FIS V Plus for masonry										<b>Annex C20</b>		
<b>Performance</b> Solid calcium silicate brick KS, dimensions, installation parameters, Group factors												

<b>Solid calcium silicate brick KS, EN 771-2:2011+A1:2015</b>			
<b>Table C21.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T <sub>inst</sub> [Nm]	4	
General installation parameters			
Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100	
Spacing	S <sub>min</sub>	390	
	S <sub>cr</sub>	390	
	S <sub>min</sub> ⊥	390	
	S <sub>cr</sub> ⊥	390	
Drilling method			
Hammer drilling with hard metal hammer drill			
<b>Table C21.2: Group factors</b>			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	α <sub>g,N</sub> (S <sub>min</sub>   )	[-]	2
	α <sub>g,V</sub> (S <sub>min</sub>   )		
	α <sub>g,N</sub> (S <sub>min</sub> ⊥)		
	α <sub>g,V</sub> (S <sub>min</sub> ⊥)		
fischer injection system FIS V Plus for masonry			<b>Annex C21</b>
<b>Performance</b> Solid calcium silicate brick KS, dimensions, installation parameters, Group factors			

**Solid calcium silicate brick, EN 771-2:2011+A1:2015**

**Table C22.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	M6 M8	11x85	-	-	-	-	M10 M12	15x85	-	-	-
Perforated sleeve FIS H K	12x85	16x85		16x130		20x85		20x130				

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions											
12,5 / 10 N/mm <sup>2</sup>	w/w	3,5	2,0	2,0	2,0	6,5	4,5					
	d/d	6,0	4,0	3,5	3,5	10,5	7,0					
25 / 20 N/mm <sup>2</sup>	w/w	5,0	3,0	3,0	3,0	9,5	6,0					
	d/d	8,5	5,5	5,5	5,5	12,0	10,0					

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

**Table C22.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
12,5 / 10 N/mm <sup>2</sup>	w/w	2,0	4,5
	d/d	3,5	7,0
25 / 20 N/mm <sup>2</sup>	w/w	3,0	6,0
	d/d	5,5	10,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**  
Solid calcium silicate brick KS, Characteristic resistance under tension loading

**Annex C22**

**Table C23.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-	
			11x85						15x85			
Perforated sleeve FIS H K	12x85		16x85			16x130		20x85			20x130	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
12,5 / 10 N/mm <sup>2</sup>	w/w	3,0	3,5
	d/d		
25 / 20 N/mm <sup>2</sup>	w/w	4,0	5,5
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

**Table C23.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
12,5 / 10 N/mm <sup>2</sup>	w/w	3,5	
	d/d		
25 / 20 N/mm <sup>2</sup>	w/w	5,5	
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C123.

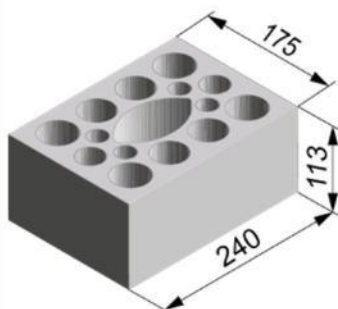
fischer injection system FIS V Plus for masonry

**Performance**

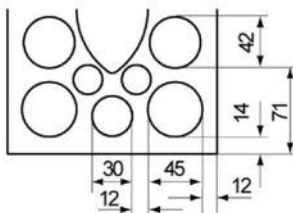
Solid calcium silicate brick KS, Characteristic resistance under shear loading

**Annex C23**

**Perforated calcium silicate brick KSL, 3DF, EN 771-2:2011+A1:2015**



Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	240	175	113
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,4$		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	10 / 8 or 12,5 / 10 or 15 / 12 or 20 / 16 or 25 / 20		
Standard or annex	EN 771-2:2011+A1:2015		



Dimension see also Annex B15

**Table C24.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque max T <sub>inst</sub> [Nm]	2													
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

**General installation parameters**

Edge distance C <sub>min</sub> = C <sub>cr</sub>	60				80									
Spacing	s <sub>min</sub>	100												
	s <sub>cr</sub>    [mm]	240												
	s <sub>min</sub> ⊥	115												
	s <sub>cr</sub> ⊥	115												

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C24.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	$\frac{\alpha_{g,N}(s_{min}   )}{\alpha_{g,V}(s_{min}   )}$	[-]	1,5											
	$\frac{\alpha_{g,N}(s_{min} \perp)}{\alpha_{g,V}(s_{min} \perp)}$		2,0											

fischer injection system FIS V Plus for masonry

**Performance**  
Perforated calcium silicate brick KSL, 3DF, dimensions, installation parameters, Group factors

**Annex C24**

Perforated calcium silicate brick KSL, 3DF, EN 771-2:2011+A1:2015			
<b>Table C25.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
Anchor rod		M10	M12
Perforated sleeve FIS H K		18x130/200	
Anchor rod with perforated sleeve FIS H K		22x130/200	
Max. installation torque	max T <sub>inst</sub> [Nm]	2	
<b>General installation parameters</b>			
Edge distance	c <sub>min</sub> = c <sub>cr</sub>	80	
Spacing	s <sub>min</sub>	100	
	s <sub>cr</sub>	240	
	s <sub>min</sub> ⊥	115	
	s <sub>cr</sub> ⊥	115	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C25.2: Group factors</b>			
Anchor rod		M10	M12
Perforated sleeve FIS H K		18x130/200	
Group factors	α <sub>g,N</sub> (s <sub>min</sub>   )	[-]	1,5
	α <sub>g,V</sub> (s <sub>min</sub>   )		
	α <sub>g,N</sub> (s <sub>min</sub> ⊥)		2,0
	α <sub>g,V</sub> (s <sub>min</sub> ⊥)		
fischer injection system FIS V Plus for masonry			<b>Annex C25</b>
<b>Performance</b> Perforated calcium silicate brick KSL, 3DF, dimensions, installation parameters, Group factors			

<b>Perforated calcium silicate brick KSL, 3DF, EN 771-2:2011+A1:2015</b>														
<b>Table C26.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130			20x85			20x130		
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5		2,0		2,0		2,0		2,0		2,0	
	d/d		1,5		2,0		2,5		2,5		2,5		2,5	
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,0		2,0		2,5		2,5		2,5		2,5	
	d/d		2,0		2,5		3,0		3,0		3,0		3,0	
15 / 12 N/mm <sup>2</sup>	w/w	w/d	2,5		2,5		3,0		3,0		3,0		3,0	
	d/d		2,5		3,0		3,5		3,5		3,5		3,5	
20 / 16 N/mm <sup>2</sup>	w/w	w/d	3,0		3,5		4,5		4,5		4,5		4,5	
	d/d		3,5		4,0		4,5		4,5		4,5		4,5	
25 / 20 N/mm <sup>2</sup>	w/w	w/d	4,0		4,5		5,5		5,5		5,5		5,5	
	d/d		4,5		5,0		6,0		6,0		6,0		6,0	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .														
<b>Table C26.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)</b>														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200				18x130/200				22x130/200					
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0											
	d/d		2,5											
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,5											
	d/d		3,0											
15 / 12 N/mm <sup>2</sup>	w/w	w/d	3,0											
	d/d		3,5											
20 / 16 N/mm <sup>2</sup>	w/w	w/d	4,5											
	d/d		4,5											
25 / 20 N/mm <sup>2</sup>	w/w	w/d	5,5											
	d/d		6,0											
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ . Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												<b>Annex C26</b>		
<b>Performance</b> Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under tension loading														

**Perforated calcium silicate brick KSL, 3DF, EN 771-2:2011+A1:2015**

**Table C27.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions												
	w/w	w/d											
10 / 8 N/mm <sup>2</sup>	d/d		1,5			3,0			2,5	3,0	2,5		
12,5 / 10 N/mm <sup>2</sup>	d/d		2,0			3,5							
15 / 12 N/mm <sup>2</sup>	d/d		2,5			4,5			4,0	4,5	4,0		
20 / 16 N/mm <sup>2</sup>	d/d		3,0	3,5	3,0	3,5	3,0	6,0			5,5	6,0	5,5
25 / 20 N/mm <sup>2</sup>	d/d		4,0	4,5	4,0	4,5	4,0	7,5			6,5	7,5	6,5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C27.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions			
	w/w	w/d		
10 / 8 N/mm <sup>2</sup>			3.0	2.5
12,5 / 10 N/mm <sup>2</sup>	d/d		3.5	3.5
15 / 12 N/mm <sup>2</sup>	d/d		4.5	4.0
20 / 16 N/mm <sup>2</sup>	d/d		6.0	5.5
25 / 20 N/mm <sup>2</sup>	d/d		7.5	6.5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

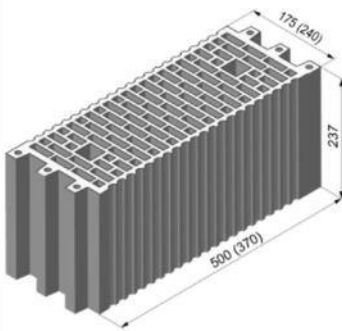
Factor for job site tests and displacements see annex C123.

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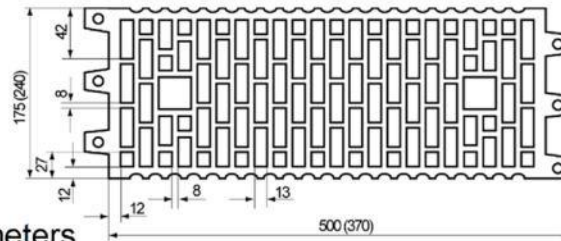
**Performance**  
Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading

**Annex C27**

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger, Poroton			
Nominal dimensions	[mm]	length L	width W	height H
		500	175	237
		370	240	237
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 7,5 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B15

Table C28.1: Installation parameters

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation torque	max T <sub>inst</sub>	[Nm]	2											
<b>General installation parameters</b>														
Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100												
	S <sub>min</sub>	100												
	S <sub>cr</sub>	[mm]	500 (370)											
	S <sub>min</sub> ⊥	100												
	S <sub>cr</sub> ⊥	240												
<b>Drilling method</b>														
Hammer drilling with hard metal hammer drill														

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Table C28.2: Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
Group factors	$\alpha_{g,N} (S_{min}   ) =$	[-]	1											
	$\alpha_{g,V} (S_{min}   ) =$													
	$\alpha_{g,N} (S_{min} \perp) =$													
	$\alpha_{g,V} (S_{min} \perp) =$													

fischer injection system FIS V Plus for masonry

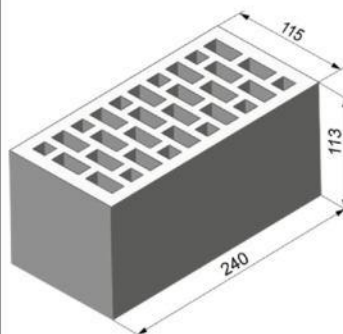
**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

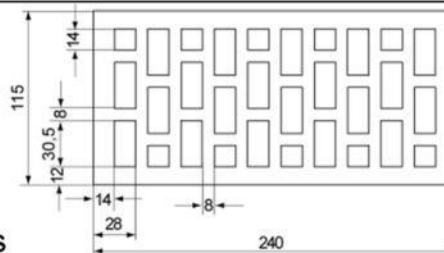
**Annex C28**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>														
<b>Table C29.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130			20x85			20x130		
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	0,30			0,90			1,20					
	d/d		0,40			0,90			1,20					
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w	w/d	0,50			1,50			2,00					
	d/d		0,60			1,50			2,00					
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	0,75			2,00			2,50					
	d/d		0,75			2,00			2,50					
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w	w/d	0,90			2,50			3,00					
	d/d		0,90			2,50			3,50					
<b>15 / 12 N/mm<sup>2</sup></b>	w/w	w/d	0,90			3,00			3,50					
	d/d		1,20			3,00			4,00					
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .														
<b>Table C29.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130			20x85			20x130		
<b><math>V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
<b>5 / 4 N/mm<sup>2</sup></b>	w/w w/d d/d		0,50			0,60			0,50		0,60			
			0,75			0,90			0,75		0,90			
			0,90			1,20			0,90		1,20			
			1,20			1,50			1,20		1,50			
			1,50			2,00			1,50		2,00			
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												<b>Annex C29</b>		
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under tension and shear loading														

### Vertical perforated brick HLz, 2DF, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	240	115	113
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	≥ 1,4		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	7,5 / 6 or 12,5 / 10 or 20 / 16 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B15

**Table C30.1:** Installation parameters

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

#### Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K

Max. installation torque max T <sub>inst</sub> [Nm]	2									
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#### General installation parameters

Edge distance C <sub>min</sub> = C <sub>cr</sub>	80									
Spacing	S <sub>cr</sub>    = S <sub>min</sub>									
	S <sub>cr</sub> ⊥ = S <sub>min</sub> ⊥									
	240									
	115									

#### Drilling method

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C30.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

Group factors	$\alpha_{g,N} (S_{min}   )$	[-]	2							
	$\alpha_{g,V} (S_{min}   )$									
	$\alpha_{g,N} (S_{min} \perp)$									
	$\alpha_{g,V} (S_{min} \perp)$									

fischer injection system FIS V Plus for masonry

#### Performance

Vertical perforated brick HLz, 2DF, dimensions, installation parameters, Group factors

**Annex C30**

**Vertical perforated brick HLz, 2DF, EN 771-1:2011+A1:2015**

**Table C31.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8				M10	M12	-
					11x85			15x85		
Perforated sleeve FIS H K	12x50	12x85	16x85			20x85				
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>										
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0,75	0,90	0,75			0,90		
	d/d		0,75	1,20	0,75			0,90		
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,20	1,50	1,20			1,50		
	d/d		1,20	2,00	1,20			1,50		
20 / 16 N/mm <sup>2</sup>	w/w	w/d	2,00	2,50	2,00			2,00		
	d/d		2,00	3,00	2,00			2,50		
25 / 20 N/mm <sup>2</sup>	w/w	w/d	2,50	3,50	2,50			3,00		
	d/d		2,50	4,00	2,50			3,00		
35 / 28 N/mm <sup>2</sup>	w/w	w/d	3,00	5,00	3,50			4,00		
	d/d		3,50	5,50	3,50			4,50		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C31.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8				M10	M12	-
					11x85			15x85		
Perforated sleeve FIS H K	12x50	12x85	16x85			20x85				
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>										
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
7,5 / 6 N/mm <sup>2</sup>	w/w w/d d/d		1,2	1,5	1,2	2,0	1,2	1,5	2,5	
		12,5 / 10 N/mm <sup>2</sup>	2,0	2,5	2,0	4,0	2,0	2,5	4,5	
20 / 16 N/mm <sup>2</sup>		3,0	3,5	3,0	6,0	3,0	3,5	7,0		
25 / 20 N/mm <sup>2</sup>		4,0	4,5	4,0	7,5	4,0	4,5	8,5		
35 / 28 N/mm <sup>2</sup>		5,0	6,5	5,0	9,5	5,0	6,5	12,0		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

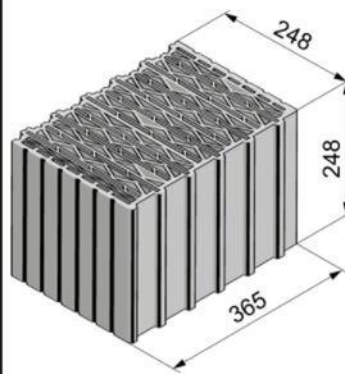
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**Performance**

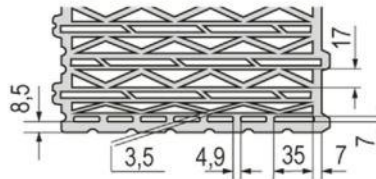
Vertical perforated brick HLz, 2DF,  
Characteristic resistance under tension and shear loading

**Annex C31**

**Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	365	248
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,6		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 7,5 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B15

**Table C32.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16	
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-		
					11x85						15x85						
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200		
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>																	
Max. installation torque	max T <sub>inst</sub>	[Nm]	3	5	3	5	3	5									5
<b>General installation parameters</b>																	
Edge distance	C <sub>min</sub> = C <sub>cr</sub>															60	
Spacing	S <sub>min</sub>															80	
	S <sub>cr</sub>															250	
	S <sub>min</sub> ⊥															80	
	S <sub>cr</sub> ⊥															250	
<b>Drilling method</b>																	
Rotary drilling with carbide drill																	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C32.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200	
Group factors	$\alpha_{g,N}$ (S <sub>min</sub>   )															1,3
	$\alpha_{g,V}$ (S <sub>min</sub>   )															1,2
	$\alpha_{g,N}$ (S <sub>min</sub> ⊥)															1,3
	$\alpha_{g,V}$ (S <sub>min</sub> ⊥)															1,0

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, U8, dimensions, installation parameters, Group factors

**Annex C32**

<b>Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015</b>			
<b>Table C33.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	5	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
<b>Drilling method</b>			
Rotary drilling with carbide drill			
<b>Table C33.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3	
	$\alpha_{g,V} (s_{min \parallel})$	1,2	
	$\alpha_{g,N} (s_{min \perp})$	1,3	
	$\alpha_{g,V} (s_{min \perp})$	1,0	
fischer injection system FIS V Plus for masonry			<b>Annex C33</b>
<b>Performance</b> Vertical perforated brick HLz, U8, dimensions, installation parameters, Group factors			

### Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015

**Table C34.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6	M8	11x85	-	-	-	-	M10	M12	15x85	-	-	-	-
<b>Perforated sleeve FIS H K</b>	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
		w/w	w/d	
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	1,2	1,2
	d/d	d/d	1,2	1,5
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w	w/d	1,5	1,5
	d/d	d/d	1,5	1,5
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	1,5	2,0
	d/d	d/d	2,0	2,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C34.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
<b>Perforated sleeve FIS H K</b>	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
		w/w	w/d	
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d		1,2
	d/d	d/d		1,5
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w	w/d		1,5
	d/d	d/d		1,5
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d		2,0
	d/d	d/d		2,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C34</b>
<b>Performance</b> Vertical perforated brick HLz, U8, Characteristic resistance under tension loading	

**Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015**

**Table C35.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85		16x130		20x85		20x130		20x200					

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
	w/w	w/d	
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2
	d/d		
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5
	d/d		
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C35.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

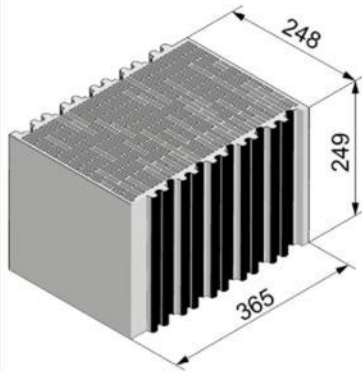
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
	w/w	w/d	
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2
	d/d		
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5
	d/d		
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

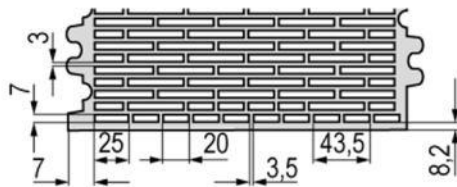
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C35</b>
<b>Performance</b> Vertical perforated brick HLz, U8, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	365	249
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B16

**Table C36.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	3				5	3	5			
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub>					60			
Spacing	S <sub>min</sub>					80			
	S <sub>cr</sub>					250			
	S <sub>min</sub> ⊥					80			
	S <sub>cr</sub> ⊥					250			

**Drilling method**

Rotary drilling with carbide drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C36.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

Group factors	$\alpha_{g,N}$ (S <sub>min</sub>   )	[-]					1,7			
	$\alpha_{g,V}$ (S <sub>min</sub>   )						0,5			
	$\alpha_{g,N}$ (S <sub>min</sub> ⊥)						1,3			
	$\alpha_{g,V}$ (S <sub>min</sub> ⊥)						0,5			

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, T10, T11, dimensions, installation parameters, Group factors

**Annex C36**

<b>Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015</b>			
<b>Table C37.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	max $T_{inst}$ [Nm]	5	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
<b>Drilling method</b>			
Rotary drilling with carbide drill			
<b>Table C37.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,7	
	$\alpha_{g,V} (s_{min \parallel})$	0,5	
	$\alpha_{g,N} (s_{min \perp})$	1,3	
	$\alpha_{g,V} (s_{min \perp})$	0,5	
fischer injection system FIS V Plus for masonry			<b>Annex C37</b>
<b>Performance</b> Vertical perforated brick HLz, T10, T11, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015**

**Table C38.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16			
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-				
					11x85						15x85								
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85			20x130		20x200			
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>																			
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions																		
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5												1,5				
	d/d		1,5												2,0				
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,5												2,0				
	d/d		2,0												2,0				
15 / 12 N/mm <sup>2</sup>	w/w	w/d	2,0												2,0				
	d/d		2,0												2,5				

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C38.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10		M12		M16			
Perforated sleeve FIS H K	18x130/200				22x130/200			
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>								
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions							
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5		1,5			
	d/d		2,0		2,0			
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,0		2,0			
	d/d		2,0		2,0			
15 / 12 N/mm <sup>2</sup>	w/w	w/d	2,0		2,0			
	d/d		2,5		2,5			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, T10, T11, Characteristic resistance under tension loading

**Annex C38**

**Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015**

**Table C39.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8					M10	M12						
			11x85						15x85							
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130			20x85			20x130		20x200		

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions						
	w/w	w/d					
10 / 8 N/mm <sup>2</sup>	d/d		0,9		1,5		2,0
12,5 / 10 N/mm <sup>2</sup>	d/d		0,9		1,5		2,0
15 / 12 N/mm <sup>2</sup>	d/d		1,2		2,0		2,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C39.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

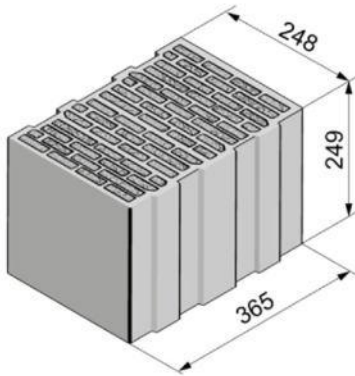
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	w/w	w/d				
10 / 8 N/mm <sup>2</sup>	d/d		1,5		2,0	
12,5 / 10 N/mm <sup>2</sup>	d/d		1,5		2,0	
15 / 12 N/mm <sup>2</sup>	d/d		2,0		2,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

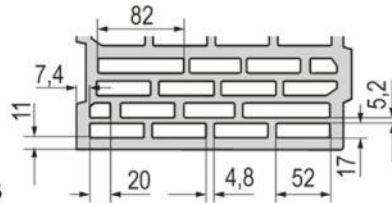
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C39</b>
<b>Performance</b> Vertical perforated brick HLz, T10, T11, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015**



<b>Producer</b>	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	365	249
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,5		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 8 / 6		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B16

**Table C40.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

<b>Max. installation torque</b>	$\max T_{inst}$ [Nm]	2				5		2		5					
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**General installation parameters**

<b>Edge distance</b>	$c_{min} = c_{cr}$	60													
<b>Spacing</b>	$s_{min \parallel}$	80													
	$s_{cr \parallel}$ [mm]	250													
	$s_{min \perp}$	80													
	$s_{cr \perp}$	250													

**Drilling method**

Rotary drilling with carbide drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C40.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

<b>Group factors</b>	$\alpha_{g,N} (s_{min \parallel})$	[-]	1,1												
	$\alpha_{g,V} (s_{min \parallel})$		1,2												
	$\alpha_{g,N} (s_{min \perp})$		1,1												
	$\alpha_{g,V} (s_{min \perp})$		1,2												

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, T7 PF, filled with perlite,  
dimensions, installation parameters, Group factors

**Annex C40**

**Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015**

**Table C41.1:** Installation parameters  
(Push through installation with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque $\max T_{inst}$ [Nm]	5		
<b>General installation parameters</b>			
Edge distance $c_{min} = c_{cr}$	60		
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$ [mm]	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
<b>Drilling method</b>			
Rotary drilling with carbide drill			

**Table C41.2:** Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,1	
	$\alpha_{g,V} (s_{min \parallel})$	1,2	
	$\alpha_{g,N} (s_{min \perp})$	1,1	
	$\alpha_{g,V} (s_{min \perp})$	1,2	

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, T7 PF, filled with perlite,  
dimensions, installation parameters, Group factors

**Annex C41**

**Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015**

**Table C42.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions											
	w/w	w/d										
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2		1,2		1,2		1,2		2,0	
	d/d		1,5		1,5		1,5		1,5		2,0	
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5		1,5		1,5		1,5		2,5	
	d/d		1,5		2,0		1,5		2,0		3,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C42.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	w/w	w/d				
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2		1,2	
	d/d		1,5		1,5	
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5		1,5	
	d/d		2,0		2,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, T7 PF, filled with perlite,  
Characteristic resistance under tension loading

**Annex C42**

**Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015**

**Table C43.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6		M8		-		M10		M12		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions							
	w/w	w/d						
5 / 4 N/mm <sup>2</sup>	d/d		0,9		1,5		1,2	
8 / 6 N/mm <sup>2</sup>	d/d		1,2		2,0		1,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C43.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

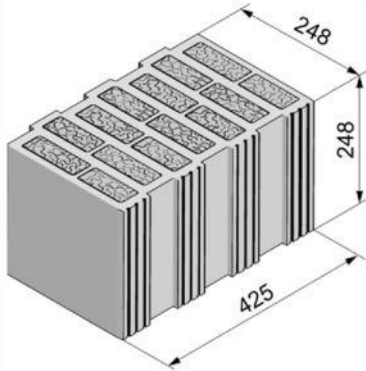
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	w/w	w/d				
5 / 4 N/mm <sup>2</sup>	d/d		1,5		1,2	
8 / 6 N/mm <sup>2</sup>	d/d		2,0		1,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

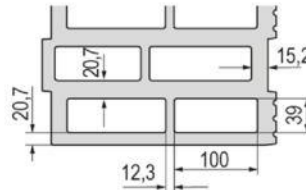
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C43</b>
<b>Performance</b> Vertical perforated brick HLz, T7 PF, filled with perlite, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	425	248
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 8 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B16

**Table C44.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6	M8	M6	M8	-	-	M10	M12	-	-	-	-	-	-
			11x85						15x85							
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200	
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>																
Max. installation torque	max T <sub>inst</sub>	[Nm]	3				5		3		5					
<b>General installation parameters</b>																
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60													
Spacing	S <sub>min</sub>	[mm]	80													
	S <sub>cr</sub>		250													
	S <sub>min</sub> ⊥		80													
	S <sub>cr</sub> ⊥		250													

**Drilling method**

Rotary drilling with carbide drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C44.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6	M8	M6	M8	-	-	M10	M12	-	-	-	-	-	-
			11x85						15x85							
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200	
Group factors	$\alpha_{g,N}$ (S <sub>min</sub>   )	[-]	1,3													
	$\alpha_{g,V}$ (S <sub>min</sub>   )		1,2													
	$\alpha_{g,N}$ (S <sub>min</sub> ⊥)		0,6													
	$\alpha_{g,V}$ (S <sub>min</sub> ⊥)		1,2													

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, T9 MW, filled with mineral wool, dimensions, installation parameters, Group factors

**Annex C44**

<b>Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015</b>			
<b>Table C45.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	max $T_{inst}$ [Nm]	5	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
<b>Drilling method</b>			
Rotary drilling with carbide drill			
<b>Table C45.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3	
	$\alpha_{g,V} (s_{min \parallel})$	1,2	
	$\alpha_{g,N} (s_{min \perp})$	0,6	
	$\alpha_{g,V} (s_{min \perp})$	1,2	
fischer injection system FIS V Plus for masonry			<b>Annex C45</b>
<b>Performance</b> Vertical perforated brick HLz, T9 MW, filled with mineral wool, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C46.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	M10	M12	15x85	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85		16x130		20x85		20x130		20x200					

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
	w/w	w/d	d/d	d/d	d/d	d/d	d/d	d/d	d/d	d/d
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	1,5	2,0	3,0	2,5	4,0			
	d/d	d/d	2,0	2,5	3,0	2,5	4,5			
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	2,0	2,5	3,5	3,0	5,0			
	d/d	d/d	2,0	3,0	4,0	3,0	5,5			
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	2,5	3,0	4,0	3,5	6,0			
	d/d	d/d	2,5	3,0	4,5	3,5	6,5			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .

**Table C46.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	w/w	w/d	d/d	d/d	d/d	d/d
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	3,0	4,0		
	d/d	d/d	3,0	4,5		
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	3,5	5,0		
	d/d	d/d	4,0	5,5		
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	4,0	6,0		
	d/d	d/d	4,5	6,5		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, T9 MW, filled with mineral wool;  
Characteristic resistance under tension loading

**Annex C46**

**Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C47.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	w/w		w/d		d/d							
5 / 4 N/mm <sup>2</sup>								2,0	2,0	2,5	2,0	1,5	
8 / 6 N/mm <sup>2</sup>								2,5	2,5	3,0	2,5	2,0	
10 / 8 N/mm <sup>2</sup>								2,5	3,0	4,0	3,0	2,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C47.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	w/w		w/d		d/d			
5 / 4 N/mm <sup>2</sup>								2,5	2,0
8 / 6 N/mm <sup>2</sup>								3,0	2,5
10 / 8 N/mm <sup>2</sup>								4,0	3,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

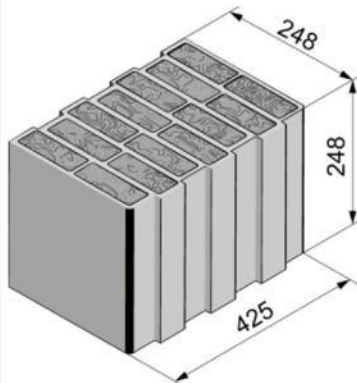
fischer injection system FIS V Plus for masonry

**Performance**

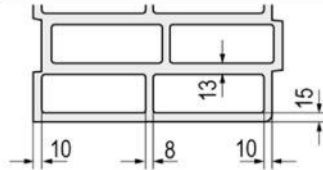
Vertical perforated brick HLz, T9 MW, filled with mineral wool;  
Characteristic resistance under shear loading

**Annex C47**

**Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	425	248
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 7,5 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B16

**Table C48.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>																
Max. installation torque	max T <sub>inst</sub>	[Nm]	2				5		2		5					
<b>General installation parameters</b>																
Edge distance	C <sub>min</sub> = C <sub>cr</sub>												60			
Spacing	S <sub>min</sub>	[mm]											80			
	S <sub>cr</sub>												250			
	S <sub>min</sub> ⊥												80			
	S <sub>cr</sub> ⊥												250			
<b>Drilling method</b>																
Rotary drilling with carbide drill																

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C48.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
Group factors	$\alpha_{g,N}$ (S <sub>min</sub>   )	[-]											1,9			
	$\alpha_{g,V}$ (S <sub>min</sub>   )												0,9			
	$\alpha_{g,N}$ (S <sub>min</sub> ⊥)												1,0			
	$\alpha_{g,V}$ (S <sub>min</sub> ⊥)												0,7			

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, FZ 7, filled with mineral wool;  
dimensions, installation parameters, Group factors

**Annex C48**

<b>Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015</b>			
<b>Table C49.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$T_{inst}$ [Nm]	5	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
<b>Drilling method</b>			
Rotary drilling with carbide drill			
<b>Table C49.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,9	
	$\alpha_{g,V} (s_{min \parallel})$	0,9	
	$\alpha_{g,N} (s_{min \perp})$	1,0	
	$\alpha_{g,V} (s_{min \perp})$	0,7	
fischer injection system FIS V Plus for masonry			<b>Annex C49</b>
<b>Performance</b> Vertical perforated brick HLz, FZ 7, filled with mineral wool; dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C50.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8						M10	M12					
			11x85							15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions								
5 / 4 N/mm <sup>2</sup>	w/w   w/d	0,60	0,75	1,50	2,00	1,20	2,00	2,00	2,00
	d/d	0,60	0,90	1,50	2,00	1,50	2,00	2,00	2,50
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	0,75	0,90	1,50	2,00	1,50	2,50	2,50	2,50
	d/d	0,90	0,90	2,00	2,50	2,00	2,50	2,50	3,00
10 / 8 N/mm <sup>2</sup>	w/w   w/d	0,90	1,20	2,00	2,50	2,00	2,50	2,50	3,00
	d/d	0,90	1,20	2,00	3,00	2,00	3,00	3,00	3,50

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .

**Table C50.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
5 / 4 N/mm <sup>2</sup>	w/w   w/d	2,0		2,0
	d/d	2,0		2,0
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	2,0		2,5
	d/d	2,5		2,5
10 / 8 N/mm <sup>2</sup>	w/w   w/d	2,5		2,5
	d/d	3,0		3,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, FZ 7, filled with mineral wool;  
Characteristic resistance under tension loading

**Annex C50**

**Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C51.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
	w/w	w/d														
5 / 4 N/mm <sup>2</sup>	d/d	1,2														
			1,5													
7,5 / 6 N/mm <sup>2</sup>	d/d	1,5														
			2,0													
10 / 8 N/mm <sup>2</sup>	d/d	1,5														
			2,5													

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C51.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

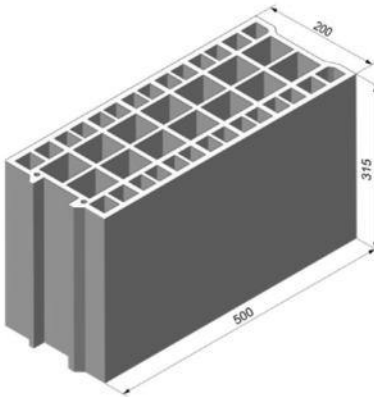
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
	w/w	w/d														
5 / 4 N/mm <sup>2</sup>	d/d	1,5														
			2,0													
7,5 / 6 N/mm <sup>2</sup>	d/d	2,0														
			2,5													

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

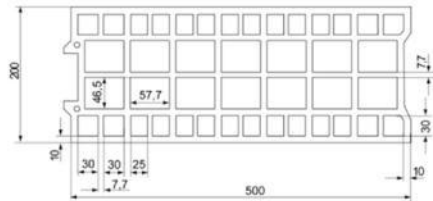
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C51</b>
<b>Performance</b> Vertical perforated brick HLz, FZ 7, filled with mineral wool; Characteristic resistance under shear loading	

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Bouyer Leroux			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	315
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,6		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 7,5 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B16

**Table C52.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

#### Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K

Max. installation torque	$\max T_{inst}$ [Nm]	2												
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#### General installation parameters

Edge distance	$C_{min} = C_{cr}$	120												
Spacing	$S_{min \parallel}$	120												
	$S_{cr \parallel}$	500												
	$S_{min \perp} = S_{cr \perp}$	315												

#### Drilling method

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C52.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	$\alpha_{g,N} (S_{min \parallel})$	[-]	1,3											
	$\alpha_{g,V} (S_{min \parallel})$		1,7											
	$\alpha_{g,N} (S_{min \perp})$		2,0											
	$\alpha_{g,V} (S_{min \perp})$													

fischer injection system FIS V Plus for masonry

#### Performance

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

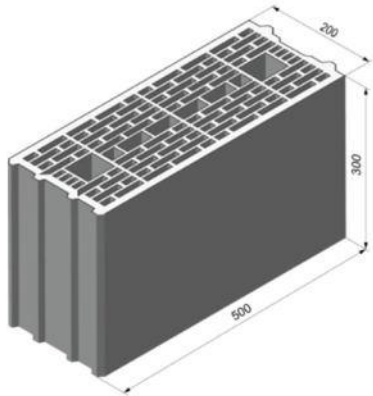
**Annex C52**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>			
<b>Table C53.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	120	
Spacing	$s_{min \parallel}$	120	
	$s_{cr \parallel}$	500	
	$s_{min \perp} = s_{cr \perp}$	315	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C53.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3	
	$\alpha_{g,V} (s_{min \parallel})$	1,7	
	$\alpha_{g,N} (s_{min \perp})$	2,0	
	$\alpha_{g,V} (s_{min \perp})$	2,0	
fischer injection system FIS V Plus for masonry			<b>Annex C53</b>
<b>Performance</b> Vertical perforated brick HLz, dimensions, installation parameters, Group factors			

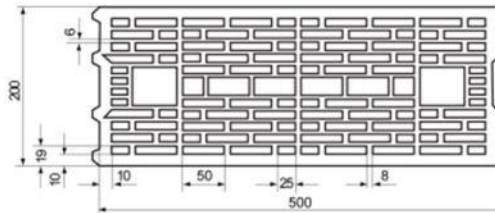
Vertical perforated brick HLz, EN 771-1:2011+A1:2015														
Table C54.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,50		1,50			0,75		1,50			1,50	
	d/d		0,60		1,50			0,90		1,50			2,00	
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0,75		2,00			1,20		2,00			2,50	
	d/d		0,90		2,50			1,20		2,50			2,50	
10 / 8 N/mm <sup>2</sup>	w/w	w/d	0,90		3,00			1,50		3,00			3,50	
	d/d		1,20		3,00			2,00		3,00			3,50	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .														
Table C54.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200				18x130/200				22x130/200					
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,75				1,50							
	d/d		0,90				2,00							
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,20				2,50							
	d/d		1,20				2,50							
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,50				3,50							
	d/d		2,00				3,50							
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .														
Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												Annex C54		
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under tension loading														

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>														
<b>Table C55.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,5				0,9		1,5		2,5		0,9	
	d/d													
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	2,5				1,5		2,5		3,5		1,5	
	d/d													
10 / 8 N/mm <sup>2</sup>	w/w	w/d	3,5				2,0		3,5		4,5		2,0	
	d/d													
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
<b>Table C55.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)</b>														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200				22x130/200									
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9											
	d/d													
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5											
	d/d													
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0											
	d/d													
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												<b>Annex C55</b>		
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading														

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	300
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 7,5 / 6 or 10 / 8 12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B17

**Table C56.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

#### Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K

Max. installation torque	$\max T_{inst}$ [Nm]	2												
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#### General installation parameters

Edge distance	$C_{min} = C_{cr}$	50				80				50		80		
Spacing	$S_{min \parallel}$	100												
	$S_{cr \parallel}$	500												
	$S_{min \perp} = S_{cr \perp}$	300												

#### Drilling method

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C56.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	$\alpha_{g,N} (S_{min \parallel})$	[-]	1,4											
	$\alpha_{g,V} (S_{min \parallel})$													
	$\alpha_{g,N} (S_{min \perp})$		2											
	$\alpha_{g,V} (S_{min \perp})$													

fischer injection system FIS V Plus for masonry

#### Performance

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C56**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C57.1:** Installation parameters  
(Push through installation with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque $\max T_{inst}$ [Nm]	2		
<b>General installation parameters</b>			
Edge distance $c_{min} = c_{cr}$	80		
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	500	
	$s_{min \perp} = s_{cr \perp}$	300	

**Drilling method**

Hammer drilling with hard metal hammer drill

**Table C57.2:** Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,4	
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$	2	
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C57**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C58.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
	w/w	w/d	d/d	d/d	d/d	d/d	d/d	d/d	d/d	d/d
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,50		0,60		1,20		0,75	1,50
	d/d		0,60		0,75		1,20		0,90	1,50
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0,75		0,90		1,50		1,20	2,00
	d/d		0,90		1,20		2,00		1,20	2,50
10 / 8 N/mm <sup>2</sup>	w/w	w/d	0,90		1,20		2,00		1,50	2,50
	d/d		1,20		1,50		2,50		1,50	3,00
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,20		1,50		2,50		2,00	3,50
	d/d		1,50		2,00		3,00		2,00	4,00

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C58.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	w/w	w/d	d/d	d/d	d/d	d/d
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2		1,5	
	d/d		1,2		1,5	
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5		2,0	
	d/d		2,0		2,5	
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0		2,5	
	d/d		2,5		3,0	
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,5		3,5	
	d/d		3,0		4,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C58**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C59.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions								
		<b>5 / 4 N/mm<sup>2</sup></b>	w/w d/d	0,9	1,2	0,9	1,2	0,6	2,0
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w d/d	1,2	1,5	1,2	1,5	0,9	3,0	0,9	
<b>10 / 8 N/mm<sup>2</sup></b>	w/w d/d	1,5	2,0	1,5	2,0	1,2	4,0	1,2	
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w d/d	2,0	3,0	2,0	3,0	1,5	5,0	1,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C59.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

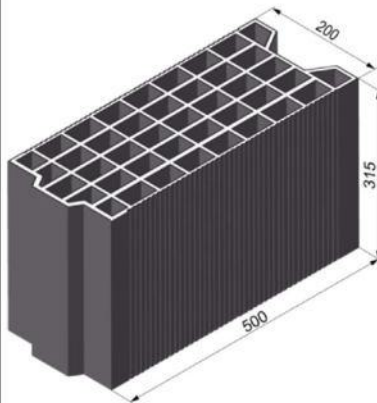
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
		<b>5 / 4 N/mm<sup>2</sup></b>	w/w d/d
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w d/d	0,9	
<b>10 / 8 N/mm<sup>2</sup></b>	w/w d/d	1,2	
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w d/d	1,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

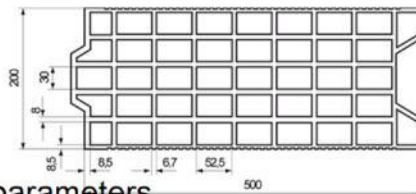
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C59</b>
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Terreal			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	315
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 7,5 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B17

**Table C60.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6 M8		-		-		M10 M12		-		-	
			11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2												
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	50			80		50		80		
Spacing	s <sub>min</sub>	100									
	s <sub>cr</sub>	500									
	s <sub>min</sub> ⊥	100									
	s <sub>cr</sub> ⊥	315									

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C60.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6 M8		-		-		M10 M12		-		-	
			11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	α <sub>g,N</sub> (s <sub>min</sub>   )	[-]	1,1											
	α <sub>g,V</sub> (s <sub>min</sub>   )		1,2											
	α <sub>g,N</sub> (s <sub>min</sub> ⊥)		1,1											
	α <sub>g,V</sub> (s <sub>min</sub> ⊥)		1,2											

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C60**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>			
<b>Table C61.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	max $T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	80	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$ [mm]	500	
	$s_{min \perp}$	100	
	$s_{cr \perp}$	315	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C61.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,1	
	$\alpha_{g,V} (s_{min \parallel})$	1,2	
	$\alpha_{g,N} (s_{min \perp})$	1,1	
	$\alpha_{g,V} (s_{min \perp})$	1,2	
fischer injection system FIS V Plus for masonry			<b>Annex C61</b>
<b>Performance</b> Vertical perforated brick HLz, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C62.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,5			
	d/d		0,5		0,6	0,5
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9			
	d/d		0,9	1,2		
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5			
	d/d		1,5			
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0			
	d/d		2,0			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C62.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,5			
	d/d		0,6			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9			
	d/d		1,2			
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5			
	d/d		1,5			
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0			
	d/d		2,0			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C62</b>
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under tension loading	

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C63.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions														
	w/w	w/d													
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,30	0,60	0,3	0,60	0,60	0,90	0,75						
	d/d	d/d													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,75	1,20	0,7	1,20	1,20	2,00	1,50						
	d/d	d/d													
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0,90	2,00	0,9	2,00	1,50	3,00	2,00						
	d/d	d/d													
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,50	2,50	1,5	2,50	2,00	4,00	3,00						
	d/d	d/d													

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C63.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

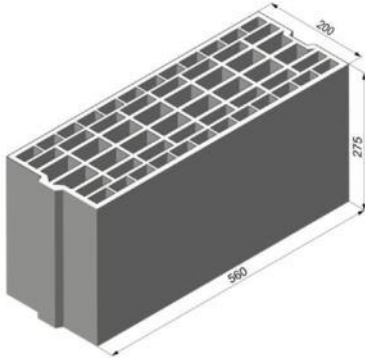
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions													
	w/w	w/d												
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,60						0,75					
	d/d	d/d												
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,20						1,50					
	d/d	d/d												
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,50						2,00					
	d/d	d/d												
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,00						3,00					
	d/d	d/d												

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

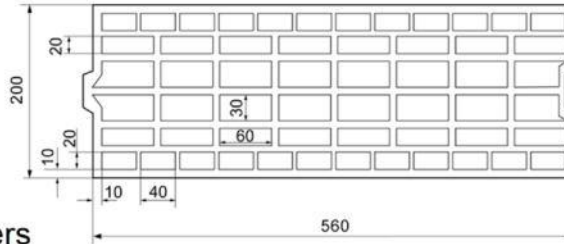
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C63</b>
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer		e.g. Imery		
Nominal dimensions	[mm]	length L	width W	height H
		560	200	275
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 8 / 6 or 10 / 8		
Standard or annex		EN 771-1:2011+A1:2015		



Dimension see also Annex B17

**Table C64.1: Installation parameters**

<b>Anchor rod</b>	<b>M8</b>	<b>M10</b>	<b>M10</b>	<b>M12</b>	<b>M12</b>	<b>M16</b>	<b>M16</b>	
<b>Perforated sleeve FIS H K</b>	<b>16x130</b>		<b>18x130/200</b>		<b>20x130</b>		<b>22x130/200</b>	
<b>Anchor rod with perforated sleeve FIS H K</b>								
Max. installation torque	$\max T_{inst}$	[Nm]						2
<b>General installation parameters</b>								
Edge distance	$C_{min} = C_{cr}$							80
Spacing	$S_{min \parallel} = S_{cr \parallel}$	[mm]						560
	$S_{min \perp} = S_{cr \perp}$							275

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C64.2: Group factors**

<b>Anchor rod</b>	<b>M8</b>	<b>M10</b>	<b>M10</b>	<b>M12</b>	<b>M12</b>	<b>M16</b>	<b>M16</b>	
<b>Perforated sleeve FIS H K</b>	<b>16x130</b>		<b>18x130/200</b>		<b>20x130</b>		<b>22x130/200</b>	
Group factors	$\alpha_{g,N} (S_{min \parallel})$	[-]						2
	$\alpha_{g,V} (S_{min \parallel})$							
	$\alpha_{g,N} (S_{min \perp})$							
	$\alpha_{g,V} (S_{min \perp})$							

fischer injection system FIS V Plus for masonry

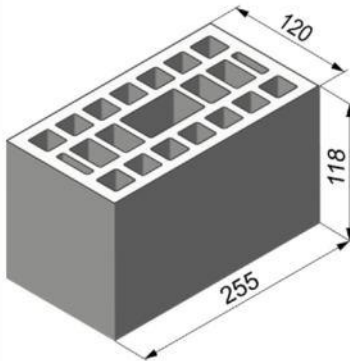
**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

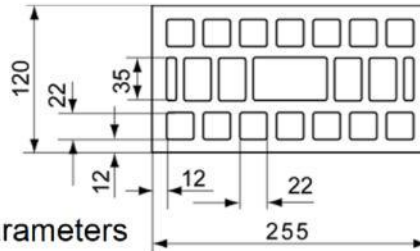
**Annex C64**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>							
<b>Table C65.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading</b>							
Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>							
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions						
	w/w	w/d					
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	0,9		1,2		
	d/d		1,2		1,5		
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	1,5		2,0		
	d/d		1,5		2,0		
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	2,0		2,5		
	d/d		2,5		3,0		
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{RK(72/120^\circ C)} = 0,83 \cdot N_{RK(50/80^\circ C)}$ .							
<b>Table C65.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading</b>							
Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,L}$ [kN]; temperature range 50/80°C and 72/120°C							
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions						
	w/w	w/d					
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d			0,9		
	d/d						
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d			1,5		
	d/d						
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d			2,0		
	d/d						
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  Factor for job site tests and displacements see annex C123.							
fischer injection system FIS V Plus for masonry						<b>Annex C65</b>	
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under tension and shear loading							

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		255	120	118
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B18

**Table C66.1: Installation parameters**

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub> [mm]	60
Spacing	S <sub>cr II</sub> = S <sub>min II</sub> [mm]	255
	S <sub>cr ⊥</sub> = S <sub>min ⊥</sub> [mm]	120

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C66.2: Group factors**

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

Group factors	$\alpha_{g,N} (S_{min II})$	[-]	2
	$\alpha_{g,V} (S_{min II})$		
	$\alpha_{g,N} (S_{min ⊥})$		
	$\alpha_{g,V} (S_{min ⊥})$		

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C66**

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015

**Table C67.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>1)</sup></b>											
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use conditions										
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,40		0,50			- <sup>3)</sup>			
	d/d		0,50		0,50			- <sup>3)</sup>			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,90		0,90			0,50			
	d/d		0,90		1,20			0,50			
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,20		1,50			0,75			
	d/d		1,50		1,50			0,75			
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,50		2,00			0,90			
	d/d		2,00		2,00			0,90			
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,00		2,50			1,20			
	d/d		2,50		2,50			1,20			
15 / 12 N/mm <sup>2</sup>	w/w	w/d	2,50		3,00			1,50			
	d/d		3,00		3,50			1,50			

<sup>1)</sup> For temperature range 72/120°C:  $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .

<sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>3)</sup> No performance assessed.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C67**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C68.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- dition						
	w/w	w/d					
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,60	0,75	0,60	0,75	0,90
	d/d						
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,20	1,50	1,20	1,50	2,00
	d/d						
8 / 6 N/mm <sup>2</sup>	w/w	w/d	2,00	2,00	2,00	2,00	2,50
	d/d						
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,50	3,00	2,50	3,00	3,50
	d/d						
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	3,00	3,50	3,00	3,50	4,50
	d/d						
15 / 12 N/mm <sup>2</sup>	w/w	w/d	4,00	4,50	4,00	4,50	5,50
	d/d						

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

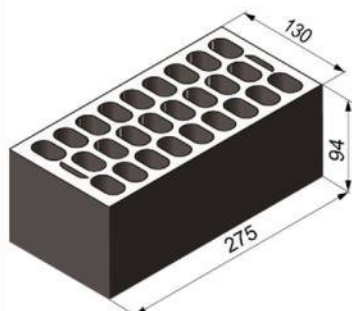
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**Performance**

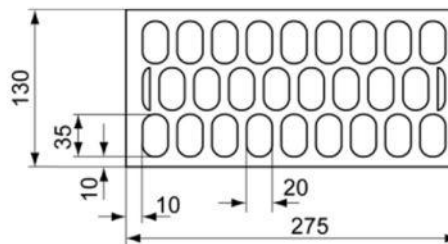
Vertical perforated brick HLz, Characteristic resistance under shear loading

**Annex C68**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Ceramica Farreny S.A.			
Nominal dimensions	[mm]	length L	width W	height H
		275	130	94
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	7,5 / 6 or 10 / 8 or 15 / 12 or 20 / 16 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B18

**Table C69.1: Installation parameters**

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2								
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100				120				
Spacing	S <sub>cr II</sub> = S <sub>min II</sub>	275								
	S <sub>cr ⊥</sub> = S <sub>min ⊥</sub>	95								

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C69.2: Group factors**

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		M10	M12
					11x85				15x85	
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			20x85		

Group factors	α <sub>g,N</sub> (S <sub>min II</sub> )	[-]	2							
	α <sub>g,V</sub> (S <sub>min II</sub> )									
	α <sub>g,N</sub> (S <sub>min ⊥</sub> )									
	α <sub>g,V</sub> (S <sub>min ⊥</sub> )									

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**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C69**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C70.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M6</b>	<b>M8</b>	<b>-</b>	<b>M8</b>	<b>M10</b>	<b>-</b>	<b>M12</b>	<b>M16</b>
<b>Internal threaded anchor FIS E</b>	<b>-</b>		<b>-</b>		<b>M6</b>	<b>M8</b>	<b>-</b>		<b>M10</b>	<b>M12</b>
					<b>11x85</b>				<b>15x85</b>	
<b>Perforated sleeve FIS H K</b>	<b>12x50</b>		<b>12x85</b>		<b>16x85</b>			<b>20x85</b>		

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
	w/w	w/d		
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w	w/d	0,40	0,90
	d/d		0,40	0,90
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	0,50	1,20
	d/d		0,60	1,20
<b>15 / 12 N/mm<sup>2</sup></b>	w/w	w/d	0,75	1,50
	d/d		0,90	2,00
<b>20 / 16 N/mm<sup>2</sup></b>	w/w	w/d	0,90	2,00
	d/d		1,20	2,50
<b>25 / 20 N/mm<sup>2</sup></b>	w/w	w/d	1,20	3,00
	d/d		1,50	3,00

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

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**Performance**

Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C70**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C71.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M6</b>	<b>M8</b>	-	<b>M8</b>	<b>M10</b>	-	<b>M12</b>	<b>M16</b>
<b>Internal threaded anchor FIS E</b>	-	-	M6 M8		11x85	-		M10 M12	-	
					16x85		20x85			

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
<b>7,5 / 6 N/mm<sup>2</sup></b>	w/w d/d	w/d d/d	1,2	1,2
<b>10 / 8 N/mm<sup>2</sup></b>	w/w d/d	w/d d/d	1,5	1,5
<b>15 / 12 N/mm<sup>2</sup></b>	w/w d/d	w/d d/d	2,0	2,5
<b>20 / 16 N/mm<sup>2</sup></b>	w/w d/d	w/d d/d	3,0	3,0
<b>25 / 20 N/mm<sup>2</sup></b>	w/w d/d	w/d d/d	4,0	4,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

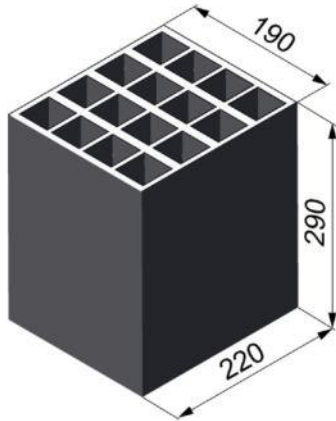
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**Performance**

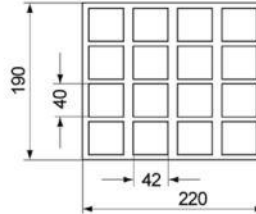
Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C71**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Perceram			
Nominal dimensions	[mm]	length L	width W	height H
		220	190	290
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	7,5 / 6 or 10 / 8 or 12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B18

**Table C72.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2												
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	110												
Spacing	S <sub>min</sub>    = S <sub>cr</sub>	220												
	S <sub>min</sub> ⊥ = S <sub>cr</sub> ⊥	290												

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C72.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	$\alpha_{g,N} (S_{min}   )$	[-]	2											
	$\alpha_{g,V} (S_{min}   )$													
	$\alpha_{g,N} (S_{min} \perp)$													
	$\alpha_{g,V} (S_{min} \perp)$													

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**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C72**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C73.1:** Installation parameters  
(Push through installation with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	110	
Spacing	$s_{min \parallel} = s_{cr \parallel}$	220	
	$s_{min \perp} = s_{cr \perp}$	290	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			

**Table C73.2:** Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		

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**Performance**  
Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C73**

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015

**Table C74.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions								
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	0,3	1,2	1,2	1,5	1,2	1,5	1,2	1,5
	d/d	0,4	1,5	1,5	1,5	1,5	1,5	1,5	1,5
10 / 8 N/mm <sup>2</sup>	w/w   w/d	0,5	1,5	1,5	2,0	1,5	2,0	1,5	2,0
	d/d	0,5	2,0	2,0	2,5	2,0	2,5	2,0	2,5
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	0,6	2,0	2,0	2,5	2,0	2,5	2,0	2,5
	d/d	0,6	2,5	2,5	3,0	2,5	3,0	2,5	3,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C74.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	1,5	
	d/d	1,5	
10 / 8 N/mm <sup>2</sup>	w/w   w/d	2,0	
	d/d	2,5	
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	2,5	
	d/d	3,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

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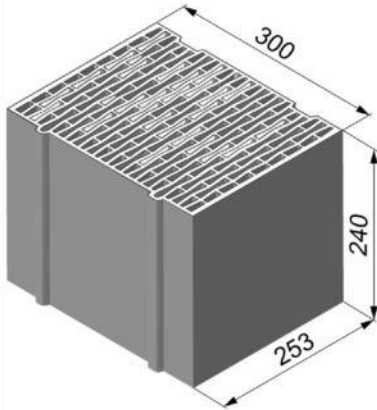
**Performance**

Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C74**

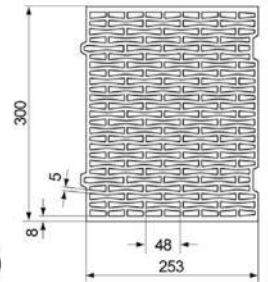
<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>														
<b>Table C75.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5	1,5	1,5	2,5	1,5	2,0						
	d/d	d/d												
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,0	2,0	2,0	3,5	2,0	3,0						
	d/d	d/d												
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,5	3,0	3,0	4,5	3,0	3,5						
	d/d	d/d												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
<b>Table C75.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)</b>														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200				18x130/200				22x130/200					
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	2,0											
	d/d	d/d												
10 / 8 N/mm <sup>2</sup>	w/w	w/d	3,0											
	d/d	d/d												
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	3,5											
	d/d	d/d												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												<b>Annex C75</b>		
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under shear loading														

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Ziegelwerk Brenna			
Nominal dimensions	[mm]	length L	width W	height H
		253	300	240
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex	EN 771-1:2011+A1:2015			

Dimension see also Annex B18



**Table C76.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	$\max T_{inst}$ [Nm]	2												
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**General installation parameters**

Edge distance	$c_{min} = c_{cr}$	60												
Spacing	$s_{min \parallel} = s_{cr \parallel}$	255												
	$s_{min \perp} = s_{cr \perp}$	240												

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C76.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2										
	$\alpha_{g,V} (s_{min \parallel})$												
	$\alpha_{g,N} (s_{min \perp})$												
	$\alpha_{g,V} (s_{min \perp})$												

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C76**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>			
<b>Table C77.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel} = s_{cr \parallel}$ [mm]	255	
	$s_{min \perp} = s_{cr \perp}$	240	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C77.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		
fischer injection system FIS V Plus for masonry			<b>Annex C77</b>
<b>Performance</b> Vertical perforated brick HLz, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C78.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions						
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	- <sup>3)</sup>	0,50	0,50	0,40	0,50	0,40
	d/d	0,30	0,50	0,50	0,50	0,50	0,50
5 / 4 N/mm <sup>2</sup>	w/w w/d	0,50	0,90	0,90	0,90	0,90	0,90
	d/d	0,60	0,90	0,90	0,90	0,90	0,90
8 / 6 N/mm <sup>2</sup>	w/w w/d	0,75	1,50	1,50	1,20	1,50	1,20
	d/d	0,90	1,50	1,50	1,50	1,50	1,50

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

<sup>3)</sup> No performance assessed.

**Table C78.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	0,4	
	d/d	0,5	
5 / 4 N/mm <sup>2</sup>	w/w w/d	0,9	
	d/d	0,9	
8 / 6 N/mm <sup>2</sup>	w/w w/d	1,2	
	d/d	1,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, Characteristic resistance under tension loading

**Annex C78**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C79.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions			
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,5	
	d/d			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9	
	d/d			
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5	
	d/d			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C79.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

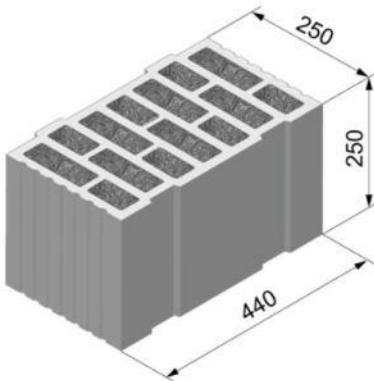
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions			
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,5	
	d/d			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9	
	d/d			
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5	
	d/d			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

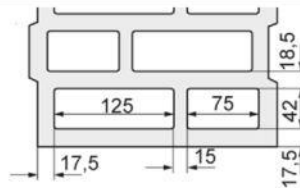
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C79</b>
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under shear loading	

**Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool,  
EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		250	440	250
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	8 / 6 or 10 / 8 or 12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B18

**Table C80.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2				5	2	5	6			
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**General installation parameters**

Edge distance	c <sub>min</sub> = c <sub>cr</sub>					60			
Spacing	s <sub>min II</sub>					80			
	s <sub>cr II</sub>	[mm]				250			
	s <sub>min ⊥</sub>					80			
	s <sub>cr ⊥</sub>					250			

**Drilling method**

Rotary drilling with carbide drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C80.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85				16x130		20x85		20x130		20x200	

Group factors	$\alpha_{g,N}$ (s <sub>min II</sub> )	[-]					1,3			
	$\alpha_{g,V}$ (s <sub>min II</sub> )						1,3			
	$\alpha_{g,N}$ (s <sub>min ⊥</sub> )						0,8			
	$\alpha_{g,V}$ (s <sub>min ⊥</sub> )						1,3			

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool;  
dimensions, installation parameters, Group factors

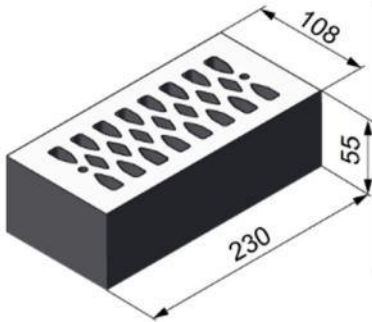
**Annex C80**

Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool, EN 771-1:2011+A1:2015			
<b>Table C81.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	max T <sub>inst</sub> [Nm]	5	6
<b>General installation parameters</b>			
Edge distance	c <sub>min</sub> = c <sub>cr</sub>		60
Spacing	s <sub>min</sub>		80
	s <sub>cr</sub>	[mm]	250
	s <sub>min</sub> ⊥		80
	s <sub>cr</sub> ⊥		250
<b>Drilling method</b>			
Rotary drilling with carbide drill			
<b>Table C81.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	α <sub>g,N</sub> (s <sub>min</sub>   )		1,3
	α <sub>g,V</sub> (s <sub>min</sub>   )		1,3
	α <sub>g,N</sub> (s <sub>min</sub> ⊥)		0,8
	α <sub>g,V</sub> (s <sub>min</sub> ⊥)		1,3
fischer injection system FIS V Plus for masonry			<b>Annex C81</b>
<b>Performance</b> Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool; dimensions, installation parameters, Group factors			

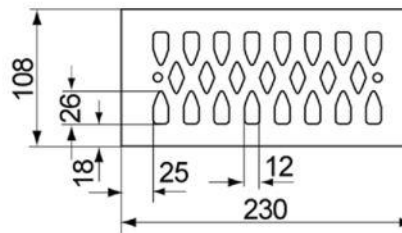
Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool, EN 771-1:2011+A1:2015																	
Table C82.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)																	
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-		
					11x85						15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85		20x130		20x200		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>																	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions																
8 / 6 N/mm <sup>2</sup>	w/w	w/d	0,75	1,50	1,20						1,50		2,50				
	d/d		0,90	1,50	1,20						1,50		2,50				
10 / 8 N/mm <sup>2</sup>	w/w	w/d	0,90	1,50	1,20						1,50		2,50				
	d/d		0,90	2,00	1,50						2,00		3,00				
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	0,90	2,00	1,50						2,00		3,00				
	d/d		1,20	2,00	1,50						2,00		3,50				
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																	
<sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .																	
Table C82.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)																	
Anchor rod					M10				M12				M16				
Perforated sleeve FIS H K					18x130/200								22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>																	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions																
8 / 6 N/mm <sup>2</sup>	w/w	w/d														1,5	
	d/d															1,5	
10 / 8 N/mm <sup>2</sup>	w/w	w/d														1,5	
	d/d															2,0	
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d														2,0	
	d/d															2,0	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																	
<sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .																	
Factor for job site tests and displacements see annex C123.																	
fischer injection system FIS V Plus for masonry														Annex C82			
<b>Performance</b> Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool, Characteristic resistance under tension loading																	

Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool, EN 771-1:2011+A1:2015																
Table C83.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)																
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C																
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
8 / 6 N/mm <sup>2</sup>	w/w	w/d	0,9				1,2		0,9			1,2		1,2		
	d/d															
10 / 8 N/mm <sup>2</sup>	w/w	w/d	0,9				1,5		0,9			1,5		1,2		
	d/d															
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,2				1,5		1,2			1,5		1,5		
	d/d															
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																
Table C83.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)																
Anchor rod	M10				M12				M16							
Perforated sleeve FIS H K	18x130/200								22x130/200							
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C																
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,2				1,2									
	d/d															
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,5				1,5									
	d/d															
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,5				1,5									
	d/d															
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																
Factor for job site tests and displacements see annex C123.																
fischer injection system FIS V Plus for masonry														Annex C83		
<b>Performance</b> Vertical perforated brick HLz, Porothersm W 44, filled with mineral wool; Characteristic resistance under shear loading																

### Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger.		
Nominal dimensions [mm]	length L	width W	height H
	230	108	55
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,4$		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B18

Table C84.1: Installation parameters

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			

#### Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K

Max. installation torque max $T_{inst}$ [Nm]	2									
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#### General installation parameters

Edge distance $c_{min} = c_{cr}$	60									
Spacing	$s_{min \parallel}$	80								
	$s_{cr \parallel}$ [mm]	230								
	$s_{min \perp}$	60								
	$s_{cr \perp}$	60								

#### Drilling method

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Table C84.2: Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			

Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2							
	$\alpha_{g,V} (s_{min \parallel})$									
	$\alpha_{g,N} (s_{min \perp})$									
	$\alpha_{g,V} (s_{min \perp})$									

fischer injection system FIS V Plus for masonry

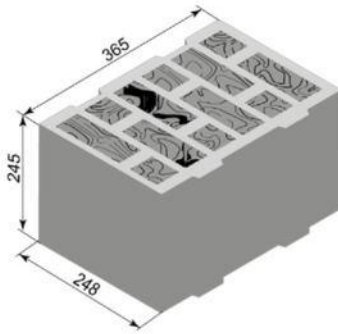
#### Performance

Vertical perforated brick HLz, dimensions, installation parameters, Group factors

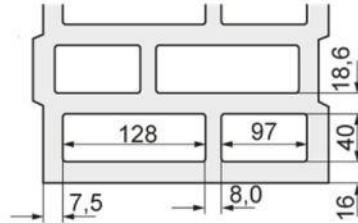
**Annex C84**

Vertical perforated brick HLz, EN 771-1:2011+A1:2015											
Table C85.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading <sup>1)</sup>											
Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>3)</sup></b>											
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use conditions										
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,30	0,90	0,75			0,50			
	d/d		0,30	0,90	0,90			0,60			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,60	1,50	1,50			0,90			
	d/d		0,75	2,00	1,50			1,20			
8 / 6 N/mm <sup>2</sup>	w/w	w/d	0,90	2,50	2,50			1,50			
	d/d		0,90	3,00	2,50			1,50			
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,20	3,50	3,00			2,00			
	d/d		1,50	4,00	3,50			2,50			
<sup>1)</sup> If the fixing is in a solid area, for use condition w/w, the characteristic value shall be reduced with the factor 0,64. <sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>3)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .											
Table C85.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading											
Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16	
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-
					11x85				15x85		
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85			
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>											
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions										
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,6				0,4				
	d/d										
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2				0,9				
	d/d										
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,5				1,2				
	d/d										
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,5				1,5				
	d/d										
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C123.											
fischer injection system FIS V Plus for masonry									Annex C85		
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under tension and shear loading											

**Vertical perforated brick HLz filled with mineral wool, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 365	≥ 248	≥ 245
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,6		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B19

**Table C86.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		M6	M8	-		-		M10	M12	-	
			11x85						15x85			
<b>Perforated sleeve FIS H K</b>	12x85		16x85			16x130		20x85			20x130	
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>												
Max. installation torque	max T <sub>inst</sub> [Nm]	2		4								
<b>General installation parameters</b>												
Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100										
Spacing	S <sub>min</sub>	250										
	S <sub>cr</sub>	[mm]										
	S <sub>min</sub> ⊥	245										
	S <sub>cr</sub> ⊥											
<b>Drilling method</b>												
Hammer drilling with hard metal hammer drill												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.												
<b>Table C86.2:</b> Group factors												
<b>Anchor rod</b>	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16		
<b>Perforated sleeve FIS H K</b>	12x85		16x85		16x130		20x85			20x130		
Group factors	$\alpha_{g,N} (S_{min}   ) =$ $\alpha_{g,V} (S_{min}   ) =$ $\alpha_{g,N} (S_{min} \perp) =$ $\alpha_{g,V} (S_{min} \perp) =$	[-]		2								
fischer injection system FIS V Plus for masonry										<b>Annex C86</b>		
<b>Performance</b> Vertical perforated brick HLz filled with mineral wool, dimensions, installation parameters, Group factors												

<b>Vertical perforated brick HLz filled with mineral wool, EN 771-1:2011+A1:2015</b>			
<b>Table C87.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	4	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	100	
Spacing	$s_{min \parallel}$	250	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	245	
	$s_{cr \perp}$	245	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C87.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N}(s_{min \parallel})$	[-]	2
	$\alpha_{g,V}(s_{min \parallel})$		
	$\alpha_{g,N}(s_{min \perp})$		
	$\alpha_{g,V}(s_{min \perp})$		
fischer injection system FIS V Plus for masonry			<b>Annex C87</b>
<b>Performance</b> Vertical perforated brick HLz filled with mineral wool, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C88.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-	
	-		11x85		-		-		15x85		-		-	
Perforated sleeve FIS H K	12x85		16x85			16x130		20x85			20x130		20x200	

$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions														
		10 / 8 N/mm <sup>2</sup>	w/w	2	1,5	2,5		2,0		2,0	3,0				
d/d	2		2,0	3,0		2,0		2,0	3,0						

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

**Table C88.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
		10 / 8 N/mm <sup>2</sup>	w/w	1,5
d/d	2,0		2,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

**Performance**

Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under tension loading

**Annex C88**

**Vertical perforated brick HLz filled with mineral wool, EN 771-1:2011+A1:2015**

**Table C89.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-	
	-		11x85		-		-		15x85		-		-	
Perforated sleeve FIS H K	12x85		16x85			16x130		20x85			20x130		20x200	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions														
10 / 8 N/mm <sup>2</sup>	w/w	2,5	3,0	3,0			3,0		1,5			1,5		1,5	1,5
	d/d	2,5	3,0	3,0			3,0		1,5			1,5		1,5	1,5

- <sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  
<sup>2)</sup> For temperature range 72/120°C no performance assessed.

**Table C89.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions						
10 / 8 N/mm <sup>2</sup>	w/w	3,0			1,5		
	d/d	3,0			1,5		

- <sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  
<sup>2)</sup> For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C123.

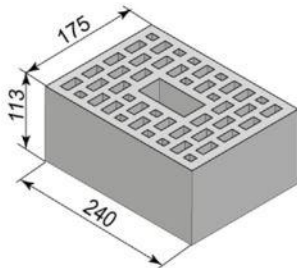
fischer injection system FIS V Plus for masonry

**Performance**

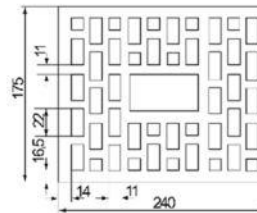
Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under shear loading

**Annex C89**

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 175	≥ 113
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,9		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B19

**Table C90.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	-	<b>M8</b>	<b>M10</b>	<b>M8</b>	<b>M10</b>	-	<b>M12</b>	<b>M16</b>	<b>M12</b>	<b>M16</b>
<b>Internal threaded anchor FIS E</b>	-		<b>M6</b>   <b>M8</b>	-		-		<b>M10</b>   <b>M12</b>	-		-	
			<b>11x85</b>				<b>15x85</b>					
<b>Perforated sleeve FIS H K</b>	<b>12x85</b>		<b>16x85</b>			<b>16x130</b>		<b>20x85</b>			<b>20x130</b>	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque	max T <sub>inst</sub> [Nm]	2	4									
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**General installation parameters**

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100										
Spacing	S <sub>min</sub>	240										
	S <sub>cr</sub>	115										
	S <sub>min</sub> ⊥	100										
	S <sub>cr</sub> ⊥	115										

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C90.2:** Group factors

<b>Anchor rod</b>	<b>M6</b>	<b>M8</b>	<b>M8</b>	<b>M10</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>12x85</b>		<b>16x85</b>		<b>16x130</b>		<b>20x85</b>		<b>20x130</b>	
Group factors	$\frac{\alpha_{g,N}(S_{min \parallel})}{\alpha_{g,V}(S_{min \parallel})} =$ $\frac{\alpha_{g,N}(S_{min \perp})}{\alpha_{g,V}(S_{min \perp})} =$		[-]		2					

fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, dimensions, installation parameters, Group factors

**Annex C90**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>			
<b>Table C91.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	4	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	100	
Spacing	$s_{min \parallel}$	240	
	$s_{cr \parallel}$		
	$s_{min \perp}$	115	
	$s_{cr \perp}$		
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C91.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N}(s_{min \parallel})$	[-]	2
	$\alpha_{g,V}(s_{min \parallel})$		
	$\alpha_{g,N}(s_{min \perp})$		
	$\alpha_{g,V}(s_{min \perp})$		
fischer injection system FIS V Plus for masonry			<b>Annex C91</b>
<b>Performance</b> Vertical perforated brick HLz, dimensions, installation parameters, Group factors			

**Vertical perforated brick HLz, EN 771-1:2011+A1:2015**

**Table C92.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	M6 M8	11x85	-	-	-	-	M10 M12	15x85	-	-	-
Perforated sleeve FIS H K	12x85	16x85		16x130		20x85		20x130				

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions								
12,5 / 10 N/mm <sup>2</sup>	w/w	3,5	4,0	4,5	4,5	4,5	4,5	4,0	4,0
	d/d	4	4,5	5,0	5,0	5,0	5,0	4,0	4,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

**Table C92.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup>

Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions		
12,5 / 10 N/mm <sup>2</sup>	w/w	4,5	4,0
	d/d	5,0	4,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C123.

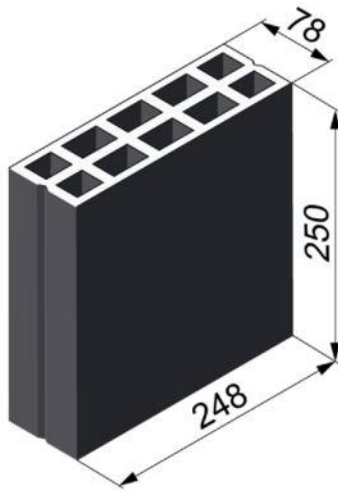
fischer injection system FIS V Plus for masonry

**Performance**  
Vertical perforated brick HLz, Characteristic resistance under tension loading

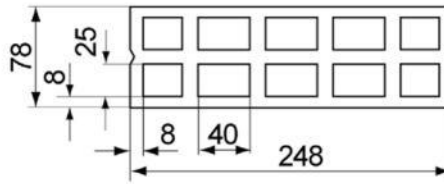
**Annex C92**

<b>Vertical perforated brick HLz, EN 771-1:2011+A1:2015</b>															
<b>Table C93.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)</b>															
Anchor rod	M6	M8	-		M8	M10	M8	M10	-		M12	M16	M12	M16	
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-		
			11x85						15x85						
Perforated sleeve FIS H K	12x85		16x85			16x130			20x85			20x130			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C <sup>2)</sup>															
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions														
12,5 / 10 N/mm <sup>2</sup>	w/w	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0	8,0	6,0	8,0
	d/d	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0	8,0	6,0	8,0
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C no performance assessed.															
<b>Table C93.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)</b>															
Anchor rod	M10				M12				M16						
Perforated sleeve FIS H K	18x130/200								22x130/200						
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C <sup>2)</sup>															
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions														
12,5 / 10 N/mm <sup>2</sup>	w/w	7,0			6,0			8,0							
	d/d	7,0			6,0			8,0							
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C no performance assessed.															
Factor for job site tests and displacements see annex C123															
fischer injection system FIS V Plus for masonry												<b>Annex C93</b>			
<b>Performance</b> Vertical perforated brick HLz, Characteristic resistance under shear loading															

**Horizontal perforated brick LLz, EN 771-1:2011+A1:2015**



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		250	78	248
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,7		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B19

**Table C94.1: Installation parameters**

Anchor rod	M6		M8
Perforated sleeve FIS H K	12x50		
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T <sub>inst</sub> [Nm]	2	
<b>General installation parameters</b>			
Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100	
Spacing	S <sub>min II</sub>	75	
	S <sub>cr II</sub>	250	
	S <sub>min ⊥</sub> = S <sub>cr ⊥</sub>	250	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C94.2: Group factors**

Anchor rod	M6		M8
Perforated sleeve FIS H K	12x50		
Group factors	$\alpha_{g,N} (S_{min II})$	[-]	1,6
	$\alpha_{g,V} (S_{min II})$		1,1
	$\alpha_{g,N} (S_{min ⊥})$		2,0
	$\alpha_{g,V} (S_{min ⊥})$		

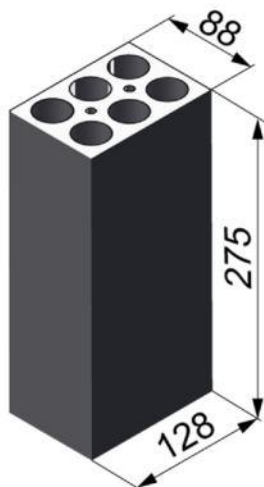
fischer injection system FIS V Plus for masonry

**Performance**  
Horizontal perforated brick LLz, dimensions, installation parameters, Group factors

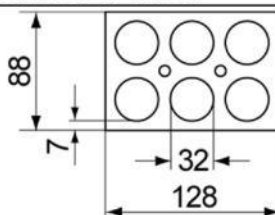
**Annex C94**

<b>Horizontal perforated brick LLz, EN 771-1:2011+A1:2015</b>		
<b>Table C95.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading</b>		
Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	
<b>2,5 / 2 N/mm<sup>2</sup></b>	w/w   w/d	0,5
	d/d	0,6
<b>5 / 4 N/mm<sup>2</sup></b>	w/w   w/d	0,9
	d/d	1,2
<b>8 / 6 N/mm<sup>2</sup></b>	w/w   w/d	1,5
	d/d	1,5
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .		
<b>Table C95.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading</b>		
Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,L}$ [kN]; temperature range 50/80°C and 72/120°C		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	
<b>2,5 / 2 N/mm<sup>2</sup></b>	w/w   w/d	0,5
	d/d	
<b>5 / 4 N/mm<sup>2</sup></b>	w/w   w/d	0,9
	d/d	
<b>8 / 6 N/mm<sup>2</sup></b>	w/w   w/d	1,5
	d/d	
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  Factor for job site tests and displacements see annex C123.		
fischer injection system FIS V Plus for masonry		<b>Annex C95</b>
<b>Performance</b> Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading		

### Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



Producer	e.g. Ceramica Farreny S.A.			
Nominal dimensions	[mm]	length L	width W	height H
		275	88	128
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 0,8		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also  
Annex B19

**Table C96.1: Installation parameters**

Anchor rod		M6	M8
Perforated sleeve FIS H K		12x50	
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	$T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	75	
	$s_{cr \parallel}$ [mm]	275	
	$s_{min \perp}$	75	
	$s_{cr \perp}$	130	

#### Drilling method

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C96.2: Group factors**

Anchor rod		M6	M8
Perforated sleeve FIS H K		12x50	
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3	
	$\alpha_{g,V} (s_{min \parallel})$	1,5	
	$\alpha_{g,N} (s_{min \perp})$	1,3	
	$\alpha_{g,V} (s_{min \perp})$	1,5	

fischer injection system FIS V Plus for masonry

**Performance**  
Horizontal perforated brick LLz, dimensions, installation parameters, Group factors

**Annex C96**

**Horizontal perforated brick LLz, EN 771-1:2011+A1:2015**

**Table C97.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

<b>Anchor rod</b>	<b>M6</b>		<b>M8</b>
<b>Perforated sleeve FIS H K</b>	<b>12x50</b>		
<b><math>N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>			
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions		
<b>2,5 / 2 N/mm<sup>2</sup></b>	w/w   w/d		<b>1,5</b>
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .

**Table C97.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

<b>Anchor rod</b>	<b>M6</b>		<b>M8</b>
<b>Perforated sleeve FIS H K</b>	<b>12x50</b>		
<b><math>V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>			
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions		
<b>2,5 / 2 N/mm<sup>2</sup></b>	w/w   w/d		<b>1,2</b>
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

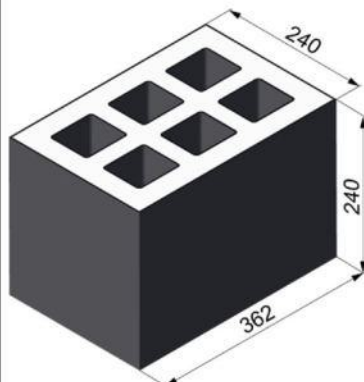
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**Performance**

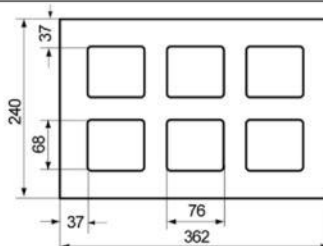
Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

**Annex C97**

**Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015**



Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	362	240	240
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,0$		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4		
Standard or annex	EN 771-3:2011+A1:2015		



Dimension see also Annex B19

**Table C98.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

**Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K**

Max. installation torque $\max T_{inst}$ [Nm]	2															
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**General installation parameters**

Edge distance $C_{min} = C_{cr}$	60																
Spacing	$S_{min \parallel}$	$S_{cr \parallel}$	[mm]	$S_{min \perp} = S_{cr \perp}$												100	
																362	
																240	

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C98.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

Group factors	$\alpha_{g,N} (S_{min \parallel})$	$\alpha_{g,V} (S_{min \parallel})$	$\alpha_{g,N} (S_{min \perp})$	$\alpha_{g,V} (S_{min \perp})$	[-]	1,2										
						1,1										
						2,0										

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**Performance**  
Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

**Annex C98**

<b>Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015</b>			
<b>Table C99.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
<b>Anchor rod with perforated sleeve FIS H K</b>			
Max. installation torque	$\max T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	362	
	$s_{min \perp} = s_{cr \perp}$	240	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C99.2: Group factors</b>			
<b>Anchor rod</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>
<b>Perforated sleeve FIS H K</b>	<b>18x130/200</b>		<b>22x130/200</b>
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,2	
	$\alpha_{g,V} (s_{min \parallel})$	1,1	
	$\alpha_{g,N} (s_{min \perp})$	2,0	
	$\alpha_{g,V} (s_{min \perp})$	2,0	
fischer injection system FIS V Plus for masonry			<b>Annex C99</b>
<b>Performance</b> Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors			

**Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015**

**Table C100.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions						
	2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	1,2		1,5	
d/d		1,2		1,5		2,5	
5 / 4 N/mm <sup>2</sup>	w/w	w/d	2,0		3,0		5,0
	d/d		2,5		3,0		5,5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C100.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup>

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions					
	2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	1,5		
d/d		1,5				
5 / 4 N/mm <sup>2</sup>	w/w	w/d	3,0			
	d/d		3,0			

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

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**Performance**  
Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading

**Annex C100**

**Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015**

**Table C101.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	M10	M12	15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		0,9
	w/w	w/d	
2,5 / 2 N/mm <sup>2</sup>	d/d		
5 / 4 N/mm <sup>2</sup>	w/w	w/d	2,0
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C101.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	

$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$  [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions		0,9
	w/w	w/d	
2,5 / 2 N/mm <sup>2</sup>	d/d		
5 / 4 N/mm <sup>2</sup>	w/w	w/d	2,0
	d/d		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

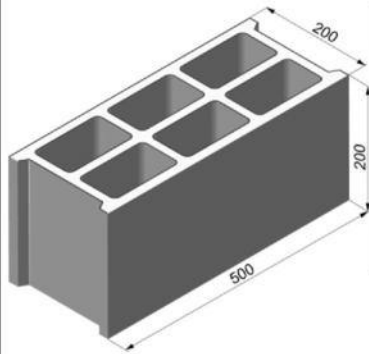
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**Performance**

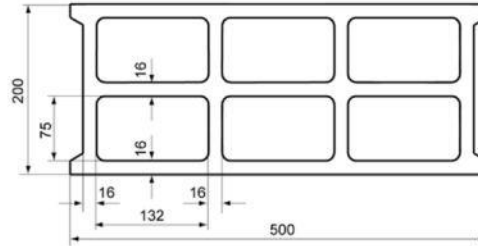
Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading

**Annex C101**

**Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015**



Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
	500	200	200
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,0$		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B19

**Table C102.1: Installation parameters**

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6	M8		-	-	-	-	-	-	M10	M12	-
			11x85									15x85		
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130	18x130/200		20x85			
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>														
Max. installation torque $\max T_{inst}$ [Nm]	1				2									

**General installation parameters**

Edge distance $C_{min} = C_{cr}$	100													
Spacing $s_{min \parallel} = s_{cr \parallel}$ [mm]	500													
$s_{min \perp} = s_{cr \perp}$	200													

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C102.2: Group factors**

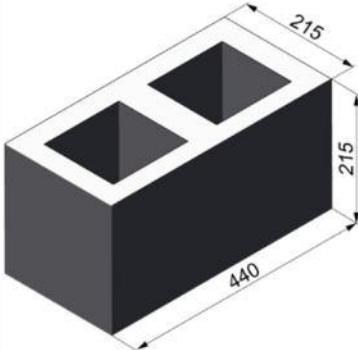
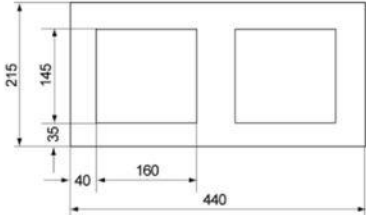
<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6	M8		-	-	-	-	-	-	M10	M12	-
			11x85									15x85		
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130	18x130/200		20x85			
Group factors	$\alpha_{g,N} (s_{min \parallel})$		$\alpha_{g,V} (s_{min \parallel})$		$\alpha_{g,N} (s_{min \perp})$		$\alpha_{g,V} (s_{min \perp})$		[-]					
									2					

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**Performance**  
Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

**Annex C102**

Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015														
Table C103.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		-		M10	M12
					11x85								15x85	
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		18x130/200		20x85		
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	use conditions													
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,4											
	d/d		0,5											
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,9											
	d/d		0,9											
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,2											
	d/d		1,5											
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .														
Table C103.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		-		M10	M12
					11x85								15x85	
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		18x130/200		20x85		
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d	0,9											
	d/d													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,5											
	d/d													
8 / 6 N/mm <sup>2</sup>	w/w	w/d	2,5											
	d/d													
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.  Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry													Annex C103	
<b>Performance</b> Light-weight concrete hollow block Hbl, Characteristic resistance under tension and shear loading														

Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015				
	Producer	e.g. Roadstone wood		
	Nominal dimensions [mm]	length L	width W	height H
	Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	≥ 1,2		
	Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10		
	Standard or annex	EN 771-3:2011+A1:2015		
		Dimension see also Annex B20		

**Table C104.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6 M8		-		-		M10 M12		-	-	-	-
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85		20x130		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation torque $\max T_{inst}$ [Nm]	2													
<b>General installation parameters</b>														
Edge distance $c_{min} = c_{cr}$	110													
Spacing	$s_{min \parallel}$	100												
	$s_{cr \parallel}$ [mm]	440												
	$s_{min \perp}$	100												
	$s_{cr \perp}$	215												
<b>Drilling method</b>														
Hammer drilling with hard metal hammer drill														

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C104.2:** Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6 M8		-		-		M10 M12		-	-	-	-
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85		20x130		
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,4												
	$\alpha_{g,V} (s_{min \parallel})$	2,0												
	$\alpha_{g,N} (s_{min \perp})$	1,4												
	$\alpha_{g,V} (s_{min \perp})$	1,2												

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**Performance**  
Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

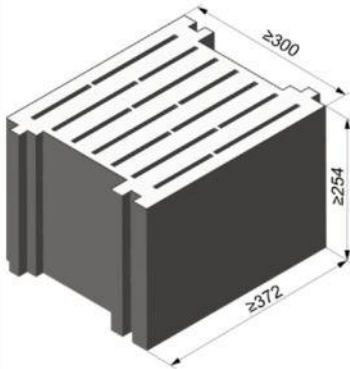
**Annex C104**

<b>Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015</b>			
<b>Table C105.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max $T_{inst}$ [Nm]	2	
<b>General installation parameters</b>			
Edge distance	$c_{min} = c_{cr}$	110	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	440	
	$s_{min \perp}$	100	
	$s_{cr \perp}$	215	
<b>Drilling method</b>			
Hammer drilling with hard metal hammer drill			
<b>Table C105.2: Group factors</b>			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,4	
	$\alpha_{g,V} (s_{min \parallel})$	2,0	
	$\alpha_{g,N} (s_{min \perp})$	1,4	
	$\alpha_{g,V} (s_{min \perp})$	1,2	
fischer injection system FIS V Plus for masonry			<b>Annex C105</b>
<b>Performance</b> Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors			

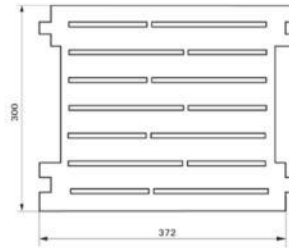
<b>Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015</b>														
<b>Table C106.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)</b>														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	11x85	-	-	-	-	-	-	M10	M12	-
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130		18x130/200		20x85				
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	0,9			1,2			2,0					
	d/d		1,2			1,5			2,0					
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	1,5			2,0			3,0					
	d/d		1,5			2,0			3,0					
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	2,0			2,5			3,5					
	d/d		2,0			3,0			4,0					
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w	w/d	2,5			3,0			4,5					
	d/d		3,0			3,5			5,0					
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .														
<b>Table C106.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)</b>														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200				22x130/200									
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>														
Mean compressive strength / Min. comp. strength single brick <sup>1)</sup>	Use conditions													
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	1,2			2,0			3,0					
	d/d		1,5			2,0			3,0					
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	2,0			3,0			4,0					
	d/d		2,0			3,0			4,0					
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	2,5			3,5			4,5					
	d/d		3,0			4,0			5,0					
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w	w/d	3,0			4,5			5,0					
	d/d		3,5			5,0			6,0					
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. <sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .														
Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry											<b>Annex C106</b>			
<b>Performance</b> Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading														

Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015														
Table C107.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)														
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I} [kN]$ ; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	0,75	1,20	0,75	1,20	0,75	1,20						
	d/d	d/d												
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,20	2,00	1,20	2,00	1,20	2,00						
	d/d	d/d												
10 / 8 N/mm <sup>2</sup>	w/w	w/d	1,50	2,50	1,50	2,50	1,50	2,50						
	d/d	d/d												
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	2,00	3,00	2,00	3,00	2,00	3,00						
	d/d	d/d												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
Table C107.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)														
Anchor rod	M10				M12				M16					
Perforated sleeve FIS H K	18x130/200								22x130/200					
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I} [kN]$ ; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions													
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,2											
	d/d	d/d												
8 / 6 N/mm <sup>2</sup>	w/w	w/d	2,0											
	d/d	d/d												
10 / 8 N/mm <sup>2</sup>	w/w	w/d	2,5											
	d/d	d/d												
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	3,0											
	d/d	d/d												
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.														
Factor for job site tests and displacements see annex C123.														
fischer injection system FIS V Plus for masonry												Annex C107		
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading														

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**



Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
	≥ 372	≥ 300	≥ 254
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	≥ 0,6		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	2,5 / 2		
Standard or annex	EN 771-3:2011+A1:2015		



Dimension see also Annex B20

**Table C108.1: Installation parameters**

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
<b>Anchor rod with perforated sleeve FIS H K</b>									
Max. installation torque max T <sub>inst</sub> [Nm]	4								
<b>General installation parameters</b>									
Edge distance C <sub>min</sub> = C <sub>cr</sub> [mm]	130								
Spacing S <sub>min</sub>    = S <sub>cr</sub>    [mm]	370								
	S <sub>min</sub> ⊥ = S <sub>cr</sub> ⊥	250							

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C108.2: Group factors**

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
Group factors [-]	2								

fischer injection system FIS V Plus for masonry

**Performance**  
Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

**Annex C108**

### Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

**Table C109.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16	
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200	
$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>										
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
	w/w	w/d	2,0				2,5		3,0	
2,5 / 2 N/mm <sup>2</sup>	d/d		2,0				3,0		4,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{RK(72/120°C)} = 0,83 \cdot N_{RK(50/80°C)}$ .

**Table C109.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16	
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200	
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}$ [kN]; temperature range 50/80°C and 72/120°C										
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions									
	w/w	w/d	4,5				6,5			
2,5 / 2 N/mm <sup>2</sup>	d/d									

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

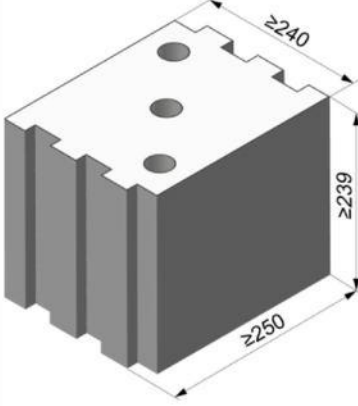
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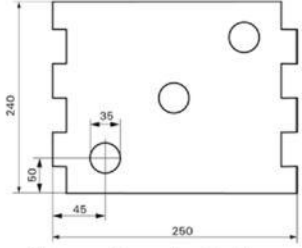
**Performance**

Light-weight concrete solid block Vbl,  
Characteristic resistance under tension and shear loading

**Annex C109**

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**

	Producer	KLB		
	Nominal dimensions [mm]	length L	width W	height H
	Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	≥ 250		
	Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	≥ 240		
	Standard or annex	≥ 239		
		≥ 1,6		
		5 / 4 or 8 / 6 or 10 / 8		
		EN 771-3:2011+A1:2015		

Dimension see also Annex B20

**Table C110.1:** Installation parameters  
(Pre-positioned installation with perforated sleeve FIS H K)

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	

<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>	
Max. installation torque $\max T_{inst}$ [Nm]	4
<b>General installation parameters</b>	
Edge distance $C_{min} = C_{cr}$	130
Spacing $S_{min \parallel} = S_{cr \parallel}$ [mm]	250
$S_{min \perp} = S_{cr \perp}$	250

**Drilling method**  
Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C110.2:** Group factors

<b>Anchor rod</b>	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
<b>Group factors</b>	$\alpha_{g,N} (S_{min \parallel})$		$\alpha_{g,V} (S_{min \parallel})$		$\alpha_{g,N} (S_{min \perp})$		$\alpha_{g,V} (S_{min \perp})$		[-]		2,0					

fischer injection system FIS V Plus for masonry	<b>Annex C110</b>
<b>Performance</b> Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors	

<b>Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015</b>			
<b>Table C111.1: Installation parameters</b> (Push through installation with perforated sleeve FIS H K)			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	$\max T_{inst}$ [Nm]	2,0	
General installation parameters			
Edge distance	$c_{min} = c_{cr}$	130	
Spacing	$s_{min \parallel} = s_{cr \parallel}$ [mm]	250	
	$s_{min \perp} = s_{cr \perp}$	250	
Drilling method			
Hammer drilling with hard metal hammer drill			
<b>Table C111.2: Group factors</b>			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	2,0	[-]
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		
fischer injection system FIS V Plus for masonry			<b>Annex C111</b>
<b>Performance</b> Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors			

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**

**Table C112.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
<b>Internal threaded anchor FIS E</b>	-	-	M6 M8		-		-		M10 M12		-	-	-	-	-	-
<b>Perforated sleeve FIS H K</b>	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>																
Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions															
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	1,2	2,0	2,5			3,0			3,0			3,0		
	d/d		2,0	3,5	4,0			5,0			5,0			5,0		
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	1,5	3,0	4,0			5,0			5,0			5,0		
	d/d		3,0	5,0	6,5			7,5			7,5			7,5		
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	2,0	4,0	5,0			6,5			6,5			6,5		
	d/d		4,0	7,0	8,5			9,0			9,0			9,0		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C112.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

Anchor rod	M10		M12		M16	
<b>Perforated sleeve FIS H K</b>	18x130/200				22x130/200	
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>						
Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions					
<b>5 / 4 N/mm<sup>2</sup></b>	w/w	w/d	2,5		3,0	
	d/d		4,0		5,0	
<b>8 / 6 N/mm<sup>2</sup></b>	w/w	w/d	4,0		5,0	
	d/d		6,5		7,5	
<b>10 / 8 N/mm<sup>2</sup></b>	w/w	w/d	5,0		6,5	
	d/d		8,5		9,0	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

Factor for job site tests and displacements see annex C123.

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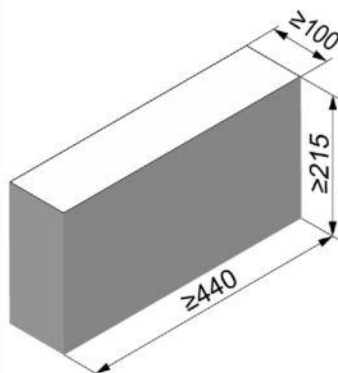
**Performance**

Light-weight concrete solid block Vbl, Characteristic resistance under tension loading

**Annex C112**

<b>Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015</b>																
<b>Table C113.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)</b>																
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		-		M10	M12	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C																
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
5 / 4 N/mm <sup>2</sup>	w/w	w/d	2,0	3,0	2,0	3,0	2,0	3,5			4,5					
	d/d															
8 / 6 N/mm <sup>2</sup>	w/w	w/d	3,0	4,5	3,0	4,5	3,0	5,5			6,5					
	d/d															
10 / 8 N/mm <sup>2</sup>	w/w	w/d	4,0	6,0	4,0	6,0	4,0	7,0			8,5					
	d/d															
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																
<b>Table C113.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)</b>																
Anchor rod	M10					M12					M16					
Perforated sleeve FIS H K	18x130/200										22x130/200					
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C																
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions															
5 / 4 N/mm <sup>2</sup>	w/w	w/d	3,5					4,5								
	d/d															
8 / 6 N/mm <sup>2</sup>	w/w	w/d	5,5					6,5								
	d/d															
10 / 8 N/mm <sup>2</sup>	w/w	w/d	7,0					8,5								
	d/d															
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.																
Factor for job site tests and displacements see annex C123.																
fischer injection system FIS V Plus for masonry														<b>Annex C113</b>		
<b>Performance</b> Light-weight concrete solid block Vbl, Characteristic resistance under shear loading																

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**



Producer		Roadstone wood		
Nominal dimensions	[mm]	length L	width W	height H
		≥ 440	≥ 100	≥ 215
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 2,0		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10		
Standard or annex		EN 771-3:2011+A1:2015		

**Table C114.1: Installation parameters**

Anchor rod		M6	M8	M10	M12	M16
<b>Anchor rod without perforated sleeve</b>						
Effective anchorage depth $h_{ef}$	[mm]	50	70	50	70	50
Max. installation torque $\max T_{inst}$	[Nm]	4		10		
<b>General installation parameters</b>						
Edge distance $c_{min} = c_{cr}$		100				
Spacing	$s_{min \parallel}$	75				
	$s_{cr \parallel}$	3x $h_{ef}$				
	$s_{min \perp}$	75				
	$s_{cr \perp}$	3x $h_{ef}$				

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C114.2: Group factors**

Anchor rod		M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,6				
	$\alpha_{g,V} (s_{min \parallel})$	1,3				
	$\alpha_{g,N} (s_{min \perp})$	1,4				
	$\alpha_{g,V} (s_{min \perp})$	1,3				

fischer injection system FIS V Plus for masonry

**Performance**

Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

**Annex C114**

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**

**Table C115.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8	M10	M12	M16
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>2)</sup></b>						
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]				
		≥ 50				
<b>5 / 4 N/mm<sup>2</sup></b>	w/w w/d	1,2			1,2	
	d/d	2,0			2,0	
<b>8 / 6 N/mm<sup>2</sup></b>	w/w w/d	1,5			2,0	
	d/d	3,0			3,5	
<b>10 / 8 N/mm<sup>2</sup></b>	w/w w/d	2,0			2,5	
	d/d	4,0			4,5	
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w w/d	3,0			3,5	
	d/d	5,0			5,5	

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C115.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

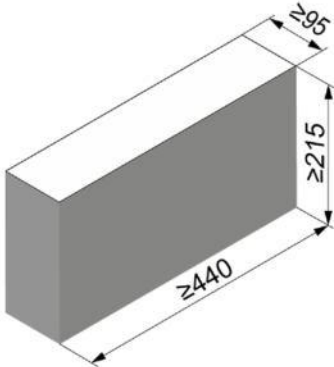
Anchor rod		M6	M8	M10	M12	M16
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>						
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]				
		≥ 50				
<b>5 / 4 N/mm<sup>2</sup></b>	w/w w/d	1,2	1,5	1,5	1,5	1,5
	d/d					
<b>8 / 6 N/mm<sup>2</sup></b>	w/w w/d	2,0	2,0	2,5	2,5	2,5
	d/d					
<b>10 / 8 N/mm<sup>2</sup></b>	w/w w/d	2,5	2,5	3,0	3,0	3,5
	d/d					
<b>12,5 / 10 N/mm<sup>2</sup></b>	w/w w/d	3,0	3,5	4,0	4,0	4,5
	d/d					

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	<b>Annex C115</b>
<b>Performance</b> Light-weight concrete solid block Vbl, Characteristic resistance under tension and shear loading	

**Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015**



Producer	Tramac			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 440	≥ 95	≥ 215
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	≥ 2,0		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	7,5 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-3:2011+A1:2015			

**Table C116.1: Installation parameters**

Anchor rod		M6	M8	M10	M12	M16					
<b>Anchor rod without perforated sleeve</b>											
Effective anchorage depth $h_{ef}$	[mm]	50	70	50	70	50	70	50	70	50	70
Max. installation torque $max T_{inst}$	[Nm]	4		10							
<b>General installation parameters</b>											
Edge distance $c_{min} = c_{cr}$		60									
Spacing	$s_{min \parallel}$	75									
	$s_{cr \parallel}$	3x $h_{ef}$									
	$s_{min \perp}$	75									
	$s_{cr \perp}$	3x $h_{ef}$									

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C116.2: Group factors**

Anchor rod		M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,9				
	$\alpha_{g,V} (s_{min \parallel})$	1,4				
	$\alpha_{g,N} (s_{min \perp})$	1,9				
	$\alpha_{g,V} (s_{min \perp})$	1,4				

fischer injection system FIS V Plus for masonry

**Performance**  
Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

**Annex C116**

### Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

**Table C117.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8	M10	M12	M16					
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>											
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	Effective anchorage depth $h_{ef}$ [mm]									
		50	70	50	70	50	70	50	70	50	70
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0
	d/d	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5
10 / 8 N/mm <sup>2</sup>	w/w   w/d	2,0	2,5	2,0	2,5	2,0	3,0	2,0	3,0	2,0	3,0
	d/d	3,5	4,5	3,5	4,5	3,5	5,0	3,5	5,0	3,5	5,0
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5
	d/d	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0
15 / 12 N/mm <sup>2</sup>	w/w   w/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	4,5	3,0	4,5
	d/d	5,0	7,0	5,0	7,0	5,0	7,5	5,0	7,5	5,0	7,5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C117.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8	M10	M12	M16
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>						
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions	Effective anchorage depth $h_{ef}$ [mm]				
		≥ 50				
7,5 / 6 N/mm <sup>2</sup>	w/w   w/d	2,0	2,0	2,0	1,5	1,5
	d/d					
10 / 8 N/mm <sup>2</sup>	w/w   w/d	2,5	2,5	3,0	2,5	2,5
	d/d					
12,5 / 10 N/mm <sup>2</sup>	w/w   w/d	3,5	3,5	4,0	3,0	3,0
	d/d					
15 / 12 N/mm <sup>2</sup>	w/w   w/d	4,0	4,0	4,5	3,5	3,5
	d/d					

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

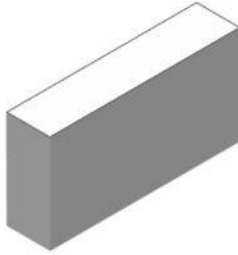
fischer injection system FIS V Plus for masonry

**Performance**

Light-weight concrete solid block Vbl,  
Characteristic resistance under tension and shear loading

**Annex C117**

**Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015**



Producer	e.g. Ytong		
Mean gross dry density $\rho$ [kg/dm <sup>3</sup> ]	0,35	0,5	0,65
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup> [N/mm <sup>2</sup> ]	2,5 / 2	5 / 4	8 / 6
Standard or annex	EN 771-4:2011+A1:2015		

**Table C118.1: Installation parameters**

Anchor rod	M6	M8	M10	M12	M16	-		-			
<b>Internal threaded anchor FIS E</b>	-	-	-	-	-	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>		
						<b>11x85</b>		<b>15x85</b>			
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>											
Effective anchorage depth $h_{ef}$ [mm]	100	200	100	200	100	200	100	200	85		
Max. installation torque $\max T_{inst}$ [Nm]	1	4	1	8	2	12	2	16	2		
<b>General installation parameters</b>											
Edge distance $c_{min} = c_{cr}$									100		
Spacing	$s_{cr \parallel} = s_{min \parallel}$									250	
	$h_{ef}=200mm$	[mm]									80
	$s_{min \parallel}$										3x $h_{ef}$
	$h_{ef}=200mm$									250	
	$s_{cr \perp}$									80	
	$h_{ef}=200mm$									3x $h_{ef}$	
	$s_{min \perp}$										
$h_{ef}=200mm$											
$s_{cr \perp}$											
<b>Drilling method</b>											
Hammer drilling with hard metal hammer drill											
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.											
fischer injection system FIS V Plus for masonry								<b>Annex C118</b>			
<b>Performance</b>		Autoclaved aerated concrete (cylindrical drill hole), dimensions, installation parameters									

<b>Table C119.1: Group factors for autoclaved aerated concrete</b> (Min. compressive strength single brick = 2 N/mm <sup>2</sup> )									
Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Group factors	[-]	$h_{ef}=200 \alpha_{g,N} (S_{min II})$	1,6			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min II})$	1,1			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N II}, \alpha_{g,V} (S_{min II})$	2,0						
		$h_{ef}=200 \alpha_{g,N} (S_{min \perp})$	1,6			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min \perp})$	0,8			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$	2,0						
1) No performance assessed.									
<b>Table C119.2: Group factors for autoclaved aerated concrete</b> (Min. compressive strength single brick = 4 N/mm <sup>2</sup> )									
Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Group factors	[-]	$h_{ef}=200 \alpha_{g,N} (S_{min II})$	0,7			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min II})$	2,0			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N II}, \alpha_{g,V} (S_{min II})$	2,0						
		$h_{ef}=200 \alpha_{g,N} (S_{min \perp})$	0,7			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min \perp})$	1,2			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$	2,0						
1) No performance assessed.									
<b>Table C119.3: Group factors for autoclaved aerated concrete</b> (Min. compressive strength single brick = 6 N/mm <sup>2</sup> )									
Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Group factors	[-]	$h_{ef}=200 \alpha_{g,N} (S_{min II})$	0,7			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min II})$	2,0			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N II}, \alpha_{g,V} (S_{min II})$	2,0						
		$h_{ef}=200 \alpha_{g,N} (S_{min \perp})$	0,7			- <sup>1)</sup>		- <sup>1)</sup>	
		$h_{ef}=200 \alpha_{g,V} (S_{min \perp})$	1,2			- <sup>1)</sup>		- <sup>1)</sup>	
		$\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$	2,0						
1) No performance assessed.									
fischer injection system FIS V Plus for masonry						<b>Annex C119</b>			
<b>Performance</b> Autoclaved aerated concrete (cylindrical drill hole), Group factors									

**Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015**

**Table C120.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8	M10	M12	M16	-		-				
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12			
							11x85		15x85				
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C<sup>3)</sup></b>													
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]											
		100	200	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5
	d/d	1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0	1,5	1,5
5 / 4 N/mm <sup>2</sup>	w/w w/d	1,2	- <sup>1)</sup>	2,0	1,5	2,5	3,5	2,5	3,5	2,0	3,5	2,0	1,5
	d/d	1,5	- <sup>1)</sup>	2,0	3,0	3,0	5,0	2,5	5,0	2,0	5,0	2,0	1,5
8 / 6 N/mm <sup>2</sup>	w/w w/d	1,5	- <sup>1)</sup>	3,0	2,5	4,5	5,0	4,5	7,0	3,0	8,5	3,5	2,5
	d/d	1,5	- <sup>1)</sup>	3,5	4,0	5,0	7,0	5,0	9,0	3,0	11,5	3,5	2,5

<sup>1)</sup> No performance assessed.

<sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>3)</sup> For temperature range 72/120°C:  $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$ .

**Table C120.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8	M10	M12	M16	-		-				
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12			
							11x85		15x85				
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}</math> [kN]; temperature range 50/80°C and 72/120°C</b>													
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use conditions	Effective anchorage depth $h_{ef}$ [mm]											
		100	200	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	1,2	1,2	1,2	1,2	1,2	1,2	1,5	1,2	1,2	1,2	1,2	1,5
	d/d	1,2	1,2	1,2	1,2	1,2	1,2	1,5	1,2	1,2	1,2	1,2	1,5
5 / 4 N/mm <sup>2</sup>	w/w w/d	2,0	- <sup>1)</sup>	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0	2,5
	d/d	2,0	- <sup>1)</sup>	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0	2,5
8 / 6 N/mm <sup>2</sup>	w/w w/d	2,5	- <sup>1)</sup>	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5	3,5
	d/d	2,5	- <sup>1)</sup>	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5	3,5

<sup>1)</sup> No performance assessed.

<sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength

Factor for job site tests and displacements see annex C123.

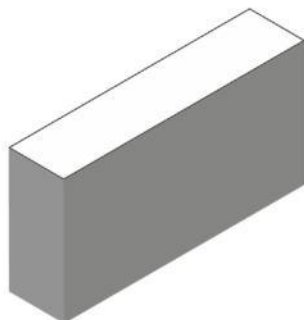
fischer injection system FIS V Plus for masonry

**Performance**

Autoclaved aerated concrete (cylindrical drill hole),  
Characteristic resistance under tension and shear loading

**Annex C120**

**Autoclaved aerated concrete (conical drill hole with special drill bit PBB),  
EN 771-4:2011+A1:2015**



Producer	e.g. Ytong			
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,35	0,5	0,65
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	[N/mm <sup>2</sup> ]	2,5 / 2	5 / 4	8 / 6
Standard or annex	EN 771-4:2011+A1:2015			

**Table C121.1: Installation parameters**

Anchor rod	M8		M10		M12		-	
Internal threaded anchor FIS E	-	-	-	-	-	-	M6	M8
11x85								
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>								
Effective anchorage depth $h_{ef}$	[mm]	75	95	75	95	75	95	85
Max. installation torque $\max T_{inst}$	[Nm]	2						
<b>General installation parameters</b>								
Edge distance $C_{min} = C_{cr}$		120	150	120	150	120	150	150
Spacing	$s_{cr \parallel} = s_{min \parallel}$	240	300	240	300	240	300	300
	$s_{cr \perp} = s_{min \perp}$	240	250	240	250	240	250	250

**Drilling method**

Hammer drilling with hard metal hammer drill

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C121.2: Group factors**

Anchor rod	M8		M10		M12		-			
Internal threaded anchor FIS E	-	-	-	-	-	-	M6	M8		
11x85										
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2							
	$\alpha_{g,V} (s_{min \parallel})$									
	$\alpha_{g,N} (s_{min \perp})$									
	$\alpha_{g,V} (s_{min \perp})$									

fischer injection system FIS V Plus for masonry

**Performance**

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),  
dimensions, installation parameters, Group factors

**Annex C121**

<b>Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4:2011+A1:2015</b>										
<b>Table C122.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading</b>										
Anchor rod		M8		M10		M12		-		
Internal threaded anchor FIS E		-		-		-		-		
								M6	M8	
								11x85		
<b><math>N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}</math> [kN]; temperature range 50/80°C <sup>2)</sup></b>										
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>		Use con- ditions		Effective anchorage depth $h_{ef}$ [mm]						
				75	95	75	95	75	95	85
2,5 / 2 N/mm <sup>2</sup>		w/w	w/d	2,0	2,5	2,0	2,5	2,0	2,5	2,0
		d/d		2,0	2,5	2,0	2,5	2,0	2,5	2,0
5 / 4 N/mm <sup>2</sup>		w/w	w/d	3,0	3,5	3,0	3,5	3,0	3,5	3,0
		d/d		3,0	3,5	3,0	3,5	3,0	3,5	3,0
8 / 6 N/mm <sup>2</sup>		w/w	w/d	3,5	4,0	3,5	4,0	3,5	4,0	3,5
		d/d		4,0	4,5	4,0	4,5	4,0	4,5	4,0
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.										
<sup>2)</sup> For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$ .										
<b>Table C122.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading</b>										
Anchor rod		M8		M10		M12		-		
Internal threaded anchor FIS E		-		-		-		-		
								M6	M8	
								11x85		
<b><math>V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}</math> [kN]; temperature range 50/80°C and 72/120°C</b>										
Mean compressive strength / Min. com-pressive strength single brick <sup>1)</sup>		Use con- ditions		Effective anchorage depth $h_{ef}$ [mm]						
				75	95	75	95	75	95	85
2,5 / 2 N/mm <sup>2</sup>		w/w	w/d	2,5						
		d/d								
5 / 4 N/mm <sup>2</sup>		w/w	w/d	4,5						
		d/d								
8 / 6 N/mm <sup>2</sup>		w/w	w/d	6,0						
		d/d								
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.										
Factor for job site tests and displacements see annex C123.										
fischer injection system FIS V Plus for masonry								<b>Annex C122</b>		
<b>Performance</b>		Autoclaved aerated concrete (conical drill hole with special drill bit PBB), Characteristic resistance under tension and shear loading								

<b>β-factors for job site tests; displacements</b>					
<b>Table C123.1: β-factors for job site tests</b>					
use conditions		w/w and w/d		d/d	
temperature range [°C]		50/80	72/120	50/80	72/120
Material	Size	β-factors			
solid units	M6	0,55	0,46	0,96	0,80
	M8	0,57	0,51		
	M10	0,59	0,52		
	M12 FIS E 11x85	0,60	0,54		
	M16 FIS E 15x85	0,62	0,52		
	FIS H 16x85 K	0,55	0,46		
hollow units	all sizes	0,86	0,72	0,96	0,80
Autoclaved aerated concrete cylindrical drill hole	all sizes	0,73	0,73	0,81	0,81
Autoclaved aerated concrete conical drill hole	all sizes	0,66	0,59	0,73	0,66

<b>Table C123.2: Displacements</b>						
Material	N [kN]	δN <sub>0</sub> [mm]	δN <sub>∞</sub> [mm]	V [kN]	δV <sub>0</sub> [mm]	δV <sub>∞</sub> [mm]
solid units and autoclaved aerated concrete h <sub>ef</sub> =100mm	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF Annex C4 - C7	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,23	1,85
solid brick KS NF Annex C14 / C15	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,20	0,40	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,91	1,37
AAC h <sub>ef</sub> =200 mm Annex C118 - C120	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,25	1,88
brick Annex C102 / C103	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	6,44	9,66

For anchorage in autoclaved aerated concrete (AAC), the partial factor  $\gamma_{MAAC}$  shall be used instead of  $\gamma_{Mm}$ .

fischer injection system FIS V Plus for masonry	<b>Annex C123</b>
<b>Performance</b> β-factors for job site tests; displacements	

<b>Characteristic values under tension and shear loading under fire exposure (single anchor)</b>																				
<b>Table C124.1: Characteristic values under tension and shear loading under fire exposure; considering all failure modes</b>																				
<b>Brick</b>		Solid brick Mz, NF, acc. to Annex C4			Solid calcium silicate brick KS, NF, acc. to Annex C14			Perforated calcium silicate brick KSL, acc. to Annex C24			Vertical perforated brick HLz, acc. to Annex C28			Vertical perforated brick HLz, acc. to Annex C30			Autoclaved aerated concrete, acc. to Annex C118			
Mean compressive strength / Min. comp. strength single brick <sup>3)</sup>		≥ 15 / ≥ 12			≥ 15 / ≥ 12			≥ 10 / ≥ 8			≥ 5 / ≥ 4			≥ 7,5 / ≥ 6			≥ 2,5 / ≥ 2			
Size		M8	M10	M12	M8	M8	M8	M8	M10	M12	M8	M10	M12	M8	M10	M12	M8	M10	M12	M16
Perforated Sleeve		-			-			16x130		16x130	16x130		20x130	16x85		20x85	-			
Perforated Sleeve for bridging of unbearing layer		-			-			-		-	-		20x200	16x130		20x130	-			
h <sub>ef</sub> [mm]		≥ 80			≥ 50			≥ 130			≥ 130			≥ 85			≥ 100			
<b>Characteristic resistance to failure under tension loading</b>																				
N <sub>Rk,s,fi</sub> = N <sub>Rk,p,fi</sub> = N <sub>Rk,b,fi</sub> <sup>2)</sup>	R30	0,82			0,32			1,07	1,09	1,10	0,31			0,28	0,30	0,35	0,84	0,82	0,80	0,80
	R60	0,73			0,31			0,66	0,61	0,56	0,22			0,19	0,22	0,22	0,71	0,67	0,63	0,63
	R90	0,64			0,29			0,25	0,13	- <sup>1)</sup>	0,13			0,10	0,10	0,10	0,58	0,51	0,45	0,45
	R120	0,59			0,28			- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>			- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>
<b>Characteristic resistance to failure under shear loading <sup>2)</sup></b>																				
<b>without lever arm</b>																				
V <sub>Rk,s,fi</sub>	R30	0,82			0,32			1,07	1,09	1,10	0,31			0,28	0,30	0,35	1,10	1,75	2,54	4,74
	R60	0,73			0,31			0,66	0,61	0,56	0,22			0,19	0,22	0,22	0,86	1,37	1,99	3,71
	R90	0,64			0,29			0,25	0,13	- <sup>1)</sup>	0,13			0,10	0,10	0,10	0,62	0,99	1,44	2,68
	R120	0,59			0,28			- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>			- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>
<b>with lever arm</b>																				
M <sup>0</sup> <sub>Rk,s,fi</sub>	R30	0,83	1,05	1,27	0,33	0,42	0,50	1,09	1,40	1,71	0,32	0,40	0,48	0,29	0,39	0,54	1,12	2,26	3,95	10,0
	R60	0,74	0,93	1,13	0,31	0,39	0,47	0,67	0,78	0,86	0,22	0,28	0,34	0,19	0,28	0,34	0,87	1,77	3,20	7,87
	R90	0,65	0,82	0,99	0,29	0,37	0,44	0,26	0,17	- <sup>1)</sup>	0,13	0,16	0,20	0,10	0,12	0,15	0,63	1,28	2,24	5,69
	R120	0,60	0,76	0,92	0,28	0,35	0,43	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>	- <sup>1)</sup>
<b>General installation Parameters</b>																				
Edge distance and spacing	C <sub>cr,fi</sub>	100			60			80			80			100			200			
	S <sub>cr,fi</sub>	320			200			520			340			520			400			
<sup>1)</sup> No performance assessed. <sup>2)</sup> V <sub>Rk,b,fi</sub> = N <sub>Rk,b,fi</sub> <sup>3)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. In absence of national regulations, the recommended partial factor γ <sub>M,fi</sub> = 1,0.																				
fischer injection system FIS V Plus for masonry																		<b>Annex C124</b>		
<b>Performance</b> Characteristic values under tension and shear loading under fire exposure (single anchor)																				

**Characteristic values under tension loading under fire exposure (anchor group)**

**Table C125.1:** Characteristic values under tension loading under fire exposure; brick breakout failure <sup>3)</sup>

Brick	Mean compressive strength / Min. comp. strength single brick <sup>2)</sup>	h <sub>ef</sub>	Spacing	M8		M10		M12		M16					
				N <sup>9</sup> <sub>Rk,b,fi(90)</sub>	N <sup>9</sup> <sub>Rk,b,fi(120)</sub>	N <sup>9</sup> <sub>Rk,b,fi(90)</sub>	N <sup>9</sup> <sub>Rk,b,fi(120)</sub>	N <sup>9</sup> <sub>Rk,b,fi(90)</sub>	N <sup>9</sup> <sub>Rk,b,fi(120)</sub>	N <sup>9</sup> <sub>Rk,b,fi(90)</sub>	N <sup>9</sup> <sub>Rk,b,fi(120)</sub>				
No. of anchors in a group:				2	4	2	4	2	4	2	4	2	4	2	4
[-]	[N/mm <sup>2</sup> ]	[mm]	[-]	[kN]											
Solid brick MZ, NF acc. to Annex C4	≥ 15 / ≥ 12	≥ 80	Scr,fi	1,1	0,8	1,3	1,0	1,5	1,2	-					
			Scr,fi ⊥	2,1	1,7	2,5	2,0	2,9	2,4	-					
Solid calcium silicate brick KS, NF, acc. to Annex C14	≥ 15 / ≥ 12	≥ 50	Scr,fi	0,3	0,2	0,3	0,2	0,3	0,2	-					
			Scr,fi ⊥	0,6	0,5	0,6	0,5	0,6	0,5	-					
Perforated calcium silicate brick KSL, acc. to Annex C24	≥ 10 / ≥ 8	≥ 130	Scr,fi	1,4	1,1	1,4	1,1	1,4	1,1	-					
			Scr,fi ⊥	2,7	2,2	2,7	2,2	2,7	2,2	-					
Vertical perforated brick HLz, acc. to Annex C30	≥ 7,5 / ≥ 6	≥ 85	Scr,fi	0,4	0,4	0,4	0,4	0,5	0,4	-					
			Scr,fi ⊥	0,9	0,7	0,9	0,7	1,1	0,9	-					
Vertical perforated brick HLz, acc. to Annex C28	≥ 5 / ≥ 4	≥ 130	Scr,fi	0,4	0,3	0,4	0,3	0,5	0,4	-					
			Scr,fi ⊥	0,4	0,3	0,4	0,3	0,5	0,4	-					
Autoclaved aerated concrete acc. to Annex C118	≥ 2,5 / ≥ 2	≥ 100	Anchor rod	M8		M10		M12		M16					
			Scr,fi	1,1	0,8	1,1	0,8	1,1	0,8	1,4	1,1	1,4	2,8	1,1	2,2
	Scr,fi ⊥	1,1	0,8	1,1	0,8	1,1	0,8	1,1	0,8	1,1	0,8	1,1	0,8	1,1	0,8
	Internal threaded anchor FIS E	11x85 M8		15x85 M10		15x85 M12		-							
≥ 2,5 / ≥ 2	≥ 85	Scr,fi	0,9	0,7	0,9	0,7	0,9	0,7	-						
		Scr,fi ⊥	0,9	0,7	0,9	0,7	0,9	0,7	-						

<sup>1)</sup> No performance assessed.

<sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>3)</sup> All other proofs have to be conducted with the single anchor in accordance with TR 054.

In absence of national regulations, the recommended partial factor  $\gamma_{M,fi} = 1,0$ .

fischer injection system FIS V Plus for masonry

**Performance**  
Characteristic values under tension loading under fire exposure (anchor group)

**Annex C125**

## Spacing and edge distance under fire exposure (anchor group)

**Table C126.1:** Spacing and Edge distance under fire exposure, brick breakout failure

<b>Solid brick MZ, NF acc. to Annex C4</b> mean compressive strength / Min. compressive strength single brick $\geq 15 / \geq 12 \text{ N/mm}^2$								
<b>Anchor rod</b>			<b>M8</b>		<b>M10</b>		<b>M12</b>	
Effective anchorage depth	$h_{ef}$	[mm]	80	200	80	200	80	200
Characteristic spacing	$s_{cr,fi \parallel}$		80	320	80	320	80	320
	$s_{cr,fi \perp}$		100	100	100	100	100	100
Edge distance	$c_{cr,fi}$		160	400	160	400	160	400
<b>Solid calcium silicate brick KS, NF, acc. to Annex C14</b> mean compressive strength / Min. compressive strength single brick $\geq 15 / \geq 12 \text{ N/mm}^2$								
<b>Anchor rod</b>			<b>M8</b>		<b>M10</b>		<b>M12</b>	
Effective anchorage depth	$h_{ef}$	[mm]	50	100	50	200	50	200
Characteristic spacing	$s_{cr,fi \parallel}$		107	107	107	107	107	107
	$s_{cr,fi \perp}$		200	400	200	800	200	800
Edge distance	$c_{cr,fi}$		100	200	100	400	100	400
<b>Perforated calcium silicate brick KSL, acc. to Annex C24</b> mean compressive strength / Min. compressive strength single brick $\geq 10 / \geq 8 \text{ N/mm}^2$								
<b>Anchor rod / perforated sleeve</b>			<b>M8 / 16x130</b>		<b>M10 / 16x130</b>		<b>M12 / 20x130</b>	
Effective anchorage depth	$h_{ef}$	[mm]	130		130		130	
Characteristic spacing	$s_{cr,fi \parallel}$		133		133		133	
	$s_{cr,fi \perp}$		153		153		153	
Edge distance	$c_{cr,fi}$		260		260		260	
<b>Vertical perforated brick HLz, acc. to Annex C30</b> mean compressive strength / Min. compressive strength single brick $\geq 7,5 / \geq 6 \text{ N/mm}^2$								
<b>Anchor rod / perforated sleeve</b>			<b>M8 / 16x85</b>		<b>M10 / 16x85</b>		<b>M12 / 20x85</b>	
Effective anchorage depth	$h_{ef}$	[mm]	85		85		85	
Characteristic spacing	$s_{cr,fi \parallel}$		320		320		320	
	$s_{cr,fi \perp}$		153		153		153	
Edge distance	$c_{cr,fi}$		170		170		170	
<b>Vertical perforated brick HLz, acc. to Annex C28</b> mean compressive strength / Min. compressive strength single brick $\geq 5 / \geq 4 \text{ N/mm}^2$								
<b>Anchor rod / perforated sleeve</b>			<b>M8 / 16x130</b>		<b>M10 / 16x130</b>		<b>M12 / 20x130</b>	
Effective anchorage depth	$h_{ef}$	[mm]	130		130		130	
Characteristic spacing	$s_{cr,fi \parallel}$		133		133		133	
	$s_{cr,fi \perp}$		133		133		133	
Edge distance	$c_{cr,fi}$		260		260		260	
fischer injection system FIS V Plus for masonry							<b>Annex C126</b>	
<b>Performance</b> Spacing and edge distance under fire exposure (anchor group)								

**Spacing and edge distance under fire exposure (anchor group)**

**Table C127.1:** Spacing and Edge distance under fire exposure, brick breakout failure

<b>Autoclaved aerated concrete acc. to Annex C118</b> mean compressive strength / Min. compressive strength single brick $\geq 2,5 / \geq 2$ N/mm <sup>2</sup>										
<b>Anchor rod</b>			<b>M8</b>		<b>M10</b>		<b>M12</b>		<b>M16</b>	
Effective anchorage depth	$h_{ef}$	[mm]	100	200	100	200	100	200	100	200
Characteristic spacing	$s_{cr,fi \parallel}$		333	107	333	107	333	107	333	107
	$s_{cr,fi \perp}$		333	107	333	107	333	107	333	107
Edge distance	$c_{cr,fi}$		200	400	200	400	200	400	200	400
<b>Autoclaved aerated concrete acc. to Annex C118</b> mean compressive strength / Min. compressive strength single brick $\geq 2,5 / \geq 2$ N/mm <sup>2</sup>										
<b>Internal threaded anchor FIS E</b>			<b>11x85 M8</b>		<b>15x85 M10</b>		<b>15x85 M12</b>			
Effective anchorage depth	$h_{ef}$	[mm]	85		85		85			
Characteristic spacing	$s_{cr,fi \parallel}$		333		333		333			
	$s_{cr,fi \perp}$		333		333		333			
Edge distance	$c_{cr,fi}$		170		170		170			
fischer injection system FIS V Plus for masonry									<b>Annex C127</b>	
<b>Performance</b> Spacing and edge distance under fire exposure (anchor group)										