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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

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Specific part

1 Technical description of the product

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

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

The product description is given in Annex A.

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

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

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

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

3.1 Mechanical resistance and stability (BWR 1)

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

3.2 Safety in case of fire (BWR 2)

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

3.3 Hygiene, health and the environment (BWR 3)

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

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

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

The system to be applied is: 1

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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

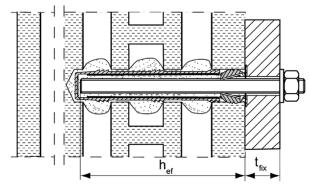
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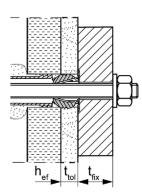
Installation conditions part 1

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

Pre-positioned installation:



Installation with render bridge



Size of the perforated sleeve:

FIS H 12x50 K

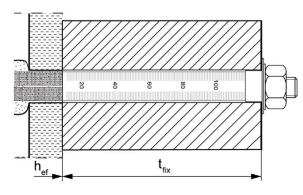
FIS H 16x85 K

FIS H 20x85 K

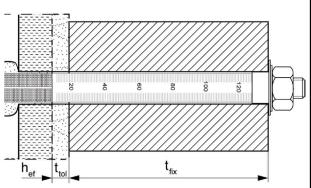
FIS H 20x200 K

FIS H 12x85 K FIS H 16x130 K FIS H 20x130 K

Push through installation:



Installation with render bridge



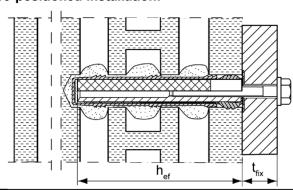
Size of the perforated sleeve:

FIS H 18x130/200 K

FIS H 22x130/200 K

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

Pre-positioned installation:



Figures not to scale

 h_{ef} = effective anchorage depth

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

 t_{fix} = thickness of fixture

fischer injection system FIS V Plus for masonry

Product description

Installation conditions part 1,

Anchor rods and internal threaded anchor with perforated sleeve

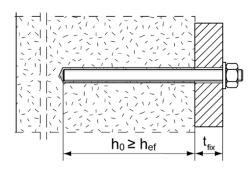
Annex A1



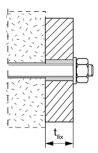
Installation conditions part 2

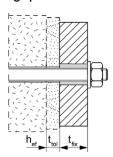
Anchor rods without perforated sleeve FIS H K; installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned installation:



Push through installation: Annular gap filled with mortar

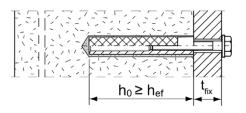




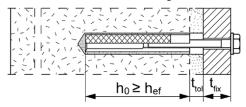
Installation with render bridge

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

Pre-positioned installation:



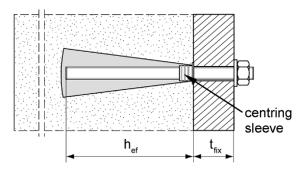
Installation with render bridge



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

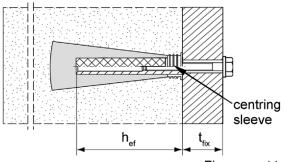
Pre-positioned installation:

anchor rods M8, M10, M12



Pre-positioned installation:

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

 h_0 = depth of drill hole

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

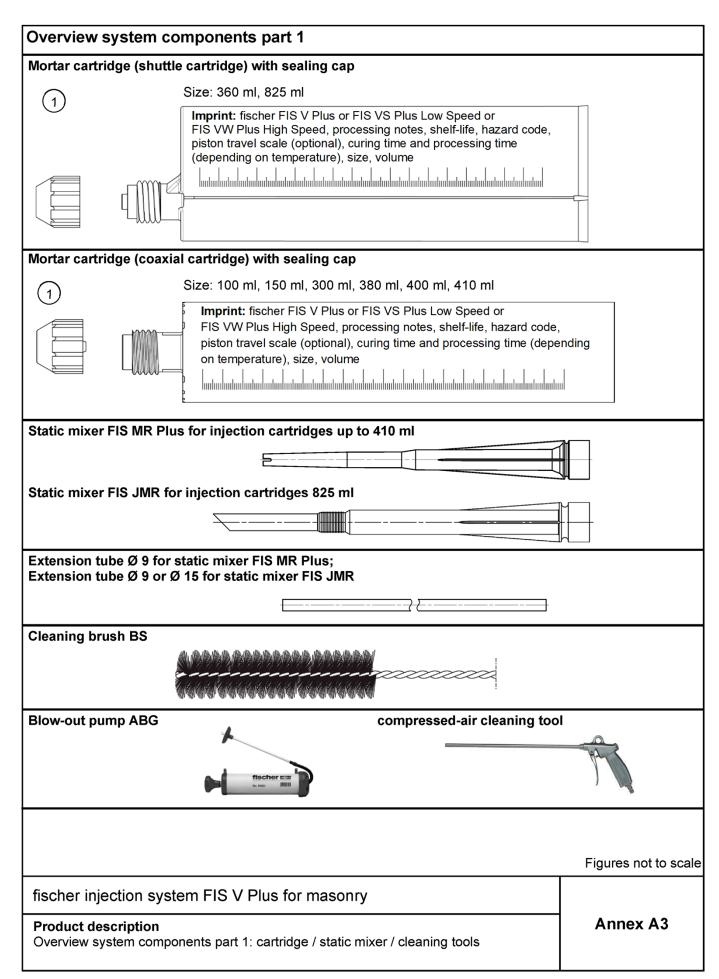
Product description

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

Annex A2

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Overv	iew system components part 2	
fische	anchor rod	
2	Size: M6, M8, M10, M12, M16	
Interna	l 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	- Igaios not to sould
Produ 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 Mortar, hardener; filler				
		Steel	Stainless steel R	High corrosion resistant stee 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+A1:2019	
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 f _{uk} ≤ 1000 N/mm² A ₅ > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1:2023 $f_{uk} \le 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with f_{yk} = 560 N/mm ² 1.4565; 1.4529 EN 10088-1:2023 $f_{uk} \le 1000 \text{ N/mm}^2$ $A_5 > 8\% \text{ fracture elongation}$	
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		
fischer injection system FIS V Plus for masonry Product description Materials Annex					



Specifications of intended use part 1

Table B1.1:	Overview use	and performance	categories
-------------	--------------	-----------------	------------

Table B1.1:		nd performance cate			
Anchorages subje	ect to	fischer injed	tion system	FIS V Plus f	or masonry
Hole drilling with	hammer drill mode	all bricks; without C28 to C48, C75 to C78			78
Hole drilling wit	h rotary drill mode		all b	ricks	
Hole drilling with	special conic drill bit		Only C11	8 to C122	
	uasi static load, asonry		all b	ricks	
	under tension and loading			s of dry masonry)	
Installation	Pre-positioned installation	Anchor rod or internal threaded a (in solid brick masor autoclaved aerated of Anchor rod;	nchor nry and	Perforated sleeve with anchor roor internal threaded anchor (in perforated and solid brick masonry) Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 16x130 K FIS H 20x85 K FIS H 20x200 K Perforated sleeve with anchor ro	
	Push through installation	use only in cylindrical drill hole (in solid brick masonry and autoclaved aerated concrete)		(in perforated and solid brick masonry) Size: FIS H 18x130/200 FIS H 22x130/200 F	
	conditions d/d (dry/dry)				
Installation and use conditions	conditions w/d (wet/dry)	all bricks			
	conditions w/w (wet/wet)				
Installation directi	on	D3 (dow	nward and h	orizontal insta	allation)
Installation tempe	rature	$T_{i,n}$	$_{nin}$ = -10 °C to	$T_{i,max} = +40^{\circ}$	°C
Temperature In-service range Tb		-40 °C to +80 °C	•	t term tempera term tempera	
temperature Temperature range Tc		-40 °C to +120 °C (max. short term temperate max. long term temperate			
fischer injection	on system FIS V F	Plus for masonry			
Intended Use Specifications p	<u> </u>	•			Annex B1



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 hef+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**_{Rk,pb} or pushing out a brick under shear loading **V**_{Rk,pb} see EOTA Technical Report TR 054:2023-12.

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

Factors for job site tests and displacements see annex C123.

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

Installation:

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

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

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

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

fischer injection system FIS V Plus for masonry	
Intended Use Specifications part 3 continued	Annex B3



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

Anchor rod	Thread	М6	M8	M10	M12	M16	
Nominal drill hole diameter	d₀ [mm]	8	10	12	14	18	
Effective anchorage depth hef1)	h _{0,min} ≥ h _{ef,min} [mm]	100					
in AAC cylindrical drill hole	h _{0,max} ≥h _{ef,max} [mm]	200					
	h₀[mm]			h _{ef} + 5			
Effective anchorage depth hef in AAC conical drill hole	h _{ef,1} [mm]	-		75		_	
iii 7 v (o domodi dilli nole	h _{ef,2} [mm]		95				
Effective anchorage depth hef1)	h _{ef,min} [mm]	50					
in solid brick (depth of drill hole $h_0 \ge h_{ef}$)	h _{ef,max} [mm]	h-30, ≤200					
Diameter of clearance pre-	oositioning d _f ≤[mm]	7	9	12	14	18	
hole in the fixture pu	sh through d _f ≤[mm]	9	11	14	16	20	
Diameter of cleaning brush d _b ≥ [mm]		see Table B8.1					
Maximum installation torque T _{inst} [Nm]		see parameters of brick					

¹⁾ $h_{ef,min} \le h_{ef} \le h_{ef,max}$ is possible.



Marking (on random place) fischer anchor rod:

Steel zinc plated PC¹) 8.8	• or +	Steel hot-dip galvanised PC ¹⁾ 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	*		

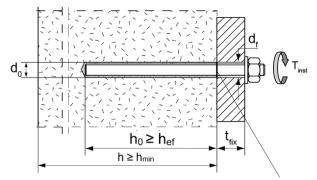
Alternatively: Colour coding according to DIN 976-1: 2016;

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

¹⁾ PC = property class

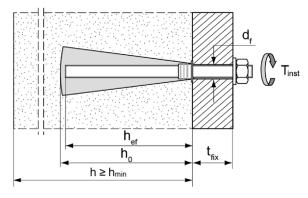
Installation conditions:

Anchor rod in cylindrical drill hole



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

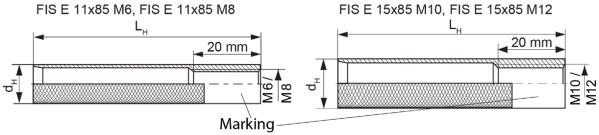
Annex B4



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 _H [mm]	11 15				
Nominal drill hole diameter	d₀[mm]	14 18			18	
Length of anchor	L⊣[mm]	85				
Effective anchorage depth	h₀ ≥ hef [mm]	85				
Effective anchorage depth hef	h₀[mm]	1	00			
in AAC (conical drill hole)	h _{ef} [mm]	85] - !		
Diameter of cleaning brush	d _b ≥[mm]		see Ta	ble B8.1		
Maximum installation torque	T _{inst} [Nm]		see parame	eters of brick		
Diameter of clearance hole in the fixture	d _f [mm]	7 9		12	14	
Saraw in donth	I _{E,min} [mm]	6	8	10	12	
Screw-in depth	I _{E,max} [mm]	60				

fischer Internal threaded anchor FISE

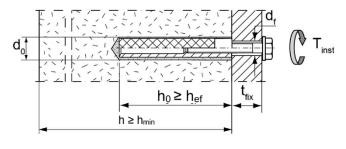


Marking:

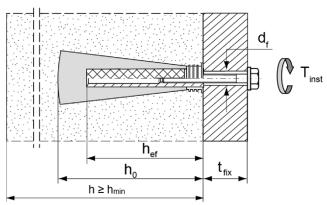
Size, e.g. M8, Stainless steel: R, e.g. M8 R, High corrosion resistant steel: HCR, e.g. M8 HCR

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 ²⁾	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter do = D _{sleeve,nom} do [mm]		12		16		20		
Depth of drill hole	ho[mm]	55	90	90	135	90	135	205
Effective anchorage denth	h _{ef.min} [mm]	50	65	85	110	85	110	180
Effective anchorage depth	h _{ef,max} [mm]	50	85	85	130	85	130	200
Size of threaded rod [-]		M6 and M8		M8 and M10		M12 and M16		16
Size of internal threaded anchor	-	-	11x85	-	15x85	-	-	
Diameter of cleaning brush ¹⁾	see Table B8.1							
Maximum installation torque	see parameters of brick							

¹⁾ Only for solid areas in hollow bricks and solid bricks.

Perforated sleeve

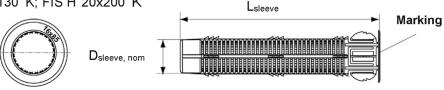
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;

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

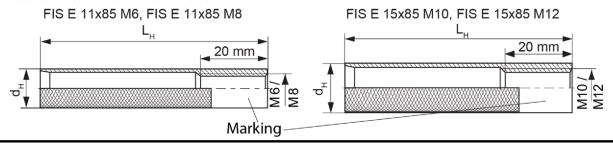
Marking:

Size D_{sleeve}, nom X L_{sleeve}

(e.g.: 16x85)

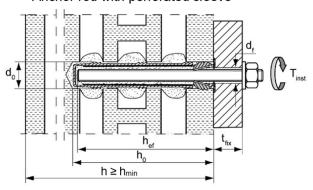


fischer Internal threaded anchor FIS E

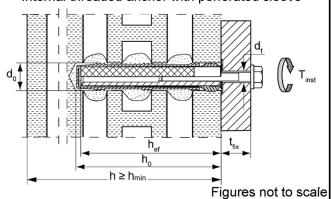


Installation conditions:

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

²⁾ Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth h_{ef, 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.



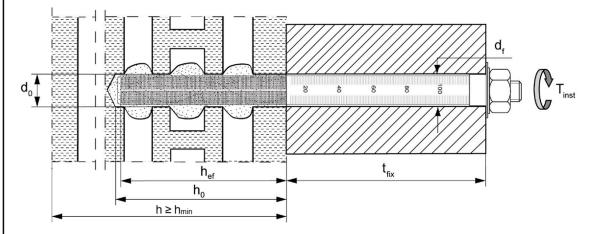
Table B7.1:	Installation parameters for anchor rods with perforated sleeves
	(push through installation)

Perforated sleeve FIS H K		18x1	30/200	22x130/200		
Nominal sleeve diameter	1	16				
Nominal drill hole diameter	d₀ [mm]	1	8	22		
Depth of drill hole	h₀[mm]] 135				
Effective anchorage depth	h _{ef} [mm]	≥130				
Diameter of cleaning brush 1)	d _b ≥ [mm]	see Table B8.1				
Size of threaded rod	[-]	M10	M12	M16		
Maximum installation torque	T _{inst} [Nm]	see parameters of brick				
Thickness of fixture	t _{fix,max} [mm]	200				

¹⁾ Only for solid areas in hollow bricks and solid bricks.

Installation conditions:

Anchor rod with perforated sleeve



Figures not to scale

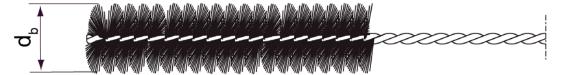
fischer injection system FIS V Plus for masonry

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

Annex B7



Table B8.1: Parameters of the cleaning brush BS (steel brush with steel bristles)										
The size of the cleaning	The size of the cleaning brush refers to the drill hole diameter									
Drill hole diameter	d₀ [mm]	8	10	12	14	16	18	20	22	
Brush diameter	d₅ [mm]	9	11	14	16	20	20	25	25	



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

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

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

¹⁾ For wet bricks the curing time must be doubled.

Figures not to scale

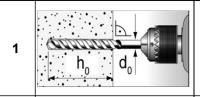
fischer injection system FIS V Plus for masonry	
Intended Use	Annex B8
Cleaning brush (steel brush)	
Maximum processing times and minimum curing times	

²⁾ Minimum cartridge temperature +5°C.

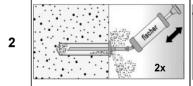


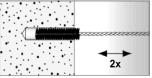
Installation instruction part 1

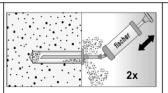
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)



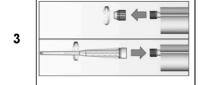
Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole h₀ and drill hole diameter d₀ see Table B4.1; B5.1.







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



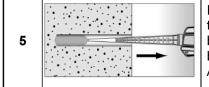
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



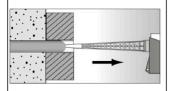
Place the cartridge into a suitable dispenser.



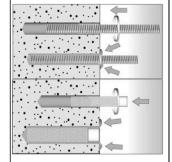
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



Fill approximetly 2/3 of the drill hole with mortar beginning from the bottom of the hole¹⁾. 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.

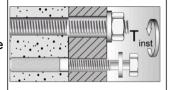
When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.

7

6



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



Mounting the fixture. max T_{inst} see parameter of brick in Annex C.

fischer injection system FIS V Plus for masonry

Intended Use

Installation instruction (without perforated sleeve) part 1

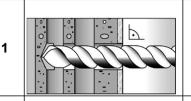
Annex B9

¹⁾ Exact volume of mortar see manufacturer's specification.



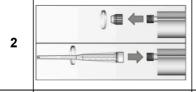
Installation instruction part 2

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.



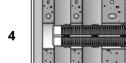
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



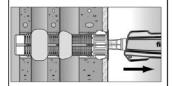
Place the cartridge into a suitable dispenser.



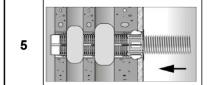
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



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



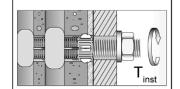
Fill the perforated sleeve completely with mortar beginning from the bottom of the hole¹⁾.



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_{inst} see parameter of brick in **Annex C**.

fischer injection system FIS V Plus for masonry

Intended Use

Installation instruction (with perforated sleeve) part 2

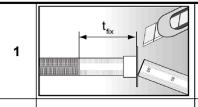
Annex B10

¹⁾ Exact volume of mortar see manufacturer's specification.

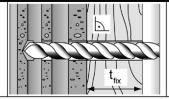


Installation instruction part 3

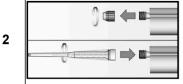
Installation in perforated or solid brick with perforated sleeve (push through installation)



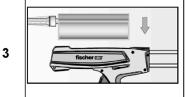
Push the movable stop up to the correct thickness of fixture and cut the overlap.



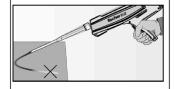
Drill the hole through the fixture. Depth of drill hole (h₀ + t_{fix}) and drill hole diameter see **Table B7.1**.



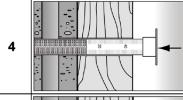
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



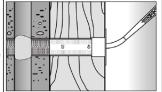
Place the cartridge into a suitable dispenser.



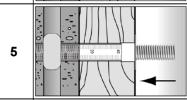
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



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



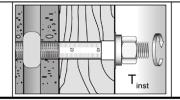
Fill the sleeve with mortar beginning from the bottom of the hole.¹⁾ For deep drill holes use an extension tube.



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_{inst} 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

¹⁾ 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)							
1	h _o = 80 mm h _o = 100 mm	Table B4.1). For this, unlock the clam	Position the movable drill bit arrester on the used drill hole depth (see Table B4.1). For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw.					
2			Drill the cylindrical hole with rotating drill until the arrester contact the material surface (drilling method see Annex C of the respective brick).					
3		Deviate the working pow material.	Deviate the working power drill circulate to generate an conic undercut in the material.					
4	4x	Blow out the drill hole four times.						
5		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).						
6	fischer c z	Place the cartridge into a suitable dispenser.	X	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.				
7		Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer.		Fill the drill hole with injection mortar.				
8			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.					
9		Do not touch. Minimum curing time see Table B8.2 .		Mounting the fixture. max T _{inst} see parameter of brick in Annex C .				

fischer injection system FIS V Plus for masonry

Intended Use

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

Annex B12

Overview of assessed bricks part 1



Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm²]	Main country of origin	Mean gross density ρ [kg/dm³]	Annex
	NF ≥240x115x71	15 / 25 / 35	Germany	≥1,8	C4 – C7
O - U-1 I! NA	2DF ≥240x115x113	12,5 / 20	Germany	≥1,8	C8 / C9
Solid brick Mz	≥ 245x118x54	12,5 / 25	Italy	≥1,8	C10 / C11
	≥ 230x108x55	12,5 / 25	Denmark	≥1,8	C12 / C13
Solid calcium sili	icate (sand- lime) bric	k KS / perforated calciur	m silicate (sa	nd- lime) bric	k KSL
	NF ≥240x115x71	15 / 25 / 35	Germany	≥2,0	C14 / C15
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 – C23
Perforated calcium silicate brick KSL	3DF 240x175x113	10 / 12,5 / 15 / 20 / 25	Germany	≥1,4	C24 – C27
	Vertic	cal 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 / C29
	2DF 240x115x113	7,5 / 12,5 / 20 / 25 / 35	Germany	≥1,4	C30 / C31
	248x365x248	5 / 7,5 / 10	Germany	≥0,6	C32 – C35
	248x365x249	10 / 12,5 / 15	Germany	≥0,7	C36 – C39
	248x365x249	5/8	Germany	≥0,5	C40 - C43
	248x425x248	5 / 8 / 10	Germany	≥0,8	C44 – C47
	248x425x248	5 / 7,5 / 10	Germany	≥0,8	C48 – C51
	500x200x315	5 / 7,5 / 10	Germany	≥0,6	C52 – C55
Vertical perforated	500x200x300	5 / 7,5 / 10 / 12,5	France	≥0,7	C56 – C59
brick HLz	500x200x315	2,5 / 5 / 7,5 / 10	France	≥0,7	C60 – C63
	560x200x275	5 / 8 / 10	France	≥0,7	C64 / C65
	255x120x118	2,5 / 5 / 8 / 10 / 12,5 / 15	Italy	≥1,0	C66 - C68
	275x130x94	7,5 / 10 / 15 / 20 / 25	Spain	≥0,8	C69 / C71
	220x190x290	7,5 / 10 / 12,5	Portugal	≥0,7	C72 – C7
	253x300x240	2,5 / 5 / 8	Austria	≥0,8	C76 – C79
	250x440x250	8 / 10 / 12,5	Austria	≥0,7	C80 – C83
	230x108x55	2,5 / 5 / 8 / 10	Denmark	≥1,4	C84 / C85
	365x248x245	10	Austria	≥0,6	C86 / C89
	240x175x113	12,5	Germany	≥0,9	C90 / C93



Table B14.1: Overview of assessed bricks part 2								
Kind of masonry	Brick format [mm]	Mean compressive Main country of strength origin [N/mm²]		Mean gross density ρ [kg/dm³]	Annex			
	Hor	izontal 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-we	eight concrete ho	low block Hbl					
	362x240x240	2,5 / 5	Germany	≥1,0	C98 – C101			
Light-weight concrete hollow block Hbl	500x200x200	2,5 / 5 / 8	France	≥1,0	C102 / C103			
TIONOW 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	-	5	Germany	0,5	C118 – C122			
PP6 / AAC	-	8	Germany	0,65	C118 – C122			

fischer injection system FIS V Plus for masonry	
Intended Use Overview of assessed bricks part 2	Annex B14



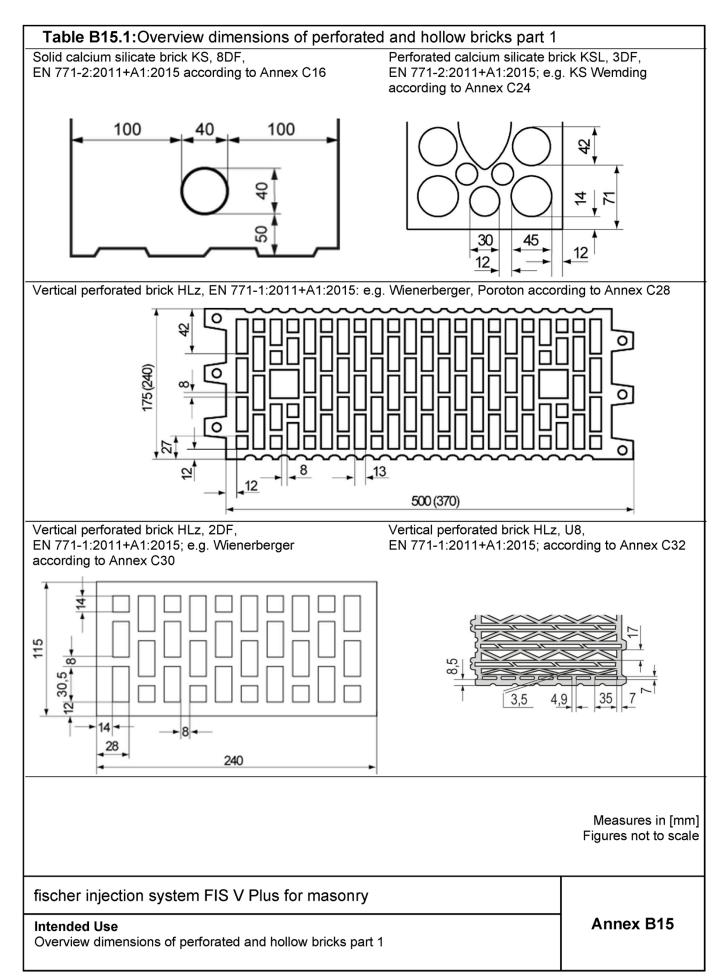




Table B16.1:Overview dimensions of perforated and hollow bricks part 2

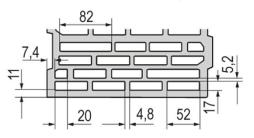
43,5

Vertical perforated brick HLz, T10, T11,

EN 771-1:2011+A1:2015; according to Annex C36

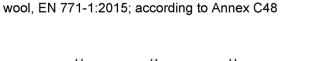


Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2011+A1:2015; according to Annex C40

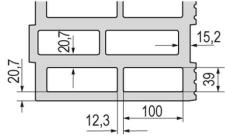


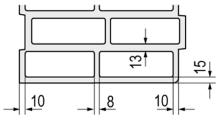
Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015; according to Annex C44



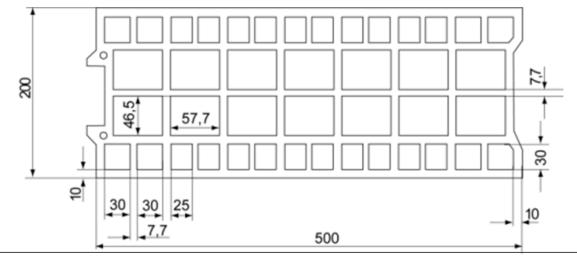


Vertical perforated brick HLz, FZ 7, filled with mineral





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 Annex B16 **Intended Use** Overview dimensions of perforated and hollow bricks part 2



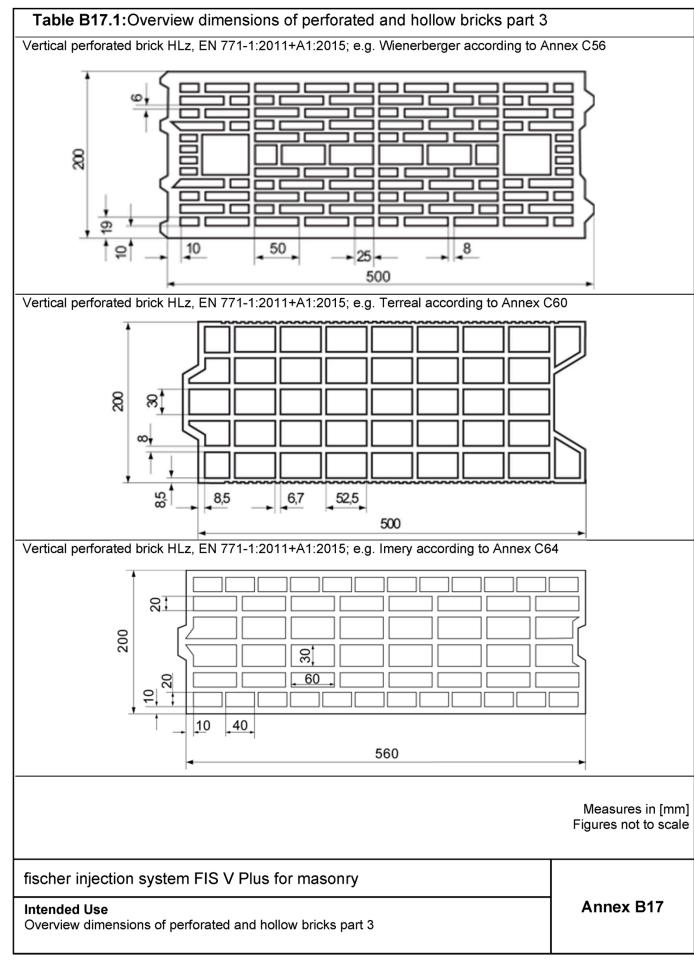
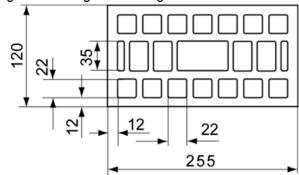




Table B18.1:Overview dimensions of perforated and hollow bricks part 4

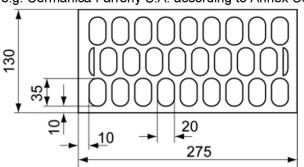
Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Wienerberger according to Annex C66



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

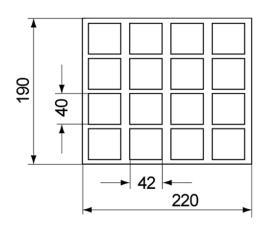
e.g. Cermanica Farreny S.A. according to Annex C69



Vertical perforated brick HLz,

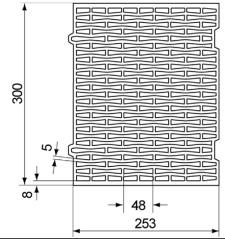
EN 771-1:2011+A1:2015;

e.g. Perceram according to Annex C72

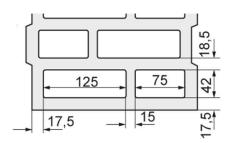


Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Ziegelwerk Brenna according to Annex C76

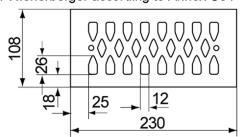


Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2011+A1:2015 according to Annex C80



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

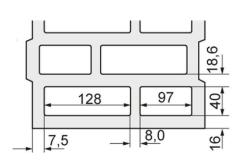
Overview dimensions of perforated and hollow bricks part 4

Annex B18



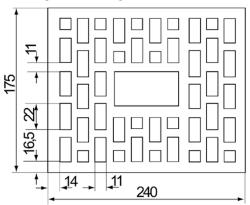
Table B19.1:Overview dimensions of perforated and hollow bricks part 5

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

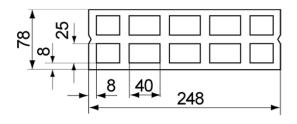


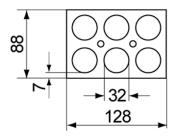
Horizontal perforated brick LLz,

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

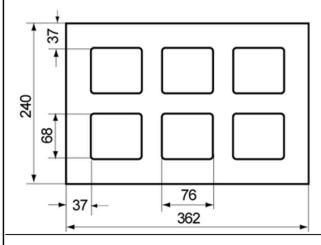


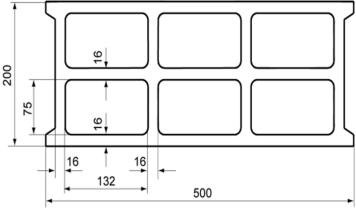


Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015; according to Annex C98

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

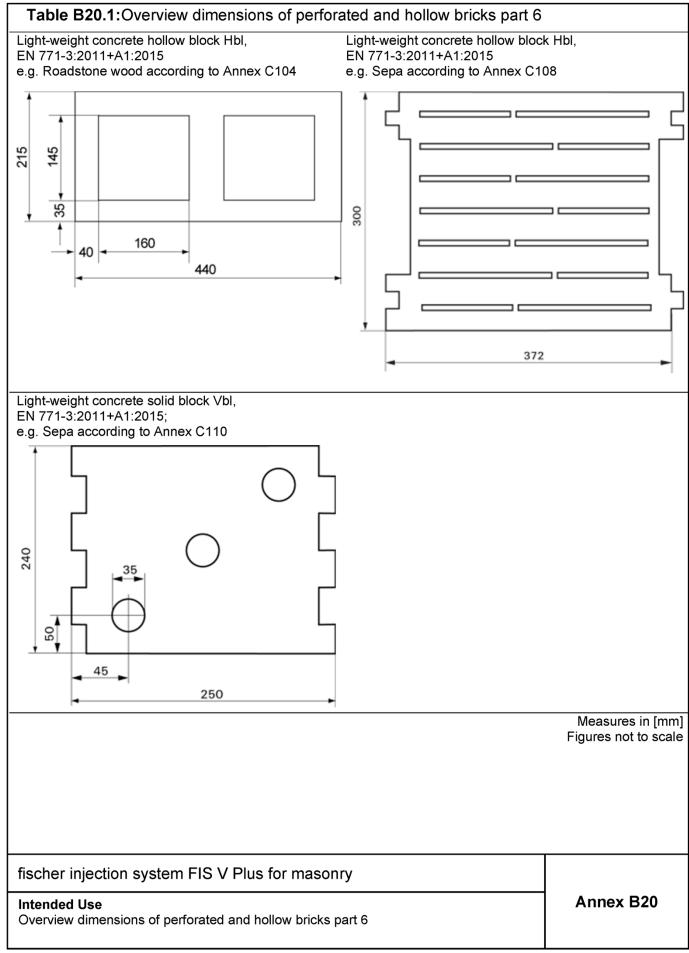
fischer injection system FIS V Plus for masonry

Intended Use

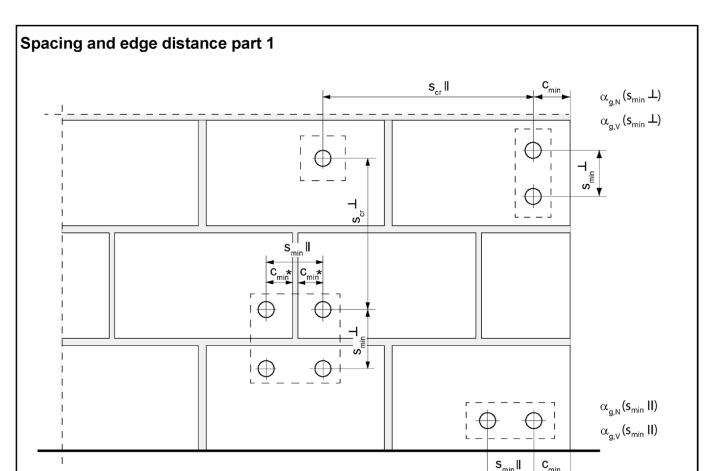
Overview dimensions of perforated and hollow bricks part 5

Annex B19









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

 s_{min} II = Minimum spacing parallel to horizontal joint

 s_{min} = Minimum spacing perpendicular to horizontal joint

s_{cr} II = Characteristic spacing parallel to horizontal joint

 s_{cr}^{\perp} = Characteristic spacing perpendicular to horizontal joint

 $c_{cr} = c_{min}$ = Edge distance

 $\alpha_{g,N}$ (s_{min} II) = Group factor for tension load, anchor group parallel to horizontal joint

 $\alpha_{g,V}$ (s_{min} II) = Group factor for shear load, anchor group parallel to horizontal joint

 $\alpha_{g,N}$ (s_{min}^{\perp}) = Group factor for tension load, anchor group perpendicular to horizontal joint

 $\alpha_{g,V}(s_{min}^{\perp})$ = Group factor for shear load, anchor group perpendicular to horizontal joint

Figures not to scale

fischer injection system FIS V Plus for masonry	
Intended Use Spacing and edge distance part 1	Annex B21



Spacing and edge distance part 2

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

For $s_{min} \le s < s_{cr}$: α_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

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

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

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

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

fischer injection system FIS V Plus for masonry

Intended Use

Spacing and edge distance part 2

Annex B22



Table C1.1: Characteristic resistance to steel failure under tension loading of fischer anchor rods and standard threaded rods

Anch	Anchor rod / standard threaded rod				M6	M8 ³⁾	M10 ³⁾	M12	M16		
Chara	acteristic resistar	ice to steel t	failure	unde	er tension lo	pading					
			4.6		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
σ	Stool zing plated		4.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
istic N _{Rk,s}	Steel zinc plated		5.8		10,0	18,3(16,6)	29,0(26,8)	42,1	78,5		
teri ce I		Property	8.8	FLAIT	16,0	29,2(26,5)	46,4(42,8)	67,4	125,6		
Characteristic resistance N _{Rk,}	Stainless steel R and	class –	50	[kN]	10,0	18,3	29,0	42,1	78,5		
ည် နို့	High corrosion		70		14,0	25,6	40,6	59,0	109,9		
	resistant steel HCR		80		16,0	29,2	46,4	67,4	125,6		
Partia	al factors 1)					•					
			4.6		2,00						
	Ctaal zina platad		4.8		1,50						
ors	Steel zinc plated		5.8		1,50						
Fact s,⊼		Property	8.8	.,			1,50				
Partial factors Y _{Ms,N}	Stainless steel R and	class		[-]	2,86						
_ g	High corrosion	7	70		1,50 ²⁾ / 1,87						
	resistant steel HCR		80				1,60				

¹⁾ 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

²⁾ Only for fischer FIS A made of high corrosion resistant steel HCR

³⁾ Values in brackets are valid for undersized threaded rods with smaller stress area A_s 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

Anch	or rod / standard	threaded ro	od		М6	M8 ³⁾	M10 ³⁾	M12	M16		
Chara	acteristic resistar	nce to steel	failure	unde	er shear load	ding					
witho	ut lever arm										
			4.6		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6		
S	Stool zing plotod		4.8		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6		
stic V _{RK,}	Steel zinc plated		5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1		
teri ce		Property	8.8	[LAI]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
Characteristic esistance V _{Rk,s}	Stainless steel R and	class	50	[kN]	5,0	9,1	14,5	21,0	39,2		
ට <u>ව</u>	High corrosion resistant steel		70		7,0	12,8	20,3	29,5	54,9		
	HCR		80		8,0	14,6	23,2	33,7	62,8		
with I	ever arm										
Ψ.		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		
esis	Oteer zine plated		5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2		
ristic re M ⁰ Rk,s		Property	8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9		
Characteristic resistance M ⁰ Rk,s	Stainless steel R and	class	50		7,6	18,7	37,3	65,4	166,2		
aract	High corrosion resistant steel		70		10,6	26,2	52,3	91,5	232,6		
Ch	HCR		80		12,2	29,9	59,8	104,6	265,9		
Partia	al factors¹)										
			4.6				1,67				
	Steel zinc plated		4.8		1,25						
tors	Oteel Zille plated		5.8				1,25				
al faci Yms,v		Property	8.8	[-]			1,25				
Partial factors	Stainless steel R and	class	50	[-]			2,38				
P	High corrosion resistant steel		70				1,25 ²⁾ / 1,56				
	HCR		80			1,33					

¹⁾ 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

²⁾ Only for fischer FIS A made of high corrosion resistant steel HCR

³⁾ Values in brackets are valid for undersized threaded rods with smaller stress area A_s for hot-dip galvanised standard threaded rods (M8 resp. M10) according to EN ISO 10684:2004+AC:2009.



Table C3.1:	Characteristic resistance to steel failure under tension / shear loading of internal threaded anchors FIS E										
fischer internal th	read	ed anchor	FIS E		M6	M8	M1	0	M12		
Characteristic res				unde	er tension loadi	ng, decisive va	ues of int	ternal t	hreaded		
		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 HCR		14,0 14,0	25,6 25,6	40,		59,0 59,0		
Partial factors ¹⁾				•							
		Property class	4.6			2,	00				
Partial factors	γMs,N	Property class	5.8	[-]		1,	50				
		Property	R		1,87						
		class 70	HCR				87				
Characteristic res			l failure	unde	er shear loading	; decisive valu	es of inte	rnal thr	readed anchor		
without lever arm											
		Property class	4.6		4,8	8,7	13,	9	20,2		
Characteristic resistance	$V_{Rk,s}$	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											
		Property class	4.6		6,1	14,9	29,	9	52,3		
Characteristic resistance	M ⁰ Rk,s	Property class		[Nm]	7,6	18,7	37,		65,4		
		Property class 70	R		10,6	26,2	52,		91,5		
Partial factors ¹⁾		UI 033 / U	HCR		10,6	26,2	52,	ى د	91,5		
i artiai iactors.		Property									
		class	4.6			1,	67				
Partial factors	YMs,∨	class	5.8	[-]	1,25						
		Property class 70	R HCR				56 56				
1) In absence of o	other r						30				
fischer injection	n sys	tem FIS	√ Plus	for n	nasonry						
Performance Characteristic res threaded anchors			ailure ur	nder te	ension / shear lo	ading of internal		Α	nnex C3		



EN 771-1:2011+A1:2015

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 Mean gross dry density ρ [kg/dm³] ≥ 1,8 Mean compressive strength / Min. 15 / 12 or 25 / 20 or $[N/mm^2]$ compressive strength single brick 1) 35 / 28

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

Standard or annex

Anchor rod				М6	M8	M10	M12	-		-	•
Internal threa	aded and	hor FIS E		-	-	-	-	M6	M8	M10	M12 (85
Anchor rod an	ıd interna	I threaded anc	hor FIS E with	out perfora	ated sleev	e		112	(05	157	(05
7 HIGHOI TOG GITG III.OTH				50	50	50	50				
Effective	th	h _{ef}	[mm]	80	80	80	80	85			
anchorage dep	uı			200	200	200	200				
Max. installation torque	n	max T _{inst}	[Nm]	4		10		4 10			
General instal	lation par	rameters			<u>'</u>						
Edge distance		C _{min} = C _{cr}				100					
Edge distance	h _{ef} =200	C _{min} = C _{cr}		150			_2)				
		Smin II,N			6	0		60			
	ŀ	n _{ef} =200 s _{min} II, _N	[mm]		24	40		_2)			
Spacing		S _{min} II,v			24	40		240			
		Scr II			24	40			24	40	
		s _{cr} ⊥ = s _{min} ⊥			7	75					

Drilling method

Hammer drilling with hard metal hammer drill

Table C4.2: Group factors

Anchor rods		M6	M8	M10	M12		-	-				
Internal three	aded anchor FIS E			-	-	-	M6	M8	M10	M12		
internal threa	aded anchor FIS E		-				11x85		15x85			
Edge distance	C _{min}	[mm]				100						
	α _{α.N} (s _{min} II)					1,5						
	α _{g,V} (s _{min} II)		2,0									
	h _{ef} =200 α _{g,N} (s _{min} II)		1,5									
Oraș va fa stan	h _{ef} =200 α _{g,V} (s _{min} II)					2,0						
Group factor	α _{g,N} (S _{min} ⊥)	[-]				2,0						
	α _{g,V} (s _{min} ⊥)		2,0									
-	h _{ef} =200 α _{g,N} (s _{min} ⊥)		2,0									
-	h _{ef} =200 α _{g,V} (s _{min} ⊥)		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

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

²⁾ 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			M6	M8	M10			M12			-		-		
Internal threaded and	IS E	_								М6	M8	M10	M12		
internal tilreaded and	Internal threaded anchor FIS E		•	_		-			-			11x85		15x85	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_R$	k,p,c =	N _{Rk,b,}	c [kN];	tempe	rature	range	50/80	°C 2)							
Mean compressive		Jse		Effective anchorage depth h _{ef} [mm]											
strength / Min. compressive strength single brick 1)	c	on- tions	≥50	≥50	50	80	200	50	80	200			85		
15 / 12 N/mm²	w/v	w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0		;	3,5		
15 / 12 N/MM ⁻	(d/d	4,0	4,0	3,5	5,0	12,0	3,0	5,5	8,0		į.	5,5		
25 / 20 N/mm²	w/v	w/d	3,5	3,5	3,0	4,5	11,0	3,0	5,0	7,0		į	5,0		
25 / 20 N/MM-		d/d	5,5	5,5	5,0	7,0	12,0	4,5	8,0	11,5			3,0		

¹⁾ 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		M6	M8	M	10	M	12					
Internal threaded anch	_	_		_		М6	M8	M10	M12			
Internal tineaded anci	_		-		·		11x85		15x85			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk}$	_{k,c,⊥} [kN];	temper	ature r	ange 50/8	0°C and	72/120°C						
Mean compressive strength / Min.	Use		Effective anchorage depth h _{ef} [mm]									
compressive strength single brick 1)	con- ditions	≥50	≥50	≥50	200	≥50	200		8	5		
15 / 12 N/mm²	w/w w/d d/d	2,5	2,5	4,0	8,5	4,0	11,5	2,5				
25 / 20 N/mm²	w/w w/d d/d	4,0	4,0	6,0	12,0	5,5	12,0		4,	0		

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk (72/120°C)} = 0,83 · N_{Rk (50/80°C)}.



Internal threa FIS E Anchor rod a Effective anchorage de	aded anchor		M6	M8	M10	M12	M16	-	-		-
Anchor rod a			_	-	-	-	-	M6	M8	M10	
Effective		41 1						112	x85	15	x85
	ind internal	thread		1			50	T			
anchorage de	h _{ef}	[mm]	50 100	50 100	50 100	50 100	50 100	_	c	35	
	pth "er	'''''	200	200	200	200	200	\dashv			
Max. installation	on max T _{inst}	[Nm]	4		I .	0		4		10	
General insta	allation para	meters	}						•		
Edge distance						60					
Edge distance h _{ef} =200	C _{min}					60					
	Smin II,N	-				80					
h _{ef}	=200 s _{min} II, _N	7				80					
Spacing ——	S _{min} II,v	.1				80 3x h _{ef}					
	S _{cr} II	 				80					
	S _{cr} \perp	 				3x h _{ef}					
		-				OX Hel					
Hammer drillir	ng with hard			I							
Hammer drillir	ng with hard			M8	M10	M12	M16		_		_
Table C6.2: Anchor rods Internal threa	ng with hard : Group	facto	rs		M10 -	M12 -	M16 -	M6	- M8	M10	
Hammer drillin Table C6.2: Anchor rods Internal threa FIS E Edge	ng with hard Group aded anchor	facto	rs		M10 -	M12 - 60	M16 -		- M8 x85		- M12 x85
Hammer drillin Table C6.2: Anchor rods Internal threa FIS E Edge	ng with hard Group aded anchor	facto	rs		M10 -	- 60	M16 -				
Hammer drillin Table C6.2: Anchor rods Internal threa FIS E Edge	ng with hard Group aded anchor	facto	rs		M10 -	-	M16 -				
Hammer drillin Table C6.2: Anchor rods Internal threa FIS E Edge distance	ng with hard Group aded anchor Cmin α _{g,N} (Smin II)	facto	rs		M10 -	- 60 0,6	M16 -				
Table C6.2: Anchor rods Internal threa FIS E Edge distance	Group aded anchor α _{g,N} (s _{min} II) α _{g,V} (s _{min} II)	factor	rs		M10 -	- 60 0,6 1,3	M16 -				
Table C6.2: Anchor rods Internal threa FIS E Edge distance her=200 Group her=200	rg with hard Group Aded anchor Cmin αg,N (Smin II) αg,V (Smin II) αg,N (Smin II)	facto	rs		M10 -	- 60 0,6 1,3 1,4	M16 -				
Hammer drillin Table C6.2: Anchor rods Internal threaters E Edge distance	Group aded anchor α _{g,N} (s _{min} II) α _{g,V} (s _{min} II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16 -				
Hammer drillin Table C6.2: Anchor rods Internal threaters E Edge distance hef=200 hef=200 factor hef=200 hef=200 hef=200	aded anchor $\alpha_{g,N} \text{ ($s_{min}$ II)}$	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16 -				



5,5

12

_2)

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			N	16	N	18		M10			M12			M16		•	-		-
Internal threaded ar	chor			•	,	•		-			-		- M6 M8 M10 11x85 15x						
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,b}$	Rk,p,c	= N _{Rk}	, _{b,c} [k	N]; t	emp	eratu	ire ra	ange	50/8	0°C 3)								
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons	50	100	50	100		Effec 100				dep		100	ĺ l		8	5	
15 / 12 N/mm²	w/w	w/d	1	,5	2,0	2,0	2,0	2,5	_2)	2,0	2,5	_2)	2,0	5,5	_2)		-	2)	
15 / 12 N/IIIII	d	/d	2	,5	3,0	4,0	3,0	4,0	9,5	3,0	4,0	9,5	3,0	8,5	9,5		-	2)	
25 / 20 N/mm²	w/w	w/d	2	,0	2,5	3,0	2,5	3,5	_2)	3,0	3,5	_2)	3,0	7,5	_2)		-	2)	
25 / 20 N/MM²	d	/d	3	,5	4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12		-	2)	
25 / 20 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)	

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

5,5 | 6,5 | 5,5 | 6,5 | 12 | 5,5 | 6,5 | 12

35 / 28 N/mm²

4,0

d/d

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 an	chor						M6	M8	M10	M12
FIS E		-	_	-	_	-	112	x85	15:	x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	V _{Rk,c,⊥} [kN]	; tempera	ture ranç	ge 50/80°C and	72/120°C					
Mean compressive	Use			Effective a	nchorage dep	th h _{ef} [mm]				

Mean compressive	Use						Effec	tive a	nchc	rage	dept	h h _{ef}	[mm]	
strength / Min. compressive strength single brick 1)	con- ditions	50	100	50	100	50	100	200	50	100	200	50	100	200	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 ²	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 ²	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)

¹⁾ 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

²⁾ No performance assessed.

³⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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 Mean gross dry density ρ [kg/dm³] ≥ 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 Installation narameters **M8** M10 M12 M16 **Anchor rod M6**

Table Co. I.	mstaliation p	arameters	>	

Internal threaded	Lanchor	FIS E		_				_		_		_	M6	M8	M10 M1		
internal tilleaded	anciloi	1 13 E											11>	c 85	15x85		
Anchor rod and i	internal t	hreade	d and	chor F	IS E	witho	ut pe	rforat	ed sle	eeve							
Effective anchorage depth	h _{ef}	[mm]	50	100	50	100	50	100	50	100	50	100		8	5		
Max. instal- lation torque	max T _{inst}	[Nm]	4	1				1	0				4		10		
Anchor rod and i	internal t	hreade	d and	chor F	IS E	with p	erfor	ated	sleev	e FIS	H 16x	85 K					
Effective anchorage depth	h _{ef}	[mm]	_2	2)		8	5			_2	?)		85				
Max. instal- lation torque	max T _{inst}	[Nm]	_	,		10	0			-	,		4	10			

General ins	tallation para	meters				
Edge distan	ce c _{min} = c _{cr}			60		
	s _{min} II	[mm]		120		
Spacing	s _{cr} II	[mm]		240		
	$s_{cr} \perp = s_{min} \perp$			115		

Drilling method

Hammer drilling with hard metal hammer drill

Table C8.2: Group factors

Anchor r	ods		М6	М8	M10	M12	M16		•	-		
Internal t	hreaded anchor F	IS E	_		_		_	M6			M12	
								11)	(85	15	x85	
	α _{g,N} (s _{min} II)					1,5						
Group	$\alpha_{g,V}$ (s _{min} II)	., [1,4						
factor	$\alpha_{\sf g,N}$ (S _{min} \perp)	[-]				2,0						
	$lpha_{g,V}\left(s_{min}\perp ight)$,						

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

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

²⁾ 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	-	-	M8	M10	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 M8 11x85	M10 M12 15x85	-	-	M6 M8 11x85
Perforated sleeve FIS H K	-	-	-	-	-	-	-		16x	85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} =$	N _{Rk} = N _{Rk,p} = N _{Rk,b,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾													
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	50	Effective anchorage depth h _{ef} [mm] 50 100 50 100 50 100 50 100 85											
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 / 16 N/mm ²	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 / 10 N/MM-	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	

¹⁾ 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	-	-	-	-	-	M6 M8 11x85	M10 M12 15x85	-	-	M6 M8 11x85
Perforated sleeve FIS H K	-	-	-	-	-	-	-	16x85		85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} =$	V _{Rk,c,⊥} [k	N]; tem	perature i	range 50/8	0°C and	72/120°C								
Mean compressive strength / Min.	Use			Effe	ctive anc	horage de	pth h	n _{ef} [m	ım]					
compressive strength single brick ¹⁾	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

¹⁾ 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

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



Solid brick Mz, EN 771-	1:2011+A1:2015						
21/18	Producer			e.g. Nigra			
100	Nominal dimensions	[mm]	length L	width W	height H		
	INOTHINAL CHITICHSIONS	[111111]	≥ 245	≥ 118	≥ 54		
4	Mean gross dry density ρ	[kg/dm³]	≥ 1,8				
	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	12,5	/ 10 or 25	/ 20		
2245	Standard or annex		EN 771	-1:2011+ <i>A</i>	1:2015		
			·				

Table C10.1: Installation parameters

Anchor rod	N	16	N	18	М	10	М	12	M	16		•		-
Internal threaded anchor											M6	M8	M10	M12
FIS E		-	'	-	'	•	'				11>	(85	15	x85
Anchor rod and internal thre	aded a	nchor	FIS E	with	out pe	rforat	ed sl	eeve						
Effective anchorage depth hef [mi	n] 50	100	50	100	50	100	50	100	50	100		8	5	
Max. installation max T _{inst} [Nr torque	n]	4				1	0				4		10	
General installation paramet	ers													
Edge distance c _{min} = c _{cr}							6	0						
Spacing s _{cr} II = s _{min} II [mi	n]] 245												
Spacing $\frac{s_{cr} \perp = s_{min} \perp}{s_{cr} \perp = s_{min} \perp}$		60												

Drilling method

Hammer drilling with hard metal hammer drill

Table C10.2: Group factors

Anchor rods		M6	M8	M10	M12	M16		-	-	
Internal threaded ar	chor	_	_	_	_	_	М6	M8	M10	M12
FIS E		_			-	_	112	x85	15x85	
Group factor $\frac{\alpha_{g,N} (s)}{\alpha_{g,V} (s)}$ $\frac{\alpha_{g,N} (s)}{\alpha_{g,V} (s)}$	min ∐) [-]				2					

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

¹⁾ 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 threeded anchor EIS E						M6	M8	M10	M12
Internal threaded anchor FIS E	-	-	-	-	-	11>	(85	15	x85

									.00	IOAGO								
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N _{Rk,}	_{b,c} [k	N]; tempe	rature ranç	ge 50/80°C	2)												
Mean compressive strength/	Us	se		E	Effective an	chorage de	epth hef[mn	n]										
Min. compressive strength single brick 1)	con- ditions ≥ 50				tions ≥ 50							con- ditions ≥ 50				85		
12,5 / 10 N/mm ²	w/w	w/d	0,60	0,90	0,75	0,75	0,75	0,60		0,75								
12,5 / 10 N/MM-	d/	′d	1,20	1,50	1,20	1,20	1,20	1,20		1,20								
25 / 20 N/mm ²	w/w	w/d	0,90	1,50	1,20	1,20	1,20	0,90		1,20								
25 / 20 N/MM-	d/	′d	1,50	2,50	2,00	2,00	2,00	1,50		2,00								

¹⁾ 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 anchor	EIG E		_		_		M6	M8	M10	M12
internal tiffeaded affordior	FIS E	-	-	-	-	-	11x85		15>	x85
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C										
Mean compressive strength / Min.	Use con-		ı	Effective ar	ichorage de	epth h _{ef} [mn	n] 			

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50 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	

¹⁾ 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

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



EN 771-1:2011+A1:2015

Solid brick Mz, EN 771-1:2011+A1:2015 \$100 e.g. Wienerberger Producer length L width W | height H Nominal dimensions [mm] ≥ 230 ≥ 108 ≥ 55 Mean gross dry density ρ [kg/dm³] ≥ 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	-	•		-
Internal threaded	anchor												M6	M8	M10	M12
FIS E			•		·	-	'	•			ľ		11>	(85	15	x85
Anchor rod and	internal t	hread	led ar	nchor	FIS E	with	out pe	rforat	ted sle	eeve						
Effective anchorage depth	h _{ef}	[mm]	50	90	50	90	50	90	50	90	50	90		85		
Max. installation torque	max T _{inst}	[Nm]	4	4				1	0				4		10	
General installat	ion para	meter	S													
Edge distance	C _{min} = C _{cr}								6	0						
Scr	II = s _{min} II	[mm]							23	30						

$s_{cr} \perp = s_{min} \perp$ Drilling method

Spacing

Hammer drilling with hard metal hammer drill

60

Table C12.2: Group factors

Anchor rods			М6	М8	M10	M12	M16		-	-	
Internal threa	Internal threaded anchor			_				М6	М8	M10	M12
FIS E			-	•	-	-	-	112	(85	15	x85
	α _{g,N} (s _{min} II)										
Group factor	α _{g,V} (s _{min} II)	[-]				2					
	$\alpha_{g,N}$ (S _{min} \perp)	.,				_					
	$lpha_{ extsf{g,V}}$ (Smin ot)										

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

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

25 / 20 N/mm²

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 ancho	r EIG	_			_	_		M6	M8	M10	M12	
Internal threaded anche	JI FIO		•	-	-	11x85		15x85				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p}$,c = N R	k,b,c [k	N]; tempe	rature ran	ge 50/80°C	2)						
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons		1	Effective an ≥ 50	nchorage de	epth h _{ef} [mn	n] 	8	5		
12,5 / 10 N/mm ²	w/w	w/d	0,60	0,90	0,75	0,75	0,75		,75			
12,5 / 10 N/MM-	d	/d	1,20	1,50	1,20	1,20	1,20		1,	20		
05 / 00 N/mm²	0,90	1,50	1,20	1,20	1,20	1,20						

¹⁾ 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

Internal threaded ancho	r FIS E	-	- - - -							M12 x85				
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,c}$	⊥ [kN]; tem	perature r	ange 50/80	0°C and 72	/120°C									
Mean compressive	Use		Effective anchorage depth hef [mm]											
strength / Min. compressive strength single brick 1)	con- ditions		≥ 50 85											
12,5 / 10 N/mm ²	w/w w/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4.0	4,5				
12,67 10 10.1111	d/d	2,0	0,0	1,0	1,0	0,0		0,0	1,0	.,0				
25 / 20 N/mm²	w/w w/d	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5	6,0				

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

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

Annex C13

²⁾ For temperature range 72/120°C: N_{Rk (72/120°C)} = 0,83 · N_{Rk (50/80°C)}.



Solid calcium silicate b	orick KS, NF, EN 771-2:2011+A1:2	2015			
2775	Producer			-	
	Nominal dimensions	[mm]	length L	width W	height H
	Norminal difficulties	נווווון	≥ 240	≥ 115	≥ 71
277	Mean gross dry density ρ	[kg/dm³]		≥ 1,8	
X	Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	15 / 12 c	r 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	M10	M	12	M	16		•		-
Internal threa	ded anchor											M6	M8	M10	M12
FIS E								- -				11x85		15	x85
Anchor rod a	nd internal t	thread	ed ar	nchor	FIS E with		out perfora	ted sleeve						-	
Effective										50	100	8	E		5
anchorage de	inchorage depth hef [mi			100	50 100		200	20	00	2	00	0	5		<u> </u>
Max. installation	on max T _{inst}	[Nm]	;	3	;	5	15	1	5	25	3	5	1	5	
General insta	llation para	meter	S												
Edge distance	$c_{min} = c_{cr}$							6	0						
_	s _{min} II							8	0						
Spacing -	s _{cr} II	[mm]						8	0						
Spacing -	$s_{min} \perp$							3x	h_{ef}						
	scr⊥							3x	h _{ef}						

Drilling method

Hammer drilling with hard metal hammer drill

Table C14.2: Group factors

Anchor rod			М6	M8		•	-				
Internal threaded anchor FIS E			-	-	-	-	-	M6	M8 (85		M12 x85
	α _{g,N} (s _{min} II)					0,7	l				
One we for the m	α _{g,V} (s _{min} II)					1,3					
Group factor	α _{g,N} (s _{min} ⊥)	[-]				2,0					
	$lpha_{ extsf{g,V}}$ ($ extsf{s}_{ extsf{min}}$ $oxdot$)					2,0					

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

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

35 / 28 N/mm²



8,0

5,5

12

12

12

6,0

4,5

7.0

6,0

4,5

7.0

12 6,5

12 7,5 9,5

11 4,5

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	Anchor rod M6 M8 M10 M12 M16										•								
Internal threaded a	ncho	r	_		_		-		_				-		M6		M10		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = 1$	N Rk,p,c	: = NF	Rk,b,c	[k N] ;	tem	perat	ure r	ange	÷ 50/8	80°C	; 2)					11)	(85	15)	(85
Mean compressive	Г	se										e dep	th h	ef [mn	ր]				
strength / Min. compressive strength single brick 1)	con- ditions		50	100	50	100	50	100	200	50	100	200	50	100	200	8	5	8	5
15 / 12 N/mm²	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/MM	d	/d	4,0	5,5	4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,5	5,5	12	4	0	4,	,0
25 / 20 N/mm ²	w/w	3,0	4,5	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	4,0	5,0	11	3,	5	3,	,5	
20 / 20 N/IIIII	ا ا	/ al	E E	7.5	60	44	60	0 0	10	60	C E	40	C E	0 0	40	0	^		^

8,0

5,5

9,0

12

12

12

6,0 6,5

7,0 7,5

5,0

4,5

6,0

4,5

12 7,0

11

8,0

5,5

3,5

6.5

7,5

5,0

9,0

6,0

4,0

7,0

d/d

w/w w/d

d/d

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

Anchor rod	Anchor rod M6 M8 M10 M12 M16 - -										-				
Internal threaded a											M10 15x				
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} =$	V _{Rk,c,⊥} [k	N]; te	mpei	ratur	e ran	ge 50/8	30°C an	d 72/1	20°C						
Mean compressive strength / Min. compressive strength	Use con-	50	100	50	100	Eff 50	ective a	nchora	age dep	th h _{ef} [n	nm] ≥100	85	5	85	5
single brick 1)	ditions								_,		_,,,,				
15 / 12 N/mm²	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	2	1,2	2
25 / 20 N/mm²	w/w w/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
35 / 28 N/mm²	/ 28 N/mm ² w/w w/d d/d				4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,	5	1,	5

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

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

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

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



42	Pro	oduce	r										-		
देश्य		minal	dimer	nsions	<u> </u>				[mr	nl	length		idth W	/ heig	nt H
											≥ 250		≥ 240	≥ 2	40
	0		oss dr mpres		sity ρ strengt	h / Mi	n		[kg/d	寸			≥ 2,0		
			•		th sing				[N/m	m²]	12,5 / 1	10 or	25 / 20	or 35	/ 28
	Sta	andard	d or ar	nex			400							A1:20	5
Table C16.1: Insta	llation	nara	mete	re	10		9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				Dimens Annex I		ee aiso	0	
Anchor rod	liation	. 	16		18	M	10	М	12		VI16		_	_	
Internal threaded anche	or		-		-		-				-	M6	M8	M10	
Anchor rod and interna	l thread	led a	nchor	EIS E witho		out ne	rforat	tod classes				11	x85	15x	85
Effective anchorage depth	[mm]	Π	100	50	100	50	100	50	100	50	100		8	5	
Max. installation max T _{ir}	ıst [Nm]		4				1	0				4		10	
Anchor rod and interna	l thread	ded ar	nchor	FIS E	with	perfo	rated	sleev	e FIS	H 16	8x85 K			ı	
Effective anchorage depth hef	[mm]	1	2)		8	5			_2	2)		8	35	2)
torque	st [Nm]		10									4	10		
General installation pa		'S							_						
Edge distance c _{min} = 0									0						
Smin									0 h _{ef}						
Spacing S _{min}	⊣ ⁻ ⁻								0						
Scr								3x	h _{ef}						
Drilling method															
Hammer drilling with har															
1) The minimum compress 2) No performance assess		ngth of	the si	ngle b	orick m	ust no	t be le:	ss tha	n 80%	of th	ne mean	com	oressiv	e stren	gth.
Table C16.2: Grou	p facto	ors													
Anchor rods		N	16	N	18	M	10	M	12		V 116		<u>-</u>	<u>-</u>	
Internal threaded anche	or		-		-		-		-		-	M6 11	│ M8 x85	M10 15x	
(Xa N (Smin	ID							1	,5					1 0 %	- -
Group $\alpha_{g,V}$ (s _{min}	11)								,2						
	─ ┤ !~!														
factors $\alpha_{g,N}$ (s _{min}	─ I-I								,5 ,2						

fischer injection system FIS V Plus for masonry	
Performance 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	-		<u> </u>		-				M8	M10	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 M8 1 11x85			M12 x85	-	-	M6 M8 11x85				
Perforated sleeve FIS H K	-	-	-	-	-	-		-			16x8	5				

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p}$	$_{p,c} = N_{Rk,b,c}$	c [kN];	tempe	rature i	range 8	50/80°C	2)						
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50 85										
42 E / 40 N/mm²	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 N/mm ²	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/IIIII-	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/mm²	d/d	8,5	12,0	12,0	12,0	11,0	8,5	11,0	12,0	8,5 12			

¹⁾ 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

M6	М8	M10	M12	M16	-		-				M8	M10	-
-	-	-	-	-	M6			1	-	-	M6 M8 11x85		
-	_	-	-	_	11x85 -		-			16x8			
_						11x	11x85	11x85 15x	11x85 15x85	11x85 15x85	11x85 15x85		

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{RI}$	_{k,c,⊥} [kN]; 1	temper	ature range 50/80°C and 72	2/120°C							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50 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			

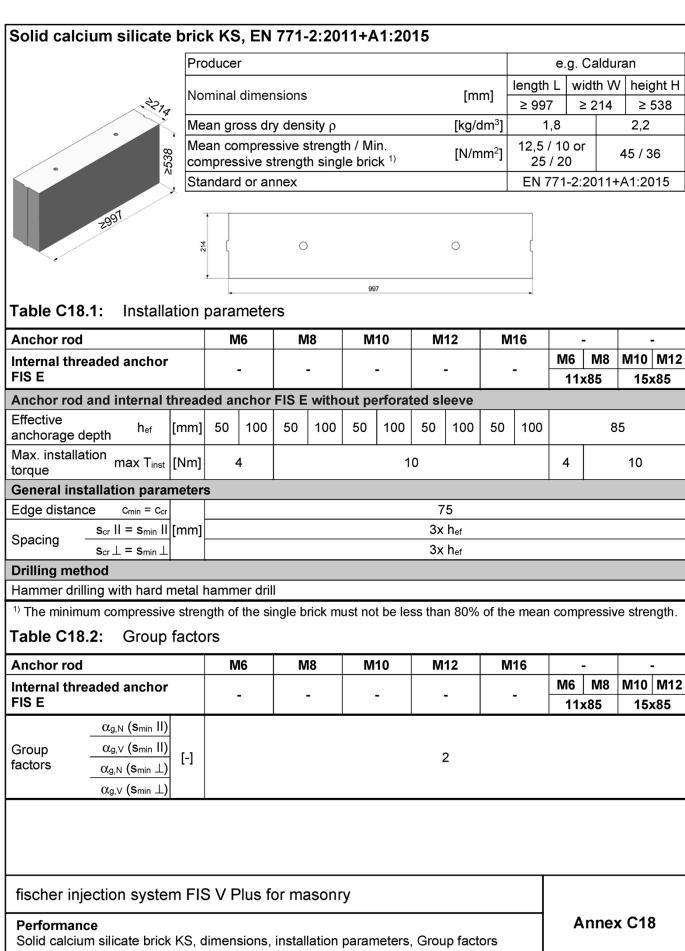
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).





45 / 36 N/mm²

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			l v	/16	M	18	M1	0	Μ´	12	M	16	-		-			
Internal threaded and	hor		-			-			•	•		•	M6 11>	M8 85		M12 x85		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_F$	Rk,p,c =	N _{Rk,l}	,c [kN	[kN]; temperature range 50/80°C ²⁾														
Mean compressive	Us	se				. E	Effectiv	e anc	horag	e dept	h hef[r	mm]						
strength / Min. compressive strength single brick 1) conditions				con-		100	50	100	50	100	50	100	50	100		8	85	
12,5 / 10 N/mm²	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			
12,57 10 14/111111	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/mm ²	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/IIIII	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			

¹⁾ 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

0,8

M6

d/d

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

M10

M8

Internal threaded and	hor						М6	M8	M10	M12
FIS E		•	•	•	•	•	112	k 85	15)	x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{I}$										
Mean compressive strength / Min. compressive strength	Use con-			Effective an ≥ 50	chorage dep	oth h _{ef} [mm]		0		
single brick 1)	ditions				85					
12,5 / 10 N/mm²	w/w w/d	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0
, -	d/d	,	,	,	,	,	,	,		Ĺ
25 / 20 N/mm²	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

¹⁾ 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

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



								νı				
Solid calcium silicate brid	k KS,	EN 77	1-2:20	11+A1:2	015							
115 Pro	oducer								-			
95	minal di	mensio	ne			[m	ml	length	L width	n W	heig	jht ⊦
								≥ 240			≥ ′	113
Me Me	ean gros			4la / N.4i.a		[kg/d	dm ³]		1,8			
(0)	ean com	•	_	tn / IVIIN. Jle brick ¹⁾		[N/m	nm²]	12,5 / 10 or 25 / 20				
2.	andard c			,				EN 7	71-2:20	11+	A1:20)15
							•					
Table C20.1: Installation (Pre-position	•		on with	n perfora	ted sl	eeve	FIS I	H K)				
Anchor rod	M6 I	VI8	-	M8 M1	0 M8	M10		-	M12 M	16	M12	M16
Internal threaded		M	6 M8				M10	M12				
anchor FIS E	•		11x85	-			15	x85				•
Perforated sleeve FIS H K	12x8			x85		x130		20>	(85	_	20x	130
Anchor rod and internal thread	ded anc	hor FIS	E with	perforate	d slee	ve FIS	HK					
Max. installation max T _{inst} [Nm] torque	2					4	ŀ					
General installation parameter	s											
Edge distance $c_{min} = c_{cr}$					1	00						
Spacing $\frac{\frac{s_{min} \text{ II}}{s_{cr} \text{ II}}}{\frac{s_{min} \perp}{s_{min} \perp}}$	255		25	3	390		25	55		39	90	
S _{Cr}												
s _{cr} ⊥												
S _{cr} ⊥ Drilling method Hammer drilling with hard metal	hammer	· drill										
Drilling method Hammer drilling with hard metal The minimum compressive strer Table C20.2: Group factor	ngth of th		e brick m		ess tha							ngth.
Drilling method Hammer drilling with hard metal 1) The minimum compressive stren Table C20.2: Group factor Anchor rod	ngth of th	ne single	M8	M10	M8	M10		/ 112	M16	M1:	2 [W16
Drilling method Hammer drilling with hard metal 1) The minimum compressive stren Table C20.2: Group factor Anchor rod Perforated sleeve FIS H K	ngth of th	ne single	M8		M8				M16	M1:		W16
Drilling method Hammer drilling with hard metal 1) The minimum compressive stren Table C20.2: Group factor Anchor rod	ngth of th	ne single	M8	M10	M8	M10		/ 112	M16	M1:	2 [W16



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	30/200	22x130/200
Anchor rod with	n perforat	ed slee	ve FIS H K		
Max. installation torque	max T _{inst}	[Nm]		4	
General installa	tion para	meters			
Edge distance	C _{min} = C _{cr}			10	0
	s _{min} II			39	0
Chaoina	s _{cr} II	[mm]		39	0
Spacing	s _{min} ⊥			39	0
	s _{cr} ⊥			39	0
Drilling method					
Hammer drilling	with hard r	netal h	ammer drill		

Table C21.2: Group factors

Anchor roo	i	M10	M12	M16		
Perforated	sleeve FIS H K	18x1:	18x130/200 22x130/200			
Group factors	$\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ II})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ II})}$ $\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ I})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ I})}$	I	:	2		

fischer injection system FIS V Plus for masonry

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

Annex C21

Anabar rad



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

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

Anchor rod	M6	M8		-	M8	M10	M8	M10	-	M12	M16	M12	M16		
Internal threaded anchor FIS E	-	•	M6	M8 1x85		-		-	M12 x85			_	•		
Perforated sleeve FIS H K	12>	12x85		16x85			16x130		16x130		20:	x85		20x	130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_R$	_{k,p,c} = N _{Rk,}	, _{b,c} [kN]; ten	perature r	ange 50/80	°C ²⁾		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
12,5 / 10 N/mm²	w/w	3,5	2,0	2,0	2,0	6,5	4,5
12,57 10 14/111111	d/d	6,0	4,0	3,5	3,5	10,5	7,0
25 / 20 N/mm²	w/w	5,0	3,0	3,0	3,0	9,5	6,0
25 / 20 N/IIIII	d/d	8,5	5,5	5,5	5,5	12,0	10,0

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

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

Anchor roa		M10	IVI12	W16		
Perforated sleeve FIS	HK	18x13	0/200	22x130/200		
N _{Rk} = N _{Rk,p} = N _{Rk,p,c} = N _{Rk,p,c} [kN]; 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	2,		4.5 7,0		
25 / 20 N/mm²	w/w d/d	3, 5,		6,0 10,0		

¹⁾ 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

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

²⁾ 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	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8 1x85		-		-		M12 x85		•	-	
Perforated sleeve FIS H K	12>	85	· ·		∟ x85		16x	130	10		x85		20x	130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{F}$	Rk,c,⊥ [kN]	temper	ature range 50/80°C ²⁾		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions				
12,5 / 10 N/mm ²	w/w d/d	3,0		3,5	
	w/w				
25 / 20 N/mm²	d/d	4,0		5,5	

¹⁾ 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	HK	18x130/200		22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_I$	Rk,c,⊥ [kN] ;	temperature range	e 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	,5
25 / 20 N/mm²	w/w d/d		5	,5

¹⁾ 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.

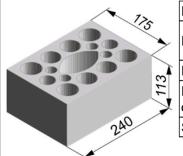
fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, Characteristic resistance under shear loading	Annex C23

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

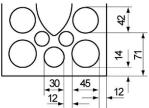
²⁾ For temperature range 72/120°C no performance assessed.



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 ³]		≥ 1,4	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]		12,5 / 10 d) / 16 or 25	
Standard or annex		EN 771	-2:2011+ <i>A</i>	1:2015



Dimension see also Annex B15

 Table C24.1:
 Installation parameters

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

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 <85		-		-	M10 15x			-		-
Perforated sleeve FIS H K	12	x50	12	(85		162	(85		16x	130		20	x85		20x	130

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

Max. installation	max T _{inst}	[NIm]	,	2
torque	IIIax I inst	נוואוון	•	_

General installation parameters

Edge distance	$c_{min} = c_{cr}$		60	80						
	s _{min} II							100		
Chasina	s _{cr} II [n	[mm]	240							
Spacing	Smin⊥			115						
	s _{cr} ⊥		115							

Drilling method

Hammer drilling with hard metal hammer drill

Table C24.2: Group factors

Anchor ro	Anchor rod			M8	М6	M6 M8 -		M8	M10	M8	M10		-		M16	M12	M16	
Internal threaded anchor		_ _		M6	M8		-		-		M12	I	-		-			
FIS E						112	k 85						k 85					
Perforated sleeve FIS H K			12:	<50	12>	(85		162	(85		16x130		20x85			20x	130	
$\alpha_{g,N} (s_{min} II) =$ Group $\alpha_{g,V} (s_{min} II)$										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 C24

¹⁾ 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	ve FIS H k	(18x13	30/200	22x130/200
Anchor rod with	n perforat	ed sle	eve FIS H K		
Max. installation torque	max T _{inst}	[Nm]			2
General installa	tion para	meters	3		
Edge distance	C _{min} = C _{cr}				80
	s _{min} II				100
Co io -	s _{cr} II	[mm]		;	240
Spacing	s _{min} ⊥				115
	s _{cr} ⊥				115
Drilling method					

Table C25.2: Group factors

Hammer drilling with hard metal hammer drill

Anchor ro	d	M10	M12	M16				
Perforated	l sleeve FIS H K	18x130/200 22x130/200						
Group	$\frac{\alpha_{g,N} (s_{min} I)}{\alpha_{g,V} (s_{min} I)}$		1	,5				
Group 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 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 M1	0 M8 M10	-	M12 M16	M12 M16
Internal threaded anchor FIS E	-	-	M6 M8	-	-	M10 M12 15x85	_	-
Perforated sleeve FIS H K	12x50	12x85	16	x85	16x130	202	k 85	20x130

$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c}$	$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²												
Mean compressive strength/ Min. comp. strength single brick 1)	Use con- ditions												
10 / 8 N/mm²	w/w	w/d	1,5	2,0	2,0	2,0	2,0						
107011////	d/d		1,5	2,0	2,5	2,5	2,5						
12,5 / 10 N/mm²	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						
13 / 12 14/111111	d/	d	2,5	3,0	3,5	3,5	3,5						
20 / 16 N/mm ²	w/w	w/d	3,0	3.5	4.5	4.5	4.5						
20 / 10 N/IIIII	d/	d	3,5	4,0	4,5	4,5	4,5						
25 / 20 N/mm ²	w/w	w/d	4,0	4,5	5,5	5,5	5,5						
25 / 20 N/IIIII	d/	d	4,5	5,0	6,0	6,0	6,0						

¹⁾ 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 I	(18x	130/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N _{Rk}	, _{b,c} [k	N]; temperatur	e 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/	w/d d			2.0 2,5
12,5 / 10 N/mm ²	w/w				2,5
12,01101111111	d/	d			3,0
15 / 12 N/mm²	w/w	w/d			3,0
107 12 14711111	d/	ď			3,5
20 / 16 N/mm²	w/w	w/d			4,5
20 / 10 N/IIIII	d/	ď			4,5
25 / 20 N/mm²	w/w	w/d		_	5,5
25 / 20 N/IIIII	d/	ď			6,0

¹⁾ 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

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

²⁾ For temperature range 72/120°C: N_{Rk (72/120°C)} = 0,83 · N_{Rk (50/80°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	М6	M8	М6	M8		-	M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 (85		-		-	M10 I		l	-		-
Perforated sleeve FIS H K	12	x50	12)	c 85		162	(85		16x	130		20>	k 85		20x	130

remorated sieever is		12/	130	12/	X05		10.00	102130	20,00		201	130			
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	Rk,c,⊥	[kN];	tem	perat	ture r	ange	50/8	0°C and 72/12	0°C						
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	- 1													
10 / 8 N/mm²	w/w d/				1,5				3,0		2,5	3,0	2,5		
12,5 / 10 N/mm²	w/w d/	-			2,0			3,5							
15 / 12 N/mm²	w/w d/	-			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/		4,0	4,5	4,0	4,5	4,0		7,5		6,5	7,5	6,5		

¹⁾ 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)

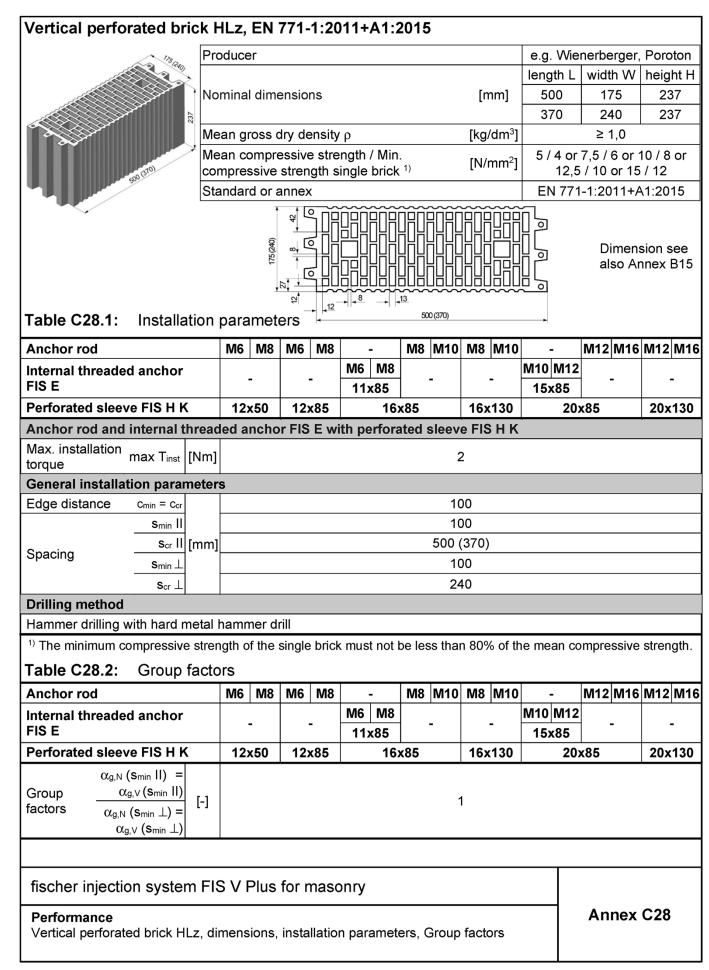
Anchor rod		M10	M12	M16								
Perforated sleeve FIS	нК	18x13	30/200	22x130/200								
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions											
10 / 8 N/mm ²		3	.0	2,5								
12,5 / 10 N/mm ²	w/w	3	,5	3,5								
15 / 12 N/mm ²	w/d	4.	.5	4,0								
20 / 16 N/mm ²	d/d	6	,0	5,5								
25 / 20 N/mm ²		7.	,5	6,5								

¹⁾ 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





15 / 12 N/mm²

Anchor rod



3,00

3,00

M8 M10 M8 M10 -

3,50

4,00

M12 M16 M12 M16

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 N			M8	_		M8	M10	M8	M10		-	M12	M16	M12	M16																																									
Internal threaded anchor FIS E							M6 11x	_		-		-		M12 x85	-		,	-																																									
Perforated sleeve FIS H	K		12)	<50	12	x85		16	x85		16>	c130		20	x85		20x	130																																									
N _{Rk} = N _{Rk,p} = N _{Rk,p,c} = N _{Rk,p,c} [kN]; temperature range 50/80°C ²⁾																																																											
Mean compressive strength / Min. comp. strength single brick 1)		se on- ons																																																									
5 / 4 N/mm ²	w/w	w/d		0,3	30		0,90										1,20																																										
5 / 4 N/IIIII	d.	/d		0,4	40			0,90									1,2																																										
7,5 / 6 N/mm ²	w/w	w/d		0.50 1.50				1,50									2.	00																																									
7,576 14/111111	d.	/d		0,0	60		1,50							2,	00																																												
10 / 8 N/mm²	w/w	w/d		0,75			0,7		0,7		0,7		0,7		0,7		0,7		0,7		0,7		0,7		0,7		0,75				0,75		0,75		0,75),75		75),75		75),75		5					2	2,00					2,	50
IU / O IN/IIIIII	d	/d		0,	75		2,00					2,	50																																														
12,5 / 10 N/mm²	w/w	w/d		0,9	90						2	2,50					3,	00																																									
12,5 / 10 N/MM-	d	/d		0.9	90							2 50			·		3	50																																									

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

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

1,20

M6 | M8 | M6 | M8 |

Internal threaded anchor FIS E		-	-	M6 M8 11x85	-	-	M10 M12 15x85	_	-
Perforated sleeve FIS H	K	12x50	12x85	16	x85	16x130	202	20x130	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c}$	_{:,⊥} [kN]; teı	mperatur	e range !	50/80°C	and 72/12	0°C			
Mean compressive strength / Min. comp. strength single brick 1)	Use con- ditions								
5 / 4 N/mm²			0,	50		0,60	0,	50	0,60
7,5 / 6 N/mm²] _{w/w}		0,	75		0,90	0,	75	0,90
10 / 8 N/mm²	w/d		0,	90		1,20	0,	90	1,20
12,5 / 10 N/mm ²	d/d		1,	20		1,50	1,3	20	1,50
15 / 12 N/mm²			1,	50		2,00	1,	50	2,00

¹⁾ 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

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



775 F	Producer	r							e.g.	Wiene	rberge	er		
		-l'					r	1 I	ength L	width	W he	eight H		
	Nominal	aimens	ions				[mr	nj 🖰	240	115	5	113		
	lean gro	oss dry	density	ρ			[kg/d	m³]		≥ 1,	4			
	Mean co						[N/m	m ²] ⁷	7,5 / 6 or 12,5 / 10 or 20 / or 25 / 20 or 35 / 28					
240	Standard	l or ann	ex						EN 77	N 771-1:2011+A1:201				
Table C30.1: Installatio	tion parameters										nensio o Anne	n see ex B15		
Anchor rod	M6	M8	M6	M8	_		M8	M10		_	M12	M16		
Internal threaded	 	M6 M8							M10	M12		1		
anchor FIS E		- 11x85							15	x85		-		
Perforated sleeve FIS H K	12	12x50 12x85 1								20:	x85			
Anchor rod and internal thre	aded an	chor F	IS E w	ith per	forated	sleev	e FIS	ΗK						
Max. installation max T _{inst} [Nr torque	n]						2							
General installation paramet	ers													
Edge distance $c_{min} = c_{cr}$														
							0							
Spacing S _{cr} II = s _{min} II	m]					24	40							
Spacing $\frac{s_{cr} I = s_{min} I }{s_{cr} \perp = s_{min} \perp} [mr]$	m]					24								
	al hamm					2 ⁴	10 15							
Spacing $\frac{\mathbf{s}_{cr} \ \mathbf{II} = \mathbf{s}_{min} \ \mathbf{II}}{\mathbf{s}_{cr} \ \bot = \mathbf{s}_{min} \ \bot} \ [mr]$ $\mathbf{Drilling \ method}$ Hammer drilling with hard meta 1) The minimum compressive str $\mathbf{Table \ C30.2:} \mathbf{Group \ fac}$	al hamm rength of	the sing			not be le	2 ⁴ 1 ²	15 n 80%			ompress				
Spacing $\frac{\mathbf{s}_{cr} \ \mathbf{II} = \mathbf{s}_{min} \ \mathbf{II}}{\mathbf{s}_{cr} \ \bot = \mathbf{s}_{min} \ \bot} \ [mr]$ $\frac{\mathbf{Drilling \ method}}{\mathbf{Hammer \ drilling \ with \ hard \ meta}}$ $^{1)} \ The \ minimum \ compressive \ str}$ $\mathbf{Table \ C30.2:} \qquad Group \ factors$ $\mathbf{Anchor \ rod}$	al hamm		yle brick	c must r	T	2 ⁴ 1 ²	10 15	of the		-	sive str			
Spacing $\frac{\mathbf{s}_{cr} \ \mathbf{I} = \mathbf{s}_{min} \ \mathbf{I} }{\mathbf{s}_{cr} \ \perp = \mathbf{s}_{min} \ \perp} [mr]$ $\frac{\mathbf{Drilling \ method}}{\mathbf{Hammer \ drilling \ with \ hard \ meta}}$ $\overset{1)}{\mathbf{The \ minimum \ compressive \ str}}$ $\mathbf{Table \ C30.2:} \qquad \mathbf{Group \ fac}$	al hamm rength of	the sing			-	1 dess that	15 n 80%		M10	-				
$\frac{\mathbf{s}_{cr} \ \mathbf{II} = \mathbf{s}_{min} \ \mathbf{II}}{\mathbf{s}_{cr} \ \mathbf{I} = \mathbf{s}_{min} \ \mathbf{II}} \ [mr]$ $\frac{\mathbf{Drilling \ method}}{\mathbf{Drilling \ method}}$ Hammer drilling with hard meta 1) The minimum compressive str $\mathbf{Table \ C30.2:} \mathbf{Group \ factorization}$ Anchor rod $\mathbf{Internal \ threaded}$	al hamm rength of ctors	the sing	M6		- M6	24 11 ess that	15 n 80%		M10	- M12 x85				
$ \frac{s_{cr} \mid I = s_{min} \mid I \mid}{s_{cr} \perp = s_{min} \perp} $	al hamm rength of ctors M6	the sing	M6	M8 -	- M6	24 11 ess that	15 n 80% M8		M10	- M12 x85	M12			
$Spacing \qquad \frac{s_{cr} \mid I = s_{min} \mid I \mid}{s_{cr} \perp = s_{min} \perp} \\ \hline \textbf{Drilling method} \\ \hline Hammer drilling with hard meta} \\ ^{1)} The minimum compressive str} \\ \hline \textbf{Table C30.2:} \qquad Group factors \\ \hline \textbf{Anchor rod} \\ \hline \textbf{Internal threaded anchor FIS E} \\ \hline \textbf{Perforated sleeve FIS H K}} \\ \hline \\ Group \\ factors \qquad \frac{\alpha_{g,N} \left(s_{min} \mid I \right)}{\alpha_{g,N} \left(s_{min} \mid I \right)} \\ \hline \\ \alpha_{g,N} \left(s_{min} \mid I \right)} \\ \hline \\ \hline \end{bmatrix} [-1] \\ \hline $	al hamm rength of stors M6	M8 - 2x50	M6	M8 - x85	- M6	24 11 ess than M8 (85 16)	15 n 80% M8		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	М6	M8	M6	M8		-		M10	-		M12	M16
Internal threaded					М6	M8			M10	M12		
anchor FIS E	-				11x85		'	-	15x85			•
Perforated sleeve FIS H K	12x	50	12	k 85		16	x85			20>	(85	

$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}_{Rk,p,c}$	N _{Rk,b,c}	[kN]; t	emperatur	e range 50)/80°C ²⁾	
Mean compressive strength / Min. compressive strength single brick 1)	U: co ditio					
7,5 / 6 N/mm ²	w/w	w/d	0,75	0,90	0,75	0,90
7,370 14/11111	d/	/d	0,75	1,20	0,75	0,90
12,5 / 10 N/mm ²	w/w	w/d	1,20	1,50	1,20	1,50
12,57 10 14/11/11	d/	/d	1,20	2,00	1,20	1,50
20 / 16 N/mm²	w/w	w/d	2,00	2,50	2,00	2,00
207 10 14/111111	d/	/d	2,00	3,00	2,00	2,50
25 / 20 N/mm ²	w/w	w/d	2,50	3,50	2,50	3,00
25 / 20 N/IIIIIF	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 / 26 N/MMF	d/	/d	3,50	5,50	3,50	4,50

¹⁾ 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		М6	M8	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 x85	,	-	M10	M12 <85		-
Perforated sleeve FIS H K	12x50		12	x85	1		6x85			202	k 85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [F	/ _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions												
7,5 / 6 N/mm ²		1,2	1,5	1,2	2,0	1,2	1,5	2,5					
12,5 / 10 N/mm ²	w/w	2,0	2,5	2,0	4,0	2,0	2,5	4,5					
20 / 16 N/mm ²	w/d	3,0	3,5	3,0	6,0	3,0	3,5	7,0					
25 / 20 N/mm ²	d/d	4,0	4,5	4,0	7,5	4,0	4,5	8,5					
35 / 28 N/mm ²		5,0	6,5	5,0	9,5	5,0	6,5	12,0					

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

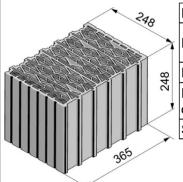
Factor for job site tests and displacements see annex C123.

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

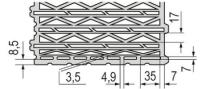
²⁾ For temperature range 72/120°C: $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$.



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



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



Dimension see also Annex B15

Table C32.1: Installation parameters

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

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10	-	N	V112	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	,	•		•	M6	M8 <85	,	-	,	•	M10 M1 15x85	\dashv		•		-		-
Perforated sleeve FIS H K	12	x50	12	k 85	16x		(85		16x	130	2	0x8	85		202	k130	20x	200
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																		

Anchor fou and internal threaded anchor Flo E with periorated sleeve Flo H F

Max. installation max T _{inst} [Nm] 3 5 3 5 3 5	5
--	---

General installation parameters

Edge distan	ce c _{min} = c _{cr}		60
	s _{min} II		80
	s _{cr} II	[mm]	250
Spacing	S _{min} ⊥		80
·	s _{cr} ⊥		250
D ::::	411		

Drilling method

Rotary drilling with carbide drill

Table C32.2: Group factors

Anchor rod	i	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12 M	16	M12 N	16	M12	M16
Internal thr anchor FIS			-		-	M6 M8		•	,	-	M10 M12 15x85	_		-		•	•
Perforated sleeve FIS H K			x50	12	x85	162	16x85		16x	130	20:	x85		20x1	30	20x	200
	$\alpha_{g,N}$ (S _{min} II)		1,3														
Group	Group $\alpha_{g,V}(s_{min} I)$, 🗀	1,2														
factors	$\alpha_{g,N}$ (Smin \perp)	' <u> </u>	1,3														
	α _{g,∨} (s _{min} ⊥)		1,0														

fischer injection system FIS V Plus for masonry

Performance

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

Annex C32

¹⁾ 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 s	leeve FIS H k	(18x13	0/200	22x130/200						
Anchor rod with perforated sleeve FIS H K											
Max. installat torque	ion max T _{inst}	[Nm]	5								
General installation parameters											
Edge distanc	e c _{min} = c _{cr}		60								
	s _{min} II		80								
0	s _{cr} II	[mm]	250								
Spacing -	S _{min} ⊥				80						
_	s cr ⊥		250								
Drilling method											
Rotary drilling with carbide drill											

Table C33.2: Group factors

Anchor roo	d	M10	M16					
Perforated	sleeve FIS H K	18x13	30/200	22x130/200				
	α _{g,N} (s _{min} II)		1	,3				
Group	α _{g,V} (s _{min} II)	1,2						
Group factors	$\alpha_{g,N}$ (S _{min} \perp) [-]	1,3						
	$\alpha_{g,V}$ ($s_{min} \perp$)		1	.0				

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, U8, dimensions, installation parameters, Group factors	Annex C33



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	М8	М6	М8	-		M8 M10	M8	M10	-		M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E	-		-		M6 11x	M8 8 5	1	•	•	M10 M		•	•	-	•	-
Perforated sleeve FIS H K	12x	50	12x	85	,	16x	85	16x	130		20x	85		20x	130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	Rk,b,c [kN] ;	tempe	rature 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	1,2	1,2
3 / 4 N/IIIII	d/d	1,2	1,5
7,5 / 6 N/mm ²	w/w w/d	1,5	1,5
7,576 N/IIIII	d/d	1,5	1,5
10 / 8 N/mm²	w/w w/d	1,5	2,0
10 / 6 N/IIIII	d/d	2,0	2,0

¹⁾ 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				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,b,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²									
Mean compressive strength / Min. compressive strength single brick 1)	C	se on- ons							
5 / 4 N/mm²		w/d		1	,2				
<u> </u>	d	/d		1	,5				
7,5 / 6 N/mm ²	w/w	w/d		1	,5				
7,5 / 6 N/IIIII-		/d		1	,5				
10 / 8 N/mm²	w/w	w/d		2	,0				
10 / 6 N/IIIII-	d	/d		2	,0				

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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	М6	M8	М6	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	12>	(50	12>	(85	16	x85		16x	130	202	k 85	20x130	20x200

V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	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							

¹⁾ 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	30/200	22x130/200				
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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		1	,2				
7,5 / 6 N/mm²	w/w w/d d/d		1	,5				
10 / 8 N/mm²	w/w w/d		1	,5				

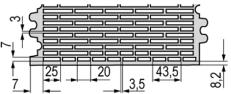
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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 ρ [kg/dm³] 0,7 Mean compressive strength / Min. 10 / 8 or 12,5 / 10 or $[N/mm^2]$ compressive strength single brick 1) 15 / 12 Standard or annex EN 771-1:2011+A1:2015



Dimension see also Annex B16

Table C36.1: Installation parameters

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

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	•	•		-	M6 112	M8 (85		•		-	M10 15x			-	_	•	-	•
Perforated sleeve FIS H K		(50	12:	k 85		16)	(85		16x	130		20>	(85		20x	130	20x	200

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

Max. installation torque	max T _{inst} [[Nm]	3	5	3		5
--------------------------	-------------------------	------	---	---	---	--	---

General installation parameters

Edge distan	ice C _{min} = C _{cr}		60		
	s _{min} II		80		
Cassina	s _{cr} II	[mm]	[mm]	[mm]	250
Spacing	S _{min} ⊥		80		
	S _{cr} ⊥		250		

Drilling method

Rotary drilling with carbide drill

Table C36.2: Group factors

Anchor rod			M6	M8	M6	M8		-	M8	M10	M8	M10	-	N	/112 M	16	M12 M16	M12	M16
Internal threanchor FIS				•		-	M6	M8 <85		•	,	-	M10 M1 15x85	-	-			-	-
Perforated s	sleeve FIS H K		12)	(50	12	x85		162	x85		16x	130	2	3x0	35		20x130	20x	200
	α _{g,N} (s _{min} II)										1	,7							
Group	$lpha_{ extsf{g,V}}$ (s _{min} II)	,,									0	,5							
factors	$lpha_{ extsf{g}, extsf{N}}$ (s $_{ extsf{min}}$ $oxdot$)	[-]									1	,3							
	$lpha_{ extsf{g,V}}$ (s _{min} $oldsymbol{\perp}$)			0,5															

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T10, T11, dimensions, installation parameters, Group factors	Annex C36

¹⁾ 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 sleeve FIS H K			18x13	22x130/200								
Anchor rod with	perforate	ed sle	eve FIS H K									
Max. installation torque	max T _{inst}	[Nm]			5							
General installat	ion parar	neter	S									
Edge distance	C _{min} = C _{cr}			6	0							
	s _{min} II			8	0							
Cassina	s _{cr} II	[mm]		25	50							
Spacing ——	s _{min} ⊥			8	0							
	s cr ⊥		250									
Drilling method												

Table C37.2: Group factors

Rotary drilling with carbide drill

Anchor rod		M10	M12	M16
Perforated	sleeve FIS H K	18x13	30/200	22x130/200
	α _{g,N} (s _{min} II)		1,	.7
Group factors	α _{g,V} (s _{min} II)		0,	,5
factors	$\frac{\alpha_{g,N}(s_{min}\perp)}{\alpha_{g,N}(s_{min}\perp)}$ [-]		1,	,3
	α _{g,V} (s _{min} ⊥)		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	М6	M8	-		М8	M10	M8	M10	-		M12	M16	M12	V116	M12	M16
Internal threaded anchor FIS E		•		•	M6 11x			-		-	M10 I		_		-			-
Perforated sleeve FIS H K	12:	<50	12>	(85		16>	(85		16x	130		20>	(85		20x1	30	20x	200

$\mathbf{N}_{\mathrm{Rk}} = \mathbf{N}_{\mathrm{Rk,p}} = \mathbf{N}_{\mathrm{Rk,b}} = \mathbf{N}_{\mathrm{Rk,p,c}} =$	N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
10 / 8 N/mm ²	w/w w/d	1,5	1,5							
10 / 6 N/IIIII	d/d	1,5	2,0							
12,5 / 10 N/mm ²	w/w w/d	1,5	2,0							
12,57 10 14/111111	d/d	2,0	2,0							
15 / 12 N/mm ²	w/w w/d	2,0	2,0							
19 / 12 N/IIIII	d/d	2,0	2,5							

¹⁾ 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			182	<130/200	22x130/200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N _{Rk,b}	,c [kN	l]; temperatur	e range 50/80°C ²⁾	
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons			
10 / 8 N/mm²	w/w	w/d		1,5	1,5
10 / 6 14/111111	d	/d		2,0	2,0
42 E / 40 N/mm²	w/w	w/d		2,0	2,0
12,5 / 10 N/mm²	d	/d		2,0	2,0
15 / 12 N/mm²	w/w	w/d		2,0	2,0
15 / 12 N/MM²	d	/d		2,5	2,5

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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, T10, T11, EN 771-1:2011+A1:2015

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

Anchor rod		М6	М8	М6	М8		М8	M10	М8	M10	-		M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E			•		-	M8 c 85		-		-	M10N	-		-		-	-	
Perforated sleeve FIS H K		12:	(50	12)	(85	16	x85		16>	130		20x	(85		20x	130	20x	200
V _{Rk} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C																		
Mean compressive strength / Min. compressive strength	Use con-																	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp} [KN]$	$V_{Rk} = V_{Rk,c,\parallel} = V_{Rk,c,\parallel}$ [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/mm²	w/w w/d d/d	0,9	1,5	2,0						
12,5 / 10 N/mm²	w/w w/d d/d	0,9	1,5	2,0						
15 / 12 N/mm²	w/w w/d d/d	1,2	2,0	2,0						

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

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

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k]	N]; tempe	rature range 50/80	0°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	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 d/d	1	,5	2,0
15 / 12 N/mm²	w/w w/d	2	,0	2,0

¹⁾ 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



Vertical perforated bric	k HL:	z, T7	PF, fill	ed with	perlit	, E	N 771-	1:201	1+A	1:2	015	5		
248	Pro	ducer								e.g.	. Wie	enerbe	rger	
	Non	ninal d	imensior	ensions [mm]						gth L	. wic	dth W	heigh	t H
		F							2	48		365	249	<u>}</u>
249	_	ean gross dry density ρ [kg/dm³] ean compressive strength / Min.								0,5				
				strength gth single			1]	N/mm²]	5 / 4 or 8 / 6					
	_		or annex						EN 771-1:2011+A1:2015					
	•	arameters 20 4,8 52 ed installation with perforated sleeve FIS H						Dimension see also Annex B16)	
Anchor rod	М	6 M8	M6 M8	_	M8 M1	0	M8 M10	_	M ²	2 M	16 M	12 M16	M12	VI16
Internal threaded anchor FIS E		•	-	M6 M8	-			M10 M1	2	-		-	-	
Perforated sleeve FIS H K	1	2x50	12x85	16:	x85	1	16x130	2	0x8	5	2	0x130	20x2	200
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation max T _{inst} [N	m]		2		5	<u> </u>	2			5	5			
General installation parame	ters													
Edge distance c _{min} = c _{cr}	-						60							
	.ml						80 250							
Spacing s _{min} ⊥	'''' 						80							
S _{cr} ⊥							250							
Drilling method														
Rotary drilling with carbide dri	II													
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. Table C40.2: Group factors														
Anchor rod	M	6 M8	M6 M8	+	M8 M1	10	M8 M10		-	12 M1	16 M	12 M16	M12	V116
Internal threaded anchor FIS E		-	-	M6 M8 11x85	-		-	M10 M1 15x85	_	-		-	-	
Perforated sleeve FIS H K	1	2x50	12x85	16:	x85		16x130	2	0x8	5	2	0x130	20x2	200
$\alpha_{g,N}$ (s_{min} II)							1,1							
Group $\alpha_{g,V}$ (s _{min} II)	-] -						1,2							
$\alpha_{g,N}$ (S _{min} \perp)	· -						1,1							
αg,∨ (Smin ⊥)							1,2							
fischer injection system	FIS \	/ Plus	s for ma	asonry										
Performance Vertical perforated brick HLz, T7 PF, filled with perlite, dimensions, installation parameters, Group factors								Annex C40						



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

Table C41.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16					
Perforated sle	eve FIS H k	(18x13	0/200	22x130/200					
Anchor rod wi	th perforat	ed sle	eve FIS H K							
Max. installatio torque	may linet IIVmII									
General instal	lation para	meter	S							
Edge distance	C _{min} = C _{cr}		60							
s _{min} II			80							
s _{cr} II [mm]			250							
Spacing —	s _{min} ⊥		80							
	s cr ⊥		250							
Drilling method										

Rotary drilling with carbide drill

Table C41.2: Group factors

Anchor ro	d	M10	M12	M16					
Perforated	d sleeve FIS H K	18x13	30/200	22x130/200					
	α _{g,N} (s _{min} II)		1	1					
Group factors	α _{g,V} (S _{min} II)	1,2							
factors	$\frac{\alpha_{g,N}(s_{min}\perp)}{\alpha_{g,N}(s_{min}\perp)}$ [-]	1,1							
	$lpha_{ extsf{g,V}}$ (s _{min} ot)	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	М6	M8	М6	M8	-		M8	M10	M8	M10		•	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E	-	•	•	•	M6 11x			-		•	M10 15x		-		•	•	-
Perforated sleeve FIS H K	12x	(50	12x	(85		16	k 85		16x	130		20x	85		20x	130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N$	N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [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/	1,2	1,2	1,2	1,2	2,0									
5 / 4 N/IIIII-	d/d	1,5	1,5	1,5	1,5	2,0									
8 / 6 N/mm²	w/w w/	1,5	1,5	1,5	1,5	2,5									
	d/d	1,5	2,0	1,5	2,0	3,0									

¹⁾ 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			
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}$	Rk,b,c	[kN];	temperature rang	ge 50/80°C ²⁾				
Mean compressive strength / Min. compressive strength single brick 1)	C	se on- ons						
5 / 4 N/mm ²	w/w	w/d	1	,2	1,2			
3 / 4 N/IIIII	d	/d	1	5	1,5			
8 / 6 N/mm ²	w/w	w/d	1	,5	1,5			
O / O N/IIIIII	d	/d	2	,0	2,0			

¹⁾ 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

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

²⁾ 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	М6	M8	М6	M8	-		M8 M10	M8 M10	-		M12M16	M12 M16	M12 M16
Internal threaded anchor FIS E		-	-	•	M6 11x		_	-	M10		_	•	-
Perforated sleeve FIS H K	12	x50	12x	(85		16x	85	16x130		20x	85	20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k]	l]; 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 0,9	1,5	1,2
8 / 6 N/mm²	w/w w/d 1,2	2,0	1,5

¹⁾ 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]	l]; tempe	rature 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

¹⁾ 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 ρ [kg/dm³] 8,0 Mean compressive strength / Min. $[N/mm^2]$ 5 / 4 or 8 / 6 or 10 / 8 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 15,2 Dimension see also Annex B16 8 **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

Anchor rod and interna	al threaded anchor FIS E with	perforated sleeve FIS H K

12x50

Max. installation torque	max T _{inst}	[Nm]	3	5	3		5
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12x85

General installation parameters

Perforated sleeve FIS H K

Edge distan	ice c _{min} = c _{cr}		60																					
	s _{min} II		80																					
Spacing	s _{cr} II [mn	[mm]	250																					
Spacing	S _{min} ⊥																							80
	s _{cr} ⊥		250																					

16x85

16x130

20x85

20x130 20x200

Drilling method

Rotary drilling with carbide drill

Table C44.2: Group factors

Anchor rod			M6 M8 M6 M8				-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E			- - ⊢		M6 M8		•	-		M10 M12 15x85		-		-				
Perforated sleeve FIS H K			12x	50	12	x85	162	(85	16x130		130	20x85		20x130		20x	200	
	$\alpha_{g,N}$ (s _{min} II)									1	,3							
Group	α _{g,V} (s _{min} II)	۱.	1,2															
factors	α _{g,N} (s _{min} ⊥)	[-] 0,6																
	$lpha_{ extsf{g,V}}$ (s _{min} $oldsymbol{\perp}$)									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

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



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 sleeve FIS H K			18x13	0/200	22x130/200				
Anchor rod with perforated sleeve FIS H K									
Max. installa torque	ation max T _{inst}	[Nm]			5				
General ins	tallation para	neter	s						
Edge distand	ce c _{min} = c _{cr}				60				
_	s _{min} II		80						
Chasina	s _{cr} II	[mm]	250						
Spacing -	$s_{min} oldsymbol{\perp}$		80						
	s cr ⊥	250							
Drilling met	thod								
Rotary drillin	ng with carbide	drill							

Table C45.2: Group factors

Anchor roo	d	M10 M12 M16							
Perforated	sleeve FIS H K	18x13	30/200	22x130/200					
	α _{g,N} (s _{min} II)		1	,3					
Group	α _{g,V} (s _{min} II)		1,2						
Group factors	$\alpha_{g,N}$ (Smin \perp) [-]	0,6							
	$\alpha_{g,V}$ ($s_{min} \perp$)		,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	М6	M8	М6	M8	-		M8 M10	M8 M10			M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E				-	M6 11x		-	-	M10		_	-	-
Perforated sleeve FIS H K	12)	(50	12	k 85		16x	85	16x130		202	x85	20x130	20x200
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾													

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N$	N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,b,c} = N _{Rk,b,c} [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	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/mm ²	w/w w/d	2,0	2,5	3,5	3,0	5,0					
8 / 6 N/IIIII	d/d	2,0	3,0	4,0	3,0	5,5					
10 / 8 N/mm²	w/w w/d	2,5	3,0	4,0	3,5	6,0					
	d/d	2,5	3,0	4,5	3,5	6,5					

¹⁾ 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			18x13	30/200	22x130/200
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}$					
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons			
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
6 / 6 N/IIIII-	d	/d		4,0	5,5
10 / 8 N/mm²	w/w	w/d		4,0	6,0
10 / 6 N/MM-	d	/d		4,5	6,5

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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	М6	М8	М6	M8	-		М8	M10	M8	M10	-		M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		•		-	M6 11x					-	M10 15x			-	-	•	
Perforated sleeve FIS H K	12)	(50	12:	x85		16>	85		16x	(130		20>	(85		20x	130	20x200

				IOXOG	. U	20%00	-	TOXIO
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k]	N]; tempe	rature r	ange 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	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

¹⁾ 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]				
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

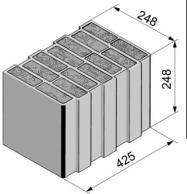
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

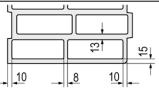
fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T9 MW, filled with mineral wool; Characteristic resistance under shear loading	Annex C47



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



Producer		e.g. Wienerberger				
Nominal dimensions	[mm]	length L	width W	height H		
	[mm]	248	425	248		
Mean gross dry density ρ	[kg/dm³]	0,8				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	5 / 4 0	r 7,5 / 6 o	r 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	М6	M8	М6	M8	-		M8	M10	M8	M10		-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	,	-	,	-	M6	M8 c85		-	,	-		M12 x85		-	•	•		-
Perforated sleeve FIS H K	12	x50	12	x85	16)		x85		16x	130	202		x 85		20x	130	20x	200

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

Max. installation torque	max T _{inst} [N	m] 2	5	2	5
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General installation parameters

	Acceptant pointern		
Edge distan	ice c _{min} = c _{cr}		60
	s _{min} II		80
Cnasina	s _{cr} II	[mm]	250
Spacing	S _{min} ⊥		80
	s _{cr} ⊥		250

Drilling method

Rotary drilling with carbide drill

Table C48.2: Group factors

Anchor rod			М6	M8	М6	M8		-	M8	M8 M10		M10	-	M12	M16	M12	M16	M12	M16
Internal thr anchor FIS						-	M6	M8 (85			-		M10 M12		•	,	•		-
Perforated sleeve FIS H K			12	<50	12	x85		162	x85		16x	130	20:	x85		20x	130	20x	200
	α _{g,N} (s _{min} II)						1,9												
Group	α _{g,∨} (s _{min} II)	r 1									0	,9							
factors	$lpha_{ extsf{g}, extsf{N}}$ (Smin ot)	[-]									1	,0							
	α _{g,V} (s _{min} ⊥)		0,7																

fischer injection system FIS V Plus for masonry	
Performance	Annex C48
Vertical perforated brick HLz, FZ 7, filled with mineral wool;	
dimensions, installation parameters, Group factors	

¹⁾ 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 sleeve FIS H K			18x13	0/200	22x130/200								
Anchor rod wit	h perforat	ed sle	eve FIS H K										
Max. installation torque	T _{inst}	[Nm]			5								
General installa	ation para	meter	S										
Edge distance	C _{min} = C _{cr}			6	60								
	s _{min} II			8	30								
	s _{cr} II	[mm]		2	50								
Spacing —	s _{min} ⊥			80									
	s cr ⊥			2	50								
Drilling method	l												

Rotary drilling with carbide drill

Table C49.2: Group factors

Anchor ro	d	M10	M12	M16								
Perforated	d sleeve FIS H K	18x13	30/200	22x130/200								
	α _{g,N} (s _{min} II)		1	,9								
Group	α _{g,V} (s _{min} II)		0,9									
factors	$\alpha_{g,N}$ (s _{min} \perp) [-]		1,0									
	$\alpha_{\sf g,V}$ (s _{min} \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 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	Me	M8	M6	M8	-		M8	M10	M8	M10			M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		-		-	M6 11x		ı	-		-	M10 15x		l	-	-		-
Perforated sleeve FIS H K	12	2x50	12	x85		16>	(85		16x	130		202	k 85		20x′	130	20x200
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}_{Rk,b,c}$	N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾																
Mean compressive strength / Us	se																

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	Rk,b,c	<u>[KN]</u>	; tempe	rature r	ange 50/80°C -	,			
Mean compressive strength / Min. compressive strength single brick 1)	co	se n- ons							
5 / 4 N/mm ²	w/w	w/d	0,60	0,75	1,50	2,00	1,20	2,00	2,00
5 / 4 14/111111	d/d		0,60	0,90	1,50	2,00	1,50	2,00	2,50
7,5 / 6 N/mm ²	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
IU / O IN/IIIIII	d/	/d	0,90	1,20	2,00	3,00	2,00	3,00	3,50

¹⁾ 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	0/200	22x130/200
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}$	Rk,b,c	[kN]	; temperature ran	ge 50/80°C ²⁾	
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons			
5 / 4 N/mm²	w/w	w/d	2,	,0	2,0
5 / 4 N/IIIII-	d	/d	2,	,0	2,0
7 F / G N/mayor ²	w/w	w/d	2,	,0	2,5
7,5 / 6 N/mm²	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

¹⁾ 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 tension loading	Annex C50

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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	М6	M8	М6	M8	-		M8 M10	M8 M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E		-		-	M6 11x			-	M10 M12	_	-	-
Perforated sleeve FIS H K	12)	(50	12)	k 85		16x	(85	16x130	20:	x85	20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k]	V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	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				

¹⁾ 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]; temp	erature range	e 50/80°C and 72/1	120°C				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions							
5 / 4 N/mm²	w/w w/d	_	1,5					
7,5 / 6 N/mm²	w/w w/d	_		2,0				
10 / 8 N/mm²	w/w w/d		2,5					

¹⁾ 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 [kg/dm³] ≥ 0,6 Mean gross dry density ρ Mean compressive strength / Min. 5 / 4 or 7,5 / 6 or 10 / 8 $[N/mm^2]$ compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 Dimension see also Annex B16 30 30 25 **Table C52.1:** Installation parameters (Pre-positioned installation with perforated sleeve FIS H K) **Anchor rod** М6 **M8** M6 | M8 M8 M10 M8 M10 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 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max T_{inst} [Nm] 2 torque General installation parameters Edge distance $c_{min} = c_{cr}$ 120 120 s_{min} II [mm] s_{cr} 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** M12 M16 M12 M16 М6 M8 M10 M8 M10 **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 $\alpha_{g,N}$ (s_{min} II) 1,7 $\alpha_{g,V}$ (s_{min} II) Group [-] factors $\alpha_{\text{g,N}}$ (s_{min} \perp) 2,0 $\alpha_{g,V}$ ($s_{min} \perp$) fischer injection system FIS V Plus for masonry Annex C52 **Performance** Vertical perforated brick HLz, dimensions, installation parameters, Group factors



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

Table C53.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16						
Perforated sle	eve FIS H I	(18x13	30/200	22x130/200						
Anchor rod with perforated sleeve FIS H K											
Max. installatio torque	n max T _{inst}	[Nm]		2							
General instal	lation para	meter	S								
Edge distance	C _{min} = C _{cr}			12	20						
	s _{min} II	r		12	20						
Spacing	s _{cr} II	[mm]		50	00						
s	_{smin} ⊥=s _{cr} ⊥		315								
Drilling metho	d										

Drilling method

Hammer drilling with hard metal hammer drill

Table C53.2: Group factors

Anchor ro	d	M10	M12	M16				
Perforated	l sleeve FIS H K	18x13	30/200	22x130/200				
	α _{g,N} (s _{min} II)	1,3						
Group factors	α _{g,V} (s _{min} II)	1,7						
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

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

Annex C53

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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	М6	M8	-		M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E		-			M6 N	_		-		-	M10 15			-		-
Perforated sleeve FIS H K	12	x50	12)	(85	162		16x85		16)	c130	20		x85		20x	130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N _{Rk,b,c} [kN]; tempe	rature range 50/80°C ²⁾			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d	0,50	1,50	0,75	1,50	1,50
574 N/IIIII	d/d	0,60	1,50	0,90	1,50	2,00
7,5 / 6 N/mm ²	w/w w/d	0,75	2,00	1,20	2,00	2,50
7,57614/11111	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 / 8 N/MM ⁻	d/d	1,20	3,00	2,00	3,00	3,50

¹⁾ 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	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 ²⁾									
Mean compressive strength / Use Min. compressive strength consingle brick 1) dition									
5 / 4 N/mm²	w/w	w/d	0,	75	1,50				
5 / 4 N/IIIIII ⁻	d/	′d	0,	90	2,00				
7. E. I. G. N./mores ²	w/w	w/d	1,:	20	2,50				
7,5 / 6 N/mm ²	d/	′d	1,:	20	2,50				
40 / 0 N/mm²	w/w	w/d	1,	50	3,50				
10 / 8 N/mm²	d/	′d	2,	00	3,50				

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

 $^{^{2)}}$ 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 C55.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	М6	M8	М6	M8			M8	M10	M8	M10	-	M12	M16	M12 M16
Internal threaded anchor FIS E		-		-	M6 11>			-		-	 M12 x85		-	ı
Perforated sleeve FIS H K	12	x50	12)	(85		16	x85		16)	(130	20:	x85		20x130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C									
Mean compressive strength / Min. compressive strength	Use con-									
single brick 1)	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				

¹⁾ 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	22x130/200						
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; tempe	erature range 50/8	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	0,9							
7,5 / 6 N/mm²	w/w w/d	1,5							
10 / 8 N/mm²	w/w w/d d/d	2,0							

¹⁾ 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 Producer e.g. Wienerberger length L | width W | height H Nominal dimensions [mm] 500 200 300 [kg/dm³] ≥ 0,7 Mean gross dry density ρ Mean compressive strength / Min. 5 / 4 or 7,5 / 6 or 10 / 8 $[N/mm^2]$ compressive strength single brick 1) 12,5 / 10 Standard or annex EN 771-1:2011+A1:2015 Dimension see also Annex B17 **Table C56.1:** Installation parameters (Pre-positioned installation with perforated sleeve FIS H K) M8 M10 M8 M10 **Anchor rod** М6 **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 16x130 20x85 20x130 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max T_{inst} [Nm] 2 torque General installation parameters Edge distance $c_{min} = c_{cr}$ 50 80 50 80 $s_{\text{min}} \; II$ 100 [mm] s_{cr} II 500 Spacing 300 $s_{min} \perp = s_{cr} \perp$ **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 C56.2: Group factors M8 M10 M12 M16 M12 M16 **Anchor rod** М6 **M8** М6 **M8** M8 M10 M6 | M8 M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 20x130 12x85 16x85 16x130 20x85 $\alpha_{g,N}$ (s_{min} II) 1,4 $\alpha_{g,V}$ (s_{min} II) Group [-] factors 2 $\alpha_{g,N}$ (s_{min} \perp) $\alpha_{g,V}$ (Smin \perp) fischer injection system FIS V Plus for masonry Annex C56 **Performance** Vertical perforated brick HLz, dimensions, installation parameters, Group factors



Table C57.1: Installation parameters

(Push through installation with perforated sleeve FIS H K)

Anchor rod			M10	M10 M12 M16							
Perforated sleeve FIS	SHK		18x13	0/200	22x130/200						
Anchor rod with perforated sleeve FIS H K											
Max. installation torque max T _{inst} [Nm] 2											
General installation	param	neter	S								
Edge distance c _{min}	= c _{cr}			8	0						
S	min II			10	00						
Spacing	s _{cr} II	[mm]	500								
s _{min} ⊥=	s _{cr} ⊥		300								
Duilling woodbood											

Drilling method

Hammer drilling with hard metal hammer drill

Table C57.2: Group factors

Anchor ro	d	M10 M12 M16							
Perforated	d sleeve FIS H K	18x13	22x130/200						
	α _{g,N} (s _{min} II)		1	,4					
Group	α _{g,V} (s _{min} II)								
factors	(-] α _{g,N} (S _{min} ⊥)		2	2					
	α _{g,} ∨ (s _{min} ⊥)								

fischer injection system FIS V Plus for masonry

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

Annex C57



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

Anchor rod	M6	M8	М6	M8	-		M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		•	M6 11x	_		-		-	 M12 x85		-		-
Perforated sleeve FIS H K	12	x50	12>	(85		16	x85		16>	c130	202	x85		20x	130
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [k]	N]; te	empe	ratu	re ra	ange	50/	/80°C) ²⁾							

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²⁾											
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	n-									
5 / 4 N/mm²	w/w	w/d	0,50	0,60	1,20	0,75	1,50				
3 / 4 N/IIIII	d/	′d	0,60	0,75	1,20	0,90	1,50				
7,5 / 6 N/mm ²	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 ²	w/w	w/d	0,90	1,20	2,00	1,50	2,50				
10 / 6 14/111111	d/	′d	1,20	1,50	2,50	1,50	3,00				
12,5 / 10 N/mm²	w/w	w/d	1,20	1,50	2,50	2,00	3,50				
12,5 / 10 N/IIIII	d/	′d	1,50	2,00	3,00	2,00	4,00				

¹⁾ 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		182	k130/200	22x130/200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N _{Rk,b,c} [kl	N]; temperatur	re range 50/80°C ²⁾					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm ²	w/w w/d		1,2	1,5				
5 / 4 N/IIIII	d/d		1,2	1,5				
7,5 / 6 N/mm ²	w/w w/d		1,5	2,0				
7,576 N/IIIII	d/d		2,0	2,5				
10 / 8 N/mm ²	w/w w/d		2,0	2,5				
TO / O IN/IIIIII	d/d		2,5	3,0				
12,5 / 10 N/mm²	w/w w/d		2,5	3,5				
12,5 / 10 N/IIIII	d/d		3,0	4,0				

¹⁾ 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

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

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



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	М6	M8			M8	M10	M8	M10		•	M12	M16	M12	M16
Internal threaded anchor FIS E		-			M6 11)	M8 (85		-		-	M10 15	M12 x85	_	•		-
Perforated sleeve FIS H K	12	x50	12)	(85		16	3x85		162	k130		20	x85		20x	130

T CHOTALCA SICCVC FIO IT IX		12730	12703		1000	102130	2000	207130				
/ _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	0,9	1,2	0,9	1,2	0,6	2,0	0,6				
7,5 / 6 N/mm ²	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				

¹⁾ 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	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [1	kN]; 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		(0,6
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
12,5 / 10 N/mm²	w/w w/d d/d			1,5

 $^{^{1)}}$ 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/dm³] ≥ 0,7 Mean gross dry density ρ Mean compressive strength / Min. 2,5 / 2 or 5 / 4 or $[N/mm^2]$ 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) M12 M16 M12 M16 M6 M8 M6 | M8 M8 M10 M8 M10 **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 T_{inst} [Nm] torque General installation parameters Edge distance $c_{min} = c_{cr}$ 50 80 50 80 $s_{\text{min}} \; II$ 100 s_{cr} II [mm] 500 Spacing 100 Smin \perp 315 $\mathbf{s}_{\mathsf{cr}} \perp$ **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 C60.2:** Group factors M8 M10 M8 M10 M12 M16 M12 M16 **Anchor rod** M6 | M8 M6 **M8** M6 | M8 M10 M12 Internal threaded anchor FIS E 15x85 11x85 Perforated sleeve FIS H K 16x85 20x85 12x50 12x85 16x130 20x130 $\alpha_{g,N}$ (s_{min} II) 1,1 1.2 $\alpha_{g,V}$ (s_{min} II) Group [-] factors 1,1 $\alpha_{\mathsf{g},\mathsf{N}}$ ($\mathsf{s}_{\mathsf{min}} \perp$) 1,2 $\alpha_{g,V}$ (s_{min} \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)

Anchor rod			M10	M12	M16					
Perforated sleev	e FIS H K	(18x13	22x130/200						
Anchor rod with	perforate	ed sle	eve FIS H K							
Max. installation torque	max T _{inst}	[Nm]		2	2					
General installa	tion parai	neter	S							
Edge distance	C _{min} = C _{cr}			8	0					
	s _{min} II			10	00					
On a sinon	s _{cr} II	[mm]		50	00					
Spacing	s _{min} ⊥		100							
	S cr ⊥			3.	15					

Drilling method

Hammer drilling with hard metal hammer drill

Table C61.2: Group factors

Anchor roo	d	M10	M10 M12 M16								
Perforated	sleeve FIS H K	18x13	30/200	22x130/200							
	α _{g,N} (s _{min} II)		1,1								
Group factors	α _{g,∨} (s _{min} II)		1,2								
factors	$\alpha_{g,N}$ ($s_{min} \perp$)		1,1								
	$\alpha_{\sf g, V}$ (S _{min} \perp)		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	М6	M8		•	M8	M10	M8	M10		-	M12	M16	M12 M16
Internal threaded anchor FIS E		-		-	M6 112	M8 (85		-		-	M10 15			-	1
Perforated sleeve FIS H K	12	x50	12)	(85		16	x85		16)	c130		20	x85		20x130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	N _{Rk,b,c} [kN]; tempe	erature range 50/80°C 2	2)		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
2,5 / 2 N/mm ²	w/w w/d			0.5		
2,5 / 2 14/111111	d/d		0,5	0,6	0,5	0,6
5 / 4 N/mm²	w/w w/d			0,9		
5 / 4 N/IIIII	d/d	0,9		1,2		
7,5 / 6 N/mm²	w/w w/d			1,5		
7,576 N/IIIII	d/d			1,5		
10 / 8 N/mm ²	w/w w/d			2,0	•	
10 / 8 14/111111-	d/d			2,0		

¹⁾ 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:	k130/200	22x130/200		
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	N _{Rk,b,c} [kN	l]; 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		

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

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



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	М6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M8 <85		-		-	 M12 x85		-	,	-
Perforated sleeve FIS H K	12	x50	12>	(85	16	x85		162	k130	20	x85		20x	130

1 cholacca diceve i lo il ik		12,00	12,000		1000	102100	2000	20X100
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	erature r	ange 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

¹⁾ 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	30/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temp	erature range 50/	80°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 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/mm²	w/w w/d d/d	1,	50	2,00
10 / 8 N/mm²	w/w w/d d/d	2,	00	3,00

¹⁾ 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



Vertical perforated brick HLz, EN 771-1:2011+A1:2015 Producer e.g. Imery length L | width W | height H Nominal dimensions [mm] 560 200 275 Mean gross dry density ρ [kg/dm³] ≥ 0,7 Mean compressive strength / Min. 5 / 4 or 8 / 6 or 10 / 8 $[N/mm^2]$ compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 Dimension 200 see also Annex B17 .40 10 560 **Table C64.1:** Installation parameters **Anchor rod M8** M10 M10 M12 M12 M16 M16 Perforated sleeve FIS H K 16x130 18x130/200 20x130 22x130/200 Anchor rod with perforated sleeve FIS H K Max. installation max T_{inst} [Nm] 2 torque General installation parameters Edge distance $c_{min} = c_{cr}$ 80 $s_{min} II = s_{cr} II [mm]$ 560 Spacing $s_{min} \perp = s_{cr} \perp$ 275 **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 C64.2:** Group factors **Anchor rod M8** M₁₀ M10 M12 M12 M16 M16 Perforated sleeve FIS H K 18x130/200 22x130/200 16x130 20x130 $\alpha_{g,N}$ (s_{min} II) $\alpha_{\text{g,V}}$ (s_{min} II) Group 2 [-] factors $\alpha_{\mathsf{g},\mathsf{N}}$ ($\mathsf{s}_{\mathsf{min}} \perp$) $\alpha_{\text{g,V}} \text{ ($s_{\text{min}} \perp$)}$ fischer injection system FIS V Plus for masonry Annex C64 **Performance** Vertical perforated brick HLz, dimensions, installation parameters, Group factors



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			16x130 18x130/200 20x130 22x130							
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	[kN]; tempe	rature rai	nge 50 /80)°C ²⁾					
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	n-								
5 / 4 N/mm²	w/w	w/d		0,9	1		1,2			
37414/11111	d/	ď		1,2			1,5			
8 / 6 N/mm ²	w/w	w/d		1,5	;			2,0		
8 / 6 N/IIIII-	d/	ď		1,5	,			2,0		
10 / 8 N/mm ²	w/w	w/d		2,0				2,5		
IU / O N/IIIII-	ď		2,5	,		3,0				

¹⁾ 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		18x13	0/200	20x	130	22x130/200	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	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	0,9							
8 / 6 N/mm²	w/w w/d d/d				1	,5			
10 / 8 N/mm²	w/w w/d d/d				2	,0			

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).



Vertical perforated brick	HLz, EN 77	′1-1:2011+ <i>A</i>	1:2015							
120	Producer				e.a.	Wienerb	erger			
				F	length L		V height F			
	Nominal dime	nsions		[mm]	255	120	118			
811	Mean gross d	ry density ρ		[kg/dm³]		≥ 1,0	•			
	Mean compre compressive s			[N/mm ²]	2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12					
4	Standard or a	nnex			EN 771-1:2011+A1:2015					
Table C66.1: Installatio	n parameter		22			mension inex B18	see also			
Anchor rod	M6 M8	M6 M8	-	M8 N	l10	- I	W12 M16			
Internal threaded	_	_	M10	M12	_					
anchor FIS E	40-50	40-05	15:	x85	_					
Perforated sleeve FIS H K Anchor rod and internal thre	12x50	12x85		x85	,	20x8	5			
Max. installation torque max T _{inst} [Nr	Т	-13 E With per		2	\					
General installation paramet	ers									
Edge distance c _{min} = c _{cr}			6	0						
Spacing $\frac{s_{cr} = s_{min} }{s_{cr} = s_{min} }$	m]		2	55						
$\mathbf{s}_{\mathrm{cr}} \perp = \mathbf{s}_{\mathrm{min}} \perp$			12	20						
Drilling method Hammer drilling with hard meta										
1) The minimum compressive str Table C66.2: Group face	ength of the sin	gle brick must	not be less tha	n 80% of t	he mean co					
Anchor rod	M6 M8	M6 M8	-	M8 N	110		M12 M16			
Internal threaded	_	_	M6 M8	_	M10	M12	-			
anchor FIS E Perforated sleeve FIS H K	12x50	12x85	11x85	 x85	15	x85 20x8	<i>-</i>			
	12350	12X05	162	KOO		2000	5			
Group factors $ \frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)} $ $ \frac{\alpha_{g,V} (s_{min} II)}{\alpha_{g,N} (s_{min} \bot)} $ $ \frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} \bot)} $	I		2	2						
fischer injection system F Performance Vertical perforated brick HLz			meters Group	factors		Anne	c C66			
Vertical perforated brick HLz,	dimensions, in	stallation para	meters, Group	factors						



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

Anchor rod	M6	M8	M6	M8	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E		-		•	M6	M8 x85		-	M10 15x			-
Perforated sleeve FIS H K	12	x50	12	x85	16x85				20)	0x85		

$\mathbf{N}_{\mathrm{Rk}} = \mathbf{N}_{\mathrm{Rk,p}} = \mathbf{N}_{\mathrm{Rk,b}} = \mathbf{N}_{\mathrm{Rk,p,c}} = \mathbf{N}_{\mathrm{Rk,p,c}}$	N _{Rk,b,c} [kN]	; temperat	ure range 50/80°C 1)	
Mean compressive strength / Min. compressive strength single brick ²⁾	Use con- ditions			
2,5 / 2 N/mm ²	w/w w/d	0,40	0,50	_3)
2,3 / 2 14/11111	d/d	0,50	0,50	_3)
5 / 4 N/mm²	w/w w/d	0,90	0,90	0,50
37414///////	d/d	0,90	1,20	0,50
8 / 6 N/mm²	w/w w/d	1,20	1,50	0,75
6 / 6 N/IIIII	d/d	1,50	1,50	0,75
10 / 8 N/mm ²	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 ²	w/w w/d	2,00	2,50	1,20
12,57 10 14/111111	d/d	2,50	2,50	1,20
15 / 12 N/mm²	w/w w/d	2,50	3,00	1,50
13 / 12 14/111111	d/d	3,00	3,50	1,50

¹⁾ 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

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

³⁾ No performance assessed.



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		-		-	M6	M8		-	M10	M12		-
Perforated sleeve FIS H K	12	x50	12	x85	112	x85	x85		152	x85	x85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; te	emp	eratu	re ranç	ge 50/	80°C a	nd 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Us cor ditio	n-						
2,5 / 2 N/mm²	w/w	_	0,60	0,75	0,60	0,75	0,9	90
5 / 4 N/mm²	w/w		1,20	1,50	1,20	1,50	2,0	00
8 / 6 N/mm²	w/w	_	2,00	2,00	2,00	2,00	2,5	50
10 / 8 N/mm²	w/w	-	2,50	3,00	2,50	3,00	3,5	50
12,5 / 10 N/mm²	w/w		3,00	3,50	3,00	3,50	4,5	50
15 / 12 N/mm²	w/w	-	4,00	4,50	4,00	4,50	5,5	50

¹⁾ 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 sh	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/dm³] ≥ 0,8 Mean gross dry density ρ Mean compressive strength / Min. 7,5 / 6 or 10 / 8 or 15 / 12 or [N/mm²]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** M10 M12 M16 **M6 M8** M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 20x85 12x85 16x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max T_{inst} [Nm] torque General installation parameters 100 Edge distance 120 $C_{min} = C_{cr}$ $s_{cr} II = s_{min} II [mm]$ 275 Spacing 95 $s_{cr} \perp = s_{min} \perp$ **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 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 $\alpha_{\text{g,N}} \; \text{(s}_{\text{min}} \; \text{II)}$ $\alpha_{g,V}$ (s_{min} II) Group 2 [-] factors $\alpha_{g,N}$ ($s_{min} \perp$) $\alpha_{g,V}$ (Smin \perp) fischer injection system FIS V Plus for masonry Annex C69 **Performance** Vertical perforated brick HLz, dimensions, installation parameters, Group factors



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		-		M12	M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	M10	M12 <85		-
Perforated sleeve FIS H K	12:	x50	12	x85	16x85		16x85		20		x85	

$\mathbf{N}_{\mathrm{Rk}} = \mathbf{N}_{\mathrm{Rk,p}} = \mathbf{N}_{\mathrm{Rk,b}} = \mathbf{N}_{\mathrm{Rk,p,c}} = \mathbf{N}_{\mathrm{Rk,p,c}}$	N _{Rk,b,c} [kN	l]; temperatı	ure range 50	0/80°C ²⁾	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions				
7,5 / 6 N/mm²	w/w w/d d/d	0,40 0,40		0,90 0,90	
10 / 8 N/mm²	w/w w/d d/d	0,50 0,60		1,20 1,20	
15 / 12 N/mm²	w/w w/d d/d	0,75 0,90		1,50 2,00	
20 / 16 N/mm²	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	

¹⁾ 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

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



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	М6	M8	-		M8	/18 M10		•	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 x85		-	M10	M12 (85		-
Perforated sleeve FIS H K	12	x50	12	x85	16x85			20:	x85			

1 chiorated diceve i lo ii it		12,00	12,00	1000	2000
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temp	erature rang	ge 50/80°C a	nd 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/mm²	w/w w/d d/d	2,0		2,5	
20 / 16 N/mm²	w/w w/d d/d	3,0		3,0	
25 / 20 N/mm²	w/w w/d d/d	4,0		4,0	

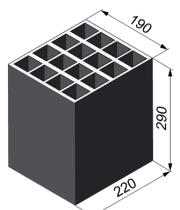
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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				
Toddeel		С.			
 Nominal dimensions	[mm]	length L	width W	height H	
	[mm]	220	190	290	
Mean gross dry density ρ	[kg/dm ³]	≥ 0,7			
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	7,5 / 6 o	10 / 8 or	12,5 / 10	
Standard or annex		EN 771	-1:2011+ <i>A</i>	1:2015	

Dimension see also Annex B18

 Table C72.1:
 Installation parameters

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

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12 N	V 116
Internal threaded					М6	M8					M10	M12				
anchor FIS E		•		•	112	k 85		-		-	15	x85] '	•	-	
Perforated sleeve FIS H K	12	x50	12)	(85		162	k 85	·	16x	130		20	x85		20x1	30

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

Max. installation	max T _{inst}	[MIM]	,	,
torque	IIIaX Tinst	נוואוון		•

General installation parameters

Edge dista	nce c _{min} = c _{cr}		110
Chaoina	s _{min} II = s _{cr} II	[mm]	220
Spacing	s _{min} ⊥ = s _{cr} ⊥		290

Drilling method

Hammer drilling with hard metal hammer drill

Table C72.2: Group factors

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded		-		-	M6	M8				_		M12	I	_		_
anchor FIS E					112	x85					15	x85				
Perforated sleeve FIS H K	12	x50	12:	k 85		162	k 85		16x	130		202	x85		20x	130
$\alpha_{g,N}$ (s_{min} II)																

$ \begin{array}{c c} & \underline{\alpha_{g,N} (s_{min} \ II)} \\ \hline Group & \underline{\alpha_{g,V} (s_{min} \ II)} \\ \hline factors & \underline{\alpha_{g,N} (s_{min} \ \bot)} \end{array} $			 2000	· OXOO	1021100	
$\alpha_{g,V}$ (Smin \perp)	Group factors	α _{g,V} (s _{min} II)		2	2	

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C72

¹⁾ 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 I	ΙK	18x13	0/200	22x130/200
Anchor rod with perfor	ated sle	eve FIS H K		
$\begin{array}{ll} \text{Max. installation} & \text{max T}_{\text{ir}} \\ \text{torque} & \end{array}$	st [Nm]			2
General installation pa	rameter	S		
Edge distance c _{min} =	Ccr			110
Smin II = Scr	II [mm]		;	220
Spacing $s_{min} \perp = s_{cr}$	工		,	290
Drilling method	•			
Hammer drilling with har	d metal	hammer drill		

Table C73.2: Group factors

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

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C73



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	М6	M8	М6	M8		-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-	•		M6 112	M8 <85		-		-	 M12 x85	l	-	,	-
Perforated sleeve FIS H K	12	x50	12>	(85		16	x85		16	c130	20	x85		20x	130

renorated sieever is in it		1230	12805	10.00	102130	20805	20X 130
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	N _{Rk,b,c} [kN	l]; tempe	rature ra	ange 50/80°C ²⁾			
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
7,5 / 6 N/mm ²	w/w w/d	0,3	1,2	1,2	1,5	1,2	1,5
7,576 N/IIIII	d/d	0,4	1,5	1,5	1,5	1,5	1,5
10 / 8 N/mm ²	w/w w/d	0,5	1,5	1,5	2,0	1,5	2,0
10 / 8 14/111111	d/d	0,5	2,0	2,0	2,5	2,0	2,5
12,5 / 10 N/mm ²	w/w w/d	0,6	2,0	2,0	2,5	2,0	2,5
12,57 10 14/111111	d/d	0,6	2,5	2,5	3,0	2,5	3,0

¹⁾ 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						
$\mathbf{N}_{\mathrm{Rk}} = \mathbf{N}_{\mathrm{Rk,p}} = \mathbf{N}_{\mathrm{Rk,b}} = \mathbf{N}_{\mathrm{Rk,p,c}} = \mathbf{N}_{\mathrm{Rk,p,c}}$	N _{Rk,b,}	c [kN	l]; temperature ra	nge 50/80°C ²⁾						
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons								
7,5 / 6 N/mm²	w/w	w/d		1	,5					
7,576 N/IIIII	d.	/d		1	,5					
10 / 8 N/mm²	w/w	w/d		2	2,0					
10 / 8 14/111111	d.	/d		2	2,5					
12,5 / 10 N/mm ²	w/w	w/d		2	2,5					
12,37 10 N/IIIII	d	/d		3	,0					

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

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



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		-		-	M6			-		-	 M12 x85		-		-
Perforated sleeve FIS H K	12	x50	12	k 85		16	x85		16>	(130	20	x85		20x	130

		·=xoo	·=xoo	IONOO	IOXIOO	2000	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; tem	perature	range 50	/80°C and 72/12	0°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

¹⁾ 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		18	3x130/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	erature range	50/80°C and 72/120	°C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
7,5 / 6 N/mm²	w/w w/d d/d			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

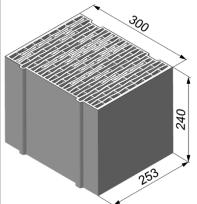
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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. Zie	egelwerk	Brenna
Nominal dimensions	length L v		width W	height H
Nominal dimensions	[mm]	253	240	
Mean gross dry density ρ	[kg/dm³]		≥ 0,8	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	2,5 / 2	or 5 / 4 c	or 8 / 6
Standard or annex	EN 771	-1:2011+/	41:2015	

Dimension see also Annex B18

Table C76.1: Installation parameters

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

Anchor rod	M6	M8	М6	M8		•	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded					M6	M8					M10	M12	l			
anchor FIS E		•	'		11)	c 85		-		-	15	x85		-	'	•
Perforated sleeve FIS H K	12	<50	12>	c 85		16)	(85		16x	130		20:	k 85		20x	130

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

Max. installation	max T _{inst}	[MIM]	,	,
torque	IIIaX Tinst	נוואוון		•

General installation parameters

Edge distar	nce c _{min} = c _{cr}		60
Canaina	s _{min} II = s _{cr} II	[mm]	255
Spacing	s _{min} ⊥ = s _{cr} ⊥		240

Drilling method

Hammer drilling with hard metal hammer drill

Table C76.2: Group factors

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

Anchor rod		M6	M8	М6	M8	-		M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E			-	-		M6 11x	M8 (85		-		-	M10	M12 x85	I	-		•
Perforated sleeve FIS H K		12	x50	12x85 16		k 85		16x130		20x85		20x	130				
Group factors	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,N} (s_{min} II)}$ $\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,N} (s_{min} \bot)}$ [-]								2	2							

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C76

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



Table C77.1: Installation parameters (Push through installation with perforated sleeve FIS H K)

Anchor rod		M10	M12	M16			
Perforated sleeve FIS I	ΙK	18x13	80/200	22x130/200			
Anchor rod with perfor	ated sle	eve FIS H K					
Max. installation torque T _{inst}	[Nm]			2			
General installation pa	rameter	S					
Edge distance c _{min} =	Ccr			60			
Smin II = Sc	II [mm]		2	255			
Spacing $s_{min} \perp = s_{cr}$	工		2	240			
Drilling method	•						
Hammer drilling with har	d metal	nammer drill					

Table C77.2: Group factors

Anchor rod	l	M10	M12	M16				
Perforated sleeve FIS H K		18x130/200		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)} $ [-]			2				

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C77



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	М6	M8	-		M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E		-			M6 11x	-		-		-	M10 15	M12 x85	l	-		-
Perforated sleeve FIS H K	12	x50	12)	k 85		16	x85		16>	<130		20	x85		20x	130

$N_{Rk} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²⁾											
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions										
2,5 / 2 N/mm ²	w/w w/d	_3)	0,50	0,50	0,40	0,50	0,40				
2,5 / 2 N/IIIII	d/d	0,30	0,50	0,50	0,50	0,50	0,50				
5 / 4 N/mm ²	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				
8 / 6 N/mm²	w/w w/d	0,75	1,50	1,50	1,20	1,50	1,20				
6 / 6 N/IIIII-	d/d	0,90	1,50	1,50	1,50	1,50	1,50				

¹⁾ 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			18>	130/200	22x130/200			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = I$	$I_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]			e range 50/80°C ²⁾				
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	n-						
2,5 / 2 N/mm²	w/w d/				0,4 0,5			
5 / 4 N/mm²	w/w d/	-			0,9 0,9			
8 / 6 N/mm²	w/w d/	-			1,2 1,5			

¹⁾ 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

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

³⁾ No performance assessed.

²⁾ 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	М6	M8	-	•	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 11x			-		-	 M12 x85	l	-	,	-
Perforated sleeve FIS H K	12	x50	12>	(85		16	x85		162	c130	202	k 85		20x	130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I	V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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							

¹⁾ 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)

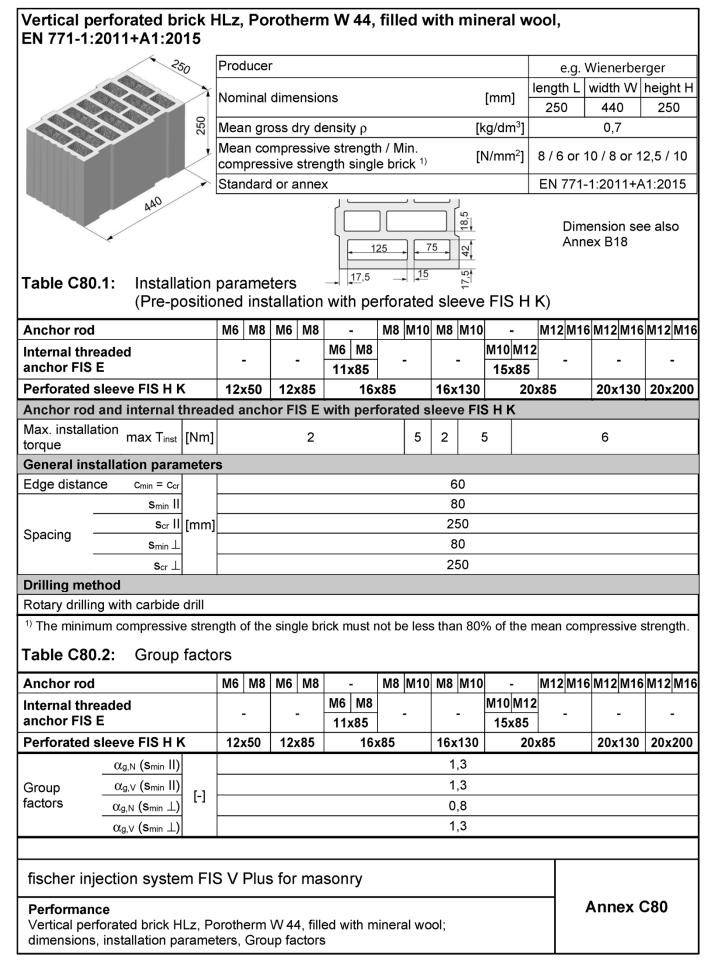
Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [I				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
2,5 / 2 N/mm²	w/w w/d d/d	0	,5	0,6
5 / 4 N/mm²	w/w w/d d/d	0	,9	1,2
8 / 6 N/mm²	w/w w/d d/d	1	,5	1,5

¹⁾ 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. installat torque	ion max T _{inst}	[Nm]	5 6							
General installation parameters										
Edge distanc	e C _{min} = C _{cr}			60						
	s _{min} II			80)					
	s _{cr} II	[mm]		25	0					
Spacing -	S _{min} ⊥			80)					
_	s _{cr} ⊥		250							
Drilling meth	nod									
Rotary drilling	g with carbide	drill								

Table C81.2: Group factors

Anchor ro	d	M10	M16					
Perforated	l sleeve FIS H K	18x13	22x130/200					
	α _{g,N} (s _{min} II)		1	3				
Group	α _{g,V} (s _{min} II)		1	3				
Group factors	$\frac{\alpha_{g,N}(\mathbf{s}_{min}\perp)}{\alpha_{g,N}(\mathbf{s}_{min}\perp)}$ [-]	0,8						
	$\alpha_{g,V}$ ($s_{min} \perp$)		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/mm²



2,00

3,50

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)

Anchor rod			M6	M8	M6	M8	-	M8 M10	M8 M10	-	M12 M16	M12 M	16 M	12 M16
Internal threaded anchor FIS E				•		-	M6 M8	-	-	M10 M12 15x85	_	-		-
Perforated sleeve FIS H K			12>	50	12	x85	162	k 85	16x130	202	x85	20x13	0 2	0x200
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N$	Rk,b,c	[kN]	; ten	npe	ratu	re r	ange 50)/80°C ²)					
Mean compressive strength / Min. compressive strength single brick 1)	Us co ditio	n-												
8 / 6 N/mm ²	w/w	w/d	0,	75	1,	50	1,	20		1,	50			2,50
87614/11111-	d/	ď	0,9	90	1,	50	1,	20		1,	50			2,50
10 / 8 N/mm ²	w/w	w/d	0,9	90	1,	50	1,:	20		1,	50			2,50
d/d			0,9	90	2,	00	1,	50		2,	00			3,00
12 F / 10 N/mm²	w/w	w/d	0,9	90	2,	00	1,	50		2,	00			3,00

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

1,50

d/d

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

1,20

Anchor rod			M10	M12	M16				
Perforated sleeve FIS H K			18x13	30/200	22x130/200				
$\textbf{N}_{Rk} = \textbf{N}_{Rk,p} = \textbf{N}_{Rk,b} = \textbf{N}_{Rk,p,c} = \textbf{N}$	Rk,b,c	[kN]	temperature ran	ge 50/80°C ²⁾					
Mean compressive strength / Min. compressive strength single brick 1)	-	se n- ons							
8 / 6 N/mm ²	w/w	w/d		1	,5				
8 / 6 N/IIIII	d.	′d		1	,5				
10 / 8 N/mm²	w/w	w/d		1	,5				
10 / 8 14/111111	d.	′d		2	,0				
12,5 / 10 N/mm²	w/w	w/d		2	,0				
12,57 10 14/111111	d.	′d	2,0						

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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		М6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	V 116	M12	M16
Internal threaded anchor FIS E			-		-	M6 M8		-		-	M10 M12 15x85	-		-			•
Perforated sleeve FIS	нк	12	x50	12	x85	16:	k 85		16x	130	202	x85		20x1	30	20x	200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{I}$	_{Rk,c,⊥} [kN]	; tem	pera	ature	e ran	ge 50/80	°C a	nd 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 d/d				0	,9			1,2 0,9		,9		1,2	2	1,	,2	
10 / 8 N/mm²	w/w w/d d/d				0	,9			1,5		0,9			1,5	5	1,	,2
12,5 / 10 N/mm²	w/w w/d				1	,2			1	,5	1	,2		1,5	5	1,	,5

¹⁾ 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	ΗK	18x13	0/200	22x130/200						
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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						

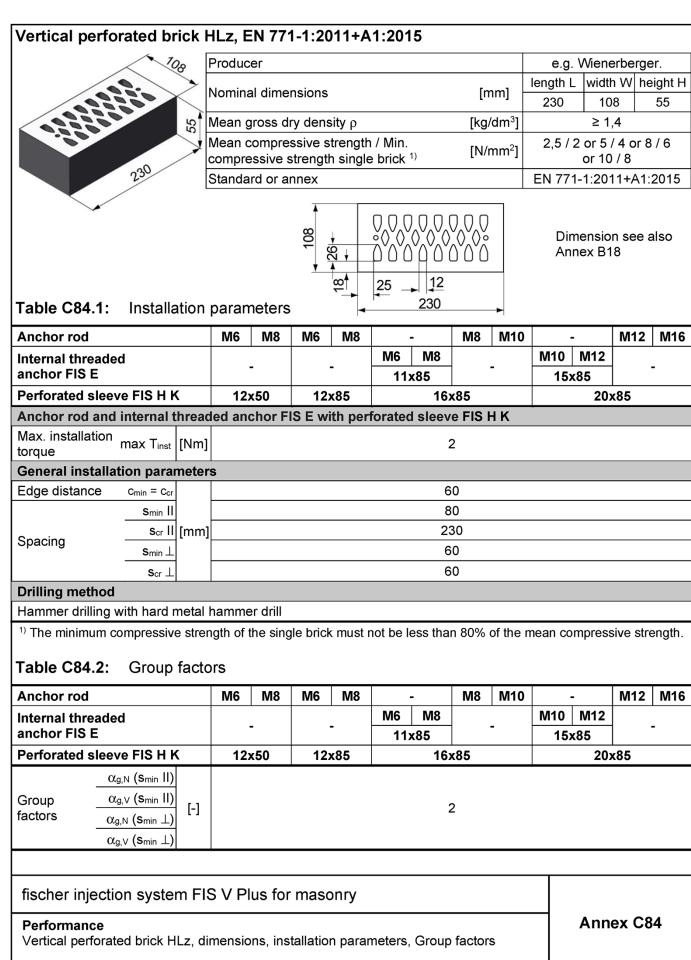
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

d/d

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







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 ¹⁾

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

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} =$	N _{Rk,b,c} [kl	N]; temperat	ure range 50)/80°C ³⁾	
Mean compressive strength / Min. compressive strength single brick ²⁾	Use con- ditions				
2,5 / 2 N/mm ²	w/w w/d	<u> </u>	0.90	0.75	0.50
_,:	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
37414/11111	d/d	0,75	2,00	1,50	1,20
8 / 6 N/mm ²	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
10 / 8 N/mm²	w/w w/d	1,20	3,50	3,00	2,00
10 / 8 14/111111	d/d	1,50	4,00	3,50	2,50

¹⁾ 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	М6	M8	М6	M8	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	M10	M12 x85		-
Perforated sleeve FIS H K	12	x50	12:	x85	16>		x85			20:	x85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; temp	perature 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	0,6	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

¹⁾ 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.

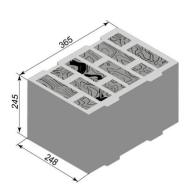
fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension and shear loading	Annex C85

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

³⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).



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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	length L width W	
INOTHINAL difficults	[mm]	≥ 365	≥ 248	≥ 245
Mean gross dry density ρ	[kg/dm³]		0,6	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]		10 / 8	
Standard or annex	EN 771-1:2011+A1:2015			

128 97 97 7,5 38,0 9

Dimension see also Annex B19

Table C86.1: Installation parameters

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

Anchor rod	М6	M8	-		M8	M10	M8	M10	-	•	M12	M16	M12	M16
Internal threaded anchor FIS E		-	M6	M8 x85		-	,	-	M10			-		-
Perforated sleeve FIS H K	12	x85			 5x85		16x	16x130		20x8			20x	130

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

Max.				
installation	max T _{inst}	[Nm]	2	4
torque				

General installation parameters

	The second second	
Edge distance	$c_{min} = c_{cr}$	100
Spacing	s _{min} II s _{cr} II [mm]	250
Spacing	Smin ⊥ Scr ⊥	245

Drilling method

Hammer drilling with hard metal hammer drill

Table C86.2: Group factors

Anchor r	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16	
Perforate	12	x85	16x85		16x130		20x85		20x130		
Group factors	$\frac{\alpha_{g,N} (s_{min} II) = \alpha_{g,V} (s_{min} II)}{\alpha_{g,N} (s_{min} \perp) = \alpha_{g,V} (s_{min} \perp)} [-]$:	2				

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz filled with mineral wool, dimensions, installation parameters, Group factors	Annex C86

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



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	perforate	ed sleev	e FIS H K								
Max. installation torque	max T _{inst}	[Nm]		4							
General installa	tion parar	neters									
Edge distance	C _{min} = C _{cr}		100								
Connecion	Smin II	[mm]	250								
Spacing	s _{min} ⊥		245								
Drilling method		•									
Hammer drilling v	with hard n	netal hai	mmer drill	_							

Table C87.2: Group factors

Anchor roo	i	M10	M12	M16					
Perforated	sleeve FIS H K	18x1:	30/200	22x130/200					
Group factors	$\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ II})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ II})}$ $\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ I})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ I})}$	I	:	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 112	M8 <85		-		-	 M12 5x85		•		•		•
Perforated sleeve FIS H K	12	k 85		16x	85		16x	130	20x	85		20x	130	20x	200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions												
10 / 8 N/mm ²	w/w	2	1,5	2,5	2,0	2,0	3,0						
10,014,11111	d/d	2	2,0	3,0	2,0	2,0	3,0						

¹⁾ 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	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 ²⁾												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions											
10 / 8 N/mm²	w/w	1	.5	2.0								
10 / 8 14/111111	d/d	2	,0	2,0								

¹⁾ 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

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

²⁾ 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	-		M8	M10	M8	M10		-	M1:	2 M16	M12	M16	M12	M16
Internal threaded anchor FIS E		-	M6 112	M8 <85		•		-		M12 x85		-		•		•
Perforated sleeve FIS H K	12	(85	16x		(85		16x	130	20x		85		20x	130	20x	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 ²⁾												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions												
10 / 8 N/mm ²	w/w	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5				
10 / 8 14/111111	d/d	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5				

¹⁾ 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		18x13	30/200	22x130/200					
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C ²⁾									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
10 / 8 N/mm²	w/w		.0	1,5					
	d/d	3,	,0	1,5					

¹⁾ 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

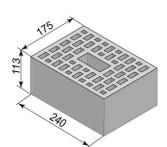
Annex C89

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

²⁾ 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	width W	height H	
	[mm]	≥ 240	≥ 175	≥ 113	
Mean gross dry density ρ	[kg/dm³]		0,9		
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	12,5 / 10			
Standard or annex		EN 771-1:2011+A1:2015			

Dimension see also Annex B19

Table C90.1: Installation parameters

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

Anchor rod	М6	M8		-	M8	M10	M8	M10			M12	M16	M12	M16
Internal threaded			М6	M8		_		_	M10	M12				
anchor FIS E				11x85						15x85				
Perforated sleeve FIS H K	12	k 85		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 _{inst}	[Nm]	2	4
torque				

General installation parameters

Edge distance	C _{min} = C _{cr}	100
Chaoina	Smin II Scr II [n	240 m]
Spacing	$rac{ extsf{S}_{min}oldsymbol{\perp}}{ extsf{S}_{cr}oldsymbol{\perp}}$	115

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	
Perforated sleeve FIS H K		12	12x85		16x85		16x130		20x85		20x130	
Group factors	$\begin{array}{c} \alpha_{g,N} (s_{min} II) = \\ \underline{\alpha_{g,V} (s_{min} II)} \\ \hline \alpha_{g,N} (s_{min} \bot) = \\ \underline{\alpha_{g,V} (s_{min} \bot)} \end{array} [-]$:	2					

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C90

¹⁾ 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)

Anchor rod			M10	M12	M16				
Perforated sleeve FIS H K			18x1	30/200	22x130/200				
Anchor rod with perforated sleeve FIS H K									
Max. installation torque	max T _{inst}	[Nm]	4						
General installation parameters									
Edge distance	C _{min} = C _{cr}			100					
Specine	S _{min} II	[mm]		240					
Spacing	$egin{array}{c} \mathbf{s}_{min}oldsymbol{oldsymbol{oldsymbol{oldsymbol{min}}}} \ \mathbf{s}_{cr}oldsymbol{oldsymbol{oldsymbol{min}}}$		115						
Drilling method		·							
Hammer drilling v	with hard r	netal ha	mmer drill						

Table C91.2: Group factors

Anchor roo	i	M10	M12	M16
Perforated	sleeve FIS H K	18x1:	30/200	22x130/200
Group factors	$\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ II})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ II})}$ $\frac{\alpha_{\text{g,N}} (\text{s}_{\text{min}} \text{ I})}{\alpha_{\text{g,V}} (\text{s}_{\text{min}} \text{ I})}$	I	:	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	М6	M8	-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded		-	M6 M8		-		-		M12 x85		-	-	•
Perforated sleeve FIS H K	12	x85		6x85		16x	130	13.		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 ²⁾										
Mean compressive strength/ Min. compressive strength single brick 1)	Use con- ditions									
12,5 / 10 N/mm ²	w/w	3,5	4,0	4,5	4,5	4,0				
12,57 10 14/111111	d/d	4	4,5	5,0	5,0	4,0				

¹⁾ 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,p,c} = N _{Rk,p,c} [kN]; 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		4.5 5,0	4.0 4,0				

¹⁾ 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

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

²⁾ 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		-	M6	M8		_		-		M12		_	-	
anchor FIS E			11x	(85					15	x85				
Perforated sleeve FIS H K	122	k 85		16	x85		16x	130		20	x85		20x	130

V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C ²⁾															
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions														
12,5 / 10 N/mm ²	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
12,57 10 14/11111	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

¹⁾ 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	K	18x1	130/200	22x130/200			
$V_{Rk} = V_{Rk,b} = V_{Rk,c, } = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C ²⁾							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
12,5 / 10 N/mm ²	w/w	7,0	6,0	8,0			
12,5 / 10 N/IIIII	d/d	7,0	6,0	8,0			

¹⁾ 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

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

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



Horizontal perforated brick LLz, EN 771-1:2011+A1:2015 Producer width W height H length L Nominal dimensions [mm] 250 78 248 Mean gross dry density ρ [kg/dm³] ≥ 0,7 Mean compressive strength / Min. 2,5 / 2 or 5 / 4 or 8 / 6 $[N/mm^2]$ compressive strength single brick 1) 250 Standard or annex EN 771-1:2011+A1:2015 8 Dimension see also Annex B19 40 248 **Table C94.1:** Installation parameters **Anchor rod M6 M8** Perforated sleeve FIS H K 12x50 Anchor rod with perforated sleeve FIS H K Max. installation max T_{inst} [Nm] 2 torque General installation parameters Edge distance 100 $c_{min} = c_{cr}$ $s_{\text{min}} \; II$ 75 [mm] scr II 250 Spacing $s_{min} \perp = s_{cr} \perp$ 250 **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 C94.2: Group factors M6 M8 Anchor rod** Perforated sleeve FIS H K 12x50 1,6 $\alpha_{g,N}$ (s_{min} II) 1,1 $\alpha_{g,V}$ (s_{min} II) Group [-] factors $\alpha_{\text{g,N}}$ (s_{min} \perp) 2,0 $\alpha_{g,V}$ ($s_{min} \perp$) fischer injection system FIS V Plus for masonry Annex C94 **Performance** Horizontal perforated brick LLz, dimensions, installation parameters, Group factors



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		М6	M8				
Perforated sleeve FIS H K	sleeve FIS H K 12x50						
N _{Rk} = N _{Rk,p} = N _{Rk,p,c} = N _{Rk,p,c} [kN]; temperature range 50/80°C ²⁾							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
2,5 / 2 N/mm ²	w/w w/d		0,5				
2,5 / 2 N/IIIII	d/d		0,6				
5 / 4 N/mm ²	w/w w/d		0,9				
3 / 4 N/IIIII	d/d		1,2				
8 / 6 N/mm²	w/w w/d		1,5				
	d/d		1,5				

¹⁾ 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,⊥} [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		
5 / 4 N/mm²	w/w w/d d/d	0	.9		
8 / 6 N/mm²	w/w w/d d/d	1	,5		

¹⁾ 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

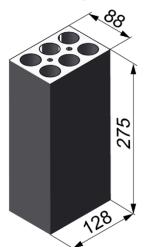
Performance
Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

Annex C95

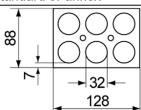
²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).



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



Producer	e.g. Cermanica Farreny S.A.			
Nominal dimensions	[mm]	length L	width W	height H
Norminal differisions	[mm]	275	88	128
Mean gross dry density ρ	[kg/dm ³]		≥ 0,8	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	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 sleev	re FIS H k	(12x50			
Anchor rod with perforated sleeve FIS H K						
Max. installation torque	T_{inst}	[Nm]	:	2		
General installat	tion para	meter	s			
Edge distance	C _{min} = C _{cr}		6	0		
	s _{min} II		7	5		
Consins	s _{cr} II	[mm]	27	75		
Spacing	s _{min} ⊥		7	5		
	s _{cr} ⊥]	1;	30		

Drilling method

Hammer drilling with hard metal hammer drill

Table C96.2: Group factors

Anchor ro	od		М6	M8					
Perforated sleeve FIS H K			12x50						
	α _{g,N} (s _{min} II)		1,	3					
Group	roup $\alpha_{g,V}$ (s _{min} II) $\alpha_{g,N}$ (s _{min} \perp) [-]	, .	1,	5					
factors		[-]	1,	3					
$\alpha_{\sf g, V}$ (${\sf s}_{\sf min}$ \perp)		1,	5						

fischer injection system FIS V Plus for masonry	
Performance Horizontal perforated brick LLz, dimensions, installation parameters, Group factors	Annex C96

¹⁾ 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		М6	M8					
Perforated sleeve FIS H K	forated sleeve FIS H K 12x50							
N _{Rk} = N _{Rk,p} = N _{Rk,p,c} = N _{Rk,p,c} [kN]; temperature 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		,5					

¹⁾ 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

Anchor rod		M6	M8				
Perforated sleeve FIS H K 12x50							
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k	N]; temp	perature range 50/80°C and 72/120°C					
Mean compressive strength / Use Min. compressive strength consingle brick 1) ditions							
2,5 / 2 N/mm²	w/w w/d d/d	1	,2				

¹⁾ 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

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



Light-weight concrete he	ollo	w blo	ock Hhl	FN 77'	1-3-201	1+Δ1·2	015						
		ducer		, = 14 77	1-3.201	1.41.2	013						
240								length L	width W	height H			
	Non	ninal c	dimensior	าร			[mm]	362	240	240			
	Mea	an gro	ss dry de	nsity ρ		[kg/dm³]		≥ 1,0				
240				strength gth single	2,5 / 2 or 5 / 4								
	Sta	ndard	or annex					EN 771-	3:2011+	1:2015			
Table C98.1: Installation				37	Anne	Dimension see also Annex B19							
(Pre-posit	ione	ed ins	stallation	n with pe	erforate	d sleeve	FIS H	K)					
Anchor rod	М	6 M8	M6 M8	-	M8 M10	M8 M10	-	M12 M16	M12 M16	M12 M16			
Internal threaded anchor FIS E		-	-	M6 M8	-	-	M10 M1 15x85	⊣ -	-	-			
Perforated sleeve FIS H K	1	2x50	12x85	162	k 85	16x130	20)x85	20x130	20x200			
Anchor rod and internal thre	adec	l anch	or FIS E	with per	forated s	sleeve Fl	SHK						
Max. installation max T _{inst} [Nn	n]					2							
General installation paramet	ers												
Edge distance c _{min} = c _{cr}	-					60							
Smin II [mr	n]├─					100 362							
Spacing $s_{cr} \parallel s_{min} \perp = s_{cr} \perp$	\vdash					240							
Drilling method						240							
Hammer drilling with hard meta	al hai	mmer	drill										
1) The minimum compressive str Table C98.2: Group face			e single b	rick must r	not be les	s than 80	% of the						
Anchor rod	M	6 M8	M6 M8	+	M8 M10	M8 M10			M12 M16	M12 M16			
Internal threaded anchor FIS E		-	-	M6 M8 11x85	_	-	M10 M1 15x85	⊣ -	-	-			
Perforated sleeve FIS H K	1	2x50	12x85	162	x85	16x130	20)x85	20x130	20x200			
α _{g,N} (S _{min} II)						1,2							
Group $\alpha_{g,V}$ (s _{min} II) [-]	ı L					1,1							
$\alpha_{g,N}$ (Smin \perp)	2,0												
$lpha_{ extsf{g,V}}\left(extsf{S}_{ extsf{min}}\perp ight)$													
fischer injection system F	FIS \	/ Plu	s for ma	asonry					•				
Performance Light-weight concrete hollow be factors	olock	Hbl, c	dimensior	ns, installa	ation para	ameters,	Group		Annex (J98 			



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 F	IS H K		18x13	0/200	22x130/200					
Anchor rod with pe	erforate	ed sle	eve FIS H K							
Max. installation ma	ax T _{inst}	[Nm]			2					
General installation	n parar	neters	3							
Edge distance c _n	min = Ccr			6	60					
	s _{min} II	r1		1	00					
Spacing	s _{cr} II	[mm]		3	62					
s _{min} ⊥ :	= s cr ⊥		240							

Drilling method

Hammer drilling with hard metal hammer drill

Table C99.2: Group factors

	M10	M12	M16						
eve FIS H K	18x1	30/200	22x130/200						
χ _{g,N} (s _{min} II)		1	,2						
α _{g,V} (s _{min} II)	1	1,1							
Ջց,N (Smin ⊥)	1	2,0							
	eve FIS H K $\begin{array}{c} \chi_{g,N} \text{ (s_{min} II)} \\ \chi_{g,V} \text{ (s_{min} II)} \\ \chi_{g,V} \text{ (s_{min} \bot)} \end{array}$ $\chi_{g,V} \text{ (s_{min} \bot)}$ $\chi_{g,V} \text{ (s_{min} \bot)}$	2xe FIS H K 2x _{g,N} (s _{min} II) 2x _{g,V} (s _{min} II) 2x _{g,N} (s _{min} Δ) [-]	Eve FIS H K 18x130/200 Δg,N (Smin II) 1 Δg,V (Smin II) 1 Δg,N (Smin ⊥) [-]						

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	М6	M8	М6	M8	-		М8	M10	М8	M10			M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		•		-	M6 11x			-		-	M10 15x		l	•		•	-
Perforated sleeve FIS H K	12)	(50	12:	x85		16x	(85		16>	<130		20>	(85		20x	130	20x200

N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
2,5 / 2 N/mm ²	w/w w/d	1,2	1,5	2,5					
2,5 / 2 N/IIIII	d/d	1,2	1,5	2,5					
5 / 4 N/mm ²	w/w w/d	2,0	3,0	5,0					
5 / 4 N/IIIII-	d/d	2,5	3,0	5,5					

¹⁾ 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
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}$	Rk,b,c	[kN]	; temperature ran	ge 50/80°C ²⁾	
Mean compressive strength / Min. compressive strength single brick 1)	CC	se on- ons			
2,5 / 2 N/mm ²	w/w	w/d		1	,5
2,5 / 2 14/111111	d	/d		1	,5
5 / 4 N/mm ²	w/w	w/d		3	,0
3 / 4 N/IIIII	d	/d		3	,0

¹⁾ 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

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

²⁾ 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	М6	M8	М6	M8	-		М8	M10	M8	M10		•	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		•		-	M6 11x		l	-		-	M10		l	-	-	•	
Perforated sleeve FIS H K	12)	(50	12	x85		16x	(85		16>	c130		20>	(85		20x	130	20x200

V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	0,9						
5 / 4 N/mm ²	w/w w/d d/d	2,0						

¹⁾ 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)

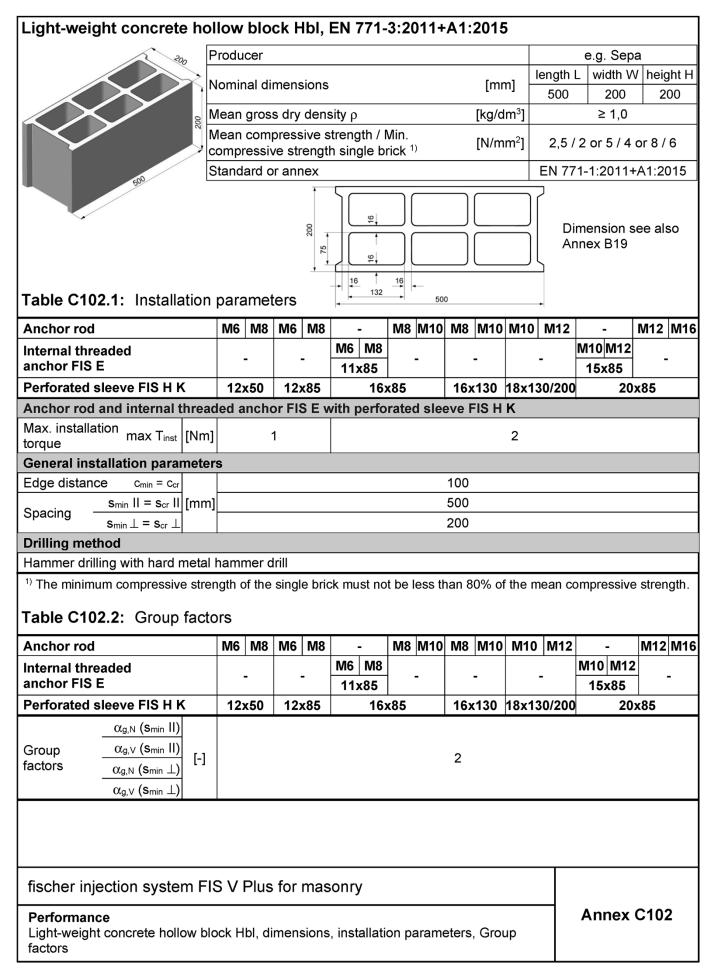
Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	0/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [k]	N]; tempe	erature range 50/8	0°C and 72/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
2,5 / 2 N/mm²	w/w w/d d/d		0,	9
5 / 4 N/mm²	w/w w/d d/d		2,	0

¹⁾ 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	М6	M8	М6	M8		•	M8	M10	M8	M10	M10	M12	-	M12 M
Internal threaded anchor FIS E		-		-	M6	M8 x85		-		-			M10 M12 15x85	-
Perforated sleeve FIS H K	12	x50	12	x85		16	k 85		16x	130	18x13	0/200	20	x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N _{Rk,b,c}	[kN]; temperature range 50/80°C ²⁾
Mean compressive strength / Min. compressive strength single brick 1)	use con- ditions	
2,5 / 2 N/mm ²	w/w w/d	0,4
2,5 / Z N/IIIII-	d/d	0,5
5 / 4 N/mm²	w/w w/d	0,9
5 / 4 N/IIIIII	d/d	0,9
8 / 6 N/mm²	w/w w/d	1.2
0 / 0 N/MM-	d/d	1,5

¹⁾ 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	М6	M8	М6	M8		-	M8	M10	M8	M10	M10	M12	•	M12 M16
Internal threaded anchor FIS E		-		•	M6 112	M8 x85		-		-		-	M10 M12 15x85	1
Perforated sleeve FIS H K	12	x50	12	k 85		16	x85		16x	130	18x13	0/200	20:	x85

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

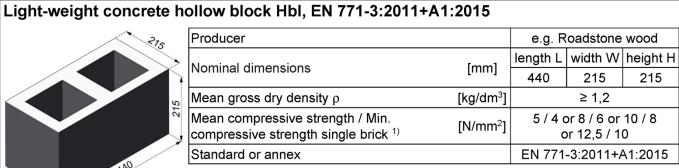
¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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 and shear loading	Annex C103

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





40 160

Dimension see also Annex B20

Table C104.1: Installation parameters

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

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded					M6	M8						M12		_		-
anchor FIS E					11)	(85					15	x85				
Perforated sleeve FIS H K	12	<50	12)	c 85		162	(85		16x	130		202	x85		20x	130

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

Max. installation	max T _{inst}	[NIma]		^
torque	Max Tinst	[[IMIT]	•	_

General installation parameters

Ceneral Installa	don paranic	CLCIC				
Edge distance	$c_{min} = c_{cr}$		110			
Spacing —	s _{min} II		100			
	s _{cr} II [n	mm]	440			
	S _{min} ⊥	그 ㅏ				100
	S cr ⊥		215			

Drilling method

Hammer drilling with hard metal hammer drill

Table C104.2: Group factors

Anchor rod			M6	M8	M6	M8	-		M8	M10	M8 M10		-		M12	M16	M12	M16
Internal threaded anchor		-		-		M6	M6 M8					M10 M12		I	_			
FIS E						11x85			_		-		15x85					
Perforated sleeve FIS H K			12	12x50 12x85				16x85			16x	130	20x85				20x	130
	α _{g,N} (s _{min} II)			1,4														
Group	$\alpha_{\text{g,V}}$ (s _{min} II)	r 1								2	,0							
factors	α _{g,N} (S _{min} ⊥)	[-]		1,4														
	$lpha_{ extsf{g,V}}$ (s $_{ extsf{min}}$ $oxdot$)									1	,2							

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors	Annex C104

¹⁾ 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)

Anchor rod			M10	M12	M16							
Perforated sleev	ve FIS H k	(18x13	22x130/200								
Anchor rod with perforated sleeve FIS H K												
Max. installation torque	max T _{inst}	[Nm]	2									
General installation parameters												
Edge distance	C _{min} = C _{cr}			11	10							
	s _{min} II			10	00							
	s _{cr} II	[mm]		440								
Spacing ——	s _{min} ⊥		100									
	s _{cr} ⊥		215									
Drilling mothed												

Drilling method

Hammer drilling with hard metal hammer drill

Table C105.2: Group factors

Anchor roo	d .	M10	M10 M12 M16							
Perforated	sleeve FIS H K	18x13	18x130/200 22x130/200							
	$\alpha_{g,N}$ (s _{min} II)	1,4								
Group factors	α _{g,V} (s _{min} II)		2	0,0						
factors	$\alpha_{g,N}$ (Smin \perp) [-]		1	,4						
	$\alpha_{\sf g, V}$ (S _{min} \perp)		,2							

fischer injection system FIS V Plus for masonry

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

Annex C105

10 / 8 N/mm²

12,5 / 10 N/mm²



3,5

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			М6	M8	M6	M8		-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded						M6	M6 M8							M10 M12			
anchor FIS E				-		- [x85	- I			-		-	15x85]	-
Perforated sleeve FIS H K			12:	x50	12	x85		16:	x85		16x	130	18x13	30/200	20	x85	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N _F	Rk,b,c	[kN]; te	mpe	eratı	ire ra	ange	50/8	0°C ²)						
Mean compressive	Us	se															
strength / Min. comp. strength single brick ¹⁾	ditio																
strength single blick	unic	פווכ															
5 / 4 N/mm²	w/w	w/d		(9,0					1,2					2,0		
5 / 4 14/111111	d/	'd		1	1,2					1,5					2,0		
8 / 6 N/mm ²	w/w	w/d		1	1,5					2,0				3,0			
O / O IN/IIIIII	d/	'd		•	1,5					2,0					3,0		

2,5

3,0

3,0

3,5

w/w w/d

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

2,0

2,5

3,0

Anchor rod		M10	M12	M16			
Perforated sleeve FIS H	K	18x	130/200	22x130/200			
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,r}$	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 d/d		1,2 1,5	2,0 2,0			
8 / 6 N/mm²	w/w w/d d/d		2,0	3.0 3,0			
10 / 8 N/mm²	w/w w/d d/d		2.5 3,0	3.5 4,0			
12,5 / 10 N/mm²	w/w w/d d/d		3.0 3,5	4.5 5,0			

¹⁾ 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

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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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 C107.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	М6	M8	M6	M8		•	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded					М6	M8					M10 M1	2			
anchor FIS E		-		-		11x85		-		-	15x85		•		-
Perforated sleeve FIS H K	12)	x50	12	k 85		16:	x85		16>	(130	2	0x85		20x	130

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	V _{Rk,c,⊥} [kN]; ten	npera	ature	rang	e 50/8	80°C and 72/12	0°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	

¹⁾ 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	нК	18x1	30/200	22x130/200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	/ _{Rk,c,⊥} [kN]	; temperature ran	ige 50/80°C and 72/1	120°C
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d d/d			1,2
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

¹⁾ 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



English translation prepared by DIBt Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015 Producer e.g. Sepa length L | width W | height H Nominal dimensions [mm] ≥ 372 ≥ 300 ≥ 254 Mean gross dry density ρ [kg/dm³] ≥ 0,6 Mean compressive strength / Min. $[N/mm^2]$ 2,5/2 compressive strength single brick 1) Standard or annex EN 771-3:2011+A1:2015 Dimension see also Annex B20 Table C108.1: Installation parameters **Anchor rod M8** M10 M12 M12 M16 M16 M12 M16 Perforated sleeve FIS H K 16x130 18x130/200 20x130 22x130/200 20x200 Anchor rod with perforated sleeve FIS H K Max. installation

General III	Stanation parai	neter	5
Edge distar	nce $c_{min} = c_{cr}$		130
Cassina	s _{min} = s _{cr}	[mm]	370
Spacing	$s_{min} \perp = s_{cr} \perp$		250

4

Drilling method

torque

Hammer drilling with hard metal hammer drill

max T_{inst} |[Nm]

Table C108.2: Group factors

Anchor roo	d	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K		162	16x130		18x130/200		130	22x130/200	20x200	
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 Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors	Annex C108

¹⁾ 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 C109.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M8	M10	M10	M12	M12	M16	M16	M12	M16	
Perforated sleeve FIS H K			16x	130	18x13	22x130/200	20x200				
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N _F	k,b,c	[kN]; ter	nperatu	re range	e 50/80°	C 2)				
Mean compressive strength / Min. compressive strength single brick 1)	co	se n- ons									
2,5 / 2 N/mm ²	w/w	w/d		2,0)			2,	,5	3	,0
2,5 / 2 N/IIIII	d,	′d		2,0)			3,	,0	4	,0

¹⁾ 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	M16	M16	M12	M16
Perforated sleeve FIS H	(16x130 18x130/200 20x130						22x130/200 20x2		200
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,}$	[kN]; te	mperatu	ıre rang	e 50/80°	°C and	72/120°	С			
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	

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

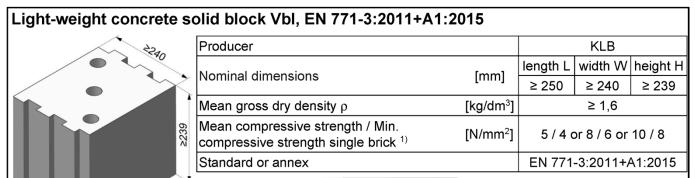
Factor for job site tests and displacements see annex C123.

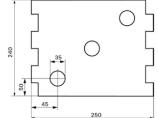
fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block VbI,
Characteristic resistance under tension and shear loading

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







Dimension see also Annex B20

Table C110.1: Installation parameters

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

Anchor rod	М6	M8	М6	M8		•	M8	M10	M8	M10	-	•	M12	M16	M12 M1	6 M12 M16
Internal threaded anchor FIS E	•	-	,	-	M6	M8 <85		-	,	-	M10 15x			•	-	-
Perforated sleeve FIS H K	12)	<50	12	x85		16	k 85		16x	130		20)	(85		20x13	0 20x200

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

Max. installation	max T _{inst}	[MIM]		
torque	IIIax Tinst	נוואוון		

General installation parameters

Edge dista	nce c _{min} = c _{cr}		130
Chaoina	s _{min} II = s _{cr} II	[mm]	250
Spacing	s _{min} ⊥ = s _{cr} ⊥		250

Drilling method

Hammer drilling with hard metal hammer drill

Table C110.2: Group factors

Anchor rod	M6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E		•		-	M6 112	M8 <85		•		•	M10	M12 x85		-		•	-	•
Perforated sleeve FIS H K	122	x50	12	x85		162	x 85		16x	130		202	x85		20x	130	20x	200
_α _{g,N} (s _{min} II)																		

	α _{g,N} (s _{min} II)					
Group	$\alpha_{ extsf{g,V}}$ (s _{min} II)	[-]		2,0		
factors	$lpha_{ extsf{g}, extsf{N}}$ (s $_{ extsf{min}}$ $oxdot$)	[-]		2,0		
	$lpha_{ extsf{g,V}}$ (s $_{ extsf{min}}$ $oxdot$)					

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

¹⁾ 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 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 perfor	ated sle	eve FIS H K							
Max. installation max T _{in}	st [Nm]		2	,0					
General installation par	ameter	S							
Edge distance c _{min} = c	cr		13	30					
Smin II = Scr	II [mm]		25	50					
Spacing $\frac{s_{min} \perp s_{cr}}{s_{min} \perp s_{cr}}$	$s_{min} \perp = s_{cr} \perp$ 250								
Drilling method									
Hammer drilling with har	l metal	hammer drill							

Table C111.2: Group factors

Anchor rod	I	M10	M10 M12 M16							
Perforated	sleeve FIS H K	18x13	30/200	22x130/200						
Group factors	$\begin{array}{c} \alpha_{\text{g,N}} \text{ (s_{min} II)} \\ \hline \alpha_{\text{g,V}} \text{ (s_{min} II)} \\ \hline \alpha_{\text{g,N}} \text{ (s_{min} \bot)} \\ \hline \alpha_{\text{g,V}} \text{ (s_{min} \bot)} \end{array} [-]$		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 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	12x50	12x85	16	x85	16x130	20:	x85	20x130	20x200

i enorated sieeve i io ii iv	L	_ •	2730	12703	10.00	107 130	20.00	20X 130	201200			
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength/ Min. compressive strength single brick 1)	Use con- ditions											
5 / 4 N/mm ²	w/w w	/d	1,2	2,0	2,5		3	,0				
5 / 4 N/IIIII	d/d		2,0	3,5	4,0		5	,0				
8 / 6 N/mm ²	w/w w	/d	1,5	3,0	4,0		5	,0				
O / O IN/IIIIII	d/d		3,0	5,0	6,5		7	,5				
10 / 8 N/mm²	w/w w	/d	2,0	4,0	5,0		6	,5				
10 / 6 14/111111	d/d		4,0	7,0	8,5		9	,0				

¹⁾ 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	130/200	22x130/200					
N _{Rk} = N _{Rk,p} = N _{Rk,p,c} = N _{Rk,p,c} [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		2,5 4,0	3,0 5,0					
8 / 6 N/mm²	w/w w/d		4,0	5,0					
O / O IN/IIIIII	d/d		6,5	7,5					
10 / 8 N/mm ²	w/w w/d		5,0	6,5					
10,014/11111	d/d		8,5	9,0					

¹⁾ 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

²⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

 $^{^{2)}}$ For temperature range 72/120°C: N_{Rk (72/120°C)} = 0,83 · N_{Rk (50/80°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	М6	M8	М6	М8			M8	M10	M8	M10	•		M12	M16	M12 M	16 N	/12 M16
Internal threaded anchor FIS E		-		•	M6	M8 (85		•		-	M10 M 15x8		•	•	-		1
Perforated sleeve FIS H K	12:	x50	12:	k 85	16x		(85		16x	130	2	20x	85		20x13	0 2	20x200

1 chorated siceve i lo i	1 1 1	12	100	12	100		10203	107130	2000	20X 130	201200	
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	2,0	3,0	2,0	3,0	2,0	3,5		4,	,5		
8 / 6 N/mm²	w/w w/d d/d	3,0	4,5	3,0	4,5	3,0	5,5		6,	,5		
10 / 8 N/mm²	w/w w/d d/d	4,0	6,0	4,0	6,0	4,0	7,0		8,	,5		

¹⁾ 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	I K	18x1	30/200	22x130/200					
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [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	3	3,5	4,5					
8 / 6 N/mm²	w/w w/d d/d	5	i,5	6,5					
10 / 8 N/mm²	w/w w/d d/d	7	7,0	8,5					

¹⁾ 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 shear loading	Annex C113



Light-weight concrete	solid block Vbl, EN 771-3:2011+A	1:2015				
2700	Producer	Roa	Roadstone wood			
	Nominal dimensions	[mm]	length L	width W	height H	
	Norminal difficultiensions	[mm]	≥ 440	≥ 100	≥ 215	
2215	Mean gross dry density ρ	[kg/dm ³]	≥ 2,0			
N N	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10			
00.	Standard or annex	EN 771-3:2011+A1:2015				
2440						

Table C114.1: Installation parameters

Anchor rod	IV	16	IV	18	M	10	M12		M16		
Anchor rod without perforated sleeve											
Effective anchorage depth hef	[mm]	50	70	50	70	50	70	50	70	50	70
Max. installation max T _{inst}	[Nm]	4	4	10							

General installation parameters

Edge distance	ce c _{min} = c _{cr}	100
	s _{min} II	75
0	s _{cr} II [mn] 3x h _{ef}
Spacing	S _{min} ⊥	75
	Scr⊥	3x h _{ef}

Drilling method

Hammer drilling with hard metal hammer drill

Table C114.2: Group factors

Anchor rod			М6	М8	M10	M12	M16					
Group factors	α _{g,N} (s _{min} II)			1,6								
	α _{g,V} (s _{min} II)				1,3							
	$lpha_{ extsf{g}, extsf{N}}$ (s _{min} $oxdot$)	[-]			1,4							
	$\alpha_{\sf g,V}$ ($s_{\sf min}$ \perp)				1,3							

fischer injection system FIS V Plus for masonry

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

Annex C114

¹⁾ 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 _{Rk,b}	,c [kN]; temperat	ure range 50/80	°C ²⁾					
Mean compressive	Use		Effective	anchorage dept	h h _{ef} [mm]				
strength / Min. compressive strength single brick 1)	con- dition		≥ 50						
5 / 4 N/mm²	w/w w	/d 1,2		1	,2				
	d/d	2,0	2,0 2,0						
0 / C N/mm²	w/w w	/d 1,5	1,5						
8 / 6 N/mm²	d/d	3,0	3,0 3,5						
40 / 0 N/mara2	w/w w	/d 2,0		2	,5				
10 / 8 N/mm²	d/d	4,0		4	,5				
42 5 / 40 N/mm²	w/w w	/d 3,0		3	,5				
12,5 / 10 N/mm²	d/d	5,0		5	,5				

¹⁾ 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]; temperature range 50/80°C and 72/120°C											
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50								
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					

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, Characteristic resistance under tension and shear loading	Annex C115

²⁾ 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/dm³] ≥ 2,0 Mean compressive strength / Min. 7,5 / 6 or 10 / 8 or 12,5 / 10 $[N/mm^2]$ compressive strength single brick 1) or 15 / 12 EN 771-3:2011+A1:2015 Standard or annex

Table C116.1: Installation parameters

Anchor rod N			16	N	M8 M10		M12		M16			
Anchor rod without perforated sleeve												
Effective anchorage depth	h _{ef}	[mm]	50	70	50	70	50	70	50	70	50	70
Max. installation torque	max T _{inst}	[Nm]	4	4	10							
Conoral installat	ion nara	General installation parameters										

General installation parameters

Edge distance	ce c _{min} = c _{cr}	60
	s _{min} II	75
Spacing -	s _{cr} II [m	n] 3x h _{ef}
	S _{min} ⊥	75
	scr⊥	3x h _{ef}

Drilling method

Hammer drilling with hard metal hammer drill

Table C116.2: Group factors

Anchor rod			М6	М8	M10	M12	M16			
Group factors	α _{g,N} (s _{min} II)				1,9					
	α _{g,V} (s _{min} II)	,,[1,4							
	$lpha_{\sf g,N}$ (S _{min} $oldsymbol{\perp}$)	[-]			1,9					
	$lpha_{ extsf{g,V}}$ (Smin $oldsymbol{\perp}$)				1,4					

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors	Annex C116

¹⁾ 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			M	16	M	18	8 M10		M12		M16	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²												
Mean compressive strength /	Us	se		Effective anchorage depth h _{ef} [mm]								
Min. compressive strength single brick 1)	ditio		50	70	50	70	50	70	50	70	50	70
7,5 / 6 N/mm²	w/w	w/d	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0
7,576 N/IIIII	d/d		2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5
10 / 8 N/mm ²	w/w	w/d	2,0	2,5	2,0	2,5	2,0	3,0	2,0	3,0	2,0	3,0
10 / 8 N/MM-	d/	′d	3,5	4,5	3,5	4,5	3,5	5,0	3,5	5,0	3,5	5,0
40 F / 40 N/mm²	w/w	w/d	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5
12,5 / 10 N/mm ²	d/	'd	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0
15 / 12 N/mm²	w/w	w/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	4,5	3,0	4,5
15 / 12 N/MM²	d/	′d	5,0	7,0	5,0	7,0	5,0	7,5	5,0	7,5	5,0	7,5

¹⁾ 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		М6	M8	M10	M12	M16					
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temp	erature range	50/80°C and 7	2/120°C							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50								
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					

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

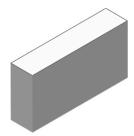
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, Characteristic resistance under tension and shear loading	Annex C117

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



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



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

Table C118.1: Installation parameters

Anchor ro	od		IV	16	IV	18	М	10	М	12	М	16	-			
Internal threaded anchor FIS E		•	-		-			-		-		-	M6 M8			M12 <85
Anchor ro	od and internal	thread	led ar	nchor	FIS E	with	out pe	rforat	ted sl	eeve						100
Effective anchorage	hat	[mm]		200	100	200	100	200	100	200	100	200		8	5	
Max. insta torque	llation max T _{inst}	[Nm]	1	4	1	8	2	12	2	16	2	20	1		2	2
General in	nstallation para	meter	S													
Edge dista	ance c _{min} = c _{cr}	r							10	00						
	s _{cr} II = s _{min} II	Ī							2	50						
	h _{ef} =200mm s _{min} II	l [mm]							8	0						
	h _{ef} =200mm s _{cr} II								3x	h _{ef}						
Spacing	$s_{cr} \perp = s_{min} \perp$]							2	50						
	h _{ef} =200mm s _{min} ⊥	-							8	0						
	h _{ef} =200mm s cr⊥	1							3x	h _{ef}						

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

¹⁾ 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/mm²)

Anchor	rod	M6	M8	M10	M12	M16	-	-
Internal	threaded anchor FIS E						M6 M8	M10 M12
internal	unreaded anchor FIS E	-	-	-	•	-	11x85	15x85
	h _{ef} =200 α _{g,N} (s _{min} II)			1,6			_1)	_1)
	h _{ef} =200 α _{g,V} (s _{min} II)			1,1			_1)	_1)
Group	$\alpha_{g,N} \text{ II, } \alpha_{g,V} \text{ (s_{min} II)}$				2,0			
factors	h_{ef} =200 $\alpha_{\text{g,N}}$ ($\mathbf{s}_{\text{min}} \perp$)			1,6			_1)	_1)
	h _{ef} =200 α _{g,∨} (s _{min} ⊥)			0,8			_1)	_1)
	$\alpha_{\text{g,N}} \perp$, $\alpha_{\text{g,V}}$ ($s_{\text{min}} \perp$)				2,0			

¹⁾ No performance assessed.

Table C119.2: Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 4 N/mm²)

Anchor	rod	М6	M8	M10	M12	M16	-		-	-
Intornal	threaded anchor FIS E	_	_	_	_	_	M6	M8	M10	M12
IIILEIIIAI	unreacted anchor FIS E		-	-	-	-	11x8	35	15>	k 85
	h _{ef} =200 α _{g,N} (s _{min} II)			0,7			_1)			1)
	h _{ef} =200 α _{gV} (s _{min} II)			2,0			_1)			1)
Group	$\alpha_{g,N} \text{ II}, \alpha_{gV} \text{ (s_{min} II)}$				2,0					
factors	$\frac{\log_{\rm p}(N_{\rm s},\log_{\rm p}(S_{\rm min},N))}{\log_{\rm p}(S_{\rm min},N)} \ [-]$			0,7			_1)			1)
	h _{ef} =200 α _{g,∨} (s _{min} ⊥)			1,2			_1)			1)
	$\alpha_{g,N}\perp,\alpha_{gV}\left(s_{min}\perp\right)$				2,0					

¹⁾ No performance assessed.

Table C119.3: Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 6 N/mm²)

Anchor	rod	M6	M8	M10	M12	M16	-				
Intornal	threaded anchor FIS E							M6	M8	M10	M12
Internal	ulreaded afficitor FIS E	-	-	-	-	-	11x	11x85		c 85	
	h _{ef} =200 α _{g,N} (s _{min} II)			0,7			_1)		1)	
	h _{ef} =200 α _{g,V} (s _{min} II)			2,0			_1)	-	1)	
Group	$\frac{\alpha_{g,N} I , \alpha_{g,V} (s_{min} I)}{[-]}$				2,0						
factors	h_{ef} =200 $\alpha_{\text{g,N}}$ ($\mathbf{s}_{\text{min}} \perp$)			0,7			_1)		1)	
	h _{ef} =200 α _{g,V} (s _{min} ⊥)			1,2			_1)	-	1)	
	$\alpha_{g,N} \perp, \alpha_{g,V} (s_{min} \perp)$				2,0						

¹⁾ 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						M6	M8	M10	M12
anchor FIS E	_	_	_	-	- 1	11)	k 85	15>	k 85

													11700	13703
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N	₹k,b,c	[kN];	tem	pera	ture ra	inge	50/80	°C 3)					
Mean compressive strength / Min. compressive strength single brick ²⁾	CC	se on- ons	100	200	100	200	Effe 100	ctive a	ancho 100	rage o	depth h	n _{ef} [mm]	8	5
2,5 / 2 N/mm ²	w/w	w/d	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5
2,5 / 2 14/111111	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 ²	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 ²	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

¹⁾ No performance assessed.

Anchor rod

М6

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

M10

M12

M16

M8

1												l			
Internal threaded anchor FIS E			-	,	-		•		•		-	M6 112	M6 M8 11x85		M12 x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,.}$	⊥ [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	ef [mm]			
strength / Min. compressive strength single brick ²⁾	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

¹⁾ 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

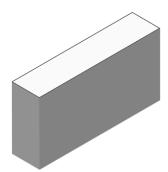
²⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

³⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · N_{Rk} (50/80°C).

²⁾ 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.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+A	1:2015		

Table C121.1: Installation parameters

Anchor rod			M	18	M	10	M	12	-						
Internal threaded anchor FIS E					-	-	-	-	M6 11x	M8 <85					
Anchor rod a	and internal	thread	ed anchor	FIS E with	out perforat	ted sleeve									
Effective anchorage depth		[mm]	75	95	75	95	75	95	8	5					
Max. installati torque	max Linet IINI					2									
General insta	allation para	meter	S												
Edge distance	e Cmin = Ccr		120	150	120	150	120	150	15	50					
Chasina	s _{cr} II = s _{min} II	[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

d	IV	18	IVI	10	IVI.	12	'	-
readed	_	_	_	_	_	_	M6	M8
S E	_	_	_	_	_	_	112	x85
α _{g,N} (s _{min} II)								
$\alpha_{\rm g,V}$ (s _{min} II)				2				
α _{g,N} (S _{min} ⊥)				2				
$lpha_{ extsf{g,V}}$ (S _{min} ot)								
r	readed $ \frac{\alpha_{g,N} (s_{min} I)}{\alpha_{g,N} (s_{min} I)} $ $ \frac{\alpha_{g,N} (s_{min} I)}{\alpha_{g,N} (s_{min} \bot)} $ [-]	readed	readed	readed	readed =	readed	readed E	readed $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

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

¹⁾ 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

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	12	-				
Internal threaded			_				_	M6	M8			
anchor FIS E								11>	(85			
$\mathbf{N}_{Rk} = \mathbf{N}_{Rk,p} = \mathbf{N}_{Rk,b} = \mathbf{N}_{Rk,p,c} = \mathbf{N}_{Rk,p,c}$	Rk,b,c [kN]; tempera	ature rang	e 50/80°C	2)							
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/mm ²	w/w w/d	2,0	2,5	2,0	2,5	2,0	2,5	2,	0			
2,5 / 2 N/IIIII-	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/IIIII	d/d	3,0	3,5	3,0	3,5	3,0	3,5	3,	0			
8 / 6 N/mm ²	w/w w/d	3,5	4,0	3,5	4,0	3,5	4,0	3,	5			
6 / 6 N/IIIII-	d/d	4,0	4,5	4,0	4,5	4,0	4,5	4,	0			

¹⁾ 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			IV	18	M	10	M [.]	12	-				
Internal threaded			_	_	_	_	_	_	М6	M8			
anchor FIS E				11x85									
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	(N]; te	emp	erature ra	nge 50/80	°C and 72	/120°C							
Mean compressive strength /	Us	е	Effective anchorage depth hef [mm]										
Min. com-pressive strength single brick 1)	ditio	-	75	75 95 75 95 75 95									
2,5 / 2 N/mm ²	w/w	w/d	2,5										
2,5 / 2 14/11111	d/d	d											
5 / 4 N/mm ²	w/w	w/d				4,5							
5 / 4 N/IIIII-	d				4,5								
8 / 6 N/mm ²	w/w	w/d				6.0							
6 / 6 N/MM-	d/d	d				6,0							

¹⁾ 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

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



β -factors for job site tests; displacements

Table C123.1: β -factors for job site tests

use conditions		w/w aı	nd w/d	d.	/d				
temperature range [°C]		50/80	72/120	50/80	72/120				
Material	Size	β-factors							
	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]	δ N ₀ [mm]	δ N ∞ [mm]	V [kN]	δV_0 [mm]	δV∞ [mm]
solid units and autoclaved aerated concrete hef=100mm	N _{Rk} 1,4 * γ _{Mm}	0,03	0,06	V _{Rk} 1,4 * γ _{Mm}	0,82	0,88
hollow units	N _{Rk} 1,4 * γ _{Mm}	0,48	0,06	V _{Rk} 1,4 * γ _{Mm}	1,71	2,56
solid brick Mz NF Annex C4 - C7	N _{Rk} 1,4 * γ _{Mm}	0,74	1,48	V _{Rk} 1,4 * γ _{Mm}	1,23	1,85
solid brick KS NF Annex C14 / C15	N _{Rk} 1,4 * γ _{Mm}	0,20	0,40	V _{Rk} 1,4 * γ _{Mm}	0,91	1,37
AAC h _{ef} =200 mm Annex C118 - C120	N _{Rk} 1,4 * γ _{Mm}	1,03	2,06	V _{Rk} 1,4 * γ _{Mm}	1,25	1,88
brick Annex C102 / C103	N _{Rk} 1,4 * γ _{Mm}	0,03	0,06	V _{Rk} 1,4 * γ _{Mm}	6,44	9,66

For anchorage in autoclaved aerated concrete (AAC), the partial factor γ_{MAAC} shall be used instead of γ_{Mm} .

fischer injection system FIS V Plus for masonry	
Performance β-factors for job site tests; displacements	Annex C123



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

F, sil D KS C4 to A	lid cald cate b s, NF, Annex	orick acc. C14	calciu brick to A		icate acc.	pe brick	ertica rforat HLz, nnex	ed acc.	pe brick	ertica rforat HLz, nnex	ed acc.	cor	clave ncrete annex	, acc	. to
	15 / ≥	12													
M12 M8			≥	10 / ≥	: 8	≥	5/≥	4	≥ 7	7,5 / ≥	≥ 6		≥ 2,5 / ≥ 2		
IVI IZ IVIC	M8	M8	M8	M10	M12	M8	M10	M12	M8	M10	M12	M8	M10	M12	M16
	-		16x	INVIXII		16x	130	20x 130	16)	c 85	20x 85		-	-	
	-			-	-		-	20x 200	16x	130	20x 130		-	-	
	≥ 50			≥ 130)		≥ 130)		≥ 85			≥ 1	00	
failure u	nder	tensi	on lo	adin	g										
	0,32		1,07	1,09	1,10		0,31		0,28	0,30	0,35	0,84	0,82	0,80	0,80
	0,31		0,66	0,61	0,56		0,22		0,19	0,22	0,22	0,71	0,67	0,63	0,63
	0,29		0,25	0,13	_ 1)		0,13		0,10	0,10	0,10	0,58	0,51	0,45	0,45
	0,28		_ ¹⁾	_ 1)	_ 1)		_ 1)		_ 1)	_ 1)	- 1)	_ 1)	_ 1)	_ 1)	- ¹⁾
failure u	nder	shea	r loa	ding	2)										
	0,32		1,07	1,09	1,10		0,31		0,28	0,30	0,35	1,10	1,75	2,54	4,74
	0,31		0,66	0,61	0,56		0,22		0,19	0,22	0,22	0,86	1,37	1,99	3,71
	0,29		0,25	0,13	_ 1)		0,13		0,10	0,10	0,10	0,62	0,99	1,44	2,68
	0,28		_ 1)	_ 1)	_ 1)		_ 1)		_ 1)	_ 1)	- 1)	_ 1)	_ 1)	_ 1)	- ¹⁾
1,27 0,3	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
1,13 0,3	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
0,99 0,29	0,37	0,44	0,26	0,17	_ 1)	0,13	0,16	0,20	0,10	0,12	0,15	0,63	1,28	2,24	5,69
0,92 0,28	0,35	0,43	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)
ters															
	60			80			80			100			20	00	
	200			520			340			520			40	00	
	failure u 1,27 0,33 1,13 0,37 0,99 0,29	- Some state of the state of t	- Solution	- 16x - 250 failure under tension log 0,32 1,07 0,31 0,66 0,29 0,25 0,28 -¹) failure under shear load 0,32 1,07 0,31 0,66 0,29 0,25 0,28 -¹) 1,27 0,33 0,42 0,50 1,09 1,13 0,31 0,39 0,47 0,67 0,99 0,29 0,37 0,44 0,26 0,92 0,28 0,35 0,43 -¹) ters 60			- 16x130 $\frac{16x1}{30}$ 16x 	- 16x130 $\frac{16x1}{30}$ 16x130 $\frac{1}{30}$ 17x130 $\frac{1}{30}$ 18x130 $\frac{1}{30}$ 18x13	- 16x130 16x130 20x 130	- 16x130 16x1 30 16x130 20x 130 16x 30 30 30 30 30 30 30 3	- 16x130 16x1 30 16x130 20x 16x130 20x 16x130 20x 20x 16x130 20x 2	- 16x130 16x1 16x130 20x 16x85 20x 85	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	

¹⁾ 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

²⁾ $V_{Rk,b,fi} = N_{Rk,b,fi}$

³⁾ 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 ³⁾

	Broakout failuro																	
					N	18			М	10			M	12			M1	6
Brick	Mean compressive strength / Min. comp. strength single brick ²⁾	h _{ef}	Spacing	5	№ Rk, b, fi(90)		N ⁹ Rk,b,fi(120)		№ Rk, b, fi(90)	2	N°Rk,b,fi(120)		™ Rk, b, fi(90)	3	N ³Rk,b,fi(120)	N ^g Rk,b,fi(90)		N ^g 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 ²]	[mm]	[-]								[k	N]						·
Solid brick MZ, NF acc.	≥ 15 / ≥ 12	≥ 80	S _{cr,fi} II	1,1	2,1	0,8	1,7	1,3	2,5	1,0	2,0	1,5	2,9	1,2	2,4		_ 1)
to Annex C4			S _{cr,fi} ⊥	1,4	′	1,1	′	1,7		1,3	,	2,0	,	1,6	,			
Solid calcium silicate brick	≥ 15 /≥ 12	≥ 50	S _{cr,fi} 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)
KS, NF, acc. to Annex C14	2 13 / 2 12	2 30	S _{cr,fi} ⊥	0,9	0,0	0,7	0,3	0,9	0,0	0,7	0,3	0,9	0,0	0,7	0,3		_	,
Perforated calcium silicate		≥ 130	s _{cr,fi} II	1,4	2,7	1,1	2,2	1,4	2,7	1,1	2,2	1,4	2,7	1,1	2,2	_ 1))
brick KSL, acc. to Annex C24	2 10 / 2 0	2 130	S _{cr,fi} ⊥	1,8	2,1	1,5		1,8		1,5	2,2	1,8	2,1	1,5	2,2			
Vertical perforated	≥ 7,5 / ≥ 6	≥ 85	S _{cr,fi} II	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)	
brick HLz, acc. to Annex C30	_ 7,07 _ 0	_ 00	Scr,fi ⊥	0,4	0,0	0,4	0,7	0,4	0,0	0,4	,,, 	0,5	.,.	0,4	0,0			
Vertical perforated	≥5/≥4	≥ 130	S _{cr,fi} 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)
brick HLz, acc. to Annex C28	- 07 - 4	_ 100	Scr,fi ⊥	0,4	0, 1	0,3	1 ′	0,4	0, 1	0,3	0,0	0,5	0,0	0,4	0, 1			
	Ancho	r rod			N	18			M	10			M	12			М1	6
Autoclaved aerated	≥ 2,5 / ≥ 2	≥ 100	S _{cr,fi} Ⅱ S _{cr,fi} ⊥	1,1 1,1	2,1	0,8 0,8	1,7	1,1 1,1	2,1	0,8 0,8	1,7	1,1 1,1	2,1	0,8 0,8	1,7	1,4 2,8 1,1		1,1 1,1
to Annex C118	1	Internal threaded anchor FIS E		,	11x85 M8		8	1	15x85 M1		5 M10 15x8		5x85	85 M12		-		
	≥ 2,5 / ≥ 2	≥ 85	Scr,fi II	0,9	1,8	0,7	1,4	0,9	1,8	0,7	1,4	0,9	1,8	0,7	1,4		_ 1)
	2 2,0 1 2 2	<u> </u>	Scr,fi ⊥	0,9	1,0	0,7	1,4	0,9	1,0	0,7	1,4	0,9	1,0	0,7	1,4		- '	,

¹⁾ 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

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

³⁾ 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

Soli	d h	rick	MZ	NF acc	to	Annex C4	_
JUII	uv	IICA	IVIZ.	INI acc		AIIIICA CT	

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

Anchor rod			M8		M10		M12	
Effective anchorage depth	h _{ef}		80	200	80	200	80	200
Characteristic spacing	Scr,fi II	[mm]	80	320	80	320	80	320
	Scr,fi ⊥	[mm]	100	100	100	100	100	100
Edge distance	C _{cr,fi}		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			М8		M10		M12	
Effective anchorage depth	h _{ef}		50	100	50	200	50	200
Characteristic spacing	Scr,fi II	[mm]	107	107	107	107	107	107
	S _{cr,fi} ⊥	[mm]	200	400	200	800	200	800
Edge distance	C _{cr,fi}		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/mm²

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

Vertical perforated brick HLz, acc. to Annex C30

mean compressive strength / Min. compressive strength single brick ≥ 7,5 / ≥ 6 N/mm²

	Anchor rod / perforated sleeve			M8 / 16x85	M8 / 16x85 M10 / 16x85		
	Effective anchorage depth	h _{ef}		85	85	85	
ſ	Characteristic spacing	S _{cr,fi} II	[mm1	320	320	320	
ı		S _{cr,fi} ⊥	[mm]	153	153	153	
Ī	Edge distance	C _{cr,fi}]	170	170	170	

Vertical perforated brick HLz, acc. to Annex C28

mean compressive strength / Min. compressive strength single brick ≥ 5 / ≥ 4 N/mm²

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ı	Anchor rod / perforated sleeve			M8 / 16x130	M10 / 16x130	M12 / 20x130
ı	Effective anchorage depth	h _{ef}		130	130	130
ı	Characteristic spacing	Scr,fi II	[mm]	133	133	133
ı	Characteristic spacing	S _{cr,fi} ⊥	ן נייייין	133	133	133
ı	Edge distance	C _{cr,fi}]	260	260	260

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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/mm²

Anchor rod			IV	18	M10		M12		M16	
Effective anchorage depth	h _{ef}		100	200	100	200	100	200	100	200
Characteristic spacing	s _{cr,fi} II	[mm]	333	107	333	107	333	107	333	107
	S _{cr,fi} ⊥	[mm]	333	107	333	107	333	107	333	107
Edge distance	C _{cr,fi}		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 _{ef}		85	85	85
Characteristic spacing	s _{cr,fi} II	[mm]	333	333	333
	Scr,fi ⊥	[mm]	333	333	333
Edge distance	C _{cr,fi}		170	170	170

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Performance
Spacing and edge distance under fire esposure (anchor group)

Annex C127