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European Technical Assessment

ETA 26/0280
of 02/09/2026

General Part

Technical Assessment Body issuing the European Technical Assessment:	Technical and Test Institute for Construction Prague
Trade name of the construction product	fischer injection system FIS VB
Product family to which the construction product belongs	Metal injection anchors for use in masonry
Manufacturer	fischerwerke GmbH & Co. KG Otto-Hahn-Straße 15 79211 Denzlingen Germany
Manufacturing plant	fischerwerke
This European Technical Assessment contains	37 pages including 33 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Article 95(4) of Regulation (EU) 2024/3110, on the basis of	EAD 330076-01-0604 Metal injection anchors for use in masonry

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es) referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

The following standards and documents are referred to in the European Technical Assessment:

EN10088-1:2023 Stainless steels-Part 1: List of stainless steels

EN 1993-1-4:2006+A1:2015 Eurocode 3: Design of steel structures-Part 1-4: General rules-Supplementary rules for stainless steels

EN ISO 898-1:2013: Mechanical properties of fasteners made of carbon steel and alloy steel-Part 1: Bolts, screws and studs with specified property classes- Coarse thread and fine pitch thread.

EN ISO 898-2:2022: Fasteners – Mechanical properties of fasteners made of carbon steel alloy steel – Part 2: Nuts with specified property classes (ISO 898-2:2022)

EN ISO 4042:2022: Fastener- Electroplated coating systems

EN ISO 10684:2004+AC:2009: Fasteners – Hot dip galvanized coatings (ISO 10684:2004+Cor.1:2008)

EN ISO 3506-1:2020: Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs with specifies grades and property classes (ISO 3506-1:2020)

EN ISO 3506-2:2020: Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 2: Nuts with specified grades and property classes (ISO3506-2:2020)

DIN 976-1:2016: Fasteners - Stud bolts – Part 1: Metric thread

EN 10204:2004: Metallic products - Types of inspection documents

EN 998-2:2016: Specification for mortar for masonry – Part 2: Masonry mortar

TR 053:2022-07: TR 053:2022-07: Recommendations for test of metal injection anchors for use in masonry to be carried out on construction works

TR 054:2023-12: Design methods for anchorages with metal injection anchors and screw anchors for use in masonry

EN 771-1:2011+A1:2015: Specification for masonry units – Part 1: Clay masonry units

EN 771-2:2011+A1:2015: Specification for masonry units – Part 2: Calcium silicate masonry units

EN 771-3:2011+A1:2015: Specification for masonry units – Part 3: Aggregate concrete masonry units (Dense and lightweight aggregates)

EN 771-4:2011+A1:2015: Specification for masonry units – Part 4: Autoclaved aerated concrete masonry units

Specific parts

1. Technical description of the product

The fischer injection system FIS VB for masonry is a bonded anchor consisting of a cartridge with injection mortar, a steel element and a plastic sleeve. The steel elements is galvanized or stainless steel threaded rod.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and masonry.

The illustration and the description of the product are given in Annex A.

2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

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 provisions made in this European Technical Assessment are based on an assumed 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 products in relation to the expected economically reasonable working life of the works.

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for static and quasi-static loading	Annex C1 to C16
Characteristic resistance and displacements for seismic loading	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Satisfy the requirements for performance class A1
Resistance to fire under tension and shear loading with and without lever arm, minimum edge distances and spacing	No performance assessed

3.3 Hygiene, health and environment (BWR 3)

No performance assessed.

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

According to the Decision 97/177/EC of the European Commission the system of assessment verification of constancy of performance (see Annex IX to Regulation (EU) 2024/3110) is system 1.

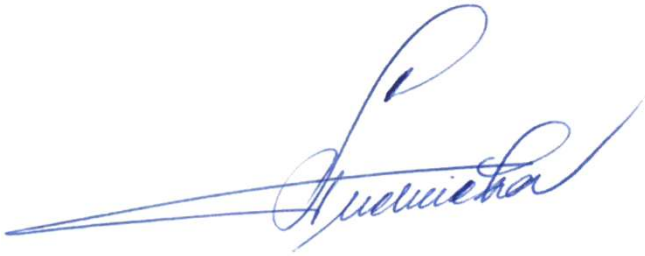
5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technical and Test Institute for Construction Prague. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

Issued in Prague on 02.09.2026

By

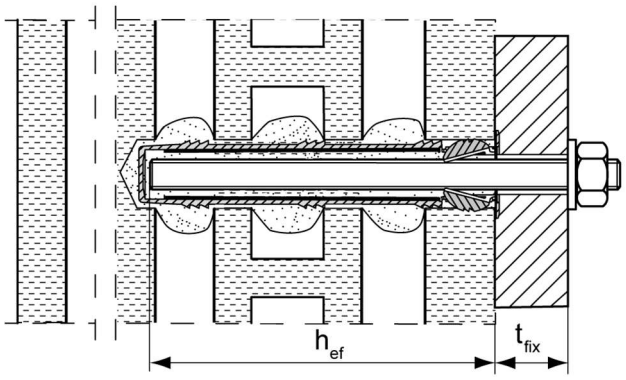
Ing. Jiří Studnička, Ph.D.
Head of the Technical Assessment Body



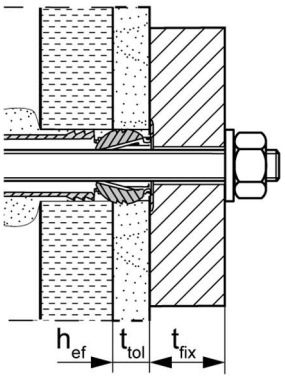
Installation conditions

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

Pre-positioned installation



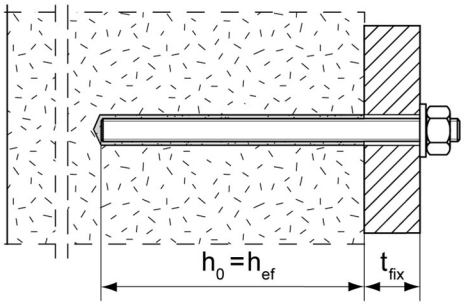
Installation with render bridge



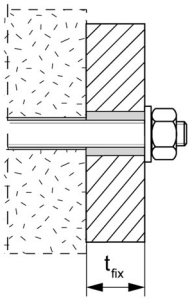
Size of the perforated sleeve: FIS H 16x85 K, FIS H 20x85 K, FIS H 12x85 K, FIS H 16x130 K, FIS H 20x130 K

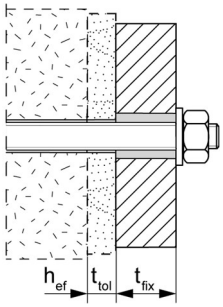
Anchor rods without perforated sleeve FIS H K;
installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned installation:



Push through installation: Annular gap filled with mortar





Installation with render bridge

Figures not to scale

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

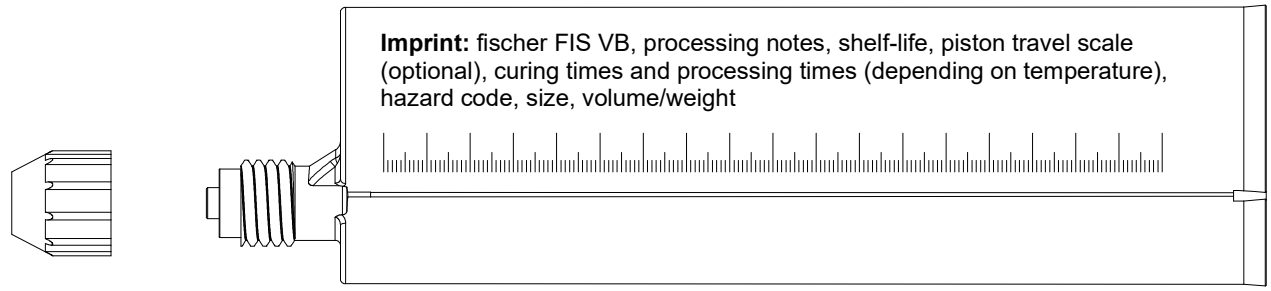
fischer injection system FIS VB for masonry

Product description
Installation conditions, Anchor rods without perforated sleeve

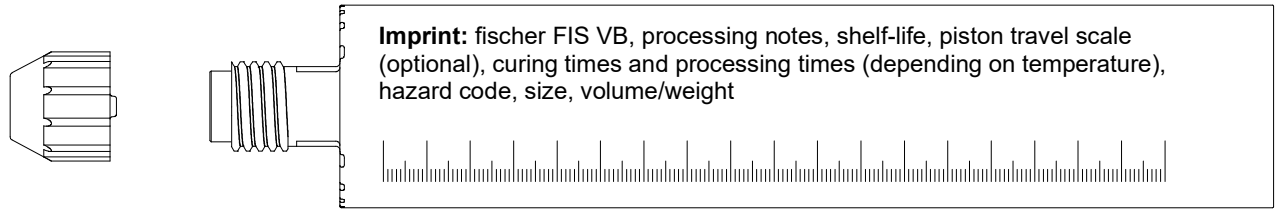
Annex A1

Overview system components part 1

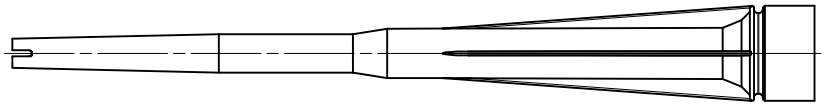
Injection cartridge (shuttle cartridge) with sealing cap; Sizes: 360 ml, 825 ml



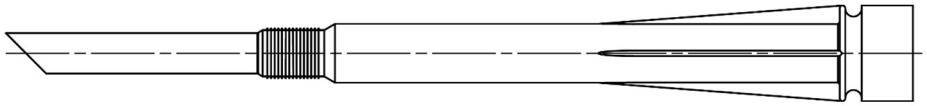
Injection cartridge (coaxial cartridge) with sealing cap; Sizes: 100 ml, 150 ml, 300 ml, 380 ml, 410 ml
Injection cartridge (foilbag cartridge) with sealing cap; Sizes: 100 ml, 150 ml, 300 ml



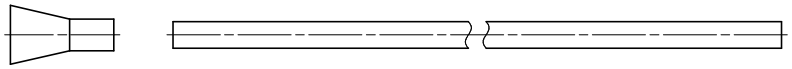
Static mixer FIS MR Plus for injection cartridges up to 825 ml



Static mixer FIS JMR for injection cartridges of 825 ml



Injection adapter and extension tube Ø 9 for static mixer FIS MR Plus;
Injection adapter and extension tube Ø 9 or Ø 15 for static mixer FIS JMR



Cleaning brush BS

Blow-out pump AB G

Compressed-air cleaning tool ABP

Figures not to scale

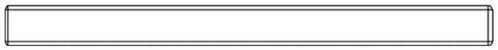
fischer injection system FIS VB for masonry

Product description
Overview system components part 1: cartridge / foil bag / static mixer / cleaning tools

Annex A2

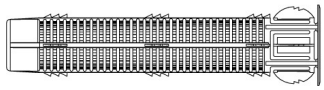
Overview system components part 2

fischer anchor rod

(2) 

Size: M8, M10, M12

Perforated sleeve FIS H K

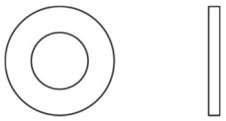
(5) 

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

(5) 

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

Washer

(3) 

Hexagon nut

(4) 

Figures not to scale

fischer injection system FIS VB for masonry

Product description
Overview system components part 2: steel parts / perforated sleeve /Injection adapter

Annex A3

Table A4.1: Materials

Part	Designation	Material		
1	IMortar cartridge	Mortar, hardener, filler		
		Steel	Stainless steel R	High corrosion resistant steel HCR
		zinc plated (zp, hdg)	EN 10088-1 Corrosion resistance class CRC III EN 1993-1-4	EN 10088-1 Corrosion resistance class CRC V EN 1993-1-4
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1 zinc plated ≥ 5µm, ISO 4042 or hot-dip galvanised EN ISO 10684 f_{uk} ≤ 1000 N/mm² A_5 > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1 f_{uk} ≤ 1000 N/mm² A_5 > 8% fracture elongation	Property class 50 or 80 EN ISO 3506-1 or property class 70 with f_{yk}= 560 N/mm² 1.4565; 1.4529 EN 10088-1 f_{uk} ≤ 1000 N/mm² A_5 > 8% fracture elongation
3	Washer ISO 7089	zinc plated ≥ 5µm, ISO 4042 or hot-dip galvanised EN ISO 10684	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1	1.4565;1.4529 EN 10088-1
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2 zinc plated ≥ 5µm, ISO 4042 or hot-dip galvanised EN ISO 10684	Property class 50, 70 or 80 EN ISO 3506-2 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1	Property class 50, 70 or 80 EN ISO 3506-2 1.4565; 1.4529 EN 10088-1
5	Perforated sleeve	PP / PE		

fischer injection system FIS VB for masonry

Product description
Materials

Annex A4

Specifications of intended use part 1

Table B1.1: Overview use and performance categories

Anchorages subject to		**fischer injection system FIS VB 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	
Installation	Pre-positioned installation	Anchor rod (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve with anchor rod (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
Installation and use conditions	conditions d/d (dry/dry)	all bricks	
	conditions w/d (wet/dry)		
	conditions w/w (wet/wet)		
Installation direction		(downward and horizontal installation)	
Installation temperature		$T_{i,min}$ = 0 °C to $T_{i,max}$ = +40 °C	
In-service temperature	Temperature range Tb	-40 °C to +80 °C	(max. short term temperature +80 °C max. long term temperature +50 °C)

Specifications of intended use part 2

Anchorages subject to:

- Static and quasi-static loads

Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d), acc. to Annex B9.
- Hollow brick masonry (base material group c), according to Annex B9.
- 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.
- 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 under consideration of the β-factor according to Annex C17, Table C17.1.

  Note (only applies to solid bricks and autoclaved aerated concrete):
  The characteristic resistance is also valid for larger brick sizes, higher compressive strength and higher raw density of the masonry unit.

Temperature Range:

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

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel)
- For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance classes mentioned to Annex A4, Table A4.1.

Specifications of intended use part 3 continued

Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054, Design method A under the responsibility of a designer experienced in anchorages and masonry work.
  Applies to all bricks, if no other values are specified:
  $N_{Rk} = N_{Rk,b} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c}$
  $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$
  For the calculation of pulling out a brick under tension loading $\mathbf{N_{Rk,pb}}$ or
  pushing out a brick under shear loading $\mathbf{V_{Rk,pb}}$ see EOTA Technical Report TR 054.
  $\mathbf{N_{Rk,s}}$, $\mathbf{V_{Rk,s}}$ and $\mathbf{M^0_{Rk,s}}$ see annexes C1-C2.
  Factors for job site tests see Annex C17 and displacements see Annex C18.
- Verifiable calculation notes and drawings have to be prepared taking into account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is to be indicated on the design drawings.

Installation:

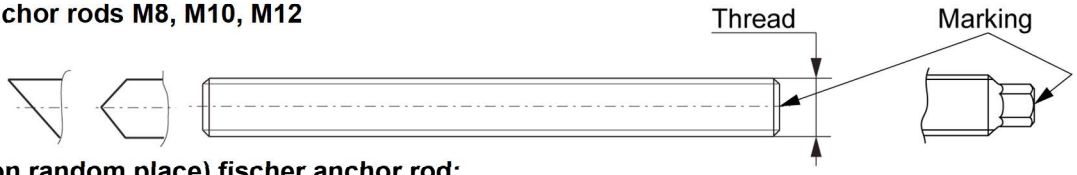
- Conditions d/d: - Installation and use in dry structures.
- Conditions w/w: - Installation and use in dry and wet structures.
- Conditions w/d: - Installation in wet structures and use in dry structures.
- In case of aborted hole: The hole shall be filled with injection mortar FIS VB.
- Bridging of unbearing layer (e.g., plaster) is permitted for masonry with solid bricks and cylindrical drill hole. At perforated brick masonry see Annex B6, Table B6.1.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Minimum curing time see Annex B6, Table B6.2.
- 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 A4, Table A4.1
  Conformation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204, 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.

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 cylindrical drill hole		$h_{0,min} \geq h_{ef,min}$ [mm]	100		
		$h_{0,max} \geq h_{ef,max}$ [mm]	200		
Effective anchorage depth h_{ef}[1] in solid brick (depth of drill hole $h_0 \geq h_{ef}$)		$h_{ef,min}$ [mm]	50		
		$h_{ef,max}$ [mm]	h-30, ≤200		
Diameter of clearance hole in the fixture	pre-positioning	$d_f \leq$ [mm]	9	12	14
	push through	$d_f \leq$ [mm]	11	14	16
Diameter of cleaning brush		$d_b \geq$ [mm]	see Table B6.1		
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:

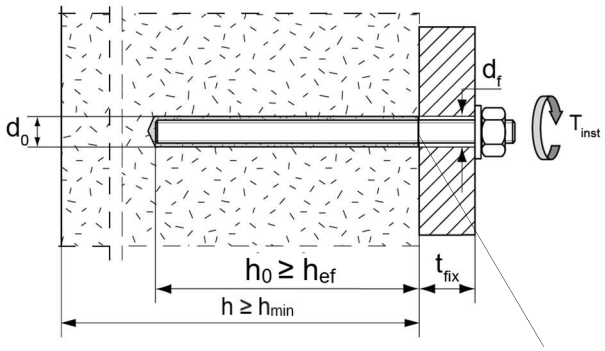
Steel zinc plated PC[1] 8.8	● or +	Steel hot-dip galvanised PC[1] 8.8	●
High corrosion resistant steel HCR PC[1] 50	●	High corrosion resistant steel HCR PC[1] 70	–
High corrosion resistant steel HCR PC[1] 80	(	Stainless steel R property class 50	~
Stainless steel R property class 80	✳		

Alternatively: Colour coding according to DIN 976-1;
property class 4.6 marking according to EN ISO 898-1

[1] PC = property class

Installation conditions:

Anchor rod in cylindrical drill hole



Setting depth mark

Figures not to scale

fischer injection system FIS VB for masonry

Intended use
Installation parameters for anchor rods without perforated sleeve

Annex B4

Table B5.1: Installation parameters for anchor rods with perforated sleeves (pre-positioned installation)

perforated sleeve FIS H K		12x85	16x85	16x130[2)]	20x85	20x130[2)]
Nominal drill hole diameter $d_0 = D_{sleeve,nom}$	d_0 [mm]	12	16		20	
Depth of drill hole	h_0 [mm]	90	90	135	90	135
Effective anchorage depth	$h_{ef,min}$ [mm]	85	85	130	85	130
	$h_{ef,max}$ [mm]	85	85	130	85	130
Size of threaded rod	[-]	M8	M8 and M10		M12	
Diameter of cleaning brush[1)]	$d_b \geq$ [mm]	see Table B6.1				
Maximum installation torque	T_{inst} [Nm]	see parameters of brick				

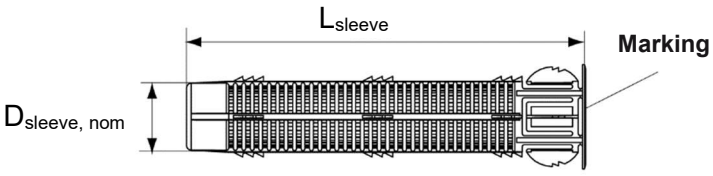
[1)] Only for solid areas in hollow bricks and solid bricks.

[2)] Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth $h_{ef,\,min}$, 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

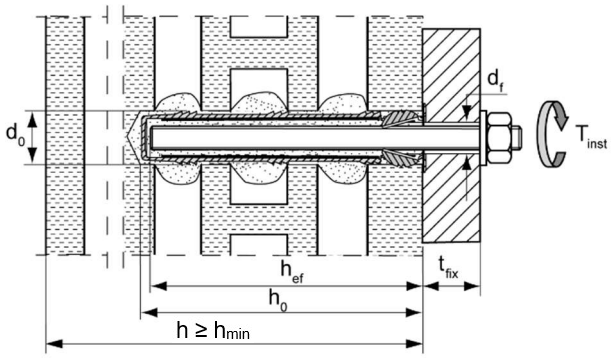
FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;
FIS H 20x85 K; FIS H 20x130 K

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



Installation conditions:

Anchor rod with perforated sleeve



Figures not to scale

fischer injection system FIS VB for masonry

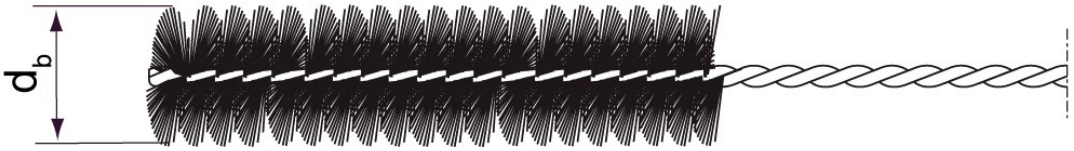
Intended use
Installation parameters for anchor rods with perforated sleeve (pre-positioned installation)

Annex B5

Table B6.1: 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	20
Brush diameter	d_b [mm]	11	14	16	20	25



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

Table B6.2: 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 [2] t_{work}	Minimum curing time [1), 2)] t_{cure}
> 0 to 5	13 min	3 h
> 5 to 10	9 min	90 min
> 10 to 20	5 min	60 min
> 20 to 30	3 min	45 min
> 30 to 40	2 min	35 min

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

[2)] Minimum cartridge temperature +5°C.

Table B6.2: Conditions for use of **static mixer** without an **extension tube**

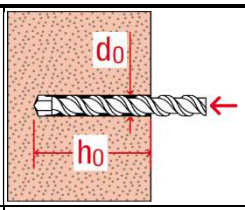
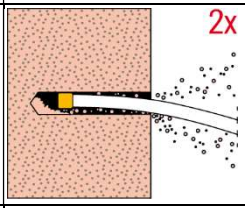
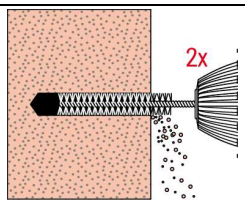
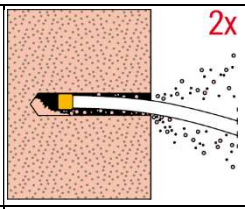
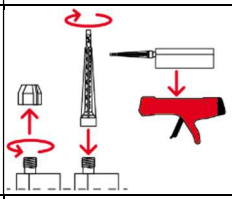
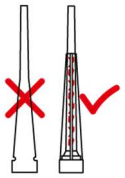
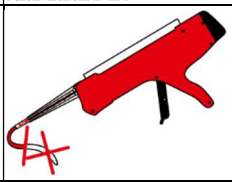
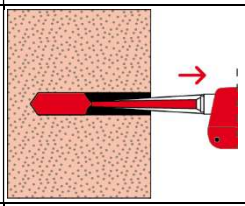
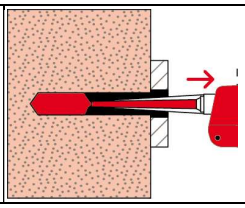
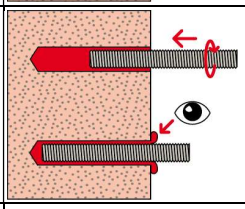
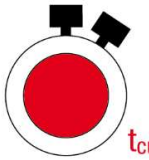
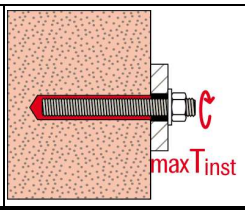
Nominal drill hole diameter		d_0	[mm]	10	12	14	16	20
Drill hole depth h_0 by using	FIS MR Plus			≤90		≤120	≤150	≤190
	FIS JMR			-	-	≤90	≤180	≤220

Figures not to scale

fischer injection system FIS VB for masonry	**Annex B6**
Intended use Cleaning brush (steel brush) Maximum processing times and minimum curing times	

Installation instructions 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**.		
2				Blow out the hole twice by hand, brush the drill hole twice, Blow out the hole twice by hand. For deep holes use an extension. Use suitable brushes (see **Table B6.1)**.
3		Remove the sealing cap. Screw on the static mixer. Place the cartridge into a suitable dispenser.		Ensuring that the spiral inside the mixer is clearly visible.
4		Extrude approximately 10 cm of material until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey.		
5		For $h_0 = h_{ef}$ fill approximately 2/3 of the drill hole with mortar. For $h_0 > h_{ef}$ more mortar is needed. Always begin from the bottom of the hole and avoid bubbles		For push through installation: the drill hole in the fixture must be also filled with mortar.
6		Only use clean and oil-free metal parts. Push the Anchor rod / Threaded rods with the setting depth mark down to the bottom of the hole, turning it slightly while doing so. After inserting the metal parts, excess mortar must be emerged around the anchor element.		
7		Wait for the specified curing time t_{cure} see **Table B6.2**.		Mounting the fixture. max T_{inst} see parameter of brick in **Annex C**.

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

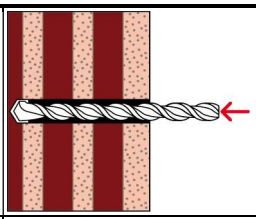
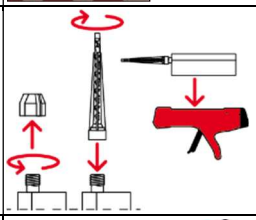
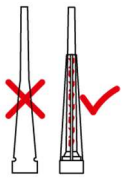
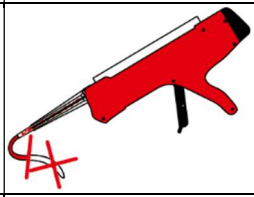
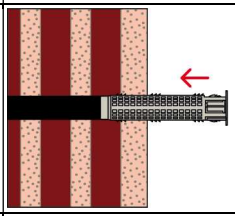
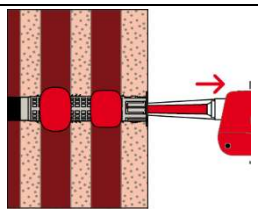
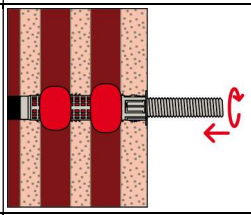
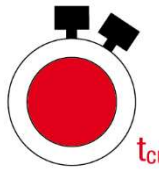
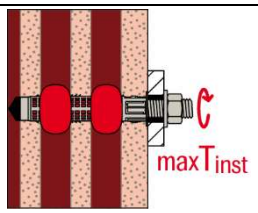
fischer injection system FIS VB for masonry

Intended use
Installation instruction (without perforated sleeve) part 1

Annex B7

Installation instructions part 2

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

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 B5.1.**	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. Place the cartridge into a suitable dispenser.		Ensuring that the spiral inside the mixer is clearly visible
3		Extrude approximately 10 cm of material until the resin is permanently grey in colour. Do not use mortar that is not uniformly grey.		
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. Push the Anchor rod / Threaded rods with the setting depth mark down to the bottom of the hole, turning it slightly while doing so. After inserting the metal parts, excess mortar must be emerged around the anchor element.		
6		Wait for the specified curing time t_{cure} see **Table B6.2**.		Mounting the fixture. max T_{inst} see parameter of brick in **Annex C**.

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

fischer injection system FIS VB for masonry

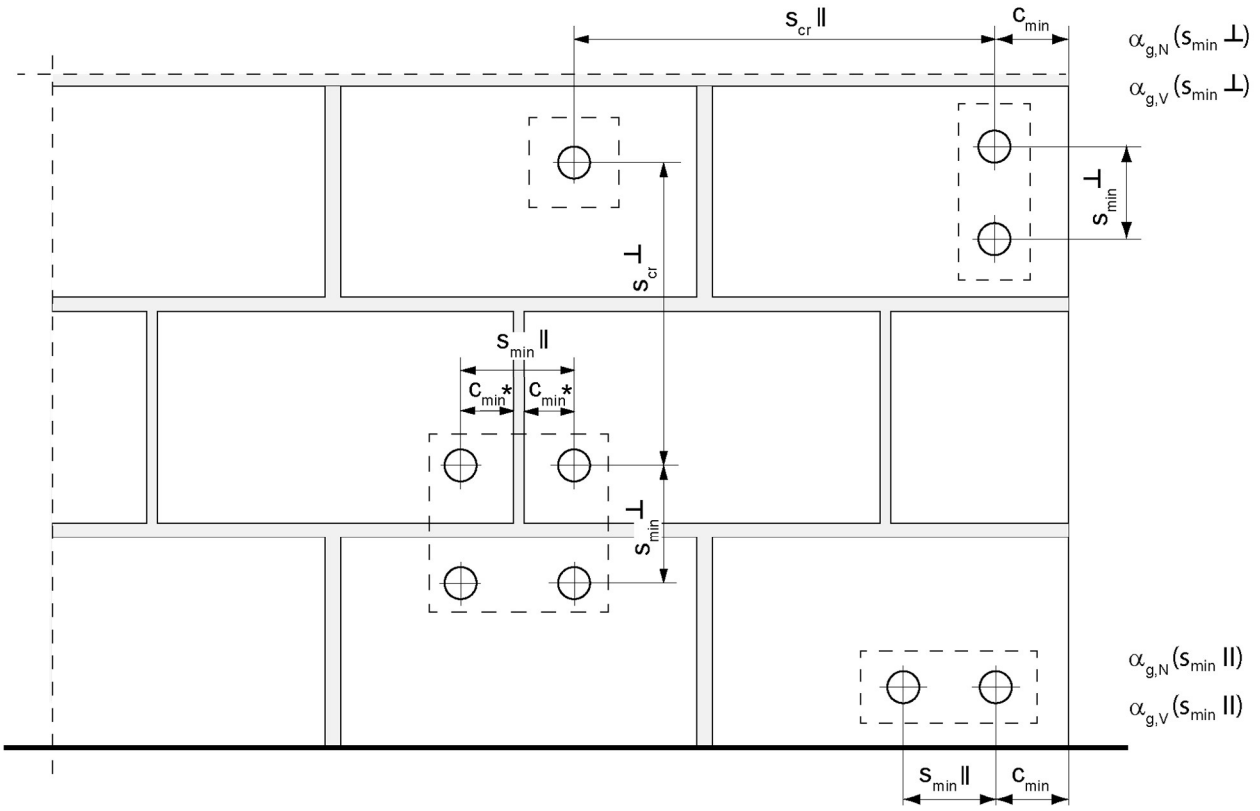
Intended use
Installation instruction (with perforated sleeve) part 2

Annex B8

Table B9.1: Overview of assessed bricks

Kind of masonry	Brick format [mm]	Min. compressive strength [N/mm²]	Main country of origin	Mean gross density ρ [kg/dm³]	Annex
Solid brick Mz					
Solid brick Mz	≥250x115x60	34 and 20	Italy	≥1,7	C3 / C4
Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL					
Solid calcium silicate brick KS	**2DF** ≥240x115x113	20	Germany	≥1,8	C5 / C6
Perforated calcium silicate brick KSL	**2DF** 240x115x113	12	Germany	≥1,2	C7 / C8
Vertical perforated brick HLz					
Vertical perforated brick HLz	120x250x120	20	Italy	≥0,9	C9 / C10
Horizontal perforated brick LLz					
Horizontal perforated brick LLz	250x250x120	6	Italy	≥0,6	C11 / C12
Light-weight concrete hollow block Hbl					
Light-weight concrete hollow block Hbl	500x200x200	6	France	≥1,0	C13 / C14
Autoclaved aerated concrete (AAC)					
PP2 / AAC	≥630x300x250	2	Germany	0,35	C15 – C16
PP2 / AAC	≥500x240x250	4	Germany	0,5	C15 – C16
PP6 / AAC	≥500x240x250	6	Germany	0,65	C15 – C16

Spacing and edge distance part 1



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

s_{min} ‖	=	Minimum spacing parallel to horizontal joint
s_{min} ⊥	=	Minimum spacing perpendicular to horizontal joint
s_{cr} ‖	=	Characteristic spacing parallel to horizontal joint
s_{cr} ⊥	=	Characteristic spacing perpendicular to horizontal joint
$c_{cr} = c_{min}$	=	Edge distance
$\alpha_{g,N}$ (s_{min} ‖)	=	Group factor for tension load, anchor group parallel to horizontal joint
$\alpha_{g,V}$ (s_{min} ‖)	=	Group factor for shear load, anchor group parallel to horizontal joint
$\alpha_{g,N}$ (s_{min} ⊥)	=	Group factor for tension load, anchor group perpendicular to horizontal joint
$\alpha_{g,V}$ (s_{min} ⊥)	=	Group factor for shear load, anchor group perpendicular to horizontal joint

Figures not to scale

fischer injection system FIS VB for masonry

Intended use
Spacing and edge distance part 1

Annex B10

Spacing and edge distance part 2

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

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

Group of 2 anchors

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

Group of 4 anchors

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

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

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

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

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

Anchor rod / standard threaded rod					**M8**[3]	**M10**[3]	**M12**
Characteristic resistance to steel failure under tension loading							
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	14,6(13,2)	23,2(21,4)	33,7
			4.8		14,6(13,2)	23,2(21,4)	33,7
			5.8		18,3(16,6)	29,0(26,8)	42,1
			8.8		29,2(26,5)	46,4(42,8)	67,4
	Stainless steel R and High corrosion resistant steel HCR		50		18,3	29,0	42,1
			70		25,6	40,6	59,0
			80		29,2	46,4	67,4
Partial factors [1]							
Partial factors $\gamma_{Ms,N}$	Steel zinc plated	Property class	4.6	[-]	2,00		
			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		fischer HCR 1,50[2] / 1,87		
			80		1,60		

[1] In absence of other national regulations

[2] Only admissible for high corrosion resistant steel HCR, acc. to Table A4.1

[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.

fischer injection system FIS VB for masonry

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

Annex C1

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

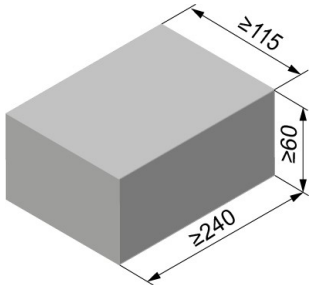
Anchor rod / standard threaded rod					**M8**[3]	**M10**[3]	**M12**
Characteristic resistance to steel failure under shear loading							
without lever arm							
Characteristic resistance $V_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	8,7(7,9)	13,9(12,8)	20,2
			4.8		8,7(7,9)	13,9(12,8)	20,2
			5.8		10,9(9,9)	17,4(16,0)	25,2
			8.8		14,6(13,2)	23,2(21,4)	33,7
	Stainless steel R and High corrosion resistant steel HCR		50		9,1	14,5	21,0
			70		12,8	20,3	29,5
			80		14,6	23,2	33,7
with lever arm							
Characteristic resistance $M^0_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	14,9(12,9)	29,9(26,5)	52,3
			4.8		14,9(12,9)	29,9(26,5)	52,3
			5.8		18,7(16,1)	37,3(33,2)	65,4
			8.8		29,9(25,9)	59,8(53,1)	104,6
	Stainless steel R and High corrosion resistant steel HCR		50		18,7	37,3	65,4
			70		26,2	52,3	91,5
			80		29,9	59,8	104,6
Partial factors [1]							
Partial factors $\gamma_{Ms,V}$	Steel zinc plated	Property class	4.6	[-]	1,67		
			4.8		1,25		
			5.8		1,25		
			8.8		1,25		
	Stainless steel R and High corrosion resistant steel HCR		50		2,38		
			70		fischer HCR 1,25[2] / 1,56		
			80		1,33		

[1] In absence of other national regulations

[2] Only admissible for high corrosion resistant steel HCR, acc. to Table A4.1

[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.

Solid brick Mz, EN 771-1



Producer		e.g. Stabila		
Nominal dimensions	[mm]	length L	width W	height H
		≥ 250	≥ 115	≥ 60
Mean gross dry density ρ	[kg/dm³]	≥ 1,7		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	36,8 / 34 or 25 / 20		
Standard or annex		EN 771-1		

Table C3.1: Installation parameters

Anchor rods			**M8**	**M10**	**M12**
Anchor rod without perforated sleeve					
Effective anchorage depth	h_{ef}	[mm]	85	85	85
Max. installation torque	max T_{inst}	[Nm]	8		
General installation parameters					
Edge distance	$c_{min} = c_{cr}$	[mm]	130		
Spacing	s_{min} II		255		
	s_{cr} II		255		
	s_{min} ⊥		255		
	s_{cr} ⊥		255		
Drilling method					
Hammer drilling with hard metal hammer drill					

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

Table C3.2: Group factors

Anchor rods			**M8**	**M10**	**M12**
Edge distance	c_{min}	[mm]	130		
Group factor	$\alpha_{g,N}$ (s_{min} II)	[-]	2		
	$\alpha_{g,V}$ (s_{min} II)				
	$\alpha_{g,N}$ (s_{min} ⊥)				
	$\alpha_{g,V}$ (s_{min} ⊥)				

fischer injection system FIS VB for masonry

Performances
Solid brick Mz, dimensions, installation parameters, Group factors

Annex C3

Solid brick Mz, EN 771-1

Table C4.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**	**M10**	**M12**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]				
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]		
		85	85	85
25 / 20 N/mm²	w/w | w/d	2,5	2,5	2,5
	d/d	2,5	2,5	2,5
36,8 / 34 N/mm²	w/w | w/d	3,0	3,5	3,5
	d/d	3,0	3,5	3,5

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

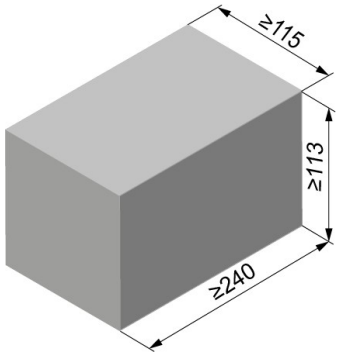
Table C4.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**	**M10**	**M12**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]				
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]		
		85	85	85
25 / 20 N/mm²	w/w | w/d	3,5	3,5	4,5
	d/d			
36,8 / 34 N/mm²	w/w | w/d	4,5	4,5	6,0
	d/d			

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

Solid calcium silicate brick KSV, 2DF, EN 771-2



Producer		e.g. Wemding		
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	29,0 / 20		
Standard or annex		EN 771-2		

Table C5.1: Installation parameters

Anchor rods			**M8**	**M10**	**M12**
Anchor rod without perforated sleeve					
Effective anchorage depth	h_{ef}	[mm]	85	85	85
Max. installation torque	max T_{inst}	[Nm]	5	5	10
General installation parameters					
Edge distance	$c_{min} = c_{cr}$	[mm]	130		
Spacing	s_{min} II		255		
	s_{cr} II		255		
	s_{min} ⊥		255		
	s_{cr} ⊥		255		
Drilling method					
Hammer drilling with hard metal hammer drill					

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

Table C5.2: Group factors

Anchor rods			**M8**	**M10**	**M12**
Group factor	$\alpha_{g,N}$ (s_{min} II)	[-]	2		
	$\alpha_{g,V}$ (s_{min} II)				
	$\alpha_{g,N}$ (s_{min} ⊥)				
	$\alpha_{g,V}$ (s_{min} ⊥)				

fischer injection system FIS VB for masonry

Performances
Solid calcium silicate brick KSV, 2DF, dimensions, installation parameters, Group factors

Annex C5

Solid calcium silicate brick KSV, 2DF, EN 771-2

Table C6.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**	**M8**	**M10**	**M12**
Perforated sleeve FIS HK		**12x85**	**16x85**		**20x85**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]					
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]			
		85	85		85
29 / 20 N/mm²	w/w w/d	5,0	5,0	3,5	4,5
	d/d	5,5	5,5	4,5	4,5
Anchor rod		**M8**	**M10**		**M12**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]					
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]			
		85	85		85
29 / 20 N/mm²	w/w w/d	5,0	3,5		4,5
	d/d	5,5	4,5		4,5

Table C6.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**	**M8**	**M10**	**M12**
Perforated sleeve FIS HK		**12x85**	**16x85**		**20x85**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]					
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]			
		85	85		85
29 / 20 N/mm²	w/w	8,0	10,0	11,0	12,0
	w/d				
	d/d				
Anchor rod		**M8**	**M10**		**M12**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]					
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]			
		85	85		85
29 / 20 N/mm²	w/w	8,0	11,0		12,0
	w/d				
	d/d				

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

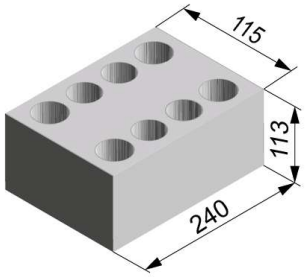
Factor for job site tests see Annex C17 and displacements see Annex C18.

fischer injection system FIS VB for masonry

Performances
Solid calcium silicate brick KSV, 2DF, Characteristic resistance under tension and shear loading

Annex C6

Perforated calcium silicate brick KSL, 2DF, EN 771-2



Producer		e.g. H+H		
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm³]	≥ 1,2		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	18,8 / 12		
Standard or annex		EN 771-2		

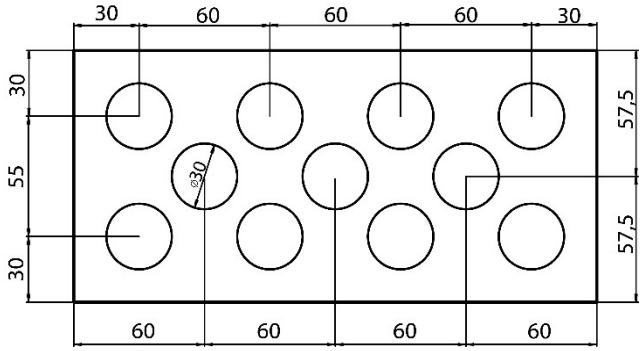


Table C7.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Anchor rod with perforated sleeve									
Max. installation torque	max T_{inst}	[Nm]	3					10	
General installation parameters									
Edge distance	$c_{min} = c_{cr}$	[mm]	130						
Spacing	s_{min} II		240						
	s_{cr} II		240						
	s_{min} ⊥		115						
	s_{cr} ⊥		115						
Drilling method									
Hammer drilling with hard metal hammer drill									

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

Table C7.2: Group factors

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Group factors	$\frac{\alpha_{g,N}\ (s_{min}\ II) = \alpha_{g,V}\ (s_{min}\ II)}{\alpha_{g,N}\ (s_{min}\ \perp) = \alpha_{g,V}\ (s_{min}\ \perp)}$	[-]	2						

fischer injection system FIS VB for masonry

Performances
Perforated calcium silicate brick KSL, 2DF, dimensions, installation parameters, Group factors

Annex C7

Perforated calcium silicate brick KSL, 2DF, EN 771-2

Table C8.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
18/8 / 12 N/mm²	w/w w/d	1,5	1,5	2,0	1,5	2,0	2,5	2,5
	d/d	1,5	1,5	2,5	1,5	2,5	2,5	2,5

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

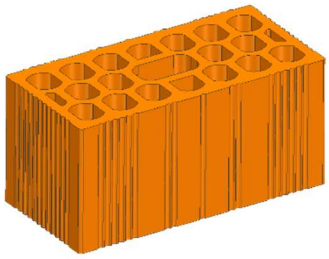
Table C8.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
18,8 / 12 N/mm²	w/w w/d	4,5	7,0	9,0	7,0	9,0	11,0	11,0
	d/d	4,5	7,0	9,0	7,0	9,0	11,0	11,0

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

Vertical perforated brick HLz, EN 771-1



Producer		e.g. Stabila		
Nominal dimensions	[mm]	length L	width W	height H
		120	250	120
Mean gross dry density ρ	[kg/dm³]	≥ 0,9		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	28,8 / 20		
Standard or annex		EN 771-1		

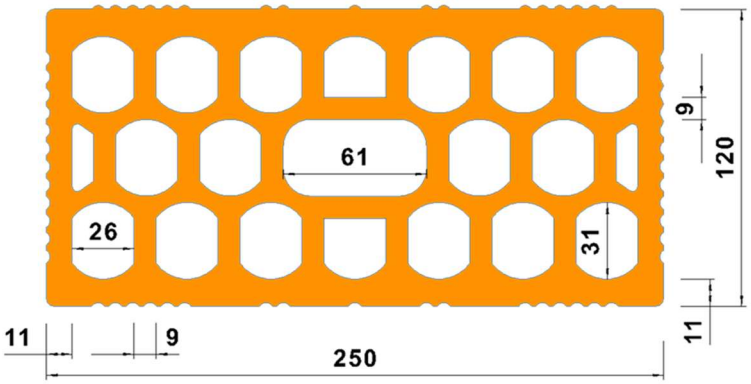


Table C9.1: Installation parameters

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Anchor rod with perforated sleeve									
Max. installation torque	max T_{inst}	[Nm]	2	4					
General installation parameters									
Edge distance	$c_{min} = c_{cr}$	[mm]	130						
Spacing	s_{min} II		250						
	s_{cr} II		250						
	s_{min} ⊥		120						
	s_{cr} ⊥		120						
Drilling method									
Hammer drilling with hard metal hammer drill									

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

Table C9.2: Group factors

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Group factors	$\frac{\alpha_{g,N}\ (s_{min}\ II) = \alpha_{g,V}\ (s_{min}\ II)}{\alpha_{g,N}\ (s_{min}\ \perp) = \alpha_{g,V}\ (s_{min}\ \perp)}$	[-]	2						

fischer injection system FIS VB for masonry

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

Annex C9

Vertical perforated brick HLz, EN 771-1

Table C10.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
28,8 / 20 N/mm²	w/w w/d	1,5	1,5	1,5	1,5	1,5	2,0	2,0
	d/d	1,5	2,0	1,5	2,0	1,5	2,0	2,0

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

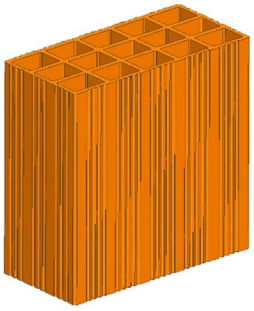
Table C10.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
28,8 / 20 N/mm²	w/w w/d	2,0	2,5	3,0	2,5	3,0	3,5	3,5
	d/d	2,0	2,5	3,0	2,5	3,0	3,5	3,5

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

Vertical perforated brick LLz, EN 771-1



Producer		e.g.Stabila		
Nominal dimensions	[mm]	length L	width W	height H
		250	250	120
Mean gross dry density ρ	[kg/dm³]	≥ 0,6		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	18,6 / 6		
Standard or annex		EN 771-1		

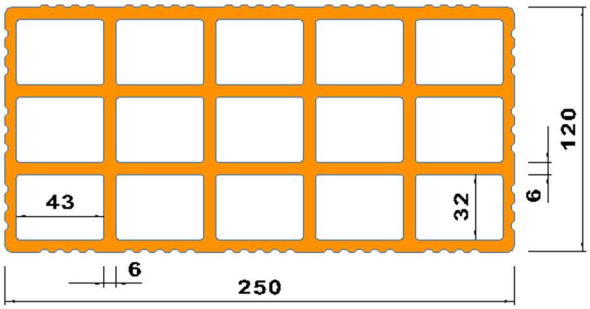


Table C11.1: Installation parameters

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Anchor rod with perforated sleeve									
Max. installation torque	max T_{inst}	[Nm]	1	3					
General installation parameters									
Edge distance	$c_{min} = c_{cr}$	[mm]	130						
Spacing	s_{min} II		250						
	s_{cr} II		250						
	s_{min} ⊥		250						
	s_{cr} ⊥		250						
Drilling method									
Hammer drilling with hard metal hammer drill									

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

Table C11.2: Group factors

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Group factors	$\alpha_{g,N}$ (s_{min} II)	[-]	2						
	$\alpha_{g,V}$ (s_{min} II)								
	$\alpha_{g,N}$ (s_{min} ⊥)								
	$\alpha_{g,V}$ (s_{min} ⊥)								

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Performances
Vertical perforated brick LLz, dimensions, installation parameters, Group factors

Annex C11

Vertical perforated brick LLz, EN 771-1

Table C12.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
18,6 / 6 N/mm²	w/w w/d	0,3	0,3	0,4	0,3	0,4	0,4	0,4
	d/d	0,4	0,3	0,4	0,3	0,4	0,4	0,4

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

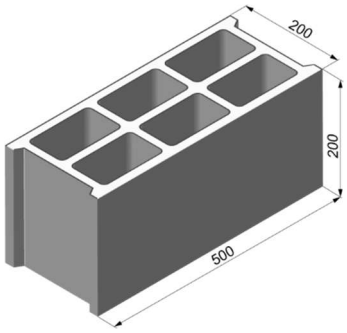
Table C12.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
18,6 / 6 N/mm²	w/w w/d	0,75	1,2	0,9	1,2	0,9	0,9	0,9
	d/d	0,75	1,2	0,9	1,2	0,9	0,9	0,9

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

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
Mean gross dry density ρ	[kg/dm³]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	7,4 / 6		
Standard or annex		EN 771-3		

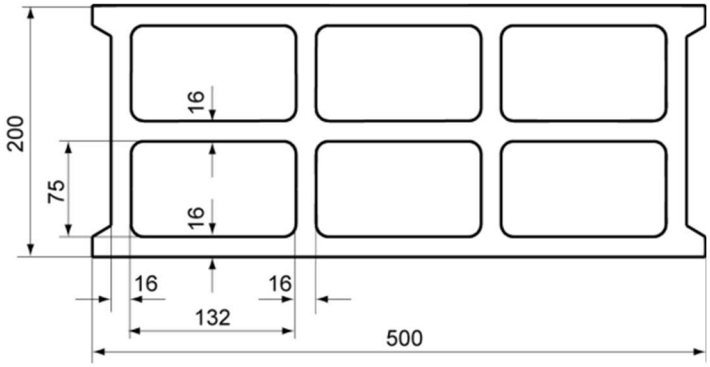


Table C13.1: Installation parameters

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Anchor rod with perforated sleeve									
Max. installation torque	max T_{inst}	[Nm]	1	3					
General installation parameters									
Edge distance	$c_{min} = c_{cr}$	[mm]	130						
Spacing	s_{min} II		500						
	s_{cr} II		500						
	s_{min} ⊥		200						
	s_{cr} ⊥		200						
Drilling method									
Hammer drilling with hard metal hammer drill									

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

Table C13.2: Group factors

Anchor rods			**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K			**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
Group factors	$\alpha_{g,N}$ (s_{min} II)	[-]	2,0						
	$\alpha_{g,V}$ (s_{min} II)								
	$\alpha_{g,N}$ (s_{min} ⊥)								
	$\alpha_{g,V}$ (s_{min} ⊥)								

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

Annex C13

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

Table C14.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
7,4 / 6 N/mm²	w/w w/d	0,6	0,5	0,6	1,5		0,75	0,75
	d/d	0,6	0,5	0,6	1,5		0,75	0,75

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

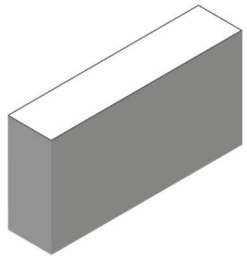
Table C14.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**	**M8**	**M10**	**M8**	**M10**	**M12**	**M12**
Perforated sleeve FIS H K		**12x85**	**16x85**		**16x130**		**20x85**	**20x130**
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]								
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use con-ditions	Effective anchorage depth h_{ef} [mm]						
		85	85		130		85	130
7,4 / 6 N/mm²	w/w w/d	3,0	2,0	2,0	3,0	3,0	1,5	1,5
	d/d	3,0	2,0	2,0	3,0	3,0	1,5	1,5

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

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



Producer		e.g. Ytong		
	[mm]	length l	width w	height h
		Annex B9		
Mean gross dry density ρ	[kg/dm³]	0,35	0,5	0,65
Mean compressive strength / Min. compressive strength single brick [1)]	[N/mm²]	3,2 / 2	4,0 / 4	6,2 / 6
Standard or annex		EN 771-4		

Table C15.1: Installation parameters

Anchor rods			**M8**		**M10**		**M12**	
Anchor rod without perforated sleeve								
Effective anchorage depth	h_{ef}	[mm]	100	200	100	200	100	200
Max. installation torque	max T_{inst}	[Nm]	2,0	4,0	2,0	4,0	2,0	4,0
General installation parameters								
Edge distance	$c_{min} = c_{cr}$	[mm]	1,5x h_{ef}					
Spacing	s_{cr} ∥ = s_{min} ∥	[mm]	3x h_{ef}					
	s_{cr} ⊥ = s_{min} ⊥							
Drilling method								
Hammer drilling with hard metal hammer drill								

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

Table C15.2: Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 2 N/mm²)

Anchor rods			**M8**	**M10**	**M12**
Group factor	$\alpha_{g,N}$ ∥, $\alpha_{g,V}$ (s_{min} ∥)	[-]	2,0	2,0	2,0
	$\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ (s_{min} ⊥)		2,0	2,0	2,0

Table C15.3: Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 4 N/mm²)

Anchor rods			**M8**	**M10**	**M12**
Group factor	$\alpha_{g,N}$ ∥, $\alpha_{g,V}$ (s_{min} ∥)	[-]	2,0	2,0	2,0
	$\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ (s_{min} ⊥)		2,0	2,0	2,0

Table C15.4: Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 6 N/mm²)

Anchor rods			**M8**	**M10**	**M12**
Group factor	$\alpha_{g,N}$ ∥, $\alpha_{g,V}$ (s_{min} ∥)	[-]	2,0	2,0	2,0
	$\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ (s_{min} ⊥)		2,0	2,0	2,0

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

Annex C15

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

Table C16.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		**M8**		**M10**		**M12**	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]							
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]					
		100	200	100	200	100	200
3,2 / 2 N/mm²	w/w w/d	0,75	0,75	0,75	0,75	0,9	1,2
	d/d	0,75	0,75	0,75	0,75	0,9	1,2
4,8 / 4 N/mm²	w/w w/d	1,5	1,5	1,2	1,2	1,2	3,0
	d/d	1,5	1,5	1,2	1,2	1,2	3,0
6,2 / 6 N/mm²	w/w w/d	2,0	2,0	2,0	2,0	1,2	5,0
	d/d	2,0	2,0	2,0	2,0	1,2	5,0

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

Table C16.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		**M8**		**M10**		**M12**	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]							
Mean compressive strength acc. EN 771 / Min. compressive strength single brick [1)]	Use conditions	Effective anchorage depth h_{ef} [mm]					
		100	200	100	200	100	200
3,2 / 2 N/mm²	w/w w/d	1,2	1,2	1,5	1,5	2,0	2,0
	d/d	1,2	1,2	1,5	1,5	2,0	2,0
4,8 / 4 N/mm²	w/w w/d	3,0	3,0	4,0	4,0	6,0	6,0
	d/d	3,0	3,0	4,0	4,0	6,0	6,0
6,2 / 6 N/mm²	w/w w/d	5,0	5,0	6,0	6,0	10,0	10,0
	d/d	5,0	5,0	6,0	6,0	10,0	10,0

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

Factor for job site tests see Annex C17 and displacements see Annex C18.

β-factors for job site tests

Table C17.1: β-factors for job site tests

Use conditions		w/w and w/d	d/d
Temperature range [°C]		50/80	
Material	Size	β-factors	
MZ Annex C3-C4	M8	0,68	0,71
	M10	0,71	0,71
	M12	0,71	0,71
KSV 2DF Annex C5-C6	M8	0,59	0,62
	M10	0,47	0,56
	M12	0,62	0,62
KSL 2DF Annex C7-C8	M8	0,47	0,47
	M10	0,47	0,56
	M12	0,62	0,62
HLZ Annex C9-C10	M8	0,68	0,71
	M10	0,71	0,71
	M12	0,71	0,71
LLz Annex C11-C12	M8	0,68	0,71
	M10	0,71	0,71
	M12	0,71	0,71
Hbl Annex C13-14	All sizes	0,62	0,62
Autoclaved aerated concrete Annex C15-C16	All sizes	0,47	0,47

Table C18.1: Displacement

Material	Size	Sleeve	h_{ef} [mm]	N [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	V [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
Mz (f_b = 20 N/mm²)	M8	-	85	$N = \frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,01	0,02	$V = \frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,41	0,62
Mz (f_b = 20 N/mm²)	M10	-	85		0,04	0,07		0,39	0,59
Mz (f_b = 20 N/mm²)	M12	-	85		0,01	0,02		0,36	0,54
Mz (f_b = 34 N/mm²)	M8	-	85		0,22	0,45		0,58	0,86
Mz (f_b = 34 N/mm²)	M10	-	85		0,18	0,36		0,54	0,82
Mz (f_b = 34 N/mm²)	M12	-	85		0,02	0,04		0,49	0,74
KS	M8	12x85	85		0,05	0,09		0,42	0,63
KS	M8	16x85	85		0,10	0,20		1,03	1,54
KS	M10	16x85	85		0,03	0,07		0,81	1,22
KS	M12	20x85	85		0,02	0,03		0,65	0,98
KSL	M8	12x85	85		0,02	0,04		1,15	1,72
KSL	M8	16x85	85		0,02	0,04		1,61	2,41
KSL	M10	16x85	85		0,01	0,02		2,41	3,61
KSL	M12	20x85	85		0,03	0,06		1,45	2,18
HLz	M8	12x85	85		0,07	0,14		0,85	1,28
HLz	M8	16x85	85		0,01	0,02		1,37	2,06
HLz	M10	16x85	85		1,42	2,83		1,26	1,88
HLz	M12	20x85	85		0,01	0,02		0,62	0,93
LLz	M8	12x85	85		0,11	0,23		0,16	0,24
LLz	M8	16x85	85		0,21	0,43		0,85	1,27
LLz	M10	16x85	85		0,22	0,44		0,37	0,56
LLz	M12	20x85	85		0,15	0,30		0,72	1,07
Hbl	M8	12x85	85		0,17	0,34		1,43	2,15
Hbl	M8	16x85	85		0,17	0,33		1,03	1,55
Hbl	M8	16x130	130		0,05	0,10		0,89	1,34
Hbl	M10	16x85	85		0,07	0,14		0,65	0,98
Hbl	M10	16x130	130		0,09	0,18		1,44	2,16
Hbl	M12	20x85	85		0,19	0,37		0,37	0,56
AAC2	M8	-	100		0,01	0,02		0,12	0,18
AAC2	M10	-	100		0,01	0,02		0,54	0,80
AAC2	M12	-	100		0,01	0,02		1,06	1,59
AAC2	M12	-	200		0,01	0,02		-	-
AAC6	M8	-	100		0,05	0,11		0,91	1,37
AAC6	M10	-	100		0,02	0,05		1,30	1,95
AAC6	M12	-	100		0,06	0,12		2,30	3,05
AAC6	M12	-	200		0,39	0,79		-	-

fischer injection system FIS VB for masonry

Performances
Displacements

Annex C18