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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:

Trade name of the construction product

Product family to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment contains

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

This version replaces

Deutsches Institut für Bautechnik

fischer injection system FIS V Plus for masonry

Metal Injection anchors for use in masonry

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

fischerwerke

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

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

ETA-20/0729 issued on 31 October 2023

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# **European Technical Assessment ETA-20/0729**

English translation prepared by DIBt



Page 2 of 158 | 3 February 2025

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Z169623.24 8.06.04-178/23



Page 3 of 158 | 3 February 2025

### 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

Z169623.24 8.06.04-178/23

# **European Technical Assessment ETA-20/0729**

English translation prepared by DIBt



Page 4 of 158 | 3 February 2025

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

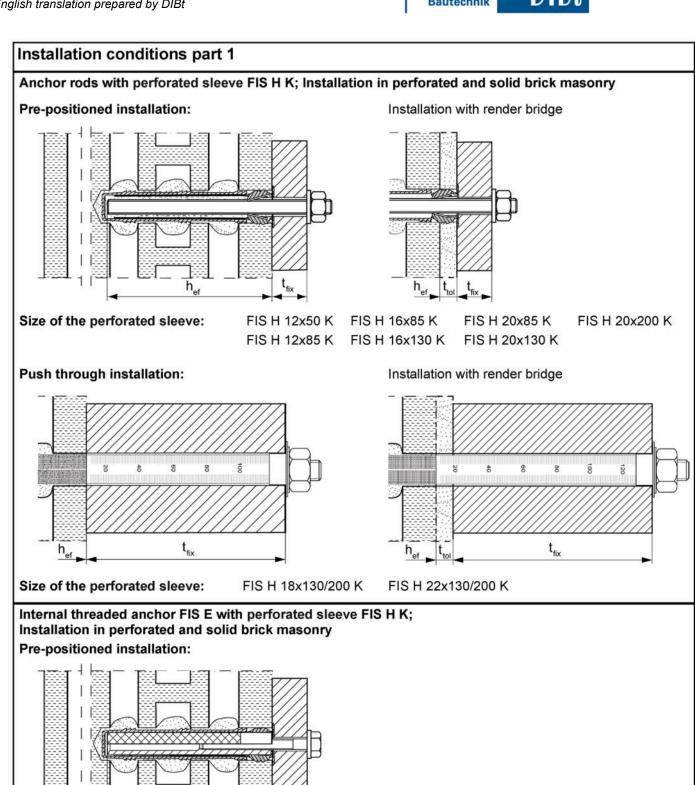
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

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

Dipl.-Ing. Beatrix Wittstock Head of Section *beglaubigt:*Baderschneider

Z169623.24 8.06.04-178/23





hef = effective anchorage depth

ttol = thickness of unbearing layer (e.g. plaster)

t<sub>fix</sub> = 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

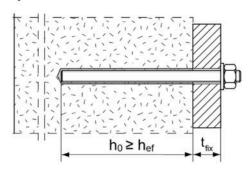
Figures not to scale



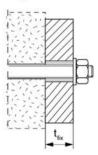
# Installation conditions part 2

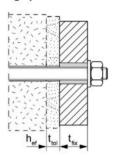
Anchor rods without perforated sleeve FIS H K; installation in solid brick masonry and autoclaved aerated concrete

### Pre-positioned installation:



# Push through installation: Annular gap filled with mortar

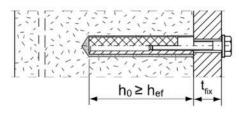




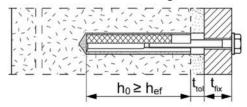
Installation with render bridge

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

# Pre-positioned installation:



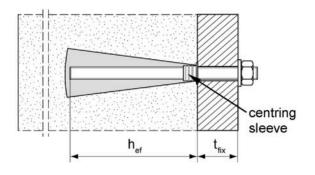
#### Installation with render bridge



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)

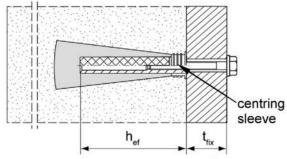
# Pre-positioned installation:

anchor rods M8, M10, M12



# Pre-positioned installation:

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

h<sub>0</sub> = depth of drill hole

ttol = thickness of unbearing layer (e.g. plaster)

hef = effective anchorage depth

 $t_{fix}$  = thickness of fixture

# fischer injection system FIS V Plus for masonry

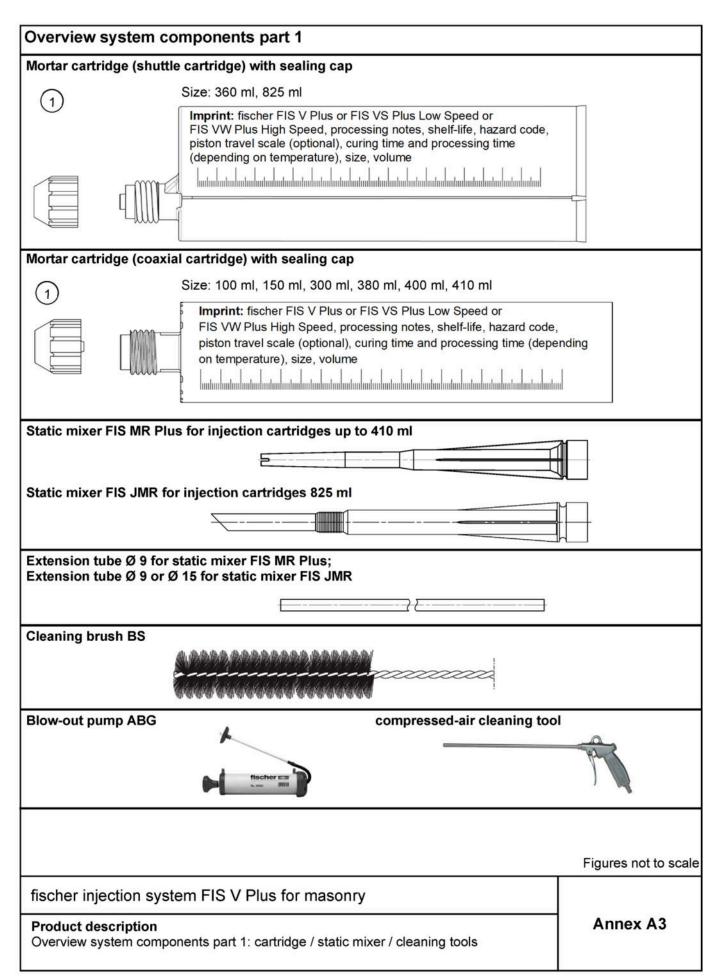
# **Product description**

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

Annex A2

Z203835.24







Overv	iew system components part 2	
fische	anchor rod	
2	Size: M6, M8, M10, M12, M16	
Interna	I threaded anchor FIS E	
5	Size: 11x85 M6 / M8 15x85 M10 / M12	
Perfor	ated 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	
Perfor	ated sleeve FIS H K (push through installation)	
7	F	ize: IS H 18x130/200 K IS H 22x130/200 K
Washe	r	
3		
Hexag	on nut	
4		
Injectio	n adapter centring sleeve PBZ	
	7	
Specia	conic drill bit PBB	
		Figures not to scale
fische	er injection system FIS V Plus for masonry	riguics not to scale
Overv	ct description ew system components part 2: steel parts / perforated sleeve / conical drill bit / on adapter / centring sleeve	Annex A4



Part	Designation		Material				
1	Mortar cartridge	artridge Mortar, hardener; filler					
		Steel	Stainless steel R	High corrosion resistant ste 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+A1:201			
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated ≥ 5µm, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 fuk ≤ 1000 N/mm² A <sub>5</sub> > 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 $f_{uk} \le 1000 \text{ N/mm}^2$ A <sub>5</sub> > 8% fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with $f_{yk}$ = 560 N/mm <sup>2</sup> 1.4565; 1.4529 EN 10088-1:2023 $f_{uk} \le 1000$ N/mm <sup>2</sup> A <sub>5</sub> > 8% fracture elongatio			
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, 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 ≥ 5µm, 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 ≥ 5µm, 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 ≥ 5µm, 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				
	luct description	tem FIS V Plus for masor	nry	Annex A5			



#### Specifications of intended use part 1 Table B1.1: Overview use and performance categories fischer injection system FIS V Plus for masonry Anchorages subject to 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, all bricks in masonry Exposure to fire under tension and C124 to C127 (Applies only to the conditions of dry masonry) shear loading Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Anchor rod or FIS H 12x50 K Size: Pre-positioned internal threaded anchor FIS H 12x85 K installation (in solid brick masonry and FIS H 16x85 K autoclaved aerated concrete) FIS H 16x130 K Installation FIS H 20x85 K FIS H 20x130 K FIS H 20x200 K Perforated sleeve with anchor rod Anchor rod; (in perforated and solid brick Push through use only in cylindrical drill hole masonry) installation (in solid brick masonry and FIS H 18x130/200 K Size: autoclaved aerated concrete) FIS H 22x130/200 K conditions d/d (dry/dry) Installation and conditions w/d all bricks use conditions (wet/dry) conditions w/w (wet/wet) D3 (downward and horizontal installation) Installation direction $T_{i,min}$ = -10 °C to $T_{i,max}$ = +40 °C Installation temperature Temperature (max. short term temperature +80 °C -40 °C to +80 °C max. long term temperature +50 °C) range Tb In-service temperature (max. short term temperature +120 °C; Temperature -40 °C to +120 °C max. long term temperature +72 °C) range Tc fischer injection system FIS V Plus for masonry Annex B1 Intended Use Specifications part 1



# Specifications of intended use part 2

## Anchorages 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 her+30mm.
- 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 β-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:

- Tb: From 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- Tc: 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:

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

$$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$$

For the calculation of pulling out a brick under tension loading **N**<sub>Rk,pb</sub> or pushing out a brick under shear loading **V**<sub>Rk,pb</sub> see EOTA Technical Report TR 054:2023-12.

N<sub>Rk,s</sub>, V<sub>Rk,s</sub> and M<sup>0</sup><sub>Rk,s</sub> 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
DELL'AND CHARGE PARK AND	aerated concrete without perforated sleeves

Anchor rod	Thread	M6	M8	M10	M12	M16	
Nominal drill hole diameter	d <sub>0</sub> [mm]	8	10	12	14	18	
Effective anchorage depth hef1)	h <sub>0,min</sub> ≥ h <sub>ef,min</sub> [mm]		S-	100	<u> </u>	20	
in AAC cylindrical drill hole	h <sub>0,max</sub> ≥h <sub>ef,max</sub> [mm]			200		-27	
	h <sub>o</sub> [mm]			h <sub>ef</sub> + 5			
Effective anchorage depth hef in AAC conical drill hole	h <sub>ef,1</sub> [mm]	-		75		-	
III 7440 comical drill floic	h <sub>ef,2</sub> [mm]			95			
Effective anchorage depth hef1)	h <sub>ef,min</sub> [mm]		***	50			
in solid brick (depth of drill hole $h_0 \ge h_{ef}$ )	h <sub>ef,max</sub> [mm]			h-30, ≤200			
Diameter of clearance pre-p	ositioning d <sub>f</sub> ≤[mm]	7	9	12	14	18	
hole in the fixture pus	sh through d <sub>f</sub> ≤[mm]	9	11	14	16	20	
Diameter of cleaning brush	d <sub>b</sub> ≥[mm]	see Table B8.1					
Maximum installation torque	T <sub>inst</sub> [Nm]	see parameters of brick					

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



Marking (on random place) fischer anchor rod:

Steel zinc plated PC1) 8.8	• or +	Steel hot-dip galvanised PC1) 8.8	•
High corrosion resistant steel HCR PC1) 50	•	High corrosion resistant steel HCR PC1) 70	=
High corrosion resistant steel HCR PC1) 80	(	Stainless steel R property class 50	~
Stainless steel R property class 80	*		

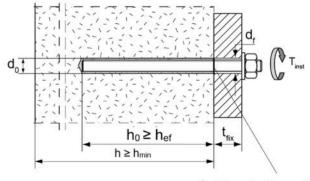
Alternatively: Colour coding according to DIN 976-1: 2016;

property class 4.6 marking according to EN ISO 898-1:2013

1) PC = property class

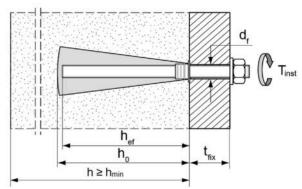
# Installation conditions:





Setting depth mark

## Anchor rod in conical drill hole



Figures not to scale

fischer injection system FIS V Plus for masonry

### Intended Use

Installation parameters for anchor rods without perforated sleeve

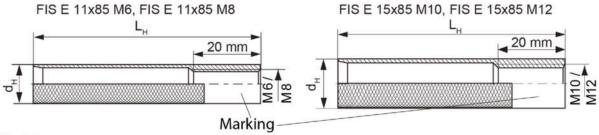
Annex B4



**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 <sub>H</sub> [mm]	11 15					11		15
Nominal drill hole diameter	d₀[mm]	1	4	1	18				
Length of anchor	L <sub>H</sub> [mm]		3	35					
Effective anchorage depth	h₀ ≥ hef[mm]	85							
Effective anchorage depth hef	h₀[mm]	100		-					
in AAC (conical drill hole)	h <sub>ef</sub> [mm]	85							
Diameter of cleaning brush	d <sub>b</sub> ≥[mm]		see Ta	ble B8.1					
Maximum installation torque	T <sub>inst</sub> [Nm]		see parame	eters of brick	a a				
Diameter of clearance hole in the fixture	d <sub>f</sub> [mm]	7 9		12	14				
Carayy in donth	I <sub>E,min</sub> [mm]	6	8	10	12				
Screw-in depth	I <sub>E,max</sub> [mm]	60							

# fischer Internal threaded anchor FISE

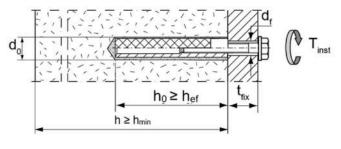


#### Marking:

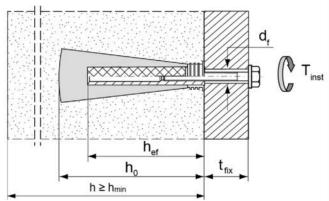
Size, e.g. M8, Stainless steel: R, e.g. M8 R, High corrosion resistant steel: HCR, e.g. M8 HCR

# Installation conditions:

Internal threaded anchor in cylindrical drill hole



Internal threaded anchor in conical drill hole



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 <sub>0</sub> = D <sub>sleeve,nom</sub>	d₀[mm]	1	2		16		20	
Depth of drill hole	h <sub>0</sub> [mm]	55	90	90	135	90	135	205
Effective anchorage depth	h <sub>ef.min</sub> [mm]	50	65	85	110	85	110	180
	hef,max [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-1	M6 and M8		nd M8 M8 and M10		M12 and M16		16
Size of internal threaded ancho	or FIS E	-	-	11x85	-	15x85	-	-
Diameter of cleaning brush1)	d <sub>b</sub> ≥[mm]	see Table B8.1						
Maximum installation torque	T <sub>inst</sub> [Nm]	see parameters of brick						

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

#### Perforated sleeve

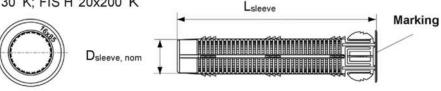
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;

FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

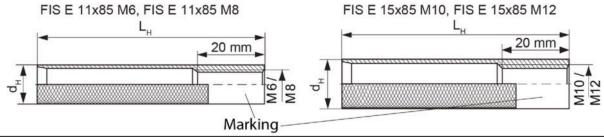
### Marking:

Size Dsleeve, nom X Lsleeve

(e.g.: 16x85)

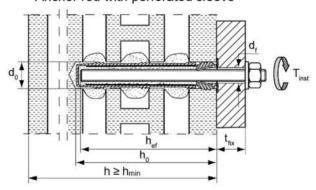


# fischer Internal threaded anchor FIS E

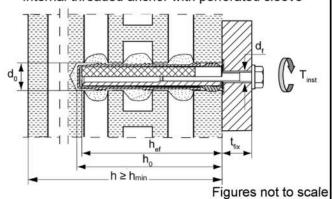


#### Installation conditions:

Anchor rod with perforated sleeve



Internal threaded anchor with perforated sleeve



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

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



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

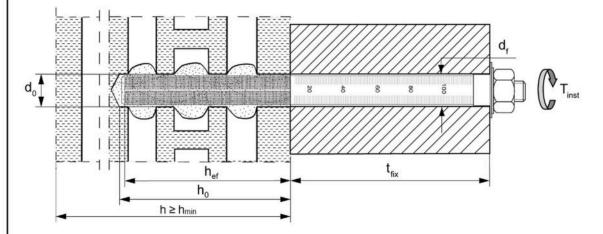
Perforated sleeve FIS H K		18x130/200 22x130/			
Nominal sleeve diameter	D <sub>sleeve,nom</sub> [mm]	16 20			
Nominal drill hole diameter	d₀[mm]	18 22			
Depth of drill hole	h₀[mm]	135			
Effective anchorage depth	h <sub>ef</sub> [mm]	≥130			
Diameter of cleaning brush 1)	d <sub>b</sub> ≥ [mm]	see Table B8.1			
Size of threaded rod	[-]	M10 M12 M16			
Maximum installation torque	T <sub>inst</sub> [Nm]	see parameters of brick			
Thickness of fixture	t <sub>fix,max</sub> [mm]	200			

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

# 

#### Installation conditions:

Anchor rod with perforated sleeve



Figures not to scale

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

Installation parameters for anchor rods with perforated sleeves



Table B8.1: Parameters of the cleaning brush BS (steel brush with steel bristles)										
The size of the clear	ing brush refers t	to the dr	ill hole dia	meter						
Drill hole diameter	d <sub>0</sub> [mm]	8	10	12	14	16	18	20	22	
Brush diameter	d₀ [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 a		Maximi	um processing t <sub>work</sub>	time <sup>2)</sup>	Minimum curing time 1), 2) tcure			
anchoring bas [°C]	se	FIS VW Plus High Speed	FIS V Plus	FIS VS Plus Low Speed	FIS VW Plus High Speed	VW Plus h Speed FIS V Plus 12 h - 3 h 24 h 3 h 3 h		
-10 to -	-5	-			12 h	9 <del>.7</del> 9	-	
> -5 to	0	5 min	-	-	3 h	24 h	1	
> 0 to	5	5 min	13 min	-	3 h	3 h	6 h	
> 5 to 1	10	3 min	9 min	20 min	50 min	90 min	3 h	
> 10 to 2	20	1 min	5 min	10 min	30 min	60 min	2 h	
> 20 to 3	30	-	4 min	6 min	-	45 min	60 min	
> 30 to 4	10	-	2 min	4 min	-	35 min	30 min	

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

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

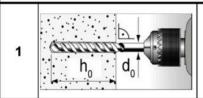
Annex B8

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

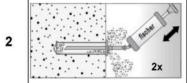


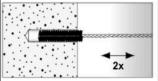
# Installation instruction part 1

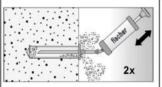
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)



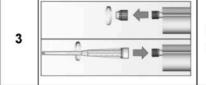
Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole  $h_0$  and drill hole diameter  $d_0$  see **Table B4.1**; **B5.1**.







Blow out the drill hole twice. Brush twice and blow out twice again.



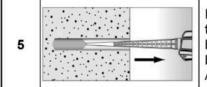
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



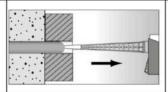
Place the cartridge into a suitable dispenser.



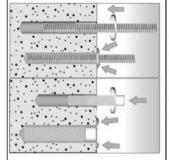
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



Fill approximetly 2/3 of the drill hole with mortar beginning from the bottom of the hole<sup>1)</sup>. Avoid bubbles!



For push through installation fill the annular clearance with mortar.



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.

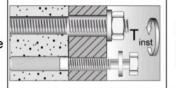
When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.

7

6



Do not touch.
Minimum curing time see **Table B8.2**.



Mounting the fixture. max T<sub>inst</sub> see parameter of brick in **Annex C**.

fischer injection system FIS V Plus for masonry

#### Intended Use

Installation instruction (without perforated sleeve) part 1

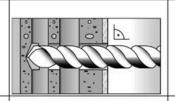
Annex B9

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



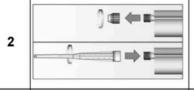
# Installation instruction part 2

Installation in perforated or solid brick with perforated sleeve (pre-positioned installation)



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 **Table B6.1** 

When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.



Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



Place the cartridge into a suitable dispenser.

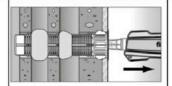


Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



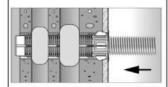


Insert the perforated sleeve flush with the surface of the masonry or plaster.



Fill the perforated sleeve completely with mortar beginning from the bottom of the hole<sup>1)</sup>.



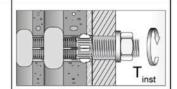


Only use clean and oil-free metal parts. Mark the ancher rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).





Do not touch. Minimum curing time see **Table B8.2** 



Mounting the fixture. max T<sub>inst</sub> see parameter of brick in **Annex C**.

fischer injection system FIS V Plus for masonry

#### Intended Use

Installation instruction (with perforated sleeve) part 2

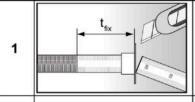
Annex B10

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

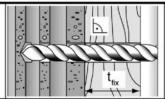


# Installation instruction part 3

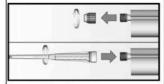
Installation in perforated or solid brick with perforated sleeve (push through installation)



Push the movable stop up to the correct thickness of fixture and cut the overlap.



Drill the hole through the fixture. Depth of drill hole (h<sub>0</sub> + t<sub>fix</sub>) and drill hole diameter see **Table B7.1**.



2

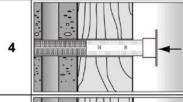
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



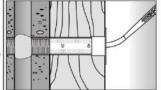
Place the cartridge into a suitable dispenser.



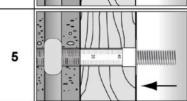
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



Insert the perforated sleeve flush with the surface of the fixture into the drill hole.



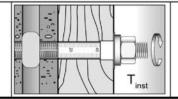
Fill the sleeve with mortar beginning from the bottom of the hole.<sup>1)</sup> For deep drill holes use an extension tube.



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).



Do not touch. Minimum curing time see **Table B8.2**.



Mounting the fixture. max T<sub>inst</sub> see parameter of brick in **Annex C**.

fischer injection system FIS V Plus for masonry

#### Intended Use

Installation instruction (with perforated sleeve) part 3

Annex B11

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



# Installation instruction part 4 Installation in autoclaved aerated concrete with special conic drill bit PBB (pre-positioned installation) Position the movable drill bit arrester on the used drill hole depth (see **Table B4.1**). 1 For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw. Drill the cylindrical hole with rotating drill until the arrester contact the material 2 surface (drilling method see Annex C of the respective brick). Deviate the working power drill circulate to generate an conic undercut in the 3 material. Blow out the drill hole four times. 4 Remove the sealing cap. Screw on the static mixer. 5 (the spiral in the static mixer must be clearly visible). Press out approximately 10 cm of mortar until the Place the cartridge into resin is permanently grey in 6 a suitable dispenser. colour. Mortar which is not grey in colour will not cure and must be disposed of. Put the center sleeve into the drill hole and Fill the drill hole with 7 adapt the injection injection mortar. adapter onto the static mixer. Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor 8 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.

ficebor	injection	custom	EIG V	Dluc	for	macann	,
lischer	injection	system	LIO A	Plus	101	masonry	,

#### Intended Use

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

Do not touch.

see Table B8.2.

Minimum curing time

Annex B12

Mounting the fixture.

of brick in Annex C.

max Tinst see parameter

9

Intended Use

Overview of assessed bricks part 1



Kind of masonry	ry Brick forma [mm]		Mean compressive strength [N/mm²]	Main country of origin	Mean gross density ρ [kg/dm³]	Annex
			Solid brick Mz			
	NF	≥240x115x71	15 / 25 / 35	Germany	≥1,8	C4 - C7
Called hadala Ma	2DF	≥240x115x113	12,5 / 20	Germany	≥1,8	C8 / C9
Solid brick Mz		≥ 245x118x54	12,5 / 25	Italy	≥1,8	C10 / C1
		≥ 230x108x55	12,5 / 25	Denmark	≥1,8	C12 / C13
Solid calcium sil	icate (	sand- lime) bric	k KS / perforated calcium	n silicate (sa	nd- lime) bric	k KSL
	NF	≥240x115x71	15 / 25 / 35	Germany	≥2,0	C14 / C1
Solid calcium silicate	8DF	≥ 250x240x240	12,5 / 25 / 35	Germany	≥2,0	C16 / C17
orick KS		≥ 997x214x538	12,5 / 25 & 45	Netherlands	≥1,8 & ≥2,2	C18 / C19
		≥ 240x115x113	12,5 / 25	Germany	≥1,8	C20 - C2
Perforated calcium silicate brick KSL	3DF	240x175x113	10 / 12,5 / 15 / 20 / 25	Germany	≥1,4	C24 – C2
		Vertic	al perforated brick HLz			
		370x240x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C28 / C29
		500x175x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C28 / C2
	2DF	240x115x113	7,5 / 12,5 / 20 / 25 / 35	Germany	≥1,4	C30 / C3
		248x365x248	5 / 7,5 / 10	Germany	≥0,6	C32 - C3
		248x365x249	10 / 12,5 / 15	Germany	≥0,7	C36 - C3
		248x365x249	5/8	Germany	≥0,5	C40 - C4
		248x425x248	5/8/10	Germany	≥0,8	C44 - C4
		248x425x248	5 / 7,5 / 10	Germany	≥0,8	C48 - C5
		500x200x315	5 / 7,5 / 10	Germany	≥0,6	C52 – C5
Vertical perforated		500x200x300	5 / 7,5 / 10 / 12,5	France	≥0,7	C56 – C5
brick HLz		500x200x315	2,5 / 5 / 7,5 / 10	France	≥0,7	C60 - C6
		560x200x275	5/8/10	France	≥0,7	C64 / C6
		255x120x118	2,5 / 5 / 8 / 10 / 12,5 / 15	Italy	≥1,0	C66 - C6
		275x130x94	7,5 / 10 / 15 / 20 / 25	Spain	≥0,8	C69 / C7
		220x190x290	7,5 / 10 / 12,5	Portugal	≥0,7	C72 - C7
		253x300x240	2,5 / 5 / 8	Austria	≥0,8	C76 - C7
		250x440x250	8 / 10 / 12,5	Austria	≥0,7	C80 – C8
		230x108x55	2,5 / 5 / 8 / 10	Denmark	≥1,4	C84 / C8
		365x248x245	10	Austria	≥0,6	C86 / C8
		240x175x113	12,5	Germany	≥0,9	C90 / C9

Z203835.24 8.06.04-178/23

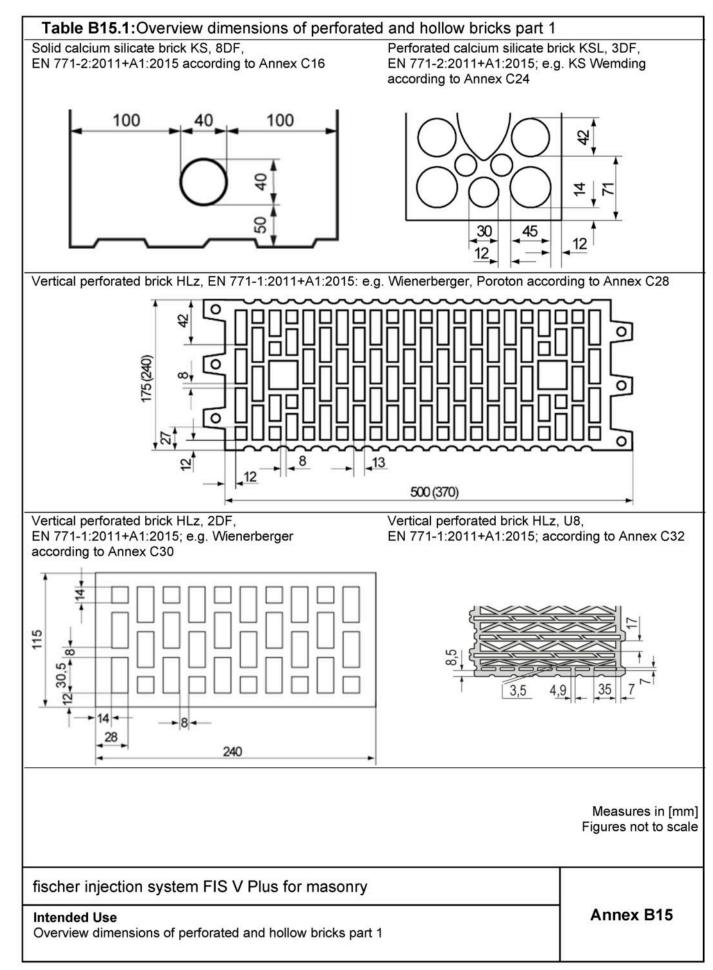
Annex B13



Table B14.1: Over	view of assesse	d bricks part 2											
Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm²]	Main country of origin	Mean gross density ρ [kg/dm³]	Annex								
	Horizontal perforated brick LLz												
Horizontal perforated	248x78x250	2,5 / 5 / 8	Italy	≥0,7	C94 / C95								
brick LLz	128x88x275	2,5	Spain	≥0,8	C96 / C97								
	Light-w	eight concrete ho	low block Hbl										
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								
HOHOW BIOCK TIBI	440x215x215	5 / 8 / 10 / 12,5	Ireland	≥1,2	C104 - C107								
	Light-v	veight concrete so	olid block Vbl										
	≥ 372x300x254	2,5	Germany	≥0,6	C108 / C109								
Light-weight concrete	≥ 250x240x239	5/8/10	Germany	≥1,6	C110 - C113								
solid block Vbl	≥ 440x100x215	5 / 8 / 10 / 12,5	Ireland	≥2,0	C114 / C115								
	≥ 440x95x215	7,5 / 10 / 12,5 / 15	England	≥2,0	C116 / C117								
	Autoc	laved aerated con	crete (AAC)										
PP2 / AAC	= .	2,5	Germany	0,35	C118 - C122								
PP4 / AAC	2 ,	5	Germany	0,5	C118 - C122								
PP6 / AAC	= .	8	Germany	0,65	C118 - C122								

Annex B14



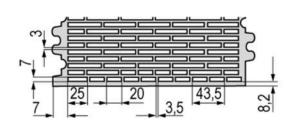


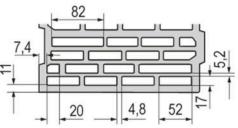


# Table B16.1:Overview dimensions of perforated and hollow bricks part 2

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

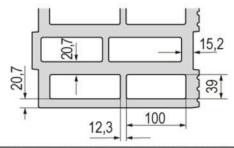
Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2011+A1:2015; according to Annex C40

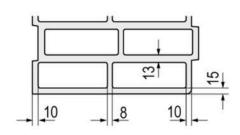




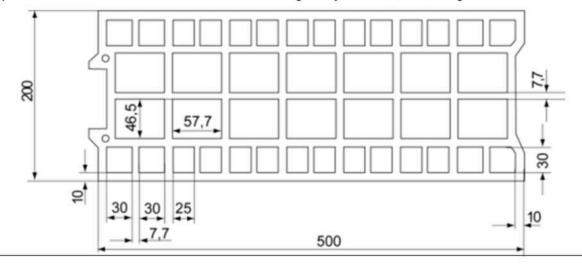
Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015; according to Annex C44

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

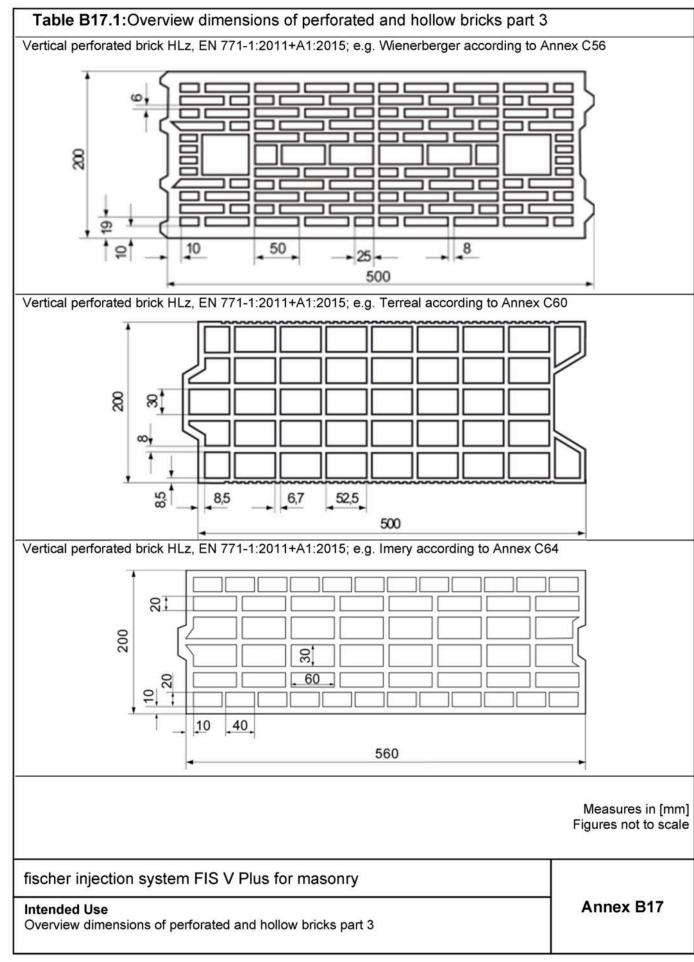
fischer injection system FIS V Plus for masonry

# Intended Use

Overview dimensions of perforated and hollow bricks part 2

Annex B16



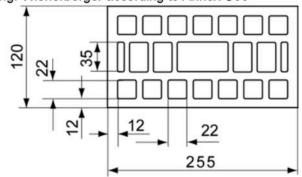




# Table B18.1:Overview dimensions of perforated and hollow bricks part 4

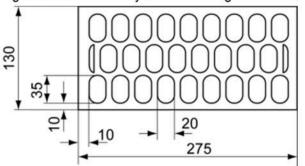
Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Wienerberger according to Annex C66



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

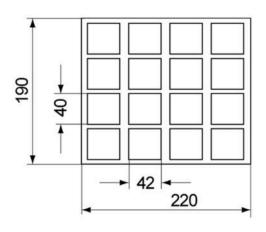
e.g. Cermanica Farreny S.A. according to Annex C69



Vertical perforated brick HLz,

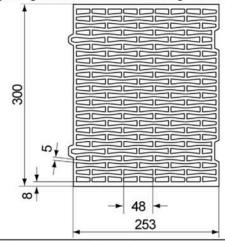
EN 771-1:2011+A1:2015;

e.g. Perceram according to Annex C72

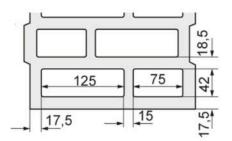


Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Ziegelwerk Brenna according to Annex C76

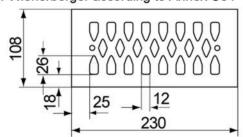


Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2011+A1:2015 according to Annex C80



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

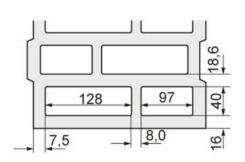
Overview dimensions of perforated and hollow bricks part 4

Annex B18



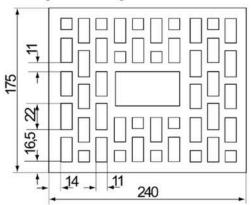
# Table B19.1:Overview dimensions of perforated and hollow bricks part 5

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

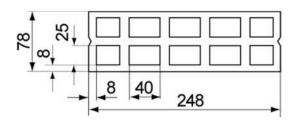


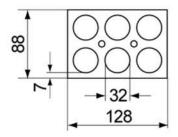
Horizontal perforated brick LLz,

EN 771-1:2011+A1:2015; according to Annex C94

Horizontal perforated brick LLz, EN 771-1:2011+A1:2015;

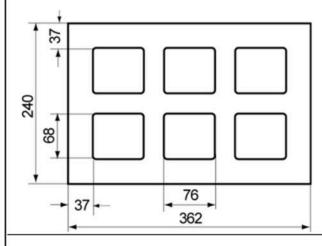
e.g. Cermanica Farreny S.A according to Annex C96

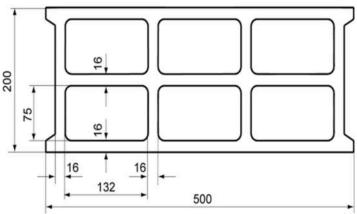




Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015; according to Annex C98 Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015;

e.g. Sepa according to Annex C102





Measures in [mm] Figures not to scale

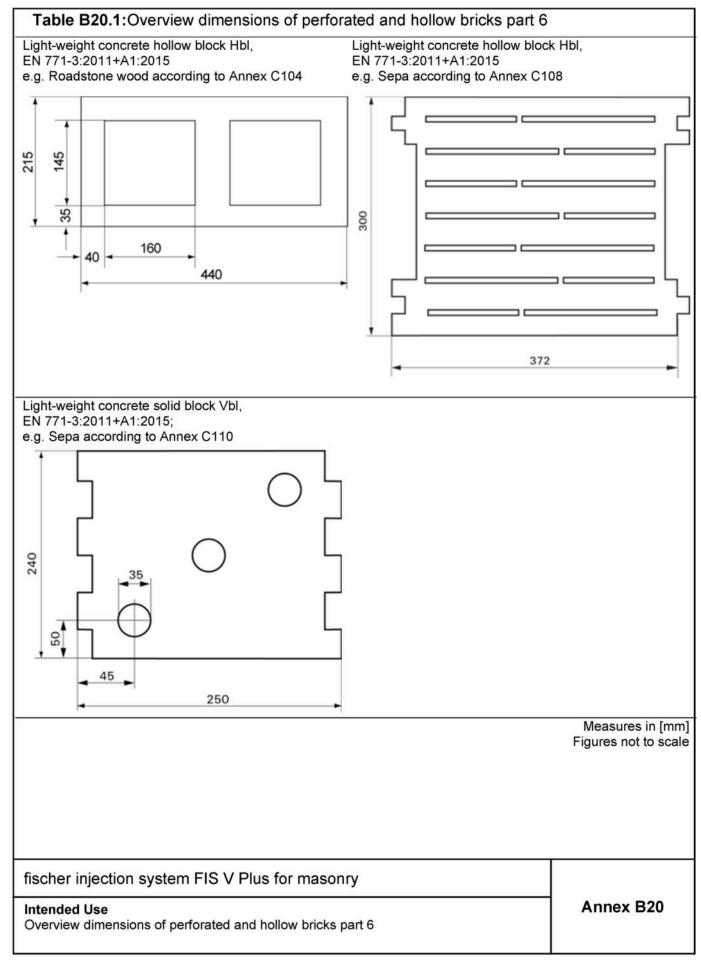
fischer injection system FIS V Plus for masonry

#### Intended Use

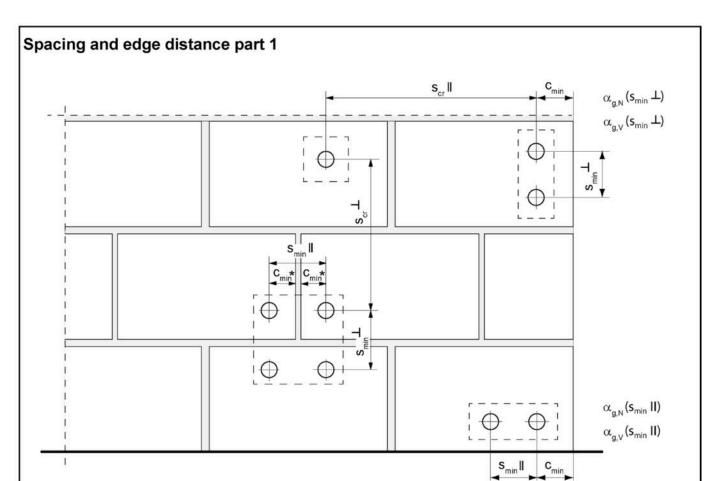
Overview dimensions of perforated and hollow bricks part 5

Annex B19









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

s<sub>min</sub> II = Minimum spacing parallel to horizontal joint

 $s_{min}$  = Minimum spacing perpendicular to horizontal joint

s<sub>cr</sub> 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<sub>min</sub> II) = Group factor for tension load, anchor group parallel to horizontal joint

 $\alpha_{g,V}$  (s<sub>min</sub> 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

Annex B21
A



# Spacing and edge distance part 2

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

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

Group of 2 anchors

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

Group of 4 anchors

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

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

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

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

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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

Anch	or rod / standard	threaded ro	od		M6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16		
Chara	acteristic resistar	ce to steel	failure	unde	r tension I	oading			ies.		
			4.6		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
S	Ctool =:== =loted		4.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
stic ZRK,	Steel zinc plated		5.8		10,0	18,3(16,6)	29,0(26,8)	42,1	78,5		
teri ce l	2	Property	8.8	ri. Nia	16,0	29,2(26,5)	46,4(42,8)	67,4	125,6		
Characteristic resistance N <sub>RK,s</sub>	Stainless steel R and	class 5	50	[kN]	10,0	18,3	29,0	42,1	78,5		
ည် ချွေ	High corrosion resistant steel		70		14,0	25,6	40,6	59,0	109,9		
			80		16,0	29,2	46,4	67,4	125,6		
Partia	al factors 1)	10				- 1 this		· ·			
			4.6		2,00						
	Ctaal mina mlatad		4.8		1,50						
ors	Steel zinc plated		5.8		1,50						
fact s,n		Property	8.8	١., ١			1,50				
Partial factors	High corresion	class	50	[-]							
Б			70				1,502) / 1,87				
	resistant steel HCR		80				1,60				

<sup>1)</sup> In absence of other national regulations

fischer injection system FIS V Plus for masonry

Performance
Characteristic resistance to steel failure under tension loading of fischer anchor rods and standard threaded rods

Annex C1

<sup>2)</sup> Only for fischer FIS A made of high corrosion resistant steel HCR

<sup>&</sup>lt;sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area A<sub>s</sub> for hot-dip galvanised standard threaded rods according to EN ISO 10684:2004+AC:2009.



Table C2.1: Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods

	4110		a o	uma	ara timoat				
Anch	or rod / standard	threaded ro	od		M6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16
Char	acteristic resistar	nce to steel	failure	unde	er shear loa	ding			
witho	ut lever arm								
<sup>®</sup> Charleins alsted		4.6		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	
stic V <sub>RK</sub>	Steel zinc plated		5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1
ce	Property	8.8	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8	
narac	of and High corrosion	class	50	[KIN]	5,0	9,1	14,5	21,0	39,2
ည် ခွ			70		7,0	12,8	20,3	29,5	54,9
	resistant steel HCR		80		8,0	14,6	23,2	33,7	62,8
with	ever arm								
9	0	4.6		6,1	14,9(12,9)	29,9(26,5)	52,3	132,9	
tan	Steel zinc plated		4.8	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
SSis	Steel Zille plated		5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2
ristic re M <sup>0</sup> Rk,s	-	Property	8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9
erist Mº	Stainless steel R and	class	50		7,6	18,7	37,3	65,4	166,2
Characteristic resistance M <sup>ORK,S</sup>	High corrosion resistant steel		70		10,6	26,2	52,3	91,5	232,6
ວິ	HCR		80		12,2	29,9	59,8	104,6	265,9
Partia	al factors1)	200							
			4.6				1,67		
	Steel zinc plated		4.8				1,25		
ors	Steel Zille plated		5.8				1,25		
al fact Yms,v		Property	8.8	, l			1,25		
Partial factors	Stainless steel R and	class	50	[-]			2,38		
P	High corrosion resistant steel		70				1,25 <sup>2)</sup> / 1,56		
	HCR		80				1,33		

<sup>1)</sup> In absence of other national regulations

fischer injection system FIS V Plus for masonry	
Performance Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods	Annex C2

<sup>2)</sup> Only for fischer FIS A made of high corrosion resistant steel HCR

<sup>&</sup>lt;sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area A<sub>s</sub> for hot-dip galvanised standard threaded rods (M8 resp. M10) according to EN ISO 10684:2004+AC:2009.



fischer internal t	hread	ed anchor	FIS E		M6	M8	M10	M12		
				under		ling, decisive val				
anchor FIS E wit		w/threade								
		Property class	4.6		8,0	14,6	23,2	33,7		
Characteristic resistance	$N_{\text{Rk,s}}$	Property class	5.8	[kN]	10,0	18,3	29,0	42,1		
		Property class 70	R	-	14,0	25,6	40,6	59,0		
Partial factors <sup>1)</sup>		Class 70	HCR		14,0	25,6	40,6	59,0		
Turtiur ruotoro		Property class	4.6			2,	00			
Partial factors	γMs,N	Property class	5.8	[-]	1,50					
		Property	R		1,87					
		class 70	HCR			100	87			
Characteristic re FIS E with screw			l failure	under	shear loadin	ig; decisive valu	es of intern	al threaded anch		
without lever arr		aca roa								
Characteristic	<u> </u>	Property class	4.6		4,8	8,7	13,9	20,2		
	$V_{Rk,s}$	Property class	5.8	[kN]	5	9	15	21		
		Property	R		7,0	12,8	20,3	29,5		
		class 70	HCR		7,0	12,8	20,3	29,5		
with lever arm		D				1				
_		Property	4.6		6,1	14,9	29,9	52,3		
Characteristic resistance	$M^0$ Rk,s	Property class	5.8	[Nm]	7,6	18,7	37,3	65,4		
		Property	R		10,6	26,2	52,3	91,5		
		class 70	HCR		10,6	26,2	52,3	91,5		
Partial factors <sup>1)</sup>		D								
		Property	4.6			1,	67			
Partial factors	γMs,V	Property class	5.8	[-]		5/3	25			
		Property class 70	R	-			56			
40.			HCR			1,	56			
1) In absence of	other r	national reg	ulations	3						
fischer injection	n sys	tem FIS	√ Plus	for ma	sonry					
Performance					.058A			Annex C3		



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

Table C4.1: Installation parameters for edge distance c=100mm

Anchor rod			M6	M8	M10	M12		•			
			200				M6	M8	M10	M12	
Internal threaded a	nchor FIS E		-	-	-	-	112	(85	15)	15x85	
Anchor rod and inter	nal threaded anch	or FIS E with	out perfor	ated sleev	e						
			50	50	50	50					
Effective anchorage depth	hef	[mm]	80	80	80	80		8	85		
andriorage deptin			200	200	200	200					
Max. installation torque	max T <sub>inst</sub>	[Nm]	4		10	č.	4 10				
General installation p	arameters										
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			100				100			
Edge distance hef=200	C <sub>min</sub> = C <sub>cr</sub>			1	50		_2)				
	Smin II,N			6	60			6	60		
8-	hef=200 smin II,N	[mm]		2	40			_	2)		
Spacing	s <sub>min</sub> II,v			2	40		240				
statistic 4,04000 SS	Scr II			2	40			2	40		
	s <sub>cr</sub> ⊥ = s <sub>min</sub> ⊥			7	75			7	'5		

# **Drilling method**

Hammer drilling with hard metal hammer drill

Table C4.2: Group factors

Anchor rods			M6	M6 M8 M10 M12 -				-	-		
Internal threaded anchor FIS E			-	=	-		M6	M8	M10	M12	
Education of the control of the cont					100	11x85		15x85			
Edge distance	Cmin	[mm]				100					
Group factor —	α <sub>a.N</sub> (S <sub>min</sub> II)		1,5								
	α <sub>g,V</sub> (s <sub>min</sub> II)		2,0								
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)		1,5								
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> II)		2,0								
	α <sub>g,N</sub> (S <sub>min</sub> ⊥)		2,0								
	α <sub>g,V</sub> (S <sub>min</sub> 上)		2,0								
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> ⊥)		2,0								
	h <sub>ef</sub> =200 α <sub>a,V</sub> (s <sub>min</sub> ⊥)		2,0								

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, NF, dimensions, installation parameters for edge distance c=100mm, Group factors	Annex C4

<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



# 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=100mm

				_			_						
Anchor rod Internal threaded anchor FIS E		M6	M8	M10		M12 -			-		-		
		-	-	-					M6	M8	M10	M12	
		2040							11x85		15x85		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p}$	$R_{k,p,c} = N_{Rk,b,c}$	c [kN];	tempe	rature	range	50/80	°C 2)						
Mean compressive	Use	Effective anchorage depth hef [mm]											
strength / Min. compressive strength single brick 1)	con- ditions	≥50	≥50	50	80	200	50	80	200	85			
4= 1.40 NV 3	w/w w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0		;	3,5	
15 / 12 N/mm <sup>2</sup>	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	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.

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

Anchor rod Internal threaded anchor FIS E		M6 M8		M10		M12		-		-	
		2225	17955		0.55	94		M6	M8	M10	M12
						-		11x85		15x85	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	Rk,c,⊥ [kN];	temper	ature r	ange 50/8	80°C and	72/120°C					
Mean compressive	Use	Effective anchorage depth hef [mm]									,
strength / Min. compressive strength single brick 1)	con- ditions	≥50	≥50	≥50	200	≥50	200	85		5	
15 / 12 N/mm²	w/w w/d	2,5	2,5	4,0	8,5	4,0	11,5		5	1	
25 / 20 N/mm²	w/w w/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=100mm

Annex C5

<sup>2)</sup> For temperature range 72/120°C: N<sub>Rk</sub> (72/120°C) = 0,83 · N<sub>Rk</sub> (50/80°C).



Internal threaded FIS E Anchor rod and i Effective anchorage depth	d anchor		M6	M8	M10	M12	M16		•		-
Anchor rod and i		•	<b>=</b> 11	-	-	-	-	M6	M8 x85	M10	M12 x85
Effective	internal	thread	ed anchor	FIS F with	out perfora	tad slaava		11/	X05	15.	X05
	IIICIIIai	lineau	50	50	50	50	50	T			
anchorage depth	h <sub>ef</sub>	[mm]	100	100	100	100	100		8	35	
			200	200	200	200	200				
Max. installation torque	max T <sub>inst</sub>	[Nm]	4		1	0		4		10	
General installat	ion para	meters	<b>3</b> ,,								
Edge distance	C <sub>min</sub> = C <sub>cr</sub>					60					
Edge distance h <sub>ef</sub> =200	C <sub>min</sub>					60					
	Smin II,N					80					
h <sub>ef</sub> =20	0 Smin II,N					80					
Spacing ———	S <sub>min</sub> II,v	1 1				80					
	S <sub>cr</sub> II	4 - 1				3x h <sub>ef</sub>					
<u> </u>	S <sub>min</sub> ⊥	1				80 3v.b					
	S <sub>cr</sub> ⊥	1 1				3x h <sub>ef</sub>					
Drilling method Hammer drilling w	vith hard Group	77530 F05-		II							
Hammer drilling w	N. 4087	77530 F05-		M8	M10	M12	M16		<b>-</b> 0:	8	-
Hammer drilling water Table C6.2:  Anchor rods Internal threaded	Group	facto	rs		M10 -	M12 -	M16	M6	M8		
Hammer drilling w Table C6.2: Anchor rods Internal threaded FIS E Edge	Group	facto	rs		M10 -	M12 - 60	M16 -	M6	_		- M12 x85
Hammer drilling w Table C6.2: Anchor rods Internal threaded FIS E Edge distance	Group d anchor	facto	rs		M10 -	- 60	M16 -	M6	M8		
Hammer drilling w Table C6.2:  Anchor rods Internal threaded FIS E Edge distance	Group	facto	rs		M10 -	-	M16	M6	M8		
Hammer drilling w Table C6.2:  Anchor rods Internal threaded FIS E Edge distance	Group d anchor  Cmin N (Smin II)	facto	rs		M10 -	60 0,6	M16 -	M6	M8		
Hammer drilling was a constant of the Table C6.2:  Anchor rods Internal threaded FIS E  Edge distance $\begin{array}{c} \alpha_{g,i} \\ \alpha_{g,i} \\ \\ \hline \alpha_{g,i} \\ \end{array}$ Group $\begin{array}{c} h_{ef} = 200 \ \alpha_{g,i} \\ h_{ef} = 200 \ \alpha_{g,i} \end{array}$	Group d anchor  Cmin N (Smin II) V (Smin II) N (Smin II)	facto	rs		M10 -	- 60 0,6 1,3	M16 -	M6	M8		
Hammer drilling w Table C6.2:  Anchor rods Internal threaded FIS E  Edge distance  α <sub>g,</sub> α <sub>g,</sub> h <sub>ef</sub> =200 α <sub>g,</sub> Group h <sub>ef</sub> =200 α <sub>g</sub> ,	Group d anchor  Cmin N (Smin II) V (Smin II) N (Smin II)	facto	rs		M10 -	- 60 0,6 1,3 1,4	M16	M6	M8		
Hammer drilling w Table C6.2:  Anchor rods Internal threaded FIS E  Edge distance	Group  d anchor  N (Smin II) V (Smin II) N (Smin II) N (Smin II) V (Smin II) V (Smin II) N (Smin II)	facto	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3 1,3	M16	M6	M8		
Hammer drilling water than the C6.2:  Anchor rods Internal threaded FIS E Edge distance  αg, αg, hef=200 αg, factor αg, αg,	Group  d anchor  N (Smin II)	facto	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16	M6	M8		- M12 x85



### 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=60mm

Anchor rod		M6	M8	M10	M12	M16	89	-		-			
Internal threaded an	chor	% <b>-</b>	-	-	-	-	48223355	M8 x85	M10	M12 x85			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N$	$I_{Rk,p,c} = N_{Rk}$	Rk,b,c [kN]; temperature range 50/80°C 3)											
Mean compressive	Llee			Effective a	anchorage dep	th hef [mm]							

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N$	Rk,p,c	= N <sub>Rk</sub>	<sub>b,c</sub> [k	(N]; t	emp	eratı	ire ra	ange	50/8	0°C 3	)					
Mean compressive strength / Min. compressive strength single brick 1)	co	se on- ons	50	100	50	100			200			200		<u> </u>	] 200	85
15 / 12 N/mm²	w/w	w/d /d	100	,5 ,5	2,0 3,0		2,0 3,0	2,5 4,0	_ <sub>2)</sub> 9,5	2,0 3,0	2,5 4,0	_ <sup>2)</sup> 9,5	2,0 3,0	S.S. X.	_ <sup>2)</sup> 9,5	_2)
25 / 20 N/mm²	w/w	w/d		,0	2,5	-	-	3,5	_2)	,	3,5	_2)	3,0	7,5	_2)	_2)
	d.	/d	3	,5	4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12	_2)
35 / 28 N/mm²	w/w	w/d	2	,5	3,0	4,0	3,0	4,0	_2)	3,5	4,0	_2)	3,5	9,0	_2)	_2)
33 / 20 14/111111	d	/d	4	,0	5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	_2)

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

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

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	::=		-	1=1	-	M6 M	M10 M12 15x85

														7.0	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	V <sub>Rk,c,⊥</sub> [kN]	; ten	npera	ture	ranç	je 50	/80°C	Cano	72/	120°0	2	3		-	E 2
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	50	100	50	100			tive a					Ĩ	[	85
15 / 12 N/mm²	w/w	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	_2)
25 / 20 N/mm <sup>2</sup>	w/d	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	_2)
35 / 28 N/mm <sup>2</sup>	d/d	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	_2)

<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=60mm	Annex C7

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

<sup>&</sup>lt;sup>3)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).

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



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

Table C8.1: Installation parameters

Anchor rod			N	16	N	18	М	10	М	12	М	16				
ludawaal dhusaala	db	FIC F	202	50		200		·		0.		S3	M6	M8	M10	M12
Internal threade	a anchor	FIS E		•		-		8	- 8	-			11)	(85	153	(85
Anchor rod and	internal t	hreade	d and	hor F	IS E	witho	ut pe	rforat	ed sle	eeve						
Effective anchorage depth	h <sub>ef</sub>	[mm]	50	100	50	100	50	100	50	100	50	100		8	35	
Max. instal- lation torque	max T <sub>inst</sub>	[Nm]	m] 4 10 4						10							
Anchor rod and	internal t	hreade	d and	hor F	IS E	with p	erfor	ated s	sleev	e FIS	H 16>	(85 K				
Effective anchorage depth	h <sub>ef</sub>	[mm]	د	2)		8	5			_2	)		8	85		2)
Max. instal- lation torque	max T <sub>inst</sub>	[Nm]	-	,		10	)			-	,		4	10		,
General installa	tion para	meters	!									*				
Edge distance	C <sub>min</sub> = C <sub>cr</sub>								6	30						
	s <sub>min</sub> II	120														
Spacing	s <sub>cr</sub> II	[mm]							2	40						
Scr	= s <sub>min</sub>								1	15						

### **Drilling method**

Hammer drilling with hard metal hammer drill

Table C8.2: Group factors

Anchor	rods	M6	M8	M10	M12	M16		•11		-
Internal	threaded anchor FIS E	_	_		-	_	M6	M8	M10	M12
internal	uneaded anchor FIS E			_	-	_	112	<b>c</b> 85	15	x85
	α <sub>g,N</sub> (s <sub>min</sub> II)				1,5					
Group	α <sub>g,V</sub> (s <sub>min</sub> II)				1,4					Ì
factor	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} [-]$				2,0					

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, 2DF, dimensions, installation parameters, Group factors	Annex C8

<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.



### 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	-	0		-	M8	M10	-
Internal threaded anchor FIS E		-	-	-	Ħ.	M6 11x		107000	M12 x85	-	-	M6 M8
Perforated sleeve FIS H K	-	-	•	-	<u>.</u>	-	9		-		16x	85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} =$	N <sub>Rk,p,c</sub> =	N <sub>Rk,b</sub>	,c [kN	1]; te	mpe	ratu	re rar	ige !	50/80	°C 2)			-
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	50	100	50	100	50	100		100		ge de 100	pth h <sub>ef</sub> [mm] 85	i
12,5 / 10 N/mm²	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
12,5 / 10 N/IIIII	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 / 46 N/mm²	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
20 / 16 N/mm²	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.

**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	-	-	152	-	S=8	11.00	M8 x85		M12 x85	-	-	M6 M8 11x85
Perforated sleeve FIS H K	-	-	-	-	-		-	3	-		16x	85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} =$	V <sub>Rk,c,⊥</sub> [k	N]; tem	perature	range 50/8	0°C and	72/120°C		-						
Mean compressive strength / Min.	Use	_		Effe	ective anc	horage de	pth h	n <sub>ef</sub> [m	ım]					
compressive strength single brick <sup>1)</sup>	con- ditions		≥ 50							85	5			
12,5 / 10 N/mm²	w/w w/d d/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
20 / 16 N/mm²	w/w w/d 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	
Performance Solid brick Mz, 2DF, Characteristic resistance under tension and shear loading	Annex C9

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



Solid brick Mz, EN 771	-1:2011+A1:2015							
21/8	Producer		e.g. Nigra					
1/8	Nominal dimensions	[mm]	length L	width W	height H			
	Nominal differsions	נווווון	≥ 245	≥ 118	≥ 54			
4	Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		≥ 1,8	M-2			
254	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]	12,5	/ 10 or 25	6/20			
2245	Standard or annex		EN 771	-1:2011+	1:2015			
	-	-31						

# Table C10.1: Installation parameters

Anchor rod		M	16	N	18	М	10	М	12	М	16		i		
Internal threaded anchor			80.1		026		<u></u>	9)	EN		150	M6	M8	M10	M12
FIS E				9	-		5.		•		05	11)	<b>k</b> 85	15:	(85
Anchor rod and internal t	hread	ed ar	nchor	FIS E	with	out pe	erforat	ed sl	eeve		95 V	-4			
Effective anchorage depth hef	[mm]	50	100	50	100	50	100	50	100	50	100		8	15	
Max. installation max T <sub>inst</sub>	[Nm]	4	4				1	0				4 10			
General installation parar	neters	3		-2							31				
Edge distance c <sub>min</sub> = c <sub>cr</sub>	5							6	0						
Spacing $s_{cr}   I = s_{min}   I  $	[mm]	245													
$s_{cr} \perp = s_{min} \perp$								6	0						

### **Drilling method**

Hammer drilling with hard metal hammer drill

# Table C10.2: Group factors

Anchor rods	M6	M8	M10	M12	M16		•9	10	-
Internal threaded anchor FIS E	<b>.</b>		-	-	-	M6	M8 (85	M10	M12 x85
$ \begin{array}{c c} \alpha_{\text{g,N}} \left( s_{\text{min}} \ II \right) \\ \hline \alpha_{\text{g,V}} \left( s_{\text{min}} \ II \right) \\ \hline \alpha_{\text{g,N}} \left( s_{\text{min}} \ \bot \right) \\ \hline \alpha_{\text{g,V}} \left( s_{\text{min}} \ \bot \right) \end{array} [ -$	]			2					

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, dimensions, installation parameters, Group factors	Annex C10

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



### 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 ancher FIC F				663	est	M6	M8	M10	M12
Internal threaded anchor FIS E	-	1.5	_	-	-	112	x85	15	x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	= N <sub>Rk,</sub>	<sub>b,c</sub> [k	N]; temper	ature rang	ge 50/80°C	2)			-
Mean compressive strength/	Us	se			Effective an	chorage de	epth hef [m	m]	
Min. compressive strength single brick 1)		con- ditions ≥ 50							85
40 F / 40 N/mm²	w/w	w/d	0,60	0,90	0,75	0,75	0,75	0,60	0,75
12,5 / 10 N/mm <sup>2</sup>	d/	d	1,20	1,50	1,20	1,20	1,20	1,20	1,20
25 / 20 N/mm²	w/w	w/d	0,90	1,50	1,20	1,20	1,20	0,90	1,20
25 / 20 N/mm <sup>2</sup>	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.

**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 anch	~ EIC E						M6	M8	M10	M12
Internal threaded anche	or FIS E	-		-	-		11x85	1x85 15x8		
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk}$	c,⊥ [kN]; ten	nperature r	ange 50/8	0°C and 72	2/120°C		3):			
Mean compressive strength / Min.	Use			Effective ar	nchorage de	epth h <sub>ef</sub> [mr	m] 			

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		E	Effective an ≥ 50	chorage de	epth h <sub>ef</sub> [mr	nj     85				
12,5 / 10 N/mm²	w/w w/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5	
25 / 20 N/mm²	w/w w/d d/d	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5	6,0	

<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, Characteristic resistance under tension and shear loading

Annex C11

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



EN 771-1:2011+A1:2015

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

Table C12.1: Installation parameters

Standard or annex

Anchor rod			M	16	M	18	M	10	M	12	M	16	-	8	27	-
Internal threaded ar	nchor												M6	M8	M10	M12
FIS E				• 1:		•		•		•			11x85		15x8	
Anchor rod and inte	ernal t	hread	ed ar	chor	FIS E	with	out pe	rforat	ted sl	eeve	-					
Effective anchorage depth	h <sub>ef</sub>	[mm]	50	90	50	90	50	90	50	90	50	90		8	5	
Max. installation max	x T <sub>inst</sub>	[Nm]	4	1				1	0				4		10	
General installation	paran	neters	3													
Edge distance cmi	in = Ccr								6	0						
Spacing s <sub>cr</sub> II =	s <sub>min</sub> II	[mm]	230													
s <sub>cr</sub> ⊥=	S <sub>min</sub> ⊥			60												

## **Drilling method**

Hammer drilling with hard metal hammer drill

### Table C12.2: Group factors

Anchor rods	M6	M8	M10	M12	M16		•		-
Internal threaded anchor	_	Steak		Section .		M6	M8	M10	M12
FIS E	•		7		•	112	x85	15	x85
$ \begin{aligned} \text{Group factor} & \frac{\alpha_{\text{g,N}} \left( \text{s}_{\text{min}} \text{ II} \right)}{\alpha_{\text{g,V}} \left( \text{s}_{\text{min}} \text{ II} \right)} \\ & \frac{\alpha_{\text{g,N}} \left( \text{s}_{\text{min}} \text{ II} \right)}{\alpha_{\text{g,N}} \left( \text{s}_{\text{min}} \text{ II} \right)} \end{aligned} $				2					

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, dimensions, installation parameters, Group factors	Annex C12

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

25 / 20 N/mm<sup>2</sup>

Anchor rod



### 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 anch	or EIS	_	_	-	_	20	-	M6 M8	M10 M12		
internal tineaueu anch	01 1 13	_	7.0	16.75c	-50	□.	(T)	11x85	15x85		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,}$	<sub>p,c</sub> = N <sub>R</sub>	2)									
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	cc	se on- ons	Effective anchorage depth hef [mm]								
40 F / 40 N/mm²	w/w w		0,60	0,90	0,75	0,75	0,75	0,	75		
12,5 / 10 N/mm²	/d	1,20	1,50	1,20	1,20	1,20	1,	20			
25 / 20 N/mm²	w/d	0,90	1,50	1,20	1,20	1,20	1,20				

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

2,00

M10

2,00

M12

2.00

M16

2,00

d/d

1,50

M6

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

**M8** 

2,50

lutaman thusandad anal	FIC F		20024	4500			M6	M8	M10	M12
Internal threaded anch	IOT FIS E	-	-	-	-	-	11:	x85	15	x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{R}$	<sub>k,c,⊥</sub> [kN]; tem	perature i	range 50/8	0°C and 72	2/120°C					
Mean compressive strength / Min.	Use			Effective ar	nchorage d	epth h <sub>ef</sub> [m	im] 			
compressive strength single brick 1)	ditions				8					
12,5 / 10 N/mm²	w/w w/d d/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
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

<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.

d/d

fischer injection system FIS V Plus for masonry

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

Annex C13

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C: N<sub>Rk</sub> (72/120°C) = 0,83 · N<sub>Rk</sub> (50/80°C).



2175	Producer			-	
	Nominal dimensions	[mm]	length L	width W	height H
	Nominal dimensions	[mm]	≥ 240	≥ 115	≥ 71
7	Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		≥ 1,8	50
Ex.	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]	15 / 12 c	or 25 / 20 c	or 35 / 28
2240	Standard or annex		EN 771	-2:2011+ <i>A</i>	1:2015

# Table C14.1: Installation parameters

Anchor rod			N	16	N	18	M	10	М	12	M	16				-
Internal thread	ed anchor									TE OF			M6	M8	M10	M12
FIS E				-	-			•		-		-	11:	<b>k</b> 85	15	x85
Anchor rod an	d internal	thread	ed ar	nchor	FIS E	witho	out pe	rforat	ed sl	eeve						
Effective	h .	[mana]	EO	100	50	100	50	100	50	100	50	100		<i>E</i>		E
anchorage dept	h h <sub>ef</sub>	[mm]	50	100	50 100		20	00	200		200		85		°	35
Max. installation torque	max T <sub>inst</sub>	[Nm]		3	5		1	5	15		25		3	5	1	5
General install	ation para	meters	3			37										
Edge distance	C <sub>min</sub> = C <sub>cr</sub>								6	0						
	s <sub>min</sub> II								8	30						
Cassian	s <sub>cr</sub> II	[mm]				80										
Spacing —	S <sub>min</sub> ⊥		3x h <sub>ef</sub>													
	S <sub>cr</sub> ⊥								3x	h <sub>ef</sub>						

### **Drilling method**

Hammer drilling with hard metal hammer drill

### Table C14.2: Group factors

Anchor rod			M6	M8	M10	M12	M16		-	-	
Internal thre	aded anchor		25		_	_	_	M6	M8	M10	M12
FIS E				-	_	-	-	112	x85	15:	x85
	α <sub>g,N</sub> (s <sub>min</sub> II)				11.	0,7					
Crown factor	α <sub>g,V</sub> (s <sub>min</sub> II)	., [				1,3					
Group factor	α <sub>g,N</sub> (S <sub>min</sub> ⊥)	[-]				2,0					
	α <sub>g,V</sub> (s <sub>min</sub> ⊥)					2,0					

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

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



### 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	I	<b>/</b> 16	1	/18		M10			M12	:	M16	i		-		-0	
Internal threaded anchor FIS E			-	,	-					-				M6		M10	M12 x85
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,b}$	$N_{Rk,p,c} = N$	Rk,b,c	[kN];	tem	perat	ure	range	e <b>50</b> /8	30°C	; 2)							
Mean compressive strength / Min.	Use con-		,,,			l	Effec	1				Ī			-		_

TAKK TAKK,P TAKK,D	lean compressive Effective anchorage depth her [mm]																
Mean compressive strength / Min.	00	se n-		9	10												intercent o
compressive strength single brick 1)	- 48EE	ons	50	100	50	100	50	100	200	50	100	200	50	100	200	85	85
15 / 12 N/mm <sup>2</sup>	w/w	w/d	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
15 / 12 N/IIIII	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/mm²	w/w	w/d	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
25 / 20 N/MM-	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/mm²	w/w	w/d	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
35 / 26 N/IIIII-	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.

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

Anchor rod		\ \	<i>1</i> 6	N	/18	N	110	l N	112	M	116	-	
Internal threaded a	nchor		•		-	3	-		•		-	M6 M8	M10 M12
V <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> =	V <sub>Rk,c,⊥</sub> [kN	l]; te	mpei	ratur	e ran	ge 50/	80°C an	d 72/1	20°C				
Mean compressive strength / Min. compressive strength	Use con- ditions	50	100	50	100	Ef 50	fective a	nchor 50	age dep     ≥100	th h <sub>ef</sub> [r 50	mm]    ≥100	85	85
single brick 1)  15 / 12 N/mm <sup>2</sup>	w/w w/d	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2
25 / 20 N/mm²	w/w w/d d/d	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5
	w/w w/d												

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

3,5

1,5 3,5

1,5

3,5

1,5

3,0 | 4,5 | 3,0 | 4,5 | 1,5 |

Factor for job site tests and displacements see annex C123.

35 / 28 N/mm<sup>2</sup>

fischer injection system FIS V Plus for masonry

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

Annex C15

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .

Performance



2240	Pro	duce	r										-		
• 10	No	minal	dimer	nsions	i				[mr	m]	ength ≥ 250	_	dth W	heigh ≥ 24	
	Me	an ar	oss dr	v den	sity o				[kg/d	m <sup>3</sup> 1	= 200	7	≥ 2,0		
284					strengt	h / Mi	n.		58707	200	10.5.1	-		05	-
	cor		POPERATION FORE		h sing	le bric	k 1)		[IN/m	m-j	50			or 35	
	Sta	ndar	d or ar	nex	¥: 500	20 0000		240			Walleton St	10 101 57700		A1:201	5
Table C16.1: Installa	tion :	nara	mete	rs	10		9 9				imens Innex I		ee also	0	
Anchor rod			16		18	M	10	M	12	М	16	,	•	-	
Internal threaded anchor			_	.,								M6	M8	M10 I	<b>/11</b>
FIS E			-								-	11:	x85	15x8	5
Anchor rod and internal t	nread	ed ar	nchor	FIS E	with	out pe	rforat	ed sl	eeve						
anchorage depth	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	
$\begin{array}{ll} \text{Max. installation} & \text{max } T_{\text{inst}} \\ \text{torque} & \end{array}$	[Nm]		4				1	0				4		10	
	nread	eaded anchor FIS E with perforated sleeve FIS H 16												,	
Effective anchorage depth hef	[mm]	2	2)		8	5			د	2)		8	5	_2)	
Max. installation max T <sub>inst</sub>	[Nm]				1	0						4	10		
General installation param	neter	s									""			2"	
Edge distance c <sub>min</sub> = c <sub>cr</sub>								6							
S <sub>min</sub> II								8	200						_
Spacing Spacing	[mm]								h <sub>ef</sub>						_
S <sub>min</sub> ⊥								3 ×	h <sub>ef</sub>						
S <sub>cr</sub> ⊥   Drilling method								3,	Het						
Hammer drilling with hard n	netal h	namm	er dril	ľ											
1) The minimum compressive 2) No performance assessed	stren				rick m	ust not	be les	ss thai	n 80%	of the	e mean	comp	ressiv	e strenç	jth.
Table C16.2: Group		rs			77							15		·	
Anchor rods		N	16	N	18	M	10	M	12	М	16		-	-	
Internal threaded anchor FIS E		į	-	b	-		.		•1		-	M6	M8 x85	M10 I	_
_ααN (Smin II)								1.	,5						
Group $\alpha_{a.V}$ (s <sub>min</sub> II)	[-]								,2						
factors $\alpha_{a.N} (s_{min} \perp)$	r.1								,5						
$\alpha_{a,V}$ (S <sub>min</sub> $\perp$ )								1,	,2						

Z203835.24 8.06.04-178/23

Solid calcium silicate brick KS, 8DF, dimensions, installation parameters, Group factors

Annex C16



### 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	9	•				-		-		M10	-
Internal threaded		100	-	0201		M6	M8	M10	M12	1 1020	_	M6 M8				
anchor FIS E		-	170	-	15	11:	<b>k</b> 85	15	x85			11x85				
Perforated sleeve FIS H K		-	•		-		-		-		16x8	5				

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_R$	$_{k,p,c} = N_{Rk,b,}$	c [kN];	tempe	rature	range !	50/80°C	2)					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h <sub>ef</sub> [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		
12,5 / 10 14/111111	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/mm²	w/w w/d	4,5	6,0	6,0	6,0	5,0	4,5	5,0	6,5	4,5 6,5		
25 / 20 N/mm <sup>2</sup>	d/d	7,5	10,0	10,0	10,0	7,5	7,5	7,5	11,0	7,5 11		
25 / 20 N/mm²	w/w w/d	5,0	8,0	8,5	8,5	7,0	5,0	7,0	8,5	5,0 8,5		
35 / 28 N/mm <sup>2</sup>	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.

**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	12 <b></b>		0.	-	M8	M10	-
Internal threaded	-			5		M6	M8	M10	M12		100	M6 M8
anchor FIS E		3. <del>-</del>	-	1.5	-	11)	11x85		x85		-	11x85
Perforated sleeve FIS H K		•		-			-	2	=		16x8	5

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{I}$	Rk,c,⊥ <b>[kN]</b> ; 1	[kN]; temperature range 50/80°C and 72/120°C											
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	_	Effective ≥ 50	anchorage de	anchorage depth h <sub>ef</sub> [mm] 85								
12,5 / 10 N/mm²	w/w w/d d/d	2,5	4,5	2,5	4,5	4,5	2,5	4,5					
25 / 20 N/mm²	w/w w/d d/d	4,0	6,5	4,0	6,5	6,5	4,0	6,5					
35 / 28 N/mm²	w/w w/d d/d	5,0	9,0	5,0	9,0	9,0	5,0	9,0					

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

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

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



	Pro	oduce	r									e.g.	Caldu	an	
40	No	minal	dimer	nsions	3				[mi	m]	length	_	idth W	_	ght l
-527	7		dr	. don	aite a				[lea/a	J. 31	≥ 997		≥ 214	95000	538
/ • /			oss dr			th / N/I			[kg/c	ım'j		,8	_	2,2	ė.
					strengt th sing				[N/m	nm²]	12,5 <i>i</i> 25	/ 20	r	45/3	36
	^i Sta		d or ar				2000				EN 7	71-2	2011+	A1:2	015
2997		h17		C	)				0						
						997	,								
Table C18.1: Install	ation	para	mete	rs											
Anchor rod		N	16	N	18	M	10	М	12	N	116		-	3	-
Internal threaded ancho	r		_		_				_		_	M6	M8	M10	_
FIS E												11	x85	15	x85
Anchor rod and internal	thread	ded a	nchor	FIS E	with	out pe	rforat	ed sl	eeve		1				
Effective anchorage depth h <sub>ef</sub>	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	
Max. installation max T <sub>inst</sub> torque	1 -		4				1	0				4		10	
General installation para	т —	s						_							
Edge distance c <sub>min</sub> = c <sub>c</sub>	<b>⊣</b>							5,51	75						
Spacing $\frac{s_{cr}  I  = s_{min}  I }{s_{cr}  I }$	H	_						100000	h <sub>ef</sub>						
$s_{cr} \perp = s_{min} \perp$ Drilling method	-							3,	llet						
Hammer drilling with hard	metal	hamn	ner dril	ı											
1) The minimum compressiv					rick m	ust not	be les	ss tha	n 80%	of th	e mean	com	oressiv	e stre	natl
Table C18.2: Group										J			.,		
Anchor rod		N	16	N	18	M	10	М	12	N	116		-	1	-
Internal threaded ancho	r		227.1						220		_	M6	M8	M10	M
FIS E												11	x85	15	x85
$\begin{array}{c} \alpha_{\text{g,N}} \text{ ($s_{\text{min}}$ II }\\ \alpha_{\text{g,V}} \text{ ($s_{\text{min}}$ II }\\ \alpha_{\text{g,V}} \text{ ($s_{\text{min}}$ \bot}\\ \alpha_{\text{g,V}} \text{ ($s_{\text{min}}$ \bot}\\ \end{array}$	[-]							:	2						

45 / 36 N/mm<sup>2</sup>

Internal threaded ancher

Anchor rod



### 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			N	/16	M	18	M1	0	M1	12	M1	16				
Internal threaded and	hor			-			-		-		-		M6	M8 (85	M10	M12 (85
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_F$	Rk,p,c =	N <sub>Rk,l</sub>	o,c [kN	l]; tem	perati	ure ra	nge 50	)/80°C	; 2)				15.10		10.00	
Mean compressive	Us	se				. E	ffectiv	e anc	horage	e dept	h hef [r	nm]				
strength / Min. compressive strength single brick 1)	co	rino,	50	100	50	100	50	100	50	100	50	100		8	<b>3</b> 5	
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	5,5	
12,5 / 10 N/MM	d/	d	7	,0	7,0	12,0	8,0	9,5	8,0	10,0	9,0	11,5		ç	9,0	
25 / 20 N/mm²	w/w	w/d	5	,5	6,0	10,0	7,0	8,5	7,0	9,0	8,0	11,0		8	3,0	
25 / 20 N/mm²	d/	d	8	,5	10,5	12,0	11,5	12,0	11,0	12,0	12,0	12,0		1	2,0	
45 / 26 N/mm²	w/w	w/d	4	,5	8,0	12,0	11,5	12,0	12,0	12,0	12,0	12,0		1	2,0	

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

12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0

M12

M16

12,0

M6 M8 M10 M12

8,0

**M6** 

d/d

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

M<sub>10</sub>

**M8** 

Internal threaded anchor						172	IVIO	IVIO	IVITO	IVIIZ
FIS E	500,000 FG. V. P. C.	-		-	_	_	112	x85	153	x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	/Rk,c,⊥ [k <b>N]</b> ;	temperatu	re range 50	/80°C and 7	72/120°C					
Mean compressive strength / Min.	Use			Effective an	chorage de	oth h <sub>ef</sub> [mm]	ı			
compressive strength single brick 1)	con- ditions				85					
12,5 / 10 N/mm <sup>2</sup>	w/w w/d d/d	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0
25 / 20 N/mm <sup>2</sup>	w/w w/d d/d	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0
45 / 36 N/mm²	w/w w/d d/d	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0

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

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

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



Solid calciur د ء		hric	k KS	FN	771-	2.20	11+4	1.20	15							
An	ii Silloate		oducer		771-	2.20	11.7	11.20	13		-1			27-227		
115	95	FIC	Juucei									length	ılv	vidth V	/ he	ight H
113	1	No	minal d	limen	sions					[m	m]	≥ 240	_	≥ 115	_	113
1	32	Me	an gro	ss dr	y dens	sity ρ				[kg/c	dm <sup>3</sup> ]			1,8		
			an con			_				[N/m	nm²]	1	2,5 /	10 or 2	25/2	0
240			mpress andard		_	n sing	ie bric	K '/			-			:2011-		100
		Ote	andara	or arr	IIIOX						-5.	LIN	7 1-2	2011	7.1.2	.010
Table C20.1:	Installa (Pre-po		•			n with	perf	orate	d sle	eeve l	FIS	H K)				
Anchor rod			M6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal thread	ed				M6	M8					M10	M12		_		_
anchor FIS E					11)	k85					15	x85				-
Perforated slee		-	12x8				<b>185</b>			(130		20:	k85		20	x130
Anchor rod an	d internal t	hread	led and	chor	FIS E	with	perfo	rated	sleev	e FIS	HK					
Max. installation torque	max T <sub>inst</sub>	[Nm]	2							4	ĺ					
General install	ation para	meter	s													
Edge distance	C <sub>min</sub> = C <sub>cr</sub>				h				1	00						
	Smin II															
Spacing		[mm]	25	5		25	55		3	90		25	55		;	390
	S <sub>min</sub> ⊥ S <sub>cr</sub> ⊥															
									-1							
Drilling method																
Drilling method Hammer drilling	9.00	netal	hamme	er drill												
Hammer drilling  The minimum  Table C20.2:	with hard r	e strer	ngth of t	he sir	ngle b								- 3350			
Hammer drilling  1) The minimum  Table C20.2:  Anchor rod	with hard r compressive	e strer	ngth of too	he si	1.401 991	M8	M		M8	M10		W12	M16	M <sup>2</sup>	12	M16
Hammer drilling  1) The minimum  Table C20.2:  Anchor rod  Perforated slee	with hard r compressive Group	e strer	ngth of too	he sir	ngle b	M8			M8				M16	M <sup>2</sup>		M16
Hammer drilling  1) The minimum  Table C20.2:  Anchor rod  Perforated sleet $\alpha_{g,t}$ Group factors $\alpha_{g,t}$	with hard r compressive	e strer	ngth of too	he si	ngle b	M8	M		M8 16x	M10		W12	M16	M <sup>2</sup>	12	M16

Z203835.24 8.06.04-178/23

Solid calcium silicate brick KS, dimensions, installation parameters, Group factors



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

# Table C21.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16
Perforated sleev	ve FIS H K	(	18x13	0/200	22x130/200
Anchor rod with	perforate	ed sleev	e FIS H K		
Max. installation torque	max T <sub>inst</sub>	[Nm]		4	
General installa	tion parai	meters			
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			100	
	s <sub>min</sub> II			390	
Cassias	s <sub>cr</sub> II	[mm]		390	
Spacing	s <sub>min</sub> ⊥			390	
	s <sub>cr</sub> ⊥			390	
Drilling method		•			
Hammer drilling	with hard r	netal ha	mmer drill		

### Table C21.2: Group factors

Anchor ro	d		M10	M12	M16
Perforated	d sleeve FIS H K		18x13	30/200	22x130/200
Group factors	$\frac{\alpha_{g,N} (Smin \ II)}{\alpha_{g,V} (Smin \ II)}$ $\frac{\alpha_{g,N} (Smin \ \bot)}{\alpha_{g,V} (Smin \ \bot)}$	[-]		<u>:</u>	2

fischer injection system FIS V Plus for masonry

Performance
Solid calcium silicate brick KS, dimensions, installation parameters, Group factors

Annex C21



### 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		-		M10	M8	M8 M10		10 -		M16	M12	M16
Internal threaded anchor FIS E		• 44	M6	M8 1x85		-		-		M12 x85		•		
Perforated sleeve FIS H K	12	x85		16>		x85		130	0 20		x85		20x	130

 $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C <sup>2)</sup> Mean compressive Use strength / Min. concompressive strength ditions single brick 1) w/w 2,0 2,0 3,5 2,0 6.5 4.5 12,5 / 10 N/mm<sup>2</sup> d/d 6,0 4,0 3,5 3,5 10,5 7,0 5.0 3.0 3.0 w/w 3.0 9.5 6.0 25 / 20 N/mm<sup>2</sup> d/d 8,5 5,5 5,5 12,0 10,0 5,5

**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	0 M12 M16					
Perforated sleeve FIS	SHK	18x130	/200	22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,b}$	$R_{k,p,c} = N_{Rk,b,c}$	[kN]; temperature	range 50/80°C <sup>2)</sup>					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
12,5 / 10 N/mm <sup>2</sup>	w/w d/d	2.0 3,5	5 5	4.5 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.

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

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

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

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



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 1x85		-			 M12 x85				
Perforated sleeve FIS H K	122	x85		16	x85		16x	130	20	x85		20x	130

The Control of the Co	CONTRACTOR TOWN	The state of the s	700000000000000000000000000000000000000		THE CONTRACTOR DESIGNATION	The second contract of							
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C <sup>2)</sup>												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions												
12,5 / 10 N/mm <sup>2</sup>	w/w d/d	3,0		3,5									
25 / 20 N/mm²	w/w d/d	4,0		5,5									

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

**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	S H K	18x13	30/200	22x130/200				
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	Rk,c,⊥ <b>[kN]</b>	temperature range	50/80°C 2)					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
12,5 / 10 N/mm²	w/w d/d		3	3,5				
25 / 20 N/mm²	w/w d/d		5	5,5				

<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

Performance
Solid calcium silicate brick KS, Characteristic resistance under shear loading

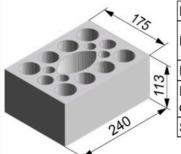
Annex C23

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

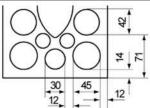
<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.



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



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



Dimension see also Annex B15

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

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10	1		M12	M16	M12	M1
Internal threaded		_		20	M6	M8		-	-		M10	M12			_	
anchor FIS E					11x85				(E)		15x85				155	
Perforated sleeve FIS H K	12	x50	12	x85		16:	<b>c85</b>		16>	130		20	<b>c</b> 85		20x	130

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

Max. installation	max T <sub>inst</sub>	[MM]	2
torque	IIIax Tinst	[INIII]	2

# General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	60	80						
Spacing	Smin II	100							
	S <sub>cr</sub> II [mm]	240							
	S <sub>min</sub> ⊥	115							
	S <sub>cr</sub> ⊥	115							
Mary States State State	(I)								

### **Drilling method**

Hammer drilling with hard metal hammer drill

### Table C24.2: Group factors

Anchor r	od	M6	M6   M8   M6   M8   -   M8   M					M10	M8  M10   -			-	M12 M16	M12 M16		
Internal t	hreaded anchor				-		M8		-				M12	-	-	
Perforated sleeve FIS H K		12	x50	12x85		11x85		x85	35		16x130		15x85 20x85		20x130	
Group	$\alpha_{g,N} (s_{min} II) = \alpha_{g,V} (s_{min} II)$	1,5														
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} = \alpha_{g,V} (s_{min} \perp)$		2,0													

# fischer injection system FIS V Plus for masonry

### Performance

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

Annex C24

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



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

**Table C25.1:** Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16					
Perforated sleev	e FIS H k	(	18x13	0/200	22x130/200					
Anchor rod with	perforat	ed sle	eve FIS H K		•					
Max. installation torque	max T <sub>inst</sub>	[Nm]	2							
General installa	tion para	meter	S							
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		80							
	Smin II			100						
Cassina	s <sub>cr</sub> II	[mm]		2	40					
Spacing	Spacing s <sub>min</sub> ⊥		115							
	s <sub>cr</sub> ⊥		115							
Drilling method										

Hammer drilling with hard metal hammer drill

#### **Table C25.2:** Group factors

Anchor ro	d	M10	M12	M16
Perforated	d sleeve FIS H K	18x13	30/200	22x130/200
Group	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)}$		1	,5
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)}$ [-]		2	,0

fischer injection system FIS V Plus for masonry Performance Perforated calcium silicate brick KSL, 3DF, dimensions, installation parameters, Group factors

Annex C25



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

**Table C26.1:** 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		-						M16	M12	M16
Internal threaded anchor FIS E		•		-	M8 (85	27	•				M12 x85				-				
Perforated sleeve FIS H K	12	x50	12	x85	16	x85		16x130 2		20:	x85		20x	130					

				4.544.54.70	5 (5 Table 20 Table 2	30-30-30-30-30-3	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,l}$	$_{\rm p,c} = N_{\rm Rk,b,c}$	[kN]; ten	nperature	range 50/80°C 2)			
Mean compressive strength/ Min. comp. strength single brick <sup>1)</sup>	Use con- ditions						
10 / 8 N/mm <sup>2</sup>	w/w w/	d	1,5	2.0	2,0	2,0	2,0
10 / 6 14/111111	d/d		1,5	2,0	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
12,57 10 14/11111	d/d		2,0	2,5	3,0	3,0	3,0
15 / 12 N/mm²	w/w w/	d	2,5	2,5	3,0	3,0	3,0
15 / 12 N/IIIII	d/d		2,5	3,0	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
20 / 16 N/IIIII	d/d		3,5	4,0	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
25 / 20 N/MM	d/d		4,5	5,0	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.

**Table C26.2:** 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	l K		18x1	30/200	22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p}$	,c = N <sub>R</sub>	,b,c [kN	l]; temperature	range 50/80°C	2)				
Mean compressive strength / Min. comp. strength single brick 1)	Us co ditio	n-							
10 / 8 N/mm²	w/w d/				2.0 2,5				
12,5 / 10 N/mm²	w/w d/				2,5 3,0				
15 / 12 N/mm²	w/w d/				3,0 3,5				
20 / 16 N/mm <sup>2</sup>	w/w d/	_			4,5 4,5				
25 / 20 N/mm²	w/w d/	2512	5,5 6,0						

<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 Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under tension loading	Annex C26

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



# 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	10	-	M8	M10	M8	M10	-		M12 M1	6 M12 M16
Internal threaded anchor FIS E		•		-	M6	M8 x85		-			M10 15x		-	-
Perforated sleeve FIS H K	12:	x50	12	x85		16:	x85		16>	130		20	x85	20x130

1 citoratea diceve i it			.00	12	~~~		1000	102100	LUXUU		201	100	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	Rk,c,⊥	[kN];	tem	perat	ture r	range	50/8	0°C and 72/12	0°C				
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	n-											
10 / 8 N/mm²	w/w d/	1991			1,5				3,0		2,5	3,0	2,5
12,5 / 10 N/mm²	w/w d/				2,0				į	3,5			
15 / 12 N/mm²	w/w d/	Sec.			2,5				4,5		4,0	4,5	4,0
20 / 16 N/mm²	w/w d/		3,0	3,5	3,0	3,5	3,0		6,0		5,5	6,0	5,5
25 / 20 N/mm²	w/w d/	S	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)

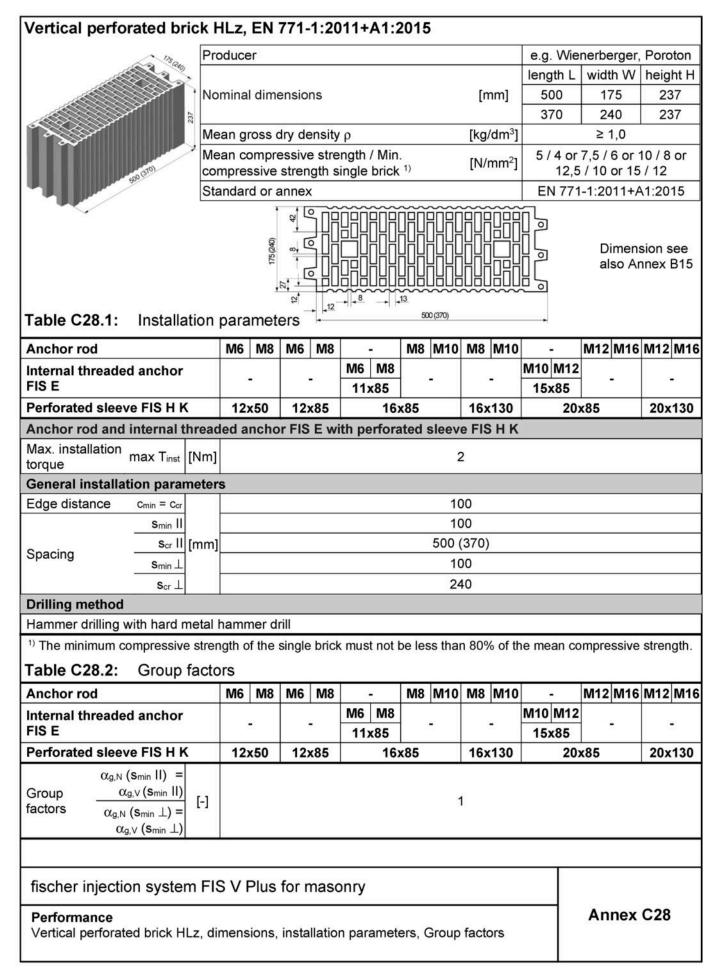
Anchor rod		M10	M12	M16						
Perforated sleeve FIS	нк	18x13	0/200	22x130/200						
V <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [kN]; temperature range 50/80°C and 72/120°C										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
10 / 8 N/mm <sup>2</sup>		3	.0	2.5						
12,5 / 10 N/mm <sup>2</sup>	w/w	3	.5	3,5						
15 / 12 N/mm <sup>2</sup>	w/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>		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.

fischer injection system FIS V Plus for masonry	
Performance Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading	Annex C27





12,5 / 10 N/mm<sup>2</sup>

15 / 12 N/mm<sup>2</sup>



2,50

2,50

3,00

3,00

3,00

3,50

3,50

4,00

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

**Table C29.1:** 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	,		M12 N	V116	M12	M16
Internal threaded anchor FIS E			-			-	M6 M8		-	-		M10 M12		-			•
Perforated sleeve FIS	ΗK		12)	(50	12	2x85	10	3x85		16)	(130		20x	130			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk}$	,p,c = N <sub>F</sub>	Rk,b,c	kN];	tem	pera	ture	range 5	0/80	°C 2)	39)							
Mean compressive strength / Min. comp. strength single brick 1)	cc	se on- ons															
5 / 4 N/mm²	w/w	w/d		0,3	30					(	0,90					1,2	20
5 / 4 N/IIIII	d	/d		0,4	40					(	0,90					1,2	20
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d		0,	50						1,50					2,0	00
7,576 N/IIIII-	/d		0,0	60		1,50							1,50			00	
10 / 9 N/mm²	w/w	w/d		0,	75					2	2,00					2,	50
10 / 8 N/mm <sup>2</sup>		/d		0.7				•	2.00				2 50				

w/w w/d

d/d

w/w w/d

d/d

**Table C29.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

0,90

0,90

0,90

1,20

Anchor rod		M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12 M16	M12 M16		
Internal threaded anchor FIS E		-		33	-	M6 M8		-		-	M10 M12 15x85	· ·	-		
Perforated sleeve FIS H	ł K	12x	50	12	x85	16	x85		16)	130	130 20x85 20x				
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													20		
Mean compressive strength / Min. comp. strength single brick 1)	Use con- ditions														
5 / 4 N/mm <sup>2</sup>					0,	50			0,	60	0,	50	0,60		
7,5 / 6 N/mm <sup>2</sup>	] <sub>w/w</sub>				0,	75			0,	90	0,	75	0,90		
10 / 8 N/mm <sup>2</sup>	w/d				0,	90			1,	20	0,	90	1,20		
12,5 / 10 N/mm <sup>2</sup>	d/d	1,20 1,50 1,20 1								1,50					
15 / 12 N/mm <sup>2</sup>					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	
Performance Vertical perforated brick HLz, Characteristic resistance under tension and shear loading	Annex C29

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

<sup>&</sup>lt;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>.



15	Produc	er								e.g	Wiene	rberg	er
	Nomin	ما طائم	none:	ione				[	m1	length L	width		eight F
	Nomina	ai dir	nensi	ions				[mr		240	115		113
	Mean g							[kg/d	_		≥ 1,		
		essiv	e stre	ength s	ength / I single b			[N/m	m <sup>2</sup> ]		5 / 20 o	r 35 /	28
240	Standa	rd or	anne	ex						EN 77	1-1:201	1+A1	2015
Table C30.1: Installation	on par	ame		115	14-28		240						on see ex B15
Anchor rod	Me		M8	M6	M8	-		M8	M10	0	<u>~</u>	M12	M16
Internal threaded						M6	M8		1	M10	M12		
anchor FIS E		-			-	11x	85		-	15	x85		-
Perforated sleeve FIS H K	12x50 12x85 16x						(85			20:	x85		
Anchor rod and internal three	eaded a	anch	or Fl	IS E w	ith per	forated	sleev	e FIS	HK				
Max. installation max T <sub>inst</sub> [N	m]						2	2					
General installation paramet	ters												
Edge distance c <sub>min</sub> = c <sub>cr</sub>	,—						8	1000					
Spacing $\frac{\mathbf{s}_{cr} \mathbf{II} = \mathbf{s}_{min} \mathbf{II}}{\mathbf{s}_{cr} \perp = \mathbf{s}_{min} \perp} [\mathbf{m}$	m]						5777	10 15					
Drilling method													
Hammer drilling with hard met													
nammer uniming with hard met	tal ham	mer	drill										
1) The minimum compressive st	trength ctors	of the	e sing			ı					3.50		
1) The minimum compressive st Table C30.2: Group face Anchor rod	trength	of the		le bric	k must r	-		n 80% M8	of the	0	-	sive st	
1) The minimum compressive st  Table C30.2: Group fact  Anchor rod  Internal threaded	trength ctors	of the	e sing			ı	M8			0 M10	3.50		
1) The minimum compressive st	ctors	of the	e sing	M6		- M6	M8 85			0 M10	- M12 x85		
1) The minimum compressive st Table C30.2: Group face Anchor rod Internal threaded anchor FIS E	ctors Me	of the	e sing	M6	M8 -	- M6	M8 85	M8 <85		0 M10	- M12 x85	M12	



### 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	1	•	M12	M16
Internal threaded anchor FIS E	-		,	•	M6	M8 x85		-	M10	M12 x85	3	-
Perforated sleeve FIS H K	12x5	50	12	x85		16	x85			20:	<b>k</b> 85	

			microscopic and a second			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = 0$	N <sub>Rk,b,c</sub>	[kN]; t	emperatur	e range 50	)/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)		se n- ons				
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0,75	0,90	0.75	0,90
7,576 N/IIIII	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
12,5 / 10 14/111111	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
20 / 16 N/IIIII	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
25 / 20 N/IIIIII	d	/d	2,50	4,00	2,50	3,00
35 / 28 N/mm²	w/w	w/d	3.00	5.00	3,50	4.00
35 / 20 N/IIIII	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.

**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	10	-	M8	M10			M12	M16
Internal threaded anchor FIS E				•	M6	M8 x85		-	M10	M12 k85		
Perforated sleeve FIS H K	123	<b>&lt;50</b>	12	<b>k</b> 85		1	6x85			202	(85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temper	ature	range	50/8	0°C	and 7	2/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
7,5 / 6 N/mm <sup>2</sup>		1,2	1,5	1,2	2,0	1,2	1,5	2,5
12,5 / 10 N/mm <sup>2</sup>	w/w	2,0	2,5	2,0	4,0	2,0	2,5	4,5
20 / 16 N/mm <sup>2</sup>	w/d	3,0	3,5	3,0	6,0	3,0	3,5	7,0
25 / 20 N/mm <sup>2</sup>	d/d	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.

fischer injection system FIS V Plus for masonry	
Performance	Annex C31
Vertical perforated brick HLz, 2DF,	
Characteristic resistance under tension and shear loading	

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



#### Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger length L | width W | height H Nominal dimensions [mm] 248 365 248 Mean gross dry density ρ [kg/dm<sup>3</sup>] 0,6 Mean compressive strength / Min. $[N/mm^2]$ 5/4 or 7,5/6 or 10/8 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015

3,5 4,9 35 7

Dimension see also Annex B15

Table C32.1: 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 x85		-	1010/19	-	M10 M12 15x85		-		-	-
Perforated sleeve FIS H	(	12	x50	12	x85		16:	x85		16>	130	20	<b>x</b> 85		20>	130	20x200
Anchor rod and internal t	Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation max T <sub>inst</sub>	[Nm]	3	5	3	5	3	5					ţ	5				

### General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	60
8:	s <sub>min</sub> II	80
Cassina	s <sub>cr</sub> II [m	n] 250
Spacing	S <sub>min</sub> ⊥	80
	S <sub>cr</sub> ⊥	250

### **Drilling method**

Rotary drilling with carbide drill

### Table C32.2: Group factors

Anchor ro	d	M6	M8	M6	M8	( <b>#</b>	M8	M10	M8	M10	-	M12 M16	M12 M16	M12 M16
Internal th					-	M6 M8			100	-	M10 M12 15x85	-		-
Perforated sleeve FIS H K			x50	12	x85	16:	16x85 16x130			130	202	x85	20x130	20x200
	α <sub>g,N</sub> (s <sub>min</sub> II)				1,3									
Group	$\alpha_{g,V}$ (s <sub>min</sub> II)								1	,2				
factors	α <sub>g,N</sub> (s <sub>min</sub> ⊥)		1,3							j				
	$\alpha_{g,V}$ ( $s_{min} \perp$ )	1,0												

## fischer injection system FIS V Plus for masonry

### Performance

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

Annex C32

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



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

Table C33.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16			
Perforated sle	eve FIS H k	(	18x130/200 22x130/200					
Anchor rod w	ith perforat	ed sleeve	FIS H K					
Max. installation torque	max T <sub>inst</sub>	[Nm]		5				
General insta	llation para	meters						
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			60				
	s <sub>min</sub> II			80				
Ci	s <sub>cr</sub> II	[mm]		250				
Spacing —	s <sub>min</sub> ⊥	100		80				
	s <sub>cr</sub> ⊥			250				
Drilling metho	od							
Rotary drilling	with carbide	drill						

# Table C33.2: Group factors

Anchor ro	d	M10	M16					
Perforated	d sleeve FIS H K	18x13	18x130/200 22x130/200					
	α <sub>g,N</sub> (s <sub>min</sub> II)		1	,3				
Group	α <sub>g,V</sub> (S <sub>min</sub> II)		1	,2				
Group factors	$\alpha_{g,N}$ (Smin $\perp$ ) [-]		1	,3				
	α <sub>g,∨</sub> (s <sub>min</sub> ⊥)	1,0						

fischer injection system FIS V Plus for masonry	
Performance	Annex C33
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
Internal threaded anchor FIS E	-	0.	-		M6 M8		-	M10 M12 15x85	-	•	-
Perforated sleeve FIS H K	12x	50	12x	85	16)	(85	16x130	20>	<b>c</b> 85	20x130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	NRk,b,c [kN];	temperature r	ange 50/80°C <sup>2)</sup>
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		
E / 4 N/mm²	w/w w/d	1,2	1,2
5 / 4 N/mm <sup>2</sup>	d/d	1,2	1,5
7,5 / 6 N/mm <sup>2</sup>	w/w w/d	1,5	1,5
7,5 / 6 N/IIIII	d/d	1,5	1,5
10 / 8 N/mm²	w/w w/d	1,5	2,0
IU / O N/IIIII	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.

**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				
Perforated sleeve FIS H K			18x13	30/200	22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	Rk,b,c	[kN];	temperature rang	ge 50/80°C <sup>2)</sup>					
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons							
5 / 4 N/mm²	w/w	w/d		1	,2				
3 / 4 N/IIIII	d	/d		1	,5				
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d		1	,5				
7,576 N/IIIII	d	/d		1	,5				
10 / 8 N/mm²	w/w	w/d	2,0						
10 / 6 14/111111	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.

Factor for job site tests and displacements see annex C123.

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

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



### 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	1 82	-		=	M10 M12 15x85	-	-	
Perforated sleeve FIS H K	12)	(50	12x	(85	16	x85		16x	130	202	x85	20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temper	ature range 50/80°C and 72/120°C	9
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		
5 / 4 N/mm²	w/w w/d d/d	1,2	
7,5 / 6 N/mm²	w/w w/d d/d	1,5	
10 / 8 N/mm²	w/w w/d 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.

**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		18x13	0/200	22x130/200					
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	N]; tempe	rature range 50/8	0°C and 72/120°C						
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
5 / 4 N/mm²	w/w w/d		1,2						
7,5 / 6 N/mm²	w/w w/d d/d		Ĩ	,5					
10 / 8 N/mm²	w/w w/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	
Performance Vertical perforated brick HLz, U8, Characteristic resistance under shear loading	Annex C35



#### Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger length L | width W | height H Nominal dimensions [mm] 248 365 249 Mean gross dry density p [kg/dm<sup>3</sup>] 0,7 Mean compressive strength / Min. 10 / 8 or 12,5 / 10 or [N/mm<sup>2</sup>]compressive strength single brick 1) 15 / 12

25 20 3,5 43,5 2 7 3,5 43,5 2

Dimension see also Annex B16

EN 771-1:2011+A1:2015

Table C36.1: 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 x85	-		-		M10 M12 15x85	-	e <u>s</u>	
Perforated sleeve FIS H K	12:	x50	12	x85	16x		x85		16x	130	20	<b>c</b> 85	20x130	20x200

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

Standard or annex

Max. Installation torque max T <sub>inst</sub>	[Nm]	3	5	3	5
--	------	---	---	---	---

### General installation parameters

Edge distar	nce c <sub>min</sub> = c <sub>cr</sub>		60
	S <sub>min</sub> II	2	80
Cassina	s <sub>cr</sub> II	[mm]	250
Spacing	S <sub>min</sub> ⊥	5	80
	S <sub>cr</sub> ⊥		250

### **Drilling method**

Rotary drilling with carbide drill

### Table C36.2: Group factors

Anchor ro	d		M6	M6   M8   M6   M8				-	M8 M10		M8	M10	-	M12	M16	M12 M	16	M12	M16
Internal th			-		<b>1</b>		M6 M8		6	-	_		M10 M12 15x85			11=			-
Perforated	d sleeve FIS H K		12x50 12x85 16x85 16x130 20x							x85		20x13	30	20x	200				
	α <sub>g,N</sub> (s <sub>min</sub> II)										1	,7							
Group	$\alpha_{g,V}$ (s <sub>min</sub> II)	[-]									0	,5							
factors	$\alpha_{\text{g,N}}$ (s <sub>min</sub> $\perp$ )	[-]		1,3															
	$lpha_{ extsf{g,V}}$ (Smin $ot$ )		0,5																

fischer injection system FIS V Plus for masonry

### Performance

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

Annex C36

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



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

Table C37.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod	·		M10	M12	M16						
Perforated slee	ve FIS H k	<b>(</b>	18x13	0/200	22x130/200						
Anchor rod with perforated sleeve FIS H K											
Max. installation torque	max T <sub>inst</sub>	[Nm]		5							
General installa	tion para	meters	3								
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60								
	s <sub>min</sub> II			8	0						
	s <sub>cr</sub> II	[mm]		25	50						
Spacing —	s <sub>min</sub> ⊥		80								
:-	Scr ⊥		250								
<b>Drilling method</b>											

# Rotary drilling with carbide drill

Group factors

Table C37.2:

Anchor ro	d	M10	M10 M12					
Perforated	d sleeve FIS H K	18x13	30/200 22x130/200					
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,7					
Group	αg, v (Smin II)		0,5					
Group factors	$\alpha_{g,N}$ ( $s_{min} \perp$ ) [-]	1,3						
	α <sub>α ∨</sub> (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 C37



### 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 15x85	-	-	
Perforated sleeve FIS H K	123	<b>&lt;50</b>	12x	85	16:	x85	16x130	20:	x85	20x130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b</sub>	c [kN	]; tempe	rature range 50/80°C <sup>2)</sup>
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
10 / 8 N/mm²	w/w	w/d	1,5	1,5
10 / 6 14/111111	d/	′d	1,5	2,0
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,5	2,0
12,5 / 10 N/MM	d	'd	2,0	2,0
15 / 12 N/mm²	w/w	w/d	2,0	2,0
15 / 12 N/IIIII	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.

**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			183	(130/200	22x130/200		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b</sub>	c [kN	e range 50/80°C <sup>2)</sup>				
Mean compressive strength / Min. compressive strength single brick 1)	CC	se n- ons					
10 / 8 N/mm <sup>2</sup>	w/w	w/d		1,5	1,5		
TO / O IN/IIIIII	d	/d		2,0	2,0		
42 E / 40 N/mm²	w/w	w/d		2,0	2,0		
12,5 / 10 N/mm <sup>2</sup>	d/d			2,0	2,0		
45 / 42 N/mm²	w/w	w/d		2,0	2,0		
15 / 12 N/mm <sup>2</sup>	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.

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

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .

12,5 / 10 N/mm<sup>2</sup>

15 / 12 N/mm<sup>2</sup>

English translation prepared by DIBt



2,0

2,0

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

w/w w/d

d/d w/w w/d

d/d

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

	М6	M8	М6	М8	-		М8	M10	M	B M10		=	M12	M16	M12	M16	M12M16			
Internal threaded anchor FIS E					-		•		_		-		-				-		-	-
Perforated sleeve FIS H K			12x	85		16	x85		16	x130		20	<b>k</b> 85		20)	<b>c130</b>	20x200			
]; tempe	ratu	re ra	ange	e 50	0/80°	C a	and	72/1	120	°C	į.				100					
Use con- ditions																				
10 / 8 N/mm <sup>2</sup> w/w w/d		0,9 1,5									2	2,0								
	Use con- ditions w/w w/d	Je Use conditions w/w w/d	12x50 ]; temperature ra Use con- ditions  w/w w/d	12x50 12x  ]; temperature range Use con- ditions  w/w w/d  0.9	12x50 12x85  ]; temperature range 50  Use conditions  w/w w/d  0.9	12x50   12x85   12x85	-	12x50   12x85   16x85   12x50   12x85   16x85   16x8	12x50   12x85   16x85   12x50   12x85   16x85   16x8	12x50   12x85   16x85   16x8	12x50   12x85   16x85   16x130   15   15   15   15   15   15   15   1	M6   M8   M10   M10	M6   M8   M10   M12   M10   M10	M6 M8   M10 M12   15x85   12x50   12x85   16x85   16x130   20x85   15x85   16x130   20x85   15x85   15x85   15x85   16x130   15x85   15x85   16x130   15x85   15x85	M6 M8	M6 M8	M6 M8   11x85   15x85   15x85   11x85   15x85   15x8			

1,5

2,0

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

0,9

1,2

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k				
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
10 / 8 N/mm²	w/w w/d d/d	1	,5	2,0
12,5 / 10 N/mm²	w/w w/d	1	,5	2,0
15 / 12 N/mm²	w/w w/d d/d	2	,0	2,0

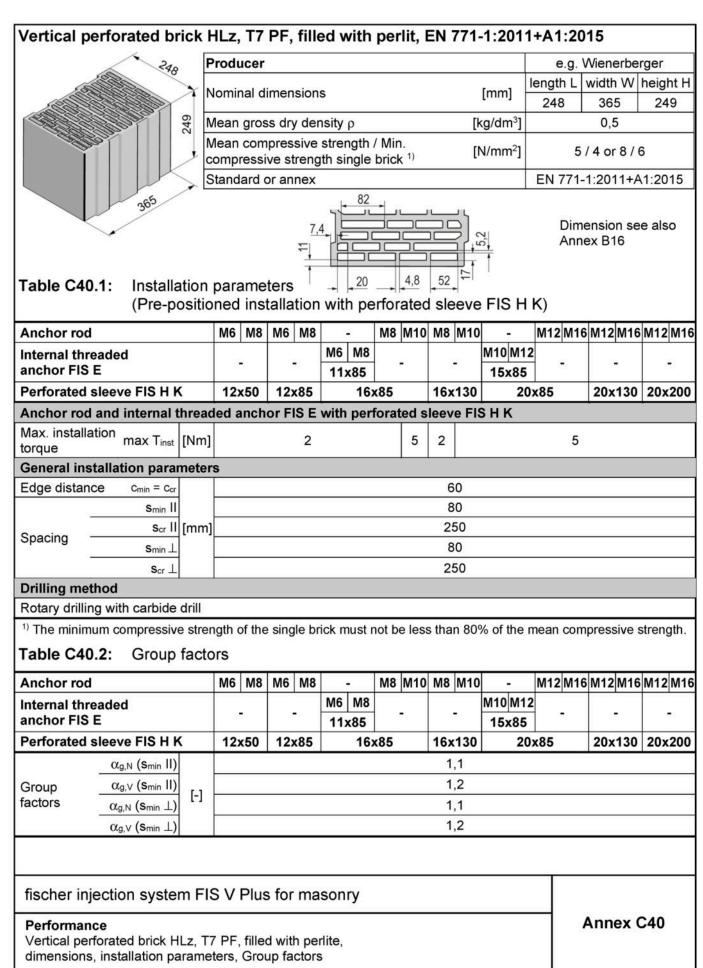
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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 shear loading	Annex C39

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







# 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			18x13	0/200	22x130/200						
Anchor rod wit	h perforat	ed slee	eve FIS H K								
Max. installation torque	max T <sub>inst</sub>	[Nm]		5							
General installa	ation para	meters	3								
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60								
	s <sub>min</sub> II			8	0						
Ci	s <sub>cr</sub> II	[mm]		25	50						
Spacing —	s <sub>min</sub> ⊥			8	0						
2	50										
Drilling method	i										

Rotary drilling with carbide drill

Table C41.2: Group factors

Anchor ro	d	M10	M12	M16			
Perforated	l sleeve FIS H K	18x130/200 22x130/200					
	α <sub>g,N</sub> (s <sub>min</sub> II)	1,1					
Group	$\frac{\alpha_{g,V}(s_{min} II)}{\alpha_{g,N}(s_{min} \bot)} [-]$	1,2					
factors		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, 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 N	18	M6	М8	-		M8 N	V110	M8	M10			M12	W16	M12 M1	M12 M16
Internal threaded anchor FIS E	-		-		M6 N		-	00	8	-	M10 N 15x8		-			-
Perforated sleeve FIS H K	12x5	50	12x	85	1	6x	85		16x	130	:	20x	85		20x130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	N <sub>Rk,b,c</sub> [kN]; temp	erature range 50/8	0°C 2)		3380	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
F / 4 N/2	w/w w/d	1,2	1,2	1,2	1,2	2,0
5 / 4 N/mm <sup>2</sup>	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
8 / 6 N/MM-	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.

**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			18x13	0/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	Rk,b,c	[kN]; te	mperature rang	ge 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons			
5 / 4 N/mm <sup>2</sup>	w/w	w/d	1,	2	1,2
5 / 4 N/IIIIII	d	/d	1,	5	1,5
8 / 6 N/mm <sup>2</sup>	w/w	w/d	1,	5	1,5
6 / 6 N/IIIII-	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	
Performance Vertical perforated brick HLz, T7 PF, filled with perlite, Characteristic resistance under tension loading	Annex C42

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



#### 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			M12M16	M12 M16	M12 M16
Internal threaded anchor FIS E				•	M6		-	-	M10		-	-	
Perforated sleeve FIS H K	12:	<b>&lt;50</b>	12)	(85		16x	85	16x130		20x	85	20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temper	ature range	e 50/80°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d	0,9	1,5	1,2
8 / 6 N/mm²	w/w w/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		18x13	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; tempera	ture range 50/80	0°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d	1,	,5	1,2
8 / 6 N/mm²	w/w w/d 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

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

Annex C43



#### Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger length L | width W | height H Nominal dimensions [mm] 248 425 248 Mean gross dry density p [kg/dm<sup>3</sup>] 0,8 Mean compressive strength / Min. 5/4 or 8/6 or 10/8 [N/mm<sup>2</sup>]compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 15,2 Dimension see also Annex B16 99 **Table C44.1:** 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 M10 M12 M6 M8 Internal threaded anchor FIS E 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 5 3 max Tinst [Nm] 3 5 torque General installation parameters Edge distance Cmin = Ccr 60 $s_{\text{min}} \, II$ 80 Scr II [mm] 250 Spacing 80 Smin 1 250 Scr 1 **Drilling method** Rotary drilling with carbide drill 1) The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Table C44.2: Group factors

Anchor ro	d		M6	M8	M6	M8		- M8 M		M10	M8 M10		4	M12 M16	M12 M16	M12 M16
Internal th			8	- I - H		M6	M8 x85		-		M10 M12 15x85		n¥	-		
Perforated	d sleeve FIS H K		12	x50	12	x85		16)	<b>c</b> 85		16x	130	202	<b>c</b> 85	20x130	20x200
	α <sub>g,N</sub> (s <sub>min</sub> II)										1	,3	02			
Group	α <sub>g,</sub> ∨ (s <sub>min</sub> II)	r 1									1	,2				
factors	$\alpha_{\text{g,N}}$ (s <sub>min</sub> $\perp$ )	[-]									0	,6				
	$\alpha_{\text{g,V}}$ (s <sub>min</sub> $\perp$ )		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



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

#### Table C45.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16
Perforated sle	eve FIS H k	(	18x13	0/200	22x130/200
Anchor rod wi	ith perforat	ed sle	eve FIS H K		
Max. installatio torque	n max T <sub>inst</sub>	[Nm]		į	5
General instal	lation para	meter	S		
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			6	60
	s <sub>min</sub> II			8	30
Cassins —	s <sub>cr</sub> II	[mm]		2	50
Spacing —	s <sub>min</sub> ⊥			8	30
	s <sub>cr</sub> ⊥			2	50
<b>Drilling metho</b>	d				

Rotary drilling with carbide drill

#### Table C45.2: Group factors

Anchor ro	d	M10	M10 M12										
Perforated	sleeve FIS H K	18x13	18x130/200 22x130/200							/200 22x130/200			
	α <sub>g,N</sub> (s <sub>min</sub> II)		1	,3									
Group	α <sub>g,V</sub> (s <sub>min</sub> II)		1	,2									
factors	$\alpha_{g,N}$ (Smin $\perp$ ) [-]		0	,6									
	α <sub>g,∨</sub> (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 C45



#### 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	nchor rod		M8	M6	M8	-		M8	M10	M8	M10		M12 M1	6 M1	2 M16	M12 M16
nternal threaded Inchor FIS E		7.5	•		-	M6 11x		1	-			M10 M12	-			
Perforated sleeve FIS H K			(50	12	x85	16x85			16x130		20x85		20	x130	20x200	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N$	Rk,b,c [kN]	; ten	npe	ratu	re r	ange	50	/80	°C 2)							
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions															

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d	1,5	2,0	3,0	2,5	4,0
5 / 4 N/IIIII	d/d	2,0	2,5	3,0	2,5	4,5
8 / 6 N/mm²	w/w w/d	2,0	2,5	3,5	3,0	5,0
0 / 0 N/IIIII	d/d	2,0	3,0	4,0	3,0	5,5
10 / 8 N/mm <sup>2</sup>	w/w w/d	2,5	3,0	4,0	3,5	6,0
10 / 6 N/IIIII	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.

**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		18x1	30/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	I <sub>Rk,b,c</sub> [kN	; temperature rar	nge 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d		3,0	4,0
5 / 4 N/IIIII-	d/d		3,0	4,5
8 / 6 N/mm²	w/w w/d		3,5	5,0
8 / 6 N/MM-	d/d		4,0	5,5
40 / 0 N/mm²	w/w w/d		4,0	6,0
10 / 8 N/mm²	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.

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

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



## 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	М6	M8	-		M8	M10	M8	M10	-	27	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E					M6 I		\$1	-		-	M10 15x		1			•	
Perforated sleeve FIS H K	12)	(50	12:	x85		16x	85		16>	(130		20)	<b>k</b> 85		20x	130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	N]; tempe	rature ran	ge 50/80	°C and 72/	120°C		ž.	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm²	w/w w/d d/d	2,0	2	,0	2,5	2,	0	1,5
8 / 6 N/mm²	w/w w/d d/d	2,5	2	,5	3,0	2,	5	2,0
10 / 8 N/mm²	w/w w/d d/d	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		18x13	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; tempe	rature range 50/8	0°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d	2	.5	2,0
8 / 6 N/mm²	w/w w/d d/d	3,	0	2,5
10 / 8 N/mm²	w/w w/d d/d	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	Annex C47
Vertical perforated brick HLz, T9 MW, filled with mineral wool;	
Characteristic resistance under shear loading	

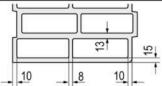


# Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger Imm length L width W height H width W height H 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 425 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 |

Mean gross dry density  $\rho$  [kg/dm³] 0,8

Mean compressive strength / Min. compressive strength single brick 1) [N/mm²] 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)

Anchor rod	M6	M8	M6	M8	93		M8	M10	M8	M10	_	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	73	•	,	-	M6	M8 c85	in .	-	8	•/	M12 x85	9	-	29 <b>-</b>	•		•3
Perforated sleeve FIS H K	12)	<b>&lt;50</b>	12	x85		162	(85		16x	130	20)	x85		20x	130	20x	200

## 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
--------------------------	-----------------------	------	---	---	---	---

#### General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	60
	Smin II	80
Ci	s <sub>cr</sub> II [n	m] 250
Spacing —	S <sub>min</sub> ⊥	80
2	s <sub>cr</sub> ⊥	250

#### **Drilling method**

Rotary drilling with carbide drill

#### Table C48.2: Group factors

Anchor ro	d	Me	S N	18	M6	M8	8	-	M8	M10	M8	M10	-		M12 M16	M12 M16	M12 M16
Internal th anchor FIS		200	-			-	M6	M8 x85			8	-	M10 15x		-		-
Perforated	l sleeve FIS H K	12	2x5	0	12	x85		16:	x85		16x	130		20	x85	20x130	20x200
	α <sub>g,N</sub> (s <sub>min</sub> II)										1	,9					
Group	α <sub>g,V</sub> (S <sub>min</sub> II)	,	0,9														
factors	$\alpha_{g,N}$ (Smin $\perp$ )	,	1,0														
	$lpha_{ extsf{g,V}}$ (s <sub>min</sub> $oldsymbol{\perp}$ )		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

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



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

Table C49.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16
Perforated slee	ve FIS H I	<b>(</b>	18x13	0/200	22x130/200
Anchor rod wit	h perforat	ed slee	eve FIS H K		
Max. installation torque	T <sub>inst</sub>	[Nm]		,	5
General installa	ation para	meters	;		
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			6	0
	s <sub>min</sub> II			8	0
	s <sub>cr</sub> II	[mm]		2:	50
Spacing —	S <sub>min</sub> ⊥			8	0
£-	S <sub>cr</sub> ⊥	1 [		2	50
Drilling method	l				

#### Table C49.2: Group factors

Rotary drilling with carbide drill

Anchor ro	d	M10	M12	M16		
Perforated	d sleeve FIS H K	18x130/200 22x130/200				
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,9			
Group	α <sub>g,V</sub> (s <sub>min</sub> II)		0,9			
Group factors	$\alpha_{g,N}$ (Smin $\perp$ ) [-]		1,0			
	α <sub>g,V</sub> (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 C49



#### 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 11x8		,			-	M10 M12		-	39			•)
Perforated sleeve FIS H K		12)	(50	12	x85		16x	85		16)	(130	20:	x85		20x	130	20x	200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N$	Rk,b,c [kN]	; ter	npe	ratu	ıre r	ange	50	/80	°C 2	)					2:			
Mean compressive strength /	Use																	
Min. compressive strength	con-																	

Mean compressive strength / Min. compressive strength single brick 1)	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
5 / 4 N/IIIII	d/d	0,60	0,90	1,50	2,00	1,50	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
7,576 14/111111	d/d	0,90	0,90	2,00	2,50	2,00	2,50	3,00
10 / 8 N/mm²	w/w w/	d 0,90	1,20	2,00	2,50	2,00	2,50	3,00
10 / 6 N/IIIII	d/d	0,90	1,20	2,00	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.

**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			18x13	22x130/200	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	Rk,b,c	[kN];	temperature ran	ge 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	co	se n- ons			
5 / 4 N/mm²	w/w	w/d	2	,0	2,0
5 / 4 N/IIIII-	d	/d	2	,0	2,0
7 E / C N/mama <sup>2</sup>	w/w	w/d	2	,0	2,5
7,5 / 6 N/mm <sup>2</sup>	d	/d	2	,5	2,5
40 / 9 N/mm²	w/w	w/d	2	,5	2,5
10 / 8 N/mm²	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.

Factor for job site tests and displacements see annex C123.

	500
fischer injection system FIS V Plus for masonry	
Performance	Annex C50
Vertical perforated brick HLz, FZ 7, filled with mineral wool;	
Characteristic resistance under tension loading	

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



#### 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	М6	M8	-		M8	M10	М8	M10	( • ·	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E				-	M6 11x		1	-		-	M10 M12		-		•	-
Perforated sleeve FIS H K	123	<b>(50</b>	12	x85		16>	(85		16>	(130	20:	x85		20x	130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temper	ature range 5	0/80°C and 72/120°C	į.
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d	1,2	1,5	1,5
7,5 / 6 N/mm²	w/w w/d d/d	1,5	2,0	1,5
10 / 8 N/mm²	w/w w/d d/d	1,5	2,5	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 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		18	x130/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; tempe	rature range	50/80°C and 72/1	20°C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d	3		1,5
7,5 / 6 N/mm²	w/w w/d d/d	1		2,0
10 / 8 N/mm²	w/w w/d d/d	3		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

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

Annex C51



#### Vertical perforated brick HLz, EN 771-1:2011+A1:2015 Producer e.g. Bouyer Leroux length L | width W | height H Nominal dimensions [mm] 500 200 315 Mean gross dry density ρ [kg/dm<sup>3</sup>] ≥ 0,6 Mean compressive strength / Min. 5/4 or 7,5/6 or 10/8 [N/mm<sup>2</sup>]compressive strength single brick 1) 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) M8 M10 M8 M10 Anchor rod M6 **M8** M6 M8 M12 M16 M12 M16 M10 M12 M6 M8 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 12x85 16x85 20x85 20x130 16x130 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] 2 torque General installation parameters Cmin = Ccr Edge distance 120 120 Smin II [mm] scr II 500 Spacing 315 $S_{min} \perp = S_{cr} \perp$ **Drilling method** Hammer drilling with hard metal hammer drill 1) 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 M8 M10 M8 M10 M12 M16 M12 M16 M6 **M8** M6 **M8** M6 **M8** M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 12x85 16x85 16x130 20x85 20x130 1,3 ag,N (Smin II) 1,7 $\alpha_{g,V}$ (s<sub>min</sub> II) Group [-] factors $\alpha_{\text{g,N}}$ (s<sub>min</sub> $\perp$ ) 2,0 $\alpha_{g,V}$ (Smin $\perp$ ) fischer injection system FIS V Plus for masonry Annex C52 Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors



(Push t	<b>ck HLz, EN 77</b> tion parameter hrough installa	s		ve FIS H K)	
Anchor rod	M10		M12		M16
Perforated sleeve FIS H K		18x130/200		22	x130/200
Anchor rod with perforate	d sleeve FIS H K				
Max. installation max T <sub>inst</sub> [	[Nm]		2		
General installation param	neters				
Edge distance $c_{min} = c_{cr}$			12	0	
S <sub>min</sub> II	[mm]		12	0	
Spacing s <sub>cr</sub> II			50	0	
s <sub>min</sub> ⊥ = s <sub>cr</sub> ⊥			31	5	
Drilling method					
Hammer drilling with hard m	etal hammer drill				
Table C53.2: Group f	actors				
Anchor rod	M10		M12		M16
Perforated sleeve FIS H K		18x130/200		22	x130/200
α <sub>g,N</sub> (s <sub>min</sub> II)			1,	3	
Group α <sub>g,V</sub> (s <sub>min</sub> II)			1,	7	
factors $\alpha_{g,N}$ (s <sub>min</sub> $\perp$ )	[-]			2	
$\alpha_{g,V}\left(s_{min}\perp\right)$			2,	J	



#### 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	-	•07	M12	M16	M12 N	116
Internal threaded anchor FIS E				•	M6 M8	-	-		-	M10 15x	2000		-	-	
Perforated sleeve FIS H K	12	x50	12	<b>x85</b>	1	6x85		16)	130		20:	x85		20x1	30

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [kN]	; temperatu	re range 50/80°C	2)		•
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d	0,50	1,50	0,75	1,50	1,50
5 / 4 N/IIIII	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
7,5 / 6 N/IIIII-	d/d	0,90	2,50	1,20	2,50	2,50
10 / 8 N/mm²	w/w w/d	0,90	3,00	1,50	3,00	3,50
10 / 6 N/MM-	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.

**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			18x13	0/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,</sub>	c [kN	nge 50/80°C <sup>2)</sup>		
Mean compressive strength / Min. compressive strength single brick 1)	co	se on- ons			
5 / 4 N/mm²		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
7,57614/111111	d	/d	1,3	20	2,50
10 / 8 N/mm²	w/w	w/d	1,	50	3,50
10 / 6 N/IIIII-	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.

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 C54

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



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

**Table C55.1:** 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	M8 M10 - M		M12	M16	M12	M16		
Internal threaded anchor FIS E		-		-	M6	M8 (85		-		-		M12 x85		•		-
Perforated sleeve FIS H K	12	x50	12	<b>x85</b>		16	x85		16	x130		20:	x85		20x	130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	[kN]; temperat	ure range 50/80°C and 7	72/120°C			9
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d d/d	1,5	0,9	1,5	2,5	0,9
7,5 / 6 N/mm²	w/w w/d d/d	2,5	1,5	2,5	3,5	1,5
10 / 8 N/mm²	w/w w/d d/d	3,5	2,0	3,5	4,5	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 C55.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

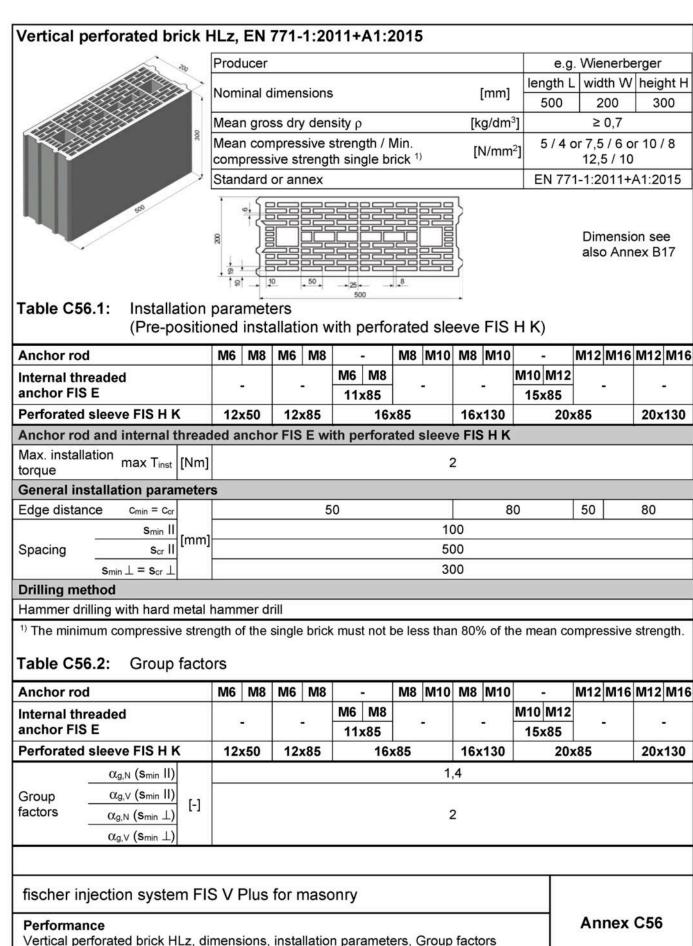
Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I	(N]; temp	erature range 50/8	30°C and 72/120°	C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d		C	0,9
7,5 / 6 N/mm²	w/w w/d d/d		·1	1,5
10 / 8 N/mm²	w/w w/d d/d		2	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	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C55







# 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	18x1	18x130/200 22x130/200			
Anchor rod with perforated sl	eeve FIS H K				
Max. installation max T <sub>inst</sub> [Nm			2		
General installation paramete	rs				
Edge distance c <sub>min</sub> = c <sub>cr</sub>		8	0		
S <sub>min</sub> II	,	10	00		
Spacing s <sub>cr</sub> II	J	50	00		
S <sub>min</sub> ⊥ = S <sub>cr</sub> ⊥		30	00		

#### **Drilling method**

Hammer drilling with hard metal hammer drill

#### Table C57.2: Group factors

Anchor ro	d	M10	M12	M16
Perforated	I sleeve FIS H K	18x130	0/200	22x130/200
	α <sub>g,N</sub> (S <sub>min</sub> II)		1,4	
Group	$\alpha_{g,V}$ (s <sub>min</sub> II) [-]			
factors	α <sub>g,N</sub> (s <sub>min</sub> ⊥)		2	
	α <sub>g,</sub> ∨ (s <sub>min</sub> ⊥)			

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)

No. 1 April 2010 April				100000	4				0 M8 M10		M8 M10		M8 M10		M8 M10		M8 M10		M8 M10	M8	M8 M	M8 M10	M8 M10		M8 M10			-		 M12 M10
Internal threaded		_		_	M6	M8		_			M10	M12		-																
anchor FIS E	-					11x85					15x85			(1 <del>75</del> ):																
Perforated sleeve FIS H K	12	x50	12:	x85		16	3x85		16)	(130		20	x85	20x130																

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [kN	]; temperature	range 50/80°C 2)			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d	0,50	0,60	1,20	0,75	1,50
5 / 4 N/IIIII	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
7,57 6 14/111111	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
10 / 6 N/IIIII	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
12,57 TO N/IIIII	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.

**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		183	k130/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [k	N]; temperatur	e range 50/80°C <sup>2</sup>	)
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d		1,2	1,5
5 / 4 N/IIIII1"	d/d		1,2	1,5
7,5 / 6 N/mm <sup>2</sup>	w/w w/d		1,5	2,0
7,576 N/IIIII-	d/d		2,0	2,5
10 / 8 N/mm²	w/w w/d		2,0	2,5
10 / 8 N/MM²	d/d		2,5	3,0
40 E / 40 N/mm²	w/w w/d		2,5	3,5
12,5 / 10 N/mm <sup>2</sup>	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.

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



#### 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 <85		-		-	M10	M12 x85		•	8	-
Perforated sleeve FIS H K	12	x50	12	(85	16		6x85		16x130		20		x85		20x	130

1 chlorated diceve i lo ii k		ILXUU	ILAGO		1000	107100	2000	LUXIOU
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	erature	range 50	)/80°	C and 72/12	0°C	50 -	5
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm²	w/w w/d d/d	0,9	1,2	0,9	1,2	0,6	2,0	0,6
7,5 / 6 N/mm <sup>2</sup>	w/w w/d d/d	1,2	1,5	1,2	1,5	0,9	3,0	0,9
10 / 8 N/mm²	w/w w/d d/d	1,5	2,0	1,5	2,0	1,2	4,0	1,2
12,5 / 10 N/mm²	w/w w/d 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		18x13	0/200	22x130/200	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I	Rk = 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 1)	Use con- ditions				
5 / 4 N/mm²	w/w w/d d/d		0,6	3	
7,5 / 6 N/mm²	w/w w/d d/d		0,9	)	
10 / 8 N/mm²	w/w w/d d/d		1,2	2	
12,5 / 10 N/mm²	w/w w/d d/d		1,5	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	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C59



#### Vertical perforated brick HLz, EN 771-1:2011+A1:2015 Producer e.g. Terreal length L | width W | height H Nominal dimensions [mm] 500 200 315 [kg/dm<sup>3</sup>] ≥ 0,7 Mean gross dry density ρ 2,5 / 2 or 5 / 4 or Mean compressive strength / Min. $[N/mm^2]$ compressive strength single brick 1) 7,5 / 6 or 10 / 8 Standard or annex EN 771-1:2011+A1:2015 Dimension see also 8 Annex B17 Table C60.1: Installation parameters (Pre-positioned installation with perforated sleeve FIS H K) M6 M8 M8 M10 M8 M10 M6 M8 M12 M16 M12 M16 Anchor rod M10 M12 M6 M8 Internal threaded anchor FIS E 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 max Tinst [Nm] torque General installation parameters Edge distance $c_{min} = c_{cr}$ 50 80 50 80 Smin II 100 scr II [mm] 500 Spacing 100 Smin 1 315 Scr 1 **Drilling method** Hammer drilling with hard metal hammer drill 1) The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. Table C60.2: Group factors M12 M16 M12 M16 Anchor rod M6 **M8** M6 **M8** M8 M10 M8 M10 M6 M8 M10 M12 Internal threaded anchor FIS E 15x85 11x85 Perforated sleeve FIS H K 16x85 20x85 12x50 12x85 16x130 20x130 αg,N (Smin II) 1,1 1.2 $\alpha_{g,V}$ (smin II) Group [-] factors $\alpha_{\text{g,N}}$ (s<sub>min</sub> $\perp$ ) 1,1 1,2 $\alpha_{g,V}$ (Smin $\perp$ ) fischer injection system FIS V Plus for masonry Annex C60 Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors



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

Table C61.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

		M10 M12 M16								
ve FIS H k	(	18x13	22x130/200							
Anchor rod with perforated sleeve FIS H K										
max T <sub>inst</sub>	[Nm]		2							
General installation parameters										
C <sub>min</sub> = C <sub>cr</sub>			1	80						
s <sub>min</sub> II			1	00						
s <sub>cr</sub> II	[mm]		5	00						
s <sub>min</sub> ⊥		100								
S <sub>cr</sub> ⊥		315								
	max T <sub>inst</sub> ntion paramoder of the second s	max T <sub>inst</sub> [Nm]           ation parameters           c <sub>min</sub> = c <sub>cr</sub> s <sub>min</sub> II           s <sub>cr</sub> II           s <sub>min</sub> ⊥	tion parameters  Cmin = Ccr Smin II Scr II [mm]	ve FIS H K         18x130/200           h perforated sleeve FIS H K           max T <sub>inst</sub> [Nm]           ation parameters           C <sub>min</sub> = C <sub>cr</sub> S <sub>min</sub> II S <sub>cr</sub> II [mm]         1           S <sub>min</sub> ⊥         1						

#### **Drilling method**

Hammer drilling with hard metal hammer drill

Table C61.2: Group factors

Anchor ro	d	M10 M12 M16						
Perforated	I sleeve FIS H K	18x130	0/200	22x130/200				
	α <sub>g,N</sub> (s <sub>min</sub> II)		1	,1				
Group	αg, v (Smin II)	1,2						
factors	$\alpha_{g,N}$ (S <sub>min</sub> $\perp$ ) [-]	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 C61



#### 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	,	-01	M12	M16	M12 M16
Internal threaded anchor FIS E		-		-	M6	M8 <85		-		-	M10	M12 x85		•	-
Perforated sleeve FIS H K	12	x50	12	<b>x85</b>		16	x85		16	k130		20:	x85		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 1)	Use con- ditions										
2,5 / 2 N/mm <sup>2</sup>	w/w w/d			0.5							
2,5 / 2 N/IIIII	d/d		0,5	0,6	0,5	0,6					
5 / 4 N/mm <sup>2</sup>	w/w w/d			0,9							
974 W/IIIII	d/d	0,9		1,2							
7,5 / 6 N/mm <sup>2</sup>	w/w w/d			1,5							
7,5 / 6 N/IIIII	d/d			1,5							
10 / 8 N/mm²	w/w w/d			2,0							
10 / 6 N/IIIIII	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.

**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		18:	x130/200	22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	N <sub>Rk,b,c</sub> [kN	]; temperatur	e range 50/80°C 2)					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
2,5 / 2 N/mm²	w/w w/d d/d			0.5 0,6				
5 / 4 N/mm²	w/w w/d d/d			0.9 1,2				
7,5 / 6 N/mm²	w/w w/d d/d			1.5 1,5				
10 / 8 N/mm²	w/w w/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.

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 C62

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

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



#### 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		<b>-</b> 2		•	M6	M8 (85		-		-	M12 x85		-	-	
Perforated sleeve FIS H K	12	x50	12	<b>k</b> 85		16	x85		16	k130	20	<b>k</b> 85		20x1	130

i citoratea siceve i lo ii k		12700	12,000		1000	107130	2000	207100	
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 1)	Use con- ditions								
2,5 / 2 N/mm²	w/w w/d d/d	0,30	0,60	0,3	0,60	0,60	0,90	0,75	
5 / 4 N/mm²	w/w w/d d/d	0,75	1,20	0,7	1,20	1,20	2,00	1,50	
7,5 / 6 N/mm²	w/w w/d d/d	0,90	2,00	0,9	2,00	1,50	3,00	2,00	
10 / 8 N/mm²	w/w w/d d/d	1,50	2,50	1,5	2,50	2,00	4,00	3,00	

<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		18x13	0/200	22x130/200			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C						
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
2,5 / 2 N/mm²	w/w w/d d/d	0,	60	0,75			
5 / 4 N/mm²	w/w w/d d/d	1,	20	1,50			
7,5 / 6 N/mm <sup>2</sup>	w/w w/d d/d	1,	50	2,00			
10 / 8 N/mm²	w/w w/d d/d	2,	00	3,00			

<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	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C63



	Produ	icer	e.g. Imery				
	>		<u> </u>	[	length L		
	Nomii	nal dimensions	•	[mm]	560	200 275	
		gross dry den		[kg/dm <sup>3</sup> ]		≥ 0,7	
	comp		strength / Min. th single brick 1)	[N/mm <sup>2</sup> ]	47/2Tv 170	or 8 / 6 or 10 / 8	
660	Stand	ard or annex			EN 77	1-1:2011+A1:2015	
Table C64.1: Installation	on narar	7.	8, 60, 0 40, 566			Dimension see also Annex B17	
Anchor rod	MI Parai	20	M10 M12	M12	M16	M16	
Perforated sleeve FIS H K	IVIC	16x130	18x130/200	20x1		22x130/200	
Anchor rod with perforated	sleeve F	1 Photographic Company	1001200	20/11		227100/200	
Max. installation max T <sub>inst</sub> [N				2			
General installation parame	ters						
Edge distance c <sub>min</sub> = c <sub>cr</sub>				30			
Spacing $\frac{s_{min} II = s_{cr} II}{s_{min} II = s_{cr} II}$	ım]			60			
$s_{min} \perp = s_{cr} \perp$ Drilling method				75			
TALL TO THE PARTY OF THE PARTY	tal hamm	er drill					
nammer unling with hard me							
	ctors						
1) The minimum compressive s <b>Table C64.2:</b> Group fa <b>Anchor rod</b>		B M10	M10 M12	M12	M16	M16	
1) The minimum compressive s  Table C64.2: Group fa  Anchor rod  Perforated sleeve FIS H K	ctors				M16		
Table C64.2: Group fa  Anchor rod  Perforated sleeve FIS H K	ctors	B M10	M10 M12 18x130/200	M12	M16	M16	



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

Table C65.1: 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
Perforated sleeve FIS H K		16>	16x130 18x130/200 20x130 2				22x130/200	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = 0$	N <sub>Rk,b,c</sub> [kl	N]; tempe	rature ra	nge 50/80	)°C <sup>2)</sup>	*		,
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm²	w/w w/c		0,9	)				
37 4 W/IIIII	d/d		1,2	2			1,5	
8 / 6 N/mm <sup>2</sup>	w/w w/c		1,5	5			2,0	N.
o / o N/IIIII-	d/d		1,5	;			2,0	9
40.10 N/m2	w/w w/c		2,0	)			2,5	
10 / 8 N/mm²	d/d		2,5	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.

**Table C65.2:** 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
Perforated sleeve FIS H K		16x130 18x130/200 20x130 22x130/20						22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	(N]; temp	erature r	ange 50/	80°C and	72/120°C	;		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm²	w/w w/d d/d	Į.			0	,9		
8 / 6 N/mm²	w/w w/d d/d	Ţ			1	,5		
10 / 8 N/mm²	w/w w/d d/d	ž.			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 Annex C65 Performance Vertical perforated brick HLz, Characteristic resistance under tension and shear loading

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



120	Producer			2	e.a.	Wienerb	erge	er
					length L	width \	_	
	Nominal dimen	sions		[mm]	255	120		118
	Mean gross dry	y density ρ		[kg/dm <sup>3</sup> ]		≥ 1,0		
	Mean compres compressive st			[N/mm <sup>2</sup> ]	2,5 / 2 o	or 5 / 4 c		
	Standard or an		DITOR			-1:2011+		
255	A A	I				1.2011	7 (1.2	
	120	-     -				mension nex B18	see a	also
	parameters		55	MO MA	10		#4 O	Bada
Anchor rod	M6 M8	M6 M8	M6 M8	M8 M1	M10	M12	<b>V</b> 112	M10
Internal threaded anchor FIS E		-	11x85		15>	, Accessor and the second		-
Perforated sleeve FIS H K	12x50	12x85	NE CONTE-E-CONT	(85	102	20x8	5	
		ed anchor FIS E with perforated sleeve FIS H K						
Max. installation max T <sub>inst</sub> [Nm]				2				
General installation paramete	rs							
Edge distance c <sub>min</sub> = c <sub>cr</sub>			6	0				
Spacing $\frac{s_{cr}     = s_{min}    }{s_{min}    }$ [mm]	ı]		25	55				
$s_{cr} \perp = s_{min} \perp$			12	20				
Drilling method								
Hammer drilling with hard metal	2004 N. 1947 N. 179 17	775 DO 025 DO 0	922-83 80 80			124.00	Albert	
Table C66.2: Group fact	ors		lot be less that					
Anchor rod	M6 M8	M6 M8	M6 M8	M8 M1			<b>/</b> 112	M1
Internal threaded anchor FIS E	-	-	M6   M8 11x85	-	M10			-
21101101 1 10 L	12x50	12x85		(85	157	20x8	5	
Perforated sleeve FIS H K	12,00	12,00	102			2010		
Perforated sleeve FIS H K $ \frac{\alpha_{g,N} \text{ (s_{min} II)}}{\alpha_{g,V} \text{ (s_{min} II)}} $ Factors $ \frac{\alpha_{g,N} \text{ (s_{min} II)}}{\alpha_{g,V} \text{ (s_{min} I)}} $ [-]			:	2				



## 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	8	-	M8 M10		M8 M10		M8 M10					M16
Internal threaded						M8	97		M10	M12	9.					
anchor FIS E	1	-		-	11	x85		-	153	(85		-				
Perforated sleeve FIS H K	12:	x50	12	x85		16:	x85			20:	<b>k</b> 85					

		3.000 (0.000 (0.000)		10-14-14-14-14-14-14-14-14-14-14-14-14-14-
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	Rk,b,c [kN]	; temperatu	re range 50/80°C 1)	
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use con- ditions			
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	0,40	0,50	_3)
2,5 / 2 N/IIIII	d/d	0,50	0,50	_3)
5 / 4 N/mm <sup>2</sup>	w/w w/d	0,90	0,90	0,50
5 / 4 N/IIIII	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
0 / 0 IN/IIIII	d/d	1,50	1,50	0,75
10 / 8 N/mm²	w/w w/d	1,50	2,00	0,90
10 / 6 14/111111	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
12,5 / 10 N/IIIII	d/d	2,50	2,50	1,20
15 / 12 N/mm²	w/w w/d	2,50	3,00	1,50
15 / 12 N/IIIII	d/d	3,00	3,50	1,50

<sup>&</sup>lt;sup>1)</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, Characteristic resistance under tension loading	Annex C67

<sup>&</sup>lt;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.



## 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		-		• (1	M6	M8 x85		-1	M10	M12 (85		<b>-</b> 0
Perforated sleeve FIS H K	12:	x50	12	x85		16:	x85			20:	x85	

		2000		100		.0	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I	kN]; temp	eratu	re ran	ge 50/	80°C a	nd 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- dition						
2,5 / 2 N/mm²	w/w w/d d/d	0,60	0,75	0,60	0,75	0,	90
5 / 4 N/mm²	w/w w/d d/d	1,20	1,50	1,20	1,50	2,	00
8 / 6 N/mm²	w/w w/d d/d	2,00	2,00	2,00	2,00	2,	50
10 / 8 N/mm²	w/w w/d d/d	2,50	3,00	2,50	3,00	3,	50
12,5 / 10 N/mm²	w/w w/d d/d	3,00	3,50	3,00	3,50	4,	50
15 / 12 N/mm²	w/w w/d d/d	4,00	4,50	4,00	4,50	5,	50

<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, Characteristic resistance under shear loading	Annex C68



#### Vertical perforated brick HLz, EN 771-1:2011+A1:2015 Producer e.g. Cermanica Farreny S.A. length L width W height H Nominal dimensions [mm] 275 130 94 [kg/dm<sup>3</sup>] ≥ 0,8 Mean gross dry density ρ Mean compressive strength / Min. 7,5 / 6 or 10 / 8 or 15 / 12 or [N/mm<sup>2</sup>] compressive strength single brick 1) 20 / 16 or 25 / 20 EN 771-1:2011+A1:2015 Standard or annex 130 Dimension see also Annex B18 20 **Table C69.1:** Installation parameters Anchor rod **M6 M8 M6 M8 M8** M<sub>10</sub> M12 M16 **M6 M8** M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 16x85 20x85 12x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] torque General installation parameters Edge distance Cmin = Ccr 100 120 275 $s_{cr} II = s_{min} II [mm]$ Spacing $s_{cr} \perp = s_{min} \perp$ 95 **Drilling method** Hammer drilling with hard metal hammer drill 1) The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. **Table C69.2:** Group factors Anchor rod **M6 M8 M6 M8 M8** M10 M12 M16 **M6 M8** M10 M12 Internal threaded anchor FIS E 11x85 15x85 20x85 Perforated sleeve FIS H K 12x50 12x85 16x85 $\alpha_{\text{g,N}}$ (s<sub>min</sub> II) $\alpha_{g,V}$ (s<sub>min</sub> II) Group 2 [-] factors $\alpha_{g,N}$ (Smin $\perp$ ) $\alpha_{g,V}$ (Smin $\perp$ ) fischer injection system FIS V Plus for masonry Annex C69 Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors



## 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

Anchor rod	M6	M8	M6	M8	-		M8 M10		M8 M10			-		M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	M10			<b>-</b> 8		
Perforated sleeve FIS H K	12:	x50	12:	x85		16:	x85			20:	(85			

		IZAGO		10/100	=0.00
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [kN]	; temperat	ure range 50	/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions				
7,5 / 6 N/mm <sup>2</sup>	w/w w/d	0,40 0,40		0,90 0,90	
10 / 8 N/mm²	w/w w/d	0,50		1,20	
	d/d w/w w/d	0,60		1,20 1,50	
15 / 12 N/mm²	d/d	0,90		2,00	
20 / 16 N/mm <sup>2</sup>	w/w w/d d/d	0,90 1,20		2,00 2,50	
25 / 20 N/mm²	w/w w/d d/d	1,20 1,50		3,00 3,00	

<sup>&</sup>lt;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	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C70

 $<sup>^{2)}</sup>$  For temperature range 72/120°C: N<sub>Rk (72/120°C)</sub> = 0,83 · N<sub>Rk (50/80°C)</sub>.



#### 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

Anchor rod	M6	M8	M6	M8	0	-	M8	M10		•	M12	M16
Internal threaded anchor FIS E		-	ŕ	-	M6	M8 x85			M10	M12 (85		-
Perforated sleeve FIS H K	12	x50	12:	x85		16:	x85			20	x85	

i citoratea oleeve i le ti ix		12700	12.00	1000	ZUXUU
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	erature ran	ge 50/80°C and	72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions				
7,5 / 6 N/mm²	w/w w/d d/d	1,2		1,2	
10 / 8 N/mm²	w/w w/d d/d	1,5		1,5	
15 / 12 N/mm <sup>2</sup>	w/w w/d d/d	2,0		2,5	
20 / 16 N/mm <sup>2</sup>	w/w w/d d/d	3,0		3,0	
25 / 20 N/mm²	w/w 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.

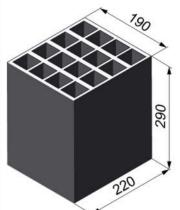
fischer injection system FIS V Plus for masonry

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				
Naminal dimensions	[mm]	length L	width W	height H	
Nominal dimensions	[mm]	220	190	290	
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]	≥ 0,7			
Mean compressive strength / Min. compressive strength single brick 1)	[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	10	-	M8	M10	M8	M10		-01	M12	M16	M12 M16
Internal threaded anchor FIS E		-	,	<b>=</b> 35	M6	M8 x85		-	3	-		M12 x85		•	-
Perforated sleeve FIS H K	12	x50	12:	x85		16:	<b>k</b> 85		16x	130	20:		x85		20x130

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

Max. installation	max T <sub>inst</sub>	[MM]	١	)
torque	IIIax Tinst	LIMILI		-

#### General installation parameters

Edge distar	nce c <sub>min</sub> = c <sub>cr</sub>		110
Cassins	smin II = scr II	[mm]	220
Spacing	$s_{min} \perp = s_{cr} \perp$		290

#### **Drilling method**

Hammer drilling with hard metal hammer drill

#### Table C72.2: Group factors

Anchor rod	M6	M8	M6	M8	10	-	M8	M10	M8	M10		- 1	M12	M16	M12	M16
Internal threaded		Ž.			M6	M8					M10	M12	1	lo-		
anchor FIS E		-		-	11:	x85		-		-	15	x85		-	(d)	•0;
Perforated sleeve FIS H K	12:	x50	12:	x85		16:	x85	(85 16x130			20:	x85		20x	130	
α <sub>g,N</sub> (s <sub>min</sub> II)																
7 118																

10	
$ \begin{array}{c c} \alpha_{g,N} \ (s_{min} \ II) \\ \hline Group \\ factors & \alpha_{g,V} \ (s_{min} \ II) \\ \hline \alpha_{g,N} \ (s_{min} \ \bot) \\ \hline \alpha_{g,V} \ (s_{min} \ \bot) \\ \hline \end{array}                                 $	

fischer injection system FIS V Plus for masonry

#### Performance

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

Annex C72

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



## 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	18x1	30/200	22x130/200							
Anchor rod with perforate	d sleeve FIS H K									
Max. installation max T <sub>inst</sub> [	Nm]		2							
General installation param	eters									
Edge distance c <sub>min</sub> = c <sub>cr</sub>		1	10							
Smin II = Scr II	mm]	2	20							
Spacing $s_{min} \perp = s_{cr} \perp$		290								
Drilling method	210									
Hammer drilling with hard m	etal hammer drill									
	to a contract of the following the Part of the Contract of the									

# Table C73.2: Group factors

Anchor ro	od	M10	M12	M16
Perforated	d sleeve FIS H K	18x1	30/200	22x130/200
Group factors	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,N} (s_{min} II)}$ $\frac{\alpha_{g,N} (s_{min} \bot)}{\alpha_{g,N} (s_{min} \bot)}$	1	2	

fischer injection system FIS V Plus for masonry	
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			-		-	 M12 x85	1	-	-
Perforated sleeve FIS H K	12	x50	12	<b>k</b> 85		16	x85		16	k130	20:	x85		20x130

Perforated sleeve FIS H K		12X50	12X85	16X85	16X130	20X85	20X130
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [kN	l]; tempe	erature rai	nge 50/80°C <sup>2)</sup>			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
7,5 / 6 N/mm <sup>2</sup>	w/w w/d	0,3	1,2	1,2	1,5	1,2	1,5
7,57 O N/IIIII	d/d	0,4	1,5	1,5	1,5	1,5	1,5
10 / 8 N/mm²	w/w w/d	0,5	1,5	1,5	2,0	1,5	2,0
10 / 6 N/MM-	d/d	0,5	2,0	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
12,5 / 10 N/MM	d/d	0,6	2,5	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.

**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		18x13	18x130/200 22x130/200						
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [	kN]; temperature ra	nge 50/80°C <sup>2)</sup>						
Mean compressive strength / Min. compressive strength single brick 1)	Use con- dition								
7,5 / 6 N/mm <sup>2</sup>	w/w w	/d	1,	5					
7,576 14/111111	d/d		1,	5					
10 / 8 N/mm²	w/w w	/d	2,	0					
10 / 6 N/IIIII	d/d		2,	5					
12,5 / 10 N/mm <sup>2</sup>	w/w w	/d	2,	5					
12,57 10 14/111111	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.

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 C74

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



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

**Table C75.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	М6	M8	-		M8	M10	M8	M10	-	•	M12	M16	M12	M16
Internal threaded anchor FIS E		-8			M6 N	-	39	-		-	M10 15x			-		-
Perforated sleeve FIS H K	12:	x50	12)	<b>k</b> 85		16	x85		162	<b>c130</b>		20:	<b>k</b> 85		20x	130

1 011010100001011101111		IZAGO	IZAGO	IOAGO	100100	20000	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	[kN]; temp	perature	range 50	/80°C and 72/1	20°C		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
7,5 / 6 N/mm²	w/w w/d d/d	1,5	1,5	1,5	2,5	1,5	2,0
10 / 8 N/mm²	w/w w/d d/d	2,0	2,0	2,0	3,5	2,0	3,0
12,5 / 10 N/mm²	w/w w/d d/d	2,5	3,0	3,0	4,5	3,0	3,5

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

**Table C75.2:** 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		18x	130/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; tempe	erature range 5	60/80°C and 72/120°	C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
7,5 / 6 N/mm²	w/w w/d d/d		2	2,0
10 / 8 N/mm²	w/w w/d d/d		;	3,0
12,5 / 10 N/mm²	w/w w/d d/d		;	3,5

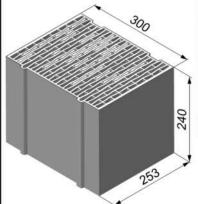
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C75



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



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

Dimension see also Annex B18

48 -

#### Table C76.1: Installation parameters

(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	30	-	M8	M10	M8	M10		-01	M12	M16	M12	M16
Internal threaded		×		âi -	M6	M8		88			M10	M12		98		58
anchor FIS E		•		-00	11:	x85		-		-	15	x85		-	, ,	
Perforated sleeve FIS H K	12	x50	12	<b>k</b> 85		162	x85		16x	130		20:	x85		20x	130

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

Max. installation	max T <sub>inst</sub>	[NIma]	,
torque	Max Tinst	[[MI]]	

#### General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60
Cassing	S <sub>min</sub> II = S <sub>cr</sub> II [	[mm]	255
Spacing s	s <sub>min</sub> ⊥=s <sub>cr</sub> ⊥		240

#### **Drilling method**

Hammer drilling with hard metal hammer drill

#### Table C76.2: Group factors

 $\alpha_{g,N}$  ( $s_{min} \perp$ )  $\alpha_{\text{g,V}}$  (s<sub>min</sub>  $\perp$ )

Anchor ro	od	M6	M8	M6	M8	10	-	M8	M10	M8	M10		-	M12 M16	M12 M16	
Internal th			-		-	M6	M8 x85		-		-	M10	M12 x85	-		
Perforated	d sleeve FIS H K	12	x50	12	x85		16:	x85		16)	(130		20	x85	20x130	
Group	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)}$								2	2						

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L			

#### fischer injection system FIS V Plus for masonry

#### Performance

factors

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

Annex C76

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



	allation pa sh through		th perforated sl	eeve FIS H K)					
Anchor rod		M10	M12		M16				
Perforated sleeve FIS	HK	18x13	0/200	2	2x130/200				
Anchor rod with perform	rated sleeve	FIS H K							
Max. installation T <sub>ins</sub>	t [Nm]			2					
General installation pa									
Edge distance $c_{min} = c_{cr}$ Spacing $s_{min}   I = s_{cr}   I  $ [mm]		60							
$s_{min} \perp = s_{c}$	r			240					
Drilling method Hammer drilling with hai	rd metal han	nmer drill							
Anchor rod	up factors	M10		M16					
Perforated sleeve FIS α <sub>g,N</sub> (s <sub>min</sub>		18x13	0/200	2	2x130/200				
Group $\alpha_{g,V}$ (Smin $\alpha_{g,N}$ (Smin $\alpha_{g,V}$ (Smin $\alpha_{g,V$				2					
fischer injection sys	stem FIS V	/ Plus for maso	onry						



## 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 (85	2.	-		-	 M12 x85		•	-
Perforated sleeve FIS H K	12	x50	12	<b>k</b> 85		16	x85		162	k130	20:	x85		20x130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	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 1)	Use con- ditions												
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	_3)	0,50	0,50	0,40	0,50	0,40						
2,5 / 2 14/111111	d/d	0,30	0,50	0,50	0,50	0,50	0,50						
5 / 4 N/mm²	w/w w/d	0,50	0,90	0,90	0,90	0,90	0,90						
5 / 4 N/IIIII	d/d	0,60	0,90	0,90	0,90	0,90	0,90						
0.70 N/2	w/w w/d	0,75	1,50	1,50	1,20	1,50	1,20						
8 / 6 N/mm²	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.

**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			18x	130/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	NRk,b,	c [kN	l]; temperature	range 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	cc	se n- ons			
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d			0,4
2,5 / 2 N/IIIII	d	/d			0,5
5 / 4 N/mm²	w/w	w/d			0,9
5 / 4 N/IIIII	d	/d			0,9
9 / 6 N/mm²	w/w	w/d			1,2
0 / 0 N/IIIII	8 / 6 N/mm²				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	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C78

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

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

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



## 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 15x		-	(	-
Perforated sleeve FIS H K	12	x50	12)	<b>k</b> 85	10	6x85		16)	(130		20:	x85		20x130

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 con- ditions								
2,5 / 2 N/mm²	w/w w/d d/d	0,5	0,6						
5 / 4 N/mm²	w/w w/d d/d	0,9	1,2						
8 / 6 N/mm²	w/w w/d d/d	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.

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

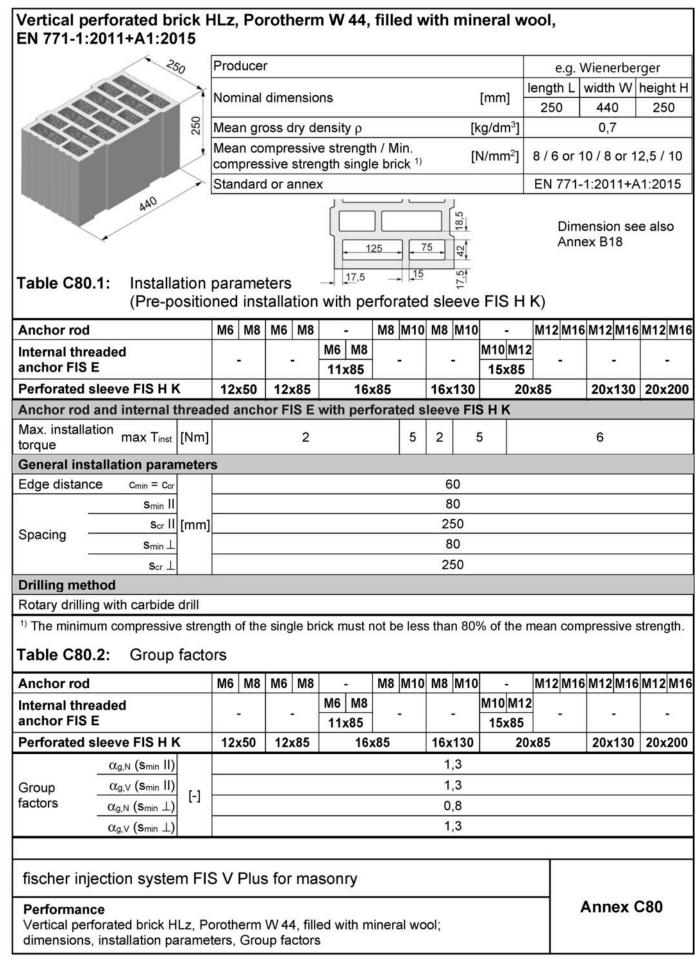
Anchor rod		M10	M12	M16						
Perforated sleeve FIS H K		18x13	0/200	22x130/200						
V <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [kN]; temperature range 50/80°C and 72/120°C										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
2,5 / 2 N/mm²	w/w w/d d/d	0,	,5	0,6						
5 / 4 N/mm²	w/w w/d d/d	0,	9	1,2						
8 / 6 N/mm²	w/w w/d d/d	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.

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 shear loading	Annex C79







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

Table C81.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16						
Perforated sleeve FIS H K			18x13	30/200	22x130/200						
Anchor rod with perforated sleeve FIS H K											
Max. installation max T <sub>inst</sub> [Nm]			5	5 6							
General installation parameters											
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60								
-	s <sub>min</sub> II		80								
_	s <sub>cr</sub> II	[mm]	250								
Spacing —	S <sub>min</sub> ⊥		80								
	s <sub>cr</sub> ⊥		250								
Drilling metho	od										
Rotary drilling	with carbide	drill									

## Table C81.2: Group factors

Anchor ro	od	M10	M16							
Perforated	d sleeve FIS H K	18x130	/200	22x130/200						
	α <sub>g,N</sub> (s <sub>min</sub> II)	1,3								
Group	α <sub>g,V</sub> (s <sub>min</sub> II)	1,3								
factors	$\alpha_{g,N}$ (Smin $\perp$ ) [-]	0,8								
	α <sub>g,∨</sub> (s <sub>min</sub> ⊥)	1,3								

fischer injection system FIS V Plus for masonry

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

Annex C81

12,5 / 10 N/mm<sup>2</sup>



2,00

2,00

3,00

3,50

140 1440 140 1440

# Vertical perforated brick HLz, Porotherm 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)

240 240 240 240

Anchor rod		M6 I	M8	M6	M8	-	N	18 M10	M8 M10	•	M12 M16	M12 M1	6 M12 M16
Internal threaded anchor FIS E		-		•	•	M6 N			-	M10 M12 15x85	-	-	
Perforated sleeve FIS H K		12x	50	12)	x85	1	6x8	5	16x130	20:	x85	20x130	20x200
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 1)	Use con- ditions												
8 / 6 N/mm²	w/w w/d	0,7	5	1,	50		1,20	)		1,	50		2,50
d/d			0,90 1,50 1,20 1,50 2						2,50				
10 / 8 N/mm²	w/w w/d	0,9	0	1,	50		1,20	)		1,	50		2,50
10 / 6 14/111111	d/d	0,9	0,90 2,00 1,50 2,00						3,00				

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

1,50

1,50

w/w w/d

d/d

0,90

1,20

**Table C82.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

2,00

2,00

Anchor rod		M10	M12	M16					
Perforated sleeve FIS H K		18x13	30/200	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 1)	Use con- ditions								
8 / 6 N/mm²	w/w w/d			,5 ,5					
10 / 8 N/mm²	w/w w/d			,5					
10 / 0 14/11111	d/d		2	,0					
12,5 / 10 N/mm <sup>2</sup>	w/w w/d		100 April 100 Ap						
	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.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, Characteristic resistance under tension loading	Annex C82

<sup>&</sup>lt;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>.

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



## Vertical perforated brick HLz, Porotherm 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 N	M8	М6	M8			M8	M10	M8	M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E		-			-	M6	M8	+	-		_	M10 M12	_	-	-
Perforated sleeve FIS	энк	12x5	12x50 12x85 16x85 16x130				20:	20x85		20x200					
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V$	/ <sub>Rk,c,⊥</sub> [kN]	; temp	era	ture	e rar	ige !	50/80	°C a	and 7	2/12	0°C				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions														
8 / 6 N/mm²	w/w w/d				C	),9				1	,2	0	,9	1,2	1,2
10 / 8 N/mm²	w/w w/d				C	,9				1	,5	0	,9	1,5	1,2
12,5 / 10 N/mm²	w/w w/d				1	,2				1	,5	1	,2	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.

**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	HK	18x13	0/200	22x130/200			
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 1)	Use con- ditions						
8 / 6 N/mm²	w/w w/d d/d	1,	2	1,2			
10 / 8 N/mm²	w/w w/d d/d	1.	5	1,5			
12,5 / 10 N/mm²	w/w w/d d/d	1,	5	1,5			

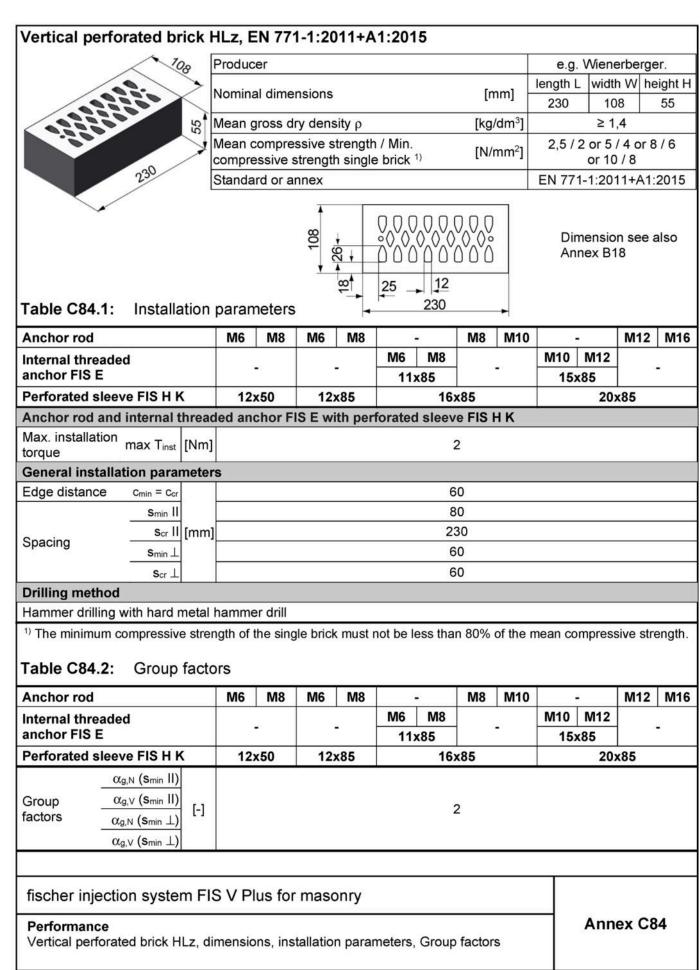
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

d/d

fischer injection system FIS V Plus for masonry	
Performance	Annex C83
Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool; Characteristic resistance under shear loading	







## 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	9	-	M8	M10		-	M12	M16
Internal threaded anchor FIS E	8	-		_	M6	M8 x85		-	M10	M12 x85		-
Perforated sleeve FIS H K	12:	x50	12	x85		16:	x85			20:	x85	

				(0.00.0.3)	2
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	NRk,b,c [KN	l]; temperati	ure range 50	0/80°C 3)	
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use con- ditions				
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	0.30	0.90	0.75	0.50
2,5 / 2 N/IIIIIF	d/d	0,30	0,90	0,90	0,60
5 / 4 N/mm²	w/w w/d	0,60	1,50	1,50	0,90
5 / 4 N/IIIII	d/d	0,75	2,00	1,50	1,20
8 / 6 N/mm²	w/w w/d	0,90	2,50	2,50	1,50
8 / 6 N/IIIII	d/d	0,90	3,00	2,50	1,50
40 / 0 N/2	w/w w/d	1,20	3,50	3,00	2,00
10 / 8 N/mm²	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.

**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		1927				M8		000	M10	M12		-350
anchor FIS E		•	2	•	112	x85		-	153	k85		-
Perforated sleeve FIS H K	12:	x50	12:	x85		16:	x85			20	x85	

		The state of the s	1,10	201 VI P1 1000 VI P1 2000	A December of the Control of the Con
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	perature range 50/	80°C and 7	2/120°C	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions				
2,5 / 2 N/mm²	w/w w/d d/d		0,6		0,4
5 / 4 N/mm²	w/w w/d d/d		1,2		0,9
8 / 6 N/mm²	w/w w/d d/d		1,5		1,2
10 / 8 N/mm²	w/w w/d d/d		2,5		1,5

<sup>&</sup>lt;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, Characteristic resistance under tension and shear loading	Annex C85

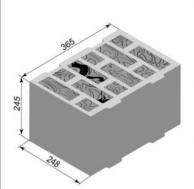
<sup>&</sup>lt;sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>&</sup>lt;sup>3)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).



Dimension see also Annex B19

# 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		
Norminal differisions	[mm]	≥ 365	≥ 248	≥ 245		
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]	0,6				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]	10 / 8				
Standard or annex EN 771-1:2011+						

128 97 04 7,5 8,0 9

Installation parameters

(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8		<b>3</b> 9	M8	M10	M8	M10			M12	M16	M12	M16
Internal threaded anchor FIS E		•	M6	M8 x85		•		•	M10	10000				
Perforated sleeve FIS H K	12	x85		16	x85		16x	130		20	x85		20x	130

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

Max. installation	max T <sub>inst</sub>	[Nm]	2	4
torque		(A) (E)		

#### General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100
0	Smin II Scr II [n	250
Spacing	S <sub>min</sub> ⊥	245

#### **Drilling method**

**Table C86.1:** 

Hammer drilling with hard metal hammer drill

#### Table C86.2: Group factors

Anchor r	od	M	M6   M8   M8   M10   M8   M10   M12   M16   M12							M16		
Perforate	Perforated sleeve FIS H K		12x85		16x85		16x130		20x85		20x130	
Group factors	$\frac{\alpha_{g,N} (s_{min} II) =}{\alpha_{g,V} (s_{min} II)}$ $\frac{\alpha_{g,N} (s_{min} \bot) =}{\alpha_{g,V} (s_{min} \bot)}$	-]						2				

fischer injection system FIS V Plus for masonry

#### Performance

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

Annex C86

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



Vertical perforated brick HLz filled with mineral wool, EN 771-1:	2011+A1:2015
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Table C87.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16				
Perforated sleev	e FIS H k	(	18x1	30/200	22x130/200				
Anchor rod with									
Max. installation torque	max T <sub>inst</sub>	[Nm]		4					
General installat	tion para	meters							
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			100	)				
0	s <sub>min</sub> II	[mm]	250						
Spacing	s <sub>min</sub> ⊥		245						
Drilling method		•							
Hammer drilling v	with hard r	netal han	nmer drill						

# Table C87.2: Group factors

Anchor ro	d	M10	M12	M16
Perforated	d sleeve FIS H K	18x13	30/200	22x130/200
Group factors	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)} \frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} \bot)} [-]$		<u>:</u>	2

fischer injection system FIS V Plus for masonry

#### Performance

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

Annex C87



### 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 x85		-		<b></b>	 M12 x85	-				10-	
Perforated sleeve FIS H K	12)	(85		16)	(85		16x	130	20x	85		20x	130	20x	200

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 1)	Use con- ditions										
10 / 8 N/mm²	w/w	2	1,5	2,5	2,0	2,0	3,0				
10 / 8 14/111111	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.

**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		18x13	0/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = 1$	N <sub>Rk,b,c</sub> [kN];	temperature ran	ge 50/80°C 2)	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
10 / 8 N/mm²	w/w	1,	5	2.0
10 / 0 14/11111	d/d	2,0	) I	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

Performance
Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under tension loading

Annex C88

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

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



# 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	9		M8	M10	M8	M10	13-	-1	M12 M16	M12 N	116	M12	M16
Internal threaded anchor FIS E		•	M6	M8 (85		<del>-</del> 2		• •3		M12 x85	-	-		10.	•
Perforated sleeve FIS H K	12:	<b>(85</b>		16)	(85		16x	130		20x	85	20x1	30	20x	200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	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 <sup>2)</sup>													
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions													
10 / 8 N/mm²	w/w	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5					
10 / 8 14/11/11	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.

**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	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temper	rature range 50/8	80°C 2)	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
10 / 8 N/mm²	w/w	3,0		1,5
10 / 8 14/111111	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.

Factor for job site tests and displacements see annex C123.

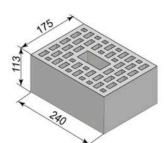
fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under shear loading	Annex C89

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

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



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



Producer	e.g. Wienerberger					
Nominal dimensions	[mm]	length L	height H			
Norminal differisions	[mm]	≥ 240	≥ 175	≥ 113		
Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]	0,9				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		12,5 / 10			
Standard or annex		EN 771	-1:2011+/	A1:2015		

14 - 11 342 14 - 11 342

Dimension see also Annex B19

Table C90.1: Installation parameters

(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	-		M8	M10	M8	M10	2.5		M12	M16	M12	M16		
Internal threaded		5-0	M6	M8		74		da W	M10	M12		8				
anchor FIS E		-		11x85		x85				-	15>	(85	<i>□</i>			
Perforated sleeve FIS H K	12	x85		16	x85		16>	(130		20:	x85		20x	130		

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

Max. installation	max T <sub>inst</sub>	[Nm]	2		4
torque				l	

## General installation parameters

C <sub>min</sub> = C <sub>cr</sub>	100	
S <sub>min</sub> II S <sub>cr</sub> II [mm]	240	
S <sub>min</sub> ⊥ S <sub>cr</sub> ⊥	115	
	Smin II Scr II [mm] Smin ⊥	S <sub>min</sub>   I

#### **Drilling method**

Hammer drilling with hard metal hammer drill

## Table C90.2: Group factors

Anchor r	od	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforate	ed sleeve FIS H K	12	x85	16	16x85 16x130 20x85		20x130				
Group factors	$\frac{\alpha_{g,N} (s_{min} II) = \alpha_{g,V} (s_{min} II)}{\alpha_{g,N} (s_{min} \bot) = \alpha_{g,V} (s_{min} \bot)} [-1]$	ĺ					2				

fischer injection system FIS V Plus for masonry

#### Performance

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

Annex C90

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



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

Table C91.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

	3%	-								
Anchor rod			M10	M12	M16					
Perforated sleev	e FIS H K		18x130/200 22x130/200							
Anchor rod with	perforate	ed sleev	e FIS H K							
Max. installation torque	max T <sub>inst</sub>	[Nm]		4						
General installa	tion para	neters								
Edge distance	C <sub>min</sub> = C <sub>cr</sub>									
Cassina	S <sub>min</sub> II	[mm]		240						
Spacing	s <sub>min</sub> ⊥		115							
<b>Drilling method</b>										
Hammer drilling v	with hard r	netal har	mmer drill							

## Table C91.2: Group factors

Anchor ro	od	M10	M12	M16				
Perforated	d sleeve FIS H K	18x13	30/200	22x130/200				
Group factors	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)}$ $\frac{\alpha_{g,N} (s_{min} \bot)}{\alpha_{g,V} (s_{min} \bot)}$ [-]		<u>:</u>	2				

fischer injection system FIS V Plus for masonry

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

Annex C91



#### 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	-		-		M10 M12 15x85		-			
Perforated sleeve FIS H K	123	x85	1	6x85		16x130		20		20x85		20x	130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	$R_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>											
Mean compressive strength/ Min. compressive strength single brick 1)	Use con- ditions											
12,5 / 10 N/mm <sup>2</sup>	w/w	3,5	4,0	4,5	4,5	4,0						
12,5 / 10 14/111111	d/d	4	4,5	5,0	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.

**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		18x	130/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N <sub>Rk,b,c</sub> [k	e range 50/80°C <sup>2)</sup>		
Mean compressive strength/ Min. compressive strength single brick 1)	Use con- ditions			
12,5 / 10 N/mm²	w/w d/d		<b>4.5 5,0</b>	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.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C92

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

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



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

**Table C93.1:** 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 15x85			•	8	
Perforated sleeve FIS H K	12:	x85	162		x85		16x130		20		x85		20x	130

Rk = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [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/mm²	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.

**Table C93.2:** 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	l K	18x1	30/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk}$	c,⊥ [kN]; tei	mperature range	50/80°C 2)	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions			
12,5 / 10 N/mm <sup>2</sup>	w/w	7.0	6,0	8,0
12,5 / 10 14/111111	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.

Factor for job site tests and displacements see annex C123

fischer injection system FIS V Plus for masonry

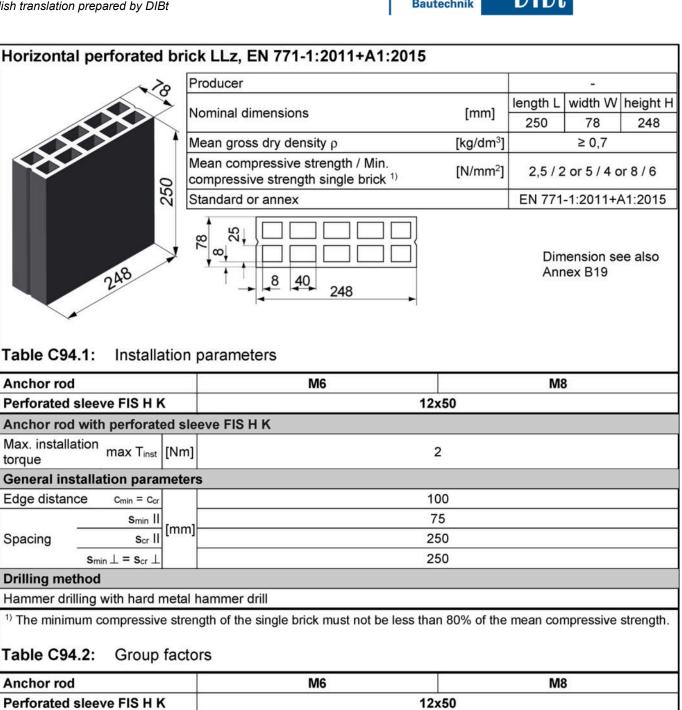
Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C93

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

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





Anchor ro	od	M6	M8				
Perforated	d sleeve FIS H K	123	c50				
	α <sub>g,N</sub> (s <sub>min</sub> II)	1,	6				
Group	2 10	1,1					
factors	$\frac{\alpha_{g,N}\left(s_{min}\;\bot\right)}{\alpha_{g,V}\left(s_{min}\;\bot\right)}$	2	0				

fischer injection system FIS V Plus for masonry	
Performance Horizontal perforated brick LLz, dimensions, installation parameters, Group factors	Annex C94



#### Horizontal perforated brick LLz, EN 771-1:2011+A1:2015

**Table C95.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8		
Perforated sleeve FIS H K		12x50			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,c</sub> [kN	]; temperature range 50/80°C <sup>2)</sup>			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions				
2,5 / 2 N/mm²	w/w w/d		0,5		
	d/d		0,6		
5 / 4 N/mm <sup>2</sup>	w/w w/d		0,9		
5 / 4 N/IIIII	d/d		1,2		
0 / C N/2	w/w w/d		1,5		
8 / 6 N/mm <sup>2</sup>	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...

**Table C95.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8			
Perforated sleeve FIS H K		12x50				
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	[kN]; temp	erature range 50/80°C and 72/120°C				
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions					
2,5 / 2 N/mm²	w/w w/d d/d	0,	5			
5 / 4 N/mm²	w/w w/d d/d	0,	9			
8 / 6 N/mm²	w/w w/d 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

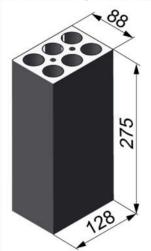
Performance
Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

Annex C95

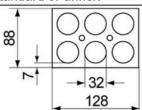
<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).



## Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



Producer	e.g. Cermanica Farreny S.A.			
Nominal dimensions  Mean gross dry density ρ	[mm]	length L	width W	height H
	[mm]	275	88	128
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		≥ 0,8	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		2,5 / 2	
Standard or annex		EN 771	-1:2011+	1:2015



Dimension see also Annex B19

Table C96.1: Installation parameters

Anchor rod			M6	M8			
Perforated slee	erforated sleeve FIS H K		12)	c50			
Anchor rod with perforated sleeve FIS H K							
Max. installation torque	T <sub>inst</sub>	[Nm]	2	2			
General installa	tion para	meter	\$				
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		6	0			
	s <sub>min</sub> II		7	5			
Cassina	s <sub>cr</sub> II	[mm]	27	75			
Spacing	S <sub>min</sub> ⊥		7	5			
	s <sub>cr</sub> ⊥		13	30			

## **Drilling method**

Hammer drilling with hard metal hammer drill

Table C96.2: Group factors

Anchor ro	od	M6	M8
Perforated	d sleeve FIS H K	1:	2x50
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,3
Group	α <sub>g,V</sub> (s <sub>min</sub> II)		1,5
Group factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)}$ [-]		1,3
	α <sub>g,</sub> ∨ (S <sub>min</sub> ⊥)		1,5

fischer injection system FIS V Plus for masonry

Performance
Horizontal perforated brick LLz, dimensions, installation parameters, Group factors

Annex C96

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



#### 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

Anchor rod		M6 M8								
Perforated sleeve FIS H K		12x50								
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	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 1)	Use con- ditions									
2,5 / 2 N/mm²	w/w w/d 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.

**Table C97.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

8									
Anchor rod		M6	M8						
Perforated sleeve FIS H K		12x50							
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 1)	Use con- ditions								
2,5 / 2 N/mm²	w/w w/d d/d	1	.2						

<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
Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

Annex C97

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



Light-weight concrete	hol	low	blo	ck Hb	l, El	N 771	-3:201	1+A1:2	015			
Producer -												
340					. H. C.					length L	width W	height H
	$\geq  N $	Nominal dimensions [mm]								362	240	240
Mean gross dry density ρ									kg/dm³]		≥ 1,0	
		Mean compressive strength / Min. compressive strength single brick 1) [N/mm²]								2,	5 / 2 or 5 /	4
	, s	tanda	andard or annex								-3:2011+	1:2015
Table C98.1: Installat (Pre-pos					240	37	- 76 362	,	e FIS H	Ann	e also	
Anchor rod		M6	M8	M6 M	8	_	M8 M10	M8 M1	) -	M12 M1	6 M12 M16	M12 M16
Internal threaded anchor FIS E		-		-	Ме	M8 1x85	-	-	M10 M1	2 _	-	-
Perforated sleeve FIS H K		12x	50	12x85		162	85	16x130		)x85	20x130	20x200
Anchor rod and internal th	read	ed a	nch	or FIS I	E wit	h perf	orated s	sleeve F	sнк			
Max. installation max T <sub>inst</sub> [	Nm]							2				
General installation param	eters	5										
Edge distance c <sub>min</sub> = c <sub>cr</sub>								60				
S <sub>min</sub> II	mm]							100				
Spacing Scr II		(0)						362				
$s_{min} \perp = s_{cr} \perp$								240				
Drilling method  Hammer drilling with hard me	-4-1			J.211								
1) The minimum compressive <b>Table C98.2:</b> Group for	stren	gth o	of the	single I		must n						3829
Anchor rod		M6	8M	M6 M	_	-	M8 M10	M8 M1			6 M12 M16	M12 M16
Internal threaded anchor FIS E		•		•	11	6 M8 1x85			M10 M1 15x85	-	-	-
Perforated sleeve FIS H K		12x	50	12x85	5	16x	85	16x130	20	0x85	20x130	20x200
αg,N (Smin II)								1,2				
Group $\alpha_{g,V}$ (s <sub>min</sub> II)	[-]							1,1				
factors $\alpha_{g,N} (s_{min} \perp)$ $\alpha_{g,V} (s_{min} \perp)$								2,0				
										N.795-		
fischer injection system	fischer injection system FIS V Plus for masonry											
Performance Light-weight concrete hollow factors	w blo	ck H	bl, d	imensic	ons, ir	nstalla	tion para	ameters,	Group		Annex	C98



## Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015

Table C99.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x13	30/200	22x130/200
Anchor rod with perforated	sleeve FIS H K		
Max. installation max T <sub>inst</sub> [Nr	m]	:	2
General installation paramet	ers		
Edge distance c <sub>min</sub> = c <sub>cr</sub>		6	0
S <sub>min</sub> II	1	10	00
Spacing S <sub>cr</sub> II	mj	36	52
$s_{min} \perp = s_{cr} \perp$		24	40

#### **Drilling method**

Hammer drilling with hard metal hammer drill

## Table C99.2: Group factors

Anchor ro	od	M10	M12	M16				
Perforate	d sleeve FIS H K	18x130	0/200	22x130/200				
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,2					
Group	α <sub>g,V</sub> (s <sub>min</sub> II)		1,1					
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,V} (s_{min} \perp)}$ [-]		2,0					

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

Annex C99



## 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		•	100	-	M6 11x		1	-		-	M10 M			•	-		-
Perforated sleeve FIS H K	12)	(50	12	x85		16)	(85		16>	(130		20x	(85		20x	130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = 1$	N <sub>Rk,b,c</sub> [kN];	temperature rang	је 50/80°С <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
0.5./ 0.N/mm²	w/w w/d	1,2	1,5	2,5
2,5 / 2 N/mm <sup>2</sup>	d/d	1,2	1,5	2,5
5 / 4 N/mm²	w/w w/d	2,0	3,0	5,0
5 / 4 N/MM <sup>-</sup>	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.

**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			18x13	0/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	N <sub>Rk,b,c</sub>	[kN]; 1	temperature ran	ge 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	C	se on- ons			
2,5 / 2 N/mm <sup>2</sup>	w/w	w/d		1	,5
2,5 / 2 N/IIIII	d	/d		1	,5
5 / 4 N/mm²	w/w	w/d		3	3,0
5 / 4 N/IIIII	d	/d		3	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 Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading	Annex C100

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



## 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	-	M	8 M10	M8 M1	0 -	M12 N	116	M12 M16	M12 M16
Internal threaded anchor FIS E	2.	•		-	M6 M	-	-	-	M10 M12	-			-
Perforated sleeve FIS H K	123	(50	12	x85	16	<b>x8</b>	5	16x13	0 20	x85		20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temperatur	e range 50/80°C and 72/120°C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	
2,5 / 2 N/mm²	w/w w/d d/d	0,9
5 / 4 N/mm²	w/w w/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.

**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		18x13	0/200	22x130/200						
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; tempe	rature range 50/8	ature range 50/80°C and 72/120°C							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
2,5 / 2 N/mm²	w/w w/d d/d	E	0,	9						
5 / 4 N/mm²	w/w w/d d/d	8	2,	0						

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

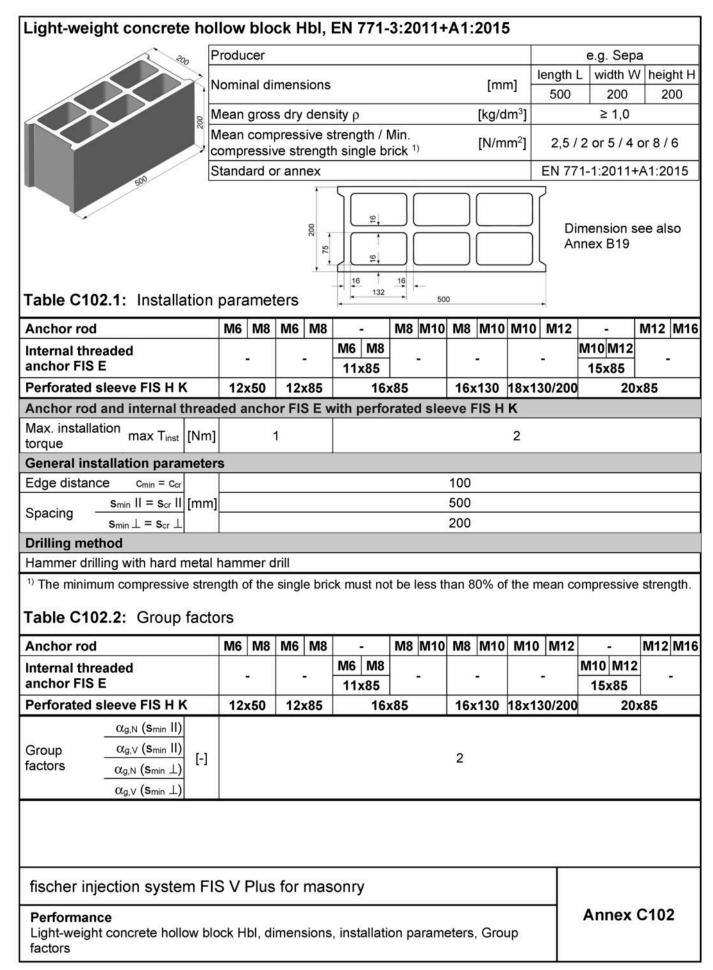
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

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

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	B -		M8 M10		M8	M8 M10		M12	-	M12 M16
Internal threaded anchor FIS E		•			M6 M8 11x85			-	n-		-		M10 M12 15x85	-
Perforated sleeve FIS H K	12)	<b>(50</b>	12	x85	16x		x85		16x130		18x130/200		20	x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Ri}$	$_{k,p,c} = N_{Rk,b,c}$	kN]; temperature range 50/80°C <sup>2)</sup>
Mean compressive strength / Min. compressive strength single brick 1)	use con- ditions	
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	0,4
2,5 / 2 N/IIIII	d/d	0,5
5 / 4 N/mm <sup>2</sup>	w/w w/d	0.9
5 / 4 N/MM-	d/d	0,9
0 / C N/mm²	w/w w/d	1,2
8 / 6 N/mm <sup>2</sup>	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.

**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	M6 M8		-		M10	M8	M10	M10	M12	-	M12 M16
Internal threaded anchor FIS E		-1	-		M6	M8 x85	-		-		-		M10 M12 15x85	•
Perforated sleeve FIS H K	12	x50	12	x85	16x		x85		16x130		18x130/200		20	x85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_R$	k,c,⊥ [kN]; te	mperature range 50/80°C and 72/120°C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	
2,5 / 2 N/mm²	w/w w/d d/d	0,9
5 / 4 N/mm²	w/w w/d d/d	1,5
8 / 6 N/mm <sup>2</sup>	w/w w/d d/d	2,5

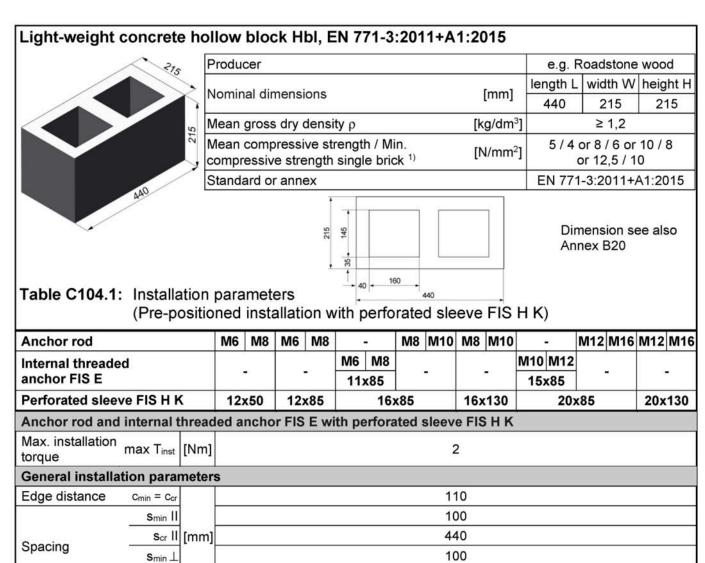
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance	Annex C103
Light-weight concrete hollow block Hbl,	
Characteristic resistance under tension and shear loading	

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





#### **Drilling method**

Hammer drilling with hard metal hammer drill

Scr 1

215

#### Table C104.2: Group factors

Anchor ro	od		M6   M8   M6   M8   -   M8   M					M10	M8 M10 -				M12	M16	M12	M16		
Internal threaded anchor			_				M6	M8					M10	M12		22		
FIS E				_		- 1/2	11:	x85			•		15x			_		
Perforate	Perforated sleeve FIS H K			2x50 12x85				16x85			16x130 20			20:	x85		20x	130
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,4															
Group	$\alpha_{\text{g,V}}$ (s <sub>min</sub> II)	r 1		2,0														
factors	α <sub>g,N</sub> (S <sub>min</sub> ⊥)	[-]						1,4										
	α <sub>g,</sub> ∨ (s <sub>min</sub> ⊥)		1,2															

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

Annex C104

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



# Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015

Table C105.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

		M10 M12 M16										
eve FIS H k	(	18x13	0/200	22x130/200								
Anchor rod with perforated sleeve FIS H K												
max T <sub>inst</sub>	[Nm]	2										
ation para	meters	,										
C <sub>min</sub> = C <sub>cr</sub>			1	10								
s <sub>min</sub> II			10	00								
s <sub>cr</sub> II	[mm]		44	40								
s <sub>min</sub> ⊥		100										
S <sub>cr</sub> ⊥		215										
֡	th perforate max T <sub>inst</sub> ation parameter  c <sub>min</sub> = c <sub>cr</sub> s <sub>min</sub> II  s <sub>cr</sub> II  s <sub>min</sub> ⊥	max T <sub>inst</sub>	th perforated sleeve FIS H K  max T <sub>inst</sub> [Nm]  ation parameters  c <sub>min</sub> = c <sub>cr</sub> s <sub>min</sub> II  s <sub>cr</sub> II  s <sub>min</sub> ⊥	Seve FIS H K								

#### Drilling method

Hammer drilling with hard metal hammer drill

## Table C105.2: Group factors

Anchor ro	od	M10 M12 M16										
Perforated	d sleeve FIS H K	18x13	0/200	22x130/200								
	α <sub>g,N</sub> (s <sub>min</sub> II)	1,4										
Group	αg, v (Smin II)		2,0									
Group factors	$\alpha_{g,N}$ ( $s_{min} \perp$ ) [-]		1,4									
	α <sub>g,V</sub> (S <sub>min</sub> ⊥)	1,2										

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors

Annex C105

12,5 / 10 N/mm<sup>2</sup>



4,0

4.5

5,0

## Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015

**Table C106.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod		N	/16 N	18	М6	M8		-	M8	M10	M8	M10	M10	M12	-	M12 M1
Internal threaded	ternal threaded						M6	M6 M8		300				946	M10 M12	
anchor FIS E			-			-	11	x85		-				- <b>=</b> €	15x85	-
Perforated sleeve FIS H K			12x50 12x85		x85	16x85			16x130		18x130/200		20x85			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk}$	<sub>,p,c</sub> = <b>N</b> <sub>Rk</sub>	,b,c [l	kN];	te	mpe	eratu	ire ra	ange	50/8	30°C 2	)					
Mean compressive	Use	•														
strength / Min. comp. strength single brick 1)	dition	S														
5 / 4 N/mm <sup>2</sup>	w/w w	v/d		0	,9					1,2					2,0	
5 / 4 N/MM	d/d			1	,2	2				1,5					2,0	
8 / 6 N/mm <sup>2</sup>	w/w w	v/d	1,5							2,0			3,0			
0 / 0 N/IIIII-	d/d			1	,5					2,0					3,0	
10 / 8 N/mm <sup>2</sup>	w/w w	v/d		2	0,2					2,5					3,5	
10 / 8 N/mm-	-17-1	8		_							•		4.0			

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

3,0

3.0

3,5

d/d

w/w w/d

d/d

**Table C106.2:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

2,0

2.5

3,0

Anchor rod		M10	M12	M16			
Perforated sleeve FIS	нĸ	18x	130/200	22x130/200			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk}$	$p,c = N_{Rk,b,c}$	[kN]; temperatur	e range 50/80°C 2)				
Mean compressive strength / Min. comp. strength single brick 1)	Use con- ditions						
5 / 4 N/mm²	w/w w/d		1,2 1,5	2,0 2,0			
8 / 6 N/mm²	w/w w/d	+	2,0	3.0 3,0			
10 / 8 N/mm²	w/w w/d	-	2.5 3,0	3.5 4,0			
12,5 / 10 N/mm²	w/w w/d		3.0 3,5	4.5 5,0			

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading	Annex C106

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

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



## 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					M6	M8		0			M10 M12	1			
anchor FIS E		-		-	11:	x85		•	-		15x85		-	- 1	
Perforated sleeve FIS H K	12:	x50	12	x85		16:	x85		16>	130	20:	x85		20x	130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	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 1)	Use con- ditions												
5 / 4 N/mm²	w/w w/d d/d	0,75	1,20	0,75	1,20	0,75	1,20						
8 / 6 N/mm²	w/w w/d d/d	1,20	2,00	1,20	2,00	1,20	2,00						
10 / 8 N/mm²	w/w w/d d/d	1,50	2,50	1,50	2,50	1,50	2,50						
12,5 / 10 N/mm²	w/w w/d d/d	2,00	3,00	2,00	3,00	2,00	3,00						

<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)

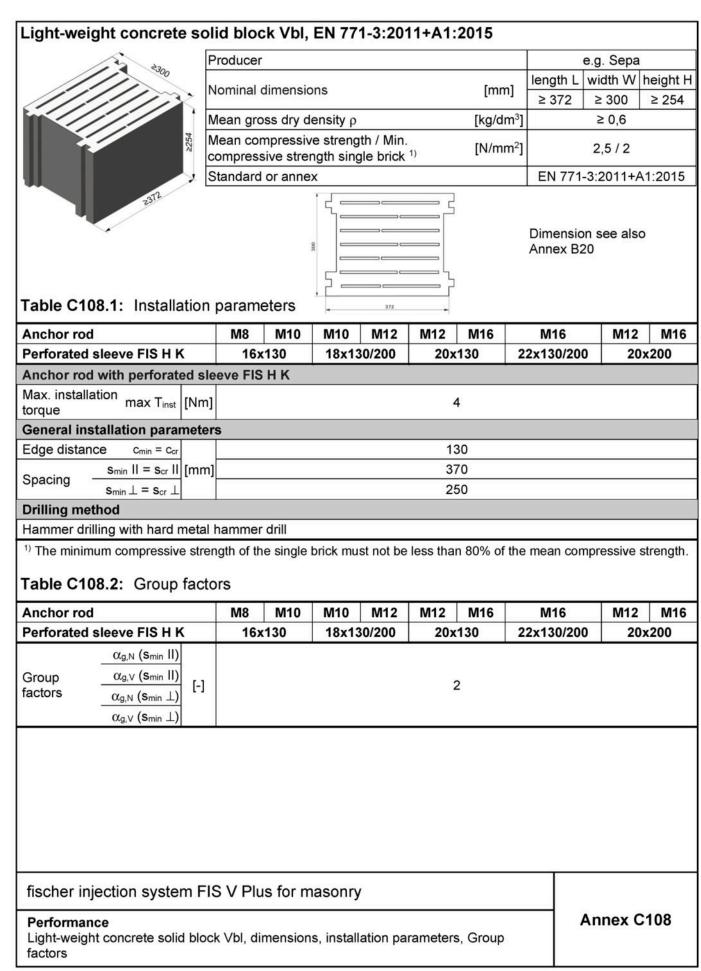
Anchor rod		M10	M12	M16							
Perforated sleeve FIS	SHK	18x1	22x130/200								
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	V <sub>Rk,c,⊥</sub> [kN]	; temperature ran	temperature range 50/80°C and 72/120°C								
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions										
5 / 4 N/mm²	w/w w/d d/d			1,2							
8 / 6 N/mm²	w/w w/d d/d			2,0							
10 / 8 N/mm²	w/w w/d d/d			2,5							
12,5 / 10 N/mm²	w/w w/d 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.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading	Annex C107







## 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	nor rod				M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H I		16x	130	18x13	30/200	20x	130	22x130/200	20x	200	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N	Rk,b,c	kN]; ter	nperatu	re range	e <b>50/80</b> °	°C 2)			*.	
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	cc	se on- ons									
2,5 / 2 N/mm <sup>2</sup>	w/d		2,	0			2	,5	3	,0	
2,5 / 2 N/MM-		2,	)		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.

**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 M						M16	M12	M16
Perforated sleeve FIS H K		16x	130	18x13	18x130/200		130	22x130/200	20x	200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,J}$	[kN]; tei	mperatı	ire rang	e 50/80°	°C and	72/120°	С		70	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
2,5 / 2 N/mm²	w/w w/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.

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

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

ag, v (Smin II)

 $\alpha_{\text{g,N}}$  ( $s_{\text{min}} \perp$ )  $\alpha_{\text{g,V}}$  ( $s_{\text{min}} \perp$ )

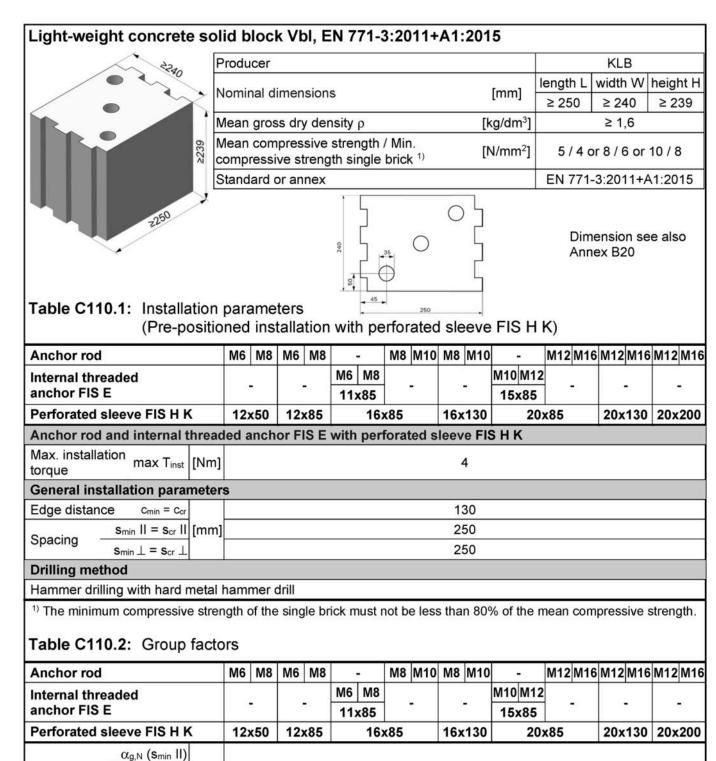
[-]

Group

factors

English translation prepared by DIBt





fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors	Annex C110

2,0



# Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

## Table C111.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod		M10	M12	M16							
Perforated sleeve FIS H	K	18x13	22x130/200								
Anchor rod with perforated sleeve FIS H K											
$\begin{array}{ll} \text{Max. installation} \\ \text{torque} \end{array} \text{max } T_{\text{installation}}$	T <sub>inst</sub> [Nm] 2,0										
General installation par	ameter	S									
Edge distance c <sub>min</sub> = c	cr		1;	30							
Smin II = Scr	II [mm]		25	50							
Spacing $s_{min} \perp = s_{cr}$		250									
Drilling method											
Hammer drilling with hard	metal l	nammer drill									

# Table C111.2: Group factors

Anchor ro	od		M10	M12	M16
Perforate	d sleeve FIS H K		18x13	30/200	22x130/200
Group factors	$\begin{array}{c} \alpha_{g,N} \ (s_{min} \ II) \\ \hline \alpha_{g,V} \ (s_{min} \ II) \\ \hline \alpha_{g,N} \ (s_{min} \ \bot) \\ \hline \alpha_{g,V} \ (s_{min} \ \bot) \end{array}$	[-]		;	2,0

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C111



## 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 N	/18 I	M6 M8	- 8	-	M8	M10	M8	M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E	-			M6	M8 x85		-	0	•	M10 M12 15x85			
Perforated sleeve FIS H K	12x	50	12x85		16:	<b>x85</b>		16x	130	20:	k85	20x130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N <sub>Rk,b,c</sub> [	(N]; tei	mperatur	e range 50/80°0	C 2)		
Mean compressive strength/ Min. compressive strength single brick <sup>1)</sup>	Use con- ditions						
5 / 4 N/mm²	w/w w/d	1,2	2,0	2,5		3	3,0
5 / 4 N/IIIII	d/d	2,0	3,5	4,0		5	5,0
8 / 6 N/mm²	w/w w/d	1,5	3,0	4,0		Ę	5,0
0 / 0 N/IIIII-	d/d	3,0	5,0	6,5		7	',5
40.40.11/2	w/w w/d	2,0	4,0	5,0		6	5,5
10 / 8 N/mm <sup>2</sup>	d/d	4,0	7,0	8,5		9	9,0

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

**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
Perforated sleeve FIS H K		18x	22x130/200	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$				
Mean compressive strength/ Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d		2,5	3,0
5 / 4 N/IIIII <sup>-</sup>	d/d	S	4,0	5,0
8 / 6 N/mm²	w/w w/d	, i	4,0	5,0
0 / 6 N/MM-	d/d	9	6,5	7,5
40 / 9 N/mm²	w/w w/d		5,0	6,5
10 / 8 N/mm <sup>2</sup>	d/d	3	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.

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 loading	Annex C112

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

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



## Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

**Table C113.1:** 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	15	-	M8	M10	M8	M10	-	M12 N	/116	M12 M16	M12 M16
Internal threaded anchor FIS E		-	32	-	M6	M8 x85		-	(1		M10 M12	-		-	-
Perforated sleeve FIS H K	12	x50	12	x85		16	(85		16x	130	20	x85		20x130	20x200

				1				.07.00			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{R}$	k,c,⊥ [k <b>N</b> ];	tem	pera	ture	ran	ge 5	0/80°C and 7	2/120°C			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions										
5 / 4 N/mm²	w/w w/d d/d	2,0	3,0	2,0	3,0	2,0	3,5		4	1,5	
8 / 6 N/mm²	w/w w/d d/d	3,0	4,5	3,0	4,5	3,0	5,5		(	5,5	
10 / 8 N/mm²	w/w w/d d/d	4,0	6,0	4,0	6,0	4,0	7,0		8	3,5	

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

**Table C113.2:** 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	l K	18x1	30/200	22x130/200			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c}$	c,⊥ [kN]; 1	0°C					
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions						
5 / 4 N/mm²	w/w w/d d/d	3	3,5	4,5			
8 / 6 N/mm²	w/w w/d d/d	5	5,5	6,5			
10 / 8 N/mm²	w/w w/d d/d	7	',0	8,5			

<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	Annex C113
Performance Light-weight concrete solid block Vbl, Characteristic resistance under shear loading	



Light-weight concret	e solid block Vbl, EN 771-3:2011+	A1:2015				
27	Producer	3)	Roa	adstone w	ood	
	Nominal dimensions	[mm]	length L	width W	height H	
	Nominal dimensions	[mm]	≥ 440	≥ 100	≥ 215	
	Mean gross dry density ρ	[kg/dm <sup>3</sup> ]	≥ 2,0			
	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		or 8 / 6 or or 12,5 / 1		
10	Standard or annex		EN 771	-3:2011+	1:2015	
2440						

## Table C114.1: Installation parameters

Anchor rod		M	16	IV	18	M	10	M12		M	M16	
Anchor rod without perfo	orated s	sleeve										
Effective anchorage depth hef	[mm]	50	70	50	70	50	70	50	70	50	70	
Max. installation torque max T <sub>inst</sub>	[Nm]	2	1	-11			1	0		36 S	•	

## General installation parameters

Edge distand	ce c <sub>min</sub> = c <sub>cr</sub>		100
	s <sub>min</sub> II		75
Canaina	s <sub>cr</sub> II	[mm]	3x h <sub>ef</sub>
Spacing	S <sub>min</sub> ⊥		75
	<b>S</b> cr⊥		3x h <sub>ef</sub>

#### **Drilling method**

Hammer drilling with hard metal hammer drill

## Table C114.2: Group factors

Anchor ro	d	M6	M8	M10	M12	M16				
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,6							
Group factors	α <sub>g,V</sub> (s <sub>min</sub> II)		1,3							
factors	$\alpha_{g,N}$ (Smin $\perp$ ) [-]			1,4						
	α <sub>g,</sub> ∨ (s <sub>min</sub> ⊥)			1,3						

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C114

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



## 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				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N <sub>Rk,b,c</sub>	[kN]; temperati	ure range 50/80	°C 2)						
Mean compressive	Use		Effective	anchorage dept	h h <sub>ef</sub> [mm]					
strength / Min. compressive strength single brick 1)	con- ditions		≥ 50							
5 / 4 N/mm <sup>2</sup>	w/w w/d	1,2		1	,2					
5 / 4 N/MM-	d/d	2,0	2,0							
0 / C N/2	w/w w/d	1,5		2	,0					
8 / 6 N/mm <sup>2</sup>	d/d	3,0		3	,5					
40.40 N/2	w/w w/d	2,0		2	,5					
10 / 8 N/mm <sup>2</sup>	d/d	4,0	4,0 4,5							
40 5 / 40 11/2	w/w w/d	3,0		3	,5					
12,5 / 10 N/mm <sup>2</sup>	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.

**Table C115.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		М6	M8	M10	M12	M16
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,.}$	∟ [kN]; te	mperature ran	ge 50/80°C and	72/120°C		
Mean compressive strength / Min. compressive strength single brick <sup>1)</sup>	Use con- ditions		Effective	anchorage dept ≥ 50	h h <sub>ef</sub> [mm]	
5 / 4 N/mm²	w/w w/d d/d	1,2	1,5	1,5	1,5	1,5
8 / 6 N/mm²	w/w w/d d/d	2,0	2,0	2,5	2,5	2,5
10 / 8 N/mm²	w/w w/d d/d	2,5	2,5	3,0	3,0	3,5
12,5 / 10 N/mm²	w/w w/d d/d	3,0	3,5	4,0	4,0	4,5

<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	
Performance Light-weight concrete solid block Vbl,	Annex C115
Characteristic resistance under tension and shear loading	

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$ .



#### Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015 Producer Tramac width W | height H length L Nominal dimensions [mm] ≥ 440 ≥ 95 ≥ 215 Mean gross dry density ρ [kg/dm<sup>3</sup>] ≥ 2,0 7,5 / 6 or 10 / 8 or 12,5 / 10 Mean compressive strength / Min. [N/mm<sup>2</sup>] compressive strength single brick 1) or 15 / 12 EN 771-3:2011+A1:2015 Standard or annex

## Table C116.1: Installation parameters

Anchor rod		M6		IV	M8		M10		M12		16
Anchor rod without perfo	rated	sleeve						20 9		10.	
Effective anchorage depth hef	[mm]	50	70	50	70	50	70	50	70	50	70
Max. installation torque max T <sub>inst</sub>	[Nm]	4	1			J. J.	1	0			
General installation parar	meters	a a									
Edge distance Cmin = Cor						6	0				

Edge distance	e c <sub>min</sub> = c <sub>cr</sub>		60
_	S <sub>min</sub> II		75
Cassina	s <sub>cr</sub> II [r	mm]	3x h <sub>ef</sub>
Spacing -	S <sub>min</sub> ⊥		75
	Scr⊥		3x h <sub>ef</sub>

### **Drilling method**

Hammer drilling with hard metal hammer drill

### Table C116.2: Group factors

Anchor ro	d	M6	М8	M10	M12	M16					
	α <sub>g,N</sub> (s <sub>min</sub> II)		1,9								
Group	α <sub>g,V</sub> (s <sub>min</sub> II)	,	1,4								
Group factors	$\alpha_{g,N}$ (s <sub>min</sub> $\perp$ )	.1		1,9							
	α <sub>g,</sub> ∨ (S <sub>min</sub> ⊥)			1,4							

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C116

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



## 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			N	16	IV	18	M	10	M	12	M	16
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N <sub>Rk,b,</sub>	c [kN	; temp	erature	range	50/80°0	C 2)					
Mean compressive strength / Min. compressive strength single brick 1)	CO ditio		50	70	Ef 50	fective a	anchora 50	ge dept	th h <sub>ef</sub> [m	m]   70	50	70
7,5 / 6 N/mm²	w/w d/		1,5 2,5	2,0 3,5	1,5 2,5	2,0 3,5	1,5 2,5	2,0 3,5	1,5 2,5	2,0 3,5	1,5 2,5	2,0 3,5
10 / 8 N/mm²	w/w d/		2,0 3,5	2,5 4,5	2,0 3,5	2,5 4,5	2,0 3,5	3,0 5,0	2,0 3,5	3,0 5,0	2,0 3,5	3,0 5,0
12,5 / 10 N/mm²	w/w d/		2,5 4,5	3,5 6,0	2,5 4,5	3,5 6,0	2,5 4,5	3,5 6,0	2,5 4,5	3,5 6,0	2,5 4,5	3,5 6,0
15 / 12 N/mm²	w/w d/		3,0 5,0	4,0 7,0	3,0 5,0	4,0 7,0	3,0 5,0	4,5 7,5	3,0 5,0	4,5 7,5	3,0 5,0	4,5 7,5

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

**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		
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temper	ature range	50/80°C and 7	2/120°C				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
7,5 / 6 N/mm²	w/w w/d d/d	2,0	2,0	2,0	1,5	1,5		
10 / 8 N/mm²	w/w w/d d/d	2,5	2,5	3,0	2,5	2,5		
12,5 / 10 N/mm²	w/w w/d d/d	3,5	3,5	4,0	3,0	3,0		
15 / 12 N/mm²	w/w w/d d/d	4,0	4,0	4,5	3,5	3,5		

<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	
Performance	Annex C117
Light-weight concrete solid block Vbl, Characteristic resistance under tension and shear loading	

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



## Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015



Producer		e.g. Ytong				
Mean gross dry density ρ	[kg/dm³]	0,35	0,5	0,65		
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	2,5 / 2	5/4	8/6		
Standard or annex		EN 771	-4:2011+ <i>A</i>	1:2015		

## Table C118.1: Installation parameters

Anchor ro	od		IV	16	IV	18	M	10	M	12	M	16		<b>6</b> 9	23	•
	hreaded anchor						_						M6	M8	M10	M12
FIS E				•	77	•			12	<del>-</del>			11>	κ85	153	ĸ85
Anchor ro	od and internal	thread	led ar	nchor	FIS E	with	out pe	rfora	ted sl	eeve						
Effective anchorage	e depth h <sub>ef</sub>	[mm]	100	200	100	200	100	200	100	200	100	200		8	5	
Max. insta torque	allation max T <sub>inst</sub>	[Nm]	1	4	1	8	2	12	2	16	2	20	1	l	2	2
General in	nstallation para	meter	s													
Edge dista	ance c <sub>min</sub> = c <sub>cr</sub>								10	00						
	s <sub>cr</sub> II = s <sub>min</sub> II								2	50						
	h <sub>ef</sub> =200mm								8	0						
		[mm]														
	h <sub>ef</sub> =200mm								3x	hef						
Spacing	S <sub>cr</sub> II	1							2/							
	$s_{cr} \perp = s_{min} \perp$								2:	50						
	h <sub>ef</sub> =200mm								8	0						
	S <sub>min</sub> ⊥ h <sub>ef</sub> =200mm															
	Nef−200mm Scr ⊥								3x	hef						

## **Drilling method**

Hammer drilling with hard metal hammer drill

fischer injection system FIS V Plus for masonry

Performance
Autoclaved aerated concrete (cylindrical drill hole), dimensions, installation parameters

Annex C118

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



**Table C119.1:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 2 N/mm<sup>2</sup>)

Anchor	rod	М6	M8	M8 M10 M12 N		M16		-0									
Intomol	threaded ancher FIG F	anchor FIS E					M6	M8	M10	M12							
internal	threaded anchor FIS E	-		-		7.5	11:	x85	15)	x85							
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)			1,6			_	1)	-	1)							
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> II)		1,1							1)							
Group	$\alpha_{g,N} \text{ II}, \alpha_{g,V} (s_{min} \text{ II})$																
factors	$\frac{\log_{N}(N,\log_{N}(S_{min} \perp))}{\log 200 \alpha_{g,N}(S_{min} \perp)}$ [-]		1,1 2,0 1,6							1,6					1)	: -	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)		0,8						-	1)							
.5	$\alpha_{\text{g,N}} \perp$ , $\alpha_{\text{g,V}}$ ( $s_{\text{min}} \perp$ )				2,0		(6.5		28								

<sup>1)</sup> No performance assessed.

**Table C119.2:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 4 N/mm<sup>2</sup>)

Anchor	rod	M6	M8	M10	M12	M16		-		-
Intornal	threeded ancher FIC F						M6	M8	M10	M12
internai	threaded anchor FIS E	-	-	-	-	-	11	x85	153	x85
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)		ía.	0,7	-65		-	1)	-	1)
	h <sub>ef</sub> =200 α <sub>gV</sub> (s <sub>min</sub> II)		2,0							1)
Group	α <sub>g,N</sub> II, α <sub>gV</sub> (s <sub>min</sub> II)			7917						
factors	$\frac{\log_{\text{N}}(N) \log (\text{Smin } 1)}{\text{hef}=200 \alpha_{\text{g,N}}(\text{Smin } 1)} [-]$			0,7			_	1)		1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)			1,2			-	1)	-	1)
	$\alpha_{g,N} \perp$ , $\alpha_{gV} (s_{min} \perp)$				2,0					

<sup>1)</sup> No performance assessed.

**Table C119.3:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 6 N/mm<sup>2</sup>)

Anchor	rod	M6	M8	M10	M12	M16				
Intornal	threaded anchor FIS E		7000		avev.	2 mil	M6	M8	M10	M12
internai	threaded anchor FIS E					•	11:	x85	15>	(85
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)			0,7			-	1)	-	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> II)		2,0							1)
Group	$\alpha_{g,N} \text{ II}, \alpha_{g,V} \text{ (s_{min} II)}$					_				
factors	$\frac{\log_{N}(N, \log_{N}(S_{min} \perp))}{\log_{N}(S_{min} \perp)} [-]$			0,7			-	1)	-	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)			1,2			_	1)	-	1)
	$\alpha_{g,N} \perp, \alpha_{g,V} (s_{min} \perp)$				2,0					

<sup>1)</sup> No performance assessed.

fischer injection system FIS V Plus for masonry	
Performance Autoclaved aerated concrete (cylindrical drill hole), Group factors	Annex C119



## 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		899	950		10.0	M6	M8	M10	M12
anchor FIS E	175	_	_	_		112	x85	15	<b>k</b> 85

												11700	1000
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk}$	,p,c = N <sub>Rk,b,c</sub>	[kN]	; tem	pera	ture r	ange	50/80	°C 3)					
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use con- ditions	100	Effective anchorage depth h <sub>ef</sub> [mm] 100 200 100 200 100 200 100 200 100 200 85									5	
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	-	-	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5
150	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	-1)	2,0	1,5	2,5	3,5	2,5	3,5	2,0	3,5	2,0	1,5
5 / 4 N/IIIII	d/d	1,5	_1)	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	_1)	3,0	2,5	4,5	5,0	4,5	7,0	3,0	8,5	3,5	2,5
6 / 6 N/IIIII	d/d	1,5	_1)	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.

Anchor rod

**M6** 

**Table C120.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

M10

M12

M16

**M8** 

		1722	50-700	10000	35000	2020		55.5	525000 II	797-79					
Internal threaded anchor FIS E		-		•		-			•	-		M6 M8			M12 <85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,.}$	⊥ [kN]; te	mper	ature	rang	e 50/8	0°C a	and 7	2/120°	°C						
Mean compressive	Use					Effect	ive an	chora	ge de	pth h	f [mm	]			
strength / Min. compressive strength single brick <sup>2)</sup>	con- ditions	100	200	100	200	100	200	100	200	100	200		8	5	
2,5 / 2 N/mm²	w/w w/d 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/mm²	w/w w/d d/d	2,0	_1)	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0		2,0		2,5
8 / 6 N/mm²	w/w w/d d/d	2,5	_1)	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.

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

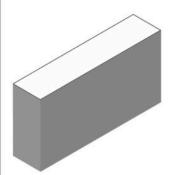
<sup>&</sup>lt;sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>&</sup>lt;sup>3)</sup> For temperature range 72/120°C: N<sub>Rk</sub> (72/120°C) = 0,83 · N<sub>Rk</sub> (50/80°C).

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



## Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4:2011+A1:2015



Producer		e		
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]	0,35	0,5	0,65
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	2,5 / 2	5/4	8/6
Standard or annex		EN 771-	4:2011+ <i>A</i>	1:2015

## Table C121.1: Installation parameters

Anchor rod		N	18	M	10	М	12	-	
Internal threaded anchor FIS E		¥	-	-	-	-	-	M6 M8	
Anchor rod and internal	thread	ed anchor	FIS E with	out perfora	ted sleeve			112	.00
Effective anchorage depth	[mm]	75	95	95	75	95	88	5	
Max. installation max T <sub>inst</sub>	[Nm]		,		2		to the second		
General installation para	meters	5							
Edge distance c <sub>min</sub> = c <sub>c</sub>		120	150	120	150	120	150	15	0
S <sub>cr</sub> II = S <sub>min</sub> I	[mm]	240	300	240	300	240	300	30	00
Spacing $s_{cr} \perp = s_{min} \perp$		240	250	240	250	240	250	25	50

#### Drilling method

Hammer drilling with hard metal hammer drill

## Table C121.2: Group factors

Anchor ro	od	N	Л8	М	10	М	-						
Internal th anchor Fl		-	-		-	-	-	M6	M8 x85				
Group factors	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,N} (s_{min} II)} = \frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,N} (s_{min} \bot)}$ $\frac{\alpha_{g,N} (s_{min} \bot)}{\alpha_{g,N} (s_{min} \bot)}$	1			2								

fischer injection system FIS V Plus for masonry	
Performance	Annex C121
Autoclaved aerated concrete (conical drill hole with special drill bit PBB), dimensions, installation parameters, Group factors	

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



8440

## Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4:2011+A1:2015

**Table C122.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		N	18	M	10	M	<u> </u>					
Internal threaded anchor FIS E			-	~	-	-	-	M6	M8 (85			
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 /	Use	Effective anchorage depth hef [mm]										
Min. compressive strength single brick 1)	con- ditions	75	95	75	95	75	95	8	5			
2.5./ 2.N/2	w/w w/d	2,0	2,5	2,0	2,5	2,0	2,5	2,	0			
2,5 / 2 N/mm <sup>2</sup>	d/d	2,0	2,5	2,0	2,5	2,0	2,5	2,	0			
5 / 4 N/mm²	w/w w/d	3,0	3,5	3,0	3,5	3,0	3,5	3,	0			
5 / 4 N/mm-	d/d	3,0	3,5	3,0	3,5	3,0	3,5	3,	0			
0./C.N/2	w/w w/d	3,5	4,0	3,5	4,0	3,5	4,0	3,	5			
8 / 6 N/mm²	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.

**Table C122.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod M8 M10 M12												
Internal threaded anchor FIS E		-	-	-	-	-	-	M6 M8				
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I	kN]; tempe	erature ra	nge 50/80	°C and 72	/120°C							
Mean compressive strength /	Use	Effective anchorage depth hef [mm]										
Min. com-pressive strength single brick 1)	con- ditions	75	95	75	95	75	95	8	5			
2,5 / 2 N/mm²	w/w w/d d/d	2,5										
5 / 4 N/mm²	w/w w/d d/d				4,5							
8 / 6 N/mm²	w/w w/d 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.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance
Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
Characteristic resistance under tension and shear loading

Annex C122

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



## β-factors for job site tests; displacements

## Table C123.1: $\beta$ -factors for job site tests

use conditions		w/w a	nd w/d	d/d		
temperature range [°C]		50/80	72/120	50/80	72/120	
Material	Size		β-fa	ctors		
	M6	0,55	0,46			
	M8	0,57	0,51			
	M10	0,59	0,52			
solid units	M12 FIS E 11x85	0,60	0,54	0,96	0,80	
	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	

## Table C123.2: Displacements

Material	N [kN]	$\delta N_0$ [mm]	δN∞ [mm]	V [kN]	δV <sub>0</sub> [mm]	δV∞ [mm]
solid units and autoclaved aerated concrete h <sub>ef</sub> =100mm	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,03	0,06	V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,82	0,88
hollow units	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,48	0,06	V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,71	2,56
solid brick Mz NF Annex C4 - C7	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,74	1,48	V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,23	1,85
solid brick KS NF Annex C14 / C15	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,20	0,40	V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,91	1,37
AAC h <sub>ef</sub> =200 mm Annex C118 - C120	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,03	2,06	VRk 1,4 * γмm	1,25	1,88
brick Annex C102 / C103	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,03	0,06	V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	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	
Performance	Annex C123
β-factors for job site tests; displacements	



# Chracteristic values under tension and shear loading under fire exposure (single anchor)

**Table C124.1:** Chracteristic values under tension and shear loading under fire exposure; considering all failure modes

			,0110		9 -	411 IG			400												
Brick			M	lid bri Iz, NF acc. to anex (	=, o	silio KS,	d cald ate b NF, a nnex	rick acc.	calcii brick	rforat um si KSL, nnex	licate acc.	pe brick	ertica rforat HLz nnex	ed acc.	Vertical perforated brick HLz, acc. to Annex C30			Autoclaved aerate concrete, acc. to Annex C118			. to
Mean compressive strength / Min. comp. strength single brick <sup>3)</sup>			≥ 1	5/≥	12	≥ 15 / ≥ 12		Ν	10 / ≥	: 8	2	5/≥	4	≥ '	7,5 / 2	≥ 6	≥ 2,5 / ≥ 2				
Size			M8	M10	M12	M8	M8	M8	M8	M10	M12	M8	M10	M12	M8	M10	M12	M8	M10	M12	M16
Perfora	ted Sle	eve		-			*		16x	130	16x1 30	16x	130	20x 130	16	x85	20x 85				
Perfora for brid unbear	ging of			-			-		9	-	1	83	-	20x 200	16x	130	20x 130				
hef		[mm]		≥ 80		≥ 50				≥ 130	)	≥ 130			≥ 85		≥ 100				
Charac	teristi	c resi	stand	e to	failu	re ur	ider i	tensi	on lo	adin	g										
car serse <u>c</u>	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
s,fi = p,fi = b,fi 2	R60	FLANT		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
NRk,s,fi = NRk,p,fi = NRk,b,fi <sup>2)</sup>	R90	[kN]		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		_ 1)	_ 1)	_ 1)		_ 1)		_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	<b>-</b> 1)
Charac	teristi	c resi	stand	e to	failu	re ur	der	shea	r loa	ding	2)										
withou	t lever	arm																			
	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
V <sub>Rk,s,fi</sub>	R60	FLAIT		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	[kN]		0,64	j		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	
.5051	R120			0,59			0,28		- 1)	- <sup>1)</sup>	- <sup>1)</sup>		- <sup>1)</sup>		- <sup>1)</sup>	- <sup>1)</sup>	_ 1)	- <sup>1)</sup>	- <sup>1)</sup>	_ 1)	- <sup>1)</sup>
with le	ver arr	n			37 72	141 0			00 00							000					
rete.	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
k,s,fi	R60	[N]1	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
M <sup>0</sup> Rk,s,fi	R90	[Nm]	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
16342-900	R120		0,60	0,76	0,92	0,28	0,35	0,43	_ 1)	_ 1)	- 1)	_ 1)	_ 1)	-1)	_ 1)	_ 1)	_ 1)	- 1)	_ 1)	_ 1)	<b>-</b> 1)
Genera	al insta	llatio	n Par	ame	ters																
Edge distanc	e <sup>C<sub>cr,fi</sub></sup>	[mm]		100			60			80		80		100			200				
and spacing Scr,fi		נייייין		320			200			520		340		520			400				

<sup>1)</sup> No performance assessed.

In absence of national regulations, the recommended partial factor  $\gamma_{\text{M,fi}}$  = 1,0.

fischer injection system FIS V Plus for masonry	
Performance Characteristic values under tension and shear loading under fire exposure (single anchor)	Annex C124

<sup>&</sup>lt;sup>2)</sup>  $V_{Rk,b,fi} = N_{Rk,b,fi}$ 

<sup>&</sup>lt;sup>3)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.



## Chracteristic 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>

Ų.	breakouti	anaro	55 555														
	STA				N	18			М	10			M	12		M	16
Brick	Mean compressive strength / Min. comp. strength single brick <sup>2)</sup>	h <sub>ef</sub>	Spacing	5	N <sup>9</sup> Rk,b,fi(90)	5	N <sup>9</sup> Rk,b,fi(120)	514	N <sup>э</sup> Rk,b,fi(90)	9	I¶ °Rk,b,fi(120)	DIA.	N°Rk,b,fi(90)		N <sup>9</sup> Rk,b,fi(120)	N <sup>g</sup> Rk,b,fi(90)	N <sup>g</sup> Rk,b,fi(120)
No. of	anchors in a g	roup:		2	4	2	4	2	4	2	4	2	4	2	4	2 4	2 4
[-]	[N/mm <sup>2</sup> ]	[mm]	[-]								[k	N]					
Solid brick MZ, NF acc. to Annex C4	≥ 15 / ≥ 12	≥ 80	s <sub>cr,fi</sub> II	1,1	2,1	0,8	1,7	1,3 1,7	2,5	1,0 1,3	2,0	1,5 2,0	2,9	1,2 1,6	2,4	-	1)
Solid calcium silicate brick KS, NF, acc.	≥ 15 / ≥ 12	≥ 50	S <sub>cr,fi</sub> II	0,3	0,6	0,2	0,5	0,3	0,6	0,2	0,5	0,3	0,6	0,2	0,5	-	1)
to Annex C14 Perforated calcium silicate brick KSL, acc.		≥ 130	Scr,fi II	1,4 1,8	2,7	1,1 1,5	2,2	1,4 1,8	2,7	1,1 1,5	2,2	0,9 1,4 1,8	2,7	1,1 1,5	2,2	-	1)
Vertical perforated brick HLz, acc. to Annex C30	≥ 7,5 / ≥ 6	≥ 85	Scr,fi ⊥ Scr,fi Ⅱ Scr,fi ⊥	0,4	0,9	0,4	0,7	0,4	0,9	0,4	0,7	0,5	1,1	0,4	0,9	-	1)
Vertical perforated brick HLz, acc. to Annex C28	≥5/≥4	≥ 130	s <sub>cr,fi</sub> II	0,4	0,4	0,3	0,3	0,4	0,4	0,3	0,3	0,5	0,5	0,4	0,4	-	1)
	Ancho	r rod			IV	18			М	10			М	12		М	16
Autoclaved aerated	≥ 2,5 / ≥ 2	≥ 100	s <sub>cr,fi</sub> II	1,1 1,1	2,1	0,8	1,7	1,1 1,1	2,1	0,8	1,7	1,1 1,1	2,1	0,8	1,7	1,4 1,4	1,1
concrete acc. to Annex C118	Internal ti anchor		ed		11x8	5 M	8	15x85 M10			15x85 M12			2		-	
	≥ 2,5 / ≥ 2	≥ 85	S <sub>cr,fi</sub> II	0,9	1,8	0,7 0,7	1,4	0,9	1,8	0,7	1,4	0,9	1,8	0,7 0,7	1,4	-	1)

<sup>1)</sup> No performance assessed.

In absence of national regulations, the recommended partial factor  $\gamma_{\text{M,fi}} = 1.0$ .

fischer injection system FIS V Plus for masonry	
Performance Chracteristic values under tension loading under fire exposure (anchor group)	Annex C125

<sup>&</sup>lt;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.



### Spacing and edge distance under fire exposure (anchor group)

### Table C126.1: Spacing and Edge distance under fire exposure, brick breackout failure

Solid brick	MZ	NE acc	to Annov	CA
SOHU DITEK	IVIZ.	NE acc.	to Alliex	U4

mean compressive strength / Min. compressive strength single brick ≥ 15 / ≥ 12 N/mm<sup>2</sup>

Anchor rod	Anchor rod		M8		M10		M12	
Effective anchorage depth	hef		80	200	80	200	80	200
Characteristic encoins	Scr,fi II	[	80	320	80	320	80	320
Characteristic spacing	Scr,fi ⊥	[mm]	100	100	100	100	100	100
Edge distance	C <sub>cr,fi</sub>		160	400	160	400	160	400

## Solid calcium silicate brick KS, NF, acc.to Annex C14

mean compressive strength / Min. compressive strength single brick ≥ 15 / ≥ 12 N/mm²

Anchor rod		M8		M10		M12		
Effective anchorage depth	hef		50	100	50	200	50	200
Characteristic appoins	scr,fi II	[mm]	107	107	107	107	107	107
Characteristic spacing	Scr,fi ⊥	[mm]	200	400	200	800	200	800
Edge distance	C <sub>cr,fi</sub>		100	200	100	400	100	400

#### Perforated calcium silicate brick KSL, acc. to Annex C24

mean compressive strength / Min. compressive strength single brick ≥ 10 / ≥ 8 N/mm<sup>2</sup>

Anchor rod / perforated sleeve			M8 / 16x130	M10 / 16x130	M12 / 20x130
Effective anchorage depth	h <sub>ef</sub>		130	130	130
Characteristic analise	S <sub>cr,fi</sub> II	[]	133	133	133
Characteristic spacing	S <sub>cr,fi</sub> ⊥	[mm]	153	153	153
Edge distance	C <sub>cr,fi</sub>		260	260	260

#### Vertical perforated brick HLz, acc. to Annex C30

mean compressive strength / Min. compressive strength single brick ≥ 7,5 / ≥ 6 N/mm<sup>2</sup>

Anchor rod / perforated sleeve			M8 / 16x85	M10 / 16x85	M12 / 20x85
Effective anchorage depth	h <sub>ef</sub>		85	85	85
Characteristic anasina	Scr.fi II	[]	320	320	320
Characteristic spacing	S <sub>cr,fi</sub> ⊥	[mm]	153	153	153
Edge distance	C <sub>cr,fi</sub>		170	170	170

#### Vertical perforated brick HLz, acc. to Annex C28

mean compressive strength / Min. compressive strength single brick ≥ 5 / ≥ 4 N/mm<sup>2</sup>

Anchor rod / perforated sleeve			M8 / 16x130	M10 / 16x130	M12 / 20x130
Effective anchorage depth	h <sub>ef</sub>		130	130	130
Characteristic anasina	Scr,fi II	[]	133	133	133
Characteristic spacing	Scr,fi ⊥	[mm]	133	133	133
Edge distance	C <sub>cr</sub> ,fi	1 [	260	260	260

fischer injection system FIS V Plus for masonry

#### Performance

Spacing and edge distance under fire esposure (anchor group)

Annex C126



## Spacing and edge distance under fire exposure (anchor group)

## Table C127.1: Spacing and Edge distance under fire exposure, brick breackout failure

## Autoclaved aerated concrete acc. to Annex C118

mean compressive strength / Min. compressive strength single brick  $\geq$  2,5 /  $\geq$  2 N/mm<sup>2</sup>

Anchor rod		M8		M10		M12		M16		
Effective anchorage depth	h <sub>ef</sub>		100	200	100	200	100	200	100	200
01	Scr,fi II	[	333	107	333	107	333	107	333	107
Characteristic spacing	S <sub>cr,fi</sub> ⊥	[mm]	333	107	333	107	333	107	333	107
Edge distance	C <sub>cr,fi</sub>		200	400	200	400	200	400	200	400

## Autoclaved aerated concrete acc. to Annex C118

mean compressive strength / Min. compressive strength single brick ≥ 2,5 / ≥ 2 N/mm²

Internal threaded anchor FIS E			11x85 M8	15x85 M10	15x85 M12
Effective anchorage depth	h <sub>ef</sub>		85	85	85
Characteristic spacing	Scr,fi II	[]	333	333	333
	Scr,fi ⊥	[mm]	333	333	333
Edge distance	C <sub>cr,fi</sub>		170	170	170

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Performance

Spacing and edge distance under fire esposure (anchor group)

Annex C127