Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA

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Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-10/0383 of 6 October 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	fischer injection system FIS V for use in masonry
Product family to which the construction product belongs	Injection system for use in masonry
Manufacturer	fischerwerke GmbH & Co. KG Otto-Hahn-Straße 15 79211 Denzlingen DEUTSCHLAND
Manufacturing plant	fischerwerke
This European Technical Assessment contains	134 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 029, April 2013, used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.
This version replaces	ETA-10/0383 issued on 17 June 2015

electronic copy of the eta by dibt: eta-10/0383

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Specific part

1 Technical description of the product

The fischer injection system FIS V for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS V, FIS VS and FIS VW, 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 anchor 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 anchor 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 tension and shear loads	See Annex C 1 – C 109
Displacements under shear and tension loads	See Annex C 110
Reduction Factor for job site tests (β-Factor)	See Annex C 110
Edge distances and spacing	See Annex C 3 – C 109

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

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3.4 Safety and accessibility in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

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

In accordance with guideline for European technical approval ETAG 029, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

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

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

Issued in Berlin on 6 October 2017 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

Beglaubigt:
Baderschneider

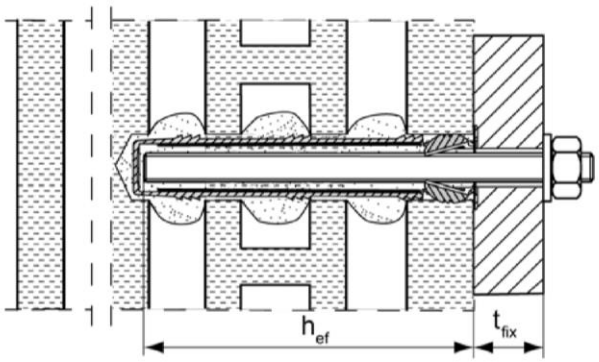
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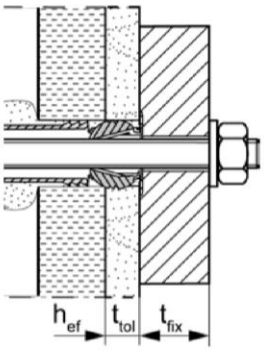
Installation conditions part 1

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

Pre-positioned anchorage:

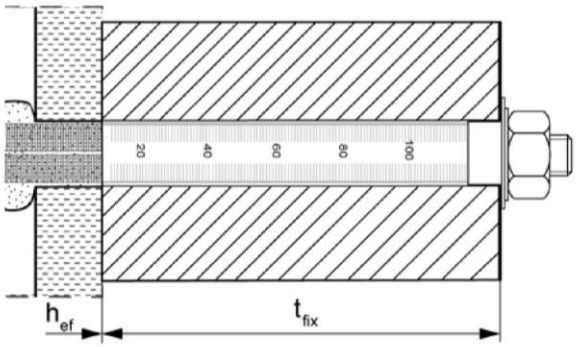


Installation with render bridge

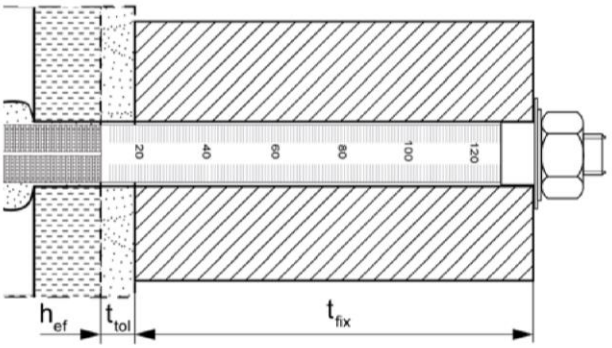


Size of the perforated sleeve: FIS H 12x50 K, FIS H 12x85 K, FIS H 16x85 K, FIS H 16x130 K, FIS H 20x85 K, FIS H 20x130 K, FIS H 20x200 K

Push through anchorage:



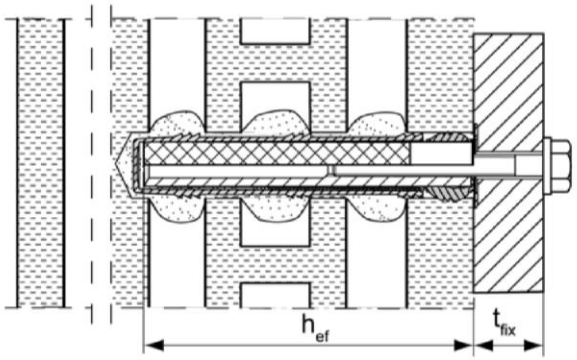
Installation with render bridge



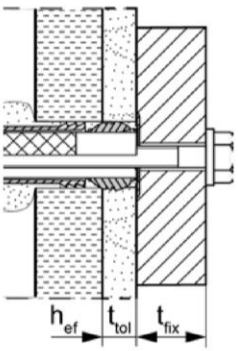
Size of the perforated sleeve: FIS H 18x130/200 K, FIS H 22x130/200 K

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

Pre-positioned anchorage:



Installation with render bridge



Pictures not to scale

h_{ef} = effective anchorage depth
t_{tol} = thickness of unbearing layer (e.g. plaster)
t_{fix} = thickness of fixture

fischer injektion system FIS V masonry

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

Annex A 1

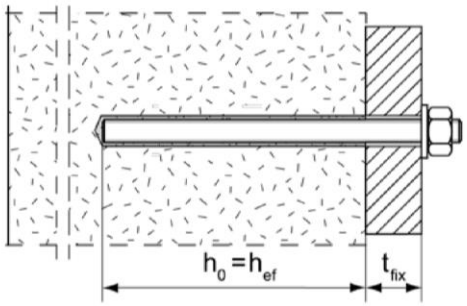
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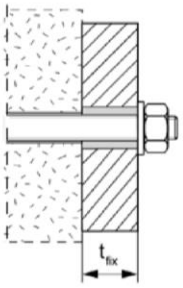
Installation conditions part 2

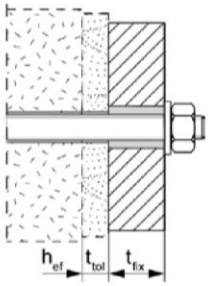
Anchor rods without perforated sleeve FIS H K;
installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned anchorage:



Push through anchorage: Annular gap filled with mortar

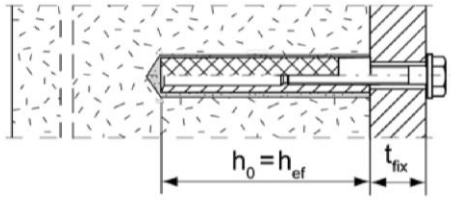




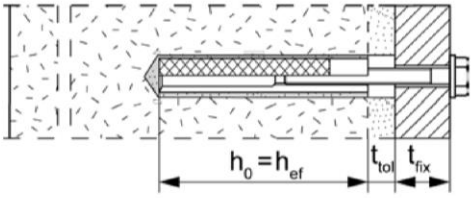
Installation with render bridge

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

Pre-positioned anchorage:

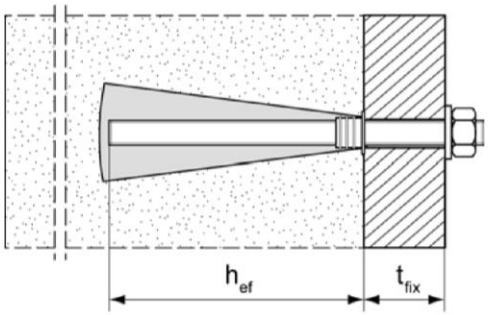


Installation with render bridge

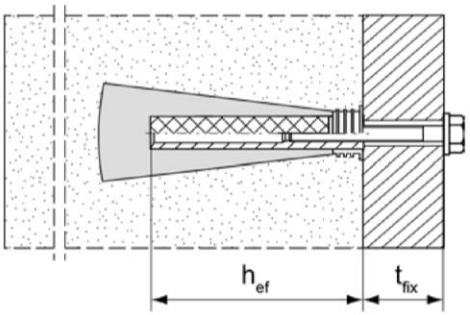


Anchor rods and internal threaded anchors FIS E without perforated sleeve FIS H K; installation in autoclaved aerated concrete with conical drill hole (installation with special conic drill bit PBB)

Pre-positioned anchorage:
anchor rods M8, M10, M12



Pre-positioned anchorage:
Internal threaded anchor FIS E 11x85 M6 / M8



Pictures not to scale

h_0 = depth of drill hole
h_{ef} = effective anchorage depth
t_{tol} = thickness of unbearing layer (e.g. plaster)
t_{fix} = thickness of fixture

fischer injektion system FIS V masonry

Product description
Installation conditions part 2,
Anchor rods and internal threaded anchor without perforated sleeve

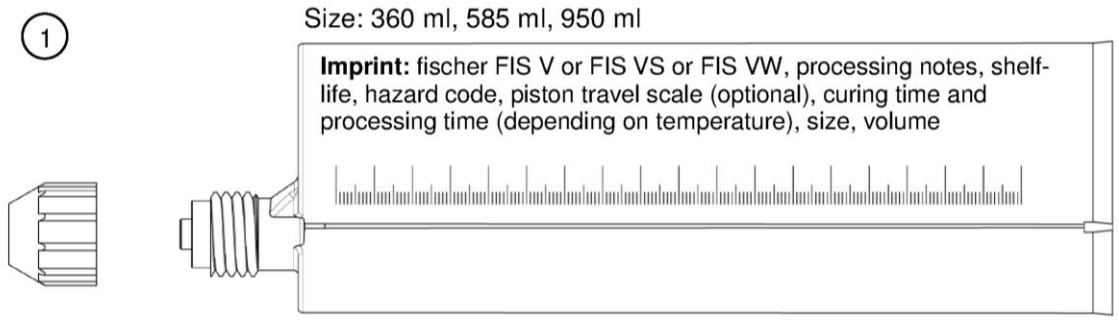
Annex A 2

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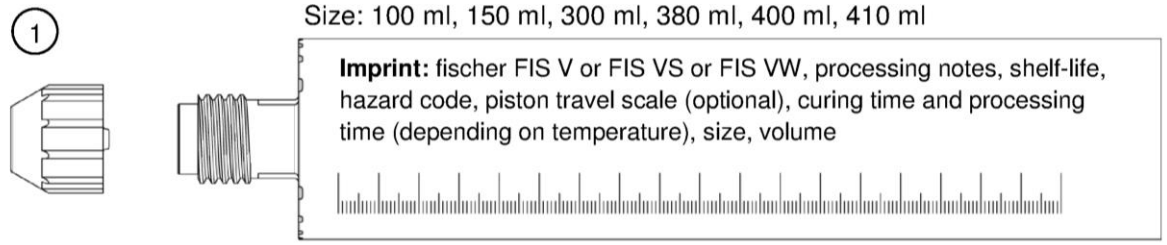
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Overview system components part 1

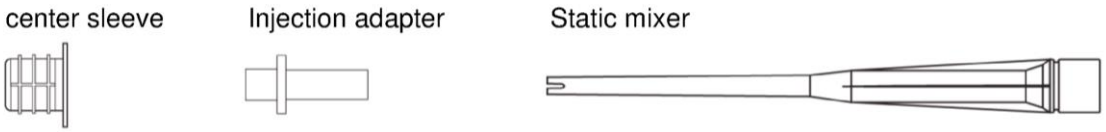
Mortar cartridge (shuttle cartridge) with sealing cap



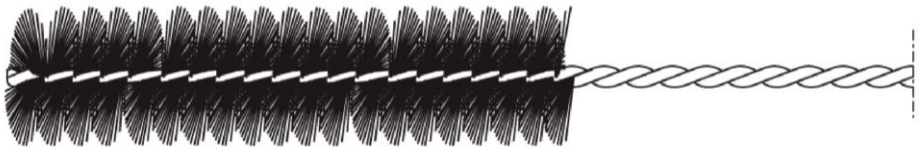
Mortar cartridge (coaxial cartridge) with sealing cap



Static mixer ME / MR with injection adapter and center sleeve for aerated concrete



Cleaning brush BS / BSB



Blow-out pump ABG or ABP



Pictures not to scale

fischer injektion system FIS V masonry	**Annex A 3**
System description Overview system components part 1: cartridge / static mixer / cleaning brush	

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Overview system components part 2

fischer anchor rod

(2) 

Size: M6, M8, M10, M12, M16

Internal threaded anchor FIS E

(5) 

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

Perforated sleeve FIS H K

(7) 

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

(7) 

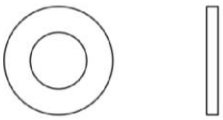
Size: FIS H 16x130 K
FIS H 20x130 K
FIS H 20x200 K

Perforated sleeve FIS H K (push through anchorage)

(7) 

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

Washer

(3) 

Hexagon nut

(4) 

Pictures not to scale

fischer injektion system FIS V masonry

System description
Overview system components part 2: steel parts / perforated sleeve

Annex A 4

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Table A5.1: Materials

Part	Designation	Material		
1	Mortar cartridge	Mortar, hardener; filler		
		Steel, zinc plated	Stainless steel A4	High corrosion-resistant steel C
2	Anchor rod	Property class 4.6; 4.8; 5.8 oder 8.8; EN ISO 898-1: 2013 zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$ fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2009 or property class 70 with f_{yk}= 560 N/mm² 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004	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 4042:1999 A2K or hot-dip galvanised ISO 10684:2004	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-1:2009 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 4042:1999 A2K	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
6	Commercial standard screw or threaded / anchor rod for internal threaded anchor FIS E	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, ISO 4042:1999 A2K	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
7	Perforated sleeve	PP / PE		

fischer injektion system FIS V masonry

Product description
Materials

Annex A 5

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Specifications of intended use (part 1)

Table B1.1: Overview use and performance categories

Anchorages subject to		**fischer injection system FIS V masonry**	
Hole drilling with hammer drill mode		all bricks; without C26 to C45, C73 to C76	
Hole drilling with rotary drill mode		all bricks	
Static and quasi static load, in masonry		all bricks	
Use category	dry or wet masonry	all bricks	
Installation	Pre-positioned anchorage	Anchor rod (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve (in perforated and solid brick masonry) Size: FIS H 12x50 K, FIS H 12x85 K, FIS H 16x85 K, FIS H 16x130 K, FIS H 20x85 K, FIS H 20x130 K, FIS H 20x200 K
	Push through anchorage	Anchor rod (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve (in perforated and solid brick masonry) Size: FIS H 18x130/200 K, FIS H 22x130/200 K
Installation conditions	category d/d	all bricks	
	category w/d		
	category w/w		
Installation temperature		-10°C to +40°C	
In-service temperature		-40°C to +80°C	max. short term temperature +80 °C and max. long term temperature +50 °C
		-40°C to +120°C	max. short term temperature +120 °C and max. long term temperature +72 °C

fischer injektion system FIS V masonry

Intended Use
Specifications (part 1)

Annex B 1

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Specifications of intended use (part 2)

Anchorages subject to:

- Static and quasi-static loads

Base materials:

- Solid brick masonry (Use category b) and autoclaved aerated concrete (Use category d), acc. to Annex B 13 / B 14
- Hollow brick masonry (use category c), according to Annex B 13 / B 14
- For minimum thickness of masonry member is h_{ef}+30mm
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010
- 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 according to ETAG 029, Annex B under consideration of the β-factor according to Annex C 110, Table C110.1

  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:

- **I**: From - 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- **II**: From -40°C to +120°C (max. short term temperature +120°C and max. long term temperature +72°C)

Use conditions (Environmental conditions):

- Dry and wet structure (regarding injection mortar)
- Structures subject to dry internal conditions exist (zinc coated steel, stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particular aggressive conditions exist exist (stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel)

  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

fischer injektion system FIS V masonry	**Annex B 2**
Intended Use Specifications (part2)	

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Specifications of intended use (part 2)

Design:

- The anchorages have to be designed in accordance with the ETAG 029, Annex C, 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:
  $N_{Rk} = N_{Rk,b} = N_{Rk,p}$
  $V_{Rk} = V_{Rk,b} = V_{Rk,c}$
  For the Calculation of pulling out a brick under tensile load $\mathbf{N_{Rk,pb}}$ or
  pushing out a brick under shear load $\mathbf{V_{Rk,pb}}$ see ETAG 029, Annex C.
  $\mathbf{N_{Rk,s}}$, $\mathbf{V_{Rk,s}}$ and $\mathbf{M_{Rk,s}}$ see annex C1-C3
  Factors for job site tests and displacements see Annex C110
- 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:

- Category d/d: - Installation and use in dry structures
- Category w/w: - Installation and use in dry and wet structures
- Category 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) 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 5.1
  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 injektion system FIS V masonry	**Annex B 3**
Intended Use Specifications (part2)	

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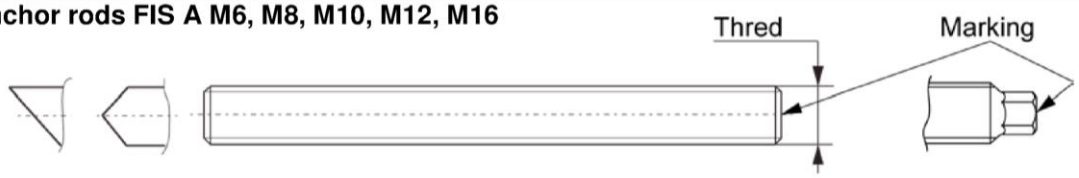
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Table B4.1: Installation parameters for anchor rods in solid bricks and autoclaved aerated concrete without perforated sleeves

Anchor rod	**Thread**	**M6**	**M8**	**M10**	**M12**	**M16**
Nominal drill hole diameter	d_0 [mm]	8	10	12	14	18
Effective anchorage depth h_{ef} [1] in AAC cylindrical drill hole	$h_0=h_{ef,min}$[mm]	100				
Effective anchorage depth h_{ef} [1] in AAC conical drill hole	$h_{o,min}$ [mm]	-	80			-
	$h_{ef,min}$ [mm]		75			
	$h_{ef,max}$ [mm]		95			
Effective anchorage depth h_{ef} [1] in solid brick (depth of drill hole $h_0 = h_{ef}$)	$h_{ef,min}$ [mm]	50				
	$h_{ef,max}$ [mm]	h-30, ≤200				
Diameter of clearance hole in the fixture	pre-position $d_f \leq$ [mm]	7	9	12	14	18
	push through $d_f \leq$ [mm]	9	11	14	16	20
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B8.1				
Maximum installation torque	$T_{inst,max}$ [Nm]	see parameters of brick				

[1] $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$ is possible.

fischer anchor rods FIS A M6, M8, M10, M12, M16

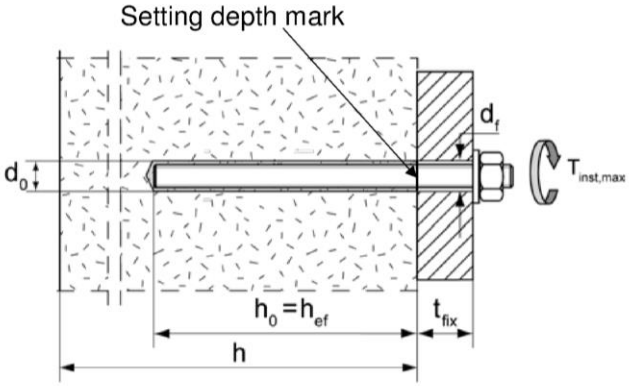


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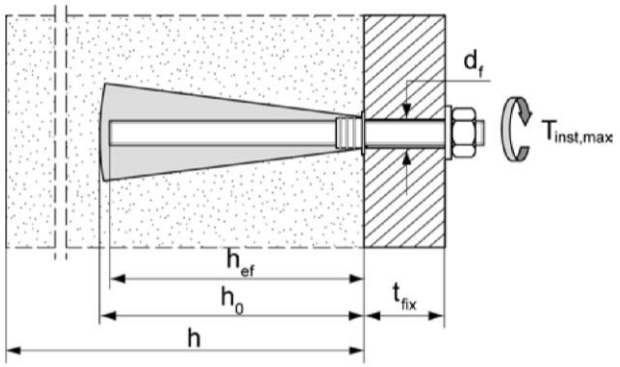
Property class 8.8, stainless steel A4 property class 80 and high corrosion resistant steel C property class 80: •
Stainless steel A4 property class 50 and high corrosion resistant steel C property class 50: ••
Or colour coding according to DIN 976-1:2016-09, property class 4.6 marking according to EN ISO 898-1:2013

Installation conditions:

Anchor rod in cylindrical drill hole



Anchor rod in conical drill hole



Pictures not to scale

fischer injektion system FIS V masonry

Intended Use
Installation parameters for anchor rods without perforated sleeve

Annex B 4

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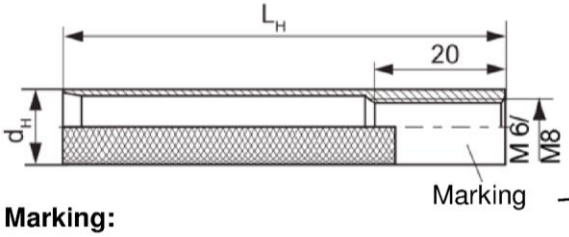
Deutsches Institut für Bautechnik DIBt

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

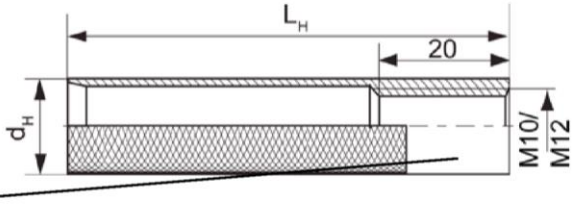
Internal threaded anchor FIS E		**11x85 M6**	**11x85 M8**	**15x85 M10**	**15x85 M12**
Diameter of anchor	d_H [mm]	11		15	
Nominal drill hole diameter	d_0 [mm]	14		18	
Length of anchor	L_H [mm]	85			
Effective anchorage depth	$h_0 = h_{ef}$ [mm]	85			
Effective anchorage depth h_{ef} in AAC (conical drill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

fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8



FIS E 15x85 M10, FIS E 15x85 M12

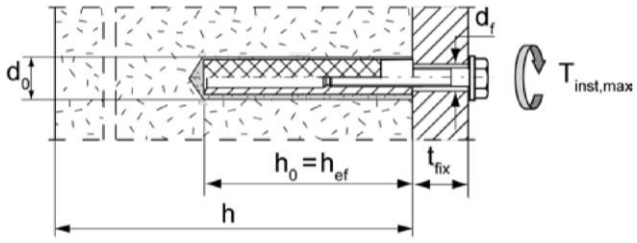


Marking:

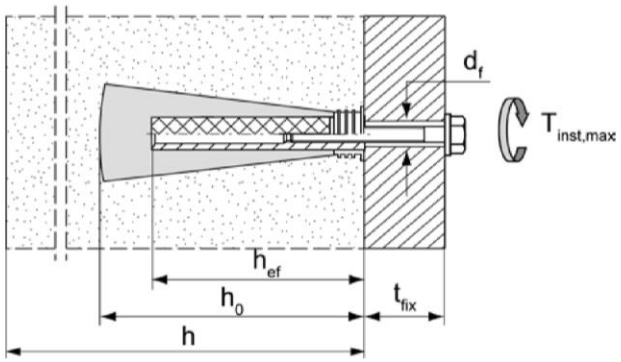
Size, e.g. **M8**, Stainless steel: A4, e.g. **M8 A4**, High corrosion-resistant steel: C, e.g. **M8 C**

Installation conditions:

Internal threaded anchor in cylindrical drill hole



Internal threaded anchor in conical drill hole



Pictures not to scale

fischer injektion system FIS V masonry

Intended Use
Installation parameters for internal threaded rods FIS E without perforated sleeve

Annex B 5

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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 anchorage depth	$h_{ef,min}$ [mm]	50	65	85	110	85	110	180
	$h_{ef,max}$ [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-]	M6 und M8		M8 und M10		M12 und M16		
Size of internal threaded anchor FIS E		-	-	11x85	-	15x85	-	-
Diameter of cleaning brush[1)]	$d_b \geq$ [mm]	see Table B8.1						
Maximum installation torque	$T_{inst,max}$ [Nm]	see parameters of brick						

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

[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.

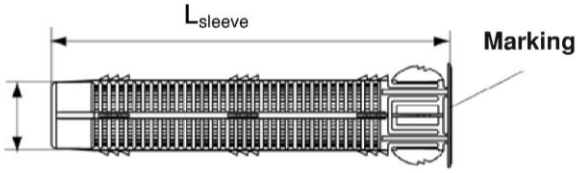
Perforated sleeve

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)

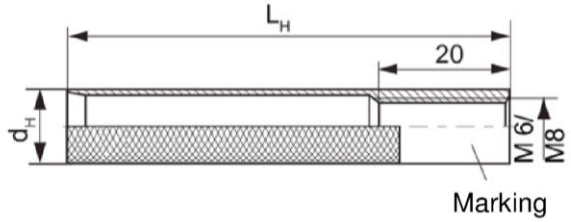


$D_{sleeve,nom}$

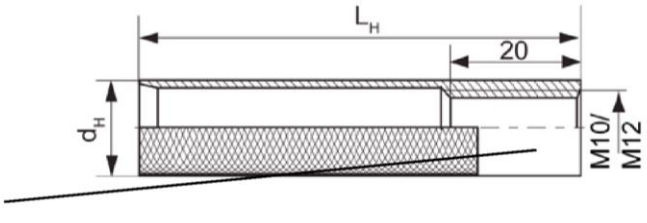


fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

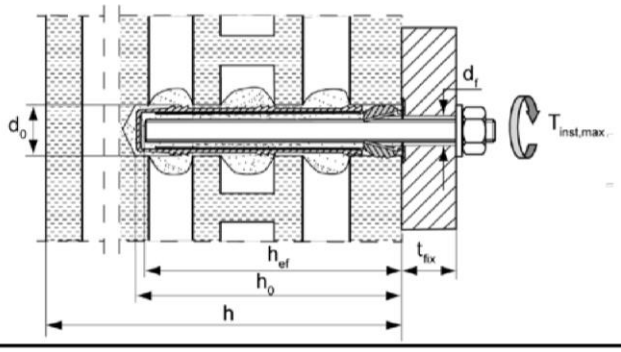


FIS E 15x85 M10, FIS E 15x85 M12

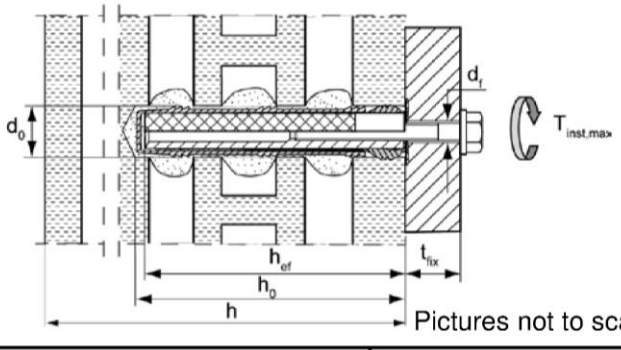


Installation conditions:

Anchor rod with perforated sleeve



Internal threaded anchor with perforated sleeve



Pictures not to scale

fischer injektion system FIS V masonry

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

Annex B 6

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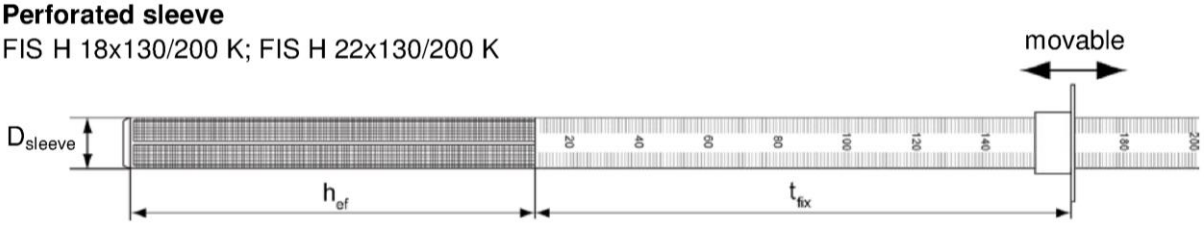
Table B7.1: Installation parameters for anchor rods with perforated sleeves (push through anchorage)

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

[1] Only for solid areas in hollow bricks and solid bricks.

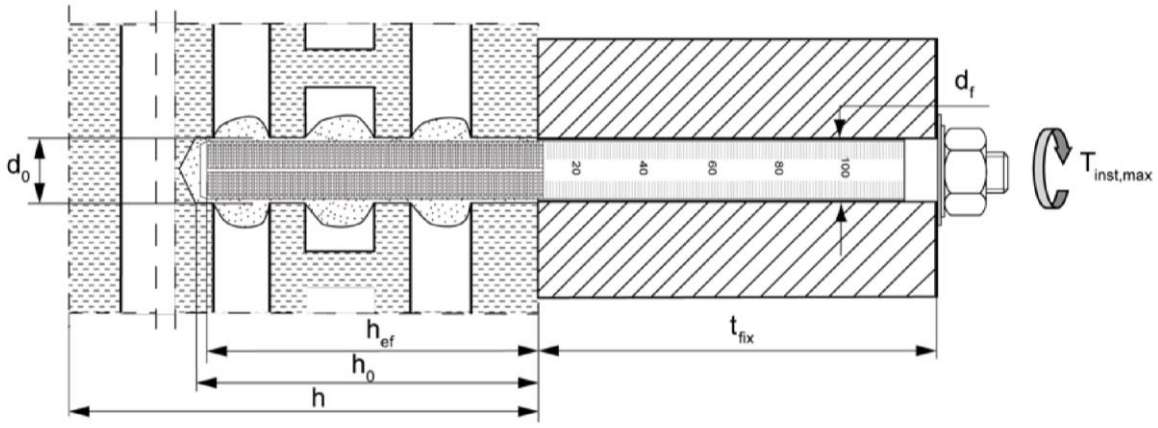
Perforated sleeve

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



Installation conditions:

Anchor rod with perforated sleeve



Pictures not to scale

fischer injektion system FIS V masonry

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

Annex B 7

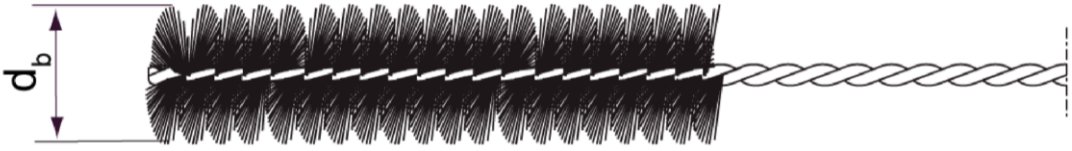
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Tabelle B8.1: Parameters of the cleaning brush BS (steel brush)

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

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



Only for solid bricks and autoclaved aerated concrete

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

Temperature at anchoring base [°C]	Minimum curing time [1] t_{cure}		
	FIS VW High Speed [3]	FIS V [2]	FIS VS Low Speed [2]
-10 to -5	12 h	-	-
>-5 to ±0	3 h	24 h	-
±0 to +5	3 h	3 h	6 h
>+5 to +10	50 min	90 min	3 h
>+10 to +20	30 min	60 min	2 h
>+20 to +30	-	45 min	60 min
>+30 to +40	-	35 min	30 min

System-temperature (mortar) [°C]	Maximum processing time t_{work}		
	FIS VW High Speed [3]	FIS V [2]	FIS VS Low Speed [2]
-	-	-	-
±0	5 min	-	-
+5	5 min	13 min	20 min
+10	3 min	9 min	20 min
+20	1 min	5 min	10 min
+30	-	4 min	6 min
+40	-	2 min	4 min

[1] For wet bricks the curing time must be doubled

[2] Minimum cartridge temperature +5°C

[3] Minimum cartridge temperature ±0°C

Pictures not to scale

fischer injektion system FIS V masonry

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

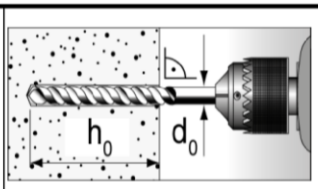
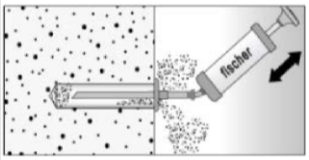
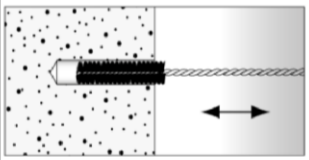
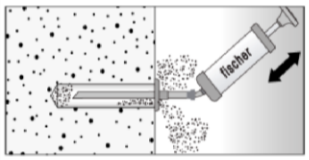
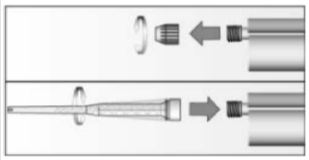
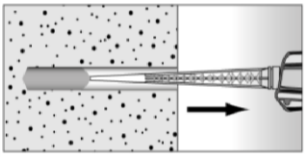
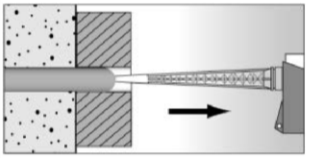
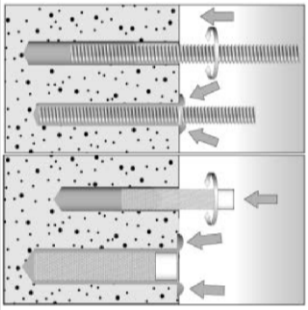
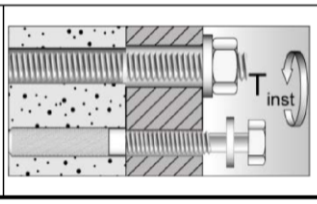
Annex B 8

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Installation instruction part 1

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

1		Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole $\mathbf{h_0}$ and drill hole diameter $\mathbf{d_0}$ see **Table B4.1; B5.1**		
2				Blow out the drill hole twice. Brush twice and blow out twice again.
3		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible)		
4		Place the cartridge into a suitable dispenser		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.
5		Fill approximetly 2/3 of the drill hole with mortar beginning from the bottom of the hole[1)]. Avoid bubbles!		For push through anchorage fill the annular clearance with mortar.
6		Only use clean and oil-free anchor elements. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.		
7		Do not touch. Minimum curing time see Table **B8.2**		Mounting the fixture. $T_{inst,max}$ see parameter of brick.

[1)] Exact volume of mortar see manufacturer´s specification.

fischer injektion system FIS V masonry

Intended use
Installation instruction (without perforated sleeve) part 1

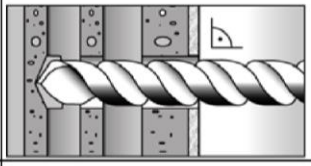
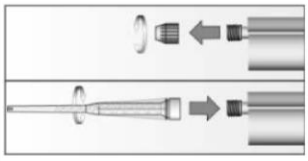
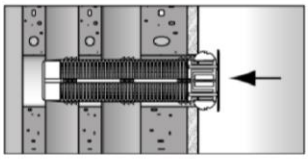
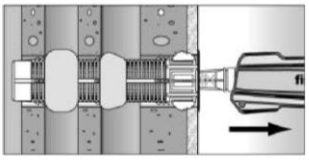
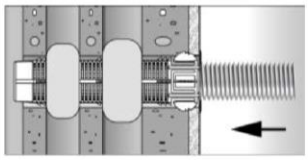
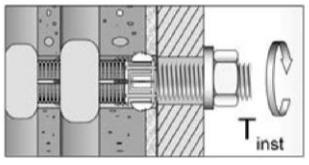
Annex B 9

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Installation instruction part 2

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

1		Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole $\mathbf{h_0}$ and drill hole diameter $\mathbf{d_0}$ see **Table B6.1**	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.	
2		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible)		
3		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.
4		Insert the perforated sleeve flush with the surface of the masonry or plaster.		Fill the perforated sleeve completely with mortar beginning from the bottom of the hole[1].
5		Only use clean and oil-free anchor elements. 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).		
6		Do not touch. Minimum curing time see Table **B8.2**		Mounting the fixture. $T_{inst,max}$ see parameter of brick.

[1] Exact volume of mortar see manufacturer´s specification.

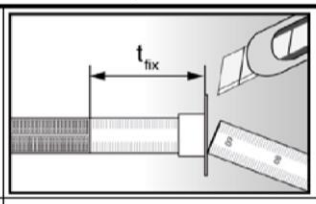
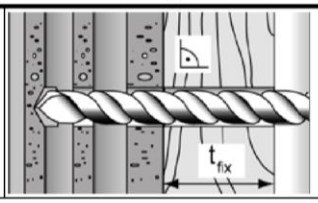
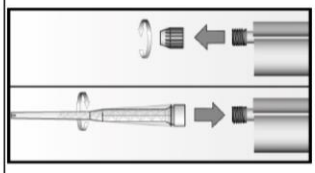
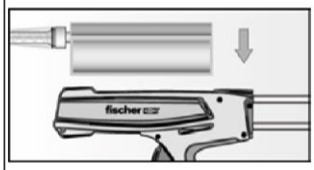
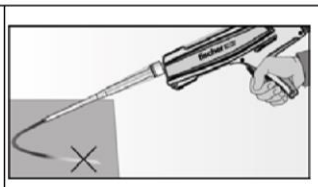
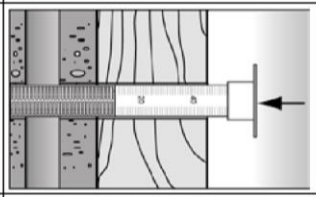
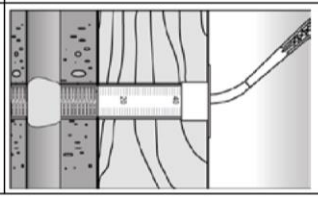
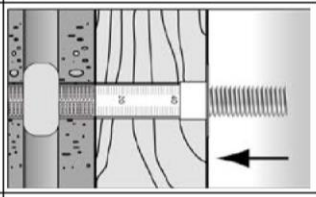
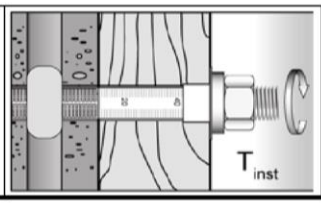
fischer injektion system FIS V masonry	**Annex B 10**
Intended use Installation instruction (with perforated sleeve) part 2	

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Installation instruction part 3

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

1		Push the movable stop up to the correct thickness of fixture and cut the overlap.		Drill the hole through the fixture. Depth of drill hole **(h_0 + t_{fix})** and drill hole diameter see **Table B7.1**
2		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible)		
3		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.
4		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.
5		Only use clean and oil-free anchor elements. 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).		
6		Do not touch. Minimum curing time see Table **B8.2**		Mounting the fixture. $T_{inst,max}$ see parameter of brick.

[1] Exact volume of mortar see manufacturer´s specification.

fischer injektion system FIS V masonry

Intended use
Installation instruction (with perforated sleeve) part 3

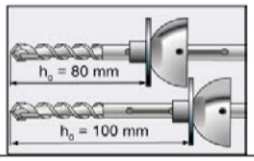
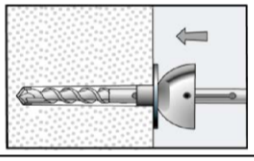
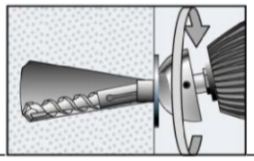
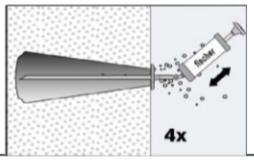
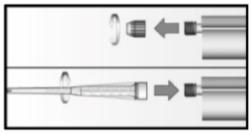
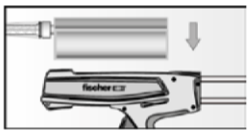
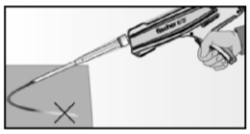
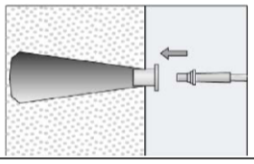
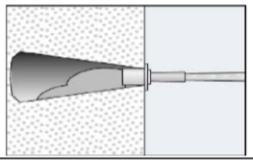
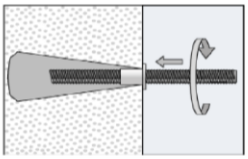
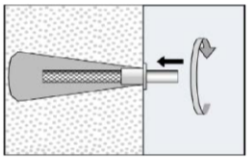
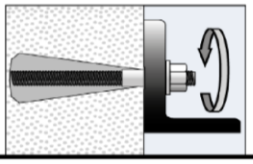
Annex B 11

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Installation instruction part 4

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

1		Position the movable drill bit arrester on the used drill hole depth. For this, unlock the clamp screw and slidethe arrester. Now fix the clamp screw.		
2		Drill the cylindrical hole with rotating drill until the arrester contact the material surface. (drilling method see Annex C of the respective brick)		
3		Deviate the working power drill circulate to generate an conic undercut in the material.		
4		Blow out the drill hole four times.		
5		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible)		
6		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.
7		Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer.		Fill the drill hole with injection mortar.
8			Only use clean and oil-free anchor elements. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.	
9		Do not touch. Minimum curing time see **Table B8.2**		Mounting the fixture. $T_{inst,max}$ see parameter of brick.

fischer injektion system FIS V masonry

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

Annex B 12

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Table B13.1: Overview of controlled bricks (part 1)

Kind of masonry	Brick format [mm]	Compressive strength f_b N/mm^2]	Producing counrty	Density ρ [kg/dm^3]	Annex
Solid brick Mz					
Solid brick Mz	**NF** ≥240x115x71	12 - 20	Germany	≥1,8	C4 - C7
	2DF ≥240x115x113	10 - 16	Germany	≥1,8	C8/C9
	≥ 245x118x54	10 - 20	Italy	≥1,8	C10/C11
	≥ 230x108x55	10 - 20	Denmark	≥1,8	C12/C13
Solid sand- lime brick KS / perforated Sand- lime brick KSL					
Solid sand- lime brick KS	**NF** ≥240x115x71	12 - 28	Germany	≥2,0	C14/C15
Solid sand- lime brick KS	**8DF** ≥ 250x240x240	10 - 28	Germany	≥2,0	C16/C17
Solid sand- lime brick KS	≥ 997x214x538	10 - 36	Netherlands	≥1,8	C18/C19
Perforated Sand- lime brick KSL	**3DF** 240x175x113	8 - 20	Germany	≥1,4	C20 - C23
Vertical perforated brick HLz					
Vertical perforated brick HLz	375x240x237	4 - 12	Germany	≥1,0	C24/C25
	500x175x237	4 - 12	Germany	≥1,0	C24/C25
	2DF 240x115x113	6 - 28	Germany	≥1,4	C26/C27
	248x365x248	4 - 8	Germany	≥0,6	C28 - C31
	248x365x249	8 - 12	Germany	≥0,7	C32 - C35
	248x365x249	4 - 6	Germany	≥0,5	C36 - C39
	248x425x248	4 - 8	Germany	≥0,8	C40 - C43
	248x425x248	4 - 8	Germany	≥0,6	C44 - C47
	500x200x315	4 - 8	France	≥0,6	C48 - C51
	500x200x300	4 - 10	France	≥0,7	C52 - C55
	500x200x315	2 - 8	France	≥0,7	C56 - C59
	560x200x275	4 - 8	France	≥0,7	C60/C61
	255x120x118	2 - 12	Italy	≥1,0	C62 - C64
	275x130x94	6 - 20	Spain	≥0,8	C65/C66
	220x190x290	6 - 10	Portugal	≥0,7	C67 - C70
	253x300x240	2 - 6	Austria	≥0,8	C71 - C74
	250x440x250	6 - 10	Austria	≥0,7	C75 - C78
	230x108x55	2 - 8	Denmark	≥1,4	C79/C80
Horizontal perforated brick LLz					
Horizontal perforated brick LLz	248x78x250	2 - 6	Italy	≥0,7	C81/C82
	128x88x275	2	Spain	≥0,8	C83/C84
Light-weight concrete hollow block Hbl					
Light-weight concrete hollow block Hbl	362x240x240	2 - 4	Germany	≥1,0	C85 - C88
	500x200x200	2 - 6	France	≥1,0	C89/C90
	440x215x215	4 - 10	Ireland	≥1,2	C91 - C94

fischer injektion system FIS V masonry

Intended use
Overview of controlled bricks (part 1)

Annex B 13

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Table B14.1: Overview of controlled bricks (part 2)

Kind of masonry	Brick format [mm]	Compressive strength f_b N/mm^2]	Producing counrty	Density ρ [kg/dm^3]	Annex
Light-weight concrete solid block Vbl					
Light-weight concrete solid block Vbl	≥ 372x300x254	2	Germany	≥0,6	C95/C96
	≥ 250x240x239	4 - 8	Germany	≥1,6	C97 - C100
	≥ 440x100x215	4 - 10	Ireland	≥2,0	C101/C102
	≥ 440x95x215	6 - 12	England	≥2,0	C103/C104
Autoclaved aerated concrete (AAC)					
PP2 / AAC	-	2	Germany	0,35	C105 - C109
PP4 / AAC	-	4	Germany	0,5	C105 - C109
PP6 / AAC	-	6	Germany	0,65	C105 - C109

fischer injektion system FIS V masonry

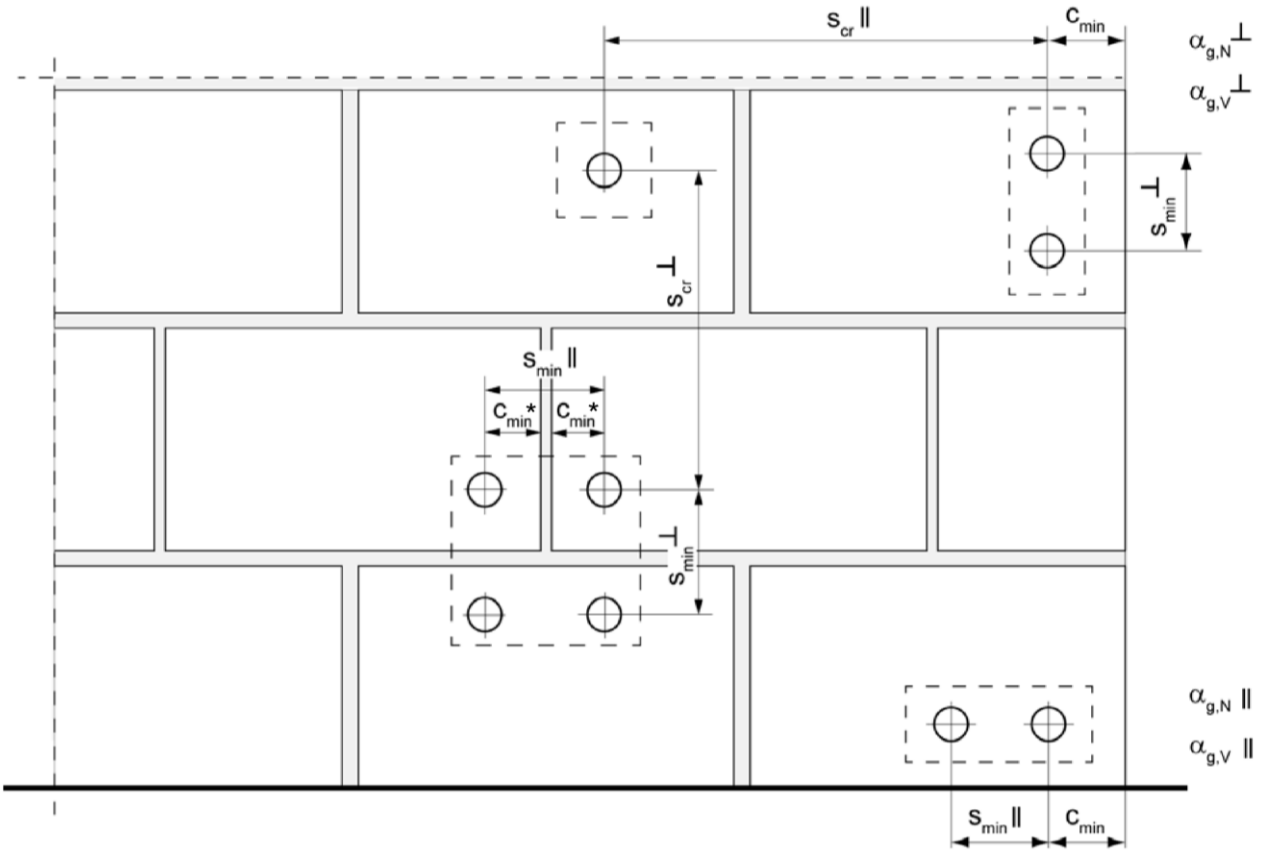
Intended use
Overview of controlled bricks (part 2)

Annex B 14

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Spacing and edge distance



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

s_{min} ‖	=	Minimum spacing parallel to bed joint
s_{min} ⊥	=	Minimum spacing vertical to bed joint
s_{cr} ‖	=	Characteristic spacing parallel to bed joint
s_{cr} ⊥	=	Characteristic spacing vertical to bed joint
$c_{cr} = c_{min}$	=	Edge distance
$\alpha_{g,N}$ ‖	=	Group factor for tensile load, anchor group parallel to bed joint
$\alpha_{g,V}$ ‖	=	Group factor for shear load, anchor group parallel to bed joint
$\alpha_{g,N}$ ⊥	=	Group factor for tensile load, anchor group vertical to bed joint
$\alpha_{g,V}$ ⊥	=	Group factor for shear load, anchor group vertical to bed joint

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

For $s_{min} \leq s < s_{cr}$ α_g according to installation parameters of brick

$N^g_{Rk} = \alpha_{g,N} \bullet N_{Rk}$; $V^g_{Rk} = \alpha_{g,V} \bullet V_{Rk}$ (Group of 2 anchors)

$N^g_{Rk} = \alpha_{g,N}$ ‖ $\bullet$ $\alpha_{g,N}$ ⊥ $\bullet$ $N_{Rk;}$ $V^g_{Rk} = \alpha_{g,V}$ ‖ $\bullet$ $\alpha_{g,V}$ ⊥ $\bullet$ V_{Rk} (Group of 4 anchors)

fischer injektion system FIS V masonry	**Annex B 15**
Intended use Spacing and edge distance	

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Table C1.1: Characteristic values for the **steel bearing capacity** of **anchor rods** under tensile load

Anchor rod				**M6**	**M8**	**M10**	**M12**	**M16**
Bearing capacity under tensile load, steel failure								
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	Property class	4.6	8	15	23	34	63
			4.8	8	15	23	34	63
			5.8	10	18	29	42	78
			8.8	16	29	46	67	125
	Stainless steel A4 and High corrosion resistant steel C		50	10	18	29	42	78
			70	14	26	41	59	110
			80	16	29	46	67	125
			[kN]					
Partial safety factors [1]								
Partial safety factor $\gamma_{Ms,N}$	Steel zinc plated	Property class	4.6	2				
			4.8	1,5				
			5.8	1,50				
			8.8	1,50				
	Stainless steel A4 and High corrosion resistant steel C		50	2,86				
			70	1,50[2] / 1,87				
			80	1,60				
			[-]					

[1] In absence of other national regulations

[2] Only for fischer FIS A made of high corrosion-resistant steel C

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Table C2.1: Characteristic values for the **steel bearing capacity** of **anchor rods** under shear load

Anchor rod					**M6**	**M8**	**M10**	**M12**	**M16**
Bearing capacity under shear load, steel failure									
without lever arm									
Characteristic resistance $V_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	4	7	12	17	31
			4.8		4	7	12	17	31
			5.8		5	9	15	21	39
			8.8		8	15	23	34	63
	Stainless steel A4 and High corrosion resistant steel C		50		5	9	15	21	39
			70		7	13	20	30	55
			80		8	15	23	34	63
with lever arm									
Characteristic bending moment $M_{Rk,s}$	Steel zinc plated	Property class	4.6	[Nm]	6	15	30	52	133
			4.8		6	15	30	52	133
			5.8		8	19	37	65	166
			8.8		12	30	60	105	266
	Stainless steel A4 and High corrosion resistant steel C		50		7	19	37	65	166
			70		10	26	52	92	232
			80		12	30	60	105	266
Partial safety factors[1]									
Partial safety factor $\gamma_{Ms,V}$	Steel zinc plated	Property class	4.6	[-]	1,67				
			4.8		1,25				
			5.8		1,25				
			8.8		1,25				
	Stainless steel A4 and High corrosion resistant steel C		50		2,38				
			70		1,25[2] / 1,56				
			80		1,33				

[1] In absence of other national regulations

[2] Only for fischer FIS A made of high corrosion-resistant steel C

fischer injektion system FIS V masonry

Performances
Characteristic steel bearing capacity of anchor rods

Annex C 2

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Table C3.1: Characteristic values for the **steel bearing capacity** of **internal threaded anchors FIS E** under tensile / shear load

fischer internal threaded anchor FIS E					**M6**	**M8**	**M10**	**M12**
Bearing capacity under tensile load, steel failure								
Characterstic resistance with screw	$N_{Rk,s}$	Property class	5.8	[kN]	10	18	29	42
		Property class 70	A4		14	26	41	59
			C		14	26	41	59
Partial safety factors[1)]								
Partial safety factor	$\gamma_{Ms,N}$	Property class	5.8	[-]	1,50			
		Property class 70	A4		1,87			
			C		1,87			
Bearing capacity under shear load, steel failure								
without lever arm								
Characterstic resistance with screw	$V_{Rk,s}$	Property class	5.8	[kN]	5	9	15	21
		Property class 70	A4		7	13	20	30
			C		7	13	20	30
with lever arm								
Characteristic bending moment	$M_{Rk,s}$	Property class	5.8	[Nm]	8	19	37	65
		Property class 70	A4		11	26	52	92
			C		11	26	52	92
Partial safety factors[1)]								
Partial safety factor	$\gamma_{Ms,V}$	Property class	5.8	[-]	1,25			
		Property class 70	A4		1,56			
			C		1,56			

[1)] In absence of other national regulations

fischer injektion system FIS V masonry

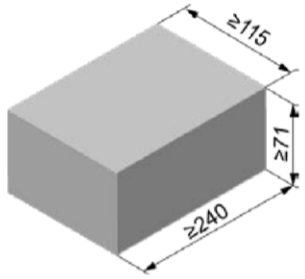
Performances
Characteristic steel bearing capacity of fischer internal threaded anchor RG MI

Annex C 3

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Solid brick Mz, NF, EN 771-1



Solid brick Mz, NF, EN 771-1			
Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	≥ 240	≥ 115	≥ 71
Density ρ [kg/dm³]	≥ 1,8		
Compressive strength f_b [N/mm²]	12 / 20		
Standard or annex	EN 771-1		

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

Anchor rod			**M6**	**M8**	**M10**	**M12**	**-**		**-**	
Internal threaded anchor FIS E			**-**	**-**	**-**	**-**	**M6**	**M8**	**M10**	**M12**
							11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	h_{ef}	[mm]	50	50	50	50	85			
			80	80	80	80				
			200	200	200	200				
Max. installation torque	$T_{inst,max}$	[Nm]	4	10			4	10		
General installation parameters										
Edge distance	c_{min}	[mm]	100				100			
Edge distance h_{ef}=200	c_{min}		150				-			
Spacing	s_{min} II,N		60				60			
	h_{ef}=200 s_{min} II,N		240				-			
	s_{min} II,v		240				240			
	s_{cr} II		240				240			
	s_{cr} ⊥ = s_{min} ⊥		75				75			
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C4.2: Group factors

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

fischer injektion system FIS V masonry

Performances
Solid brick Mz, NF, dimensions, installation parameters c=100mm

Annex C 4

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Solid brick Mz, NF, EN 771-1

Table C5.1: Characteristic resistance under tensile load for edge distance 100mm

Anchor rod		**M6**	**M8**	**M10**		**M12**		-		-	
Internal threaded anchor FIS E		-	-	-		-		**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)											
compressive strength f_b	Use categorie	Effective anchorage depth h_{ef} [mm]									
		≥50	≥50	50	80	200	50	80	200	85	
12N/mm²	w/w w/d	2,5	2,5	2	3	7,5	2	3,5	5	3,5	
	d/d	4	4	3,5	5	12	3	5,5	8	5,5	
20N/mm²	w/w w/d	3,5	3,5	3	4,5	11	3	5	7	5	
	d/d	5,5	5,5	5	7	12	4,5	8	11,5	8	

Factor for temperature range 72/120°C: 0,83

Table C5.2: Characteristic resistance under shear load for edge distance 100mm

Anchor rod		**M6**	**M8**	**M10**		**M12**		-		-	
Internal threaded anchor FIS E		-	-	-		-		**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)											
compressive strength f_b	Use categorie	Effective anchorage depth h_{ef} [mm]									
		≥50	≥50	≥50	200	≥50	200	85			
12N/mm²	w/w w/d d/d	2,5	2,5	4	8,5	4	11,5	2,5			
20N/mm²	w/w w/d d/d	4,0	4,0	6	12	5,5	12	4			

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

Performances
Solid brick Mz, NF, Characteristic resistance under tensile and shear load c=100mm

Annex C 5

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Solid brick Mz, NF, EN 771-1

Table C6.1: Installation parameters for edge distance c=60mm

Anchor rod			**M6**	**M8**	**M10**	**M12**	**M16**	-		-	
Internal threaded anchor FIS E			-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve											
Effective anchorage depth	h_{ef}	[mm]	50	50	50	50	50	85			
			100	100	100	100	100				
			200	200	200	200	200				
Max. installation torque	$T_{inst,max}$	[Nm]	4	10				4	10		
General installation parameters											
Edge distance	c_{min}	[mm]	60								
Edge distance h_{ef}=200	c_{min}		60								
Spacing	s_{min} II,N		80								
	h_{ef}=200 s_{min} II,N		80								
	s_{min} II,v		80								
	s_{cr} II		3x h_{ef}								
	s_{min} ⊥		80								
	s_{cr} ⊥		3x h_{ef}								
Drilling method											
Hammer drilling with hard metal hammer drill											

Table C6.2: Group factors

Anchor rods			**M6**	**M8**	**M10**	**M12**	**M16**	-		-	
Internal threaded anchor FIS E			-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Edge distance	c_{min}	[mm]	**60**								
Group factor	$\alpha_{g,N}$ II	[-]	0,6								
	$\alpha_{g,V}$ II		1,3								
	h_{ef}=200 $\alpha_{g,N}$ II		1,4								
	h_{ef}=200 $\alpha_{g,V}$ II		1,5								
	$\alpha_{g,N}$ ⊥		0,3								
	$\alpha_{g,V}$ ⊥		1,3								
	h_{ef}=200 $\alpha_{g,N}$ ⊥		2,0								
	h_{ef}=200 $\alpha_{g,V}$ ⊥		1,1								

fischer injektion system FIS V masonry

Performances
Solid brick Mz, NF, dimensions, installation parameters c=60mm

Annex C 6

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Deutsches Institut für Bautechnik DIBt

Solid brick Mz, NF, EN 771-1

Table C7.1: Characteristic resistance under tensile load for edge distance c= 60 mm

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E		-	-	-	-	-	**M6** / **M8**: **11x85**	**M10** / **M12**: **15x85**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)								
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]						
		50	100	50	100	50	100	200	50	100	200	50	100	200	85
12N/mm²	w/w w/d	1,5		2,0	2,0	2,0	2,5	-	2,0	2,5	-	2,0	5,5	-	-
	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	-
20N/mm²	w/w w/d	2,0		2,5	3,0	2,5	3,5	-	3,0	3,5	-	3,0	7,5	-	-
	d/d	3,5		4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12	-
28N/mm²	w/w w/d	2,5		3,0	4,0	3,0	4,0	-	3,5	4,0	-	3,5	9,0	-	-
	d/d	4,0		5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	-

Factor for temperature range 72/120°C: 0,83

Table C7.2: Characteristic resistance under shear load for edge distance c= 60 mm

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E		-	-	-	-	-	**M6** / **M8**: **11x85**	**M10** / **M12**: **15x85**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)								
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]						
		50	100	50	100	50	100	200	50	100	200	50	100	200	85
12N/mm²	w/w w/d d/d	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	-
20N/mm²	w/w w/d d/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	-
28N/mm²	w/w w/d 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	-

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

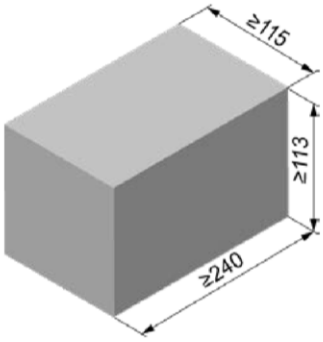
Performances
Solid brick Mz, NF, Characteristic resistance under tensile and shear load c=60

Annex C 7

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Solid brick Mz, 2DF, EN 771-1



Solid brick Mz, 2DF, EN 771-1				
Producer		e.g. Wienerberger		
Nominal dimensions [mm]		length L	width W	height H
		≥ 240	≥ 115	≥ 113
Density ρ	[kg/dm³]	≥ 1,8		
Compressive strength f_b	[N/mm²]	10 / 16		
Standard or annex		EN 771-1		

Table C8.1: Installation parameters

Anchor rod			**M6**		**M8**		**M10**		**M12**		**M16**		-		-	
Internal threaded anchor FIS E			-		-		-		-		-		**M6**	**M8**	**M10**	**M12**
													11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85			
Max. installation torque	$T_{inst,max}$	[Nm]	4		10								4	10		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K																
Effective anchorage depth	h_{ef}	[mm]	-		85				-				85		-	
Max. installation torque	$T_{inst,max}$	[Nm]			10								4	10		
General installation parameters																
Edge distance	c_{min}	[mm]	60													
Spacing	s_{min} ∥		120													
	s_{cr} ∥		240													
	s_{cr} ⊥ = s_{min} ⊥		115													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C8.2: Group factors

Anchor rods			**M6**	**M8**	**M10**	**M12**	**M16**	-		-	
Internal threaded anchor FIS E			-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Group factor	$\alpha_{g,N}$ ∥	[-]	1,5								
	$\alpha_{g,V}$ ∥		1,4								
	$\alpha_{g,N}$ ⊥		2								
	$\alpha_{g,V}$ ⊥										

fischer injektion system FIS V masonry

Performances
Solid brick Mz, 2DF, dimensions, installation parameters

Annex C 8

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Deutsches Institut für Bautechnik DIBt

Solid brick Mz, 2DF, EN 771-1

Table C9.1: Characteristic resistance under tensile load

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

Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)

compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]											
		50	100	50	100	50	100	50	100	50	100	85	
10N/mm²	w/w w/d	1,5	2,5	1,5	2,5	1,5	3	2	3,5	2	3,5	2	1,5
	d/d	3	4,0	3,0	4,0	3,0	4,5	3	5,5	3	5,5	3	3
16N/mm²	w/w w/d	2,5	4	2,5	4	2,5	4,5	3,5	5,5	3,5	5,5	3,5	2,5
	d/d	4,5	7,0	4,5	7,0	4,5	7,5	5,5	8	5,5	8	5,5	4,5

Factor for temperature range 72/120°C: 0,83

Table C9.2: Characteristic resistance under shear load

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

Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)

compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]													
		≥ 50					85								
10N/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	
16N/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	

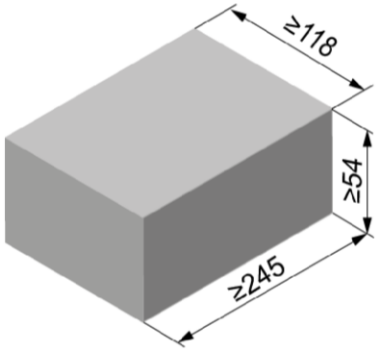
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 9**
Performances Solid brick Mz, 2DF, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Solid brick Mz, EN 771-1



Solid brick Mz, EN 771-1			
Producer	e.g. Nigra		
Nominal dimensions [mm]	length L	width W	height H
	≥ 245	≥ 118	≥ 54
Density ρ [kg/dm³]	≥ 1,8		
Compressive strength f_b [N/mm²]	10 / 20		
Standard or annex	EN 771-1		

Table C10.1: Installation parameters

Anchor rod			**M6**		**M8**		**M10**		**M12**		**M16**		**-**		**-**	
Internal threaded anchor FIS E			-		-		-		-				**M6**	**M8**	**M10**	**M12**
													11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85			
Max. installation torque	$T_{inst,max}$	[Nm]	4		10								4	10		
General installation parameters																
Edge distance	c_{min}	[mm]	60													
Spacing	s_{cr} II = s_{min} II	[mm]	245													
	s_{cr} ⊥ = s_{min} ⊥	[mm]	60													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C10.2: Group factors

Anchor rods			**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E			-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Group factor	$\alpha_{g,N}$ II $\alpha_{g,V}$ II $\alpha_{g,N}$ ⊥ $\alpha_{g,V}$ ⊥	[-]	2								

fischer injektion system FIS V masonry

Performances
Solid brick Mz, dimensions, installation parameters

Annex C 10

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Solid brick Mz, EN 771-1

Table C11.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E		**-**	**-**	**-**	**-**	**-**	**M6**	**M8**	**M10**	**M12**
							11x85		**15x85**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)										
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85			
10N/mm²	w/w w/d	0,6	0,9	0,75	0,75	0,75	0,6		0,75	
	d/d	1,2	1,5	1,2	1,2	1,2	1,2		1,2	
20N/mm²	w/w w/d	0,9	1,5	1,2	1,2	1,2	0,9		1,2	
	d/d	1,5	2,5	2,0	2,0	2,0	1,5		2,0	

Factor for temperature range 72/120°C: 0,83

Table C11.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E		**-**	**-**	**-**	**-**	**-**	**M6**	**M8**	**M10**	**M12**
							11x85		**15x85**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)										
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85			
10N/mm²	w/w w/d d/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
20N/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

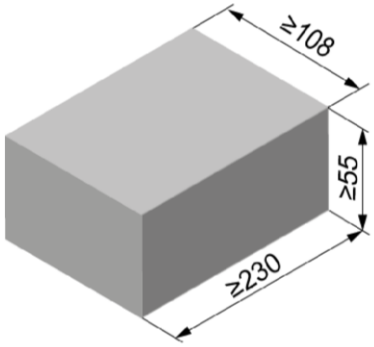
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 11**
Performances Solid brick Mz, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Solid brick Mz, EN 771-1



Solid brick Mz, EN 771-1			
Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	≥ 230	≥ 108	≥ 55
Density ρ [kg/dm³]	≥ 1,8		
Compressive strength f_b [N/mm²]	10 / 20		
Standard or annex	EN 771-1		

Table C12.1: Installation parameters

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

Table C12.2: Group factors

Anchor rods			**M6**	**M8**	**M10**	**M12**	**M16**	-		-	
Internal threaded anchor FIS E			-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Group factor	$\alpha_{g,N}$ II $\alpha_{g,V}$ II $\alpha_{g,N}$ ⊥ $\alpha_{g,V}$ ⊥	[-]	2								

fischer injektion system FIS V masonry

Performances
Solid brick Mz, dimensions, installation parameters

Annex C 12

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Deutsches Institut für Bautechnik DIBt

Solid brick Mz, EN 771-1

Table C13.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E		**-**	**-**	**-**	**-**	**-**	**M6 M8**	**M10 M12**
							11x85	**15x85**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)								
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85	
10N/mm²	w/w w/d	0,6	0,9	0,75	0,75	0,75	0,75	
	d/d	1,2	1,5	1,2	1,2	1,2	1,2	
20N/mm²	w/w w/d	0,9	1,5	1,2	1,2	1,2	1,2	
	d/d	1,5	2,5	2,0	2,0	2,0	2,0	

Factor for temperature range 72/120°C: 0,83

Table C13.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E		**-**	**-**	**-**	**-**	**-**	**M6 M8**		**M10 M12**	
							11x85		**15x85**	
Querlast V_{Rk} [kN] in Abhängigkeit von der Druckfestigkeit f_b (Temperaturbereich 50/80°C und 72/120°C)										
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85			
10N/mm²	w/w w/d d/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0	4,5
20N/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

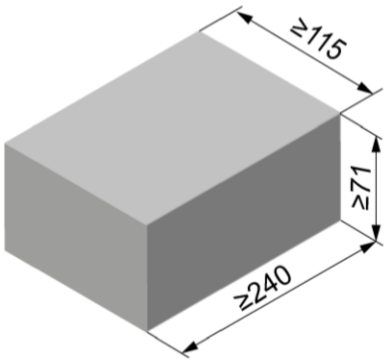
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 13**
Performances Solid brick Mz, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, NF, EN 771-2



Solid sand-lime brick KS, NF, EN 771-2			
Producer			
Nominal dimensions [mm]	length L	width W	height H
	≥ 240	≥ 115	≥ 71
Density ρ [kg/dm³]			
Compressive strength f_b [N/mm²]	12 / 20 / 28		
Standard or annex	EN 771-2		

Table C14.1: Installation parameters

Anchor rod			**M6**		**M8**		**M10**		**M12**		**M16**		**-**		**-**	
Internal threaded anchor FIS E			**-**		**-**		**-**		**-**		**-**		**M6**	**M8**	**M10**	**M12**
													11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85		85	
							200		200		200					
Max. installation torque	$T_{inst,max}$	[Nm]	3		5		15		15		25		3	5	15	
General installation parameters																
Edge distance	c_{min}	[mm]	60													
Spacing	s_{min} ∥		80													
	s_{cr} ∥		80													
	s_{min} ⊥		3x h_{ef}													
	s_{cr} ⊥		3xh_{ef}													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C14.2: Group factors

Anchor rod			**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E			**-**	**-**	**-**	**-**	**-**	**M6**	**M8**	**M10**	**M12**
								11x85		**15x85**	
Group factor	$\alpha_{g,N}$ ∥	[-]	0,7								
	$\alpha_{g,V}$ ∥		1,3								
	$\alpha_{g,N}$ ⊥		2,0								
	$\alpha_{g,V}$ ⊥		2,0								

fischer injektion system FIS V masonry

Performances
Solid sand-lime brick KS, NF, dimensions, installation parameters

Annex C 14

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Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, NF, EN 771-2

Table C15.1: Characteristic resistance under tensile load

Anchor rod		**M6**		**M8**		**M10**			**M12**			**M16**			**-**	**-**
Internal threaded anchor FIS E		-		-		-			-			-			**M6 M8** **11x85**	**M10 M12** **15x85**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]														
		50	100	50	100	50	100	200	50	100	200	50	100	200	85	85
12N/mm²	w/w w/d	2,0	3,0	2,5	4,5	2,5	3,5	7,0	2,5	3,0	6,5	2,5	3,5	8,0	2,5	2,5
	d/d	4,0	5,5	4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,5	5,5	12	4,0	4,0
20N/mm²	w/w w/d	3,0	4,5	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	4,0	5,0	11	3,5	3,5
	d/d	5,5	7,5	6,0	11	6,0	8,0	12	6,0	6,5	12	6,5	8,0	12	6,0	6,0
28N/mm²	w/w w/d	3,5	5,0	4,0	8,0	4,5	5,5	12	4,5	5,0	11	4,5	5,5	12	4,5	4,5
	d/d	6,5	9,0	7,0	12	7,0	9,0	12	7,0	7,5	12	7,5	9,5	12	7,0	7,0

Factor for temperature range 72/120°C: 0,83

Table C15.2: Characteristic resistance under shear load

Anchor rod		**M6**		**M8**		**M10**		**M12**		**M16**		**-**	**-**
Internal threaded anchor FIS E		-		-		-		-		-		**M6 M8** **11x85**	**M10 M12** **15x85**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)													
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]											
		50	100	50	100	50	≥100	50	≥100	50	≥100	85	85
12N/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
20N/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
28N/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

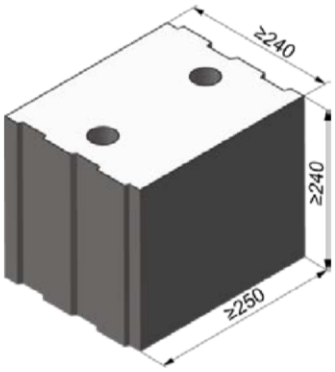
Factor for job site tests and displacements see annex C110

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fischer injektion system FIS V masonry	**Annex C 15**
Performances Solid sand-lime brick KS, NF, Characteristic resistance under tensile and shear load	

Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, 8DF, EN 771-2



Solid sand-lime brick KS, 8DF, EN 771-2			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	≥ 250	≥ 240	≥ 240
Density ρ [kg/dm³]	≥ 2,0		
Compressive strength f_b [N/mm²]	10 / 20 / 28		
Standard or annex	EN 771-2		

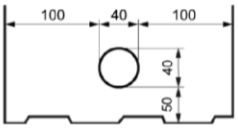


Table C16.1: Installation parameters

Anchor rod			M6		M8		M10		M12		M16		-		-	
Internal threaded anchor FIS E			-		-		-		-		-		M6	M8	M10	M12
													11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85			
Max. installation torque	$T_{inst,max}$	[Nm]	4		10								4	10		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K																
Effective anchorage depth	h_{ef}	[mm]	-		85				-				85		-	
Max. installation torque	$T_{inst,max}$	[Nm]			10								4	10		
General installation parameters																
Edge distance	c_{min}	[mm]	60													
Spacing	s_{min} ∥		80													
	s_{cr} ∥		250													
	s_{min} ⊥		80													
	s_{cr} ⊥		240													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C16.2: Group factors

Anchor rods			M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E			-	-	-	-	-	M6	M8	M10	M12
								11x85		15x85	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,5								
	$\alpha_{g,V}$ ∥		1,2								
	$\alpha_{g,N}$ ⊥		1,5								
	$\alpha_{g,V}$ ⊥		1,2								

fischer injektion system FIS V masonry

Performances
Solid sand-lime brick KS, 8DF, dimensions, installation parameters

Annex C 16

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Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, 8DF, EN 771-2

Table C17.1: Characteristic resistance under tensile load

Anchor rod	**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**		**M8**	**M10**	**-**	
Internal threaded anchor FIS E	-	-	-	-	-	**M6** | **M8**		**M10** | **M12**		-	-	**M6** | **M8**	
						11x85		**15x85**				**11x85**	
Perforated sleeve FIS H K	-	-	-	-	-	-		-		**16x85**			
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)													
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85						
10N/mm²	w/w | w/d	3,0	4,0	4,5	4,5	3,5	3,0	3,5		4,5		3,0	4,5
	d/d	5,0	7,0	7,0	7,0	5,5	5,0	5,5		8,0		5,0	8,0
20N/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
	d/d	7,5	10,0	10,0	10,0	7,5	7,5	7,5		11,0		7,5	11
28N/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

Factor for temperature range 72/120°C: 0,83

Table C17.2: Characteristic resistance under shear load

Anchor rod	**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**		**M8**	**M10**	**-**	
Internal threaded anchor FIS E	-	-	-	-	-	**M6** | **M8**		**M10** | **M12**		-	-	**M6** | **M8**	
						11x85		**15x85**				**11x85**	
Perforated sleeve FIS H K	-	-	-	-	-	-		-		**16x85**			
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)													
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50					85						
10N/mm²	w/w | w/d | d/d	2,5	4,5				2,5	4,5		4,5		2,5	4,5
20N/mm²	w/w | w/d | d/d	4,0	6,5				4,0	6,5		6,5		4,0	6,5
28N/mm²	w/w | w/d | d/d	5,0	9,0				5,0	9,0		9,0		5,0	9,0

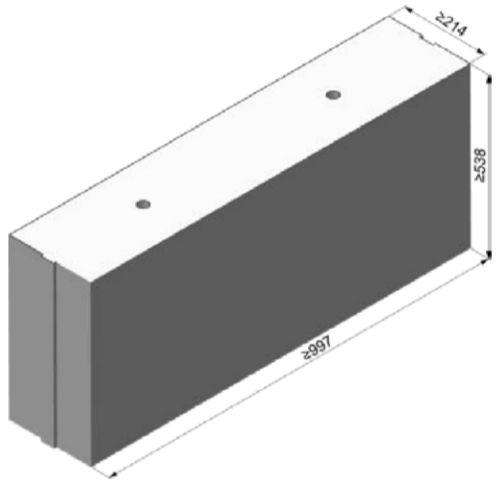
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 17**
Performances Solid sand-lime brick KS, 8DF, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, EN 771-2



Solid sand-lime brick KS, EN 771-2			
Producer	e.g. Calduran		
Nominal dimensions [mm]	length L	width W	height H
	≥ 997	≥ 214	≥ 538
Density ρ [kg/dm³]	1,8		2,2
Compressive strength f_b [N/mm²]	10 / 20		36
Standard or annex	EN 771-2		



Table C18.1: Installation parameters

Anchor rod			**M6**		**M8**		**M10**		**M12**		**M16**		**-**		**-**	
Internal threaded anchor FIS E			-		-		-		-		-		**M6**	**M8**	**M10**	**M12**
													11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85			
Max. installation torque	$T_{inst,max}$	[Nm]	4		10								4		10	
General installation parameters																
Edge distance	c_{min}	[mm]	75													
Spacing	s_{cr} II = s_{min} II		3x h_{ef}													
	s_{cr} ⊥ = s_{min} ⊥		3x h_{ef}													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C18.2: Group factors

Anchor rod		**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E		-	-	-	-	-	**M6**	**M8**	**M10**	**M12**
							11x85		**15x85**	
Group factors	$\alpha_{g,N}$ II $\alpha_{g,V}$ II $\alpha_{g,N}$ ⊥ $\alpha_{g,V}$ ⊥	[-]	2							

fischer injektion system FIS V masonry

Performances
Solid sand-lime brick KS, dimensions, installation parameters

Annex C 18

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Deutsches Institut für Bautechnik DIBt

Solid sand-lime brick KS, EN 771-2

Table C19.1: Characteristic resistance under tensile load

Anchor rod		**M6**		**M8**		**M10**		**M12**		**M16**		**-**		**-**	
Internal threaded anchor FIS E		**-**		**-**		**-**		**-**		**-**		**M6** | **M8**		**M10** | **M12**	
												11x85		**15x85**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]													
		50	100	50	100	50	100	50	100	50	100	85			
10N/mm²	w/w | w/d	4,0		4,0	7,0	5,0	6,0	5,0	6,0	5,5	7,5	5,5			
	d/d	7,0		7,0	12,0	8,0	9,5	8,0	10,0	9,0	11,5	9,0			
20N/mm²	w/w | w/d	5,5		6,0	10,0	7,0	8,5	7,0	9,0	8,0	11,0	8,0			
	d/d	8,5		10,5	12,0	11,5	12,0	11,0	12,0	12,0	12,0	12,0			
36N/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			
	d/d	8,0		12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0			

Factor for temperature range 72/120°C: 0,83

Table C19.2: Characteristic resistance under shear load

Anchor rod	**M6**	**M8**	**M10**	**M12**	**M16**	**-**		**-**	
Internal threaded anchor FIS E	**-**	**-**	**-**	**-**	**-**	**M6** | **M8**		**M10** | **M12**	
						11x85		**15x85**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)									
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]							
		≥ 50					85		
10N/mm²	w/w | w/d d/d	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0
20N/mm²	w/w | w/d d/d	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0
36N/mm²	w/w | w/d d/d	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0

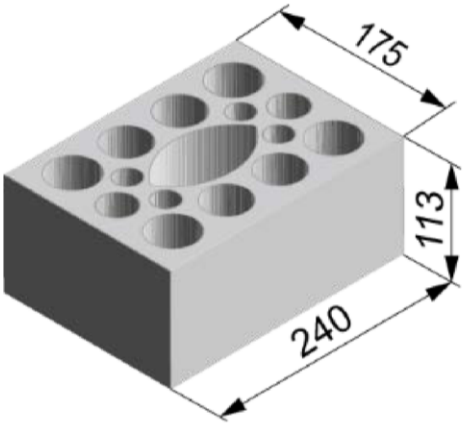
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 19**
Performances Solid sand-lime brick KS, Characteristic resistance under tensile and shear load	

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Perforated sand-lime brick KSL, 3DF, EN 771-2



Perforated sand-lime brick KSL, 3DF, EN 771-2			
Producer	e.g. KS Wemding		
Nominal dimensions [mm]	length L	width W	height H
	240	175	113
Density ρ [kg/dm³]	≥ 1,4		
Compressive strength f_b [N/mm²]	8 / 10 / 12 / 16 / 20		
Standard or annex	EN 771-2		

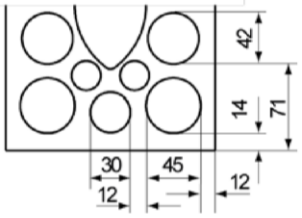


Tabelle C20.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6 M8** **11x85**	**-**		**-**		**M10 M12** **15x85**	**-**		**-**	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**	**16x130**				**20x85**			**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS HK														
Max. installation torque $T_{inst,max}$ [Nm]	2													
General installation parameters														
Edge distance c_{min} [mm]	60				80									
Spacing s_{min} ∥ [mm]	100													
Spacing s_{cr} ∥ [mm]	240													
Spacing s_{min} ⊥ [mm]	115													
Spacing s_{cr} ⊥ [mm]	115													
Drilling method														
Hammer drilling with hard metal hammer drill														

Table C20.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6 M8** **11x85**	**-**		**-**		**M10 M12** **15x85**	**-**		**-**	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**	**16x130**				**20x85**			**20x130**	
Group factors $\alpha_{g,N}$ ∥ = $\alpha_{g,V}$ ∥ [-]	1,5													
Group factors $\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥ [-]	2,0													

fischer injektion system FIS V masonry

Performances
Perforated sand-lime brick KSL, 3DF, dimensions, installation parameters

Annex C 20

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Deutsches Institut für Bautechnik DIBt

Perforated sand-lime brick KSL, 3DF, EN 771-2

Table C21.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	80		
Spacing	s_{min} ∥		100		
	s_{cr} ∥		240		
	s_{min} ⊥		115		
	s_{cr} ⊥		115		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C21.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,5		
	$\alpha_{g,V}$ ∥				
	$\alpha_{g,N}$ ⊥		2,0		
	$\alpha_{g,V}$ ⊥				

fischer injektion system FIS V masonry

Performances
Perforated sand-lime brick KSL, 3DF, dimensions, installation parameters

Annex C 21

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Deutsches Institut für Bautechnik DIBt

Perforated sand-lime brick KSL, 3DF, EN 771-2

Table C22.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category														
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	
10 N/mm²	w/w w/d	2,0				2,0			2,5		2,5			2,5	
	d/d	2,0				2,5			3,0		3,0			3,0	
12 N/mm²	w/w w/d	2,5				2,5			3,0		3,0			3,0	
	d/d	2,5				3,0			3,5		3,5			3,5	
16 N/mm²	w/w w/d	3,0				3,5			4,5		4,5			4,5	
	d/d	3,5				4,0			4,5		4,5			4,5	
20 N/mm²	w/w w/d	4,0				4,5			5,5		5,5			5,5	
	d/d	4,5				5,0			6,0		6,0			6,0	

Table C22.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
8 N/mm²	w/w w/d	2,0		
	d/d	2,5		
10 N/mm²	w/w w/d	2,5		
	d/d	3,0		
12 N/mm²	w/w w/d	3,0		
	d/d	3,5		
16 N/mm²	w/w w/d	4,5		
	d/d	4,5		
20 N/mm²	w/w w/d	5,5		
	d/d	6,0		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

fischer injektion system FIS V masonry

Performances
Perforated sand-lime brick KSL, 3DF, Characteristic resistance under tensile load

Annex C 22

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Deutsches Institut für Bautechnik DIBt

Perforated sand-lime brick KSL, 3DF, EN 771-2

Table C23.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
8 N/mm²	w/w w/d d/d	1,5						3,0						2,5	3,0	2,5	
10 N/mm²	w/w w/d d/d	2,0						3,5									
12 N/mm²	w/w w/d d/d	2,5						4,5						4,0	4,5	4,0	
16 N/mm²	w/w w/d d/d	3,0	3,5	3,0	3,5	3,0		6,0						5,5	6,0	5,5	
20 N/mm²	w/w w/d d/d	4,0	4,5	4,0	4,5	4,0		7,5						6,5	7,5	6,5	

Table C23.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
8 N/mm²	w/w w/d d/d	3,0		2,5
10 N/mm²	w/w w/d d/d	3,5		3,5
12 N/mm²	w/w w/d d/d	4,5		4,0
16 N/mm²	w/w w/d d/d	6,0		5,5
20 N/mm²	w/w w/d d/d	7,5		6,5

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

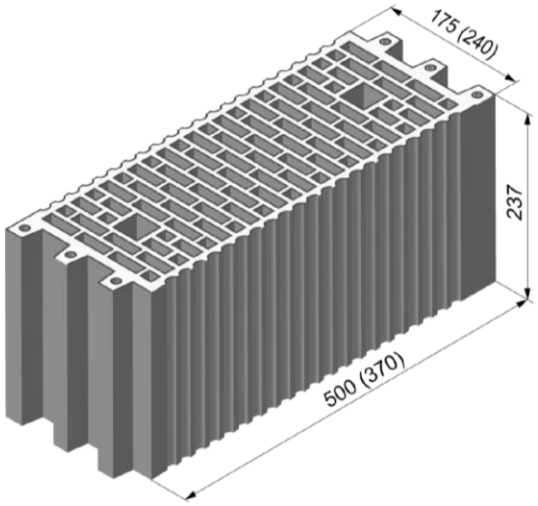
Performances
Perforated sand-lime brick KSL, 3DF, Characteristic resistance under shear load

Annex C 23

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1



Vertical perforated brick HLz, form B, EN 771-1			
Producer	e.g. Wienerberger, Poroton		
Nominal dimensions [mm]	length L	width W	height H
	500	175	237
	370	240	237
Density ρ [kg/dm³]	≥ 1,0		
Compressive strength f_b [N/mm²]	4 / 6 / 8 / 10 / 12		
Standard or annex	EN 771-1		

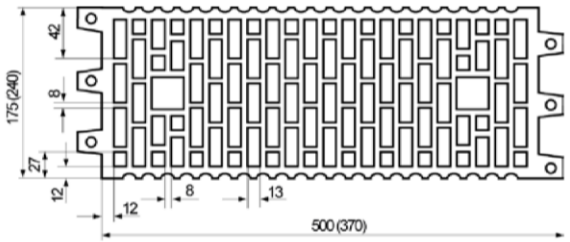


Table C24.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation torque $T_{inst,max}$ [Nm]	2													
General installation parameters														
Edge distance c_{min} [mm]	100													
Spacing s_{min} ∥ [mm]	100													
Spacing s_{cr} ∥ [mm]	500 (370)													
Spacing s_{min} ⊥ [mm]	100													
Spacing s_{cr} ⊥ [mm]	240													
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** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Group factors $\frac{\alpha_{g,N} \parallel = \alpha_{g,V} \parallel}{\alpha_{g,N} \perp = \alpha_{g,V} \perp}$ [-]	1													

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 24

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1

Table C25.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category														
4 N/mm²	w/w w/d	0,3				0,9								1,2	
	d/d	0,4				0,9								1,2	
6 N/mm²	w/w w/d	0,5				1,5								2,0	
	d/d	0,6				1,5								2,0	
8 N/mm²	w/w w/d	0,75				2,0								2,5	
	d/d	0,75				2,0								2,5	
10 N/mm²	w/w w/d	0,9				2,5								3,0	
	d/d	0,9				2,5								3,5	
12 N/mm²	w/w w/d	0,9				3,0								3,5	
	d/d	1,2				3,0								4,0	

Factor for temperature range 72/120°C: 0,83

Table C25.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)															
compressive strength f_b	use category														
4 N/mm²	w/w w/d d/d	0,5							0,6		0,5			0,6	
6 N/mm²	w/w w/d d/d	0,75							0,9		0,75			0,9	
8 N/mm²	w/w w/d d/d	0,9							1,2		0,9			1,2	
10 N/mm²	w/w w/d d/d	1,2							1,5		1,2			1,5	
12 N/mm²	w/w w/d d/d	1,5							2,0		1,5			2,0	

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

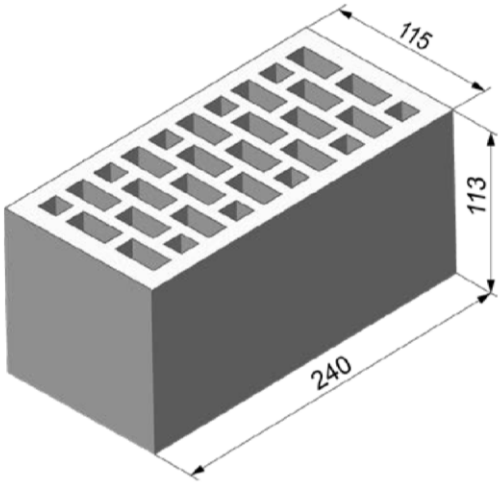
Performances
Vertical perforated brick HLz, form B,
Characteristic resistance under tensile and shear load

Annex C 25

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Vertical perforated brick HLz, 2DF, EN 771-1



Vertical perforated brick HLz, 2DF, EN 771-1			
Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	240	115	113
Density ρ [kg/dm³]	≥ 1,4		
Compressive strength f_b [N/mm²]	6 / 10 / 16 / 20 / 28		
Standard or annex	EN 771-1		

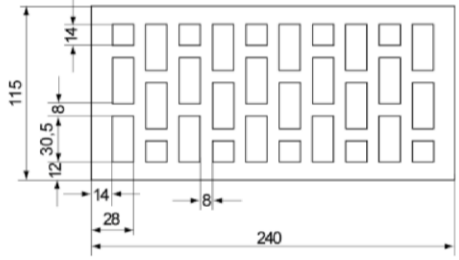


Table C26.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K										
Max. installation torque $T_{inst,max}$ [Nm]	2									
General installation parameters										
Edge distance c_{min} [mm]	80									
Spacing s_{cr} II = s_{min} II [mm]	240									
Spacing s_{cr} ⊥ = s_{min} ⊥ [mm]	115									
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C26.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Group factors $\alpha_{g,N}$ II, $\alpha_{g,V}$ II, $\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ ⊥ [-]	2									

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, 2DF, dimensions, installation parameters

Annex C 26

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, 2DF, EN 771-1

Table C27.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)											
compressive strength f_b	use category										
6 N/mm²	w/w w/d	0,75		0,9		0,75			0,9		
	d/d	0,75		1,2		0,75			0,9		
10 N/mm²	w/w w/d	1,2		1,5		1,2			1,5		
	d/d	1,2		2,0		1,2			1,5		
16 N/mm²	w/w w/d	2,0		2,5		2,0			2,0		
	d/d	2,0		3,0		2,0			2,5		
20 N/mm²	w/w w/d	2,5		3,5		2,5			3,0		
	d/d	2,5		4,0		2,5			3,0		
28 N/mm²	w/w w/d	3,0		5,0		3,5			4,0		
	d/d	3,5		5,5		3,5			4,5		

Factor for temperature range 72/120°C: 0,83

Table C27.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)											
compressive strength f_b	use category										
6 N/mm²	w/w w/d d/d	1,2	1,5	1,2	2,0	1,2	1,5		2,5		
10 N/mm²	w/w w/d d/d	2,0	2,5	2,0	4,0	2,0	2,5		4,5		
16 N/mm²	w/w w/d d/d	3,0	3,5	3,0	6,0	3,0	3,5		7,0		
20 N/mm²	w/w w/d d/d	4,0	4,5	4,0	7,5	4,0	4,5		8,5		
28 N/mm²	w/w w/d d/d	5,0	6,5	5,0	9,5	5,0	6,5		12,0		

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

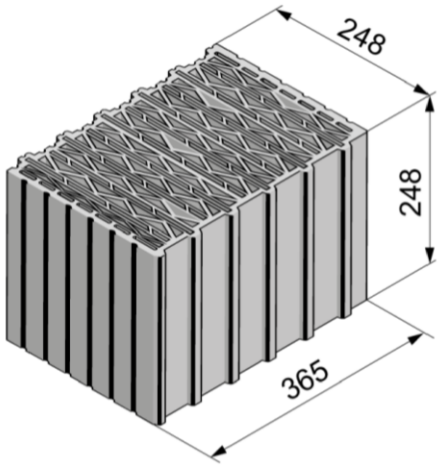
Performances
Vertical perforated brick HLz, 2DF,
Characteristic resistance under tensile and shear load

Annex C 27

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Vertical perforated brick HLz, U8, EN 771-1



Vertical perforated brick HLz, U8, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	248	365	248
Density ρ [kg/dm³]	0,6		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-1		

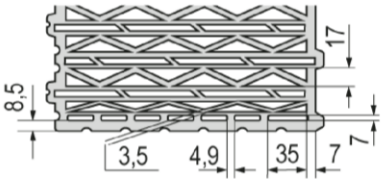


Table C28.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6**	**M8**	-		-		**M10**	**M12**	-				-	
							11x85						**15x85**							
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																				
Max. installation torque	$T_{inst,max}$	[Nm]	3	5	3	5	3	5	5											
General installation parameters																				
Edge distance	c_{min}	[mm]	60																	
Spacing	s_{min} ∥		80																	
	s_{cr} ∥		250																	
	s_{min} ⊥		80																	
	s_{cr} ⊥		250																	
Drilling method																				
Rotary drilling with carbide drill																				

Table C28.2: Group factors

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6**	**M8**	-		-		**M10**	**M12**	-				-	
							11x85						**15x85**							
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3																	
	$\alpha_{g,V}$ ∥		1,2																	
	$\alpha_{g,N}$ ⊥		1,3																	
	$\alpha_{g,V}$ ⊥		1,0																	

fischer injektion system FIS V masonry

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

Annex C 28

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, U8, EN 771-1

Table C29.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C29.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3		
	$\alpha_{g,V}$ ∥		1,2		
	$\alpha_{g,N}$ ⊥		1,3		
	$\alpha_{g,V}$ ⊥		1,0		

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, U8, EN 771-1

Table C30.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**			**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w	w/d	1,2		1,2												
	d/d		1,2		1,5												
6 N/mm²	w/w	w/d	1,5		1,5												
	d/d		1,5		1,5												
8 N/mm²	w/w	w/d	1,5		2,0												
	d/d		2,0		2,0												

Table C30.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)			
compressive strength f_b / use category			
4 N/mm² w/w w/d	1,2		
d/d	1,5		
6 N/mm² w/w w/d	1,5		
d/d	1,5		
8 N/mm² w/w w/d	2,0		
d/d	2,0		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, U8, Characteristic resistance under tensile load

Annex C 30

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, U8, EN 771-1

Table C31.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**				**-**
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																
compressive strength f_b	use category															
4 N/mm²	w/w, w/d, d/d				1,2											
6 N/mm²	w/w, w/d, d/d				1,5											
8 N/mm²	w/w, w/d, d/d				1,5											

Table C31.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
4 N/mm²	w/w, w/d, d/d	1,2	
6 N/mm²	w/w, w/d, d/d	1,5	
8 N/mm²	w/w, w/d, d/d	1,5	

Factor for job site tests and displacements see annex C108

fischer injektion system FIS V masonry

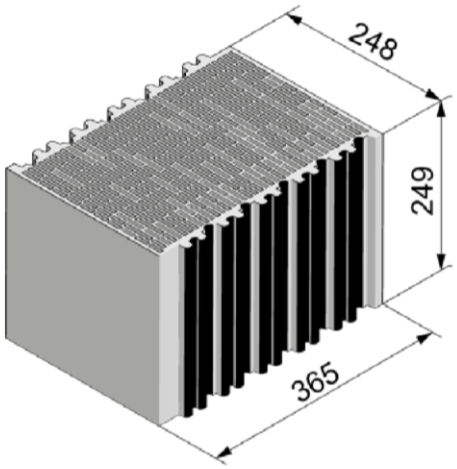
Performances
Vertical perforated brick HLz, U8, Characteristic resistance under shear load

Annex C 31

electronic copy of the eta by dibt: eta-10/0383

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T10, T11, EN 771-1



Vertical perforated brick HLz, T10, T11, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	248	365	249
Density ρ [kg/dm³]	0,7		
Compressive strength f_b [N/mm²]	8 / 10 / 12		
Standard or annex	EN 771-1		

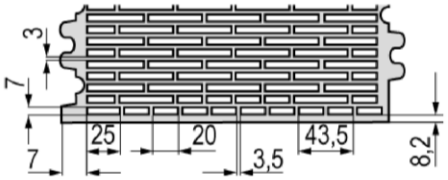


Table C32.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		-		-	**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-				-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	3						5	3		5						
General installation parameters																
Edge distance c_{min} [mm]	60															
Spacing s_{min} ∥ [mm]	80															
Spacing s_{cr} ∥ [mm]	250															
Spacing s_{min} ⊥ [mm]	80															
Spacing s_{cr} ⊥ [mm]	250															
Drilling method																
Rotary drilling with carbide drill																

Table C32.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		-		-	**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-				-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Group factors $\alpha_{g,N}$ ∥ [-]	1,7															
Group factors $\alpha_{g,V}$ ∥ [-]	0,5															
Group factors $\alpha_{g,N}$ ⊥ [-]	1,3															
Group factors $\alpha_{g,V}$ ⊥ [-]	0,5															

fischer injektion system FIS V masonry

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

Annex C 32

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Vertical perforated brick HLz, T10, T11, EN 771-1

Table C33.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C33.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,7		
	$\alpha_{g,V}$ ∥		0,5		
	$\alpha_{g,N}$ ⊥		1,3		
	$\alpha_{g,V}$ ⊥		0,5		

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fischer injektion system FIS V masonry

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

Annex C 33

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T10, T11, EN 771-1

Table C34.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
						11x85						**15x85**							
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																			
compressive strength f_b	use category																		
8 N/mm²	w/w	w/d		1,5		1,5													
	d/d			1,5		2,0													
10 N/mm²	w/w	w/d		1,5		2,0													
	d/d			2,0		2,0													
12 N/mm²	w/w	w/d		2,0		2,0													
	d/d			2,0		2,5													

Table C34.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
8 N/mm²	w/w w/d	1,5		1,5
	d/d	2,0		2,0
10 N/mm²	w/w w/d	2,0		2,0
	d/d	2,0		2,0
12 N/mm²	w/w w/d	2,0		2,0
	d/d	2,5		2,5

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry	**Annex C 34**
Performances Vertical perforated brick HLz, T10, T11, Characteristic resistance under tensile load	

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T10, T11, EN 771-1

Table C35.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**			**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
8 N/mm²	w/w, w/d, d/d	0,9				1,5					2,0						
10 N/mm²	w/w, w/d, d/d	0,9				1,5					2,0						
12 N/mm²	w/w, w/d, d/d	1,2				2,0					2,0						

Table C35.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
8 N/mm²	w/w, w/d, d/d	1,5		2,0
10 N/mm²	w/w, w/d, d/d	1,5		2,0
12 N/mm²	w/w, w/d, d/d	2,0		2,0

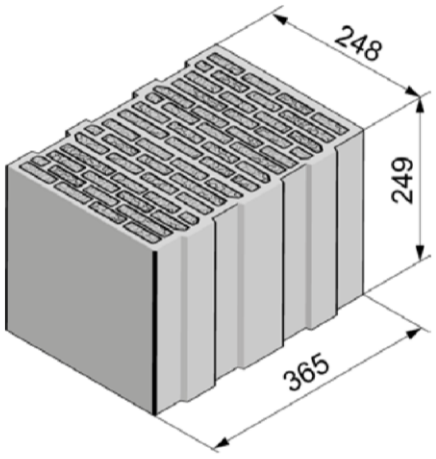
Factor for job site tests and displacements see annex C110

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fischer injektion system FIS V masonry	**Annex C 35**
Performances Vertical perforated brick HLz, T10, T11, Characteristic resistance under shear load	

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Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1



Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	248	365	249
Density ρ [kg/dm³]	0,5		
Compressive strength f_b [N/mm²]	4 / 6		
Standard or annex	EN 771-1		

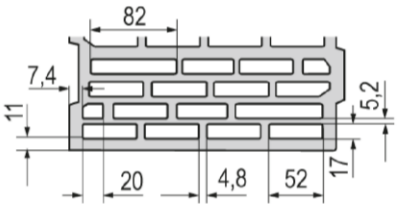


Table C36.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** **M8** **11x85**	**-**		**-**		**M10** **M12** **15x85**	**-**				**-**	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**	**16x130**				**20x85**			**20x130**		**20x200**	
Ankerstangen und Innengewindeanker FIS E mit Injektionsanker-Hülse FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	2					5	2	5								
General installation parameters																
Edge distance c_{min} [mm]	60															
Spacing s_{min} ∥ [mm]	80															
Spacing s_{cr} ∥ [mm]	250															
Spacing s_{min} ⊥ [mm]	80															
Spacing s_{cr} ⊥ [mm]	250															
Drilling method																
Rotary drilling with carbide drill																

Table C36.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** **M8** **11x85**	**-**		**-**		**M10** **M12** **15x85**	**-**				**-**	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**	**16x130**				**20x85**			**20x130**		**20x200**	
Group factors $\alpha_{g,N}$ ∥ [-]	1,1															
Group factors $\alpha_{g,V}$ ∥ [-]	1,2															
Group factors $\alpha_{g,N}$ ⊥ [-]	1,1															
Group factors $\alpha_{g,V}$ ⊥ [-]	1,2															

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, T7 PF, filled with perlite,
dimensions, installation parameters

Annex C 36

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Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1

Table C37.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C37.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,1		
	$\alpha_{g,V}$ ∥		1,2		
	$\alpha_{g,N}$ ⊥		1,1		
	$\alpha_{g,V}$ ⊥		1,2		

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1

Table C38.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
						11x85						**15x85**							
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																			
compressive strength f_b	use category																		
4 N/mm²	w/w	w/d				1,2				1,2		1,2				1,2		2,0	
	d/d					1,5				1,5		1,5				1,5		2,0	
6 N/mm²	w/w	w/d				1,5				1,5		1,5				1,5		2,5	
	d/d					1,5				2,0		1,5				2,0		3,0	

Table C38.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**		**M12**		**M16**	
Perforated sleeve FIS H K		**18x130/200**				**22x130/200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)							
compressive strength f_b	use category						
4 N/mm²	w/w	w/d	1,2			1,2	
	d/d		1,5			1,5	
6 N/mm²	w/w	w/d	1,5			1,5	
	d/d		2,0			2,0	

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry	**Annex C 38**
Performances Vertical perforated brick HLz, T7 PF, filled with perlite, Characteristic resistance under tensile load	

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1

Table C39.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**				**-**
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																
compressive strength f_b	use category															
4 N/mm²	w/w, w/d, d/d		0,9		1,5					1,2						
6 N/mm²	w/w, w/d, d/d		1,2		2,0					1,5						

Table C39.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
4 N/mm²	w/w, w/d, d/d	1,5	1,2
6 N/mm²	w/w, w/d, d/d	2,0	1,5

Factor for job site tests and displacements see annex C110

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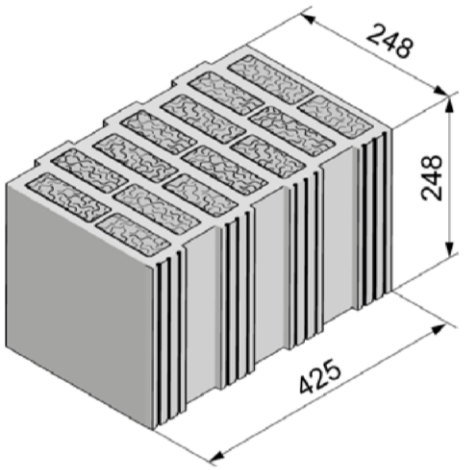
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Performances
Vertical perforated brick HLz, T7 PF, filled with perlite,
Characteristic resistance under shear load

Annex C 39

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1



Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	248	425	248
Density ρ [kg/dm³]	0,8		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-1		

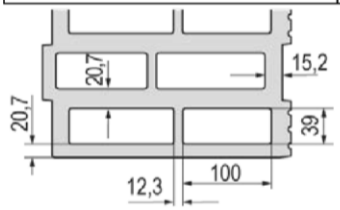


Table C40.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-		-		M6 M8 11x85	-		-		M10 M12 15x85	-				-	
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130		20x85			20x130		20x200	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	3					5		3		5						
General installation parameters																
Edge distance c_{min} [mm]	60															
Spacing s_{min} ∥ [mm]	80															
Spacing s_{cr} ∥ [mm]	250															
Spacing s_{min} ⊥ [mm]	80															
Spacing s_{cr} ⊥ [mm]	250															
Drilling method																
Rotary drilling with carbide drill																

Table C40.2: Group factors

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

fischer injektion system FIS V masonry

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

Annex C 40

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1

Table C41.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C41.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3		
	$\alpha_{g,V}$ ∥		1,2		
	$\alpha_{g,N}$ ⊥		0,6		
	$\alpha_{g,V}$ ⊥		1,2		

fischer injektion system FIS V masonry

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

Annex C 41

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1

Table C42.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**			**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w	w/d		1,5		2,0			3,0		2,5			4,0			
	d/d			2,0		2,5			3,0		2,5			4,5			
6 N/mm²	w/w	w/d		2,0		2,5			3,5		3,0			5,0			
	d/d			2,0		3,0			4,0		3,0			5,5			
8 N/mm²	w/w	w/d		2,5		3,0			4,0		3,5			6,0			
	d/d			2,5		3,0			4,5		3,5			6,5			

Table C42.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d	3,0		4,0
	d/d	3,0		4,5
6 N/mm²	w/w w/d	3,5		5,0
	d/d	4,0		5,5
8 N/mm²	w/w w/d	4,0		6,0
	d/d	4,5		6,5

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, T9 MW, filled with mineral wool;
Characteristic resistance under tensile load

Annex C 42

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1

Table C43.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
						11x85						**15x85**							
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																			
compressive strength f_b	use category																		
4 N/mm²	w/w w/d d/d	2,0		2,0						2,5		2,0						1,5	
6 N/mm²	w/w w/d d/d	2,5		2,5						3,0		2,5						2,0	
8 N/mm²	w/w w/d d/d	2,5		3,0						4,0		3,0						2,5	

Table C43.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d d/d	2,5		2,0
6 N/mm²	w/w w/d d/d	3,0		2,5
8 N/mm²	w/w w/d d/d	4,0		3,0

Factor for job site tests and displacements see annex C110

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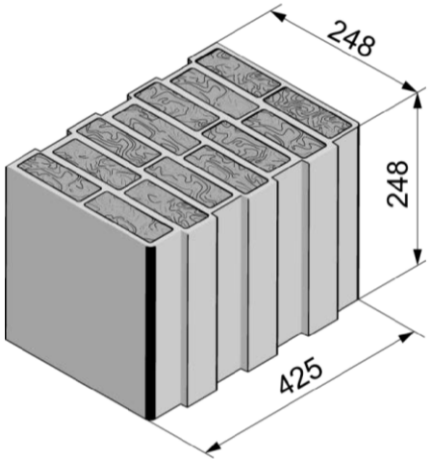
fischer injektion system FIS V masonry

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

Annex C 43

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1



Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	248	425	248
Density ρ [kg/dm³]	0,6		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-1		

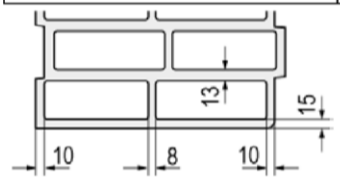


Table C44.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** **M8** **11x85**	-		-		**M10** **M12** **15x85**	-				-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	2					5		2		5						
General installation parameters																
Edge distance c_{min} [mm]	60															
Spacing s_{min} ∥ [mm]	80															
Spacing s_{cr} ∥ [mm]	250															
Spacing s_{min} ⊥ [mm]	80															
Spacing s_{cr} ⊥ [mm]	250															
Drilling method																
Rotary drilling with carbide drill																

Table C44.2: Group factors

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

fischer injektion system FIS V masonry

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

Annex C 44

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1

Table C45.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C45.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,9		
	$\alpha_{g,V}$ ∥		0,9		
	$\alpha_{g,N}$ ⊥		1,0		
	$\alpha_{g,V}$ ⊥		0,7		

fischer injektion system FIS V masonry

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

Annex C 45

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1

Table C46.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
							11x85						**15x85**							
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																				
compressive strength f_b	use category																			
4 N/mm²	w/w	w/d	0,6		0,75		1,5				2,0		1,2				2,0		2,0	
	d/d		0,6		0,9		1,5				2,0		1,5				2,0		2,5	
6 N/mm²	w/w	w/d	0,75		0,9		1,5				2,0		1,5				2,5		2,5	
	d/d		0,9		0,9		2,0				2,5		2,0				2,5		3,0	
8 N/mm²	w/w	w/d	0,9		1,2		2,0				2,5		2,0				2,5		3,0	
	d/d		0,9		1,2		2,0				3,0		2,0				3,0		3,5	

Table C46.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)					
compressive strength f_b	use category				
4 N/mm²	w/w	w/d	2,0		2,0
	d/d		2,0		2,0
6 N/mm²	w/w	w/d	2,0		2,5
	d/d		2,5		2,5
8 N/mm²	w/w	w/d	2,5		2,5
	d/d		3,0		3,0

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, FZ 7, filled with mineral wool;
Characteristic resistance under tensile load

Annex C 46

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1

Table C47.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6 M8** 11x85	**-**		**-**		**M10 M12** 15x85	**-**				**-**	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																
compressive strength f_b	use category															
4 N/mm²	w/w w/d d/d		1,2		1,5										1,5	
6 N/mm²	w/w w/d d/d		1,5		2,0										1,5	
8 N/mm²	w/w w/d d/d		1,5		2,5										2,0	

Table C47.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
4 N/mm²	w/w w/d d/d	1,5	
6 N/mm²	w/w w/d d/d	2,0	
8 N/mm²	w/w w/d d/d	2,5	

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

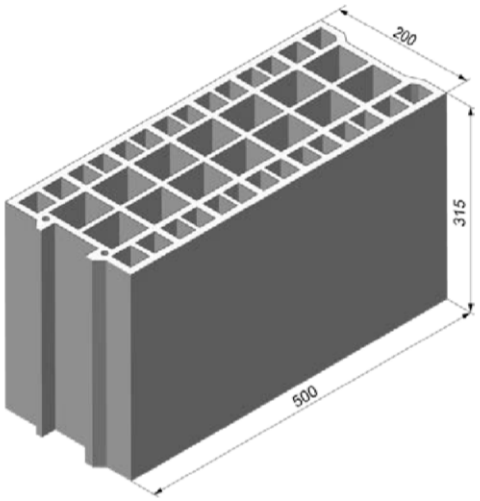
Performances
Vertical perforated brick HLz, FZ 7, filled with mineral wool;
Characteristic resistance under shear load

Annex C 47

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Vertical perforated brick HLz, form B, EN 771-1



Vertical perforated brick HLz, form B, EN 771-1			
Producer	e.g. Bouyer Leroux		
Nominal dimensions [mm]	length L	width W	height H
	500	200	315
Density ρ [kg/dm³]	≥ 0,6		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-1		

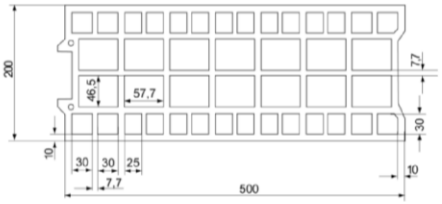


Table C48.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$	[Nm]	2														
General installation parameters																
Edge distance c_{min}	[mm]	120														
Spacing s_{min} ∥		120														
Spacing s_{cr} ∥		500														
Spacing $s_{min} \perp = s_{cr} \perp$		315														
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C48.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Group factors $\alpha_{g,N}$ ∥	[-]	1,3														
Group factors $\alpha_{g,V}$ ∥		1,7														
Group factors $\alpha_{g,N} \perp = \alpha_{g,V} \perp$		2														

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 48

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Vertical perforated brick HLz, form B, EN 771-1

Table C49.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	120		
Spacing	s_{min} ∥	[mm]	120		
	s_{cr} ∥	[mm]	500		
	s_{min} ⊥ = s_{cr} ⊥	[mm]	315		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C49.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3		
	$\alpha_{g,V}$ ∥	[-]	1,7		
	$\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥	[-]	2		

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 49

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Vertical perforated brick HLz, form B, EN 771-1

Table C50.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category														
4 N/mm²	w/w	w/d	0,5		1,5				0,75		1,5			1,5	
	d/d		0,6		1,5				0,9		1,5			2,0	
6 N/mm²	w/w	w/d	0,75		2,0				1,2		2,0			2,5	
	d/d		0,9		2,5				1,2		2,5			2,5	
8 N/mm²	w/w	w/d	0,9		3,0				1,5		3,0			3,5	
	d/d		1,2		3,0				2,0		3,0			3,5	

Table C50.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d	0,75		1,5
	d/d	0,9		2,0
6 N/mm²	w/w w/d	1,2		2,5
	d/d	1,2		2,5
8 N/mm²	w/w w/d	1,5		3,5
	d/d	2,0		3,5

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, Characteristic resistance under tensile load

Annex C 50

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1

Table C51.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w w/d d/d	1,5								0,9		1,5		2,5		0,9	
6 N/mm²	w/w w/d d/d	2,5								1,5		2,5		3,5		1,5	
8 N/mm²	w/w w/d d/d	3,5								2,0		3,5		4,5		2,0	

Table C51.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d d/d	0,9		
6 N/mm²	w/w w/d d/d	1,5		
8 N/mm²	w/w w/d d/d	2,0		

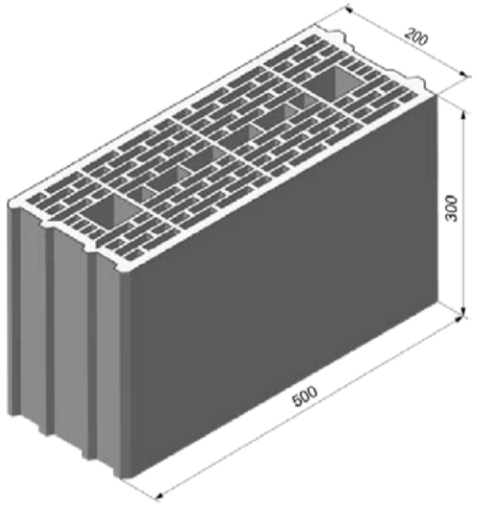
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 51**
Performances Vertical perforated brick HLz, form B, Characteristic resistance under shear load	

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Vertical perforated brick HLz, form B, EN 771-1



Vertical perforated brick HLz, form B, EN 771-1			
Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	500	200	300
Density ρ [kg/dm³]	≥ 0,7		
Compressive strength f_b [N/mm²]	4 / 6 / 8 / 10		
Standard or annex	EN 771-1		

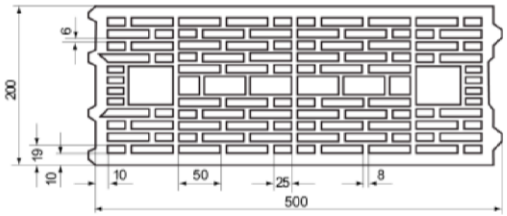


Table C52.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**--**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$	[Nm]	2														
General installation parameters																
Edge distance c_{min}	[mm]	50							80				50		80	
Spacing s_{min} ∥	[mm]	100														
Spacing s_{cr} ∥	[mm]	500														
Spacing s_{min} ⊥ = s_{cr} ⊥	[mm]	300														
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C52.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Group factors $\alpha_{g,N}$ ∥	[-]	1,4														
Group factors $\alpha_{g,V}$ ∥	[-]	2														
Group factors $\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥	[-]	2														

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 52

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1

Table C53.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	80		
Spacing	s_{min} ∥	[mm]	100		
	s_{cr} ∥	[mm]	500		
	s_{min} ⊥ = s_{cr} ⊥	[mm]	300		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C53.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,4		
	$\alpha_{g,V}$ ∥	[-]	2		
	$\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥	[-]	2		

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 53

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1

Table C54.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category														
4 N/mm²	w/w	w/d	0,5			0,6			1,2		0,75			1,5	
	d/d		0,6			0,75			1,2		0,9			1,5	
6 N/mm²	w/w	w/d	0,75			0,9			1,5		1,2			2,0	
	d/d		0,9			1,2			2,0		1,2			2,5	
8 N/mm²	w/w	w/d	0,9			1,2			2,0		1,5			2,5	
	d/d		1,2			1,5			2,5		1,5			3,0	
10 N/mm²	w/w	w/d	1,2			1,5			2,5		2,0			3,5	
	d/d		1,5			2,0			3,0		2,0			4,0	

Table C54.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d	1,2		1,5
	d/d	1,2		1,5
6 N/mm²	w/w w/d	1,5		2,0
	d/d	2,0		2,5
8 N/mm²	w/w w/d	2,0		2,5
	d/d	2,5		3,0
10 N/mm²	w/w w/d	2,5		3,5
	d/d	3,0		4,0

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, Characteristic resistance under tensile load

Annex C 54

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Vertical perforated brick HLz, form B, EN 771-1

Table C55.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w w/d d/d	0,9		1,2		0,9		1,2		0,6		2,0				0,6	
6 N/mm²	w/w w/d d/d	1,2		1,5		1,2		1,5		0,9		3,0				0,9	
8 N/mm²	w/w w/d d/d	1,5		2,0		1,5		2,0		1,2		4,0				1,2	
10 N/mm²	w/w w/d d/d	2,0		3,0		2,0		3,0		1,5		5,0				1,5	

Table C55.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d d/d	0,6		
6 N/mm²	w/w w/d d/d	0,9		
8 N/mm²	w/w w/d d/d	1,2		
10 N/mm²	w/w w/d d/d	1,5		

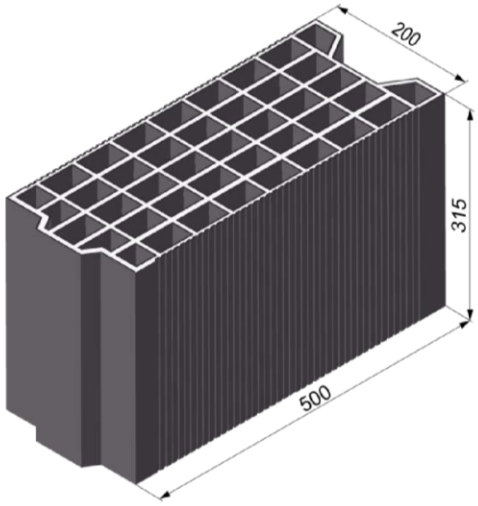
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 55**
Performances Vertical perforated brick HLz, form B, Characteristic resistance under shear load	

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Vertical perforated brick HLz, form B, EN 771-1



Vertical perforated brick HLz, form B, EN 771-1			
Producer	e.g. Terreal		
Nominal dimensions [mm]	length L	width W	height H
	500	200	315
Density ρ [kg/dm³]	≥ 0,7		
Compressive strength f_b [N/mm²]	2 / 4 / 6 / 8		
Standard or annex	EN 771-1		

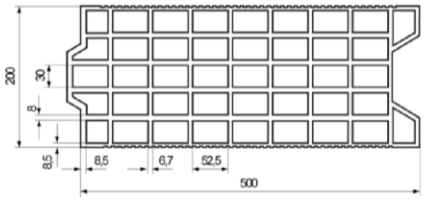


Table C56.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque	$T_{inst,max}$	[Nm]	2													
General installation parameters																
Edge distance	c_{min}	[mm]	50							80		50			80	
Spacing	s_{min} ∥		100													
	s_{cr} ∥		500													
	s_{min} ⊥		100													
	s_{cr} ⊥		315													
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C56.2: Group factors

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,1													
	$\alpha_{g,V}$ ∥		1,2													
	$\alpha_{g,N}$ ⊥		1,1													
	$\alpha_{g,V}$ ⊥		1,2													

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 56

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Vertical perforated brick HLz, form B, EN 771-1

Table C57.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	80		
Spacing	s_{min} ∥		100		
	s_{cr} ∥		500		
	s_{min} ⊥		100		
	s_{cr} ⊥		315		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C57.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,1		
	$\alpha_{g,V}$ ∥		1,2		
	$\alpha_{g,N}$ ⊥		1,1		
	$\alpha_{g,V}$ ⊥		1,2		

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Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 57

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Vertical perforated brick HLz, form B, EN 771-1

Table C58.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																	
compressive strength f_b	use category																
2 N/mm²	w/w	w/d		0,5													
	d/d			0,5						0,6		0,5				0,6	
4 N/mm²	w/w	w/d		0,9													
	d/d			0,9		1,2											
6 N/mm²	w/w	w/d		1,5													
	d/d			1,5													
8 N/mm²	w/w	w/d		2,0													
	d/d			2,0													

Table C58.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
2 N/mm²	w/w w/d	0,5		
	d/d	0,6		
4 N/mm²	w/w w/d	0,9		
	d/d	1,2		
6 N/mm²	w/w w/d	1,5		
	d/d	1,5		
8 N/mm²	w/w w/d	2,0		
	d/d	2,0		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry	**Annex C 58**
Performances Vertical perforated brick HLz, form B, Characteristic resistance under tensile load	

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, form B, EN 771-1

Table C59.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
2 N/mm²	w/w w/d d/d	0,3		0,6		0,3		0,6		0,6		0,9				0,75	
4 N/mm²	w/w w/d d/d	0,75		1,2		0,75		1,2		1,2		2,0				1,5	
6 N/mm²	w/w w/d d/d	0,9		2,0		0,9		2,0		1,5		3,0				2,0	
8 N/mm²	w/w w/d d/d	1,5		2,5		1,5		2,5		2,0		4,0				3,0	

Table C59.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
2 N/mm²	w/w w/d d/d	0,6		0,75
4 N/mm²	w/w w/d d/d	1,2		1,5
6 N/mm²	w/w w/d d/d	1,5		2,0
8 N/mm²	w/w w/d d/d	2,0		3,0

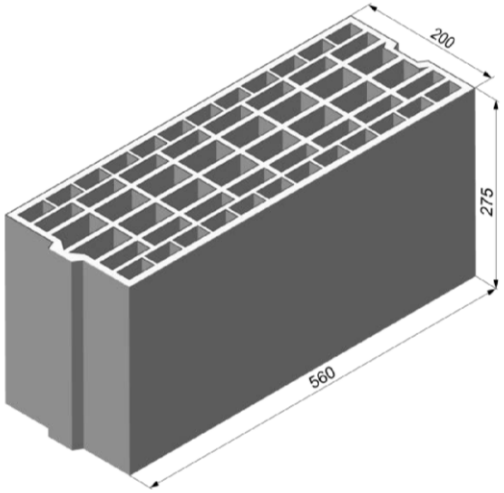
Factor for job site tests and displacements see annex C110

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fischer injektion system FIS V masonry	**Annex C 59**
Performances Vertical perforated brick HLz, form B, Characteristic resistance under shear load	

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Vertical perforated brick HLz, form B, EN 771-1



Vertical perforated brick HLz, form B, EN 771-1			
Producer	e.g. Imery		
Nominal dimensions [mm]	length L	width W	height H
	560	200	275
Density ρ [kg/dm³]	≥ 0,7		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-1		

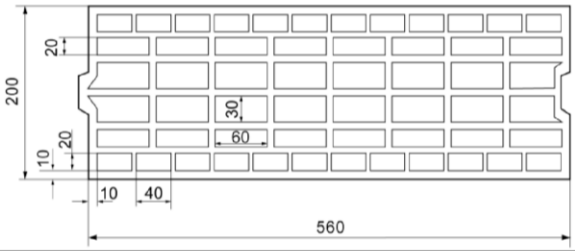


Table C60.1: Installation parameters

Anchor rod			**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**
Perforated sleeve FIS H K			**16x130**		**18x130/200**		**20x130**		**22x130/200**
Anchor rod with perforated sleeve FIS H K									
Max. installation torque	$T_{inst,max}$	[Nm]	2						
General installation parameters									
Edge distance	c_{min}	[mm]	80						
Spacing	$s_{min} \parallel = s_{cr} \parallel$	[mm]	560						
	$s_{min} \perp = s_{cr} \perp$	[mm]	275						
Drilling method									
Hammer drilling with hard metal hammer drill									

Table C60.2: Group factors

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

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Performances
Vertical perforated brick HLz, form B, dimensions, installation parameters

Annex C 60

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Vertical perforated brick HLz, form B, EN 771-1

Table C61.1: Characteristic resistance under tensile load

Anchor rod		**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**
Perforated sleeve FIS H K		**16x130**		**18x130/200**		**20x130**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)								
compressive strength f_b	use category							
4 N/mm²	w/w w/d	0,9				1,2		
	d/d	1,2				1,5		
6 N/mm²	w/w w/d	1,5				2,0		
	d/d	1,5				2,0		
8 N/mm²	w/w w/d	2,0				2,5		
	d/d	2,5				3,0		

Factor for temperature range 72/120°C: 0,83

Table C61.2: Characteristic resistance under shear load

Anchor rod		**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**
Perforated sleeve FIS H K		**16x130**		**18x130/200**		**20x130**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)								
compressive strength f_b	use category							
4 N/mm²	w/w w/d	0,9						
	d/d							
6 N/mm²	w/w w/d	1,5						
	d/d							
8 N/mm²	w/w w/d	2,0						
	d/d							

Factor for job site tests and displacements see annex C110

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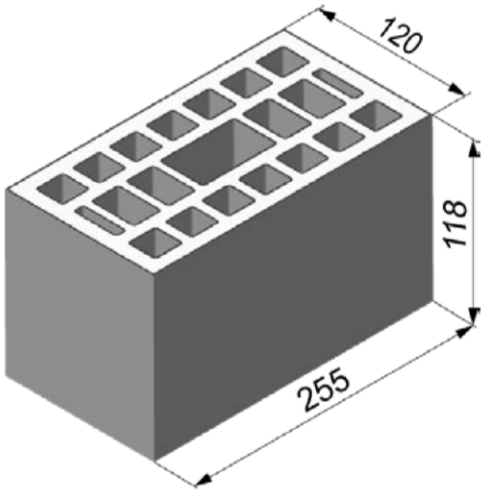
Performances
Vertical perforated brick HLz, form B,
Characteristic resistance under tensile and shear load

Annex C 61

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Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, EN 771-1			
Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	255	120	118
Density ρ [kg/dm³]	≥ 1,0		
Compressive strength f_b [N/mm²]	2 / 4 / 6 / 8 / 10 / 12		
Standard or annex	EN 771-1		

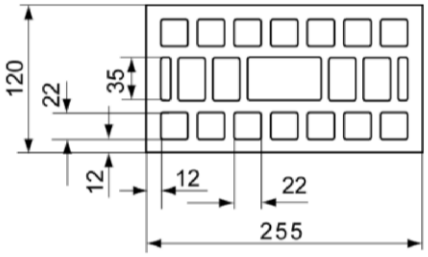


Table C62.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K										
Max. installation torque $T_{inst,max}$ [Nm]	2									
General installation parameters										
Edge distance c_{min} [mm]	60									
Spacing s_{cr} II = s_{min} II [mm]	255									
Spacing s_{cr} ⊥ = s_{min} ⊥ [mm]	120									
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C62.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Group factors $\alpha_{g,N}$ II, $\alpha_{g,V}$ II, $\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ ⊥ [-]	2									

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Performances
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 62

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, EN 771-1

Table C63.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**-**		**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**M10**	**M12**	**-**	
						11x85				**15x85**			
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**20x85**			
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)													
compressive strength f_b	use category												
2 N/mm²	w/w w/d	0,4		0,5						-			
	d/d	0,5		0,5						-			
4 N/mm²	w/w w/d	0,9		0,9						0,5			
	d/d	0,9		1,2						0,5			
6 N/mm²	w/w w/d	1,2		1,5						0,75			
	d/d	1,5		1,5						0,75			
8 N/mm²	w/w w/d	1,5		2,0						0,9			
	d/d	2,0		2,0						0,9			
10 N/mm²	w/w w/d	2,0		2,5						1,2			
	d/d	2,5		2,5						1,2			
12 N/mm²	w/w w/d	2,5		3,0						1,5			
	d/d	3,0		3,5						1,5			

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, Characteristic resistance under tensile load

Annex C 63

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, EN 771-1

Table C64.1: Characteristic resistance under shear load

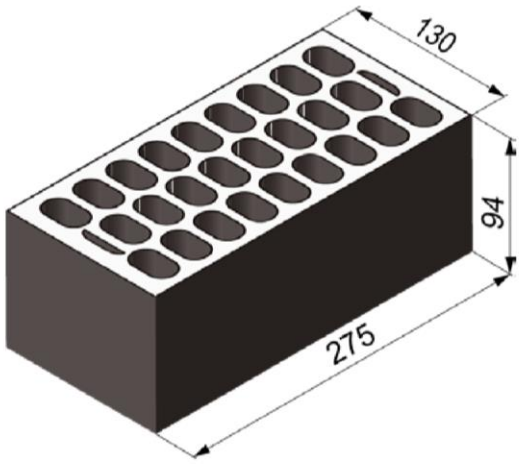
Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)											
compressivestrength f_b	use category										
2 N/mm²	w/w, w/d, d/d	0,6	0,75	0,6	0,75	0,9					
4 N/mm²	w/w, w/d, d/d	1,2	1,5	1,2	1,5	2,0					
6 N/mm²	w/w, w/d, d/d	2,0	2,0	2,0	2,0	2,5					
8 N/mm²	w/w, w/d, d/d	2,5	3,0	2,5	3,0	3,5					
10 N/mm²	w/w, w/d, d/d	3,0	3,5	3,0	3,5	4,5					
12 N/mm²	w/w, w/d, d/d	4,0	4,5	4,0	4,5	5,5					

Factor for job site tests and displacements see annex C110

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Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, EN 771-1			
Producer	e.g. Cermanica Farreny S.A.		
Nominal dimensions [mm]	length L	width W	height H
	275	130	94
Density ρ [kg/dm³]	≥ 0,8		
Compressive strength f_b [N/mm²]	6 / 8 / 12 / 16 / 20		
Standard or annex	EN 771-1		

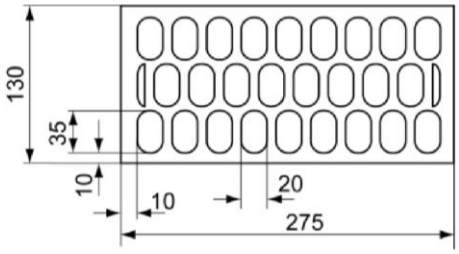


Table C65.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K										
Max. installation torque $T_{inst,max}$ [Nm]	2									
General installation parameters										
Edge distance c_{min} [mm]	100							120		
Spacing s_{cr} II = s_{min} II [mm]	275									
Spacing s_{cr} ⊥ = s_{min} ⊥ [mm]	95									
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C65.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Group factors $\alpha_{g,N}$ II, $\alpha_{g,V}$ II, $\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ ⊥ [-]	2									

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 65

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Vertical perforated brick HLz, EN 771-1

Table C66.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)											
compressive strength f_b	use category										
6 N/mm²	w/w, w/d	0,4		0,9							
	d/d	0,4		0,9							
8 N/mm²	w/w, w/d	0,5		1,2							
	d/d	0,6		1,2							
12 N/mm²	w/w, w/d	0,75		1,5							
	d/d	0,9		2,0							
16 N/mm²	w/w, w/d	0,9		2,0							
	d/d	1,2		2,5							
20 N/mm²	w/w, w/d	1,2		3,0							
	d/d	1,5		3,0							

Factor for temperature range 72/120°C: 0,83

Table C66.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)											
compressive strength f_b	use category										
6 N/mm²	w/w, w/d, d/d	1,2		1,2							
8 N/mm²	w/w, w/d, d/d	1,5		1,5							
12 N/mm²	w/w, w/d, d/d	2,0		2,5							
16 N/mm²	w/w, w/d, d/d	3,0		3,0							
20 N/mm²	w/w, w/d, d/d	4,0		4,0							

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

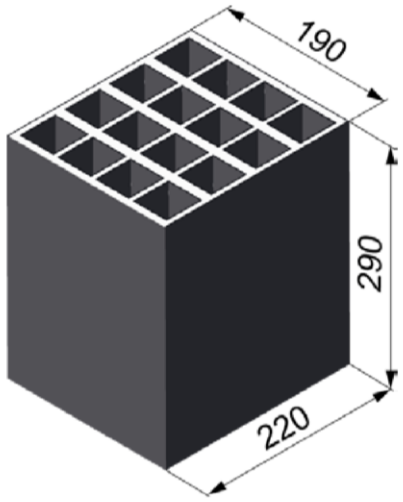
Performances
Vertical perforated brick HLz, Characteristic resistance under tensile and shear load

Annex C 66

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Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, EN 771-1			
Producer	e.g. Perceram		
Nominal dimensions [mm]	length L	width W	height H
	220	190	290
Density ρ [kg/dm³]	≥ 0,7		
Compressive strength f_b [N/mm²]	6 / 8 / 10		
Standard or annex	EN 771-1		

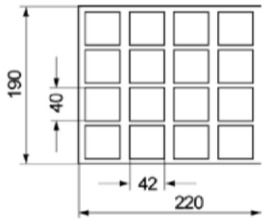


Table C67.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	2															
General installation parameters																
Edge distance c_{min} [mm]	110															
Spacing $s_{min} \parallel = s_{cr} \parallel$ [mm]	220															
Spacing $s_{min} \perp = s_{cr} \perp$ [mm]	290															
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C67.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
					11x85						**15x85**					
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Group factors $\alpha_{g,N} \parallel$, $\alpha_{g,V} \parallel$, $\alpha_{g,N} \perp$, $\alpha_{g,V} \perp$ [-]	2															

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, dimensions, installation parameters

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Vertical perforated brick HLz, EN 771-1

Table C68.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

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

Table C68.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ II	[-]	2		
	$\alpha_{g,V}$ II	[-]	2		
	$\alpha_{g,N}$ ⊥	[-]	2		
	$\alpha_{g,V}$ ⊥	[-]	2		

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Performances
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 68

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Vertical perforated brick HLz, EN 771-1

Table C69.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
							11x85						**15x85**					
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																		
compressive strength f_b	use category																	
6 N/mm²	w/w	w/d	0,3		1,2		1,2				1,5		1,2				1,5	
	d/d		0,4		1,5		1,5				1,5		1,5				1,5	
8 N/mm²	w/w	w/d	0,5		1,5		1,5				2,0		1,5				2,0	
	d/d		0,5		2,0		2,0				2,5		2,0				2,5	
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	

Table C69.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)					
compressive strength f_b	use category				
6 N/mm²	w/w	w/d	1,5		
	d/d		1,5		
8 N/mm²	w/w	w/d	2,0		
	d/d		2,5		
10 N/mm²	w/w	w/d	2,5		
	d/d		3,0		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

fischer injektion system FIS V masonry	**Annex C 69**
Performances Vertical perforated brick HLz, Characteristic resistance under tensile load	

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Vertical perforated brick HLz, EN 771-1

Table C70.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**	**-**	
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)															
compressive strength f_b	use category														
6 N/mm²	w/w, w/d, d/d	1,5		1,5		1,5			2,5		1,5			2,0	
8 N/mm²	w/w, w/d, d/d	2,0		2,0		2,0			3,5		2,0			3,0	
10 N/mm²	w/w, w/d, d/d	2,5		3,0		3,0			4,5		3,0			3,5	

Table C70.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b / use category			
6 N/mm² (w/w, w/d, d/d)	2,0		
8 N/mm² (w/w, w/d, d/d)	3,0		
10 N/mm² (w/w, w/d, d/d)	3,5		

Factor for job site tests and displacements see annex C110

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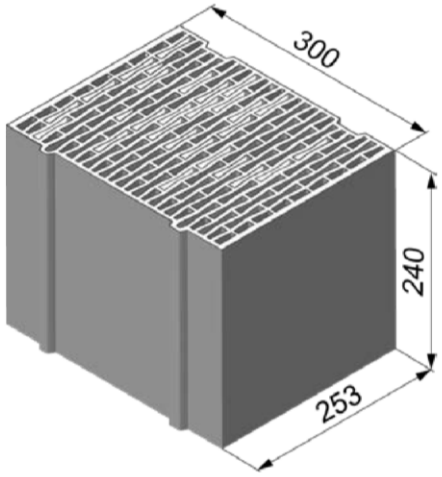
Performances
Vertical perforated brick HLz, Characteristic resistance under shear load

Annex C 70

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Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, EN 771-1			
Producer	e.g. Ziegelwerk Brenna		
Nominal dimensions [mm]	length L	width W	height H
	253	300	240
Density ρ [kg/dm³]	≥ 0,8		
Compressive strength f_b [N/mm²]	2 / 4 / 6		
Standard or annex	EN 771-1		

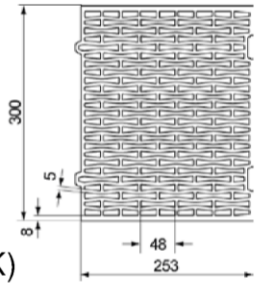


Table C71.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation torque $T_{inst,max}$ [Nm]	2													
General installation parameters														
Edge distance c_{min} [mm]	60													
Spacing $s_{min} \parallel = s_{cr} \parallel$ [mm]	255													
Spacing $s_{min} \perp = s_{cr} \perp$ [mm]	240													
Drilling method														
Hammer drilling with hard metal hammer drill														

Table C71.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		**M10** / **15x85**	**M12** / **15x85**	-	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**	
Group factors $\alpha_{g,N} \parallel$ / $\alpha_{g,V} \parallel$ / $\alpha_{g,N} \perp$ / $\alpha_{g,V} \perp$ [-]	2													

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 71

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Vertical perforated brick HLz, EN 771-1

Table C72.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	60		
Spacing	s_{min} II = s_{cr} II	[mm]	255		
	s_{min} ⊥ = s_{cr} ⊥	[mm]	240		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C72.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ II	[-]	2		
	$\alpha_{g,V}$ II	[-]	2		
	$\alpha_{g,N}$ ⊥	[-]	2		
	$\alpha_{g,V}$ ⊥	[-]	2		

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, dimensions, installation parameters

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Vertical perforated brick HLz, EN 771-1

Table C73.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
							11x85						**15x85**					
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																		
compressive strength f_b	use category																	
2 N/mm²	w/w	w/d	-		0,5		0,5				0,4		0,5				0,4	
	d/d		0,3		0,5		0,5				0,5		0,5				0,5	
4 N/mm²	w/w	w/d	0,5		0,9		0,9				0,9		0,9				0,9	
	d/d		0,6		0,9		0,9				0,9		0,9				0,9	
6 N/mm²	w/w	w/d	0,75		1,5		1,5				1,2		1,5				1,2	
	d/d		0,9		1,5		1,5				1,5		1,5				1,5	

Table C73.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)					
compressive strength f_b	use category				
2 N/mm²	w/w	w/d	0,4		
	d/d		0,5		
4 N/mm²	w/w	w/d	0,9		
	d/d		0,9		
6 N/mm²	w/w	w/d	1,2		
	d/d		1,5		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, Characteristic resistance under tensile load

Annex C 73

Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, EN 771-1

Table C74.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
2 N/mm²	w/w w/d d/d	0,5										0,6					
4 N/mm²	w/w w/d d/d	0,9										1,2					
6 N/mm²	w/w w/d d/d	1,5										1,5					

Table C74.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
2 N/mm²	w/w w/d d/d	0,5		0,6
4 N/mm²	w/w w/d d/d	0,9		1,2
6 N/mm²	w/w w/d d/d	1,5		1,5

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

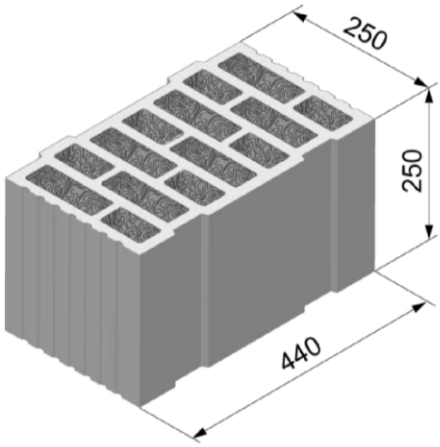
Performances
Vertical perforated brick HLz, Characteristic resistance under shear load

Annex C 74

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1



Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	250	440	250
Density ρ [kg/dm³]	0,7		
Compressive strength f_b [N/mm²]	6 / 8 / 10		
Standard or annex	EN 771-1		

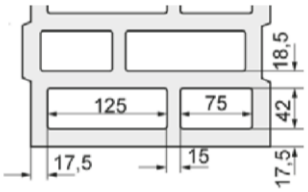


Table C75.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		-		-	**M6** **M8** **11x85**		-		-	**M10** **M12** **15x85**		-				-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	2					5	2	5		6						
General installation parameters																
Edge distance c_{min} [mm]	60															
Spacing s_{min} ∥ [mm]	80															
Spacing s_{cr} ∥ [mm]	250															
Spacing s_{min} ⊥ [mm]	80															
Spacing s_{cr} ⊥ [mm]	250															
Drilling method																
Rotary drilling with carbide drill																

Table C75.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		-		-	**M6** **M8** **11x85**		-		-	**M10** **M12** **15x85**		-				-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Group factors $\alpha_{g,N}$ ∥ [-]	1,3															
Group factors $\alpha_{g,V}$ ∥ [-]	1,3															
Group factors $\alpha_{g,N}$ ⊥ [-]	0,8															
Group factors $\alpha_{g,V}$ ⊥ [-]	1,3															

fischer injektion system FIS V masonry

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

Annex C 75

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1

Table C76.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	5	6	
General installation parameters					
Edge distance	c_{min}	[mm]	60		
Spacing	s_{min} ∥		80		
	s_{cr} ∥		250		
	s_{min} ⊥		80		
	s_{cr} ⊥		250		
Drilling method					
Rotary drilling with carbide drill					

Table C76.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3		
	$\alpha_{g,V}$ ∥		1,3		
	$\alpha_{g,N}$ ⊥		0,8		
	$\alpha_{g,V}$ ⊥		1,3		

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1

Table C77.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
							11x85						**15x85**							
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																				
compressive strength f_b	use category																			
6 N/mm²	w/w	w/d	0,75		1,5		1,2				1,5						2,5			
	d/d		0,9		1,5		1,2				1,5						2,5			
8 N/mm²	w/w	w/d	0,9		1,5		1,2				1,5						2,5			
	d/d		0,9		2,0		1,5				2,0						3,0			
10 N/mm²	w/w	w/d	0,9		2,0		1,5				2,0						3,0			
	d/d		1,2		2,0		1,5				2,0						3,5			

Table C77.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)					
compressive strength f_b	use category				
6 N/mm²	w/w	w/d	1,5		
	d/d		1,5		
8 N/mm²	w/w	w/d	1,5		
	d/d		2,0		
10 N/mm²	w/w	w/d	2,0		
	d/d		2,0		

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1

Table C78.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
					11x85						**15x85**							
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																		
compressive strength f_b	use category																	
6 N/mm²	w/w	w/d			0,9				1,2		0,9				1,2		1,2	
	d/d																	
8 N/mm²	w/w	w/d			0,9				1,5		0,9				1,5		1,2	
	d/d																	
10 N/mm²	w/w	w/d			1,2				1,5		1,2				1,5		1,5	
	d/d																	

Table C78.2: Characteristic resistance under shear load (Push through anchorage)

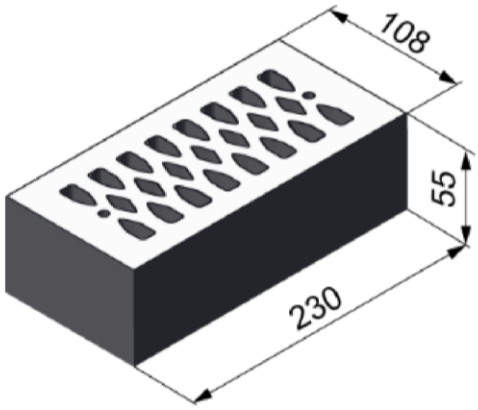
Anchor rod	**M10**	**M12**	**M16**
Perforated sleeve FIS H K	**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
6 N/mm²	w/w w/d d/d	1,2	1,2
8 N/mm²	w/w w/d d/d	1,5	1,5
10 N/mm²	w/w w/d d/d	1,5	1,5

Factor for job site tests and displacements see annex C110

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, EN 771-1			
Producer	e.g. Wienerberger.		
Nominal dimensions [mm]	length L	width W	height H
	230	108	55
Density ρ [kg/dm³]	≥ 1,4		
Compressive strength f_b [N/mm²]	2 / 4 / 6 / 8		
Standard or annex	EN 771-1		

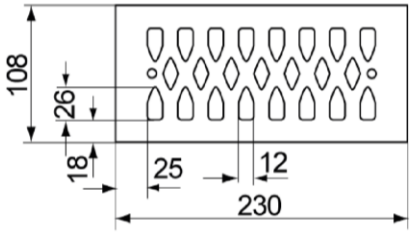


Table C79.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K										
Max. installation torque $T_{inst,max}$ [Nm]	2									
General installation parameters										
Edge distance c_{min} [mm]	60									
Spacing s_{min} ∥ [mm]	80									
Spacing s_{cr} ∥ [mm]	230									
Spacing s_{min} ⊥ [mm]	60									
Spacing s_{cr} ⊥ [mm]	60									
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C79.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **M8** **11x85**	-		**M10** / **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**20x85**		
Group factors $\alpha_{g,N}$ ∥ [-]	2									
Group factors $\alpha_{g,V}$ ∥ [-]	2									
Group factors $\alpha_{g,N}$ ⊥ [-]	2									
Group factors $\alpha_{g,V}$ ⊥ [-]	2									

fischer injektion system FIS V masonry

Performances
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 79

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Deutsches Institut für Bautechnik DIBt

Vertical perforated brick HLz, EN 771-1

Table C80.1: Characteristic resistance under tensile load [1)]

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)											
compressive strength f_b	use category										
2 N/mm²	w/w / w/d	0,3		0,9		0,75			0,5		
	d/d	0,3		0,9		0,9			0,6		
4 N/mm²	w/w / w/d	0,6		1,5		1,5			0,9		
	d/d	0,75		2,0		1,5			1,2		
6 N/mm²	w/w / w/d	0,9		2,5		2,5			1,5		
	d/d	0,9		3,0		2,5			1,5		
8 N/mm²	w/w / w/d	1,2		3,5		3,0			2,0		
	d/d	1,5		4,0		3,5			2,5		

[1)] If the fixing is in a solid area, for w/w, the characteristic value shall be reduced with the factor 0,64.

Factor for temperature range 72/120°C: 0,83

Table C80.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**-**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**M10** / **15x85**	**M12** / **15x85**	**-**
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**			**20x85**		
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)											
compressive strength f_b	use category										
2 N/mm²	w/w / w/d / d/d	0,6							0,4		
4 N/mm²	w/w / w/d / d/d	1,2							0,9		
6 N/mm²	w/w / w/d / d/d	1,5							1,2		
8 N/mm²	w/w / w/d / d/d	2,5							1,5		

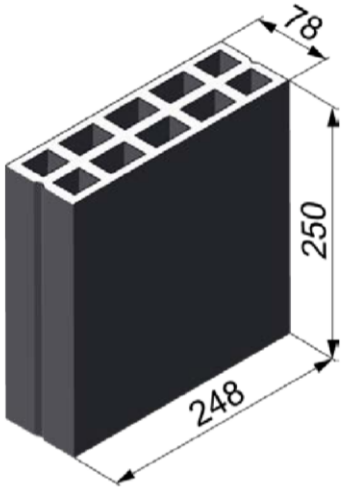
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 80**
Performances Vertical perforated brick HLz, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Horizontal perforated brick LLz, EN 771-1



Horizontal perforated brick LLz, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	250	78	248
Density ρ [kg/dm³]	≥ 0,7		
Compressive strength f_b [N/mm²]	2 / 4 / 6		
Standard or annex	EN 771-1		

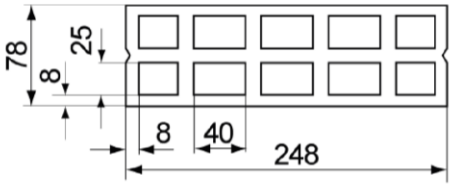


Table C81.1: Installation parameters

Anchor rod			**M6**	**M8**
Perforated sleeve FIS H K			**12x50**	
Anchor rod with perforated sleeve FIS H K				
Max. installation torque	$T_{inst,max}$	[Nm]	2	
General installation parameters				
Edge distance	c_{min}	[mm]	100	
Spacing	s_{min} ∥	[mm]	75	
	s_{cr} ∥	[mm]	250	
	s_{min} ⊥ = s_{cr} ⊥	[mm]	250	
Drilling method				
Hammer drilling with hard metal hammer drill				

Table C81.2: Group factors

Anchor rod			**M6**	**M8**
Perforated sleeve FIS H K			**12x50**	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,6	
	$\alpha_{g,V}$ ∥	[-]	1,1	
	$\alpha_{g,N}$ ⊥	[-]	2,0	
	$\alpha_{g,V}$ ⊥	[-]		

fischer injektion system FIS V masonry

Performances
Horizontal perforated brick LLz, dimensions, installation parameters

Annex C 81

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Deutsches Institut für Bautechnik DIBt

Horizontal perforated brick LLz, EN 771-1

Table C82.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**
Perforated sleeve FIS H K		**12x50**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)			
compressive strength f_b	use category		
2 N/mm²	w/w w/d	0,5	
	d/d	0,6	
4 N/mm²	w/w w/d	0,9	
	d/d	1,2	
6 N/mm²	w/w w/d	1,5	
	d/d	1,5	

Factor for temperature range 72/120°C: 0,83

Table C82.2: Characteristic resistance under shear load

Anchor rod		**M6**	**M8**
Perforated sleeve FIS H K		**12x50**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
2 N/mm²	w/w w/d	0,5	
	d/d		
4 N/mm²	w/w w/d	0,9	
	d/d		
6 N/mm²	w/w w/d	1,5	
	d/d		

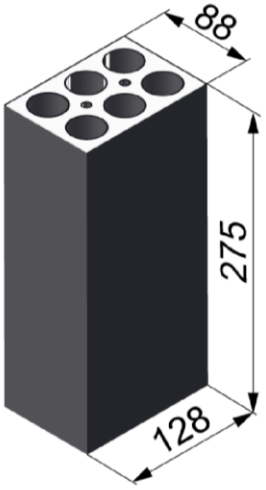
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 82**
Performances Horizontal perforated brick LLz, Characteristic resistance under tensile and shear load	

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Deutsches Institut für Bautechnik DIBt

Horizontal perforated brick LLz, EN 771-1



Horizontal perforated brick LLz, EN 771-1			
Producer	e.g. Cermanica Farreny S.A.		
Nominal dimensions [mm]	length L	width W	height H
	275	88	128
Density ρ [kg/dm³]	≥ 0,8		
Compressive strength f_b [N/mm²]	2		
Standard or annex	EN 771-1		

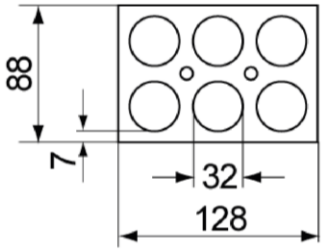


Table C83.1: Installation parameters

Anchor rod			**M6**	**M8**
Perforated sleeve FIS H K			**12x50**	
Anchor rod with perforated sleeve FIS H K				
Max. installation torque	$T_{inst,max}$	[Nm]	2	
General installation parameters				
Edge distance	c_{min}	[mm]	60	
Spacing	s_{min} ∥		75	
	s_{cr} ∥		275	
	s_{min} ⊥		75	
	s_{cr} ⊥		130	
Drilling method				
Hammer drilling with hard metal hammer drill				

Table C83.2: Group factors

Anchor rod			**M6**	**M8**
Perforated sleeve FIS H K			**12x50**	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,3	
	$\alpha_{g,V}$ ∥		1,5	
	$\alpha_{g,N}$ ⊥		1,3	
	$\alpha_{g,V}$ ⊥		1,5	

fischer injektion system FIS V masonry

Performances
Horizontal perforated brick LLz, dimensions, installation parameters

Annex C 83

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Deutsches Institut für Bautechnik DIBt

Horizontal perforated brick LLz, EN 771-1

Table C84.1: Characteristic resistance under tensile load

Anchor rod		**M6**	**M8**
Perforated sleeve FIS H K		**12x50**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)			
compressive strength f_b	use category		
2 N/mm²	w/w, w/d, d/d	1,5	

Factor for temperature range 72/120°C: 0,83

Table C84.2: Characteristic resistance under shear load

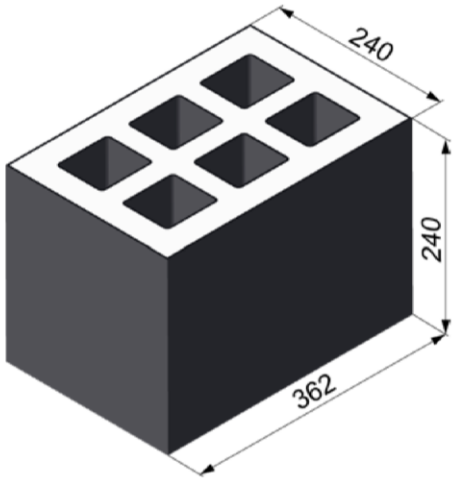
Anchor rod		**M6**	**M8**
Perforated sleeve FIS H K		**12x50**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
2 N/mm²	w/w, w/d, d/d	1,2	

Factor for job site tests and displacements see annex C110

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Deutsches Institut für Bautechnik DIBt

Light-weight concrete hollow block Hbl, EN 771-3



Light-weight concrete hollow block Hbl, EN 771-3			
Producer	-		
Nominal dimensions [mm]	Länge L	Breite B	Höhe H
	362	240	240
Density ρ [kg/dm³]	≥ 1,0		
Compressive strength f_b [N/mm²]	2 / 4		
Standard or annex	EN 771-3		

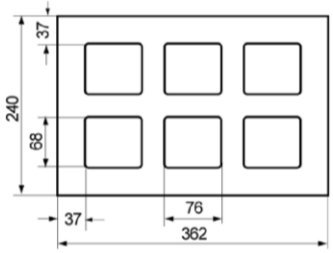


Table C85.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**				**-**
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$	[Nm]	2														
General installation parameters																
Edge distance c_{min}	[mm]	60														
Spacing s_{min} ∥	[mm]	100														
Spacing s_{cr} ∥	[mm]	362														
Spacing s_{min} ⊥ = s_{cr} ⊥	[mm]	240														
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C85.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	**-**		**-**		**M6** / **11x85**	**M8** / **11x85**	**-**	**-**		**M10** / **15x85**	**M12** / **15x85**	**-**				**-**
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Group factors $\alpha_{g,N}$ ∥	[-]	1,2														
Group factors $\alpha_{g,V}$ ∥	[-]	1,1														
Group factors $\alpha_{g,N}$ ⊥	[-]	2,0														
Group factors $\alpha_{g,V}$ ⊥	[-]	2,0														

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Performances
Light-weight concrete hollow block Hbl, dimensions, installation parameters

Annex C 85

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Light-weight concrete hollow block Hbl, EN 771-3

Table C86.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	60		
Spacing	s_{min} ∥		100		
	s_{cr} ∥		362		
	s_{min} ⊥ = s_{cr} ⊥		240		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C86.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,2		
	$\alpha_{g,V}$ ∥		1,1		
	$\alpha_{g,N}$ ⊥		2,0		
	$\alpha_{g,V}$ ⊥				

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Performances
Light-weight concrete hollow block Hbl, dimensions, installation parameters

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Light-weight concrete hollow block Hbl, EN 771-3

Table C87.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
							11x85						**15x85**							
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																				
compressive strength f_b	use category																			
2 N/mm²	w/w	w/d	1,2				1,5												2,5	
	d/d		1,2				1,5												2,5	
4 N/mm²	w/w	w/d	2,0				3,0												5,0	
	d/d		2,5				3,0												5,5	

Table C87.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod			**M10**		**M12**		**M16**	
Perforated sleeve FIS H K			**18x130/200**				**22x130/200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)								
compressive strength f_b	use category							
2 N/mm²	w/w	w/d	1,5					
	d/d		1,5					
4 N/mm²	w/w	w/d	3,0					
	d/d		3,0					

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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Light-weight concrete hollow block Hbl, EN 771-3

Table C88.1: Characteristic resistance under shear load (Pre-positioned anchorage)

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

Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)		
compressive strength f_b	use category	
2 N/mm²	w/w, w/d, d/d	0,9
4 N/mm²	w/w, w/d, d/d	2,0

Table C88.2: Characteristic resistance under shear load (Push through anchorage)

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

Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)		
compressive strength f_b	use category	
2 N/mm²	w/w, w/d, d/d	0,9
4 N/mm²	w/w, w/d, d/d	2,0

Factor for job site tests and displacements see annex C110

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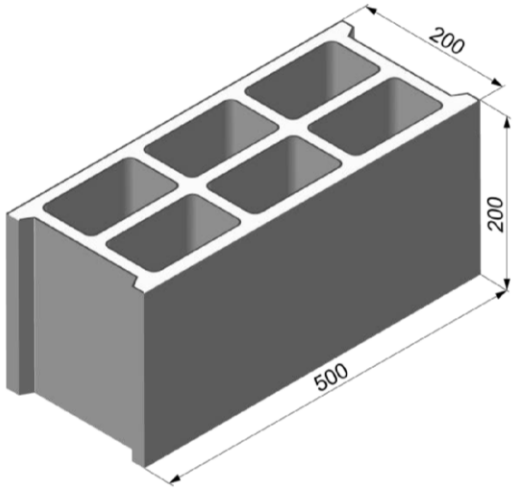
fischer injektion system FIS V masonry

Performances
Light-weight concrete hollow block Hbl, Characteristic resistance under shear load

Annex C 88

Deutsches Institut für Bautechnik DIBt

Light-weight concrete hollow block Hbl, EN 771-3



Light-weight concrete hollow block Hbl, EN 771-3			
Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
	500	200	200
Density ρ [kg/dm³]	≥ 1,0		
Compressive strength f_b [N/mm²]	2 / 4 / 6		
Standard or annex	EN 771-1		

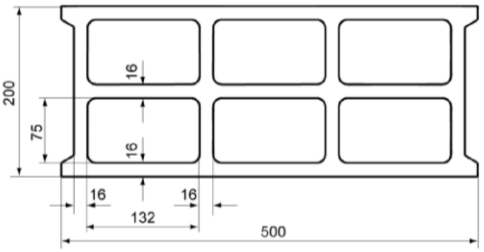


Table C89.1: Installation parameters

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**M10**	**M12**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** **M8** **11x85**	-		-		-		**M10** **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**18x130/200**		**20x85**		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K														
Max. installation torque $T_{inst,max}$ [Nm]	1				2									
General installation parameters														
Edge distance c_{min} [mm]	100													
Spacing s_{min} II = s_{cr} II [mm]	500													
Spacing s_{min} ⊥ = s_{cr} ⊥ [mm]	200													
Drilling method														
Hammer drilling with hard metal hammer drill														

Table C89.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**M10**	**M12**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** **M8** **11x85**	-		-		-		**M10** **M12** **15x85**	-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**18x130/200**		**20x85**		
Group factors $\alpha_{g,N}$ II, $\alpha_{g,V}$ II, $\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ ⊥ [-]	2													

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Performances
Light-weight concrete hollow block Hbl, dimensions, installation parameters

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Deutsches Institut für Bautechnik DIBt

Light-weight concrete hollow block Hbl, EN 771-3

Table C90.1: Characteristic resistance under tensile load

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**M10**	**M12**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		-		**M10** / **15x85**	**M12** / **15x85**	-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**18x130/200**		**20x85**		

Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)			
compressive strength f_b	use category		
2 N/mm²	w/w	w/d	0,4
	d/d		0,5
4 N/mm²	w/w	w/d	0,9
	d/d		0,9
6 N/mm²	w/w	w/d	1,2
	d/d		1,5

Factor for temperature range 72/120°C: 0,83

Table C90.2: Characteristic resistance under shear load

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**M10**	**M12**	**-**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** / **11x85**	**M8** / **11x85**	-	-		-		**M10** / **15x85**	**M12** / **15x85**	-
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**18x130/200**		**20x85**		

Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)			
compressive strength f_b	use category		
2 N/mm²	w/w	w/d	0,9
	d/d		
4 N/mm²	w/w	w/d	1,5
	d/d		
6 N/mm²	w/w	w/d	2,5
	d/d		

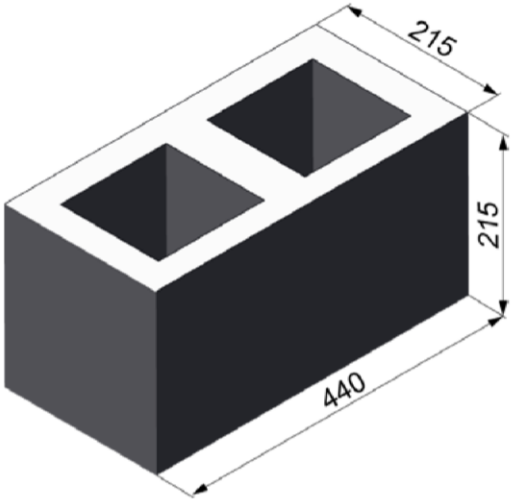
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 90**
Performances Light-weight concrete hollow block Hbl, Characteristic resistance under tensile and shear load	

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Light-weight concrete hollow block Hbl, EN 771-3



Light-weight concrete hollow block Hbl, EN 771-3			
Producer	e.g. Roadstone wood		
Nominal dimensions [mm]	length L	width W	height H
	440	215	215
Density ρ [kg/dm³]	≥ 1,2		
Compressive strength f_b [N/mm²]	4 / 6 / 8 / 10		
Standard or annex	EN 771-3		

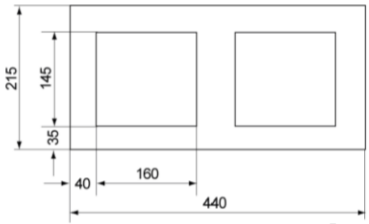


Table C91.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6**	**M8**	-		-		**M10**	**M12**	-		-	
							11x85						**15x85**					
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS HK																		
Max. installation torque	$T_{inst,max}$	[Nm]	2															
General installation parameters																		
Edge distance	c_{min}	[mm]	110															
Spacing	s_{min} ∥		100															
	s_{cr} ∥		440															
	s_{min} ⊥		100															
	s_{cr} ⊥		215															
Drilling method																		
Hammer drilling with hard metal hammer drill																		

Table C91.2: Group factors

Anchor rod			**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E			-		-		**M6**	**M8**	-		-		**M10**	**M12**	-		-	
							11x85						**15x85**					
Perforated sleeve FIS H K			**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Group factors	$\alpha_{g,N}$ ∥	[-]	1,4															
	$\alpha_{g,V}$ ∥		2,0															
	$\alpha_{g,N}$ ⊥		1,4															
	$\alpha_{g,V}$ ⊥		1,2															

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Performances
Light-weight concrete hollow block Hbl, dimensions, installation parameters

Annex C 91

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Light-weight concrete hollow block Hbl, EN 771-3

Table C92.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	110		
Spacing	s_{min} ∥		100		
	s_{cr} ∥		440		
	s_{min} ⊥		100		
	s_{cr} ⊥		215		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C92.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ ∥	[-]	1,4		
	$\alpha_{g,V}$ ∥		2,0		
	$\alpha_{g,N}$ ⊥		1,4		
	$\alpha_{g,V}$ ⊥		1,2		

fischer injektion system FIS V masonry

Performances
Light-weight concrete hollow block Hbl, dimensions, installation parameters

Annex C 92

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Light-weight concrete hollow block Hbl, EN 771-3

Table C93.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w w/d	0,9				1,2						2,0					
	d/d	1,2				1,5						2,0					
6 N/mm²	w/w w/d	1,5				2,0						3,0					
	d/d	1,5				2,0						3,0					
8 N/mm²	w/w w/d	2,0				2,5						3,5					
	d/d	2,0				3,0						4,0					
10 N/mm²	w/w w/d	2,5				3,0						4,5					
	d/d	3,0				3,5						5,0					

Table C93.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d	1,2		2,0
	d/d	1,5		2,0
6 N/mm²	w/w w/d	2,0		3,0
	d/d	2,0		3,0
8 N/mm²	w/w w/d	2,5		3,5
	d/d	3,0		4,0
10 N/mm²	w/w w/d	3,0		4,5
	d/d	3,5		5,0

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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Performances
Light-weight concrete hollow block Hbl, Characteristic resistance under tensile load

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Deutsches Institut für Bautechnik DIBt

Light-weight concrete hollow block Hbl, EN 771-3

Table C94.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**		**-**	
						11x85						**15x85**					
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																	
compressive strength f_b	use category																
4 N/mm²	w/w w/d d/d	0,75	1,2	0,75	1,2	0,75	1,2										
6 N/mm²	w/w w/d d/d	1,2	2,0	1,2	2,0	1,2	2,0										
8 N/mm²	w/w w/d d/d	1,5	2,5	1,5	2,5	1,5	2,5										
10 N/mm²	w/w w/d d/d	2,0	3,0	2,0	3,0	2,0	3,0										

Table C94.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d d/d	1,2		
6 N/mm²	w/w w/d d/d	2,0		
8 N/mm²	w/w w/d d/d	2,5		
10 N/mm²	w/w w/d d/d	3,0		

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

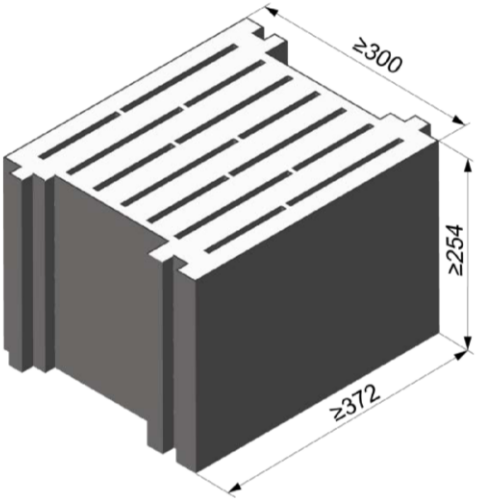
Performances
Light-weight concrete hollow block Hbl, Characteristic resistance under shear load

Annex C 94

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Light-weight concrete solid block Vbl, EN 771-3



Light-weight concrete solid block Vbl, EN 771-3			
Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
	≥ 372	≥ 300	≥ 254
Density ρ [kg/dm³]	≥ 0,6		
Compressive strength f_b [N/mm²]	2		
Standard or annex	EN 771-3		

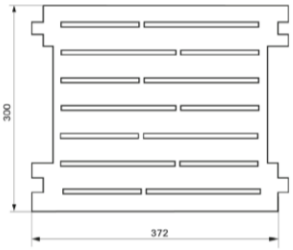


Table C95.1: Installation parameters

Anchor rod			**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**	**M12**	**M16**
Perforated sleeve FIS H K			**16x130**		**18x130/200**		**20x130**		**22x130/200**	**20x200**	
Anchor rod with perforated sleeve FIS H K											
Max. installation torque	$T_{inst,max}$	[Nm]	4								
General installation parameters											
Edge distance	c_{min}	[mm]	130								
Spacing	s_{min} II = s_{cr} II		370								
	s_{min} ⊥ = s_{cr} ⊥		250								
Drilling method											
Hammer drilling with hard metal hammer drill											

Table C95.2: Group factors

Anchor rod			**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**	**M12**	**M16**
Perforated sleeve FIS H K			**16x130**		**18x130/200**		**20x130**		**22x130/200**	**20x200**	
Group factors	$\alpha_{g,N}$ II	[-]	2								
	$\alpha_{g,V}$ II										
	$\alpha_{g,N}$ ⊥										
	$\alpha_{g,V}$ ⊥										

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

Annex C 95

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Light-weight concrete solid block Vbl, EN 771-3

Table C96.1: Characteristic resistance under tensile load

Anchor rod		**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**	**M12**	**M16**
Perforated sleeve FIS H K		**16x130**		**18x130/200**		**20x130**		**22x130/200**	**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)										
compressive strength f_b	use category									
2 N/mm²	w/w w/d	2,0				2,5			3,0	
	d/d	2,0				3,0			4,0	

Factor for temperature range 72/120°C: 0,83

Table C96.2: Characteristic resistance under shear load

Anchor rod		**M8**	**M10**	**M10**	**M12**	**M12**	**M16**	**M16**	**M12**	**M16**
Perforated sleeve FIS H K		**16x130**		**18x130/200**		**20x130**		**22x130/200**	**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)										
compressive strength f_b	use category									
2 N/mm²	w/w w/d	4,5						6,5		
	d/d									

Factor for job site tests and displacements see annex C110

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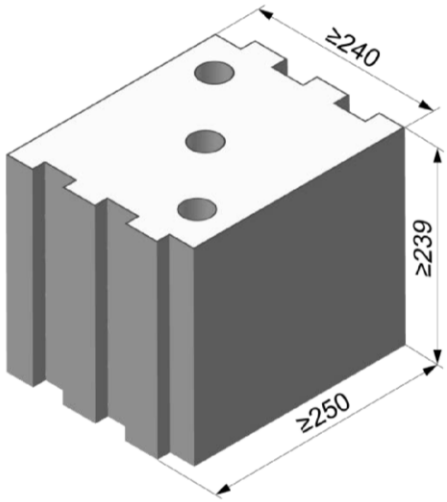
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Performances
Light-weight concrete solid block Vbl,
Characteristic resistance under tensile and shear load

Annex C 96

Deutsches Institut für Bautechnik DIBt

Light-weight concrete solid block Vbl, EN 771-3



Light-weight concrete solid block Vbl, EN 771-3			
Producer	KLB		
Nominal dimensions [mm]	length L	width W	height H
	≥ 250	≥ 240	≥ 239
Density ρ [kg/dm³]	≥ 1,6		
Compressive strength f_b [N/mm²]	4 / 6 / 8		
Standard or annex	EN 771-3		

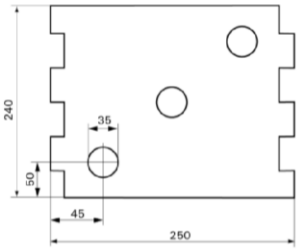


Table C97.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS HK)

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** **M8** **11x85**	-		-		**M10** **M12** **15x85**	-				-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K																
Max. installation torque $T_{inst,max}$ [Nm]	4															
General installation parameters																
Edge distance c_{min} [mm]	130															
Spacing $s_{min} \parallel = s_{cr} \parallel$ [mm]	250															
Spacing $s_{min} \perp = s_{cr} \perp$ [mm]	250															
Drilling method																
Hammer drilling with hard metal hammer drill																

Table C97.2: Group factors

Anchor rod	**M6**	**M8**	**M6**	**M8**	**-**	**M8**	**M10**	**M8**	**M10**	**-**	**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E	-		-		**M6** **M8** **11x85**	-		-		**M10** **M12** **15x85**	-				-	
Perforated sleeve FIS H K	**12x50**		**12x85**		**16x85**			**16x130**		**20x85**			**20x130**		**20x200**	
Group factors $\alpha_{g,N} \parallel$, $\alpha_{g,V} \parallel$, $\alpha_{g,N} \perp$, $\alpha_{g,V} \perp$ [-]	2,0															

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

Annex C 97

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Light-weight concrete solid block Vbl, EN 771-3

Table C98.1: Installation parameters
(Push through anchorage with perforated sleeve FIS HK)

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Anchor rod with perforated sleeve FIS H K					
Max. installation torque	$T_{inst,max}$	[Nm]	2		
General installation parameters					
Edge distance	c_{min}	[mm]	130		
Spacing	s_{min} II = s_{cr} II	[mm]	250		
	s_{min} ⊥ = s_{cr} ⊥	[mm]	250		
Drilling method					
Hammer drilling with hard metal hammer drill					

Table C98.2: Group factors

Anchor rod			**M10**	**M12**	**M16**
Perforated sleeve FIS H K			**18x130/200**		**22x130/200**
Group factors	$\alpha_{g,N}$ II $\alpha_{g,V}$ II $\alpha_{g,N}$ ⊥ $\alpha_{g,V}$ ⊥	[-]	2,0		

fischer injektion system FIS V masonry

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

Annex C 98

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Light-weight concrete solid block Vbl, EN 771-3

Table C99.1: Characteristic resistance under tensile load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
						11x85						**15x85**							
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)																			
compressive strength f_b	use category																		
4 N/mm²	w/w	w/d		1,2		2,0		2,5				3,0							
	d/d			2,0		3,5		4,0				5,0							
6 N/mm²	w/w	w/d		1,5		3,0		4,0				5,0							
	d/d			3,0		5,0		6,5				7,5							
8 N/mm²	w/w	w/d		2,0		4,0		5,0				6,5							
	d/d			4,0		7,0		8,5				9,0							

Table C99.2: Characteristic resistance under tensile load (Push through anchorage)

Anchor rod		**M10**		**M12**		**M16**	
Perforated sleeve FIS H K		**18x130/200**				**22x130/200**	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)							
compressive strength f_b	use category						
4 N/mm²	w/w	w/d	2,5			3,0	
	d/d		4,0			5,0	
6 N/mm²	w/w	w/d	4,0			5,0	
	d/d		6,5			7,5	
8 N/mm²	w/w	w/d	5,0			6,5	
	d/d		8,5			9,0	

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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Light-weight concrete solid block Vbl, EN 771-3

Table C100.1: Characteristic resistance under shear load (Pre-positioned anchorage)

Anchor rod		**M6**	**M8**	**M6**	**M8**	**-**		**M8**	**M10**	**M8**	**M10**	**-**		**M12**	**M16**	**M12**	**M16**	**M12**	**M16**
Internal threaded anchor FIS E		**-**		**-**		**M6**	**M8**	**-**		**-**		**M10**	**M12**	**-**				**-**	
						11x85						**15x85**							
Perforated sleeve FIS H K		**12x50**		**12x85**		**16x85**				**16x130**		**20x85**				**20x130**		**20x200**	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)																			
compressive strength f_b	use category																		
4 N/mm²	w/w w/d d/d	2,0	3,0	2,0	3,0	2,0		3,5				4,5							
6 N/mm²	w/w w/d d/d	3,0	4,5	3,0	4,5	3,0		5,5				6,5							
8 N/mm²	w/w w/d d/d	4,0	6,0	4,0	6,0	4,0		7,0				8,5							

Table C100.2: Characteristic resistance under shear load (Push through anchorage)

Anchor rod		**M10**	**M12**	**M16**
Perforated sleeve FIS H K		**18x130/200**		**22x130/200**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)				
compressive strength f_b	use category			
4 N/mm²	w/w w/d d/d	3,5		4,5
6 N/mm²	w/w w/d d/d	5,5		6,5
8 N/mm²	w/w w/d d/d	7,0		8,5

Factor for job site tests and displacements see annex C110

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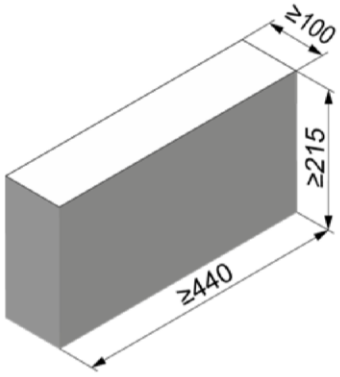
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Performances
Light-weight concrete solid block Vbl, Characteristic resistance under shear load

Annex C 100

Deutsches Institut für Bautechnik DIBt

Light-weight concrete solid block Vbl, EN 771-3



Light-weight concrete solid block Vbl, EN 771-3			
Producer	Roadstone wood		
Nominal dimensions [mm]	length L	width W	height H
	≥ 440	≥ 100	≥ 215
Density ρ [kg/dm³]	≥ 2,0		
Compressive strength f_b [N/mm²]	4 / 6 / 8 / 10		
Standard or annex	EN 771-3		

Table C101.1: 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 torque	$T_{inst,max}$	[Nm]	4		10							
General installation parameters												
Edge distance	c_{min}	[mm]	100									
Spacing	s_{min} ∥		75									
	s_{cr} ∥		440									
	s_{min} ⊥		75									
	s_{cr} ⊥		215									
Drilling method												
Hammer drilling with hard metal hammer drill												

Table C101.2: Group factors

Anchor rod			M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N}$ ∥	[-]	1,6				
	$\alpha_{g,V}$ ∥		1,3				
	$\alpha_{g,N}$ ⊥		1,4				
	$\alpha_{g,V}$ ⊥		1,3				

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

Annex C 101

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Deutsches Institut für Bautechnik DIBt

Light-weight concrete solid block Vbl, EN 771-3

Table C102.1: Characteristic resistance under tensile load

Anchor rod		M6	M8	M10	M12	M16
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)						
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50				
4 N/mm²	w/w w/d	1,2	1,2			
	d/d	2,0	2,0			
6 N/mm²	w/w w/d	1,5	2,0			
	d/d	3,0	3,5			
8 N/mm²	w/w w/d	2,0	2,5			
	d/d	4,0	4,5			
10N/mm²	w/w w/d	3,0	3,5			
	d/d	5,0	5,5			

Factor for temperature range 72/120°C: 0,83

Table C102.2: Characteristic resistance under shear load

Anchor rod		M6	M8	M10	M12	M16
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)						
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50				
4 N/mm²	w/w w/d d/d	1,2	1,5	1,5	1,5	1,5
6 N/mm²	w/w w/d d/d	2,0	2,0	2,5	2,5	2,5
8 N/mm²	w/w w/d d/d	2,5	2,5	3,0	3,0	3,5
10N/mm²	w/w w/d d/d	3,0	3,5	4,0	4,0	4,5

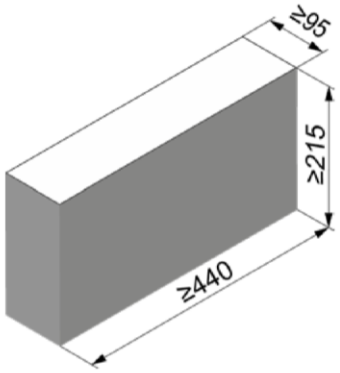
Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry	**Annex C 102**
Performances Light-weight concrete solid block Vbl, Characteristic resistance under tensile and shear load	

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Light-weight concrete solid block Vbl, EN 771-3



Light-weight concrete solid block Vbl, EN 771-3			
Producer	Tramac		
Nominal dimensions [mm]	length L	width W	height H
	≥ 440	≥ 95	≥ 215
Density ρ [kg/dm³]	≥ 2,0		
Compressive strength f_b [N/mm²]	6 / 8 / 10 / 12		
Standard or annex	EN 771-3		

Table C103.1: 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 torque	$T_{inst,max}$	[Nm]	4		10							
General installation parameters												
Edge distance	c_{min}	[mm]	60									
Spacing	s_{min} ∥		75									
	s_{cr} ∥		440									
	s_{min} ⊥		75									
	s_{cr} ⊥		215									
Drilling method												
Hammer drilling with hard metal hammer drill												

Table C103.2: Group factors

Anchor rod			M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N}$ ∥	[-]	1,9				
	$\alpha_{g,V}$ ∥		1,4				
	$\alpha_{g,N}$ ⊥		1,9				
	$\alpha_{g,V}$ ⊥		1,4				

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fischer injektion system FIS V masonry

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

Annex C 103

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Light-weight concrete solid block Vbl, EN 771-3

Table C104.1: Characteristic resistance under tensile load

Anchor rod		M6		M8		M10		M12		M16	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)											
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]									
		50	70	50	70	50	70	50	70	50	70
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	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5
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
	d/d	3,5	4,5	3,5	4,5	3,5	5,0	3,5	5,0	3,5	5,0
10N/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
	d/d	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0
12N/mm²	w/w w/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	4,5	3,0	4,5
	d/d	5,0	7,0	5,0	7,0	5,0	7,5	5,0	7,5	5,0	7,5

Factor for temperature range 72/120°C: 0,83

Table C104.2: Characteristic resistance under shear load

Anchor rod		M6	M8	M10	M12	M16
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)						
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm] ≥ 50				
6 N/mm²	w/w w/d d/d	2,0	2,0	2,0	1,5	1,5
8 N/mm²	w/w w/d d/d	2,5	2,5	3,0	2,5	2,5
10N/mm²	w/w w/d d/d	3,5	3,5	4,0	3,0	3,0
12N/mm²	w/w w/d d/d	4,0	4,0	4,5	3,5	3,5

Factor for job site tests and displacements see annex C110

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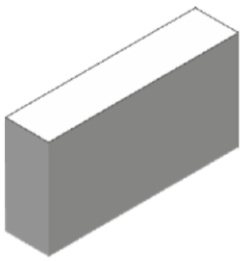
Performances
Light-weight concrete solid block Vbl,
Characteristic resistance under tensile and shear load

Annex C 104

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Autoclaved aerated concrete (cylindrical drill hole), EN 771-4



Autoclaved aerated concrete, EN 771-4				
Producer		e.g. Ytong		
Density ρ	[kg/dm³]	0,35	0,5	0,65
Compressive strength f_b	[N/mm²]	2	4	6
Standard or annex		EN 771-4		

Table C105.1: Installation parameters

Anchor rod			**M6**		**M8**		**M10**		**M12**		**M16**		**-**		**-**	
Internal threaded anchor FIS E			**-**		**-**		**-**		**-**				**M6**	**M8**	**M10**	**M12**
													11x85		**15x85**	
Anchor rod and internal threaded anchor FIS E without perforated sleeve																
Effective anchorage depth	h_{ef}	[mm]	100	200	100	200	100	200	100	200	100	200	85			
Max. installation torque	$T_{inst,max}$	[Nm]	1	4	1	8	2	12	2	16	2	20	1		2	
General installation parameters																
Edge distance	c_{min}	[mm]	100													
Spacing	s_{cr} ∥ = s_{min} ∥	[mm]	250													
	h_{ef}=200mm s_{cr} ∥ = s_{min} ∥	[mm]	80													
	s_{cr} ⊥ = s_{min} ⊥	[mm]	250													
	h_{ef}=200mm s_{cr} ⊥ = s_{min} ⊥	[mm]	80													
Drilling method																
Hammer drilling with hard metal hammer drill																

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

Annex C 105

Deutsches Institut für Bautechnik DIBt

Table C106.1: Group factors for autoclaved aerated concrete (Compressive strength f_b =2 N/mm²)

Anchor rod			**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E			**-**	**-**	**-**	**-**	**-**	**M6 M8**	**M10 M12**
								11x85	**15x85**
Group factors	h_{ef}=200 $\alpha_{g,N}$ II	[-]	1,6					-	-
	h_{ef}=200 $\alpha_{g,V}$ II		1,1					-	-
	$\alpha_{g,N}$ II, $\alpha_{g,V}$ II		2						
	h_{ef}=200 $\alpha_{g,N}\perp$		1,6					-	-
	h_{ef}=200 $\alpha_{g,V}\perp$		0,8					-	-
	$\alpha_{g,N}\perp$, $\alpha_{g,V}\perp$		2						

Table C106.2: Group factors for autoclaved aerated concrete (Compressive strength f_b =4 N/mm²)

Anchor rod			**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E			**-**	**-**	**-**	**-**	**-**	**M6 M8**	**M10 M12**
								11x85	**15x85**
Group factors	h_{ef}=200 $\alpha_{g,N}$ II	[-]	0,7					-	-
	h_{ef}=200 α_{gV} II		2,0					-	-
	$\alpha_{g,N}$ II, α_{gV} II		2						
	h_{ef}=200 $\alpha_{g,N}\perp$		0,7					-	-
	h_{ef}=200 $\alpha_{g,V}\perp$		1,2					-	-
	$\alpha_{g,N}\perp$, $\alpha_{gV}\perp$		2						

Table C106.3: Group factors for autoclaved aerated concrete (Compressive strength f_b =6 N/mm²)

Anchor rod			**M6**	**M8**	**M10**	**M12**	**M16**	**-**	**-**
Internal threaded anchor FIS E			**-**	**-**	**-**	**-**	**-**	**M6 M8**	**M10 M12**
								11x85	**15x85**
Group factors	h_{ef}=200 $\alpha_{g,N}$ II	[-]	0,7					-	-
	h_{ef}=200 $\alpha_{g,V}$ II		2,0					-	-
	$\alpha_{g,N}$ II, $\alpha_{g,V}$ II		2						
	h_{ef}=200 $\alpha_{g,N}\perp$		0,7					-	-
	h_{ef}=200 $\alpha_{g,V}\perp$		1,2					-	-
	$\alpha_{g,N}\perp$, $\alpha_{g,V}\perp$		2						

fischer injektion system FIS V masonry

Performances
Autoclaved aerated concrete (cylindrical drill hole), Group factors

Annex C 106

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Autoclaved aerated concrete (cylindrical drill hole), EN 771-4

Table C107.1: Characteristic resistance under tensile load

Anchor rod		M6		M8		M10		M12		M16		-		-	
Internal threaded anchor FIS E		-		-		-		-		-		M6 / M8: 11x85		M10 / M12: 15x85	
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)															
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]													
		100	200	100	200	100	200	100	200	100	200	85			
2 N/mm²	w/w w/d	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5		1,5	
	d/d	1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0	1,5		1,5	
4 N/mm²	w/w w/d	1,2	-	2,0	1,5	2,5	3,5	2,5	3,5	2,0	3,5	2,0		1,5	
	d/d	1,5	-	2,0	3,0	3,0	5,0	2,5	5,0	2,0	5,0	2,0		1,5	
6 N/mm²	w/w w/d	1,5	-	3,0	2,5	4,5	5,0	4,5	7,0	3,0	8,5	3,5		2,5	
	d/d	1,5	-	3,5	4,0	5,0	7,0	5,0	9,0	3,0	11,5	3,5		2,5	

Factor for temperature range 72/120°C: 0,83

Table C107.2: Characteristic resistance under shear load

Anchor rod		M6		M8		M10		M12		M16		-		-	
Internal threaded anchor FIS E		-		-		-		-		-		M6 / M8: 11x85		M10 / M12: 15x85	
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)															
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]													
		100	200	100	200	100	200	100	200	100	200	85			
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	
4 N/mm²	w/w w/d d/d	2,0	-	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0		2,5	
6 N/mm²	w/w w/d d/d	2,5	-	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5		3,5	

Factor for job site tests and displacements see annex C110

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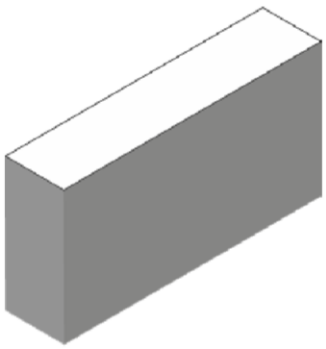
Performances
Autoclaved aerated concrete (cylindrical drill hole),
Characteristic resistance under tensile and shear load

Annex C 107

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Deutsches Institut für Bautechnik DIBt

Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4



Autoclaved aerated concrete, EN 771-4				
Producer		e.g. Ytong		
Density ρ	[kg/dm³]	0,35	0,5	0,65
Compressive strength f_b	[N/mm²]	2	4	6
Standard or annex		EN 771-4		

Table C108.1: Installation parameters

Anchor rod			**M8**		**M10**		**M12**		**-**	
Internal threaded anchor FIS E			-	-	-	-	-	-	**M6**	**M8**
									11x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	h_{ef}	[mm]	75	95	75	95	75	95	85	
Max. installation torque	$T_{inst,max}$	[Nm]	2							
General installation parameters										
Edge distance	c_{min}	[mm]	120	150	120	150	120	150	150	
Spacing	s_{cr} ∥ = s_{min} ∥	[mm]	240	300	240	300	240	300	300	
	s_{cr} ⊥ = s_{min} ⊥	[mm]	240	250	240	250	240	250	250	
Drilling method										
Hammer drilling with hard metal hammer drill										

Table C108.2: Group factors

Anchor rod			**M8**		**M10**		**M12**		**-**	
Internal threaded anchor FIS E			-	-	-	-	-	-	**M6**	**M8**
									11x85	
Group factors	$\alpha_{g,N}$ ∥ $\alpha_{g,V}$ ∥ $\alpha_{g,N}$ ⊥ $\alpha_{g,V}$ ⊥	[-]	2							

fischer injektion system FIS V masonry

Performances
Autoclaved aerated concrete (conical drill hole with special drill bit PBB), dimensions, installation parameters

Annex C 108

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Deutsches Institut für Bautechnik DIBt

Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4

Table C109.1: Characteristic resistance under tensile load

Anchor rod		**M8**		**M10**		**M12**		**-**
Internal threaded anchor FIS E		-	-	-	-	-	-	**M6** **M8** **11x85**
Tensile load N_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)								
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]						
		75	95	75	95	75	95	85
2 N/mm²	w/w w/d	2,0	2,5	2,0	2,5	2,0	2,5	2,0
	d/d	2,0	2,5	2,0	2,5	2,0	2,5	2,0
4 N/mm²	w/w w/d	3,0	3,5	3,0	3,5	3,0	3,5	3,0
	d/d	3,0	3,5	3,0	3,5	3,0	3,5	3,0
6 N/mm²	w/w w/d	3,5	4,0	3,5	4,0	3,5	4,0	3,5
	d/d	4,0	4,5	4,0	4,5	4,0	4,5	4,0

Factor for temperature range 72/120°C: 0,83

Table C109.2: Characteristic resistance under shear load

Anchor rod		**M8**		**M10**		**M12**		**-**
Internal threaded anchor FIS E		-	-	-	-	-	-	**M6** **M8** **11x85**
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C and 72/120°C)								
compressive strength f_b	use category	Effective anchorage depth h_{ef} [mm]						
		75	95	75	95	75	95	85
2 N/mm²	w/w w/d d/d	2,5						
4 N/mm²	w/w w/d d/d	4,5						
6 N/mm²	w/w w/d d/d	6,0						

Factor for job site tests and displacements see annex C110

fischer injektion system FIS V masonry

Performances
Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
Characteristic resistance under tensile and shear load

Annex C 109

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β-factors for job site tests; displacements

Table C110.1: β-factors for job site tests

use category		w/w and w/d		d/d	
temperature range		50/80	72/120	50/80	72/120
Material	Size				
solid units	M6	0,55	0,46	0,96	0,80
	M8	0,57	0,51		
	M10	0,59	0,52		
	M12 FIS E 11x85	0,6	0,54		
	M16 FIS E 15x85	0,62	0,52		
	16x85	0,55	0,46		
hollow units	all sizes	0,86	0,72	0,96	0,8
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 C110.2: Displacements

Material	N [kN]	δN_0 [mm]	δN_∞ [mm]	V [kN]	δV_0 [mm]	δV_∞ [mm]
solid units and autoclaved aerated concrete h_{ef}=100m	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF annex C 4 - C 7	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,23	1,85
solid brick Ks NF annex C 14 / C 15	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,2	0,4	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,91	1,37
AAC h_{ef}=200 mm annex C 105 - C 107	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,25	1,88
brick Annex C 89 / C 90	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	6,44	9,66

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

fischer injektion system FIS V masonry

Performances
β-factors for job site tests; displacements

Annex C 110

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