

PROHLÁŠENÍ O VLASTNOSTECH

DoP 0354

pro injektážní systém fischer FIS V Plus (vlepovaná ocelová kotva pro zdivo)

CS

1. Jedinečný identifikační kód typu výrobku:

DoP 0354

2. Zamýšlené/zamýšlená použití:

Dodatečné kotvení v cihelném zdívě, Viz. dodatek, obzvláště Přílohy B1 - B22.

3. Výrobce:

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

4. Zplnomocněný zástupce:

-

5. Systém/systémy POSV:

1

6. Evropský dokument pro posuzování:

EAD 330076-01-0604, Edition 10/2022

ETA-20/0729; 2023-10-31

Evropské technické posouzení:

DBIT- Deutsches Institut für Bautechnik

Subjekt pro technické posuzování:

2873 TU Darmstadt

Oznámený subjekt/oznámené subjekty:

7. Deklarovaná vlastnost/Deklarované vlastnosti:

Mechanická odolnost a stabilita (BWR 1)

Charakteristická odolnost při statickém a kvazistatickém zatížení:

1 Charakteristická odolnost proti selhání oceli jedné kotvy při zatížení tahem: Viz. dodatek, obzvláště Přílohy C1, C3

2 Charakteristická odolnost proti selhání oceli jedné kotvy při zatížení snykem s a bez ramene sil: Viz. dodatek, obzvláště Přílohy C2, C3

3 Charakteristická odolnost jedné kotvy proti porušení vytažením nebo proti porušení vylomením cihly při zatížení tahem, Redukční faktor: Viz. dodatek, obzvláště Přílohy C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C27, C29, C31, C35, C39, C43, C47, C51, C55, C59, C63, C65, C68, C71, C75, C79, C83, C85, C89, C93, C95, C97, C101, C103, C107, C109, C113, C115, C117, C120, C122, C123

4 Charakteristická odolnost jedné kotvy proti lokálnímu porušení nebo vylomení cihly při zatížení snykem: Viz. dodatek, obzvláště Přílohy C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C27, C29, C31, C35, C39, C43, C47, C51, C55, C59, C63, C65, C68, C71, C75, C79, C83, C85, C89, C93, C95, C97, C101, C103, C107, C109, C113, C115, C117, C120, C122, C123

5 Charakteristická odolnost skupiny kotev proti vylomení cihly při zatížení tahem: Viz. dodatek, obzvláště Přílohy B21, B22, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C25, C28, C30, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C61, C64, C66, C69, C72, C73, C76, C77, C80, C81, C84, C86, C87, C90, C91, C94, C96, C98, C99, C102, C104, C105, C108, C110, C111, C114, C116, C119, C121

6 Charakteristická odolnost skupiny kotev proti lokálnímu porušení nebo vylomení cihly při zatížení snykem: Viz. dodatek, obzvláště Přílohy B21, B22, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C25, C28, C30, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C61, C64, C66, C69, C72, C73, C76, C77, C80, C81, C84, C86, C87, C90, C91, C94, C96, C98, C99, C102, C104, C105, C108, C110, C111, C114, C116, C119, C121

7 Okrajové vzdálenosti, rozteč, tloušťka nosného podkladu: Viz. dodatek, obzvláště Přílohy B21, B22, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C25, C28, C30, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C61, C64, C66, C69, C72, C73, C76, C77, C80, C81, C84, C86, C87, C90, C91, C94, C96, C98, C99, C102, C104, C105, C108, C110, C111, C114, C116, C119, C121

8 Posuny při zatížení tahem a snykem: viz. dodatek, obzvláště Příloha C123

9 Maximální utahovací moment: Viz. dodatek, obzvláště Přílohy B4-B7, B9-B12, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C25, C28, C30, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C61, C64, C66, C69, C72, C73, C76, C77, C80, C81, C84, C86, C87, C90, C91, C94, C96, C98, C99, C102, C104, C105, C108, C110, C111, C114, C116, C119, C121

Charakteristická únosnost a posuny při seismickém zatížení:

10 Odolnost proti tahovému zatížení, posuny: NPD

11 Odolnost proti snykovému zatížení, posuny: NPD

12 Koefficient prstencové mezery: NPD

Bezpečnost v případě požáru (BWR 2)

13 Odolnost proti ohni: Třídy (A1)

14 Odolnost proti požáru při zatížení tahem a snykem s a bez ramene sil, minimální okrajové a osové vzdálenosti: viz. dodatek, obzvláště Příloha C124

Hygiena, zdraví a životní prostředí (BWR 3)

15 Obsah, emise a / nebo uvolňování nebezpečných látek: NPD

8. Příslušná technická dokumentace a/nebo specifická technická dokumentace: **-**

Vlastnosti výše uvedeného výrobku jsou ve shodě se souborem deklarovaných vlastností. Toto prohlášení o vlastnostech se v souladu s nařízením (EU) č. 305/2011 vydává na výhradní odpovědnost výrobce uvedeného výše.

Podepsáno za výrobce a jeho jménem:

Dr.-Ing. Oliver Geibig, Výkonný ředitel pro obchodní jednotky a inženýrství
Tumlingen, 2023-11-14

Jürgen Grün, Výkonný ředitel pro chemii a kvalitu

Toto PoV bylo připraveno v různých jazykových mutacích. V případě rozporu vždy rozhoduje interpretace verze v anglickém jazyce.

Příloha obsahuje nepovinné a doplňkové informace v anglickém jazyce nad rámec zákonného požadavků.

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Pokyny pro překlad Základní charakteristiky a výkonné parametry příloh

Mechanical resistance and stability (BWR 1)

Mechanická odolnost a stabilita (BWR 1)

Characteristic resistance for static and quasi-static loading:

Charakteristická odolnost při statickém a kvazistatickém zatížení:

1	Characteristic resistance to steel failure of a single anchor under tension loading: Charakteristická odolnost proti selhání oceli jedné kotvy při zatížení tahem:	$N_{Rk,s}$ [kN]
2	Characteristic resistance to steel failure of a single anchor under shear loading with and without level arm: Charakteristická odolnost proti selhání oceli jedné kotvy při zatížení snykem s a bez ramene sil:	$V_{Rk,s}$ [kN], $M_{Rk,s}^0$ [Nm]
3	Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading, Reduction factor: Charakteristická odolnost jedné kotvy proti porušení vytažením nebo proti porušení vylomením cihly při zatížení tahem, Redukční faktor:	$N_{Rk,p}; N_{Rk,b};$ [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: Charakteristická odolnost jedné kotvy proti lokálnímu porušení nebo vylomení cihly při zatížení snykem:	$V_{Rk,b}; V_{Rk,c,II}; V_{Rk,c,\perp}$ [kN]
5	Characteristic resistance to brick breakout failure of an anchor group under tension loading: Charakteristická odolnost skupiny kotev proti vylomení cihly při zatížení tahem:	N_{Rk}^g [kN], $\alpha_{g,N}$ [-]
6	Characteristic resistance to local brick failure or brick breakout failure of an anchor group under shear loading: Charakteristická odolnost skupiny kotev proti lokálnímu porušení nebo vylomení cihly při zatížení snykem:	$V_{Rk,b,I}; V_{Rk,c,II}; V_{Rk,c,\perp}$ [kN]; $\alpha_{g,V,II}; \alpha_{g,V,\perp}$ [-]
7	Edge distances, spacing, member thickness: Okrajové vzdálenosti, rozteč, tloušťka nosného podkladu:	$c_{ci}; s_{ch}; c_{min}; s_{min,II}; s_{min,\perp}; h_{min}$ [mm]
8	Displacements under tension and shear loading: Posuny při zatížení tahem a snykem:	$\delta_{N0}; \delta_{N\infty}; \delta_{V0}, \delta_{V\infty}$ [mm]
9	Maximum installation torque: Maximální utahovací moment:	max. T_{inst} [Nm]
Characteristic resistance and displacements for seismic loading:		
Charakteristická únosnost a posuny při seismickém zatížení:		
10	Resistance to tension load, displacements: Odolnost proti tahovému zatížení, posuny:	$N_{Rk,s,eq}; N_{Rk,eq}$ [kN], $\alpha_{N,seis}$ [-]; $\delta_{N,eq}$ [mm]
11	Resistance to shear load, displacements: Odolnost proti snykovému zatížení, posuny:	$V_{Rk,s,eq}; V_{Rk,b,eq}$ [kN], $\alpha_{V,seis}$ [-]; $\delta_{V,eq}$ [mm]
12	Factor annular gap: Koefficient prstencové mezery:	α_{gap} [-]
Safety in case of fire (BWR 2)		
Bezpečnost v případě požáru (BWR 2)		
13	Reaction to fire: Odolnost proti ohni:	-
14	Resistance to fire under tension and shear loading with and without level arm, minimum edge distances and spacing: Odolnost proti požáru při zatížení tahem a snykem s a bez ramene sil, minimální okrajové a osové vzdálenosti:	$N_{Rk,s,fi}; N_{Rk,p,fi}$ [kN], $N_{Rk,b,fi}; V_{Rk,s,fi}$ [kN], $M_{Rk,s}^0$ [Nm], $c_{cr,fi}, s_{cr,fi}$ [mm]
Hygiene, health and the environment (BWR 3)		
Hygiena, zdraví a životní prostředí (BWR 3)		
15	Content, emission and/or release of dangerous substances: Obsah, emise a / nebo uvolňování nebezpečných látek:	-

Specific Part

1 Technical description of the product

The fischer injection system FIS V Plus for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS V Plus, FIS VS Plus Low Speed and FIS VW Plus High Speed, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod in the range of M6 to M16. 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 B 4 to B 7, B 21, B 22, C 1 to C 123
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	See Annex C 124

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

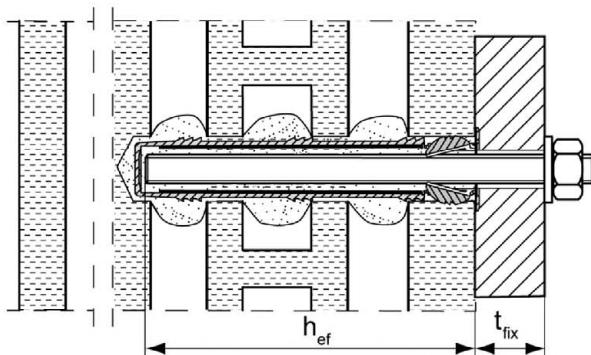
In accordance with the European Assessment Document EAD 330076-01-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

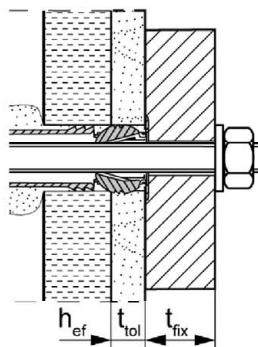
Installation conditions part 1

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

Pre-positioned anchorage:



Installation with render bridge



Size of the perforated sleeve:

FIS H 12x50 K

FIS H 16x85 K

FIS H 20x85 K

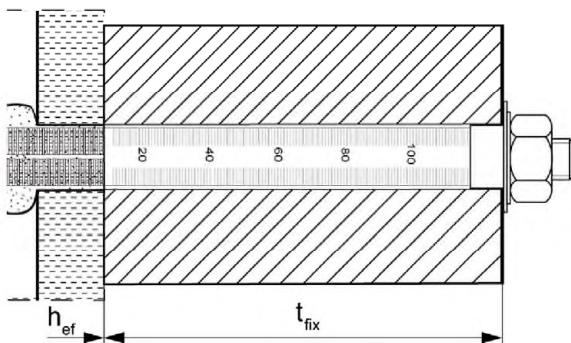
FIS H 20x200 K

FIS H 12x85 K

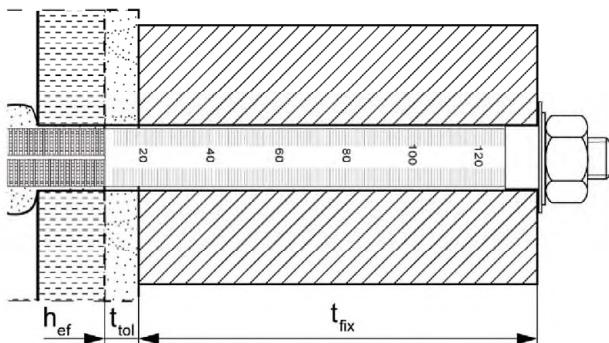
FIS H 16x130 K

FIS H 20x130 K

Push through anchorage:



Installation with render bridge



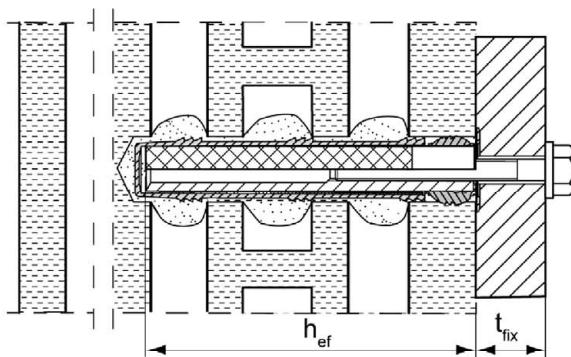
Size of the perforated sleeve:

FIS H 18x130/200 K

FIS H 22x130/200 K

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

Pre-positioned anchorage:



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 V Plus for masonry

Product description

Installation conditions part 1,

Anchor rods and internal threaded anchor with perforated sleeve

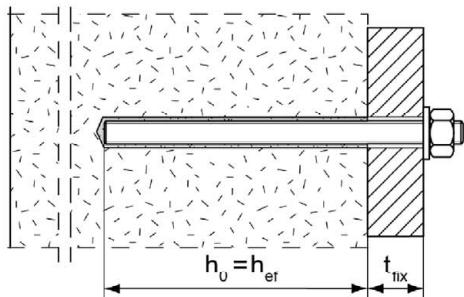
Annex A 1

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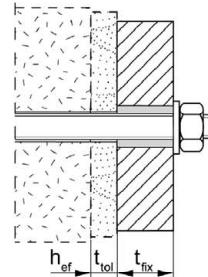
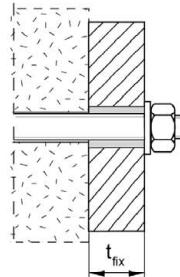
Installation conditions part 2

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

Pre-positioned anchorage:



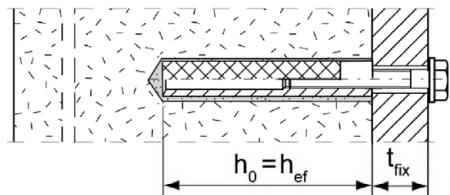
Push through anchorage: Annular gap filled with mortar



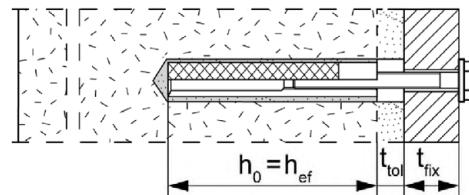
Installation with render bridge

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

Pre-positioned anchorage:



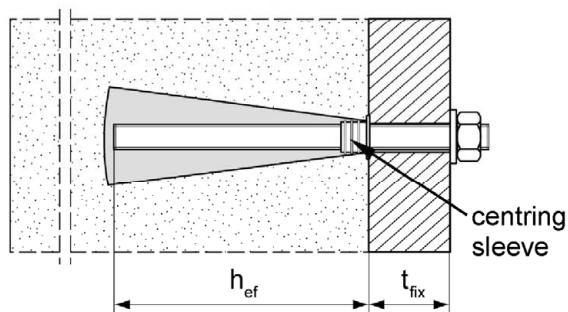
Installation with render bridge



**Anchor rods and internal threaded anchors FIS E without perforated sleeve FIS H K; installation with centring sleeve in autoclaved aerated concrete with conical drill hole
(installation with special conic drill bit PBB)**

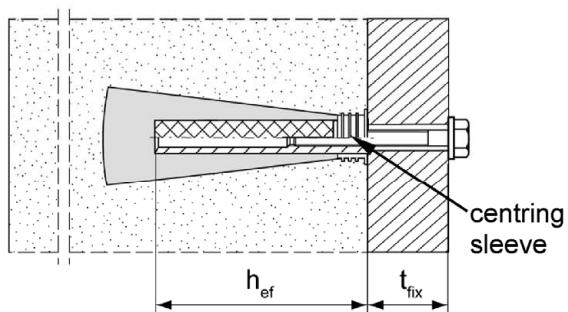
Pre-positioned anchorage:

anchor rods M8, M10, M12



Pre-positioned anchorage:

Internal threaded anchor FIS E 11x85 M6 / M8



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 V Plus for masonry

Product description

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

Annex A 2

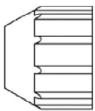
Overview system components part 1

Mortar cartridge (shuttle cartridge) with sealing cap

1

Size: 360 ml, 825 ml

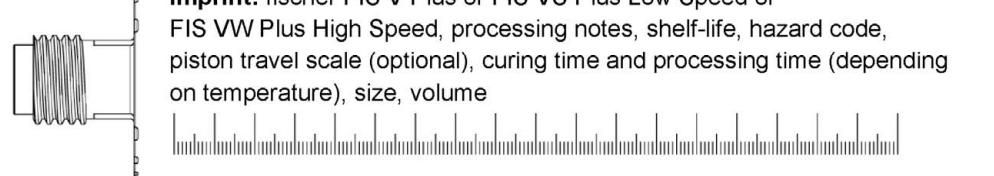
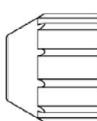
Imprint: fischer FIS V Plus or FIS VS Plus Low Speed or FIS VW Plus High Speed, processing notes, shelf-life, hazard code, piston travel scale (optional), curing time and processing time (depending on temperature), size, volume



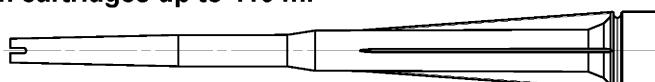
Mortar cartridge (coaxial cartridge) with sealing cap

1

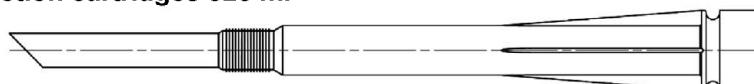
Size: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



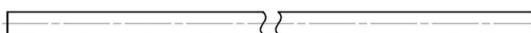
Static mixer FIS MR Plus for injection cartridges up to 410 ml



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 AB-G



compressed-air cleaning tool



Figures not to scale

fischer injection system FIS V Plus for masonry

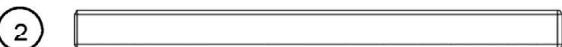
Product description

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

Annex A 3

Overview system components part 2

fischer anchor rod



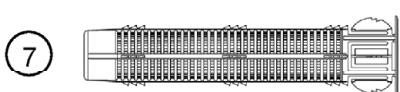
Size: M6, M8, M10, M12, M16

Internal threaded anchor FIS E

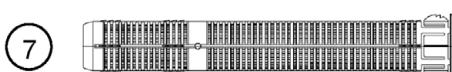


Size: 11x85 M6 / M8
15x85 M10 / M12

Perforated sleeve FIS H K



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



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

Perforated sleeve FIS H K (push through anchorage)



Size:
FIS H 18x130/200 K
FIS H 22x130/200 K

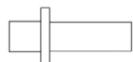
Washer



Hexagon nut



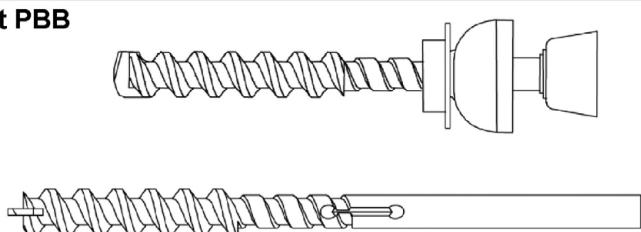
Injection adapter



centring sleeve PBZ



Special conic drill bit PBB



Figures not to scale

fischer injection system FIS V Plus for masonry

Product description

Overview system components part 2: steel parts / perforated sleeve / conical drill bit /
Injection adapter / centring sleeve

Annex A 4

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Table A5.1: Materials

Part	Designation	Material		
1	Mortar cartridge	Mortar, hardener; filler		
		Steel	Stainless steel R	High corrosion resistant steel HCR
		zinc plated	acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2014 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 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ 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 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 or hot-dip galvanised EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565; 1.4529 EN 10088-1:2014
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2012 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 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 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2014
5	Internal threaded anchor FIS E	Property class 5.8; EN 10277-1:2008-06 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014
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 4042:2018	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014
7	Perforated sleeve and centring sleeve	PP / PE		

fischer injection system FIS V Plus for masonry

Product description
Materials

Annex A 5

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Specifications of intended use part 1

Table B1.1: Overview use and performance categories

Anchorage subject to		fischer injection system FIS V Plus for masonry	
Hole drilling with hammer drill mode —————	all bricks; without C 28 to C 48, C 75 to C 78		
Hole drilling with rotary drill mode —————	all bricks		
Hole drilling with special conic drill bit	Only C 118 to C 122		
Static and quasi static load, in masonry	all bricks		
Resistance to fire under tension and shear loading	C 124 (Applies only to the conditions of dry masonry)		
Installation	Pre-positioned anchorage	Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Anchor rod or internal threaded anchor (in solid brick masonry and autoclaved aerated concrete)	
	Push through anchorage	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	
Installation and use conditions	conditions d/d (dry/dry)	Perforated sleeve with anchor rod (in perforated and solid brick masonry) Size: FIS H 18x130/200 K FIS H 22x130/200 K	
	conditions w/d (wet/dry)		
	conditions w/w (wet/wet)		
Installation direction	D3 (downward and horizontal installation)		
Installation temperature	$T_{i,min} = -10 \text{ }^{\circ}\text{C}$ to $T_{i,max} = +40 \text{ }^{\circ}\text{C}$		
In-service temperature	Temperature range Tb	-40 $\text{ }^{\circ}\text{C}$ to +80 $\text{ }^{\circ}\text{C}$ (max. short term temperature +80 $\text{ }^{\circ}\text{C}$ max. long term temperature +50 $\text{ }^{\circ}\text{C}$)	
	Temperature range Tc	-40 $\text{ }^{\circ}\text{C}$ to +120 $\text{ }^{\circ}\text{C}$ (max. short term temperature +120 $\text{ }^{\circ}\text{C}$ max. long term temperature +72 $\text{ }^{\circ}\text{C}$)	
fischer injection system FIS V Plus for masonry		Annex B 1 Appendix 8 / 153	
Intended Use Specifications part 1			

Specifications of intended use part 2

Anchors subject to:

- Static and quasi-static loads
- Resistance to fire under tension and shear loading

Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d), acc. to Annex B 13 / B 14.
- Hollow brick masonry (base material group c), according to Annex B 13 / B 14
- 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 (not for bricks under fire exposure) according to EOTA Technical Report TR 053:2022-07, Annex B under consideration of the β -factor according to Annex C 123, Table C123.1.

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 1993-1-4:2015 corresponding to corrosion resistance classes to Annex A 5, Table A5.1.

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 2

Annex B 2

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Specifications of intended use part 2 continued

Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054:2022-07 (included the dimensioning for fire exposure), Design method A under the responsibility of an engineer experienced in anchorages and masonry work.

Applies to all bricks, if no other values are specified:

$$N_{Rk} = N_{Rk,b} = N_{Rk,p} = N_{Rk,b,c} = N_{Rk,p,c}$$

$$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$$

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 054:2022-07.

$N_{Rk,s}$, $V_{Rk,s}$ and $M^0_{Rk,s}$ see annexes C 1-C 3

Factors for job site tests and displacements see annex C 123.

- Verifiable calculation notes and drawings have to be prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.

Installation:

- 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 mortar.
- Bridging of unbearing layer (e.g., plaster) masonry with solid bricks and cylindrical drill hole. At perforated brick masonry see Annex B 6, Table B6.1.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Fastening screws or anchor rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E.
- Minimum curing time see Annex B 8, Table B8.2.
- Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

Material dimensions and mechanical properties of the metal parts according to the specifications are given in Annex A 5, Table 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 envisaged embedment depth. This may be done by the manufacturer of the rod or by a person on job site.

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 2 continued

Annex B 3

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

Anchor rod	Thread	M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0 [mm]	8	10	12	14	18
Effective anchorage depth $h_{ef}^{(1)}$ in AAC cylindrical drill hole	$h_{0,min}=h_{ef,min}$ [mm] $h_{0,max}=h_{ef,max}$ [mm]			100 200		
Effective anchorage depth $h_{ef}^{(1)}$ in AAC conical drill hole	h_0 [mm] $h_{ef,1}$ [mm] $h_{ef,2}$ [mm]		$h_{ef} + 5$			
Effective anchorage depth $h_{ef}^{(1)}$ in solid brick (depth of drill hole $h_0 = h_{ef}$)	$h_{ef,min}$ [mm] $h_{ef,max}$ [mm]			50 $h-30, \leq 200$		
Diameter of clearance hole in the fixture	pre-position $d_f \leq$ [mm] push through $d_f \leq$ [mm]	7 9	9 11	12 14	14 16	18 20
Diameter of cleaning brush	$d_b \geq$ [mm]					see Table B8.1
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



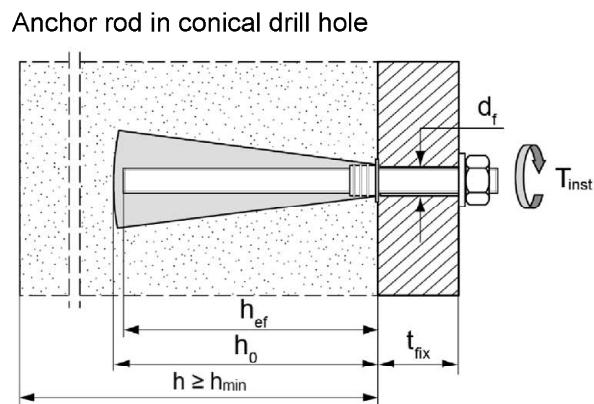
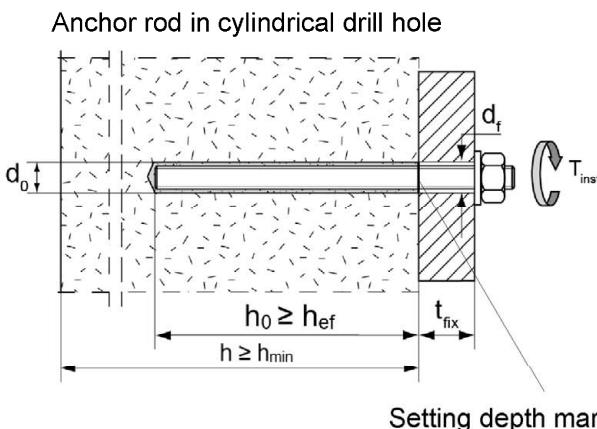
Marking (on random place) fischer anchor rod:

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:



Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Installation parameters for anchor rods without perforated sleeve

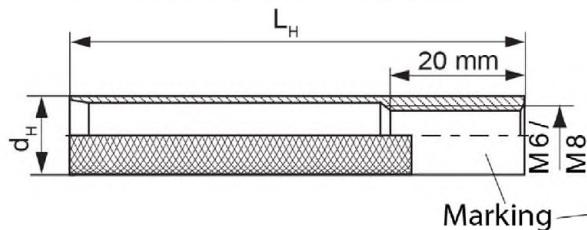
Annex B 4

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

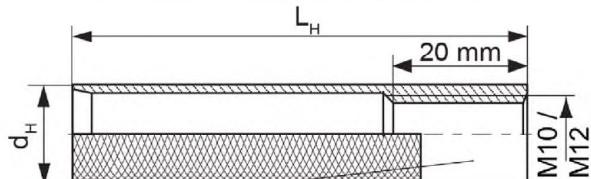
Internal threaded anchor FIS E	11x85 M6	11x85 M8	15x85 M10	15x85 M12
Diameter of anchor d_H [mm]	11		15	
Nominal drill hole diameter d_0 [mm]		14		18
Length of anchor L_H [mm]			85	
Effective anchorage depth $h_0 = h_{ef}$ [mm]			85	
Effective anchorage depth h_0 [mm] in AAC (conical drill hole)	100			
h_{ef} [mm]	85			-
Diameter of cleaning brush $d_b \geq$ [mm]			see Table B8.1	
Maximum installation torque T_{inst} [Nm]			see parameters of brick	
Diameter of clearance hole in the fixture d_f [mm]	7	9	12	14
Screw-in depth $l_{E,min}$ [mm]	6	8	10	12
$l_{E,max}$ [mm]			60	

fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8



FIS E 15x85 M10, FIS E 15x85 M12

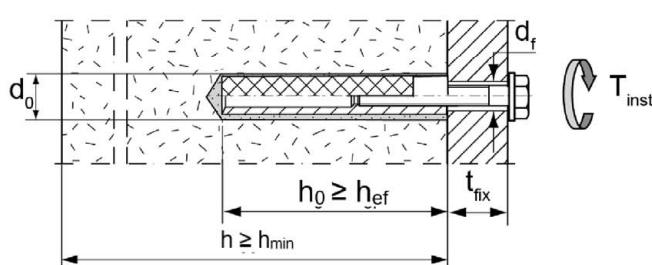


Marking:

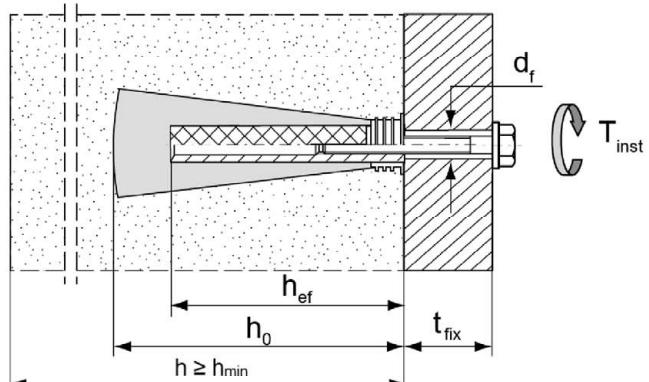
Size, e.g. **M8**, Stainless steel: R, e.g. **M8 R**, High corrosion resistant steel: HCR, e.g. **M8 HCR**

Installation conditions:

Internal threaded anchor in cylindrical drill hole



Internal threaded anchor in conical drill hole



Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Installation parameters for internal threaded rods FIS E without perforated sleeve

Annex B 5

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

perforated sleeve FIS H K	12x50	12x85 ²⁾	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter $d_0 = D_{\text{sleeve,nom}}$	$d_0 [\text{mm}]$	12		16		20	
Depth of drill hole	$h_0 [\text{mm}]$	55	90	90	135	90	135
Effective anchorage depth	$h_{\text{ef,min}} [\text{mm}]$	50	65	85	110	85	110
	$h_{\text{ef,max}} [\text{mm}]$	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⁾	$d_b \geq [\text{mm}]$	see Table B8.1					
Maximum installation torque	$T_{\text{inst}} [\text{Nm}]$	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.

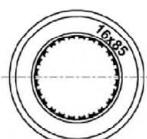
Perforated sleeve

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

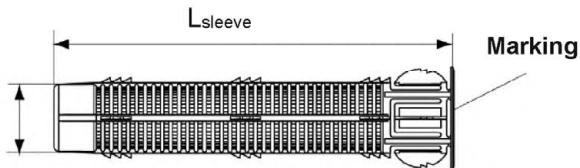
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

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



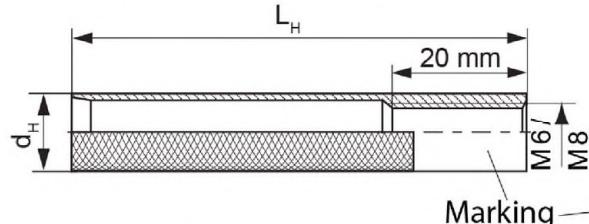
$D_{\text{sleeve,nom}}$



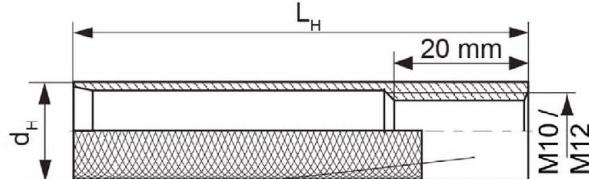
Marking

fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

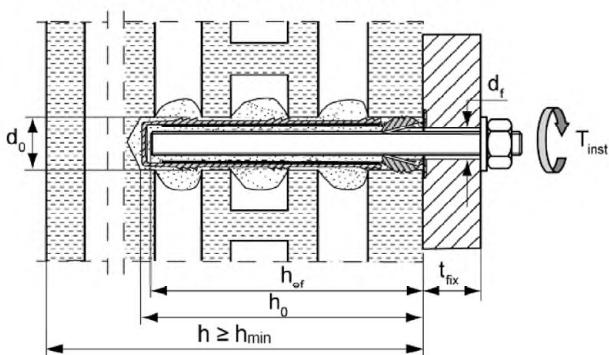


FIS E 15x85 M10, FIS E 15x85 M12

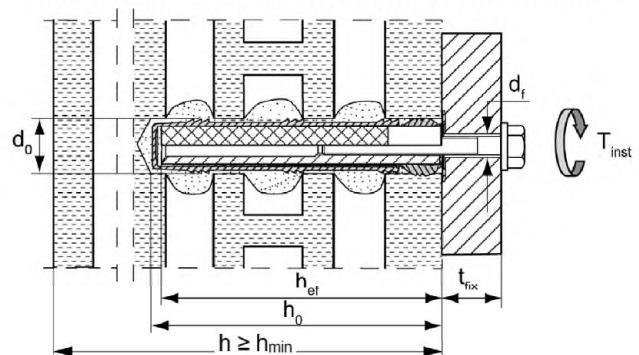


Installation conditions:

Anchor rod with perforated sleeve



Internal threaded anchor with perforated sleeve



Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

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

Annex B 6

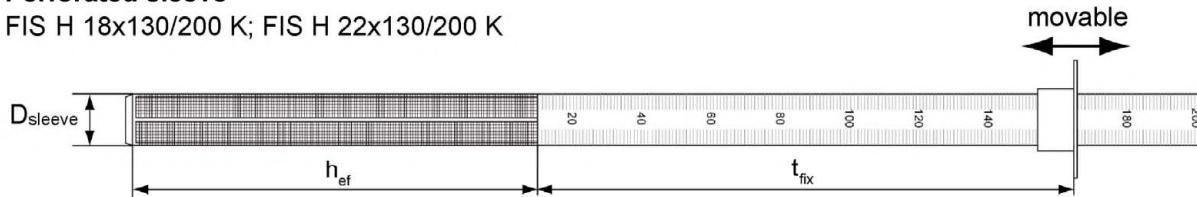
Table B7.1: Installation parameters for anchor rods with perforated sleeves
(push through anchorage)

Perforated sleeve FIS H K	18x130/200	22x130/200
Nominal sleeve diameter $D_{\text{sleeve,nom}}$ [mm]	16	20
Nominal drill hole diameter d_0 [mm]	18	22
Depth of drill hole h_0 [mm]	135	
Effective anchorage depth h_{ef} [mm]		≥ 130
Diameter of cleaning brush ¹⁾ $d_b \geq$ [mm]	see Table B8.1	
Size of threaded rod [-]	M10	M12
Maximum installation torque T_{inst} [Nm]	see parameters of brick	
Thickness of fixture $t_{\text{fix,max}}$ [mm]	200	

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

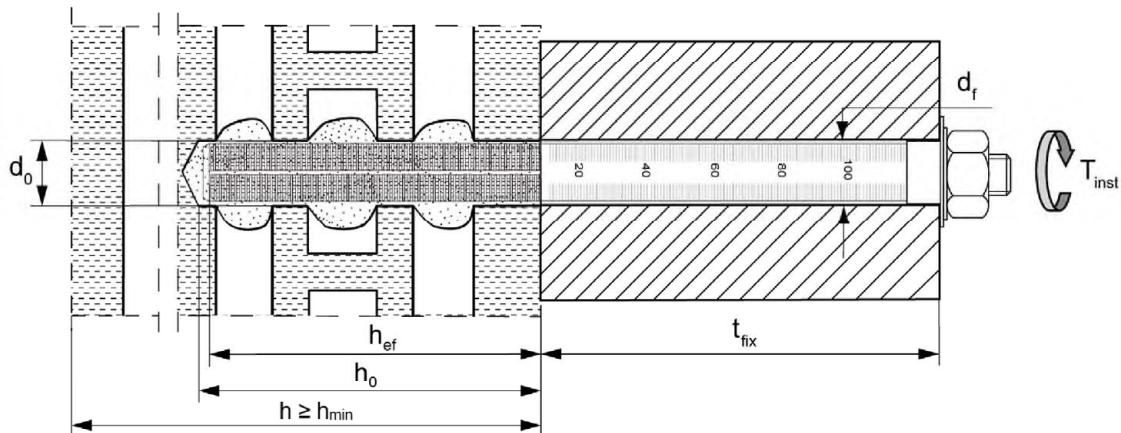
Perforated sleeve

FIS H 18x130/200 K; FIS H 22x130/200 K



Installation conditions:

Anchor rod with perforated sleeve



Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Installation parameters for anchor rods with perforated sleeves
(push through anchorage)

Annex B 7

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Table B8.1: 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 B8.2: Maximum processing times and minimum curing times

(During the curing time of the mortar the masonry temperature may not fall below the listed minimum temperature)

Temperature at anchoring base [°C]	Maximum processing time ²⁾ t_{work}			Minimum curing time ^{1), 2)} t_{cure}		
	FIS VW Plus High Speed	FIS V Plus	FIS VS Plus Low Speed	FIS VW Plus High Speed	FIS V Plus ¹⁾	FIS VS Plus Low Speed
-10 to -5	>5 min	-	-	12 h	-	-
> -5 to 0	5 min	>13 min	-	3 h	24 h	-
> 0 to 5	5 min	13 min	>20 min	3 h	3 h	6 h
> 5 to 10	3 min	9 min	20 min	50 min	90 min	3 h
> 10 to 20	1 min	5 min	10 min	30 min	60 min	2 h
> 20 to 30	-	4 min	6 min	-	45 min	60 min
> 30 to 40	-	2 min	4 min	-	35 min	30 min

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

²⁾ Minimum cartridge temperature +5°C.

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

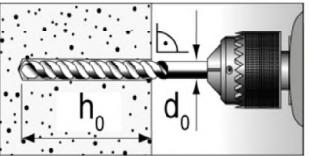
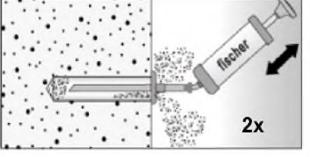
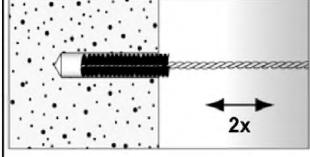
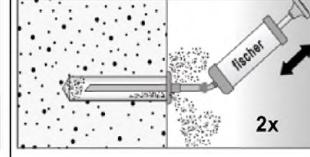
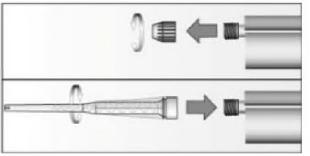
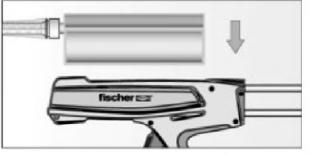
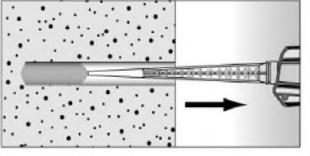
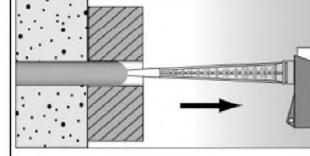
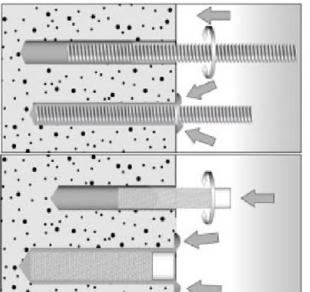
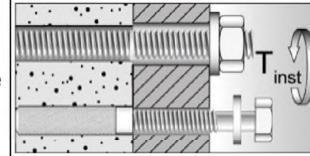
Cleaning brush (steel brush)

Maximum processing times and minimum curing times

Annex B 8

Installation instruction part 1

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

1		<p>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</p>	
2		  <p>Blow out the drill hole twice. Brush twice and blow out twice again.</p>	
3		<p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p>	
4		<p>Place the cartridge into a suitable dispenser</p>	 <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p>
5		<p>Fill approximately 2/3 of the drill hole with mortar beginning from the bottom of the hole¹⁾. Avoid bubbles!</p>	 <p>For push through anchorage fill the annular clearance with mortar.</p>
6		<p>Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.</p>	
7		<p>Do not touch. Minimum curing time see Table B8.2</p>	 <p>Mounting the fixture. max T_{inst} see parameter of brick in Annex C.</p>

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

fischer injection system FIS V Plus for masonry

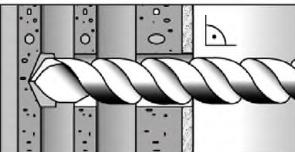
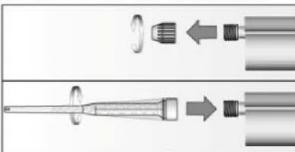
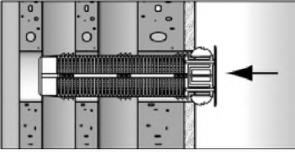
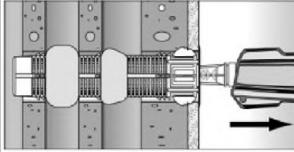
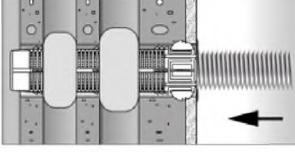
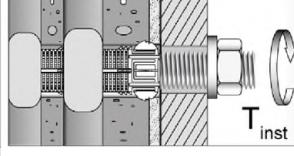
Intended Use

Installation instruction (without perforated sleeve) part 1

Annex B 9

Installation instruction part 2

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

1		Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole h_0 and drill hole diameter d_0 see Table B6.1	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.
2		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).	
3		Place the cartridge into a suitable dispenser.	 Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.
4		Insert the perforated sleeve flush with the surface of the masonry or plaster.	 Fill the perforated sleeve completely with mortar beginning from the bottom of the hole ¹⁾ .
5		Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor).	
6		Do not touch. Minimum curing time see Table B8.2	 Mounting the fixture. max T_{inst} see parameter of brick in Annex C .

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

fischer injection system FIS V Plus for masonry

Intended Use

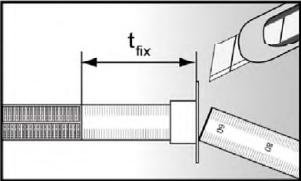
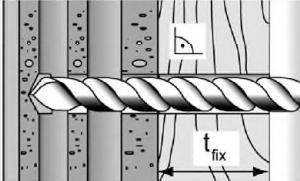
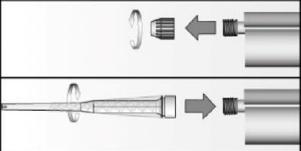
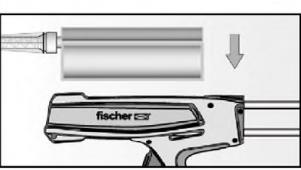
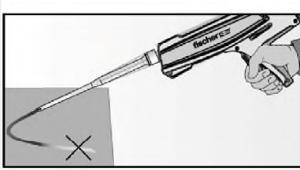
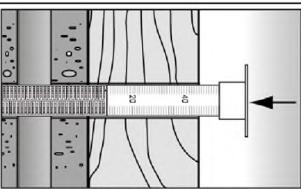
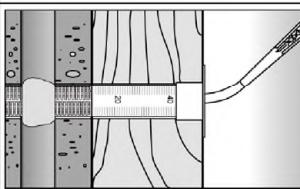
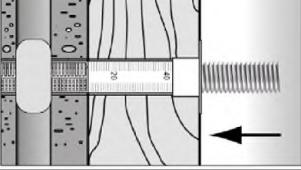
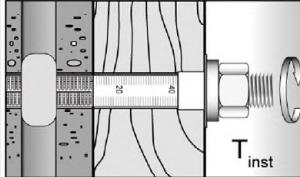
Installation instruction (with perforated sleeve) part 2

Annex B 10

Appendix 17 / 153

Installation instruction part 3

Installation in perforated or solid brick with perforated sleeve (push through anchorage)

1		Push the movable stop up to the correct thickness of fixture and cut the overlap.		Drill the hole through the fixture. Depth of drill hole ($h_0 + t_{fix}$) and drill hole diameter see Table B7.1 .
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 fixture into the drill hole.		Fill the sleeve with mortar beginning from the bottom of the hole. ¹⁾ For deep drill holes use an extension tube.
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 B8.2 .		Mounting the fixture. max T_{inst} see parameter of brick in Annex C .

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

fischer injection system FIS V Plus for masonry

Intended Use

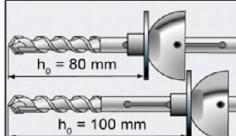
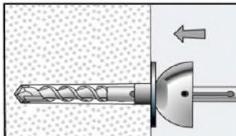
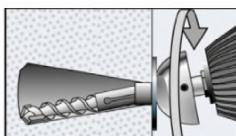
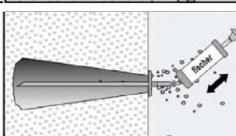
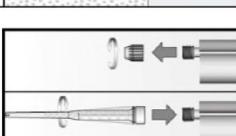
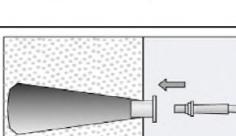
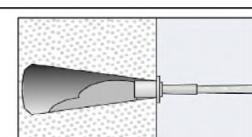
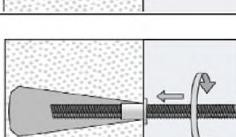
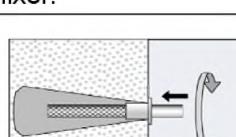
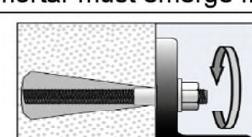
Installation instruction (with perforated sleeve) part 3

Annex B 11

Appendix 18 / 153

Installation instruction part 4

Installation in autoclaved aerated concrete with special conic drill bit PBB
(pre-positioned anchorage)

1		Position the movable drill bit arrester on the used drill hole depth (see Table B4.1). For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw.		
2		Drill the cylindrical hole with rotating drill until the arrester contact the material surface (drilling method see Annex C of the respective brick).		
3		Deviate the working power drill circulate to generate an conic undercut in the material.		
4		Blow out the drill hole four times.		
5		Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).		
6		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.
7		Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer.		Fill the drill hole with injection mortar.
8			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.	
9		Do not touch. Minimum curing time see Table B8.2 .		Mounting the fixture. max T_{inst} see parameter of brick in Annex C .

fischer injection system FIS V Plus for masonry

Intended Use

Installation instruction for autoclaved aerated concrete with special conic drill bit PBB
(pre-positioned anchorage) part 4

Annex B 12

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Table B13.1: Overview of assessed bricks part 1

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	12 / 20 / 28	Germany	≥1,8	C 4 – C 7
	2DF ≥240x115x113	10 / 16	Germany	≥1,8	C 8 / C 9
	≥ 245x118x54	10 / 20	Italy	≥1,8	C 10 / C 11
	≥ 230x108x55	10 / 20	Denmark	≥1,8	C 12 / C 13
Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL					
Solid calcium silicate brick KS	NF ≥240x115x71	12 - 28	Germany	≥2,0	C 14 / C 15
	8DF ≥ 250x240x240	10 - 28	Germany	≥2,0	C 16 / C 17
	≥ 997x214x538	10 - 36	Netherlands	≥1,8	C 18 / C 19
	≥ 240x115x113	10 / 20	Germany	≥1,8	C 20 – C 23
Perforated calcium silicate brick KSL	3DF 240x175x113	8 - 20	Germany	≥1,4	C 24 – C 27
Vertical perforated brick HLz					
Vertical perforated brick HLz	370x240x237	4 - 12	Germany	≥1,0	C 28 / C 29
	500x175x237	4 - 12	Germany	≥1,0	C 28 / C 29
	2DF 240x115x113	6 - 28	Germany	≥1,4	C 30 / C 31
	248x365x248	4 - 8	Germany	≥0,6	C 32 – C 35
	248x365x249	8 - 12	Germany	≥0,7	C 36 – C 39
	248x365x249	4 / 6	Germany	≥0,5	C 40 – C 43
	248x425x248	4 - 8	Germany	≥0,8	C 44 – C 47
	248x425x248	4 - 8	Germany	≥0,8	C 48 – C 51
	500x200x315	4 - 8	Germany	≥0,6	C 52 – C 55
	500x200x300	4 - 10	France	≥0,7	C 56 – C 59
	500x200x315	2 - 8	France	≥0,7	C 60 – C 63
	560x200x275	4 - 8	France	≥0,7	C 64 / C 65
	255x120x118	2 - 12	Italy	≥1,0	C 66 - C 68
	275x130x94	6 - 20	Spain	≥0,8	C 69 / C 71
	220x190x290	6 - 10	Portugal	≥0,7	C 72 – C 75
	253x300x240	2 - 6	Austria	≥0,8	C 76 – C 79
	250x440x250	6 - 10	Austria	≥0,7	C 80 – C 83
	230x108x55	2 - 8	Denmark	≥1,4	C 84 / C 85
	365x248x245	8	Austria	≥0,6	C 86 / C 89
	240x175x113	10	Germany	≥0,9	C 90 / C 93
fischer injection system FIS V Plus for masonry					
Intended Use Overview of assessed bricks part 1					
Annex B 13					
Appendix 20 / 153					

Table B14.1: Overview of assessed bricks part 2

Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm ²]	Main country of origin	Mean gross density ρ [kg/dm ³]	Annex
Horizontal perforated brick LLz					
Horizontal perforated brick LLz	248x78x250	2 - 6	Italy	≥0,7	C 94 / C 95
	128x88x275	2	Spain	≥0,8	C 96 / C 97
Light-weight concrete hollow block Hbl					
Light-weight concrete hollow block Hbl	362x240x240	2 / 4	Germany	≥1,0	C 98 – C 101
	500x200x200	2 - 6	France	≥1,0	C 102 / C 103
	440x215x215	4 - 10	Ireland	≥1,2	C 104 – C 107
Light-weight concrete solid block Vbl					
Light-weight concrete solid block Vbl	≥ 372x300x254	2	Germany	≥0,6	C 108 / C 109
	≥ 250x240x239	4 - 8	Germany	≥1,6	C 110 – C 113
	≥ 440x100x215	4 - 10	Ireland	≥2,0	C 114 / C 115
	≥ 440x95x215	6 - 12	England	≥2,0	C 116 / C 117
Autoclaved aerated concrete (AAC)					
PP2 / AAC	-	2	Germany	0,35	C 118 – C 122
PP4 / AAC	-	4	Germany	0,5	C 118 – C 122
PP6 / AAC	-	6	Germany	0,65	C 118 – C 122

fischer injection system FIS V Plus for masonry

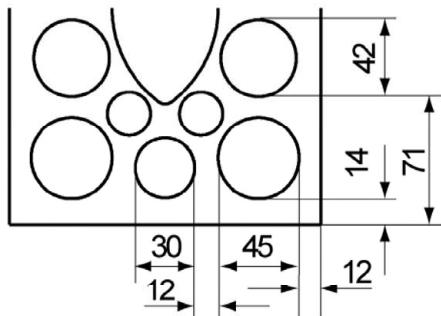
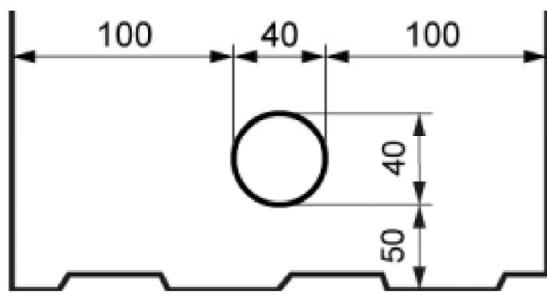
Intended Use
Overview of assessed bricks part 2

Annex B 14

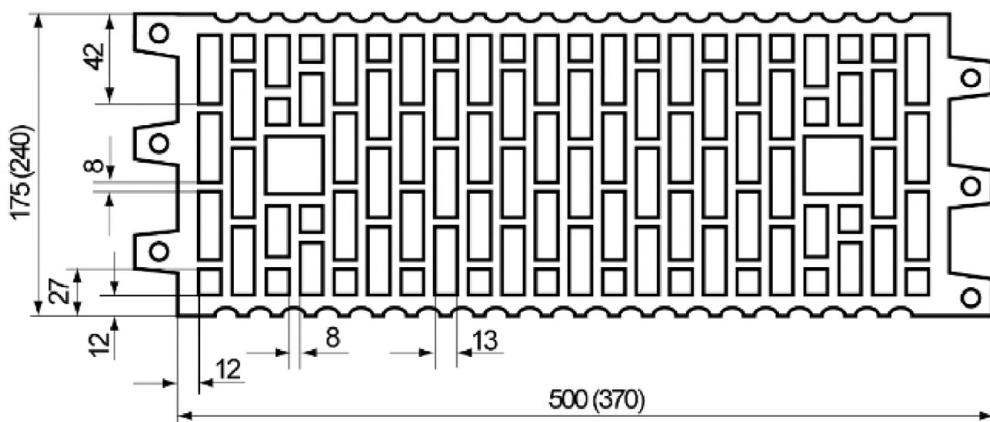
Table B15.1:Overview dimensions of perforated and hollow bricks part 1

Solid calcium silicate brick KS, 8DF,
EN 771-2:2011+A1:2015 according to Annex C 16

Perforated calcium silicate brick KSL, 3DF,
EN 771-2:2011+A1:2015; e.g. KS Wemding
according to Annex C 24

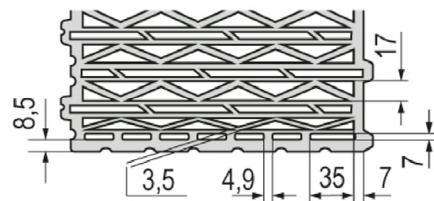
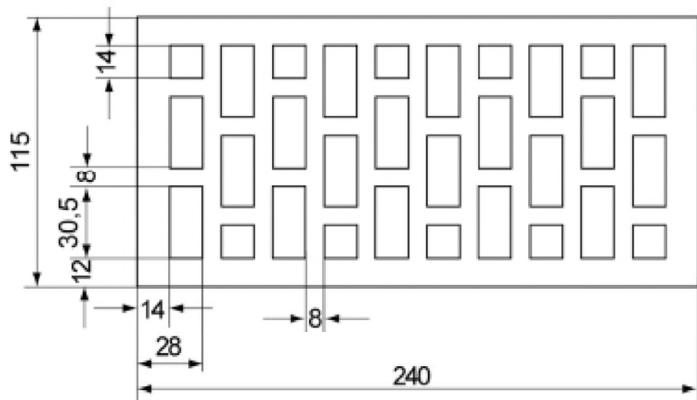


Vertical perforated brick HLz, EN 771-1:2011+A1:2015: e.g. Wienerberger, Poroton according to Annex C 28



Vertical perforated brick HLz, 2DF,
EN 771-1:2011+A1:2015; e.g. Wienerberger
according to Annex C 30

Vertical perforated brick HLz, U8,
EN 771-1:2011+A1:2015; according to Annex C 32



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

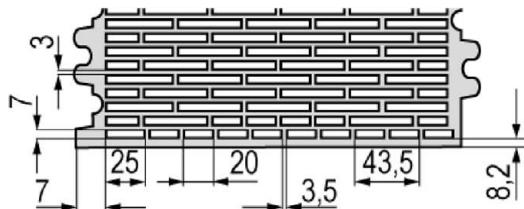
Overview dimensions of perforated and hollow bricks part 1

Annex B 15

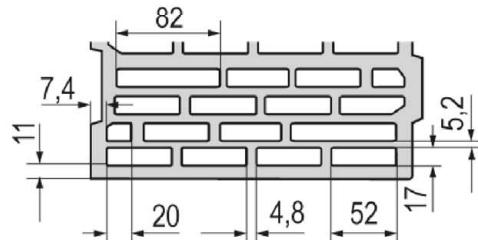
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Table B16.1:Overview dimensions of perforated and hollow bricks part 2

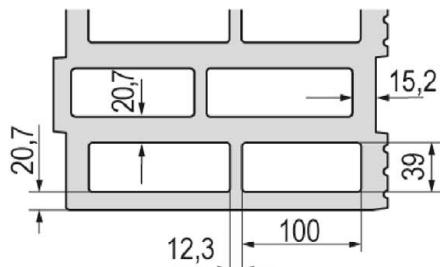
Vertical perforated brick HLz, T10, T11,
EN 771-1:2011+A1:2015; according to Annex C36



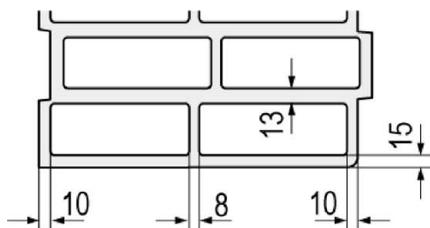
Vertical perforated brick HLz, T7 PF, filled with perlite,
EN 771-1:2011+A1:2015; according to Annex C 40



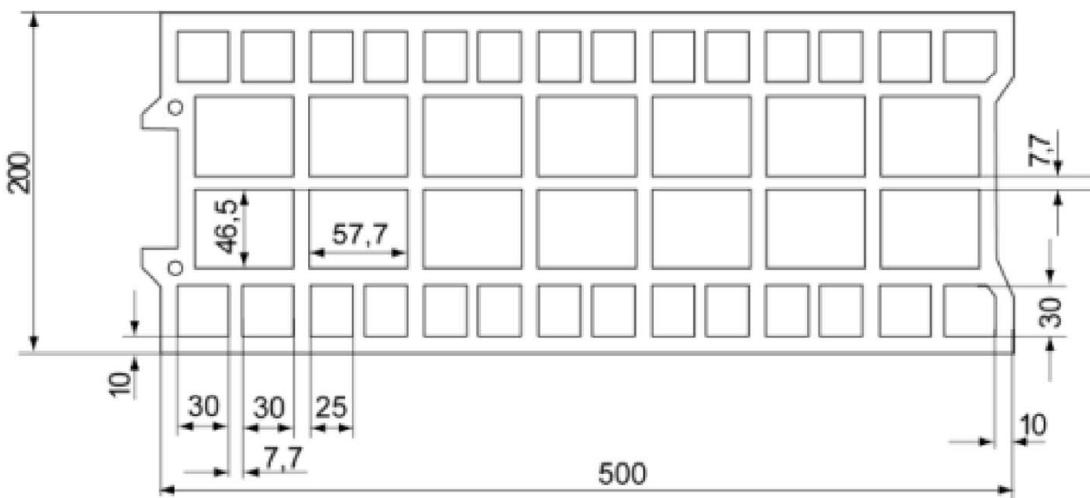
Vertical perforated brick HLz, T9 MW, filled with
mineral wool, EN 771-1:2011+A1:2015, according to
Annex C 44



Vertical perforated brick HLz, FZ 7, filled with mineral
wool, EN 771-1:2015, according to Annex C 48



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Bouyer Leroux; According to Annex C 52



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

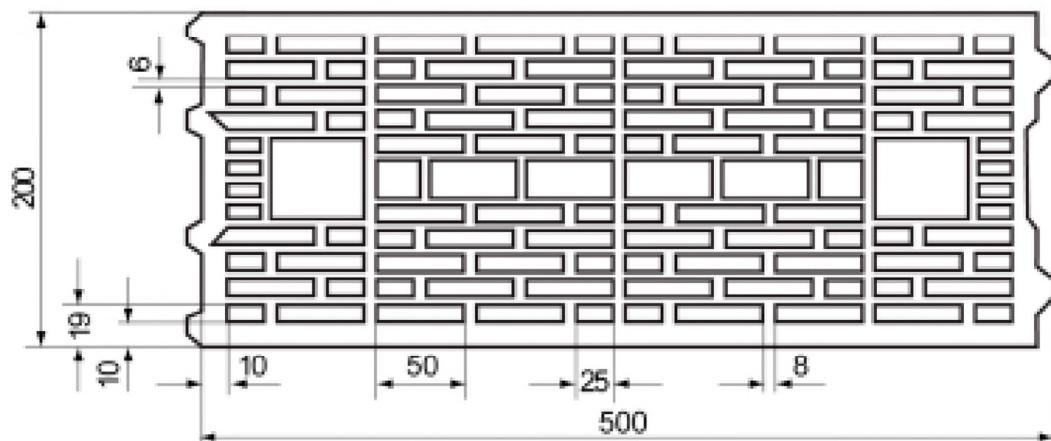
Overview dimensions of perforated and hollow bricks part 2

Annex B 16

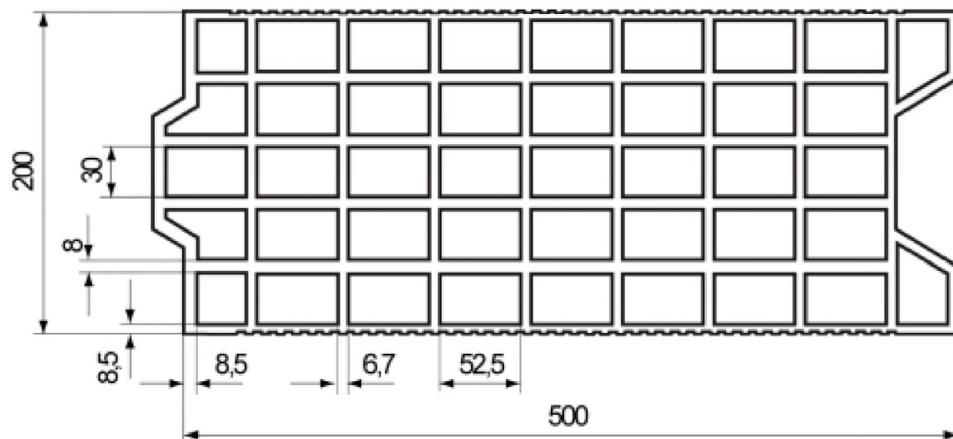
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Table B17.1:Overview dimensions of perforated and hollow bricks part 3

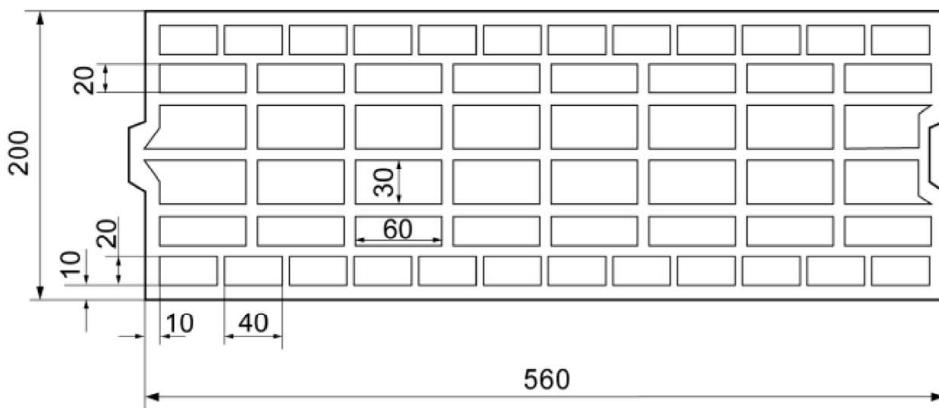
Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C 56



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Terreal according to Annex C 60



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Imery according to Annex C 64



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Overview dimensions of perforated and hollow bricks part 3

Annex B 17

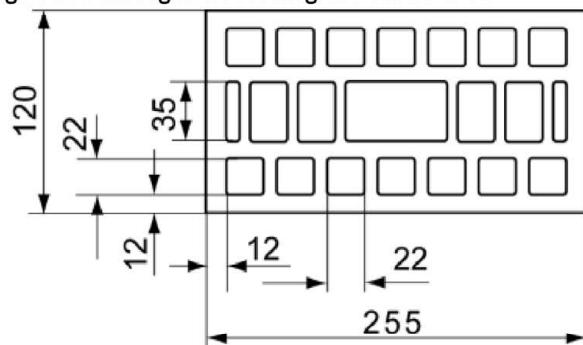
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Table B18.1:Overview dimensions of perforated and hollow bricks part 4

Vertical perforated brick HLz,

EN 771-1:2011+A1:2015;

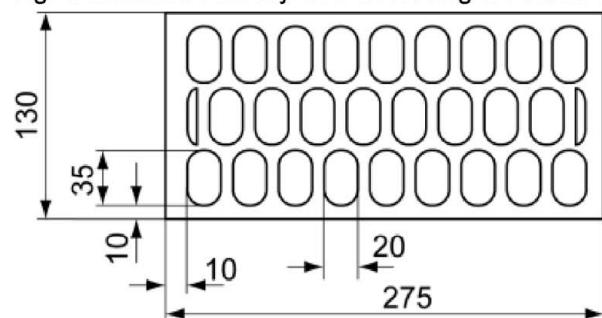
e.g. Wienerberger according to Annex C 66



Vertical perforated brick HLz,

EN 771-1:2011+A1:2015;

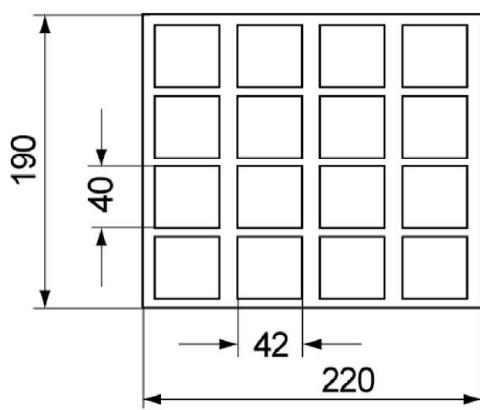
e.g. Germanica Farreny S.A. according to Annex C 69



Vertical perforated brick HLz,

EN 771-1:2011+A1:2015;

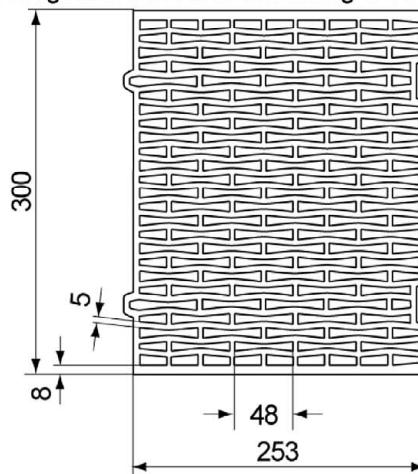
e.g. Perceram according to Annex C 72



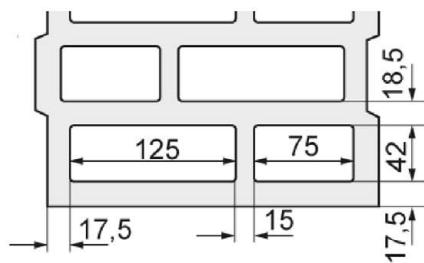
Vertical perforated brick HLz,

EN 771-1:2011+A1:2015;

e.g. Ziegelwerk Brenna according to Annex C 76



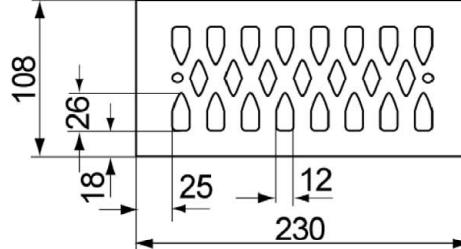
Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2011+A1:2015 according to Annex C 80



Vertical perforated brick HLz,

EN 771-1:2011+A1:2015;

e.g. Wienerberger according to Annex C 84



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

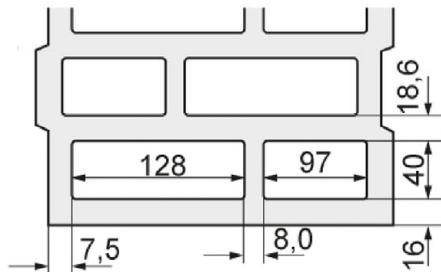
Overview dimensions of perforated and hollow bricks part 4

Annex B 18

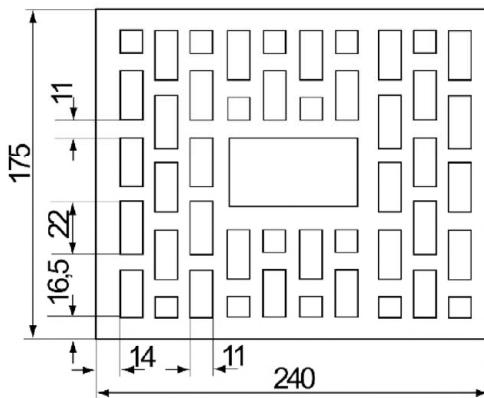
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Table B19.1:Overview dimensions of perforated and hollow bricks part 5

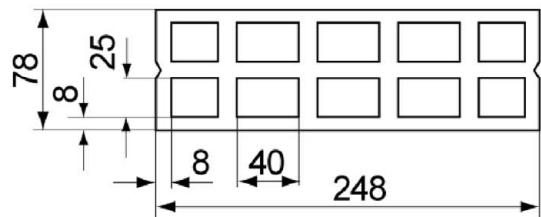
Vertical perforated brick filled with mineral wool,
EN 771-1:2011+A1:2015; according to Annex C 86



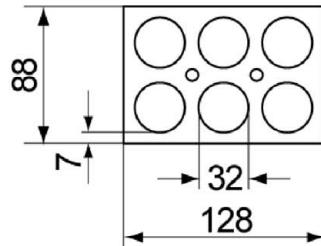
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C 90



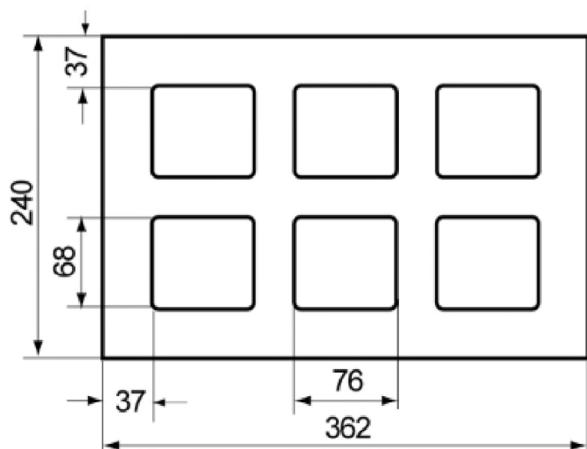
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015; according to Annex C 94



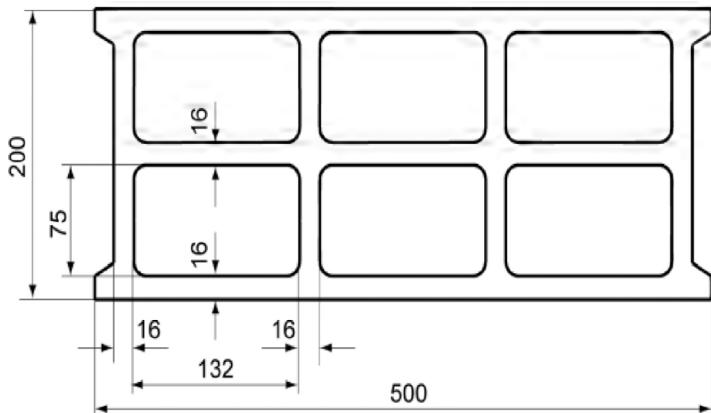
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015;
e.g. Cermanica Farreny S.A according to Annex C 96



Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015; according to Annex C 98



Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015;
e.g. Sepa according to Annex C 102



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Overview dimensions of perforated and hollow bricks part 5

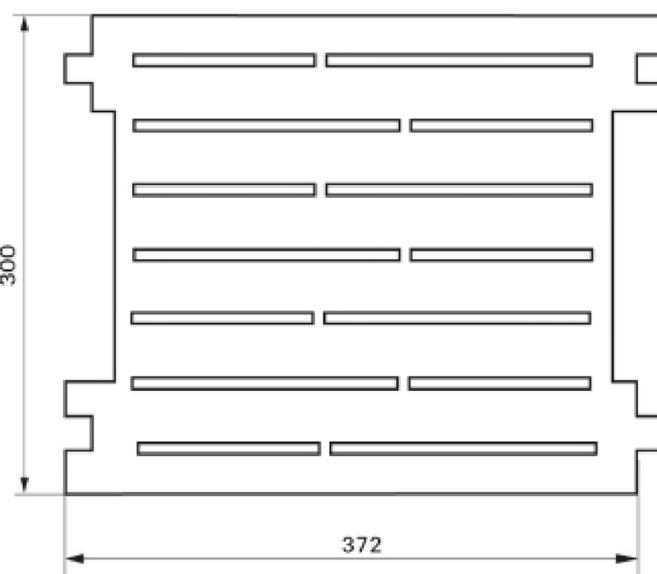
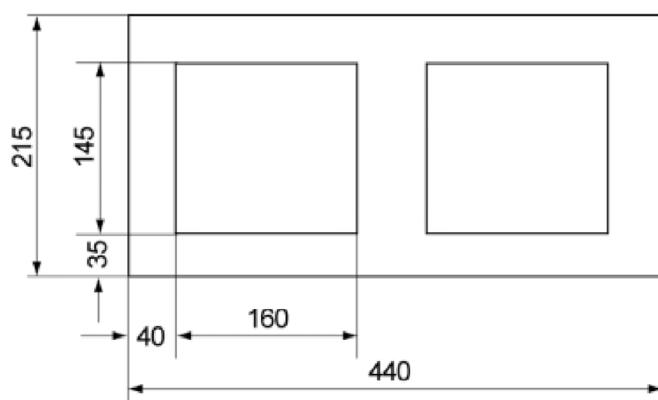
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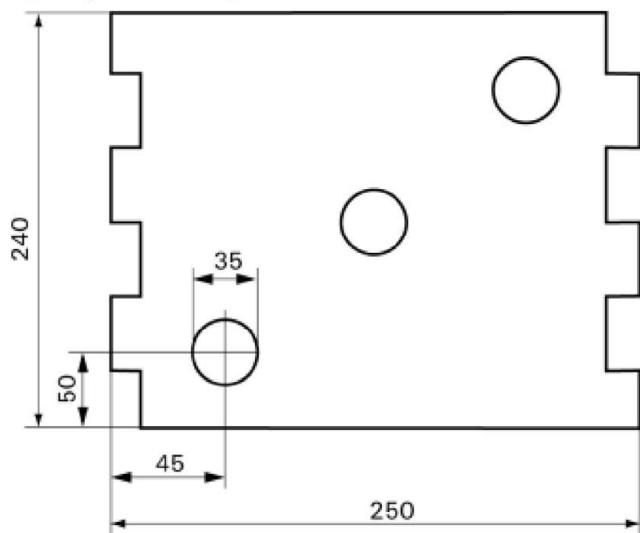
Table B20.1:Overview dimensions of perforated and hollow bricks part 6

Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015
e.g. Roadstone wood according to Annex C 104

Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015
e.g. Sepa according to Annex C 108



Light-weight concrete solid block Vbl,
EN 771-3:2011+A1:2015;
e.g. Sepa according to Annex C 110



Measures in [mm]
Figures not to scale

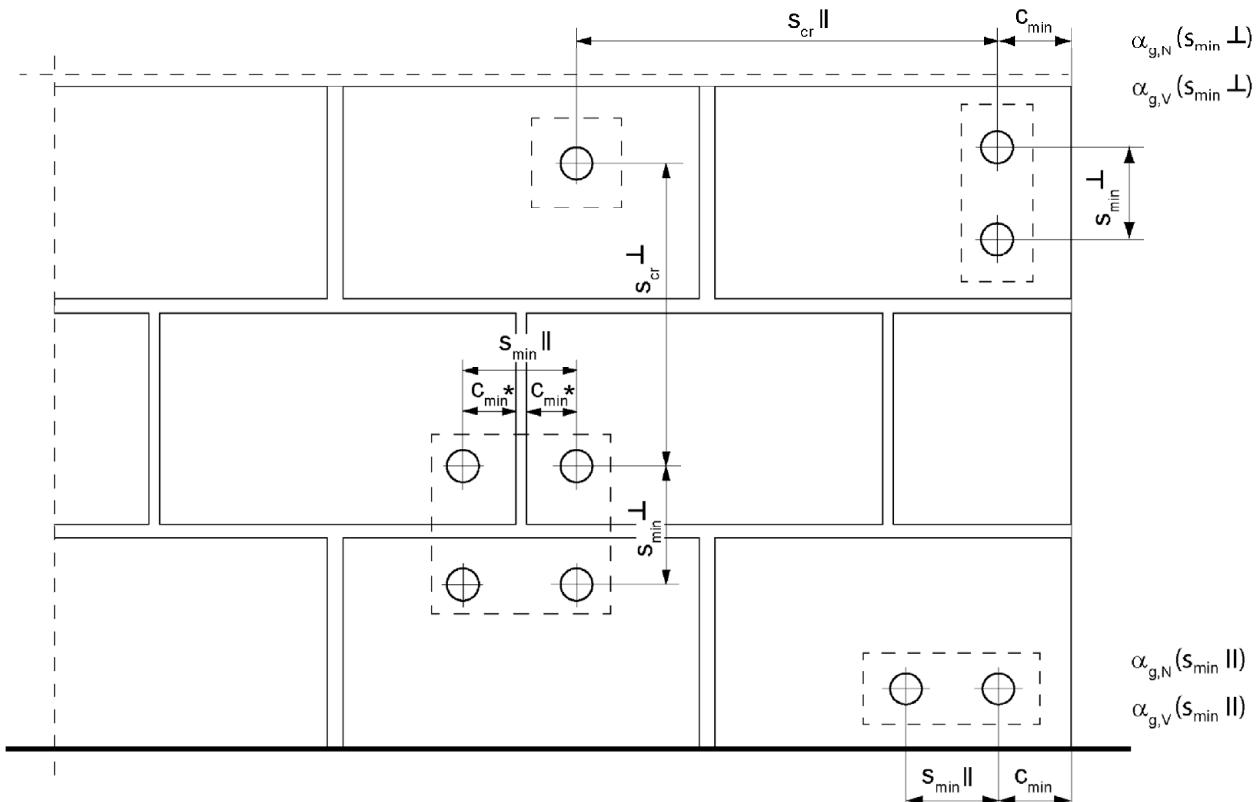
fischer injection system FIS V Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 6

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Spacing and edge distance part 1



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

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

Intended Use
Spacing and edge distance part 1

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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

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

Group of 4 anchors

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

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

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

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

Table C1.1: Characteristic resistance to **steel failure** of a single anchor 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 $N_{Rk,s}$	Property class	4.6	8,0	14,6(13,2)	23,2(21,4)	33,7
		4.8	8,0	14,6(13,2)	23,2(21,4)	33,7
		5.8	10,0	18,3(16,6)	29,0(26,8)	42,1
		8.8	16,0	29,2(26,5)	46,4(42,8)	67,4
		50	10,0	18,3	29,0	42,1
		70	14,0	25,6	40,6	59,0
		80	16,0	29,2	46,4	67,4
						125,6
						125,6
Partial factors¹⁾						
$\gamma_{Ms,N}$	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	

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 V Plus for masonry

Performance

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

Annex C 1

Table C2.1: Characteristic resistance to **steel failure** of a single anchor under **shear loading** with and without lever arm 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 $V_{Rk,s}$	Property class	4.6	4,8	8,7(7,9)	13,9(12,8)	20,2
		4,8	4,8	8,7(7,9)	13,9(12,8)	20,2
		5,8	6,0	10,9(9,9)	17,4(16,0)	25,2
		8,8	8,0	14,6(13,2)	23,2(21,4)	33,7
		50	5,0	9,1	14,5	21,0
		70	7,0	12,8	20,3	29,5
		80	8,0	14,6	23,2	33,7
						62,8
with lever arm						
Characteristic resistance $M_{Rk,s}^0$	Property class	4.6	6,1	14,9(12,9)	29,9(26,5)	52,3
		4,8	6,1	14,9(12,9)	29,9(26,5)	52,3
		5,8	7,6	18,7(16,1)	37,3(33,2)	65,4
		8,8	12,2	29,9(25,9)	59,8(53,1)	104,6
		50	7,6	18,7	37,3	65,4
		70	10,6	26,2	52,3	91,5
		80	12,2	29,9	59,8	104,6
						265,9
Partial factors¹⁾						
Partial factors $\gamma_{Ms,V}$	Property class	4.6			1,67	
		4,8			1,25	
		5,8			1,25	
		8,8			1,25	
		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 V Plus for masonry

Performance

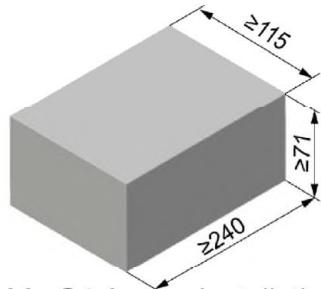
Characteristic resistance to steel failure of a single anchor under shear loading with and without lever arm of fischer anchor rods and standard threaded rods

Annex C 2

Table C3.1: Characteristic resistance to steel failure of a single anchor 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 sleeve and screw/threaded rod									
Characteristic resistance with screw $N_{Rk,s}$	Property class 4.6	[kN]	8,0	14,6	23,2				
	Property class 5.8		10,0	18,3	29,0				
	Property class R		14,0	25,6	40,6				
	Property class 70 HCR		14,0	25,6	59,0				
Partial factors¹⁾									
Partial factors $\gamma_{Ms,N}$	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 sleeve and screw/threaded rod									
without lever arm									
Characteristic resistance with screw $V_{Rk,s}$	Property class 4.6	[kN]	4,8	8,7	13,9				
	Property class 5.8		5	9	15				
	Property class R		7,0	12,8	20,3				
	Property class 70 HCR		7,0	12,8	20,3				
with lever arm									
Characteristic resistance $M^0_{Rk,s}$	Property class 4.6	[Nm]	6,1	14,9	29,9				
	Property class 5.8		7,6	18,7	37,3				
	Property class R		10,6	26,2	52,3				
	Property class 70 HCR		10,6	26,2	52,3				
Partial factors¹⁾									
Partial factors $\gamma_{Ms,V}$	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									
fischer injection system FIS V Plus for masonry									
Performance Characteristic resistance to steel failure of a single anchor under tension / shear loading of internal threaded anchors FIS E									
Annex C 3									
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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
Mean gross dry density ρ [kg/dm ³]	≥ 240	≥ 115	≥ 71
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	$15 / 12 \text{ or } 25 / 20$ $35 / 28$		
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 11x85	M8 15x85 M10 M12

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h_{ref}	[mm]	50	50	50	50	85		
		80	80	80	80			
		200	200	200	200			
Max. installation torque	[Nm]	4	10		4	10		
General installation parameters								
Edge distance $C_{\min} = C_{cr}$	[mm]	100			100			
Edge distance $h_{\text{ref}}=200$ $C_{\min} = C_{cr}$		150			- ²⁾			
Spacing $s_{\min II,N}$		60			60			
		240			- ²⁾			
$h_{\text{ref}}=200$ $s_{\min II,V}$		240			240			
		240			240			
$s_{cr II}$		75			75			

Drilling method

Hammer drilling with hard metal hammer drill

¹⁾ The 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 11x85	M8 15x85 M10 M12
Edge distance C_{\min}	[mm]	100				
Group factor	[-]	1,5				
		2,0				
		1,5				
		2,0				
		2,0				
		2,0				
		2,0				
		2,0				

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 4

Solid brick Mz, NF, EN 771-1:211+A1:2015
Table C5.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading for edge distance c=100mm

Anchor rod	M6	M8	M10		M12		-	-					
Internal threaded anchor FIS E	-	-	-		-		M6	M8					
		11x85		15x85									
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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					
15 / 12 N/mm ²	w/w	w/d	2,5	2,5	2,0	3,0	7,5	2,0					
	d/d		4,0	4,0	3,5	5,0	12,0	3,0					
25 / 20 N/mm ²	w/w	w/d	3,5	3,5	3,0	4,5	11,0	3,0					
	d/d		5,5	5,5	5,0	7,0	12,0	4,5					
								85					

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

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

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

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

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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
	d/d							2,5
25 / 20 N/mm ²	w/w	w/d	4,0	4,0	6,0	12,0	5,5	12,0
	d/d							4,0

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, NF, Characteristic resistance under tension and shear loading
c=100mm

Annex C 5

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Solid brick Mz, NF, EN 771-1:2011+A1:2015
Table C6.1: Installation parameters for edge distance c=60mm

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						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} $h_{ef}=200$		60					
Spacing	[mm]	$s_{min \parallel, N}$	80				
		$h_{ef}=200 s_{min \parallel, N}$	80				
		$s_{min \parallel, V}$	80				
		$s_{cr \parallel}$	3x h_{ef}				
		$s_{min \perp}$	80				
		$s_{cr \perp}$	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
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 V Plus for masonry

Performance

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

Annex C 6

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

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

Anchor rod	M6	M8	M10	M12	M16	-	-								
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8								
						M10	M12								
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ³⁾															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	50	100	50	100	50	100	200	50	100	200	50	100	200	85
15 / 12 N/mm ²	w/w	1,5		2,0	2,0	2,0	2,5	⁻²⁾	2,0	2,5	⁻²⁾	2,0	5,5	⁻²⁾	
	w/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	2,0		2,5	3,0	2,5	3,5	⁻²⁾	3,0	3,5	⁻²⁾	3,0	7,5	⁻²⁾	
	w/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	2,5		3,0	4,0	3,0	4,0	⁻²⁾	3,5	4,0	⁻²⁾	3,5	9,0	⁻²⁾	
	w/d	4,0		5,5	6,5	5,5	6,5	12	5,5	6,5	12	5,5	12	12	⁻²⁾

¹⁾ The 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: $N_{Rk}(72/120°C) = 0,83 \cdot N_{Rk}(50/80°C)$.

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

Anchor rod	M6	M8	M10	M12	M16	-	-								
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8								
						M10	M12								
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	50	100	50	100	50	100	200	50	100	200	50	100	200	85
15 / 12 N/mm ²	w/w	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	⁻²⁾
	w/d	1,5	3,5	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	0,9	4,5	6,0	⁻²⁾
	d/d	2,0	4,0	2,0	5,0	3,5	5,0	3,0	2,5	5,0	5,0	1,2	5,0	7,5	⁻²⁾
25 / 20 N/mm ²	w/w	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	⁻²⁾
	w/d	1,5	3,5	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	0,9	4,5	6,0	⁻²⁾
	d/d	2,0	4,0	2,0	5,0	3,5	5,0	3,0	2,5	5,0	5,0	1,2	5,0	7,5	⁻²⁾
35 / 28 N/mm ²	w/w	1,2	2,5	1,2	3,0	2,0	3,0	1,5	1,5	3,0	3,0	0,6	3,0	4,5	⁻²⁾
	w/d	1,5	3,5	1,5	4,5	3,0	4,5	2,5	2,0	4,5	4,5	0,9	4,5	6,0	⁻²⁾
	d/d	2,0	4,0	2,0	5,0	3,5	5,0	3,0	2,5	5,0	5,0	1,2	5,0	7,5	⁻²⁾

¹⁾ The 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 C 123.

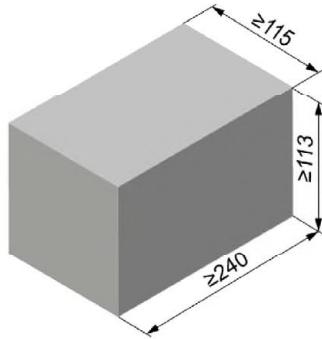
fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, NF, Characteristic resistance under tension and shear loading c=60mm

Annex C 7

Solid brick Mz, 2DF, EN 771-1:2011+A1:2015



Producer			e.g. Wienerberger		
Nominal dimensions [mm]			length L	width W	height H
Mean gross dry density ρ [kg/dm ³]			≥ 240		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]			≥ 115		
Standard or annex			EN 771-1:2011+A1:2015		

Table C8.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						11x85	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
Max. installation torque $\max T_{\text{inst}}$ [Nm]	4										4
											10

Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K

Effective anchorage depth h_{ef} [mm]	- ²⁾	85	- ²⁾	85	- ²⁾
Max. installation torque $\max T_{\text{inst}}$ [Nm]		10		4	

General installation parameters

Edge distance $c_{\min} = c_{\text{cr}}$	[mm]	60
$s_{\min \parallel}$		120
$s_{\text{cr} \parallel}$		240
$s_{\text{cr} \perp} = s_{\min \perp}$		115

Drilling method

Hammer drilling with hard metal hammer drill

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

²⁾ No performance assessed.

Table C8.2: Group factors

Anchor rods	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
Group factor	[-]	11x85					
		11x85					
		1,5					
		1,4					
		2,0					

fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, 2DF, dimensions, installation parameters

Annex C 8

Solid brick Mz, 2DF, EN 771-1:2011+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	-	-	M8	M10	-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12	-	
						11x85	15x85			11x85	
Perforated sleeve FIS H K	-	-	-	-	-	-	-	-	-	16x85	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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	50	100		85
12,5 / 10 N/mm ²	w/w w/d	1,5	2,5	1,5	2,5	1,5	3,0	2,0	3,5	2,0	3,5
	d/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	5,5	3,0	5,5
20 / 16 N/mm ²	w/w w/d	2,5	4,0	2,5	4,0	2,5	4,5	3,5	5,5	3,5	5,5
	d/d	4,5	7,0	4,5	7,0	4,5	7,5	5,5	8,0	5,5	8,0

¹⁾ The 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 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	-	-	M8	M10	-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12	-	
						11x85	15x85			11x85	
Perforated sleeve FIS H K	-	-	-	-	-	-	-	-	-	16x85	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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									
12,5 / 10 N/mm ²	w/w w/d	2,5	3,0	3,0	3,5	3,0	2,5	3,0	3,0	3,0	3,5
	d/d										
20 / 16 N/mm ²	w/w w/d	4,0	5,0	5,5	5,5	5,0	4,0	5,0	5,0	5,0	6,0
	d/d										

¹⁾ The 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 C 123.

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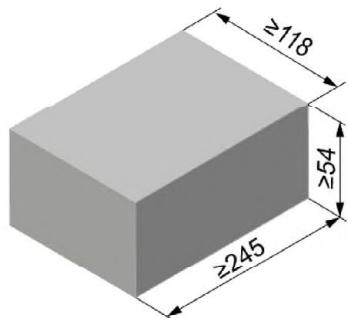
Performance

Solid brick Mz, 2DF, Characteristic resistance under tension and shear loading

Annex C 9

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



Producer			e.g. Nigra		
Nominal dimensions [mm]			length L	width W	height H
Mean gross dry density ρ [kg/dm ³]			≥ 245		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]			$\geq 1,8$		
Standard or annex			EN 771-1:2011+A1:2015		

Table C10.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
Anchor rod and internal threaded anchor FIS E without perforated sleeve							
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	85
Max. installation torque $\max T_{\text{inst}}$ [Nm]	4			10		4	10
General installation parameters							
Edge distance $c_{\min} = c_{\text{cr}}$				60			
Spacing $s_{\text{cr}} \parallel = s_{\min} \parallel$ [mm]				245			
				60			

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C10.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, dimensions, installation parameters

Annex C 10

Solid brick Mz, EN 771-1:2011+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	M10	M12	M16	-	-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾									
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]						85	
12,5 / 10 N/mm ²	w/w w/d	0,60	0,90	0,75	0,75	0,75	0,60	0,75	
	d/d	1,20	1,50	1,20	1,20	1,20	1,20	1,20	
25 / 20 N/mm ²	w/w w/d	0,90	1,50	1,20	1,20	1,20	0,90	1,20	
	d/d	1,50	2,50	2,00	2,00	2,00	1,50	2,00	

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

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

Table C11.2: 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
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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]						85	
12,5 / 10 N/mm ²	w/w w/d	2,0	3,0	4,0	4,5	5,5	2,0	3,0	4,0
	d/d		2,5	4,0	5,5	6,0	8,0	2,5	4,0
25 / 20 N/mm ²	w/w w/d	2,5	4,0	5,5	6,0	8,0	2,5	4,0	5,5
	d/d		6,0	8,0	10,0	12,0	15,0	18,0	20,0

¹⁾ The 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 C 123.

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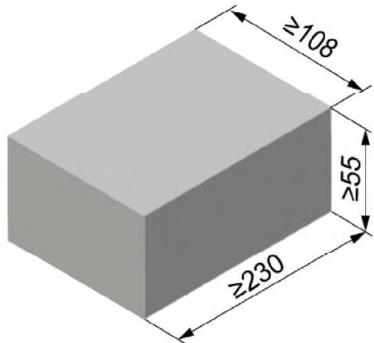
Performance

Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C 11

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



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm^3]	≥ 230	≥ 108	≥ 55
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm^2]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015		

Table C12.1: Installation parameters

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

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h_{ef} [mm]	50	90	50	90	50	90	50	90	50	90	85
Max. installation torque $\text{max } T_{\text{inst}}$ [Nm]	4				10				4		10

General installation parameters

Edge distance $c_{\min} = c_{\text{cr}}$ [mm]	60
Spacing $s_{\text{cr II}} = s_{\min \parallel}$ [mm]	230
$s_{\text{cr } \perp} = s_{\min \perp}$	60

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C12.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Solid brick Mz, dimensions, installation parameters

Annex C 12

Solid brick Mz, EN 771-1:2011+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	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						11x85	15x85

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]					85
		≥ 50					
12,5 / 10 N/mm²	w/w	0,60	0,90	0,75	0,75	0,75	0,75
	d/d	1,20	1,50	1,20	1,20	1,20	1,20
25 / 20 N/mm²	w/w	0,90	1,50	1,20	1,20	1,20	1,20
	d/d	1,50	2,50	2,00	2,00	2,00	2,00

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

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

Table C13.2: 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	15x85

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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]						85
		≥ 50						
12,5 / 10 N/mm²	w/w	2,0	3,0	4,0	4,5	5,5	2,0	3,0
	d/d						4,0	4,5
25 / 20 N/mm²	w/w	2,5	4,0	5,5	6,0	8,0	2,5	4,0
	d/d						5,5	6,0

¹⁾ The 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 C 123.

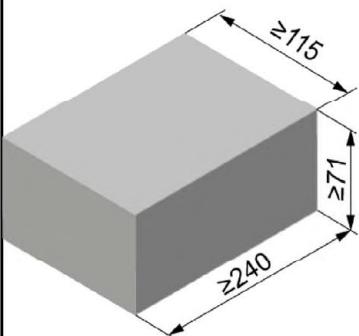
fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C 13

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/dm ³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	15 / 12 or 25 / 20 or 35 / 28		
Standard or annex	EN 771-2:2011+A1:2015		

Table C14.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
Anchor rod and internal threaded anchor FIS E without perforated sleeve							
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	85
			200		200		85
Max. installation torque $\max T_{\text{inst}}$ [Nm]	3		5		15	25	3
General installation parameters							
Edge distance $c_{\min} = c_{\text{cr}}$	60						
Spacing $s_{\min \parallel}$ [mm]	80						
	80						
	3x h_{ef}						
	3x h_{ef}						

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C14.2: Group factors

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

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Performance

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

Annex C 14

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

Table C15.1: 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	15x85

Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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	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	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	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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table C15.2: 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	15x85

Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2	1,2	1,2	
	d/d															
25 / 20 N/mm ²	w/w	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5	1,5
	d/d															
35 / 28 N/mm ²	w/w	3,0	4,5	3,0	4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	1,5	1,5
	d/d															

¹⁾ The 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 C 123.

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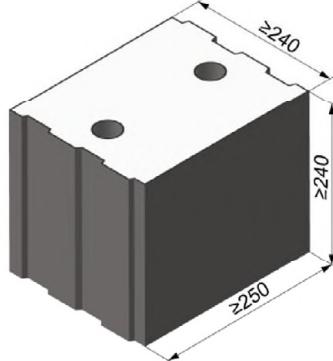
Performance

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

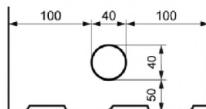
Annex C 15

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Solid calcium silicate brick KS, 8DF, EN 771-2:2011+A1:2015



Producer		-		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]			$\geq 2,0$	
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]			12,5 / 10 or 25 / 20 or 35 / 28	
Standard or annex			EN 771-2:2011+A1:2015	



Dimension see also
Annex B 15

Table C16.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
Anchor rod and internal threaded anchor FIS E without perforated sleeve							
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	85
Max. installation torque max T_{inst} [Nm]	4				10	4	10
Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H 16x85 K							
Effective anchorage depth h_{ef} [mm]	- ²⁾	85			- ²⁾	85	- ²⁾
Max. installation torque max T_{inst} [Nm]		10				4	

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

²⁾ No performance assessed

Table C16.2: Group factors

Anchor rods	M6	M8	M10	M12	M16	-	-	
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	
Group factors	[-]	1,5			- ¹⁾	M10		
		1,2				11x85		
		1,5				15x85		
		1,2						

fischer injection system FIS V Plus for masonry

Performance

Solid calcium silicate brick KS, 8DF, dimensions, installation parameters

Annex C 16

Solid calcium silicate brick KS, 8DF, EN 771-2:2011+A1:2015

Table C17.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

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

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

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

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

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

Table C17.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

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

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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					85				
12,5 / 10 N/mm ²	w/w w/d	2,5	4,5				2,5	4,5			4,5 2,5 4,5
	d/d										
25 / 20 N/mm ²	w/w w/d	4,0	6,5				4,0	6,5			6,5 4,0 6,5
	d/d										
35 / 28 N/mm ²	w/w w/d	5,0	9,0				5,0	9,0			9,0 5,0 9,0
	d/d										

¹⁾ The 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 C 123.

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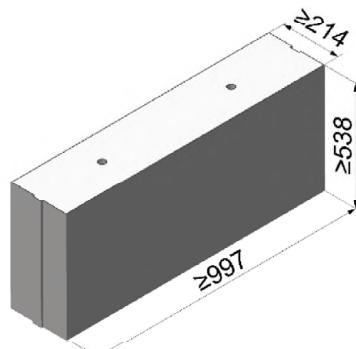
Performance

Solid calcium silicate brick KS, 8DF, Characteristic resistance under tension and shear loading

Annex C 17

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



Producer		e.g. Calduran		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		≥ 997	≥ 214	≥ 538
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		12,5 / 10 or 25 / 20	45 / 36	
Standard or annex			EN 771-2:2011+A1:2015	

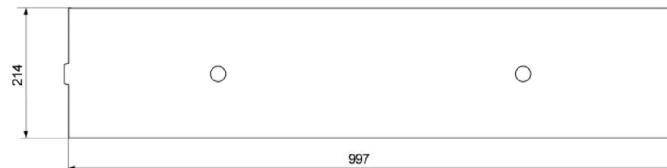


Table C18.1: Installation parameters

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

General installation parameters

Edge distance $C_{\min} = C_{\text{cr}}$		75
Spacing $s_{\text{cr II}} = s_{\min \parallel}$	[mm]	3x h_{ef}
$s_{\text{cr } \perp} = s_{\min \perp}$		3x h_{ef}

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C18.2: Group factors

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

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Performance

Solid calcium silicate brick KS, dimensions, installation parameters

Annex C 18

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

Table C19.1: 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 11x85	M8 15x85 M10 M12
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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	50	100	50	100
12,5 / 10 N/mm²	w/w	4,0	4,0	7,0	5,0	6,0	5,0	6,0	5,5	7,5	5,5
	d/d	7,0	7,0	12,0	8,0	9,5	8,0	10,0	9,0	11,5	9,0
25 / 20 N/mm²	w/w	5,5	6,0	10,0	7,0	8,5	7,0	9,0	8,0	11,0	8,0
	d/d	8,5	10,5	12,0	11,5	12,0	11,0	12,0	12,0	12,0	12,0
45 / 36 N/mm²	w/w	4,5	8,0	12,0	11,5	12,0	12,0	12,0	12,0	12,0	12,0
	d/d	8,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0

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

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

Table C19.2: 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 11x85	M8 15x85 M10 M12
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (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					85				
12,5 / 10 N/mm²	w/w	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0	
	d/d										
25 / 20 N/mm²	w/w	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0	
	d/d										
45 / 36 N/mm²	w/w	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0	
	d/d										

¹⁾ The 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 C 123.

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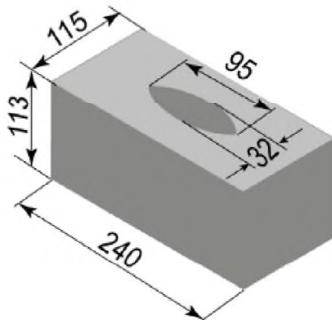
Performance

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

Annex C 19

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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
Mean gross dry density ρ [kg/dm ³]	≥ 240	≥ 115	≥ 113
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-2:2011+A1:2015		

Table C20.1: Installation parameters
(Pre-positioned anchorage 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	-	-	-
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	$s_{min \parallel}$ $s_{cr \parallel}$ $s_{min \perp}$ $s_{cr \perp}$	[mm]	255	255	390	255
						390

Drilling method

Hammer drilling with hard metal hammer drill

¹⁾ The 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	M8	M10	M8	M10	M12	M16	M12	M16
Perforated sleeve FIS H K	12x85		16x85		16x130		20x85		20x130	
Group factors	$\alpha_{g,N}(s_{min \parallel}) =$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp}) =$ $\alpha_{g,V}(s_{min \perp})$	[$-$]				2				

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Performance

Solid calcium silicate brick KS, dimensions, installation parameters

Annex C 20

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

Table C21.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		4
General installation parameters			
Edge distance	$c_{min} = c_{cr}$		100
Spacing	$s_{min \parallel}$		390
	$s_{cr \parallel}$	[mm]	390
	$s_{min \perp}$		390
	$s_{cr \perp}$		390

Drilling method

Hammer drilling with hard metal hammer drill

Table C21.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry

Performance

Solid calcium silicate brick KS, dimensions, installation parameters

Annex C 21

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

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

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		20x130		20x85		20x130	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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 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 pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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	2,0	4,5
	d/d	3,5	7,0
25 / 20 N/mm ²	w/w	3,0	6,0
	d/d	5,5	10,0

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

Solid calcium silicate brick KS, Characteristic resistance under tension loading

Annex C 22

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Table C23.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ;
Installation and use condition w/w, d/d; (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										
	d/d											
25 / 20 N/mm ²	w/w	4,0										
	d/d											

¹⁾ The 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 C23.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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	
	d/d		
25 / 20 N/mm ²	w/w	5,5	
	d/d		

¹⁾ The 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 C 123.

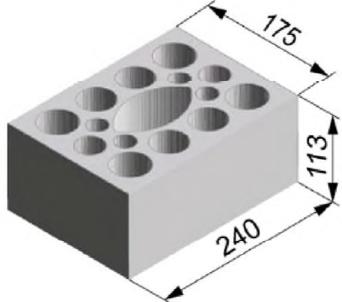
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Performance

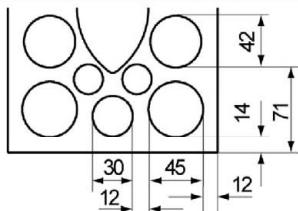
Solid calcium silicate brick KS, Characteristic resistance under shear loading

Annex C 23

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



Producer		-		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		$\geq 1,4$		
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 B 15

Table C24.1: Installation parameters
(Pre-positioned anchorage 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	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	240	
	$s_{min \perp}$	115	
	$s_{cr \perp}$	115	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C24.2: 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	$\alpha_{g,N}(s_{min \parallel}) =$									1,5				
	$\alpha_{g,V}(s_{min \parallel})$	[-]												
	$\alpha_{g,N}(s_{min \perp}) =$									2,0				
	$\alpha_{g,V}(s_{min \perp})$													

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Performance

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

Annex C 24

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

Table C25.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $c_{min} = c_{cr}$		80	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	240	
	$s_{min \perp}$	115	
	$s_{cr \perp}$	115	
	[mm]		

Drilling method

Hammer drilling with hard metal hammer drill

Table C25.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$		1,5
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$	2,0	
	$\alpha_{g,V} (s_{min \perp})$		
[-]			

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Performance

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

Annex C 25

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

Table C26.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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		

Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

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

¹⁾ The 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 C26.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	w/w	w/d
10 / 8 N/mm ²	w/w	w/d	2,0
			2,5
12,5 / 10 N/mm ²	w/w	w/d	2,5
			3,0
15 / 12 N/mm ²	w/w	w/d	3,0
			3,5
20 / 16 N/mm ²	w/w	w/d	4,5
			4,5
25 / 20 N/mm ²	w/w	w/d	5,5
			6,0

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

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

Factor for job site tests and displacements see annex C 123.

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Performance

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

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

Table C27.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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				
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions														
10 / 8 N/mm ²	w/w	w/d	1,5				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				
	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			
	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			
	d/d														

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

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

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾			
10 / 8 N/mm ²	3,0		2,5
12,5 / 10 N/mm ²	3,5		3,5
	4,5		4,0
	6,0		5,5
25 / 20 N/mm ²	7,5		6,5

¹⁾ The 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 C 123.

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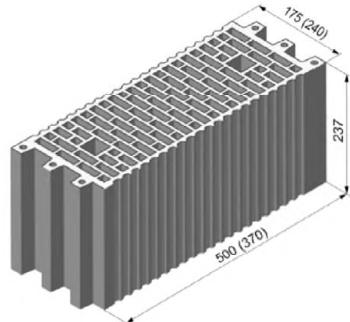
Performance

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

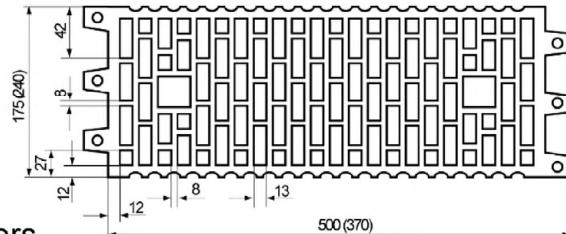
Annex C 27

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



Producer		e.g. Wienerberger, Poroton		
		length L	width W	height H
Nominal dimensions		[mm]		500 175 237
		370 240 237		
Mean gross dry density ρ		[kg/dm ³]		$\geq 1,0$
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 B 15

Table C28.1: Installation parameters

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6 M8	-	-	-	-	M10 M12	-	-	-	-
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													
General installation parameters														
Edge distance $c_{min} = c_{cr}$	100													
Spacing	$s_{min \parallel}$	100												
	$s_{cr \parallel}$	500 (370)												
	$s_{min \perp}$	100												
	$s_{cr \perp}$	240												

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C28.2: 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	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130								
Group factors	$\alpha_{g,N} (s_{min \parallel}) =$ $\alpha_{g,V} (s_{min \parallel}) =$ $\alpha_{g,N} (s_{min \perp}) =$ $\alpha_{g,V} (s_{min \perp})$	[\cdot]	1											

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 28

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

Table C29.1: 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								
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d	0,30			0,90					1,20			
	d/d		0,40				0,90				1,20			
7,5 / 6 N/mm ²	w/w	w/d	0,50				1,50				2,00			
	d/d		0,60				1,50				2,00			
10 / 8 N/mm ²	w/w	w/d	0,75				2,00				2,50			
	d/d		0,75				2,00				2,50			
12,5 / 10 N/mm ²	w/w	w/d	0,90				2,50				3,00			
	d/d		0,90				2,50				3,50			
15 / 12 N/mm ²	w/w	w/d	0,90				3,00				3,50			
	d/d		1,20				3,00				4,00			

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

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

Table C29.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

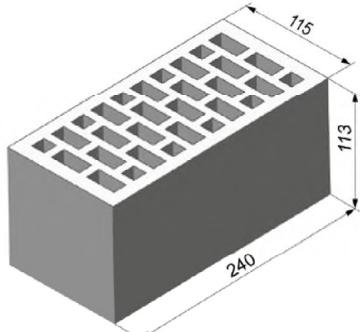
Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	-	M6 M8	-	-	-	-	-	M10 M12	-	-	-	
						11x85							15x85	
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130								
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w		0,50		0,60		0,50		0,60		0,50		0,60	
7,5 / 6 N/mm ²	w/w		0,75		0,90		0,75		0,90		0,75		0,90	
10 / 8 N/mm ²	w/w	w/d	0,90		1,20		0,90		1,20		0,90		1,20	
12,5 / 10 N/mm ²	w/w	w/d	1,20		1,50		1,20		1,50		1,20		1,50	
15 / 12 N/mm ²	w/w	w/d	1,50		2,00		1,50		2,00		1,50		2,00	

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

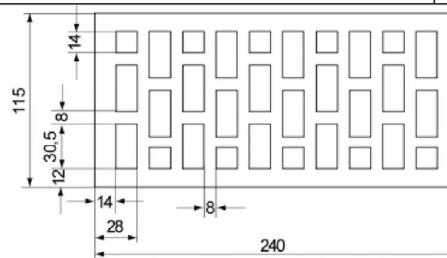
Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	Annex C 29
Performance Vertical perforated brick HLz, Characteristic resistance under tension and shear loading	Appendix 58 / 153

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



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	240	115	113
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 B 15

Table C30.1: 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		16x85			20x85		

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

Max. installation torque	max T _{inst} [Nm]	2
General installation parameters		
Edge distance c _{min} = c _{cr}		80
Spacing s _{cr II} = s _{min II} [mm]		240
s _{cr ⊥} = s _{min ⊥}		115

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C30.2: 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		16x85			20x85						
Group factors	$\alpha_{g,N} (s_{min II})$	[-]			2									
	$\alpha_{g,V} (s_{min II})$													
	$\alpha_{g,N} (s_{min ⊥})$													
	$\alpha_{g,V} (s_{min ⊥})$													

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 30

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

Table C31.1: 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	-	11x85	-	M10	M12	-
										15x85
Perforated sleeve FIS H K	12x50	12x85		16x85				20x85		

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	w/w	w/d	0.75	0.90	0.75	0.90
7,5 / 6 N/mm ²		w/w	w/d	0,75	1,20	0,75	0,90
		d/d		1,20		1,20	
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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table C31.2: 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	-	11x85	-	M10	M12	-
										15x85
Perforated sleeve FIS H K	12x50	12x85		16x85			20x85			

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	1,2	1,5	1,2	2,0	1,2	1,5	2,5
w/w w/d d/d		2,0	2,5	2,0	4,0	2,0	2,5	4,5
		3,0	3,5	3,0	6,0	3,0	3,5	7,0
		4,0	4,5	4,0	7,5	4,0	4,5	8,5
		5,0	6,5	5,0	9,5	5,0	6,5	12,0

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

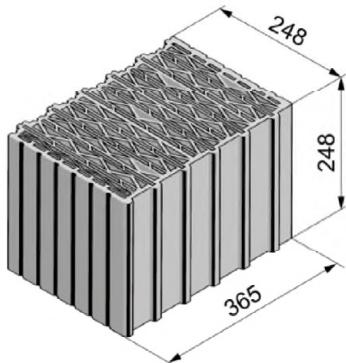
Performance

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

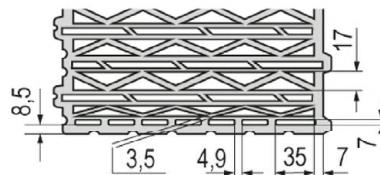
Annex C 31

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Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015



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



Dimension see also
Annex B 15

Table C32.1: Installation parameters
(Pre-positioned anchorage 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						

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

Max. installation torque	max T_{inst} [Nm]	3	5	3	5	3	5	5	5	5	5	5	5	5	5	5
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General installation parameters

Edge distance	$c_{min} = c_{cr}$	[mm]	60
	$s_{min \parallel}$		80
Spacing	$s_{cr \parallel}$		250
	$s_{min \perp}$		80
	$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

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

Table C32.2: 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	$\alpha_{g,N} (s_{min \parallel})$	[-]	1,3													
	$\alpha_{g,V} (s_{min \parallel})$		1,2													
	$\alpha_{g,N} (s_{min \perp})$		1,3													
	$\alpha_{g,V} (s_{min \perp})$		1,0													

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, U8, dimensions, installation parameters

Annex C 32

Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015

Table C33.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		5
General installation parameters			
Edge distance $c_{min} = c_{cr}$		60	
Spacing $s_{min \parallel}$		80	
	[mm]	250	
Spacing $s_{cr \parallel}$		80	
		250	
Spacing $s_{min \perp}$			
Spacing $s_{cr \perp}$			

Drilling method

Rotary drilling with carbide drill

Table C33.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$		1,3
	$\alpha_{g,V} (s_{min \parallel})$		1,2
	$\alpha_{g,N} (s_{min \perp})$		1,3
	$\alpha_{g,V} (s_{min \perp})$		1,0

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, U8, dimensions, installation parameters

Annex C 33

Vertical perforated brick HLz, U8, EN 771-1:2011+A1:2015

Table C34.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	16x130	20x85	20x130	20x130	20x200	20x200						
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	1,2													1,2
		d/d	1,2													1,5
8 / 6 N/mm ²	w/w	w/d	1,5													1,5
		d/d	1,5													1,5
10 / 8 N/mm ²	w/w	w/d	1,5													2,0
		d/d	2,0													2,0

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

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

Table C34.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	1,2
		d/d	1,5
8 / 6 N/mm ²	w/w	w/d	1,5
		d/d	1,5
10 / 8 N/mm ²	w/w	w/d	2,0
		d/d	2,0

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, U8, Characteristic resistance under tension loading

Annex C 34

Vertical perforated brick HLz. U8. EN 771-1:2011+A1:2015

Table C35.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

Table C35.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		
5 / 4 N/mm ²	w/w	w/d	1,2
8 / 6 N/mm ²	w/w	w/d	1,5
10 / 8 N/mm ²	w/w	w/d	1,5

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

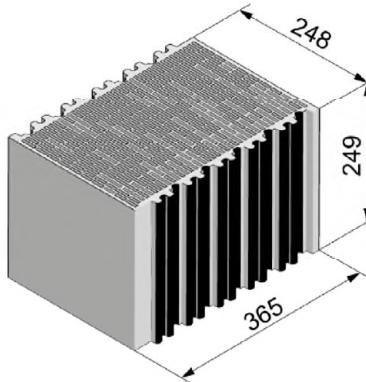
Performance

Vertical perforated brick HLz, U8. Characteristic resistance under shear loading

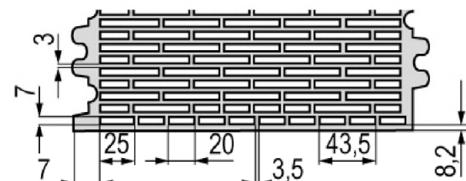
Annex C 35

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Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015



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



Dimension see also Annex B 16

Table C36.1: Installation parameters
(Pre-positioned anchorage 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					
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85		-	-	-	-	-

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

Max. installation torque	max T_{inst} [Nm]	3	5	3	5
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General installation parameters

Edge distance	$C_{min} = C_{cr}$	[mm]	60
	$s_{min \parallel}$		80
Spacing	$s_{cr \parallel}$		250
	$s_{min \perp}$		80
	$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

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

Table C36.2: 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					
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85		-	-	-	-	-
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	1,7													
	$\alpha_{g,V} (s_{min \parallel})$		0,5													
	$\alpha_{g,N} (s_{min \perp})$		1,3													
	$\alpha_{g,V} (s_{min \perp})$		0,5													

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T10, T11, dimensions, installation parameters

Annex C 36

Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015

Table C37.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		5
General installation parameters			
Edge distance $C_{min} = C_{cr}$		60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$ [mm]	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	

Drilling method

Rotary drilling with carbide drill

Table C37.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,7	
	$\alpha_{g,V} (s_{min \parallel})$	0,5	
	$\alpha_{g,N} (s_{min \perp})$	1,3	
	$\alpha_{g,V} (s_{min \perp})$	0,5	
	[$-$]		

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T10, T11, dimensions, installation parameters

Annex C 37

Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015

Table C38.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-			M6 11x85	M8			-	M10 15x85	M12		-	-	-	-
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130		20x85		20x130		20x200			
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
10 / 8 N/mm ²	w/w	w/d	1,5													1,5
		d/d	1,5													2,0
12,5 / 10 N/mm ²	w/w	w/d	1,5													2,0
		d/d	2,0													2,0
15 / 12 N/mm ²	w/w	w/d	2,0													2,0
		d/d	2,0													2,5

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

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

Table C38.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
10 / 8 N/mm ²	w/w	w/d	1,5
		d/d	2,0
12,5 / 10 N/mm ²	w/w	w/d	2,0
		d/d	2,0
15 / 12 N/mm ²	w/w	w/d	2,0
		d/d	2,5

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T10, T11, Characteristic resistance under tension loading

Annex C 38

Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015

Table C39.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
10 / 8 N/mm ²	w/w	w/d	0,9	1,5	2,0											
	d/d															
12,5 / 10 N/mm ²	w/w	w/d	0,9	1,5	2,0											
	d/d															
15 / 12 N/mm ²	w/w	w/d	1,2	2,0	2,0											
	d/d															

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

Table C39.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
10 / 8 N/mm ²	w/w	w/d	1,5	2,0
	d/d			
12,5 / 10 N/mm ²	w/w	w/d	1,5	2,0
	d/d			
15 / 12 N/mm ²	w/w	w/d	2,0	2,0
	d/d			

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

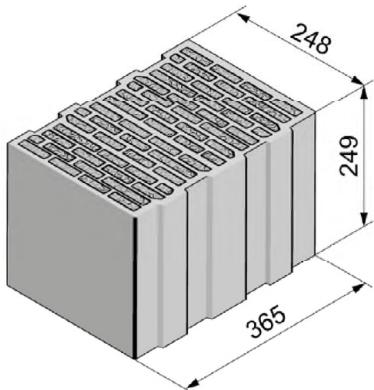
Performance

Vertical perforated brick HLz, T10, T11, Characteristic resistance under shear loading

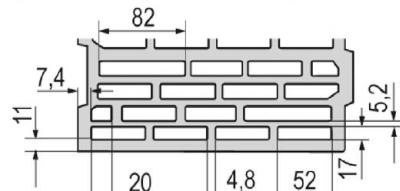
Annex C 39

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Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015



Producer		e.g. Wienerberger		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		248		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		365		
Standard or annex			249	
EN 771-1:2011+A1:2015			0,5	



Dimension see also
Annex B 16

Table C40.1: Installation parameters
(Pre-positioned anchorage 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			-	-	-
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85				20x130	20x200	

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

Max. installation torque	max T_{inst} [Nm]	2	5	2	5
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General installation parameters

Edge distance	$c_{min} = c_{cr}$	[mm]	60
	$s_{min \parallel}$		80
Spacing	$s_{cr \parallel}$		250
	$s_{min \perp}$		80
	$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

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

Table C40.2: 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			-	-	-
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85				20x130	20x200	
	$\alpha_{g,N} (s_{min \parallel})$	[-]												1,1		
Group factors	$\alpha_{g,V} (s_{min \parallel})$													1,2		
	$\alpha_{g,N} (s_{min \perp})$													1,1		
	$\alpha_{g,V} (s_{min \perp})$													1,2		

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Performance

Vertical perforated brick HLz, T7 PF, filled with perlite,
dimensions, installation parameters

Annex C 40

Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015

Table C41.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		5
General installation parameters			
Edge distance $C_{min} = C_{cr}$		60	
Spacing $s_{min \parallel}$		80	
		250	
Spacing $s_{cr \parallel}$		80	
		250	
Drilling method			
Rotary drilling with carbide drill			

Table C41.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$		1,1
	$\alpha_{g,V} (s_{min \parallel})$		1,2
	$\alpha_{g,N} (s_{min \perp})$		1,1
	$\alpha_{g,V} (s_{min \perp})$		1,2

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Performance

Vertical perforated brick HLz, T7 PF, filled with perlite,
dimensions, installation parameters

Annex C 41

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Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015

Table C42.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	1,2				1,2				1,2				1,2	2,0
	d/d		1,5				1,5				1,5				1,5	2,0
8 / 6 N/mm ²	w/w	w/d	1,5				1,5				1,5				1,5	2,5
	d/d		1,5				2,0				1,5				2,0	3,0

¹⁾ The 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 C42.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	1,2	1,2
	d/d		1,5	1,5
8 / 6 N/mm ²	w/w	w/d	1,5	1,5
	d/d		2,0	2,0

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

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

Factor for job site tests and displacements see annex C 123.

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Performance

Vertical perforated brick HLz, T7 PF, filled with perlite,
Characteristic resistance under tension loading

Annex C 42

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Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015

Table C43.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	11x85	-	M10	M12	-	-	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	0,9	1,5				1,2								
	d/d															
8 / 6 N/mm ²	w/w	w/d	1,2	2,0				1,5								
	d/d															

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

Table C43.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	1,5
	d/d		
8 / 6 N/mm ²	w/w	w/d	2,0
	d/d		

¹⁾ The 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 C 123.

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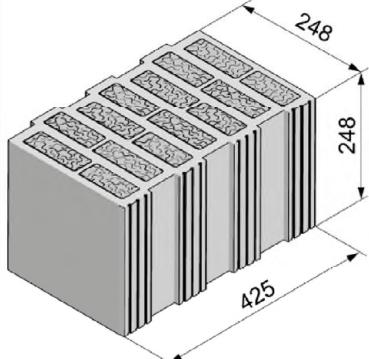
Performance

Vertical perforated brick HLz, T7 PF, filled with perlite,
Characteristic resistance under shear loading

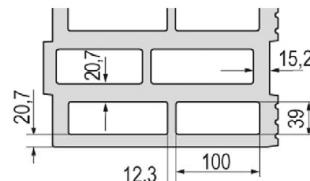
Annex C 43

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015



Producer	e.g. Wienerberger		
Nominal dimensions [mm]			length L width W height H
			248 425 248
Mean gross dry density ρ [kg/dm ³]			0,8
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]			5 / 4 or 8 / 6 or 10 / 8
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 16

Table C44.1: Installation parameters
(Pre-positioned anchorage 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
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Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K

Max. installation torque	max T_{inst} [Nm]	3	5	3	5
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General installation parameters

Edge distance	$c_{min} = c_{cr}$	[mm]	60
	$s_{min \parallel}$		80
Spacing	$s_{cr \parallel}$		250
	$s_{min \perp}$		80
	$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

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

Table C44.2: 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	$\alpha_{g,N} (s_{min \parallel})$	[-]														
	$\alpha_{g,V} (s_{min \parallel})$															
	$\alpha_{g,N} (s_{min \perp})$															
	$\alpha_{g,V} (s_{min \perp})$															

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Performance

Vertical perforated brick HLz, T9 MW, filled with mineral wool, dimensions, installation parameters

Annex C 44

Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015

Table C45.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		5
General installation parameters			
Edge distance $c_{min} = c_{cr}$		60	
Spacing $s_{min \parallel}$		80	
	[mm]	250	
Spacing $s_{cr \parallel}$		80	
		250	
Spacing $s_{min \perp}$			
Spacing $s_{cr \perp}$			

Drilling method

Rotary drilling with carbide drill

Table C45.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$		1,3
	$\alpha_{g,V} (s_{min \parallel})$		1,2
	$\alpha_{g,N} (s_{min \perp})$		0,6
	$\alpha_{g,V} (s_{min \perp})$		1,2

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T9 MW, filled with mineral wool,
dimensions, installation parameters

Annex C 45

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015

Table C46.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	11x85	-	M10	M12	-	-	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	1,5		2,0		3,0		2,5		4,0					
	d/d		2,0		2,5		3,0		2,5		4,5					
8 / 6 N/mm ²	w/w	w/d	2,0		2,5		3,5		3,0		5,0					
	d/d		2,0		3,0		4,0		3,0		5,5					
10 / 8 N/mm ²	w/w	w/d	2,5		3,0		4,0		3,5		6,0					
	d/d		2,5		3,0		4,5		3,5		6,5					

¹⁾ The 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 C46.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	3,0	4,0
	d/d		3,0	4,5
8 / 6 N/mm ²	w/w	w/d	3,5	5,0
	d/d		4,0	5,5
10 / 8 N/mm ²	w/w	w/d	4,0	6,0
	d/d		4,5	6,5

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T9 MW, filled with mineral wool;
Characteristic resistance under tension loading

Annex C 46

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015

Table C47.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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	-	-	-	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	2,0				2,5				2,0				1,5	
	d/d															
8 / 6 N/mm ²	w/w	w/d	2,5				3,0				2,5				2,0	
	d/d															
10 / 8 N/mm ²	w/w	w/d	2,5				4,0				3,0				2,5	
	d/d															

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

Table C47.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	2,5	2,0
	d/d			
8 / 6 N/mm ²	w/w	w/d	3,0	2,5
	d/d			
10 / 8 N/mm ²	w/w	w/d	4,0	3,0
	d/d			

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, T9 MW, filled with mineral wool;
Characteristic resistance under shear loading

Annex C 47

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015

	Producer		e.g. Wienerberger
	Nominal dimensions [mm]		length L width W height H
	248 425 248		
	Mean gross dry density ρ [kg/dm ³]		0,8
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		5 / 4 or 7,5 / 6 or 10 / 8	
Standard or annex		EN 771-1:2011+A1:2015	
		Dimension see also Annex B 16	

Table C48.1: Installation parameters
(Pre-positioned anchorage 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	5	2	5
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General installation parameters

Edge distance $c_{min} = c_{cr}$	[mm]	60
$s_{min \parallel}$		80
$s_{cr \parallel}$		250
$s_{min \perp}$		80
$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

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

Table C48.2: 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	$\alpha_{g,N} (s_{min \parallel})$	[-]	1,9													
	$\alpha_{g,V} (s_{min \parallel})$		0,9													
	$\alpha_{g,N} (s_{min \perp})$		1,0													
	$\alpha_{g,V} (s_{min \perp})$		0,7													

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Performance

Vertical perforated brick HLz, FZ 7, filled with mineral wool;
dimensions, installation parameters

Annex C 48

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015

Table C49.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	T_{inst} [Nm]		5

General installation parameters

Edge distance	$C_{min} = C_{cr}$	[mm]	60
	$s_{min \parallel}$		80
Spacing	$s_{cr \parallel}$		250
	$s_{min \perp}$		80
	$s_{cr \perp}$		250

Drilling method

Rotary drilling with carbide drill

Table C49.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	1,9
	$\alpha_{g,V} (s_{min \parallel})$		0,9
	$\alpha_{g,N} (s_{min \perp})$		1,0
	$\alpha_{g,V} (s_{min \perp})$		0,7

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, FZ 7, filled with mineral wool;
dimensions, installation parameters

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015

Table C50.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
5 / 4 N/mm ²	w/w	w/d	0,60	0,75	1,50	2,00	1,20	2,00	2,00
	d/d		0,60	0,90	1,50	2,00	1,50	2,00	2,50
7,5 / 6 N/mm ²	w/w	w/d	0,75	0,90	1,50	2,00	1,50	2,50	2,50
	d/d		0,90	0,90	2,00	2,50	2,00	2,50	3,00
10 / 8 N/mm ²	w/w	w/d	0,90	1,20	2,00	2,50	2,00	2,50	3,00
	d/d		0,90	1,20	2,00	3,00	2,00	3,00	3,50

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

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

Table C50.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	2,0	2,0
	d/d		2,0	2,0
7,5 / 6 N/mm ²	w/w	w/d	2,0	2,5
	d/d		2,5	2,5
10 / 8 N/mm ²	w/w	w/d	2,5	2,5
	d/d		3,0	3,0

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, FZ 7, filled with mineral wool;
Characteristic resistance under tension loading

Annex C 50

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015

Table C51.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	11x85	-	M10	M12	-	-	-	-	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
5 / 4 N/mm ²	w/w	w/d	1,2													
	d/d															
7,5 / 6 N/mm ²	w/w	w/d	1,5													
	d/d															
10 / 8 N/mm ²	w/w	w/d	1,5													
	d/d															

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

Table C51.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	1,5
	d/d		
7,5 / 6 N/mm ²	w/w	w/d	2,0
	d/d		
10 / 8 N/mm ²	w/w	w/d	2,5
	d/d		

¹⁾ The 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 C123.

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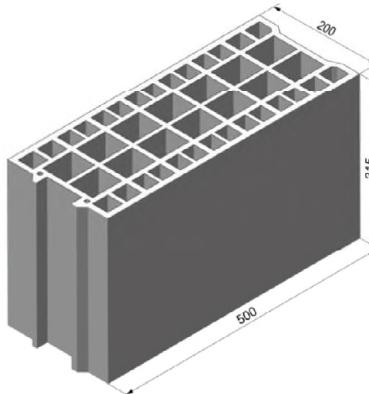
Performance

Vertical perforated brick HLz, FZ 7, filled with mineral wool;
Characteristic resistance under shear loading

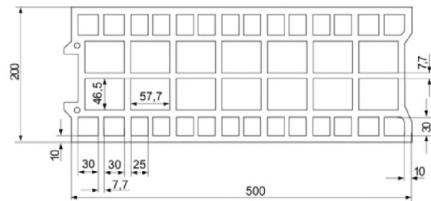
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Bouyer Leroux		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	500	200	315
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	$\geq 0,6$	5 / 4 or 7,5 / 6 or 10 / 8	
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 16

Table C52.1: Installation parameters
(Pre-positioned anchorage 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	-	-	-
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 $c_{min} = c_{cr}$	[mm]	120
Spacing $s_{min \parallel}$	[mm]	120
$s_{cr \parallel}$		500
$s_{min \perp} = s_{cr \perp}$		315

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C52.2: 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	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130								
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[$s_{min \parallel}$]												
	$\alpha_{g,V} (s_{min \parallel})$	[$s_{min \parallel}$]												
	$\alpha_{g,N} (s_{min \perp})$	[$s_{min \perp}$]												
	$\alpha_{g,V} (s_{min \perp})$	[$s_{min \perp}$]												

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 52

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

Table C53.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $C_{min} = C_{cr}$		120	
Spacing $s_{min \parallel}$	[mm]	120	
		500	
		315	
Drilling method			
Hammer drilling with hard metal hammer drill			
Table C53.2: Group factors			
Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N}(s_{min \parallel})$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp})$ $\alpha_{g,V}(s_{min \perp})$	[-]	1,3 1,7 2,0

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

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

Table C54.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d	0,50		1,50		0,75		1,50		1,50		1,50	
	d/d		0,60		1,50		0,90		1,50		2,00			
7,5 / 6 N/mm ²	w/w	w/d	0,75		2,00		1,20		2,00		2,50			
	d/d		0,90		2,50		1,20		2,50		2,50			
10 / 8 N/mm ²	w/w	w/d	0,90		3,00		1,50		3,00		3,50			
	d/d		1,20		3,00		2,00		3,00		3,50			

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

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

Table C54.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	0,75	1,50
	d/d		0,90	2,00
7,5 / 6 N/mm ²	w/w	w/d	1,20	2,50
	d/d		1,20	2,50
10 / 8 N/mm ²	w/w	w/d	1,50	3,50
	d/d		2,00	3,50

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

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

Factor for job site tests and displacements see annex C 123.

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Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 54

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

Table C55.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d	1,5				0,9	1,5		2,5	0,9			
	d/d													
7,5 / 6 N/mm ²	w/w	w/d	2,5				1,5	2,5		3,5	1,5			
	d/d													
10 / 8 N/mm ²	w/w	w/d	3,5				2,0	3,5		4,5	2,0			
	d/d													

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

Table C55.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	0,9	
	d/d			
7,5 / 6 N/mm ²	w/w	w/d	1,5	
	d/d			
10 / 8 N/mm ²	w/w	w/d	2,0	
	d/d			

¹⁾ The 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 C 123.

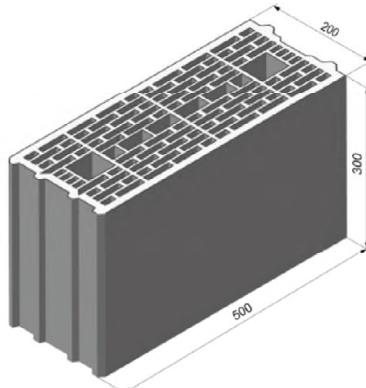
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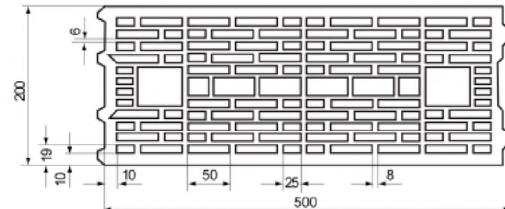
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Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

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



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	500	200	300
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	5 / 4 or 7,5 / 6 or 10 / 8 12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see
also Annex B 17

Table C56.1: Installation parameters
(Pre-positioned anchorage 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	$C_{min} = C_{cr}$	50	80	50	80
Spacing	$s_{min \parallel}$ [mm]	100			
	$s_{cr \parallel}$	500			
	$s_{min \perp} = s_{cr \perp}$	300			

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C56.2: 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	$\alpha_{g,N} (s_{min \parallel})$									1,4				
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$									2				
	$\alpha_{g,V} (s_{min \perp})$													

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 56

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

Table C57.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $C_{min} = C_{cr}$		80	
Spacing $s_{min \parallel}$	[mm]	100	
$s_{cr \parallel}$		500	
$s_{min \perp} = s_{cr \perp}$		300	

Drilling method

Hammer drilling with hard metal hammer drill

Table C57.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$		1,4
	$\alpha_{g,V} (s_{min \parallel})$	[-]	
	$\alpha_{g,N} (s_{min \perp})$		2
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 57

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

Table C58.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d	0,50		0,60		1,20		0,75		1,50			
	d/d		0,60		0,75		1,20		0,90		1,50			
7,5 / 6 N/mm ²	w/w	w/d	0,75		0,90		1,50		1,20		2,00			
	d/d		0,90		1,20		2,00		1,20		2,50			
10 / 8 N/mm ²	w/w	w/d	0,90		1,20		2,00		1,50		2,50			
	d/d		1,20		1,50		2,50		1,50		3,00			
12,5 / 10 N/mm ²	w/w	w/d	1,20		1,50		2,50		2,00		3,50			
	d/d		1,50		2,00		3,00		2,00		4,00			

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

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

Table C58.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
5 / 4 N/mm ²	w/w	w/d	1,2	1,5
	d/d		1,2	1,5
7,5 / 6 N/mm ²	w/w	w/d	1,5	2,0
	d/d		2,0	2,5
10 / 8 N/mm ²	w/w	w/d	2,0	2,5
	d/d		2,5	3,0
12,5 / 10 N/mm ²	w/w	w/d	2,5	3,5
	d/d		3,0	4,0

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry	Annex C 58
Performance Vertical perforated brick HLz, Characteristic resistance under tension loading	

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

Table C59.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d	0,9	1,2	0,9	1,2	0,6	2,0	0,6	2,0	0,6	2,0	0,6	2,0
	d/d													
7,5 / 6 N/mm ²	w/w	w/d	1,2	1,5	1,2	1,5	0,9	3,0	0,9	3,0	0,9	3,0	0,9	3,0
	d/d													
10 / 8 N/mm ²	w/w	w/d	1,5	2,0	1,5	2,0	1,2	4,0	1,2	4,0	1,2	4,0	1,2	4,0
	d/d													
12,5 / 10 N/mm ²	w/w	w/d	2,0	3,0	2,0	3,0	1,5	5,0	1,5	5,0	1,5	5,0	1,5	5,0
	d/d													

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

Table C59.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	0,6
	d/d		
7,5 / 6 N/mm ²	w/w	w/d	0,9
	d/d		
10 / 8 N/mm ²	w/w	w/d	1,2
	d/d		
12,5 / 10 N/mm ²	w/w	w/d	1,5
	d/d		

¹⁾ The 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 C 123.

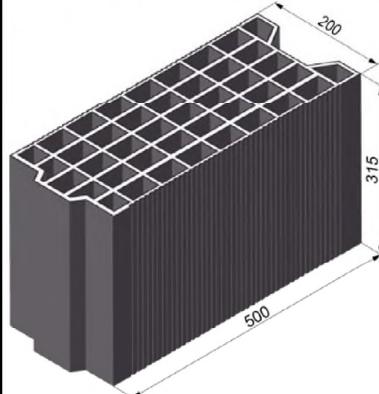
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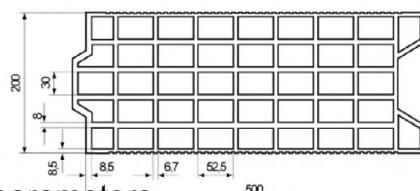
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C 59

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



Producer	e.g. Terreal		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	500	200	315
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	2,5 / 2 or 5 / 4 or 7,5 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 17

Table C60.1: Installation parameters
(Pre-positioned anchorage 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				
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85				

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 $c_{min} = c_{cr}$		50	80	50	80
Spacing $s_{min \parallel}$	$s_{cr \parallel}$ [mm]		100		
	$s_{min \perp}$		500		
	$s_{cr \perp}$		100		
			315		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C60.2: 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				
Perforated sleeve FIS H K	12x50	12x85			11x85					15x85				

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

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Vertical perforated brick HLz, dimensions, installation parameters

Annex C 60

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

Table C61.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $C_{min} = C_{cr}$		80	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$ [mm]	500	
	$s_{min \perp}$	100	
	$s_{cr \perp}$	315	

Drilling method

Hammer drilling with hard metal hammer drill

Table C61.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,1	
	$\alpha_{g,V} (s_{min \parallel})$	1,2	
	$\alpha_{g,N} (s_{min \perp})$	1,1	
	$\alpha_{g,V} (s_{min \perp})$	1,2	

fischer injection system FIS V Plus for masonry

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Vertical perforated brick HLz, dimensions, installation parameters

Annex C 61

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

Table C62.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
2,5 / 2 N/mm ²	w/w	w/d									0,5			
	d/d					0,5		0,6		0,5		0,6		
5 / 4 N/mm ²	w/w	w/d									0,9			
	d/d		0,9								1,2			
7,5 / 6 N/mm ²	w/w	w/d									1,5			
	d/d										1,5			
10 / 8 N/mm ²	w/w	w/d									2,0			
	d/d										2,0			

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

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

Table C62.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/mm ²	w/w	w/d	0,5
	d/d		0,6
5 / 4 N/mm ²	w/w	w/d	0,9
	d/d		1,2
7,5 / 6 N/mm ²	w/w	w/d	1,5
	d/d		1,5
10 / 8 N/mm ²	w/w	w/d	2,0
	d/d		2,0

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

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Vertical perforated brick HLz, Characteristic resistance under tension loading

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

Table C63.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
2,5 / 2 N/mm ²	w/w	w/d	0,30	0,60	0,3	0,60	0,60	0,90	0,75					
	d/d													
5 / 4 N/mm ²	w/w	w/d	0,75	1,20	0,7	1,20	1,20	2,00	1,50					
	d/d													
7,5 / 6 N/mm ²	w/w	w/d	0,90	2,00	0,9	2,00	1,50	3,00	2,00					
	d/d													
10 / 8 N/mm ²	w/w	w/d	1,50	2,50	1,5	2,50	2,00	4,00	3,00					
	d/d													

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

Table C63.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200	22x130/200		
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
2,5 / 2 N/mm ²	w/w	w/d	0,60	0,75
	d/d			
5 / 4 N/mm ²	w/w	w/d	1,20	1,50
	d/d			
7,5 / 6 N/mm ²	w/w	w/d	1,50	2,00
	d/d			
10 / 8 N/mm ²	w/w	w/d	2,00	3,00
	d/d			

¹⁾ The 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 C 123.

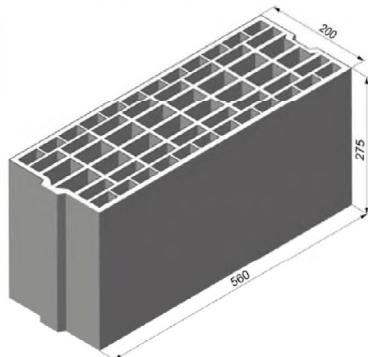
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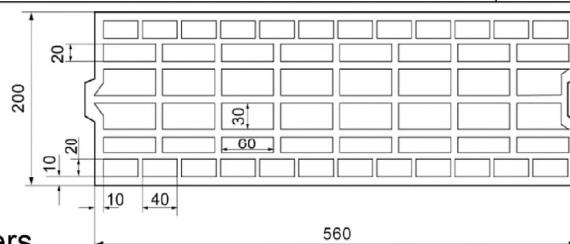
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C 63

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



Producer	e.g. Imery		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	560	200	275
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	≥ 0,7	5 / 4 or 8 / 6 or 10 / 8	
Standard or annex	EN 771-1:2011+A1:2015		



Dimension
see also
Annex B 17

Table C64.1: Installation parameters

Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
Anchor rod with perforated sleeve FIS H K							
Max. installation torque	max T_{inst} [Nm]					2	
Edge distance $c_{min} = c_{cr}$					80		
Spacing $s_{min \parallel} = s_{cr \parallel}$ [mm]					560		
	$s_{min \perp} = s_{cr \perp}$				275		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C64.2: Group factors

Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$					2	
	$\alpha_{g,V} (s_{min \parallel})$						
	$\alpha_{g,N} (s_{min \perp})$	[-]					
	$\alpha_{g,V} (s_{min \perp})$						

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Vertical perforated brick HLz, dimensions, installation parameters

Annex C 64

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

Table C65.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾							
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions						
5 / 4 N/mm ²	w/w	w/d	0,9			1,2	
	d/d		1,2			1,5	
8 / 6 N/mm ²	w/w	w/d	1,5			2,0	
	d/d		1,5			2,0	
10 / 8 N/mm ²	w/w	w/d	2,0			2,5	
	d/d		2,5			3,0	

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

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

Table C65.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)							
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions						
5 / 4 N/mm ²	w/w	w/d					
	d/d		0,9				
8 / 6 N/mm ²	w/w	w/d					
	d/d		1,5				
10 / 8 N/mm ²	w/w	w/d					
	d/d		2,0				

¹⁾ The 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 C 123.

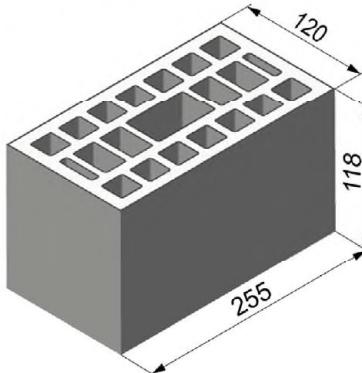
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Performance

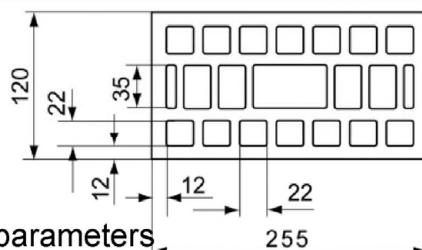
Vertical perforated brick HLz, Characteristic resistance under tension and shear loading

Annex C 65

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



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	255	120	118
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	$\geq 1,0$ 2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10 / or 15 / 12		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 18

Table C66.1: 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		16x85			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	$c_{min} = c_{cr}$	60
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]	255
	$s_{cr \perp} = s_{min \perp}$	120

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C66.2: 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		16x85			20x85						
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2											
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$													
	$\alpha_{g,V} (s_{min \perp})$													

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 66

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

Table C67.1: 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	-	M10	M12
			11x85		-		15x85	-		
Perforated sleeve FIS H K	12x50		12x85		16x85		20x85			
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ¹⁾										
Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions									
2,5 / 2 N/mm ²	w/w	w/d	0,40		0,50			- ³⁾		
		d/d	0,50		0,50			- ³⁾		
5 / 4 N/mm ²	w/w	w/d	0,90		0,90			0,50		
		d/d	0,90		1,20			0,50		
8 / 6 N/mm ²	w/w	w/d	1,20		1,50			0,75		
		d/d	1,50		1,50			0,75		
10 / 8 N/mm ²	w/w	w/d	1,50		2,00			0,90		
		d/d	2,00		2,00			0,90		
12,5 / 10 N/mm ²	w/w	w/d	2,00		2,50			1,20		
		d/d	2,50		2,50			1,20		
15 / 12 N/mm ²	w/w	w/d	2,50		3,00			1,50		
		d/d	3,00		3,50			1,50		

¹⁾ For temperature range 72/120°C: $N_{Rk}(72/120°C) = 0,83 \cdot N_{Rk}(50/80°C)$.

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

³⁾ No performance assessed

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 67

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

Table C68.1: 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	-	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	M10	M12	-	M10	M12
			11x85						15x85	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x85		20x85		
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)										
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- dition									
2,5 / 2 N/mm ²	w/w	w/d	0,60	0,75	0,60	0,75			0,90	
	d/d									
5 / 4 N/mm ²	w/w	w/d	1,20	1,50	1,20	1,50			2,00	
	d/d									
8 / 6 N/mm ²	w/w	w/d	2,00	2,00	2,00	2,00			2,50	
	d/d									
10 / 8 N/mm ²	w/w	w/d	2,50	3,00	2,50	3,00			3,50	
	d/d									
12,5 / 10 N/mm ²	w/w	w/d	3,00	3,50	3,00	3,50			4,50	
	d/d									
15 / 12 N/mm ²	w/w	w/d	4,00	4,50	4,00	4,50			5,50	
	d/d									

¹⁾ The 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 C 123.

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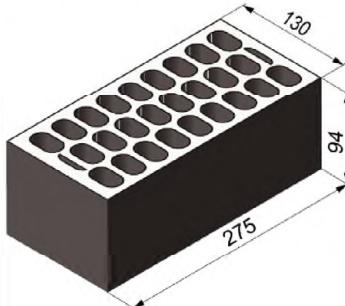
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

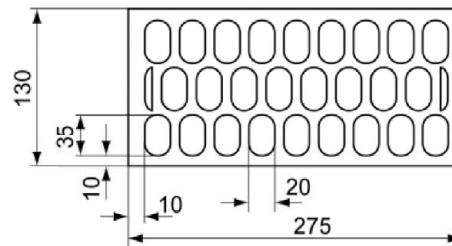
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



Producer	e.g. Cermanica Farreny S.A.		
Nominal dimensions [mm]	length L	width W	height H
	275	130	94
Mean gross dry density ρ [kg/dm ³]	$\geq 0,8$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	7,5 / 6 or 10 / 8 or 15 / 12 or 20 / 16 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 18

Table C69.1: Installation parameters

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16
Internal threaded anchor FIS E	-	-			M6	M8	-	M10	M12	-
					11x85	11x85				
Perforated sleeve FIS H K	12x50	12x85	16x85			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	$c_{min} = c_{cr}$	100	120
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]	275	95

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C69.2: Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16				
Internal threaded anchor FIS E	-	-			M6	M8	-	M10	M12	-				
					11x85	11x85								
Perforated sleeve FIS H K	12x50	12x85	16x85			20x85								
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2											
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$													
	$\alpha_{g,V} (s_{min \perp})$													

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 69

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

Table C70.1: 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	-	15x85											
			11x85	15x85																
Perforated sleeve FIS H K	12x50		12x85		16x85			20x85												
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions																			
7,5 / 6 N/mm ²	w/w	w/d	0,40		0,90															
	d/d		0,40		0,90															
10 / 8 N/mm ²	w/w	w/d	0,50		1,20															
	d/d		0,60		1,20															
15 / 12 N/mm ²	w/w	w/d	0,75		1,50															
	d/d		0,90		2,00															
20 / 16 N/mm ²	w/w	w/d	0,90		2,00															
	d/d		1,20		2,50															
25 / 20 N/mm ²	w/w	w/d	1,20		3,00															
	d/d		1,50		3,00															

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

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

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

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

Table C71.2: 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	-	15x85	-
Perforated sleeve FIS H K	12x50	12x85		16x85					20x85	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)										
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions									
7,5 / 6 N/mm ²	w/w	w/d	1,2			1,2				
	d/d									
10 / 8 N/mm ²	w/w	w/d	1,5			1,5				
	d/d									
15 / 12 N/mm ²	w/w	w/d	2,0			2,5				
	d/d									
20 / 16 N/mm ²	w/w	w/d	3,0			3,0				
	d/d									
25 / 20 N/mm ²	w/w	w/d	4,0			4,0				
	d/d									

¹⁾ The 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 C 123.

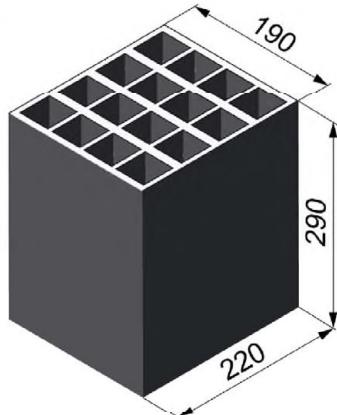
fischer injection system FIS V Plus for masonry

Performance

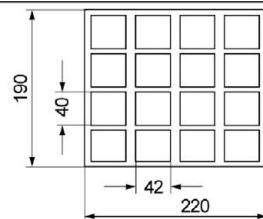
Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 71

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



Producer		e.g. Perceram		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		$\geq 0,7$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		7,5 / 6 or 10 / 8 or 12,5 / 10		
Standard or annex			EN 771-1:2011+A1:2015	



Dimension see also
Annex B 18

Table C72.1: Installation parameters
(Pre-positioned anchorage 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 $c_{min} = c_{cr}$	[mm]	110
Spacing $s_{min \parallel} = s_{cr \parallel}$	[mm]	220
$s_{min \perp} = s_{cr \perp}$		290

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C72.2: 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			
Group factors	$\alpha_{g,N} (s_{min \parallel})$ $\alpha_{g,V} (s_{min \parallel})$ $\alpha_{g,N} (s_{min \perp})$ $\alpha_{g,V} (s_{min \perp})$	[-]	2											

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 72

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

Table C73.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $c_{min} = c_{cr}$		110	
Spacing $s_{min \parallel} = s_{cr \parallel}$ [mm]		220	
		290	
Drilling method			
Hammer drilling with hard metal hammer drill			

Table C73.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$ $\alpha_{g,V} (s_{min \parallel})$ $\alpha_{g,N} (s_{min \perp})$ $\alpha_{g,V} (s_{min \perp})$	[-]	2

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 73

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

Table C74.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
7,5 / 6 N/mm ²	w/w	w/d	0,3	1,2		1,2		1,5		1,2		1,5		
	d/d		0,4	1,5		1,5		1,5		1,5		1,5		
10 / 8 N/mm ²	w/w	w/d	0,5	1,5		1,5		2,0		1,5		2,0		
	d/d		0,5	2,0		2,0		2,5		2,0		2,5		
12,5 / 10 N/mm ²	w/w	w/d	0,6	2,0		2,0		2,5		2,0		2,5		
	d/d		0,6	2,5		2,5		3,0		2,5		3,0		

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

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

Table C74.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
7,5 / 6 N/mm ²	w/w	w/d	1,5
	d/d		1,5
10 / 8 N/mm ²	w/w	w/d	2,0
	d/d		2,5
12,5 / 10 N/mm ²	w/w	w/d	2,5
	d/d		3,0

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 74

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

Table C75.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130					
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)															
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions														
7,5 / 6 N/mm ²	w/w	w/d	1,5	1,5	1,5	2,5	1,5	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
	d/d														
10 / 8 N/mm ²	w/w	w/d	2,0	2,0	2,0	3,5	2,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0
	d/d														
12,5 / 10 N/mm ²	w/w	w/d	2,5	3,0	3,0	4,5	3,0	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
	d/d														

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

Table C75.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200	22x130/200		
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
7,5 / 6 N/mm ²	w/w	w/d	2,0	2,0
	d/d			
10 / 8 N/mm ²	w/w	w/d	3,0	3,0
	d/d			
12,5 / 10 N/mm ²	w/w	w/d	3,5	3,5
	d/d			

¹⁾ The 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 C123.

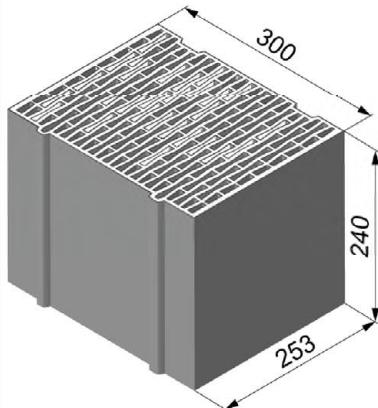
fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C 75

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



Producer		e.g. Ziegelwerk Brenna		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		$\geq 0,8$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex			EN 771-1:2011+A1:2015	

Dimension see also Annex B 18

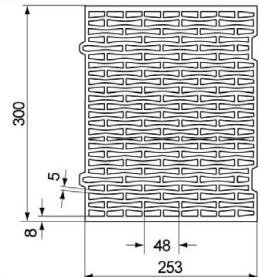


Table C76.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS H K)

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
Spacing	$s_{min \parallel} = s_{cr \parallel}$ [mm]	255
	$s_{min \perp} = s_{cr \perp}$	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C76.2: 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	$\alpha_{g,N} (s_{min \parallel})$	[-]												
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$													
	$\alpha_{g,V} (s_{min \perp})$													

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 76

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

Table C77.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	T_{inst} [Nm]		2
General installation parameters			
Edge distance	$c_{min} = c_{cr}$		60
Spacing	$s_{min \parallel} = s_{cr \parallel}$ [mm]		255
	$s_{min \perp} = s_{cr \perp}$		240
Drilling method			
Hammer drilling with hard metal hammer drill			

Table C77.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N}(s_{min \parallel})$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp})$ $\alpha_{g,V}(s_{min \perp})$	[-]	2

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 77

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

Table C78.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
2,5 / 2 N/mm ²	w/w	w/d	- ³⁾	0,50		0,50		0,40		0,50		0,40		
	d/d		0,30	0,50		0,50		0,50		0,50		0,50		
5 / 4 N/mm ²	w/w	w/d	0,50	0,90		0,90		0,90		0,90		0,90		
	d/d		0,60	0,90		0,90		0,90		0,90		0,90		
8 / 6 N/mm ²	w/w	w/d	0,75	1,50		1,50		1,20		1,50		1,20		
	d/d		0,90	1,50		1,50		1,50		1,50		1,50		

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

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

³⁾ No performance assessed.

Table C78.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/mm ²	w/w	w/d	0,4
	d/d		0,5
5 / 4 N/mm ²	w/w	w/d	0,9
	d/d		0,9
8 / 6 N/mm ²	w/w	w/d	1,2
	d/d		1,5

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 78

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

Table C79.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	-	-	-	M10	M12	-	-	
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
2,5 / 2 N/mm ²	w/w	w/d												
	d/d													
5 / 4 N/mm ²	w/w	w/d												
	d/d													
8 / 6 N/mm ²	w/w	w/d												
	d/d													

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

Table C79.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
2,5 / 2 N/mm ²	w/w	w/d		
	d/d			
5 / 4 N/mm ²	w/w	w/d		
	d/d			
8 / 6 N/mm ²	w/w	w/d		
	d/d			

¹⁾ The 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 C 123.

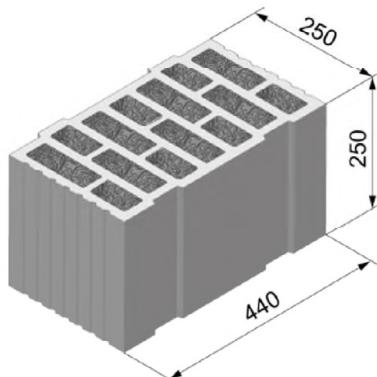
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Performance

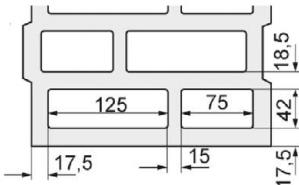
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C 79

**Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
EN 771-1:2011+A1:2015**



Producer		e.g. Wienerberger	
Nominal dimensions	[mm]	length L	width W height H
		250	440 250
Mean gross dry density ρ	[kg/dm ³]	0,7	
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	8 / 6 or 10 / 8 or 12,5 / 10	
Standard or annex		EN 771-1:2011+A1:2015	



Dimension see also
Annex B 18

Table C80.1: Installation parameters
(Pre-positioned anchorage 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-	-	15x85		-	-	-	-	-

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

Max. installation torque	max T_{inst} [Nm]	2	5	2	5	6
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General installation parameters

Edge distance	$c_{min} = c_{cr}$	60
	$s_{min \parallel}$	80
Spacing	$s_{cr \parallel}$ [mm]	250
	$s_{min \perp}$	80
	$s_{cr \perp}$	250

Drilling method

Rotary drilling with carbide drill

Table C80.2: 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-	-	15x85		-	-	-	-	-
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]														
	$\alpha_{g,V} (s_{min \parallel})$															
	$\alpha_{g,N} (s_{min \perp})$															
	$\alpha_{g,V} (s_{min \perp})$															

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Performance

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool;
dimensions, installation parameters

Annex C 80

**Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
EN 771-1:2011+A1:2015**

Table C81.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]	5	6
General installation parameters			
Edge distance $c_{min} = c_{cr}$		60	
Spacing	$s_{min \parallel}$	80	
	$s_{cr \parallel}$	250	
	$s_{min \perp}$	80	
	$s_{cr \perp}$	250	
	[mm]		
Drilling method			
Rotary drilling with carbide drill			

Table C81.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3	
	$\alpha_{g,V} (s_{min \parallel})$	1,3	
	$\alpha_{g,N} (s_{min \perp})$	0,8	
	$\alpha_{g,V} (s_{min \perp})$	1,3	
[-]			

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Performance

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool;
dimensions, installation parameters

Annex C 81

**Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
EN 771-1:2011+A1:2015**

Table C82.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾																

Mean compressive strength /
Min. compressive strength
single brick ¹⁾

Use
con-
ditions

8 / 6 N/mm ²	w/w	w/d	0,75	1,50	1,20			1,50			2,50
	d/d		0,90	1,50	1,20			1,50			2,50
10 / 8 N/mm ²	w/w	w/d	0,90	1,50	1,20			1,50			2,50
	d/d		0,90	2,00	1,50			2,00			3,00
12,5 / 10 N/mm ²	w/w	w/d	0,90	2,00	1,50			2,00			3,00
	d/d		1,20	2,00	1,50			2,00			3,50

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

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

Table C82.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾			

Use
con-
ditions

8 / 6 N/mm ²	w/w	w/d	1,5
	d/d		1,5
10 / 8 N/mm ²	w/w	w/d	1,5
	d/d		2,0
12,5 / 10 N/mm ²	w/w	w/d	2,0
	d/d		2,0

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

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

Factor for job site tests and displacements see annex C 123.

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Performance

Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
Characteristic resistance under tension loading

Annex C 82

**Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
EN 771-1:2011+A1:2015**

Table C83.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ;
Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions						
8 / 6 N/mm ²	w/w	w/d	0,9	1,2	0,9	1,2	1,2
	d/d						
10 / 8 N/mm ²	w/w	w/d	0,9	1,5	0,9	1,5	1,2
	d/d						
12,5 / 10 N/mm ²	w/w	w/d	1,2	1,5	1,2	1,5	1,5
	d/d						

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

Table C83.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
	w/w	w/d		
8 / 6 N/mm ²	w/w	w/d	1,2	1,2
	d/d			
10 / 8 N/mm ²	w/w	w/d	1,5	1,5
	d/d			
12,5 / 10 N/mm ²	w/w	w/d	1,5	1,5
	d/d			

¹⁾ The 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 C 123.

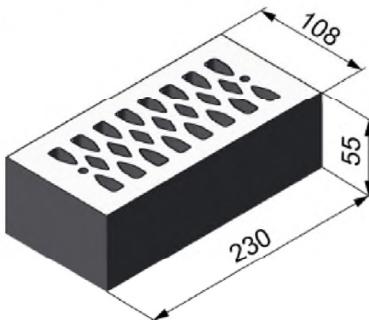
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Performance

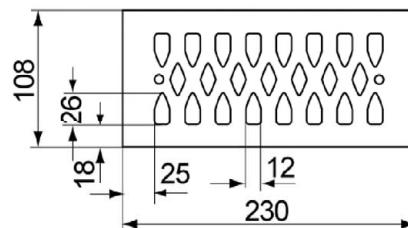
Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool;
Characteristic resistance under shear loading

Annex C 83

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



Producer	e.g. Wienerberger.		
Nominal dimensions [mm]	length L		width W
	230	108	55
Mean gross dry density ρ [kg/dm ³]	$\geq 1,4$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	2,5 / 2 or 5 / 4 or 8 / 6 or 10 / 8		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B 18

Table C84.1: 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		16x85			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	$c_{min} = c_{cr}$	60
Spacing	$s_{min \parallel}$	80
	$s_{cr \parallel}$	230
	$s_{min \perp}$	60
	$s_{cr \perp}$	60

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C84.2: 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		16x85			20x85						
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]			2									
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$													
	$\alpha_{g,V} (s_{min \perp})$													

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Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 84

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

Table C85.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading¹⁾

Anchor rod	M6	M8	M6	M8	-	M8	M10	-	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6	M8	-	M10	M12	-
					11x85	11x85			15x85	
Perforated sleeve FIS H K	12x50	12x85			16x85			20x85		
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)³⁾										
Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions									
2,5 / 2 N/mm ²	w/w	w/d	0,30	0,90		0,75		0,50		
	d/d		0,30	0,90		0,90		0,60		
5 / 4 N/mm ²	w/w	w/d	0,60	1,50		1,50		0,90		
	d/d		0,75	2,00		1,50		1,20		
8 / 6 N/mm ²	w/w	w/d	0,90	2,50		2,50		1,50		
	d/d		0,90	3,00		2,50		1,50		
10 / 8 N/mm ²	w/w	w/d	1,20	3,50		3,00		2,00		
	d/d		1,50	4,00		3,50		2,50		

¹⁾ If the fixing is in a solid area, for w/w, the characteristic value shall be reduced with the factor 0,64.

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

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

Table C85.2: 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	11x85			15x85		
Perforated sleeve FIS H K	12x50	12x85			16x85			20x85			
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)											
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions										
2,5 / 2 N/mm ²	w/w	w/d	0,6					0,4			
	d/d										
5 / 4 N/mm ²	w/w	w/d	1,2					0,9			
	d/d										
8 / 6 N/mm ²	w/w	w/d	1,5					1,2			
	d/d										
10 / 8 N/mm ²	w/w	w/d	2,5					1,5			
	d/d										

¹⁾ The 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 C123.

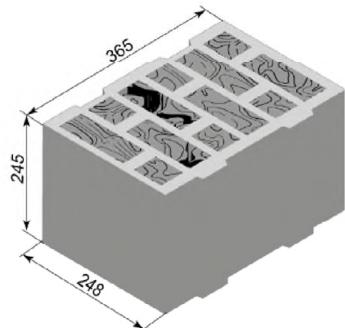
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Performance

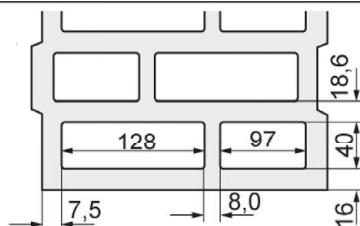
Vertical perforated brick HLz, Characteristic resistance under tension and shear loading

Annex C 85

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



Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	≥ 365	≥ 248	≥ 245
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	0,6	10 / 8	
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B 19

Table C86.1: Installation parameters
(Pre-positioned anchorage 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	-			
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	$s_{min \parallel}$	250
	$s_{cr \parallel}$ [mm]	
	$s_{min \perp}$	245
	$s_{cr \perp}$	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C86.2: 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	$\alpha_{g,N}(s_{min \parallel}) =$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp}) =$ $\alpha_{g,V}(s_{min \perp})$	[$]$					2			

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Performance

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

Annex C 86

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

Table C87.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		4
General installation parameters			
Edge distance	$c_{min} = c_{cr}$		100
Spacing	$s_{min \parallel}$	[mm]	250
	$s_{cr \parallel}$		
	$s_{min \perp}$		245
	$s_{cr \perp}$		

Drilling method

Hammer drilling with hard metal hammer drill

Table C87.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	
	$\alpha_{g,V} (s_{min \parallel})$		2
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 87

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

Table C88.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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		20x130		20x200	

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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	1,5	2,5	2,0	2,0	2,0	3,0
	d/d	2	2,0	3,0	2,0	2,0	2,0	3,0

¹⁾ The 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 C88.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod		M10		M12		M16			
Perforated sleeve FIS H K		18x130/200			22x130/200				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, d/d; (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		1,5			2,0			
	d/d		2,0			2,0			

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry	Annex C 88 Appendix 117 / 153
Performance Vertical perforated brick filled with mineral wool, Characteristic resistance under tension loading	

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

Table C89.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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			

**Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ;
Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾**

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions										
10 / 8 N/mm ²	w/w	2,5	3,0	3,0	3,0	1,5	1,5	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	1,5	1,5

¹⁾ The 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 C89.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod		M10	M12	M16
Perforated sleeve FIS H K		18x130/200		22x130/200
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (temperature range 50/80°C)²⁾				
Mean compressive strength / Min. compressive strength single brick ¹⁾				
10 / 8 N/mm ²	w/w	3,0		1,5
	d/d	3,0		1,5

¹⁾ The 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 C 123.

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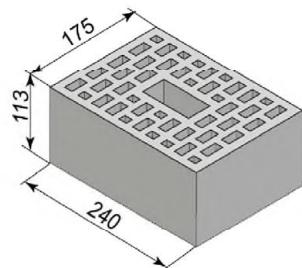
Performance

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

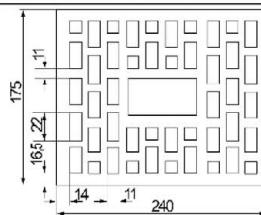
Annex C 89

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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/dm ³]	0,9		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	12,5 / 10		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also Annex B 19

Table C90.1: Installation parameters
(Pre-positioned anchorage 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	$s_{min \parallel}$ $s_{cr \parallel}$ [mm]	240
	$s_{min \perp}$	115
	$s_{cr \perp}$	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C90.2: 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	$\alpha_{g,N}(s_{min \parallel}) =$ $\alpha_{g,V}(s_{min \parallel})$ [-]						2			
	$\alpha_{g,N}(s_{min \perp}) =$ $\alpha_{g,V}(s_{min \perp})$									

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 90

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

Table C91.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		4
General installation parameters			
Edge distance	$c_{min} = c_{cr}$		100
Spacing	$s_{min \parallel}$ $s_{cr \parallel}$ $s_{min \perp}$ $s_{cr \perp}$	[mm]	240
			115

Drilling method

Hammer drilling with hard metal hammer drill

Table C91.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N}(s_{min \parallel})$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp})$ $\alpha_{g,V}(s_{min \perp})$	[-]	2

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, dimensions, installation parameters

Annex C 91

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

Table C92.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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		20x130		20x85		20x130	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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		4,0		4,5		4,5		4,0		
	d/d	4		4,5		5,0		5,0		4,0		

¹⁾ The 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 C92.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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	4,5	4,0
	d/d	5,0	4,0

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 92

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

Table C93.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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		20x130		20x85		20x130	
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0
	d/d	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0
¹⁾ The 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 C93.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, d/d; (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	7,0	6,0	8,0
	d/d	7,0	6,0	8,0

¹⁾ The 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 C 123

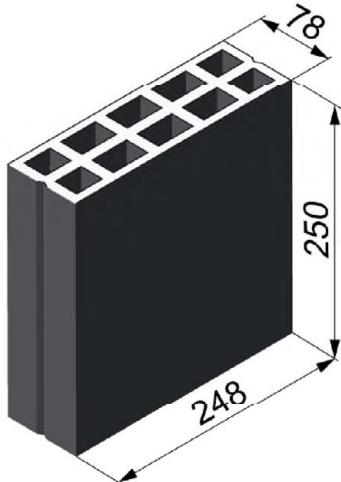
fischer injection system FIS V Plus for masonry

Performance

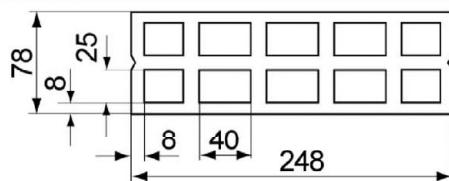
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C 93

Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



Producer		-		
Nominal dimensions [mm]		length L	width W	height H
Mean gross dry density ρ [kg/dm ³]		$\geq 0,7$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex			EN 771-1:2011+A1:2015	



Dimension see also
Annex B 19

Table C94.1: Installation parameters

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Anchor rod with perforated sleeve FIS H K		
Max. installation torque	max T_{inst} [Nm]	2
General installation parameters		
Edge distance $c_{min} = c_{cr}$	[mm]	100
$s_{min \parallel}$		75
Spacing $s_{cr \parallel}$		250
$s_{min \perp} = s_{cr \perp}$		250

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C94.2: Group factors

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,6
	$\alpha_{g,V} (s_{min \parallel})$	1,1
	$\alpha_{g,N} (s_{min \perp})$	2,0
	$\alpha_{g,V} (s_{min \perp})$	

fischer injection system FIS V Plus for masonry

Performance

Horizontal perforated brick LLz, dimensions, installation parameters

Annex C 94

Horizontal perforated brick LLz, EN 771-1:2011+A1:2015

Table C95.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod		M6	M8
Perforated sleeve FIS H K		12x50	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/mm ²	w/w	w/d	0,5
	d/d		0,6
5 / 4 N/mm ²	w/w	w/d	0,9
	d/d		1,2
8 / 6 N/mm ²	w/w	w/d	1,5
	d/d		1,5

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

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

Table C95.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M6	M8
Perforated sleeve FIS H K		12x50	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/mm ²	w/w	w/d	0,5
	d/d		
5 / 4 N/mm ²	w/w	w/d	0,9
	d/d		
8 / 6 N/mm ²	w/w	w/d	1,5
	d/d		

¹⁾ The 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 C 123.

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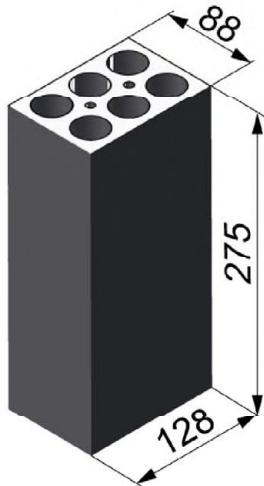
Performance

Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

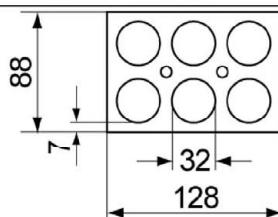
Annex C 95

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Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



Producer	e.g. Cermanica Farreny S.A.		
Nominal dimensions [mm]	length L	width W	height H
	275	88	128
Mean gross dry density ρ [kg/dm ³]	$\geq 0,8$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	2,5 / 2		
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 19

Table C96.1: Installation parameters

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Anchor rod with perforated sleeve FIS H K		
Max. installation torque T_{inst} [Nm]	2	
General installation parameters		
Edge distance $c_{min} = c_{cr}$	60	
Spacing	$s_{min \parallel}$	75
	$s_{cr \parallel}$ [mm]	275
	$s_{min \perp}$	75
	$s_{cr \perp}$	130

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C96.2: Group factors

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,3
	$\alpha_{g,V} (s_{min \parallel})$	1,5
	$\alpha_{g,N} (s_{min \perp})$	1,3
	$\alpha_{g,V} (s_{min \perp})$	1,5

fischer injection system FIS V Plus for masonry

Performance

Horizontal perforated brick LLz, dimensions, installation parameters

Annex C 96

Horizontal perforated brick LLz, EN 771-1:2011+A1:2015

Table C97.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾		
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
2,5 / 2 N/mm ²	w/w w/d d/d	1,5

¹⁾ The 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 C97.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

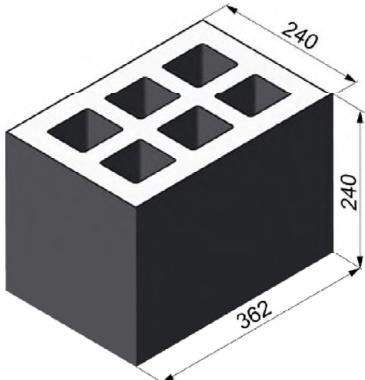
Anchor rod	M6	M8
Perforated sleeve FIS H K	12x50	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)		
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
2,5 / 2 N/mm ²	w/w w/d d/d	1,2

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

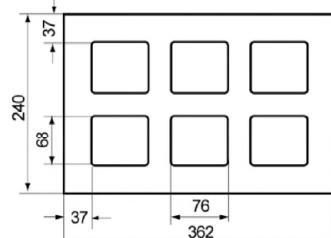
Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry	Annex C 97
Performance Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading	

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]	$\geq 1,0$		
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 B 19

Table C98.1: Installation parameters
(Pre-positioned anchorage 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-		15x85		-	-	-	-	

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	$s_{min \parallel}$ [mm]	100
	$s_{cr \parallel}$	362
	$s_{min \perp} = s_{cr \perp}$	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C98.2: 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-		15x85		-	-	-	-	
Group factors	$\alpha_{g,N} (s_{min \parallel})$															
	$\alpha_{g,V} (s_{min \parallel})$															
	$\alpha_{g,N} (s_{min \perp})$															
	$\alpha_{g,V} (s_{min \perp})$															

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 98

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

Table C99.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $C_{min} = C_{cr}$		60	
Spacing $s_{min \parallel}$	[mm]	100	
$s_{cr \parallel}$		362	
$s_{min \perp} = s_{cr \perp}$		240	

Drilling method

Hammer drilling with hard metal hammer drill

Table C99.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
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 V Plus for masonry

Performance

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

Annex C 99

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

Table C100.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾

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

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

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

Table C100.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/mm ²	w/w	w/d	1,5
	d/d		1,5
5 / 4 N/mm ²	w/w	w/d	3,0
	d/d		3,0

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 100

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

Table C101.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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	-			-	-	-
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

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

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

Table C101.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16	
Perforated sleeve FIS H K	18x130/200		22x130/200	
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)				
Mean compressive strength / Min. compressive strength single brick ¹⁾				
2,5 / 2 N/mm ²	w/w	w/d		0,9
	d/d			
5 / 4 N/mm ²	w/w	w/d		2,0
	d/d			

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

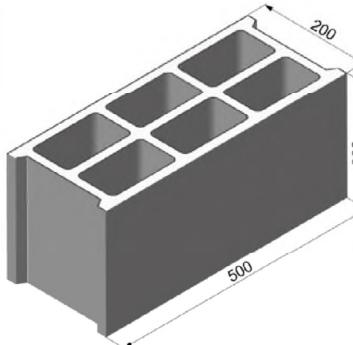
Performance

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

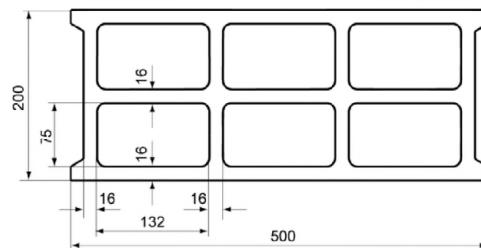
Annex C 101

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



Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	500	200	200
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	$\geq 1,0$	2,5 / 2 or 5 / 4 or 8 / 6	
Standard or annex	EN 771-1:2011+A1:2015		



Dimension see also
Annex B 19

Table C102.1: Installation parameters

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6	M8	-	-	-	-	M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130	18x130/200			20x85			

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

Max. installation torque	max T_{inst} [Nm]	1	2
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General installation parameters

Edge distance $c_{min} = c_{cr}$	[mm]	100
Spacing $s_{min \parallel} = s_{cr \parallel}$		500
Spacing $s_{min \perp} = s_{cr \perp}$		200

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C102.2: Group factors

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6	M8	-	-	-	-	M10	M12	-	
					11x85						15x85			
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130	18x130/200			20x85			
Group factors	$\alpha_{g,N} (s_{min \parallel})$	[-]	2											
	$\alpha_{g,V} (s_{min \parallel})$													
	$\alpha_{g,N} (s_{min \perp})$													
	$\alpha_{g,V} (s_{min \perp})$													

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Performance

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

Annex C 102

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

Table C103.1: 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	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-			M6	M8					M10	M12		
					11x85						15x85			
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130	18x130/200			20x85			
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	use conditions													
2,5 / 2 N/mm ²	w/w	w/d									0,4			
	d/d										0,5			
5 / 4 N/mm ²	w/w	w/d									0,9			
	d/d										0,9			
8 / 6 N/mm ²	w/w	w/d									1,2			
	d/d										1,5			

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

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

Table C103.2: 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	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-			M6	M8					M10	M12		
					11x85						15x85			
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130	18x130/200			20x85			
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
2,5 / 2 N/mm ²	w/w	w/d									0,9			
	d/d													
5 / 4 N/mm ²	w/w	w/d									1,5			
	d/d													
8 / 6 N/mm ²	w/w	w/d									2,5			
	d/d													

¹⁾ The 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 C 123.

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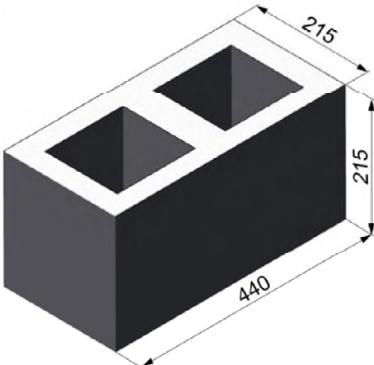
Performance

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

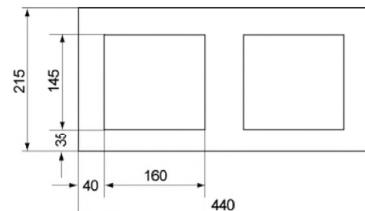
Annex C 103

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



Producer	e.g. Roadstone wood		
Nominal dimensions [mm]			length L
	440	215	height H
Mean gross dry density ρ [kg/dm ³]	$\geq 1,2$		
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10		
Standard or annex	EN 771-3:2011+A1:2015		



Dimension see also
Annex B 20

Table C104.1: Installation parameters
(Pre-positioned anchorage 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			
	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	$c_{min} = c_{cr}$	110
Spacing	$s_{min \parallel}$	100
	$s_{cr \parallel}$ [mm]	440
	$s_{min \perp}$	100
	$s_{cr \perp}$	215

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C104.2: 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			
	12x50	12x85			16x85		16x130			20x85		20x130		
Group factors	$\alpha_{g,N} (s_{min \parallel})$									1,4				
	$\alpha_{g,V} (s_{min \parallel})$									2,0				
	$\alpha_{g,N} (s_{min \perp})$									1,4				
	$\alpha_{g,V} (s_{min \perp})$									1,2				

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Performance

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

Annex C 104

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

Table C105.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2
General installation parameters			
Edge distance $C_{min} = C_{cr}$		110	
Spacing	$s_{min \parallel}$	100	
	$s_{cr \parallel}$	440	
	$s_{min \perp}$	100	
	$s_{cr \perp}$	215	

Drilling method

Hammer drilling with hard metal hammer drill

Table C105.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,4	
	$\alpha_{g,V} (s_{min \parallel})$	2,0	
	$\alpha_{g,N} (s_{min \perp})$	1,4	
	$\alpha_{g,V} (s_{min \perp})$	1,2	

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Performance

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

Annex C 105

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

Table C106.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	M10	M12	-	M12	M16
Internal threaded anchor FIS E	-	-			M6	M8					M10	M12		
					11x85						15x85			
Perforated sleeve FIS H K	12x50	12x85			16x85		16x130	18x130/200		20x85				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w	w/d			0,9			1,2			2,0			
	d/d				1,2			1,5			2,0			
8 / 6 N/mm ²	w/w	w/d			1,5			2,0			3,0			
	d/d				1,5			2,0			3,0			
10 / 8 N/mm ²	w/w	w/d			2,0			2,5			3,5			
	d/d				2,0			3,0			4,0			
12,5 / 10 N/mm ²	w/w	w/d			2,5			3,0			4,5			
	d/d				3,0			3,5			5,0			

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

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

Table C106.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	1,2
	d/d		1,5
8 / 6 N/mm ²	w/w	w/d	2,0
	d/d		2,0
10 / 8 N/mm ²	w/w	w/d	2,5
	d/d		3,0
12,5 / 10 N/mm ²	w/w	w/d	3,0
	d/d		3,5

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

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

Factor for job site tests and displacements see annex C 123.

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Performance

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

Annex C 106

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

Table C107.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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		16x85		16x130		20x85		20x130				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions													
5 / 4 N/mm ²	w/w w/d	0,75	1,20	0,75	1,20	0,75								
	d/d						1,20							
8 / 6 N/mm ²	w/w w/d	1,20	2,00	1,20	2,00	1,20								
	d/d						2,00							
10 / 8 N/mm ²	w/w w/d	1,50	2,50	1,50	2,50	1,50								
	d/d						2,50							
12,5 / 10 N/mm ²	w/w w/d	2,00	3,00	2,00	3,00	2,00								
	d/d						3,00							

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

Table C107.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w w/d		
	d/d	1,2	
8 / 6 N/mm ²	w/w w/d		
	d/d	2,0	
10 / 8 N/mm ²	w/w w/d		
	d/d	2,5	
12,5 / 10 N/mm ²	w/w w/d		
	d/d	3,0	

¹⁾ The 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 C 123.

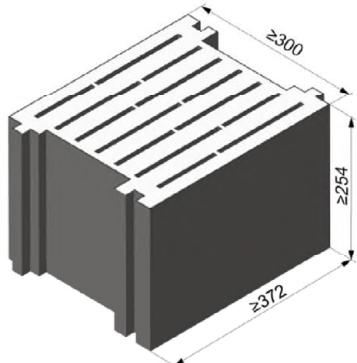
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Performance

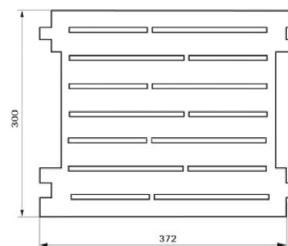
Light-weight concrete hollow block Hbl, Characteristic resistance under shear loading

Annex C 107

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	e.g. Sepa		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	≥ 372	≥ 300	≥ 254
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]		2,5 / 2	
Standard or annex	EN 771-3:2011+A1:2015		



Dimension see also
Annex B 20

Table C108.1: Installation parameters

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
Anchor rod with perforated sleeve FIS H K									
Max. installation torque	max T_{inst} [Nm]							4	
Edge distance	$c_{min} = c_{cr}$						130		
Spacing	$s_{min \parallel} = s_{cr \parallel}$ [mm]						370		
	$s_{min \perp} = s_{cr \perp}$						250		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C108.2: Group factors

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
Group factors	$\alpha_{g,N} (s_{min \parallel})$								
	$\alpha_{g,V} (s_{min \parallel})$								
	$\alpha_{g,N} (s_{min \perp})$	[-]						2	
	$\alpha_{g,V} (s_{min \perp})$								

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Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters

Annex C 108

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C109.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾									
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
2,5 / 2 N/mm ²	w/w	w/d	2,0			2,5		3,0	
	d/d		2,0			3,0		4,0	

¹⁾ The 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 C109.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M8	M10	M10	M12	M12	M16	M16	M12	M16
Perforated sleeve FIS H K	16x130		18x130/200		20x130		22x130/200		20x200
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)									
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
2,5 / 2 N/mm ²	w/w	w/d	4,5					6,5	
	d/d								

¹⁾ The 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 C 123.

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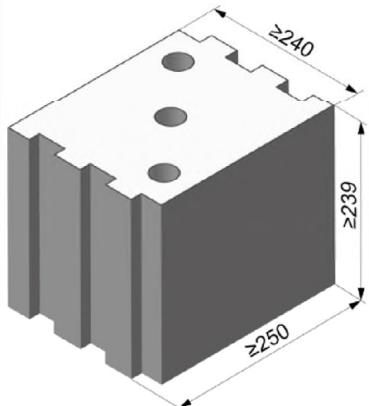
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

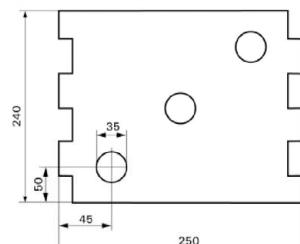
Annex C 109

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	KLB		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	≥ 250	≥ 240	≥ 239
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	5 / 4 or 8 / 6 or 10 / 8		
Standard or annex	EN 771-3:2011+A1:2015		



Dimension see also
Annex B 20

Table C110.1: Installation parameters
(Pre-positioned anchorage 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-		15x85		-	-	-	-	-

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

Max. installation torque	max T_{inst} [Nm]	4
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General installation parameters

Edge distance $c_{min} = c_{cr}$	[mm]	130
Spacing $s_{min \parallel} = s_{cr \parallel}$	[mm]	250
$s_{min \perp} = s_{cr \perp}$		250

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C110.2: 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					
Perforated sleeve FIS H K	12x50	12x85			11x85		-	-		15x85		-	-	-	-	-
Group factors	$\alpha_{g,N} (s_{min \parallel})$	$\alpha_{g,V} (s_{min \parallel})$	$\alpha_{g,N} (s_{min \perp})$	$\alpha_{g,V} (s_{min \perp})$	[$-$]											

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters

Annex C 110

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C111.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Anchor rod with perforated sleeve FIS H K			
Max. installation torque	max T_{inst} [Nm]		2,0
General installation parameters			
Edge distance $c_{min} = c_{cr}$		130	
Spacing $s_{min \parallel} = s_{cr \parallel}$	[mm]	250	
		250	
Drilling method			
Hammer drilling with hard metal hammer drill			

Table C111.2: Group factors

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200		22x130/200
Group factors	$\alpha_{g,N}(s_{min \parallel})$ $\alpha_{g,V}(s_{min \parallel})$ $\alpha_{g,N}(s_{min \perp})$ $\alpha_{g,V}(s_{min \perp})$	[-]	2,0

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters

Annex C 111

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C112.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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	-	-	-	-	
										15x85						
			11x85													
Perforated sleeve FIS H K	12x50	12x85		16x85		16x130		20x85		20x130		20x200				

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions									
5 / 4 N/mm ²	w/w	w/d	1,2	2,0	2,5					3,0
	d/d		2,0	3,5	4,0					5,0
8 / 6 N/mm ²	w/w	w/d	1,5	3,0	4,0					5,0
	d/d		3,0	5,0	6,5					7,5
10 / 8 N/mm ²	w/w	w/d	2,0	4,0	5,0					6,5
	d/d		4,0	7,0	8,5					9,0

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

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

Table C112.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

Anchor rod	M10	M12	M16
Perforated sleeve FIS H K	18x130/200	22x130/200	
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	2,5
	d/d		4,0
8 / 6 N/mm ²	w/w	w/d	4,0
	d/d		6,5
10 / 8 N/mm ²	w/w	w/d	5,0
	d/d		8,5

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

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

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, Characteristic resistance under tension loading

Annex C 112

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C113.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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			
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)																	
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions																
5 / 4 N/mm ²	w/w	w/d	2,0	3,0	2,0	3,0	2,0		3,5					4,5			
	d/d																
8 / 6 N/mm ²	w/w	w/d	3,0	4,5	3,0	4,5	3,0		5,5					6,5			
	d/d																
10 / 8 N/mm ²	w/w	w/d	4,0	6,0	4,0	6,0	4,0		7,0					8,5			
	d/d																

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

Table C113.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

Anchor rod		M10	M12	M16		
Perforated sleeve FIS H K		18x130/200		22x130/200		
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)						
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions					
5 / 4 N/mm ²	w/w	w/d	3,5			
	d/d					
8 / 6 N/mm ²	w/w	w/d	5,5			
	d/d					
10 / 8 N/mm ²	w/w	w/d	7,0			
	d/d					

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

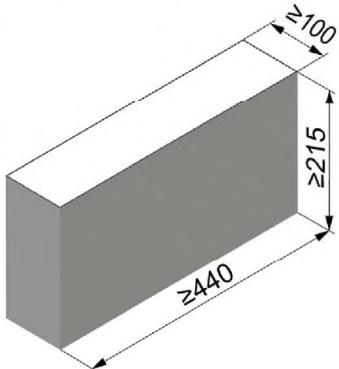
Performance

Light-weight concrete solid block Vbl, Characteristic resistance under shear loading

Annex C 113

Appendix 142 / 153

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	Roadstone wood		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	≥ 440	≥ 100	≥ 215
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	≥ 2,0	5 / 4 or 8 / 6 or 10 / 8 or 12,5 / 10	
Standard or annex	EN 771-3:2011+A1:2015		

Table C114.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16
Anchor rod without perforated sleeve					
Effective anchorage depth h_{ef} [mm]	50	70	50	70	50
Max. installation torque $max\ T_{inst}$ [Nm]	4			10	
General installation parameters					
Edge distance $c_{min} = c_{cr}$			100		
Spacing	$s_{min\ }$		75		
	$s_{cr\ }$	[mm]	3x h_{ef}		
	$s_{min\ \perp}$		75		
	$s_{cr\ \perp}$		3x h_{ef}		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C114.2: Group factors

Anchor rod	M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N}(s_{min\ })$	[-]	1,6		
	$\alpha_{g,V}(s_{min\ })$		1,3		
	$\alpha_{g,N}(s_{min\ \perp})$		1,4		
	$\alpha_{g,V}(s_{min\ \perp})$		1,3		

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters

Annex C 114

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C115.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M6	M8	M10	M12	M16
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾					
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]			
5 / 4 N/mm²	w/w	1,2	≥ 50		
	w/d	2,0	1,2		
8 / 6 N/mm²	w/w	1,5	2,0		
	w/d	3,0	3,5		
10 / 8 N/mm²	w/w	2,0	2,5		
	w/d	4,0	4,5		
12,5 / 10 N/mm²	w/w	3,0	3,5		
	w/d	5,0	5,5		

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

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

Table C115.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod	M6	M8	M10	M12	M16
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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]			
5 / 4 N/mm²	w/w	1,2	≥ 50	1,5	1,5
	w/d	1,5		1,5	1,5
8 / 6 N/mm²	w/w	2,0	2,0	2,5	2,5
	w/d	2,0	2,5	2,5	2,5
10 / 8 N/mm²	w/w	2,5	2,5	3,0	3,0
	w/d	2,5	3,0	3,0	3,5
12,5 / 10 N/mm²	w/w	3,0	3,5	4,0	4,0
	w/d	3,0	3,5	4,0	4,5

¹⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

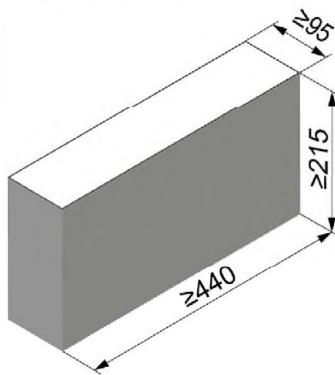
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C 115

Appendix 144 / 153

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	Tramac		
Nominal dimensions [mm]	length L	width W	height H
Mean gross dry density ρ [kg/dm ³]	≥ 440	≥ 95	≥ 215
Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	7,5 / 6 or 10 / 8 or 12,5 / 10 or 15 / 12		
Standard or annex	EN 771-3:2011+A1:2015		

Table C116.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16
Anchor rod without perforated sleeve					
Effective anchorage depth h_{ef} [mm]	50	70	50	70	50
Max. installation torque $max\ T_{inst}$ [Nm]	4			10	
General installation parameters					
Edge distance $c_{min} = c_{cr}$			60		
Spacing	$s_{min\ }$		75		
	$s_{cr\ }$	[mm]	3x h_{ef}		
	$s_{min\ \perp}$		75		
	$s_{cr\ \perp}$		3x h_{ef}		

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C116.2: Group factors

Anchor rod	M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N} (s_{min\ })$	[-]	1,9		
	$\alpha_{g,V} (s_{min\ })$		1,4		
	$\alpha_{g,N} (s_{min\ \perp})$		1,9		
	$\alpha_{g,V} (s_{min\ \perp})$		1,4		

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters

Annex C 116

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C117.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod			M6	M8		M10		M12		M16									
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾																			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h_{ef} [mm]																
7,5 / 6 N/mm²	w/w	w/d	50	70	50	70	50	70	50	70	50	70							
	d/d		2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5							
10 / 8 N/mm²	w/w	w/d	2,0	2,5	2,0	2,5	2,0	3,0	2,0	3,0	2,0	3,0							
	d/d		3,5	4,5	3,5	4,5	3,5	5,0	3,5	5,0	3,5	5,0							
12,5 / 10 N/mm²	w/w	w/d	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5	2,5	3,5							
	d/d		4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0	4,5	6,0							
15 / 12 N/mm²	w/w	w/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	4,5	3,0	4,5							
	d/d		5,0	7,0	5,0	7,0	5,0	7,5	5,0	7,5	5,0	7,5							

¹⁾ The 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 C117.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod			M6	M8	M10	M12	M16
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (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]				
7,5 / 6 N/mm²	w/w	w/d	2,0	2,0	2,0	1,5	1,5
	d/d						
10 / 8 N/mm²	w/w	w/d	2,5	2,5	3,0	2,5	2,5
	d/d						
12,5 / 10 N/mm²	w/w	w/d	3,5	3,5	4,0	3,0	3,0
	d/d						
15 / 12 N/mm²	w/w	w/d	4,0	4,0	4,5	3,5	3,5
	d/d						

¹⁾ The 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 C 123.

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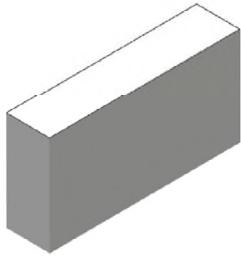
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C 117

Appendix 146 / 153

Autoclaved aerated concrete (cylindrical drill hole), 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 C118.1: Installation parameters

Anchor rod	M6	M8	M10	M12	M16	-	-		
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8	M10	M12
						11x85	15x85	15x85	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
Spacing	$s_{cr \parallel} = s_{min \parallel}$	250
	$h_{ef} = 200\text{mm}$	80
	$s_{min \parallel}$ [mm]	$3 \times h_{ef}$
	$h_{ef} = 200\text{mm}$	250
	$s_{cr \parallel}$	80
	$s_{cr \perp} = s_{min \perp}$	$3 \times h_{ef}$
	$h_{ef} = 200\text{mm}$	80

Drilling method

Hammer drilling with hard metal hammer drill

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 118

Table C119.1: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 2 \text{ N/mm}^2$)

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						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				
	$h_{ef}=200 \alpha_{g,N} (s_{min} \perp)$		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				

¹⁾ No performance assessed.

Table C119.2: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 4 \text{ N/mm}^2$)

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						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				
	$h_{ef}=200 \alpha_{g,N} (s_{min} \perp)$		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				

¹⁾ No performance assessed.

Table C119.3: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 6 \text{ N/mm}^2$)

Anchor rod	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6	M8
						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				
	$h_{ef}=200 \alpha_{g,N} (s_{min} \perp)$		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				

¹⁾ No performance assessed.

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (cylindrical drill hole), Group factors

Annex C 119

Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015

Table C120.1: 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				
Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)³⁾											
Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm ²	w/w	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	1,5	1,5
	d/d	1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0
5 / 4 N/mm ²	w/w	1,2	- ¹⁾	2,0	1,5	2,5	3,5	2,5	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	2,0
8 / 6 N/mm ²	w/w	1,5	- ¹⁾	3,0	2,5	4,5	5,0	4,5	7,0	3,0	3,5
	d/d	1,5	- ¹⁾	3,5	4,0	5,0	7,0	5,0	9,0	3,0	2,5

¹⁾ No performance assessed.

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

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

Table C120.2: 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				
Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)											
Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm ²	w/w	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,5
	d/d										
5 / 4 N/mm ²	w/w	2,0	- ¹⁾	2,5	2,0	2,0	2,5	2,0	2,0	2,0	2,5
	d/d										
8 / 6 N/mm ²	w/w	2,5	- ¹⁾	3,0	2,5	3,0	3,0	3,5	4,0	4,5	2,5
	d/d										3,5

¹⁾ No performance assessed.

²⁾ The 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 C 123.

fischer injection system FIS V Plus for masonry

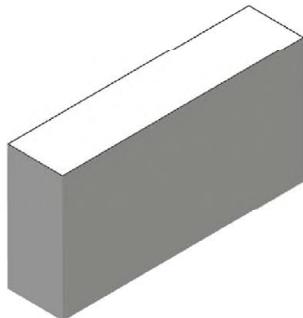
Performance

Autoclaved aerated concrete (cylindrical drill hole),
Characteristic resistance under tension and shear loading

Annex C 120

Appendix 149 / 153

**Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
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 C121.1: Installation parameters

Anchor rod	M8	M10		M12		-	
Internal threaded anchor FIS E	-	-		-	-	-	
Anchor rod and internal threaded anchor FIS E without perforated sleeve							
Effective anchorage depth h_{ef} [mm]	75	95	75	95	75	95	85
Max. installation torque $\max T_{\text{inst}}$ [Nm]				2			
General installation parameters							
Edge distance $c_{\min} = c_{\text{cr}}$ [mm]	120	150	120	150	120	150	150
Spacing $s_{\text{cr}} \parallel = s_{\min} \parallel$ [mm]	240	300	240	300	240	300	300
$s_{\text{cr}} \perp = s_{\min} \perp$	240	250	240	250	240	250	250

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C121.2: Group factors

Anchor rod	M8	M10		M12		-	
Internal threaded anchor FIS E	-	-		-	-	-	
Group factors	$\alpha_{g,N} (s_{\min} \parallel)$ $\alpha_{g,V} (s_{\min} \parallel)$ $\alpha_{g,N} (s_{\min} \perp)$ $\alpha_{g,V} (s_{\min} \perp)$	[\cdot]			2		

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
dimensions, installation parameters

Annex C 121

**Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
EN 771-4:2011+A1:2015**

Table C122.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Anchor rod	M8		M10		M12		-
Internal threaded anchor FIS E	-	-	-	-	-	-	M6 M8 11x85
Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾							
Mean compressive strength / Min. compressive strength single brick ¹⁾		Use conditions	Effective anchorage depth h_{ef} [mm]				
2,5 / 2 N/mm ²	w/w	w/d	75	95	75	95	75
	d/d		2,0	2,5	2,0	2,5	2,0
5 / 4 N/mm ²	w/w	w/d	3,0	3,5	3,0	3,5	3,0
	d/d		3,0	3,5	3,0	3,5	3,0
8 / 6 N/mm ²	w/w	w/d	3,5	4,0	3,5	4,0	3,5
	d/d		4,0	4,5	4,0	4,5	4,0

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

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

Table C122.2: Characteristic resistance under shear loading

Anchor rod	M8		M10		M12		-
Internal threaded anchor FIS E	-	-	-	-	-	-	M6 M8 11x85
Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (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]				
2,5 / 2 N/mm ²	w/w	w/d	75	95	75	95	75
	d/d						2,5
5 / 4 N/mm ²	w/w	w/d					4,5
	d/d						
8 / 6 N/mm ²	w/w	w/d					6,0
	d/d						

¹⁾ The 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 C 123.

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Performance

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
Characteristic resistance under tension and shear loading

Annex C 122

β -factors for job site tests; displacements

Table C123.1: 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				
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
Autoclaved aerated concrete conical drill hole	all sizes	0,66	0,59	0,73	0,66

Table C123.2: Displacements

Material	N [kN]	δN_0 [mm]	δN_∞ [mm]	V [kN]	δV_0 [mm]	δV_∞ [mm]
solid units and autoclaved aerated concrete $h_{ef}=100\text{mm}$	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF annex C 4 - C 7	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,23	1,85
solid brick KS NF annex C 14 / C 15	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,20	0,40	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	0,91	1,37
AAC $h_{ef}=200\text{ mm}$ annex C 118 - C 120	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	1,25	1,88
brick Annex C 101 / C 102	$\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$	6,44	9,66

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

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Performance

β -factors for job site tests; displacements

Annex C 123

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Fire resistance under tension and shear loading

Table C124.1: Fire resistance under tension and shear loading

Brick	Solid brick Mz,NF, acc. to Annex C 4	Solid calcium silicate brick KS, NF, acc. to Annex C 14	Perforated calcium silicate brick KSL, acc to Annex C 24	Vertical perforated brick HLz, acc to Annex C 30	Vertical perforated brick HLz, acc to Annex C 28
Mean compressive strength / Min. compressive strength single brick ³⁾	$\geq 15 / \geq 12$	$\geq 15 / \geq 12$	$\geq 10 / \geq 8$	$\geq 7,5 / \geq 6$	$\geq 5 / \geq 4$
Size	M8 M10 M12	M8 M10 M12	M8 M10 M12	M8 M10 M12	M8 M10 M12
Perforated Sleeve	-	-	16x130	20x130	16x85
Perforated Sleeve for bridging of unbearing layer	-	-	-	20x 200	16x130
h_{ef} [mm]	≥ 80	≥ 50	≥ 130	≥ 130	≥ 85
Characteristic resistance to failure under tension loading					

$N_{Rk,s,fi} = N_{Rk,p,fi} = N_{Rk,b,fi}^{(2)}$	R30	[kN]	0,82	0,32	1,07	1,09	1,10	0,28	0,30	0,35	0,31
	R60		0,73	0,31	0,66	0,61	0,56	0,19	0,22	0,22	0,22
	R90		0,64	0,29	0,25	0,13	- ¹⁾	0,10	0,10	0,10	0,13
	R120		0,59	0,28	- ¹⁾						

Characteristic resistance to failure under shear loading ²⁾

without lever arm											
$V_{Rk,s,fi}$	R30	[kN]	0,82	0,32	1,07	1,09	1,10	0,28	0,30	0,35	0,31
	R60		0,73	0,31	0,66	0,61	0,56	0,19	0,22	0,22	0,22
	R90		0,64	0,29	0,25	0,13	- ¹⁾	0,10	0,10	0,10	0,13
	R120		0,59	0,28	- ¹⁾						

with lever arm											
$M_{Rk,s,fi}^0$	R30	[Nm]	0,83	1,05	1,27	0,33	0,42	0,50	1,09	1,40	1,71
	R60		0,74	0,93	1,13	0,31	0,39	0,47	0,67	0,78	0,86
	R90		0,65	0,82	0,99	0,29	0,37	0,44	0,26	0,17	- ¹⁾
	R120		0,60	0,76	0,92	0,28	0,35	0,43	- ¹⁾	- ¹⁾	- ¹⁾

General installation Parameters											
Edge distance and spacing	$c_{cr,fi}$	[mm]	100	60	80	80	100				
	$s_{cr,fi}$		320	200	520	340	520				

¹⁾ No performance assessed.

²⁾ $V_{Rk,b,fi} = N_{Rk,b,fi}$.

³⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

In absence of national regulations, the recommended partial factor $\gamma_{M,fi} = 1,0$.

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Performance

Fire resistance to failure under tension and shear loading; Fire resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Annex C 124

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