



Approval body for construction products and types of construction

**Bautechnisches Prüfamt** 

An institution established by the Federal and Laender Governments



## European Technical Assessment

ETA-11/0419 of 4 November 2025

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 P Plus masonry

Metal Injection anchors for use in masonry

fischerwerke GmbH & Co. KG Klaus-Fischer-Straße 1 72178 Waldachtal DEUTSCHLAND

fischerwerke

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

EAD 330076-01-0604, Edition 10/2022

ETA-11/0419 issued on 30 October 2015



# European Technical Assessment ETA-11/0419

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English translation prepared by DIBt

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# European Technical Assessment ETA-11/0419

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#### **Specific Part**

#### 1 Technical description of the product

The fischer injection system FIS P Plus for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS P Plus, 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 fastener is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastener of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

## 3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for static and quasi-static loading	See Annexes B4 to B6, B13, B14, C1 to C28
Characteristic resistance and displacements for seismic loading	No performance assessed

## 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire under tension and shear loading with and without lever arm. Minimum edge distances and spacing	No performance assessed

#### 3.3 Hygiene, health and the environment (BWR 3)

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

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

In accordance with the European Assessment Document EAD 330076-01-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

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

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

Issued in Berlin on 4 November 2025 by Deutsches Institut für Bautechnik

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

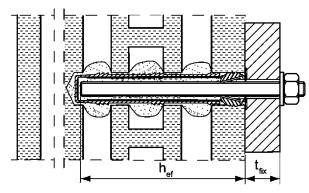
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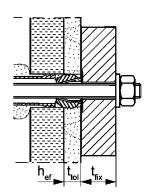
## Installation conditions part 1

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

## Pre-positioned installation:



Installation with render bridge



Size of the perforated sleeve: FIS H 12x50 K

FIS H 16x85 K

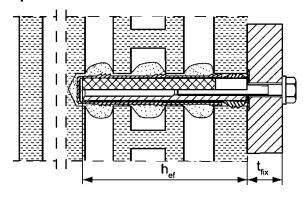
FIS H 20x85 K

FIS H 20x200 K

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

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

## Pre-positioned installation:



Figures not to scale

hef = effective anchorage depth

ttol = thickness of unbearing layer (e.g. plaster)

 $t_{fix}$  = thickness of fixture

fischer injection system FIS P Plus for masonry

#### **Product description**

Installation conditions part 1,

Anchor rods and internal threaded anchor with perforated sleeve

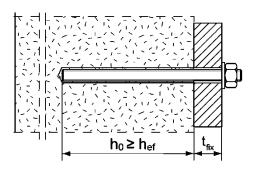
Annex A1



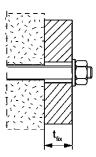
## Installation conditions part 2

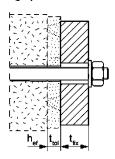
Anchor rods without perforated sleeve FIS H K; installation in solid brick masonry and autoclaved aerated concrete

#### Pre-positioned installation:



## Push through installation: Annular gap filled with mortar

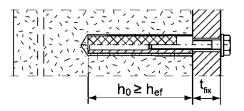




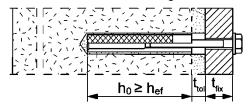
Installation with render bridge

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

## Pre-positioned installation:



#### Installation with render bridge



#### Figures not to scale

 $h_0$  = depth of drill hole

ttol = thickness of unbearing layer (e.g. plaster)

hef = effective anchorage depth

 $t_{fix}$  = thickness of fixture

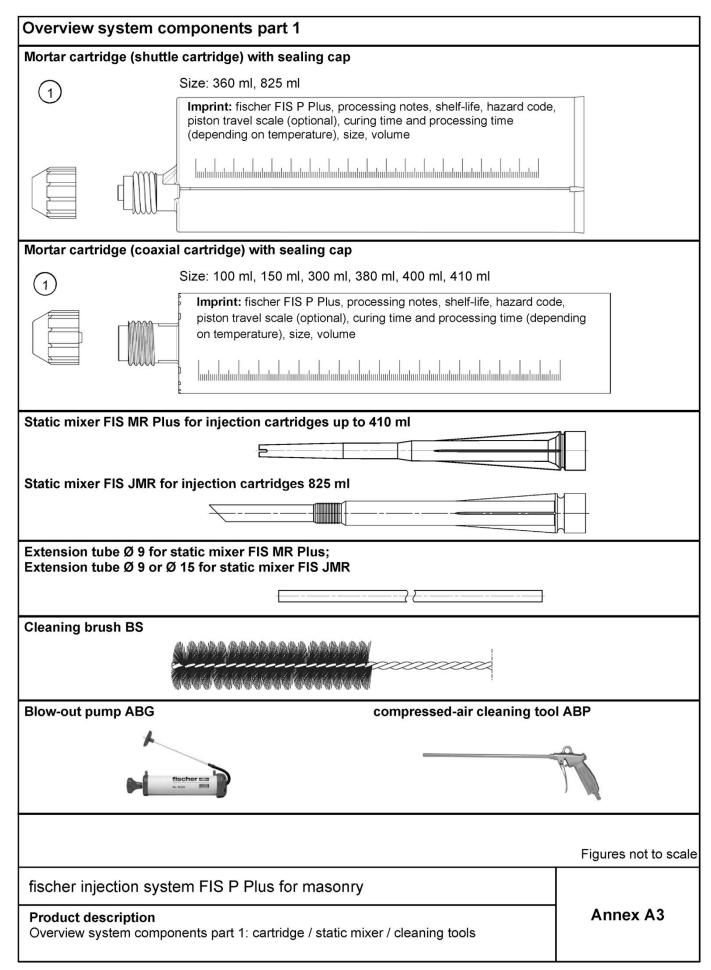
## fischer injection system FIS P Plus for masonry

## **Product description**

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

Annex A2







Overv	iew system components part	: 2		
fischer	anchor rod			
2		Size:	M6, M8, M10, M12, M16	
Interna	I threaded anchor FIS E			
5		Size:	11x85 M6 / M8 15x85 M10 / M12	
Perfora  7	ated sleeve FIS H K	Size:	FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K	
7		Size:	FIS H 16x130 K FIS H 20x130 K FIS H 20x200 K	
Washe	r		Π	
3				
Hexago	on nut			
4				
				Figures not to scale
fische	er injection system FIS P Plus fo	or masonry		
<b>Produ</b> Overvi	ct description ew system components part 2: steel	parts / perforate	d sleeve	Annex A4



Part	Designation		Material				
1	Mortar cartridge	Mortar, hardener; filler					
5		Steel	Stainless steel R	High corrosion resistant stee			
		zinc plated	acc. to EN 10088-1:2023 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2023 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:201			
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated ≥ 5µm, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 fuk ≤ 1000 N/mm² A <sub>5</sub> > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1:2023 f <sub>uk</sub> ≤ 1000 N/mm² A <sub>5</sub> > 8% fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with f <sub>yk</sub> = 560 N/mm <sup>2</sup> 1.4565; 1.4529 EN 10088-1:2023 f <sub>uk</sub> ≤ 1000 N/mm <sup>2</sup> A <sub>5</sub> > 8% fracture elongation			
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	1.4565;1.4529 EN 10088-1:2023			
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2022 zinc plated ≥ 5µm, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2023			
5	Internal threaded anchor FIS E	Property class 5.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023			
6	Commercial standard screw or threaded rod for internal threaded anchor FIS E	Property class 4.6, 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023			
7	Perforated sleeve		PP				
	luct description	tem FIS P Plus for masor	nry	Annex A5			

Intended Use Specifications part 1



#### Specifications of intended use part 1 Table B1.1: Overview use and performance categories fischer injection system fischer FIS P Plus for masonry Anchorages subject to Hole drilling with hammer drill mode all bricks Hole drilling with rotary drill mode all bricks Static and quasi static load, all bricks in masonry Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Anchor rod or Size: FIS H 12x50 K Pre-positioned internal threaded anchor FIS H 12x85 K installation (in solid brick masonry and FIS H 16x85 K autoclaved aerated concrete) Installation FIS H 16x130 K FIS H 20x85 K FIS H 20x130 K FIS H 20x200 K Anchor rod: Push through use in cylindrical drill hole (in solid brick masonry and autoclaved aerated installation concrete) conditions d/d (dry/dry) conditions w/d Installation and all bricks (wet/dry) use conditions conditions w/w (wet/wet) Installation direction D3 (downward and horizontal installation) $T_{i,min} = -5$ °C to $T_{i,max} = +40$ °C Installation temperature Temperature (max. short term temperature +80 °C -40 °C to +80 °C range Tb max. long term temperature +50 °C) In-service temperature Temperature (max. short term temperature +120 °C; -40 °C to +120 °C max. long term temperature +72 °C) range Tc fischer injection system FIS P Plus for masonry

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Annex B1



## 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 B10.
- Hollow brick masonry (base material group c), according to Annex B10.
- For minimum thickness of masonry member is hef+30mm.
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2016.
- For other bricks in solid masonry, hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to EOTA Technical Report TR 053:2022-07 under consideration of the β-factor according to Annex C28, Table C28.1.

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

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

#### **Temperature Range:**

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

#### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel)
- For all other conditions according to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance classes to Annex A5, Table A5.1.

fischer injection system FIS P Plus for masonry	
Intended Use Specifications part 2	Annex B2



# Specifications of intended use part 3 continued Design:

 The anchorages have to be designed in accordance with EOTA Technical Report TR 054:2023-12 (included the dimensioning for fire exposure), 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 **N**<sub>Rk,pb</sub> or pushing out a brick under shear loading **V**<sub>Rk,pb</sub> see EOTA Technical Report TR 054:2023-12.

N<sub>Rk,s</sub>, V<sub>Rk,s</sub> and M<sup>0</sup><sub>Rk,s</sub> see annexes C1-C3.

Factors for job site tests and displacements see annex C28.

 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.
- · Hole drilling see Annex C (drilling method).
- In case of aborted hole: The hole shall be filled with injection mortar.
- 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.
- 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 mentioned in Annex A5, Table A5.1.
- Minimum curing time see Annex B7, Table B7.3.
- 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 A5, Table A5.1

Conformation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204:2004, the documents shall be stored.

Marking of the anchor rod with the envisage embedment depth. This may be done by the manufacturer of the rod or by a person on job site.

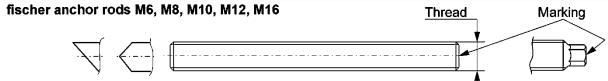
fischer injection system FIS P Plus for masonry	
Intended Use Specifications part 3 continued	Annex B3



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

Anchor rod		Thread	M6	M8	M10	M12	M16	
Nominal drill hole diame	Nominal drill hole diameter d <sub>0</sub> [mm]		8	10	12	14	18	
Effective anchorage depth h <sub>ef</sub> 1) in AAC cylindrical drill hole		h <sub>0,min</sub> ≥ h <sub>ef,min</sub> [mm]	100					
		h <sub>0,max</sub> ≥h <sub>ef,max</sub> [mm]	h-30, ≤200					
Effective anchorage depth $h_{ef}^{1)}$ in solid brick (depth of drill hole $h_0 \ge h_{ef}$ )		h <sub>ef,min</sub> [mm]	50					
		h <sub>ef,max</sub> [mm]	h-30, ≤200					
		ositioning d <sub>f</sub> ≤[mm]	7	9	12	14	18	
		h through d₁≤[mm]	9 11 14 16 20					
Diameter of cleaning bru	ush	d <sub>b</sub> ≥[mm]	nm] see Table B7.1					
Maximum installation to	rque	T <sub>inst</sub> [Nm]	see parameters of brick					

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



Marking (on random place) fischer anchor rod:

Steel zinc plated PC <sup>1)</sup> 8.8	• or <b>+</b>	Steel hot-dip galvanised PC1) 8.8	•
High corrosion resistant steel HCR PC1) 50	•	High corrosion resistant steel HCR PC1) 70	_
High corrosion resistant steel HCR PC1) 80	(	Stainless steel R property class 50	~
Stainless steel R property class 80	*		

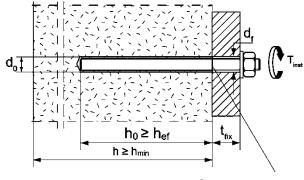
Alternatively: Colour coding according to DIN 976-1: 2016;

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

1) PC = property class

## Installation conditions:

Anchor rod in cylindrical drill hole



Setting depth mark

Figures not to scale

fischer injection system FIS P Plus for masonry

Intended Use
Installation parameters for anchor rods without perforated sleeve

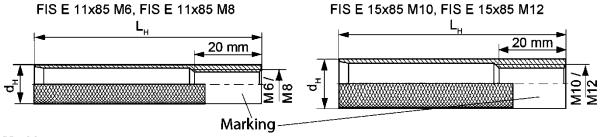
Annex B4



**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 M6 11x85 M8		15x85 M12			
Diameter of anchor	d⊦ [mm]	11 15					
Nominal drill hole diameter	d₀ [mm]	14 18					
Length of anchor	L⊦ [mm]		8	35			
Effective anchorage depth	h₀ ≥ h <sub>ef</sub> [mm]	85					
Diameter of cleaning brush	d <sub>b</sub> ≥[mm]	see Table B7.1					
Maximum installation torque	T <sub>inst</sub> [Nm]	see parameters of brick					
Diameter of clearance hole in the fixture	d <sub>f</sub> [mm]	7 9		12	14		
Carous in donth	I <sub>E,min</sub> [mm]	6 8		10	12		
Screw-in depth	I <sub>E.max</sub> [mm]	60					

#### fischer Internal threaded anchor FIS E

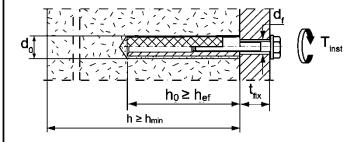


#### Marking:

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

#### Installation conditions:

Internal threaded anchor in cylindrical drill hole



Figures not to scale

fischer injection system FIS P Plus for masonry

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

Annex B5



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

perforated sleeve FIS H K	12x50	12x85 <sup>2)</sup>	16x85	16x130 <sup>2)</sup>	20x85	20x130 <sup>2)</sup>	20x200 <sup>2)</sup>	
Nominal drill hole diameter d <sub>0</sub> = D <sub>sleeve,nom</sub>	d₀[mm]	12		16		20		
Depth of drill hole	h₀ [mm]	55	90	90	135	90	135	205
Effective encharge denth	h <sub>ef.min</sub> [mm]	50	65	85	110	85	110	180
Effective anchorage depth	h <sub>ef,max</sub> [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-]	M6 a	nd M8	M8 ar	nd M10	M	I12 and M	16
Size of internal threaded anchor	FIS E	-	-	11x85	-	15x85	-	-
Diameter of cleaning brush <sup>1)</sup>	d <sub>b</sub> ≥[mm]	nm] see Table B7.1			7.1			
Maximum installation torque	T <sub>inst</sub> [Nm]	nl see parameters of brick						

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

#### Perforated sleeve

FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;

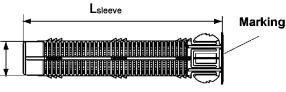
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

#### Marking:

Size D<sub>sleeve, nom</sub> x L<sub>sleeve</sub> (e.g.: 16x85)

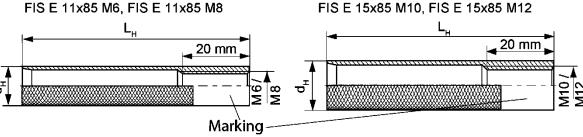


D<sub>sleeve, nom</sub>



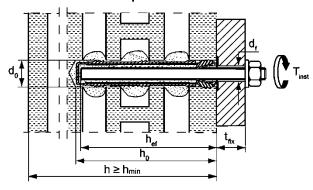
## fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

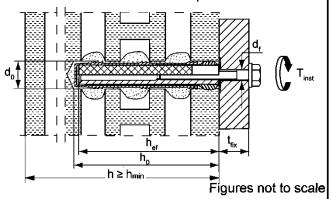


#### Installation conditions:

Anchor rod with perforated sleeve



Internal threaded anchor with perforated sleeve



## fischer injection system FIS P Plus for masonry

#### Intended Use

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

Annex B6

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



Table B7.1: Parameters of the cleaning brush BS (steel brush with steel bristles)									
The size of the cleaning	g brush refers	to the dri	ll hole dia	meter					
Drill hole diameter	d₀ [mm]	8	10	12	14	16	18	20	22
Brush diameter	d₀ [mm]	9	11	14	16	20	20	25	25



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

Table B7.2: Conditions for use static mixer without an extension tube

Nominal drill hole diameter	d <sub>0</sub>	[mm]	10	12	14	16	18	20	22
Drill hole depth ho	FIS MR Plus	[mm]	≤90		≤120 ≤140 ≤150		≤160	≤170	
by using	FIS JMR	[mm]	-		≤90			≤2	60

Table B7.3: 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	Maximum processing time <sup>2)</sup> t <sub>work</sub>	Minimum curing time 1), 2) t <sub>cure</sub>				
[°C]	FIS P Plus	FIS P Plus				
> -5 to 0	> 13 min	24 h				
> 0 to 5	13 min	3 h				
> 5 to 10	9 min	90 min				
> 10 to 20	5 min	60 min				
> 20 to 30	4 min	45 min				
> 30 to 40	2 min	35 min				

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

Figures not to scale

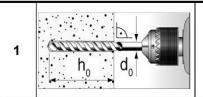
fischer injection system FIS P Plus for masonry	
Intended Use Cleaning brush (steel brush) Maximum processing times and minimum curing times	Annex B7

<sup>&</sup>lt;sup>2)</sup> Minimum cartridge temperature +5°C.

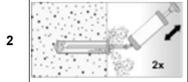


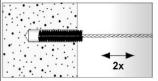
## Installation instruction part 1

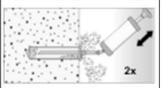
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)



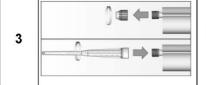
Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole h₀ and drill hole diameter d₀ see Table B4.1; B5.1.



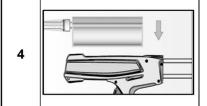




Blow out the drill hole twice. Brush twice and blow out twice again.



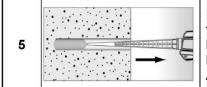
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



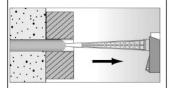
Place the cartridge into a suitable dispenser.



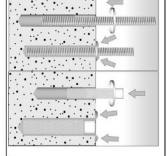
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



Fill approximetly 2/3 of the drill hole with mortar beginning from the bottom of the hole<sup>1)</sup>. Avoid bubbles!



For push through installation fill the annular clearance with mortar.



Only use clean and oil-free metal parts.

Mark the anchor rod for setting depth.

Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions.

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

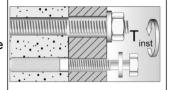
7

6



Do not touch.

Minimum curing time see **Table B7.3**.



Mounting the fixture. max T<sub>inst</sub> see parameter of brick in **Annex C**.

fischer injection system FIS P Plus for masonry

#### Intended Use

Installation instruction (without perforated sleeve) part 1

Annex B8

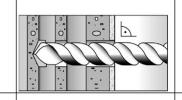
<sup>1)</sup> Exact volume of mortar see manufacturer's specification.

1



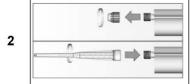
## Installation instruction part 2

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

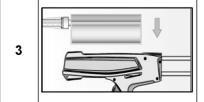


Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole  $h_0$  and drill hole diameter  $d_0$  see **Table B6.1** 

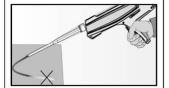
When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.



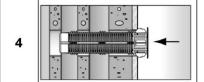
Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).



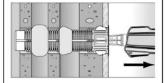
Place the cartridge into a suitable dispenser.



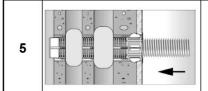
Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.



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



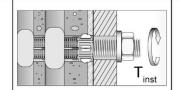
Fill the perforated sleeve completely with mortar beginning from the bottom of the hole<sup>1)</sup>.



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



Do not touch. Minimum curing time see **Table B7.3** 



Mounting the fixture. max T<sub>inst</sub> see parameter of brick in **Annex C**.

fischer injection system FIS P Plus for masonry

#### Intended Use

Installation instruction (with perforated sleeve) part 2

Annex B9

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



Table B10.1: Over	view	of assessed b	ricks								
Kind of masonry Brick format [mm]			Mean compressive strength [N/mm²]	Main country of origin	Mean gross density ρ [kg/dm³]	Annex					
	ē.		Solid brick Mz								
Solid brick Mz	NF	≥240x115x71	15 / 25 / 35	Germany	≥1,8	C4 - C7					
Solid calcium sili	Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL										
Solid calcium silicate	NF	≥240x115x71	15 / 25 / 35	Germany	≥2,0	C8 / C9					
brick KS		≥ 240x115x113	12,5 / 25	Germany	≥1,8	C10 / C11					
Perforated calcium silicate brick KSL	3DF	240x175x113	10 / 12,5 / 15 / 20 / 25	Germany	≥1,4	C12 – C14					
		Vertic	al perforated brick HLz								
		370x240x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C15 / C16					
V. C. I C (		500x175x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C15 / C16					
Vertical perforated brick HLz	2DF	240x115x113	7,5 / 12,5 / 20 / 25 / 35	Germany	≥1,4	C17 / C18					
OTION TIEZ		365x248x245	10	Austria	≥0,6	C19 - C20					
		240x175x113	12,5	Germany	≥0,9	C21 / C22					
		Light-weig	ht concrete hollow block	k Hbl							
Light-weight concrete hollow block Hbl		362x240x240	2,5 / 5	Germany	≥1,0	C23 / C24					
		Autoclav	ed aerated concrete (AA	(C)							
PP2 / AAC	-		2,5	Germany	0,35	C25 - C27					
PP4 / AAC	-		5	Germany	0,5	C25 - C27					
PP6 / AAC			8	Germany	0,65	C25 - C27					

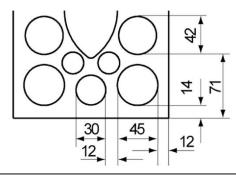
fischer injection system FIS P Plus for masonry	
Intended Use Overview of assessed bricks	Annex B10





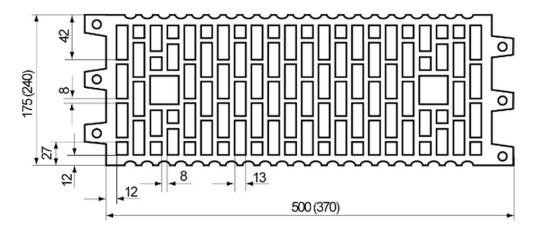
Perforated calcium silicate brick KSL, 3DF,

EN 771-2:2011+A1:2015; e.g. KS Wemding according to Annex C12



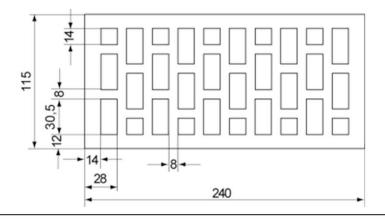
Vertical perforated brick HLz,

EN 771-1:2011+A1:2015: e.g. Wienerberger, Poroton according to Annex C15



Vertical perforated brick HLz, 2DF,

EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C17



Measures in [mm] Figures not to scale

fischer injection system FIS P Plus for masonry

#### **Intended Use**

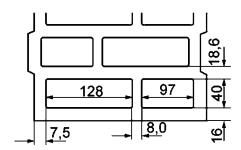
Overview dimensions of perforated and hollow bricks part 1

**Annex B11** 



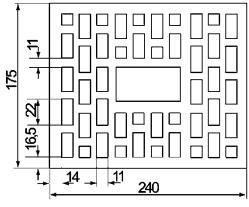


Vertical perforated brick filled with mineral wool, EN 771-1:2011+A1:2015; according to Annex C19



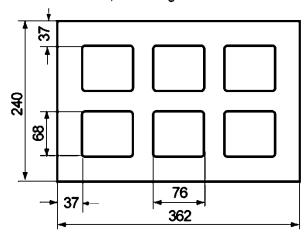
Vertical perforated brick HLz,

EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C21



Light-weight concrete hollow block Hbl,

EN 771-3:2011+A1:2015; according to Annex C23



Measures in [mm] Figures not to scale

fischer injection system FIS P Plus for masonry

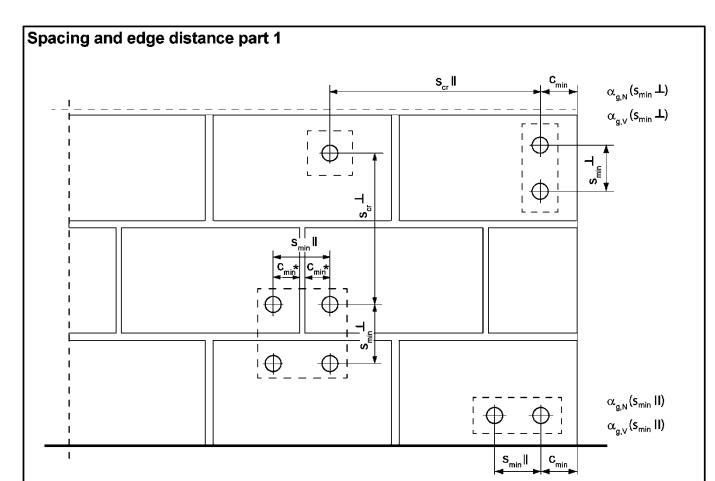
#### Intended Use

Overview dimensions of perforated and hollow bricks part 2

**Annex B12** 

8.06.04-363/21





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

 $s_{min}$  II = Minimum spacing parallel to horizontal joint

 $s_{min}$  = Minimum spacing perpendicular to horizontal joint

s<sub>cr</sub> II = Characteristic spacing parallel to horizontal joint

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

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

 $\alpha_{g,N}$  (s<sub>min</sub> II) = Group factor for tension load, anchor group parallel to horizontal joint

 $\alpha_{g,V}(s_{min} | I)$  = Group factor for shear load, anchor group parallel to horizontal joint

 $\alpha_{g,N}(s_{min}^{\perp})$  = Group factor for tension load, anchor group perpendicular to horizontal joint

 $\alpha_{g,V}(s_{min} \perp)$  = Group factor for shear load, anchor group perpendicular to horizontal joint

Figures not to scale

fischer injection system FIS P Plus for masonry	
Intended Use Spacing and edge distance part 1	Annex B13



## Spacing and edge distance part 2

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

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

## Group of 2 anchors

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

## Group of 4 anchors

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

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

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

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

fischer injection system FIS P Plus for masonry

Intended Use

Spacing and edge distance part 2

Annex B14



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

Anch	or rod / standard	threaded ro	d		M6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16		
Chara	acteristic resistar	ice to steel t	failure	unde	er tension lo	ading					
			4.6		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
v	Ctool zine plated		4.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
stic ZRK,	Steel zinc plated		5.8		10,0	18,3(16,6)	29,0(26,8)	42,1	78,5		
teri		Property	8.8	FLAIT	16,0	29,2(26,5)	46,4(42,8)	67,4	125,6		
Characteristic resistance N <sub>Rk,s</sub>	Stainless steel R and	class –	50	[kN]	10,0	18,3	29,0	42,1	78,5		
ည် နို	High corrosion		70		14,0	25,6	40,6	59,0	109,9		
	resistant steel HCR		80		16,0	29,2	46,4	67,4	125,6		
Partia	al factors 1)		12								
			4.6				2,00				
10	Ctool zine plated		4.8		1,50						
ors	Steel zinc plated		5.8		1,50						
fact °,×	Stainless steel R and	Property	8.8		1,50						
Partial factors			50	[-]	2,86						
Pa	High corrosion		70			1,50 <sup>2)</sup> / 1,87					
	resistant steel HCR		80				1,60				

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

$\vdash$		
fi	scher injection system FIS P Plus for masonry	
C	Performance Characteristic resistance to steel failure under tension loading of fischer anchor rods and standard threaded rods	Annex C1

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

<sup>&</sup>lt;sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area A<sub>s</sub> for hot-dip galvanised standard threaded rods according to EN ISO 10684:2004+AC:2009.



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

	41101	101 1040 0	411G O	tarrac	ara tinoaa						
Anch	or rod / standard	threaded ro	od		М6	M8 <sup>3)</sup>	M10 <sup>3)</sup>	M12	M16		
Char	acteristic resistar	ice to steel	failure	unde	er shear load	ding					
witho	ut lever arm										
			4.6		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6		
v	Ctaal zina platad		4.8		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6		
stic V <sub>RK,</sub>	Steel zinc plated		5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1		
teri	-	Property	8.8	[LAI]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8		
Characteristic esistance V <sub>RK,s</sub>	Stainless steel R and	class	50	[kN]	5,0	9,1	14,5	21,0	39,2		
다 Si	High corrosion resistant steel		70		7,0	12,8	20,3	29,5	54,9		
	HCR		80		8,0	14,6	23,2	33,7	62,8		
with	ever arm	~									
ee	Steel zinc plated	Property	4.6		6,1	14,9(12,9)	29,9(26,5)	52,3	132,9		
tan			4.8	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9		
esis			5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2		
ristic re M <sup>0</sup> Rk,s			8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9		
Characteristic resistance M <sup>0</sup> Rk,s	Stainless steel R and	class	50		7,6	18,7	37,3	65,4	166,2		
aract	High corrosion resistant steel		70		10,6	26,2	52,3	91,5	232,6		
Ch	HCR		80		12,2	29,9	59,8	104,6	265,9		
Partia	al factors <sup>1)</sup>										
			4.6				1,67				
	Steel zinc plated		4.8		1,25						
tors	Steel Zille plated		5.8		1,25						
al fact ‱,∨		Property	8.8	[-]		1,25					
Partial factors	Stainless steel R and	class	50	[-]			2,38				
P	High corrosion resistant steel		70				1,25 <sup>2)</sup> / 1,56				
	HCR		80				1,33				

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

fischer injection system FIS P Plus for masonry	
Performance Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods	Annex C2

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

<sup>&</sup>lt;sup>3)</sup> Values in brackets are valid for undersized threaded rods with smaller stress area A<sub>s</sub> for hot-dip galvanised standard threaded rods (M8 resp. M10) according to EN ISO 10684:2004+AC:2009.



fischer internal	thread	ed anchor	FIS E		M6	M8	M10	M12	
			STATISTICS IN THE	under	(E)(E)(A)(A)(A)	ding, decisive val	ues of inte	200000000000000000000000000000000000000	
anchor FIS E wi				C Market Header Look					
		Property class	4.6		8,0	14,6	23,2	33,7	
Characteristic resistance	$N_{Rk,s}$	Property class	5.8	[kN]	10,0	18,3	29,0	42,1	
		Property	R		14,0	25,6	40,6		
D1:-1 511		class 70	HCR		14,0	25,6	40,6	59,0	
Partial factors <sup>1)</sup>		<u></u>							
		Property class	4.6			2,	00		
Partial factors	γMs,N	Class	[-]			50			
		Property	R				87		
	-	class 70	HCR				87		
Characteristic r FIS E with screv			l failure	under	shear loadir	ng; decisive valu	es of inter	nal threaded anc	
without lever ar		ided 100							
at level al		Property							
		class	4.6		4,8	8,7	13,9	20,2	
Characteristic resistance	$V_{Rk,s}$	Property class	5.8	[kN]	6,0	10,9	15,0		
		Property	R		7,0	12,8	20,3		
parents are		class 70	HCR		7,0	12,8	20,3	3 29,5	
with lever arm									
		Property class	4.6		6,1	14,9	29,9	52,3	
Characteristic resistance	$M^0$ <sub>Rk,s</sub>	Property class	5.8	[Nm]	7,6	18,7	37,3	65,4	
		Property	R		10,6	26,2	52,3	91,5	
		class 70	HCR		10,6	26,2	52,3	91,5	
Partial factors <sup>1)</sup>									
		Property class	4.6			1,	67		
Partial factors	γMs,V	Property class	5.8	[-]	1,25				
		Property	R				56		
		class 70	HCR			1,	56		
1) In absence of	f other	national reg	ulations	S					
	on sys	tem FIS I	P Plus	for ma	asonry				
fischer injecti									



#### Solid brick Mz, NF, EN 771-1:2011+A1:2015 Producer e.g. Wienerberger length L | width W | height H Nominal dimensions [mm] ≥ 240 ≥ 115 ≥ 71 Mean gross dry density $\rho$ [kg/dm<sup>3</sup>] ≥ 1,8 Mean compressive strength / Min. 15 / 12 or 25 / 20 or $[N/mm^2]$ compressive strength single brick 1) 35 / 28 Standard or annex EN 771-1:2011+A1:2015

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

Anchor rod			M6	M8	M10	M12	6-			
Internal threa	aded anchor FIS E		•	-	_	-	М6	M8	M10	M12
							11>	(85	15>	(85
Anchor rod an	d internal threaded and	hor FIS E with	out perfor	ated sleev	е					
E. C.			50	50	50	50				
Effective anchorage dep	th h <sub>ef</sub>	[mm]	80	80	80	80		8	85	
anchorage dep	uı		200	200	200	200				
Max. installatio torque	n max T <sub>inst</sub>	[Nm]	4		10		4		10	
General instal	lation parameters									
Edge distance	C <sub>min</sub> = C <sub>cr</sub>			10	00			10	00	
Edge distance	h <sub>ef</sub> =200			15	50			-	2)	
	Smin II,N			6	60			6	60	
	h <sub>ef</sub> =200 s <sub>min</sub> II, <sub>N</sub>	[mm]		24	40			1.2	2)	
Spacing	s <sub>min</sub> II,v			24	40			2	40	
	Scr II			24	40			2	40	
	s <sub>cr</sub> ⊥ = s <sub>min</sub> ⊥			7	'5			7	'5	

## **Drilling method**

Hammer drilling with hard metal hammer drill

Table C4.2: Group factors

Anchor rods			M6	M8	M10	M12	87			-
Internal three	aded anchor FIS E						M6	M8	M10	M12
internal tille	aueu alichor FIS E		-	-	-		112	x85	15	<b>k</b> 85
Edge distance	C <sub>min</sub>	[mm]				100				
	α <sub>α.N</sub> (s <sub>min</sub> II)					1,5				
	α <sub>g,V</sub> (s <sub>min</sub> II)					2,0				
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)					1,5				
	hef=200 αg,v (Smin II)					2,0				
Group factor	α <sub>g,N</sub> (S <sub>min</sub> ⊥)	[-]				2,0				
	$\alpha_{q,V}$ ( $s_{min}$ $\perp$ )					2,0				
	h <sub>ef</sub> =200 $\alpha_{q,N}$ (s <sub>min</sub> $\perp$ )					2,0				
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)					2,0				

fischer injection system FIS P Plus for masonry	
Performance Solid brick Mz, NF, dimensions, installation parameters for edge distance c=100mm, Group factors	Annex C4

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> No performance assessed



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

**Table C5.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading for edge distance c=100mm

Anchor rod			M6	M8		M10			M12		-			•
Internal threaded ancl	or Fl	S F	_			7-					M6	M8	M10	M12
internal tilleaded alloi	101 1 1	O L	_	_							11x	85	15x85	
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk}$	, <sub>p,c</sub> =	N <sub>Rk,b,</sub>	c [kN];	tempe	ature	range	50/80	°C 2)					<del>-</del>	
Mean compressive	U	se				Effe	ctive a	nchora	ge de	oth hef	[mm]			
strength / Min. compressive strength single brick 1)	CC	on- ons	≥50	≥50	50	80	200	50	80	200			85	
15 / 12 N/mm²	w/w	w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0		3,5		
15 / 12 N/MM <sup>-</sup>	d	/d	4,0	4,0	3,5	5,0	12,0	3,0	5,5	8,0		į.	5,5	
25 / 20 N/mm <sup>2</sup>	w/w	w/d	3,5	3,5	3,0	4,5	11,0	3,0	5,0	7,0	5,0			
25 / 20 N/MM-	d	/d	5,5	5,5	5,0	7,0	12,0	4,5	8,0	11,5		8,0		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C5.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading for edge distance c=100mm

Anchor rod		M6	M8	M	10	M	12	-						
Internal threaded anch	or FIS F	_	_		•			M6	M8	M10	M12			
Internal unreaded and	01110 =	1772	100		=1	=	5	11x8	11x85 15x					
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk}$	<sub>k,c,⊥</sub> [kN];	temper	ature r	ange 50/8	30°C and	72/120°C								
Mean compressive strength / Min.	Use		1	E	ffective ar	chorage o	depth h <sub>ef</sub> [r	nm]						
compressive strength single brick 1)	con- ditions	≥50	≥50	≥50	200	≥50	200		8	5				
15 / 12 N/mm²	w/w w/d d/d	2,5	2,5	4,0	8,5	4,0	11,5		2,	5				
25 / 20 N/mm²	w/w w/d d/d	4,0	4,0	6,0	12,0	5,5	12,0		4,	0				

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance c=100mm	Annex C5

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C: N<sub>Rk (72/120°C)</sub> = 0,83 · N<sub>Rk (50/80°C)</sub>.



Internal threade FIS E Anchor rod and	d anchor		M6	M8	M10	M12	M16	3.	-		-
Anchor rod and	a anchor			-	-	-	-	M6	M8	M10	
								112	x85	15	<b>k85</b>
T# 4:	Internal	tnreade	50 ancnor	50 E With	50	ted sieeve 50	50	T			
Effective	h <sub>ef</sub>	[mm]	100	100	100	100	100	+	9	35	
anchorage depth	) He		200	200	200	200	200	1		,,,	
Max. installation torque	max T <sub>inst</sub>	[Nm]	4		1	0		4		10	
General installa	ition para	meters		•				ল'			
Edge distance	C <sub>min</sub> = C <sub>cr</sub>					60					
Edge distance h <sub>ef</sub> =200	C <sub>min</sub>					60					
	Smin II,N	4 -				80					
h <sub>ef</sub> =20	00 Smin II,N	1				80					
Spacing ———	S <sub>min</sub> II,v	1				80 3x h <sub>ef</sub>					
<del></del>	S <sub>cr</sub> Ⅱ S <sub>min</sub> ⊥	1				80					
-	S <sub>cr</sub> ⊥	1				3x h <sub>ef</sub>					
						OX Her					
Hammer drilling	with hard			I							
Hammer drilling v	11.			M8	M10	M12	M16				
Drilling method Hammer drilling v  Table C6.2: Anchor rods Internal threade FIS E	with hard	factor	rs		M10 -	M12 -	M16 -	M6	- M8 x85	M10	M12
Hammer drilling v Table C6.2: Anchor rods Internal threade FIS E Edge	Group	factor	rs		M10 -	<b>M12</b> - 60	M16 -	State agreement	100000000		
Table C6.2: Anchor rods Internal threade FIS E Edge distance	Group	factor	rs		M10 -	-	M16 -	State agreement	100000000		
Hammer drilling v Table C6.2:  Anchor rods Internal threade FIS E Edge distance	Group ed anchor	factor	rs		M10 -	- 60	M16 -	State agreement	100000000		
Hammer drilling v Table C6.2: Anchor rods Internal threade FIS E Edge distance	Group  ed anchor  Cmin  g,N (Smin II)	factor	rs		M10 -	- 60 0,6	M16 -	State agreement	100000000		
Hammer drilling variable C6.2:  Anchor rods Internal threade FIS E  Edge distance  α  α  hef=200 α  Group hef=200 α	Group  ed anchor  Cmin  g,N (Smin II) g,V (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16	State agreement	100000000		
Table C6.2:  Anchor rods Internal threade FIS E Edge distance  α <sub>c</sub> α <sub>c</sub> hef=200 α <sub>c</sub> Group factor α <sub>g</sub> α <sub>g</sub>	Group  ed anchor  Cmin  g,N (Smin II) g,V (Smin II) g,N (Smin II) g,N (Smin II) g,N (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16	State agreement	100000000		
Hammer drilling variable C6.2:  Anchor rods Internal threade FIS E  Edge distance     Group factor  Ag  Ag  Ag  Ag  Ag  Ag  Ag  Ag  Ag  A	Group  ed anchor  Cmin  g,N (Smin II) g,V (Smin II) g,V (Smin II) g,N (Smin II) g,N (Smin II) g,N (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5 0,3 1,3	M16	State agreement	100000000		
Hammer drilling variations of the Table C6.2:  Anchor rods Internal threader FIS E Edge distance  Group factor  Group factor  Age de Her=200 Age her=2	Group  ed anchor  Cmin  g,N (Smin II) g,V (Smin II) g,V (Smin II) g,N (Smin II) g,N (Smin II) g,N (Smin II)	factor	rs		M10 -	- 60 0,6 1,3 1,4 1,5	M16	State agreement	100000000		



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

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

Anchor rod			N	16	N	18		M10			M12			M16			•		-
Internal threaded an	chor			•	9	-		-			-			-		M6 M8 I			M12 x85
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,b}$	I <sub>Rk,p,c</sub> =	N <sub>Rk</sub> ,	<sub>b,c</sub> [k	N]; t	emp	eratu	ire ra	inge	50/8	0°C 3	)								
Mean compressive strength / Min.	Use		ä	ĺ								dep		[mm	]				
compressive strength single brick 1)	dition	9.	50	100	50	100	50	100	200	50	100	200	50	100	200		8	5	
	w/w \	w/d	1	.5	2.0	2.0	2.0	2.5	_2)	2.0	2.5	_2)	2.0	5.5	_2)		_	2)	

15 / 12 N/mm<sup>2</sup> d/d 2,5 3,0 4,0 3,0 4,0 9,5 3,0 4,0 9,5 3,0 8,5 9,5 \_2) 2,0 2,5 3,0 2,5 3,5 3,0 3,5 7,5 \_2) \_2) w/w w/d 3,0 25 / 20 N/mm<sup>2</sup> 12 \_2) d/d 3,5 4,5 5,5 4,5 5,5 12 4,5 5,5 12 4,5 12 3,0 4,0 4,0 \_2) \_2) w/w w/d 2,5 3,0 3,5 4,0 3,5 9,0 35 / 28 N/mm<sup>2</sup> 4,0 5,5 6,5 5,5 5,5 6,5 5,5 12 \_2) d/d 6,5 12 12 12

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

Anchor rod	M6	M8	M10	M12	M16	,	-	- 1	-
Internal threaded anchor FIS E	-	-	-	-	-		M8 x85	. 100 .	M12 x85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,II}$	V <sub>Rk,c,⊥</sub> [kN]	; tem	pera	ture	rang	ge 50	/80°0	and	172/	120°0	3				
Mean compressive	Use		ı	<b>1</b> 8	i		Effec	tive a	nchc	rage	dept	h hef	[mm	]	
strength / Min. compressive strength single brick 1)	con- ditions	50	100	50	100	50	100	200	50	100	200	50	100	200	85
15 / 12 N/mm²	w/w	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	_2)
25 / 20 N/mm <sup>2</sup>	w/d	1,5	3,5	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	0,9	4,5	6,0	_2)
35 / 28 N/mm <sup>2</sup>	d/d	2,0	4,0	2,0	5,0	3,5	5,0	3,0	2,5	5,0	5,0	1,2	5,0	7,5	_2)

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance c=60mm	Annex C7

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> No performance assessed.

<sup>&</sup>lt;sup>3)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).

<sup>2)</sup> No performance assessed.



Solid calcium silicate b	orick KS, NF, EN 771-2:2011+A1:	2015			
2175	Producer			=	
	Nominal dimensions	[mm]	length L	width W	height H
	INOTHINAL difficults	finni	≥ 240	≥ 115	≥ 71
>71	Mean gross dry density $\rho$	[kg/dm <sup>3</sup> ]		≥ 1,8	
*	Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]	15 / 12 o	r 25 / 20 c	or 35 / 28
2240	Standard or annex		EN 771	-2:2011+ <i>A</i>	1:2015

## Table C8.1: Installation parameters

Anchor rod			IV	16	IV	18	M10	M	12	М	16		•		-
Internal threa	aded anchor	r .										M6	M8	M10	M12
FIS E				-	_		-		-	_		11x85		15)	x85
Anchor rod a	nd internal	thread	ed ar	nchor	FIS E	with	out perfora	ted sl	eeve						
Effective	n <sub>ef</sub> IIm			50 100		100	50 100	50	100	50 100		85		8	E
anchorage depth n <sub>ef</sub> [lmi		[mm]	50	100	50   100		200	2	00	20	00	0	55   6		5
Max. installati torque	on max T <sub>inst</sub>	[Nm]	;	3 5		5	15	1	5	2	5	3	5	1	5
General insta	allation para	meter	s				\$	***						0)	
Edge distance	Cmin = Ccr							6	0						
_	s <sub>min</sub> II		80												
Cnacina -	[mm]	n] 80													
Spacing – –	$s_{min} oldsymbol{\perp}$						3x h <sub>ef</sub>								
	Scr⊥		3x h <sub>ef</sub>												
			The state of the s												

## **Drilling method**

Hammer drilling with hard metal hammer drill

## Table C8.2: Group factors

Anchor rod			M6	M16		•	-							
Internal threaded anchor FIS E			•	-	-	<b>(4)</b>	ı	M6			M12 x85			
	$\alpha_{\text{g,N}}$ (s <sub>min</sub> II)					0,7								
Croup factor	$\alpha_{a} \vee (s_{min} \parallel)$			1,3										
Group factor	[-]				2,0									
,	$\alpha_{\text{g,V}}$ ( $s_{\text{min}} \perp$ )		2,0											

fischer injection system FIS P Plus for masonry	
Performance Solid calcium silicate brick KS, NF, dimensions, installation parameters, Group factors	Annex C8

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength...



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

**Table C9.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M10	M12	M16		•		-
Internal threaded anchor		_				М6	M8	M10	M12
FIS E	_	-	-	-	-	112	(85	15	x85

N <sub>Rk</sub> = N <sub>Rk,p</sub> = N <sub>Rk,b</sub> = N <sub>Rk,p,c</sub> = N <sub>Rk,b,c</sub> [kN]; temperature range 50/80°C <sup>2)</sup>																	
Mean compressive strength / Min. compressive strength single brick 1)	СО	Use con- ditions		100	50	100			tive a			e dep 200		100		85	85
15 / 12 N/mm²	w/w d/	4.5-1.11	2,0 4,0	3,0 5,5	2,5 4,0	4,5 8,0	2,5 4,0		7,0 12	2,5 4,0		6,5 12	2,5 4,5	3,5 5,5	8,0 12	2,5 4,0	2,5 4,0
25 / 20 N/mm²	2 W/W W/0		3,0	4,5	3,5	6,5	3,5	4,5	I I I I I I I I I I I I I I I I I I I	3,5	4,0	9,5	4,0	5,0	11	3,5	3,5
	w/w		5,5 3,5	7,5 5,0	6,0 4,0	11 8,0	6,0 4,5	8,0 5,5	12 12	6,0 4,5	- 6	12 11	6,5	8,0 5,5	12 12	6,0 4,5	6,0 4,5
	d/		6,5	9,0	7,0	12	7,0	9,0	12		7,5	12	7,5		12	7,0	7,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C9.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	·	N	16	N	18	М	10	М	12	M	16	-		-	
Internal threaded ar	nchor		-		-		-		-	•	<b>-</b> 55	M6 11x	M8 85	M10 15x	
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} =$	V <sub>Rk,c,⊥</sub> [kN	l]; te	mpei	atur	e ran	ge 50/8	30°C an	d 72/1	20°C						
Mean compressive	Use		2 .			Eff	ective a	nchora	age dep	th h <sub>ef</sub> [n	nm]		172		
strength / Min. compressive strength single brick 1)	con- ditions	con-   50 100 50 100 50   >100 50   >100			50	≥100	0 85		8	5					

strength / Min. compressive strength single brick 1)	con- ditions	50	100	50	100	50	≥100	50	≥100	50	≥100	85	85
15 / 12 N/mm²	w/w w/d d/d	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2
25 / 20 N/mm²	w/w w/d d/d	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5
35 / 28 N/mm²	w/w w/d d/d	3,0	4,5	3,0	4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	1,5

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Solid calcium silicate brick KS, NF, Characteristic resistance under tension and shear loading	Annex C9

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



lish translation prepa		Bau	technik		νı	DL									
Solid calcium	silicate	bric	k KS	FN	771	-2:20	11+Δ1:2	015							
1/5 T	Jillouto		oducer				11.741.2								
113	95										length	I v	vidth W	he	ight H
113	1	No	minal	dimer	nsions	3			[m	m]	≥ 240		≥ 115	/11/24/24/24/25	: 113
-	32	Me	an gro	oss dr	y den	isity ρ			[kg/d	dm³]			1,8		
							th / Min. le brick <sup>1)</sup>		[N/m	nm²]	1:	2,5 /	10 or 2	5 / 2	0
240		Sta	andard	or ar	nnex						EN 7	771-2	2:2011+	A1:2	015
Table C10.1:	Installa (Pre-p					n with	n perforat	ed sle	eeve l	FIS	HK)				
Anchor rod			M6	M8		-	M8 M10	M8	M10		-	M12	M16	M12	M16
Internal threaded	I				M6	M8			_		M12		-		-
anchor FIS E Perforated sleeve	. EIC II k	,	12x	.O.F	11	x85 16x	,0E	16	x130	15	20)	,0 <i>E</i>		20	x130
Anchor rod and i		_			FIS F		100.00000			нк	20)	(05		20.	X 130
Max.	internar t	.iii eac	ieu an		I IO L	_ WILLI	periorated	i Sieev	76 113	пк					
	max T <sub>inst</sub>	[Nm]	2	ES 95					4	•					
General installat	ion para	meter	s												
Edge distance	C <sub>min</sub> = C <sub>cr</sub>	,			ī			1	00				Т		
Spacing	S <sub>min</sub> II S <sub>cr</sub> II S <sub>min</sub> ⊥ S <sub>cr</sub> ⊥	[mm]													
Drilling method	Scr ⊥														
Hammer drilling w	rith hard r	netal	hamm	er dril	II										
Table C10.2:	mpressiv Group		ors												
Anchor rod   M6   M8   M8   M10   M10   M8   M10								M12 20x8	M16		20x1	M16			
Group factors $\frac{\alpha_{g,N} (s_{min}   I )}{\alpha_{g,N} (s_{min}   \bot )} = \frac{\alpha_{g,V} (s_{min}   I )}{\alpha_{g,N} (s_{min}   \bot )} = \frac{\alpha_{g,V} (s_{min}   \bot )}{\alpha_{g,V} (s_{min}   \bot )} = $															
fischer injectio	n syste	m FI	SPP	lus f	or m	asonr	у					1			
Performance	aata bulal	VC .	d:	iono	inata	llation			foot			-	Annex	. C1	U

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Solid calcium silicate brick KS, dimensions, installation parameters, Group factors



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

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

Anchor rod	M6	M6 M8				M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E			M6	M8 1x85		-		-		M12 x85		•		
Perforated sleeve FIS H K	12x85		16:		x85		16x130		20		)x85		20x130	

 $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup> Mean compressive Use strength / Min. concompressive strength ditions single brick 1) w/w 2,0 2,0 3,5 2,0 6,5 4,5 12,5 / 10 N/mm<sup>2</sup> d/d 6,0 4,0 3,5 3,5 10,5 7,0 5.0 3,0 3,0 w/w 3,0 9,5 6.0 25 / 20 N/mm<sup>2</sup> d/d 5,5 5,5 12,0 10,0 8,5 5,5

Table C11.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6 M8				M8	M10	M8	M10			0 - M12 M		M16	M12	M16
Internal threaded anchor FIS E	-	•	M6	M8 1x85	S 5	-		-		M12 x85		-	_		
Perforated sleeve FIS H K	12x85		16		x85		16x130		20		)x85		20x130		

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{I}$	$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C <sup>2)</sup>											
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions											
12,5 / 10 N/mm²	w/w d/d	3,0	3,5									
25 / 20 N/mm²	w/w d/d	4,0	5,5									

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Solid calcium silicate brick KS, Characteristic resistance under tension loading and shear loading	Annex C11

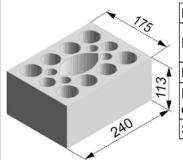
<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.

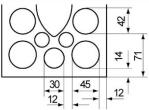
<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.



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



Producer			-	
Nominal dimensions	[mm]	length L	width W	height H
Norminal dimensions	נוווווון	240	175	113
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		≥ 1,4	2
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		12,5 / 10 d ) / 16 or 25	
Standard or annex		EN 771	-2:2011+ <i>A</i>	1:2015



Dimension see also Annex B11

Table C12.1: Installation parameters

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

Anchor rod	M6	M8	M6	M8			M8	M10	M8	M10	-	M1	2 M16	M12	M16
Internal threaded anchor FIS E		-		-	M6 112	M8 <85	99	•		-	M10 M <sup>2</sup>	-	-	-	•
Perforated sleeve FIS H K	122	x50	12	x85		162	(85		16x	130	2	0x85		20x	130

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

Max. installation	max T <sub>inst</sub>	[MIM]	
torque	IIIaX I inst	[[IAIII]	

## General installation parameters

			giller																
Edge distance	C <sub>min</sub> = C <sub>cr</sub>		60	80															
	s <sub>min</sub> II			100															
Cassina	s <sub>cr</sub> II	[mm]	240																
Spacing	S <sub>min</sub> ⊥								: viii	1.00	7 VIII			T2 10	T 100				
	s <sub>cr</sub> ⊥			115															
Towns and the second se			#																

## **Drilling method**

Hammer drilling with hard metal hammer drill

## Table C12.2: Group factors

Anchor ro	od		M6	M6   M8   M6   M8   -			-	M8	M10	M8	M10	,	-	M12	M16	M12	M16	
Internal threaded anchor FIS E				-		•	M6 112	M8 <85		-			M10	M12 <85	1	-	-	-
Perforated sleeve FIS H K			12>	x50	12>	(85		162	x85		16x	16x130 20		20:	x85		20x	130
Group	$\alpha_{g,N} (s_{min} II) = \alpha_{g,V} (s_{min} II)$	<b>F</b> 1							1,5									
factors	ctors $\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,N} (s_{min} \perp)} = [-]$ 2,0																	

## fischer injection system FIS P Plus for masonry

## Performance

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

Annex C12

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.



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

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

Anchor rod	M6	M8	M6	M8	-		M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E		-	13	-03	M6 11x	M8 85	×	-		<b>-</b> 0	 M12 x85		-		-
Perforated sleeve FIS H K	122	x50	12	x85		16	x85		16x	130	202	<b>k</b> 85		20x	130

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C <sup>2)</sup>										
Mean compressive strength/ Min. comp. strength single brick 1)	Use con- ditions									
10 / 8 N/mm²	w/w w/d	1,5	2,0	2,0	2,0	2,0				
	d/d	1,5	2,0	2,5	2,5	2,5				
12,5 / 10 N/mm²	w/w w/d d/d		2,0 2,5	2.5 3,0	2,5 3,0	2,5 3,0				
15 / 12 N/mm²	w/w w/d	2,5	2.5	3,0	3,0	3,0				
	d/d	2,5	3,0	3,5	3,5	3,5				
20 / 16 N/mm²	w/w w/d	3.0	3.5	4.5	4.5	4.5				
	d/d	3,5	4,0	4,5	4,5	4,5				
25 / 20 N/mm²	w/w w/d	4,0	4,5	5,5	5,5	5,5				
	d/d	4,5	5,0	6,0	6,0	6,0				

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under tension loading	Annex C13

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



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

**Table C14.1:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M6	M8	9	-	M8	M10	M8	M10	-	M12 M16	M12 M16
Internal threaded anchor FIS E		-		-	M6	M8 <85	0	-			M10 M12 15x85	-	-
Perforated sleeve FIS H K	12:	x50	12	<b>k</b> 85		162	(85		16x	130	20:	x85	20x130

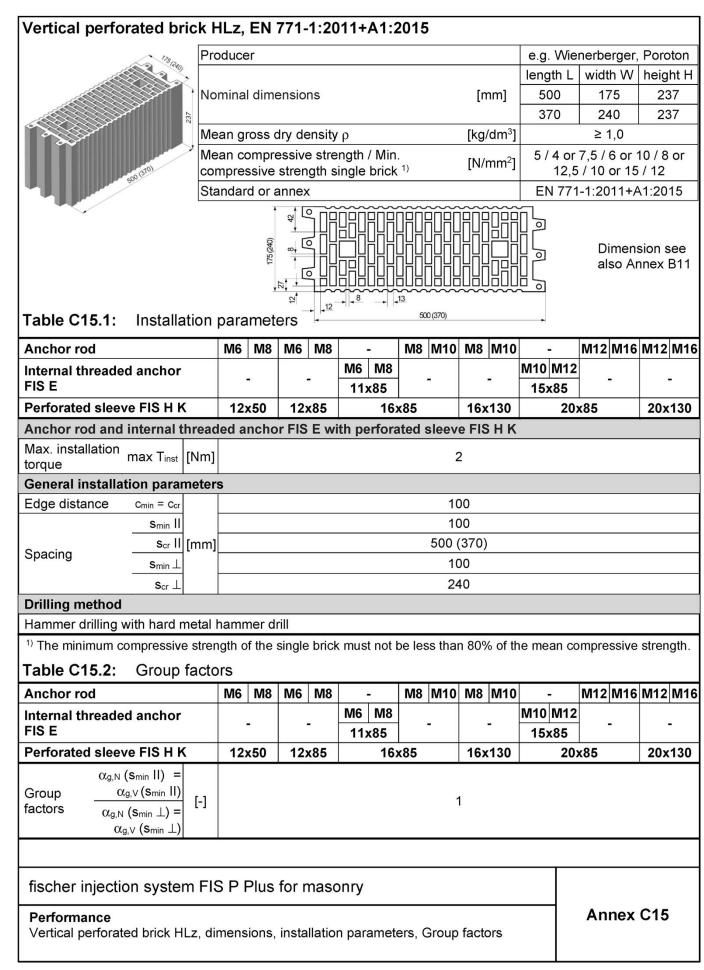
, 11 13	1.2.	.00	12			1000		20X 130			
Rk,c,⊥ <b>[kN]</b> ;	tem	perat	ture r	ange	50/8	80°C and 72/12	0°C				
Use con- ditions											
w/w w/d d/d			1,5				3,0		2,5	3,0	2,5
w/w w/d d/d			2,0					3,5			
w/w w/d d/d			2,5				4,5		4,0	4,5	4,0
w/w w/d d/d	3,0	3,5	3,0	3,5	3,0		6,0		5,5	6,0	5,5
w/w w/d d/d	4,0	4,5	4,0	4,5	4,0		7,5		6,5	7,5	6,5
	Use conditions  w/w w/d d/d  w/w w/d  d/d  w/w w/d  d/d  w/w w/d  d/d	Use conditions  w/w w/d d/d  4.0	Use conditions  w/w w/d d/d  4.0 4.5	Use conditions    W/w   w/d	Use conditions    W/w   w/d	Use conditions    W/w   w/d   d/d   2,0     w/w   w/d   d/d   2,5     w/w   w/d   d/d   2,5     w/w   w/d   d/d   4,0   4,5   4,0   4,5   4,0	Use conditions    W/w   w/d   d/d   2,0     W/w   w/d   d/d   2,5     W/w   w/d   d/d   2,5     W/w   w/d   d/d   4,0   4,5   4,0   4,5   4,0     W/w   w/d   d,0   4,5   4,0   4,5   4,0	Use   Conditions	Use   conditions	Use conditions	Use conditions

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading	Annex C14







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

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

10-00																
Anchor rod		M6	M8	M6	M8	-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded anchor FIS E			• 0		-	M6 M8 11x85		-		-	M10	M12 <85		•	8	-
Perforated sleeve FIS H K	(	12)	<b>&lt;50</b>	12	x85	16	x85		16x	130		20:	x85		20x	130
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N <sub>Rk,b,c</sub> [l	kN];	tem	pera	ture	range 5	0/80°	°C 2)								
Management	Han															

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p}$	c = N <sub>Rk,b,c</sub> [	kN]; temperature	range 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. comp. strength single brick 1)	Use con- ditions			
5 / 4 N/mm²	w/w w/d	0,30	0,90	1,20
	d/d	0,40	0,90	1,20
7,5 / 6 N/mm²	w/w w/d	0.50	1.50	2.00
	d/d	0,60	1,50	2,00
10 / 8 N/mm²	w/w w/d	0,75	2,00	2,50
	d/d	0,75	2,00	2,50
12,5 / 10 N/mm²	w/w w/d	0,90	2,50	3,00
	d/d	0,90	2,50	3,50
15 / 12 N/mm²	w/w w/d	0,90	3,00	3,50
	d/d	1,20	3,00	4,00

<sup>1)</sup> 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		M6	M6   M8   N		M8		-	M8	M10	M8	M10		-	M12	M16	M12	M16
Internal threaded					-	M6	M8 (85		-				M12 x85		-		-
Perforated sleeve FIS H	K	12>	(50	12	x85	117		x85		16>	(130	15		∖ x85		20x	130
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,c}$	⊥ [kN]; ter			e rai	nge 8	50/80	)°C i	and	72/12	0°C							
Mean compressive	Use																
strength / Min. comp. strength single brick 1)	con- ditions																
5 / 4 N/mm <sup>2</sup>					0,	50				0,	60		0,	50		0,0	60

strength / Min. comp. strength single brick 1)	con- ditions				
5 / 4 N/mm²		0,50	0,60	0,50	0,60
7,5 / 6 N/mm <sup>2</sup>	w/w	0,75	0,90	0,75	0,90
10 / 8 N/mm <sup>2</sup>	w/d	0,90	1,20	0,90	1,20
12,5 / 10 N/mm <sup>2</sup>	d/d	1,20	1,50	1,20	1,50
15 / 12 N/mm <sup>2</sup>		1,50	2,00	1,50	2,00

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension and shear loading	Annex C16

 $<sup>^{2)}</sup>$  For temperature range 72/120°C: N<sub>Rk (72/120°C)</sub> = 0,83  $\cdot$  N<sub>Rk (50/80°C)</sub>.



175	Producer				e.a.	Wienerk	perger
	ST TO THE PARTY OF A TOP COMMENT OF THE PARTY.	•			length L		V height H
	Nominal dimens	ions		[mm]	240	115	113
	Mean gross dry			[kg/dm <sup>3</sup> ]		≥ 1,4	
	Mean compress compressive str	•		[N/mm <sup>2</sup> ]		12,5 / 1 / 20 or	0 or 20 / 16 35 / 28
240	Standard or ann	iex			EN 771	-1:2011·	+A1:2015
Table C20.1: Installation	on parameters	115	→8 → 240				ension see Annex B11
Anchor rod	M6 M8	M6 M8	_	M8 M1	0 -		M12 M16
Internal threaded	1		M6 M8		M10	M12	
anchor FIS E	-1	-	11x85		15>	(85	-
Perforated sleeve FIS H K	12x50	12x85		x85		20x8	35
Anchor rod and internal three	aded anchor F	IS E with per	forated sleev	e FIS H K			
Max. installation max T <sub>inst</sub> [N				2			
General installation parame	ters						
Edge distance $c_{min} = c_{cr}$ $s_{cr}   I = s_{min}   I   [m]$	Imu			40			
Spacing $\frac{s_{cr} \Pi - s_{min} \Pi}{s_{cr} \bot = s_{min} \bot}$	1111			15			
Drilling method			a.e.	10			
Hammer drilling with hard met	al hammer drill						
1) The minimum compressive st	rength of the sing	gle brick must r	not be less tha	n 80% of th	e mean co	mpressiv	ve strength
Table C20.2: Group fac			1				
Anchor rod	ctors M6 M8	M6 M8	-	M8 M1			M12 M16
Anchor rod Internal threaded		M6 M8	M6 M8	M8 M1	M10	M12	M12   M16
Anchor rod Internal threaded anchor FIS E	M6 M8	-	M6 M8 11x85	-		M12 (85	-
Anchor rod Internal threaded anchor FIS E Perforated sleeve FIS H K		M6 M8 - 12x85	M6 M8 11x85 16	M8 M1	M10	M12	-



#### Vertical perforated brick HLz, 2DF, EN 771-1:2011+A1:2015

**Table C18.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6 M8		M6	M8		-		M10	-		M12	M16
Internal threaded	_				M6	M8		2007	M10	M12		
anchor FIS E	i=	-		-		11x85		-	15)	(85		-
Perforated sleeve FIS H K	12x50		12x85		16		6x85		20		(85	

$\mathbf{N}_{\mathrm{Rk}} = \mathbf{N}_{\mathrm{Rk,p}} = \mathbf{N}_{\mathrm{Rk,b}} = \mathbf{N}_{\mathrm{Rk,p,c}} = \mathbf{N}_{\mathrm{Rk,p,c}}$	N <sub>Rk,b,c</sub>	[kN]; t	emperatur	e range 50	)/80°C <sup>2)</sup>			
Mean compressive strength / Min. compressive strength single brick 1)	U: co ditio							
7,5 / 6 N/mm <sup>2</sup>	w/w	w/d	0.75	0,90	0,75	0,90		
7,57614/11111	d,	′d	0,75	1,20	0,75	0,90		
12,5 / 10 N/mm <sup>2</sup>	w/w	w/d	1,20	1,50	1,20	1,50		
12,37 10 14/11/11	d/d		d/d		1,20	2,00	1,20	1,50
20 / 16 N/mm <sup>2</sup>	w/w	w/d	2,00	2,50	2,00	2,00		
207 10 14/11111	d,	′d	2,00	3,00	2,00	2,50		
25 / 20 N/mm <sup>2</sup>	w/w	w/d	2,50	3,50	2,50	3,00		
25 / 20 14/111111	d,	'd	2,50	4,00	2,50	3,00		
35 / 28 N/mm²	w/w	w/d	3,00	5.00	3,50	4.00		
35 / 26 N/IIIII	d,	'd	3,50	5,50	3,50	4,50		

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C18.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6 M8		M6	M8		-		M10		-	M12	M16
Internal threaded anchor FIS E		-	Í	- 3	M6	M8 <85	1 2•	-	M10	M12 <85		-
Perforated sleeve FIS H K	12x50		12x85		1		6x85		20		<b>k</b> 85	

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [F	(N]; tempera	ature	range	50/8	0°C a	and 7	2/120°C	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions							
7,5 / 6 N/mm <sup>2</sup>		1,2	1,5	1,2	2,0	1,2	1,5	2,5
12,5 / 10 N/mm <sup>2</sup>	w/w	2,0	2,5	2,0	4,0	2,0	2,5	4,5
20 / 16 N/mm <sup>2</sup>	w/d	3,0	3,5	3,0	6,0	3,0	3,5	7,0
25 / 20 N/mm <sup>2</sup>	d/d	4,0	4,5	4,0	7,5	4,0	4,5	8,5
35 / 28 N/mm <sup>2</sup>		5,0	6,5	5,0	9,5	5,0	6,5	12,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

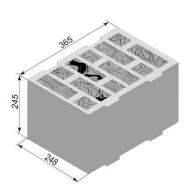
Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz, 2DF, Characteristic resistance under tension and shear loading	Annex C18

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).



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



Producer		e.g. Wienerberger					
Nominal dimensions	[mm]	length L	height H				
	[mm]	≥ 365	≥ 245				
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		0,6				
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		10 / 8				
Standard or annex	EN 771-1:2011+A1:2015						

128 97 04 7,5 8,0 9

Dimension see also Annex B12

Table C19.1: Installation parameters

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

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

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

Max.					
installation	max T <sub>inst</sub>	[Nm]	2	4	
torque					

#### General installation parameters

are in pair annie ser	
C <sub>min</sub> = C <sub>cr</sub>	100
s <sub>min</sub> II s <sub>cr</sub> II [mm]	250
S <sub>min</sub> ⊥ S <sub>cr</sub> ⊥	245
	$\begin{aligned} & c_{\text{min}} = c_{\text{cr}} \\ & s_{\text{min}} \text{ II} \\ & s_{\text{cr}} \text{ II} \\ & s_{\text{min}} \perp \end{aligned} \text{ [mm]}$

#### **Drilling method**

Hammer drilling with hard metal hammer drill

#### Table C19.2: Group factors

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

fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz filled with mineral wool, dimensions, installation parameters, Group factors	Annex C19

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.



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

**Table C20.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

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

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	N <sub>Rk</sub> = N <sub>Rk,p</sub> = N <sub>Rk,b,c</sub> = N <sub>Rk,b,c</sub> [kN]; temperature range 50/80°C <sup>2)</sup>													
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions													
10 / 8 N/mm²	w/w	2,0	1,5	2,	,5	2,0	2,0	3,0						
10 / 3 14/11111	d/d	2,0	2,0	3,	,0	2,0	2,0	3,0						

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C20.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8			M8	M10	M8	M10		•	M12	M16	M12	M16	M12	M16
Internal threaded		5)	M6	M8					M10	M12	l .			8		
anchor FIS E		-	112	<b>k</b> 85		-		-	15>	(85	)		0.5	•	-	
Perforated sleeve FIS H K	12:	x85	16x		(85		16x	(130	20x85			20x	130	20x	200	
V - V - V - V - I NI 4 50(0000 2)																

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$	kN]; tem <sub>l</sub>	oerat	ure i	range 50/80°C <sup>2)</sup>					
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions								
10 / 8 N/mm <sup>2</sup>	w/w	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5
10 / 0 14/11111	d/d	2,5	3,0	3,0	3,0	1,5	1,5	1,5	1,5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

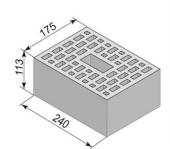
fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under tension loading and shear loading	Annex C20

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.



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



Producer	e.g. Wienerberger					
Nominal dimensions	[mm]	length L	width W	height H		
	[mm]	≥ 240	≥ 175	≥ 113		
Mean gross dry density ρ	[kg/dm <sup>3</sup> ]		0,9	2		
Mean compressive strength / Min. compressive strength single brick 1)	[N/mm <sup>2</sup> ]		12,5 / 10			
Standard or annex		EN 771-1:2011+A1:2015				

\$\frac{1}{2} \frac{1}{2} \frac

Dimension see also Annex B12

Table C21.1: Installation parameters

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

Anchor rod	M6	M8		-		-		-		-		-		M10	M8	M10	-		M12	M16	M12	M16
Internal threaded	-		M6	M8	M8				M10	M12			_									
anchor FIS E			11x85		_		-		15x85		·	•	,	•								
Perforated sleeve FIS H K	12:	x85	16:		16x85 16x130 20x85		30 20:			20x	130											

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

Max.				
installation	max T <sub>inst</sub>	[Nm]	2	4
torque				

### General installation parameters

Edge distance	C <sub>min</sub> = C <sub>cr</sub>	100
One since	s <sub>min</sub> II s <sub>cr</sub> II [mm]	240
Spacing	S <sub>min</sub> ⊥ S <sub>cr</sub> ⊥	115

#### **Drilling method**

Hammer drilling with hard metal hammer drill

Table C21.2: Group factors

Anchor rod		M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforated sleeve FIS H K		12:	x85	16x85		16x130		20x85		20x130	
$\begin{array}{c} \text{Group} \\ \text{factors} \end{array} \qquad \begin{array}{c} \alpha_{\text{g,N}} \left( s_{\text{min}} \ I \right) \\ \alpha_{\text{g,V}} \left( s_{\text{m}} \right) \\ \alpha_{\text{g,N}} \left( s_{\text{min}} \right) \\ \alpha_{\text{g,V}} \left( s_{\text{m}} \right) \end{array}$	in II) L) = [-]					:	2				

fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	Annex C21

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.



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

**Table C22.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	-	<b>1</b> 8	M8	M10	M8	M10	TI.	-	M12	M16	M12	M16
Internal threaded anchor FIS E			M6	M8					M10	M12				
			11x	85	-		-		15x85			-	-	
Perforated sleeve FIS H K	12)	(85	16		5x85		16x	130		20:	x85		20x	130

 $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$  [kN]; temperature range 50/80°C<sup>2)</sup> Mean compressive strength/ Use Min. compressive strength consingle brick 1) ditions w/w 4,0 3,5 4,5 4,5 4.0 12,5 / 10 N/mm<sup>2</sup> d/d 4,5 5,0 5,0 4.0

**Table C22.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	17-1		M8	M8 M10 M8		M10		-		M16	M12	M16		
Internal threaded	_		_		M6	M8		_		_		M10 M12		_		
anchor FIS E			11x88						15x85							
Perforated sleeve FIS H K	12>	<b>c</b> 85	16>		x85		16x	130		20:	x85		20x	130		

/ <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [kN]; temperature range 50/80°C <sup>2)</sup>															
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions														
12,5 / 10 N/mm <sup>2</sup>	w/w	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0	8,0	6,0	8,0
12,57 10 14/11111	d/d	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0	8,0	6,0	8,0

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading and shear loading	Annex C22

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.

<sup>&</sup>lt;sup>2)</sup> For temperature range 72/120°C no performance assessed.



Light-weight concrete ho	llow blo	ock Hbl	FN 77	1-3-201	1+Δ1·2	015					
^	Producer	CK HIDI	, =14 7 7	1-0.201	1	<b>010</b>					
240							length L	width W	height H		
	Nominal d	imension	ıs			[mm]	362	240	240		
	Mean gros	ss dry de	nsity ρ		[1	kg/dm³]		≥ 1,0			
240	Mean com				[1	N/mm <sup>2</sup> ]	2,5	6 / 2 or 5 /	4		
	Standard	or annex					EN 771-	3:2011+	1:2015		
Table C23.1: Installation	n parame	eters	37 - 37 -			ension se ex B12	e also				
(Pre-positi			with pe	rforated	l sleeve	FIS H	K)				
Anchor rod	M6 M8	M6 M8	-	M8 M10	M8 M10	-	M12 M16	M12 M16	M12 M16		
Internal threaded anchor FIS E	-	-	M6 M8		-	M10 M1	_	-	-		
Perforated sleeve FIS H K	12x50	12x85	162	<b>k</b> 85	16x130	20	)x85	20x130	20x200		
Anchor rod and internal threa	ded anch	or FIS E	with perf	forated s	leeve FI	знк					
Max. installation max T <sub>inst</sub> Nm	1]				2						
General installation parameter	ers										
Edge distance c <sub>min</sub> = c <sub>cr</sub>					60						
Smin II [mn	ոյ ———				100						
Spacing s <sub>cr</sub> II					362						
s <sub>min</sub> ⊥ = s <sub>cr</sub> ⊥  Drilling method					240						
Hammer drilling with hard meta	l hammer i	drill									
Table C23.2: Group fact	ength of the		rick must r	not be less	s than 80°	% of the	mean com	pressive	strength.		
Anchor rod	M6 M8	M6 M8	1	M8 M10	M8 M10			M12 M16	M12 M16		
Internal threaded anchor FIS E	-	-	M6 M8 11x85	•	-	M10 M1 15x85		-	-		
Perforated sleeve FIS H K	12x50	12x85	162	<b>c</b> 85	16x130	20	)x85	20x130	20x200		
α <sub>g,N</sub> (s <sub>min</sub> II)					1,2						
Group $\alpha_{g,V}$ (s <sub>min</sub> II) [-]					1,1						
factors $\frac{\alpha_{g,N} (s_{min} \perp)}{\alpha_{g,V} (s_{min} \perp)}$					2,0						
	•										
fischer injection system F	IS P Plus	s for ma	sonry								
Performance Light-weight concrete hollow block Hbl, dimensions, installation parameters, Group factors  Annex C23											



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

**Table C24.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned installation)

Anchor rod	M6	M8	М6	M8	-		M8	M10	M8	M10	-	e.	M12	M16	M12	M16	M12 M16
Internal threaded anchor FIS E		•		-	M6 11x	100000000000000000000000000000000000000	1	-		-	M10 15x		1	-	-	•	
Perforated sleeve FIS H K	12>	(50	12:	x85		16>	(85		16>	<b>c130</b>		20>	(85		20x	130	20x200

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,p,c}$	Rk,b,c <b>[kN]</b>	; tempe	rature range 50/80°C <sup>2)</sup>	
Mean compressive strength / Min. compressive strength single brick 1)	Use con- ditions			
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	1,2	1,5	2,5
2,5 / 2 N/IIIII	d/d	1,2	1,5	2,5
5 / 4 N/mm <sup>2</sup>	w/w w/d	2,0	3,0	5,0
5 / 4 N/MM	d/d	2,5	3,0	5,5

<sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

**Table C24.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned installation)

Anchor rod	M6	M8	М6	M8	•	N	//8 M10	M8 M10	-	M12 M16	M12 M16	M12 M16
Internal threaded anchor FIS E		•	,	-	M6 M	72.50	-	-	M10 M12	-	-	-
Perforated sleeve FIS H K	12)	<b>(50</b>	12	<b>k</b> 85	10	6x8	35	16x130	20:	x85	20x130	20x200

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}  \text{[k]}$	N]; tempe	rature range 50/80°C and 72/120°C
Mean compressive strength / Min. compressive strength	Use con-	
single brick 1)	ditions	
2,5 / 2 N/mm²	w/w w/d d/d	0,9
5 / 4 N/mm²	w/w w/d d/d	2,0

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry	
Performance Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading and shear loading	Annex C24

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



#### Autoclaved aerated concrete, EN 771-4:2011+A1:2015 Producer e.g. Ytong Mean gross dry density $\rho$ [kg/dm<sup>3</sup>] 0,35 0,5 0,65 Mean compressive strength / Min. [N/mm<sup>2</sup>]2,5/2 5/4 8/6 compressive strength single brick 1) Standard or annex EN 771-4:2011+A1:2015

#### Table C25.1: Installation parameters

Anchor ro	od		IV	16	M	18	M	10	M	12	M	16				
Internal th	readed anchor												M6	M8	M10	M12
FIS E			,	•		•	9	•	,		,	-	11>	(85	15	(85
Anchor ro	od and internal t	hread	led ar	nchor	FIS E	with	out pe	rfora	ted sl	eeve					•	
Effective anchorage	e depth h <sub>ef</sub>	[mm]	100	200	100	200	100	200	100	200	100	200		8	5	
Max. instal torque	llation max T <sub>inst</sub>	[Nm]	1	4	1	8	2	12	2	16	2	20	·		2	2
General in	nstallation para	meter	s												*	
Edge dista	ance $c_{min} = c_{cr}$								10	00						
	$s_{cr} \parallel = s_{min} \parallel$								2	50						
	h <sub>ef</sub> =200mm								8	0						
	S <sub>min</sub> II															
	h <sub>ef</sub> =200mm								3x	h <sub>ef</sub>						
Spacing -		[mm]							0.000	50000000000						
' .	$s_{cr} \perp = s_{min} \perp$								2	50						
	h <sub>ef</sub> =200mm								8	0						
	S <sub>min</sub> ⊥															
	h <sub>ef</sub> =200mm <b>s</b> cr ⊥								3x	h <sub>ef</sub>						

#### **Drilling method**

Hammer drilling with hard metal hammer drill

fischer injection system FIS P Plus for masonry

Performance
Autoclaved aerated concrete, dimensions, installation parameters

Annex C25

<sup>&</sup>lt;sup>1)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.



#### Autoclaved aerated concrete, EN 771-4:2011+A1:2015

**Table C26.1:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 2 N/mm²)

Anchor	rod	М6	M8	M10	M12	M16	-			-
Intornal	threaded anchor FIS E						M6	M8	M10	M12
internai	uireaded anchor FIS E	-	-	-	-	-	11x	85	15>	<b>x85</b>
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)			1,6			_1)	)		1)
	hef=200 αg,γ ( <b>s</b> min <b>II</b> )			1,1			_1)	)		1)
Group	$\alpha_{g,N}$ II, $\alpha_{g,V}$ ( $s_{min}$ II)				2,0					
factors	$\frac{\text{bef=200 } \alpha_{g,N} \text{ (smin } \bot)}{\text{hef=200 } \alpha_{g,N} \text{ (smin } \bot)} \text{ [-]}$			1,6			_1)	)		1)
	h <sub>ef</sub> =200 α <sub>g,</sub> γ (s <sub>min</sub> ⊥)			0,8			_1)	)		1)
	$\alpha_{\text{g,N}} \perp$ , $\alpha_{\text{g,V}}$ ( $s_{\text{min}} \perp$ )				2,0		•			

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

**Table C26.2:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 4 N/mm²)

Anchor	chor rod		M8	M10	M12	M16	-			-
Intornal	threaded anchor FIS E						M6	M8	M10	M12
Internal	ulreaded afficitor FIS E	-	-	-	•	-	11x8	B <b>5</b>	15>	<b>k</b> 85
	h <sub>ef</sub> =200 α <sub>g,N</sub> ( <b>s</b> <sub>min</sub> II)			0,7			_1)			1)
	h <sub>ef</sub> =200 α <sub>gV</sub> (s <sub>min</sub> II)			2,0			_1)		-	1)
Group	$\alpha_{g,N} \parallel, \alpha_{gV} (s_{min} \parallel)$				2,0					
factors	$\frac{\text{bef=200 }\alpha_{g,N}\text{ (smin }\bot)}{\text{hef=200 }\alpha_{g,N}\text{ (smin }\bot)}$			0,7			_1)		-	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)			1,2			_1)		-	1)
	$\alpha_{g,N} \perp$ , $\alpha_{gV} (s_{min} \perp)$				2,0					

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

**Table C26.3:** Group factors for autoclaved aerated concrete (Min. compressive strength single brick = 6 N/mm²)

Anchor	rod	M6	M8	M10	M12	M16	-			-
Intornal	threaded anchor FIS E						M6	M8	M10	M12
internal	uireaded anchor FIS E	-	-	-	-	-	11)	<b>(8</b> 5	15)	<b>k</b> 85
	h <sub>ef</sub> =200 α <sub>g,N</sub> (s <sub>min</sub> II)			0,7				1)	-	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> II)			2,0				1)	-	1)
Group	$\alpha_{g,N} \parallel \mid \alpha_{g,V} (s_{min} \parallel \mid)$				2,0					
factors	$\frac{\text{bef=200 } \alpha_{g,N} (s_{min} \perp)}{\text{hef=200 } \alpha_{g,N} (s_{min} \perp)} [-]$			0,7			_	1)	-	1)
	h <sub>ef</sub> =200 α <sub>g,V</sub> (s <sub>min</sub> ⊥)			1,2				1)		1)
	$\alpha_{g,N} \perp, \alpha_{g,V} (s_{min} \perp)$				2,0					

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

fischer injection system FIS P Plus for masonry	
Performance Autoclaved aerated concrete, Group factors	Annex C26



#### Autoclaved aerated concrete, EN 771-4:2011+A1:2015

**Table C27.1:** Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M10	M12	M16			1-	
Internal threaded						M6	M8	M10	M12
anchor FIS E	_	-	-	_	-	112	<b>k</b> 85	15x	85

		4										11700	1000
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c}$	= N <sub>Rk,b,</sub>	[kN]	; tem	pera	ture ra	ange	50/80	°C 3)					
Mean compressive strength / Min. compressive strength single brick <sup>2)</sup>	Use con- ditions	100	200	100	200	Effe 100	ctive a	ancho 100	rage 200	depth I	n <sub>ef</sub> [mm     200	] 8	5
2,5 / 2 N/mm <sup>2</sup>	w/w w/d	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5
2,5 / 2 N/IIIII	d/d	1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0	1,5	1,5
5 / 4 N/mm <sup>2</sup>	w/w w/d	1,2	_1)	2,0	1,5	2,5	3,5	2,5	3,5	2,0	3,5	2,0	1,5
5 / 4 N/IIIII	d/d	1,5	_1)	2,0	3,0	3,0	5,0	2,5	5,0	2,0	5,0	2,0	1,5
8 / 6 N/mm <sup>2</sup>	w/w w/d	1,5	_1)	3,0	2,5	4,5	5,0	4,5	7,0	3,0	8,5	3,5	2,5
O / O N/IIIII	d/d	1,5	_1)	3,5	4,0	5,0	7,0	5,0	9,0	3,0	11,5	3,5	2,5

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

Anchor rod

**M6** 

**Table C27.2:** Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

M10

M12

M16

**M8** 

Internal threaded			_				_		_			M6	M8	M10	M12
anchor FIS E		_		_		_		-		_		11x85		15x85	
V <sub>Rk</sub> = V <sub>Rk,b</sub> = V <sub>Rk,c,II</sub> = V <sub>Rk,c,⊥</sub> [kN]; temperature range 50/80°C and 72/120°C															
Mean compressive Use strength / Min. compressive con-		Effective anchorage depth hef [mm]													
strength single brick 2)	ditions	100	200	100	200	100	200	100	200	100 200		85			
2,5 / 2 N/mm²	w/w w/d d/d	1,2	1,2	1,2	1,2	1,2	1,2	1,5	1,2	1,2	1,2		1,2		1,5
5 / 4 N/mm²	w/w w/d d/d	2,0	_1)	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0		2,0		2,5
8 / 6 N/mm²	w/w w/d d/d	2,5	_1)	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5		2,5		3,5

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

Factor for job site tests and displacements see annex C28.

fischer injection system FIS P Plus for masonry

Performance
Autoclaved aerated concrete,
Characteristic resistance under tension and shear loading

<sup>&</sup>lt;sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>&</sup>lt;sup>3)</sup> For temperature range 72/120°C:  $N_{Rk}$  (72/120°C) = 0,83 ·  $N_{Rk}$  (50/80°C).

<sup>&</sup>lt;sup>2)</sup> The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength



# β-factors for job site tests; displacements

Table C28.1: β-factors for job site tests

use conditions	w/w a	nd w/d	d/d			
temperature range [°C]	50/80	72/120	50/80	72/120		
Material	Size	β-factors [-]				
solid units	M6	0,55	0,46		0,80	
	M8	0,57	0,51			
	M10	0,59	0,52			
	M12 FIS E 11x85	0,60	0,54	0,96		
	M16 FIS E 15x85	0,62	0,52			
	FIS H 16x85 K	0,55	0,46			
hollow units	all sizes	0,86	0,72	0,96	0,80	
Autoclaved aerated concrete cylindrical drill hole	all sizes	0,73	0,73	0,81	0,81	

### Table C28.2: Displacements

Material	N /[kN]	δN₀ [mm]	δN∞ [mm]
solid units and autoclaved aerated concrete hef=100mm	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,03	0,06
hollow units	N <sub>Rk</sub> 1,4 * <b>γ</b> мm	0,48	0,06
solid brick Mz NF Annex C4 - C7	NRk 1,4 * γ <sub>Mm</sub>	0,74	1,48
solid brick KS NF Annex C8 / C9	NRk 1,4 * γ <sub>Mm</sub>	0,20	0,40
AAC h <sub>ef</sub> =200 mm Annex C25 – C27	N <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,03	2,06

V [kN]	δ <b>V</b> ₀ [mm]	δV∞ [mm]
V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,82	0,88
V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,71	2,56
V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,23	1,85
V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	0,91	1,37
V <sub>Rk</sub> 1,4 * γ <sub>Mm</sub>	1,25	1,88

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

fischer injection system FIS P Plus for masonry	
Performance β-factors for job site tests; displacements	Annex C28