

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments

★ ★ ★  
★ Designated  
according to  
Article 29 of Regula-  
tion (EU) No 305/2011  
and member of EOTA  
(European Organi-  
sation for Technical  
Assessment)  
★ ★ ★  
★ ★

## European Technical Assessment

ETA-17/0352  
of 8 June 2021

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

fischer Injection system FIS AB for masonry

Injection system for use in masonry

fischerwerke GmbH & Co. KG  
Otto-Hahn-Straße 15  
79211 Denzlingen  
DEUTSCHLAND

fischerwerke

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

EAD 330076-00-0604, Edition 11/2017

ETA-17/0352 issued on 14 December 2017

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

**European Technical Assessment****ETA-17/0352**

English translation prepared by DIBt

Page 3 of 48 | 8 June 2021

**Specific Part****1 Technical description of the product**

The fischer injectionsystem FIS AB for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS AB, FIS AB Low Speed and FIS AB 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

**European Technical Assessment**

**ETA-17/0352**

English translation prepared by DIBt

**Page 4 of 48 | 8 June 2021**

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

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

Issued in Berlin on 8 June 2021 by Deutsches Institut für Bautechnik

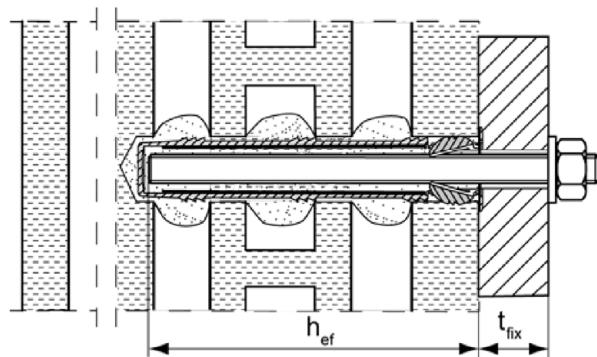
Dipl.-Ing. Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Baderschneider

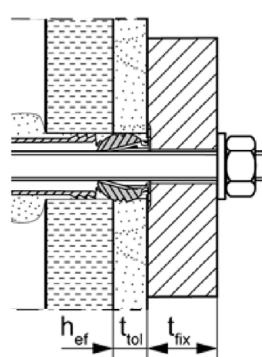
## Installation conditions part 1

### 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

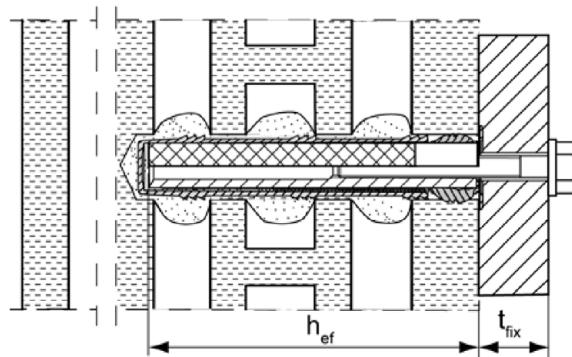
FIS H 16x85 K

FIS H 20x85 K

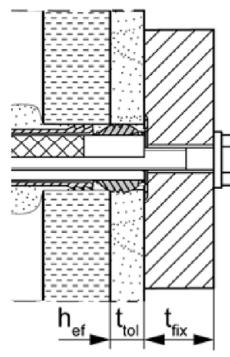
FIS H 20x200 K

### 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



Figures not to scale

$h_{ef}$  = effective anchorage depth

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

$t_{fix}$  = thickness of fixture

fischer injection system FIS AB for masonry

#### Product description

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

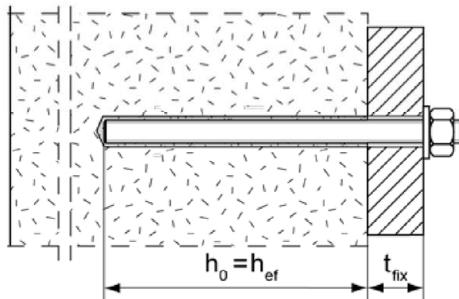
Annex A 1

## Installation conditions part 2

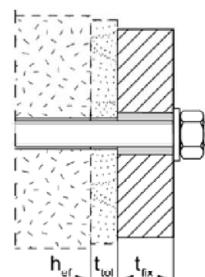
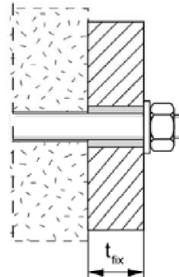
Anchor rods without perforated sleeve FIS H K;

Installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned anchorage:



Push through anchorage: Annular gap filled with mortar

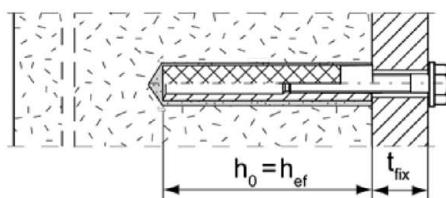


Installation with  
render bridge

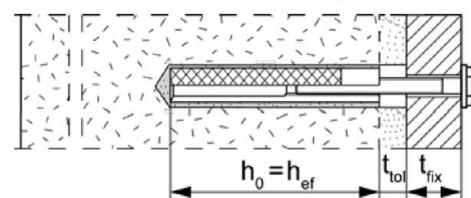
Internal threaded anchors FIS E without perforated sleeve FIS H K;

Installation in solid brick masonry and autoclaved aerated concrete

Pre-positioned anchorage:



Installation with render bridge



Figures 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 AB 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

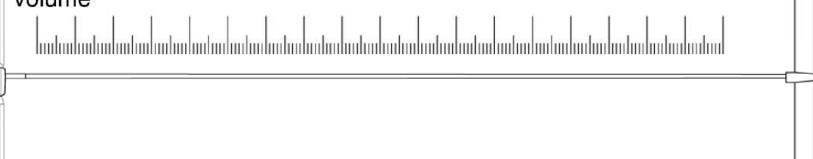
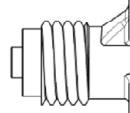
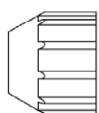
## Overview system components part 1

### Mortar cartridge (shuttle cartridge) with sealing cap

1

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

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

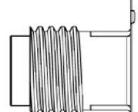
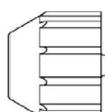


### Mortar cartridge (coaxial cartridge) with sealing cap

1

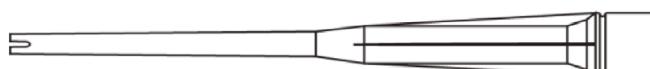
Size: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml

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

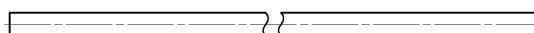


### Static mixer MR Plus with extension tube

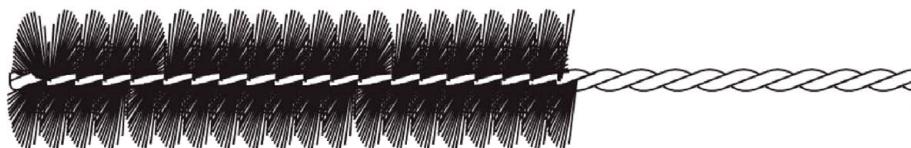
Static mixer



Extension tube



### Cleaning brush BS



### Blow-out pump ABG or ABP



Figures not to scale

### fischer injection system FIS AB for masonry

#### System description

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

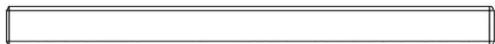
#### Annex A 3

English translation prepared by DIBt

## Overview system components part 2

### fischer anchor rod

(2)



Size: M8, M10, M12

### Internal threaded anchor FIS E

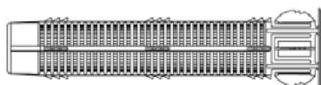
(5)



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

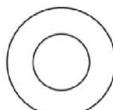
(7)



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

### Washer

(3)



### Hexagon nut

(4)



Figures not to scale

### fischer injection system FIS AB for masonry

#### System description

Overview system components part 2: steel parts / perforated sleeve

Annex A 4

**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 $\geq 5\mu\text{m}$ , EN ISO 4042:2018 Zn5/An(A2K) or hot-dip galvanised EN ISO 10684:2004 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ 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 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50 or 80; EN ISO 3506-1:2009 or property class 70 with $f_y = 560 \text{ N/mm}^2$ 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated $\geq 5\mu\text{m}$ , 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 $\geq 5\mu\text{m}$ , EN ISO 4042:2018 Zn5/An(A2K) or hot-dip galvanised ISO 10684:2004	Property class 50, 70 or 80; EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 50, 70 or 80; EN ISO 3506-1:2009 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 $\geq 5\mu\text{m}$ , EN ISO 4042:2018 Zn5/An(A2K)	Property class 70; EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 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 $\geq 5\mu\text{m}$ , EN ISO 4042:2018 Zn5/An(A2K)	Property class 70; EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70; EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
7	Perforated sleeve	PP / PE		
fischer injection system FIS AB for masonry				
<b>Product description</b> Materials				<b>Annex A 5</b>

## Specifications of intended use (part 1)

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

		<b>fischer injection system FIS AB for masonry</b>			
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	$T_{i,min} = 0 \text{ }^{\circ}\text{C}$ bis $T_{i,max} = +40 \text{ }^{\circ}\text{C}$				
In-service temperature	Temperature range Tb	-40 $\text{ }^{\circ}\text{C}$ to +80 $\text{ }^{\circ}\text{C}$	(max. short term temperature +80 $\text{ }^{\circ}\text{C}$ max. long term temperature +50 $\text{ }^{\circ}\text{C}$ )		
<b>fischer injection system FIS AB for masonry</b>					
<b>Intended Use</b> Specifications (part 1)		<b>Annex B 1</b>			

## Specifications of intended use (part 2)

### Anchors 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  $\beta$ -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 particulary 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 particulary aggressive conditions exist (high corrosion resistant steel)

Note: Particulary 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 AB for masonry

Intended Use  
Specifications (part 2)

Annex B 2

## Specifications of intended use (part 2 continued)

### Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054, 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 envisaged embedment depth. This may be done by the manufacturer of the rod or by a person on job site.

fischer injection system FIS AB for masonry

**Intended Use**  
Specifications (part 2 continued)

**Annex B 3**

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

Anchor rod	Thread	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] $h_{0,max}=h_{ef,max}$ [mm]	100 200		
Effective anchorage depth $h_{ef}^{(1)}$ in solid brick (depth of drill hole $h_0 = h_{ef}$ )	$h_{ef,min}$ [mm] $h_{ef,max}$ [mm]	50 h-30, ≤ 200		
Diameter of clearance hole in the fixture	pre-position $d_f \leq$ [mm] push through $d_f \leq$ [mm]	9 11	12 14	14 16
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B7.1		
Maximum installation torque	$T_{inst}$ [Nm]	see parameters of brick		

<sup>1)</sup>  $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$  is possible.

**fischer anchor rods M8, M10, M12**



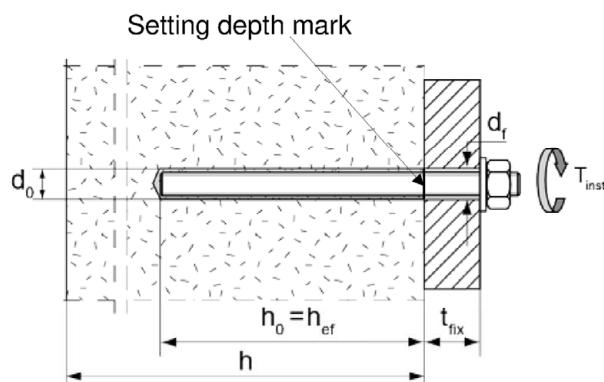
**Marking (on random place) fischer anchor rod:**

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

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

<sup>1)</sup> PC = property class

**Installation condition:**



Figures not to scale

**fischer injection system FIS AB for masonry**

**Intended Use**

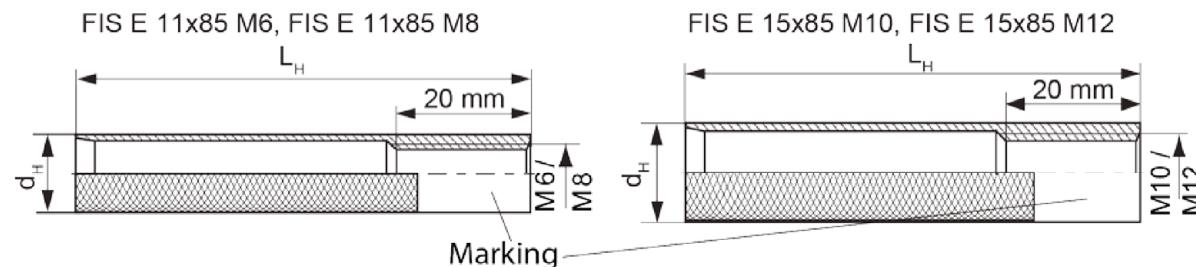
Installation parameters for anchor rods without perforated sleeve

**Annex B 4**

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

Internal threaded anchor FIS E	11x85 M6	11x85 M8	15x85 M10	15x85 M12
Diameter of anchor $d_H$ [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 $d_b \geq$ [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	

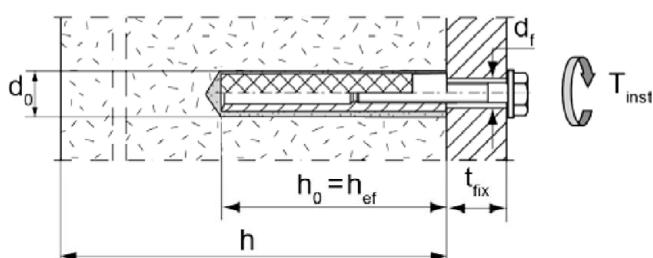
**fischer internal threaded anchor FIS E**



**Marking:**

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

**Installation condition:**



Figures not to scale

**fischer injection system FIS AB for masonry**

**Intended Use**

Installation parameters for internal threaded rods FIS E without perforated sleeve

**Annex B 5**

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

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

<sup>1)</sup> Only for solid areas in hollow bricks and solid bricks.

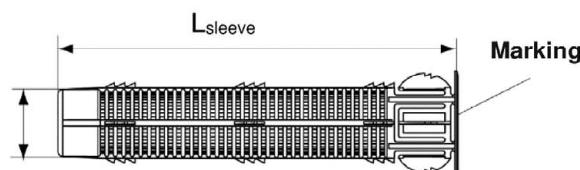
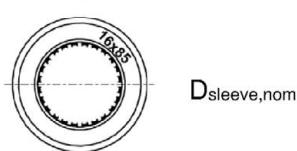
<sup>2)</sup> Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth  $h_{\text{ef,min}}$ , the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of characteristic resistance must be taken.

#### 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

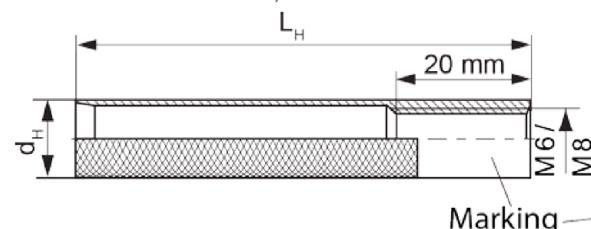
#### Marking:

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

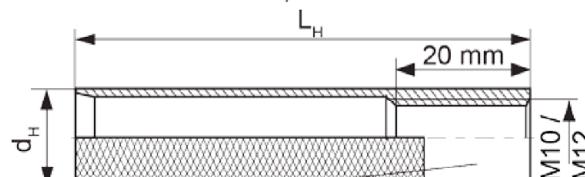


#### fischer internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

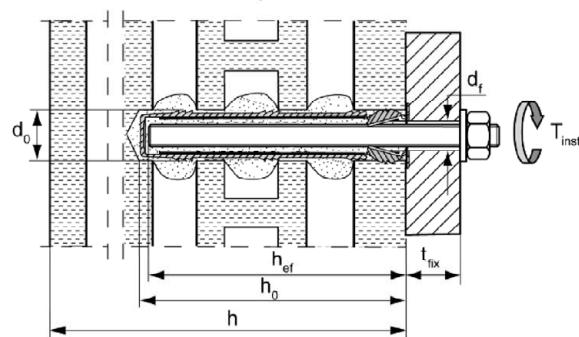


FIS E 15x85 M10, FIS E 15x85 M12

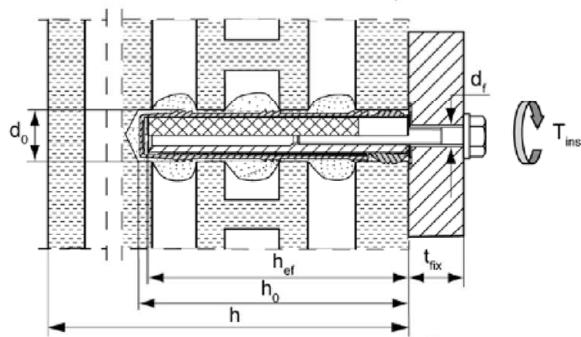


#### Installation conditions:

##### Anchor rod with perforated sleeve



##### Internal threaded anchor with perforated sleeve



Figures not to scale

#### fischer injection system FIS AB for masonry

#### Intended Use

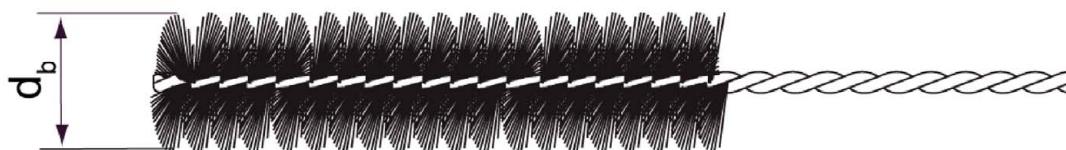
Installation parameters for anchor rods and internal threaded anchors FIS E with perforated sleeve (pre-positioned anchorage)

#### Annex B 6

**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 <sup>1)</sup> $t_{cure}$		
	FIS AB High Speed <sup>3)</sup>	FIS AB <sup>2)</sup>	FIS AB Low Speed <sup>2)</sup>	FIS AB High Speed <sup>3)</sup>	FIS AB <sup>2)</sup>	FIS AB Low Speed <sup>2)</sup>
> 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

<sup>1)</sup> For wet bricks the curing time must be doubled

<sup>2)</sup> Minimum cartridge temperature +5°C

<sup>3)</sup> Minimum cartridge temperature ±0°C

Figures not to scale

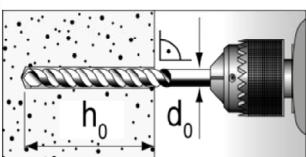
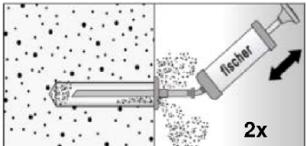
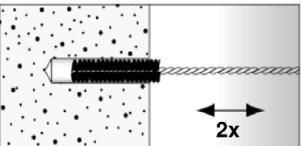
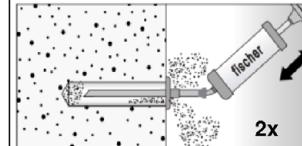
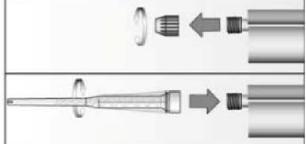
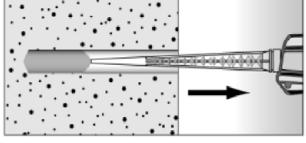
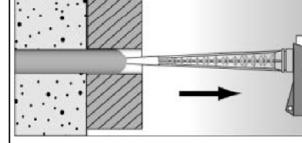
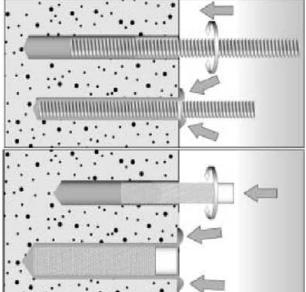
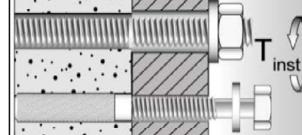
fischer injection system FIS AB for masonry

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

**Annex B 7**

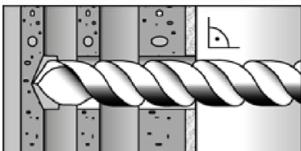
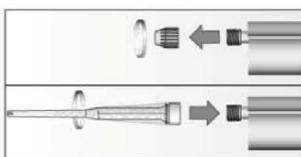
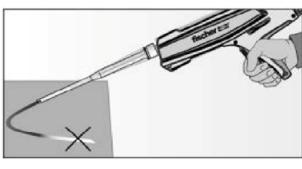
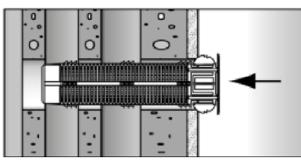
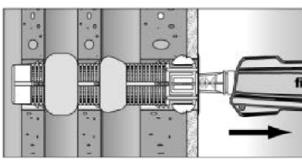
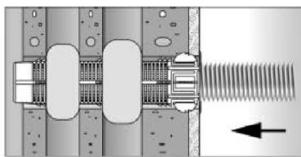
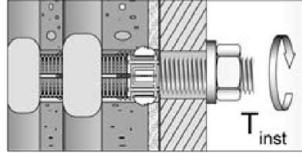
## Installation instruction part 1

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

 <p>1</p>	<p>Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole <math>h_0</math> and drill hole diameter <math>d_0</math> see <b>Table B4.1; B5.1</b></p>		
 <p>2</p>	 <p>2x</p>	 <p>2x</p>	<p>Blow out the drill hole twice. Brush twice and blow out twice again.</p>
 <p>3</p>	<p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible)</p>		
 <p>4</p>	<p>Place the cartridge into a suitable dispenser</p>		<p>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.</p>
 <p>5</p>	<p>Fill approximately 2/3 of the drill hole with mortar beginning from the bottom of the hole<sup>1)</sup>. Avoid bubbles!</p>		<p>For push through anchorage (not FIS E) fill the annular clearance with mortar.</p>
 <p>6</p>	<p>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.</p>		
 <p>7</p>	<p>Do not touch. Minimum curing time see <b>Table B7.2</b></p>	 <p><math>T_{inst}</math></p>	<p>Mounting the fixture. <math>T_{inst}</math> see parameter of brick.</p>
<p><sup>1)</sup> Exact volume of mortar see manufacturer's specification.</p>			
<p>fischer injection system FIS AB for masonry</p>			
<p><b>Intended use</b> Installation instruction (without perforated sleeve) part 1</p>		<p><b>Annex B 8</b></p>	

## 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 <b>Table B6.1</b>	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 <sup>1)</sup> .
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 <b>Table B7.2</b>	 Mounting the fixture. $T_{inst}$ see parameter of brick.

<sup>1)</sup> Exact volume of mortar see manufacturer's specification.

fischer injection system FIS AB for masonry

**Intended use**

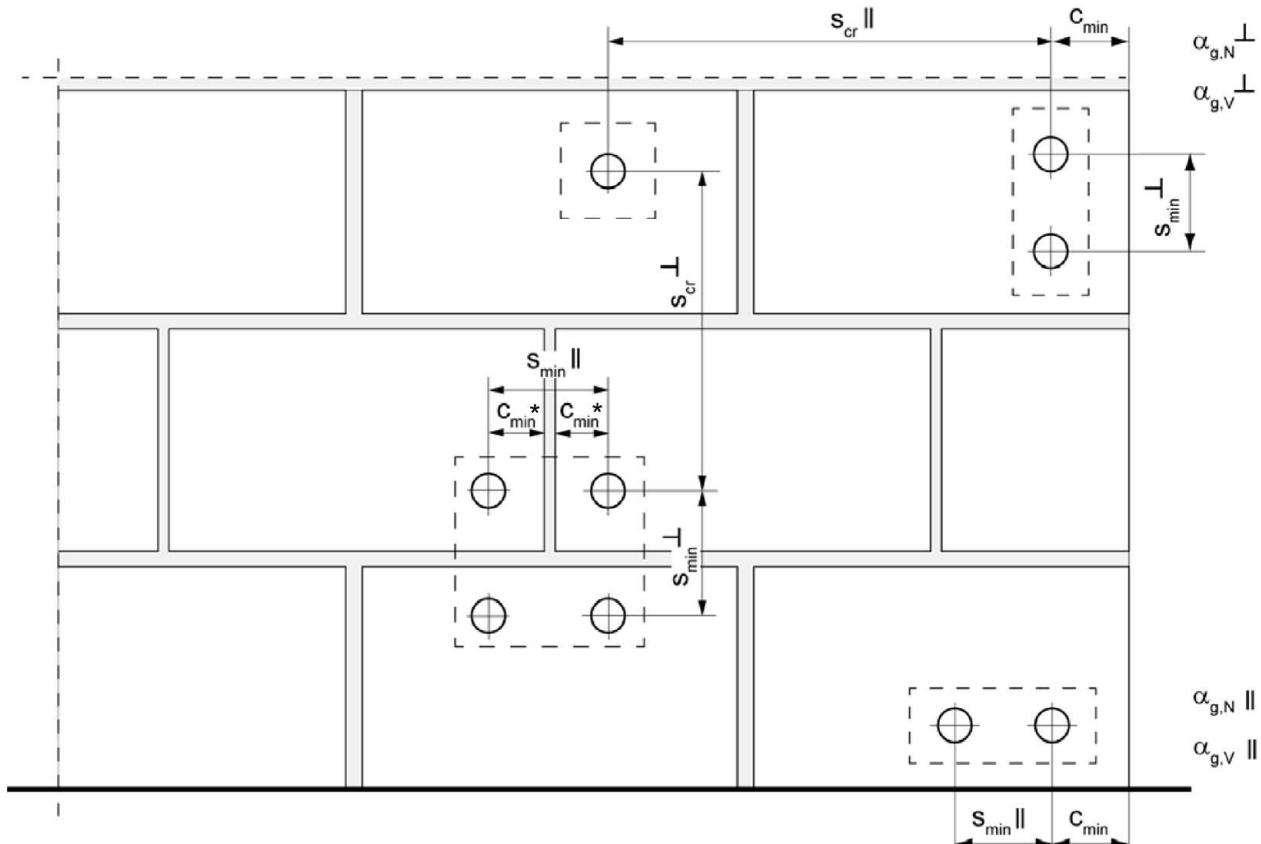
Installation instruction (with perforated sleeve) part 2

**Annex B 9**

**Table B10.1:** Overview of controlled bricks

Kind of masonry	Brick format [mm]	Compressive strength $f_b$ [N/mm <sup>2</sup> ]	Density $\rho$ [kg/dm <sup>3</sup> ]	Annex	
<b>Solid brick Mz</b>					
<b>Solid brick Mz</b>	<b>NF</b> 240x115x71	$\geq 12$ or 20	$\geq 1,8$	C 4 – C 7	
<b>Solid sand- lime brick KS / perforated Sand- lime brick KSL</b>					
<b>Solid sand – lime brick KS</b>	<b>NF</b> 240x115x71	$\geq 12$ or 20	$\geq 1,8$	C 8 – C 9	
	240x115x113	$\geq 10$ or 20	$\geq 1,8$	C 10 – C 11	
<b>Perforated sand - lime brick KSL</b>	<b>3DF</b> 240x175x113	$\geq 12$ or 20	$\geq 1,4$	C 12 – C 13	
<b>Vertical perforated brick HLz</b>					
<b>Vertical perforated brick HLz</b>	240x175x113	$\geq 10$	$\geq 0,9$	C 14 – C 15	
	<b>2DF</b> 240x115x113	$\geq 20$	$\geq 1,4$	C 16 – C 17	
	500x175x237	$\geq 10$	$\geq 1,0$	C 18 – C 19	
	370x240x237	$\geq 10$	$\geq 1,0$		
	370x250x245	$\geq 8$	$\geq 0,6$	C 20 – C 21	
<b>Light-weight concrete hollow block Hbl</b>					
<b>Light-weight concrete hollow block Hbl</b>	362x240x240	$\geq 4$	$\geq 1,0$	C 22 – C 23	
<b>Autoclaved aerated concrete (AAC)</b>					
<b>PP2 / AAC</b>	500x300x250	$\geq 2$	$\geq 0,35$	C 24 – C 26	
<b>PP4 / AAC</b>		$\geq 4$	$\geq 0,5$		
<b>PP6 / AAC</b>		$\geq 6$	$\geq 0,65$		
fischer injection system FIS AB for masonry					
<b>Intended use</b> Overview of controlled bricks				<b>Annex B 10</b>	

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

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

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

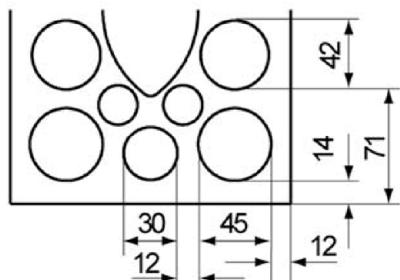
fischer injection system FIS AB for masonry

Intended use  
Spacing and edge distance

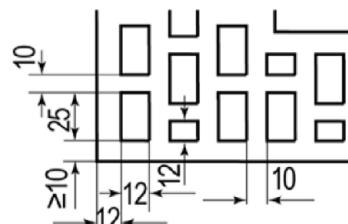
Annex B 11

**Table B12.1: Overview dimensions of perforated and hollow bricks**

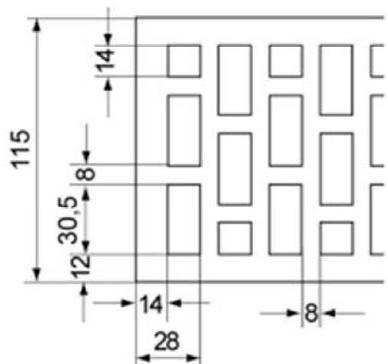
Perforated sand-lime brick KSL, 3DF, EN 771-2:2015;  
e.g. KS Wemding according to Annex C 12



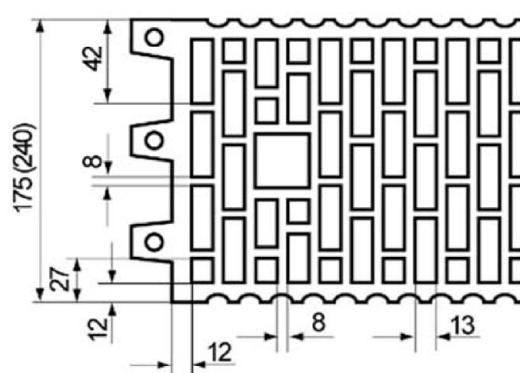
Vertical perforated brick HLz, EN 771-1:2015:  
e.g. Wienerberger, according to Annex C 14



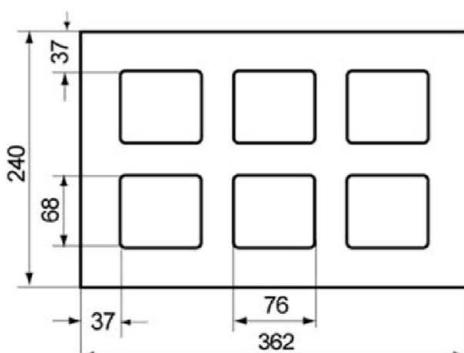
Vertical perforated brick HLz, 2DF, EN 771-1:2015:  
e.g. Wienerberger, Poroton according to Annex C 16



Vertical perforated brick HLz, EN 771-1:2015  
according to Annex C 18



Light-weight concrete hollow block Hbl, EN 771-3:2015  
according to Annex C 22



Figures not to scale

fischer injection system FIS AB for masonry

**Intended use**  
Overview dimensions of perforated and hollow bricks

**Annex B 12**

**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	15(13)	23(21)
		5.8	19(17)	29(27)
		8.8	29(27)	47(43)
		50	19	29
		70	26	41
	Stainless steel R and High corrosion resistant steel HCR	80	30	47
				68
Partial factors <sup>1)</sup>				
$\gamma_{M,N}$	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 <sup>2)</sup> / 1,87	
		80	1,60	

<sup>1)</sup> In absence of other national regulations

<sup>2)</sup> Only for fischer FIS A made of high corrosion-resistant steel HCR

<sup>3)</sup> 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 AB for masonry

**Performance**

Characteristic steel bearing capacity of anchor rods under tensile load

**Annex C 1**

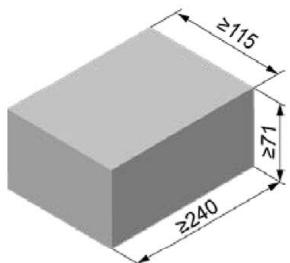
**Table C2.1:** Characteristic values for the **steel bearing capacity of anchor rods under shear load**

Anchor rod		M8	M10	M12	
<b>Bearing capacity under shear load, steel failure</b>					
<b>without lever arm</b>					
Characteristic resistance $V_{Rk,s}$	Property class	4.8	9(8)	14(13)	
		5.8	11(10)	17(16)	
		8.8	15(13)	23(21)	
		50	9	15	
		70	13	20	
		80	15	23	
<b>with lever arm</b>					
Characteristic resistance $M^0_{Rk,s}$	Property class	4.8	15(13)	30(27)	
		5.8	19(16)	37(33)	
		8.8	30(26)	60(53)	
		50	19	37	
		70	26	52	
		80	30	60	
<b>Partial factors<sup>1)</sup></b>					
$\gamma_{M,V}$	Property class	4.8		1,25	
		5.8		1,25	
		8.8		1,25	
		50		2,38	
		70		1,25 <sup>2)</sup> / 1,56	
		80		1,33	
<sup>1)</sup> In absence of other national regulations <sup>2)</sup> Only for fischer FIS A made of high corrosion-resistant steel HCR <sup>3)</sup> 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 AB for masonry					
<b>Performance</b> Characteristic steel bearing capacity of anchor rods under shear load				<b>Annex C 2</b>	

**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				
<b>Bearing capacity under tensile load, steel failure</b>										
Characteristic resistance with screw $N_{Rk,s}$	Property class	5.8	[kN]	10	18	29				
	Property class R	R		14	26	41				
	Property class 70	HCR		14	26	41				
<b>Partial factors<sup>1)</sup></b>										
Partial factor $\gamma_{Ms,N}$	Property class	5.8	[-]	1,50						
	Property class R	R		1,87						
	Property class 70	HCR		1,87						
<b>Bearing capacity under shear load, steel failure</b>										
<b>without lever arm</b>										
Characteristic resistance with screw $V_{Rk,s}$	Property class	5.8	[kN]	5	9	15				
	Property class R	R		7	13	20				
	Property class 70	HCR		7	13	20				
<b>with lever arm</b>										
Characteristic resistance $M_{Rk,s}^0$	Property class	5.8	[Nm]	8	19	37				
	Property class R	R		11	26	52				
	Property class 70	HCR		11	26	52				
<b>Partial factors<sup>1)</sup></b>										
Partial factor $\gamma_{Ms,V}$	Property class	5.8	[-]	1,25						
	Property class R	R		1,56						
	Property class 70	HCR		1,56						
<sup>1)</sup> In absence of other national regulations										
fischer injection system FIS AB for masonry										
<b>Performance</b> Characteristic steel bearing capacity of fischer internal threaded anchor FIS E					<b>Annex C 3</b>					

### Solid brick Mz, NF, EN 771-1:2015



Solid brick Mz, NF, EN 771-1:2015		
Producer	e.g. Wienerberger	
Nominal dimensions [mm]	length L ≥ 240	width W ≥ 115
Density $\rho$ [kg/dm <sup>3</sup> ]		height H ≥ 71
Compressive strength $f_b$ [N/mm <sup>2</sup> ]		≥ 12 / ≥ 20
Standard or annex	EN 771-1:2015	

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

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	- <sup>1)</sup>
$s_{min \parallel, N}$		60	60
$h_{ef}=200 s_{min \parallel, N}$		240	- <sup>1)</sup>
$s_{min \parallel, V}$		240	240
$s_{cr \parallel}$		240	240
$s_{cr \perp} = s_{min \perp}$		75	75
Drilling method			

Hammer drilling with hard metal hammer drill

<sup>1)</sup> 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		
$\alpha_{g,N} \parallel$	[-]	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 AB for masonry

#### Performance

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

Annex C 4

### Solid brick Mz, NF, EN 771-1:2015

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

Anchor rod		M8	M10			M12			-
Internal threaded anchor FIS E		-	-			-			M6
		-			-			11x85	
<b>Tensile load N<sub>Rk</sub> [kN] depending on the compressive strength f<sub>b</sub> (temperature range 50/80°C)</b>									
compressive strength f <sub>b</sub>	use categorie	≥ 50	Effective anchorage depth h <sub>ef</sub> [mm]			50	80	200	85
≥ 12N/mm <sup>2</sup>	w/w	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/mm <sup>2</sup>	w/w	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=100mm

Anchor rod		M8	M10			M12			-
Internal threaded anchor FIS E		-	-			-			M6
		-			-			11x85	
<b>Shear load V<sub>Rk</sub> [kN] depending on the compressive strength f<sub>b</sub> (temperature range 50/80°C)</b>									
compressive strength f <sub>b</sub>	use categorie	≥ 50	≥ 50	200	≥ 50	200	200	85	
≥ 12N/mm <sup>2</sup>	w/w	2,5	4,0	8,5	4,0	11,5	11,5	2,5	
	d/d								
≥ 20N/mm <sup>2</sup>	w/w	4,0	6,0	12,0	5,5	12,0	12,0	4,0	
	d/d								

Factor for job site tests and displacements see annex C27

fischer injection system FIS AB for masonry

**Performance**

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

**Annex C 5**

## Solid brick Mz, NF, EN 771-1:2015

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

Anchor rod	M8	M10	M12	-								
Internal threaded anchor FIS E	-	-	-	M6	M8							
						11x85						
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>												
Effective anchorage depth $h_{\text{ef}}$	[mm]	50	50	50	85							
		100	100	100								
		200	200	200								
Max. installation torque $T_{\text{inst}}$	[Nm]	10			4	10						
<b>General installation parameters</b>												
Edge distance $C_{\text{min}}$	[mm]	60										
Edge distance $h_{\text{ef}}=200$ $C_{\text{min}}$		60										
Spacing		80										
		80										
		80										
		3x $h_{\text{ef}}$										
		80										
		3x $h_{\text{ef}}$										
<b>Drilling method</b>												
Hammer drilling with hard metal hammer drill												

**Table C6.2:** Group factors

Anchor rods	M8	M10	M12	-						
Internal threaded anchor FIS E	-	-	-	-	M6	M8				
Edge distance $C_{\text{min}}$	[mm]	60								
		0,6								
		1,3								
		1,4								
		1,5								
		0,3								
		1,3								
		2,0								
		1,1								
<b>fischer injection system FIS AB for masonry</b>										

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

**Annex C 6**

### Solid brick Mz, NF, EN 771-1:2015

**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									
<b>Tensile load N<sub>Rk</sub> [kN] depending on the compressive strength f<sub>b</sub> (temperature range 50/80°C)</b>																			
compressive strength f <sub>b</sub>	use category		Effective anchorage depth h <sub>ef</sub> [mm]																
	50	100	50	100	200	50	100	200			85								
$\geq 12\text{N/mm}^2$	w/w	w/d	2,0	2,0	2,5	- <sup>1)</sup>	2,0	2,5	- <sup>1)</sup>		- <sup>1)</sup>								
	d/d		3,0	4,0	3,0	4,0	9,5	3,0	4,0	9,5	- <sup>1)</sup>								
$\geq 20\text{N/mm}^2$	w/w	w/d	2,5	3,0	2,5	3,5	- <sup>1)</sup>	3,0	3,5	- <sup>1)</sup>	- <sup>1)</sup>								
	d/d		4,5	5,5	4,5	5,5	12	4,5	5,5	12	- <sup>1)</sup>								

<sup>1)</sup> 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									
<b>Shear load V<sub>Rk</sub> [kN] depending on the compressive strength f<sub>b</sub> (temperature range 50/80°C)</b>																			
compressive strength f <sub>b</sub>	use category		Effective anchorage depth h <sub>ef</sub> [mm]																
	50	100	50	100	200	50	100	200			85								
$\geq 12\text{N/mm}^2$	w/w	w/d	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	- <sup>1)</sup>								
	d/d																		
$\geq 20\text{N/mm}^2$	w/w	w/d	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	- <sup>1)</sup>								
	d/d																		

<sup>1)</sup> No performance assessed

Factor for job site tests and displacements see annex C27

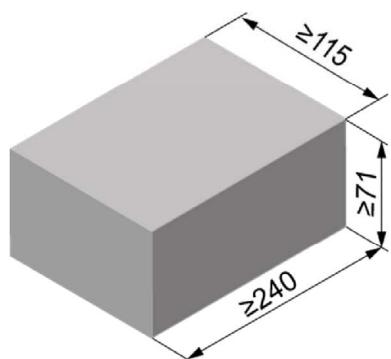
fischer injection system FIS AB for masonry

**Performance**

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

**Annex C 7**

### Solid sand-lime brick KS, NF, EN 771-2:2015



Solid sand-lime brick KS, NF, EN 771-2:2015			
Producer	-		
Nominal dimensions [mm]	length L ≥ 240	width W ≥ 115	height H ≥ 71
Density $\rho$ [kg/dm <sup>3</sup> ]	≥ 1,8		
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	≥ 12 / ≥ 20		
Standard or annex	EN 771-2:2015		

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 $h_{\text{ef}}$ [mm]	50	50	50	85					
	100	100	100						
	- <sup>1)</sup>	200	200						
Max. installation torque $T_{\text{inst}}$ [Nm]	5	15	15	3	5				
General installation parameters									
Edge distance $c_{\text{min}}$ Spacing $s_{\text{min II}}$ $s_{\text{cr II}}$ [mm]	60								
	80								
	3x $h_{\text{ef}}$								
	80								
	3x $h_{\text{ef}}$								
Drilling method									
Hammer drilling with hard metal hammer drill									

<sup>1)</sup> No performance assessed

Table C8.2: Group factors

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

fischer injection system FIS AB for masonry

#### Performance

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

#### Annex C 8

### Solid sand-lime brick KS, NF, EN 771-2:2015

**Table C9.1:** Characteristic resistance under tensile load

Anchor rod		M8		M10			M12			-	
Internal threaded anchor FIS E		-		-			-			M6	M8
										11x85	
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>											
compressive strength $f_b$	use category	50	100	50	100	200	50	100	200	85	
$\geq 12\text{N/mm}^2$	w/w	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	
$\geq 20\text{N/mm}^2$	w/w	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	
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>											
compressive strength $f_b$	use category	50	100	50	$\geq 100$	50	$\geq 100$	50	$\geq 100$	85	
$\geq 12\text{N/mm}^2$	w/w	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	
	d/d										
$\geq 20\text{N/mm}^2$	w/w	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	
	d/d										

Factor for job site tests and displacements see annex C27

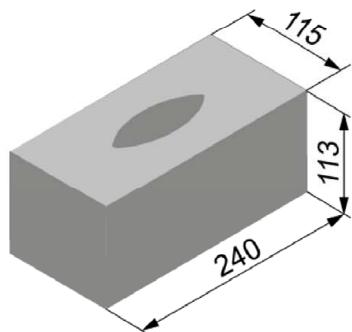
fischer injection system FIS AB for masonry

**Performance**

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

**Annex C 9**

## Solid sand-lime brick KS, EN 771-2:2015



Solid sand-lime brick KS, EN 771-2:2015		
Producer	-	
Nominal dimensions [mm]	length L	width W
	240	115
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,8$	
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 10 / \geq 20$	
Standard or annex	EN 771-2:2015	

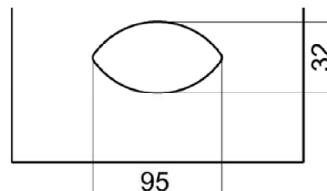


Table C10.1: Installation parameters

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

### Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS HK

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

### General installation parameters

Edge distance	$c_{min}$	100
	$s_{min \parallel}$	240
Spacing	$s_{cr \parallel}$ [mm]	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 11x85	-	-	-	-	M10 M12 15x85	-	-
Perforated sleeve FIS HK	12x85	16x85	16x130	16x130	20x85	20x85	20x130	20x130	20x130

Group factor	$\alpha_{g,N} \parallel = \alpha_{g,v} \parallel$ $\alpha_{g,N} \perp = \alpha_{g,v} \perp$	[ - ]	2,0
			2,0

fischer injection system FIS AB for masonry

**Performance**  
Perforated sand-lime brick KS, dimensions, installation parameters

**Annex C 10**

English translation prepared by DIBt

### Solid sand-lime brick KS, EN 771-2:2015

**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					15x85					
Perforated sleeve FIS HK		12x85	16x85		16x130	20x85		20x130				
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	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			
$\geq 20\text{N/mm}^2$	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 HK		12x85	16x85		16x130	20x85		20x130				
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	w/w	w/d	3,0						3,5			
	d/d											
$\geq 20\text{N/mm}^2$	w/w	w/d	4,5						5,5			
	d/d											

Factor for job site tests and displacements see annex C27

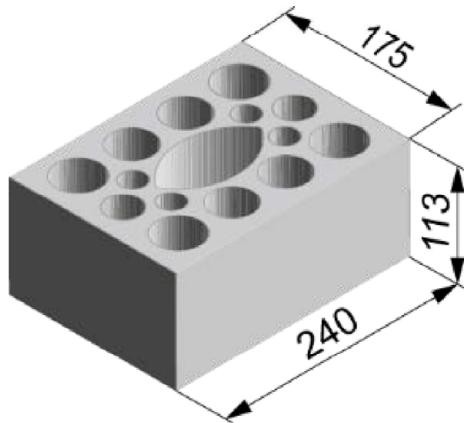
fischer injection system FIS AB for masonry

**Performance**

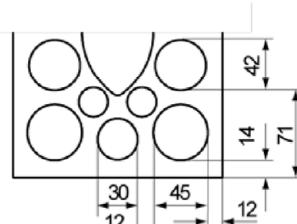
Perforated sand-lime brick KS, Characteristic resistance under tensile and shear load

**Annex C 11**

## Perforated sand-lime brick KSL, 3DF, EN 771-2:2015



Perforated sand-lime brick KSL, 3DF, EN 771-2:2015		
Producer	e.g. KS Wemding	
Nominal dimensions [mm]	length L	width W
	240	175
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,4$	
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 12 / \geq 20$	
Standard or annex	EN 771-2:2015	



Dimension see also  
Annex B 12

Table C12.1: Installation parameters

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

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

Max. installation torque	$T_{inst}$ [Nm]	2
<b>General installation parameters</b>		
Edge distance	$c_{min}$	60
	$s_{min \parallel}$	100
Spacing	$s_{cr \parallel}$ [mm]	240
	$s_{min \perp}$	115
	$s_{cr \perp}$	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 11x85	-	-	-	-	M10 M12 15x85	-	-
Perforated sleeve FIS H K	12x85	16x85	16x130	16x130	20x85	20x130			
Group factors	$\alpha_{g,N} \parallel = \alpha_{g,v} \parallel$ $\alpha_{g,N} \perp = \alpha_{g,v} \perp$	[ $\cdot$ ]					1,5		

fischer injection system FIS AB for masonry

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

**Annex C 12**

**Perforated sand-lime brick KSL, 3DF, EN 771-2:2015**

**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					
<b>Perforated sleeve FIS H K</b>		<b>12x85</b>	<b>16x85</b>		<b>16x130</b>	<b>20x85</b>		<b>20x130</b>				
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 12\text{N/mm}^2$	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			
$\geq 20\text{N/mm}^2$	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					
<b>Perforated sleeve FIS H K</b>		<b>12x85</b>	<b>16x85</b>		<b>16x130</b>	<b>20x85</b>		<b>20x130</b>				
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 12\text{N/mm}^2$	w/w	w/d	2,5						4,5			
	d/d											
$\geq 20\text{N/mm}^2$	w/w	w/d	4,5	4,0					7,5			
	d/d											

Factor for job site tests and displacements see annex C27

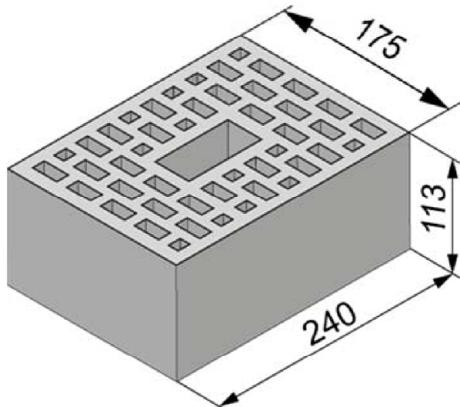
fischer injection system FIS AB for masonry

**Performance**

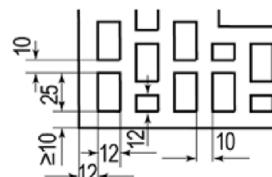
Perforated sand-lime brick KSL, 3DF,  
Characteristic resistance under tensile and shear load

**Annex C 13**

### Vertical perforated brick HLz, EN 771-1:2015



Vertical perforated brick HLz, EN 771-1:2015		
Producer	e.g. Wienerberger	
Nominal dimensions [mm]	length L	width W
	240	175
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 0,9$	
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 10$	
Standard or annex	EN 771-1:2015	



Dimension see also Annex B 12

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	$s_{min \parallel}$		240																				
	$s_{cr \parallel}$		240																				
	$s_{min \perp}$		115																				
	$s_{cr \perp}$		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 AB for masonry

#### Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 14

### Vertical perforated brick HLz, EN 771-1:2015

**Table C15.1:** Characteristic resistance under tensile load

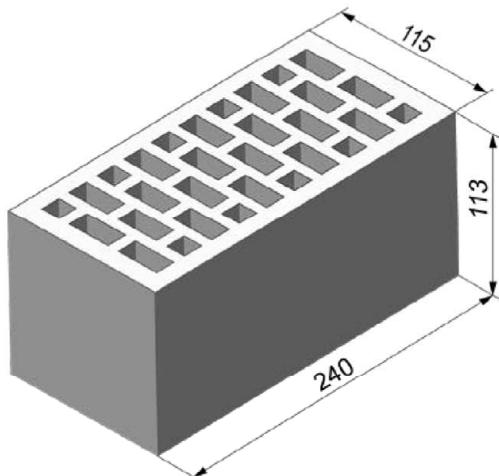
Anchor rod	M8	-	M8	M10	M8	M10	-	M12	M12			
Internal threaded anchor FIS E	-	M6	M8	-	-	-	M10	M12	-			
		11x85					15x85					
Perforated sleeve FIS H K		12x85	16x85		16x130	20x85		20x130				
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	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				
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	w/w	w/d	4,0	5,5			6,0					
	d/d											

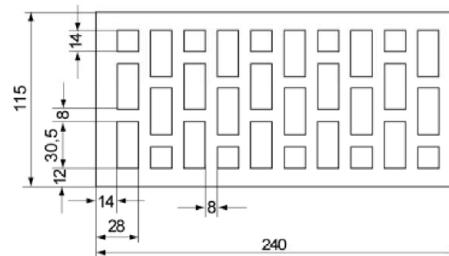
Factor for job site tests and displacements see annex C27

### Vertical perforated brick HLz, 2DF, EN 771-1:2015



#### Vertical perforated brick HLz, 2DF, EN 771-1:2015

Producer	e.g. Wienerberger	
Nominal dimensions [mm]	length L	width W
	240	115
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,4$	
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 20$	
Standard or annex	EN 771-1:2015	



Dimension see also  
Annex B 12

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						
<b>Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K</b>												
Max. installation torque $T_{inst}$ [Nm]				2								
<b>General installation parameters</b>												
Edge distance $c_{min}$	[mm]	80										
Spacing $s_{cr \parallel} = s_{min \parallel}$		240										
		115										
Spacing $s_{cr \perp} = s_{min \perp}$												
<b>Drilling method</b>												
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	$\alpha_{g,N \parallel}$ $\alpha_{g,v \parallel}$ $\alpha_{g,N \perp}$ $\alpha_{g,v \perp}$	[-]	2				

fischer injection system FIS AB for masonry

**Performance**

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

**Annex C 16**

### Vertical perforated brick HLz, 2DF, EN 771-1:2015

**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					
$\geq 20\text{N/mm}^2$	w/w		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		7,5	4,0	4,5	
	d/d				8,5	

Factor for job site tests and displacements see annex C27

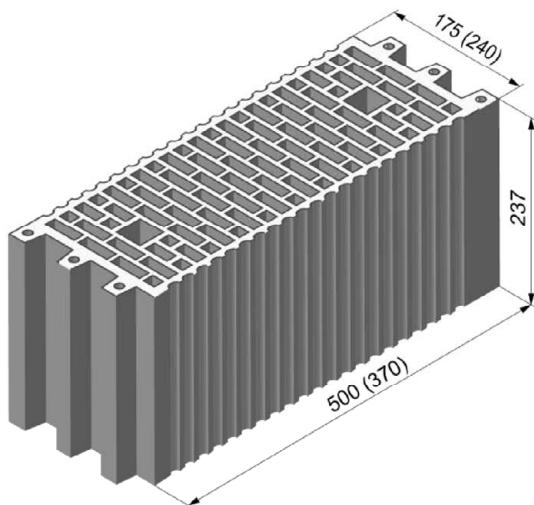
fischer injection system FIS AB for masonry

**Performance**

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

**Annex C 17**

### Vertical perforated brick HLz, EN 771-1:2015



Vertical perforated brick HLz, EN 771-1:2015				
Producer	e.g. Wienerberger, Poroton			
Nominal dimensions [mm]	length L	width W		
	500	175		
	370	240		
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,0$			
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 10$			
Standard or annex	EN 771-1:2015			
Dimension see also Annex B 12				

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	$c_{min}$	100
	$s_{min \parallel}$	100
Spacing	$s_{cr \parallel}$ [mm]	500 (370)
	$s_{min \perp}$	100
	$s_{cr \perp}$	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	$\alpha_{g,N \parallel} = \alpha_{g,v \parallel}$ $\alpha_{g,N \perp} = \alpha_{g,v \perp}$	[ $\cdot$ ]					1		

fischer injection system FIS AB for masonry

Performance  
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 18

### Vertical perforated brick HLz, EN 771-1:2015

**Table C19.1:** Characteristic resistance under tensile load

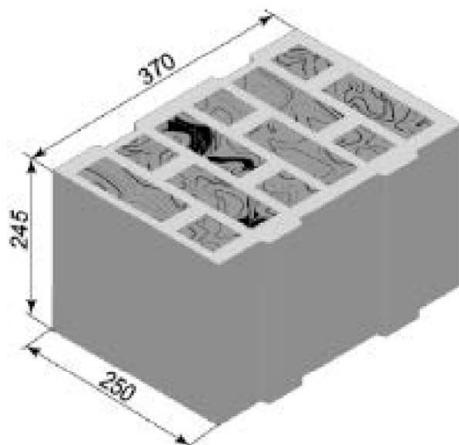
Anchor rod	M8	-	M8	M10	M8	M10	-	M12	M12			
Internal threaded anchor FIS E	-	M6	M8	-	-	-	M10	M12	-			
		11x85					15x85					
Perforated sleeve FIS H K		12x85	16x85		16x130	20x85		20x130				
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	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				
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>												
compressive strength $f_b$	use category											
$\geq 10\text{N/mm}^2$	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 771-1:2015



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

Producer	-		
Nominal dimensions [mm]	length L	width W	height H
	370	250	245
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 0,6$		
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 8$		
Standard or annex	EN 771-1:2015		

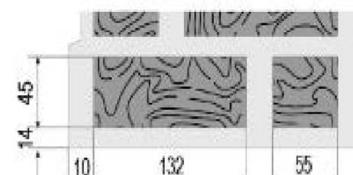


Table C20.1: Installation parameters

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	$c_{min}$	250
	$s_{min \parallel}$	250
Spacing	$s_{cr \parallel}$ [mm]	250
	$s_{min \perp}$	245
	$s_{cr \perp}$	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			

Group factors	$\alpha_{g,N \parallel}$ $\alpha_{g,V \parallel}$ $\alpha_{g,N \perp}$ $\alpha_{g,V \perp}$	[ $\cdot$ ]	2,0
---------------	--	-------------	-----

fischer injection system FIS AB for masonry

#### Performance

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

#### Annex C 20

**Vertical perforated brick HLz, filled with mineral wool, EN 771-1:2015**

**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	11x85				15x85	15x85		
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130	20x200
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>										
compressive strength $f_b$	use category									
$\geq 8\text{N/mm}^2$	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	11x85				15x85	15x85		
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130	20x200
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>										
compressive strength $f_b$	use category									
$\geq 8\text{N/mm}^2$	w/w	w/d	2,5		3,0		1,5			
	d/d									

Factor for job site tests and displacements see annex C27

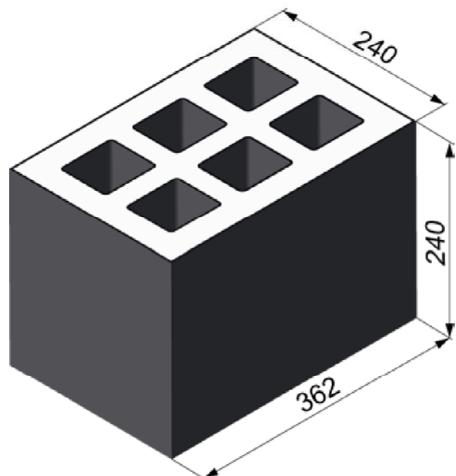
fischer injection system FIS AB for masonry

**Performance**

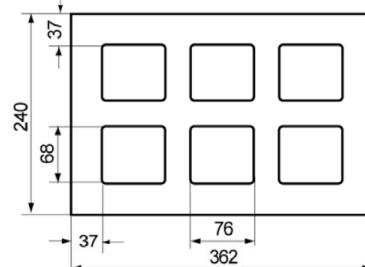
Vertical perforated brick HLz, filled with mineral wool;  
Characteristic resistance under tensile and shear load

**Annex C 21**

### Light-weight concrete hollow block Hbl, EN 771-3:2015



Light-weight concrete hollow block Hbl, EN 771-3:2015		
Producer	-	
Nominal dimensions [mm]	length L	width W
	362	240
height H	240	
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 1,0$	
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 4$	
Standard or annex	EN 771-3:2015	



Dimension see also  
Annex B 12

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	$c_{min}$	60
Spacing	$s_{min \parallel}$ [mm]	100
	$s_{cr \parallel}$	362
	$s_{min \perp} = s_{cr \perp}$	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	$\alpha_{g,N \parallel}$ $\alpha_{g,v \parallel}$ $\alpha_{g,N \perp}$ $\alpha_{g,v \perp}$	[ $\cdot$ ]							
							1,2		
							1,1		
							2,0		

fischer injection system FIS AB for masonry

#### Performance

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

#### Annex C 22

### Light-weight concrete hollow block Hbl, EN 771-3:2015

**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	11x85				15x85	15x85	
<b>Perforated sleeve FIS H K</b>		<b>12x85</b>	<b>16x85</b>		<b>16x130</b>	<b>20x85</b>		<b>20x130</b>	

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

compressive strength $f_b$	use category								
$\geq 4\text{N/mm}^2$	w/w	w/d							
	d/d								

3,0

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	11x85				15x85	15x85	
<b>Perforated sleeve FIS H K</b>		<b>12x85</b>	<b>16x85</b>		<b>16x130</b>	<b>20x85</b>		<b>20x130</b>	

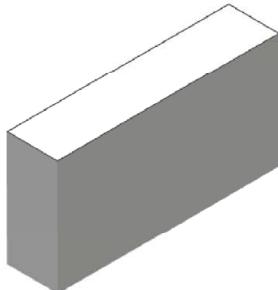
**Shear load  $V_{Rk}$  [kN] depending on the compressive strength  $f_b$  (temperature range 50/80°C)**

compressive strength $f_b$	use category								
$\geq 4\text{N/mm}^2$	w/w	w/d							
	d/d								

2,0

Factor for job site tests and displacements see annex C27

## Autoclaved aerated concrete, EN 771-4:2015



Autoclaved aerated concrete, EN 771-4:2015			
Producer	e.g. Ytong		
Density $\rho$ [kg/dm <sup>3</sup> ]	$\geq 0,35$	$\geq 0,5$	$\geq 0,65$
Compressive strength $f_b$ [N/mm <sup>2</sup> ]	$\geq 2$	$\geq 4$	$\geq 6$
Standard or annex	EN 771-4		

**Table C24.1:** Installation parameters

Anchor rod	M8	M10	M12	-	-				
Internal threaded anchor FIS E	-	-	-	M6	M8				
<b>Anchor rod and internal threaded anchor FIS E without perforated sleeve</b>									
Effective anchorage depth $h_{ef}$ [mm]	100	200	100	200	85				
Max. installation torque $T_{inst}$ [Nm]	1	8	2	12	16				
<b>General installation parameters</b>									
Edge distance $C_{min}$	[mm]	100							
$S_{cr \parallel} = S_{min \parallel}$		250							
$h_{ef}=200\text{mm}$		80							
$S_{min \parallel}$		3x $h_{ef}$							
$h_{ef}=200\text{mm}$		250							
$S_{cr \perp} = S_{min \perp}$		80							
$h_{ef}=200\text{mm}$		3x $h_{ef}$							
$S_{min \perp}$									
$h_{ef}=200\text{mm}$									
$S_{cr \perp}$									
<b>Drilling method</b>									
Hammer drilling with hard metal hammer drill									
fischer injection system FIS AB for masonry									
<b>Performance</b>									
Autoclaved aerated concrete, dimensions, installation parameters					<b>Annex C 24</b>				

**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
				11x85	
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	1,6	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \parallel$		1,1	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2		
	$h_{ef}=200 \alpha_{g,N} \perp$		1,6	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \perp$		0,8	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2		

<sup>1)</sup> 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
				11x85	
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	0,7	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \parallel$		2,0	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2		
	$h_{ef}=200 \alpha_{g,N} \perp$		0,7	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \perp$		1,2	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2		

<sup>1)</sup> 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
				11x85	
Group factors	$h_{ef}=200 \alpha_{g,N} \parallel$	[-]	0,7	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \parallel$		2,0	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \parallel, \alpha_{g,v} \parallel$		2		
	$h_{ef}=200 \alpha_{g,N} \perp$		0,7	- <sup>1)</sup>	- <sup>1)</sup>
	$h_{ef}=200 \alpha_{g,v} \perp$		1,2	- <sup>1)</sup>	- <sup>1)</sup>
	$\alpha_{g,N} \perp, \alpha_{g,v} \perp$		2		

<sup>1)</sup> No performance assessed

fischer injection system FIS AB for masonry

**Performance**  
Autoclaved aerated concrete, Group factors

**Annex C 25**

## Autoclaved aerated concrete, EN 771-4:2015

**Table C26.1:** Characteristic resistance under tensile load

Anchor rod		M8		M10		M12		-	-
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12
<b>Tensile load <math>N_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>									
compressive strength $f_b$	use category	Effective anchorage depth $h_{ef}$ [mm]				85			
$\geq 2 \text{ N/mm}^2$	w/w	w/d	1,5	2,0	1,5	3,0	1,5	3,0	1,5
	d/d		1,5	3,0	1,5	3,5	2,0	4,0	1,5
$\geq 4 \text{ N/mm}^2$	w/w	w/d	2,0	1,5	2,5	3,5	2,5	3,5	2,0
	d/d		2,0	3,0	3,0	5,0	2,5	5,0	2,0
$\geq 6 \text{ N/mm}^2$	w/w	w/d	3,0	2,5	4,5	5,0	4,5	7,0	3,5
	d/d		3,5	4,0	5,0	7,0	5,0	9,0	3,5

**Table C26.2:** Characteristic resistance under shear load

Anchor rod		M8		M10		M12		-	-
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12
<b>Shear load <math>V_{Rk}</math> [kN] depending on the compressive strength <math>f_b</math> (temperature range 50/80°C)</b>									
compressive strength $f_b$	use category	Effective anchorage depth $h_{ef}$ [mm]				85			
$\geq 2 \text{ N/mm}^2$	w/w	w/d	1,2	1,2	1,2	1,2	1,5	1,2	1,5
	d/d								
$\geq 4 \text{ N/mm}^2$	w/w	w/d	2,5	2,0	2,0	2,0	2,5	2,0	2,5
	d/d								
$\geq 6 \text{ N/mm}^2$	w/w	w/d	3,0	2,5	3,0	3,0	3,5	4,0	3,5
	d/d								

Factor for job site tests and displacements see annex C27

fischer injection system FIS AB for masonry

**Performance**  
Autoclaved aerated concrete, Characteristic resistance under tensile and shear load

**Annex C 26**

### **β-factors for job site tests; displacements**

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

use category	Size	w/w and w/d	d/d
temperature range		50/80	50/80
Material			
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]	δN₀ [mm]	δN∞ [mm]	V [kN]	δV₀ [mm]	δV∞ [mm]
solid units and autoclaved aerated concrete $h_{ef}=100\text{mm}$	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF annex C 4 - C 7	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,23	1,85
solid brick KS NF annex C 8 / C 9	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,2	0,4	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,91	1,37
Autoclaved aerated concrete (AAC) $h_{ef}=200\text{ mm}$ annex C 24 - C 26	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,25	1,88

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

fischer injection system FIS AB for masonry

**Performance**  
β-factors for job site tests; displacements

**Annex C 27**