

IZJAVA O SVOJSTVIMA

DoP 0195

za fischer injekcijski sustav FIS VL (Metalna sidra za ubrizgavanje u zidove)

HR

1. Jedinstveni identifikator tipa proizvoda:

DoP 0195

2. Namjena korištenja:

Naknadna montaža u zidanim konstrukcijama.

Vidi dodatak, posebno priloge

B1- B11

fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Germany

3. Proizvođač:

4. Ovlašteni zastupnik:

–

5. Sistem/i od AVCP:

1

6. Europski dokument za ocjenjivanje:

EAD 330076-00-0604, Edition 11/ 2017

Europska tehnička ocjena:

ETA-15/0263; 2020-07-07

Tijelo za tehničko ocjenjivanje:

DIBt- Deutsches Institut für Bautechnik

Prijavljeno tijelo/prijavljena tijela:

1343 MPA Darmstadt / 2873 TU Darmstadt

7. Objavljena svojstva:

Mehanička otpornost i stabilnost (BWR 1)

Karakteristične vrijednosti otpora:

Faktor smanjenja:

Priloge C27

Karakteristična otpornost jednog sidra pod vlačnim opterećenjem:

Priloge B3, C1, C3, C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C25, C26

Karakteristična otpornost skupine sidara pod vlačnim opterećenjem:

Priloge B11

Karakteristična otpornost jednog sidra pri posmičnom opterećenju:

Priloge B3, C2, C3, C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C26

Karakteristična otpornost skupine sidara pri posmičnom opterećenju bez i s utjecajem ruba:

Priloge B11

Karakteristična udaljenost i razmak od ruba:

Priloge B11, C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C25

Minimalna udaljenost i razmak od ruba:

Priloge B11, C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C25

Grupni faktor pri opterećenju vlačnom i posmičnom silom:

Priloge C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C25

Minimalna debljina elementa:

Priloge B2

Durabilitate:

Priloge A5, B2

Deplasări:

Priloge C27

Siguranța în caz de incendiu (BWR 2)

Reacție la foc:

Clasa (A1)

Igienă, sănătate și mediu (BWR 3)

Conținutul, emisia și / sau eliberarea de substanțe periculoase:

NPA



8. Odgovarajuća tehnička dokumentacija i/ili specifična –
tehnička dokumentacija.

Svojstva gore navedenog proizvoda su u skladu sa skupom izjava o svojstvima. Ova izjava o svojstvima se izdaje, u skladu sa Europskom regulativom (EU) Br. 305/2011, pod punom odgovornošću gore navedenog proizvođača

Za proizvođača i u njegovo ime potpisao:

Thilo Pregartner, Dr.-Ing.
Tumlingen, 2020-08-04

Peter Schillinger, Dipl.-Ing.

Ovaj DoP je pripremljen u različitim jezicima. U slučaju da postoji spor u tumačenju, engleska verzija će uvijek prevladati.

U aneksu se nalaze dodatni podaci na engleskom jeziku, koji ne podliježu zakonskoj regulativi.

Specific Part

1 Technical description of the product

The fischer injectionsystem FIS VL for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS VL, FIS VL Low Speed and FIS VL High Speed, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod. 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 values for resistance	See Annexes C 1 to C 26
Displacements	See Annex C 27
Durability	See annex B 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Hygiene, health and the environment (BWR 3)

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

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

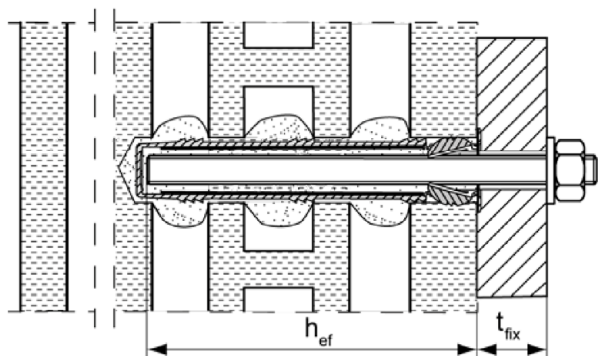
In accordance with the European Assessment Document EAD 330076-00-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

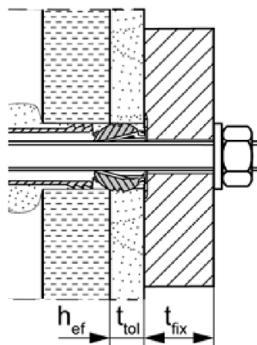
Installation conditions part 1

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 12x85 K

FIS H 16x130 K

FIS H 20x130 K

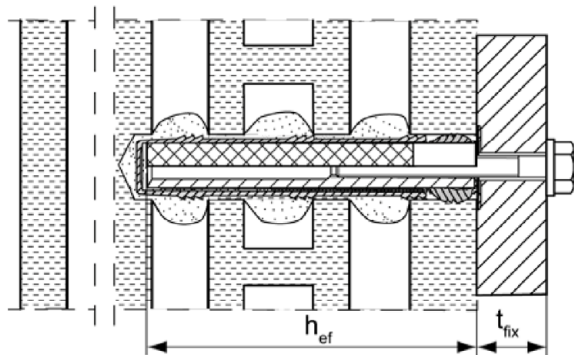
FIS H 16x85 K

FIS H 20x85 K

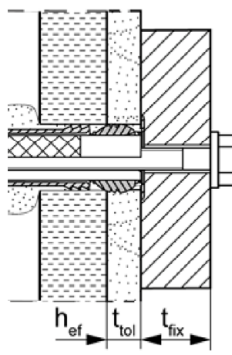
FIS H 20x200 K

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 injection system FIS VL for masonry

Product description

Installation conditions part 1, Installation in perforated and solid brick masonry
Anchor rods and internal threaded anchor with perforated sleeve

Annex A 1

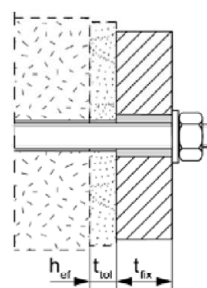
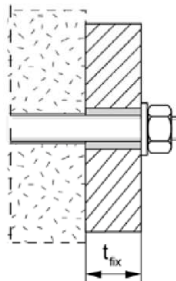
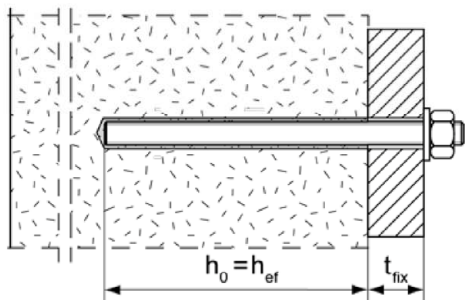
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Installation conditions part 2

**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

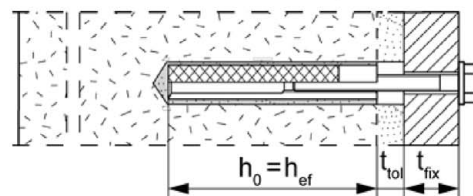
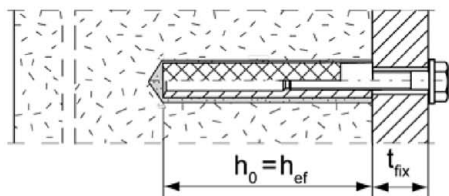


Installation with
render bridge

**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



Pictures not to scale

h_0 = depth of drill hole

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

h_{ef} = effective anchorage depth

t_{fix} = thickness of fixture

fischer injection system FIS VL for masonry

Product description

Installation conditions part 2, Installation in solid brick masonry and autoclaved aerated concrete. Anchor rods and internal threaded anchors without perforated sleeve

Annex A 2

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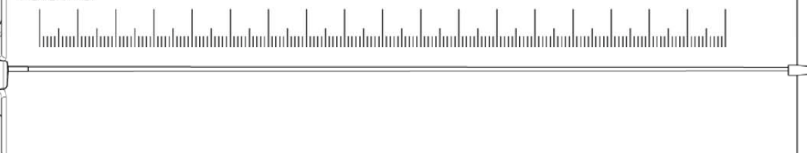
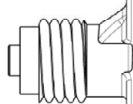
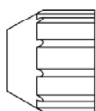
Overview system components part 1

Mortar cartridge (shuttle cartridge) with sealing cap

①

Size: 350 ml, 360 ml, 390 ml, 550 ml, 825 ml

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

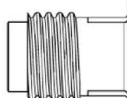
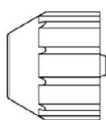


Mortar cartridge (coaxial cartridge) with sealing cap

①

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

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

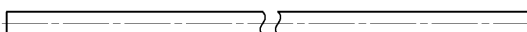


Static mixer MR Plus with extension tube

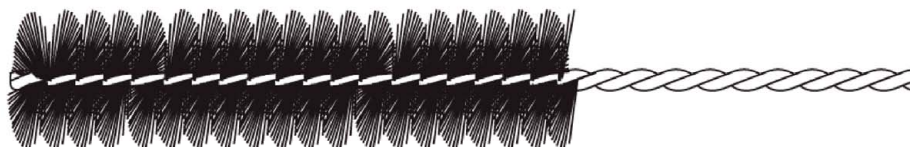
Static mixer



Extension tube



Cleaning brush BS



Blow-out pump ABG or ABP



Pictures not to scale

fischer injection system FIS VL for masonry

System description

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

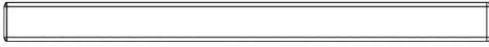
Annex A 3

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Overview system components part 2

fischer anchor rod

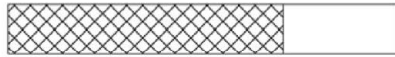
2



Size: M8, M10, M12

Internal threaded anchor FIS E

5



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

Perforated sleeve FIS H K

7



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

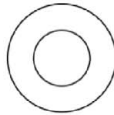
7



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

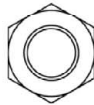
Washer

3



Hexagon nut

4



Pictures not to scale

fischer injection system FIS VL for 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	Stainless steel R	High corrosion-resistant steel HCR
		zinc plated	acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2015	acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2015
2	Anchor rod	Property class 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated ≥ 5µm, EN ISO 4042:2018 Zn5/An(A2K) or hot-dip galvanised EN ISO 10684:2004 f _{uk} ≤ 1000 N/mm ² 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; 1.4662; 1.4462; EN 10088-1:2014 f _{uk} ≤ 1000 N/mm ² A ₅ > 8% fracture elongation	Property class 50 or 80; EN ISO 3506-1:2009 or property class 70 with f _{yk} = 560 N/mm ² 1.4565; 1.4529 EN 10088-1:2014 f _{uk} ≤ 1000 N/mm ² A ₅ > 8% fracture elongation
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, EN ISO 4042:2018 Zn5/An(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, EN ISO 4042:2018 Zn5/An(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, EN ISO 4042:2018 Zn5/An(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 rod for internal threaded anchor FIS E	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, EN ISO 4042:2018 Zn5/An(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 injection system FIS VL for masonry				Annex A 5 Appendix 6/ 44
Product description Materials				

Specifications of intended use (part 1)

Table B1.1: Overview use and performance categories

fischer injection system FIS VL for masonry		
Hole drilling with hammer drill mode 	all bricks	
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 or internal threaded anchor (in solid brick masonry and autoclaved aerated concrete) Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Size: FIS H 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) ---
Installation conditions	category d/d	all bricks
	category w/d	
	category w/w	
Installation direction		D3 (downward and horizontal and upwards (e.g. overhead) installation)
Installation temperature		T _{i,min} = 0 °C bis T _{i,max} = +40 °C
In-service temperature	Temperature range T _b	-40 °C to +80 °C (max. short term temperature +80 °C max. long term temperature +50 °C)
fischer injection system FIS VL for masonry		Annex B 1 Appendix 7/ 44
Intended Use Specifications (part 1)		

Specifications of intended use (part 2)

Anchorage 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 10
- Hollow brick masonry (use category c), according to Annex B 10
- For minimum thickness of masonry member is $h_{ef}+30\text{mm}$
- 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 EOTA Technical Report TR 053, Annex B under consideration of the β -factor according to Annex C 27, Table C27.

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

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

Temperature Range:

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

Use conditions (Environmental conditions):

- **X1:** Structures subject to dry internal conditions exist
(zinc coated steel, stainless steel or high corrosion resistant steel)
- **X2:** Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particular aggressive conditions exist
(stainless steel or high corrosion resistant steel)
- **X3:** 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 injection system FIS VL for masonry

Intended Use
Specifications (part2)

Annex B 2

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Specifications of intended use (part 2 continued)

Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054, 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 $N_{Rk,pb}$ or pushing out a brick under shear load $V_{Rk,pb}$ see EOTA Technical Report TR 054.

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

Factors for job site tests and displacements see Annex C27

- 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) at perforated brick masonry see Annex B 6, Table B6.1
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Fastening screws or anchor rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E.
- minimum curing time see Annex B 7, Table B7.2
- 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 injection system FIS VL for masonry

Intended Use
Specifications (part2 continued)

Annex B 3

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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	M8	M10	M12
Nominal drill hole diameter	d_0 [mm]	10	12	14
Effective anchorage depth $h_{ef}^{1)}$ in AAC	$h_{0,min}=h_{ef,min}$ [mm]	100		
	$h_{0,max}=h_{ef,max}$ [mm]	200		
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]	$h-30, \leq 200$		
Diameter of clearance hole in the fixture	pre-position $d_f \leq$ [mm]	9	12	14
	push through $d_f \leq$ [mm]	11	14	16
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B7.1		
Maximum installation torque	T_{inst} [Nm]	see parameters of brick		

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

fischer anchor rods M8, M10, M12

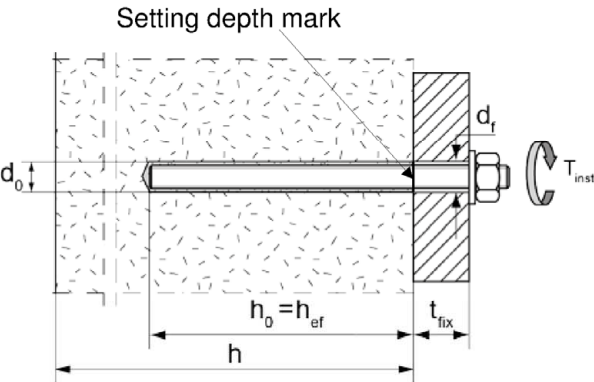


Marking (on random place) fischer anchor rod:

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

Alternatively: Colour coding according to DIN 976-1: 2016 1) PC = property class

Installation condition:



Pictures not to scale

fischer injection system FIS VL for masonry

Intended Use
Installation parameters for anchor rods without perforated sleeve

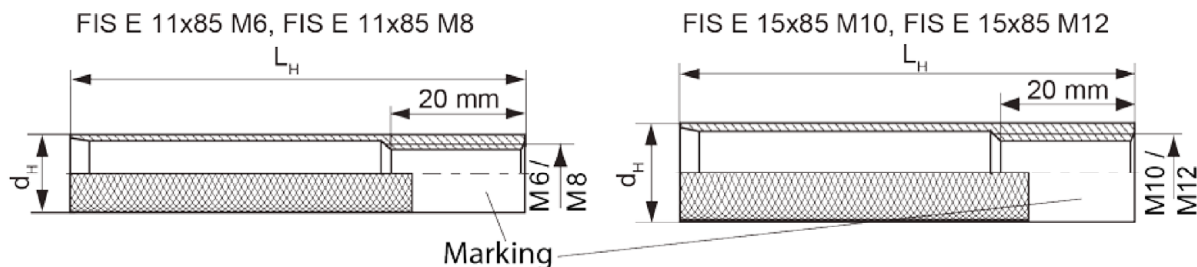
Annex B 4

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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			
Diameter of cleaning brush	d _b ≥ [mm]	see Table B7.1			
Maximum installation torque	T _{inst} [Nm]	see parameters of brick			
Diameter of clearance hole in the fixture	d _f [mm]	7	9	12	14
Screw-in depth	l _{E,min} [mm]	6	8	10	12
	l _{E,max} [mm]	60			

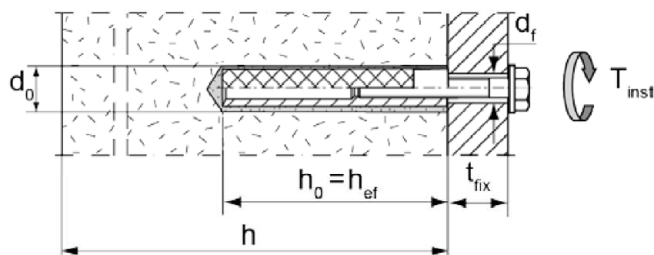
fischer internal threaded anchor FIS E



Marking:

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

Installation condition:



Pictures not to scale

fischer injection system FIS VL for 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		12x85	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter $d_0 = D_{\text{sleeve, nom}}$	d_0 [mm]	12	16		20		
Depth of drill hole	h_0 [mm]	90	90	135	90	135	205
Effective anchorage depth	$h_{\text{ef, min}}$ [mm]	65	85	110	85	110	180
	$h_{\text{ef, max}}$ [mm]	85	85	130	85	130	200
Size of threaded rod	[-]	M8	M8 and M10		M12		
Size of internal threaded anchor FIS E		---	11x85	---	15x85	---	---
Diameter of cleaning brush ¹⁾	$d_b \geq$ [mm]	see Table B7.1					
Maximum installation torque	T_{inst} [Nm]	see parameters of brick					

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

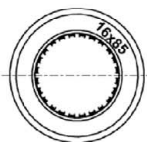
²⁾ Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth $h_{\text{ef, min}}$, the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of characteristic resistance must be taken.

Perforated sleeve

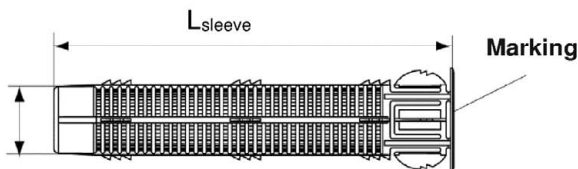
FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

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



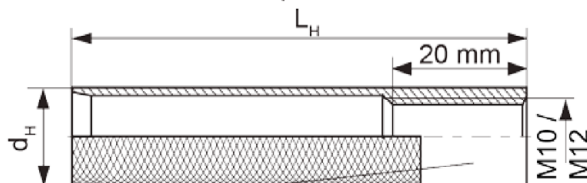
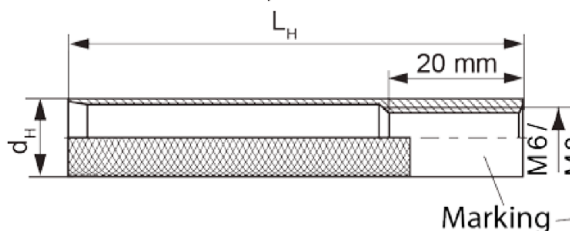
$D_{\text{sleeve, nom}}$



fischer internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

FIS E 15x85 M10, FIS E 15x85 M12

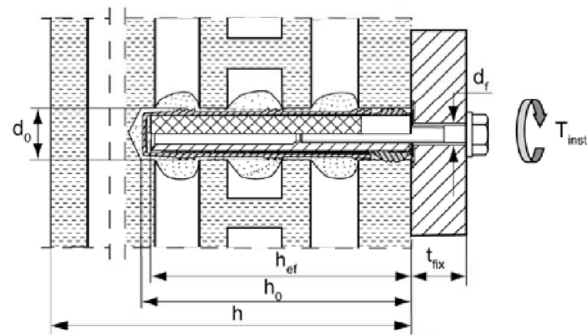
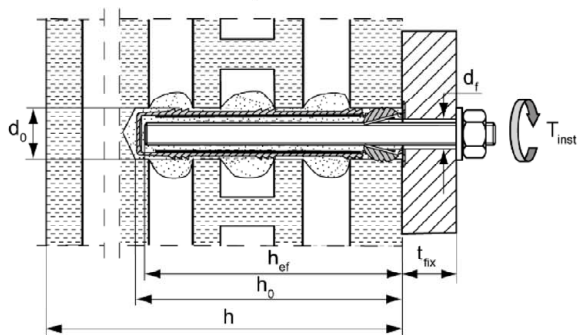


Marking

Installation conditions:

Anchor rod with perforated sleeve

Internal threaded anchor with perforated sleeve



Pictures not to scale

fischer injection system FIS VL for masonry

Intended Use

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

Annex B 6

Appendix 12/ 44

Table B7.1: Parameters of the cleaning brush BS (steel brush with steel bristles)

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

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



Only for solid bricks and autoclaved aerated concrete

Table B7.2: Maximum processing times and minimum curing times
(During the curing time of the mortar the masonry temperature may not fall below the listed minimum temperature)

Temperature at anchoring base [°C]	Maximum processing time t_{work}			Minimum curing time ¹⁾ t_{cure}		
	FIS VL High Speed ³⁾	FIS VL ²⁾	FIS VL Low Speed ²⁾	FIS VL High Speed ³⁾	FIS VL ²⁾	FIS VL Low Speed ²⁾
> 0 to 5	5 min	13 min	20 min	90 min	3 h	6 h
> 5 to 10	3 min	9 min	20 min	45 min	90 min	3 h
> 10 to 20	1 min	5 min	10 min	30 min	60 min	2 h
> 20 to 30	-	4 min	6 min	-	45 min	60 min
> 30 to 40	-	2 min	4 min	-	35 min	30 min

¹⁾ For wet bricks the curing time must be doubled

²⁾ Minimum cartridge temperature +5°C

³⁾ Minimum cartridge temperature ±0°C

Pictures not to scale

fischer injection system FIS VL for masonry

Intended use

Cleaning brush (steel brush)

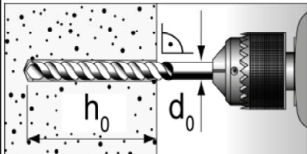
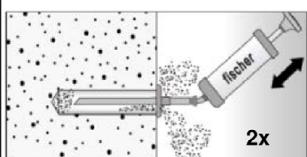
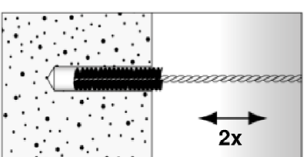
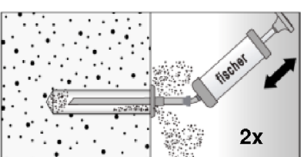
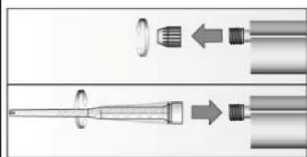
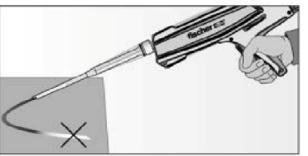
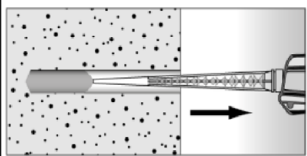
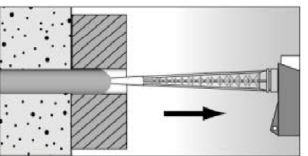
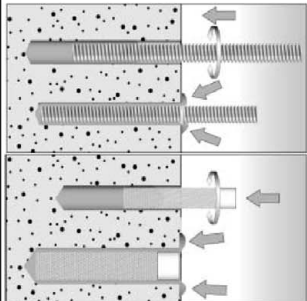
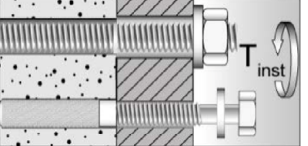
Maximum processing times and minimum curing times

Annex B 7

Appendix 13/ 44

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 h₀ and drill hole diameter d₀ see Table B4.1; B5.1		
2				Blow out the drill hole twice. Brush twice and blow out twice again.
3				
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 approximately 2/3 of the drill hole with mortar beginning from the bottom of the hole ¹⁾ . Avoid bubbles!		For push through anchorage (not FIS E) fill the annular clearance with mortar.
6				Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.
7		Do not touch. Minimum curing time see Table B7.2		Mounting the fixture. T_{inst} see parameter of brick.

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

fischer injection system FIS VL for masonry

Intended use

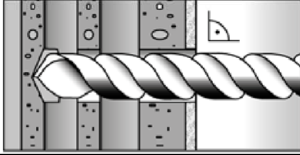
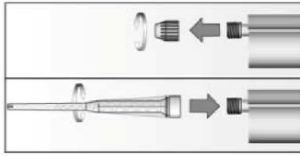
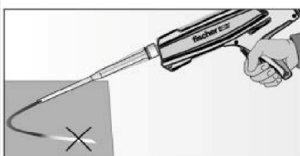
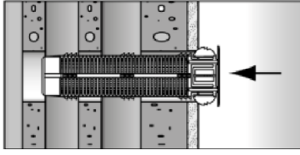
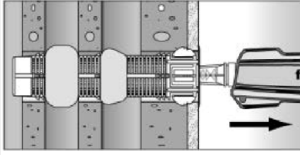
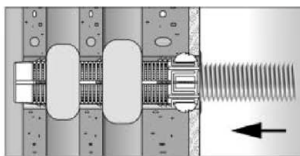
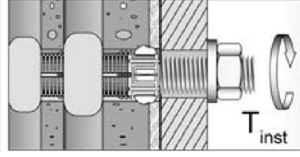
Installation instruction (without perforated sleeve) part 1

Annex B 8

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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 h_0 and drill hole diameter d_0 see Table B6.1	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.
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 metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).	
6		Do not touch. Minimum curing time see Table B7.2	 Mounting the fixture. T_{inst} see parameter of brick.

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

fischer injection system FIS VL for masonry

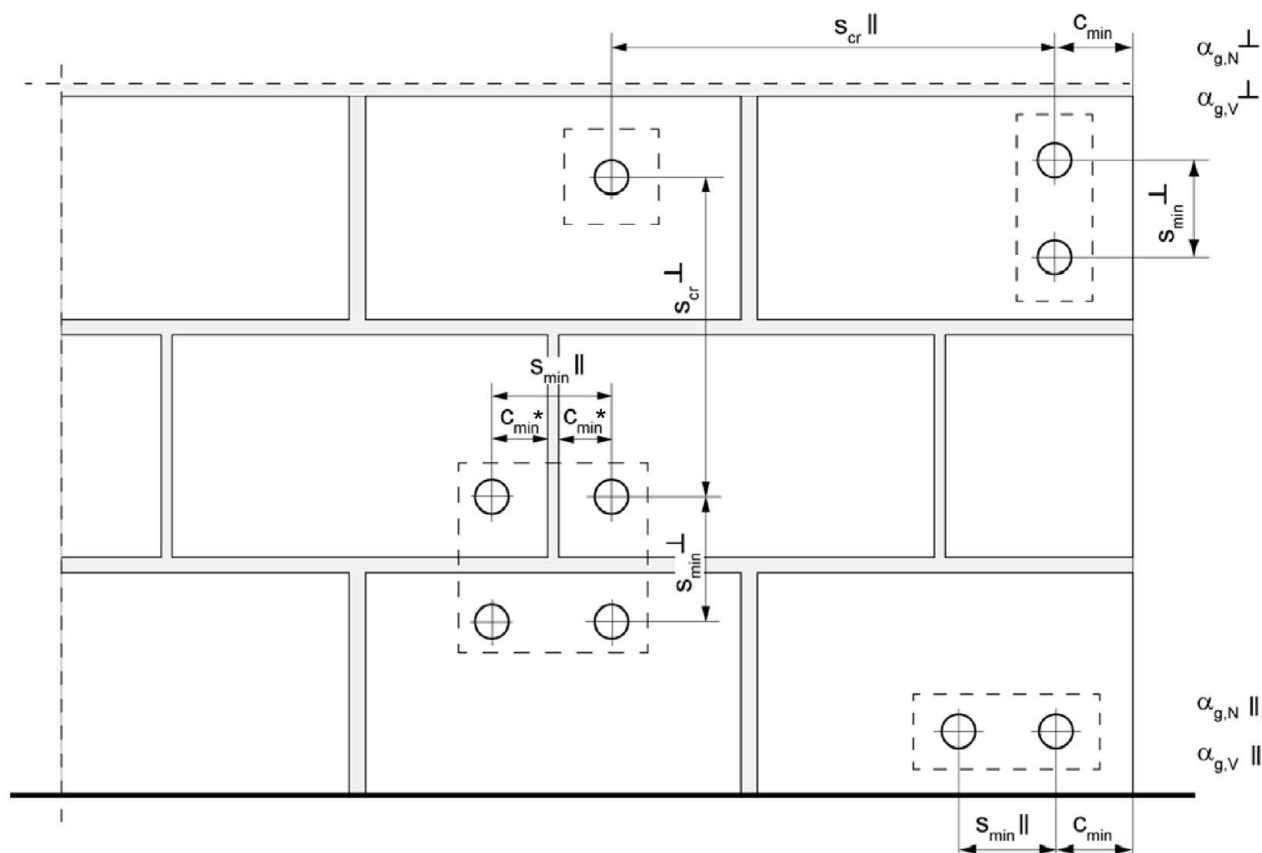
Intended use

Installation instruction (with perforated sleeve) part 2

Annex B 9

Appendix 15/ 44

Spacing and edge distance



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

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

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

$N_{Rk}^g = \alpha_{g,N \parallel} \cdot \alpha_{g,N \perp} \cdot N_{Rk}$; $V_{Rk}^g = \alpha_{g,V \parallel} \cdot \alpha_{g,V \perp} \cdot V_{Rk}$ (Group of 4 anchors)

fischer injection system FIS VL for masonry

Intended use
Spacing and edge distance

Annex B 11

Appendix 17/ 44

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

Anchor rod			M8	M10	M12	
Bearing capacity under tensile load, steel failure						
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	4.8	[kN]	15(13)	23(21)	33
		5.8		19(17)	29(27)	43
		8.8		29(27)	47(43)	68
	Stainless steel R and High corrosion resistant steel HCR	50		19	29	43
		70		26	41	59
		80		30	47	68
Partial factors ¹⁾						
Partial factor $\gamma_{Ms,N}$	Steel zinc plated	4.8	[-]	1,50		
		5.8		1,50		
		8.8		1,50		
	Stainless steel R and High corrosion resistant steel HCR	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 HCR

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

fischer injection system FIS VL for masonry

Performance

Characteristic steel bearing capacity of anchor rods under tensile load

Annex C 1

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

Anchor rod			M8		M10		M12	
Bearing capacity under shear load, steel failure								
without lever arm								
Characteristic resistance $V_{Rk,s}$	Steel zinc plated	Property class	4.8	[kN]	9(8)	14(13)	20	
			5.8		11(10)	17(16)	25	
			8.8		15(13)	23(21)	34	
	Stainless steel R and High corrosion resistant steel HCR	50	9		15	21		
		70	13		20	30		
		80	15		23	34		
with lever arm								
Characteristic resistance $M^0_{Rk,s}$	Steel zinc plated	Property class	4.8	[Nm]	15(13)	30(27)	52	
			5.8		19(16)	37(33)	65	
			8.8		30(26)	60(53)	105	
	Stainless steel R and High corrosion resistant steel HCR	50	19		37	65		
		70	26		52	92		
		80	30		60	105		
Partial factors ¹⁾								
Partial factors $\gamma_{Ms,V}$	Steel zinc plated	Property class	4.8	[-]	1,25			
			5.8		1,25			
			8.8		1,25			
	Stainless steel R and High corrosion resistant steel HCR		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 HCR

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

fischer injection system FIS VL for masonry

Performance

Characteristic steel bearing capacity of anchor rods under shear load

Annex C 2

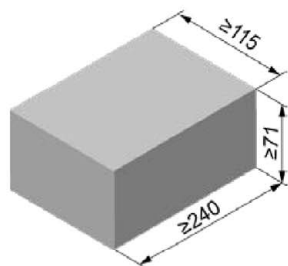
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Table C3.1: Characteristic values for the **steel bearing capacity** of **internal threaded anchors FIS E** under tensile / shear load

fischer internal threaded anchor FIS E				M6	M8	M10	M12	
Bearing capacity under tensile load, steel failure								
Characteristic resistance with screw	N _{Rk,s}	Property class 5.8	[kN]	10	18	29	42	
		Property class 70		R	14	26	41	59
		HCR		14	26	41	59	
Partial factors ¹⁾								
Partial factor	γ _{Ms,N}	Property class 5.8	[-]	1,50				
		Property class 70		R	1,87			
		HCR		1,87				
Bearing capacity under shear load, steel failure								
without lever arm								
Characteristic resistance with screw	V _{Rk,s}	Property class 5.8	[kN]	5	9	15	21	
		Property class 70		R	7	13	20	30
		HCR		7	13	20	30	
with lever arm								
Characteristic resistance	M ⁰ _{Rk,s}	Property class 5.8	[Nm]	8	19	37	65	
		Property class 70		R	11	26	52	92
		HCR		11	26	52	92	
Partial factors ¹⁾								
Partial factor	γ _{Ms,V}	Property class 5.8	[-]	1,25				
		Property class 70		R	1,56			
		HCR		1,56				

¹⁾ In absence of other national regulations

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/dm ³]	≥ 1,8		
Compressive strength f_b [N/mm ²]	≥ 12 / ≥ 20		
Standard or annex	EN 771-1		

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

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]	50	50	50	85		
		80	80	80			
		200	200	200			
Max. installation torque T_{inst}	[Nm]	10			4	10	
General installation parameters							
Edge distance c_{min}	[mm]	100			100		
Edge distance $h_{ef}=200$ c_{min}		150			- ¹⁾		
Spacing		$s_{min II,N}$	60			60	
		$h_{ef}=200$ $s_{min II,N}$	240			- ¹⁾	
		$s_{min II,V}$	240			240	
		$s_{cr II}$	240			240	
		$s_{cr \perp} = s_{min \perp}$	75			75	
Drilling method							
Hammer drilling with hard metal hammer drill							

¹⁾ No performance assessed

Table C4.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

Solid brick Mz, NF, dimensions, installation parameters $c=100\text{mm}$

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 $c=100\text{mm}$

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 categorie		Effective anchorage depth h _{ef} [mm]									
			≥ 50	50	80	200	50	80	200	85		
≥ 12N/mm²	w/w	w/d	2,5	2,0	3,0	7,5	2,0	3,5	5,0	3,5		
	d/d		4,0	3,5	5,0	12,0	3,0	5,5	8,0	5,5		
≥ 20N/mm²	w/w	w/d	3,5	3,0	4,5	11,0	3,0	5,0	7,0	5,0		
	d/d		5,5	5,0	7,0	12,0	4,5	8,0	11,5	8,0		

Table C5.2: Characteristic resistance under shear load for edge distance $c=100\text{mm}$

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)										
compressive strength f _b	use categorie		Effective anchorage depth h _{ef} [mm]							
			≥ 50	≥ 50	200	≥ 50	200	85		
≥ 12N/mm²	w/w	w/d	2,5	4,0	8,5	4,0	11,5	2,5		
	d/d									
≥ 20N/mm²	w/w	w/d	4,0	6,0	12,0	5,5	12,0	4,0		
	d/d									

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

Performance

Solid brick Mz, NF, Characteristic resistance under tensile and shear load $c=100\text{mm}$

Annex C 5

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Solid brick Mz, NF, EN 771-1

Table C6.1: Installation parameters for edge distance $c=60\text{mm}$

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]	50	50	50	85	
			100	100	100		
			200	200	200		
Max. installation torque	T _{inst}	[Nm]	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		M8	M10	M12	-	
Internal threaded anchor FIS E		-	-	-	M6	M8
					11x85	
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			
	$\alpha_{g,N}$ $\perp$		0,3			
	$\alpha_{g,V}$ $\perp$		1,3			
	$h_{ef}=200$ $\alpha_{g,N}$ $\perp$		2,0			
	$h_{ef}=200$ $\alpha_{g,V}$ $\perp$		1,1			

fischer injection system FIS VL for masonry

Performance

Solid brick Mz, NF, dimensions, installation parameters $c=60\text{mm}$

Annex C 6

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Solid brick Mz, NF, EN 771-1

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

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]									
			50	100	50	100	200	50	100	200	85	
≥ 12N/mm²	w/w	w/d	2,0	2,0	2,0	2,5	- ¹⁾	2,0	2,5	- ¹⁾	- ¹⁾	
	d/d		3,0	4,0	3,0	4,0	9,5	3,0	4,0	9,5	- ¹⁾	
≥ 20N/mm²	w/w	w/d	2,5	3,0	2,5	3,5	- ¹⁾	3,0	3,5	- ¹⁾	- ¹⁾	
	d/d		4,5	5,5	4,5	5,5	12	4,5	5,5	12	- ¹⁾	

¹⁾ No performance assessed

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

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)												
compressive strength f _b	use category		Effective anchorage depth h _{ef} [mm]									
			50	100	50	100	200	50	100	200	85	
≥ 12N/mm²	w/w	w/d	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	- ¹⁾	
	d/d											
≥ 20N/mm²	w/w	w/d	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	- ¹⁾	
	d/d											

¹⁾ No performance assessed

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

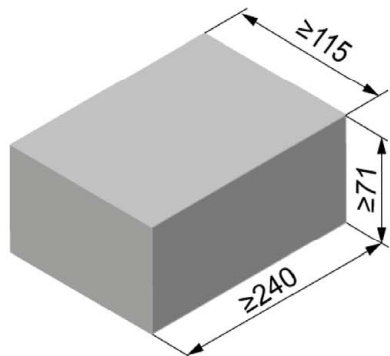
Performance

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

Annex C 7

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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/dm ³]	≥ 1,8		
Compressive strength f_b [N/mm ²]	≥ 12 / ≥ 20		
Standard or annex	EN 771-2		

Table C8.1: 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]	50	50	50	85	
			100	100	100		
			1 ¹⁾	200	200		
Max. installation torque	T _{inst}	[Nm]	5	15	15	3	5
General installation parameters							
Edge distance	c _{min}	[mm]	60				
Spacing	s _{min}		80				
	s _{cr}		80				
	s _{min} ⊥		3x h _{ef}				
	s _{cr} ⊥		3x h _{ef}				
Drilling method							
Hammer drilling with hard metal hammer drill							
1) No performance assessed							

Table C8.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

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

Annex C 8

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

Table C9.1: 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]									
			50	100	50	100	200	50	100	200	85	
≥ 12N/mm²	w/w	w/d	2,5	4,5	2,5	3,5	7,0	2,5	3,0	6,5	2,5	
	d/d		4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,0	
≥ 20N/mm²	w/w	w/d	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	3,5	
	d/d		6,0	11	6,0	8,0	12	6,0	6,5	12	6,0	

Table C9.2: 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)									
compressive strength f _b	use category		Effective anchorage depth h _{ef} [mm]						
			50	100	50	≥100	50	≥100	85
≥ 12N/mm²	w/w	w/d	1,5	3,0	1,2	2,0	1,2	2,0	1,2
	d/d								
≥ 20N/mm²	w/w	w/d	2,5	4,0	1,5	3,0	1,5	3,0	1,5
	d/d								

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

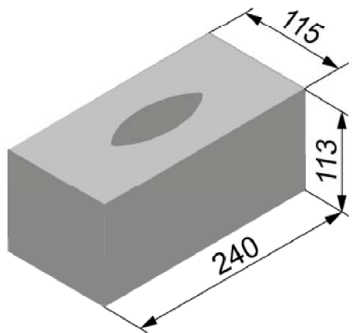
Performance

Solid sand-lime brick KS, NF, Characteristic resistance under tensile and shear load

Annex C 9

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Solid sand-lime brick KS, EN 771-2



Solid sand-lime brick KS, EN 771-2			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	240	115	113
Density ρ [kg/dm ³]	$\geq 1,8$		
Compressive strength f_b [N/mm ²]	$\geq 10 / \geq 20$		
Standard or annex	EN 771-2		

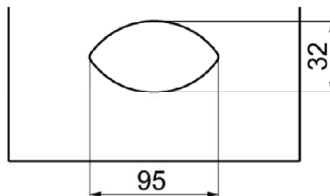


Table C10.1: Installation parameters

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

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

Max. installation torque	T_{inst}	[Nm]	2						
--------------------------	------------	------	---	--	--	--	--	--	--

General installation parameters

Edge distance	C_{min}	[mm]	100						
	$S_{min} \parallel$		240						
	$S_{cr} \parallel$		240						
	$S_{min} \perp$		115						
	$S_{cr} \perp$		115						

Drilling method

Hammer drilling with hard metal hammer drill

Table C10.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

Perforated sand-lime brick KS, dimensions, installation parameters

Annex C 10

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Solid sand-lime brick KS, EN 771-2

Table C11.1: Characteristic resistance under tensile load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-	M6	M8	-	-	M10	M12	-	-	-	-	
												11x85
Perforated sleeve FIS H K	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											
≥ 10N/mm²	w/w	w/d	3,5	2,0		2,0		6,5			4,5	
	d/d		6,0	3,5		3,5		8,5			7,0	
≥ 20N/mm²	w/w	w/d	5,0	3,0		3,0		8,5			6,0	
	d/d		8,5	5,5		5,0		8,5			8,5	

Table C11.2: Characteristic resistance under shear load

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

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

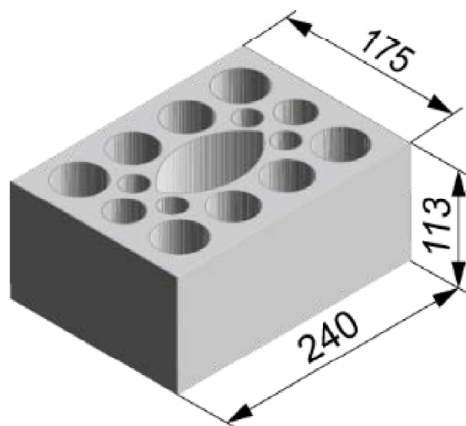
Performance

Perforated sand-lime brick KS, Characteristic resistance under tensile and shear load

Annex C 11

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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/dm ³]	$\geq 1,4$		
Compressive strength f_b [N/mm ²]	$\geq 12 / \geq 20$		
Standard or annex	EN 771-2		

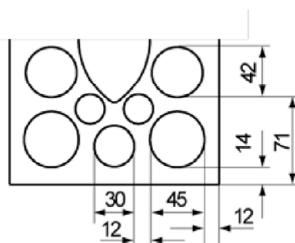


Table C12.1: Installation parameters

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

Table C12.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

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

Annex C 12

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

Table C13.1: Characteristic resistance under tensile load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-	-
			11x85						15x85			
Perforated sleeve FIS H K	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											
≥ 12N/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
≥ 20N/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 C13.2: Characteristic resistance under shear load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12		M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-		-	
		11x85						15x85					
Perforated sleeve FIS H K	12x85	16x85				16x130		20x85				20x130	
Shear load V _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)													
compressive strength f _b	use category												
≥ 12N/mm²	w/w	w/d	2,5		4,5								
	d/d												
≥ 20N/mm²	w/w	w/d	4,5	4,0	7,5								
	d/d												

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

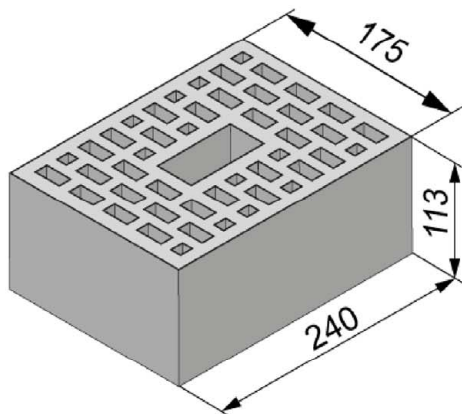
Performance

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

Annex C 13

Appendix 30/ 44

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
	240	175	113
Density ρ [kg/dm ³]	$\geq 0,9$		
Compressive strength f_b [N/mm ²]	≥ 10		
Standard or annex	EN 771-1		

Table C14.1: Installation parameters

Anchor rod		M8		-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E		-	M6	M8	-		-		M10	M12	-	-	
			11x85						15x85				
Perforated sleeve FIS H K		12x85	16x85				16x130		20x85			20x130	
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K													
Max. installation torque	T _{inst}	[Nm]	2										
General installation parameters													
Edge distance	C _{min}	[mm]	100										
Spacing	S _{min}		240										
	S _{scr}		240										
	S _{min} ⊥		115										
	S _{scr} ⊥		115										
Drilling method													
Hammer drilling with hard metal hammer drill													

Table C14.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 14

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Vertical perforated brick HLz, EN 771-1

Table C15.1: Characteristic resistance under tensile load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-	-	
		11x85						15x85				
Perforated sleeve FIS H K	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											
≥ 10N/mm²	w/w	w/d	3,5	3,5				4,5				
	d/d		4,0	3,5				5,0				

Table C15.2: Characteristic resistance under shear load

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

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

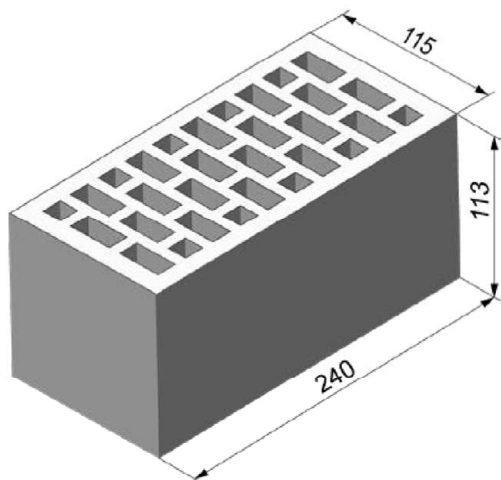
Performance

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

Annex C 15

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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/dm ³]	$\geq 1,4$		
Compressive strength f_b [N/mm ²]	≥ 20		
Standard or annex	EN 771-1		

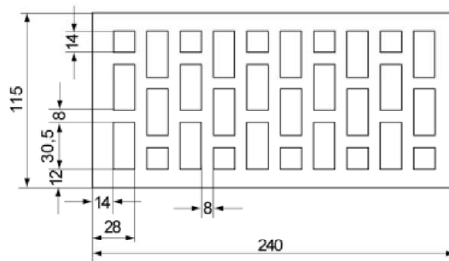


Table C16.1: Installation parameters

Anchor rod	M8	-		M8	M10	-		M12
Internal threaded anchor FIS E	-	M6	M8	-		M10	M12	-
		11x85				15x85		
Perforated sleeve FIS H K	12x85	16x85				20x85		
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K								
Max. installation torque	T _{inst}	[Nm]	2					
General installation parameters								
Edge distance	C _{min}	[mm]	80					
Spacing	S _{scr} = S _{min}		240					
	S _{scr} ⊥ = S _{min} ⊥		115					
Drilling method								
Hammer drilling with hard metal hammer drill								

Table C16.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

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

Annex C 16

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

Table C17.1: Characteristic resistance under tensile load

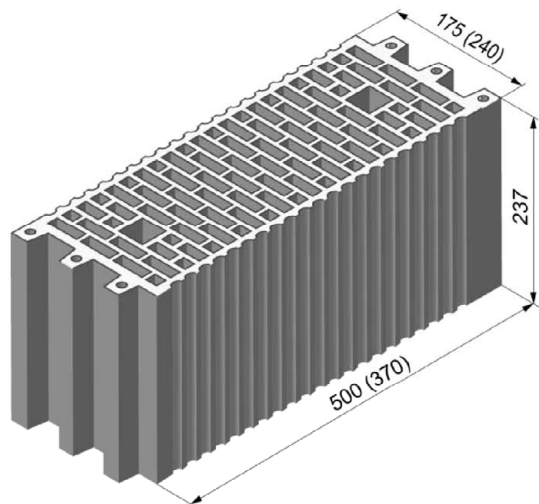
Anchor rod			M8		-		M8	M10	-		M12	
Internal threaded anchor FIS E			-		M6	M8	-		M10	M12	-	
					11x85				15x85			
Perforated sleeve FIS H K			12x85		16x85				20x85			
Tensile load N _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)												
compressive strength f _b		use category										
≥ 20N/mm ²		w/w	w/d	3,5	2,5				3,0			
		d/d		4,0	2,5				3,0			

Table C17.2: Characteristic resistance under shear load

Anchor rod		M8		-		M8	M10	-		M12
Internal threaded anchor FIS E		-		M6	M8	-		M10	M12	-
				11x85				15x85		
Perforated sleeve FIS H K		12x85		16x85				20x85		
Shear load V_{Rk} [kN] depending on the compressive strength f_b (temperature range 50/80°C)										
compressive strength f_b	use category									
$\geq 20\text{N/mm}^2$	w/w	w/d	7,5	4,0	4,5		8,5			
	d/d									

Factor for job site tests and displacements see annex C27

Vertical perforated brick HLz, EN 771-1



Vertical perforated brick HLz, 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/dm ³]	$\geq 1,0$		
Compressive strength f_b [N/mm ²]	≥ 10		
Standard or annex	EN 771-1		

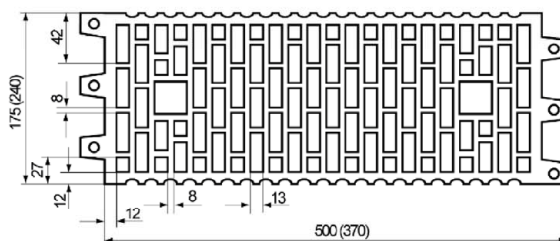


Table C18.1: Installation parameters

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

Table C18.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 18

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Vertical perforated brick HLz, EN 771-1

Table C19.1: Characteristic resistance under tensile load

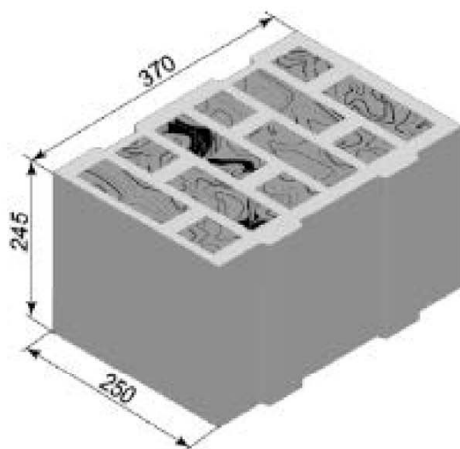
Anchor rod			M8	-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E			-	M6	M8	-		-		M10	M12	-	-
				11x85						15x85			
Perforated sleeve FIS H K			12x85	16x85				16x130		20x85			20x130
Tensile load N _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)													
compressive strength f _b		use category											
≥ 10N/mm ²		w/w	w/d	0,9	2,5							3,0	
		d/d		0,9	2,5							3,5	

Table C19.2: Characteristic resistance under shear load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-	-	
		11x85						15x85				
Perforated sleeve FIS H K	12x85	16x85				16x130		20x85			20x130	
Shear load V _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)												
compressive strength f _b	use category											
≥ 10N/mm²	w/w	w/d	1,2				1,5		1,2			1,5
	d/d											

Factor for job site tests and displacements see annex C27

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



Vertical perforated brick HLz, filled with mineral wool, EN 771-1			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	370	250	245
Density ρ [kg/dm ³]	$\geq 0,6$		
Compressive strength f_b [N/mm ²]	≥ 8		
Standard or annex	EN 771-1		

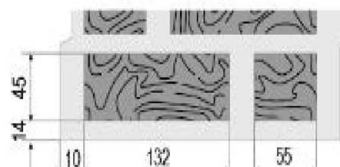


Table C20.1: Installation parameters

Anchor rod		M8	-		M8	M10	M8	M10	-		M12	M12	M12
Internal threaded anchor FIS E		-	M6	M8	-		-		M10	M12	-	-	-
			11x85						15x85				
Perforated sleeve FIS H K		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}	[Nm]	2										
General installation parameters													
Edge distance	C _{min}	[mm]	250										
Spacing	S _{min}		250										
	S _{cr}		250										
	S _{min} ⊥		245										
	S _{cr} ⊥		245										
Drilling method													
Hammer drilling with hard metal hammer drill													

Table C20.2: Group factors

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

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Performance

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

Annex C 20

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

Table C21.1: Characteristic resistance under tensile load

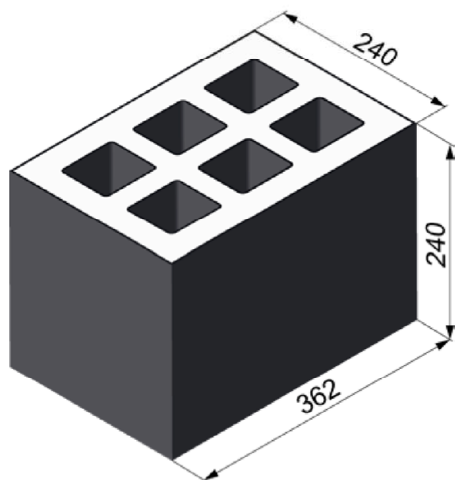
Anchor rod			M8	-		M8	M10	M8	M10	-		M12	M12	M12	
Internal threaded anchor FIS E			-	M6	M8	-		-		M10	M12	-	-	-	
				11x85						15x85					
Perforated sleeve FIS H K			12x85	16x85				16x130		20x85			20x130	20x200	
Tensile load N _{RK} [kN] depending on the compressive strength f _b (temperature range 50/80°C)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

Table C21.2: Characteristic resistance under shear load

Anchor rod	M8		-		M8	M10	M8	M10	-		M12	M12	M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-	-	-	
		11x85						15x85					
Perforated sleeve FIS H K	12x85	16x85				16x130		20x85			20x130	20x200	
Shear load V _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)													
compressive strength f _b	use category												
≥ 8N/mm ²	w/w	w/d	2,5	3,0				1,5					
	d/d												

Factor for job site tests and displacements see annex C27

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



Light-weight concrete hollow block Hbl, EN 771-3			
Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	362	240	240
Density ρ [kg/dm ³]	$\geq 1,0$		
Compressive strength f_b [N/mm ²]	≥ 4		
Standard or annex	EN 771-3		

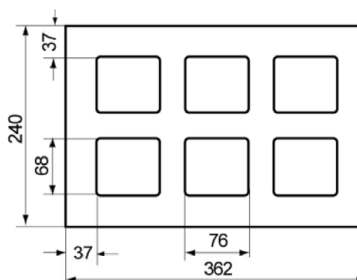


Table C22.1: Installation parameters

Anchor rod	M8	-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-	-
		11x85						15x85			
Perforated sleeve FIS H K	12x85	16x85				16x130		20x85			20x130
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K											
Max. installation torque	T _{inst}	[Nm]	2								
General installation parameters											
Edge distance	C _{min}	[mm]	60								
Spacing	S _{min}		100								
	S _{scr}		362								
	S _{min} ⊥ = S _{scr} ⊥		240								
Drilling method											
Hammer drilling with hard metal hammer drill											

Table C22.2: Group factors

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

fischer injection system FIS VL for masonry

Performance

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

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

Table C23.1: Characteristic resistance under tensile load

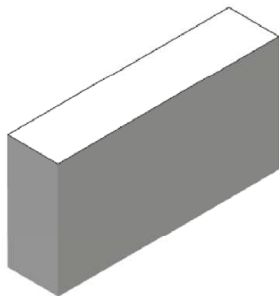
Anchor rod		M8		-		M8	M10	M8	M10	-		M12		M12	
Internal threaded anchor FIS E		-		M6	M8	-		-		M10	M12	-		-	
				11x85						15x85					
Perforated sleeve FIS H K		12x85		16x85				16x130		20x85				20x130	
Tensile load N _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)															
compressive strength f _b		use category													
≥ 4N/mm ²		w/w	w/d	3,0											
		d/d		3,0											

Table C23.2: Characteristic resistance under shear load

Anchor rod	M8	-		M8	M10	M8	M10	-		M12	M12
Internal threaded anchor FIS E	-	M6	M8	-		-		M10	M12	-	-
		11x85						15x85			
Perforated sleeve FIS H K	12x85	16x85				16x130		20x85			20x130
Shear load V _{Rk} [kN] depending on the compressive strength f _b (temperature range 50/80°C)											
compressive strength f _b	use category										
≥ 4N/mm ²	w/w	w/d	2,0								
	d/d										

Factor for job site tests and displacements see annex C27

Autoclaved aerated concrete, EN 771-4



Autoclaved aerated concrete, EN 771-4			
Producer	e.g. Ytong		
Density ρ [kg/dm ³]	≥ 0,35	≥ 0,5	≥ 0,65
Compressive strength f_b [N/mm ²]	≥ 2	≥ 4	≥ 6
Standard or annex	EN 771-4		

Table C24.1: Installation parameters

Anchor rod			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]	100	200	100	200	100	200	85			
Max. installation torque	T_{inst}	[Nm]	1	8	2	12	2	16	1		2	
General installation parameters												
Edge distance	c_{min}	[mm]	100									
$s_{cr \parallel} = s_{min \parallel}$			250									
$h_{ef}=200mm$ $s_{min \parallel}$			80									
$h_{ef}=200mm$ $s_{cr \parallel}$			3x h_{ef}									
$s_{cr \perp} = s_{min \perp}$			250									
$h_{ef}=200mm$ $s_{min \perp}$			80									
$h_{ef}=200mm$ $s_{cr \perp}$			3x h_{ef}									
Drilling method												
Hammer drilling with hard metal hammer drill												

fischer injection system FIS VL for masonry

Performance

Autoclaved aerated concrete, dimensions, installation parameters

Annex C 24

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Table C25.1: Group factors for autoclaved aerated concrete
(Compressive strength $f_b \geq 2 \text{ N/mm}^2$)

Anchor rod		M8	M10	M12	-		-		
Internal threaded anchor FIS E		-	-	-	M6	M8	M10	M12	
					11x85		15x85		
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	1,6			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \parallel$		1,1			_1)		_1)	
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2						
	$h_{ef}=200 \alpha_{g,N} \perp$		1,6			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \perp$		0,8			_1)		_1)	
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2						

¹⁾ No performance assessed

Table C25.2: Group factors for autoclaved aerated concrete
(Compressive strength $f_b \geq 4 \text{ N/mm}^2$)

Anchor rod		M8	M10	M12	-		-		
Internal threaded anchor FIS E		-	-	-	M6	M8	M10	M12	
					11x85		15x85		
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	0,7			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \parallel$		2,0			_1)		_1)	
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2						
	$h_{ef}=200 \alpha_{g,N} \perp$		0,7			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \perp$		1,2			_1)		_1)	
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2						

¹⁾ No performance assessed

Table C25.3: Group factors for autoclaved aerated concrete
(Compressive strength $f_b \geq 6 \text{ N/mm}^2$)

Anchor rod		M8	M10	M12	-		-		
Internal threaded anchor FIS E		-	-	-	M6	M8	M10	M12	
					11x85		15x85		
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	0,7			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \parallel$		2,0			_1)		_1)	
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2						
	$h_{ef}=200 \alpha_{g,N} \perp$		0,7			_1)		_1)	
	$h_{ef}=200 \alpha_{g,v} \perp$		1,2			_1)		_1)	
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2						

¹⁾ No performance assessed

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Performance
Autoclaved aerated concrete, Group factors

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Autoclaved aerated concrete, EN 771-4

Table C26.1: Characteristic resistance under tensile load

Anchor rod			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 category		Effective anchorage depth h _{ef} [mm]									
			100	200	100	200	100	200	85			
≥ 2 N/mm²	w/w	w/d	1,5	2,0	1,5	3,0	1,5	3,0	1,5		1,5	
	d/d		1,5	3,0	1,5	3,5	2,0	4,0	1,5		1,5	
≥ 4 N/mm²	w/w	w/d	2,0	1,5	2,5	3,5	2,5	3,5	2,0		1,5	
	d/d		2,0	3,0	3,0	5,0	2,5	5,0	2,0		1,5	
≥ 6 N/mm²	w/w	w/d	3,0	2,5	4,5	5,0	4,5	7,0	3,5		2,5	
	d/d		3,5	4,0	5,0	7,0	5,0	9,0	3,5		2,5	

Table C26.2: Characteristic resistance under shear load

Anchor rod			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)												
compressive strength f _b	use category		Effective anchorage depth h _{ef} [mm]									
			100	200	100	200	100	200	85			
≥ 2 N/mm²	w/w	w/d	1,2	1,2	1,2	1,2	1,5	1,2	1,2		1,5	
	d/d											
≥ 4 N/mm²	w/w	w/d	2,5	2,0	2,0	2,0	2,5	2,0	2,0		2,5	
	d/d											
≥ 6 N/mm²	w/w	w/d	3,0	2,5	3,0	3,0	3,5	4,0	2,5		3,5	
	d/d											

Factor for job site tests and displacements see annex C27

fischer injection system FIS VL for masonry

Performance

Autoclaved aerated concrete, Characteristic resistance under tensile and shear load

Annex C 26

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β-factors for job site tests; displacements

Table C27.1: β-factors for job site tests

use category		w/w and w/d	d/d
temperature range		50/80	50/80
Material	Size		
solid units	M8	0,57	0,96
	M10	0,59	
	M12 FIS E 11x85	0,6	
	FIS E 15x85	0,62	
	FIS H 16x85 K	0,55	
hollow units	all sizes	0,86	0,96
Autoclaved aerated concrete (AAC)	all sizes	0,73	0,81

Table C27.2: Displacements

Material	N [kN]	δN ₀ [mm]	δN _∞ [mm]	V [kN]	δV ₀ [mm]	δV _∞ [mm]
solid units and autoclaved aerated concrete h _{ef} =100mm	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF annex C 4 - C 7	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,23	1,85
solid brick KS NF annex C 8 / C 9	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,2	0,4	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,91	1,37
Autoclaved aerated concrete (AAC) h _{ef} =200 mm annex C 24 - C 26	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,25	1,88

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

fischer injection system FIS VL for masonry

Performance

β-factors for job site tests; displacements

Annex C 27

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