



Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments



European Technical Assessment

ETA-20/0729 of 31 October 2023

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

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

330076-01-0604, Edition 10/2022

ETA-20/0729 issued on 26 November 2020



European Technical Assessment ETA-20/0729

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Z84444.23 8.06.04-134/23



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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 B 4 to B 7, B 21, B 22, C 1 to C 123
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 C 124

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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 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

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

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

Issued in Berlin on 31 October 2023 by Deutsches Institut für Bautechnik

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

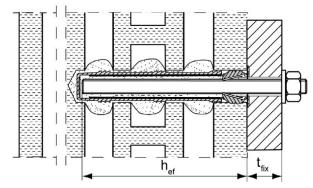
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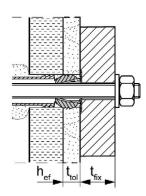
Installation conditions part 1

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

Pre-positioned anchorage:



Installation with render bridge



Size of the perforated sleeve:

FIS H 12x50 K

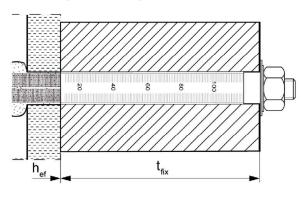
FIS H 16x85 K

FIS H 20x85 K

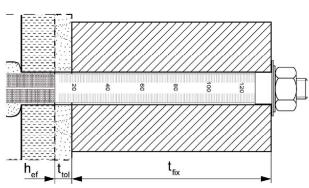
FIS H 20x200 K

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

Push through anchorage:



Installation with render bridge



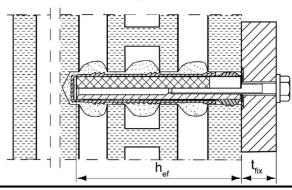
Size of the perforated sleeve:

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 anchorage:



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

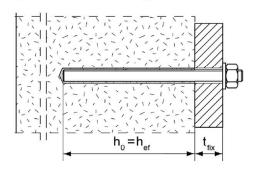
Annex A 1



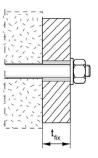
Installation conditions part 2

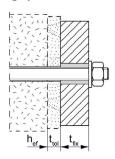
Anchor rods without perforated sleeve FIS H K; installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned anchorage:



Push through anchorage: Annular gap filled with mortar

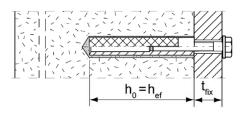




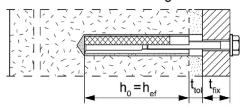
Installation with render bridge

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

Pre-positioned anchorage:



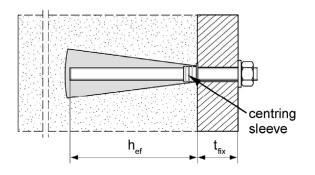
Installation with render bridge



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)

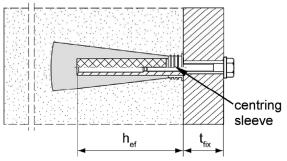
Pre-positioned anchorage:

anchor rods M8, M10, M12



Pre-positioned anchorage:

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

 h_0 = depth of drill hole

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

hef = effective anchorage depth

 t_{fix} = thickness of fixture

fischer injection system FIS V Plus for masonry

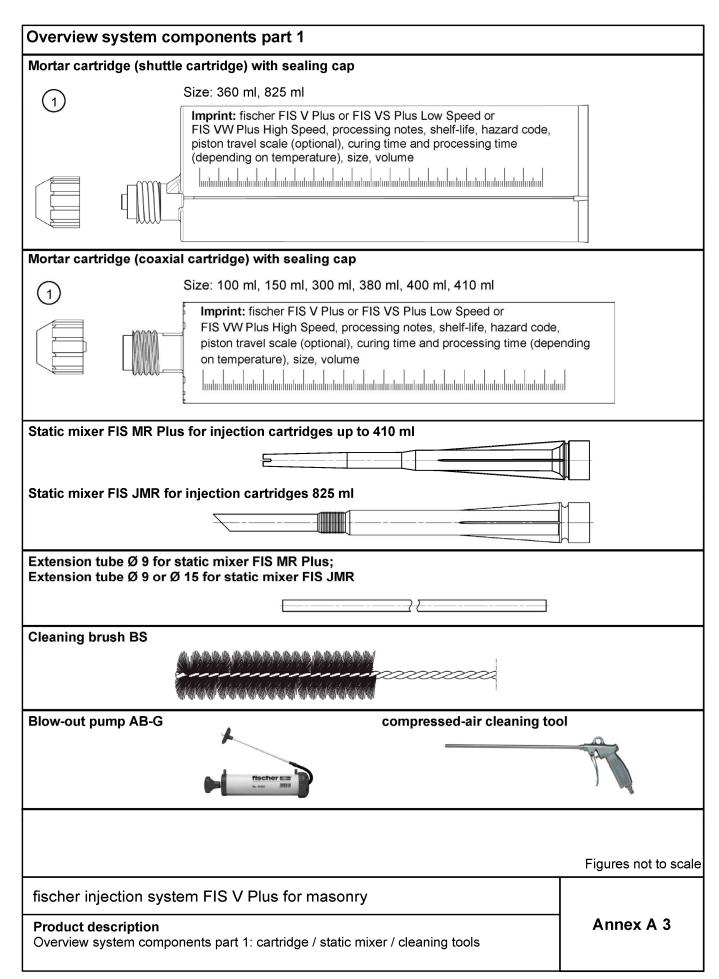
Product description

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

Annex A 2

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Overv	iew system components part 2	
fische	anchor rod	
2	Size: M6, M8, M10, M12, M16	
Interna	I threaded anchor FIS E	
5	Size: 11x85 M6 / M8 15x85 M10 / M12	
Perfor	ated sleeve FIS H K	
7	Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K	
7	Size: FIS H 16x130 K FIS H 20x130 K FIS H 20x200 K	
Perfor	ated sleeve FIS H K (push through anchorage)	
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	
Specia	conic drill bit PBB	
		Figures not to scale
fische	er injection system FIS V Plus for masonry	
Overv	ct description ew system components part 2: steel parts / perforated sleeve / conical drill bit / on adapter / centring sleeve	Annex A 4



Part	Part Designation Material						
1	Mortar cartridge	Mortar, hardener; filler					
'	Mortar cartriage			High corrosion resistant stee			
		zinc plated	acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015			
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated ≥ 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 10088-1:2014 f _{uk} ≤ 1000 N/mm² 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 10088-1:2014 $f_{uk} \le 1000$ N/mm ² A ₅ > 8% fracture elongation			
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, ISO 4042:2018 or hot-dip galvanised EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565;1.4529 EN 10088-1:2014			
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2012 zinc plated ≥ 5µm, ISO 4042:2018 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 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2014			
5	Internal threaded anchor FIS E	Property class 5.8; EN 10277-1:2008-06 zinc plated ≥ 5µm, ISO 4042:2018	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014			
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 4042:2018	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014			
7	Perforated sleeve and centring sleeve		PP / PE				
fisc	her injection sys	tem FIS V Plus for masor	nry				
	duct description erials			Annex A 5			



Specifications of intended use part 1

Anchorages subj	ect to	fischer inje	ction system	n FIS V Plus fo	or masonry
_	n hammer drill mode	all bricks; without C 28 to C 48, C 75 to C 7			78
	th rotary drill mode	all bricks			
Hole drilling with	special conic drill bit	Only C 118 to C 122			
-	uasi static load, nasonry	all bricks			
	e under tension and r loading	C 124 (Applie	es only to the	conditions of c	dry masonry)
Installation	Pre-positioned anchorage	Anchor rod o internal threaded a (in solid brick maso autoclaved aerated o	anchor nry and	Perforated sleeve with ancho or internal threaded ancho (in perforated and solid bri masonry) Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 16x130 I FIS H 20x85 K FIS H 20x200 I	
	Push through anchorage	Anchor rod; use only in cylindrical drill hole (in solid brick masonry and autoclaved aerated concrete)			sleeve with anchor rod ated and solid brick masonry) FIS H 18x130/200 K FIS H 22x130/200 K
Installation and use conditions	conditions d/d (dry/dry) conditions w/d (wet/dry) conditions w/w (wet/wet)	all bricks			
Installation direct	ion	D3 (dov	vnward and h	norizontal insta	llation)
Installation tempe	erature		_{min} = -10 °C to	o T _{i,max} = +40 °	C
In-service	Temperature range Tb	-40 °C to +80 °C (max. short term temperature +80 ° max. long term temperature +50 °C			
temperature	Temperature range Tc	-40 °C to +120 °C (max. short term temperal max. long term temperal			
fischer injecti Intended Use Specifications p	on system FIS V P	lus for masonry			Annex B 1



Specifications of intended use part 2

Anchorages subject to:

- Static and quasi-static loads
- · Resistance to fire under tension and shear loading

Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d),
 acc. to Annex B 13 / B 14.
- Hollow brick masonry (base material group c), according to Annex B 13 / B 14
- 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, Annex B under consideration of the β-factor according to Annex C 123, 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 A 5, Table A5.1.

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 2

Annex B 2



Specifications of intended use part 2 continued Design:

 The anchorages have to be designed in accordance with EOTA Technical Report TR 054:2022-07 (included the dimensioning for fire exposure), Design method A under the responsibility of an engineer 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 054:2022-07.

N_{Rk,s}, V_{Rk,s} and M⁰_{Rk,s} see annexes C 1-C 3

Factors for job site tests and displacements see annex C 123.

Verifiable calculation notes and drawings have to be prepared taking 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 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 mortar.
- Bridging of unbearing layer (e.g., plaster) masonry with solid bricks and cylindrical drill hole. At perforated brick masonry see Annex B 6, 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.
- Minimum curing time see Annex B 8, 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 A 5, 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 2 continued	Annex B 3



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 h	ef ¹⁾ 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 h in AAC conical drill hole	h _{ef,1} [mm]	-		75		_
mi / v to comoci ami noio	h _{ef,2} [mm]		95			
Effective anchorage depth h	hef,min [mm]			50		
in solid brick (depth of drill hole $h_0 = h_{ef}$)	h _{ef,max} [mm]	h-30, ≤200				
Diameter of clearance	pre-position d _f ≤[mm]	7	9	12	14	18
hole in the fixture	push 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 PC ¹⁾ 8.8	• or +	Steel hot-dip galvanised PC¹) 8.8	•
High corrosion resistant steel HCR PC ¹⁾ 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	*		

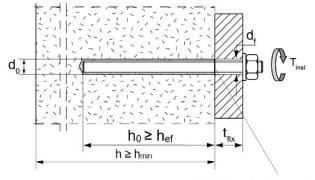
Alternatively: Colour coding according to DIN 976-1: 2016;

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

1) PC = property class

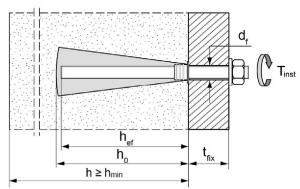
Installation conditions:

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

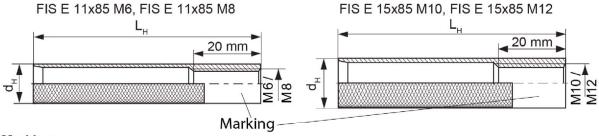
Annex B 4



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⊦[mm]	11 15			
Nominal drill hole diameter	d₀ [mm]	14 18			8
Length of anchor	L _H [mm]		8	35	
Effective anchorage depth	$h_0 = h_{ef}[mm]$	85			
Effective anchorage depth hef	h ₀ [mm]	100			
in AAC (conical drill hole)	h _{ef} [mm]	8	35		
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
Caraci in donth	I _{E,min} [mm]	6	8	10	12
Screw-in depth	I _{E,max} [mm]	60			

fischer Internal threaded anchor FISE

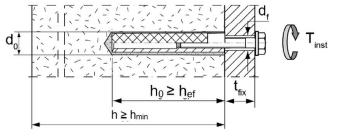


Marking:

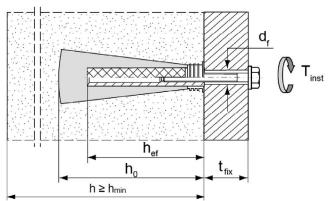
Size, e.g. M8, Stainless steel: R, e.g. M8 R, High corrosion resistant steel: HCR, e.g. M8 HCR

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 B 5



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

perforated sleeve FIS H K		12x50	12x85 ²⁾	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter $d_0 = D_{sleeve,nom}$ $d_0 [mm]$		12		16		20		
Depth of drill hole	h ₀ [mm]	55	90	90	135	90	135	205
Effective encharage depth	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 aı	M6 and M8 M8 and M10		М	M12 and M16		
Size of internal threaded anchor FIS E		-	-	11x85	-	15x85	-	-
Diameter of cleaning brush¹) d _b ≥[mm]		see Table B8.1						
Maximum installation torque	T _{inst} [Nm]	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;

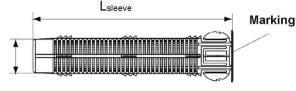
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

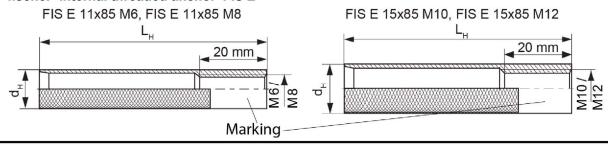
Size D_{sleeve, nom} x L_{sleeve} (e.g.: 16x85)



D_{sleeve, nom}

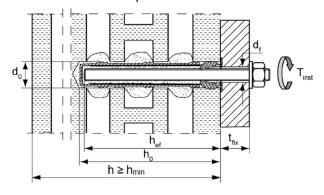


fischer Internal threaded anchor FIS E

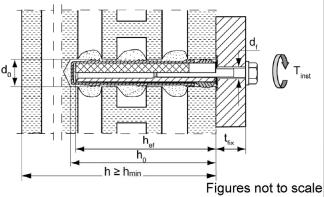


Installation conditions:

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 anchorage)

Annex B 6

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 anchorage)

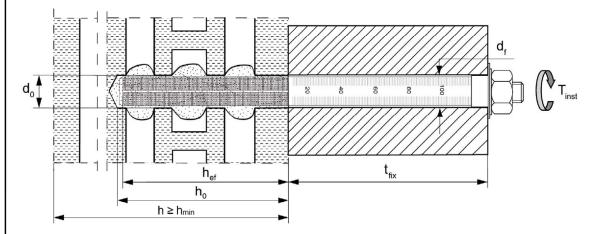
Perforated sleeve FIS H K		18x1	22x130/200			
Nominal sleeve diameter	1	20				
Nominal drill hole diameter	d₀ [mm]	1	22			
Depth of drill hole	h₀ [mm]					
Effective anchorage depth	h _{ef} [mm]] ≥130				
Diameter of cleaning brush 1)	d _b ≥ [mm]	see Table B8.1				
Size of threaded rod		M10	M12	M16		
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.

Perforated sleeve FIS H 18x130/200 K; FIS H 22x130/200 K Dsleeve heft the table to the table to

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 anchorage)

Annex B 7



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	d ₀ [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	>5 min	ı	-	12 h	ı	-	
> -5 to 0	5 min	>13 min	-	3 h	24 h	-	
> 0 to 5	5 min	13 min	>20 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

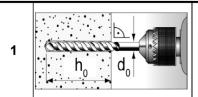
fischer injection system FIS V Plus for masonry	
Intended Use	Annex B 8
Cleaning brush (steel brush)	
Maximum processing times and minimum curing times	

²⁾ Minimum cartridge temperature +5°C.

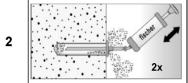


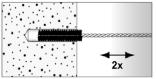
Installation instruction part 1

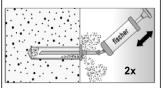
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)



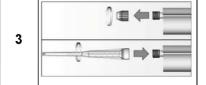
Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole h₀ and drill hole diameter d₀ see **Table B4.1**; **B5.1**







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



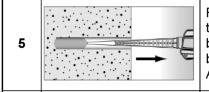
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



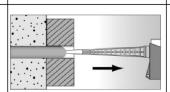
Place the cartridge into a suitable dispenser



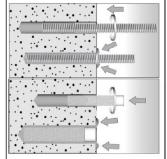
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



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



For push through anchorage 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.

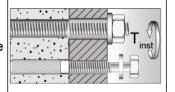
When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.

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

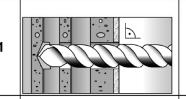
Annex B 9

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



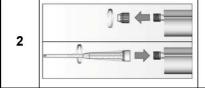
Installation instruction part 2

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



Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole h₀ and drill hole diameter do 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.

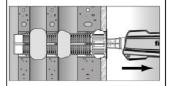


Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



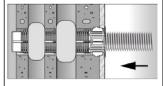


Insert the perforated sleeve flush with the surface of the masonry or plaster.



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



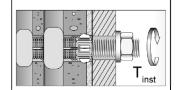


Only use clean and oil-free metal parts. Mark the ancher rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).





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

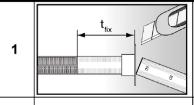
Annex B 10

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

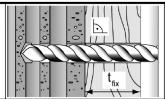


Installation instruction part 3

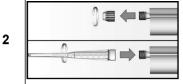
Installation in perforated or solid brick with perforated sleeve (push through anchorage)



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



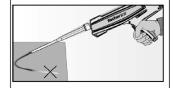
Drill the hole through the fixture. Depth of drill hole (h₀ + t_{fix}) and drill hole diameter see **Table B7.1**.



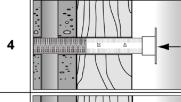
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



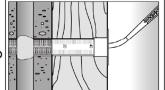
Place the cartridge into a suitable dispenser.



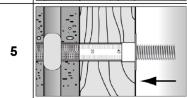
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



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



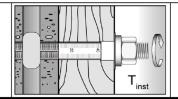
Fill the sleeve with mortar beginning from the bottom of the hole.¹⁾ For deep drill holes use an extension tube.



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 B 11

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

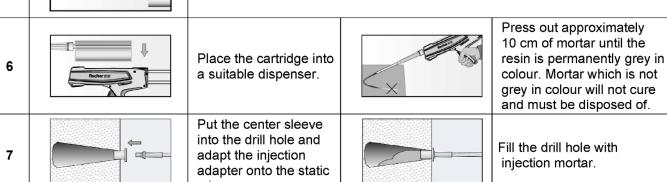


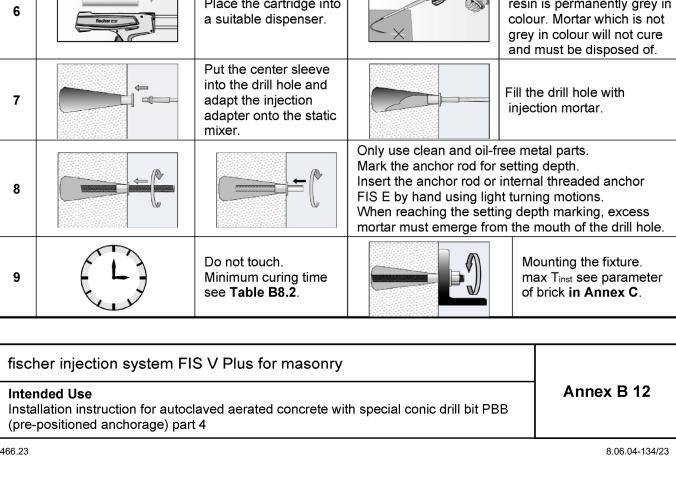
Installation instruction part 4 Installation in autoclaved aerated concrete with special conic drill bit PBB (pre-positioned anchorage) Position the movable drill bit arrester on the used drill hole depth (see **Table B4.1**). 1 For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw. Drill the cylindrical hole with rotating drill until the arrester contact the material 2 surface (drilling method see Annex C of the respective brick).

3	material.

Blow out the drill hole four times.

Remove the sealing cap. Screw on the static mixer. 5 (the spiral in the static mixer must be clearly visible).





Z101466.23



Kind of masonry	Brick format [mm]				Annex
	Sol	id brick Mz			
	NF ≥240x115x71	12 / 20 / 28	Germany	≥1,8	C4-C7
	2DF ≥240x115x113	10 / 16	Germany	≥1,8	C8/C9
Solid brick Mz	≥ 245x118x54	10 / 20	Italy	≥1,8	C 10 / C 1
	≥ 230x108x55	10 / 20	Denmark	≥1,8	C 12 / C 1
Solid calcium silid	cate (sand- lime) brick KS	/ perforated calciu	ım silicate (sa	nd- lime) bric	k KSL
	NF ≥240x115x71	12 - 28	Germany	≥2,0	C 14 / C 1
Solid calcium silicate	8DF ≥ 250x240x240	10 - 28	Germany	≥2,0	C 16 / C 1
brick KS	≥ 997x214x538	10 - 36	Netherlands	≥1,8	C 18 / C 1
	≥ 240x115x113	10 / 20	Germany	≥1,8	C 20 – C 2
Perforated calcium silicate brick KSL	3DF 240x175x113	8 - 20	Germany	≥1,4	C 24 – C 2
	Vertical pe	erforated brick HLz	2		
	370x240x237	4 - 12	Germany	≥1,0	C 28 / C 29
	500x175x237	4 - 12	Germany	≥1,0	C 28 / C 2
	2DF 240x115x113	6 - 28	Germany	≥1,4	C 30 / C 3
	248x365x248	4 - 8	Germany	≥0,6	C 32 – C 3
	248x365x249	8 - 12	Germany	≥0,7	C 36 – C 3
	248x365x249	4 / 6	Germany	≥0,5	C 40 – C 4
	248x425x248	4 - 8	Germany	≥0,8	C 44 – C 4
	248x425x248	4 - 8	Germany	≥0,8	C 48 – C 5
	500x200x315	4 - 8	Germany	≥0,6	C 52 – C 5
Vertical perforated	500x200x300	4 - 10	France	≥0,7	C 56 – C 5
brick HLz	500x200x315	2 - 8	France	≥0,7	C 60 – C 6
	560x200x275	4 - 8	France	≥0,7	C 64 / C 6
	255x120x118	2 - 12	Italy	≥1,0	C66 - C68
	275x130x94	6 - 20	Spain	≥0,8	C 69 / C 7
	220x190x290	6 - 10	Portugal	≥0,7	C 72 – C 7
	253x300x240	2 - 6	Austria	≥0,8	C 76 – C 7
	250x440x250	6 - 10	Austria	≥0,7	C 80 – C 8
	230x108x55	2 - 8	Denmark	≥1,4	C 84 / C 8
	365x248x245	8	Austria	≥0,6	C 86 / C 8
	240x175x113	10	Germany	≥0,9	C 90 / C 9



Table B14.1: Overview of assessed bricks part 2							
Kind of masonry	Brick format [mm]	mat compressive wain country of		Mean gross density ρ [kg/dm³]	Annex		
	Horiz	ontal perforated	brick LLz				
Horizontal perforated	248x78x250	2 - 6	Italy	≥0,7	C 94 / C 95		
brick LLz	128x88x275	2	Spain	≥0,8	C 96 / C 97		
	Light-wei	ght concrete ho	llow block Hbl				
12.14	362x240x240	2/4	Germany	≥1,0	C 98 – C 101		
Light-weight concrete hollow block Hbl	500x200x200	2 - 6	France	≥1,0	C 102 / C 103		
Hollow Block Hibi	440x215x215	4 - 10	Ireland	≥1,2	C 104 – C 107		
	Light-we	eight concrete so	olid block Vbl				
	≥ 372x300x254	2	Germany	≥0,6	C 108 / C 109		
Light-weight concrete	≥ 250x240x239	4 - 8	Germany	≥1,6	C 110 – C 113		
solid block Vbl	≥ 440x100x215	4 - 10	Ireland	≥2,0	C 114 / C 115		
	≥ 440x95x215	6 - 12	England	≥2,0	C 116 / C 117		
	Autocla	ved aerated cor	crete (AAC)				
PP2 / AAC	-	2	Germany	0,35	C 118 – C 122		
PP4 / AAC	-	4	Germany	0,5	C 118 – C 122		
PP6 / AAC	-	6	Germany	0,65	C 118 – C 122		

fischer injection system FIS V Plus for masonry	
Intended Use Overview of assessed bricks part 2	Annex B 14



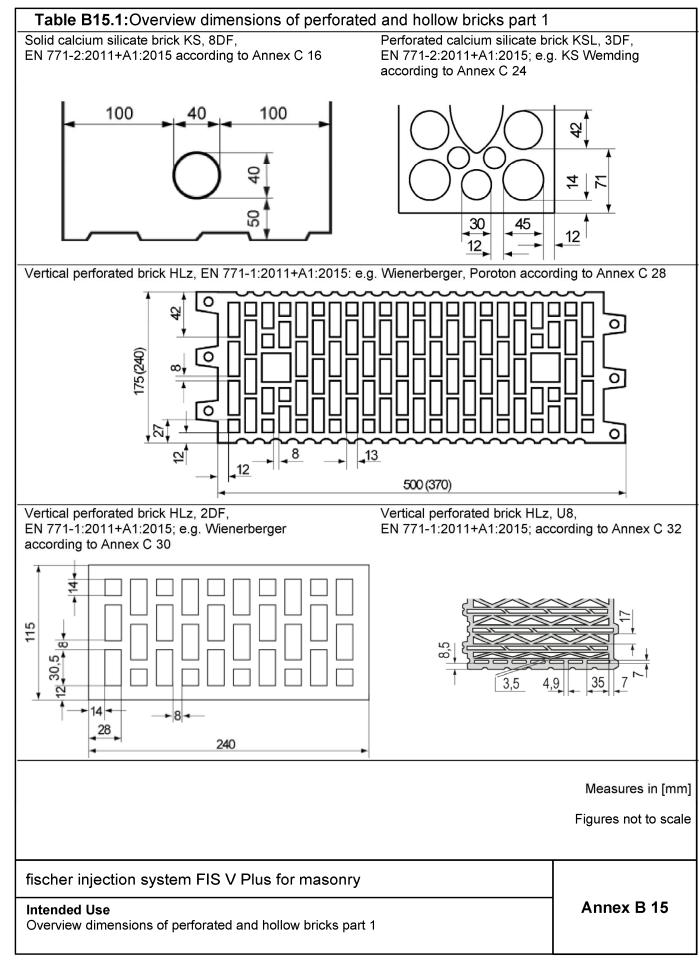
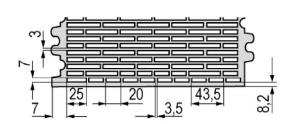


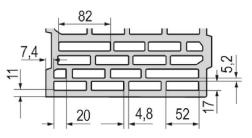


Table B16.1:Overview dimensions of perforated and hollow bricks part 2

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

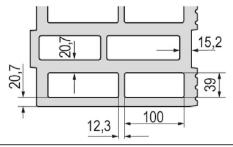
Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2011+A1:2015; according to Annex C 40

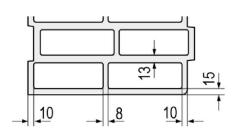




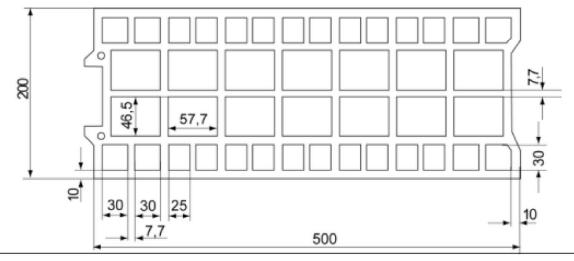
Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015; according to Annex C 44

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2015, according to Annex C 48





Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Bouyer Leroux; According to Annex C 52



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry	
Intended Use Overview dimensions of perforated and hollow bricks part 2	Annex B 16



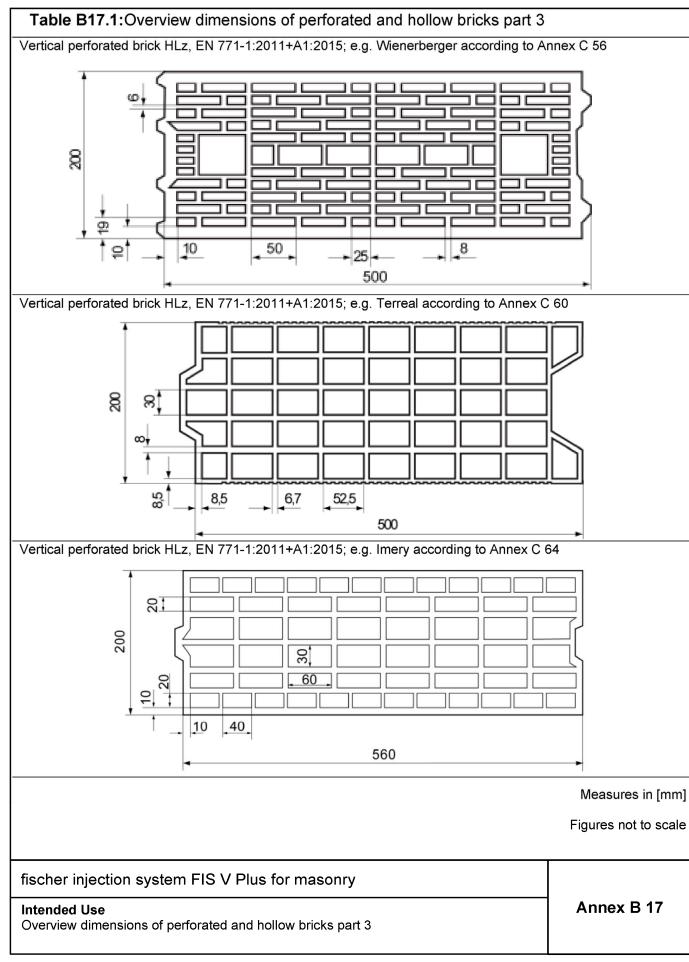
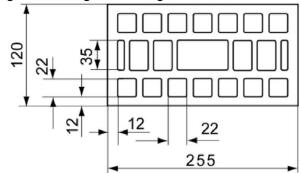




Table B18.1:Overview dimensions of perforated and hollow bricks part 4

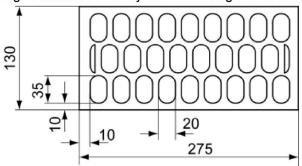
Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Wienerberger according to Annex C 66



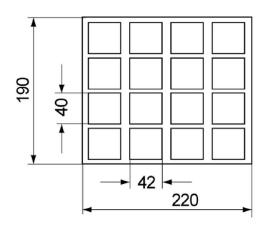
Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Cermanica Farreny S.A. according to Annex C 69



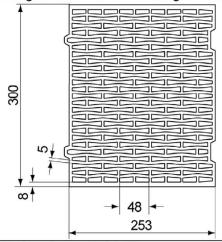
Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Perceram according to Annex C 72

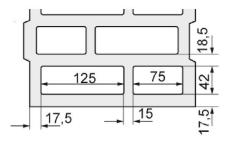


Vertical perforated brick HLz, EN 771-1:2011+A1:2015;

e.g. Ziegelwerk Brenna according to Annex C 76

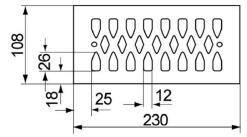


Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2011+A1:2015 according to Annex C 80



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

e.g. Wienerberger according to Annex C 84



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

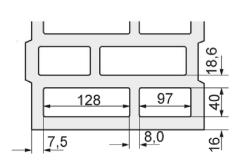
Overview dimensions of perforated and hollow bricks part 4

Annex B 18



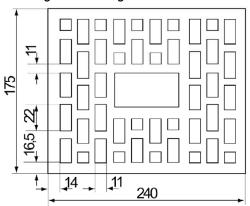
Table B19.1:Overview dimensions of perforated and hollow bricks part 5

Vertical perforated brick filled with mineral wool, EN 771-1:2011+A1:2015; according to Annex C 86



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

e.g. Wienerberger according to Annex C 90

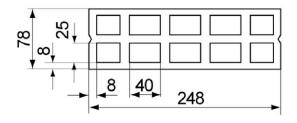


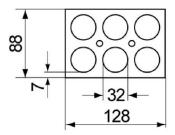
Horizontal perforated brick LLz,

EN 771-1:2011+A1:2015; according to Annex C 94

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

e.g. Cermanica Farreny S.A according to Annex C 96

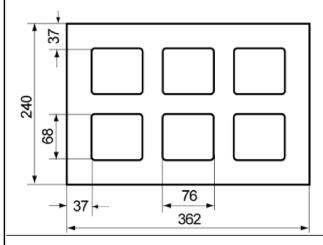


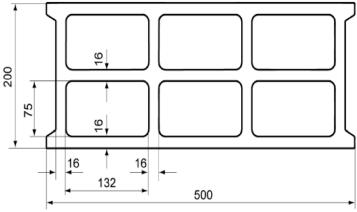


Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015; according to Annex C 98

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

e.g. Sepa according to Annex C 102





Measures in [mm] Figures not to scale

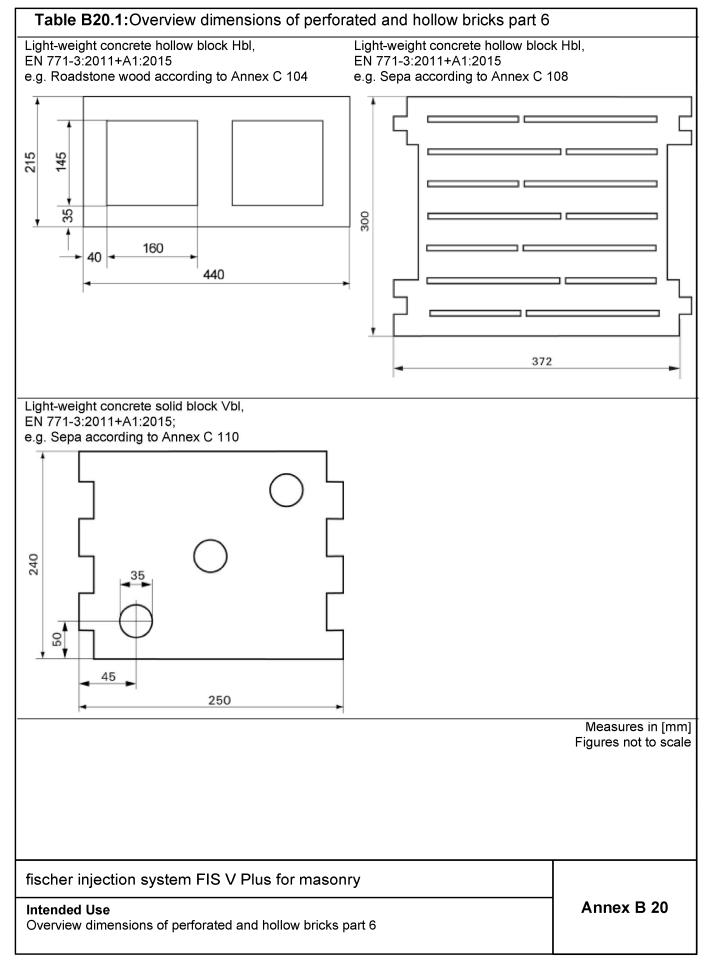
fischer injection system FIS V Plus for masonry

Intended Use

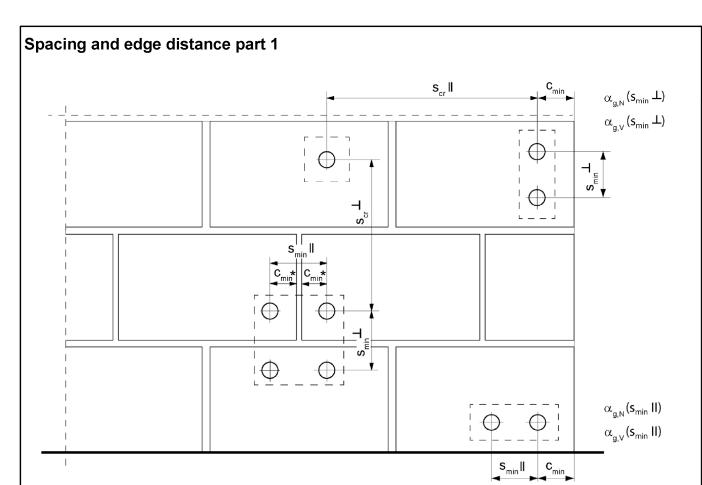
Overview dimensions of perforated and hollow bricks part 5

Annex B 19









* 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

 $s_{cr}\bot$ = Characteristic spacing perpendicular to horizontal joint

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

 $\alpha_{g,N}(s_{min} | I)$ = 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

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Figures not to scale

fischer injection system FIS V Plus for masonry	
Intended Use Spacing and edge distance part 1	Annex B 21



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

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

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

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

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

fischer injection system FIS V Plus for masonry

Intended Use

Spacing and edge distance part 2

Annex B 22



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

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	Ctool =inc 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 Se 1		Property	8.8	FLAND	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
ည်း	High corrosion resistant steel HCR	-	70		14,0	25,6	40,6	59,0	109,9
			80		16,0	29,2	46,4	67,4	125,6
Partia	al factors 1)								
			4.6		2,00				
	Ctaal =ina mlatad		4.8				1,50		
ยเร	Steel zinc plated		5.8				1,50		
[act		Property	8.8	.,			1,50		
Partial factors ‱, N	Stainless steel R and	class	50	- - -			2,86		
	High corrosion		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 of a single anchor under tension loading of fischer anchor rods and standard threaded rods	Annex C 1

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 of a single anchor under shear loading with and without lever arm of fischer anchor rods and standard threaded rods

Anch	or rod / standard	threaded re	od		M6	M8 ³⁾	M10 ³⁾	M12	M16
	acteristic resistar			unde		dina			
	out lever arm	100 10 01001	Tanara	, and	J. 511541 154				
			4.6		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
	Steel zinc plated		4.8		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
stic /Rk,s			5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1
Ge /		Property	8.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
Characteristic esistance V _{RK,s}	Stainless steel R		[kN]	5,0	9,1	14,5	21,0	39,2	
င် စို	High corrosion		70		7,0	12,8	20,3	29,5	54,9
⊢	resistant steel HCR		80		8,0	14,6	23,2	33,7	62,8
with I	ever arm								
Characteristic resistance Morks			4.6		6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
	Steel zinc plated		4.8	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
	Steel Zille plated		5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2
		Property class	8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9
ieristi M ^o r	Stainless steel R and		50		7,6	18,7	37,3	65,4	166,2
araci	High corrosion		70		10,6	26,2	52,3	91,5	232,6
ວິ	resistant steel HCR		80		12,2	29,9	59,8	104,6	265,9
Partia	al factors ¹⁾								
			4.6				1,67		
	Steel zinc plated		4.8				1,25		
SOCS	Steel Zinc plated		5.8				1,25		
al fact _{YMs,} ∨		Property	8.8] , ,			1,25		
Partial factors Y _{Ms,V}	Stainless steel R and	class	50	[-]			2,38		
മ്	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 of a single anchor under shear loading with and without lever arm of fischer anchor rods and standard threaded rods

Annex C 2

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.



fischer internal	thread	ed anchor	FIS E		M6	M8	M10	M12			
Characteristic r		ice to steel	failure	under	tension loadi	ng, decisive val	ues of slee	ve and			
		Property class	4.6		8,0	14,6	23,2	33,7			
Characteristic resistance	$N_{Rk,s}$	Property class	5.8	[kN]	10,0	18,3	29,0	42,1			
with screw		Property	R		14,0	25,6	40,6	59,0			
		class 70	HCR		14,0	25,6	40,6	59,0			
Partial factors ¹⁾											
Property 4.6 class			4.6			2,	00				
Partial factors	γMs,N	Property class	5.8	[-]	1,50						
		Property class 70	R HCR		1,87 1,87						
Characteristic r screw/threaded		ice to steel	failure	under	shear loading	g; decisive valu	es of sleev	e and			
without lever a											
Characteristic		Property class	4.6		4,8	8,7	13,9	20,2			
	$V_{Rk,s}$	Property class	5.8	[kN]	5	9	15	21			
		Property	R		7,0	12,8	20,3	29,5			
		class 70	HCR		7,0	12,8	20,3	29,5			
with lever arm											
		Property 4.6	4.6		6,1	14,9	29,9	52,3			
Characteristic resistance	M^0 Rk,s	Property class	5.8	[Nm]	7,6	18,7	37,3	65,4			
		Property	R		10,6	26,2	52,3	91,5			
		class 70	HCR		10,6	26,2	52,3	91,5			
Partial factors ¹⁾											
		Property class	4.6			1,	67				
Partial factors	γMs,V	Property class	5.8	[-]	1,25						
		Property class 70	$\frac{R}{HCR}$		1,56 1,56						
1) In absence o	f other i	national reg	ulations	3							
fischer injecti	on svs	tem FIS \	/ Plus	for ma	sonry						



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 / 15 / 12 or 25 / 20 $[N/mm^2]$ Min. compressive strength single brick1) 35 / 28

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

Standard or annex

Anchor rod			M6	M8	M10	M12	2 - 2			•	
Internal threaded	anchor FIS E		-	_	-	-	M6	M8	M10	M12 <85	
Anchor rod and int	ernal threaded anc	hor FIS E with	out perfor	ated sleev	e		117	.03	137	.03	
			50	50	50	50					
Effective anchorage depth	h _{ef}	[mm]	80	80	80	80	1	85			
anchorage depth			200	200	200	200					
Max. installation torque	max T _{inst}	[Nm]	4	4 10		4	10				
General installation	n parameters			•							
Edge distance	C _{min} = C _{cr}			10	100						
Edge distance hef=2	00 C _{min} = C _{cr}			1:	_2)						
	S _{min} II,N			6	60			6	0		
	h _{ef} =200 s _{min} II, _N	[mm]			_2)						
Spacing	S _{min} II,v			240							
	S _{cr} II				240						
	s _{cr} ⊥ = s _{min} ⊥			7	'5			7	5		

Drilling method

Hammer drilling with hard metal hammer drill

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- 2) No performance assessed

Table C4.2: Group factors

Anchor rods	Anchor rods			6 M8 M10 M12				-		-	
Internal three		_			M6	M8	M10	M12			
internal threa	aded anchor FIS E		-	-	-	-	112	k 85	15>	(85	
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								
0	h _{ef} =200 α _{g,V} (s _{min} II)	[-]	2,0								
Group factor	α _{α,N} (S _{min} ⊥)		2,0								
	αg,v (Smin ⊥)		2,0								
	h _{ef} =200 α _{g,N} (s _{min} ⊥)		2,0								
	h _{ef} =200 $\alpha_{g,V}$ ($s_{min} \perp$)		2,0								

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, NF, dimensions, installation parameters c=100mm	Annex C 4



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 anchor FIS E		-			М6	M8	M10	M12
	-		-	-	11x85		15x85	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength is, installation and use condition w/w, w/a, tru, (temperature range 50/00 0)												
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	≥50	≥50	50	Effe	ctive a	nchora 50	ige der 80	oth h _{ef} 200	[mm] 85		
15 / 12 N/mm ²	w/w w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0	3,5		
15 / 12 N/IIIII	d/d	4,0	4,0	3,5	5,0	12,0	3,0	5,5	8,0	5,5		
25 / 20 N/mm ²	w/w w/d	3,5	3,5	3,0	4,5	11,0	3,0	5,0	7,0	5,0		
25 / 20 N/MM ⁻	d/d	5,5	5,5	5,0	7,0	12,0	4,5	8,0	11,5	8,0		

¹⁾ The 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	M10	M12	-		-			
Internal threaded anch	_				M6	M8	M10	M12			
Internal threaded anchor FIS E		_	-	-	-	11x85		15x85			
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)											
Mean compressive	Hee	Effective anchorage depth hef [mm]									

Mean compressive strength / Min. compressive strength single brick 1)	Use	Effective anchorage depth hef [mm]								
	con- ditions	≥50	≥50	≥50	200	≥50	200	85		
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 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 C 123.

fischer injection system FIS V Plus for masonry

Performance
Solid brick Mz, NF, Characteristic resistance under tension and shear loading c=100mm

Annex C 5

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



Anchor rod			М6	M8	M10	M12	M16		-	-	
Internal threaded	anchor		_	_	_	_	_	M6	M8	M10	
FIS E								112	x85	15x	85
Anchor rod and in	nternal t	threade		1		1	50				
Effective	h .	[50 100	100	50 100	50 100	50 100			5	
anchorage depth	h _{ef}	[mm]	200	200	200	200	200		C	5	
Max. installation m	nax T _{inst}	[Nm]	4		1	0		4		10	
General installation	on para	meters									
Edge distance	C _{min} = C _{cr}					60					
Edge distance h _{ef} =200	Cmin					60					
	s _{min} II, _N					80					
h _{ef} =200	s _{min} II, _N	1				80					
Spacing ———	s _{min} II,v					80					
	S _{cr} II					3x h _{ef}					
	S _{min} ⊥	 				80					
	S cr⊥					3x h _{ef}					
Hammer drilling wi				II							
	ith hard i		rs		M10	M12	M16				
Hammer drilling wi Table C6.2: Anchor rods	Group	factor		II M8	M10	M12	M16	M6	- M18	- M10	M12
Hammer drilling wi Table C6.2: Anchor rods Internal threaded FIS E	Group	factor	rs		M10 -	M12 -	M16 -	M6	- M8 x85	- M10 15x	
Hammer drilling wire Table C6.2: Anchor rods Internal threaded	Group	factor	rs		M10 -	M12 - 60	M16 -		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance	Group	factor	rs		M10 -	- 60 0,6	M16 -		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance α _{g,N} α _{g,v}	Group anchor Cmin (Smin II)	factor	rs		M10 -	- 60 0,6 1,3	M16 -		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance α _{g,N} α _{g,V} h _{ef} =200 α _{g,N}	Group anchor Cmin (Smin II) (Smin II) (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4	M16 -		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance αg,N αg,ν hef=200 αg,ν hef=200 αg,ν	Group anchor Cmin (Smin II) (Smin II) (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance	Group anchor Cmin (Smin II) (Smin II) (Smin II) (Smin II) (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3	M16		l		
Hammer drilling with Table C6.2: Anchor rods Internal threaded FIS E Edge distance $ \frac{\alpha_{g,N}}{\alpha_{g,V}} $ $ \frac{h_{ef}=200 \alpha_{g,V}}{h_{ef}=200 \alpha_{g,V}} $ factor $ \frac{\alpha_{g,N}}{\alpha_{g,V}} $	Cmin (Smin II) (Smin II) (Smin II) (Smin II) (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3 1,3	M16 -		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance	Cmin (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3	M16		l		
Hammer drilling wire Table C6.2: Anchor rods Internal threaded FIS E Edge distance	Cmin (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3 1,3 2,0	M16		l		



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

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

Anchor rod	M6	M8	M10	M12	M16		-	-	
Internal threaded anchor						М6	M8	M10	V112
FIS E	-	-	_	_	_	112	(85	15x8	85

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)³⁾

Mean compressive strength / Min. com-	U:	se		I		l 1	ŀ	Effec	tive a	ancho	orage	dep	th h _{ef}	[mm] 	
pressive strength single brick 1)	con- ditions		50	100	50	100	50	100	200	50	100	200	50	100	200	85
15 / 12 N/mm ²	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 14/111111	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/mm ²	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/IIIII-	d,	/d	3	,5	4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12	_2)
35 / 28 N/mm ²	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)
35 / 20 N/IIIII	d,	d/d		,0	5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	_2)

- The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- 2) No performance assessed
- ³⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0.83 \cdot N_{Rk(50/80^{\circ}C)}$.

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

Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	_	_	-	-	-	М6	M8	M1 0	M12
I FIS E						11x	85	15x	(85

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive	Use						Effec	tive a	ncho	rage	dept	h h _{ef}	[mm]	
strength / Min. com- pressive strength single brick 1)	con- ditions	50	100	50	100	50	100	200	50	100	200	50	100	200	85
15 / 12 N/mm ²	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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

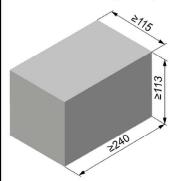
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, NF, Characteristic resistance under tension and shear loading c=60mm	Annex C 7

²⁾ No performance assessed.



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



Producer		ea	Wienerbe	rger
1 1044001		o.g.	***************************************	1901
Nominal dimensions	[mm]	length L	width W	height H
	נוווווון	≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm ³]		≥ 1,8	
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	12,5	/ 10 or 20	/ 16
Standard or annex		EN 771	-1:2011+ <i>A</i>	1:2015

Table C8.1: Installation parameters

Anchor rod			IV	16	IV	18	М	10	М	12	М	16		•		-
Internal thre	adad anabar	EIG E											M6	M8	M10	M12
internal tilre	aueu anchor	rio E			'		'			•		•	11>	(85	153	k 85
Anchor rod a	and internal	threade	led anchor FIS E without perforated sleeve													
Effective anchorage de	epth h _{ef}	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	
Max. instal- lation torque	max T _{inst}	[Nm]	4	4				1	0				4		10	
Anchor rod	and internal	threade	d and	chor F	IS E	with p	erfor	ated	sleev	e FIS	H 16x	85 K				
Effective anchorage de	epth h _{ef}	[mm]		2)		8	5			_2))		8	5		2)
Max. instal- lation torque	max T _{inst}	[Nm]		-/		10)				.,		4	10		-,
General inst	allation para	meters														
Edge distanc	e c _{min} = c _{cr}								6	30						
	s _{min} II	[mama]	120													
Spacing	s _{cr} II	S _{cr} II [mm] 240														
	$s_{cr} \perp = s_{min} \perp$								1	15						

Drilling method

Hammer drilling with hard metal hammer drill

- The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- 2) No performance assessed.

Table C8.2: Group factors

Anchor	rods		М6	M8	M10	M12	M16		•		-
Internal	threaded anchor	FIS E	-	-	-	-	-	M6	M8		M12
								112	(85	15	x85
	$lpha_{ extsf{g}, extsf{N}}$ (s _{min} II)					1,5					
Group	α _{g,V} (s _{min} II)	[-]				1,4					
factor	$\alpha_{\sf g,N}$ (S _{min} \perp)	ובין				2,0					
	$lpha$ g, \lor (S $_{min}$ \bot)					=,0					

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, 2DF, dimensions, installation parameters	Annex C 8



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	_	_	_	_	-	M6	M8	M10	M12	•	-	M6 I	VI8
anchor FIS E						112	(85	15)	(85			11x	85
Perforated sleeve FIS H K	_	-	-	-	-		-		-		16x	85	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive	Use						Effe	ective	anc	hora	ge de	pth h _{ef} [mm]	
strength / Min. compressive strength single brick 1)	con- ditions	50	100	50	100	50	100	50	100	50	100	85	
42 E / 40 N/mana2	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/mm²	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/mm²	w/w w/d	2,5	4,0	2,5	4,0	2,5	4,5	3,5	5,5	3,5	5,5	3,5	2,5
20 / 16 N/IIIII-	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

The 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	М6	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

Shear resistance $V_{Rk} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. com-	Use			pth h	n _{ef} [m	ım]								
pressive 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

The 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 C 123.

fischer injection system FIS V Plus for masonry

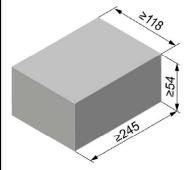
Performance
Solid brick Mz, 2DF, Characteristic resistance under tension and shear loading

Annex C 9

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



Producer		e.g. Nigra					
Nominal dimensions	[mm]	length L	width W	height H			
	funni	≥ 245	≥ 118	≥ 54			
Mean gross dry density ρ	[kg/dm ³]		≥ 1,8				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	12,5	/ 10 or 25	/ 20			
Standard or annex	EN 771-1:2011+A1:2015						

Table C10.1: Installation parameters

	_														
Anchor rod		N	16	IV	18	M	10	М	12	М	16		•		-
Internal threaded anchor												M6 M8		M10	M12
FIS E		'		,	-		-	'	-	'	-	11)	(85	15	x85
Anchor rod and internal	thread	led ar	anchor FIS E without perforated sleeve												
Effective anchorage depth hef	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	
Max. installation max T _{inst}	[Nm]	4	4				1	0				4			
General installation para	meter	s													
Edge distance c _{min} = c _{cr}			60												
Scr = Smin	[mm]] 245													
Spacing $\frac{s_{cr} \perp = s_{min} \perp s_{cr}}{s_{cr} \perp = s_{min} \perp s_{cr}}$]	60													

Drilling method

Hammer drilling with hard metal hammer drill

Table C10.2: Group factors

Anchor rods	i		M6	M8	M10	M12	M16		-		-
Internal thre	aded anchor							M6	M8	M10	M12
FIS E			-	-	-	-	-	112	c 85	15:	x85
	$\alpha_{\text{g,N}}$ (s_{min} II)										
Group factor	$\alpha_{\text{g,V}}$ (s _{min} II)	[-]				2					
Group ractor	$lpha_{ extsf{g}, extsf{N}}$ (s _{min} $oldsymbol{\perp}$)	ן נ־ <u>י</u>				2					
	$lpha_{ extsf{g,V}}$ ($ extsf{s}_{ extsf{min}}$ $oxdot$)										

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, dimensions, installation parameters	Annex C 10

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



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

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

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

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

				• •							
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50 85								
12,5 / 10 N/mm²	w/w w/c	0,60	0,90	0,75	0,75	0,75	0,60	0,75			
12,5 / 10 14/111111	d/d	1,20	1,50	1,20	1,20	1,20	1,20	1,20			
25 / 20 N/mm ²	w/w w/c	0,90	1,50	1,20	1,20	1,20	0,90	1,20			
25 / 20 N/IIIII-	d/d	1,50	2,50	2,00	2,00	2,00	1,50	2,00			

¹⁾ The 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 FIS E						М6	M8	M10	M12
Internal threaded anchor FIS E	-	-	-	-	-	11)	(85	15>	(85

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. com-	Use											
pressive strength single brick 1)	con- ditions				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	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5	6,0		

The 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 C 123.

fischer injection system FIS V Plus for masonry

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

Annex C 11

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 =100 Producer e.g. Wienerberger length L width W height H Nominal dimensions [mm] ≥ 230 ≥ 108 ≥ 55 [kg/dm³] Mean gross dry density ρ ≥ 1,8 Mean compressive strength / Min. 12,5 / 10 or 25 / 20 $[N/mm^2]$ compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015

Table C12.1: Installation parameters

															_	
Anchor rod			N	16	IV	18	M	10	М	12	М	16		•		-
Internal threade	d anchor						_						М6	M8	M10	M12
FIS E					'	-	'		'	-	'	•	11)	(85	15	x85
Anchor rod and	internal t	hread	led ar	nnchor FIS E without perforated sleeve												
Effective anchorage depth	h_{ef}	[mm]	50	90	50	90	50	90	50	90	50	90		8	5	
Max. installation torque	max T _{inst}	[Nm]	4	1				1	0				4	10		
General installat	tion para	meter	s													
Edge distance	c _{min} = c _{cr}			60												
Spacing Scr	$ = s_{min} $	[mm]	230													
Spacing	1 1	1		60												

60

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C12.2: Group factors

Anchor rods	i		M6	M8	M10	M12	M16		•		-
Internal threa	aded anchor		_	_	_	_	_	М6	M8	M10	M12
FIS E			_	_	_	_	_	11)	c 85	15:	x85
	$lpha_{ extsf{g,N}}$ (s _{min} II)										
Group factor	α _{g,V} (s _{min} II)	[-]				2					
Group ractor	$lpha_{ extsf{g}, extsf{N}}$ (Smin $oldsymbol{\perp}$)	[-]				2					
	$lpha_{ extsf{g,V}}$ ($ extsf{S}_{ ext{min}}$ $oxdot$)										

fischer injection system FIS V Plus for masonry	
Performance Solid brick Mz, dimensions, installation parameters	Annex C 12

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

Anchor rod	M6	M8	M10	M12	M16		•		-
Internal threaded anchor FIS E	-	-	-			M6	M8	M10	M12
				-	-	11)	(85	15	x85

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

				, , ,			,					
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	co	se on- ons		Effective anchorage depth h _{ef} [mm] ≥ 50 85								
12,5 / 10 N/mm²	w/w d/	w/d /d	0,60 1,20	0,90 1,50	0,75 1,20	0,75 1,20	0,75 1,20	0,75 1,20				
25 / 20 N/mm²	w/w d/	w/d /d	0,90 1,50	1,50 2,50	1,20 2,00	1,20 2,00	1,20 2,00	1,20 2,00				
						•						

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

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

Anchor rod		M6	M8	M10	M12	M16		-		-				
Internal threaded ancho	- EIG E					-	M6	M8	M10	M12				
internal threaded ancho	I FIS E	-	-	-	-		112	k 85	15>	x85				
	Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ;													
Installation and use cond	dition w/w,	w/d, d/d; (1	temperatu	re range 50	0/80°C and	72/120°C								
Mean compressive	Use		ı	Effective ar	ichorage de	epth h _{ef} [mr	n]							

strength / Min. com- pressive strength single brick 1)	Use con- ditions		t	≟πective ar ≥ 50	icnorage de	epin n _{ef} imr	nj 	85		
12,5 / 10 N/mm ²	w/w w/d d/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
25 / 20 N/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

The 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 C 123.

fischer injection system FIS V Plus for masonry

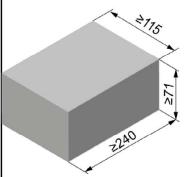
Performance
Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C 13

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



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



		55					
Producer			-				
Nominal dimensions	[mm]	length L	width W	height H			
Norminal dimensions	נוווווון	≥ 240	≥ 115	≥ 71			
Mean gross dry density ρ	[kg/dm ³]	≥ 1,8					
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	15 / 12 o	or 25 / 20 c	or 35 / 28			
Standard or annex		EN 771	-2:2011+ <i>A</i>	1:2015			

Table C14.1: Installation parameters

Anchor rod			N	16	IV	18	M	10	M	12	M	16				-
Internal threa	ided anchor												M6	M8	M10	M12
FIS E			<u>-</u>		-			•		-	-		11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective hef [m			50	100	100 50		50 100		50	100	50 100		Q	5	٥	5
anchorage de	pth 11ef	נוווווון	50	100	50	50 100		00	200		200		85		85	
Max. installation	on max T _{inst}	[Nm]	;	3	5		1	15		5	2	5	3	5	1	5
General insta	Illation para	meter	5													
Edge distance	C _{min} = C _{cr}								6	0						
_	s _{min} I								8	0						
s _{cr} II [mr									8	0						
Spacing -	s _{min} ⊥	.] [3x	$h_{\text{ef}} \\$						
	s cr⊥	. [3x h _{ef}													

Drilling method

Hammer drilling with hard metal hammer drill

Table C14.2: Group factors

Anchor rod			М6	M8	M10	M12	M16		•	-			
Internal threa	aded anchor		_	_	_	_	_	М6	M8	M10	M12		
FIS E			_	_	_	_	_	11)	(85	15)	x85		
	$\alpha_{\text{g,N}}$ (s _{min} II)					0,7							
Croup factor	α _{g,V} (s _{min} II)	r 1											
Group factor	$lpha_{ extsf{g}, extsf{N}}$ ($ extsf{s}_{ extsf{min}}$ $oldsymbol{\perp}$)	[-]											
	$lpha_{ extsf{g,V}}$ (s $_{ extsf{min}}$ $oxdot$)		2,0										

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, NF, dimensions, installation parameters	Annex C 14

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



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

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

Anchor rod	M6	M8	M10	M12	M16	M16 -			•
Internal threaded anchor					-	М6	M8	M10	M12
FIS E	-	-	-	-		11)	(85	15>	c 85

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

and garden and and an analysis and an analysis and an																	
Mean compressive strength / Min. com- pressive strength single brick 1)	Use con- ditions		50	100	50	100	50		tive a			e dep 200		ef [mm		85	85
15 / 12 N/mm²	w/w d/		2,0 4,0	3,0 5,5	2,5 4,0		2,5 4,0	3,5 5,5	7,0 12	2,5 4,0		6,5 12	2,5 4,5	3,5 5,5	8,0 12	2,5 4,0	2,5 4,0
25 / 20 N/mm²	w/w d/		3,0 5,5	4,5 7,5	3,5 6,0		3,5 6,0	4,5 8,0	10 12	3,5 6,0		9,5 12	4,0 6,5		11 12	3,5 6,0	3,5 6,0
35 / 28 N/mm²	w/w d/	w/d ⁄d	3,5 6,5	5,0 9,0	4,0 7,0	8,0 12	4,5 7,0	5,5 9,0	12 12	4,5 7,0		11 12	4,5 7,5	5,5 9,5	12 12	4,5 7,0	4,5 7,0

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

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

Anchor rod	М6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	•		-	-	-	M6 M8	M10 M12 15x85

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

			•	,	, ,		•	•						
Mean compressive	Use		Effective anchorage depth h _{ef} [mm]											
strength / Min. compressive strength single brick 1)	con- ditions	50	100	50	100	50	≥100	50	≥100	50	≥100	85	85	
15 / 12 N/mm²	w/w w/d d/d	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2	
25 / 20 N/mm²	w/w w/d d/d	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5	
35 / 28 N/mm²	w/w w/d d/d	3,0	4,5	3,0	4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	1,5	

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

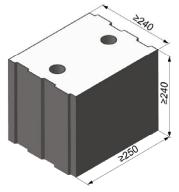
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, NF, Characteristic resistance under tension and shear loading	Annex C 15

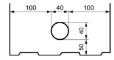
²⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0.83 \cdot N_{Rk(50/80^{\circ}C)}$.



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



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



10

Dimension see also Annex B 15

10

Table C16.1: Installation parameters

max T_{inst} [[Nm]

Anchor rod			IV	16	IV	18	М	10	М	12	M16		-		-	
Internal threaded anchor		or											M6	M8	M10	M12
FIS E			•		•	•	'	-	'		-		11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h _{ef}	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	

Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K

Effective anchorage depth hef	[mm]	_2)	85	2)	8	5	2)
Max. installation max T _{inst}	[Nm]		10		4	10	_2)

General installation parameters

Edge distance	e C _{min} = C _{cr}		60																	
_	s _{min} II		80																	
Chaoing	s _{cr} II	[mm]	3x h _{ef}																	
Spacing -	s $_{min} oldsymbol{\perp}$		80																	
	scr⊥																			3x h _{ef}

Drilling method

Max. installation

torque

Hammer drilling with hard metal hammer drill

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength
- 2) No performance assessed

Table C16.2: Group factors

Anchor ro	nor rods		М6	M6 M8 M10 M12 M16							-
Internal threaded anchor								M6	M8	M10	M12
FIS E			-	-	-	•	-	11)	11x85		x85
	ααΝ (Smin II)					1,5					
Group	α _{g,V} (s _{min} II)					1,2					
factors	$lpha_{\sf g,N}$ (S $_{\sf min}$ $oxdot$)	[-]				1,5					
	$\alpha_{g,V}$ (S _{min} \perp)					1,2					

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 16



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	-		-			-		-		M10	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 M8 11x85		-	M12 x85	-	-	M6 M8 11x85				
Perforated sleeve FIS H K	-	-	-	-	-	-					16x8	5				

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

_										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50 85							
12,5 / 10 N/mm ²	w/w w/d		4,0	4,5	4,5	3,5	3,0	3,5	4,5	3,0 4,5
12,01101111111	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
35 / 28 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
	d/d	8,5	12,0	12,0	12,0	11,0	8,5	11,0	12,0	8,5 12

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

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

Anchor rod	M6	M8	M10	M12	M16	-		-		M8	M10	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x		-	M12 x85	-	-	M6 M8 11x85
Perforated sleeve FIS H K	-	-	-	-	-	-			-		16x8	5

Shear resistance $V_{Rk} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive	Use	Effective anchorage depth hef [mm]									
strength / Min. com- pressive strength single brick 1)	con- ditions		≥ 50	85							
12,5 / 10 N/mm ²	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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

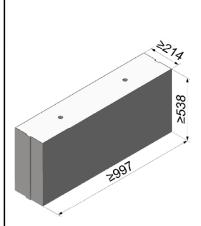
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, 8DF, Characteristic resistance under tension and shear loading	Annex C 17

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



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



Producer	e.g. Calduran					
Nominal dimensions	[mm]	length L	width W		height H	
INOTHINAL CHILDRIS	נוווווון	≥ 997	≥ 2	214	≥ 538	
Mean gross dry density $ ho$	[kg/dm³]	1,8			2,2	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	12,5 / 10 25 / 20		4	5 / 36	
Standard or annex		EN 771	-2:20	11+	1:2015	

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Table C18.1: Installation parameters

Anchor rod	Anchor rod			M6		M8		M10		M12		16	-		-	
Internal threaded anchor													M6	M8	M10	M12
FIS E			'	-	'	-		-		-	'	•	11x85 15			k 85
Anchor rod and	internal t	threac	led ar	nchor	FIS E	with	out pe	erforat	ted sl	eeve						
Effective anchorage depth	h _{ef}	[mm]	50	100	50	100	50	100	50	100	50	100		8	5	
Max. installation torque	max T _{inst}	[Nm]	,	4	10 4					10						

General installation parameters

Edge distan	ICE Cmin = Ccr		75
Specine	s _{cr} II = s _{min} II [m	nm][3x h _{ef}
Spacing	$s_{cr} \perp = s_{min} \perp$		3x h _{ef}

Drilling method

Hammer drilling with hard metal hammer drill

Table C18.2: Group factors

Anchor roo	d	M6	M8	M10	M12	M16		•	-	
Internal threaded anchor		_			_	_	M6	M8	M10	M12
FIS E		-	-	-	-	-	11)	(8 5	15	x85
	α _{g,N} (s _{min} II)									
Group	$\frac{\alpha_{g,V} (s_{min} II)}{(s_{min} II)} $ [-]				2					
factors	$\alpha_{\sf g,N}$ (S _{min} \perp)				2					
	$lpha_{ extsf{g,V}}$ (s _{min} $oldsymbol{\perp}$)									

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, dimensions, installation parameters	Annex C 18

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



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	М6	M8	M10	M12	M16	-		-	
Internal threaded anchor						M6	M8	M10	M12
FIS E	-	-	-	-	-	11x85		15	k 85

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

•													
Mean compressive	Us	9				E	Effectiv	e anc	horage	e dept	h h _{ef} [r	nm]	
strength / Min. com- pressive strength single brick 1)	con- ditions		50	100	50	100	50	100	50	100	50	100	85
12,5 / 10 N/mm ²	w/w	/w w/d		,0	4,0	7,0	5,0	6,0	5,0	6,0	5,5	7,5	5,5
12,5 / 10 N/IIIII	d/	d 7		,0	7,0	12,0	8,0	9,5	8,0	10,0	9,0	11,5	9,0
25 / 20 N/mm ²	w/w	w/d	5	,5	6,0	10,0	7,0	8,5	7,0	9,0	8,0	11,0	8,0
25 / 20 N/IIIII	d/	d	8	,5	10,5	12,0	11,5	12,0	11,0	12,0	12,0	12,0	12,0
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	12,0
45 / 36 N/mm²	d/	d	8	,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0

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

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

Anchor rod	M6	M8	M10	M12	M16	-			
Internal threaded anchor						М6	M8	M10	M12
FIS E	-	-	-	-	-	11x85		15x85	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive	Us	se			Effective an	chorage der	oth hef [mm]						
strength / Min. com- pressive strength single brick 1)	co ditio			≥ 50 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/	a								, i			
25 / 20 N/mm²	w/w d/	w/d d	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0		
45 / 36 N/mm ²	w/w	w/d	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0		
45 / 55 N/IIIII	d/	ď	7,5	5,0	11,0	12,0	12,0	7,5	3,0	1 1,0	12,0		

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

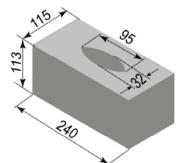
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, Characteristic resistance under tension and shear loading	Annex C 19

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



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



Producer			-		
Nominal dimensions	[mm]	length L	width W	height H	
Norminal dimensions	[mm]	≥ 240	≥ 115	≥ 113	
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	
Standard or annex		EN 771	-2:2011+	1:2015	

Table C20.1: Installation parameters

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

Anchor rod	М6	M8	-		M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded			М6	M8		-				M12	-			
anchor FIS E	'	-		11x85			<u> </u>		15x85					•
Perforated sleeve FIS H K	12	x85	162		x85		16x	130	20		x85		20x	130

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}		100												
Spacing	s _{min} s _{cr} s _{min} ⊥ s _{cr} ⊥	255	255	390	255	390									

Drilling method

Hammer drilling with hard metal hammer drill

Table C20.2: Group factors

Anchor r	od	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforate	Perforated sleeve FIS H K		12x85		16x85		16x130		20x85		130
Group factors	$\frac{\alpha_{g,N} (s_{min} II) = \alpha_{g,V} (s_{min} II)}{\alpha_{g,N} (s_{min} \bot) = \alpha_{g,V} (s_{min} \bot)} [-1]$	1				;	2				

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, dimensions, installation parameters	Annex C 20

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



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

Table C21.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	anchor rod			M12	M16						
Perforated sleev	erforated sleeve FIS H K			0/200	22x130/200						
Anchor rod with	n perforat	ed sleeve	FIS H K								
Max. installation torque	max T _{inst}	[Nm]		4							
General installa	tion para	meters									
Edge distance	C _{min} = C _{cr}			10	00						
	s _{min} II		390								
Caasias	Scr II	[mm]		39	00						
Spacing	s _{min} ⊥			39	90						
	s _{cr} ⊥			39	90						
Drilling method											
Hammer drilling	with hard i	metal han	nmer drill								

Table C21.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Solid calcium silicate brick KS, dimensions, installation parameters

Annex C 21



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 anchorage)

Anchor rod	M6	M8		-	M8	M10	M8 M10		-		M12	M16	M12	M16
Internal threaded anchor FIS E	-	•	M6	M6 M8 11x85		-		_		M10 M12 15x85		_		•
Perforated sleeve FIS H K	12>	(85	16x		x85		16x	130	20		x85		20x130	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. com- pressive 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
	d/d	6,0	4,0	3,5	3,5	10,5	7,0
25 / 20 N/mm ²	w/w	5,0	3,0	3,0	3,0	9,5	6,0
25 / 20 N/MM²	d/d	8,5	5,5	5,5	5,5	12,0	10,0

The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FI	SHK	18x13	30/200	22x130/200
Tension resistance N strength f _b ; Installation				on the mean compressive ge 50/80°C) ²⁾
Mean compressive strength / Min. com- pressive strength single brick 1)	Use con- ditions			
12,5 / 10 N/mm²	w/w		.0	4,5
12,0 / 10 10	d/d	3	,5	7,0
25 / 20 N/mm ²	w/w	3	.0	6,0
25 / 20 N/IIIII	d/d	5	,5	10,0

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, Characteristic resistance under tension loading	Annex C 22

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 anchorage)

Anchor rod	M6	M8	-		M8	M10	M8	M8 M10		-		M16	M12	M16
Internal threaded anchor FIS E		•	M6	M8 1x85		-		-		M12 x85			_	
Perforated sleeve FIS H K	12>	(85	16>		x85		16x	130	20		0x85		20x130	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾

Totaliation and documents, and, (tomporature range co., co.,											
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions										
12,5 / 10 N/mm²	w/w d/d	3,0	3,5								
25 / 20 N/mm²	w/w d/d	4,0	5,5								

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS	нк	18x13	0/200	22x130/200
Shear resistance V _{Rk} : Installation and use c	= V _{Rk,b} = V ondition v	v _{Rk,c,II} = V _{Rk,c,⊥} [kN] de v/w, d/d; (temperatu	epending on the m re range 50/80°C) ²	ean compressive strength f _b ;
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions			
12,5 / 10 N/mm ²	w/w d/d		3	,5
25 / 20 N/mm²	w/w d/d		5	,5

The 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 C 123.

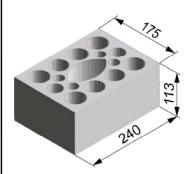
fischer injection system FIS V Plus for masonry	
Performance Solid calcium silicate brick KS, Characteristic resistance under shear loading	Annex C 23

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

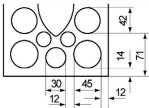
²⁾ For temperature range 72/120°C no performance assessed.



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



Producer	_				
Producer	-				
Nominal dimensions	[mm]	length L	width W	height H	
	[111111]	240	175	113	
Mean gross dry density ρ	[kg/dm³]	≥ 1,4			
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	10 / 8 or 12,5 / 10 or 15 / 12 or 20 / 16 or 25 / 20			
Standard or annex	EN 771-2:2011+A1:2015				



Dimension see also Annex B 15

Table C24.1: Installation parameters

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

Anchor rod	М6	M8	M6	M8		-	M8	M10	M8	M10	-	١	V 112	M16	M12 I	M16
Internal threaded anchor FIS E		-		•	M6	M8 x85		-		-	M10 M ²	-		•	-	
Perforated sleeve FIS H K	12:	x50	12)	(85		162	k 85		16x	130	2	0x8	35		20x1	130

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

Max. installation torque max T_{inst} [Nm]

General installation parameters

		<u> </u>								
Edge distance	c _{min} = c _{cr}	60	80							
Conneiro	s _{min} II		100							
	s _{cr} II [mm]		240							
Spacing	s _{min} ⊥		115							
	s _{cr} ⊥	115								

Drilling method

Hammer drilling with hard metal hammer drill

Table C24.2: Group factors

Anchor rod		M6	M8	M6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E			-		-	M6 112	M8 x85		-		-		M12 x85	1	-		-
Perforated sleeve FIS H K		12	x50	12	x85	16x		x85		16x130		20x85		20x	130		
$\begin{array}{c c} \alpha_{g,N} (s_{min} II) = \\ Group & \alpha_{g,V} (s_{min} II) \end{array}$									1,	,5							
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} = \alpha_{g,V} (s_{min} \perp)$					2,0											

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 24

The 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 anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16		
Perforated slee	erforated sleeve FIS H K			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	meter	S				
Edge distance	$c_{min} = c_{cr}$			80			
	s _{min} II			100)		
Chasina	s _{cr} II	[mm]		240)		
Spacing	$s_{min} \bot$			115	5		
	s _{cr} ⊥			115	5		
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	18x13	30/200	22x130/200	
Group	$\frac{\alpha_{g,N} (s_{min} II)}{\alpha_{g,V} (s_{min} II)}$		1	,5	
Group 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	Annex C 25



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 anchorage)

Anchor rod	M6 M8	M6 M8	-	M8 M10	M8 M10	-	M12 M16	M12 M16
Internal threaded		-	M6 M8			M10 M12		
anchor FIS E	_		11x85	-	-	15x85	•	-
Perforated sleeve FIS H K	12x50	12x85	16	x85	16x130	20x	(85	20x130

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

arengen is, metamation and accordination with, was aren ferringe cores of											
Mean compressive strength / Min. compressive strength single brick 1)	Us cor ditio	า-									
10 / 8 N/mm²	w/w	w/d	1,5	2,0	2,0	2,0	2,0				
	d/d		1,5	2,0	2,5	2,5	2,5				
12,5 / 10 N/mm ²	w/w	w/d	2,0	2,0	2,5	2,5	2,5				
12,57 10 14/111111	d/d		2,0	2,5	3,0	3,0	3,0				
15 / 12 N/mm²	w/w	w/d	2,5	2,5	3,0	3,0	3,0				
15 / 12 14/11111	d/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 / 16 N/IIIII-	d/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/MM²	d/d	d	4,5	5,0	6,0	6,0	6,0				

The 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 anchorage)

Anchor rod			M10	M12	M16								
Perforated sleeve FIS H I	<		18x	130/200	22x130/200								
Tension resistance N_{Rk} = strength f_b ; Installation an					on the mean compressive range 50/80°C) ²⁾								
Mean compressive strength / Min. compressive strength single brick 1)	Us cor ditio	۱-											
10 / 8 N/mm²	w/w d/d			2.0 2,5									
12,5 / 10 N/mm²	w/w d/d				2.5 3,0								
15 / 12 N/mm²	w/w d/d				3.0 3,5								
20 / 16 N/mm²	w/w d/d				4.5 4,5								
25 / 20 N/mm²	w/w d/d				5.5 6,0								

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under tension loading	Annex C 26

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).



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 anchorage)

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 <85		-		-	M12 x85	1	-		-
Perforated sleeve FIS H K	12	k 50	12)	(85		16:	(85		16x	130	20	x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

motanation and use c	onanion v	v/ vv, v	wa, c	<i>ar</i> u, (remp	ciall	ire range 50/60 C and 12/120 C)			
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions									
10 / 8 N/mm ²	w/w w/d d/d			1,5			3,0	2,5	3,0	2,5
12,5 / 10 N/mm²	w/w w/d d/d			2,0			3,5			
15 / 12 N/mm²	w/w w/d d/d			2,5			4,5	4,0	4,5	4,0
20 / 16 N/mm ²	w/w w/d d/d	3,0	3,5	3,0	3,5	3,0	6,0	5,5	6,0	5,5
25 / 20 N/mm ²	w/w w/d d/d	4,0	4,5	4,0	4,5	4,0	7,5	6,5	7,5	6,5

The 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 anchorage)

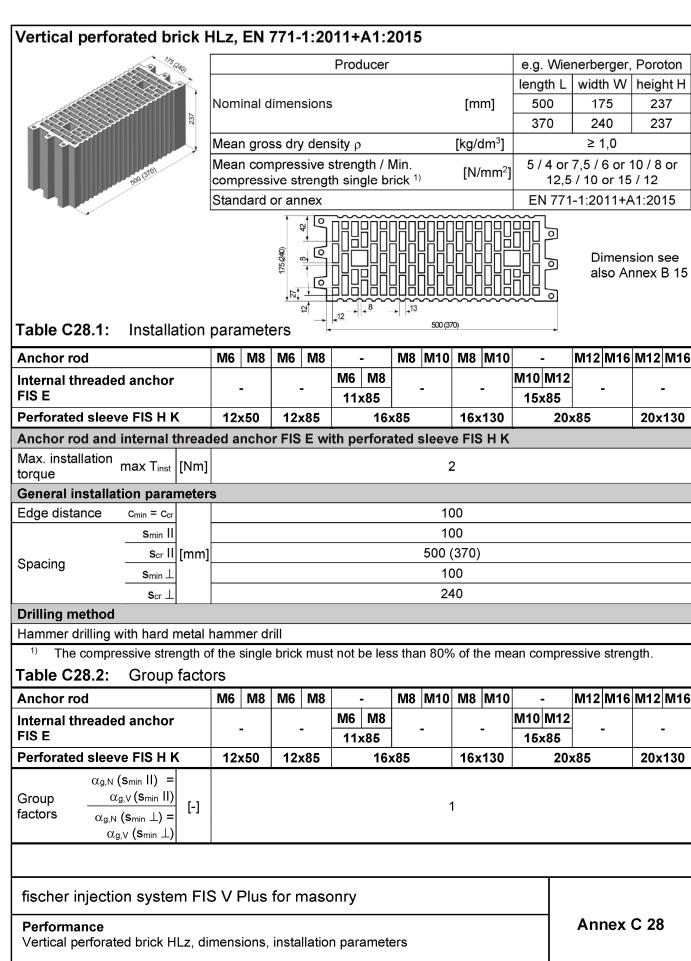
Anchor rod		M10	M12	M16							
Perforated sleeve FIS	HK	18x13	30/200	22x130/200							
	Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c, } = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)										
Mean compressive strength / Min. compressive strength single brick 1) Use conditions											
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 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading	Annex C 27







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

Table C29.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded		- -		-	М6	M8					M10	M12				
anchor FIS E	-				11x85] -			-	15x85] '	-		•
Perforated sleeve FIS H K	12>	(50	12	x85		16	3x85		16x	130		20:	x85		20x	130

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾

suchigan ib, mistanation o	illa asc co	ilaition www, wa,	ura, (temperature range 30/00 C)	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
5 / 4 N/mm ²	w/w w/d	0,30	0,90	1,20
	d/d	0,40	0,90	1,20
7,5 / 6 N/mm ²	w/w w/d	0,50	1,50	2,00
7,57514/11111	d/d	0,60	1,50	2,00
10 / 8 N/mm²	w/w w/d	0.75	2.00	2,50
107014/111111	d/d	0,75	2,00	2,50
12,5 / 10 N/mm²	w/w w/d	0,90	2,50	3,00
12,57 10 14/111111	d/d	0,90	2,50	3,50
15 / 12 N/mm²	w/w w/d	0,90	3,00	3,50
15 / 12 N/MIII-	d/d	1,20	3,00	4,00

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

Table C29.2: 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	M8	M10	_		M12	V116	M12	V 116
Internal threaded anchor FIS E		•		-	M8 x85		-		-	M10 15x		-		•	
Perforated sleeve FIS H K	12>	(50	12	x85	16	x85		16x	130		20:	x85		20x1	30

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

motamation and doo come	,	ma, ara, (componacaro rango ouro		: · · · ·	
Mean compressive stre- ngth / Min. compressive strength single brick 1)	Use con- ditions				
5 / 4 N/mm ²		0,50	0,60	0,50	0,60
7,5 / 6 N/mm ²	w/w	0,75	0,90	0,75	0,90
10 / 8 N/mm ²	w/d	0,90	1,20	0,90	1,20
12,5 / 10 N/mm ²	d/d	1,20	1,50	1,20	1,50
15 / 12 N/mm ²		1,50	2,00	1,50	2,00

¹⁾ The 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 C 123.

fischer injection system	FIS V Plus for masonry
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Performance

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

Annex C 29

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	HI z 2DF F	N 771-1-20	11+Δ1-201	5							
	Producer				0.0	\\/ienorb	arger				
1715					e.g. length L	Wienerbe width W	height H				
	Nominal dimen	sions		[mm]	240	115	113				
£ 85	Mean gross dry	y density ρ		[kg/dm ³]	'	≥ 1,4					
	Mean compres Min. compressi		7,5 / 6 or 12,5 / 10 or 20 / 16 or 25 / 20 or 35 / 28								
240	Standard or an		mgio prior		EN 771-1:2011+A1:2015						
	n parameters	115			•		ision see nnex B 15				
Anchor rod	M6 M8	M6 M8	-	M8 M1	10 -	N	112 M16				
Internal threaded anchor FIS E	-	-	M6 M8	-	M10	M12	-				
Perforated sleeve FIS H K	12x50	12x85	162	(85	13%	20x8	5				
Anchor rod and internal threa	aded anchor Fl	S E with per	forated sleev	e FIS H K							
Max. installation max T _{inst} [Nn torque	וו		2	2							
General installation parameter	ers										
Edge distance c _{min} = c _{cr}			8								
Spacing $\frac{\mathbf{s}_{cr} \mathbf{II} = \mathbf{s}_{min} \mathbf{II}}{\mathbf{s}_{cr} \perp = \mathbf{s}_{min} \perp} [mn]$	nj		24	15							
Drilling method											
Hammer drilling with hard meta	l hammer drill										
Table C30.2: Group fac	tors		e less than 80%	,							
Anchor rod	M6 M8	M6 M8	-	M8 M1			112 M16				
Internal threaded anchor FIS E	-	-	M6 M8	-	M10 15x	M12	-				
Perforated sleeve FIS H K	12x50	12x85		(85		20x8	5				
$\begin{array}{c} \alpha_{\text{g,N}}\left(\textbf{s}_{\text{min}}\ \textbf{II}\right) \\ \alpha_{\text{g,V}}\left(\textbf{s}_{\text{min}}\ \textbf{II}\right) \\ \alpha_{\text{g,N}}\left(\textbf{s}_{\text{min}}\ \bot\right) \\ \hline \alpha_{\text{g,V}}\left(\textbf{s}_{\text{min}}\ \bot\right) \end{array} [\text{-}]$			2	2							
fischer injection system F Performance Vertical perforated brick HLz,			narametere			Annex	C 30				
vortion portorated brick FILZ,	LDI , MITIGIISION	o, motanation	paramoters								



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

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength ib, mstanation and	use co	Jiiaiu)	i, ara, (teri	iperature range 30/00	0)
Mean compressive strength / Min. compressive strength single brick 1)	co	se n- ons				
7,5 / 6 N/mm ²	w/w	w/d	0.75	0.90	0.75	0.90
7,57 6 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 14/111111	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
20 / 10 14/111111	d,	/d	2,00	3,00	2,00	2,50
25 / 20 N/mm²	w/w	w/d	2,50	3,50	2,50	3,00
25 / 20 N/IIIII-	d,	/d	2,50	4,00	2,50	3,00
35 / 28 N/mm²	w/w	w/d	3,00	5,00	3,50	4,00
35 / 20 14/111111	d,	/d	3,50	5,50	3,50	4,50

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

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

Anchor rod	M6	M8	M6	M8		-	M8	M10		-	M12	M16
Internal threaded		_		-	M6			-	M10	M12		-
	12	ν.Ε.Ο.	42	, O F	112	x85	6v0E		15	k85	,0 <i>E</i>	
Perforated sleeve FIS H K	12	x50	122	x85		1	6x85			202	(8 5	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

	··· ,	, ,	,00000					· · · · · · · · · · · · · · · · · · ·
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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

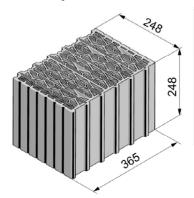
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, 2DF, Characteristic resistance under tension and shear loading	Annex C 31

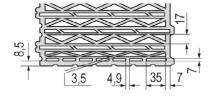
²⁾ For temperature range 72/120°C: $N_{Rk,(72/120^{\circ}C)} = 0.83 \cdot N_{Rk,(50/80^{\circ}C)}$.



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



and the second s				
Producer		e.g.	Wienerbe	erger
Nominal dimensions	[mm]	length L	width W	height H
INOTHINAL difficults	[mm]	248	365	248
Mean gross dry density ρ	[kg/dm³]		0,6	
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+/	41:2015



Dimension see also Annex B 15

 Table C32.1:
 Installation parameters

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

Anchor rod	М6	M8	М6	M8		3	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E		•	,	-	M6	M8 (85		-		-	M10 M12 15x85	_	•	-	•	•	•
Perforated sleeve FIS H K	12>	<50	12	x85		162	x 85		16x	130	20:	x85		20x	130	20x	200

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

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

General installation parameters

Edge distan	ce c _{min} = c _{cr}		60
	s _{min} II		80
Cassina	s _{cr} II	[mm]	250
Spacing	s $_{min} \perp$		80
	s _{cr} ⊥		250
	41 1		

Drilling method

Rotary drilling with carbide drill

Table C32.2: Group factors

Anchor rod	l		М6	M8	М6	M8		-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal thr anchor FIS				•		-	M6 112	M8 <85	,	•		-	M10 M1 15x85	2	-				-
Perforated	sleeve FIS H K		12)	<50	12	x85		162	(85		16x	130	20	x85		20x	130	20x	200
	α _{g,N} (s _{min} II)										1	,3							
Group	α _{g,V} (s _{min} II)	r 1									1	,2							
factors	$lpha_{ extsf{g}, extsf{N}}$ (S $_{ extsf{min}}$ \perp)	[-]									1	,3							
	$lpha_{\sf g,V}$ (S $_{\sf min}$ \perp)										1	,0							

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, U8, dimensions, installation parameters	Annex C 32

The 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 anchorage with perforated sleeve FIS H K)

sleeve FIS H K d with perforated sl ation max T _{inst} [Nm	perforated sleeve FIS H K
otion	
ation max T _{inst} [Nm	nay Tinet [Nm] 5
	MAX TIMEL [FAIT]
stallation paramete	on parameters
nce c _{min} = c _{cr}	$c_{min} = c_{cr}$ 60
s _{min} II	s _{min} II
s _{cr} II [mm	s _{cr} II [mm] 250
S _{min} ⊥	s _{min} ⊥ 80
s _{cr} ⊥	s _{cr} ⊥ 250
S _{cr} II [mm	Scr II [mm] 250 Smin ⊥ 80

Rotary drilling with carbide drill

Table C33.2: Group factors

Anchor rod	I	M10	M12	M16
Perforated	sleeve FIS H K	18x13	30/200	22x130/200
	α _{g,N} (s _{min} II)		1,	3
Group factors	α _{g,} ν (s _{min} II)		1,	2
factors	$\alpha_{g,N}$ (S _{min} \perp) [-]		1,	3
	α _{g,} ∨ (s _{min} ⊥)		0	

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, U8, dimensions, installation parameters

Annex C 33



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 anchorage)

Anchor rod	M6	M8	М6	M8	-		M8 M10	M8 M10	-		M12	V116	M12	M16	M12 M16
Internal threaded			-		M6 M8		-	-	M10 15x		_		_		-
Perforated sleeve FIS H K	12x	50	12x	85		оэ 16х	85	16x130	-	20>	(85		20x′	130	20x200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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	1,2
3 / 4 N/IIIII	d/d	1,2	1,5
8 / 6 N/mm ²	w/w w/d	1,5	1,5
8 / 6 14/111111	d/d	1,5	1,5
10 / 8 N/mm ²	w/w w/d	1,5	2,0
10 / 8 14/111111	d/d	2,0	2,0

The 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 anchorage)

Anchor rod			M10	M12	M16			
Perforated sleeve FIS H K			18x13	30/200	22x130/200			
Tension resistance $N_{Rk} = N_{Rk,l}$ strength f_b ; Installation and u :								
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons						
5 / 4 N/mm²	w/w	w/d		1	,2			
37419/11111	d.	/d		1	,5			
8 / 6 N/mm ²	w/w	w/d		1	,5			
0 / 0 I4/IIIII	d.	/d		1	,5			
10 / 8 N/mm ²	w/w	w/d		2	,0			
10 / 8 N/IIIII-	d.	/d	2,0					

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, U8, Characteristic resistance under tension loading	Annex C 34

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

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

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

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

	_	_	_		_	_	_	_	_	_	_				_		_	_
Anchor rod	M6	M8	M6	М8	-	I	M8	M10	M8	M10		-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E		•		-	M6 N	_	-	•		-	M10 15x			-	-		ı	
Perforated sleeve FIS H K	12)	(50	12>	(85	1	6x	85	j	16x	130		20×	85		20x1	130	20x2	200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

motanation and doo contaition	,,	i, ara, (temperature range object of and 12/120 of
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	1,5
10 / 8 N/mm²	w/w w/d d/d	1,5

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

Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

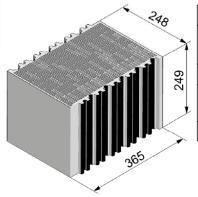
Anchor rod			M10	M12	M16
Perforated sleeve FIS H K			18x13	30/200	22x130/200
Shear resistance V _{Rk} = V _{Rk,b} = Installation and use condition	· V _{Rk,o} 1 w/w	_{:,II} = \ /, w/d	/ _{Rk,c,⊥} [kN] depend l, d/d; (temperatu	ding on the mean re range 50/80°C	compressive strength f _b ; and 72/120°C)
Mean compressive strength / Min. compressive strength single brick 1)	cc	se n- ons			
5 / 4 N/mm²	w/w d	w/d /d		1	,2
8 / 6 N/mm²	w/w d	w/d /d		1	,5
10 / 8 N/mm²	w/w d	w/d /d		1	,5

The 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 C 123.

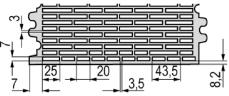
fischer injection system FIS V Plus for masonry Annex C 35 Performance Vertical perforated brick HLz, U8, Characteristic resistance under shear loading



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



Producer		e.g.	Wienerbe	erger			
Nominal dimensions	length L width W						
Norminal diffierisions	[mm]	248	365	249			
Mean gross dry density ρ	[kg/dm³]		0,7				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	10 / 8 or 12,5 / 10 or 15 / 12					
Standard or annex		EN 771	-1:2011+/	41:2015			



Dimension see also Annex B 16

Table C36.1: Installation parameters

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

Anchor rod	М6	M8	М6	M8			M8	M10	M8	M10		-	M12	M16	M12 M	16 M12	2 M16
Internal threaded anchor FIS E		•	,	-	M6	M8 (85		-	,	-	M10 15)		,	-	-		
Perforated sleeve FIS H K	12)	(50	12	k 85		162	(85		16x	130		20>	(85		20x13	0 20	x200

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

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

Edge distan	nce c _{min} = c _{cr}		60											
	s _{min} II		80											
Cooring	Secritical Ser II [mm]	250												
Spacing	S _{min} ⊥													80
	s _{cr} ⊥		250											

Drilling method

Rotary drilling with carbide drill

Table C36.2: Group factors

Anchor roo	d	M6	M6 M8 M6 M8 - M						M10	M8	M10	-	Ν	И12 M16	M12 M16	M12 M	116
Internal thi			-		-	M6	M8				-	M10 M1	-	-	-	-	
Perforated sleeve FIS H K		12	x50	12	x85	11x85 16x		x85		16x130				85	20x130	20x20	00
	α _{g,N} (S _{min} II)					1,7											
Group	$\alpha_{g,V}$ (s _{min} II)	, L	0,5														
factors	αg,N (Smin ⊥)	'	1,3														
	$lpha_{ extsf{g,V}}$ (S $_{ extsf{min}}$ \perp)					0,5											

Performance

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

Annex C 36

¹⁾ The 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 anchorage with perforated sleeve FIS H K)

22x130/200 5								
5								
5								
60								
80								
250								
80								
250								

Table C37.2: Group factors

Anchor ro	d	M10	M12	M16								
Perforated	l sleeve FIS H K	18x13	18x130/200 22x130/200									
	α _{g,N} (s _{min} II)		1	7								
Group	α _{g,V} (s _{min} II)		0,5 1,3									
Group factors	$\frac{\alpha_{g,N}(s_{min}\perp)}{\alpha_{g,N}(s_{min}\perp)}$ [-]											
	$\alpha_{g,V}$ (Smin \perp)		0,5									

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T10, T11, dimensions, installation parameters	Annex C 37



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 anchorage)

Anchor rod	М6	M8	М6	M8	-	•	М8	M10	M8	M10		•	M12	M16	M12 M	16 I	M12 N	116
Internal threaded anchor FIS E		-		•	M6 11x			-	,	-	M10 15		_	1	-		-	
Perforated sleeve FIS H K	12:	c50	12>	(85		16)	(85		16x	130		20:	(85		20x13	0	20x2	00

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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 / 0 14/11111	d/d	1,5	2,0
12,5 / 10 N/mm²	w/w w/d	1,5	2,0
12,57 10 14/111111	d/d	2,0	2,0
15 / 12 N/mm²	w/w w/d	2,0	2,0
15 / 12 N/IIIII	d/d	2,0	2,5

¹⁾ The 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 anchorage)

Anchor rod			M10	M12	M16						
Perforated sleeve FIS H K			18x	130/200	22x130/200						
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾											
Mean compressive strength / Min. compressive strength single brick 1)	cc	se on- ons									
10 / 8 N/mm ²	w/w	w/d		1,5	1,5						
TO / O IN/IIIIII	d.	/d		2,0	2,0						
12,5 / 10 N/mm²	w/w	w/d		2,0	2,0						
12,57 10 14/111111	d.	/d		2,0	2,0						
15 / 12 N/mm²	w/w	w/d		2,0	2,0						
19 / 12 N/IIIII	d	/d		2,5	2,5						

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T10, T11, Characteristic resistance under tension loading	Annex C 38

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 anchorage)

Anchor rod	М6	M8	М6	М8		-	М8	M10	М8	M10			M12	M16	M12	M16	M12M16
Internal threaded				•	М6	М8		-		-	M10	M12	1				
anchor FIS E					11x85						15>	(85		- -		-	
Perforated sleeve FIS H K	12:	<50	12>	(85		16	x85		16x	130		20)	k 85		20x	130	20x200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

installation and use condition w/w, w/d, d/d, (temperature range 50/60°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							

The 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 anchorage)

Anchor rod		M10	M12	M16						
Perforated sleeve FIS H K		18x13	30/200	22x130/200						
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f _b ; installation and use condition w/w, w/d, d/d; (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	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 d/d	2	,0	2,0						

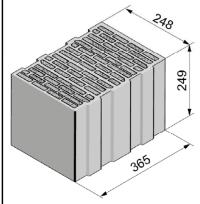
The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T10, T11, Characteristic resistance under shear loading	Annex C 39



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



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

7,4

Dimension see also Annex B 16

 Table C40.1:
 Installation parameters

(Pre-positioned anchorage 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 <85		-	,	-	M10 15	M12 x85		-		-		-
Perforated sleeve FIS H K	12)	x50	12:	x85		16	k 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]	2	5	2	5
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General installation parameters

Edge distar	nce Cmin = Ccr		60		
-	s _{min} II	-l	-l -l	80	
	s _{cr} II			[mm]	[mm]
Spacing	s $_{min} \perp$		80		
	s _{cr} ⊥			250	

Drilling method

Rotary drilling with carbide drill

Table C40.2: Group factors

Anchor rod			М6	M8	М6	M8		-	M8	M10	M8	M10	-	M1	12 M16	M1	2 M16	M12	M16
Internal threanchor FIS			•	-		-	M6 112	M8 (85		-		-	M10 M1 15x85	-	-		-		-
Perforated sleeve FIS H K			12x50 12x85				16x85			16x	130	20)x8	5	20)x130	20×	(200	
	α _{g,N} (s _{min} II)										1	,1							
Group	$\alpha_{\text{g,V}}$ (s _{min} II)	[-]									1	,2							
factors	$lpha$ g,N (S $_{ m min}$ $oxdot$)	[-]	1,1																
	$lpha_{ extsf{g,V}}$ (S $_{ extsf{min}}$ \perp)			1,2															

Annex C 40

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



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

Table C41.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M16				
Perforated sl	eeve FIS H k	(18x13	0/200	22x130/200			
Anchor rod v	vith perforat	ed sleeve	FIS H K					
Max. installati torque	on max T _{inst}	[Nm]		5				
General insta	llation para	meters						
Edge distance	c _{min} = c _{cr}			60				
	s _{min} II			80				
	s _{cr} II	[mm]		250				
Spacing —	S _{min} ⊥			80				
_	s cr ⊥			250				
Drilling meth	od							
Rotary drilling	with carbide	drill						

Table C41.2: Group factors

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

fischer injection system FIS V Plus for masonry	
Performance	Annex C 41
Vertical perforated brick HLz, T7 PF, filled with perlite,	
dimensions, installation parameters	



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 anchorage)

Anchor rod	M6	M8	M6	M8	-		M8	M10	M8	M10			M12	M16	M12	M16	M12 N	116
Internal threaded anchor FIS E		•	-	-	M6 11x	_		-		-	M10 15)			•		•	-	
Perforated sleeve FIS H K	12:	<50	12x	(85		162	ĸ8 5		16x	130		20x	85		20x	130	20x2	00

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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	1,2	1,2	1,2	2,0
3 / 4 N/IIIII	d/d	1,5	1,5	1,5	1,5	2,0
8 / 6 N/mm ²	w/w w/d	1,5	1,5	1,5	1,5	2,5
O / O IN/IIIIII	d/d	1,5	2,0	1,5	2,0	3,0

¹⁾ The 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 anchorage)

Anchor rod			M10	M12	M16
Perforated sleeve FIS H K			18x13	22x130/200	
Tension resistance N_{Rk} = N_{Rk} strength f_{b} ; Installation and ι	_{.p} = N ise c	_{Rk,b} = ondit	: N _{Rk,p,c} = N _{Rk,b,c} [k tion w/w, w/d, d/d	N] depending on ; (temperature rar	the mean compressive age 50/80°C) ²⁾
Mean compressive strength / Min. compressive strength single brick 1)	C	se on- ons			
5 / 4 N/mm²	w/w	w/d	1	,2	1,2
5 / 4 N/IIIII	d	/d	1	,5	1,5
8 / 6 N/mm²	w/w	w/d	1	,5	1,5
0 / 0 IN/IIIII-	d	/d	2	,0	2,0

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T7 PF, filled with perlite, Characteristic resistance under tension loading	Annex C 42

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

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

Anchor rod	М6	M8	М6	M8	-		M8	V110	M8	M10	-		M12	V116	M12	M16	M12	M16
Internal threaded anchor FIS E		-	-	•	M6 11x		-			-	M10		-		-	•		-
Perforated sleeve FIS H K	12	x50	12>	(85		16x	85		16x	(130		20x	85		20x	130	20x	200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

mstanation and use condition	1 W/ W, W/G	i, uru, (t	emperature range 30/00 0 am	u 12/120 0)
Mean compressive strength /	Use			
Min. compressive strength	con-			
single brick 1)	ditions			
5 / 4 N/mm ²	w/w w/d	0.9	1,5	1,2
37414/11111	d/d	0,9	1,5	1,2
8 / 6 N/mm ²	w/w w/d	1,2	2.0	1.5
0 / 0 N/IIIII	d/d	1,∠	2,0	1,5

The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} =$ Installation and use condition				
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		,0	1,5

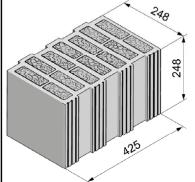
The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T7 PF, filled with perlite, Characteristic resistance under shear loading	Annex C 43



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



	7)			
Producer		e.g.	Wienerbe	erger
Nominal dimensions	[mm]	length L	width W	height H
INOTHINAL diffierisions	[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]	5/40	or 8 / 6 or	10 / 8
Standard or annex		EN 771	-1:2011+/	41:2015

12,3

Dimension see also Annex B 16

Table C44.1: Installation parameters

(Pre-positioned anchorage 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 x85		-	,	-	M10 15	M12 x85		-		-		-
Perforated sleeve FIS H K	12:	<50	12:	x85		16	k 85		16x	130		20)	k 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
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General installation parameters

Edge distar	nce Cmin = Ccr		60								
	s _{min} II	_{in} II									80
Chasina	s _{cr} II [mm	[mm]	250								
Spacing	g s _{min} ⊥		80								
	s _{cr} ⊥		250								

Drilling method

Rotary drilling with carbide drill

Table C44.2: Group factors

Anchor roc	d		М6	M8	М6	M8	-	N	18 M10	M8	M10	-	M12 M16	M12 M16	M12 M16
Internal thr anchor FIS			-			-	M6 M	-	-		-	M10 M12 15x85	_	-	-
Perforated sleeve FIS H K			12x	(50	12:	x85	16x85			16x	130	20	x85	20x130	20x200
	α _{g,N} (s _{min} II)									1	,3				
Group	Group $\alpha_{g,V}$ (s _{min} II)	[-]		1,2											
factors $\alpha_{g,N}$ (s	$lpha_{ extsf{g}, extsf{N}}$ (Smin ot)	[-]		0,6											
	$lpha_{ extsf{g,V}}$ ($ extsf{s}_{ ext{min}}$ $oxdot$)			1,2											

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, T9 MW, filled with mineral wool, dimensions, installation parameters	Annex C 44

The 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 anchorage with perforated sleeve FIS H K)

Anchor rod	M10 M12 M16											
Perforated slee	erforated sleeve FIS H K 18x130/200 22x130/200											
Anchor rod wit	h perforat	ed sle	eve FIS H K									
Max. installation torque	max T _{inst}	[Nm]	5									
General installation parameters												
Edge distance	$c_{min} = c_{cr}$			60								
	s _{min} II			80								
Cnacing —	s _{cr} II	[mm]	250									
Spacing ——	$s_{min} oldsymbol{\perp}$			80								
	s _{cr} ⊥		250									

Rotary drilling with carbide drill

Table C45.2: Group factors

Anchor rod		M10	M10 M12 M16								
Perforated	sleeve FIS H K	18x13	30/200	22x130/200							
	α _{g,N} (s _{min} II)	1,3									
Group factors	α _{g,} ν (S _{min} II)	1,2									
factors	$\alpha_{g,N}$ (S _{min} \perp) [-]	0,6									
	α _{g,V} (s _{min} ⊥)	1,2									

fischer injection system FIS V Plus for masonry

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

Annex C 45



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 anchorage)

Anchor rod	M6	M8	M6	M8			M8 M10	M8 M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E				-	М6	М8		-	M10M12 -			
				11x	85	-		15x85		-	-	
Perforated sleeve FIS H K	12	x50	12	x85		16)	(85	16x130	20	x85	20x130	20x200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. compressive strength single brick 1)	U: co ditio						
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
10 / 8 14/111111	d/	′d	2,5	3,0	4,5	3,5	6,5

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H K		18x13	30/200	22x130/200				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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		3,0	4,0				
3 / 4 14/111111	d/d		3,0	4,5				
8 / 6 N/mm²	w/w w/d		3,5	5,0				
0 / 0 N/IIIIII ⁻	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 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 C 123.

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 C 46

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 anchorage)

Anchor rod	M6	M8	М6	M8		•	М8	M10	M8	M10		•	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		•		-	M6 11>			-		-	M10 15	M12 <85		•		•	-
Perforated sleeve FIS H K	12	(50	12	x85		16)	(85		16)	<130		202	x85		20x	130	20x200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

ilistaliation and use condition	installation and use condition w/w, w/d, d/d, (temperature range 30/00 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	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						

The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} =$ Installation and use condition				
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

The 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 C 123.

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 C 47



Annex B 16

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger 248 length L | width W | height H Nominal dimensions [mm] 248 425 248 Mean gross dry density ρ [kg/dm³] 0,8 Mean compressive strength / Min. $[N/mm^2]$ 5 / 4 or 7,5 / 6 or 10 / 8 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 425 Dimension see also 2

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

_10

_8

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10	9	-2	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E		•		-	M6	M8 x85		-		-	M10			•		-		•
Perforated sleeve FIS H K	12	x50	12	x85		16	x85		16x	130		20)	(85		20x	130	20x	200

Anchor rod and	d internal t	hread	led ancho	r FIS E v	with perforat	ed s	leev	e FIS	HK		
Max. installation torque	max T _{inst}	[Nm]		2		5	2			5	
General installa	ation para	meter	S								
Edge distance	C _{min} = C _{cr}						6	0			
	s _{min} II						8	80			
0	s _{cr} II	[mm]					2	50			
Spacing —	s _{min} ⊥						8	30			

250

Drilling method

Rotary drilling with carbide drill

Table C48.2: Group factors

 $\textbf{s}_{\text{cr}}\,\bot$

Anchor rod			M6	M8	М6	M8	-	M8	M10	M8	M10	-	M12 N	116	M12	M16	M12	M16
Internal thr anchor FIS			-	-		-	M6 M8 11x85	-	-		-	M10 M12 15x85	-		•	•	-	-
Perforated	sleeve FIS H K		12>	(50	12:	x85	162	x85		16x	130	202	(85		20x	130	20x	200
	α _{g,N} (s _{min} II)									1	,9							
Group	$\alpha_{g,V}$ (s _{min} II)	гэ								0	,9							
factors	$lpha_{\sf g,N}$ (S _{min} $oldsymbol{\perp}$)	[-]								1	,0							
	$lpha_{ extsf{g}, extsf{V}}$ (S $_{ extsf{min}}$ \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	Annex C 48

The 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 anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16
Perforated sle	eve FIS H k	(18x13	30/200	22x130/200
Anchor rod wi	th perforat	ed sleeve	FIS H K		
Max. installation torque	n _{Tinst}	[Nm]		5	
General instal	ation para	meters			
Edge distance	C _{min} = C _{cr}			60	
	s _{min} II			80	
Consider —	s _{cr} II	[mm]		250	
Spacing —	$\mathbf{s}_{min}ot$			80	
	s cr ⊥			250	
Drilling metho	d	<u> </u>			
Rotary drilling v	vith carbide	drill			

Table C49.2: Group factors

Anchor rod		M10	M12	M16
Perforated	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
Group factors	$\alpha_{g,N}$ (Smin \perp) [-]		1,	0,0
	α _{g,} ∨ (S min ⊥)		0	7

fischer injection system FIS V Plus for masonry

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

Annex C 49



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 anchorage)

Anchor rod	M6	M8	M6	M8	-		M8	M10	M8	M10		•	M12	M16	M12	M16	M12 M16
Internal threaded				-	М6	М8				-	M10	M12		•			
anchor FIS E		-			11x	85		•			15)	(85			-		-
Perforated sleeve FIS H K	12x		12	12x85		16x		x85		16x130		20:	x85		20x	130	20x200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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	0,60	0,75	1,50	2,00	1,20	2,00	2,00
3 / 4 N/IIIII	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 N/IIIII	d/d	0,90	0,90	2,00	2,50	2,00	2,50	3,00
10 / 8 N/mm ²	w/w w/d	0,90	1,20	2,00	2,50	2,00	2,50	3,00
10 / 6 14/111111	d/d	0,90	1,20	2,00	3,00	2,00	3,00	3,50

¹⁾ The 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 anchorage)

Anchor rod			M10	M12	M16					
Perforated sleeve FIS H K			18x13	30/200	22x130/200					
	ce $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressiv llation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾									
Mean compressive strength / Min. compressive strength single brick 1)	co	se on- ons								
5 / 4 N/mm²	w/w	w/d	2	,0	2,0					
5 / 4 N/IIIIII ⁻	d	/d	2	,0	2,0					
7,5 / 6 N/mm²	w/w	w/d	2	,0	2,5					
i,5 i d inititi-	d	/d	2	,5	2,5					
10 / 8 N/mm²	w/w	w/d	2	,5	2,5					
iu / o N/mm-	d	/d	3	,0	3,0					

¹⁾ The 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 C 123.

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 C 50

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 anchorage)

Anchor rod	M6	M8	М6	M8	-		M8	M10	M8	M10		•	M12	M16	M12	M16	M1:	2 M16
Internal threaded		_		-	М6	М8		_		-	M10	M12		•				_
anchor FIS E					11x	85					15	k 85						
Perforated sleeve FIS H K	12	(50	12	x85		16x	85		162	c130		20	x85		20x	130	20	x200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

mistaliation and use contaition	. **/ **, **/	a, a/a, (t	temperature range 60/00 0 and 72/120 0/	
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

The 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H K		18x13	0/200	22x130/200				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f _b ; Installation and use condition w/w, w/d, d/d; (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			1,5				
7,5 / 6 N/mm²	w/w w/d d/d			2,0				
10 / 8 N/mm²	w/w w/d d/d			2,5				

The 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 C 51



Vertical perforated brick HLz, EN 771-1:2011+A1:2015 Producer e.g. Bouyer Leroux length L width W height H Nominal dimensions [mm] 500 200 315 Mean gross dry density ρ [kg/dm³] ≥ 0,6 Mean compressive strength / Min. $[N/mm^2]$ 5 / 4 or 7,5 / 6 or 10 / 8 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 Dimension see also Annex B 16 **Table C52.1:** Installation parameters (Pre-positioned anchorage with perforated sleeve FIS H K) M6 | M8 M8 M10 M8 M10 M12 M16 M12 M16 **Anchor rod** M6 **M8** M6 | M8 M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 12x85 16x85 20x130 16x130 20x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] 2 torque General installation parameters Edge distance Cmin = Ccr 120 120 $s_{\text{min}} \, II$ [mm] scr II 500 Spacing $s_{min} \perp = s_{cr} \perp$ 315 **Drilling method** Hammer drilling with hard metal hammer drill The compressive strength of the single brick must not be less than 80% of the mean compressive strength. **Table C52.2:** Group factors **Anchor rod M6 M8 M6 M8** M8 M10 M8 M10 M12 M16 M12 M16 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) Group 1.7 $\alpha_{g,V}$ (s_{min} II) factors [-] $\alpha_{g,N}$ (S_{min} \perp) 2.0 $\alpha_{g,V}$ (s_{min} \perp) fischer injection system FIS V Plus for masonry Annex C 52 Performance

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Vertical perforated brick HLz, dimensions, installation parameters



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

Table C53.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

		M10	M12	M16					
e FIS H H	(18x13	0/200	22x130/200					
Anchor rod with perforated sleeve FIS H K									
max T _{inst}	[Nm]	2							
ion para	meter	S							
C _{min} = C _{cr}			12	20					
s _{min} II	Г		12	20					
s _{cr} II	נוווווון	500							
= s _{cr}			3′	5					
	max T _{inst} cion paral c _{min} = c _{cr} s _{min} II	max T _{inst} [Nm] ion parameters c _{min} = c _{cr} s _{min} II s _{cr} II	perforated sleeve FIS H K max T _{inst} [Nm] cion parameters C _{min} = C _{cr} S _{min} II S _{cr} II [mm]	perforated sleeve FIS H K max T _{inst} [Nm] 2 tion parameters C _{min} = C _{cr} 12 S _{min} II S _{cr} II [mm] 50					

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	K 18x130/200 22x130/200							
	α _{g,N} (s _{min} II)		1,3						
Group factors	α _{g,} ν (s _{min} II)		1,7						
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} [-]$		2,0						
	$\alpha_{g,V}$ (S _{min} \perp)								

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 53



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 anchorage)

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16	
Internal threaded anchor FIS E		-		-	1	M8 <85		-		-		M12 x85		-	-	•	
Perforated sleeve FIS H K	12	x50	12	x85	16:		16x85			162	c130	20:		x85		20x	130

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d	0,50	1,50	0,75	1,50	1,50
5 / 4 N/MIM-	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
7,57 6 N/IIIII	d/d	0,90	2,50	1,20	2,50	2,50
10 / 8 N/mm ²	w/w w/d	0,90	3,00	1,50	3,00	3,50
10 / 0 14/111111	d/d	1,20	3,00	2,00	3,00	3,50

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16		
Perforated sleeve FIS H K		18x13	22x130/200			
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾						
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	S				
5 / 4 N/mm ²	w/w w	/d 0,	75	1,50		
5 / 4 N/IIIII	d/d	0,	90	2,00		
7,5 / 6 N/mm ²	w/w w	/d 1,	20	2,50		
7,576 N/IIIII	d/d	1,	20	2,50		
10 / 8 N/mm ²	w/w w	/d 1,	50	3,50		
10 / 8 N/mm²	d/d	2,	00	3,50		

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 54

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



B # 4 0

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 anchorage)

Anchor rod	M6	M8	М6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		•	M8 <85		-		-	M12 x85	I	-		-
Perforated sleeve FIS H K	12	x50	12	(85	16	3x85		16)	(130	20:	x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

	•	ra, ara, (componacaro rango corco	C 0	- : · · /		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
5 / 4 N/mm²	w/w w/d d/d	1,5	0,9	1,5	2,5	0,9
7,5 / 6 N/mm²	w/w w/d d/d	2,5	1,5	2,5	3,5	1,5
10 / 8 N/mm²	w/w w/d d/d	3,5	2,0	3,5	4,5	2,0

The 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 anchorage)

B/I/A

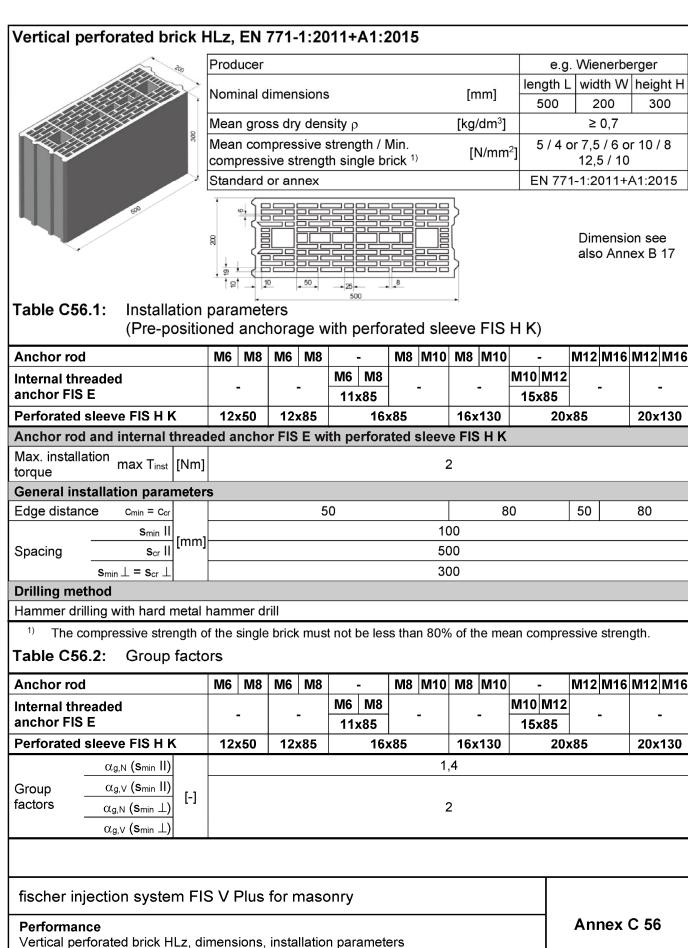
Anchor rod		M10	M12	M16						
Perforated sleeve FIS H K		18x13	0/200	22x130/200						
	Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; nstallation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
5 / 4 N/mm²	w/w w/d d/d	0,9								
7,5 / 6 N/mm²	w/w w/d d/d			1,5						
10 / 8 N/mm²	w/w w/d d/d			2,0						

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 55







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

 Table C57.1:
 Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M16								
Perforated sleeve F	FIS 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	neter	S									
Edge distance c _n	_{min} = C _{cr}			8	0							
	s _{min} II	r		10	00							
Spacing	s _{cr} II	[mm]	500									
s _{min} ⊥ :	= s cr ⊥		300									

Drilling method

Hammer drilling with hard metal hammer drill

Table C57.2: Group factors

Anchor ro	od		M10	M12	M16				
Perforate	d sleeve FIS H K		18x13	80/200	22x130/200				
	α _{g,N} (s _{min} II)			1,	,4				
Group factors	α _{g,V} (S _{min} II)	[-]							
factors	$\alpha_{ extsf{g,N}}$ (s _{min} \perp)	נ-יו		2	2				
	$lpha_{g,V}\left(s_{min}\perp ight)$								

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 57



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

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

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

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

ocionigai ip, motanacion ana		~		a, (temperature			
Mean compressive strength / Min. compressive strength single brick 1)	Use con ditio	1-					
5 / 4 N/mm ²	w/w \	w/d	0,50	0,60	1,20	0,75	1,50
5 / 4 N/IIIII	d/c	k	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
7,576 14/111111	d/c	k	0,90	1,20	2,00	1,20	2,50
10 / 8 N/mm ²	w/w v	w/d	0,90	1,20	2,00	1,50	2,50
10 / 6 14/111111	d/c	k	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
12,57 10 10/1111117	d/c	k	1,50	2,00	3,00	2,00	4,00

The 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 anchorage)

Anchor rod			M10	M12	M16							
Perforated sleeve FIS H K			18x13	0/200	22x130/200							
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾												
Mean compressive strength / Min. compressive strength single brick 1)	1	se n- ons										
5 / 4 N/mm²	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/IIIII1 ⁻	d,	/d		2,0	2,5							
10 / 8 N/mm²	w/w	w/d		2,0	2,5							
10 / 6 N/MM-	d/	/d		2,5	3,0							
42 E / 40 N/mm²	w/w	w/d		2,5	3,5							
12,5 / 10 N/mm²	d/	/d		3,0	4,0							

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 58

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, EN 771-1:2011+A1:2015

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

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	M12 <85	l .	-		-
Perforated sleeve FIS H K	12	x50	12	(85		16x85		162	k130		20	x85		20x	130	

Shear resistance $V_{Rk} = V_{Rk,c,||} = V_{Rk,c,||} = V_{Rk,c,||}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w w/d, d/d: (temperature range 50/80°C and 72/120°C)

installation and use condition	n w/w, w	//a, c	a/a; (tempera	iture	range 50/80°	C and 72	2/120°C)	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
5 / 4 N/mm²	w/w w/d d/d	0,9	1,2	0,9	1,2	0,6	2,0	0,6
7,5 / 6 N/mm²	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

The 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 anchorage)

Anchor rod			M10	M12	M16							
Perforated sleeve FIS H K			18x13	30/200	22x130/200							
Shear resistance V _{Rk} = V _{Rk,b} Installation and use condition	nding on the mear ure range 50/80°C	n compressive strength f _b ; and 72/120°C)										
Mean compressive strength / Min. compressive strength single brick 1)	Us cor ditio	1-										
5 / 4 N/mm²	w/w d/d			0,6								
7,5 / 6 N/mm²	w/w d/d			0	,9							
10 / 8 N/mm²	w/w		1,2									
12,5 / 10 N/mm²	w/w d/d			1,5								

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 59



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/mm²]compressive strength single brick 1) 7,5 / 6 or 10 / 8 EN 771-1:2011+A1:2015 Standard or annex Dimension see also 8 Annex B 17 **Table C60.1:** Installation parameters (Pre-positioned anchorage with perforated sleeve FIS H K) М6 M8 M8 M10 M8 M10 M12 M16 M12 M16 Anchor rod **M8** M6 M6 | M8 M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 20x130 12x85 16x85 16x130 20x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] torque General installation parameters Edge distance Cmin = Ccr 50 80 50 80 100 smin II 500 s_{cr} II [mm] Spacing 100 S_{min} \bot 315 $\mathbf{s}_{\mathsf{cr}} \, \bot$ **Drilling method** Hammer drilling with hard metal hammer drill The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Table C60.2: Group factors M6 **M8** M8 M10 M8 M10 M12 M16 M12 M16 **Anchor rod** M6 | M8 M6 | M8 M10 M12 Internal threaded anchor FIS E 15x85 11x85 Perforated sleeve FIS H K 20x85 12x50 12x85 16x85 16x130 20x130 $\alpha_{g,N}$ (s_{min} II) 1,1 1,2 $\alpha_{g,V}$ (s_{min} II) Group [-] factors 1,1 $\alpha_{g,N}$ (S_{min} \perp) $\alpha_{\text{g,V}}$ (s_{min} \perp) 1,2 fischer injection system FIS V Plus for masonry Annex C 60 Performance Vertical perforated brick HLz, dimensions, installation parameters



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

 Table C61.1:
 Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16				
Perforated sleeve FIS H K			18x13	0/200	22x130/200				
Anchor rod with	perforat	ed sleeve	FIS H K						
Max. installation torque	max T _{inst}	[Nm]	2						
General installat	ion parai	meters							
Edge distance	C _{min} = C _{cr}		80						
	s_{min} II			100					
Chaoina	s _{cr} II	[mm]	500						
Spacing	Smin⊥			100					
	s _{cr} ⊥			315					

Hammer drilling with hard metal hammer drill

Table C61.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 61



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 anchorage)

Anchor rod	M6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12 N	/ 116
Internal threaded anchor FIS E		-		•	M6			-		-	M10 15	M12 x85	l	-	-	
Perforated sleeve FIS H K	12	x50	122	x85		16	x85		16	c130		20	x85		20x1	30

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b : Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength 16, installation and use condition w/w, w/d, d/d, (temperature range 30/00 0)									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
2,5 / 2 N/mm ²	w/w w/c			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	0,9						
7,5 / 6 N/mm ²	w/w w/d			1,5					
7,57614/11111	d/d			1,5					
10 / 8 N/mm ²	w/w w/d			2,0					
IO / O N/IIIIII	d/d			2,0					

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16							
Perforated sleeve FIS H K		18x13	0/200	22x130/200							
	Tension resistance N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN] depending on the mean compressive strength f _b ; Installation and use condition w/w, w/d, d/d; (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			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 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 62

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

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



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

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

Anchor rod	M6	M8	М6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	 M8 <85		-		-	M12 x85	1	-		•
Perforated sleeve FIS H K	12	x50	12:	k 85	16	x85		162	c130	20:	x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

installation and use condition	on w/w, w	//a, a/a; (t	empera.	iture	range 50/80°	C and 72	2/120°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

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

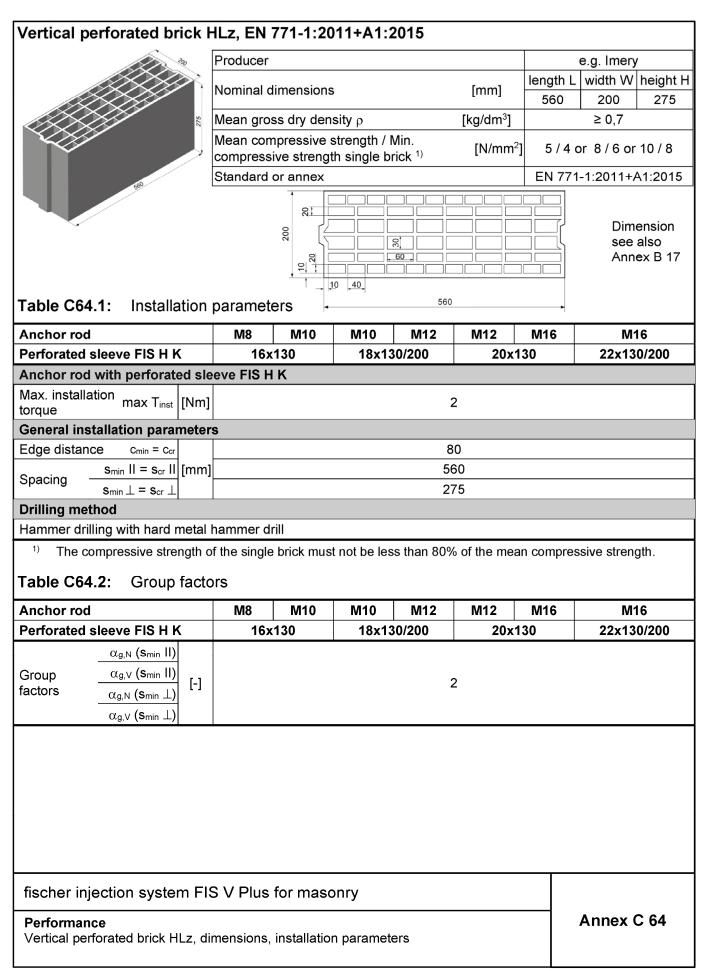
Table C63.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Shear resistance $V_{Rk} = V_{Rk,b}$ Installation and use condition				
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

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 63







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		20x	130	22x130/200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength 16; installation and t	ise cond	illion w/w, w/a, a/a; (temperature	range 50/60°C) -/
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		
5 / 4 N/mm²	w/w w/d	,	1,2
	d/d	1,2	1,5
8 / 6 N/mm ²	w/w w/d	1,5	2,0
0 / 0 N/IIIII	d/d	1,5	2,0
10 / 8 N/mm²	w/w w/d	2,0	2,5
	d/d	2,5	3,0

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

Table C65.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16			
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200			
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f _b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)										
Mean compressive strength / Lise										

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

The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 65

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



120	Produce	er			<u> </u>				e.g	. Wiene	rberge	r	
							Farmer	, 1	ength L	width		ight H	
	Nomina	l dimen	sions				[mm	ן ני	255	120)	118	
	Mean g	ross dry	dens	ity ρ			[kg/dr	n ³]	≥ 1,0				
=	Mean co						[N/mr	n²]	2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10 / or 15 / 12				
	Standar	d or an	nex						EN 771-1:2011+A1:2015				
Table C66.1: Installation	paran	27	12	22 255						mensic		also	
Anchor rod	M6	M8	M6	M8			M8	M10	<u> </u>		M12	M16	
Internal threaded	•	15		10	M6	M8		1	M10	M12		1	
anchor FIS E		-		-	11>	(85	1	-	15	x85	1	-	
Perforated sleeve FIS H K	12	x50	12	x85		162	x85			20x85			
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K													
Max. installation max T _{inst} [Nm]]					2	2						
General installation paramete	rs												
Edge distance $c_{min} = c_{cr}$							50						
Spacing $\frac{\mathbf{s}_{cr} \ \mathbf{II} = \mathbf{s}_{min} \ \mathbf{II}}{\mathbf{s}_{cr} \ \mathbf{I} = \mathbf{s}_{min} \ \mathbf{I}} [mm]$	·]	255 120											
Drilling method						12	20						
Drining inculou						12	20						
Hammer drilling with hard metal	hamme	er drill				12	20						
Hammer drilling with hard metal The compressive strength Table C66.2: Group fact	of the si		ck mus	t not be	less th			mear	n compre	essive s	_		
Hammer drilling with hard metal The compressive strength of the compressive strength	of the si		ck mus	t not be		an 80%		mear)	-	trength	M16	
Hammer drilling with hard metal The compressive strength of the compressive strength	of the si	ngle bri			M6	an 80% - M8	6 of the		M10	- M12	_		
Hammer drilling with hard metal The compressive strength of the compressive strength	of the si	ngle bri M8	M6	M8 -		an 80% - M8 (85	6 of the		M10	- M12 x85	M12		
Hammer drilling with hard metal The compressive strength of the compressive strength	of the si	ngle bri	M6		M6	an 80% - M8 (85	6 of the		M10	- M12 x85	_		
Hammer drilling with hard metal 1) The compressive strength of the compressive streng	of the si	ngle bri M8	M6	M8 -	M6	an 80%	6 of the		M10	- M12 x85	M12		
Hammer drilling with hard metal 1) The compressive strength of the compressive streng	of the si	ngle bri M8	M6	M8 -	M6	an 80%	6 of the		M10	- M12 x85	M12		
Hammer drilling with hard metal The compressive strength of the compressive strength	of the si	M8 - x50	M6	M8 - x85	M6	an 80%	6 of the		M10	- M12 x85	M12		



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

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

Anchor rod	M6	M8	M6	M8	-		M8	M10		-	M12	M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	M10	M12 x85		
Perforated sleeve FIS H K	12	x50	12	x85	16x		16x85		20x8		k 85	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)¹⁾

suchgui ib, mistanation and	use con	altion w/w, w	na, ara, (temperature range 30/00 c	') '
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/mm ²	w/w w/d	0,90	0,90	0,50
3 / 4 N/IIIII	d/d	0,90	1,20	0,50
8 / 6 N/mm²	w/w w/d	1,20	1,50	0,75
8 / 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 / 8 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
12,5 / 10 N/IIIII	d/d	2,50	2,50	1,20
15 / 12 N/mm ²	w/w w/d	2,50	3,00	1,50
15 / 12 N/MM²	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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 67

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

³⁾ No performance assessed



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

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

Anchor rod	М6	M8	M6	M8	-		M8	M10		-	M12	M16	
Internal threaded anchor FIS E	,	-	,	-	M6	M8 x85	-	-	M10	M12 x85		-	
Perforated sleeve FIS H K	12	x 50	12	x85	16x		16x85			20x85		x85	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

installation and use condition w/w, w/d, d/d; (temperature range 50/80 C and 72/120 C)									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- dition								
2,5 / 2 N/mm²	w/w w/d d/d	0,60	0,75	0,60	0,75	0,90			
5 / 4 N/mm²	w/w w/d d/d	1,20	1,50	1,20	1,50	2,00			
8 / 6 N/mm²	w/w w/d d/d	2,00	2,00	2,00	2,00	2,50			
10 / 8 N/mm²	w/w w/d d/d	2,50	3,00	2,50	3,00	3,50			
12,5 / 10 N/mm²	w/w w/d d/d	3,00	3,50	3,00	3,50	4,50			
15 / 12 N/mm²	w/w w/d d/d	4,00	4,50	4,00	4,50	5,50			

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 68



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 Mean gross dry density ρ [kg/dm³] ≥ 0,8 7,5 / 6 or 10 / 8 or 15 / 12 or Mean compressive strength / Min. $[N/mm^2]$ compressive strength single brick 1) 20 / 16 or 25 / 20 EN 771-1:2011+A1:2015 Standard or annex 130 Dimension see also Annex B 18 20 275 **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 12x85 16x85 20x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] torque General installation parameters Edge distance 100 120 $C_{min} = C_{cr}$ $s_{cr} II = s_{min} II [mm]$ 275 Spacing 95 $s_{cr} \perp = s_{min} \perp$ **Drilling method** Hammer drilling with hard metal hammer drill The 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 Perforated sleeve FIS H K 12x50 12x85 16x85 20x85 $\alpha_{g,N}$ (s_{min} II) $\alpha_{g,V}$ (s_{min} II) Group 2 [-] factors $\alpha_{g,N}$ (Smin \perp) $\alpha_{g,V}$ ($\mathbf{s}_{min} \perp$) fischer injection system FIS V Plus for masonry Annex C 69 Performance

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Vertical perforated brick HLz, dimensions, installation parameters



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

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

Anchor rod	M6	M8	M6	M8	-		M8 M10		-		M12	M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	M10	M12 <85		-
Perforated sleeve FIS H K	12	x50	12	x85		16:	x85			202	x85	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength t_0 ; installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁷									
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
7,5 / 6 N/mm²	w/w w/d	0,40	0,90						
	d/d	0,40	0,90						
10 / 8 N/mm²	w/w w/d	0,50	1,20						
	d/d	0,60	1,20						
15 / 12 N/mm²	w/w w/d	0,75	1,50						
	d/d	0,90	2,00						
20 / 16 N/mm²	w/w w/d	0,90	2,00						
	d/d	1,20	2,50						
25 / 20 N/mm²	w/w w/d	1,20	3,00						
	d/d	1,50	3,00						

The 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 C 70

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



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

Table C71.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6 M8		M6	M8		-	M8	M10		•	M12	M16
Internal threaded anchor FIS E			M6 M8 11x85		<u>-</u>		M10 M12 15x85			-		
Perforated sleeve FIS H K	12:	x50	12	x85	16>		x85		20x8		(85	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) Mean compressive strength Use / Min. compressive strength consingle brick 1) ditions w/w w/d 7,5 / 6 N/mm² 1,2 1,2 d/d w/w w/d 10 / 8 N/mm² 1.5 1.5 d/d w/w w/d 15 / 12 N/mm² 2,0 2,5 d/d w/w w/d 20 / 16 N/mm² 3,0 3,0 d/d w/w w/d 25 / 20 N/mm² 4,0 4,0 d/d

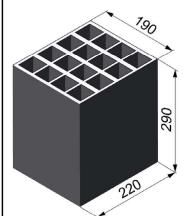
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 71

The 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



Producer		e.	g. Percera	ım	
Nominal dimensions	[mm]	length L	width W	height H	
	[HIIII]	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	r 10 / 8 or	12,5 / 10	
Standard or annex		EN 771	-1:2011+	1:2015	

9 42 - 220	1			
	190	40		
	•	1		

Dimension see also Annex B 18

Table C72.1: Installation parameters

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

Anchor rod	М6	M8	M6	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		16:	k 85		16x	130		20:	x85		20x130

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

Max. installation	max T _{inst}	[NIm]	,	
torque	IIIax Tinst	ווואוון		

General installation parameters

Edge distar	nce C _{min} = C _{cr}		110
Chaoina	s _{min} II = s _{cr} II	[mm]	220
Spacing	$s_{min} \perp = s_{cr} \perp$		290

Drilling method

Hammer drilling with hard metal hammer drill

Table C72.2: Group factors

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10	,	-	M12	M16	M12	M16
Internal threaded					M6	M8					M10	M12	1			
anchor FIS E		•		-	112	x85		•		-	15:	x85	·	-	•	
Perforated sleeve FIS H K	12:	x50	12:	x85		162	x85		16x	130		20:	x85		20x	130
α _{g,N} (s _{min} II)																·

Group factors $ \frac{\alpha_{g,N} (s_{min} I)}{\alpha_{g,N} (s_{min} \bot)} $ [-	-1		2	2		
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fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters	Annex C 72

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



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

Table C73.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H	K	18x13	18x130/200 22x130/200					
Anchor rod with perfora	ted sle	eve FIS H K						
$\begin{array}{ll} \text{Max. installation} & \text{max } T_{\text{inst}} \end{array}$	t [Nm]			2				
General installation par	ameter	S						
Edge distance c _{min} = c	or		•	10				
Smin II = Scr	II [mm]		2	220				
Spacing $s_{min} \perp = s_{cr}$	L		2	290				
Drilling method								
Hammer drilling with hard	metal	hammer drill						

Table C73.2: Group factors

Anchor ro	od		M10	M12		M16
Perforated sleeve FIS H K			18x13	0/200		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	

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters	Annex C 73



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

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

Anchor rod	M6	M8	М6	M8			M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 <85		-		-		M12 x85	-	-		-
Perforated sleeve FIS H K	12	12x50 12x85			16x85		16x130		20		x85		20x	130		

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

our ornigani ris, miotamataroni amita			, ,	, ,	3		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
7.5./6.N/mm²	w/w w/d	0,3	1,2	1,2	1,5	1,2	1,5
7,5 / 6 N/mm ²	d/d	0,4	1,5	1,5	1,5	1,5	1,5
10 / 8 N/mm²	w/w w/d	0,5	1,5	1,5	2,0	1,5	2,0
10 / 6 14/111111	d/d	0,5	2,0	2,0	2,5	2,0	2,5
12,5 / 10 N/mm²	w/w w/d	0,6	2,0	2,0	2,5	2,0	2,5
	d/d	0,6	2,5	2,5	3,0	2,5	3,0

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16						
Perforated sleeve FIS H K		18x13	0/200	22x130/200						
			= N _{Rk,p,c} = N _{Rk,b,c} [kN] depending on the mean compressive tion w/w, w/d, d/d; (temperature range 50/80°C) ²⁾							
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
7,5 / 6 N/mm²	w/w w/d		1	,5						
7,57014/111111	d/d		1	,5						
10 / 8 N/mm²	w/w w/d		2	,0						
10 / 8 14/111111	d/d		2	,5						
12,5 / 10 N/mm ²	w/w w/d		2	,5						
12,5 / 10 N/MMF	d/d		3	,0						

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 74

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, EN 771-1:2011+A1:2015

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

Anchor rod	M6	M8	М6	M8		M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E		-	•	•	M8 x85		-		-		M12 x85	l .	-		-
Perforated sleeve FIS H K	12	x50	12x85		16	6x85		16)	c130	20		x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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/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

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

Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18	3x130/200	22x130/200
Shear resistance $V_{Rk} = V_{Rk,b}$ Installation and use condition				
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

The 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 C 75



Vertical perforated brick HLz, EN 771-1:2011+A1:2015 e.g. Ziegelwerk Brenna Producer length L | width W | height H Nominal dimensions [mm] 253 300 240 Mean gross dry density ρ [kg/dm³] ≥ 0,8 Mean compressive strength / Min. $[N/mm^2]$ 2,5 / 2 or 5 / 4 or 8 / 6 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015

Dimension see also Annex B 18



Table C76.1: Installation parameters

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

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

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

Max. installation	max T _{inst}	[NIm]		2
torque	IIIax Tinst	ווואוון	•	_

General installation parameters

P									
Edge distar	nce c _{min} = c _{cr}		60						
Specing	$s_{min} \parallel = s_{cr} \parallel$	[mm]	255						
Spacing	$s_{min} \perp = s_{cr} \perp$		240						

Drilling method

Hammer drilling with hard metal hammer drill

Table C76.2: Group factors

Anchor rod		M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E				M6	M8 <85			-		M10 M12 15x85			•			
Perforated sleeve FIS H K		x50	12x85			16x85		16x	130	20		x85		20x	130	
<u>α_{g,N} (s_{min} II)</u>																

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		
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fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters	Annex C 76

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



Table C77.1: In	stallation pa		11+A1:2015 h perforated sleeve	e FIS H K)
Anchor rod		M10	M12	M16
Perforated sleeve F	IS H K	18x13		22x130/200
Anchor rod with per	forated sleev	e FIS H K	<u> </u>	
Max. installation . torque	T _{inst} [Nm]		2	
General installation	parameters			
	n = Ccr		60	
Spacing ———	s _{cr} II [mm]		255	
S _{min} ⊥ =	· S _{cr} ⊥		240	
Drilling method				
Hammer drilling with	naru metarnar	IIIII CI UIIII		
Table C77.2 : G	roup factors			
Anchor rod		M10	M12	M16
Perforated sleeve F	IS H K	18x13	0/200	22x130/200
$\alpha_{\sf g,N}$ (s	s _{min} II)			
Group $\alpha_{\sf g,V}$ (s	6 _{min}		2	
factors $\alpha_{g,N}$ (s	min 上)		_	
$lpha_{ extsf{g}, extsf{V}}$ (s	min ⊥)			
fischer injection s	system FIS \	/ Plus for maso	nry	Annex C 7



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 anchorage)

Anchor rod	M6	M8	M6 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		162	c130		20	x85		20x	130

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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/MM ⁻	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/mm ²	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

- The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- ²⁾ For temperature range 72/120°C: $N_{Rk (72/120^{\circ}C)} = 0.83 \cdot N_{Rk (50/80^{\circ}C)}$.

3) No performance assessed.

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

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18:	22x130/200	
Tension resistance $N_{Rk} = N_R$ strength f_b ; Installation and				
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 / 2 14/111111	d/d			0,5
5 / 4 N/mm²	w/w w/d		_	0,9
5 / 4 N/IIIII ⁻	d/d			0,9
8 / 6 N/mm²	w/w w/d			1,2
0 / 0 N/IIIII-	d/d			1,5

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 78

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, 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 anchorage)

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	1	-		-
Perforated sleeve FIS H K	12	x50	12)	(85		16	x85		16)	k130	20:	x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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

The 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 anchorage)

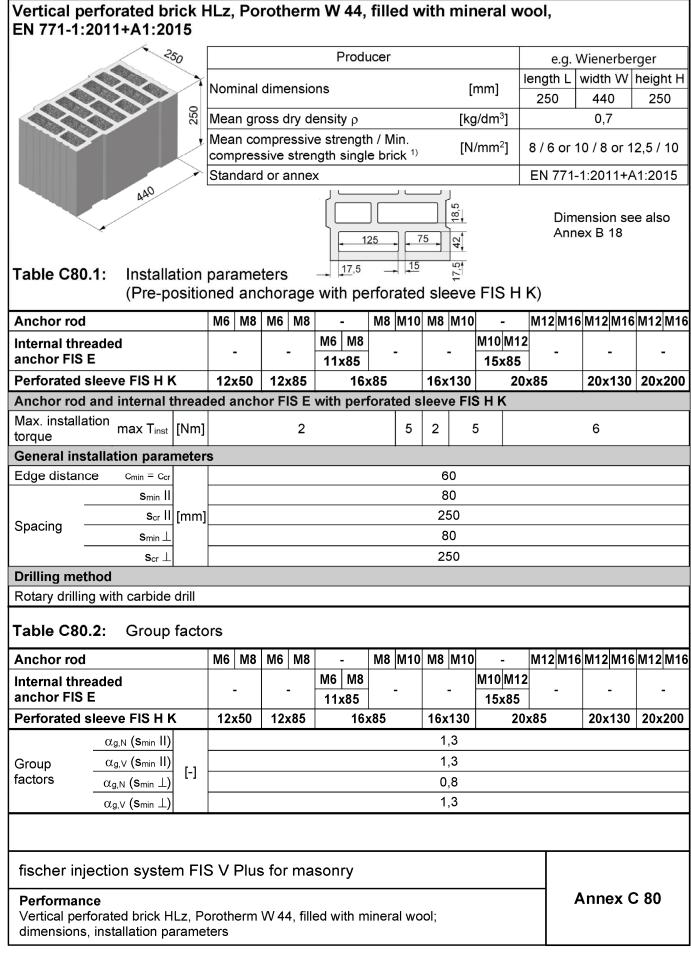
Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Shear resistance V _{Rk} = V _{Rk,b} Installation and use condition				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
2,5 / 2 N/mm²	w/w w/d d/d	0	,5	0,6
5 / 4 N/mm²	w/w w/d d/d	0	,9	1,2
8 / 6 N/mm²	w/w w/d d/d	1	,5	1,5

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 79







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

Table C81.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M10 M12 M16						
Perforated sl	eeve FIS H k	(18x13	18x130/200 22x130/200						
Anchor rod with perforated sleeve FIS H K										
Max. installation	on max T _{inst}	[Nm]	5	6						
General insta	Illation para	meter	S							
Edge distance	c _{min} = c _{cr}			60	0					
	s _{min} II			80	0					
	s _{cr} II	[mm]		25	0					
Spacing —	s _{min} ⊥			80	0					
	s cr⊥		250							
Drilling meth	od									
Rotary drilling	with carbide	drill								

Table C81.2: Group factors

Anchor ro	d	M10	M10 M12							
Perforated	d sleeve FIS H K	18x1	18x130/200 22x130/200							
	α _{g,N} (s _{min} II)		1	,3						
Group	α _{g,} ν (s _{min} II)	1	1	,3						
Group factors	$\alpha_{\sf g,N}$ (S _{min} \perp)	-]	0,8							
	$\alpha_{g,V}$ (S _{min} \perp)		1,3							

fischer injection system FIS V Plus for masonry

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

Annex C 81



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 anchorage)

Anchor rod	М6	M8	M6	M8	-	1	М8	M10	M8	M10		-	M12	M16	M12	M16	M12 M16
Internal threaded				-	M6			-		-	M10		•	-			-
Perforated sleeve FIS H K	12>	(50	12:	x85	TIX	(05 16)	(85		16>	k130		(85 20)	(85		20x	130	20x200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions					
8 / 6 N/mm ²	w/w w/d	0,75	1,50	1,20	1,50	2,50
8 / 6 N/IIIII	d/d	0,90	1,50	1,20	1,50	2,50
10 / 8 N/mm²	w/w w/d	0,90	1,50	1,20	1,50	2,50
10 / 5 14/111111	d/d	0,90	2,00	1,50	2,00	3,00
12,5 / 10 N/mm ²	w/w w/d	0,90	2,00	1,50	2,00	3,00
12,37 10 14/111111	d/d	1,20	2,00	1,50	2,00	3,50

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

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

Anchor rod			IVI10	M12	M16			
Perforated sleeve FIS H K			18x13	0/200	22x130/200			
Tension resistance $N_{Rk} = N_{Rk,l}$ strength f_b ; Installation and u								
Mean compressive strength / Min. compressive strength single brick 1)	cc	se n- ons						
8 / 6 N/mm ²	w/w	w/d		1,	,5			
G / G 14/11/11	d.	/d	1,5					
10 / 8 N/mm²	w/w	w/d		1,	,5			
10 / 3 14/111111	d.	/d	2,0					
12,5 / 10 N/mm²	w/w	w/d		2	,0			
12,57 10 N/IIIII-	d.	/d		2	,0			

The 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 C 123.

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 C 82

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, 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 anchorage)

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10		•	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	•	-		•	M6 11)	M8 (85		•		-	M10 15x		•	-	-	•	•	-
Perforated sleeve FIS H K	12)	<50	12	k 85		16)	(85		16x	130		20>	(85		20x	130	20x	200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions								
8 / 6 N/mm²	w/w w/d d/d	0,9	1,2	0,9	1,2	1,2			
10 / 8 N/mm ²	w/w w/d d/d	0,9	1,5	0,9	1,5	1,2			
12,5 / 10 N/mm²	w/w w/d d/d	1,2	1,5	1,2	1,5	1,5			

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS	ΗK	18x13	0/200	22x130/200
Shear resistance V _{Rk} = Installation and use co				ean compressive strength f♭; 0°C and 72/120°C)
Mean compressive strength / Min. com- pressive 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

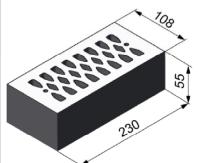
¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

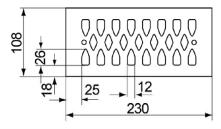
fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool; Characteristic resistance under shear loading	Annex C 83



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



	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	901		
Producer		e.g.	Wienerbe	rger.
Nominal dimensions	[mm]	length L	width W	height H
INOTHINAL CHILICISIONS	[HIIII]	230	108	55
Mean gross dry density ρ	[kg/dm³]		≥ 1,4	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]	2,5 / 2	or 5 / 4 or or 10 / 8	or 8 / 6
Standard or annex		EN 771	-1:2011+/	41:2015



Dimension see also Annex B 18

Table C84.1: Installation parameters

Anchor rod	M6	M8	М6	M8		-	M8	M10		-	M12	M16
Internal threaded					М6	M8			M10	M12	·	
anchor FIS E		- -			11x85				15x85		-	
Perforated sleeve FIS H K	12:	x50	12	k 85		16:	x85			20:	k 85	

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	נוואון	•	_

General installation parameters

General Installa	General installation parameters											
Edge distance	$c_{min} = c_{cr}$	60										
	s _{min} II	80										
Chasins	s _{cr} II [mm]	230										
Spacing	$s_{min} oldsymbol{\perp}$	60										
	S cr ⊥	60										

Drilling method

Hammer drilling with hard metal hammer drill

Table C84.2: Group factors

Anchor rod	M6	M8	M6	M8		-	M8	M10		-	M12	M16
Internal threaded					M6	M8			M10	M12		
anchor FIS E	'	•		-	11)	k 85		-	15:	x85	'	
Perforated sleeve FIS H K	12	x50	12)	x85		16:	x85			20)	k 85	
α _{g,N} (S _{min} II)					·	·		·		·		

	$\alpha_{g,N}$ (S _{min} II)		
Group	$lpha_{ extsf{g,V}}$ (s _{min} II)	ſ - 1	
factors	$lpha_{\sf g,N}$ (S _{min} $oldsymbol{\perp}$)	[-]	
	(av (Smin 1)		

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 84

The 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 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	12x50 12x85		16x85			20x85						

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ³⁾

strength 16; installation and	use cond	iluon w/w, w	na, ara; (ten	iperature range 50/60 C) ~'
Mean compressive strength / Min. compressive strength single brick ²⁾	Use con- ditions				
2,5 / 2 N/mm ²	w/w w/d	0,30	0,90	0,75	0,50
2,5 / 2 14/11111	d/d	0,30	0,90	0,90	0,60
5 / 4 N/mm ²	w/w w/d	0.60	1,50	1,50	0.90
37 4 14/111111	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
87614/11111	d/d	0,90	3,00	2,50	1,50
10 / 8 N/mm ²	w/w w/d	1,20	3,50	3,00	2,00
10 / 8 N/mm²	d/d	1,50	4,00	3,50	2,50

- 1) If the fixing is in a solid area, for w/w, the characteristic value shall be reduced with the factor 0,64.
- ²⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0.83 \cdot N_{Rk(50/80^{\circ}C)}$.

Table C85.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

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

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,||} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

,, (, y, y, y, y, y										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
2,5 / 2 N/mm ²	w/w w/d d/d	0,6	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 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

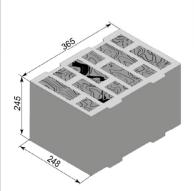
Performance

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

Annex C 85



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



Producer		e.g.	Wienerbe	erger	
Nominal dimensions	[mm]	length L	width W	height H	
	נוווווון	≥ 365	≥ 248	≥ 245	
Mean gross dry density ρ	[kg/dm³]		0,6		
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]	10 / 8			
Standard or annex		EN 771	-1:2011+/	41:2015	

128 97 Q 7,5 8,0 ©

Dimension see also Annex B 19

Table C86.1: Installation parameters

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

Anchor rod	M6	M8		-	M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded		-	M6	M8		-		-	M10			•		-
anchor FIS E			11x85						15x85					
Perforated sleeve FIS H K	123	c 85		162	x85		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}	[Nm]	2	4
torque				

General installation parameters

Contrai inclaire	onoral motanation parameters										
Edge distance	C _{min} = C _{cr}	100									
Spacing	s _{min} II s _{cr} II [mm]	250									
Spacing	S _{min} ⊥ S _{cr} ⊥	245									

Drilling method

Hammer drilling with hard metal hammer drill

Table C86.2: Group factors

Anchor	od	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforat	ed sleeve FIS H K	12x85 16x85			x85	16>	(130	20x85		20x130	
Group factors	$\frac{\alpha_{g,N} (s_{min} II) =}{\alpha_{g,N} (s_{min} II)}$ $\frac{\alpha_{g,N} (s_{min} \perp) =}{\alpha_{g,N} (s_{min} \perp)}$ [-]						2				

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick filled with mineral wool, dimensions, installation parameters

Annex C 86

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



 Table C87.1:
 Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

				T						
Anchor rod			M10	M12	M16					
Perforated sleev	/e FIS H K	IS H K 18x130/200 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							
Chasing	S _{min} II S _{cr} II	[mm]		25	250					
Spacing			245							
Drilling method										
Hammer drilling v	with hard r	netal ha	mmer drill							

Table C87.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick filled with mineral wool, dimensions, installation parameters

Annex C 87



Vertical perforated brick 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 anchorage)

Anchor rod	M6	M8		•	M8	M10	M8	M10		•	M12	M16	M12	M16	M12	M16
Internal threaded		•	М6	M8		•		-	M10	M12		•				
anchor FIS E			11)	(85					15:	(85] '	-	•	•
Perforated sleeve FIS H K	12:	k 85		16>	(85		16x	130		20x8	35		20x	130	20x	200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾

				<u> </u>			
Mean compressive strength /	Use						
Min. compressive strength	con-						
single brick 1)	ditions						
10 / 8 N/mm ²	w/w	2	1,5	2,5	2,0	2,0	3,0
10 / 0 14/111111	d/d	2	2,0	3,0	2,0	2,0	3,0

The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Tension resistance N _{Rk} = N _{Rl} strength f _b ; Installation and				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
10 / 8 N/mm²	w/w	-	.5	2.0
	d/d	1 2	.0	2.0

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick filled with mineral wool, Characteristic resistance under tension loading	Annex C 88

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

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



Vertical perforated brick 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 anchorage)

Anchor rod	M6	М8			М8	M10	М8	M10			M12	M16	M12	M16	M12	M16
1			M6	М8		_		-		M12		_				
Internal threaded anchor FIS E	-		11x85						15x85					-		•
Perforated sleeve FIS H K	12	(85		16)	(85		16x	130		20x	85		20x	130	20x	200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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 / 0 14/111111	d/d	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5

¹⁾ The 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 anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x13	30/200	22x130/200
Shear resistance V _{Rk} = V _{Rk,b} Installation and use condition				n compressive strength f _b ;
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
10 / 8 N/mm²	w/w d/d		,0 ,0	1,5 1,5

The 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 C 123.

fischer injection system FIS V Plus for masonry

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

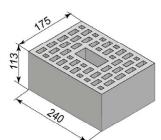
Annex C 89

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



	79-0	100				
Producer	e.g. Wienerberger					
Nominal dimensions	[mm]	length L	width W	height H		
Norminal differisions	[mm]	≥ 240	≥ 175	≥ 113		
Mean gross dry density ρ	[kg/dm³]		0,9			
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm²]		12,5 / 10			
Standard or annex		EN 771	-1:2011+/	41:2015		

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Dimension see also Annex B 19

Table C90.1: Installation parameters

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

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

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}	100
Cassina	s _{min} II s _{cr} II [mm]	240
Spacing	S _{min} ⊥ S _{cr} ⊥	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		130
Group factors	$\begin{array}{c} \alpha_{g,N} \left(s_{min} \ II \right) = \\ \underline{\alpha_{g,V} \left(s_{min} \ II \right)} \\ \overline{\alpha_{g,N} \left(s_{min} \ \bot \right)} = \\ \alpha_{g,V} \left(s_{min} \ \bot \right) \end{array} [-]$;	2				

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters	Annex C 90

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



Table C91.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

				1110				
Anchor rod			M10 M12 M16					
Perforated sleeve FIS H K			18x1	30/200	22x130/200			
Anchor rod with	perforate	ed slee	ve FIS H K					
Max. installation torque	max T _{inst}	[Nm]			4			
General installa	tion parar	neters						
Edge distance	C _{min} = C _{cr}			1	00			
Chasing	S _{min} II S _{cr} II	[mm]		2	40			
Spacing	$egin{array}{c} \mathbf{s}_{min}oldsymbol{oldsymbol{oldsymbol{oldsymbol{min}}}} \ \mathbf{s}_{cr}oldsymbol{oldsymbol{oldsymbol{L}}} \end{array}$		115					
Drilling method								
Hammer drilling v	with hard r	netal ha	mmer drill					

Table C91.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 91



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 anchorage)

Anchor rod	M6	M8	-		M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E		-	M6	M8 85		-		-		M12 x85		•	-	•
Perforated sleeve FIS H K	12	x85			5x85		16x	130	10		x85		20x	130

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾

- a. a g			,, (,	
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 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H I	<	18x	130/200	22x130/200				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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		4,5	4.0				
12,5 / 10 N/IIIII-	d/d		5,0	4,0				

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	Annex C 92

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 anchorage)

Anchor rod	M6	M8	-		M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-	M6 11x	M8 85		-		-	M12 x85		•	-	•
Perforated sleeve FIS H K	12:	x85		16	x85		16x	130	20:	x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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 14/111111	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 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 anchorage)

Anchor rod		M10 M12 M16						
Perforated sleeve FIS H	K	18x ²	130/200	22x130/200				
	$R_{k,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; lition w/w, d/d; (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	0,8				
12,5 / 10 N/IIIII-	d/d	7,0	6,0	8,0				

¹⁾ The 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 C 123

fischer injection system FIS V Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under shear loading	Annex C 93

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

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



English translation prepared by DIBt Horizontal perforated brick LLz, EN 771-1:2011+A1:2015 Producer length L | width W | height H Nominal dimensions [mm] 250 78 248 Mean gross dry density ρ [kg/dm³] ≥ 0,7 Mean compressive strength / Min. $[N/mm^2]$ 2,5/2 or 5/4 or 8/6 compressive strength single brick 1) Standard or annex EN 771-1:2011+A1:2015 Dimension see also Annex B 19 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

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

Edge distance

Spacing

Hammer drilling with hard metal hammer drill

 $C_{min} = C_{cr}$

 $s_{\text{min}} \; II$

 $s_{\text{cr}} \, II$

[mm]

100 75

250

250

Table C94.2: Group factors

Anchor rod			M6	М8
Perforated sleeve FIS H K			12x50	
α _{g,N} (s _{min} II)			1,	6
Group factors	α _{g,∨} (s _{min} II)	1	1,	1
	$\alpha_{g,N}$ (S _{min} \perp)		2	0
	$lpha_{ extsf{g,V}}$ (S $_{ extsf{min}}$ \perp)		2,	0

fischer injection system FIS V Plus for masonry	
Performance Horizontal perforated brick LLz, dimensions, installation parameters	Annex C 94

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

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

strength fb; Installation and i	strength f₀; Installation and use condition w/w, w/d, d/d; (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	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				

The 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,c,⊥} [kN] depending on the mear r/d, d/d; (temperature range 50/80°C	
Mean compressive strength / Min. compressive strength single brick 1)			
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

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

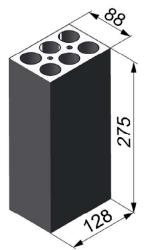
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading	Annex C 95

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



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



		10		
Producer		e.g. Cern	nanica Far	reny S.A.
Nominal dimensions	[mm]	length L	width W	height H
Norminal difficults	[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 B 19

Table C96.1: Installation parameters

Anchor rod			M6	M8
Perforated sleeve FIS H K			12x50	
Anchor rod with	perforat	ed sle	eve FIS H K	
Max. installation torque	T_{inst}	[Nm]	2	2
General installation parameters			S	
Edge distance	Cmin = Ccr		6	0
	s _{min} II		7	5
Cassins	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 rod		M6	M8
Perforated sleeve FIS H K		12x50	
	α _{g,N} (S _{min} II)	1	3
Group factors	α _{g,V} (s _{min} II)	1	5
factors	$\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} [-]$	1	3
	$lpha_{ extsf{g,V}}$ (S _{min} ot)	1	5

fischer injection system FIS V Plus for masonry	
Performance Horizontal perforated brick LLz, dimensions, installation parameters	Annex C 96

The 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

emigre arraner arraer terrerer reading					
Anchor rod		M6	М8		
Perforated sleeve FIS H K		12x50			
		= N _{Rk,p,c} = N _{Rk,b,c} [kN] depending on lition w/w, w/d, d/d; (temperature ra			
Mean compressive strength / Use Min. compressive strength single brick 1) ditions					
2,5 / 2 N/mm²	w/w w/d		5		

The 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,c,⊥} [kN] depending on the mear /d, d/d; (temperature range 50/80°C	
Mean compressive strength / Us Min. compressive strength co single brick 1) ditio			
2,5 / 2 N/mm²	w/w w/d d/d		,2

The 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 C 97

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 Producer length L width W height H Nominal dimensions [mm] 362 240 240 Mean gross dry density ρ [kg/dm³] ≥ 1,0 Mean compressive strength / Min. $[N/mm^2]$ 2.5 / 2 or 5 / 4 compressive strength single brick 1) Standard or annex EN 771-3:2011+A1:2015 37 Dimension see also 240 Annex B 19 88 76 37 -**Table C98.1:** 362 Installation parameters (Pre-positioned anchorage with perforated sleeve FIS H K) M6 M8 M8 M10 M8 M10 M12 M16 M12 M16 M12 M16 Anchor rod M6 M8 M6 | M8 M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 12x85 20x130 20x200 16x85 16x130 20x85 Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K Max. installation max Tinst [Nm] 2 torque General installation parameters Edge distance Cmin = Ccr 60 100 s_{min} II [mm] scr II 362 Spacing $s_{min} \perp = s_{cr} \perp$ 240 **Drilling method** Hammer drilling with hard metal hammer drill The compressive strength of the single brick must not be less than 80% of the mean compressive strength. **Table C98.2:** Group factors M8 M10 M8 M10 Anchor rod M6 | M8 M12 M16 M12 M16 M12 M16 M6 | M8 M6 | M8 M10 M12 Internal threaded anchor FIS E 11x85 15x85 Perforated sleeve FIS H K 12x50 12x85 16x85 16x130 20x85 20x130 20x200 $\alpha_{g,N}$ (s_{min} II) 1,2 1,1 $\alpha_{g,V}$ (s_{min} II) Group [-] factors $\alpha_{g,N}$ (s_{min} \perp) 2,0 $\alpha_{g,V}$ (Smin \perp) fischer injection system FIS V Plus for masonry Annex C 98 Performance Light-weight concrete hollow block Hbl, dimensions, installation parameters



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

Table C99.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod			M10	M12	M16							
Perforated sleeve FIS H K			18x13	0/200	22x130/200							
Anchor rod with pe	rforate	ed sle	eve FIS H K									
Max. installation max	x T _{inst}	[Nm]		2								
General installation parameters												
Edge distance c _m	nin = Ccr			6	0							
	s _{min} II	r		10	00							
Spacing	s _{cr} II	[mm]	362									
S _{min} ⊥ =	= s cr ⊥			24	40							

Drilling method

Hammer drilling with hard metal hammer drill

Table C99.2: Group factors

Anchor roo	t	M10	M12	M16							
Perforated	sleeve FIS H K	18x1	30/200	22x130/200							
	α _{g,N} (s _{min} II)		1	2							
Group factors	α _{g,V} (S _{min} II)		1,1								
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
Light-weight concrete hollow block Hbl, dimensions, installation parameters

Annex C 99



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 anchorage)

Anchor rod	M6	M8	M6	M8	-		M8 N	/110	M8	M10		•	M12	M16	M12	M16	M12 M16	
Internal threaded				-		М6	М8			-		M10	M12		•			
nchor FIS E		-			11x85	_				15>	(85] -		-		
Perforated sleeve FIS H K	12:	x50	12	12x85 16x		16x85		16x	130	20:		k 85		20x	130	20x200		

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength /	Use			
Min. compressive strength single brick ¹⁾	con- ditions			
dirigio briok	G.I.G.I.G			
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

The 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 anchorage)

Anchor rod			M10	M12	M16
Perforated sleeve FIS H K			18x13	0/200	22x130/200
Tension resistance $N_{Rk} = N_{Rk}$ strength f_b ; Installation and u					
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
2,3 / 2 N/IIIII	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 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 C 100

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 anchorage)

Anchor rod																		
	Anchor rod	М6	M8	М6	M8	-		M8	M10	M8	M10			M12	M16	M12	M16	M12 M1
11805		_						⊣ -		-						_	-	
Perforated sleeve FIS H K 12x50 12x85 16x85 16x130 20x85 20x130 20x200		12)	12×50		12v85		111100		(85		16x130					20x130		20×200

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

motanation and doc condition	• ••, ••,	a, ara, (temperature range 60/00 6 and 72/120 6)
Mean compressive strength /	Use	
Min. compressive strength	con-	
single brick 1)	ditions	
2,5 / 2 N/mm ²	w/w w/d	0.9
2,3 / 2 14/111111	d/d	0,9
5 / 4 N/mm ²	w/w w/d	
5 / 4 N/IIIII	d/d	2,0

The 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 anchorage)

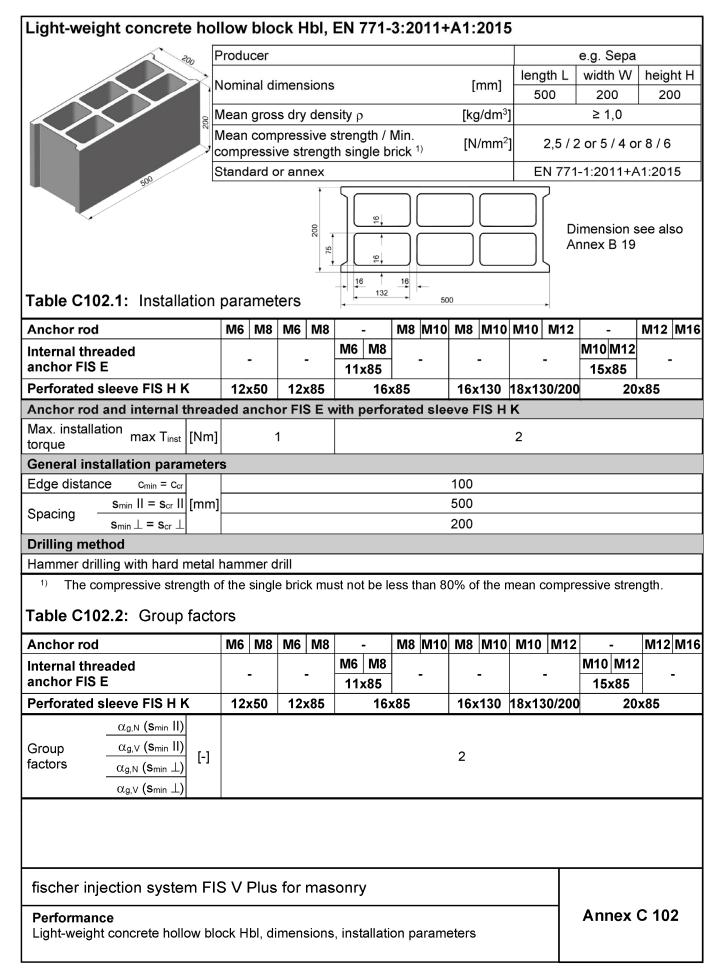
Anchor rod		M10	M12	M16						
Perforated sleeve FIS H K		18x13	18x130/200 22x							
Shear resistance $V_{Rk} = V_{Rk,b} =$ Installation and use condition										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions									
2,5 / 2 N/mm²	w/w w/d d/d		0	9						
5 / 4 N/mm²	w/w w/d d/d		2	,0						

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading	Annex C 101







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	M6	M8		-	M8	M10	M8	M10	M10	M12	-	M12 M16
Internal threaded			-		М6	M8							M10 M12	·
anchor FIS E		-			11x85		'		-		-		15x85	-
Perforated sleeve FIS H K	12:	x50	12	x85	16x8		x85		16x130 18x130/200		20x85			

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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 d/d	0.4 0,5
	w/w w/d	
5 / 4 N/mm ²	d/d	0,9
8 / 6 N/mm ²	w/w w/d	1,2
0 / 0 IN/IIIII-	d/d	1,5

- The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
- 2) For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0.83 \cdot N_{Rk(50/80^{\circ}C)}$.

Table C103.2: 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	M8	M10	M10	M12	-	M12	M16
Internal threaded					М6	M8							M10 M12		
anchor FIS E		-		-		11x85] -		-			15x85	•	
Perforated sleeve FIS H K	12	x50	12	k 85		162	x85		16x	130	18x13	0/200	20:	x85	

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

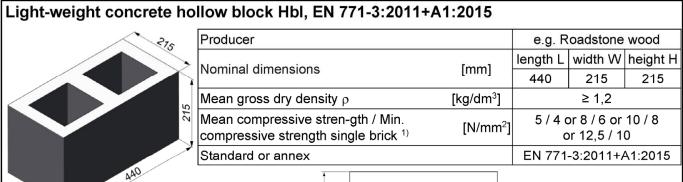
		, , , , , , , , , , , , , , , , , , , ,
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	
2,5 / 2 N/mm²	w/w w/d d/d	0,9
5 / 4 N/mm²	w/w w/d d/d	1,5
8 / 6 N/mm²	w/w w/d d/d	2,5

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under tension and shear loading	Annex C 103





40 440

Dimension see also Annex B 20

Table C104.1: Installation parameters

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

Anchor rod	M6	M8	M6	M8	-		M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		•		•	M6 112	M8 x85		-		-	M10 M1 15x85	2	•		-
Perforated sleeve FIS H K	12	x50	12)	(85		162	k 85		16x	130	2)x85		20x	130

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

ı	Max. installation	max T _{inst}	[MM]	2
ı	torque	IIIax Tinst	נואווון	_

General installation parameters

Ochiciai motana	cion parametei	S
Edge distance	C _{min} = C _{cr}	110
	s _{min} II	100
Spacing	s _{cr} II [mm]	440
	S _{min} ⊥	100
	s _{cr} ⊥	215

Drilling method

Hammer drilling with hard metal hammer drill

Table C104.2: Group factors

Anchor roo	Anchor rod		M6	M8	М6	M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E				M6	6 M8 1x85		-		M10 M12 15x85		-		-					
Perforated sleeve FIS H K			12	x50	12:	k 85		162	(85		16x130		20x85		20x	130		
	α _{g,N} (s _{min} II)			1,4														
Group	$\alpha_{\text{g,V}}$ (s _{min} II)	i) [2,0														
factors	$lpha_{ extsf{g,N}}$ (Smin $oldsymbol{\perp}$)	[-]		1,4														
	$lpha_{ extsf{g,V}}$ (S $_{ extsf{min}}$ \perp)			1,2														

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, dimensions, installation parameters	Annex C 104

¹⁾ The 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 anchorage 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	ntion max T _{inst}	[Nm]	2								
General installation parameters											
Edge distand	ce $c_{min} = c_{cr}$			110							
_	s _{min} II				100						
Chaoina -	s _{cr} II	[mm]			440						
Spacing -	S $_{min} \bot$				100						
_	s _{cr} ⊥				215						
Drilling met	hod										
Hammer dril	ling with hard i	netal l	nammer drill								

Table C105.2: Group factors

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

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, dimensions, installation parameters	Annex C 105



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 anchorage)

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded					М6	M8							M10 M12		
anchor FIS E		_		-		k 85	_		-		-		15x85		
Perforated sleeve FIS H K	12:	x50	12:	x85	16>		16x85		16x130 18x130/200		20:	20x85			

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f₀; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾

our on guir ib, motamation an	ongan is, motamation and doctoration in it, in a, and, (compensation range co. co										
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions										
5 / 4 N/mm²	w/w w/d	0,9	1,2	2.0							
	d/d	1,2	1,5	2,0							
8 / 6 N/mm²	w/w w/d	1,5	2.0	3,0							
	d/d	1,5	2,0	3,0							
10 / 8 N/mm²	w/w w/d	2,0	2.5	3,5							
	d/d	2,0	3,0	4,0							
12,5 / 10 N/mm²	w/w w/d	2,5	3,0	4,5							
	d/d	3,0	3,5	5,0							

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

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

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H	ve FIS H K 18x130/200 22x130/200							
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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 d/d		1.2 1,5	2.0 2,0				
8 / 6 N/mm²	w/w w/d d/d		2,0 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				

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading	Annex C 106

For temperature range 72/120°C: NRk (72/120°C) = 0,83 · NRk (50/80°C).

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 anchorage)

Anchor rod	M6	M8	M6	M8		-	M8	M10	M8	M10	-	M12 M16	M12	M16	
Internal threaded	_		_		М6	M8		_			M10 M12	_		_	
anchor FIS E					112	x85					15x85				
Perforated sleeve FIS H K	12)	k 50	12:	12x85		16x8		16x85		16x	(130	20x85		20x	130

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions						
5 / 4 N/mm²	w/w w/d d/d	0,75	1,20	0,75	1,20	0,75	1,20
8 / 6 N/mm²	w/w w/d d/d	1,20	2,00	1,20	2,00	1,20	2,00
10 / 8 N/mm²	w/w w/d d/d	1,50	2,50	1,50	2,50	1,50	2,50
12,5 / 10 N/mm²	w/w w/d d/d	2,00	3,00	2,00	3,00	2,00	3,00

The 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS	нК	18x1	30/200	22x130/200				
				the mean compressive strength f _b ; 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						
8 / 6 N/mm ²	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				

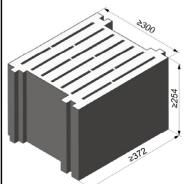
The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading	Annex C 107



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



Producer		e.g. Sepa				
Nominal dimensions	[mm]	length L	width W	height H		
Norminal dimensions	[HHHH]	≥ 372	≥ 300	≥ 254		
Mean gross dry density ρ	[kg/dm³]		≥ 0,6			
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]		2,5 / 2			
Standard or annex		EN 771-3:2011+A1:2015				

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Dimension see also Annex B 20

Table C108.1: Installation parameters

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16									
Perforated sleeve FIS H K	16x	130	18x13	30/200	20x	130	22x130/200	20x	200									
Anchor rod with perforated sle	eve FIS	HK						Anchor rod with perforated sleeve FIS H K										

Max. installation max T_{inst} [Nm]

General in	General installation parameters							
Edge distar	nce c _{min} = c _{cr}	130						
Chaoina	s _{min} II = s _{cr} II [mm] 370						
Spacing	$s_{min} \perp = s_{cr} \perp$	250						

Drilling method

Hammer drilling with hard metal hammer drill

Table C108.2: Group factors

Anchor ro	M8	M10	M10	M12	M12	M16	M16	M12	M16	
Perforated	sleeve FIS H K 1		16x130		18x130/200		130	22x130/200	20x200	
	α _{g,N} (s _{min} II)									
$ \begin{array}{c c} \text{Group} & \overline{\alpha_{\text{g,V}}\left(\textbf{s}_{\text{min}}\ \textbf{II}\right)} \\ \text{factors} & \overline{\alpha_{\text{g,N}}\left(\textbf{s}_{\text{min}}\ \bot\right)} \end{array} [-] $		3								
	$\alpha_{\sf g,N}$ (S _{min} \perp)					4	2			
	α _{g,} ∨ (S _{min} ⊥)									

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block VbI, dimensions, installation parameters

Annex C 108

¹⁾ The 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 M10		M12	M16	M16	M12	M16	
Perforated sleeve FIS H K	16x	16x130		18x130/200		130	22x130/200	20x200		

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive stren-	Use			
gth / Min. compressive	con-			
strength single brick 1)	ditions			
2,5 / 2 N/mm ²	w/w w/d	2,0	2,5	3,0
2,9 / 2 N/IIIIIF	d/d	2,0	3,0	4,0

¹⁾ The 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 K 16x130 18x130/200 20x130 22x130/200 20x20										200		
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)												
Mean compressive stren-	Use											

strength single brick 1) 2,5 / 2 N/mm ²	ditions w/w w/d	4.5	6,5
_,6 / _ 10/11111	d/d	1,5	3,3

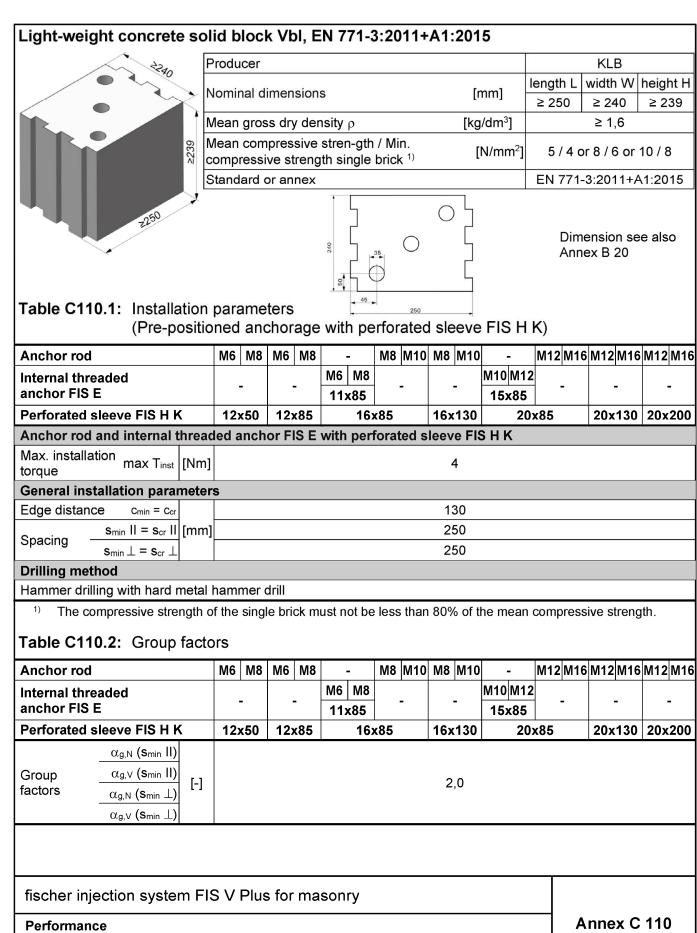
The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

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

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





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



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

Table C111.1: Installation parameters

(Push through anchorage 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. installation max T _{inst} [Nm]		2,0									
General installation parameters	3										
Edge distance c _{min} = c _{cr}		13	30								
Smin II = Scr II [mm]		25	50								
Spacing $s_{min} \perp = s_{cr} \perp$	250										
Drilling method											

Hammer drilling with hard metal hammer drill

Table C111.2: Group factors

Anchor rod	ı		M10	M16					
Perforated sleeve FIS H K			18x13	30/200	22x130/200				
Group factors	$\begin{array}{c} \alpha_{\text{g,N}}\left(\textbf{s}_{\text{min}}\ \textbf{II}\right) \\ \hline \alpha_{\text{g,V}}\left(\textbf{s}_{\text{min}}\ \textbf{II}\right) \\ \hline \alpha_{\text{g,N}}\left(\textbf{s}_{\text{min}}\ \bot\right) \\ \hline \alpha_{\text{g,V}}\left(\textbf{s}_{\text{min}}\ \bot\right) \end{array}$	[-]		2	,0,				

fischer injection system FIS V Plus for masonry Annex C 111 **Performance** Light-weight concrete solid block Vbl, dimensions, installation parameters



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 anchorage)

Anchor rod	M6 I	VI8	M6 M8		-	M8	M10	M8	M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E	-		-	M6	M8 x85		-		-	M10 M12 15x85	-	-	-
Perforated sleeve FIS H K	12x	50	12x85	16x		16x85		16x	130	20	x85	20x130	20x200

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

ou ongur is, motumation and			,	ra, ara, (componentino ram,	90 00.00 0,
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/mm ²	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

The 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H K	(18x ⁻	130/200	22x130/200				
Tension resistance $N_{Rk} = 1$ strength f_b ; Installation an				on the mean compressive range 50/80°C) ²⁾				
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	con-						
5 / 4 N/mm ²	w/w w/d		2,5	3,0				
5 / 4 N/IIIII	d/d		4,0	5,0				
8 / 6 N/mm ²	w/w w/d		4,0	5,0				
O / O N/IIIIII	d/d		6,5	7,5				
10 / 8 N/mm ²	w/w w/d		5,0	6,5				
10 / 6 N/MM-	d/d		8,5	9,0				

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, Characteristic resistance under tension loading	Annex C 112

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

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



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

Table C113.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	М6	M8	М6	M8		-	M8	M10	M8	M10			M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E		-		-	M6	M8 x85		-	,	-	M10 15	M12 <85	•	-	-	•		-
Perforated sleeve FIS H K	12:	x50	12	x85	16x		x85		16x	130	202		(85		20x	130	20x	200

Shear resistance $V_{Rk} = V_{Rk,c,\parallel} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. com- pressive 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

The 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 anchorage)

Anchor rod		M10	M12	M16				
Perforated sleeve FIS H	l K	18x1	30/200	22x130/200				
	Shear resistance V_{Rk} = $V_{Rk,b}$ = $V_{Rk,c,\parallel}$ = $V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)							
Mean compressive strength / Min. com- pressive strength single brick ¹⁾	Use con- ditions							
5 / 4 N/mm²	w/w w/d d/d	3	,5	4,5				
8 / 6 N/mm²	w/w w/d d/d	5	,5	6,5				
10 / 8 N/mm²	w/w w/d d/d	7	,0	8,5				

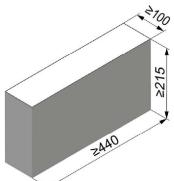
¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, Characteristic resistance under shear loading	Annex C 113



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



Producer	Roadstone wood			
Nominal dimensions	[mm]	length L	width W	height H
INOTHINAL difficults	[mm]	≥ 440	≥ 100	≥ 215
Mean gross dry density ρ	[kg/dm³]		≥ 2,0	
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm ²]		or 8 / 6 or or 12,5 / 10	
Standard or annex		EN 771	-3:2011+A	1:2015

Table C114.1: Installation parameters

Anchor rod		M6		M8		M10		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 _{in}	st [Nm]	4	4				1	0			

General installation parameters

Edge distanc	ce C _{min} = C _{cr}		100				
	s _{min} II		75				
Cassina	S _{cr} II	[mm]	3x h _{ef}				
Spacing ——	s _{min} ⊥		75				
	S cr⊥		3x h _{ef}				

Drilling method

Hammer drilling with hard metal hammer drill

Table C114.2: Group factors

Anchor rod			М6	М8	M10	M12	M16			
	α _{g,N} (s _{min} II)				1,6					
Group factors	α _{g,V} (s _{min} II)	[-]	1,3							
factors	αg,N (Smin ⊥)	-J			1,4					
	$\alpha_{g,V}$ (S _{min} \perp)				1,3					

fischer injection system FIS V Plus for masonry

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

Annex C 114

The 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		
Tension resistance N _{Rk} = strength f₀; Installation a						sive		
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions	con-						
5 / 4 N/mm²	w/w w/d	1,2		1	,2			
	d/d	2,0	2,0					
8 / 6 N/mm²	w/w w/d	1,5		2	,0			
O / O IN/IIIIII	d/d	3,0	3,0					
40 / 0 N/mm²	w/w w/d	2,0		2	,5			
10 / 8 N/mm²	d/d	4,0		4	,5			
40 F / 40 N/mm²	w/w w/d	3,0		3	,5			
12,5 / 10 N/mm ²	d/d	5,0		5	,5			

The 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	М8	M10	M12	M16
Shear resistance V _{Rk} = V _F Installation and use cond						jth f _b ;
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions		Effective	anchorage dept ≥ 50	h h _{ef} [mm]	
5 / 4 N/mm²	w/w w/d d/d	1,2	1,5	1,5	1,5	1,5
8 / 6 N/mm²	w/w w/d d/d	2,0	2,0	2,5	2,5	2,5
10 / 8 N/mm²	w/w w/d d/d	2,5	2,5	3,0	3,0	3,5
12,5 / 10 N/mm ²	w/w w/d d/d	3,0	3,5	4,0	4,0	4,5

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, Characteristic resistance under tension and shear loading	Annex C 115

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 length L height H 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 Standard or annex EN 771-3:2011+A1:2015

Table C116.1: Installation parameters

Anchor rod		M6		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 ma	ax T _{inst}	[Nm]	4	1				1	0			

General installation parameters

Edge distanc	ce C _{min} = C _{cr}		60
	s _{min} II		75
Cooring	S _{cr} II	mm][3x h _{ef}
Spacing	S _{min} ⊥		75
	s cr⊥		3x h _{ef}

Drilling method

Hammer drilling with hard metal hammer drill

Table C116.2: Group factors

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

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block Vbl, dimensions, installation parameters	Annex C 116

¹⁾ The 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	Anchor rod			M6		М8		M10		12	M	16
ension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive trength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾												
Mean compressive strength	Us	е			Ef	fective a	anchora	ge dept	h h _{ef} [m	m]		
/ Min. compressive strength single brick 1)	cor 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
	d/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/mm²	w/w	w/d	2,0	2,5	2,0	2,5	2,0	3,0	2,0	3,0	2,0	3,0
TU / O IN/ITITIT	d/d	b	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	d	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0
45 / 40 N/2	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	d	5,0	7,0	5,0	7,0	5,0	7,5	5,0	7,5	5,0	7,5

¹⁾ The 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					
	hear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; istallation and use condition w/w, w/d, d/d; (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								
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					

The 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 C 123.

fischer injection system FIS V Plus for masonry	
Performance Light-weight concrete solid block VbI, Characteristic resistance under tension and shear loading	Annex C 117

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

Table C118.1: Installation parameters

Anchor ro	od		IV	16	l N	18	M	10	M	12	M	16		•		•
Internal th	hreaded anchor	,											М6	M8	M10	M12
FIS E			-		· '	-		-		-		-	11x85		15x85	
Anchor ro	od and internal	threac	led ar	nchor	FIS E	with	out pe	erforat	ted sl	eeve						
Effective anchorage	e depth h _{ef}	[mm]	100	200	100	200	100	200	100	00 200 100 200 85			5			
Max. insta torque	Illation max T _{inst}	[Nm]	1	4	1	8	2	12	2	16	2	20	1 2			2
General in	General installation parameters															
Edge distance c _{min} = c _{cr}									10	00						
	s _{cr} = s _{min}		250													
	h _{ef} =200mm		80													
	S _{min} II	[mm]														
	h _{ef} =200mm	1							3x	h _{ef}						
Spacing -	s _{cr}	-														
Opaomig	$s_{cr} \perp = s_{min} \perp$								2	50						
	h _{ef} =200mm								8	0						
	s _{min} ⊥															
	h _{ef} =200mm			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 C 118

The 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 (Compressive strength $f_b = 2 \text{ N/mm}^2$)

Anchor	Anchor rod		M6 M8 M10 M12				-	-		-
Internal threaded anchor FIS E					-		М6	M8	M10	M12
			-	-		-	11x85		15>	x85
	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)	
Group	$\alpha_{g,N} \text{ II, } \alpha_{g,V} \text{ (smin II)}$ [-]	2								
factors	h _{ef} =200 $\alpha_{\rm g,N}$ ($\mathbf{s}_{\rm min} \perp$)			1,6			_1))	_	1)
	h _{ef} =200 α _{g,V} (s _{min} ⊥)		0,8				_1))		1)
	$\alpha_{g,N} \perp$, $\alpha_{g,V}$ ($s_{min} \perp$)				2					

¹⁾ No performance assessed.

Table C119.2: Group factors for autoclaved aerated concrete (Compressive strength $f_b = 4 \text{ N/mm}^2$)

Anchor	Anchor rod		M8	M10	M12	M16	-	-
Internal threaded anchor FIS E			_	_			M6 M8	M10 M12
		-	-	-		_	11x85	15x85
	h _{ef} =200 α _{g,N} (s _{min} II)			0,7			_1)	_1)
	h _{ef} =200 α_{gV} (\mathbf{s}_{min} II)			2,0			_1)	_1)
Group	$\alpha_{g,N} \text{ II}, \alpha_{gV} \text{ (s}_{min} \text{ II)}$				2			
factors	$\frac{\text{hef}=200 \ \alpha_{\text{g,N}} \ (\text{s}_{\text{min}} \ \bot)}{\text{hef}=200 \ \alpha_{\text{g,N}} \ (\text{s}_{\text{min}} \ \bot)} \ [-]$			0,7			_1)	_1)
	h _{ef} =200 $\alpha_{g,V}$ (s_{min} \perp)			1,2			_1)	_1)
	$\alpha_{g,N} \perp$, α_{gV} (Smin \perp)				2	·	·	

¹⁾ No performance assessed.

Table C119.3: Group factors for autoclaved aerated concrete (Compressive strength $f_b = 6 \text{ N/mm}^2$)

Anchor rod		M6 M8		M10	M12	M16		•		-
Internal threaded anchor FIS E							M6	M8	M10	M12
		-	-	-	-	-	11x85		15	x85
	hef=200 $\alpha_{g,N}$ (s_{min} II)			0,7			_	1)	_	1)
	h _{ef} =200 α _{g,V} (s _{min} II)			2,0				1)		1)
Group	$\alpha_{g,N} \text{ II}, \alpha_{g,V} \text{ (s_{min} II)}$				2					
factors	$\frac{\alpha_{g,N}(n,\alpha_{g,N}(s_{min} \perp))}{h_{ef}=200 \alpha_{g,N}(s_{min} \perp)} [-]$			0,7				1)	_1)	
	h _{ef} =200 $\alpha_{\rm g,V}$ ($\mathbf{s}_{\rm min}$ \perp)	1,2						_1)		1)
	$\alpha_{g,N} \perp, \alpha_{g,V} (s_{min} \perp)$	2								

¹⁾ No performance assessed.

fischer injection system FIS V Plus for masonry	
Performance Autoclaved aerated concrete (cylindrical drill hole), Group factors	Annex C 119



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	-	-	-	-	-	11x85		15x85		

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) 3)

Mean compressive stren-	U	se		Effective anchorage depth hef [mm]										
gth / Min. compressive strength single brick ²⁾		n- ons	100	200	100	200	100	200	100	200	100	200	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 10/111111	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
0 / 0 14/111111	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

No performance assessed.

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

Anchor rod	M6	M8	M10	M12	M16		•		•
Internal threaded						М6	M8	M10	M12
anchor FIS E	-	-	-	-	-	112	k85	15)	x85

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,ll} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive stren-	Use					Effecti	ive an	chora	ge de	pth h	f [mm]	
gth / Min. compressive strength single brick ²⁾	con- ditions	100	200	100	200	100	200	100	200	100	200	85	
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

No performance assessed.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	
Performance Autoclaved aerated concrete (cylindrical drill hole), Characteristic resistance under tension and shear loading	Annex C 120

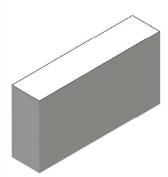
²⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

³⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0.83 \cdot N_{Rk(50/80^{\circ}C)}$.

The 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/mm ²]	2,5 / 2	5/4	8/6	
Standard or annex		EN 77	'1-4:2011+ <i>A</i>	1:2015	

Table C121.1: Installation parameters

Anchor rod		N	18	M	10	M	12	-		
Internal threaded anchor FIS E		-	-	-	-	-	-		M6 M8 11x85	
Anchor rod and int	ernal threa	ded anchor	FIS E with	out perfora	ted sleeve					
Effective anchorage depth	h _{ef} [mm]	75	95	75	95	75	95	85	;	
Max. installation ma	x T _{inst} [Nm]				2					
General installation	paramete	rs								
Edge distance c _n	nin = Ccr	120	150	120	150	120	150	150	0	
Specing Scr =	s _{min} II [mm]	240	300	240	300	240	300	300	0	
Spacing $s_{cr} \perp =$: s _{min} ⊥	240	250	240	250	240	250	250	0	

Drilling method

Hammer drilling with hard metal hammer drill

Table C121.2: Group factors

Anchor ro	d		IV	ıx	Mi	10	M	12		-
Internal th			_	_	_	_	_	_	М6	M8
anchor FIS	S E		_	_	_	_	_	_	112	x85
	α _{g,N} (s _{min} II)									
Group	$\alpha_{g,V}$ (s _{min} II)	[-]				2				
factors	$lpha_{ extsf{g}, extsf{N}}$ (S $_{ extsf{min}}$ \perp)	ן נ־ו				2				
	α _{g,} ∨ (s _{min} ⊥)									

fischer injection system FIS V Plus for masonry	
Performance Autoclaved aerated concrete (conical drill hole with special drill bit PBB), dimensions, installation parameters	Annex C 121

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

Anchor rod



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	IV	18	M	10	М	12	-		
Internal threaded anchor FIS E	-	-	-	-	-	-	M6 112	M8 (85	
	Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,p} = N_{Rk,p,c} = N_{Rk,p,c}$ [kN] depending on the mean compressive strength $f_{a,m}$: Installation and use condition w/w , w/d , d/d : (temperature range 50/80°C) ²)								

w/w w/d 2,0 2,5 2,0 2,5 2.0 2,5 2,0 2,5 / 2 N/mm² 2,5 d/d 2,0 2,5 2,0 2,5 2,0 2,0 w/w w/d 3.0 3.5 3.0 3,5 3.0 3.5 3.0 5 / 4 N/mm² d/d 3,0 3,5 3,0 3,5 3,0 3,5 3,0 w/w w/d 3,5 4,0 3,5 4,0 3,5 4,0 3,5 8 / 6 N/mm² d/d 4,0 4,5 4.0 4,5 4.0 4,5 4.0

M8

Table C122.2: Characteristic resistance under shear loading

1										
Internal threaded anchor FIS E		-	-	-	-	-	-	M6 11x	M8 (85	
Shear resistance $V_{Rk} = V_{Rk,b}$: Installation and use condition	Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c, } = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; nstallation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)									
Mean compressive strength /	Use			Effective a	nchorage o	depth h _{ef} [m	nm]			
Min. compressive strength single brick ¹⁾	con- ditions	75	95	75	95	75	95	8	5	
2,5 / 2 N/mm²	w/w w/d d/d				2,5					
5 / 4 N/mm²	w/w w/d d/d				4,5					
8 / 6 N/mm²	w/w w/d d/d				6,0					

M10

M12

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 C 122

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

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

The 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 C 123.



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					
	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]	δ V o [mm]	δ V ∞ [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 C 4 - C 7	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 C 14 / C 15	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 C 118 - C 120	N _{Rk} 1,4 * γ _{Mm}	1,03	2,06	V _{Rk} 1,4 * γ _{Mm}	1,25	1,88
brick Annex C 101 / C 102	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, 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 C 123



Fire res	sistar	nce u	nder	tens	sion	and	she	ar le	oadin	<u> </u>							
Table C										•	loading						
Brick			Solid brick Mz,NF, acc. to Annex C 4			Solid calcium silicate brick KS, NF,acc. to Annex C 14			Perforated calcium silicate brick KSL, acc to Annex C 24			Vertical perforated brick HLz, acc to Annex C 30			Vertical perforated brick HLz, acc to Annex C 28		
Mean compressive strength / Min. compressive strength single brick ³⁾			≥ 15 / ≥ 12		≥ 15 / ≥ 12			≥ 10 / ≥ 8			≥ 7,5 / ≥ 6			≥ 5 / ≥ 4			
Size			M8	M10	M12	M8 M10 M1			M8	M10	M12	M8	M10	M12	M8	M10	M12
Perforated Sleeve			-			-			16x130		20x130	16x85		20x 85	16x130		20x130
Perforated Sleeve for bridging of unbearing layer						-			-		20x 200	16x130		20x 130	-		20x200
h _{ef}		[mm]	[mm] ≥ 80			≥ 50			≥ 130		≥ 130	≥ 85		≥ 85	≥ 130		≥ 130
Characteristic resistance to failure under tension loading																	
NRk,s,fi = NRk,p,fi = NRk,b,fi ²⁾	R30		0,82		0,32		1,07 1,09		1,10	0,28 0,30		0,35	0,31		1		
	R60	1 [[]	0,73		0,31		0,66 0,61		0,56	0,19 0,22		0,22	0,22		2		
	R90	[kN]	0,64		0,29		0,25 0,13		_ 1)	0,10 0,10		0,10	0,13		3		
	R120 0,59			0,28			_ 1)	_ 1) _ 1) _ 1)		_ 1) _ 1) _ 1)		_ 1)					
			С	hara	cteri	stic r	esist	ance	to fail	ure und	der shea	r load	ing ²⁾				
without	lever a	arm															
	R30		0,82		0,32		1,07	1,09	1,10	0,28 0,30		0,35			<u> </u>		
V _{Rk,s,fi}	R60	[kN]	(0,73		0,31		0,66	0,61	0,56	0,19 0,22		0,22	 		<u> </u>	
	R90		0,64		0,29		0,25	0,13	_ 1)	0,10 0,10		0,10			3		
	R120		0,59		0,28		_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)		_ 1)			
with leve		<u> </u>								Г						ı	_
М ⁰ Rk,s,fi	R30	[Nm]	0,83							1,40	1,71	0,29	0,39	0,54	0,32		
	R60		0,74							0,78	0,86	0,19	0,28	0,34	0,22		<u> </u>
	R90		0,65							0,17	_ 1)	0,10	0,12	0,15	0,13		
	R120		0,60			0,28	0,35	0,43	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)	_ 1)
General	ınstal	lation	Paran	neter	S												
Edge distance	C _{cr,fi}	[mm]	100			60			80			80			100		
and .	Scr fi	' '	320		200			520			340			520			

¹⁾ No performance assessed.

320

spacing

S_{cr,fi}

200

fischer injection system FIS V Plus for masonry	
Performance Fire resistance to failure under tension and shear loading; Fire resistance to pull-out failure or brick breakout failure of a single anchor under tension loading	Annex C 124

520

340

520

 $V_{Rk,b,fi} = N_{Rk,b,fi}$

The compressive strength of the single brick must not be less than 80% of the mean compressive strength. In absence of national regulations, the recommended partial factor $\gamma_{M,fi}$ = 1,0.