

DECLARACIÓN DE PRESTACIONES

DoP 0400

para el sistema de inyección fischer FIS P Plus (Anclaje químico para uso en mampostería)

ES

1. Código de identificación única del producto tipo:

DoP 0400
2. Usos previstos:

Fijación a posteriori en mampostería, Véase el apéndice, especialmente los anexos B1 - B14.
3. Fabricante:

fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Alemania
4. Representante autorizado:

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5. Sistemas de evaluación y verificación de la constancia de las prestaciones (EVCP):

1
6. Documento de evaluación europeo:

EAD 330076-01-0604, Edition 10/2022

Evaluación técnica europea:

ETA-11/0419; 2025-11-04

Organismo de evaluación técnica:

DIBt- Deutsches Institut für Bautechnik

Organismos notificados:

2873 TU Darmstadt
7. Prestaciones declaradas:

Resistencia mecánica y estabilidad (BWR 1)

Resistencia característica bajo carga estática y cuasi-estática:

1 Resistencia característica por fallo del acero de un anclaje individual bajo sollicitación a tracción: Véase el apéndice, especialmente los anexos C1, C3

2 Resistencia característica por fallo del acero de un anclaje individual bajo sollicitación a cortante sin brazo de palanca: Véase el apéndice, especialmente los anexos C2, C3

3 Resistencia característica a fallo por arranque o por rotura del ladrillo de un anclaje individual bajo sollicitación a tracción, factor de minoración: Véase el apéndice, especialmente los anexos C5, C7, C9, C11, C13, C16, C18, C20, C22, C24, C27

4 Resistencia característica a fallo local del ladrillo o por rotura del ladrillo de un anclaje individual bajo carga a cortante: Véase el apéndice, especialmente los anexos C5, C7, C9, C11, C14, C16, C18, C20, C22, C24, C27

5 Resistencia característica a fallo por rotura del ladrillo de un grupo de anclajes bajo sollicitación a tracción: Véase el apéndice, especialmente los anexos B13,B14,C4,C6,C8,C10,C12,C15,C17,C19,C21,C23,C26

6 Resistencia característica a fallo por rotura local o total del ladrillo de un grupo de anclajes bajo sollicitación a cortante: Véase el apéndice, especialmente los anexos B13,B14,C4,C6,C8,C10,C12,C15,C17,C19,C21,C23,C26

7 Distancias al borde y entre ejes, y espesor de la base de anclaje: Véase el apéndice, especialmente los anexos B13,B14,C4,C6,C8,C10,C12,C15,C17,C19,C21,C23,C25

8 Desplazamientos bajo cargas a tracción y a cortante: véase el apéndice, especialmente anexo C28

9 Par de apriete de montaje máximo: Véase el apéndice, especialmente los anexos B4 - B6

Resistencia y desplazamientos característicos bajo sollicitaciones sísmicas:

10 Resistencia a carga de tracción, desplazamientos: NPD

11 Resistencia a esfuerzo cortante, desplazamientos: NPD

12 Factor espacio anular: NPD

Seguridad en caso de incendio (BWR 2)

13 Reacción al fuego: Clase (A1)

14 Resistencia al fuego bajo sollicitación a tracción y a cortante, con y sin brazo de palanca: NPD

Higiene, salud y medio ambiente (BWR 3)

15 Contenido, emisión y/o desprendimiento de sustancias peligrosas: NPD

8. Documentación técnica adecuada o documentación técnica específica:

—

Las prestaciones del producto identificado anteriormente son conformes con el conjunto de prestaciones declaradas. La presente declaración de prestaciones se emite, de conformidad con el Reglamento (UE) no 305/2011, bajo la sola responsabilidad del fabricante arriba identificado.

Firmado por y en nombre del fabricante por:



Dr. Christian Weber, Director General de Ventas y Director General de Investigación y Desarrollo

Tumlingen, 2026-03-01



Dieter Pfaff, Jefe de la Federación Internacional de Producción y Gestión de Calidad

Esta DdR se ha preparado en distintos idiomas. En caso de que haya alguna controversia sobre la interpretación prevalecerá siempre la versión inglesa. El Apéndice incluye información voluntaria y complementaria en idioma inglés que excede los requisitos legales (de idioma neutral).

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Translation guidance Essential Characteristics and Performance Parameters for Annexes

Glosario de parámetros esenciales, característicos y de prestaciones para los anexos

Mechanical resistance and stability (BWR 1)		
Resistencia mecánica y estabilidad (BWR 1)		
Characteristic resistance for static and quasi-static loading:		
Resistencia característica bajo carga estática y cuasi-estática:		
1	Characteristic resistance to steel failure of a single anchor under tension loading: Resistencia característica por fallo del acero de un anclaje individual bajo sollicitación a tracción:	$N_{Rk,s}$ [kN]
2	Characteristic resistance to steel failure of a single anchor under shear loading with and without level arm: Resistencia característica por fallo del acero de un anclaje individual bajo sollicitación a cortante sin brazo de palanca:	$V_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm]
3	Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading, Reduction factor: Resistencia característica a fallo por arranque o por rotura del ladrillo de un anclaje individual bajo sollicitación a tracción, factor de minoración:	$N_{Rk,p}$; $N_{Rk,b}$; [kN] $N_{Rk,p,c}$; $N_{Rk,b,c}$ [kN], β [-]
4	Characteristic resistance to local brick failure or brick breakout failure of a single anchor under shear loading: Resistencia característica a fallo local del ladrillo o por rotura del ladrillo de un anclaje individual bajo carga a cortante:	$V_{Rk,b}$; $V_{Rk,c,II}$; $V_{Rk,c,I}$ [kN]
5	Characteristic resistance to brick breakout failure of an anchor group under tension loading: Resistencia característica a fallo por rotura del ladrillo de un grupo de anclajes bajo sollicitación a tracción:	N^g_{Rk} [kN], $\alpha_{g,N}$ [-]
6	Characteristic resistance to local brick failure or brick breakout failure of an anchor group under shear loading: Resistencia característica a fallo por rotura local o total del ladrillo de un grupo de anclajes bajo sollicitación a cortante:	$V^g_{Rk,b}$; $V^g_{Rk,c,II}$; $V^g_{Rk,c,I}$ [kN]; $\alpha_{g,V,II}$; $\alpha_{g,V,I}$ [-]
7	Edge distances, spacing, member thickness: Distancias al borde y entre ejes, y espesor de la base de anclaje:	c_{cr} ; s_{cr} ; c_{min} ; $s_{min,II}$; $s_{min,I}$; h_{min} [mm]
8	Displacements under tension and shear loading: Desplazamientos bajo cargas a tracción y a cortante:	δ_{N0} ; $\delta_{N\infty}$; δ_{V0} ; $\delta_{V\infty}$ [mm]
9	Maximum installation torque: Par de apriete de montaje máximo:	max. T_{inst} [Nm]
Characteristic resistance and displacements for seismic loading:		
Resistencia y desplazamientos característicos bajo sollicitaciones sísmicas:		
10	Resistance to tension load, displacements: Resistencia a carga de tracción, desplazamientos:	$N_{Rk,s,eq}$; $N_{Rk,eq}$ [kN], $\alpha_{N,seis}$ [-]; $\delta_{N,eq}$ [mm]
11	Resistance to shear load, displacements: Resistencia a esfuerzo cortante, desplazamientos:	$V_{Rk,s,eq}$; $V_{Rk,b,eq}$ [kN], $\alpha_{V,seis}$ [-]; $\delta_{V,eq}$ [mm]
12	Factor annular gap: Factor espacio anular:	α_{gap} [-]
Safety in case of fire (BWR 2)		
Seguridad en caso de incendio (BWR 2)		
13	Reaction to fire: Reacción al fuego:	-
14	Resistance to fire under tension and shear loading with and without level arm, minimum edge distances and spacing: Resistencia al fuego bajo sollicitación a tracción y a cortante, con y sin brazo de palanca:	$N_{Rk,s,fi}$; $N_{Rk,p,fi}$; [kN], $N_{Rk,b,fi}$; $V_{Rk,s,fi}$ [kN], $M^0_{Rk,s}$ [Nm], $c_{cr,fi}$; $s_{cr,fi}$ [mm]
Hygiene, health and the environment (BWR 3)		
Higiene, salud y medio ambiente (BWR 3)		
15	Content, emission and/or release of dangerous substances: Contenido, emisión y/o desprendimiento de sustancias peligrosas:	-

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

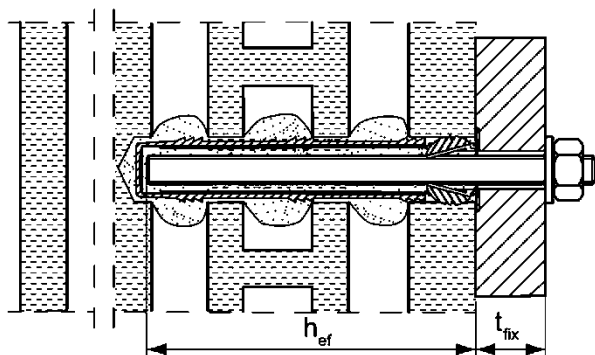
In accordance with the European Assessment Document EAD 330076-01-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

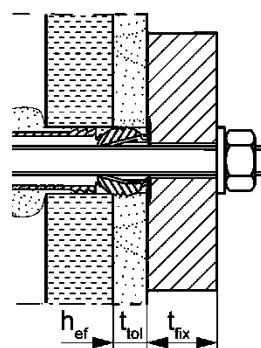
Installation conditions part 1

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

Pre-positioned installation:



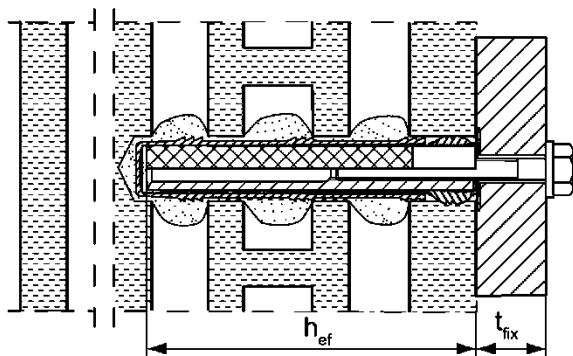
Installation with render bridge



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

h_{ef} = effective anchorage depth

t_{tol} = 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

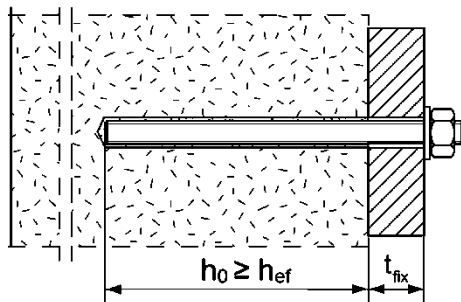
Annex A1

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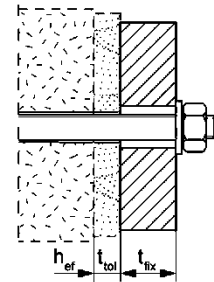
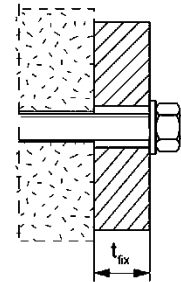
Installation conditions part 2

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

Pre-positioned installation:



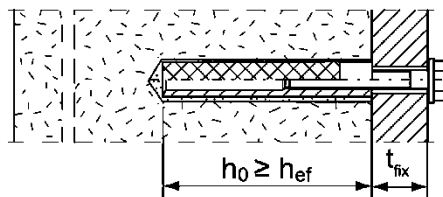
Push through installation: Annular gap filled with mortar



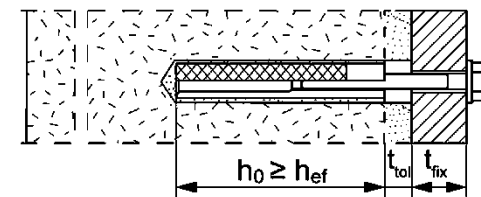
**Installation with
render bridge**

**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

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

h_{ef} = 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

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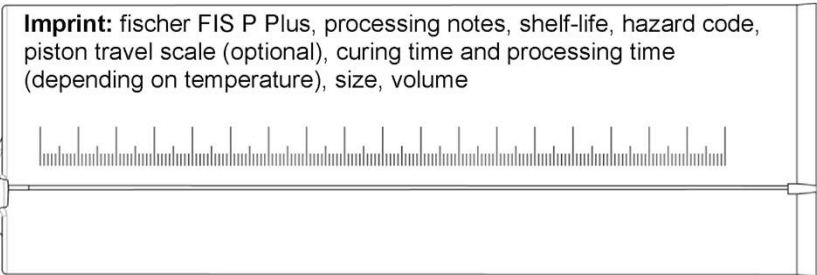
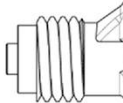
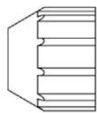
Overview system components part 1

Mortar cartridge (shuttle cartridge) with sealing cap

①

Size: 360 ml, 825 ml

Imprint: fischer FIS P Plus, processing notes, shelf-life, hazard code, piston travel scale (optional), curing time and processing time (depending on temperature), size, volume

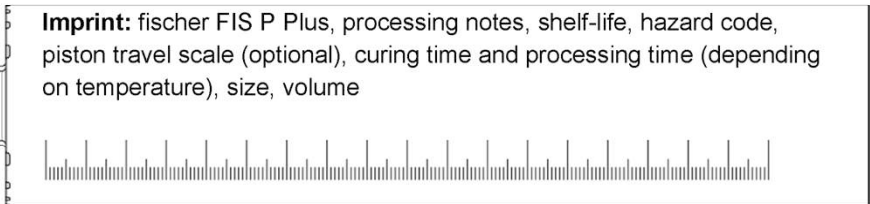
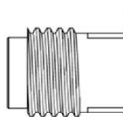
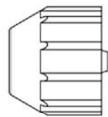


Mortar cartridge (coaxial cartridge) with sealing cap

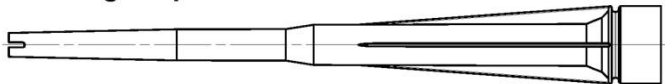
①

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

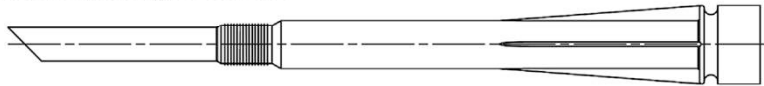
Imprint: fischer FIS P Plus, processing notes, shelf-life, hazard code, piston travel scale (optional), curing time and processing time (depending on temperature), size, volume



Static mixer FIS MR Plus for injection cartridges up to 410 ml



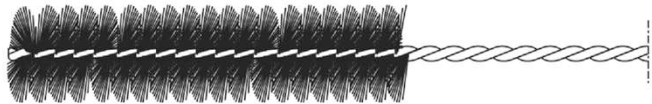
Static mixer FIS JMR for injection cartridges 825 ml



Extension tube Ø 9 for static mixer FIS MR Plus; Extension tube Ø 9 or Ø 15 for static mixer FIS JMR



Cleaning brush BS



Blow-out pump ABG



compressed-air cleaning tool ABP



Figures not to scale

fischer injection system FIS P Plus for masonry

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

Annex A3
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Overview system components part 2

fischer anchor rod

2



Size: M6, M8, M10, M12, M16

Internal threaded anchor FIS E

5



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

Perforated sleeve FIS H K

7



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

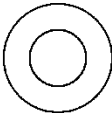
7



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

Washer

3





Hexagon nut

4





Figures not to scale

Table A5.1: Materials

Part	Designation	Material		
1	Mortar cartridge	Mortar, hardener; filler		
		Steel	Stainless steel R	High corrosion resistant steel HCR
		zinc plated	acc. to EN 10088-1:2023 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+A1:2015
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ 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 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4565; 1.4529 EN 10088-1:2023 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated $\geq 5\mu\text{m}$, 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 $\geq 5\mu\text{m}$, 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 $\geq 5\mu\text{m}$, 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 $\geq 5\mu\text{m}$, 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		

fischer injection system FIS P Plus for masonry

Product description
 Materials
Annex A5

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Specifications of intended use part 1				
Table B1.1: Overview use and performance categories				
Anchorages subject to		fischer injection system fischer FIS P Plus for masonry		
Hole drilling with hammer drill mode 		all bricks		
Hole drilling with rotary drill mode 		all bricks		
Static and quasi static load, in masonry		all bricks		
Installation	Pre-positioned installation	Anchor rod or internal threaded anchor (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 16x130 K FIS H 20x85 K FIS H 20x130 K FIS H 20x200 K	
	Push through installation	Anchor rod; use in cylindrical drill hole (in solid brick masonry and autoclaved aerated concrete)		
Installation and use conditions	conditions d/d (dry/dry)	all bricks		
	conditions w/d (wet/dry)			
	conditions w/w (wet/wet)			
Installation direction		D3 (downward and horizontal installation)		
Installation temperature		T _{i,min} = -5 °C to T _{i,max} = +40 °C		
In-service temperature	Temperature range Tb	-40 °C to +80 °C	(max. short term temperature +80 °C max. long term temperature +50 °C)	
	Temperature range Tc	-40 °C to +120 °C	(max. short term temperature +120 °C; max. long term temperature +72 °C)	
fischer injection system FIS P Plus for masonry			Annex B1 Appendix 7 / 48	
Intended Use Specifications part 1				

Specifications of intended use part 2

Anchorage 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 $h_{ef}+30\text{mm}$.
- 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:

- **T_b**: From - 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- **T_c**: 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
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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 $N_{Rk,pb}$ or pushing out a brick under shear loading $V_{Rk,pb}$ see EOTA Technical Report TR 054:2023-12.

$N_{Rk,s}$, $V_{Rk,s}$ and $M^0_{Rk,s}$ 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

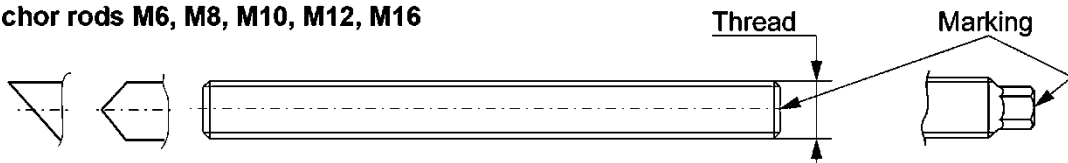
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Table B4.1: Installation parameters for anchor rods in solid bricks and autoclaved aerated concrete without perforated sleeves

Anchor rod	Thread	M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0 [mm]	8	10	12	14	18
Effective anchorage depth $h_{ef}^{1)}$	$h_{0,min} \geq h_{ef,min}$ [mm]	100				
in AAC cylindrical drill hole	$h_{0,max} \geq h_{ef,max}$ [mm]	h-30, ≤ 200				
Effective anchorage depth $h_{ef}^{1)}$	$h_{ef,min}$ [mm]	50				
in solid brick	$h_{ef,max}$ [mm]	h-30, ≤ 200				
(depth of drill hole $h_0 \geq h_{ef}$)						
Diameter of clearance	pre-positioning $d_f \leq$ [mm]	7	9	12	14	18
hole in the fixture	push through $d_f \leq$ [mm]	9	11	14	16	20
Diameter of cleaning brush	$d_b \geq$ [mm]	see Table B7.1				
Maximum installation torque	T_{inst} [Nm]	see parameters of brick				

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

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



Marking (on random place) fischer anchor rod:

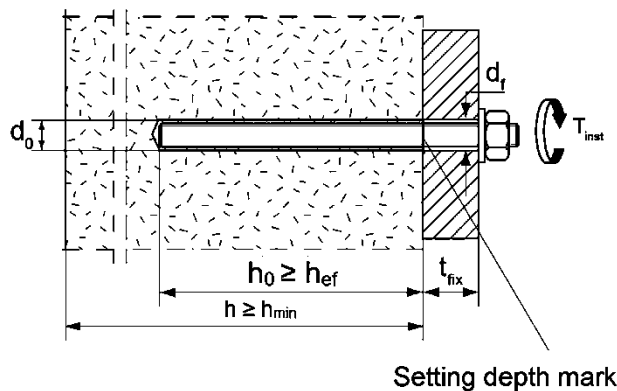
Steel zinc plated PC ¹⁾ 8.8	● or +	Steel hot-dip galvanised PC ¹⁾ 8.8	●
High corrosion resistant steel HCR PC ¹⁾ 50	●	High corrosion resistant steel HCR PC ¹⁾ 70	–
High corrosion resistant steel HCR PC ¹⁾ 80	(	Stainless steel R property class 50	~
Stainless steel R property class 80	*		

Alternatively: Colour coding according to DIN 976-1: 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



Figures not to scale

fischer injection system FIS P Plus for masonry

Intended Use

Installation parameters for anchor rods without perforated sleeve

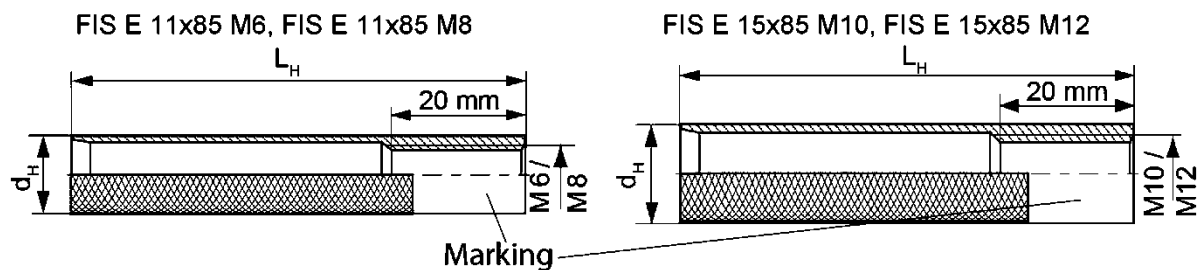
Annex B4

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

Internal threaded anchor FIS E		11x85 M6	11x85 M8	15x85 M10	15x85 M12
Diameter of anchor	d _H [mm]	11		15	
Nominal drill hole diameter	d ₀ [mm]	14		18	
Length of anchor	L _H [mm]	85			
Effective anchorage depth	h ₀ ≥ h _{ef} [mm]	85			
Diameter of cleaning brush	d _b ≥ [mm]	see Table B7.1			
Maximum installation torque	T _{inst} [Nm]	see parameters of brick			
Diameter of clearance hole in the fixture	d _r [mm]	7	9	12	14
Screw-in depth	l _{E,min} [mm]	6	8	10	12
	l _{E,max} [mm]	60			

fischer Internal threaded anchor FIS E

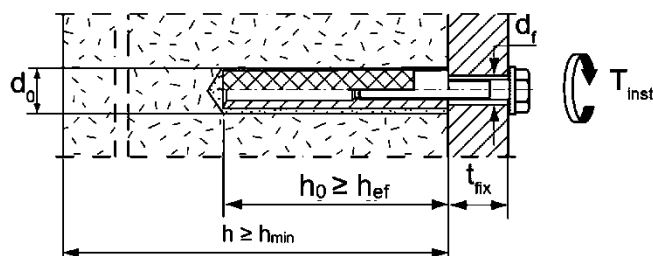


Marking:

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

Installation 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

Appendix 11 / 48

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

perforated sleeve FIS H K	12x50	12x85 ²⁾	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter $d_0 = D_{\text{sleeve, nom}}$	12		16		20		
Depth of drill hole h_0 [mm]	55	90	90	135	90	135	205
Effective anchorage depth	$h_{\text{ef, min}}$ [mm]	50	65	85	110	85	180
	$h_{\text{ef, max}}$ [mm]	50	85	85	130	85	200
Size of threaded rod [-]	M6 and M8		M8 and M10		M12 and M16		
Size of internal threaded anchor FIS E	-	-	11x85	-	15x85	-	-
Diameter of cleaning brush ¹⁾ $d_b \geq$ [mm]	see Table B7.1						
Maximum installation torque T_{inst} [Nm]	see parameters of brick						

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

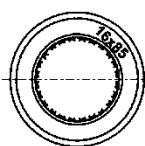
²⁾ Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth $h_{\text{ef, min}}$, the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of characteristic resistance must be taken.

Perforated sleeve

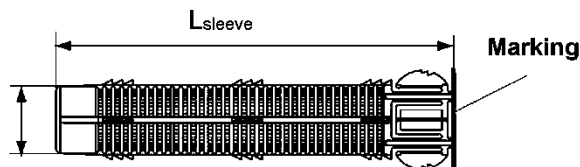
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

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



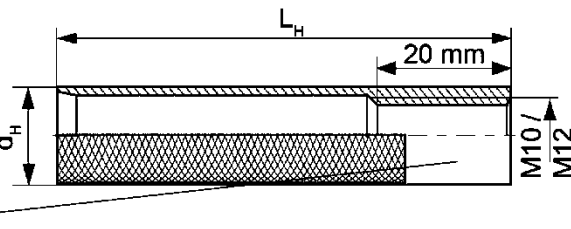
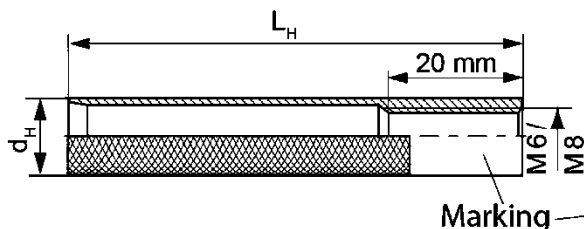
$D_{\text{sleeve, nom}}$



fischer Internal threaded anchor FIS E

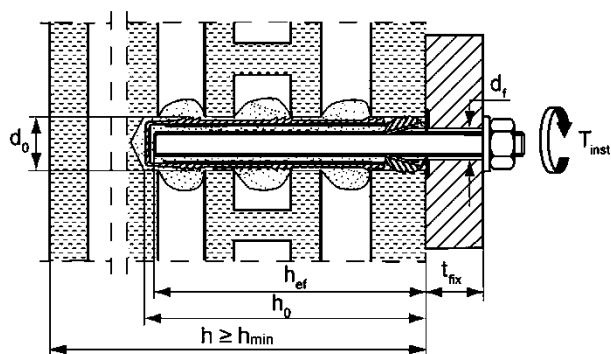
FIS E 11x85 M6, FIS E 11x85 M8

FIS E 15x85 M10, FIS E 15x85 M12

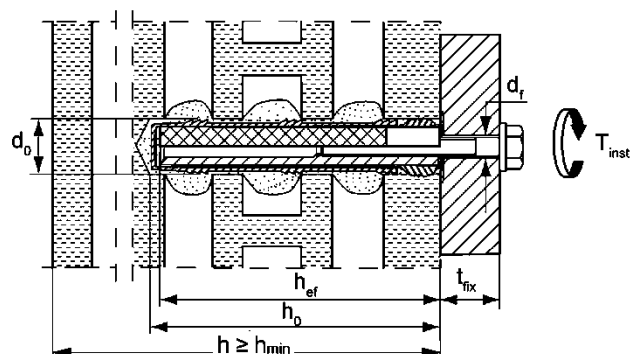


Installation conditions:

Anchor rod with perforated sleeve



Internal threaded anchor with perforated sleeve



Figures not to scale

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)

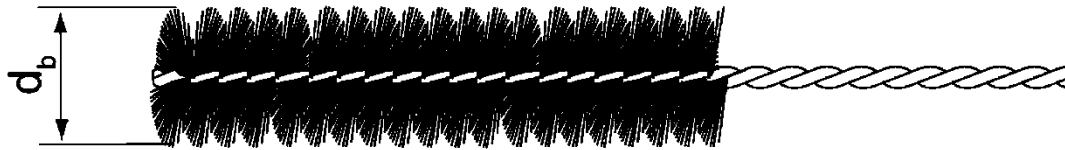
Annex B6

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

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

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



Only for solid bricks and autoclaved aerated concrete 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_0	[mm]	10	12	14	16	18	20	22
Drill hole depth h_0 by using	FIS MR Plus	[mm]	≤ 90		≤ 120	≤ 140	≤ 150	≤ 160	≤ 170
	FIS JMR	[mm]	-		≤ 90			≤ 260	

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 [°C]	Maximum processing time ²⁾ t_{work}	Minimum curing time ^{1), 2)} t_{cure}
	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

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

²⁾ Minimum cartridge temperature +5°C.

Figures not to scale

fischer injection system FIS P Plus for masonry

Intended Use

Cleaning brush (steel brush)

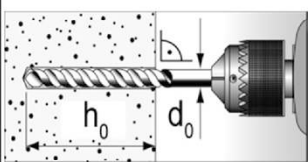
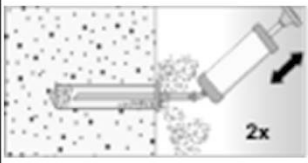
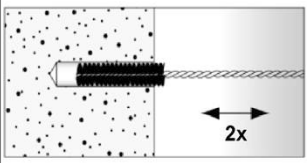
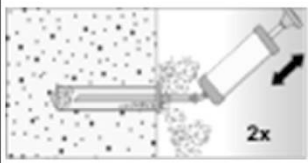
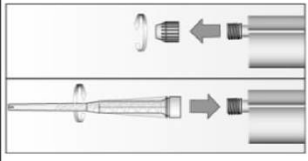
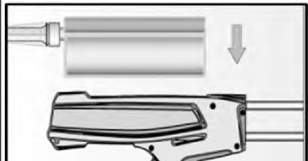
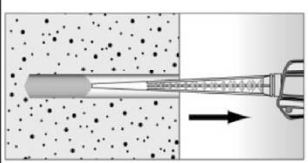
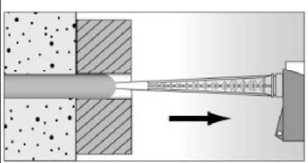
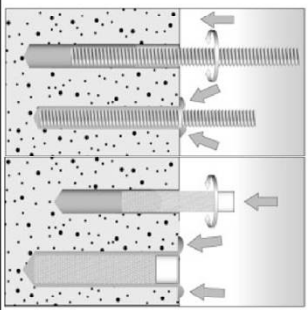
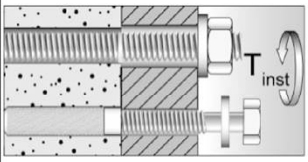
Maximum processing times and minimum curing times

Annex B7

Appendix 13 / 48

Installation instruction part 1

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

1		Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole h_0 and drill hole diameter d_0 see Table B4.1; B5.1 .		
2				Blow out the drill hole twice. Brush twice and blow out twice again.
3		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).		
4		Place the cartridge into a suitable dispenser.		Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.
5		Fill approximetly 2/3 of the drill hole with mortar beginning from the bottom of the hole ¹⁾ . Avoid bubbles!		For push through installation fill the annular clearance with mortar.
6		Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.		
7		Do not touch. Minimum curing time see Table B7.3 .		Mounting the fixture. max T_{inst} see parameter of brick in Annex C .

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

fischer injection system FIS P Plus for masonry

Intended Use

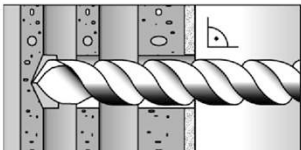
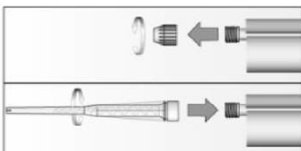
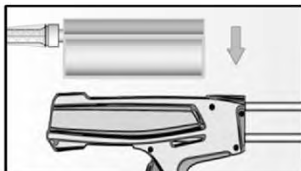
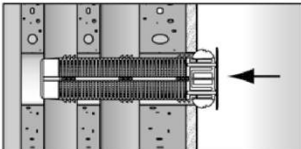
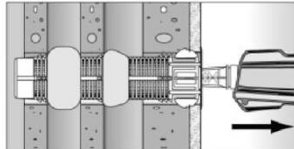
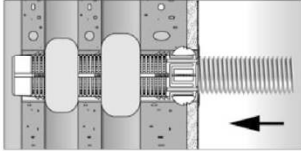
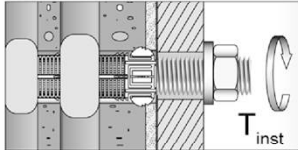
Installation instruction (without perforated sleeve) part 1

Annex B8

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Installation instruction part 2

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

1		Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole h_0 and drill hole diameter d_0 see Table B6.1		When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.	
2		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).			
3		Place the cartridge into a suitable dispenser.		Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.	
4		Insert the perforated sleeve flush with the surface of the masonry or plaster.		Fill the perforated sleeve completely with mortar beginning from the bottom of the hole ¹⁾ .	
5		Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).			
6		Do not touch. Minimum curing time see Table B7.3		Mounting the fixture. max T_{inst} see parameter of brick in Annex C .	

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

fischer injection system FIS P Plus for masonry

Intended Use

Installation instruction (with perforated sleeve) part 2

Annex B9

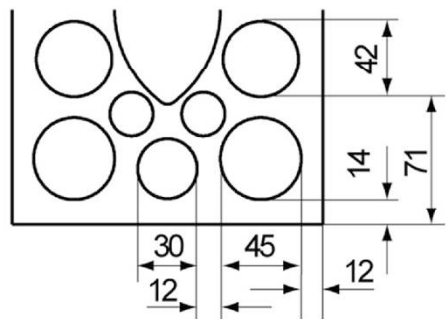
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Table B10.1: Overview of assessed bricks

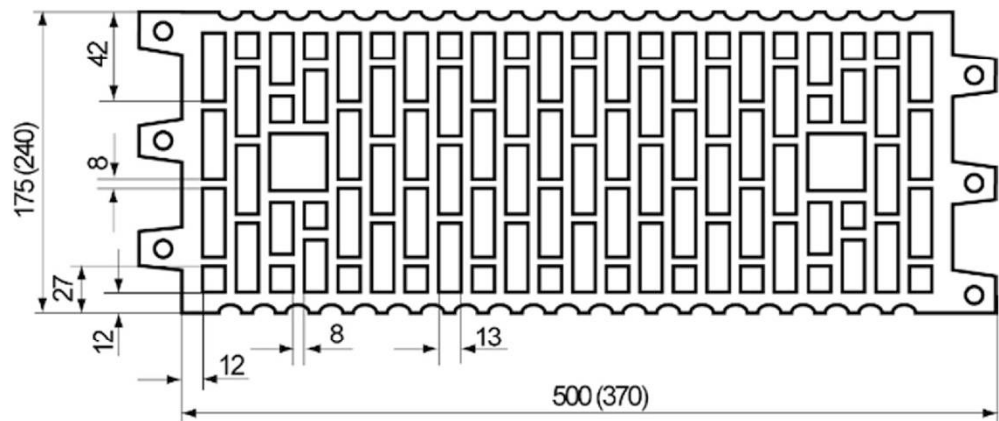
Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm ²]	Main country of origin	Mean gross density ρ [kg/dm ³]	Annex
Solid brick Mz					
Solid brick Mz	NF ≥240x115x71	15 / 25 / 35	Germany	≥1,8	C4 – C7
Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL					
Solid calcium silicate brick KS	NF ≥240x115x71	15 / 25 / 35	Germany	≥2,0	C8 / C9
	≥ 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
Vertical perforated brick HLz					
Vertical perforated brick HLz	370x240x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C15 / C16
	500x175x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C15 / C16
	2DF 240x115x113	7,5 / 12,5 / 20 / 25 / 35	Germany	≥1,4	C17 / C18
	365x248x245	10	Austria	≥0,6	C19 – C20
	240x175x113	12,5	Germany	≥0,9	C21 / C22
Light-weight concrete hollow block Hbl					
Light-weight concrete hollow block Hbl	362x240x240	2,5 / 5	Germany	≥1,0	C23 / C24
Autoclaved aerated concrete (AAC)					
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 Appendix 16 / 48	

Table B11.1: Overview dimensions of perforated and hollow bricks part 1

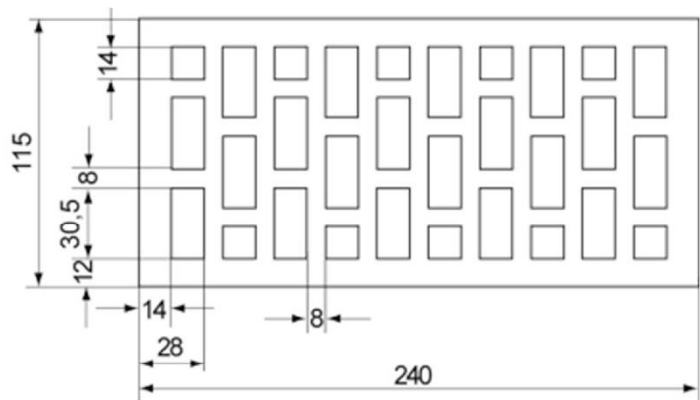
Perforated calcium silicate brick KSL, 3DF,
EN 771-2:2011+A1:2015; e.g. KS Wemding according to Annex C12



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

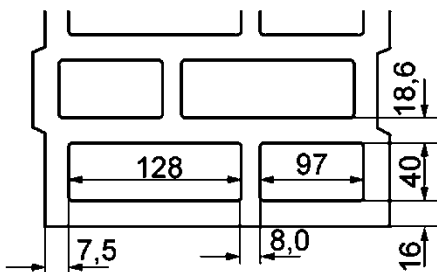
fischer injection system FIS P Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 1

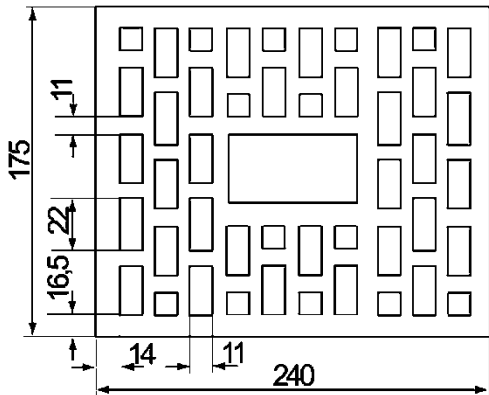
Annex B11
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Table B14.1: Overview dimensions of perforated and hollow bricks part 2

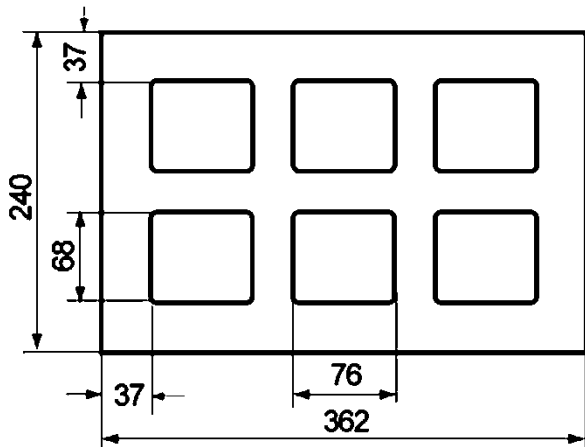
Vertical perforated brick filled with mineral wool,
EN 771-1:2011+A1:2015; according to Annex C19



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



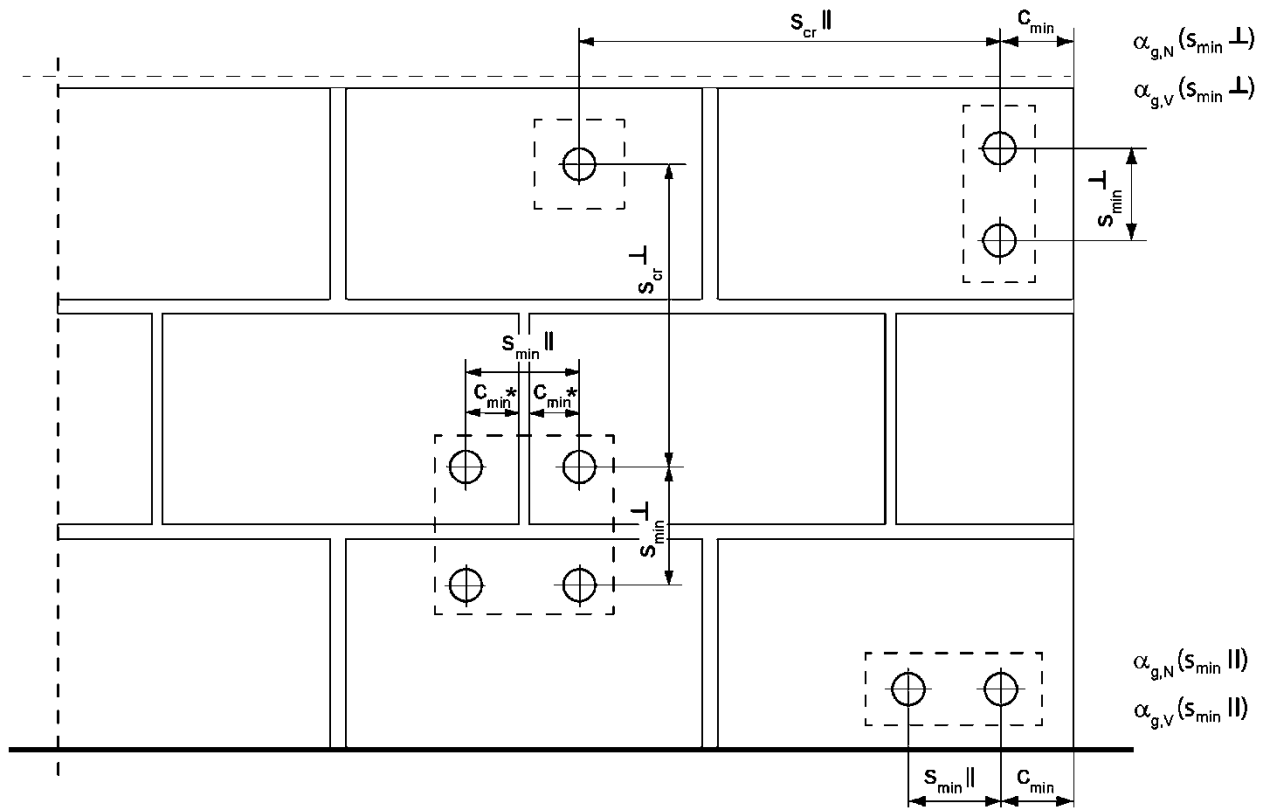
Measures in [mm]
Figures not to scale

fischer injection system FIS P Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 2

Annex B12
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Spacing and edge distance part 1



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

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

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Spacing and edge distance part 2

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

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

Group of 2 anchors

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

Group of 4 anchors

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

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

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

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

fischer injection system FIS P Plus for masonry

Intended Use
Spacing and edge distance part 2

Annex B14

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

Anchor rod / standard threaded rod				M6	M8 ³⁾	M10 ³⁾	M12	M16	
Characteristic resistance to steel failure under tension loading									
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	Property class	4.6 4.8 5.8 8.8 50 70 80	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
					8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
					10,0	18,3(16,6)	29,0(26,8)	42,1	78,5
	Stainless steel R and High corrosion resistant steel HCR				16,0	29,2(26,5)	46,4(42,8)	67,4	125,6
					10,0	18,3	29,0	42,1	78,5
					14,0	25,6	40,6	59,0	109,9
					16,0	29,2	46,4	67,4	125,6

Partial factors ¹⁾

Partial factors $\gamma_{Ms,N}$	Steel zinc plated	Property class	[-]	4.6	2,00
				4.8	1,50
				5.8	1,50
	8.8			1,50	
	50			2,86	
	70			1,50 ²⁾ / 1,87	
	80			1,60	
	Stainless steel R and High corrosion resistant steel HCR				

¹⁾ In absence of other national regulations

²⁾ Only for fischer FIS A made of high corrosion resistant steel HCR

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

fischer injection system FIS P Plus for masonry

Performance

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

Annex C1

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Table C2.1: Characteristic resistance to steel failure under shear loading of fischer anchor rods and standard threaded rods									
Anchor rod / standard threaded rod				M6	M8 ³⁾	M10 ³⁾	M12	M16	
Characteristic resistance to steel failure under shear loading									
without lever arm									
Characteristic resistance $V_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
			4.8		4,8	8,7(7,9)	13,9(12,8)	20,2	37,6
			5.8		6,0	10,9(9,9)	17,4(16,0)	25,2	47,1
			8.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
	Stainless steel R and High corrosion resistant steel HCR		50		5,0	9,1	14,5	21,0	39,2
			70		7,0	12,8	20,3	29,5	54,9
			80		8,0	14,6	23,2	33,7	62,8
with lever arm									
Characteristic resistance $M^0_{Rk,s}$	Steel zinc plated	Property class	4.6	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
			4.8		6,1	14,9(12,9)	29,9(26,5)	52,3	132,9
			5.8		7,6	18,7(16,1)	37,3(33,2)	65,4	166,2
			8.8		12,2	29,9(25,9)	59,8(53,1)	104,6	265,9
	Stainless steel R and High corrosion resistant steel HCR		50		7,6	18,7	37,3	65,4	166,2
			70		10,6	26,2	52,3	91,5	232,6
			80		12,2	29,9	59,8	104,6	265,9
Partial factors ¹⁾									
Partial factors $\gamma_{Ms,V}$	Steel zinc plated	Property class	4.6	[-]	1,67				
			4.8		1,25				
			5.8		1,25				
			8.8		1,25				
	Stainless steel R and High corrosion resistant steel HCR		50		2,38				
			70		1,25 ²⁾ / 1,56				
			80		1,33				

¹⁾ In absence of other national regulations

²⁾ Only for fischer FIS A made of high corrosion resistant steel HCR

³⁾ Values in brackets are valid for undersized threaded rods with smaller stress area A_s for hot-dip galvanised standard threaded rods (M8 resp. M10) according to EN ISO 10684:2004+AC:2009.

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

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Table C3.1: Characteristic resistance to **steel failure** under **tension / shear loading** of **internal threaded anchors FIS E**

fischer internal threaded anchor FIS E				M6	M8	M10	M12
Characteristic resistance to steel failure under tension loading, decisive values of internal threaded anchor FIS E with screw/threaded rod							
Characteristic resistance	N _{Rk,s}	Property class 4.6	[kN]	8,0	14,6	23,2	33,7
		Property class 5.8		10,0	18,3	29,0	42,1
		Property class R		14,0	25,6	40,6	59,0
		Property class 70 HCR		14,0	25,6	40,6	59,0
Partial factors ¹⁾							
Partial factors	γ _{Ms,N}	Property class 4.6	[-]	2,00			
		Property class 5.8		1,50			
		Property class R		1,87			
		Property class 70 HCR		1,87			
Characteristic resistance to steel failure under shear loading; decisive values of internal threaded anchor FIS E with screw/threaded rod							
without lever arm							
Characteristic resistance	V _{Rk,s}	Property class 4.6	[kN]	4,8	8,7	13,9	20,2
		Property class 5.8		6,0	10,9	15,0	21,0
		Property class R		7,0	12,8	20,3	29,5
		Property class 70 HCR		7,0	12,8	20,3	29,5
with lever arm							
Characteristic resistance	M ⁰ _{Rk,s}	Property class 4.6	[Nm]	6,1	14,9	29,9	52,3
		Property class 5.8		7,6	18,7	37,3	65,4
		Property class R		10,6	26,2	52,3	91,5
		Property class 70 HCR		10,6	26,2	52,3	91,5
Partial factors ¹⁾							
Partial factors	γ _{Ms,V}	Property class 4.6	[-]	1,67			
		Property class 5.8		1,25			
		Property class R		1,56			
		Property class 70 HCR		1,56			

¹⁾ In absence of other national regulations

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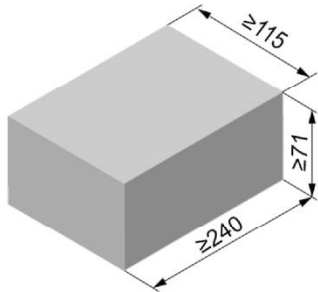
Performance

Characteristic resistance to steel failure under tension / shear loading of internal threaded anchors FIS E

Annex C3

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 71
Mean gross dry density ρ	[kg/dm³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	15 / 12 or 25 / 20 or 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	-		-	
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve									
Effective anchorage depth hef	[mm]	50	50	50	50	85			
		80	80	80	80				
		200	200	200	200				
Max. installation torque max Tinst	[Nm]	4	10			4	10		
General installation parameters									
Edge distance Cmin = Ccr	[mm]	100				100			
Edge distance hef=200 Cmin = Ccr		150				_2)			
Smin II,N		60				60			
hef=200 Smin II,N		240				_2)			
Smin II,V		240				240			
Scr II		240				240			
Scr ⊥ = Smin ⊥		75				75			

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

²⁾ No performance assessed

Table C4.2: Group factors

Anchor rods	M6	M8	M10	M12	-	-
Internal threaded anchor FIS E	-	-	-	-	M6	M8
					11x85	15x85
Edge distance C_{min}	[mm]	100				
$\alpha_{a,N} (S_{min II})$	[-]	1,5				
$\alpha_{g,V} (S_{min II})$		2,0				
$h_{ef}=200$ $\alpha_{g,N} (S_{min II})$		1,5				
$h_{ef}=200$ $\alpha_{g,V} (S_{min II})$		2,0				
$\alpha_{a,N} (S_{min \perp})$		2,0				
$\alpha_{a,V} (S_{min \perp})$		2,0				
$h_{ef}=200$ $\alpha_{a,N} (S_{min \perp})$		2,0				
$h_{ef}=200$ $\alpha_{a,V} (S_{min \perp})$		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

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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 $c=100\text{mm}$

Anchor rod	M6		M8		M10		M12		-		-	
Internal threaded anchor FIS E	-		-		-		-		M6	M8	M10	M12
									11x85		15x85	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]									
			≥50	≥50	50	80	200	50	80	200	85	
15 / 12 N/mm ²	w/w	w/d	2,5	2,5	2,0	3,0	7,5	2,0	3,5	5,0	3,5	
	d/d		4,0	4,0	3,5	5,0	12,0	3,0	5,5	8,0	5,5	
25 / 20 N/mm ²	w/w	w/d	3,5	3,5	3,0	4,5	11,0	3,0	5,0	7,0	5,0	
	d/d		5,5	5,5	5,0	7,0	12,0	4,5	8,0	11,5	8,0	

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

²⁾ For temperature range 72/120°C: $N_{Rk(72/120^\circ\text{C})} = 0,83 \cdot N_{Rk(50/80^\circ\text{C})}$.

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

Anchor rod	M6		M8	M10		M12		-		-	
Internal threaded anchor FIS E	-		-	-		-		M6	M8	M10	M12
								11x85		15x85	
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C											
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]								
			≥50	≥50	≥50	200	≥50	200	85		
15 / 12 N/mm ²	w/w	w/d	2,5	2,5	4,0	8,5	4,0	11,5	2,5		
	d/d										
25 / 20 N/mm ²	w/w	w/d	4,0	4,0	6,0	12,0	5,5	12,0	4,0		
	d/d										

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

Factor for job site tests 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 $c=100\text{mm}$

Annex C5

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

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

Anchor rod		M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12
							11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	h _{ef}	[mm]	50	50	50	50	50	85		
			100	100	100	100	100			
			200	200	200	200	200			
Max. installation torque	max T _{inst}	[Nm]	4	10				4	10	

General installation parameters

Edge distance		$c_{min} = c_{cr}$	60							
Edge distance		c_{min}	60							
Spacing	s_{min} II,N	$h_{ef}=200$ s_{min} II,N [mm]	80							
			80							
			80							
			3x h_{ef}							
			80							
			3x h_{ef}							

Drilling method

Hammer drilling with hard metal hammer drill

Table C6.2: Group factors

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

fischer injection system FIS P Plus for masonry

Performance

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

Annex C6

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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 $c=60\text{mm}$

Anchor rod			M6		M8		M10			M12			M16			-		-	
Internal threaded anchor FIS E			-		-		-			-			-			M6	M8	M10	M12
																11x85		15x85	
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ³⁾																			
Mean compressive strength / Min. compressive strength single brick ¹⁾		Use conditions		Effective anchorage depth h _{ef} [mm]															
				50	100	50	100	50	100	200	50	100	200	50	100	200	85		
15 / 12 N/mm ²		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⁾			
		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⁾			
25 / 20 N/mm ²		w/w	w/d	2,0	2,5	3,0	2,5	3,5	- ²⁾	3,0	3,5	- ²⁾	3,0	7,5	- ²⁾	- ²⁾			
		d/d		3,5	4,5	5,5	4,5	5,5	12	4,5	5,5	12	4,5	12	12	- ²⁾			
35 / 28 N/mm ²		w/w	w/d	2,5	3,0	4,0	3,0	4,0	- ²⁾	3,5	4,0	- ²⁾	3,5	9,0	- ²⁾	- ²⁾			
		d/d		4,0	5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	- ²⁾			

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

²⁾ No performance assessed.

³⁾ For temperature range 72/120°C: $N_{Rk(72/120^\circ\text{C})} = 0,83 \cdot N_{Rk(50/80^\circ\text{C})}$.

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

Anchor rod		M6		M8		M10		M12		M16		-		-	
Internal threaded anchor FIS E		-		-		-		-		-		M6	M8	M10	M12
												11x85		15x85	
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h _{ef} [mm]													
		50	100	50	100	50	100	200	50	100	200	50	100	200	85
	15 / 12 N/mm ²	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 ²	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 ²	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⁾

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

²⁾ No performance assessed.

Factor for job site tests and displacements see annex C28.

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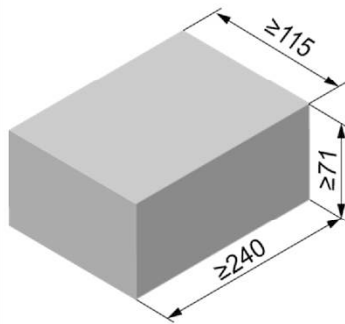
Performance

Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance $c=60\text{mm}$

Annex C7

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



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 71
Mean gross dry density ρ	[kg/dm³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	15 / 12 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-2:2011+A1:2015			

Table C8.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85	85
Max. installation torque $\max T_{inst}$	[Nm]	3	5	15	15	25	3	5	15				

General installation parameters

Edge distance $c_{min} = c_{cr}$		60
Spacing $s_{min} \parallel$		80
Spacing $s_{cr} \parallel$	[mm]	80
Spacing $s_{min} \perp$		3x h_{ef}
Spacing $s_{cr} \perp$		3x h_{ef}

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C8.2: Group factors

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 15x85
Group factor $\alpha_{g,N} (s_{min} \parallel)$	[-]	0,7					
Group factor $\alpha_{g,V} (s_{min} \parallel)$		1,3					
Group factor $\alpha_{g,N} (s_{min} \perp)$		2,0					
Group factor $\alpha_{g,V} (s_{min} \perp)$		2,0					

fischer injection system FIS P Plus for masonry

Performance

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

Annex C8

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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 FIS E	-	-	-	-	-	M6 M8 11x85	M10 M12 15x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]														
			50	100	50	100	50	100	200	50	100	200	50	100	200	85	85
15 / 12 N/mm ²	w/w	w/d	2,0	3,0	2,5	4,5	2,5	3,5	7,0	2,5	3,0	6,5	2,5	3,5	8,0	2,5	2,5
	d/d		4,0	5,5	4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,5	5,5	12	4,0	4,0
25 / 20 N/mm ²	w/w	w/d	3,0	4,5	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	4,0	5,0	11	3,5	3,5
	d/d		5,5	7,5	6,0	11	6,0	8,0	12	6,0	6,5	12	6,5	8,0	12	6,0	6,0
35 / 28 N/mm ²	w/w	w/d	3,5	5,0	4,0	8,0	4,5	5,5	12	4,5	5,0	11	4,5	5,5	12	4,5	4,5
	d/d		6,5	9,0	7,0	12	7,0	9,0	12	7,0	7,5	12	7,5	9,5	12	7,0	7,0

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

²⁾ For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$.

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

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 M8 11x85	M10 M12 15x85

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]											
		50	100	50	100	50	≥100	50	≥100	50	≥100	85	85
15 / 12 N/mm ²	w/w w/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
	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
25 / 20 N/mm ²	w/w w/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
	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

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

Factor for job site tests and displacements see annex C28.

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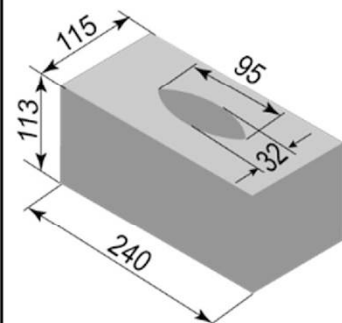
Performance

Solid calcium silicate brick KS, NF, Characteristic resistance under tension and shear loading

Annex C9

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



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm³]	1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-2:2011+A1:2015			

Table C10.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T _{inst} [Nm]	2	4									
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General installation parameters

Edge distance	$C_{min} = C_{cr}$	[mm]	100				
Spacing	$s_{min} \parallel$		255	255	390	255	390
	$s_{cr} \parallel$						
	$s_{min} \perp$						
	$s_{cr} \perp$						

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C10.2: Group factors

Anchor rod		M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforated sleeve FIS H K		12x85		16x85		16x130		20x85		20x130	
Group factors	$\alpha_{g,N} (s_{min}) =$	[-]	2								
	$\alpha_{g,V} (s_{min}) =$										
	$\alpha_{g,N} (s_{min} \perp) =$										
	$\alpha_{g,V} (s_{min} \perp) =$										

fischer injection system FIS P Plus for masonry

Performance

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

Annex C10

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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	M8	-		M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-	
			11x85						15x85					
Perforated sleeve FIS H K	12x85		16x85				16x130		20x85				20x130	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
12,5 / 10 N/mm ²	w/w	3,5	2,0		2,0		2,0		6,5				4,5	
	d/d	6,0	4,0		3,5		3,5		10,5				7,0	
25 / 20 N/mm ²	w/w	5,0	3,0		3,0		3,0		9,5				6,0	
	d/d	8,5	5,5		5,5		5,5		12,0				10,0	

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

²⁾ For temperature range 72/120°C no performance assessed.

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	-		M12	M16	M12	M16
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-	
			11x85						15x85					
Perforated sleeve FIS H K	12x85		16x85				16x130		20x85				20x130	
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
12,5 / 10 N/mm ²	w/w	3,0	3,5											
	d/d													
25 / 20 N/mm ²	w/w	4,0	5,5											
	d/d													

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

²⁾ For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C28.

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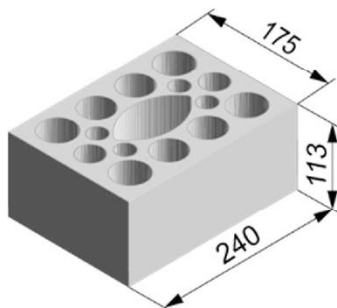
Performance

Solid calcium silicate brick KS, Characteristic resistance under tension loading and shear loading

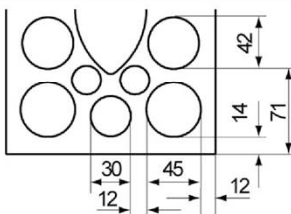
Annex C11

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



Producer		-		
Nominal dimensions	[mm]	length L	width W	height H
		240	175	113
Mean gross dry density ρ	[kg/dm ³]	≥ 1,4		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	10 / 8 or 12,5 / 10 or 15 / 12 or 20 / 16 or 25 / 20		
Standard or annex		EN 771-2:2011+A1:2015		



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

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

Max. installation torque	max T _{inst} [Nm]	2
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General installation parameters

Edge distance	C _{min} = C _{cr}	60	80
Spacing	S _{min}	100	
	S _{cr} [mm]	240	
	S _{min} ⊥	115	
	S _{cr} ⊥	115	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C12.2: Group factors

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

Group factors	$\alpha_{g,N} (S_{min}) =$ $\alpha_{g,V} (S_{min})$	[-]	1,5
	$\alpha_{g,N} (S_{min} \perp) =$ $\alpha_{g,V} (S_{min} \perp)$		2,0

fischer injection system FIS P Plus for masonry

Performance

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

Annex C12

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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	-		-		M6	M8	-		-		M10	M12	-		
					11x85						15x85				
Perforated sleeve FIS H K	12x50		12x85		16x85				16x130		20x85			20x130	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾															
Mean compressive strength/ Min. comp. strength single brick ¹⁾	Use conditions														
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	2,0		2,0			2,5		2,5			2,5		
	d/d		2,0		2,5			3,0		3,0			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		

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

²⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0,83 \cdot N_{Rk(50/80^{\circ}C)}$.

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

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

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions														
10 / 8 N/mm ²	w/w	w/d	1,5						3,0				2,5	3,0	2,5
	d/d														
12,5 / 10 N/mm ²	w/w	w/d	2,0						3,5						
	d/d														
15 / 12 N/mm ²	w/w	w/d	2,5						4,5				4,0	4,5	4,0
	d/d														
20 / 16 N/mm ²	w/w	w/d	3,0	3,5	3,0	3,5	3,0	6,0				5,5	6,0	5,5	
	d/d														
25 / 20 N/mm ²	w/w	w/d	4,0	4,5	4,0	4,5	4,0	7,5				6,5	7,5	6,5	
	d/d														

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

Factor for job site tests and displacements see annex C28.

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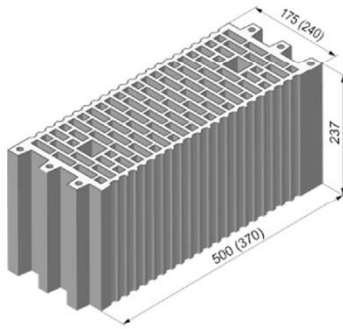
Performance

Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading

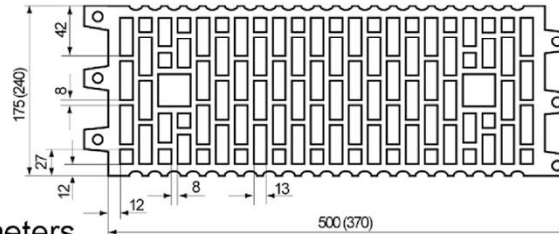
Annex C14

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



Producer	e.g. Wienerberger, Poroton			
Nominal dimensions	[mm]	length L	width W	height H
		500	175	237
		370	240	237
Mean gross dry density ρ	[kg/dm ³]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	5 / 4 or 7,5 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B11

Table C15.1: Installation parameters

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

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

Max. installation torque	max T _{inst} [Nm]	2
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General installation parameters

Edge distance	C _{min} = C _{cr}	100
Spacing	S _{min}	100
	S _{cr} [mm]	500 (370)
	S _{min} ⊥	100
	S _{cr} ⊥	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C15.2: Group factors

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

Group factors	$\alpha_{g,N} (S_{min}) =$ $\alpha_{g,V} (S_{min}) =$ $\alpha_{g,N} (S_{min} \perp) =$ $\alpha_{g,V} (S_{min} \perp) =$	[-]	1
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fischer injection system FIS P Plus for masonry	Annex C15 Appendix 35 / 48
Performance Vertical perforated brick HLz, dimensions, installation parameters, Group factors	

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

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
			11x85							15x85				
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130								
N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c} [kN]; temperature range 50/80°C ²⁾														
Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions													
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									

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

²⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0,83 \cdot N_{Rk(50/80^{\circ}C)}$.

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

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
			11x85							15x85				
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130								
V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions													
5 / 4 N/mm²	w/w w/d d/d	0,50	0,60	0,50	0,60									
7,5 / 6 N/mm²		0,75	0,90	0,75	0,90									
10 / 8 N/mm²		0,90	1,20	0,90	1,20									
12,5 / 10 N/mm²		1,20	1,50	1,20	1,50									
15 / 12 N/mm²		1,50	2,00	1,50	2,00									

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

Factor for job site tests and displacements see annex C28.

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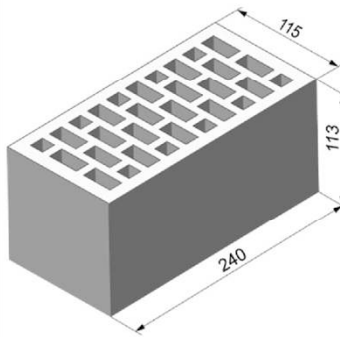
Performance

Vertical perforated brick HLz, Characteristic resistance under tension and shear loading

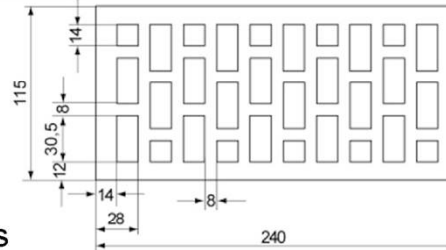
Annex C16

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		240	115	113
Mean gross dry density ρ	[kg/dm ³]	≥ 1,4		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	7,5 / 6 or 12,5 / 10 or 20 / 16 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B11

Table C20.1: Installation parameters

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

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

Max. installation torque	max T _{inst} [Nm]	2
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General installation parameters

Edge distance	C _{min} = C _{cr}	80
Spacing	s _{cr} = s _{min}	240
	s _{cr} ⊥ = s _{min} ⊥	115

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C20.2: Group factors

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

Group factors	$\alpha_{g,N} (s_{min})$	[-]	2
	$\alpha_{g,V} (s_{min})$		
	$\alpha_{g,N} (s_{min} \perp)$		
	$\alpha_{g,V} (s_{min} \perp)$		

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Performance

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

Annex C17

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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	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions											
7,5 / 6 N/mm ²	w/w	w/d	0,75		0,90		0,75			0,90		
	d/d		0,75		1,20		0,75			0,90		
12,5 / 10 N/mm ²	w/w	w/d	1,20		1,50		1,20			1,50		
	d/d		1,20		2,00		1,20			1,50		
20 / 16 N/mm ²	w/w	w/d	2,00		2,50		2,00			2,00		
	d/d		2,00		3,00		2,00			2,50		
25 / 20 N/mm ²	w/w	w/d	2,50		3,50		2,50			3,00		
	d/d		2,50		4,00		2,50			3,00		
35 / 28 N/mm ²	w/w	w/d	3,00		5,00		3,50			4,00		
	d/d		3,50		5,50		3,50			4,50		

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

²⁾ For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$.

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	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
V _{RK} = V _{RK,b} = V _{RK,c,II} = V _{RK,c,I} [kN]; temperature range 50/80°C and 72/120°C												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions											
7,5 / 6 N/mm ²	w/w w/d d/d	1,2	1,5	1,2	2,0	1,2	1,5		2,5			
12,5 / 10 N/mm ²		2,0	2,5	2,0	4,0	2,0	2,5		4,5			
20 / 16 N/mm ²		3,0	3,5	3,0	6,0	3,0	3,5		7,0			
25 / 20 N/mm ²		4,0	4,5	4,0	7,5	4,0	4,5		8,5			
35 / 28 N/mm ²		5,0	6,5	5,0	9,5	5,0	6,5		12,0			

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

Factor for job site tests and displacements see annex C28.

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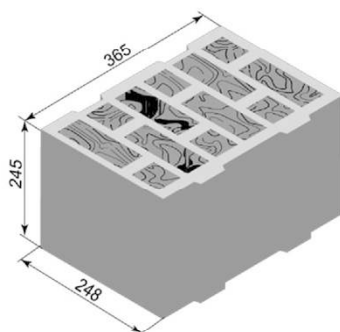
Performance

Vertical perforated brick HLz, 2DF,
Characteristic resistance under tension and shear loading

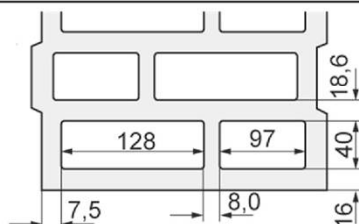
Annex C18

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 365	≥ 248	≥ 245
Mean gross dry density ρ	[kg/dm³]	0,6		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	10 / 8		
Standard or annex	EN 771-1:2011+A1:2015			



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

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

Max. installation torque	max T _{inst} [Nm]	2	4
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General installation parameters

Edge distance	C _{min} = C _{cr}	100	
Spacing	S _{min}	250	
	S _{cr}		
	S _{min} ⊥	245	
	S _{cr} ⊥		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C19.2: Group factors

Anchor rod		M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforated sleeve FIS H K		12x85		16x85		16x130		20x85		20x130	
Group factors	$\alpha_{g,N} (s_{min}) =$	[-]	2								
	$\alpha_{g,V} (s_{min}) =$										
	$\alpha_{g,N} (s_{min} \perp) =$										
	$\alpha_{g,V} (s_{min} \perp) =$										

fischer injection system FIS P Plus for masonry

Performance

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

Annex C19

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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	M8	-	-	-	-	M10	M12	-	-	-	-	-	-	-
Perforated sleeve FIS H K	12x85	16x85			16x130			20x85			20x130			20x200		
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- di- tions															
10 / 8 N/mm ²	w/w	2,0	1,5	2,5			2,0			2,0			3,0			
	d/d	2,0	2,0	3,0			2,0			2,0			3,0			

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

²⁾ For temperature range 72/120°C no performance assessed.

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 anchor FIS E	-		M6	M8	-		-		M10	M12	-		-		-	
			11x85						15x85							
Perforated sleeve FIS H K	12x85		16x85				16x130		20x85			20x130		20x200		
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions															
10 / 8 N/mm ²	w/w	2,5	3,0	3,0			3,0		1,5			1,5		1,5	1,5	
	d/d	2,5	3,0	3,0			3,0		1,5			1,5		1,5	1,5	

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

²⁾ For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C28.

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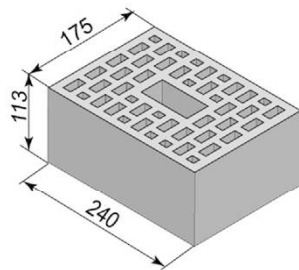
Performance

Vertical perforated brick HLz filled with mineral wool, Characteristic resistance under tension loading and shear loading

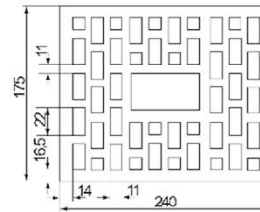
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 175	≥ 113
Mean gross dry density ρ	[kg/dm³]	0,9		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B12

Table C21.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T _{inst} [Nm]	2	4
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General installation parameters

Edge distance	C _{min} = C _{cr}	[mm]	100
	S _{min}		240
	S _{cr}		115
	S _{min} ⊥		
Spacing	S _{cr} ⊥		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C21.2: Group factors

Anchor rod	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130	
Group factors	$\alpha_{g,N} (S_{min}) =$ $\alpha_{g,V} (S_{min}) =$ $\alpha_{g,N} (S_{min} \perp) =$ $\alpha_{g,V} (S_{min} \perp) =$		[-]		2					

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Performance

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

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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	-		M8	M10	M8	M10	-		M12	M16	M12	M16
Internal threaded anchor FIS E	-	M6		M8	-	-		M10	M12	-	-			
		11x85		15x85										
Perforated sleeve FIS H K	12x85		16x85			16x130		20x85			20x130			
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾														
Mean compressive strength/ Min. compressive strength single brick ¹⁾	Use con- ditions													
12,5 / 10 N/mm ²	w/w	3,5	4,0			4,5		4,5			4,0			
	d/d	4	4,5			5,0		5,0			4,0			

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

²⁾ For temperature range 72/120°C no performance assessed.

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	-		M8	M10	M8	M10	-		M12	M16	M12	M16	
Internal threaded anchor FIS E	-		M6	M8	-		-		M10	M12	-		-		
			11x85						15x85						
Perforated sleeve FIS H K	12x85		16x85				16x130		20x85				20x130		
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C ²⁾															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions														
12,5 / 10 N/mm ²	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
	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

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

²⁾ For temperature range 72/120°C no performance assessed.

Factor for job site tests and displacements see annex C28.

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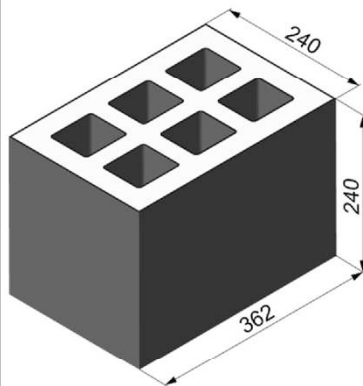
Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading and shear loading

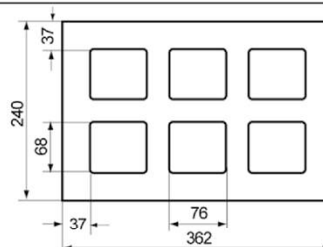
Annex C22

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



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		362	240	240
Mean gross dry density ρ	[kg/dm ³]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	2,5 / 2 or 5 / 4		
Standard or annex	EN 771-3:2011+A1:2015			



Dimension see also Annex B12

Table C23.1: Installation parameters
(Pre-positioned installation with perforated 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	M12	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

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

Max. installation torque	max T_{inst} [Nm]	2
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General installation parameters

Edge distance	$C_{min} = C_{cr}$	60
Spacing	$S_{min \parallel}$	100
	$S_{cr \parallel}$	362
	$S_{min \perp} = S_{cr \perp}$	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C23.2: Group factors

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

Group factors	$\alpha_{g,N} (S_{min \parallel})$	[-]	1,2
	$\alpha_{g,V} (S_{min \parallel})$		1,1
	$\alpha_{g,N} (S_{min \perp})$		2,0
	$\alpha_{g,V} (S_{min \perp})$		

fischer injection system FIS P Plus for masonry

Performance

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

Annex C23

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

 $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
2,5 / 2 N/mm²	w/w	w/d	1,2							1,5						2,5
	d/d		1,2							1,5						2,5
5 / 4 N/mm²	w/w	w/d	2,0							3,0						5,0
	d/d		2,5							3,0						5,5

¹⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.²⁾ For temperature range 72/120°C: $N_{Rk(72/120^{\circ}C)} = 0,83 \cdot N_{Rk(50/80^{\circ}C)}$.**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	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	M10	M12	-	-	-	-	-	-	-	-
			11x85							15x85						
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

 $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
2,5 / 2 N/mm²	w/w	w/d														0,9
	d/d															
5 / 4 N/mm²	w/w	w/d														2,0
	d/d															

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

Factor for job site tests and displacements see annex C28.

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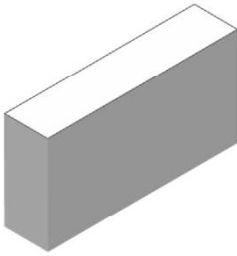
Performance

Light-weight concrete hollow block Hbl, Characteristic resistance under tension loading and shear loading

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



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

Table C25.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
						11x85		15x85	

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h_{ef}	[mm]	100	200	100	200	100	200	100	200	100	200	100	200	85	
Max. installation torque $\max T_{inst}$	[Nm]	1	4	1	8	2	12	2	16	2	20	1	2		

General installation parameters

Edge distance $c_{min} = c_{cr}$		100													
$s_{cr \parallel} = s_{min \parallel}$		250													
$h_{ef}=200mm$ $s_{min \parallel}$		80													
$h_{ef}=200mm$ $s_{cr \parallel}$	[mm]	3x h_{ef}													
$s_{cr \perp} = s_{min \perp}$		250													
$h_{ef}=200mm$ $s_{min \perp}$		80													
$h_{ef}=200mm$ $s_{cr \perp}$		3x h_{ef}													

Drilling method

Hammer drilling with hard metal hammer drill

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

fischer injection system FIS P Plus for masonry	Annex C25 Appendix 45 / 48
Performance Autoclaved aerated concrete, dimensions, installation parameters	

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		M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12
							11x85		15x85	
Group factors	$h_{ef}=200 \alpha_{g,N} (s_{min} \parallel)$	[-]	1,6				_1)		_1)	
	$h_{ef}=200 \alpha_{g,V} (s_{min} \parallel)$		1,1				_1)		_1)	
	$\alpha_{g,N} \parallel, \alpha_{g,V} (s_{min} \parallel)$		2,0							
	$h_{ef}=200 \alpha_{g,N} (s_{min} \perp)$		1,6				_1)		_1)	
	$h_{ef}=200 \alpha_{g,V} (s_{min} \perp)$		0,8				_1)		_1)	
	$\alpha_{g,N} \perp, \alpha_{g,V} (s_{min} \perp)$		2,0							

¹⁾ No performance assessed.

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

Anchor rod		M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12
							11x85		15x85	
Group factors	$h_{ef}=200 \alpha_{g,N} (s_{min} \parallel)$	[-]	0,7				_1)		_1)	
	$h_{ef}=200 \alpha_{gV} (s_{min} \parallel)$		2,0				_1)		_1)	
	$\alpha_{g,N} \parallel, \alpha_{gV} (s_{min} \parallel)$		2,0							
	$h_{ef}=200 \alpha_{g,N} (s_{min} \perp)$		0,7				_1)		_1)	
	$h_{ef}=200 \alpha_{g,V} (s_{min} \perp)$		1,2				_1)		_1)	
	$\alpha_{g,N} \perp, \alpha_{gV} (s_{min} \perp)$		2,0							

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

¹⁾ No performance assessed.

fischer injection system FIS P Plus for masonry

Performance
Autoclaved aerated concrete, Group factors

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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		-		-		
Internal threaded anchor FIS E			-		-		-		-		-		M6	M8	M10	M12	
													11x85		15x85		
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ³⁾																	
Mean compressive strength / Min. compressive strength single brick ²⁾			Use conditions		Effective anchorage depth h _{ef} [mm]												
					100	200	100	200	100	200	100	200	100	200	100	200	85
2,5 / 2 N/mm ²			w/w	w/d	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5	
			d/d		1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0	1,5	1,5	
5 / 4 N/mm ²			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	
			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 ²			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	
			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	

¹⁾ No performance assessed.

²⁾ The minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

³⁾ For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$.

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

Anchor rod	M6	M8	M10	M12	M16	-		-						
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12					
						11x85		15x85						
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions	Effective anchorage depth h _{ef} [mm]												
		100	200	100	200	100	200	100	200	100	200	85		
2,5 / 2 N/mm ²	w/w	w/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
	d/d													
5 / 4 N/mm ²	w/w	w/d	2,0	- ¹⁾	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0	2,5
	d/d													
8 / 6 N/mm ²	w/w	w/d	2,5	- ¹⁾	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5	3,5
	d/d													

¹⁾ No performance assessed.

²⁾ 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

Autoclaved aerated concrete,
Characteristic resistance under tension and shear loading

Annex C27

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β-factors for job site tests; displacements

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

use conditions		w/w and 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	0,96	0,80
	M8	0,57	0,51		
	M10	0,59	0,52		
	M12 FIS E 11x85	0,60	0,54		
	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]	δN ₀ [mm]	δN _∞ [mm]	V [kN]	δV ₀ [mm]	δV _∞ [mm]
solid units and autoclaved aerated concrete h _{ef} =100mm	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF Annex C4 - C7	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,23	1,85
solid brick KS NF Annex C8 / C9	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,20	0,40	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,91	1,37
AAC h _{ef} =200 mm Annex C25 – C27	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,25	1,88

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

fischer injection system FIS P Plus for masonry

Performance
β-factors for job site tests; displacements

Annex C28

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