

DÉCLARATION DES PERFORMANCES

DoP 0381

pour le système d'injection fischer FIS V Plus (cheville à scellement pour utilisation dans la maçonnerie)

FR

1. Code d'identification unique du type de produit: **DoP 0381**
2. Usage(s) prévu(s): **Fixation dans la maçonnerie, Voir annexes, en particulier les annexes B1 - B22.**
3. Fabricant: **fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Allemagne**
4. Mandataire: **-**
5. Système(s) d'évaluation et de vérification de la constance des performances: **1**
6. Document d'évaluation européen: **EAD 330076-01-0604-v01, Edition 03/2024**
Evaluation Technique Européenne: **ETA-20/0729; 2025-02-03**
Organisme d'évaluation technique: **DIBt- Deutsches Institut für Bautechnik**
Organisme(s) notifié(s): **-**
7. Performance(s) déclarée(s):
Résistance mécanique et stabilité (BWR 1)
Résistance caractéristique sous charge statique et quasi statique:
 - 1 Résistance caractéristique à la rupture de l'acier d'un ancrage isolé sous charge de traction: Voir annexes, en particulier les annexes C1, C3
 - 2 Résistance caractéristique à la rupture de l'acier d'un ancrage isolé sous charge de cisaillement avec et sans bras de levier: Voir annexes, en particulier les annexes C2, C3
 - 3 Résistance caractéristique à la rupture par extraction glissement ou rupture de la maçonnerie d'un ancrage isolé sous charge de traction, facteur de réduction: Voir annexes, en particulier les annexes C5, C7, C9, C11, C13, C15, C17, C19, C22, C26, C29, C31, C34, C38, C42, C46, C50, C54, C58, C62, C65, C67, C70, C74, C78, C82, C85, C88, C92, C95, C97, C100, C103, C106, C109, C112, C115, C117, C120, C122, C123
 - 4 Résistance caractéristique à la rupture locale de la brique ou à la rupture en bord de la brique d'un ancrage isolé sous charge de cisaillement: Voir annexes, en particulier les annexes C5, C7, C9, C11, C13, C15, C17, C19, 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
 - 5 Résistance caractéristique à la rupture de la brique d'un groupe de chevilles sous charge de traction: Voir annexes, en particulier les annexes 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 Résistance caractéristique à la rupture locale de la brique ou à la rupture en bord de la brique d'un groupe de chevilles sous charge de cisaillement: Voir annexes, en particulier les annexes 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 Distances au bord, entraxes, épaisseur du support: Voir annexes, en particulier les annexes 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, C118, C121
 - 8 Déplacements sous charge de traction et de cisaillement: voir annexes, en particulier annexe C123
 - 9 Couple de serrage maximum: Voir annexes, en particulier les annexes 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, C118, C121
Résistance caractéristique et déplacements sous charge sismique:
 - 10 Résistance à la charge de traction: NPD
 - 11 Résistance à la charge de cisaillement: NPD
 - 12 Facteur espace annulaire: NPD
Sécurité en cas d'incendie (BWR 2)
 - 13 Réaction au feu: Classe (A1)
 - 14 Résistance au feu sous charge de traction et de cisaillement avec et sans bras de levier, distances au bord et entraxes minimums: voir annexes, en particulier les annexes C124-C127
Hygiène, santé et environnement (BWR 3)
 - 15 Contenu, émission et/ou rejet de substances dangereuses: NPD
8. Documentation technique appropriée et/ou documentation technique spécifique: **-**

Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.

Signé pour le fabricant et en son nom par:



Dr. Ronald Mihala, Direction du développement et de la gestion de la production
Tumlingen, 2025-02-17



Dieter Pfaff, Chef de la Fédération Internationale de Production et Gestion de la Qualité

Cette DoP a été préparée en plusieurs langues. En cas de différend relatif à l'interprétation, la version anglaise prévaudra.

L'annexe comprend des informations volontaires et complémentaires en langue anglaise dépassant les exigences légales (spécifiées de manière neutre).

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Guide de traduction des caractéristiques essentielles et des paramètres de performance pour les annexes

Mechanical resistance and stability (BWR 1)	
Résistance mécanique et stabilité (BWR 1)	
Characteristic resistance for static and quasi-static loading:	
Résistance caractéristique sous charge statique et quasi statique:	
1 Characteristic resistance to steel failure of a single anchor under tension loading:	$N_{Rk,s}$ [kN]
2 Characteristic resistance to steel failure of a single anchor under shear loading with and without level arm:	$V_{Rk,s}$ [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:	$N_{Rk,p}$, $N_{Rk,b}$ [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:	$V_{Rk,b}$, $V_{Rk,c,II}$, $V_{Rk,c,I}$ [kN]
5 Characteristic resistance to brick breakout failure of an anchor group under tension loading:	N_{Rk}^0 [kN], $\alpha_{g,N}$ [-]
6 Characteristic resistance to local brick failure or brick breakout failure of an anchor group under shear loading:	$V_{Rk,b}^0$, $V_{Rk,c,II}^0$, $V_{Rk,c,I}^0$ [kN]; $\alpha_{g,V,II}$, $\alpha_{g,V,I}$ [-]
7 Edge distances, spacing, member thickness:	c_{cr} , s_{cr} , c_{min} , $s_{min,II}$, $s_{min,I}$, h_{min} [mm]
8 Displacements under tension and shear loading:	δ_{N0} , $\delta_{N\infty}$, δ_{V0} , $\delta_{V\infty}$ [mm]
9 Maximum installation torque:	$\max. T_{inst}$ [Nm]
Couple de serrage maximum:	
Characteristic resistance and displacements for seismic loading:	
Résistance caractéristique et déplacements sous charge sismique:	
10 Resistance to tension load, displacements:	$N_{Rk,s,eq}$, $N_{Rk,eq}$ [kN], $\alpha_{N,seis}$ [-]; $\delta_{N,eq}$ [mm]
11 Resistance to shear load, displacements:	$V_{Rk,s,eq}$, $V_{Rk,b,eq}$ [kN], $\alpha_{V,seis}$ [-]; $\delta_{V,eq}$ [mm]
12 Factor annular gap:	α_{gap} [-]
Facteur espace annulaire:	
Safety in case of fire (BWR 2)	
Sécurité en cas d'incendie (BWR 2)	
13 Reaction to fire:	-
14 Resistance to fire under tension and shear loading with and without level arm, minimum edge distances and spacing:	$N_{Rk,s,fi}$, $N_{Rk,p,fi}$ [kN], $N_{Rk,b,fi}$, $N_{Rk,c,fi}^0$, $V_{Rk,s,fi}$ [kN], $M_{Rk,s}^0$ [Nm], $c_{cr,fi}$, $s_{cr,fi}$ [mm]
Résistance au feu sous charge de traction et de cisaillement avec et sans bras de levier, distances au bord et entraxes minimums:	
Hygiene, health and the environment (BWR 3)	
Hygiène, santé et environnement (BWR 3)	
15 Content, emission and/or release of dangerous substances:	-
Contenu, émission et/ou rejet de substances dangereuses:	

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 B4 to B7, B21, B22, C1 to C123
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 C124 to C127

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

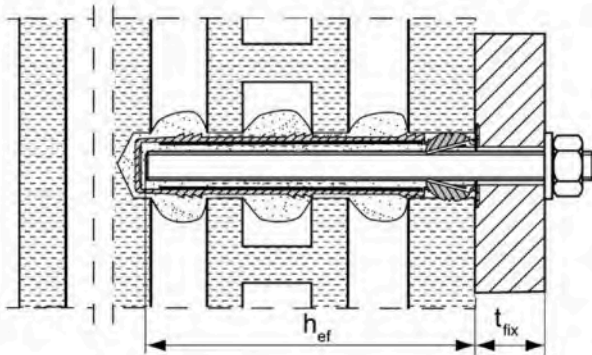
In accordance with the European Assessment Document EAD 330076-01-0604-v01 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

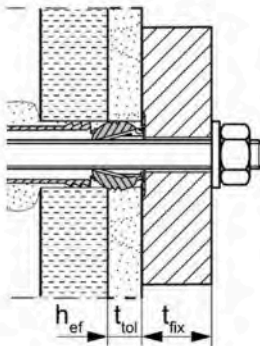
Installation conditions part 1

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

Pre-positioned installation:



Installation with render bridge



Size of the perforated sleeve:

FIS H 12x50 K

FIS H 16x85 K

FIS H 20x85 K

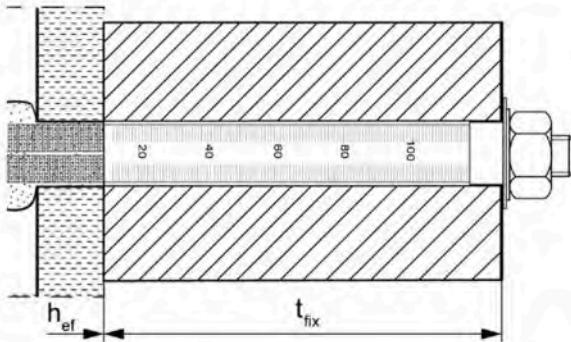
FIS H 20x200 K

FIS H 12x85 K

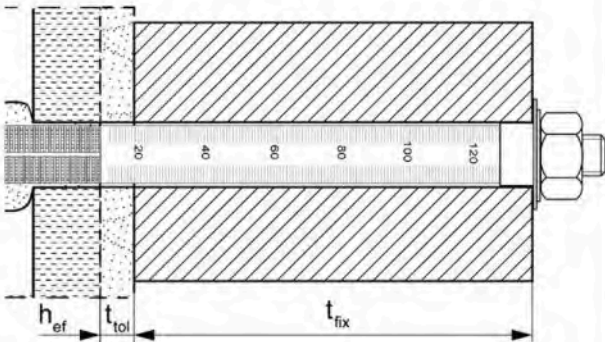
FIS H 16x130 K

FIS H 20x130 K

Push through installation:



Installation with render bridge



Size of the perforated sleeve:

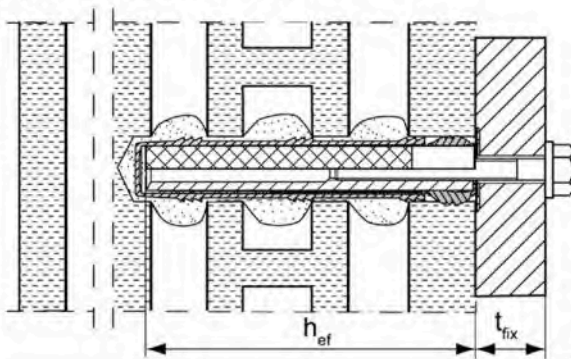
FIS H 18x130/200 K

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 installation:



Figures not to scale

h_{ef} = effective anchorage depth

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

t_{fix} = thickness of fixture

fischer injection system FIS V Plus for masonry

Product description

Installation conditions part 1,

Anchor rods and internal threaded anchor with perforated sleeve

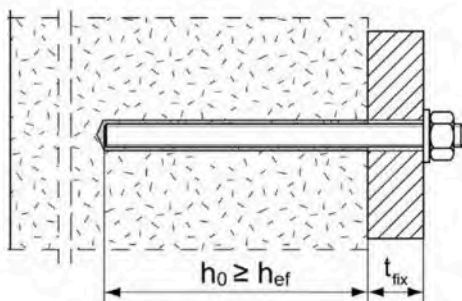
Annex A1

Appendix 2 / 155

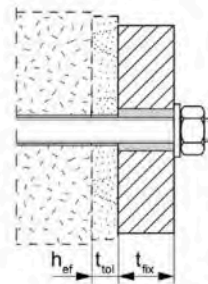
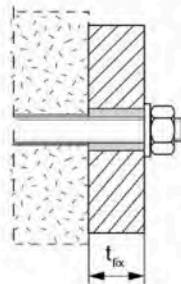
Installation conditions part 2

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

Pre-positioned installation:



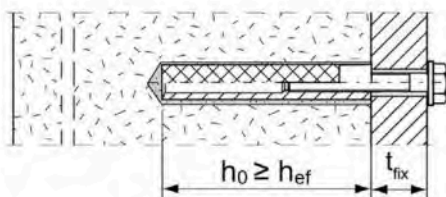
Push through installation: Annular gap filled with mortar



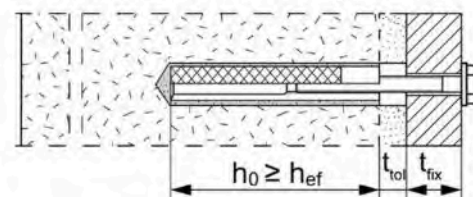
Installation with
render bridge

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

Pre-positioned installation:



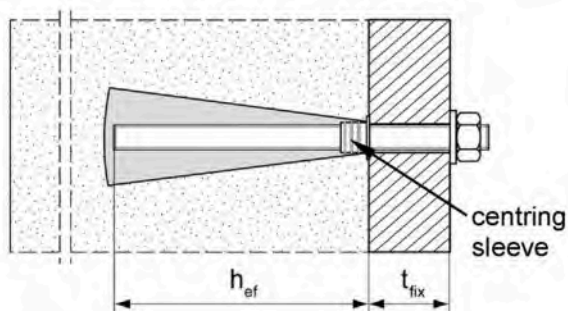
Installation with render bridge



**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)**

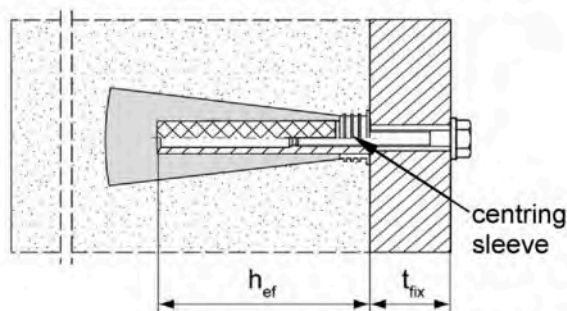
Pre-positioned installation:

anchor rods M8, M10, M12



Pre-positioned installation:

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

h_0 = depth of drill hole

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

Annex A2

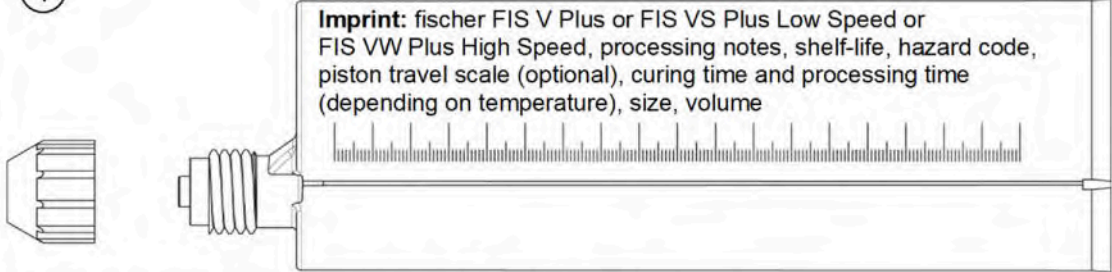
Appendix 3 / 155

Overview system components part 1

Mortar cartridge (shuttle cartridge) with sealing cap

1

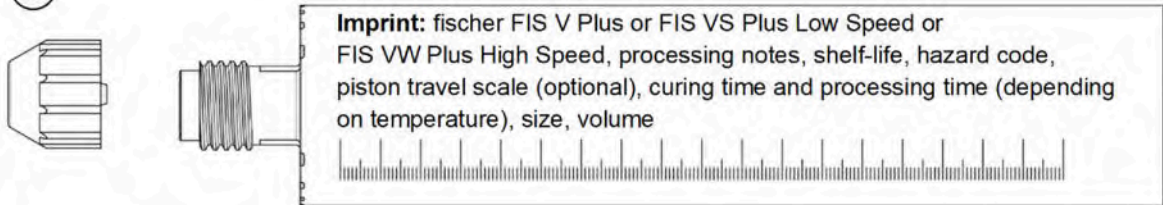
Size: 360 ml, 825 ml



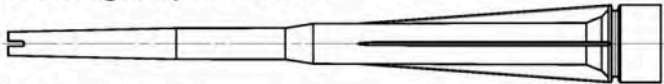
Mortar cartridge (coaxial cartridge) with sealing cap

1

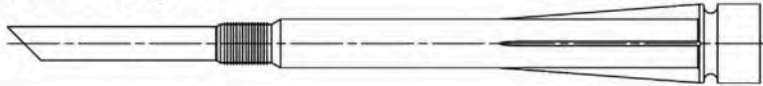
Size: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



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 ABG



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 A3

Appendix 4 / 155

Overview system components part 2

fischer anchor rod

②



Size: M6, M8, M10, M12, M16

Internal threaded anchor FIS E

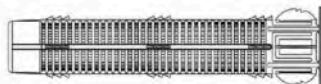
⑤



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

Perforated sleeve FIS H K

⑦



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

⑦



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

Perforated sleeve FIS H K (push through installation)

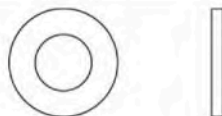
⑦



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

Washer

③

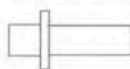


Hexagon nut

④



Injection adapter

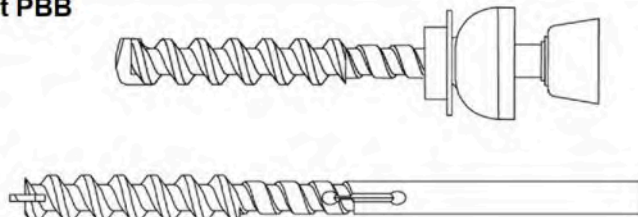


centring sleeve PBZ

⑦



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 A4

Appendix 5 / 155

Table A5.1: Materials

Part	Designation	Material		
1	Mortar cartridge	Mortar, hardener; filler		
		Steel	Stainless steel R	High corrosion resistant steel HCR
		zinc plated	acc. to EN 10088-1:2023 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2023 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015
2	Anchor rod	Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1:2023 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4565; 1.4529 EN 10088-1:2023 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation
3	Washer ISO 7089:2000	zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	1.4565; 1.4529 EN 10088-1:2023
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2022 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2023
5	Internal threaded anchor FIS E	Property class 5.8; EN 10277-1:2018 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023
6	Commercial standard screw or threaded rod for internal threaded anchor FIS E	Property class 4.6, 5.8 or 8.8; EN ISO 898-1:2013 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2023
7	Perforated sleeve and centring sleeve	PP / PE		

fischer injection system FIS V Plus for masonry

Product description
 Materials
Annex A5

Appendix 6 / 155

Specifications of intended use part 1

Table B1.1: Overview use and performance categories

Anchorages subject to		fischer injection system FIS V Plus for masonry	
Hole drilling with hammer drill mode 		all bricks; without C28 to C48, C75 to C78	
Hole drilling with rotary drill mode 		all bricks	
Hole drilling with special conic drill bit		Only C118 to C122	
Static and quasi static load, in masonry		all bricks	
Exposure to fire under tension and shear loading		C124 to C127 (Applies only to the conditions of dry masonry)	
Installation	Pre-positioned installation	Anchor rod or internal threaded anchor (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve with anchor rod or internal threaded anchor (in perforated and solid brick masonry) Size: FIS H 12x50 K FIS H 12x85 K FIS H 16x85 K FIS H 16x130 K FIS H 20x85 K FIS H 20x130 K FIS H 20x200 K
	Push through installation	Anchor rod; use only in cylindrical drill hole (in solid brick masonry and autoclaved aerated concrete)	Perforated sleeve with anchor rod (in perforated and solid brick masonry) Size: FIS H 18x130/200 K FIS H 22x130/200 K
Installation and use conditions	conditions d/d (dry/dry)	all bricks	
	conditions w/d (wet/dry)		
	conditions w/w (wet/wet)		
Installation direction		D3 (downward and horizontal installation)	
Installation temperature		$T_{i,min} = -10\text{ °C}$ to $T_{i,max} = +40\text{ °C}$	
In-service temperature	Temperature range Tb	-40 °C to +80 °C	(max. short term temperature +80 °C max. long term temperature +50 °C)
	Temperature range Tc	-40 °C to +120 °C	(max. short term temperature +120 °C; max. long term temperature +72 °C)
fischer injection system FIS V Plus for masonry			Annex B1 Appendix 7 / 155
Intended Use Specifications part 1			

Specifications of intended use part 2

Anchorage subject to:

- Static and quasi-static loads
- Exposure to fire

Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d), acc. to Annex B13 / B14.
- Hollow brick masonry (base material group c), according to Annex B13 / B14.
- 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 under consideration of the β -factor according to Annex C123, 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:

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

Use conditions (Environmental conditions):

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

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 2

Annex B2

Appendix 8 / 155

Specifications of intended use part 3 continued

Design:

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054:2023-12 (included the dimensioning for fire exposure), Design method A under the responsibility of a designer experienced in anchorages and masonry work.

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

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

$$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$$

For the calculation of pulling out a brick under tension loading $N_{Rk,pb}$ or pushing out a brick under shear loading $V_{Rk,pb}$ see EOTA Technical Report TR 054:2023-12.

$N_{Rk,s}$, $V_{Rk,s}$ and $M^0_{Rk,s}$ see annexes C1-C3.

Factors for job site tests and displacements see annex C123.

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

Installation:

- Conditions d/d: - Installation and use in dry structures.
- Conditions w/w: - Installation and use in dry and wet structures.
- Conditions w/d: - Installation in wet structures and use in dry structures.
- Hole drilling see Annex C (drilling method).
- In case of aborted hole: The hole shall be filled with injection mortar FIS V Plus.
- Bridging of unbearing layer (e.g., plaster) is permitted for masonry with solid bricks and cylindrical drill hole. At perforated brick masonry see Annex B6, Table B6.1.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Fastening screws or anchor rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E mentioned in Annex A5, Table A5.1.
- Minimum curing time see Annex B8, 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 A5, Table A5.1

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

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

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 3 continued

Annex B3

Appendix 9 / 155

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

Anchor rod	Thread	M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0 [mm]	8	10	12	14	18
Effective anchorage depth $h_{ef}^{1)}$	$h_{0,min} \geq h_{ef,min}$ [mm]	100				
in AAC cylindrical drill hole	$h_{0,max} \geq h_{ef,max}$ [mm]	200				
Effective anchorage depth h_{ef} in AAC conical drill hole	h_0 [mm]	-	$h_{ef} + 5$			-
	$h_{ef,1}$ [mm]		75			
	$h_{ef,2}$ [mm]		95			
Effective anchorage depth $h_{ef}^{1)}$	$h_{ef,min}$ [mm]	50				
in solid brick (depth of drill hole $h_0 \geq h_{ef}$)	$h_{ef,max}$ [mm]	$h-30, \leq 200$				
Diameter of clearance hole in the fixture	pre-positioning $d_f \leq$ [mm]	7	9	12	14	18
	push through $d_f \leq$ [mm]	9	11	14	16	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



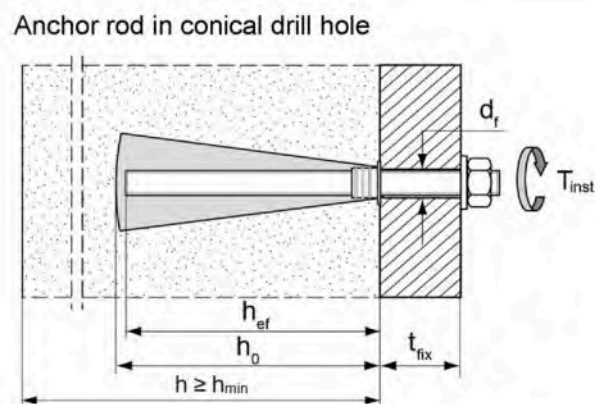
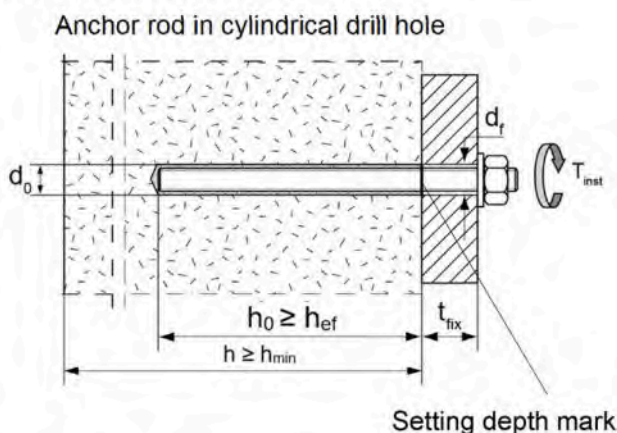
Marking (on random place) fischer anchor rod:

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

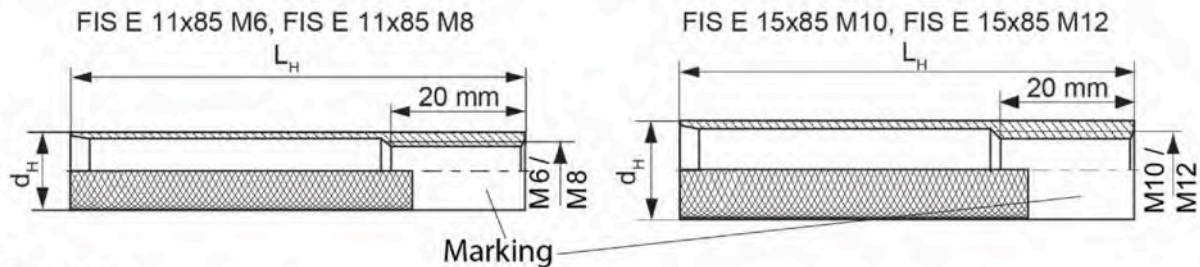
Annex B4

Appendix 10 / 155

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 _{ef} in AAC (conical drill hole)	h ₀ [mm]	100		-	
	h _{ef} [mm]	85			
Diameter of cleaning brush	d _b ≥ [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			

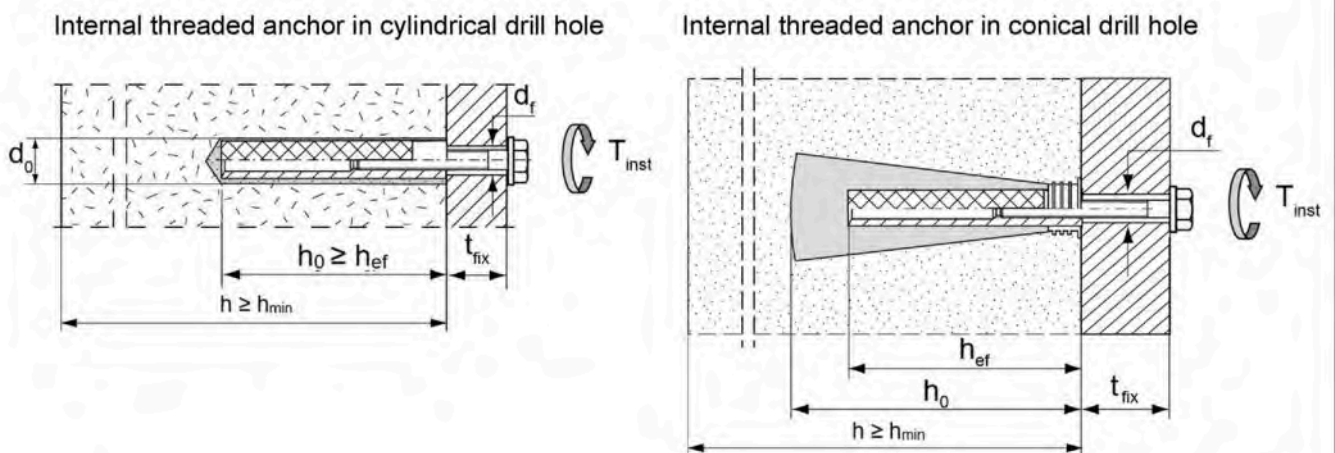
fischer Internal threaded anchor FIS E



Marking:

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

Installation conditions:



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 B5

Appendix 11 / 155

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

perforated sleeve FIS H K		12x50	12x85 ²⁾	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter $d_0 = D_{\text{sleeve, nom}}$	d_0 [mm]	12		16		20		
Depth of drill hole	h_0 [mm]	55	90	90	135	90	135	205
Effective anchorage depth	$h_{\text{ef, min}}$ [mm]	50	65	85	110	85	110	180
	$h_{\text{ef, max}}$ [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-]	M6 and M8		M8 and M10		M12 and M16		
Size of internal threaded anchor FIS E		-	-	11x85	-	15x85	-	-
Diameter of cleaning brush ¹⁾	$d_b \geq$ [mm]	see Table B8.1						
Maximum installation torque	T_{inst} [Nm]	see parameters of brick						

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

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

Perforated sleeve

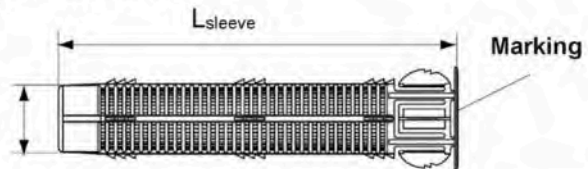
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

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

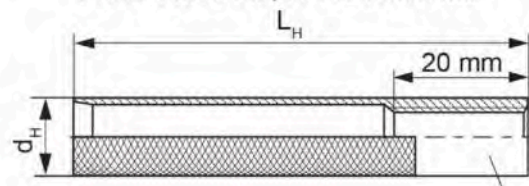


$D_{\text{sleeve, nom}}$

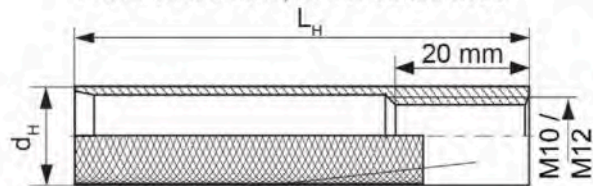


fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8



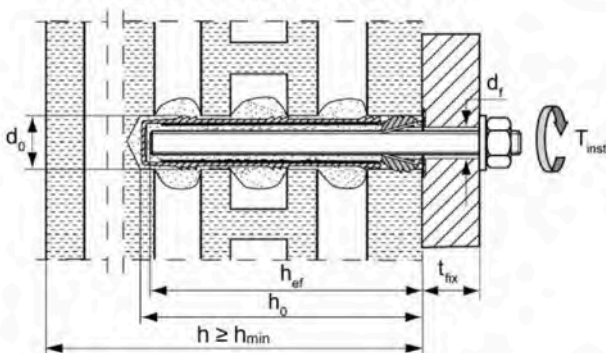
FIS E 15x85 M10, FIS E 15x85 M12



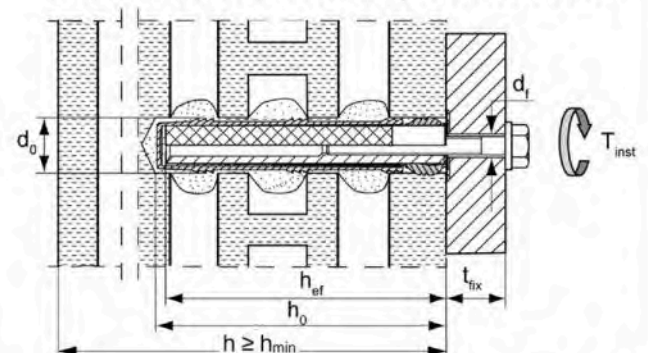
Marking

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 installation)

Annex B6

Appendix 12 / 155

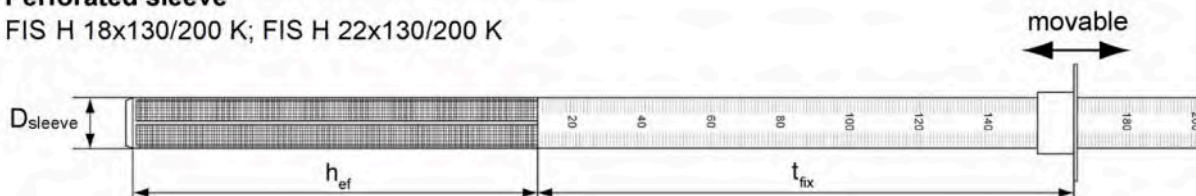
Table B7.1: Installation parameters for anchor rods with perforated sleeves
(push through installation)

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	M16
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.

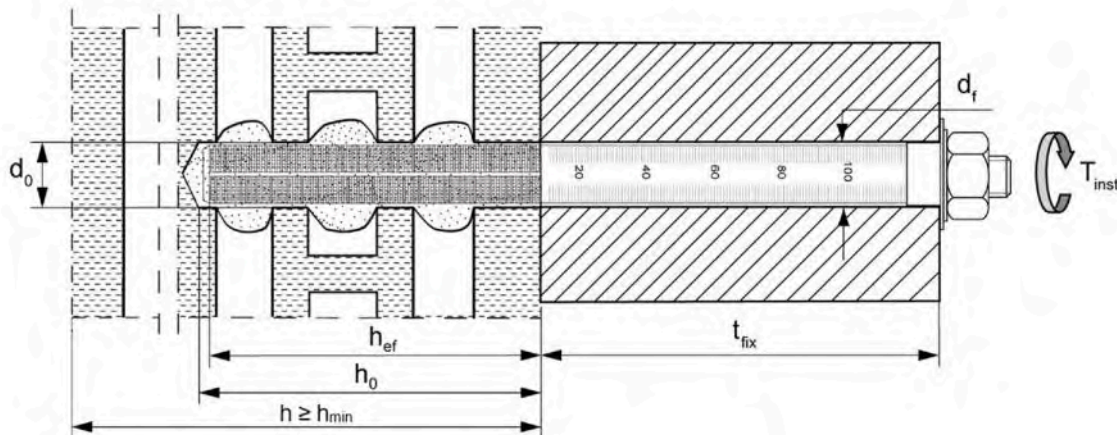
Perforated sleeve

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 installation)

Annex B7

Appendix 13 / 155

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	FIS VS Plus Low Speed
-10 to -5	-	-	-	12 h	-	-
> -5 to 0	5 min	-	-	3 h	24 h	-
> 0 to 5	5 min	13 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)

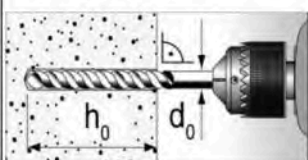
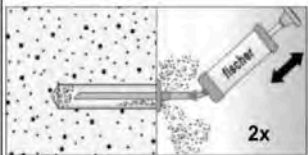
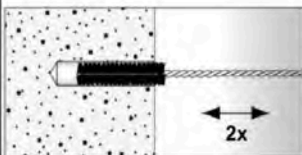
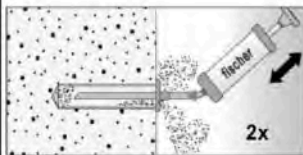
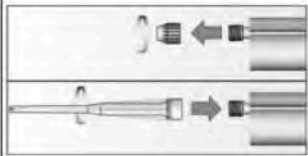
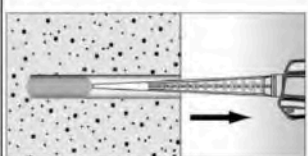
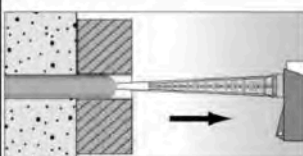
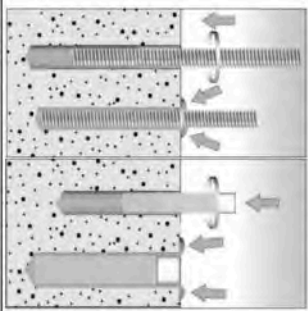
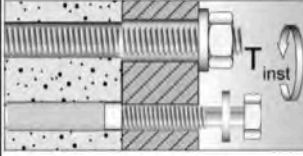
Maximum processing times and minimum curing times

Annex B8

Appendix 14 / 155

Installation instruction part 1

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

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

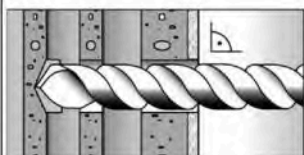
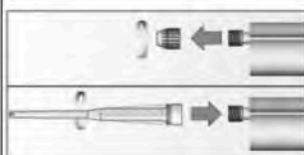
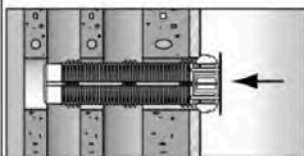
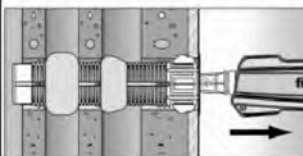
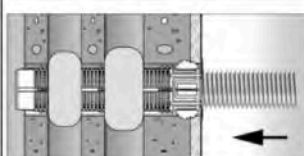
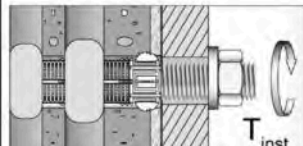
Installation instruction (without perforated sleeve) part 1

Annex B9

Appendix 15 / 155

Installation instruction part 2

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

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

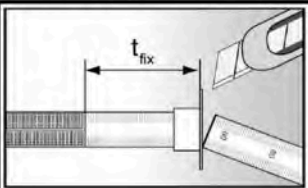
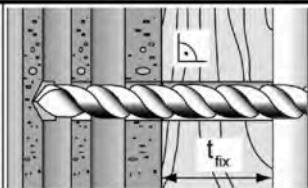
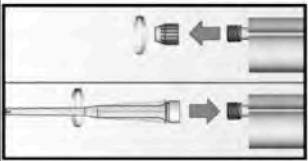
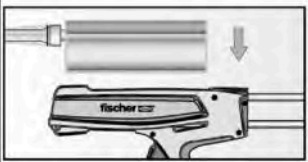
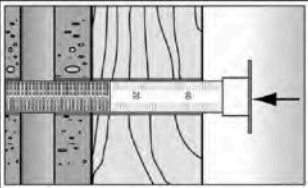
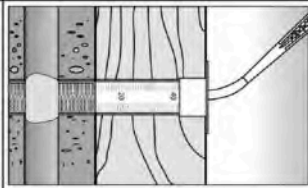
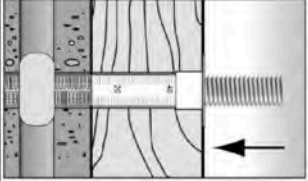
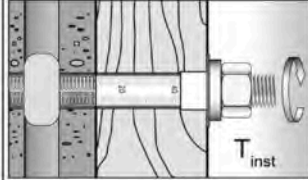
Installation instruction (with perforated sleeve) part 2

Annex B10

Appendix 16 / 155

Installation instruction part 3

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

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

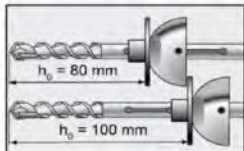
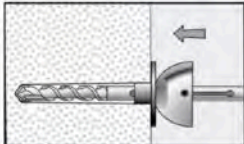
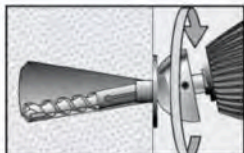
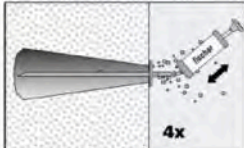
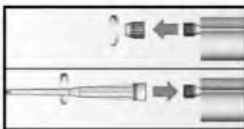
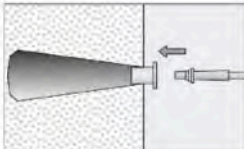
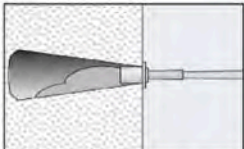
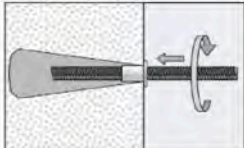
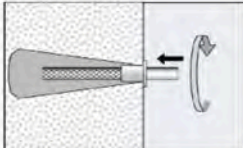
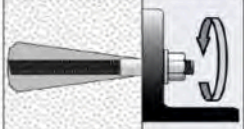
Installation instruction (with perforated sleeve) part 3

Annex B11

Appendix 17 / 155

Installation instruction part 4

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

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 installation) part 4

Annex B12

Appendix 18 / 155

Table B13.1: Overview of assessed bricks part 1

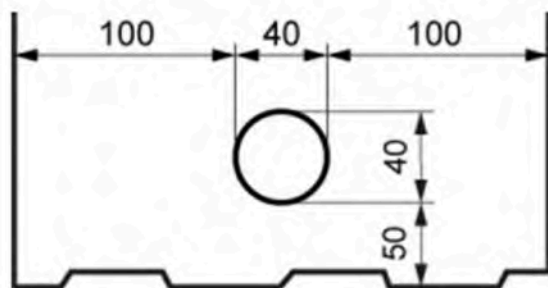
Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm ²]	Main country of origin	Mean gross density ρ [kg/dm ³]	Annex
Solid brick Mz					
Solid brick Mz	NF ≥240x115x71	15 / 25 / 35	Germany	≥1,8	C4 – C7
	2DF ≥240x115x113	12,5 / 20	Germany	≥1,8	C8 / C9
	≥ 245x118x54	12,5 / 25	Italy	≥1,8	C10 / C11
	≥ 230x108x55	12,5 / 25	Denmark	≥1,8	C12 / C13
Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL					
Solid calcium silicate brick KS	NF ≥240x115x71	15 / 25 / 35	Germany	≥2,0	C14 / C15
	8DF ≥ 250x240x240	12,5 / 25 / 35	Germany	≥2,0	C16 / C17
	≥ 997x214x538	12,5 / 25 & 45	Netherlands	≥1,8 & ≥2,2	C18 / C19
	≥ 240x115x113	12,5 / 25	Germany	≥1,8	C20 – C23
Perforated calcium silicate brick KSL	3DF 240x175x113	10 / 12,5 / 15 / 20 / 25	Germany	≥1,4	C24 – C27
Vertical perforated brick HLz					
Vertical perforated brick HLz	370x240x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C28 / C29
	500x175x237	5 / 7,5 / 10 / 12,5 / 15	Germany	≥1,0	C28 / C29
	2DF 240x115x113	7,5 / 12,5 / 20 / 25 / 35	Germany	≥1,4	C30 / C31
	248x365x248	5 / 7,5 / 10	Germany	≥0,6	C32 – C35
	248x365x249	10 / 12,5 / 15	Germany	≥0,7	C36 – C39
	248x365x249	5 / 8	Germany	≥0,5	C40 – C43
	248x425x248	5 / 8 / 10	Germany	≥0,8	C44 – C47
	248x425x248	5 / 7,5 / 10	Germany	≥0,8	C48 – C51
	500x200x315	5 / 7,5 / 10	Germany	≥0,6	C52 – C55
	500x200x300	5 / 7,5 / 10 / 12,5	France	≥0,7	C56 – C59
	500x200x315	2,5 / 5 / 7,5 / 10	France	≥0,7	C60 – C63
	560x200x275	5 / 8 / 10	France	≥0,7	C64 / C65
	255x120x118	2,5 / 5 / 8 / 10 / 12,5 / 15	Italy	≥1,0	C66 - C68
	275x130x94	7,5 / 10 / 15 / 20 / 25	Spain	≥0,8	C69 / C71
	220x190x290	7,5 / 10 / 12,5	Portugal	≥0,7	C72 – C75
	253x300x240	2,5 / 5 / 8	Austria	≥0,8	C76 – C79
	250x440x250	8 / 10 / 12,5	Austria	≥0,7	C80 – C83
	230x108x55	2,5 / 5 / 8 / 10	Denmark	≥1,4	C84 / C85
	365x248x245	10	Austria	≥0,6	C86 / C89
	240x175x113	12,5	Germany	≥0,9	C90 / C93
fischer injection system FIS V Plus for masonry					
Intended Use Overview of assessed bricks part 1				Annex B13 Appendix 19 / 155	

Table B14.1: Overview of assessed bricks part 2

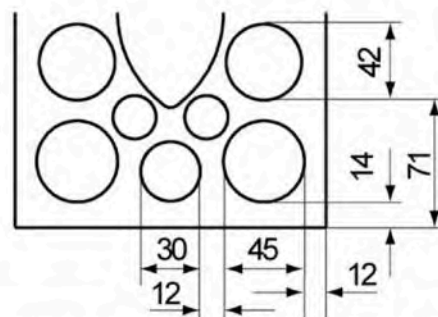
Kind of masonry	Brick format [mm]	Mean compressive strength [N/mm ²]	Main country of origin	Mean gross density ρ [kg/dm ³]	Annex
Horizontal perforated brick LLz					
Horizontal perforated brick LLz	248x78x250	2,5 / 5 / 8	Italy	≥0,7	C94 / C95
	128x88x275	2,5	Spain	≥0,8	C96 / C97
Light-weight concrete hollow block Hbl					
Light-weight concrete hollow block Hbl	362x240x240	2,5 / 5	Germany	≥1,0	C98 – C101
	500x200x200	2,5 / 5 / 8	France	≥1,0	C102 / C103
	440x215x215	5 / 8 / 10 / 12,5	Ireland	≥1,2	C104 – C107
Light-weight concrete solid block Vbl					
Light-weight concrete solid block Vbl	≥ 372x300x254	2,5	Germany	≥0,6	C108 / C109
	≥ 250x240x239	5 / 8 / 10	Germany	≥1,6	C110 – C113
	≥ 440x100x215	5 / 8 / 10 / 12,5	Ireland	≥2,0	C114 / C115
	≥ 440x95x215	7,5 / 10 / 12,5 / 15	England	≥2,0	C116 / C117
Autoclaved aerated concrete (AAC)					
PP2 / AAC	-	2,5	Germany	0,35	C118 – C122
PP4 / AAC	-	5	Germany	0,5	C118 – C122
PP6 / AAC	-	8	Germany	0,65	C118 – C122
fischer injection system FIS V Plus for masonry					Annex B14 Appendix 20 / 155
Intended Use Overview of assessed bricks part 2					

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

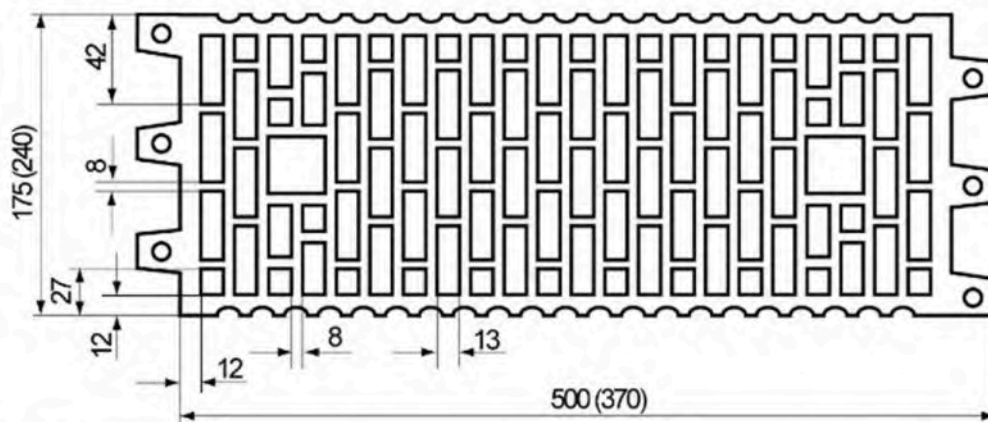
Solid calcium silicate brick KS, 8DF,
EN 771-2:2011+A1:2015 according to Annex C16



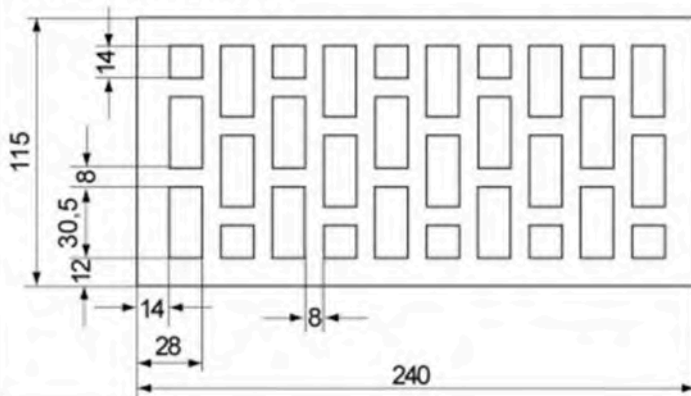
Perforated calcium silicate brick KSL, 3DF,
EN 771-2:2011+A1:2015; e.g. KS Wemding
according to Annex C24



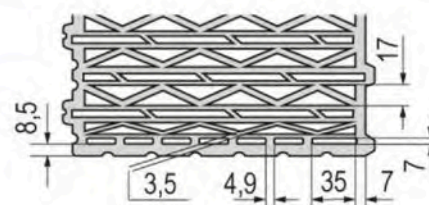
Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Wienerberger, Poroton according to Annex C28



Vertical perforated brick HLz, 2DF,
EN 771-1:2011+A1:2015; e.g. Wienerberger
according to Annex C30



Vertical perforated brick HLz, U8,
EN 771-1:2011+A1:2015; according to Annex C32



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

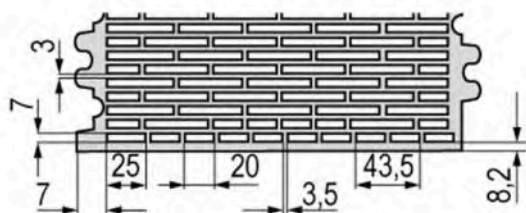
Intended Use
Overview dimensions of perforated and hollow bricks part 1

Annex B15

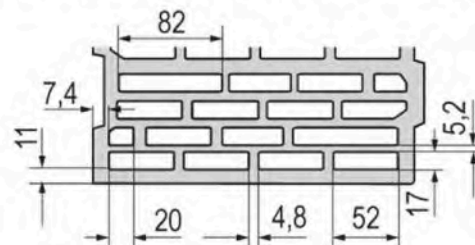
Appendix 21 / 155

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

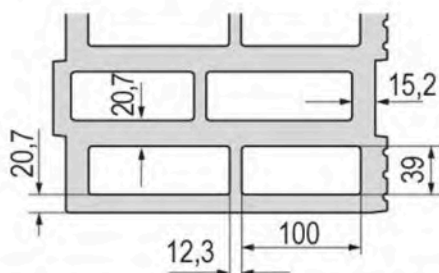
Vertical perforated brick HLz, T10, T11,
EN 771-1:2011+A1:2015; according to Annex C36



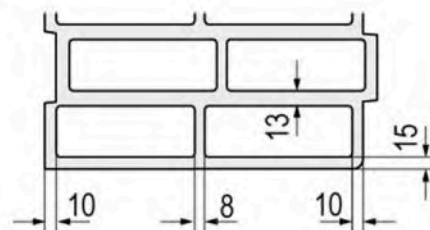
Vertical perforated brick HLz, T7 PF, filled with perlite,
EN 771-1:2011+A1:2015; according to Annex C40



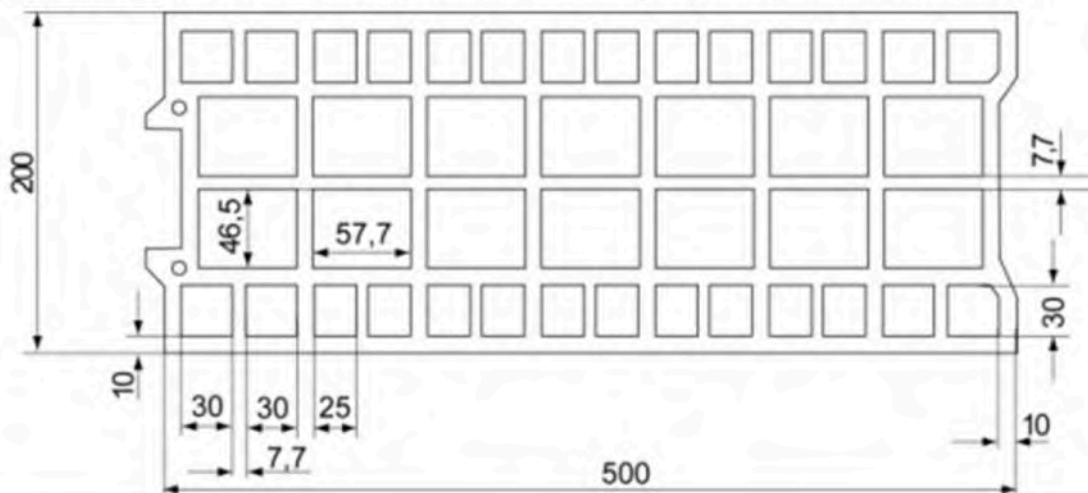
Vertical perforated brick HLz, T9 MW, filled with
mineral wool, EN 771-1:2011+A1:2015; according to
Annex C44



Vertical perforated brick HLz, FZ 7, filled with mineral
wool, EN 771-1:2015; according to Annex C48



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Bouyer Leroux; According to Annex C52



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

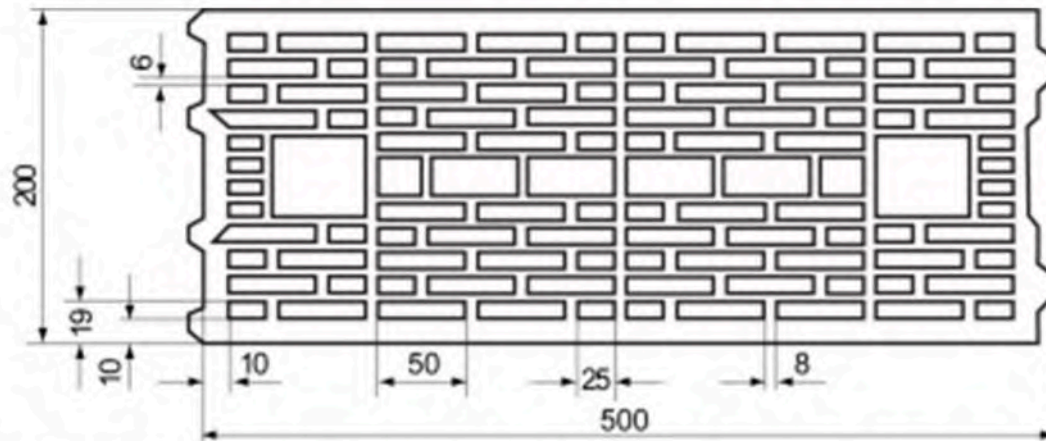
Overview dimensions of perforated and hollow bricks part 2

Annex B16

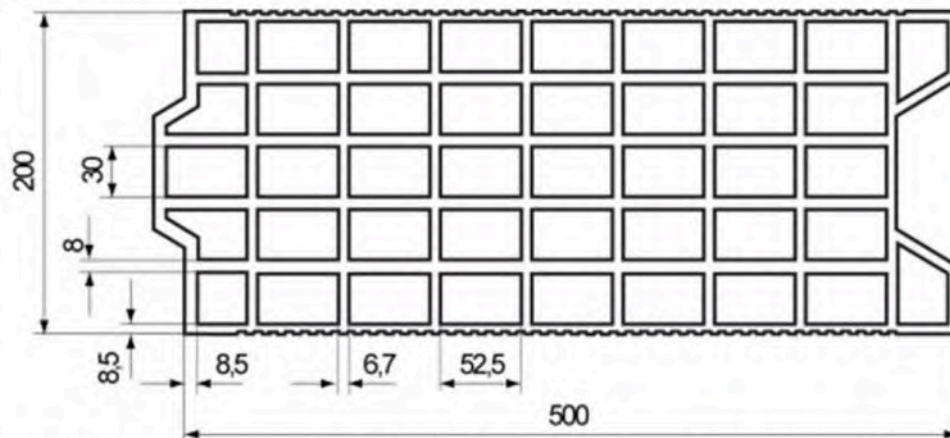
Appendix 22 / 155

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

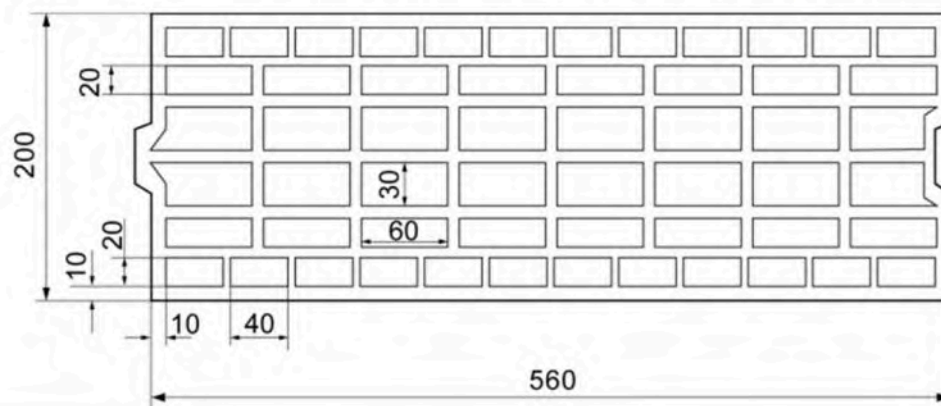
Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C56



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Terreal according to Annex C60



Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Imery according to Annex C64



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

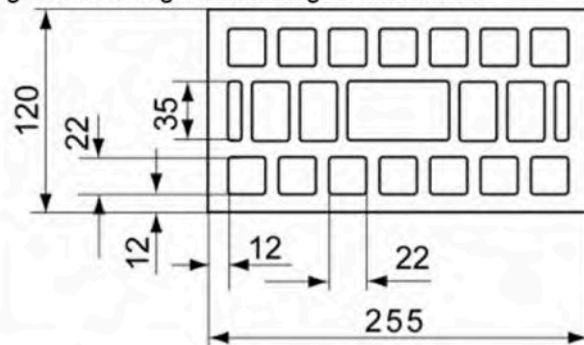
Intended Use
Overview dimensions of perforated and hollow bricks part 3

Annex B17

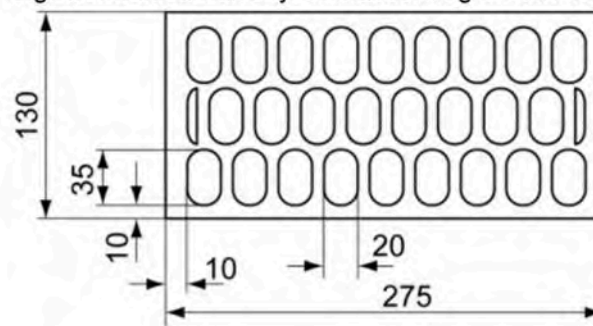
Appendix 23 / 155

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

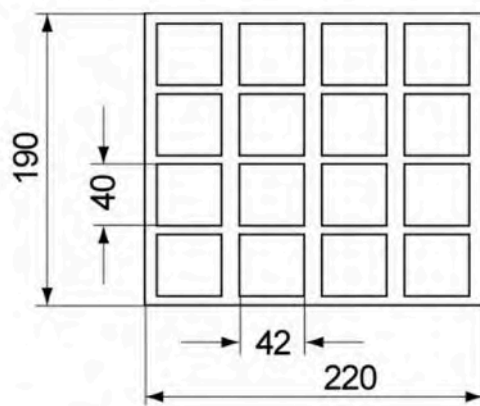
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C66



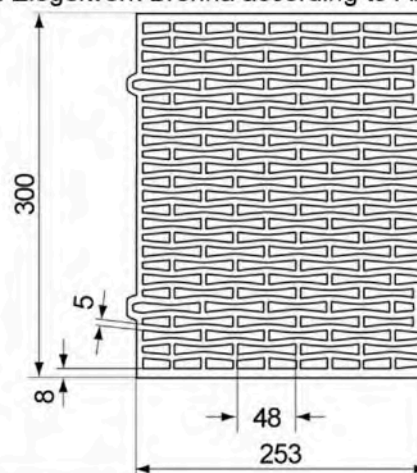
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Cermanica Farreny S.A. according to Annex C69



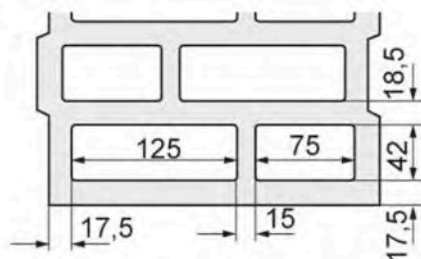
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Perceram according to Annex C72



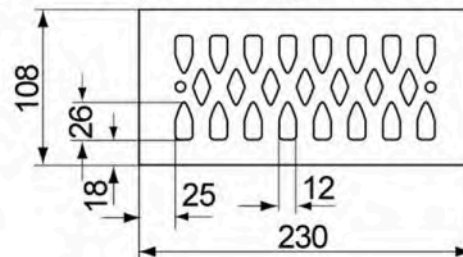
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Ziegelwerk Brenna according to Annex C76



Vertical perforated brick HLz, Porotherm W 44, filled
with mineral wool, EN 771-1:2011+A1:2015 according
to Annex C80



Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C84



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

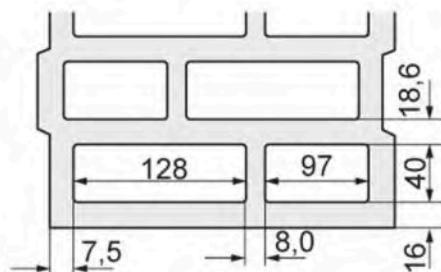
Overview dimensions of perforated and hollow bricks part 4

Annex B18

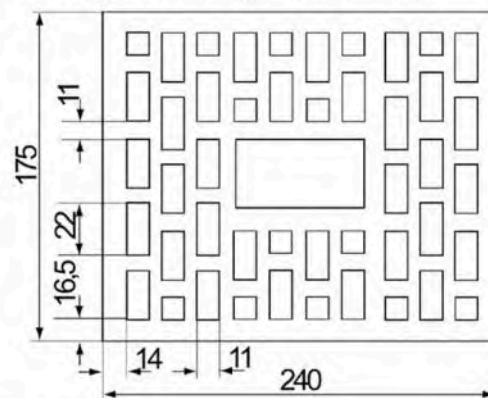
Appendix 24 / 155

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

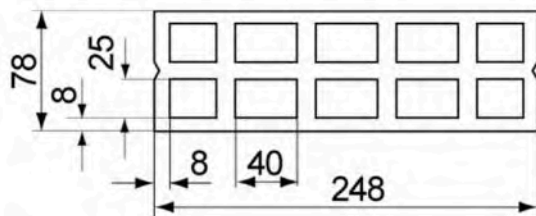
Vertical perforated brick filled with mineral wool,
EN 771-1:2011+A1:2015; according to Annex C86



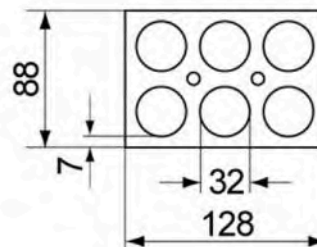
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C90



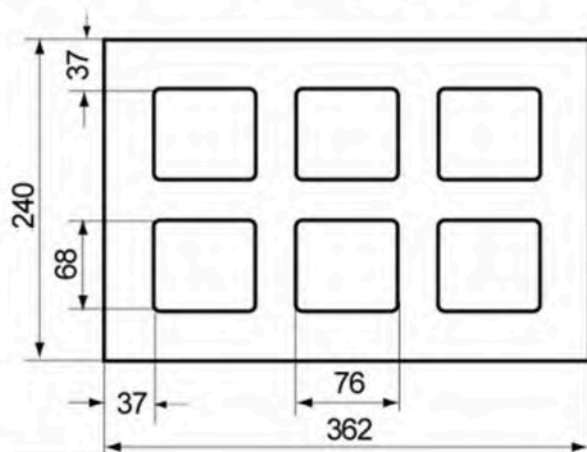
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015; according to Annex C94



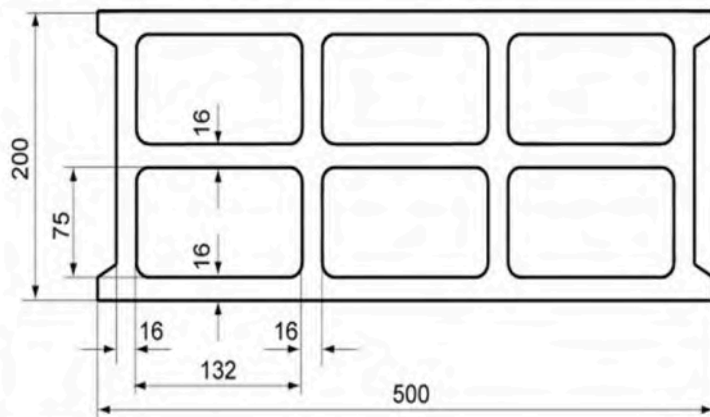
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015;
e.g. Cermanica Farreny S.A according to Annex C96



Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015; according to Annex C98



Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015;
e.g. Sepa according to Annex C102



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

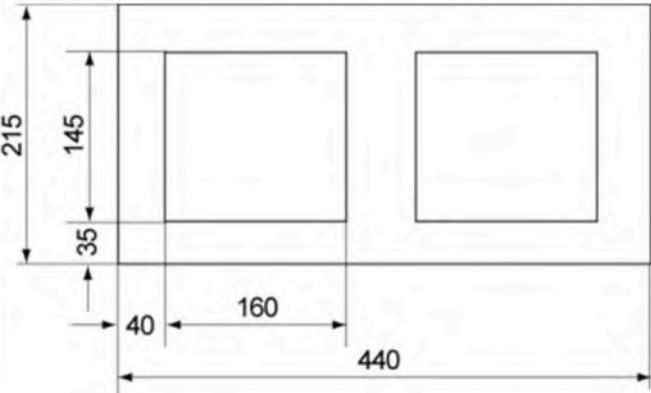
Intended Use
Overview dimensions of perforated and hollow bricks part 5

Annex B19

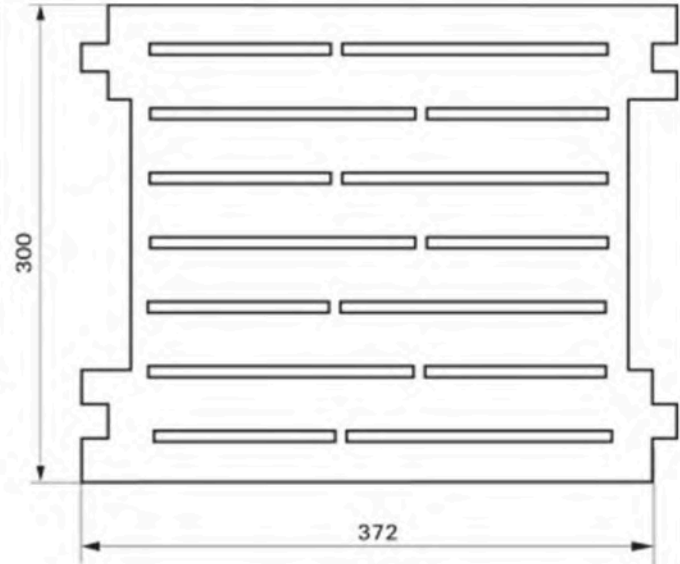
Appendix 25 / 155

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

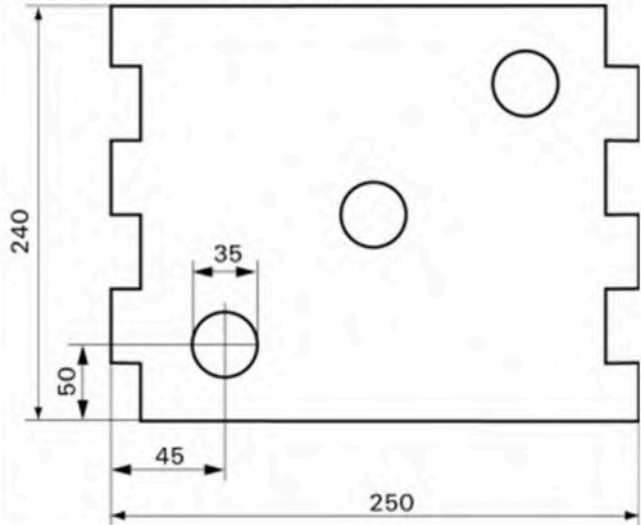
Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015
e.g. Roadstone wood according to Annex C104



Light-weight concrete hollow block Hbl,
EN 771-3:2011+A1:2015
e.g. Sepa according to Annex C108



Light-weight concrete solid block Vbl,
EN 771-3:2011+A1:2015;
e.g. Sepa according to Annex C110

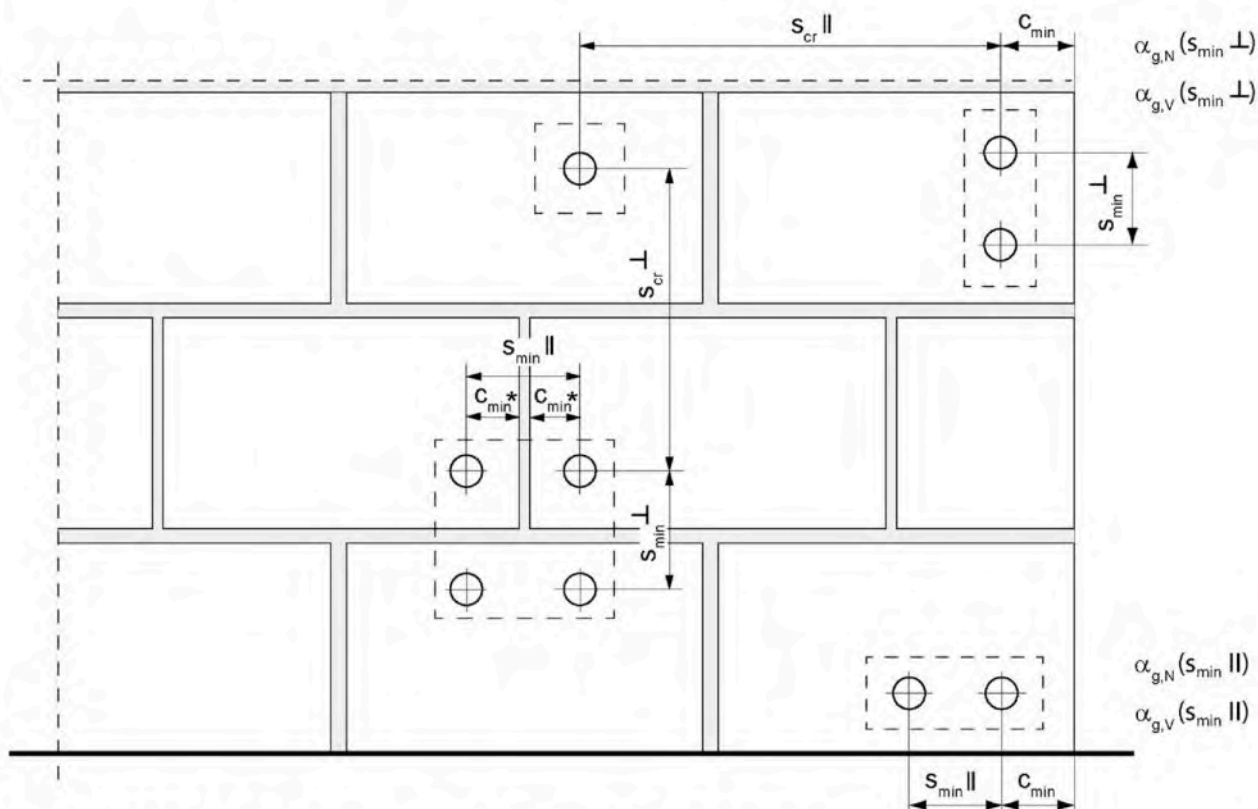


Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 6

Spacing and edge distance part 1



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

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

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use
Spacing and edge distance part 1

Annex B21

Appendix 27 / 155

Spacing and edge distance part 2

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

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

Group of 2 anchors

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

Group of 4 anchors

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

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

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

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

fischer injection system FIS V Plus for masonry

Intended Use
Spacing and edge distance part 2

Annex B22

Appendix 28 / 155

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

Anchor rod / standard threaded rod			M6	M8 ³⁾	M10 ³⁾	M12	M16		
Characteristic resistance to steel failure under tension loading									
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	Property class	4.6	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
			4.8		8,0	14,6(13,2)	23,2(21,4)	33,7	62,8
			5.8		10,0	18,3(16,6)	29,0(26,8)	42,1	78,5
			8.8		16,0	29,2(26,5)	46,4(42,8)	67,4	125,6
	Stainless steel R and High corrosion resistant steel HCR	Property class	50		10,0	18,3	29,0	42,1	78,5
			70		14,0	25,6	40,6	59,0	109,9
			80		16,0	29,2	46,4	67,4	125,6
Partial factors ¹⁾									
Partial factors $\gamma_{Ms,N}$	Steel zinc plated	Property class	4.6	[-]	2,00				
			4.8		1,50				
			5.8		1,50				
			8.8		1,50				
	Stainless steel R and High corrosion resistant steel HCR		Property class		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 under tension loading of fischer anchor rods and standard threaded rods

Annex C1

Appendix 29 / 155

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

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

¹⁾ In absence of other national regulations

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

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C2

Appendix 30 / 155

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

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

¹⁾ In absence of other national regulations

¹⁾ In absence of other national regulations

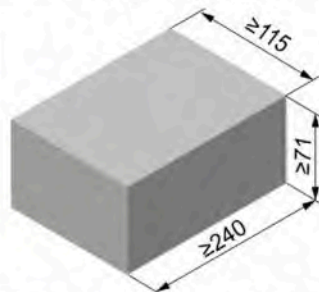
fischer injection system FIS V Plus for masonry

Performance

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

Annex C3

Appendix 31 / 155

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


Producer	e.g. Wienerberger		
Nominal dimensions [mm]	length L	width W	height H
	≥ 240	≥ 115	≥ 71
Mean gross dry density ρ [kg/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 771-1:2011+A1:2015		

Table C4.1: Installation parameters for edge distance $c=100\text{mm}$

Anchor rod		M6	M8	M10	M12	-		-	
Internal threaded anchor FIS E		-	-	-	-	M6	M8	M10	M12
						11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve									
Effective anchorage depth h_{ef}	[mm]	50	50	50	50	85			
		80	80	80	80				
		200	200	200	200				
Max. installation torque $\max T_{inst}$	[Nm]	4	10			4	10		
General installation parameters									
Edge distance $C_{min} = C_{cr}$	[mm]	100				100			
Edge distance $h_{ef}=200$ $C_{min} = C_{cr}$		150				2)			
$S_{min II,N}$		60				60			
$h_{ef}=200$ $S_{min II,N}$		240				2)			
Spacing $S_{min II,V}$		240				240			
$S_{cr II}$		240				240			
$S_{cr \perp} = S_{min \perp}$		75				75			

Drilling method

Hammer drilling with hard metal hammer drill

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

²⁾ No performance assessed

Table C4.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

 Solid brick Mz, NF, dimensions, installation parameters for edge distance $c=100\text{mm}$,
Group factors

Annex C4

Appendix 32 / 155

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 $c=100\text{mm}$

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance $c=100\text{mm}$

Annex C5

Appendix 33 / 155

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

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

Anchor rod		M6	M8	M10	M12	M16	-		-	
Internal threaded anchor FIS E		-	-	-	-	-	M6	M8	M10	M12
							11x85		15x85	
Anchor rod and internal threaded anchor FIS E without perforated sleeve										
Effective anchorage depth	h _{ef}	[mm]	50	50	50	50	50	85		
			100	100	100	100	100			
			200	200	200	200	200			
Max. installation torque	max T _{inst}	[Nm]	4	10				4	10	
General installation parameters										
Edge distance	c _{min} = c _{cr}	[mm]	60							
Edge distance	c _{min}		60							
Spacing	s _{min} ,N		80							
	h _{ef} =200 s _{min} ,N		80							
	s _{min} ,v		80							
	s _{cr}		3x h _{ef}							
	s _{min} ⊥		80							
	s _{cr} ⊥		3x h _{ef}							

Drilling method

Hammer drilling with hard metal hammer drill

Table C6.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C6

Solid brick Mz, NF, EN 771-1:2011+A1:2015
Table C7.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading for edge distance $c=60\text{mm}$

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

 $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ³⁾

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

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

²⁾ No performance assessed.

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

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

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

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

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

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

²⁾ No performance assessed.

Factor for job site tests and displacements see annex C123.

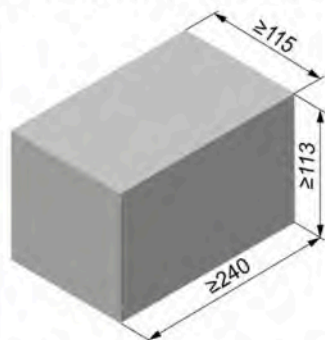
fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, NF, Characteristic resistance under tension and shear loading, edge distance $c=60\text{mm}$
Annex C7

Appendix 35 / 155

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	12,5 / 10 or 20 / 16		
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 11x85	M8 15x85

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85	
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	10

General installation parameters

Edge distance $C_{min} = C_{cr}$	[mm]	60
Spacing $S_{min II}$		120
Spacing $S_{cr II}$		240
Spacing $S_{cr \perp} = S_{min \perp}$		115

Drilling method

Hammer drilling with hard metal hammer drill

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

²⁾ No performance assessed.

Table C8.2: Group factors

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

Group factor	$\alpha_{g,N} (S_{min II})$	[-]	1,5
	$\alpha_{g,V} (S_{min II})$		1,4
	$\alpha_{g,N} (S_{min \perp})$		2,0
	$\alpha_{g,V} (S_{min \perp})$		

fischer injection system FIS V Plus for masonry

Performance

Solid brick Mz, 2DF, dimensions, installation parameters, Group factors

Annex C8

Appendix 36 / 155

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	-	-	M6	M8
											11x85		15x85				11x85	
Perforated sleeve FIS H K	-		-		-		-		-		-		-		16x85			

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h _{ef} [mm]												
		50	100	50	100	50	100	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	2,0		1,5
	d/d	3,0	4,0	3,0	4,0	3,0	4,5	3,0	5,5	3,0	5,5	3,0		3,0
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	3,5		2,5
	d/d	4,5	7,0	4,5	7,0	4,5	7,5	5,5	8,0	5,5	8,0	5,5		4,5

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

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

Table 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	-	-	M6	M8
						11x85		15x85				11x85	
Perforated sleeve FIS H K	-	-	-	-	-	-	-	16x85					

</

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

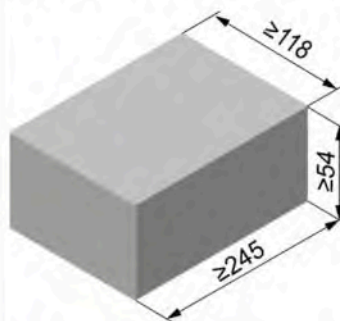
Performance

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

Annex C9

Appendix 37 / 155

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



Producer	e.g. Nigra			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 245	≥ 118	≥ 54
Mean gross dry density ρ	[kg/dm³]	≥ 1,8		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	12,5 / 10 or 25 / 20		
Standard or annex	EN 771-1:2011+A1:2015			

Table C10.1: Installation parameters

Anchor rod	M6		M8		M10		M12		M16		-		-		
Internal threaded anchor FIS E	-		-		-		-		-		M6		M8	M10	M12
											11x85		15x85		
Anchor rod and internal threaded anchor FIS E without perforated sleeve															
Effective anchorage depth	h_{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85		
Max. installation torque	$\max T_{inst}$	[Nm]	4		10							4	10		
General installation parameters															
Edge distance	$c_{min} = c_{cr}$	[mm]	60												
Spacing	$s_{cr \parallel} = s_{min \parallel}$		245												
	$s_{cr \perp} = s_{min \perp}$		60												
Drilling method															

Hammer drilling with hard metal hammer drill

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

Table C10.2: Group factors

Anchor rods	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 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, Group factors

Annex C10

Appendix 38 / 155

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
								11x85		15x85	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾											
Mean compressive strength/ Min. compressive strength single brick ¹⁾		Use con- ditions	Effective anchorage depth h _{ef} [mm]								
			≥ 50					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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table 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
								11x85		15x85	
V _{RK} = V _{RK,b} = V _{RK,c,II} = V _{RK,c,⊥} [kN]; temperature range 50/80°C and 72/120°C											
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]								
			≥ 50					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	4,5
	d/d										
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	6,0
	d/d										

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

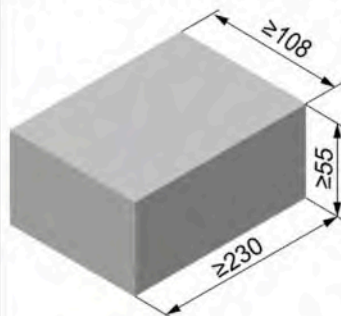
Performance

Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C11

Appendix 39 / 155

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 230	≥ 108	≥ 55
Mean gross dry density ρ	[kg/dm ³]	≥ 1,8		
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 11x85	M8 15x85

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	$\max T_{inst}$	[Nm]	4		10								4	10

General installation parameters

Edge distance $C_{min} = C_{cr}$	[mm]	60									
Spacing $S_{cr \parallel} = S_{min \parallel}$		230									
$S_{cr \perp} = S_{min \perp}$		60									

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C12.2: Group factors

Anchor rods	M6	M8	M10	M12	M16	-	-
Internal threaded anchor FIS E	-	-	-	-	-	M6 11x85	M8 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, Group factors

Annex C12

Appendix 40 / 155

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	M10	M12
								11x85		15x85	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾											
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]							85	
			≥ 50								
12,5 / 10 N/mm ²	w/w	w/d	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/mm ²	w/w	w/d	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table 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	M10	M12	
							11x85		15x85		
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C											
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		Effective anchorage depth h _{ef} [mm]					85			
			≥ 50								
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	4,5
	d/d										
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	6,0
	d/d										

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

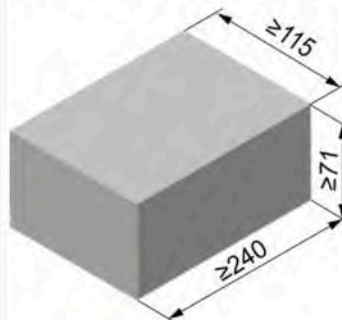
Performance

Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C13

Appendix 41 / 155

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



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

Table C14.1: Installation parameters

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

Anchor rod and internal threaded anchor FIS E without perforated sleeve

Effective anchorage depth h _{ef}	[mm]	50	100	50	100	50	100	50	100	50	100	85	85	
						200		200		200				
Max. installation torque max T _{inst}	[Nm]	3		5		15		15		25		3	5	15

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C14.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C14

Appendix 42 / 155

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		M10		M12	
												11x85		15x85					
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾																			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		Effective anchorage depth h _{ef} [mm]																
			50	100	50	100	50	100	200	50	100	200	50	100	200	85	85		
15 / 12 N/mm ²	w/w	w/d	2,0	3,0	2,5	4,5	2,5	3,5	7,0	2,5	3,0	6,5	2,5	3,5	8,0	2,5	2,5		
	d/d		4,0	5,5	4,0	8,0	4,0	5,5	12	4,0	4,5	12	4,5	5,5	12	4,0	4,0		
25 / 20 N/mm ²	w/w	w/d	3,0	4,5	3,5	6,5	3,5	4,5	10	3,5	4,0	9,5	4,0	5,0	11	3,5	3,5		
	d/d		5,5	7,5	6,0	11	6,0	8,0	12	6,0	6,5	12	6,5	8,0	12	6,0	6,0		
35 / 28 N/mm ²	w/w	w/d	3,5	5,0	4,0	8,0	4,5	5,5	12	4,5	5,0	11	4,5	5,5	12	4,5	4,5		
	d/d		6,5	9,0	7,0	12	7,0	9,0	12	7,0	7,5	12	7,5	9,5	12	7,0	7,0		

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

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

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	M10	M12
											11x85		15x85	
V _{RK} = V _{RK,b} = V _{RK,c,II} = V _{RK,c,I} [kN]; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h _{ef} [mm]												
		50	100	50	100	50	≥100	50	≥100	50	≥100	85	85	
15 / 12 N/mm²	w/w	d/d	1,5	3,0	1,5	3,0	1,2	2,0	1,2	2,0	1,2	2,0	1,2	1,2
	d/d													
25 / 20 N/mm²	w/w	d/d	2,5	4,0	2,5	4,0	1,5	3,0	1,5	3,0	1,5	3,0	1,5	1,5
	d/d													
35 / 28 N/mm²	w/w	d/d	3,0	4,5	3,0	4,5	1,5	3,5	1,5	3,5	1,5	3,5	1,5	1,5
	d/d													

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

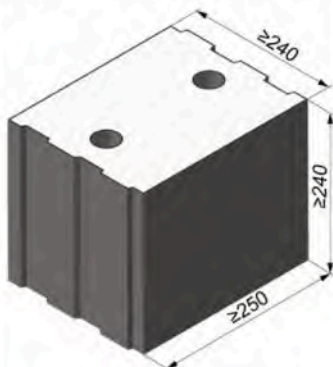
Performance

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

Annex C15

Appendix 43 / 155

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



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 250	≥ 240	≥ 240
Mean gross dry density ρ	[kg/dm ³]	≥ 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 B15

Table C16.1: 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	$\max T_{inst}$	[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]	85		85		85	
Max. installation torque $\max T_{inst}$	[Nm]	10		10		10	

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

²⁾ No performance assessed.

Table C16.2: Group factors

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

Group factors	$\alpha_{a,N} (s_{min} \parallel)$	[-]	1,5
	$\alpha_{a,V} (s_{min} \parallel)$		1,2
	$\alpha_{a,N} (s_{min} \perp)$		1,5
	$\alpha_{a,V} (s_{min} \perp)$		1,2

fischer injection system FIS V Plus for masonry

Performance

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

Annex C16

Appendix 44 / 155

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		15x85				11x85	
Perforated sleeve FIS H K	-	-	-	-	-	-		-	16x85				

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h _{ef} [mm]											
		≥ 50						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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table 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		15x85				11x85	
Perforated sleeve FIS H K	-	-	-	-	-	-		-		16x85			

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]									
		≥ 50					85				
12,5 / 10 N/mm ²	w/w w/d	2,5	4,5	4,5	4,5	2,5	4,5	4,5	4,5	2,5	4,5
	d/d	4,0	6,5	6,5	6,5	4,0	6,5	6,5	6,5	4,0	6,5
25 / 20 N/mm ²	w/w w/d	4,0	6,5	6,5	6,5	4,0	6,5	6,5	6,5	4,0	6,5
	d/d	5,0	9,0	9,0	9,0	5,0	9,0	9,0	9,0	5,0	9,0

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C17

Appendix 45 / 155

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

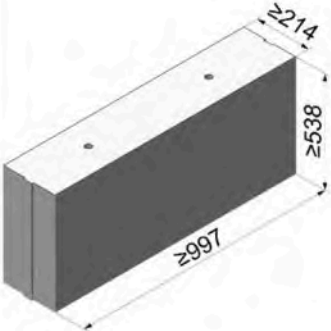
	Producer	e.g. Calduran		
	Nominal dimensions [mm]	length L	width W	height H
		≥ 997	≥ 214	≥ 538
	Mean gross dry density ρ [kg/dm ³]	1,8		2,2
	Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²]	12,5 / 10 or 25 / 20		45 / 36
Standard or annex		EN 771-2:2011+A1:2015		



Table C18.1: Installation parameters

Anchor rod	M6		M8		M10		M12		M16		-		-		
Internal threaded anchor FIS E	-		-		-		-		-		M6		M8	M10	M12
											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 $\max T_{inst}$	[Nm]	4		10								4	10		
General installation parameters															
Edge distance $C_{min} = C_{cr}$	[mm]	75													
Spacing $s_{cr \parallel} = s_{min \parallel}$		3x h_{ef}													
		$s_{cr \perp} = s_{min \perp}$	3x h_{ef}												
Drilling method															
Hammer drilling with hard metal hammer drill															

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

Table C18.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C18

Appendix 46 / 155

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]										85
		50	100	50	100	50	100	50	100	50	100	
12,5 / 10 N/mm ²	w/w w/d	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/mm ²	w/w w/d	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/mm ²	w/w w/d	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h _{ef} [mm]									
		≥ 50					85				
12,5 / 10 N/mm ²	w/w w/d	3,0	5,0	5,5	4,0	4,0	3,0	5,0	5,5	4,0	
	d/d										
25 / 20 N/mm ²	w/w w/d	4,5	7,0	7,5	6,0	6,0	4,5	7,0	7,5	6,0	
	d/d										
45 / 36 N/mm ²	w/w w/d	4,5	9,0	11,0	12,0	12,0	4,5	9,0	11,0	12,0	
	d/d										

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

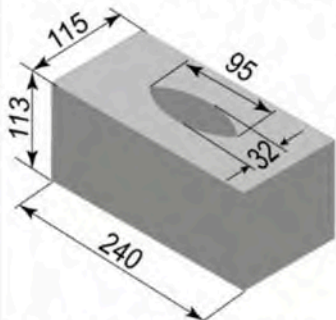
Performance

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

Annex C19

Appendix 47 / 155

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



Producer		-		
Nominal dimensions	[mm]	length L	width W	height H
		≥ 240	≥ 115	≥ 113
Mean gross dry density ρ	[kg/dm ³]	1,8		
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 installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T_{inst} [Nm]	2	4
--------------------------	---------------------	---	---

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	$\alpha_{g,N} (s_{min \parallel}) =$	[-]	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, Group factors

Annex C20

Appendix 48 / 155

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

Table C21.1: Installation parameters
(Push through installation 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}	[mm]	100	
Spacing	s _{min}		390	
	s _{cr}		390	
	s _{min} ⊥		390	
	s _{cr} ⊥		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	α _{g,N} (s _{min})	[-]	2	
	α _{g,V} (s _{min})			
	α _{g,N} (s _{min} ⊥)			
	α _{g,V} (s _{min} ⊥)			

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions											
12,5 / 10 N/mm ²	w/w	3,5	2,0	2,0	2,0	6,5	4,5					
	d/d	6,0	4,0	3,5	3,5	10,5	7,0					
25 / 20 N/mm ²	w/w	5,0	3,0	3,0	3,0	9,5	6,0					
	d/d	8,5	5,5	5,5	5,5	12,0	10,0					

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

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

Table C22.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions											
12,5 / 10 N/mm ²	w/w	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Solid calcium silicate brick KS, Characteristic resistance under tension loading

Annex C22

Appendix 50 / 155

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

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

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C ²⁾

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

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

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

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

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

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C ²⁾

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

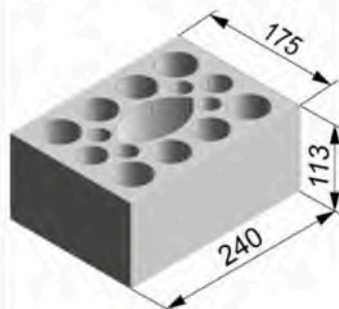
Performance

Solid calcium silicate brick KS, Characteristic resistance under shear loading

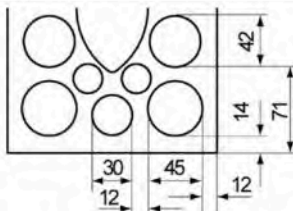
Annex C23

Appendix 51 / 155

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



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



Dimension see also Annex B15

Table C24.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6	M8	-	-	-	M10	M12	-	-	-
					11x85					15x85				
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x85	20x130	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}	60	80
Spacing	S _{min}	100	
	S _{cr} [mm]	240	
	S _{min} ⊥	115	
	S _{cr} ⊥	115	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x85	20x130	20x130

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C24

Appendix 52 / 155

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

Table C25.1: Installation parameters
(Push through installation 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}	[mm]	80	
Spacing	s _{min}		100	
	s _{cr}		240	
	s _{min} ⊥		115	
	s _{cr} ⊥		115	
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	$\alpha_{g,N} (s_{\text{min}} \parallel)$	[-]	1,5	
	$\alpha_{g,V} (s_{\text{min}} \parallel)$			
	$\alpha_{g,N} (s_{\text{min}} \perp)$		2,0	
	$\alpha_{g,V} (s_{\text{min}} \perp)$			

fischer injection system FIS V Plus for masonry

Performance

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

Annex C25

Appendix 53 / 155

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 installation)

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

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

Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions													
10 / 8 N/mm ²	w/w	w/d	1.5		2.0		2.0		2.0		2.0		2.0	
	d/d		1,5		2,0		2,5		2,5		2,5		2,5	
12,5 / 10 N/mm ²	w/w	w/d	2.0		2.0		2.5		2.5		2.5		2.5	
	d/d		2,0		2,5		3,0		3,0		3,0		3,0	
15 / 12 N/mm ²	w/w	w/d	2.5		2.5		3.0		3.0		3.0		3.0	
	d/d		2,5		3,0		3,5		3,5		3,5		3,5	
20 / 16 N/mm ²	w/w	w/d	3.0		3.5		4.5		4.5		4.5		4.5	
	d/d		3,5		4,0		4,5		4,5		4,5		4,5	
25 / 20 N/mm ²	w/w	w/d	4.0		4.5		5.5		5.5		5.5		5.5	
	d/d		4,5		5,0		6,0		6,0		6,0		6,0	

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

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

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

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

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

Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions													
10 / 8 N/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											
15 / 12 N/mm ²	w/w	w/d	3.0											
	d/d		3,5											
20 / 16 N/mm ²	w/w	w/d	4.5											
	d/d		4,5											
25 / 20 N/mm ²	w/w	w/d	5.5											
	d/d		6,0											

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C26

Appendix 54 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions														
10 / 8 N/mm²	w/w	w/d	1,5						3,0				2,5	3,0	2,5
	d/d	d/d													
12,5 / 10 N/mm²	w/w	w/d	2,0						3,5						
	d/d	d/d													
15 / 12 N/mm²	w/w	w/d	2,5						4,5				4,0	4,5	4,0
	d/d	d/d													
20 / 16 N/mm²	w/w	w/d	3,0	3,5	3,0	3,5	3,0	6,0				5,5	6,0	5,5	
	d/d	d/d													
25 / 20 N/mm²	w/w	w/d	4,0	4,5	4,0	4,5	4,0	7,5				6,5	7,5	6,5	
	d/d	d/d													

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

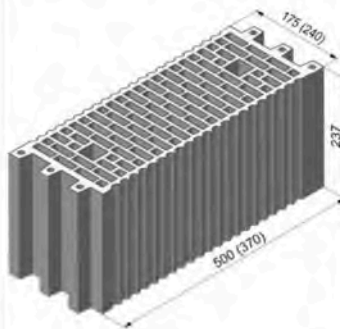
Performance

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

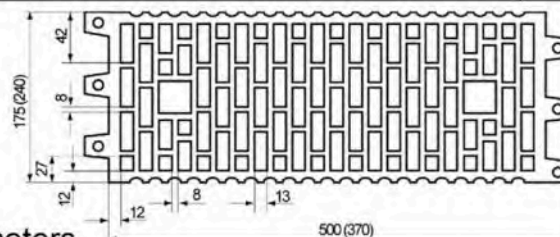
Annex C27

Appendix 55 / 155

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



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



Dimension see also Annex B15

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 11x85	-	-	-	-	M10 M12 15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x85	20x130	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
	$s_{cr \parallel}$ [mm]	500 (370)
	$s_{min \perp}$	100
	$s_{cr \perp}$	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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 11x85	-	-	-	-	M10 M12 15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x85	20x130	20x130

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C28

Appendix 56 / 155

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

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

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

Table 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								
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN]; temperature range 50/80°C and 72/120°C														
Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions													
5 / 4 N/mm²	w/w w/d d/d		0,50	0,60	0,50	0,60								
			0,75	0,90	0,75	0,90								
			0,90	1,20	0,90	1,20								
			1,20	1,50	1,20	1,50								
			1,50	2,00	1,50	2,00								

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

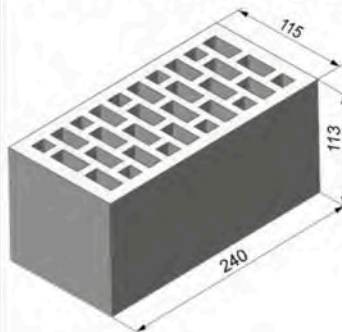
Performance

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

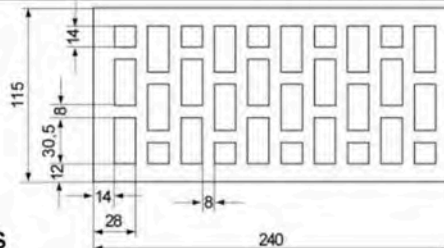
Annex C29

Appendix 57 / 155

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



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



Dimension see also Annex B15

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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

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

General installation parameters

Edge distance	$C_{min} = C_{cr}$	[mm]	80
Spacing	$S_{cr \parallel} = S_{min \parallel}$	[mm]	240
	$S_{cr \perp} = S_{min \perp}$	[mm]	115

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	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, 2DF, dimensions, installation parameters, Group factors

Annex C30

Appendix 58 / 155

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 11x85	M8	-	M10 15x85	M12	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions						
7,5 / 6 N/mm ²	w/w	w/d	0,75	0,90	0,75	0,90	
	d/d		0,75	1,20	0,75	0,90	
12,5 / 10 N/mm ²	w/w	w/d	1,20	1,50	1,20	1,50	
	d/d		1,20	2,00	1,20	1,50	
20 / 16 N/mm ²	w/w	w/d	2,00	2,50	2,00	2,50	
	d/d		2,00	3,00	2,00	2,50	
25 / 20 N/mm ²	w/w	w/d	2,50	3,50	2,50	3,00	
	d/d		2,50	4,00	2,50	3,00	
35 / 28 N/mm ²	w/w	w/d	3,00	5,00	3,50	4,00	
	d/d		3,50	5,50	3,50	4,50	

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

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

Table 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 11x85	M8	-	M10 15x85	M12	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions								
7,5 / 6 N/mm ²	w/w w/d d/d	1,2	1,5	1,2	2,0	1,2	1,5	2,5	
12,5 / 10 N/mm ²		2,0	2,5	2,0	4,0	2,0	2,5	4,5	
20 / 16 N/mm ²		3,0	3,5	3,0	6,0	3,0	3,5	7,0	
25 / 20 N/mm ²		4,0	4,5	4,0	7,5	4,0	4,5	8,5	
35 / 28 N/mm ²		5,0	6,5	5,0	9,5	5,0	6,5	12,0	

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

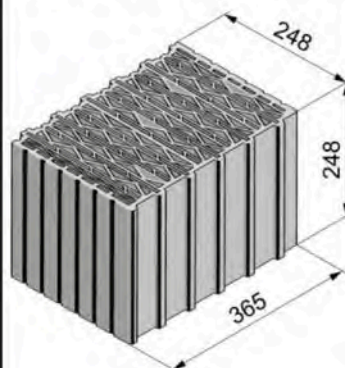
Performance

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

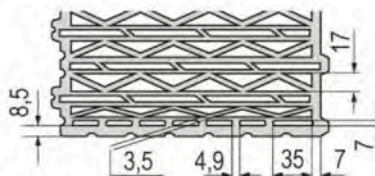
Annex C31

Appendix 59 / 155

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		248	365	248
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 B15

Table C32.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque max T _{inst} [Nm]	3	5	3	5	3	5	5									
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--

General installation parameters

Edge distance	C _{min} = C _{cr}	60														
Spacing	S _{min}	80														
	S _{cr} [mm]	250														
	S _{min} ⊥	80														
	S _{cr} ⊥	250														

Drilling method

Rotary drilling with carbide drill

¹⁾ The minimum 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})	[-]	1,3													
	$\alpha_{g,V}$ (S _{min})		1,2													
	$\alpha_{g,N}$ (S _{min} ⊥)		1,3													
	$\alpha_{g,V}$ (S _{min} ⊥)		1,0													

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, U8, dimensions, installation parameters, Group factors

Annex C32

Appendix 60 / 155

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

Table C33.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		250	
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	$\alpha_{g,N} (s_{\text{min}} \parallel)$	[-]	1,3	
	$\alpha_{g,V} (s_{\text{min}} \parallel)$		1,2	
	$\alpha_{g,N} (s_{\text{min}} \perp)$		1,3	
	$\alpha_{g,V} (s_{\text{min}} \perp)$		1,0	

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, U8, dimensions, installation parameters, Group factors

Annex C33

Appendix 61 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	
5 / 4 N/mm ²	w/w w/d	1,2
	d/d	1,5
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	
5 / 4 N/mm ²	w/w w/d	1,2
	d/d	1,5
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C34

Appendix 62 / 155

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 installation)

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 15x85	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	16x85	16x130	20x85	20x130	20x200								

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
5 / 4 N/mm ²	w/w w/d d/d	1,2
7,5 / 6 N/mm ²	w/w w/d d/d	1,5
10 / 8 N/mm ²	w/w w/d d/d	1,5

¹⁾ The minimum 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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
5 / 4 N/mm ²	w/w w/d d/d	1,2
7,5 / 6 N/mm ²	w/w w/d d/d	1,5
10 / 8 N/mm ²	w/w w/d d/d	1,5

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

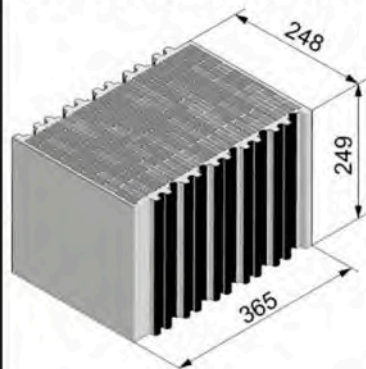
Performance

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

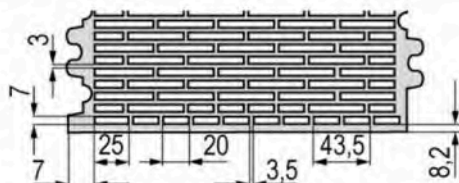
Annex C35

Appendix 63 / 155

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
		248	365	249
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 B16

Table C36.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

¹⁾ The minimum 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	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

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, Group factors

Annex C36

Appendix 64 / 155

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

Table C37.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		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, Group factors

Annex C37

Appendix 65 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C38

Appendix 66 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
10 / 8 N/mm ²	w/w w/d d/d	0,9	1,5	2,0
12,5 / 10 N/mm ²	w/w w/d d/d	0,9	1,5	2,0
15 / 12 N/mm ²	w/w w/d d/d	1,2	2,0	2,0

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

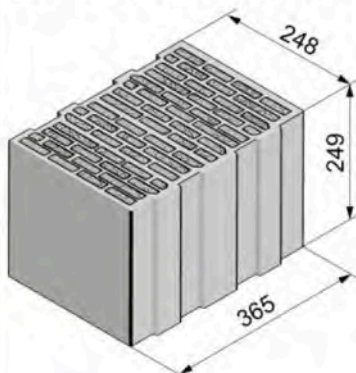
Performance

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

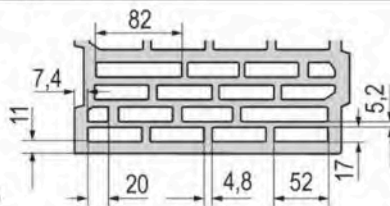
Annex C39

Appendix 67 / 155

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
		248	365	249
Mean gross dry density ρ	[kg/dm ³]	0,5		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	5 / 4 or 8 / 6		
Standard or annex		EN 771-1:2011+A1:2015		



Dimension see also Annex B16

Table C40.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T _{inst} [Nm]	2			5	2	5		
--------------------------	----------------------------	---	--	--	---	---	---	--	--

General installation parameters

Spacing	Edge distance	C _{min} = C _{cr}	60		
		S _{min}	80		
		S _{cr} [mm]	250		
		S _{min} ⊥	80		
		S _{cr} ⊥	250		

Drilling method

Rotary drilling with carbide drill

¹⁾ The minimum 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	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85			16x130			20x85		20x130		20x200	

Group factors	$\alpha_{g,N}$ (S _{min})	[-]	1,1		
	$\alpha_{g,V}$ (S _{min})		1,2		
	$\alpha_{g,N}$ (S _{min} ⊥)		1,1		
	$\alpha_{g,V}$ (S _{min} ⊥)		1,2		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C40

Appendix 68 / 155

Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015
Table C41.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		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		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C41

Appendix 69 / 155

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 installation)

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	12x85	16x85	16x130	20x85	20x130	20x200								

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions						
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		
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		2,0

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C42

Appendix 70 / 155

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 installation)

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	15x85	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200									

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

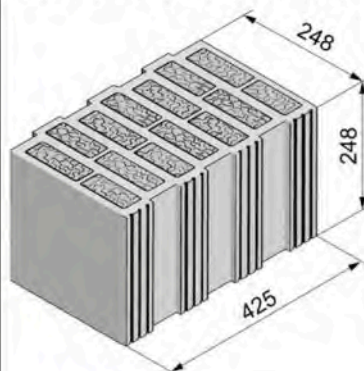
Performance

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

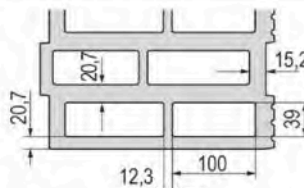
Annex C43

Appendix 71 / 155

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 B16

Table C44.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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
---	---	---	---	---

General installation parameters

Edge distance C _{min} = C _{cr}	60
S _{min} II	80
S _{cr} II [mm]	250
S _{min} ⊥	80
S _{cr} ⊥	250

Drilling method

Rotary drilling with carbide drill

¹⁾ The minimum 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	12x85	12x85	16x85	16x85	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x200	20x200	20x200

Group factors	α _{g,N} (S _{min} II)	1,3
	α _{g,V} (S _{min} II)	1,2
	α _{g,N} (S _{min} ⊥)	0,6
	α _{g,V} (S _{min} ⊥)	1,2

fischer injection system FIS V Plus for masonry

Performance

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

Annex C44

Appendix 72 / 155

Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015
Table C45.1: Installation parameters
 (Push through installation 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}	[mm]	60	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		250	
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, Group factors

Annex C45

Appendix 73 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions						
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

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 C46

Appendix 74 / 155

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 installation)

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

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

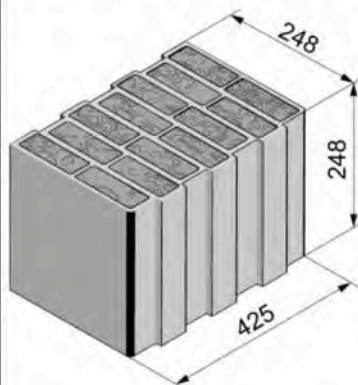
fischer injection system FIS V Plus for masonry

Performance

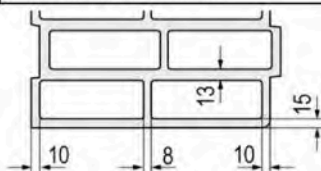
Vertical perforated brick HLz, T9 MW, filled with mineral wool;
Characteristic resistance under shear loading

Annex C47

Appendix 75 / 155

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 B16

Table C48.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T _{inst} [Nm]	2			5	2	5		
--------------------------	----------------------------	---	--	--	---	---	---	--	--

General installation parameters

Edge distance	C _{min} = C _{cr}	60		
Spacing	S _{min} II	80		
	S _{cr} II [mm]	250		
	S _{min} ⊥	80		
	S _{cr} ⊥	250		

Drilling method

Rotary drilling with carbide drill

¹⁾ The minimum 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} II)	[-]	1,9		
	$\alpha_{g,V}$ (S _{min} II)		0,9		
	$\alpha_{g,N}$ (S _{min} ⊥)		1,0		
	$\alpha_{g,V}$ (S _{min} ⊥)		0,7		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C48

Appendix 76 / 155

Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015
Table C49.1: Installation parameters

(Push through installation 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	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		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, Group factors

Annex C49

Appendix 77 / 155

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 installation)

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

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

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

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

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

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 C50

Appendix 78 / 155

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 installation)

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	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x130	20x200	20x200

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

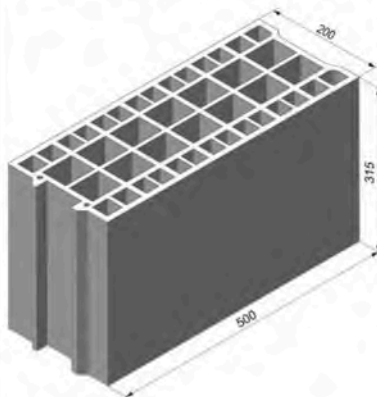
Performance

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

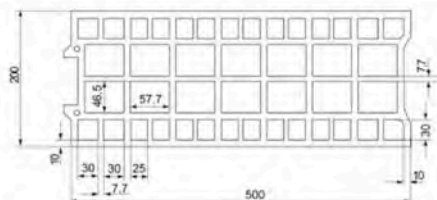
Annex C51

Appendix 79 / 155

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



Producer	e.g. Bouyer Leroux			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	315
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 B16

Table C52.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

Edge distance $C_{min} = C_{cr}$	[mm]	120												
Spacing $S_{min \parallel}$		120												
Spacing $S_{cr \parallel}$		500												
Spacing $S_{min \perp} = S_{cr \perp}$		315												

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	-	-				
			11x85	15x85										
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130		20x85			20x130			

Group factors	$\alpha_{g,N} (S_{min \parallel})$	[-]	1,3											
	$\alpha_{g,V} (S_{min \parallel})$		1,7											
	$\alpha_{g,N} (S_{min \perp})$		2,0											
	$\alpha_{g,V} (S_{min \perp})$													

fischer injection system FIS V Plus for masonry

Performance

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

Annex C52

Appendix 80 / 155

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

Table C53.1: Installation parameters
(Push through installation 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}	[mm]	120	
Spacing	s _{min}		120	
	s _{cr}		500	
	s _{min} ⊥ = s _{cr} ⊥		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	$\alpha_{g,N} (s_{\text{min II}})$	[-]	1,3	
	$\alpha_{g,V} (s_{\text{min II}})$		1,7	
	$\alpha_{g,N} (s_{\text{min } \perp})$		2,0	
	$\alpha_{g,V} (s_{\text{min } \perp})$			

fischer injection system FIS V Plus for masonry

Performance

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

Annex C53

Appendix 81 / 155

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 installation)

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

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

Mean compressive strength / Min. 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	
	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C54

Appendix 82 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions					
5 / 4 N/mm ²	w/w w/d d/d	1,5	0,9	1,5	2,5	0,9
7,5 / 6 N/mm ²	w/w w/d d/d	2,5	1,5	2,5	3,5	1,5
10 / 8 N/mm ²	w/w w/d d/d	3,5	2,0	3,5	4,5	2,0

¹⁾ The minimum 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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	
5 / 4 N/mm ²	w/w w/d d/d	0,9
7,5 / 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

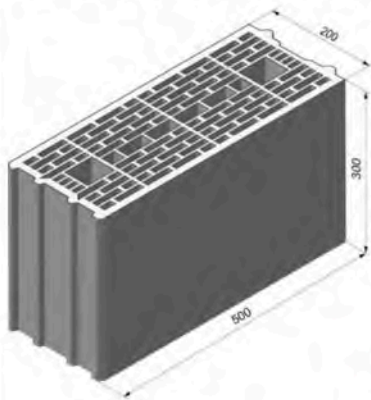
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

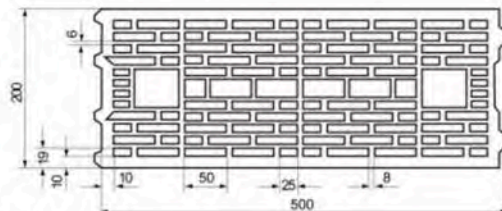
Annex C55

Appendix 83 / 155

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	300
Mean gross dry density ρ	[kg/dm ³]	≥ 0,7		
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 B17

Table C56.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

Edge distance $C_{min} = C_{cr}$	50													
Spacing	$S_{min} \parallel$	100												
	$S_{cr} \parallel$	500												
	$S_{min} \perp = S_{cr} \perp$	300												

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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											
	$\alpha_{g,V} (S_{min} \perp)$													

fischer injection system FIS V Plus for masonry

Performance

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

Annex C56

Appendix 84 / 155

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

Table C57.1: Installation parameters
(Push through installation 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}	[mm]	80	
Spacing	s _{min}		100	
	s _{cr}		500	
	s _{min} ⊥ = s _{cr} ⊥		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		
	$\alpha_{g,V} (s_{\min \parallel})$	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, Group factors

Annex C57

Appendix 85 / 155

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 installation)

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

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

Mean compressive strength / Min. 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
5 / 4 N/mm ²	w/w	w/d	1,2
	d/d		1,2
7,5 / 6 N/mm ²	w/w	w/d	1,5
	d/d		2,0
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C58

Appendix 86 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
5 / 4 N/mm ²	w/w w/d d/d	0,9	1,2	0,9	1,2	0,6	2,0	0,6	
7,5 / 6 N/mm ²	w/w w/d d/d	1,2	1,5	1,2	1,5	0,9	3,0	0,9	
10 / 8 N/mm ²	w/w w/d d/d	1,5	2,0	1,5	2,0	1,2	4,0	1,2	
12,5 / 10 N/mm ²	w/w w/d d/d	2,0	3,0	2,0	3,0	1,5	5,0	1,5	

¹⁾ The minimum 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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	
5 / 4 N/mm ²	w/w w/d d/d	0,6
7,5 / 6 N/mm ²	w/w w/d d/d	0,9
10 / 8 N/mm ²	w/w w/d d/d	1,2
12,5 / 10 N/mm ²	w/w w/d d/d	1,5

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

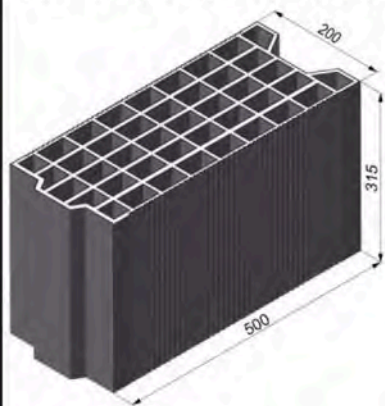
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

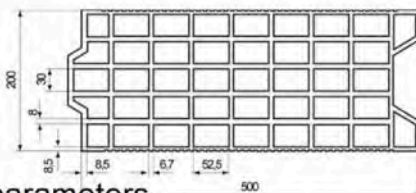
Annex C59

Appendix 87 / 155

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



Producer	e.g. Terreal			
Nominal dimensions	[mm]	length L	width W	height H
		500	200	315
Mean gross dry density ρ	[kg/dm ³]	≥ 0,7		
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 B17

Table C60.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	-		-	
					11x85						15x85					
Perforated sleeve FIS H K	12x50		12x85		16x85				16x130		20x85				20x130	

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

Performance

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

Annex C60

Appendix 88 / 155

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

Table C61.1: Installation parameters
(Push through installation 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}	[mm]	80	
Spacing	s _{min}		100	
	s _{cr}		500	
	s _{min} ⊥		100	
	s _{cr} ⊥		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

Performance

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

Annex C61

Appendix 89 / 155

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 installation)

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

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

Mean compressive strength / Min. 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	1,2		
	d/d				
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions		
2,5 / 2 N/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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C62

Appendix 90 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
2,5 / 2 N/mm ²	w/w d/d	0,30	0,60	0,3	0,60	0,60	0,90	0,75	
5 / 4 N/mm ²	w/w d/d	0,75	1,20	0,7	1,20	1,20	2,00	1,50	
7,5 / 6 N/mm ²	w/w d/d	0,90	2,00	0,9	2,00	1,50	3,00	2,00	
10 / 8 N/mm ²	w/w d/d	1,50	2,50	1,5	2,50	2,00	4,00	3,00	

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

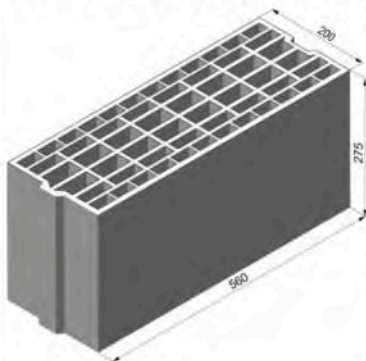
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

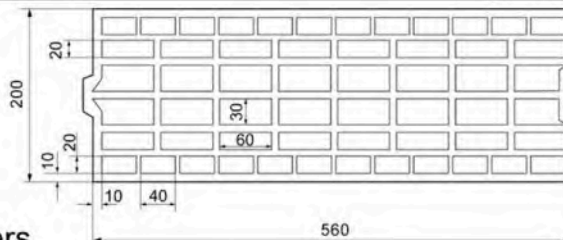
Annex C63

Appendix 91 / 155

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



Producer	e.g. Imery			
Nominal dimensions	[mm]	length L	width W	height H
		560	200	275
Mean gross dry density ρ	[kg/dm ³]	≥ 0,7		
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 B17

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					
General installation parameters								
Edge distance	C _{min} = C _{cr}	[mm]	80					
Spacing	s _{min} = s _{cr}		560					
	s _{min} ⊥ = s _{cr} ⊥		275					

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	$\alpha_{g,N} (S_{min})$	[-]	2					
	$\alpha_{g,V} (S_{min})$							
	$\alpha_{g,N} (S_{min} \perp)$							
	$\alpha_{g,V} (S_{min} \perp)$							

fischer injection system FIS V Plus for masonry

Performance

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

Annex C64

Appendix 92 / 155

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
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾							
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions						
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table 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
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,I} [kN]; temperature range 50/80°C and 72/120°C							
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions						
5 / 4 N/mm ²	w/w	w/d					
	d/d		0,9				
8 / 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

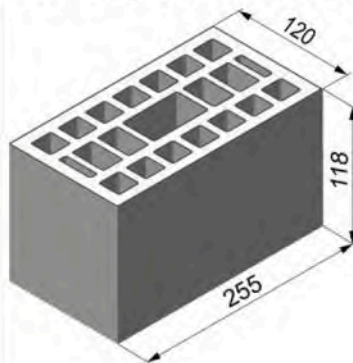
Performance

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

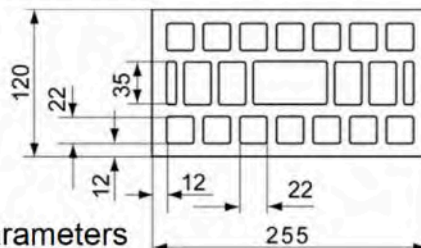
Annex C65

Appendix 93 / 155

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



Producer	e.g. Wienerberger			
Nominal dimensions	[mm]	length L	width W	height H
		255	120	118
Mean gross dry density ρ	[kg/dm ³]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	2,5 / 2 or 5 / 4 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 B18

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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}	[mm]	60
Spacing	S _{cr II} = S _{min II}	[mm]	255
	S _{cr ⊥} = S _{min ⊥}	[mm]	120

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

Group factors	$\alpha_{g,N} (S_{min II})$	$\alpha_{g,V} (S_{min II})$	$\alpha_{g,N} (S_{min ⊥})$	$\alpha_{g,V} (S_{min ⊥})$	[-]	2
---------------	-----------------------------	-----------------------------	----------------------------	----------------------------	-----	---

fischer injection system FIS V Plus for masonry

Performance

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

Annex C66

Appendix 94 / 155

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	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C 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: $N_{RK(72/120^\circ C)} = 0,83 \cdot N_{RK(50/80^\circ C)}$.

²⁾ The minimum 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 C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C67

Appendix 95 / 155

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	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- dition									
2,5 / 2 N/mm ²	w/w	w/d	0,60	0,75	0,60	0,75	0,90			
	d/d	d/d								
5 / 4 N/mm ²	w/w	w/d	1,20	1,50	1,20	1,50	2,00			
	d/d	d/d								
8 / 6 N/mm ²	w/w	w/d	2,00	2,00	2,00	2,00	2,50			
	d/d	d/d								
10 / 8 N/mm ²	w/w	w/d	2,50	3,00	2,50	3,00	3,50			
	d/d	d/d								
12,5 / 10 N/mm ²	w/w	w/d	3,00	3,50	3,00	3,50	4,50			
	d/d	d/d								
15 / 12 N/mm ²	w/w	w/d	4,00	4,50	4,00	4,50	5,50			
	d/d	d/d								

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

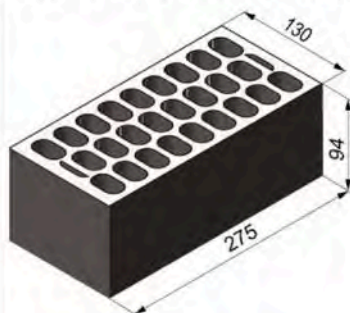
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

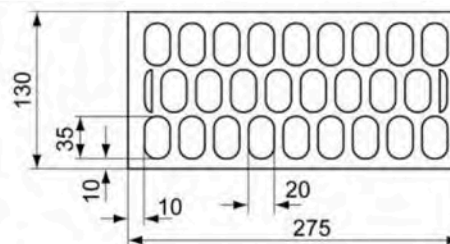
Annex C68

Appendix 96 / 155

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]	≥ 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 B18

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			15x85		
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}		100	120
Spacing	S _{cr II} = S _{min II}	[mm]	275	
	S _{cr ⊥} = S _{min ⊥}		95	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C69.2: 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										
	$\alpha_{g,V} (S_{min II})$												
	$\alpha_{g,N} (S_{min \perp})$												
	$\alpha_{g,V} (S_{min \perp})$												

fischer injection system FIS V Plus for masonry

Performance

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

Annex C69

Appendix 97 / 155

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	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions											
7,5 / 6 N/mm ²	w/w	w/d	0,40		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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C70

Appendix 98 / 155

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

Table C71.1: 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	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions											
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

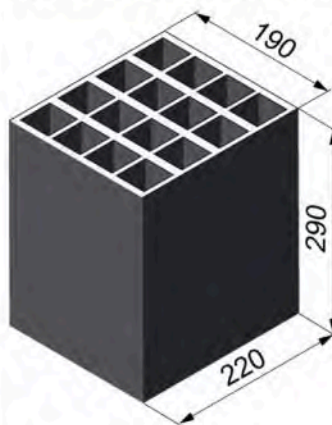
Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

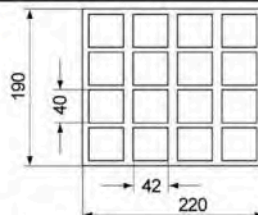
Annex C71

Appendix 99 / 155

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



Producer	e.g. Perceram			
Nominal dimensions	[mm]	length L	width W	height H
		220	190	290
Mean gross dry density ρ	[kg/dm ³]	≥ 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 B18

Table C72.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

Edge distance $c_{min} = c_{cr}$	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 minimum 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 11x85	-	-	-	-	M10 M12 15x85	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x130	16x130	16x130	20x85	20x85	20x130	20x130	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
---------------	--	-----	---

fischer injection system FIS V Plus for masonry

Performance

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

Annex C72

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

Table C73.1: Installation parameters
(Push through installation 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}	[mm]	110	
Spacing	s _{min} = s _{cr}		220	
	s _{min} ⊥ = s _{cr} ⊥		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	$\alpha_{g,N} (s_{\text{min II}})$	[-]	2	
	$\alpha_{g,V} (s_{\text{min II}})$			
	$\alpha_{g,N} (s_{\text{min } \perp})$			
	$\alpha_{g,V} (s_{\text{min } \perp})$			

fischer injection system FIS V Plus for masonry

Performance

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

Annex C73

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions						
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	
7,5 / 6 N/mm ²	w/w w/d	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C74

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 installation)

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

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

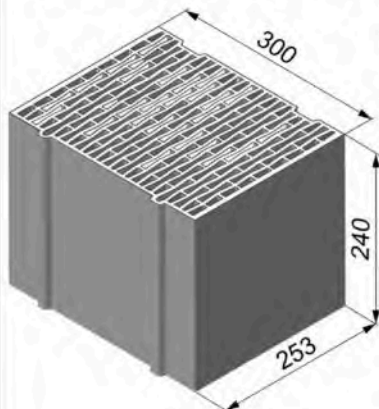
fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C75

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



Producer	e.g. Ziegelwerk Brenna			
Nominal dimensions	[mm]	length L	width W	height H
		253	300	240
Mean gross dry density ρ	[kg/dm ³]	≥ 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 B18

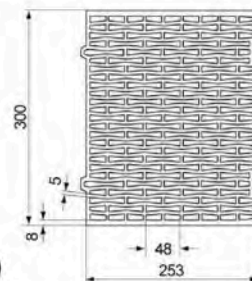


Table C76.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}	60
Spacing	S _{min} = S _{cr} [mm]	255
	S _{min} ⊥ = S _{cr} ⊥	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	11x85				15x85	15x85			
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x130

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C76

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

Table C77.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min} = s _{cr}		255	
	s _{min} ⊥ = s _{cr} ⊥		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	$\alpha_{g,N} (s_{min \parallel})$	[-]	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, Group factors

Annex C77

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 installation)

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

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

Mean compressive strength / Min. 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	
2,5 / 2 N/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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C78

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 installation)

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

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

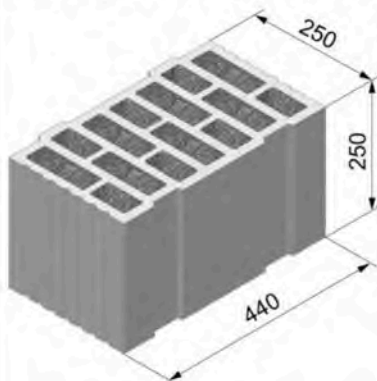
fischer injection system FIS V Plus for masonry

Performance

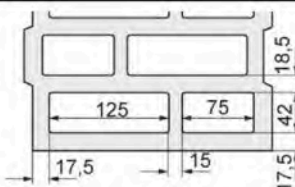
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C79

**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 B18

Table C80.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	-	-	M6	M8	-	-	-	M10	M12	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x200	20x200	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	6
--------------------------	----------------------------	---	---	---	---	---

General installation parameters

Edge distance	C _{min} = C _{cr}	60
Spacing	S _{min}	80
	S _{cr} [mm]	250
	S _{min} ⊥	80
	S _{cr} ⊥	250

Drilling method

Rotary drilling with carbide drill

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

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	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x85	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x200	20x200	20x200

Group factors	$\alpha_{g,N}$ (S _{min})	1,3
	$\alpha_{g,V}$ (S _{min})	1,3
	$\alpha_{g,N}$ (S _{min} ⊥)	0,8
	$\alpha_{g,V}$ (S _{min} ⊥)	1,3

fischer injection system FIS V Plus for masonry

Performance

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

Annex C80

Appendix 108 / 155

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

Table C81.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min}		80	
	s _{cr}		250	
	s _{min} ⊥		80	
	s _{cr} ⊥		250	
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	$\alpha_{g,N} (s_{\text{min}} \parallel)$	[-]	1,3	
	$\alpha_{g,V} (s_{\text{min}} \parallel)$		1,3	
	$\alpha_{g,N} (s_{\text{min}} \perp)$		0,8	
	$\alpha_{g,V} (s_{\text{min}} \perp)$		1,3	

fischer injection system FIS V Plus for masonry

Performance

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

Annex C81

**Vertical perforated brick HLz, Porothersm 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 installation)

Anchor rod	M6	M8	M6	M8	-	M8	M10	M8	M10	-	M12	M16	M12	M16	M12	M16
Internal threaded anchor FIS E	-	-	M6	M8	-	-	M10	M12	-	-	-	-	-	-	-	-
			11x85	15x85												
Perforated sleeve FIS H K	12x50	12x85	16x85			16x130	20x85			20x130	20x200					
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾																
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

Anchor rod		M10		M12		M16	
Perforated sleeve FIS H K		18x130/200				22x130/200	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾							
Mean compressive strength / Min. compressive strength single brick ¹⁾		Use con- ditions					
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C82

**Vertical perforated brick HLz, Porothersm 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 installation)

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	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x200	20x200	20x200

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

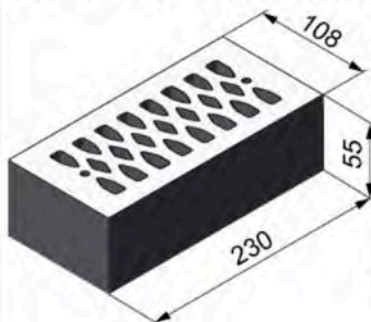
Performance

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

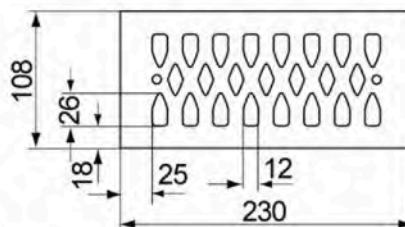
Annex C83

Appendix 111 / 155

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



Producer	e.g. Wienerberger.			
Nominal dimensions	[mm]	length L	width W	height H
		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 B18

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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	20x85

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

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

General installation parameters

Edge distance	C _{min} = C _{cr}		60
	S _{min} II		80
Spacing	S _{cr} II	[mm]	230
	S _{min} ⊥		60
	S _{cr} ⊥		60

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	12x85	12x85	16x85	16x85	16x85	20x85	20x85	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, dimensions, installation parameters, Group factors

Annex C84

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 loading ¹⁾

Anchor rod	M6	M8	M6	M8	-		M8	M10	-		M12	M16
Internal threaded anchor FIS E	-		-		M6	M8	-		M10	M12	-	
					11x85				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ³⁾												
Mean compressive strength / Min. compressive strength single brick ²⁾	Use con- ditions											
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 use condition w/w, the characteristic value shall be reduced with the factor 0,64.

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

³⁾ For temperature range 72/120°C: N_{Rk} (72/120°C) = 0,83 · 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				15x85			
Perforated sleeve FIS H K	12x50		12x85		16x85				20x85			
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,I} [kN]; temperature range 50/80°C and 72/120°C												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C123.

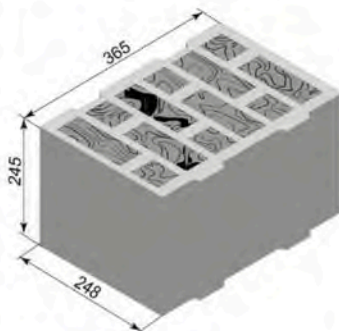
fischer injection system FIS V Plus for masonry

Performance

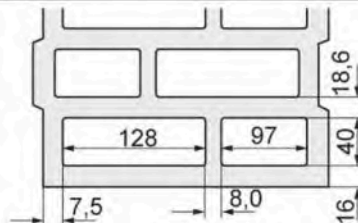
Vertical perforated brick HLz, Characteristic resistance under tension and shear loading

Annex C85

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



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



Dimension see also Annex B19

Table C86.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

General installation parameters

Edge distance	$c_{min} = c_{cr}$	100
Spacing	$s_{min II}$	250
	$s_{cr II}$ [mm]	
	$s_{min \perp}$	245
	$s_{cr \perp}$	

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	$\alpha_{g,N} (s_{min \parallel}) =$	[-]	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 filled with mineral wool, dimensions, installation parameters, Group factors

Annex C86

Appendix 114 / 155

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

Table C87.1: Installation parameters
(Push through installation 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}	[mm]	100	
Spacing	s _{min}		250	
	s _{cr}			
	s _{min} ⊥		245	
s _{cr} ⊥				
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	$\alpha_{g,N} (s_{\text{min}} \parallel)$	2		
	$\alpha_{g,V} (s_{\text{min}} \parallel)$			
	$\alpha_{g,N} (s_{\text{min}} \perp)$			
	$\alpha_{g,V} (s_{\text{min}} \perp)$			

fischer injection system FIS V Plus for masonry

Performance

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

Annex C87

Appendix 115 / 155

Vertical perforated brick HLz 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 installation)

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

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

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

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

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

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C88

Vertical perforated brick HLz 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 installation)

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

 $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; 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	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	1,5	1,5	1,5

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

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

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

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

 $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C ²⁾

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

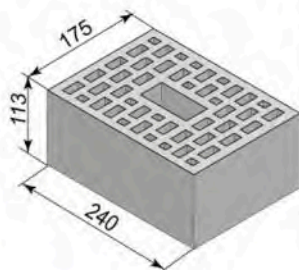
Performance

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

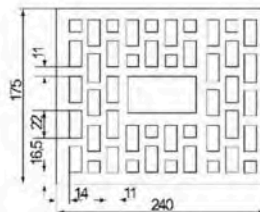
Annex C89

Appendix 117 / 155

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 B19

Table C90.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	$\alpha_{g,N} (S_{min}) =$	[-]	2								
	$\alpha_{g,V} (S_{min})$										
	$\alpha_{g,N} (S_{min} \perp) =$										
	$\alpha_{g,V} (S_{min} \perp)$										

fischer injection system FIS V Plus for masonry

Performance

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

Annex C90

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

Table C91.1: Installation parameters
(Push through installation 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}	[mm]	100	
Spacing	s _{min}		240	
	s _{cr}			
	s _{min} ⊥		115	
s _{cr} ⊥				
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	$\alpha_{g,N} (s_{\min \parallel})$	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, Group factors

Annex C91

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 installation)

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

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

Mean compressive strength/ Min. compressive strength single brick ¹⁾	Use con- ditions					
12,5 / 10 N/mm ²	w/w	3,5	4,0	4,5	4,5	4,0
	d/d	4	4,5	5,0	5,0	4,0

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

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

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

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

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

Mean compressive strength/ Min. compressive strength single brick ¹⁾	Use con- ditions		
12,5 / 10 N/mm ²	w/w	4,5	4,0
	d/d	5,0	4,0

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

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

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 tension loading

Annex C92

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 installation)

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

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; 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	8,0	6,0	8,0
	d/d	4,0	5,5	4,0	5,5	5,5	7,0	5,5	7,0	7,0	6,0	6,0	8,0	6,0	8,0

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

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

Table C93.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through installation)

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

$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C ²⁾

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions			
12,5 / 10 N/mm ²	w/w	7,0	6,0	8,0
	d/d	7,0	6,0	8,0

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

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

Factor for job site tests and displacements see annex C123

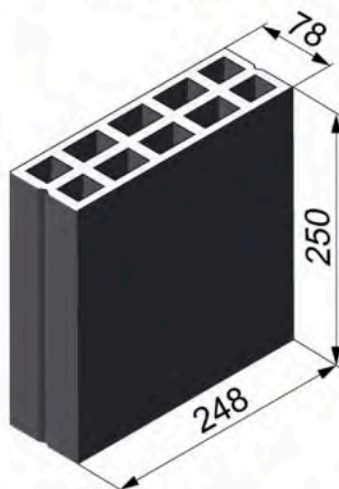
fischer injection system FIS V Plus for masonry

Performance

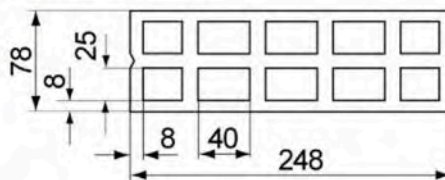
Vertical perforated brick HLz, Characteristic resistance under shear loading

Annex C93

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



Producer	-			
Nominal dimensions	[mm]	length L	width W	height H
		250	78	248
Mean gross dry density ρ	[kg/dm ³]	≥ 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 B19

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}		75
Spacing	S _{cr}		250
	S _{min} ⊥ = S _{cr} ⊥		250
Drilling method			

Hammer drilling with hard metal hammer drill

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

Table C94.2: Group factors

Anchor rod	M6		M8
Perforated sleeve FIS H K	12x50		
Group factors	$\alpha_{g,N} (S_{min})$	[-]	1,6
	$\alpha_{g,V} (S_{min})$		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, Group factors

Annex C94

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	
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾			
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength..

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

Table 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			
V _{RK} = V _{RK,b} = V _{RK,c,II} = V _{RK,c,I} [kN]; temperature range 50/80°C and 72/120°C					
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions				
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

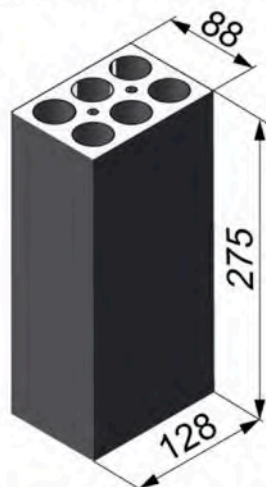
fischer injection system FIS V Plus for masonry

Performance

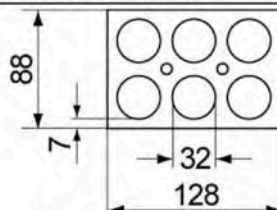
Horizontal perforated brick LLz, Characteristic resistance under tension and shear loading

Annex C95

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]	≥ 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 B19

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}	[mm]	60
Spacing	s _{min}		75
	s _{cr}		275
	s _{min} ⊥		75
	s _{cr} ⊥		130

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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, Group factors

Annex C96

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			
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾					
Mean compressive strength / Min. compressive strength single brick ¹⁾		Use con- ditions			
2,5 / 2 N/mm ²	w/w	w/d	1,5		
	d/d				

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

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

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			
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C					
Mean compressive strength / Min. compressive strength single brick ¹⁾		Use con- ditions			
2,5 / 2 N/mm ²	w/w	w/d	1,2		
	d/d				

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

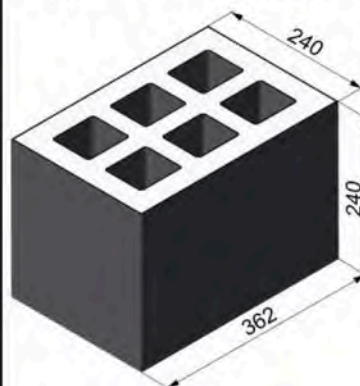
Performance

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

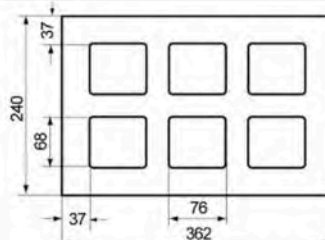
Annex C97

Appendix 125 / 155

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



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



Dimension see also Annex B19

Table C98.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

General installation parameters

Edge distance	C _{min} = C _{cr}	60
Spacing	S _{min}	100
	S _{cr}	362
	S _{min} ⊥ = S _{cr} ⊥	240

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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 11x85	-	-	-	-	M10 M12 15x85	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50		12x85		16x85		16x130		20x85		20x130		20x200			

Group factors	$\alpha_{g,N}$ (S _{min})	[-]	1,2
	$\alpha_{g,V}$ (S _{min})		1,1
	$\alpha_{g,N}$ (S _{min} ⊥)		2,0
	$\alpha_{g,V}$ (S _{min} ⊥)		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C98

Appendix 126 / 155

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

Table C99.1: Installation parameters
(Push through installation 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}	[mm]	60	
Spacing	s _{min}		100	
	s _{cr}		362	
	s _{min} ⊥ = s _{cr} ⊥		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, Group factors

Annex C99

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions			
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

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

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

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

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 C100

Appendix 128 / 155

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 installation)

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	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x85	20x130	20x130	20x130	20x200	20x200

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

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

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

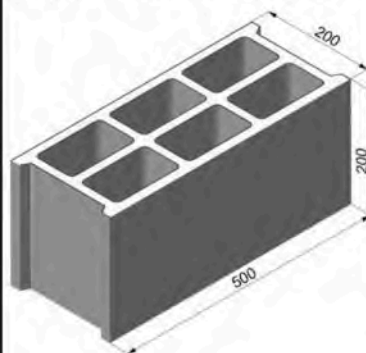
Performance

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

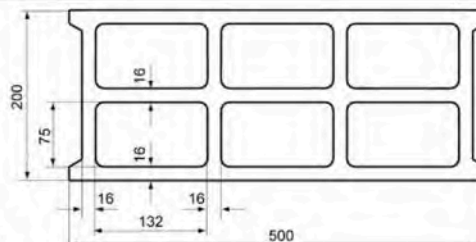
Annex C101

Appendix 129 / 155

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
		500	200	200
Mean gross dry density ρ	[kg/dm ³]	≥ 1,0		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm ²]	2,5 / 2 or 5 / 4 or 8 / 6		
Standard or annex	EN 771-1:2011+A1:2015			



Dimension see also Annex B19

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 11x85	-	-	-	-	-	-	M10 M12 15x85	-	-
Perforated sleeve FIS H K	12x50	12x85	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
--	---	---

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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 11x85	-	-	-	-	-	-	M10 M12 15x85	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	16x85	16x130	18x130/200	20x85							

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

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

Annex C102

Appendix 130 / 155

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								

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	use conditions	
2,5 / 2 N/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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table 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								

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use 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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

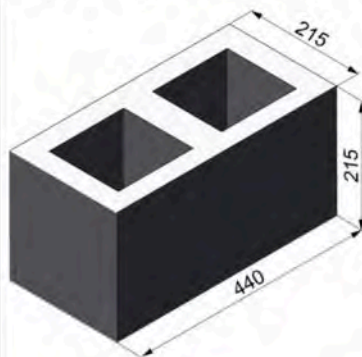
Performance

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

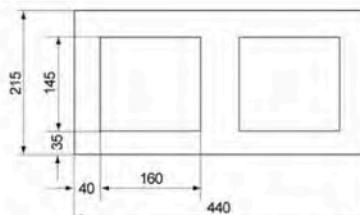
Annex C103

Appendix 131 / 155

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



Producer	e.g. Roadstone wood			
Nominal dimensions	[mm]	length L	width W	height H
		440	215	215
Mean gross dry density ρ	[kg/dm ³]	≥ 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 B20

Table C104.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

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

General installation parameters

Edge distance	$C_{min} = C_{cr}$	110
	$S_{min II}$	100
	$S_{cr II}$ [mm]	440
	$S_{min \perp}$	100
	$S_{cr \perp}$	215

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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					
Perforated sleeve FIS H K	12x50		12x85		16x85				16x130		20x85				20x130	

Group factors	$\alpha_{g,N} (S_{min II})$	[-]	1,4
	$\alpha_{g,V} (S_{min II})$		2,0
	$\alpha_{g,N} (S_{min \perp})$		1,4
	$\alpha_{g,V} (S_{min \perp})$		1,2

fischer injection system FIS V Plus for masonry

Performance

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

Annex C104

Appendix 132 / 155

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

Table C105.1: Installation parameters

(Push through installation 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}	[mm]	110	
Spacing	s _{min}		100	
	s _{cr}		440	
	s _{min} ⊥		100	
	s _{cr} ⊥		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		

fischer injection system FIS V Plus for masonry

Performance

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

Annex C105

Appendix 133 / 155

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 installation)

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								

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

Mean compressive strength / Min. comp. strength single brick ¹⁾	Use conditions			
5 / 4 N/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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

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

Annex C106

Appendix 134 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions												
5 / 4 N/mm ²	w/w	w/d	0,75	1,20	0,75	1,20	0,75						
	d/d	d/d											
8 / 6 N/mm ²	w/w	w/d	1,20	2,00	1,20	2,00	1,20						
	d/d	d/d											
10 / 8 N/mm ²	w/w	w/d	1,50	2,50	1,50	2,50	1,50						
	d/d	d/d											
12,5 / 10 N/mm ²	w/w	w/d	2,00	3,00	2,00	3,00	2,00						
	d/d	d/d											

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

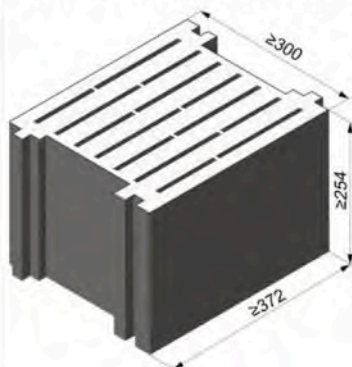
Performance

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

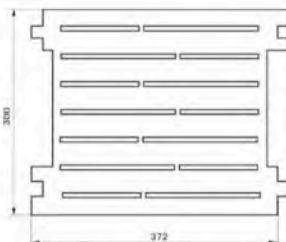
Annex C107

Appendix 135 / 155

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
		≥ 372	≥ 300	≥ 254
Mean gross dry density ρ	[kg/dm³]	≥ 0,6		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	2,5 / 2		
Standard or annex	EN 771-3:2011+A1:2015			



Dimension see also Annex B20

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						
General installation parameters									
Edge distance	C _{min} = C _{cr}	[mm]	130						
Spacing	S _{min} = S _{cr}		370						
	S _{min} ⊥ = S _{cr} ⊥		250						

Drilling method

Hammer drilling with hard metal hammer drill

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

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

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C108

Appendix 136 / 155

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	
N _{Rk} = N _{Rk,p} = N _{Rk,b} = N _{Rk,p,c} = N _{Rk,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick ¹⁾			Use conditions									
2,5 / 2 N/mm ²			w/w	w/d	2,0			2,5			3,0	
			d/d		2,0			3,0			4,0	

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

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

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
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C									
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions								
2,5 / 2 N/mm ²	w/w	w/d	4,5				6,5		
	d/d								

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

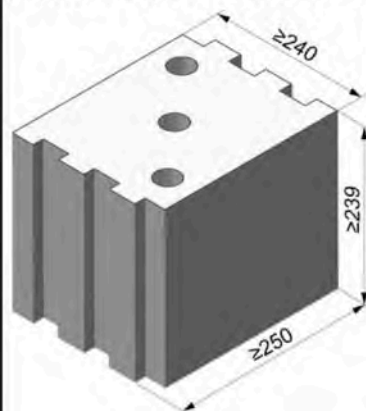
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

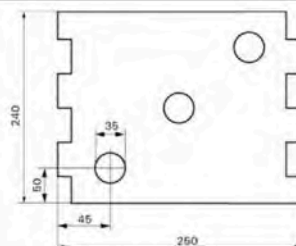
Annex C109

Appendix 137 / 155

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	KLB			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 250	≥ 240	≥ 239
Mean gross dry density ρ	[kg/dm³]	≥ 1,6		
Mean compressive strength / Min. compressive strength single brick ¹⁾	[N/mm²]	5 / 4 or 8 / 6 or 10 / 8		
Standard or annex	EN 771-3:2011+A1:2015			



Dimension see also Annex B20

Table C110.1: Installation parameters
(Pre-positioned installation with perforated sleeve FIS H K)

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

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

Max. installation torque	max T _{inst} [Nm]	4
--------------------------	----------------------------	---

General installation parameters

Edge distance	C _{min} = C _{cr}	130
Spacing	S _{min} = S _{cr} [mm]	250
	S _{min} ⊥ = S _{cr} ⊥	250

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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	-	-	-	-	-	-
					11x85					15x85						
Perforated sleeve FIS H K	12x50		12x85		16x85		16x130		20x85		20x130		20x200			

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

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C110

Appendix 138 / 155

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C111.1: Installation parameters

(Push through installation 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} = s _{cr}	250	
	s _{min} ⊥ = s _{cr} ⊥	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	$\alpha_{g,N} (s_{min \parallel})$	[-]	2,0
	$\alpha_{g,V} (s_{min \parallel})$		
	$\alpha_{g,N} (s_{min \perp})$		
	$\alpha_{g,V} (s_{min \perp})$		

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, dimensions, installation parameters, Group factors

Annex C111

Appendix 139 / 155

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 installation)

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 15x85	-	-	-	-	-	-
Perforated sleeve FIS H K	12x50	12x85	12x85	12x85	16x85	16x130	16x130	16x130	16x130	20x85	20x130	20x130	20x130	20x130	20x200	20x200

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

Mean compressive strength/ Min. compressive strength single brick ¹⁾	Use con- ditions						
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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

Table C112.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through installation)

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

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

Mean compressive strength/ Min. compressive strength single brick ¹⁾	Use con- ditions				
5 / 4 N/mm ²	w/w w/d	2,5	3,0		
	d/d	4,0	5,0		
8 / 6 N/mm ²	w/w w/d	4,0	5,0		
	d/d	6,5	7,5		
10 / 8 N/mm ²	w/w w/d	5,0	6,5		
	d/d	8,5	9,0		

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, Characteristic resistance under tension loading

Annex C112

Appendix 140 / 155

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 installation)

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

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

Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions															
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	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	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	d/d														

¹⁾ The minimum 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 installation)

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

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

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

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

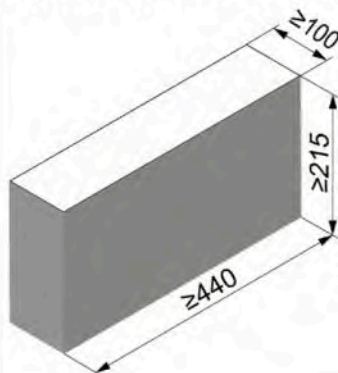
Performance

Light-weight concrete solid block Vbl, Characteristic resistance under shear loading

Annex C113

Appendix 141 / 155

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	Roadstone wood			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 440	≥ 100	≥ 215
Mean gross dry density ρ	[kg/dm ³]	≥ 2,0		
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			

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	70	50	70	50	70
Max. installation torque	$\max T_{inst}$	[Nm]	4		10							
General installation parameters												
Edge distance	$c_{min} = c_{cr}$	[mm]	100									
Spacing	$s_{min} \parallel$		75									
	$s_{cr} \parallel$		$3 \times h_{ef}$									
	$s_{min} \perp$		75									
	$s_{cr} \perp$		$3 \times h_{ef}$									

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C114.2: Group factors

Anchor rod		M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,6				
	$\alpha_{g,V} (s_{min \parallel})$	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, Group factors

Annex C114

Appendix 142 / 155

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
$N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN]; temperature range 50/80°C ²⁾						
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]				
		≥ 50				
5 / 4 N/mm²	w/w w/d	1,2		1,2		
	d/d	2,0		2,0		
8 / 6 N/mm²	w/w w/d	1,5		2,0		
	d/d	3,0		3,5		
10 / 8 N/mm²	w/w w/d	2,0		2,5		
	d/d	4,0		4,5		
12,5 / 10 N/mm²	w/w w/d	3,0		3,5		
	d/d	5,0		5,5		

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

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

Table 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
$V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C						
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use conditions	Effective anchorage depth h_{ef} [mm]				
		≥ 50				
5 / 4 N/mm²	w/w w/d	1,2	1,5	1,5	1,5	1,5
	d/d					
8 / 6 N/mm²	w/w w/d	2,0	2,0	2,5	2,5	2,5
	d/d					
10 / 8 N/mm²	w/w w/d	2,5	2,5	3,0	3,0	3,5
	d/d					
12,5 / 10 N/mm²	w/w w/d	3,0	3,5	4,0	4,0	4,5
	d/d					

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

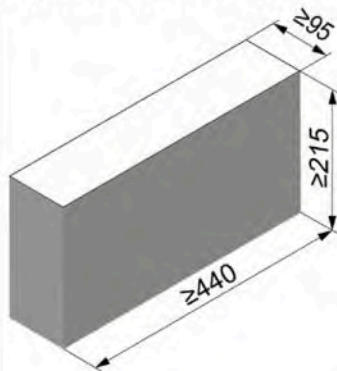
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C115

Appendix 143 / 155

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



Producer	Tramac			
Nominal dimensions	[mm]	length L	width W	height H
		≥ 440	≥ 95	≥ 215
Mean gross dry density ρ	[kg/dm ³]	≥ 2,0		
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	70	50	70	50	70
Max. installation torque	$\max T_{inst}$	[Nm]	4		10							
General installation parameters												
Edge distance	$c_{min} = c_{cr}$	[mm]	60									
Spacing	$s_{min} \parallel$		75									
	$s_{cr} \parallel$		3x h_{ef}									
	$s_{min} \perp$		75									
	$s_{cr} \perp$		3x h_{ef}									

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C116.2: Group factors

Anchor rod		M6	M8	M10	M12	M16
Group factors	$\alpha_{g,N} (s_{min \parallel})$	1,9				
	$\alpha_{g,V} (s_{min \parallel})$	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, Group factors

Annex C116

Appendix 144 / 155

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	
N _{RK} = N _{RK,p} = N _{RK,b} = N _{RK,p,c} = N _{RK,b,c} [kN]; temperature range 50/80°C ²⁾												
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		Effective anchorage depth h _{ef} [mm]									
			50	70	50	70	50	70	50	70	50	70
7,5 / 6 N/mm ²	w/w	w/d	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0	1,5	2,0
	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/mm ²	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/mm ²	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/mm ²	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 minimum compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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
V _{Rk} = V _{Rk,b} = V _{Rk,c,II} = V _{Rk,c,⊥} [kN]; temperature range 50/80°C and 72/120°C							
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions		Effective anchorage depth h _{ef} [mm] ≥ 50				
7,5 / 6 N/mm ²	w/w	w/d	2,0	2,0	2,0	1,5	1,5
	d/d						
10 / 8 N/mm ²	w/w	w/d	2,5	2,5	3,0	2,5	2,5
	d/d						
12,5 / 10 N/mm ²	w/w	w/d	3,5	3,5	4,0	3,0	3,0
	d/d						
15 / 12 N/mm ²	w/w	w/d	4,0	4,0	4,5	3,5	3,5
	d/d						

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C117

Appendix 145 / 155

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 11x85	M8 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	85	
Max. installation torque	$\max T_{inst}$	[Nm]	1	4	1	8	2	12	2	16	2	20	1	2

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C118

Appendix 146 / 155

Table C119.1: Group factors for autoclaved aerated concrete
(Min. compressive strength single brick = 2 N/mm²)

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

¹⁾ No performance assessed.

Table C119.2: Group factors for autoclaved aerated concrete
(Min. compressive strength single brick = 4 N/mm²)

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

¹⁾ No performance assessed.

Table C119.3: Group factors for autoclaved aerated concrete
(Min. compressive strength single brick = 6 N/mm²)

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

¹⁾ No performance assessed.

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (cylindrical drill hole), Group factors

Annex C119

Appendix 147 / 155

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 11x85	M8 15x85

$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C³⁾

Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions	Effective anchorage depth h_{ef} [mm]											
		100	200	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm²	w/w	1,2	1,2	1,5	2,0	1,5	3,0	1,5	3,0	2,0	3,0	1,5	1,5
	d/d	1,5	3,0	1,5	3,0	1,5	3,5	2,0	4,0	2,0	4,0	1,5	1,5
5 / 4 N/mm²	w/w	1,2	- ¹⁾	2,0	1,5	2,5	3,5	2,5	3,5	2,0	3,5	2,0	1,5
	d/d	1,5	- ¹⁾	2,0	3,0	3,0	5,0	2,5	5,0	2,0	5,0	2,0	1,5
8 / 6 N/mm²	w/w	1,5	- ¹⁾	3,0	2,5	4,5	5,0	4,5	7,0	3,0	8,5	3,5	2,5
	d/d	1,5	- ¹⁾	3,5	4,0	5,0	7,0	5,0	9,0	3,0	11,5	3,5	2,5

¹⁾ No performance assessed.

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

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

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 11x85	M8 15x85

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

Mean compressive strength / Min. compressive strength single brick ²⁾	Use conditions	Effective anchorage depth h_{ef} [mm]											
		100	200	100	200	100	200	100	200	100	200	85	
2,5 / 2 N/mm²	w/w	1,2	1,2	1,2	1,2	1,2	1,2	1,5	1,2	1,2	1,2	1,2	1,5
	d/d	1,2	1,2	1,2	1,2	1,2	1,2	1,5	1,2	1,2	1,2	1,2	1,5
5 / 4 N/mm²	w/w	2,0	- ¹⁾	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0	2,5
	d/d	2,0	- ¹⁾	2,5	2,0	2,0	2,0	2,5	2,0	2,0	2,0	2,0	2,5
8 / 6 N/mm²	w/w	2,5	- ¹⁾	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5	3,5
	d/d	2,5	- ¹⁾	3,0	2,5	3,0	3,0	3,5	4,0	4,5	4,5	2,5	3,5

¹⁾ No performance assessed.

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (cylindrical drill hole),
Characteristic resistance under tension and shear loading

Annex C120

Appendix 148 / 155

**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		-	-	-	-	-	-	M6	M8	
								11x85		
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	$\max T_{inst}$	[Nm]	2							
General installation parameters										
Edge distance	$C_{min} = C_{cr}$		120	150	120	150	120	150	150	
Spacing	$s_{cr \parallel} = s_{min \parallel}$		[mm]	240	300	240	300	240	300	300
	$s_{cr \perp} = s_{min \perp}$			240	250	240	250	240	250	250

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C121.2: Group factors

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

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
dimensions, installation parameters, Group factors

Annex C121

Appendix 149 / 155

**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
$N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN]; temperature range 50/80°C ²⁾								
Mean compressive strength / Min. compressive strength single brick ¹⁾	Use con- ditions	Effective anchorage depth h_{ef} [mm]						
		75	95	75	95	75	95	85
2,5 / 2 N/mm²	w/w w/d	2,0	2,5	2,0	2,5	2,0	2,5	2,0
	d/d	2,0	2,5	2,0	2,5	2,0	2,5	2,0
5 / 4 N/mm²	w/w w/d	3,0	3,5	3,0	3,5	3,0	3,5	3,0
	d/d	3,0	3,5	3,0	3,5	3,0	3,5	3,0
8 / 6 N/mm²	w/w w/d	3,5	4,0	3,5	4,0	3,5	4,0	3,5
	d/d	4,0	4,5	4,0	4,5	4,0	4,5	4,0

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

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

Table C122.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

Anchor rod		M8		M10		M12		-
Internal threaded anchor FIS E		-	-	-	-	-	-	M6 M8
								11x85
$V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN]; temperature range 50/80°C and 72/120°C								
Mean compressive strength / Min. com-pressive strength single brick ¹⁾	Use con- ditions	Effective anchorage depth h_{ef} [mm]						
		75	95	75	95	75	95	85
2,5 / 2 N/mm²	w/w w/d	2,5						
	d/d							
5 / 4 N/mm²	w/w w/d	4,5						
	d/d							
8 / 6 N/mm²	w/w w/d	6,0						
	d/d							

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
Characteristic resistance under tension and shear loading

Annex C122

Appendix 150 / 155

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	β-factors			
solid units	M6	0,55	0,46	0,96	0,80
	M8	0,57	0,51		
	M10	0,59	0,52		
	M12 FIS E 11x85	0,60	0,54		
	M16 FIS E 15x85	0,62	0,52		
	FIS H 16x85 K	0,55	0,46		
hollow units	all sizes	0,86	0,72	0,96	0,80
Autoclaved aerated concrete cylindrical drill hole	all sizes	0,73	0,73	0,81	0,81
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} =100mm	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,82	0,88
hollow units	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,48	0,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,71	2,56
solid brick Mz NF Annex C4 - C7	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,74	1,48	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,23	1,85
solid brick KS NF Annex C14 / C15	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,20	0,40	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,91	1,37
AAC h _{ef} =200 mm Annex C118 - C120	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,03	2,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	1,25	1,88
brick Annex C102 / C103	$\frac{N_{Rk}}{1,4 \cdot \gamma_{Mm}}$	0,03	0,06	$\frac{V_{Rk}}{1,4 \cdot \gamma_{Mm}}$	6,44	9,66

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

fischer injection system FIS V Plus for masonry

Performance
β-factors for job site tests; displacements

Annex C123

Appendix 151 / 155

Table C124.1: Characteristic values under tension and shear loading under fire exposure; considering all failure modes

Brick		Solid brick Mz, NF, acc. to Annex C4			Solid calcium silicate brick KS, NF, acc. to Annex C14			Perforated calcium silicate brick KSL, acc. to Annex C24			Vertical perforated brick HLz, acc. to Annex C28			Vertical perforated brick HLz, acc. to Annex C30			Autoclaved aerated concrete, acc. to Annex C118			
Mean compressive strength / Min. comp. strength single brick ³⁾		≥ 15 / ≥ 12			≥ 15 / ≥ 12			≥ 10 / ≥ 8			≥ 5 / ≥ 4			≥ 7,5 / ≥ 6			≥ 2,5 / ≥ 2			
Size		M8	M10	M12	M8	M8	M8	M8	M10	M12	M8	M10	M12	M8	M10	M12	M8	M10	M12	M16
Perforated Sleeve		-			-			16x130		16x130	16x130		20x130	16x85		20x85	-			
Perforated Sleeve for bridging of unbearing layer		-			-			-		-	-		20x200	16x130		20x130	-			
h _{ef}	[mm]	≥ 80			≥ 50			≥ 130			≥ 130			≥ 85			≥ 100			

Characteristic resistance to failure under tension loading

[illegible]

Characteristic resistance to failure under shear loading ²⁾

without lever arm

[illegible]

with lever arm

[illegible]

General installation Parameters

Edge distance and spacing	$C_{cr,fi}$	[mm]	100	60	80	80	100	200
	$S_{cr,fi}$		320	200	520	340	520	400

¹⁾ No performance assessed.

$$2) V_{Rk,b,fi} = N_{Rk,b,fi}$$

³⁾ The minimum 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 $\gamma_{M,fi} = 1,0$.

fischer injection system FIS V Plus for masonry

Performance

Characteristic values under tension and shear loading under fire exposure (single anchor)

Annex C124

Appendix 152 / 155

Characteristic values under tension loading under fire exposure (anchor group)

Table C125.1: Characteristic values under tension loading under fire exposure; brick breakout failure ³⁾

Brick	Mean compressive strength / Min. comp. strength single brick ²⁾	h _{ef}	Spacing	M8				M10				M12				M16			
				N ^{gr} _{Rk,b,fi(90)}		N ^{gr} _{Rk,b,fi(120)}		N ^{gr} _{Rk,b,fi(90)}		N ^{gr} _{Rk,b,fi(120)}		N ^{gr} _{Rk,b,fi(90)}		N ^{gr} _{Rk,b,fi(120)}		N ^{gr} _{Rk,b,fi(90)}		N ^{gr} _{Rk,b,fi(120)}	
No. of anchors in a group:				2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
[-]	[N/mm ²]	[mm]	[-]	[kN]															
Solid brick MZ, NF acc. to Annex C4	≥ 15 / ≥ 12	≥ 80	Scr,fi	1,1	2,1	0,8	1,7	1,3	2,5	1,0	2,0	1,5	2,9	1,2	2,4	- ¹⁾			
			Scr,fi ⊥	1,4		1,1		1,7		1,3		2,0		1,6					
Solid calcium silicate brick KS, NF, acc. to Annex C14	≥ 15 / ≥ 12	≥ 50	Scr,fi	0,3	0,6	0,2	0,5	0,3	0,6	0,2	0,5	0,3	0,6	0,2	0,5	- ¹⁾			
			Scr,fi ⊥	0,9		0,7		0,9		0,7		0,9		0,7					
Perforated calcium silicate brick KSL, acc. to Annex C24	≥ 10 / ≥ 8	≥ 130	Scr,fi	1,4	2,7	1,1	2,2	1,4	2,7	1,1	2,2	1,4	2,7	1,1	2,2	- ¹⁾			
			Scr,fi ⊥	1,8		1,5		1,8		1,5		1,8		1,5					
Vertical perforated brick HLz, acc. to Annex C30	≥ 7,5 / ≥ 6	≥ 85	Scr,fi	0,4	0,9	0,4	0,7	0,4	0,9	0,4	0,7	0,5	1,1	0,4	0,9	- ¹⁾			
			Scr,fi ⊥	0,4		0,4		0,4		0,4		0,5		0,4					
Vertical perforated brick HLz, acc. to Annex C28	≥ 5 / ≥ 4	≥ 130	Scr,fi	0,4	0,4	0,3	0,3	0,4	0,4	0,3	0,3	0,5	0,5	0,4	0,4	- ¹⁾			
			Scr,fi ⊥	0,4		0,3		0,4		0,3		0,5		0,4					
Autoclaved aerated concrete acc. to Annex C118	Anchor rod			M8				M10				M12				M16			
	≥ 2,5 / ≥ 2	≥ 100	Scr,fi	1,1	2,1	0,8	1,7	1,1	2,1	0,8	1,7	1,1	2,1	0,8	1,7	1,4	2,8	1,1	2,2
			Scr,fi ⊥	1,1		0,8		1,1		0,8		1,1		0,8		1,4		1,1	
	Internal threaded anchor FIS E			11x85 M8				15x85 M10				15x85 M12				-			
	≥ 2,5 / ≥ 2	≥ 85	Scr,fi	0,9	1,8	0,7	1,4	0,9	1,8	0,7	1,4	0,9	1,8	0,7	1,4	- ¹⁾			
Scr,fi ⊥			0,9	0,7		0,9		0,7		0,9		0,7							

¹⁾ No performance assessed.

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

³⁾ All other proofs have to be conducted with the single anchor in accordance with TR 054.

In absence of national regulations, the recommended partial factor $\gamma_{M,fi} = 1,0$.

fischer injection system FIS V Plus for masonry

Performance

Characteristic values under tension loading under fire exposure (anchor group)

Annex C125

Appendix 153 / 155

Spacing and edge distance under fire exposure (anchor group)

Table C126.1: Spacing and Edge distance under fire exposure, brick breakout failure

Solid brick MZ, NF acc. to Annex C4

mean compressive strength / Min. compressive strength single brick $\geq 15 / \geq 12 \text{ N/mm}^2$

Anchor rod			M8		M10		M12	
Effective anchorage depth	h_{ef}	[mm]	80	200	80	200	80	200
Characteristic spacing	$s_{cr,fi} \parallel$		80	320	80	320	80	320
	$s_{cr,fi} \perp$		100	100	100	100	100	100
Edge distance	$c_{cr,fi}$		160	400	160	400	160	400

Solid calcium silicate brick KS, NF, acc. to Annex C14

mean compressive strength / Min. compressive strength single brick $\geq 15 / \geq 12 \text{ N/mm}^2$

Anchor rod			M8		M10		M12	
Effective anchorage depth	h_{ef}	[mm]	50	100	50	200	50	200
Characteristic spacing	$s_{cr,fi} \parallel$		107	107	107	107	107	107
	$s_{cr,fi} \perp$		200	400	200	800	200	800
Edge distance	$c_{cr,fi}$		100	200	100	400	100	400

Perforated calcium silicate brick KSL, acc. to Annex C24

mean compressive strength / Min. compressive strength single brick $\geq 10 / \geq 8 \text{ N/mm}^2$

Anchor rod / perforated sleeve			M8 / 16x130	M10 / 16x130	M12 / 20x130
Effective anchorage depth	h_{ef}	[mm]	130	130	130
Characteristic spacing	$s_{cr,fi} \parallel$		133	133	133
	$s_{cr,fi} \perp$		153	153	153
Edge distance	$c_{cr,fi}$		260	260	260

Vertical perforated brick HLz, acc. to Annex C30

mean compressive strength / Min. compressive strength single brick $\geq 7,5 / \geq 6 \text{ N/mm}^2$

Anchor rod / perforated sleeve			M8 / 16x85	M10 / 16x85	M12 / 20x85
Effective anchorage depth	h_{ef}	[mm]	85	85	85
Characteristic spacing	$s_{cr,fi} \parallel$		320	320	320
	$s_{cr,fi} \perp$		153	153	153
Edge distance	$c_{cr,fi}$		170	170	170

Vertical perforated brick HLz, acc. to Annex C28

mean compressive strength / Min. compressive strength single brick $\geq 5 / \geq 4 \text{ N/mm}^2$

Anchor rod / perforated sleeve			M8 / 16x130	M10 / 16x130	M12 / 20x130
Effective anchorage depth	h_{ef}	[mm]	130	130	130
Characteristic spacing	$s_{cr,fi} \parallel$		133	133	133
	$s_{cr,fi} \perp$		133	133	133
Edge distance	$c_{cr,fi}$		260	260	260

fischer injection system FIS V Plus for masonry

Performance

Spacing and edge distance under fire exposure (anchor group)

Annex C126

Appendix 154 / 155

Spacing and edge distance under fire exposure (anchor group)

Table C127.1: Spacing and Edge distance under fire exposure, brick breackout failure

Autoclaved aerated concrete acc. to Annex C118

mean compressive strength / Min. compressive strength single brick $\geq 2,5 / \geq 2 \text{ N/mm}^2$

Anchor rod			M8		M10		M12		M16	
Effective anchorage depth	h_{ef}	[mm]	100	200	100	200	100	200	100	200
Characteristic spacing	$s_{cr,fi} \parallel$		333	107	333	107	333	107	333	107
	$s_{cr,fi} \perp$		333	107	333	107	333	107	333	107
Edge distance	$c_{cr,fi}$		200	400	200	400	200	400	200	400

Autoclaved aerated concrete acc. to Annex C118

mean compressive strength / Min. compressive strength single brick $\geq 2,5 / \geq 2 \text{ N/mm}^2$

Internal threaded anchor FIS E			11x85 M8	15x85 M10	15x85 M12
Effective anchorage depth	h_{ef}	[mm]	85	85	85
Characteristic spacing	$s_{cr,fi} \parallel$		333	333	333
	$s_{cr,fi} \perp$		333	333	333
Edge distance	$c_{cr,fi}$		170	170	170

fischer injection system FIS V Plus for masonry

Performance

Spacing and edge distance under fire exposure (anchor group)

Annex C127

Appendix 155 / 155