

ΔΗΛΩΣΗ ΕΠΙΔΟΣΕΩΝ

DoP 0354

για το σύστημα έκχυσης FIS V Plus (χημικό αγκύριο για χρήση σε τούβλο)

EL

1. Μοναδικός κωδικός ταυτοποίησης του τύπου του προϊόντος: **DoP 0354**
2. Προβλεπόμενη(-ες) χρήση(-εις): **Εκ των υστέρων αγκυρώσεις σε τούβλα, δείτε το παράρτημα, ειδικά τα παραρτήματα B1 - B22.**
3. Κατασκευαστής: **fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Γερμανία**
4. Εξουσιοδοτημένος αντιπρόσωπος: **-**
5. Σύστημα/συστήματα AVCP (αξιολόγηση και επαλήθευση της σταθερότητας της επίδοσης): **1**
6. Ευρωπαϊκό έγγραφο αξιολόγησης: **EAD 330076-01-0604, Edition 10/2022**
 Ευρωπαϊκή τεχνική αξιολόγηση: **ETA-20/0729; 2023-10-31**
 Οργανισμός τεχνικής αξιολόγησης: **DIBt- Deutsches Institut für Bautechnik**
 Κοινοποιημένος(-οι) οργανισμός(-οι): **2873 TU Darmstadt**
7. Δηλωθείσα(-ες) επίδοση(-εις):
Μηχανική αντίσταση και σταθερότητα (BWR1)
 Χαρακτηριστική αντοχή σε στατική και οιονεί στατική φόρτιση:
 1 Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία χάλυβα υπό εφελκυστικό φορτίο: δείτε το παράρτημα, ειδικά τα παραρτήματα C1, C3
 2 Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία χάλυβα υπό διατμητικό φορτίο με και χωρίς μοχλό: δείτε το παράρτημα, ειδικά τα παραρτήματα C2, C3
 3 Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία από εξόλκευση ή θραύση τούβλου υπό εφελκυστικό φορτίο. Συντελεστής απομείωσης: δείτε το παράρτημα, ειδικά τα παραρτήματα 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 Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία από εξόλκευση ή θραύση τούβλου υπό διατμητικό φορτίο: δείτε το παράρτημα, ειδικά τα παραρτήματα 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 Χαρακτηριστική αντίσταση ομάδας αγκυρίων σε αστοχία από θραύση τούβλου υπό εφελκυστικό φορτίο: δείτε το παράρτημα, ειδικά τα παραρτήματα 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 Χαρακτηριστική αντίσταση ομάδας αγκυρίων σε αστοχία από τοπική θραύση τούβλου υπό διατμητικό φορτίο: δείτε το παράρτημα, ειδικά τα παραρτήματα 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 Αποστάσεις από ακμή και μεταξύ αγκυρίων, πάχος δομικού υλικού: δείτε το παράρτημα, ειδικά τα παραρτήματα 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 Μετατόπιση υπό εφελκυστικό και διατμητικό φορτίο: δείτε το παράρτημα, ειδικά τα Παραρτήματα C123
 9 Μέγιστη ροπή σύσφιξης: δείτε το παράρτημα, ειδικά τα παραρτήματα B4-B7, B9-B12, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C25, C28, C30, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C61, C64, C66, C69, C72, C73, C76, C77, C80, C81, C84, C86, C87, C90, C91, C94, C96, C98, C99, C102, C104, C105, C108, C110, C111, C114, C116, C118, C121
 Χαρακτηριστική αντίσταση και μετακινήσεις σε σεισμική φόρτιση:
 10 Αντίσταση σε εφελκυσμό, μετατόπιση: NPD
 11 Αντίσταση σε διάτμηση, μετατόπιση: NPD
 12 Παράμετρος περιμετρικού κενού: NPD
- Ασφάλεια σε περίπτωση φωτιάς (BWR 2)**
 13 Αντίδραση σε φωτιά: Κατηγορίας (A1)
 14 Αντίσταση σε φωτιά υπό εφελκυστικό και διατμητικό φορτίο με και χωρίς μοχλό, ελάχιστες αποστάσεις από ακμή και μεταξύ αγκυρίων: δείτε το παράρτημα, ειδικά τα Παραρτήματα C124
- Υγιεινή, υγεία και περιβάλλον (BWR 3)**
 15 Περιεχόμενο, εκπομπή ή/και απελευθέρωση επικίνδυνων ουσιών: NPD
8. Κατάλληλη τεχνική τεκμηρίωση και/ή ειδική τεχνική τεκμηρίωση: **-**

Η επίδοση του προϊόντος που ταυτοποιείται ανωτέρω είναι σύμφωνη με τη (τις) δηλωθείσα(-ες) επίδοση(-εις). Αυτή η δήλωση επιδόσεων εκδίδεται σύμφωνα με τον Κανονισμό (ΕΕ) Αρ. 305/2011 με αποκλειστική ευθύνη του κατασκευαστή που προσδιορίζεται παραπάνω.

Υπογραφή για λογαριασμό και εξ ονόματος του κατασκευαστή από:



Dr.-Ing. Oliver Geibig, Γενικός Διευθυντής Επιχειρηματικών Μονάδων & Μηχανικής
 Tumlingen, 2023-11-14



Jürgen Grün, Γενικός Διευθυντής Χημικών & Ποιότητας

Αυτή η Δήλωση Επιδόσεων μεταφράστηκε σε διάφορες γλώσσες. Σε περίπτωση που υπάρχει αμφιβολία για τη μετάφραση, υπερισχύει πάντα η αγγλική έκδοση.

Το παράρτημα περιλαμβάνει προαιρετικές και συμπληρωματικές πληροφορίες στα αγγλικά, που ξεπερνούν τις (οριζόμενες σε άλλες γλώσσες) νόμιμες απαιτήσεις.

Translation guidance Essential Characteristics and Performance Parameters for Annexes
Οδηγίες Μετάφρασης των βασικών χαρακτηριστικών και απόδοσης για τα παραρτήματα

| Mechanical resistance and stability (BWR 1) | |
|---|---|
| Μηχανική αντίσταση και σταθερότητα (BWR1) | |
| Characteristic resistance for static and quasi-static loading: Χαρακτηριστική αντοχή σε στατική και οιονεί στατική φόρτιση: | |
| 1 Characteristic resistance to steel failure of a single anchor under tension loading: Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία χάλυβα υπό εφελκυστικό φορτίο: | $N_{Rk,s}$ [kN] |
| 2 Characteristic resistance to steel failure of a single anchor under shear loading with and without level arm: Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία χάλυβα υπό διατμητικό φορτίο με και χωρίς μοχλό: | $V_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm] |
| 3 Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading, Reduction factor: Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία από εξόλκευση ή θραύση τούβλου υπό εφελκυστικό φορτίο. Συντελεστής απομείωσης: | $N_{Rk,p}$, $N_{Rk,b}$ [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: Χαρακτηριστική αντίσταση ενός αγκυρίου σε αστοχία από εξόλκευση ή θραύση τούβλου υπό διατμητικό φορτίο: | $V_{Rk,b}$, $V_{Rk,c,II}$, $V_{Rk,c,I}$ [kN] |
| 5 Characteristic resistance to brick breakout failure of an anchor group under tension loading: Χαρακτηριστική αντίσταση ομάδας αγκυρίων σε αστοχία από θραύση τούβλου υπό εφελκυστικό φορτίο: | N^a_{Rk} [kN], $\alpha_{g,N}$ [-] |
| 6 Characteristic resistance to local brick failure or brick breakout failure of an anchor group under shear loading: Χαρακτηριστική αντίσταση ομάδας αγκυρίων σε αστοχία από τοπική θραύση τούβλου υπό διατμητικό φορτίο: | $V^a_{Rk,b}$, $V^a_{Rk,c,II}$, $V^a_{Rk,c,I}$ [kN]; $\alpha_{g,V,II}$, $\alpha_{g,V,I}$ [-] |
| 7 Edge distances, spacing, member thickness: Αποστάσεις από ακμή και μεταξύ αγκυρίων, πάχος δομικού υλικού: | c_{cr} , s_{cr} , c_{min} , $s_{min,II}$, $s_{min,I}$, h_{min} [mm] |
| 8 Displacements under tension and shear loading: Μετατόπιση υπό εφελκυστικό και διατμητικό φορτίο: | δ_{N0} , $\delta_{N\infty}$, δ_{V0} , $\delta_{V\infty}$ [mm] |
| 9 Maximum installation torque: Μέγιστη ροπή σύσφιξης: | max. T_{inst} [Nm] |
| Characteristic resistance and displacements for seismic loading: Χαρακτηριστική αντίσταση και μετακινήσεις σε σεισμική φόρτιση: | |
| 10 Resistance to tension load, displacements: Αντίσταση σε εφελκυσμό, μετατόπιση: | $N_{Rk,s,eq}$, $N_{Rk,eq}$ [kN], $\alpha_{N,seis}$ [-], $\delta_{N,eq}$ [mm] |
| 11 Resistance to shear load, displacements: Αντίσταση σε διάτμηση, μετατόπιση: | $V_{Rk,s,eq}$, $V_{Rk,b,eq}$ [kN], $\alpha_{V,seis}$ [-], $\delta_{V,eq}$ [mm] |
| 12 Factor annular gap: Παράμετρος περιμετρικού κενού: | α_{gap} [-] |
| Safety in case of fire (BWR 2) | |
| Ασφάλεια σε περίπτωση φωτιάς (BWR 2) | |
| 13 Reaction to fire: Αντίδραση σε φωτιά: | - |
| 14 Resistance to fire under tension and shear loading with and without level arm, minimum edge distances and spacing: Αντίσταση σε φωτιά υπό εφελκυστικό και διατμητικό φορτίο με και χωρίς μοχλό, ελάχιστες αποστάσεις από ακμή και μεταξύ αγκυρίων: | $N_{Rk,s,fi}$, $N_{Rk,p,fi}$ [kN], $N_{Rk,b,fi}$, $V_{Rk,s,fi}$ [kN], $M^0_{Rk,s}$ [Nm], $c_{cr,fi}$, $s_{cr,fi}$ [mm] |
| Hygiene, health and the environment (BWR 3) | |
| Υγιεινή, υγεία και περιβάλλον (BWR 3) | |
| 15 Content, emission and/or release of dangerous substances: Περιεχόμενο, εκπομπή ή/και απελευθέρωση επικίνδυνων ουσιών: | - |

Specific Part

1 Technical description of the product

The fischer injection system FIS V Plus for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar fischer FIS V Plus, FIS VS Plus Low Speed and FIS VW Plus High Speed, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod in the range of M6 to M16. The steel elements are made of zinc coated steel, stainless steel or high corrosion resistant steel.

The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry and mechanical interlock.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

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

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

3.1 Mechanical resistance and stability (BWR 1)

| Essential characteristic | Performance |
|---|--|
| Characteristic resistance for static and quasi-static loading | See Annexes B 4 to B 7, B 21, B 22, C 1 to C 123 |
| Characteristic resistance and displacements for seismic loading | No performance assessed |

3.2 Safety in case of fire (BWR 2)

| Essential characteristic | Performance |
|---|-----------------|
| Reaction to fire | Class A1 |
| Resistance to fire under tension and shear loading with and without lever arm. Minimum edge distances and spacing | See Annex C 124 |

3.3 Hygiene, health and the environment (BWR 3)

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

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

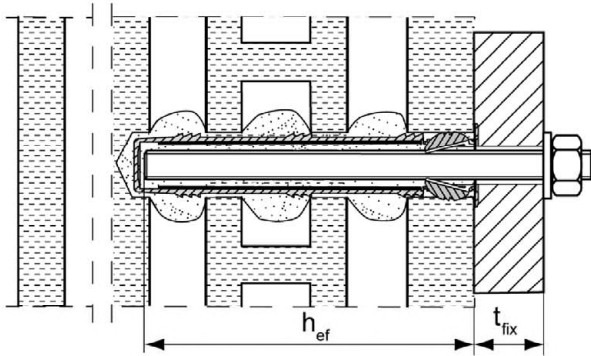
In accordance with the European Assessment Document EAD 330076-01-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

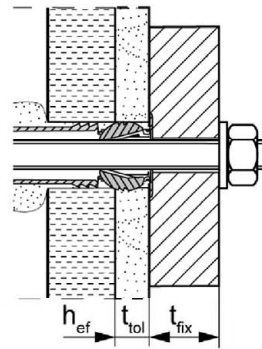
Installation conditions part 1

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

Pre-positioned anchorage:

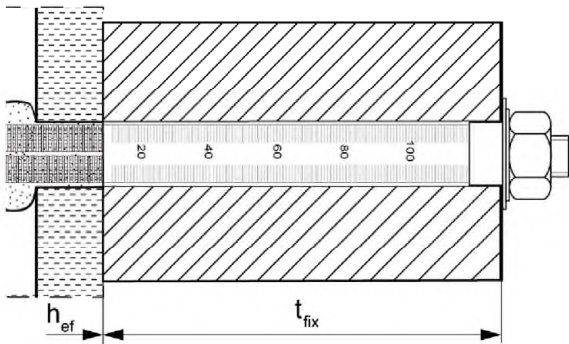


Installation with render bridge

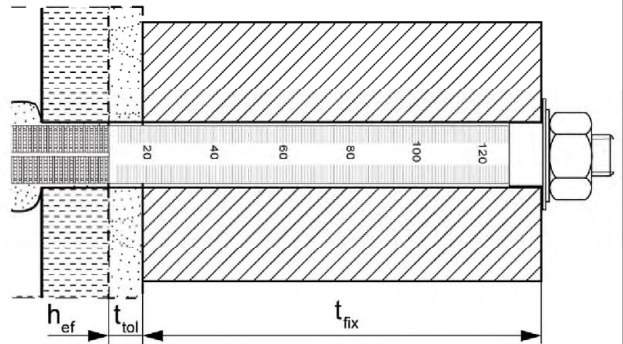


Size of the perforated sleeve: FIS H 12x50 K FIS H 16x85 K FIS H 20x85 K FIS H 20x200 K
 FIS H 12x85 K FIS H 16x130 K FIS H 20x130 K

Push through anchorage:



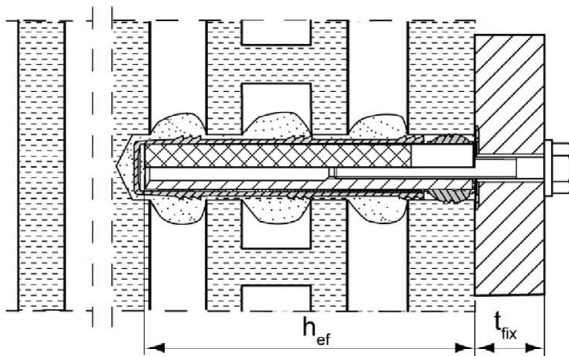
Installation with render bridge



Size of the perforated sleeve: FIS H 18x130/200 K FIS H 22x130/200 K

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

Pre-positioned anchorage:



Figures not to scale

h_{ef} = effective anchorage depth

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

t_{fix} = thickness of fixture

fischer injection system FIS V Plus for masonry

Product description
 Installation conditions part 1,
 Anchor rods and internal threaded anchor with perforated sleeve

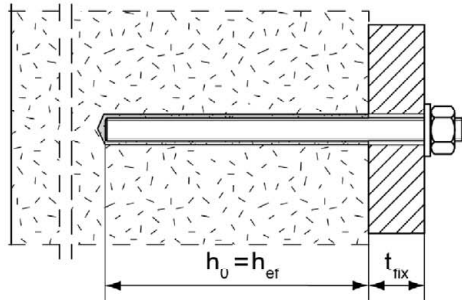
Annex A 1

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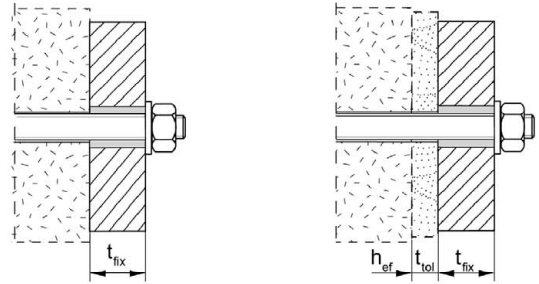
Installation conditions part 2

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

Pre-positioned anchorage:



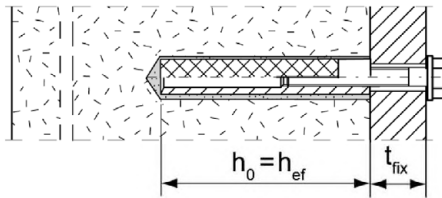
Push through anchorage: Annular gap filled with mortar



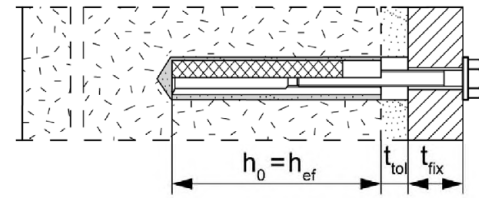
Installation with
render bridge

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

Pre-positioned anchorage:



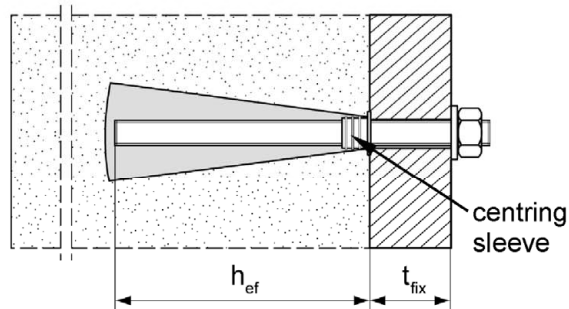
Installation with render bridge



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

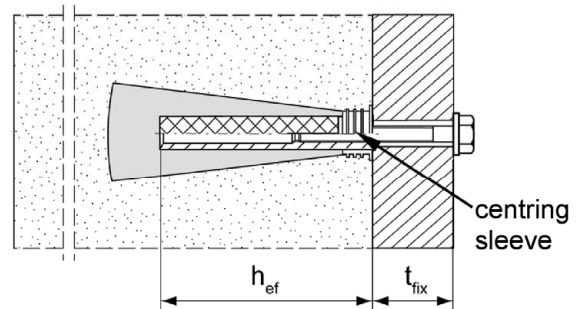
Pre-positioned anchorage:

anchor rods M8, M10, M12



Pre-positioned anchorage:

Internal threaded anchor FIS E 11x85 M6 / M8



Figures not to scale

h_0 = depth of drill hole

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 A 2

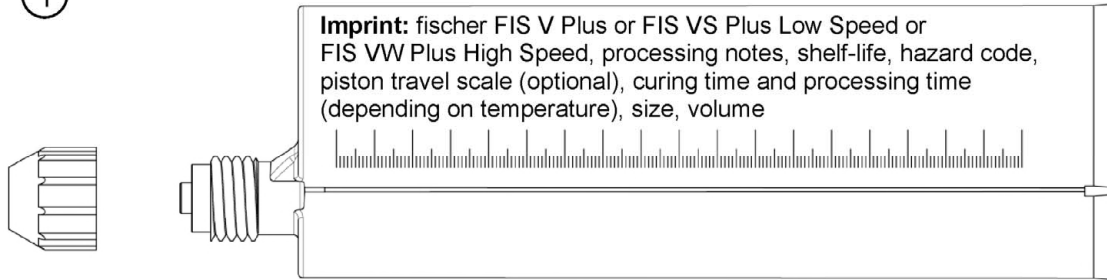
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Overview system components part 1

Mortar cartridge (shuttle cartridge) with sealing cap

①

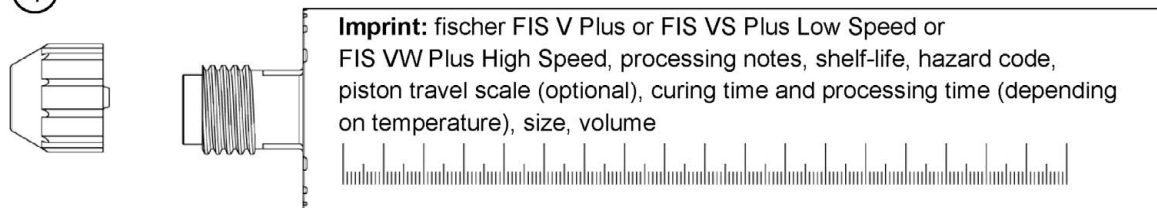
Size: 360 ml, 825 ml



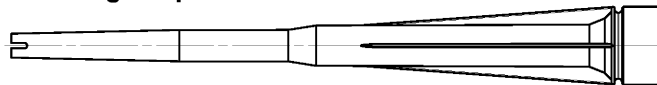
Mortar cartridge (coaxial cartridge) with sealing cap

①

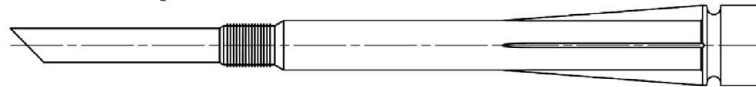
Size: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



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 AB-G



compressed-air cleaning tool



Figures not to scale

fischer injection system FIS V Plus for masonry

Product description

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

Annex A 3

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Overview system components part 2

fischer anchor rod

②



Size: M6, M8, M10, M12, M16

Internal threaded anchor FIS E

⑤



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

Perforated sleeve FIS H K

⑦



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

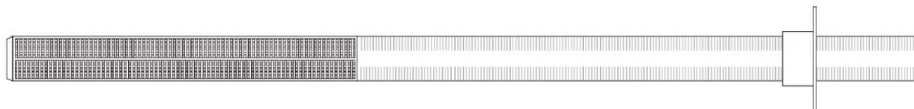
⑦



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

Perforated sleeve FIS H K (push through anchorage)

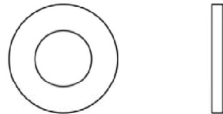
⑦



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

Washer

③

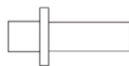


Hexagon nut

④



Injection adapter

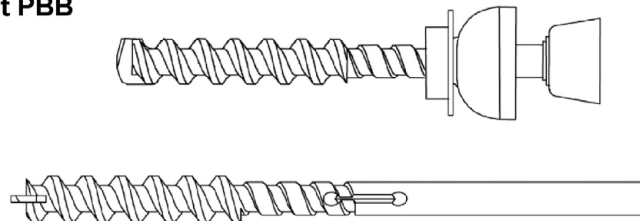


centring sleeve PBZ

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 A 4

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Table A5.1: Materials

| Part | Designation | Material | | |
|------|--|---|--|---|
| 1 | Mortar cartridge | Mortar, hardener; filler | | |
| | | Steel | Stainless steel R | High corrosion resistant steel HCR |
| | | zinc plated | acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015 | acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015 |
| 2 | Anchor rod | Property class 4.6; 4.8; 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022 or hot-dip galvanised EN ISO 10684:2004+AC:2009 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation | Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462; EN 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation | Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 8\%$ fracture elongation |
| 3 | Washer ISO 7089:2000 | zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 or hot-dip galvanised EN ISO 10684:2004+AC:2009 | 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | 1.4565; 1.4529 EN 10088-1:2014 |
| 4 | Hexagon nut | Property class 5 or 8; EN ISO 898-2:2012 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 or hot-dip galvanised EN ISO 10684:2004+AC:2009 | Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2014 |
| 5 | Internal threaded anchor FIS E | Property class 5.8; EN 10277-1:2008-06 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 | Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014 |
| 6 | Commercial standard screw or threaded rod for internal threaded anchor FIS E | Property class 4.6, 5.8 or 8.8; EN ISO 898-1:2013 zinc plated $\geq 5\mu\text{m}$, ISO 4042:2018 | Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014 |
| 7 | Perforated sleeve and centring sleeve | PP / PE | | |



fischer injection system FIS V Plus for masonry

Product description
Materials**Annex A 5**

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Specifications of intended use part 1

Table B1.1: Overview use and performance categories

| Anchorages subject to | | fischer injection system FIS V Plus for masonry | |
|---|--|--|--|
| Hole drilling with hammer drill mode  | | all bricks; without C 28 to C 48, C 75 to C 78 | |
| Hole drilling with rotary drill mode  | | all bricks | |
| Hole drilling with special conic drill bit | | Only C 118 to C 122 | |
| Static and quasi static load, in masonry | | all bricks | |
| Resistance to fire under tension and shear loading | | C 124 (Applies only to the conditions of dry masonry) | |
| Installation | Pre-positioned anchorage | 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 anchorage | 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

Intended Use
Specifications part 1

Annex B 1

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Specifications of intended use part 2

Anchorage subject to:

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

Base materials:

- Solid brick masonry (base material group b) and autoclaved aerated concrete (base material group d), acc. to Annex B 13 / B 14.
- Hollow brick masonry (base material group c), according to Annex B 13 / B 14
- For minimum thickness of masonry member is $h_{ef}+30\text{mm}$
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2016
- For other bricks in solid masonry, hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests (not for bricks under fire exposure) according to EOTA Technical Report TR 053:2022-07, Annex B under consideration of the β -factor according to Annex C 123, Table C123.1.

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

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

Temperature Range:

- **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 A 5, Table A5.1.

fischer injection system FIS V Plus for masonry

Intended Use
Specifications part 2

Annex B 2

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Specifications of intended use part 2 continued

Design:

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

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

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

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

For the calculation of pulling out a brick under tension loading $N_{RK,pb}$ or pushing out a brick under shear loading $V_{RK,pb}$ see EOTA Technical Report TR 054:2022-07.

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

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

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

Installation:

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

Material dimensions and mechanical properties of the metal parts according to the specifications are given in Annex A 5, Table A5.1

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

Marking of the anchor rod with the 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 2 continued

Annex B 3

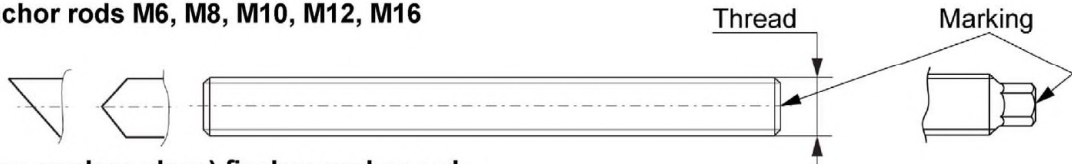
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Table B4.1: Installation parameters for anchor rods in solid bricks and autoclaved aerated concrete without perforated sleeves

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



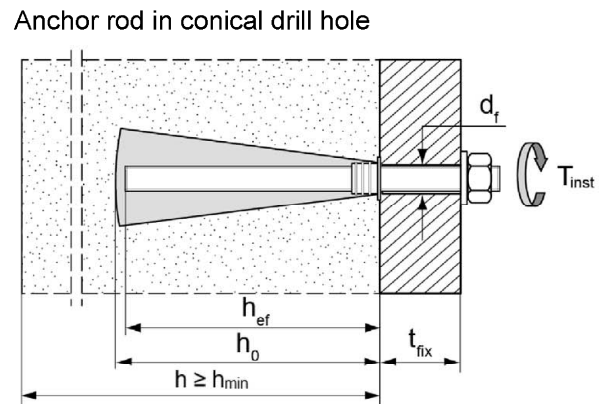
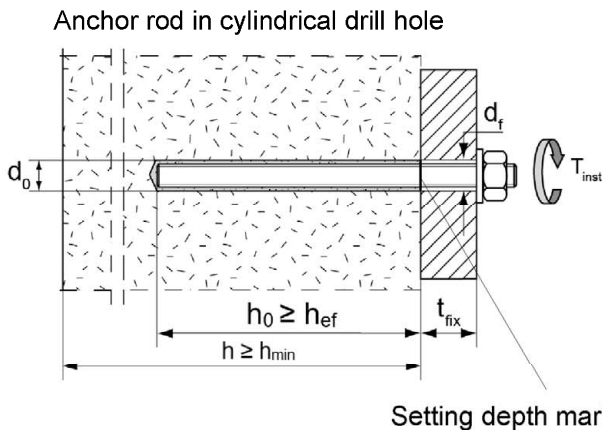
Marking (on random place) fischer anchor rod:

| | | | |
|--|--------|--|---|
| 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

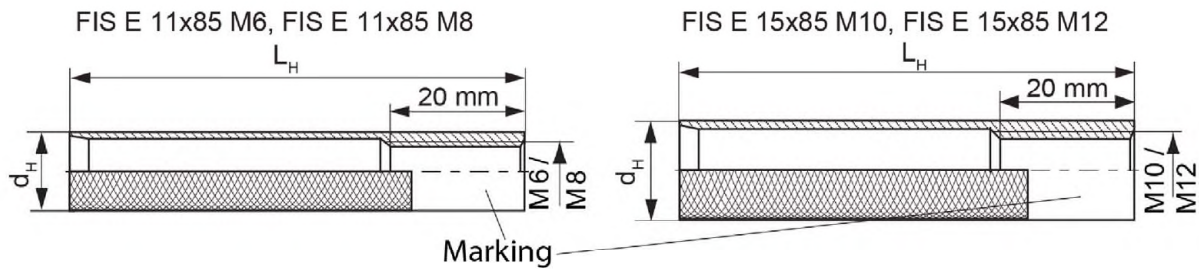
Annex B 4

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

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

fischer Internal threaded anchor FIS E

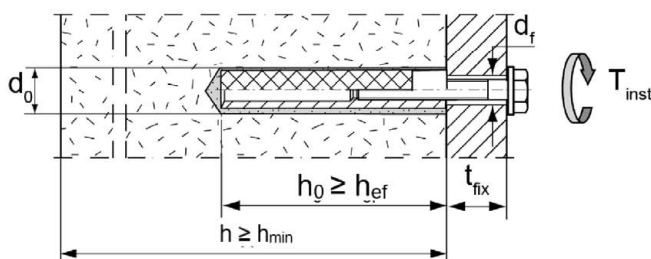


Marking:

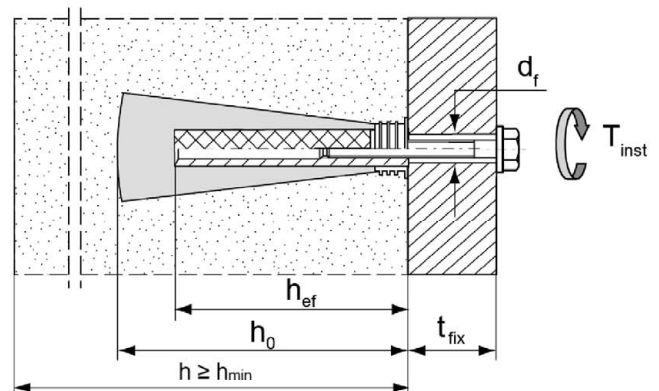
Size, e.g. **M8**, Stainless steel: R, e.g. **M8 R**, High corrosion resistant steel: HCR, e.g. **M8 HCR**

Installation conditions:

Internal threaded anchor in cylindrical drill hole



Internal threaded anchor in conical drill hole



Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use

Installation parameters for internal threaded rods FIS E without perforated sleeve

Annex B 5

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

| perforated sleeve FIS H K | | 12x50 | 12x85 ²⁾ | 16x85 | 16x130 ²⁾ | 20x85 | 20x130 ²⁾ | 20x200 ²⁾ |
|---|---------------------------|-------------------------|---------------------|------------|----------------------|-------------|----------------------|----------------------|
| Nominal drill hole diameter $d_0 = D_{\text{sleeve, nom}}$ | d_0 [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.

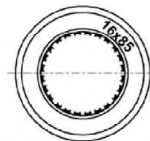
²⁾ Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth $h_{\text{ef, min}}$, the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of characteristic resistance must be taken.

Perforated sleeve

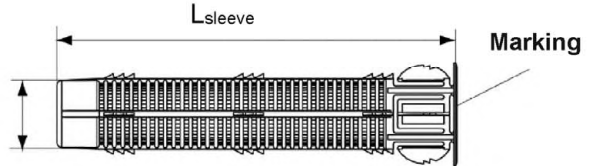
FIS H 12x50 K; FIS H 12x85 K; FIS H 16x85 K; FIS H 16x130 K;
FIS H 20x85 K; FIS H 20x130 K; FIS H 20x200 K

Marking:

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



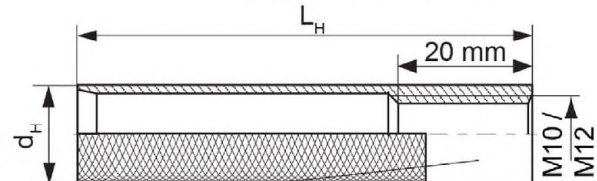
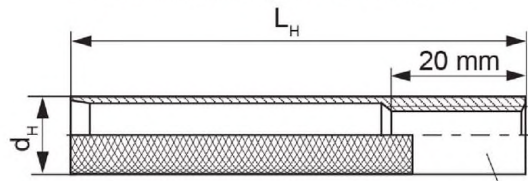
$D_{\text{sleeve, nom}}$



fischer Internal threaded anchor FIS E

FIS E 11x85 M6, FIS E 11x85 M8

FIS E 15x85 M10, FIS E 15x85 M12

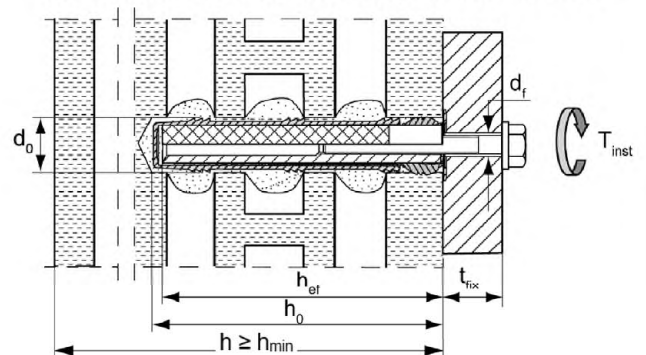
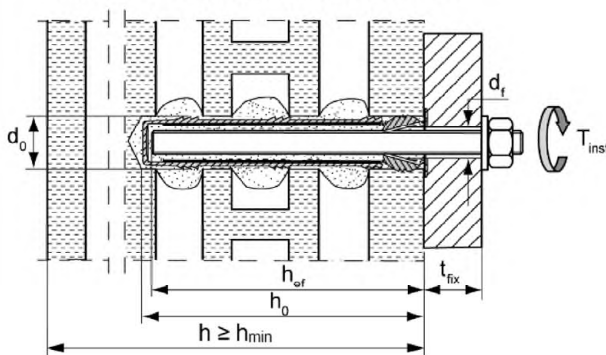


Marking

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 anchorage)

Annex B 6

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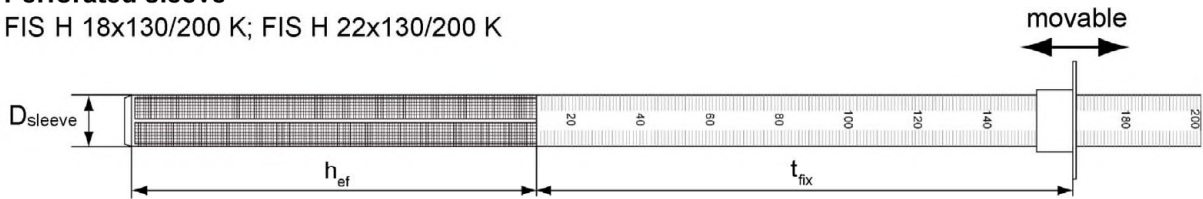
Table B7.1: Installation parameters for anchor rods with perforated sleeves (push through anchorage)

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

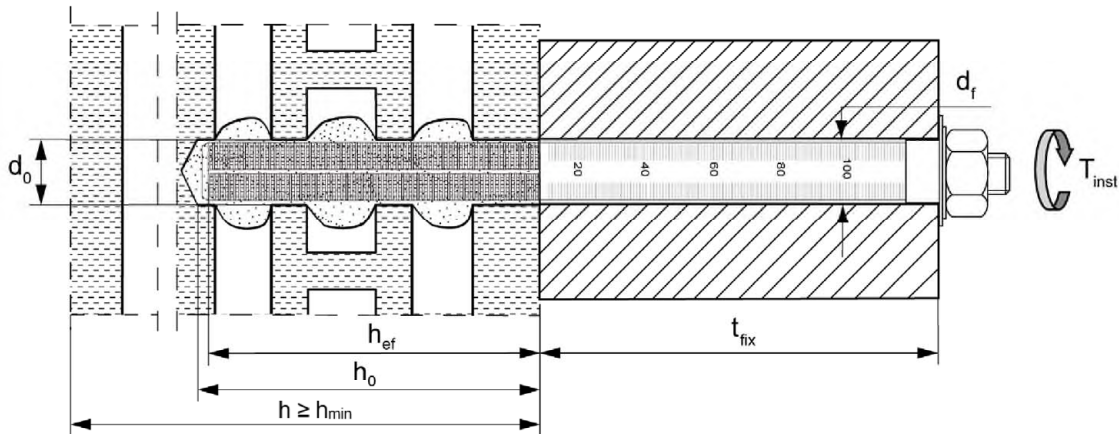
Perforated sleeve

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 anchorage)

Annex B 7

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Table B8.1: Parameters of the cleaning brush BS (steel brush with steel bristles)

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

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



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

Table B8.2: Maximum processing times and minimum curing times
(During the curing time of the mortar the masonry temperature may not fall below the listed minimum temperature)

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

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

²⁾ Minimum cartridge temperature +5°C.

Figures not to scale

fischer injection system FIS V Plus for masonry

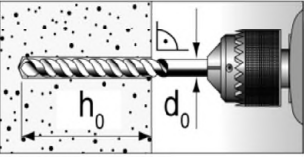
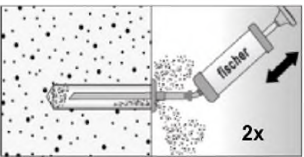
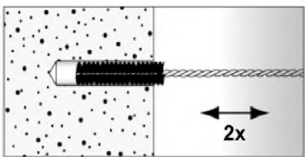
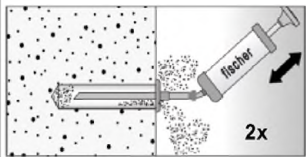
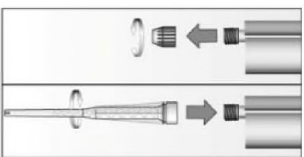
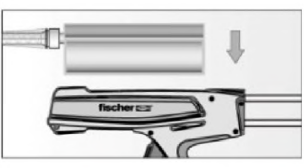
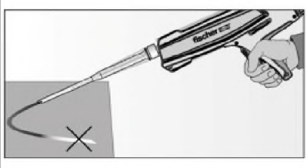
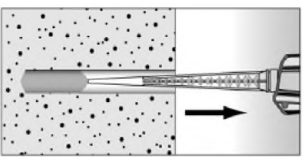
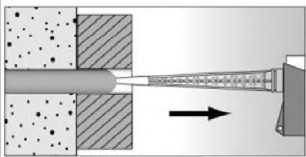
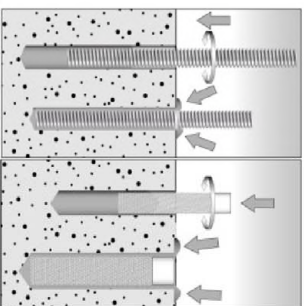

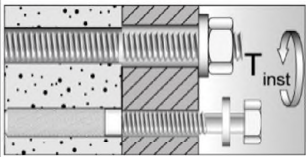
Intended Use
Cleaning brush (steel brush)
Maximum processing times and minimum curing times

Annex B 8

Appendix 15 / 153

Installation instruction part 1

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

| | | | |
|---|---|--|--|
| 1 |  | <p>Drill the hole (drilling method see Annex C of the respective brick) depth of drill hole h_0 and drill hole diameter d_0 see Table B4.1; B5.1</p> | |
| 2 |  |  |  <p>Blow out the drill hole twice. Brush twice and blow out twice again.</p> |
| 3 |  | <p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p> | |
| 4 |  | <p>Place the cartridge into a suitable dispenser</p> |  <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p> |
| 5 |  | <p>Fill approximately 2/3 of the drill hole with mortar beginning from the bottom of the hole¹⁾. Avoid bubbles!</p> |  <p>For push through anchorage fill the annular clearance with mortar.</p> |
| 6 |  | <p>Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.</p> | |
| 7 |  | <p>Do not touch. Minimum curing time see Table B8.2</p> |  <p>Mounting the fixture. max T_{inst} see parameter of brick in Annex C.</p> |

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

fischer injection system FIS V Plus for masonry

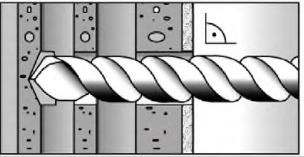
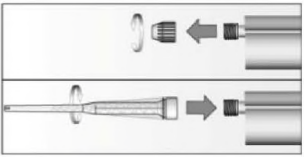


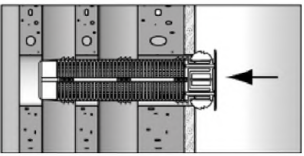
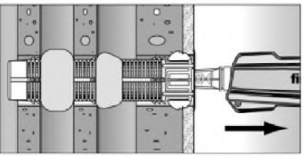
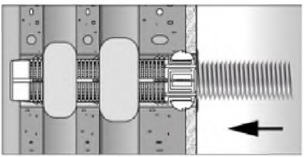

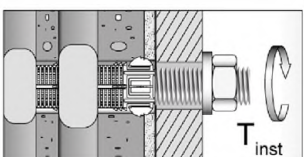
Intended Use
Installation instruction (without perforated sleeve) part 1

Annex B 9

Appendix 16 / 153

Installation instruction part 2

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

| | | | | |
|---|---|--|--|---|
| 1 |  | <p>Drill the hole (drilling method see Annex C of the respective brick). depth of drill hole h_0 and drill hole diameter d_0 see Table B6.1</p> | <p>When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.</p> | |
| 2 |  | <p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p> | | |
| 3 |  | <p>Place the cartridge into a suitable dispenser.</p> |  | <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p> |
| 4 |  | <p>Insert the perforated sleeve flush with the surface of the masonry or plaster.</p> |  | <p>Fill the perforated sleeve completely with mortar beginning from the bottom of the hole¹⁾.</p> |
| 5 |  | <p>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).</p> | | |
| 6 |  | <p>Do not touch. Minimum curing time see Table B8.2</p> |  | <p>Mounting the fixture. max T_{inst} see parameter of brick in Annex C.</p> |

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

fischer injection system FIS V Plus for masonry

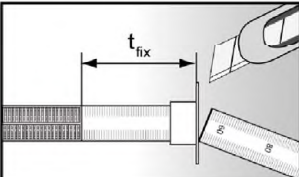
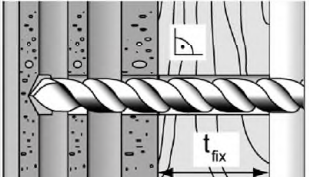
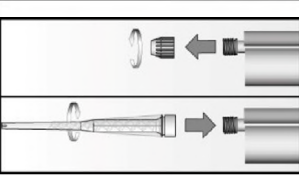
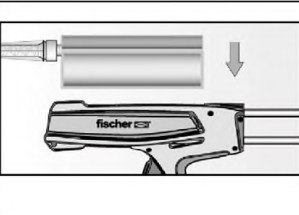
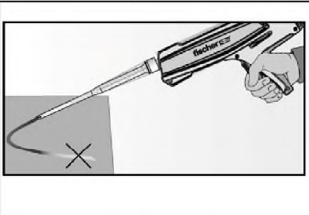
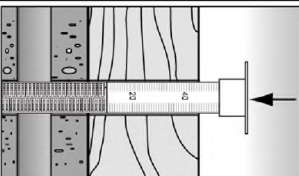
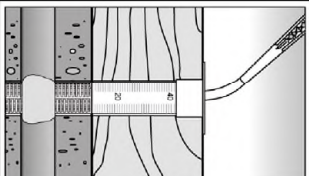
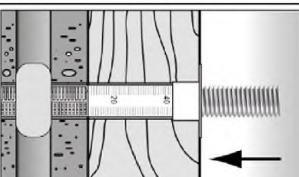
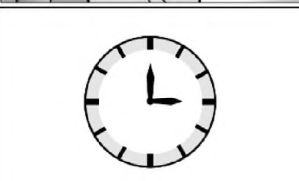
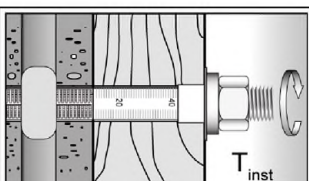
Intended Use
Installation instruction (with perforated sleeve) part 2

Annex B 10

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Installation instruction part 3

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

| | | | | |
|---|---|--|--|---|
| 1 |  | <p>Push the movable stop up to the correct thickness of fixture and cut the overlap.</p> |  | <p>Drill the hole through the fixture. Depth of drill hole ($h_0 + t_{fix}$) and drill hole diameter see Table B7.1.</p> |
| 2 |  | <p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p> | | |
| 3 |  | <p>Place the cartridge into a suitable dispenser.</p> |  | <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p> |
| 4 |  | <p>Insert the perforated sleeve flush with the surface of the fixture into the drill hole.</p> |  | <p>Fill the sleeve with mortar beginning from the bottom of the hole.¹⁾ For deep drill holes use an extension tube.</p> |
| 5 |  | <p>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).</p> | | |
| 6 |  | <p>Do not touch. Minimum curing time see Table B8.2.</p> |  | <p>Mounting the fixture. max T_{inst} see parameter of brick in Annex C.</p> |

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

fischer injection system FIS V Plus for masonry

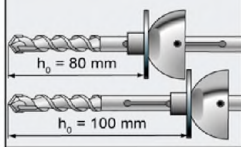
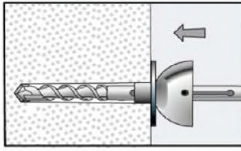
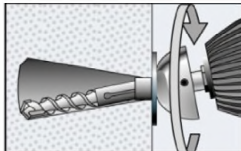
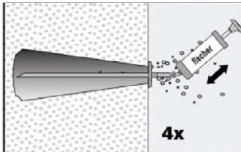
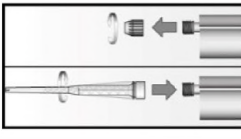


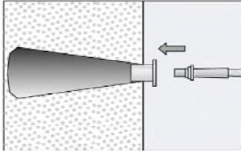
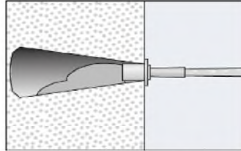
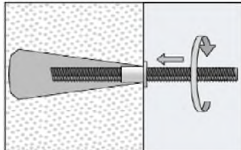
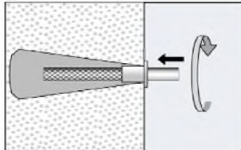

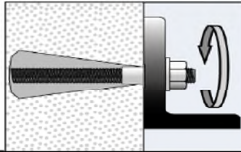
Intended Use
Installation instruction (with perforated sleeve) part 3

Annex B 11

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Installation instruction part 4

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

| | | | |
|---|---|--|---|
| 1 |  | <p>Position the movable drill bit arrester on the used drill hole depth (see Table B4.1).</p> <p>For this, unlock the clamp screw and slide the arrester.</p> <p>Now fix the clamp screw.</p> | |
| 2 |  | <p>Drill the cylindrical hole with rotating drill until the arrester contact the material surface (drilling method see Annex C of the respective brick).</p> | |
| 3 |  | <p>Deviate the working power drill circulate to generate an conic undercut in the material.</p> | |
| 4 |  | <p>Blow out the drill hole four times.</p> | |
| 5 |  | <p>Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible).</p> | |
| 6 |  |  | <p>Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.</p> |
| 7 |  |  | <p>Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer.</p> <p>Fill the drill hole with injection mortar.</p> |
| 8 |  |  | <p>Only use clean and oil-free metal parts.</p> <p>Mark the anchor rod for setting depth.</p> <p>Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions.</p> <p>When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole.</p> |
| 9 |  | <p>Do not touch.</p> <p>Minimum curing time see Table B8.2.</p> |  <p>Mounting the fixture.</p> <p>max T_{inst} see parameter of brick in Annex C.</p> |

fischer injection system FIS V Plus for masonry

Intended Use

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

Annex B 12

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Table B13.1: Overview of assessed bricks part 1

| Kind of masonry | Brick format [mm] | Mean compressive strength [N/mm ²] | Main country of origin | Mean gross density ρ [kg/dm ³] | Annex |
|--|-------------------|--|------------------------|--|-------------|
| Solid brick Mz | | | | | |
| Solid brick Mz | NF ≥240x115x71 | 12 / 20 / 28 | Germany | ≥1,8 | C 4 – C 7 |
| | 2DF ≥240x115x113 | 10 / 16 | Germany | ≥1,8 | C 8 / C 9 |
| | ≥ 245x118x54 | 10 / 20 | Italy | ≥1,8 | C 10 / C 11 |
| | ≥ 230x108x55 | 10 / 20 | Denmark | ≥1,8 | C 12 / C 13 |
| Solid calcium silicate (sand- lime) brick KS / perforated calcium silicate (sand- lime) brick KSL | | | | | |
| Solid calcium silicate brick KS | NF ≥240x115x71 | 12 - 28 | Germany | ≥2,0 | C 14 / C 15 |
| | 8DF ≥ 250x240x240 | 10 - 28 | Germany | ≥2,0 | C 16 / C 17 |
| | ≥ 997x214x538 | 10 - 36 | Netherlands | ≥1,8 | C 18 / C 19 |
| | ≥ 240x115x113 | 10 / 20 | Germany | ≥1,8 | C 20 – C 23 |
| Perforated calcium silicate brick KSL | 3DF 240x175x113 | 8 - 20 | Germany | ≥1,4 | C 24 – C 27 |
| Vertical perforated brick HLz | | | | | |
| Vertical perforated brick HLz | 370x240x237 | 4 - 12 | Germany | ≥1,0 | C 28 / C 29 |
| | 500x175x237 | 4 - 12 | Germany | ≥1,0 | C 28 / C 29 |
| | 2DF 240x115x113 | 6 - 28 | Germany | ≥1,4 | C 30 / C 31 |
| | 248x365x248 | 4 - 8 | Germany | ≥0,6 | C 32 – C 35 |
| | 248x365x249 | 8 - 12 | Germany | ≥0,7 | C 36 – C 39 |
| | 248x365x249 | 4 / 6 | Germany | ≥0,5 | C 40 – C 43 |
| | 248x425x248 | 4 - 8 | Germany | ≥0,8 | C 44 – C 47 |
| | 248x425x248 | 4 - 8 | Germany | ≥0,8 | C 48 – C 51 |
| | 500x200x315 | 4 - 8 | Germany | ≥0,6 | C 52 – C 55 |
| | 500x200x300 | 4 - 10 | France | ≥0,7 | C 56 – C 59 |
| | 500x200x315 | 2 - 8 | France | ≥0,7 | C 60 – C 63 |
| | 560x200x275 | 4 - 8 | France | ≥0,7 | C 64 / C 65 |
| | 255x120x118 | 2 - 12 | Italy | ≥1,0 | C66 - C68 |
| | 275x130x94 | 6 - 20 | Spain | ≥0,8 | C 69 / C 71 |
| | 220x190x290 | 6 - 10 | Portugal | ≥0,7 | C 72 – C 75 |
| | 253x300x240 | 2 - 6 | Austria | ≥0,8 | C 76 – C 79 |
| | 250x440x250 | 6 - 10 | Austria | ≥0,7 | C 80 – C 83 |
| | 230x108x55 | 2 - 8 | Denmark | ≥1,4 | C 84 / C 85 |
| | 365x248x245 | 8 | Austria | ≥0,6 | C 86 / C 89 |
| | 240x175x113 | 10 | Germany | ≥0,9 | C 90 / C 93 |

fischer injection system FIS V Plus for masonry

Intended Use
Overview of assessed bricks part 1

Annex B 13

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Table B14.1: Overview of assessed bricks part 2

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

fischer injection system FIS V Plus for masonry

Intended Use
Overview of assessed bricks part 2

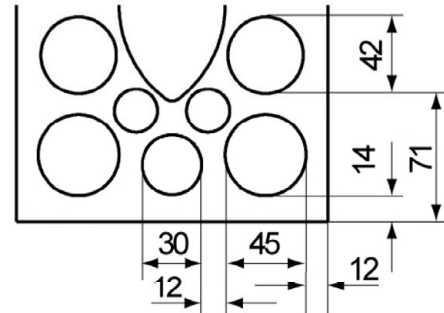
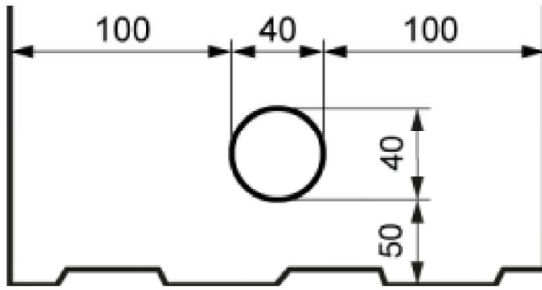
Annex B 14

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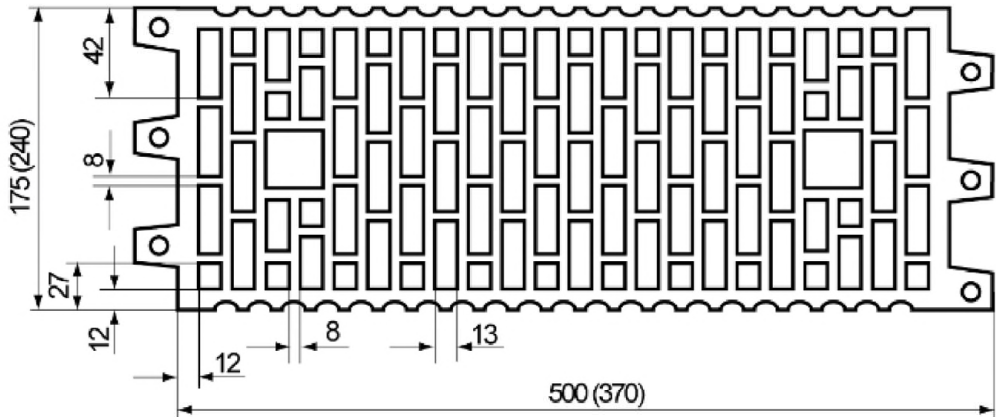
Table B15.1: Overview dimensions of perforated and hollow bricks part 1

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

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

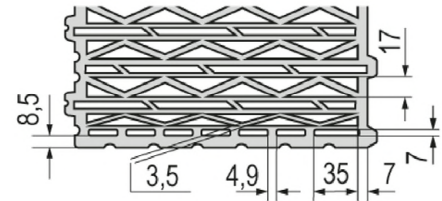
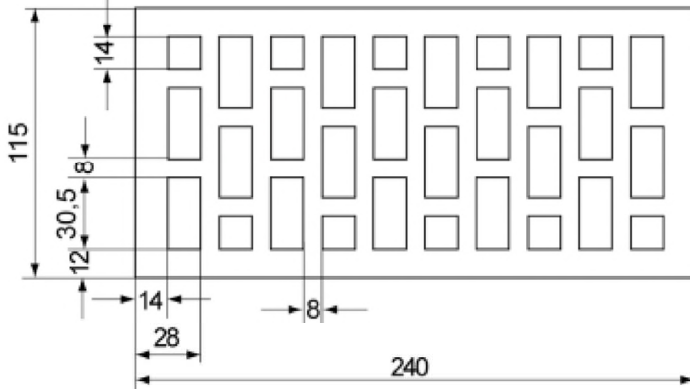


Vertical perforated brick HLz, EN 771-1:2011+A1:2015: e.g. Wienerberger, Poroton according to Annex C 28



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

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



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

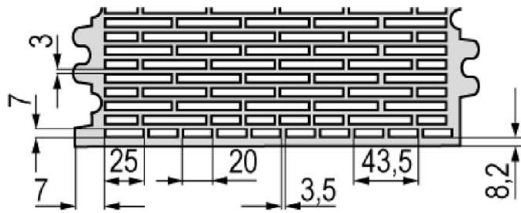
Intended Use
Overview dimensions of perforated and hollow bricks part 1

Annex B 15

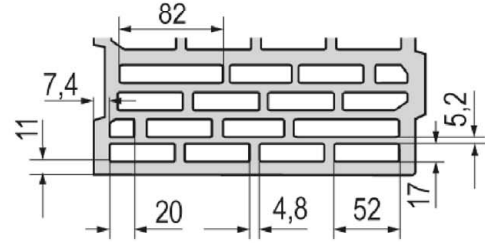
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Table B16.1: Overview dimensions of perforated and hollow bricks part 2

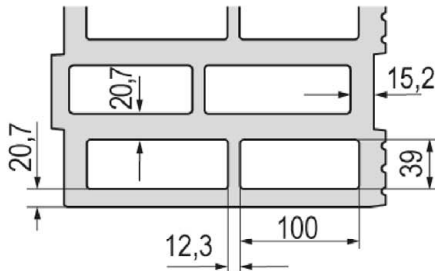
Vertical perforated brick HLz, T10, T11, EN 771-1:2011+A1:2015; according to Annex C36



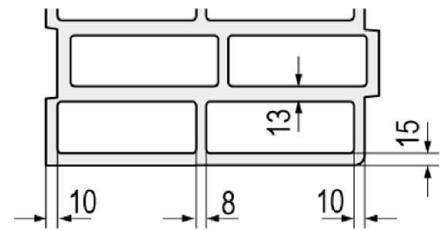
Vertical perforated brick HLz, T7 PF, filled with perlite, EN 771-1:2011+A1:2015; according to Annex C 40



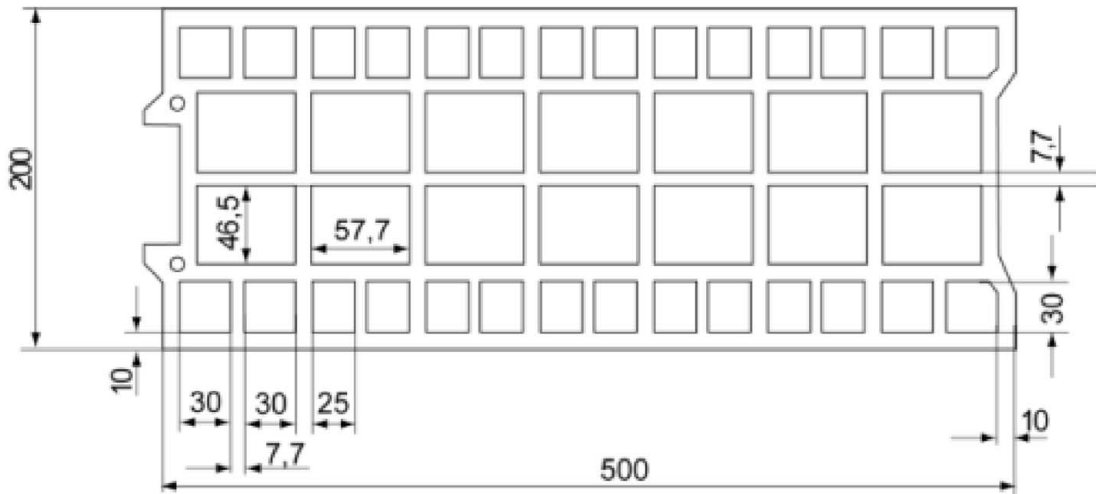
Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1.2011+A1.2015; according to Annex C 44



Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1.2015, according to Annex C 48



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



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

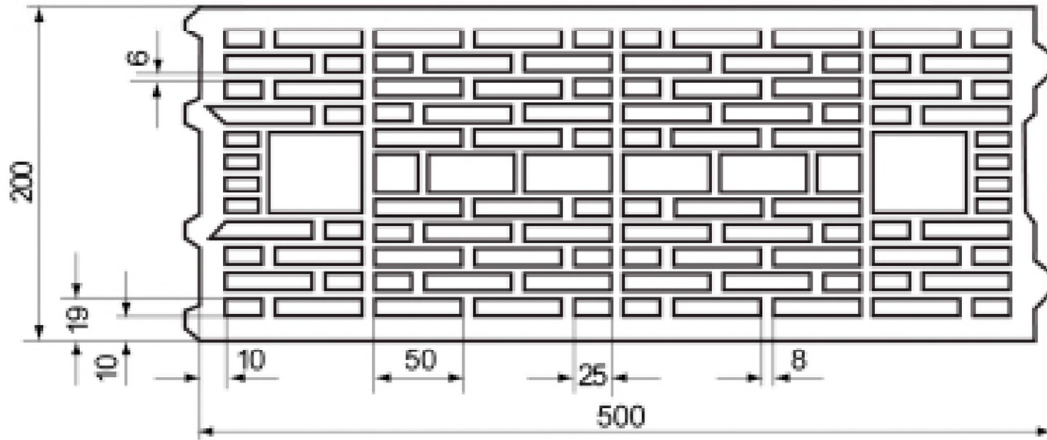
Intended Use
Overview dimensions of perforated and hollow bricks part 2

Annex B 16

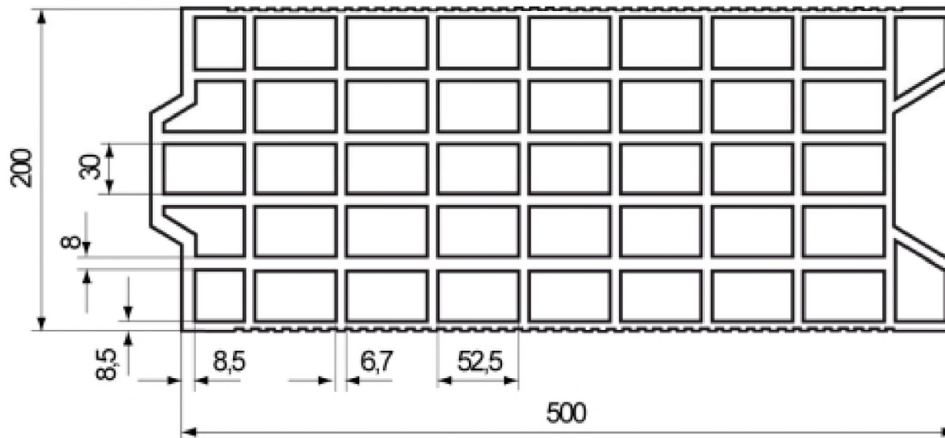
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Table B17.1: Overview dimensions of perforated and hollow bricks part 3

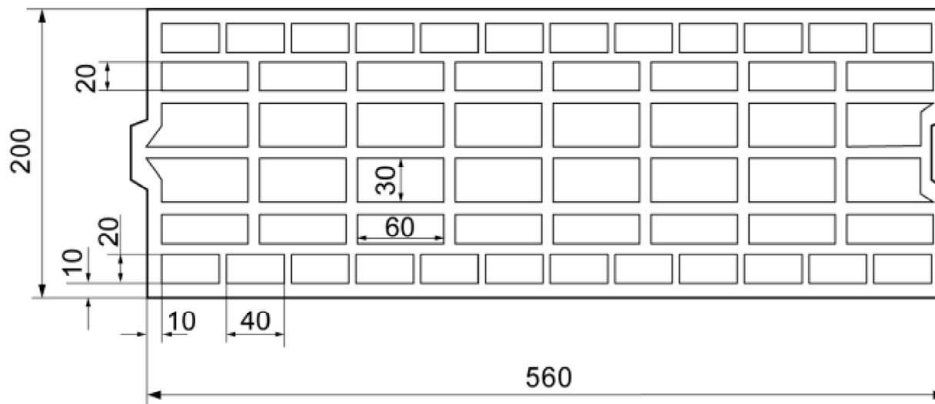
Vertical perforated brick HLz, EN 771-1:2011+A1:2015; e.g. Wienerberger according to Annex C 56



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



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



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

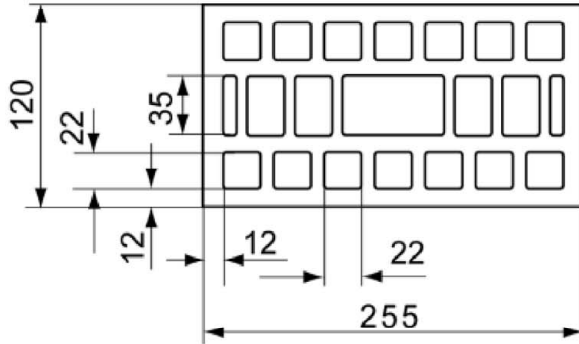
Intended Use
Overview dimensions of perforated and hollow bricks part 3

Annex B 17

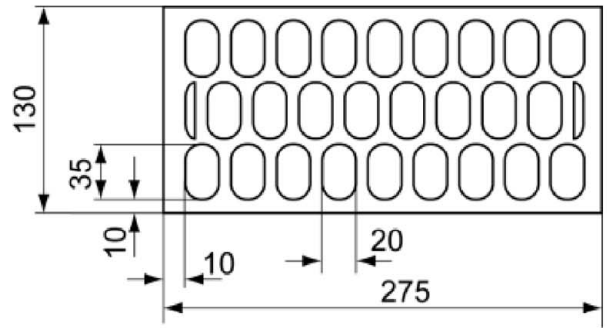
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Table B18.1: Overview dimensions of perforated and hollow bricks part 4

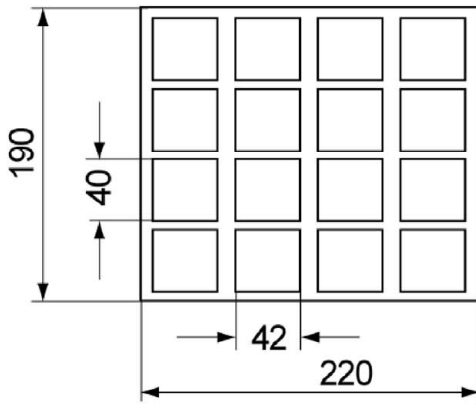
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C 66



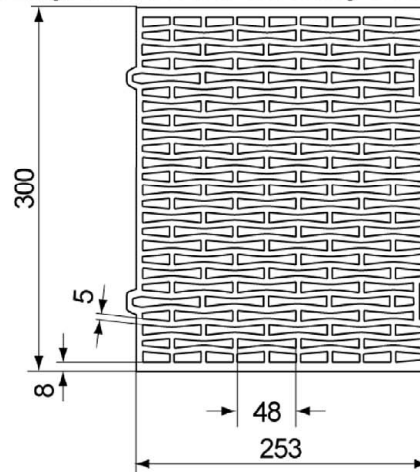
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Ceramica Farreny S.A. according to Annex C 69



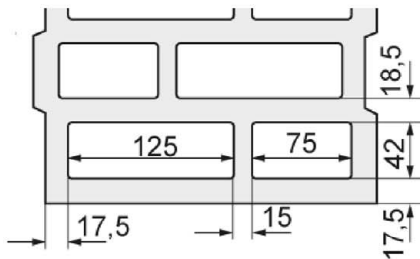
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Perceram according to Annex C 72



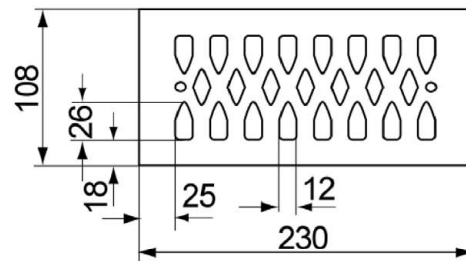
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Ziegelwerk Brenna according to Annex C 76



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



Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C 84



Measures in [mm]

Figures not to scale

fischer injection system FIS V Plus for masonry

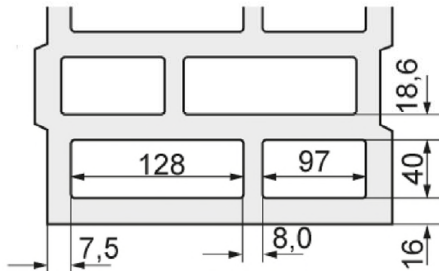
Intended Use
Overview dimensions of perforated and hollow bricks part 4

Annex B 18

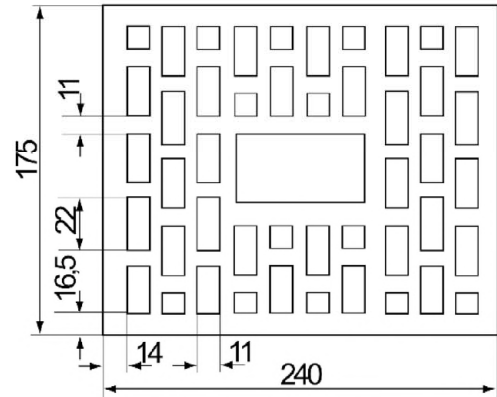
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Table B19.1: Overview dimensions of perforated and hollow bricks part 5

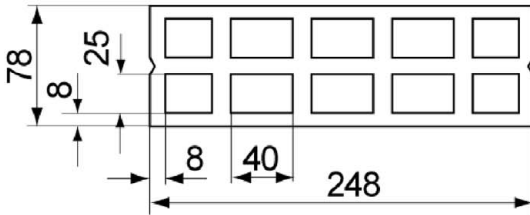
Vertical perforated brick filled with mineral wool,
EN 771-1:2011+A1:2015; according to Annex C 86



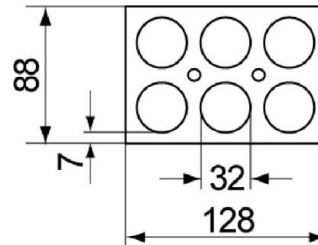
Vertical perforated brick HLz,
EN 771-1:2011+A1:2015;
e.g. Wienerberger according to Annex C 90



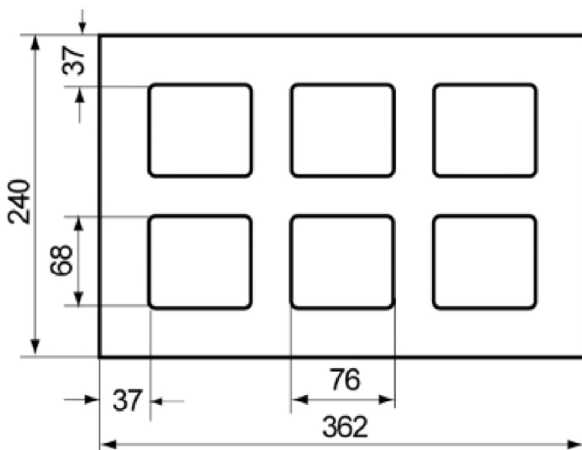
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015; according to Annex C 94



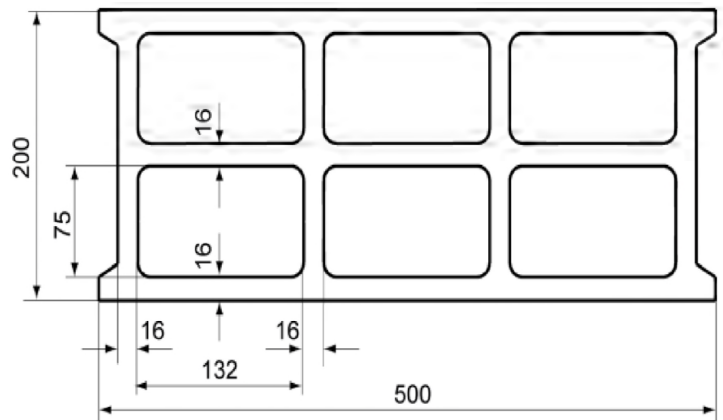
Horizontal perforated brick LLz,
EN 771-1:2011+A1:2015;
e.g. Cermanica Farreny S.A according to Annex C 96



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



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



Measures in [mm]
Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 5

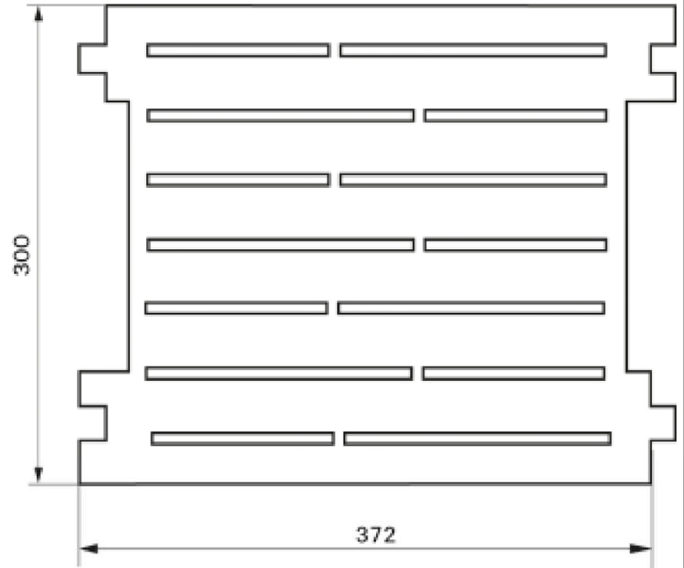
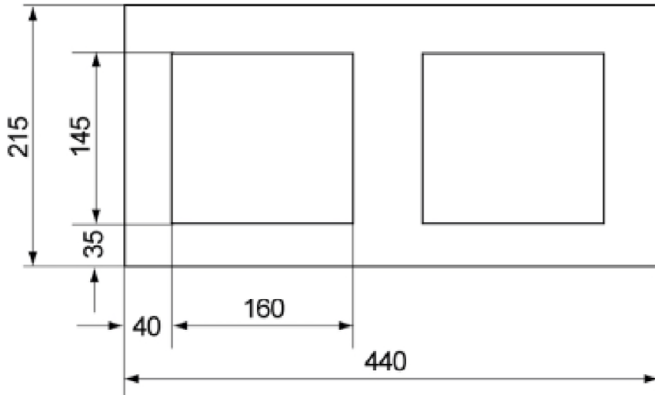
Annex B 19

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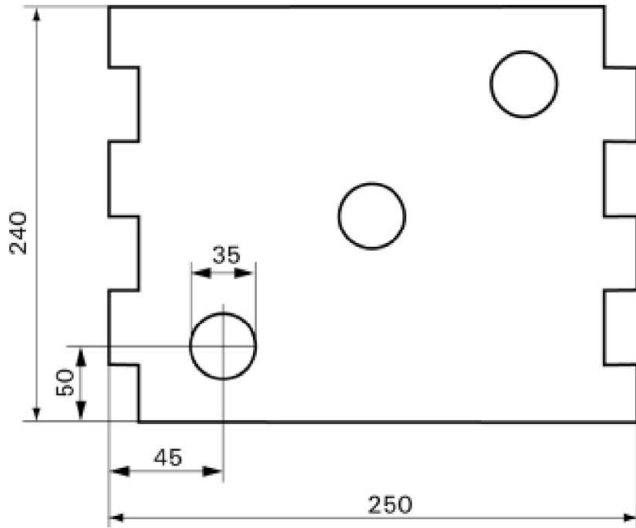
Table B20.1: Overview dimensions of perforated and hollow bricks part 6

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

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



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



Measures in [mm]
Figures not to scale

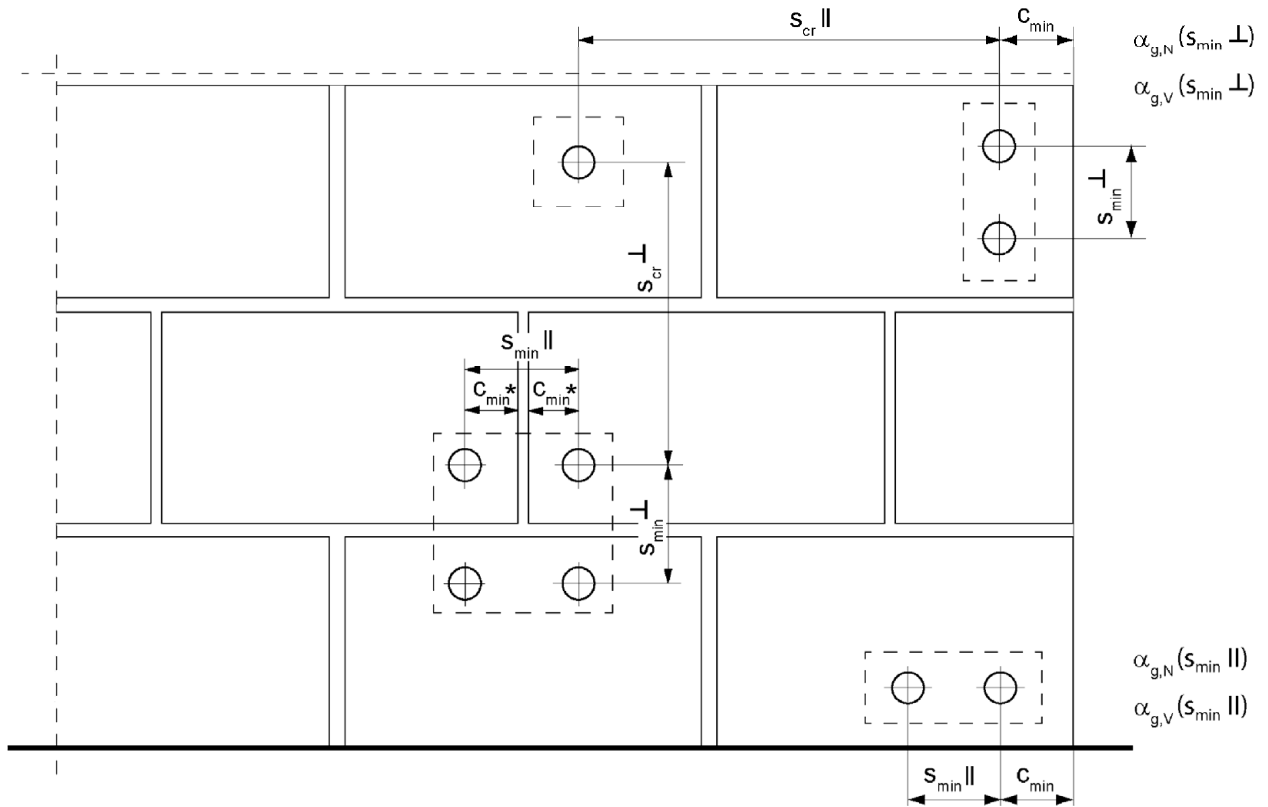
fischer injection system FIS V Plus for masonry

Intended Use
Overview dimensions of perforated and hollow bricks part 6

Annex B 20

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Spacing and edge distance part 1



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

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

Figures not to scale

fischer injection system FIS V Plus for masonry

Intended Use
Spacing and edge distance part 1

Annex B 21

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Spacing and edge distance part 2

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

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

Group of 2 anchors

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

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 B 22

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

| Anchor rod / standard threaded rod | | M6 | M8 ³⁾ | M10 ³⁾ | M12 | M16 | | |
|---|--|-----|------------------|---------------------------|------------|------------|------|-------|
| Characteristic resistance to steel failure under tension loading | | | | | | | | |
| Characteristic resistance $N_{Rk,s}$ | Steel zinc plated | 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 |
| | Stainless steel R and High corrosion resistant steel HCR | 8.8 | | 16,0 | 29,2(26,5) | 46,4(42,8) | 67,4 | 125,6 |
| | | 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 | 4.6 | [-] | 2,00 | | | | |
| | | 4.8 | | 1,50 | | | | |
| | | 5.8 | | 1,50 | | | | |
| | Stainless steel R and High corrosion resistant steel HCR | 8.8 | | 1,50 | | | | |
| | | 50 | | 2,86 | | | | |
| | | 70 | | 1,50 ²⁾ / 1,87 | | | | |
| | | 80 | | 1,60 | | | | |

¹⁾ In absence of other national regulations

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

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 1

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Table C2.1: Characteristic resistance to **steel failure** of a single anchor under **shear loading** with and without lever arm of **fischer anchor rods** and **standard threaded rods**

| Anchor rod / standard threaded rod | | M6 | M8 ³⁾ | M10 ³⁾ | M12 | M16 | | | |
|---|--|----------------|------------------|-------------------|---------------------------|------------|------------|-------|-------|
| Characteristic resistance to steel failure under shear loading | | | | | | | | | |
| without lever arm | | | | | | | | | |
| Characteristic resistance $V_{Rk,s}$ | 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 | Property class | 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 | Property class | 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 factors¹⁾ | | | | | | | | | |
| 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 of a single anchor under shear loading with and without lever arm of fischer anchor rods and standard threaded rods

Annex C 2

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

| fischer internal threaded anchor FIS E | | | M6 | M8 | M10 | M12 | |
|---|-----------------|-----------------------|------|------|------|------|------|
| Characteristic resistance to steel failure under tension loading, decisive values of sleeve and screw/threaded rod | | | | | | | |
| Characteristic resistance with screw | $N_{Rk,s}$ | Property class 4.6 | [kN] | 8,0 | 14,6 | 23,2 | 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 factors¹⁾ | | | | | | | |
| Partial factors | $\gamma_{Ms,N}$ | Property class 4.6 | [-] | 2,00 | | | |
| | | Property class 5.8 | | 1,50 | | | |
| | | Property class R | | 1,87 | | | |
| | | Property class 70 HCR | | 1,87 | | | |
| Characteristic resistance to steel failure under shear loading; decisive values of sleeve and screw/threaded rod | | | | | | | |
| without lever arm | | | | | | | |
| Characteristic resistance with screw | $V_{Rk,s}$ | Property class 4.6 | [kN] | 4,8 | 8,7 | 13,9 | 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 factors¹⁾ | | | | | | | |
| Partial factors | $\gamma_{Ms,V}$ | Property class 4.6 | [-] | 1,67 | | | |
| | | Property class 5.8 | | 1,25 | | | |
| | | Property class R | | 1,56 | | | |
| | | Property class 70 HCR | | 1,56 | | | |
| ¹⁾ In absence of other national regulations | | | | | | | |

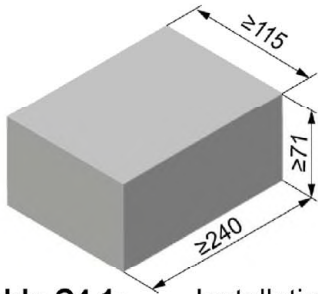
fischer injection system FIS V Plus for masonry

Performance

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

Annex C 3

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


| | | | |
|--|-------------------------------|---------|----------|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 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 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 $c_{min} = c_{cr}$ | 100 | | | 100 | | | | |
| Edge distance $h_{ef}=200$ $c_{min} = c_{cr}$ | 150 | | | - ²⁾ | | | | |
| Spacing | $s_{min II,N}$ | 60 | | | 60 | | | |
| | $h_{ef}=200$ $s_{min II,N}$ | 240 | | | - ²⁾ | | | |
| | $s_{min II,V}$ | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

²⁾ No performance assessed

Table C4.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

 Solid brick Mz, NF, dimensions, installation parameters $c=100\text{mm}$
Annex C 4

Solid brick Mz, NF, EN 771-1:211+A1:2015

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

| Anchor rod | | M6 | M8 | M10 | | | M12 | | | - | | - | |
|--|----------------|---|-----|-----|-----|------|-----|-----|------|-------|----|-------|-----|
| Internal threaded anchor FIS E | | - | - | - | | | - | | | M6 | M8 | M10 | M12 |
| | | | | | | | | | | 11x85 | | 15x85 | |
| Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾ | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | |
| | | ≥50 | ≥50 | 50 | 80 | 200 | 50 | 80 | 200 | 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 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 | |
| Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,I}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | |
| | | ≥50 | ≥50 | ≥50 | 200 | ≥50 | 200 | 85 | | | | | |
| 15 / 12 N/mm ² | w/w w/d | 2,5 | 2,5 | 4,0 | 8,5 | 4,0 | 11,5 | 2,5 | | | | | |
| | d/d | 4,0 | 4,0 | 6,0 | 12,0 | 5,5 | 12,0 | 4,0 | | | | | |

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

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

fischer injection system FIS V Plus for masonry

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

Annex C 5

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

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

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

General installation parameters

| | | |
|--------------------------------------|--|-------------|
| Edge distance $c_{min} = C_{cr}$ | | 60 |
| Edge distance $h_{ef}=200$ c_{min} | | 60 |
| Spacing | $s_{min \parallel, N}$ | 80 |
| | $h_{ef}=200$ $s_{min \parallel, N}$ [mm] | 80 |
| | $s_{min \parallel, V}$ | 80 |
| | $s_{cr \parallel}$ | $3x h_{ef}$ |
| | $s_{min \perp}$ | 80 |
| | $s_{cr \perp}$ | $3x h_{ef}$ |

Drilling method

Hammer drilling with hard metal hammer drill

Table C6.2: Group factors

| Anchor rods | M6 | M8 | M10 | M12 | M16 | - | - | | |
|--------------------------------|--|-----|-------|-----|-----|----|----|-----|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | 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 $c=60\text{mm}$

Annex C 6

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

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

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

Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ³⁾

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | 85 |
|--|----------------|-----|---|-----|-----|-----|-----|---------------|-----|-----|---------------|-----|-----|---------------|---------------|
| | | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | |
| 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.
 2) No performance assessed
 3) For temperature range 72/120°C: $N_{Rk(72/120^\circ\text{C})} = 0,83 \cdot N_{Rk(50/80^\circ\text{C})}$.

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | 85 | |
|--|-------------------|--|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------|
| | | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | | 200 |
| 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.
 2) No performance assessed.
 Factor for job site tests and displacements see annex C 123.

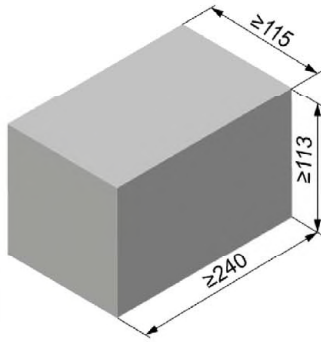
fischer injection system FIS V Plus for masonry

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

Annex C 7

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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/dm ³] | ≥ 1,8 | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²] | 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 | 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 | 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] | _2) | | 10 | | _2) | | | 4 | 10 | _2) | |
| General installation parameters | | | | | | | | | | | |
| Edge distance $c_{min} = c_{cr}$ | | | | | 60 | | | | | | |
| Spacing | $s_{min \parallel}$ | | | | | 120 | | | | | |
| | $s_{cr \parallel}$ | | | | | 240 | | | | | |
| | $s_{cr \perp} = s_{min \perp}$ | | | | | 115 | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
 2) No performance assessed.

Table C8.2: Group factors

| Anchor rods | M6 | M8 | M10 | M12 | M16 | - | | - | | |
|--------------------------------|------------------------------------|----|-------|-----|-----|-----|----|-----|-----|--|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | M10 | M12 | |
| | 11x85 | | 15x85 | | | | | | | |
| Group factor | $\alpha_{g,N} (s_{min \parallel})$ | | | | | 1,5 | | | | |
| | $\alpha_{g,V} (s_{min \parallel})$ | | | | | 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

Annex C 8

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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 | | | | | |

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | |
|--|----------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|
| | | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 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 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 | | | | | |

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | |
|--|----------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | ≥ 50 | | | | | | 85 | | | | | | |
| 12,5 / 10 N/mm ² | w/w w/d | 2,5 | 3,0 | 3,0 | 3,5 | 3,0 | 2,5 | 3,0 | 3,0 | 3,0 | 3,0 | 3,5 | 2,5 | 3,0 |
| | d/d | | | | | | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 |
| 20 / 16 N/mm ² | w/w w/d | 4,0 | 5,0 | 5,5 | 5,5 | 5,0 | 4,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 6,0 | 4,0 |
| | d/d | | | | | | 4,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

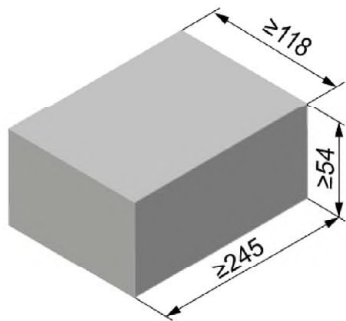
fischer injection system FIS V Plus for masonry

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

Annex C 9

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



| | | | | |
|--|-----------------------|-----------------------|---------|----------|
| Producer | | e.g. Nigra | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | ≥ 245 | ≥ 118 | ≥ 54 |
| 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 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 | 85 |
| Max. installation torque $\max T_{inst}$ | [Nm] | 4 | | 10 | | | | 4 | 10 | |
| General installation parameters | | | | | | | | | | |
| Edge distance $c_{min} = c_{cr}$ | | 60 | | | | | | | | |
| Spacing $s_{cr \parallel} = s_{min \parallel}$ | [mm] | 245 | | | | | | | | |
| | | $s_{cr \perp} = s_{min \perp}$ | | | | | | | | |
| | | 60 | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C10.2: Group factors

| Anchor rods | M6 | M8 | M10 | M12 | M16 | - | | - | |
|--------------------------------|------------------------------------|-----|-------|-----|-----|----|----|-----|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | M10 | M12 |
| | 11x85 | | 15x85 | | | | | | |
| Group factor | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 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 brick Mz, dimensions, installation parameters

Annex C 10

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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 | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 0,60 | 0,90 | 0,75 | 0,75 | 0,75 | 0,60 | 0,75 | |
| | d/d | | 1,20 | 1,50 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | |
| 25 / 20 N/mm ² | w/w | w/d | 0,90 | 1,50 | 1,20 | 1,20 | 1,20 | 0,90 | 1,20 | |
| | d/d | | 1,50 | 2,50 | 2,00 | 2,00 | 2,00 | 1,50 | 2,00 | |

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

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

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 | | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 2,0 | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

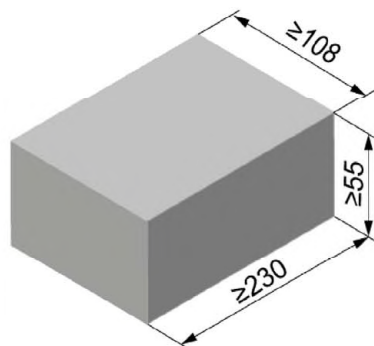
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Performance
Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C 11

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



| | | | |
|---|-----------------------|---------|----------|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 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 | M8 | M10 | M12 |
| | 11x85 | | 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 | 85 |
| Max. installation torque $\max T_{inst}$ [Nm] | 4 | | 10 | | | | 4 | | 10 |
| General installation parameters | | | | | | | | | |
| Edge distance $c_{min} = c_{cr}$ | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Table C12.2: Group factors

| Anchor rods | M6 | M8 | M10 | M12 | M16 | - | | - | | | |
|--------------------------------|------------------------------------|-----|-------|-----|-----|----|----|-----|-----|--|--|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | M10 | M12 | | |
| | 11x85 | | 15x85 | | | | | | | | |
| Group factor | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 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 brick Mz, dimensions, installation parameters

Annex C 12

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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 | | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | |
| 12,5 / 10 N/mm ² | w/w | 0,60 | 0,90 | 0,75 | 0,75 | 0,75 | 0,75 | | | |
| | w/d | 1,20 | 1,50 | 1,20 | 1,20 | 1,20 | 1,20 | | | |
| 25 / 20 N/mm ² | w/w | 0,90 | 1,50 | 1,20 | 1,20 | 1,20 | 1,20 | | | |
| | w/d | 1,50 | 2,50 | 2,00 | 2,00 | 2,00 | 2,00 | | | |

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

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

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 | | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | |
| 12,5 / 10 N/mm ² | w/w | 2,0 | 3,0 | 4,0 | 4,5 | 5,5 | 2,0 | 3,0 | 4,0 | 4,5 |
| | w/d | | | | | | | | | |
| 25 / 20 N/mm ² | w/w | 2,5 | 4,0 | 5,5 | 6,0 | 8,0 | 2,5 | 4,0 | 5,5 | 6,0 |
| | w/d | | | | | | | | | |

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

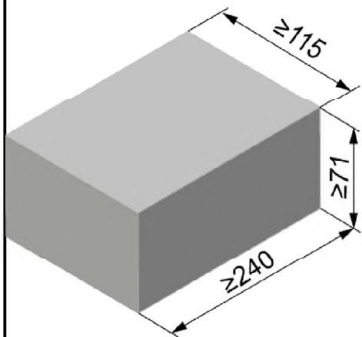
fischer injection system FIS V Plus for masonry

Performance
Solid brick Mz, Characteristic resistance under tension and shear loading

Annex C 13

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



| | | | |
|---|-------------------------------|---------|----------|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 240 | ≥ 115 | ≥ 71 |
| Mean gross dry density ρ [kg/dm ³] | ≥ 1,8 | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm ²] | 15 / 12 or 25 / 20 or 35 / 28 | | |
| Standard or annex | EN 771-2:2011+A1:2015 | | |

Table C14.1: Installation parameters

| | | | | | | | | | |
|---------------------------------------|-----------|-----------|------------|------------|------------|--------------|--------------|------------|------------|
| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | - | | |
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | 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 | 85 | |
| | | | | | 200 | | 200 | | 200 | | | | |
| Max. installation torque $max T_{inst}$ [Nm] | 3 | | 5 | | 15 | | 15 | | 25 | | 3 | 5 | 15 |

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C14.2: Group factors

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

Annex C 14

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

Table C15.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | | M6 | M8 | M10 | M12 | M16 | - | | - | | | | | | | |
|---|----------------|---|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Internal threaded anchor FIS E | | - | - | - | - | - | M6 | M8 | M10 | M12 | | | | | | |
| | | 11x85 | | 15x85 | | | | | | | | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | 200 | 85 | 85 |
| 15 / 12 N/mm ² | w/w 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 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 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 | | | | | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | ≥100 | 50 | ≥100 | 50 | ≥100 | 85 | 85 |
| 15 / 12 N/mm ² | w/w w/d | 1,5 | 3,0 | 1,5 | 3,0 | 1,2 | 2,0 | 1,2 | 2,0 | 1,2 | 2,0 | 1,2 | 1,2 |
| | d/d | 1,5 | 3,0 | 1,5 | 3,0 | 1,2 | 2,0 | 1,2 | 2,0 | 1,2 | 2,0 | 1,2 | 1,2 |
| 25 / 20 N/mm ² | w/w w/d | 2,5 | 4,0 | 2,5 | 4,0 | 1,5 | 3,0 | 1,5 | 3,0 | 1,5 | 3,0 | 1,5 | 1,5 |
| | d/d | 2,5 | 4,0 | 2,5 | 4,0 | 1,5 | 3,0 | 1,5 | 3,0 | 1,5 | 3,0 | 1,5 | 1,5 |
| 35 / 28 N/mm ² | w/w w/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 | 3,0 | 4,5 | 3,0 | 4,5 | 1,5 | 3,5 | 1,5 | 3,5 | 1,5 | 3,5 | 1,5 | 1,5 |

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

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

fischer injection system FIS V Plus for masonry

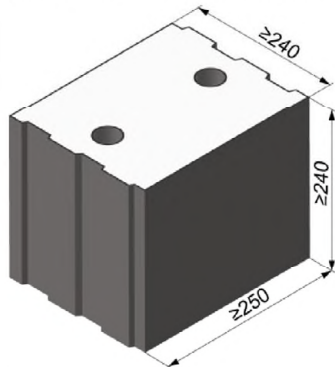
Performance

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

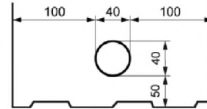
Annex C 15

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



| | | | | |
|--|-----------------------|---------------------------------|---------|----------|
| Producer | | - | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | ≥ 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 B 15

Table C16.1: 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 | |

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] | _2) | | 10 | | | | _2) | | 4 | | 10 | |

General installation parameters

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

Drilling method

Hammer drilling with hard metal hammer drill

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength
- 2) No performance assessed

Table C16.2: Group factors

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

Annex C 16

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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 | | | |
| Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | | | | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 3,0 | 4,0 | 4,5 | 4,5 | 3,5 | 3,0 | 3,5 | | 4,5 | | 3,0 | 4,5 | |
| | d/d | | 5,0 | 7,0 | 7,0 | 7,0 | 5,5 | 5,0 | 5,5 | | 8,0 | | 5,0 | 8,0 | |
| 25 / 20 N/mm ² | w/w | w/d | 4,5 | 6,0 | 6,0 | 6,0 | 5,0 | 4,5 | 5,0 | | 6,5 | | 4,5 | 6,5 | |
| | d/d | | 7,5 | 10,0 | 10,0 | 10,0 | 7,5 | 7,5 | 7,5 | | 11,0 | | 7,5 | 11 | |
| 35 / 28 N/mm ² | w/w | w/d | 5,0 | 8,0 | 8,5 | 8,5 | 7,0 | 5,0 | 7,0 | | 8,5 | | 5,0 | 8,5 | |
| | d/d | | 8,5 | 12,0 | 12,0 | 12,0 | 11,0 | 8,5 | 11,0 | | 12,0 | | 8,5 | 12 | |

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

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

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

| Anchor rod | | M6 | M8 | M10 | M12 | M16 | - | | - | | M8 | M10 | - | | |
|--|----------------|---|-----|-----|-----|-----|-------|-----|-------|-----|-----|-------|-------|-----|-----|
| Internal threaded anchor FIS E | | | - | - | - | - | - | M6 | M8 | M10 | M12 | - | - | M6 | M8 |
| | | | | | | | 11x85 | | 15x85 | | | | 11x85 | | |
| Perforated sleeve FIS H K | | | | - | - | - | - | - | | - | | 16x85 | | | |
| Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | | |
| | | ≥ 50 | | | | | | 85 | | | | | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 2,5 | | 4,5 | | | 2,5 | | 4,5 | | 4,5 | | 2,5 | 4,5 |
| | d/d | | 4,0 | | 6,5 | | | 4,0 | | 6,5 | | 6,5 | | 4,0 | 6,5 |
| 25 / 20 N/mm ² | w/w | w/d | 4,0 | | 6,5 | | | 4,0 | | 6,5 | | 6,5 | | 4,0 | 6,5 |
| | d/d | | 5,0 | | 9,0 | | | 5,0 | | 9,0 | | 9,0 | | 5,0 | 9,0 |

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

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

fischer injection system FIS V Plus for masonry

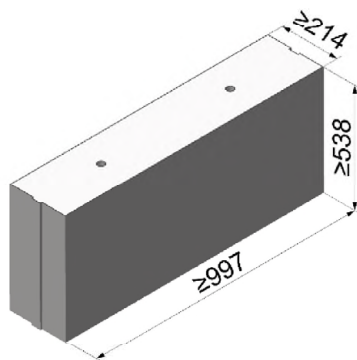
Performance

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

Annex C 17

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



| | | | | |
|--|-----------------------|-----------------------|---------|----------|
| Producer | | e.g. Calduran | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | ≥ 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 | | |

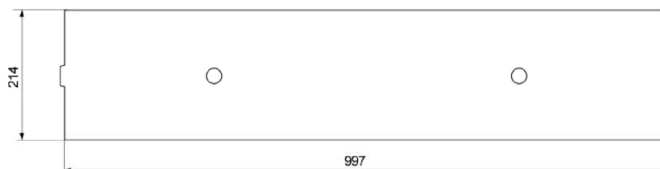


Table C18.1: Installation parameters

| | | | | | | | | | |
|---------------------------------------|-----------|-----------|------------|------------|------------|--------------|-----------|--------------|------------|
| 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 | 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 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

Annex C 18

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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 | M8 | M10 | M12 | |
| | | 11x85 | | 15x85 | | | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)²⁾ | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | 100 | 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 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 | M8 | M10 | M12 | |
| | | 11x85 | | 15x85 | | | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | |
| | | ≥ 50 | | | | | | | | | |
| 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

fischer injection system FIS V Plus for masonry

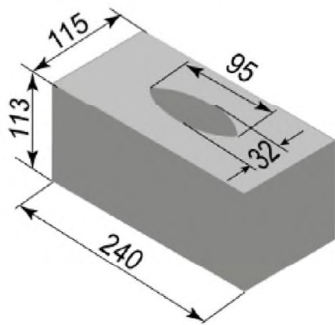
Performance

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

Annex C 19

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



| | | | |
|---|-----------------------|---------|----------|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 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 anchorage with perforated sleeve FIS H K)

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

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

| | | | | | | | | | | | | |
|--------------------------|----------------------------|---|---|--|--|--|--|--|--|--|--|--|
| Max. installation torque | max T _{inst} [Nm] | 2 | 4 | | | | | | | | | |
|--------------------------|----------------------------|---|---|--|--|--|--|--|--|--|--|--|

General installation parameters

| | | | | | | | | | | | | |
|---------------|------------------------------------|------|-----|-----|-----|-----|-----|--|--|--|--|--|
| Edge distance | C _{min} = C _{cr} | 100 | | | | | | | | | | |
| Spacing | S _{min} | [mm] | 255 | 255 | 390 | 255 | 390 | | | | | |
| | S _{scr} | | | | | | | | | | | |
| | S _{min} ⊥ | | | | | | | | | | | |
| | S _{scr} ⊥ | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C20.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Solid calcium silicate brick KS, dimensions, installation parameters

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

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

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

Table C21.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Solid calcium silicate brick KS, dimensions, installation parameters

Annex C 21

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Performance
Solid calcium silicate brick KS, Characteristic resistance under tension loading

Annex C 22

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

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

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

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

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

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

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

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

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

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

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

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

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

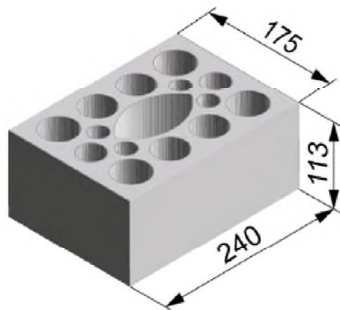
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Performance
Solid calcium silicate brick KS, Characteristic resistance under shear loading

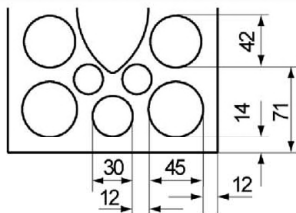
Annex C 23

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



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



Dimension see also Annex B 15

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

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

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

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

General installation parameters

| | | | | | | | | | | | | | | | |
|---------------|------------------------------------|----|--|--|--|-----|--|--|--|--|--|--|--|--|--|
| Edge distance | C _{min} = C _{cr} | 60 | | | | 80 | | | | | | | | | |
| Spacing | S _{min} | | | | | 100 | | | | | | | | | |
| | S _{cr} | | | | | 240 | | | | | | | | | |
| | S _{min} ⊥ | | | | | 115 | | | | | | | | | |
| | S _{cr} ⊥ | | | | | 115 | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C24.2: Group factors

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

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

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Performance

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

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

Table C25.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

| Anchor rod | | M10 | M12 | M16 |
|--|---------------------|------------|-----|------------|
| Perforated sleeve FIS H K | | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | | |
| Max. installation torque | $\max T_{inst}$ | [Nm] | 2 | |
| General installation parameters | | | | |
| Edge distance | $c_{min} = c_{cr}$ | | 80 | |
| Spacing | $s_{min \parallel}$ | [mm] | 100 | |
| | $s_{cr \parallel}$ | | 240 | |
| | $s_{min \perp}$ | | 115 | |
| | $s_{cr \perp}$ | | 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 | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 1,5 | |
| | $\alpha_{g,V} (s_{min \parallel})$ | | | |
| | $\alpha_{g,N} (s_{min \perp})$ | | 2,0 | |
| | $\alpha_{g,V} (s_{min \perp})$ | | | |

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

Annex C 25

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

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

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

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

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

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

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | |
|--|----------------|-----|-----|--|
| | w/w | w/d | | |
| 10 / 8 N/mm ² | w/w | w/d | 2,0 | |
| | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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Performance

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

Annex C 26

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

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

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

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

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

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

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

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

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

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

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

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

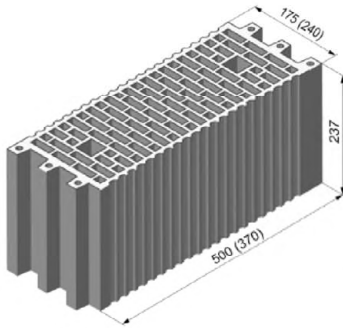
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Performance
Perforated calcium silicate brick KSL, 3DF, Characteristic resistance under shear loading

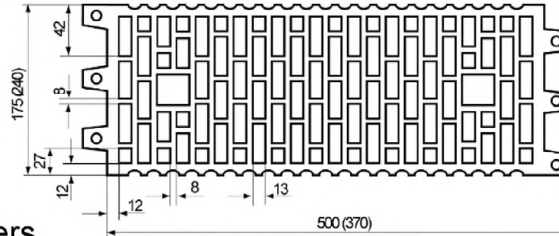
Annex C 27

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



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



Dimension see also Annex B 15

Table C28.1: Installation parameters

| | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|--------|-----|-------|-----|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | - | M6 | M8 | - | - | - | M10 | M12 | - | - | - | - | - |
| | | | 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} | 100 |
| Spacing | S _{min II} | 100 |
| | S _{cr II} [mm] | 500 (370) |
| | S _{min ⊥} | 100 |
| | S _{cr ⊥} | 240 |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C28.2: Group factors

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

| | | | |
|---------------|-------------------------------|-----|---|
| Group factors | $\alpha_{g,N} (S_{min II}) =$ | [-] | 1 |
| | $\alpha_{g,V} (S_{min II}) =$ | | |
| | $\alpha_{g,N} (S_{min ⊥}) =$ | | |
| | $\alpha_{g,V} (S_{min ⊥}) =$ | | |

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 28

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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 | M6 | M8 | - | - | M10 | M12 | - | - | - | - |
| Perforated sleeve FIS H K | 12x50 | 12x85 | 16x85 | | 16x130 | | 20x85 | | 20x130 | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 0,30 | | 0,90 | | 1,20 | | | | | | | |
| | d/d | | 0,40 | | 0,90 | | 1,20 | | | | | | | |
| 7,5 / 6 N/mm ² | w/w | w/d | 0,50 | | 1,50 | | 2,00 | | | | | | | |
| | d/d | | 0,60 | | 1,50 | | 2,00 | | | | | | | |
| 10 / 8 N/mm ² | w/w | w/d | 0,75 | | 2,00 | | 2,50 | | | | | | | |
| | d/d | | 0,75 | | 2,00 | | 2,50 | | | | | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 0,90 | | 2,50 | | 3,00 | | | | | | | |
| | d/d | | 0,90 | | 2,50 | | 3,50 | | | | | | | |
| 15 / 12 N/mm ² | w/w | w/d | 0,90 | | 3,00 | | 3,50 | | | | | | | |
| | d/d | | 1,20 | | 3,00 | | 4,00 | | | | | | | |

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

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

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 | M6 | M8 | - | - | M10 | M12 | - | - | - | - |
| Perforated sleeve FIS H K | 12x50 | 12x85 | 16x85 | | 16x130 | | 20x85 | | 20x130 | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 0,50 | | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

fischer injection system FIS V Plus for masonry

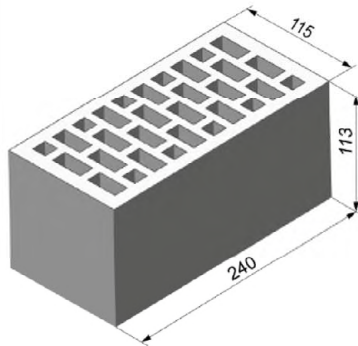
Performance

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

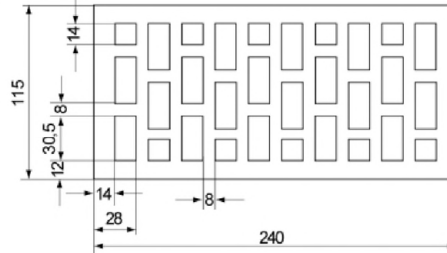
Annex C 29

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



| | | | | |
|---|-----------------------|--|---------|----------|
| Producer | e.g. Wienerberger | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 240 | 115 | 113 |
| Mean gross dry density ρ | [kg/dm ³] | $\geq 1,4$ | | |
| 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 B 15

Table C30.1: Installation parameters

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

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

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

General installation parameters

| | | | | | | | | | | |
|--|--------------------------------|-----|--|--|--|--|--|--|--|--|
| Edge distance $c_{min} = c_{cr}$ | 80 | | | | | | | | | |
| Spacing $s_{cr \parallel} = s_{min \parallel}$ | 240 | | | | | | | | | |
| | $s_{cr \perp} = s_{min \perp}$ | 115 | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C30.2: Group factors

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

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

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

Table C31.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | - | M12 | M16 | |
|---|----------------|-----|-------|------|-------|----|-----|-------|-----|-----|---|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | M10 | M12 | - |
| | | | 11x85 | | 15x85 | | | | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 20x85 | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | |
| 7,5 / 6 N/mm ² | w/w | w/d | 0,75 | 0,90 | 0,75 | | | 0,90 | | | |
| | d/d | | 0,75 | 1,20 | 0,75 | | | 0,90 | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 1,20 | 1,50 | 1,20 | | | 1,50 | | | |
| | d/d | | 1,20 | 2,00 | 1,20 | | | 1,50 | | | |
| 20 / 16 N/mm ² | w/w | w/d | 2,00 | 2,50 | 2,00 | | | 2,00 | | | |
| | d/d | | 2,00 | 3,00 | 2,00 | | | 2,50 | | | |
| 25 / 20 N/mm ² | w/w | w/d | 2,50 | 3,50 | 2,50 | | | 3,00 | | | |
| | d/d | | 2,50 | 4,00 | 2,50 | | | 3,00 | | | |
| 35 / 28 N/mm ² | w/w | w/d | 3,00 | 5,00 | 3,50 | | | 4,00 | | | |
| | d/d | | 3,50 | 5,50 | 3,50 | | | 4,50 | | | |

¹⁾ The 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 | M8 | - | | M10 | M12 | - |
| | | | 11x85 | | 15x85 | | | | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 20x85 | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | |
| 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

fischer injection system FIS V Plus for masonry

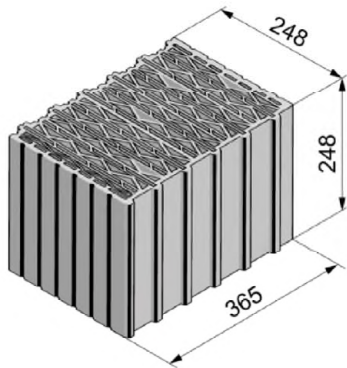
Performance

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

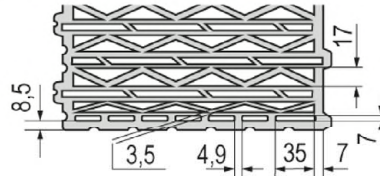
Annex C 31

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



| Producer | | e.g. Wienerberger | | |
|--|-----------------------|----------------------------|---------|----------|
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 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 B 15

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
|--------------------------------|-------|----|-------|----|-------|----|-----|--------|---------|-------|-----|-----|--------|-----|--------|-----|
| Internal threaded anchor FIS E | - | - | M6 M8 | | - | | - | | M10 M12 | | - | - | - | - | - | - |
| | | | 11x85 | | | | | | 15x85 | | | | | | | |
| 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 | $s_{min \parallel}$ | | | | | | | 80 | | | | | | | | | |
| | $s_{cr \parallel}$ [mm] | | | | | | | 250 | | | | | | | | | |
| | $s_{min \perp}$ | | | | | | | 80 | | | | | | | | | |
| | $s_{cr \perp}$ | | | | | | | 250 | | | | | | | | | |

Drilling method

Rotary drilling with carbide drill

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

Table C32.2: Group factors

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, U8, dimensions, installation parameters

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

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

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

Table C33.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, U8, dimensions, installation parameters

Annex C 33

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use con- ditions | | | | | | | | | | | | | | | |
|--|-------------------------------|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|
| | 5 / 4 N/mm² | w/w | w/d | 1,2 | | | | | | | | | | | | |
| d/d | | 1,5 | | | | | | | | | | | | | | |
| 8 / 6 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | | | |
| | d/d | | 1,5 | | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | | | |
| | d/d | | 2,0 | | | | | | | | | | | | | |

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

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use con- ditions | | | | | | | | | | | | | | | |
|--|-------------------------------|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|
| | 5 / 4 N/mm² | w/w | w/d | 1,2 | | | | | | | | | | | | |
| d/d | | 1,5 | | | | | | | | | | | | | | |
| 8 / 6 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | | | |
| | d/d | | 1,5 | | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 2,0 | | | | | | | | | | | | | |
| | d/d | | 2,0 | | | | | | | | | | | | | |

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

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

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

fischer injection system FIS V Plus for masonry

Performance

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

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

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

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

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

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

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

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

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

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

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

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

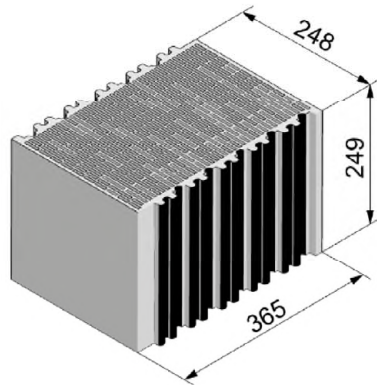
Performance

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

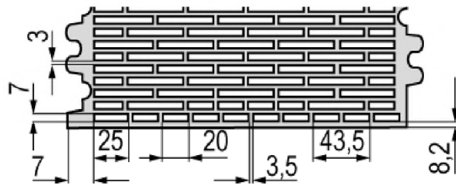
Annex C 35

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



| | | | | |
|--|-----------------------|--------------------------------|---------|----------|
| Producer | e.g. Wienerberger | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 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 B 16

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

| | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|----|--------|---|-------|-----|--------|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | |
| | | | | | 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} | 80 |
| | | | S _{cr} [mm] | 250 |
| | | | S _{min} ⊥ | 80 |
| | | | S _{cr} ⊥ | 250 |

Drilling method

Rotary drilling with carbide drill

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

Table C36.2: Group factors

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

| | | | | |
|---------------|--|-----|--|-----|
| Group factors | α _{g,N} (S _{min}) | [-] | 1,7 | |
| | | | α _{g,V} (S _{min}) | 0,5 |
| | | | α _{g,N} (S _{min} ⊥) | 1,3 |
| | | | α _{g,V} (S _{min} ⊥) | 0,5 |

fischer injection system FIS V Plus for masonry

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

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

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

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

Table 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

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

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

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 | |
|--|-------|----------------|-------|-----|-------|----|-----|--------|-----|-----|-------|-----|-----|--------|-----|--------|--|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | | |
| | | | | | 11x85 | | | | | | 15x85 | | | | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | | 20x85 | | | 20x130 | | 20x200 | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | | Use conditions | | | | | | | | | | | | | | | |
| 10 / 8 N/mm ² | | w/w | w/d | 0,9 | | | 1,5 | | | 2,0 | | | | | | | |
| | | d/d | | | | | | | | | | | | | | | |
| 12,5 / 10 N/mm ² | | w/w | w/d | 0,9 | | | 1,5 | | | 2,0 | | | | | | | |
| | | d/d | | | | | | | | | | | | | | | |
| 15 / 12 N/mm ² | | w/w | w/d | 1,2 | | | 2,0 | | | 2,0 | | | | | | | |
| | | d/d | | | | | | | | | | | | | | | |

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

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

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

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

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

fischer injection system FIS V Plus for masonry

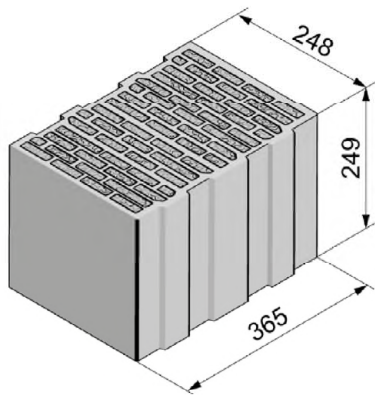
Performance

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

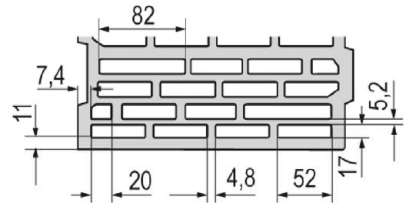
Annex C 39

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



| | | | | |
|--|-----------------------|----------------|---------|----------|
| Producer | e.g. Wienerberger | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 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 B 16

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

| | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|----|--------|---|-------|-----|--------|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | |
| | | | | | 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 | | | | | | | | | | | | | | |
| $s_{min \parallel}$ | 80 | | | | | | | | | | | | | | |
| Spacing $s_{cr \parallel}$ [mm] | 250 | | | | | | | | | | | | | | |
| $s_{min \perp}$ | 80 | | | | | | | | | | | | | | |
| $s_{cr \perp}$ | 250 | | | | | | | | | | | | | | |

Drilling method

Rotary drilling with carbide drill

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

Table C40.2: Group factors

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 42

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

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

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

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

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

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

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

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

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

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

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

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

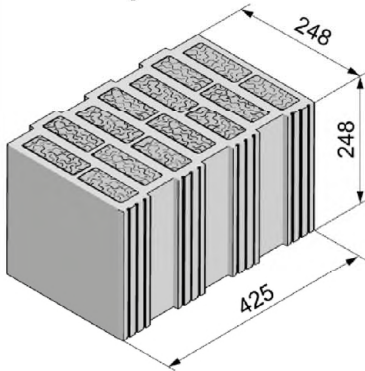
fischer injection system FIS V Plus for masonry

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

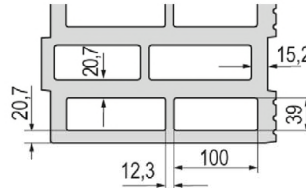
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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015



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



Dimension see also Annex B 16

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

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

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 | | | | | |
| $s_{min \parallel}$ | 80 | | | | | |
| Spacing $s_{cr \parallel}$ [mm] | 250 | | | | | |
| $s_{min \perp}$ | 80 | | | | | |
| $s_{cr \perp}$ | 250 | | | | | |

Drilling method

Rotary drilling with carbide drill

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

Table C44.2: Group factors

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

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

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

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

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

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015
Table C46.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | |
|--|----------------|-----|-----|--|-----|--|-----|--|-----|--|-----|--|
| 5 / 4 N/mm² | 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/mm² | 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/mm² | w/w | w/d | 2,5 | | 3,0 | | 4,0 | | 3,5 | | 6,0 | |
| | d/d | | 2,5 | | 3,0 | | 4,5 | | 3,5 | | 6,5 | |

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

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | |
|--|----------------|-----|-----|--|-----|--|
| 5 / 4 N/mm² | w/w | w/d | 3,0 | | 4,0 | |
| | d/d | | 3,0 | | 4,5 | |
| 8 / 6 N/mm² | w/w | w/d | 3,5 | | 5,0 | |
| | d/d | | 4,0 | | 5,5 | |
| 10 / 8 N/mm² | w/w | w/d | 4,0 | | 6,0 | |
| | d/d | | 4,5 | | 6,5 | |

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

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

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

fischer injection system FIS V Plus for masonry

Performance

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

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Vertical perforated brick HLz, T9 MW, filled with mineral wool, EN 771-1:2011+A1:2015
Table C47.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | |
|--|----------------|-----|-----|-----|-----|-----|-----|--|--|--|--|--|
| 5 / 4 N/mm² | w/w | w/d | 2,0 | 2,0 | 2,5 | 2,0 | 1,5 | | | | | |
| | d/d | | | | | | | | | | | |
| 8 / 6 N/mm² | w/w | w/d | 2,5 | 2,5 | 3,0 | 2,5 | 2,0 | | | | | |
| | d/d | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 2,5 | 3,0 | 4,0 | 3,0 | 2,5 | | | | | |
| | d/d | | | | | | | | | | | |

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | |
|--|----------------|-----|-----|-----|--|--|
| 5 / 4 N/mm² | w/w | w/d | 2,5 | 2,0 | | |
| | d/d | | | | | |
| 8 / 6 N/mm² | w/w | w/d | 3,0 | 2,5 | | |
| | d/d | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 4,0 | 3,0 | | |
| | d/d | | | | | |

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

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

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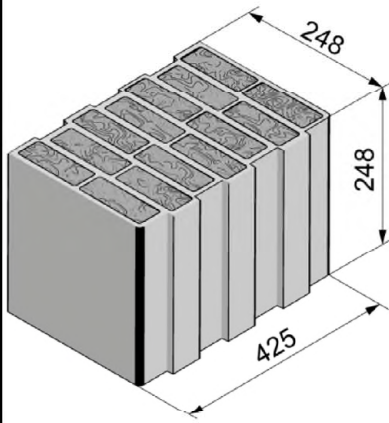
Performance

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

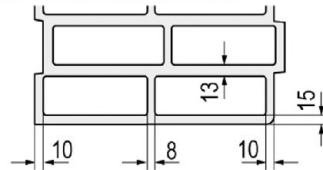
Annex C 47

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



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



Dimension see also Annex B 16

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
|--------------------------------|-------|-------|-------|-------|--------|-------|--------|--------|-------|-----|-----|-----|-----|-----|-----|-----|
| Internal threaded anchor FIS E | - | - | - | - | M6 | M8 | - | - | M10 | M12 | - | - | - | - | - | - |
| | | | | | 11x85 | | | | 15x85 | | | | | | | |
| Perforated sleeve FIS H K | 12x50 | 12x85 | 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 | $s_{min \parallel}$ | 80 |
| | $s_{cr \parallel}$ [mm] | 250 |
| | $s_{min \perp}$ | 80 |
| | $s_{cr \perp}$ | 250 |

Drilling method

Rotary drilling with carbide drill

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

Table C48.2: Group factors

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

| | | | |
|---------------|------------------------------------|-----|-----|
| Group factors | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 1,9 |
| | $\alpha_{g,V} (s_{min \parallel})$ | | 0,9 |
| | $\alpha_{g,N} (s_{min \perp})$ | | 1,0 |
| | $\alpha_{g,V} (s_{min \perp})$ | | 0,7 |

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

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

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

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

Table C49.2: Group factors

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

fischer injection system FIS V Plus for masonry

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

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015
Table C50.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance

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

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Vertical perforated brick HLz, FZ 7, filled with mineral wool, EN 771-1:2011+A1:2015
Table C51.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | | | |
|--|----------------|-----|-----|--|--|--|--|--|--|--|--|--|--|-----|-----|--|
| 5 / 4 N/mm² | w/w | w/d | 1,2 | | | | | | | | | | | 1,5 | 1,5 | |
| | d/d | | | | | | | | | | | | | | | |
| 7,5 / 6 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | 2,0 | 1,5 | |
| | d/d | | | | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | 2,5 | 2,0 | |
| | d/d | | | | | | | | | | | | | | | |

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | | | | |
|--|----------------|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 5 / 4 N/mm² | w/w | w/d | 1,5 | | | | | | | | | | | | | | |
| | d/d | | | | | | | | | | | | | | | | |
| 7,5 / 6 N/mm² | w/w | w/d | 2,0 | | | | | | | | | | | | | | |
| | d/d | | | | | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 2,5 | | | | | | | | | | | | | | |
| | d/d | | | | | | | | | | | | | | | | |

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

Factor for job site tests and displacements see annex C123.

fischer injection system FIS V Plus for masonry

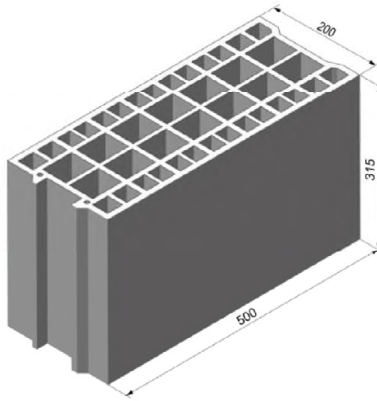
Performance

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

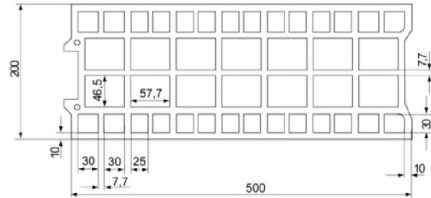
Annex C 51

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



| | | | | |
|--|-----------------------|----------------------------|---------|----------|
| Producer | e.g. Bouyer Leroux | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 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 B 16

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

| | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|--------|-----|-------|-----|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | - | M6 | M8 | - | - | - | M10 | M12 | - | - | - | - | - |
| | | | 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 | | | | | | | | | | | | | |
| $s_{cr \parallel}$ | | 500 | | | | | | | | | | | | | |
| $s_{min \perp} = s_{cr \perp}$ | | 315 | | | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C52.2: Group factors

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

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

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

| Anchor rod | M10 | M12 | M16 |
|--|--------------------------------|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 2 | | |
| General installation parameters | | | |
| Edge distance $c_{min} = c_{cr}$ | 120 | | |
| Spacing | $s_{min II}$ | 120 | |
| | $s_{cr II}$ | 500 | |
| | $s_{min \perp} = s_{cr \perp}$ | 315 | |
| Drilling method | | | |
| Hammer drilling with hard metal hammer drill | | | |

Table C53.2: Group factors

| Anchor rod | M10 | M12 | M16 |
|---------------------------|--------------------------------|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Group factors | $\alpha_{g,N} (s_{min II})$ | 1,3 | |
| | $\alpha_{g,V} (s_{min II})$ | 1,7 | |
| | $\alpha_{g,N} (s_{min \perp})$ | 2,0 | |
| | $\alpha_{g,V} (s_{min \perp})$ | 2,0 | |

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 53

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | |
|--|----------------|-----|------|--|------|--|------|--|------|--|------|
| 5 / 4 N/mm ² | w/w | w/d | 0,50 | | 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 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 anchorage)

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

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

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

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

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

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

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

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

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

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

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

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

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

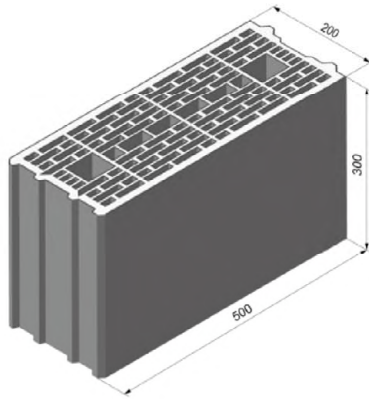
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Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

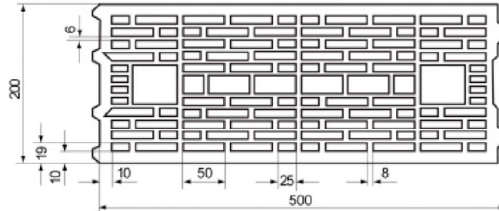
Annex C 55

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



| | | | | |
|--|-----------------------|---|---------|----------|
| Producer | e.g. Wienerberger | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 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 B 17

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

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

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

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

General installation parameters

| | | | | | | | | | | | | | |
|----------------------------------|--------------------------------|-----|--|--|----|--|--|--|----|--|----|--|--|
| Edge distance $C_{min} = C_{cr}$ | 50 | | | | 80 | | | | 50 | | 80 | | |
| 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 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 | | | | | | | | | | | | |
| | $\alpha_{g,V} (S_{min \parallel})$ | 2 | | | | | | | | | | | | |
| | $\alpha_{g,N} (S_{min \perp})$ | 2 | | | | | | | | | | | | |
| | $\alpha_{g,V} (S_{min \perp})$ | 2 | | | | | | | | | | | | |

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 56

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

Table C57.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

| Anchor rod | M10 | M12 | M16 |
|--|--------------------------------|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 2 | | |
| General installation parameters | | | |
| Edge distance $c_{min} = c_{cr}$ | 80 | | |
| Spacing | $s_{min II}$ | 100 | |
| | $s_{cr II}$ | 500 | |
| | $s_{min \perp} = s_{cr \perp}$ | 300 | |
| Drilling method | | | |
| Hammer drilling with hard metal hammer drill | | | |

Table C57.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 57

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 58

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

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|--|----------------|-----|-------|-----|-------|-----|-----|--------|-----|-------|-------|-----|--------|-----|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | |
| | | | | | 11x85 | | | | | | 15x85 | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | | 20x130 | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 0,9 | 1,2 | 0,9 | 1,2 | 0,6 | 2,0 | 0,6 | | | | | |
| | d/d | | | | | | | | | | | | | |
| 7,5 / 6 N/mm ² | w/w | w/d | 1,2 | 1,5 | 1,2 | 1,5 | 0,9 | 3,0 | 0,9 | | | | | |
| | d/d | | | | | | | | | | | | | |
| 10 / 8 N/mm ² | w/w | w/d | 1,5 | 2,0 | 1,5 | 2,0 | 1,2 | 4,0 | 1,2 | | | | | |
| | d/d | | | | | | | | | | | | | |
| 12,5 / 10 N/mm ² | w/w | w/d | 2,0 | 3,0 | 2,0 | 3,0 | 1,5 | 5,0 | 1,5 | | | | | |
| | d/d | | | | | | | | | | | | | |

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

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

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

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

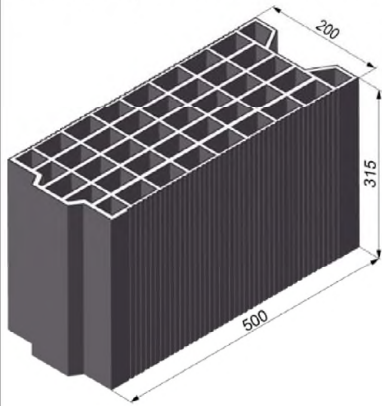
fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

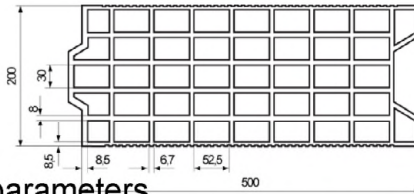
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



| | | | | |
|--|-----------------------|---------------------------------------|---------|----------|
| Producer | e.g. 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 B 17

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

| | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|--------|-----|-------|-------|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | |
| | | | | | 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 | | | | 80 | | | | 50 | | | | 80 | | | |
| Spacing | $s_{min \parallel}$ | 100 | | | | | | | | | | | | | | |
| | $s_{cr \parallel}$ [mm] | 500 | | | | | | | | | | | | | | |
| | $s_{min \perp}$ | 100 | | | | | | | | | | | | | | |
| | $s_{cr \perp}$ | 315 | | | | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C60.2: Group factors

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

Table C61.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 61

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

Annex C 62

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

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

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

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

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

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

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

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

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

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

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

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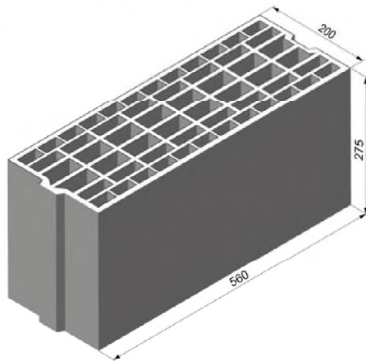
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

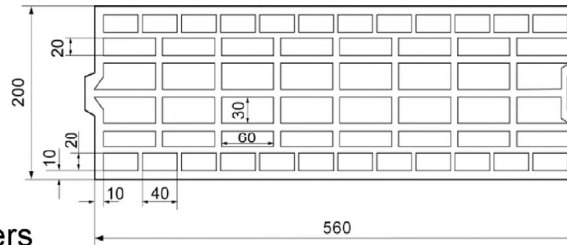
Annex C 63

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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 B 17

Table C64.1: Installation parameters

| | | | | | | | |
|--|---|-----|------------|-----|--------|-----|------------|
| Anchor rod | M8 | M10 | M10 | M12 | M12 | M16 | M16 |
| Perforated sleeve FIS H K | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | | | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 2 | | | | | | |
| General installation parameters | | | | | | | |
| Edge distance $C_{min} = C_{cr}$ | 80 | | | | | | |
| Spacing | $S_{min \parallel} = S_{cr \parallel}$ [mm] | 560 | | | | | |
| | $S_{min \perp} = S_{cr \perp}$ | 275 | | | | | |
| Drilling method | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | |

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

Table C64.2: Group factors

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

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

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

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

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C 123.

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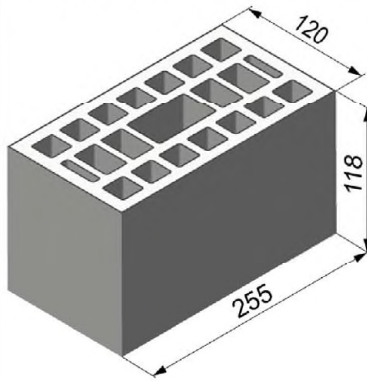
Performance

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

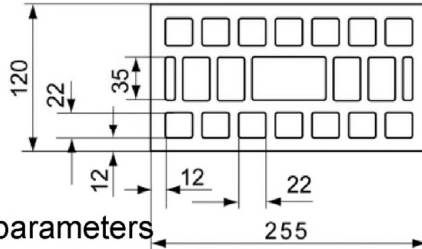
Annex C 65

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



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



Dimension see also Annex B 18

Table C66.1: Installation parameters

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

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

| | | | | | | | | | | |
|--|--------------------------------|-----|--|--|--|--|--|--|--|--|
| Max. installation torque $\max T_{inst}$ [Nm] | 2 | | | | | | | | | |
| General installation parameters | | | | | | | | | | |
| Edge distance $c_{min} = c_{cr}$ | 60 | | | | | | | | | |
| Spacing $s_{cr \parallel} = s_{min \parallel}$ | 255 | | | | | | | | | |
| | $s_{cr \perp} = s_{min \perp}$ | 120 | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C66.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

3) No performance assessed

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

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

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

Table C68.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | - | M12 | M16 | |
|---|-----------------------|-----|-------|------|-------|------|------|-------|-------|-----|---|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | M10 | M12 | - |
| | | | | | 11x85 | | | | 15x85 | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 20x85 | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use con- dition | | | | | | | | | | |
| 2,5 / 2 N/mm² | w/w | w/d | 0,60 | 0,75 | 0,60 | 0,75 | 0,90 | | | | |
| | d/d | | | | | | | | | | |
| 5 / 4 N/mm² | w/w | w/d | 1,20 | 1,50 | 1,20 | 1,50 | 2,00 | | | | |
| | d/d | | | | | | | | | | |
| 8 / 6 N/mm² | w/w | w/d | 2,00 | 2,00 | 2,00 | 2,00 | 2,50 | | | | |
| | d/d | | | | | | | | | | |
| 10 / 8 N/mm² | w/w | w/d | 2,50 | 3,00 | 2,50 | 3,00 | 3,50 | | | | |
| | d/d | | | | | | | | | | |
| 12,5 / 10 N/mm² | w/w | w/d | 3,00 | 3,50 | 3,00 | 3,50 | 4,50 | | | | |
| | d/d | | | | | | | | | | |
| 15 / 12 N/mm² | w/w | w/d | 4,00 | 4,50 | 4,00 | 4,50 | 5,50 | | | | |
| | d/d | | | | | | | | | | |

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

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

fischer injection system FIS V Plus for masonry

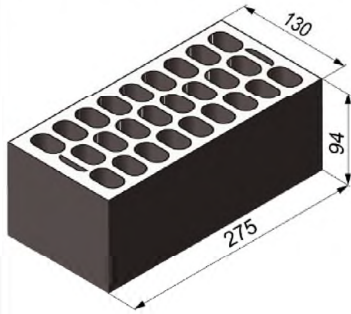
Performance

Vertical perforated brick HLz, Characteristic resistance under shear loading

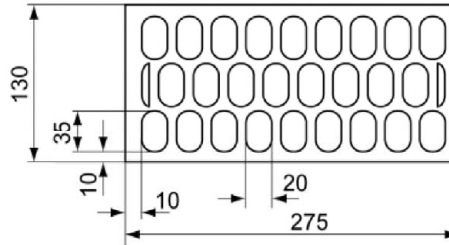
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



| | | | | |
|--|----------------------------|--|---------|----------|
| Producer | e.g. Ceramica 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 B 18

Table C69.1: Installation parameters

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

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

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

General installation parameters

| | | | | | | | | | | |
|--|------|--|--|--|--|-----|--|--|--|--|
| Edge distance $c_{min} = c_{cr}$ | 100 | | | | | 120 | | | | |
| Spacing $s_{cr \parallel} = s_{min \parallel}$ | [mm] | | | | | | | | | |
| | 275 | | | | | | | | | |
| $s_{cr \perp} = s_{min \perp}$ | 95 | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C69.2: Group factors

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

fischer injection system FIS V Plus for masonry

Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

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

Table C71.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|--|----------------|-----|-------|----|-------|----|----|-----|-------|-----|-----|-----|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | |
| 7,5 / 6 N/mm ² | w/w | w/d | 1,2 | | 1,2 | | | | | | | |
| | d/d | | | | | | | | | | | |
| 10 / 8 N/mm ² | w/w | w/d | 1,5 | | 1,5 | | | | | | | |
| | d/d | | | | | | | | | | | |
| 15 / 12 N/mm ² | w/w | w/d | 2,0 | | 2,5 | | | | | | | |
| | d/d | | | | | | | | | | | |
| 20 / 16 N/mm ² | w/w | w/d | 3,0 | | 3,0 | | | | | | | |
| | d/d | | | | | | | | | | | |
| 25 / 20 N/mm ² | w/w | w/d | 4,0 | | 4,0 | | | | | | | |
| | d/d | | | | | | | | | | | |

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

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

fischer injection system FIS V Plus for masonry

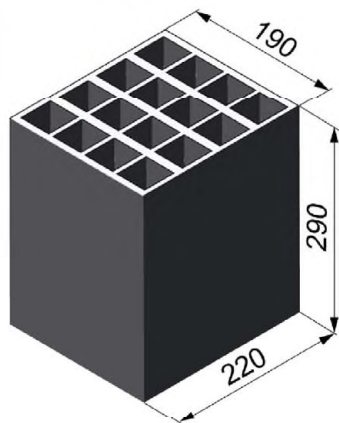
Performance

Vertical perforated brick HLz, Characteristic resistance under tension loading

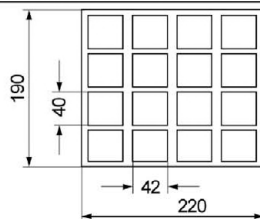
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015



| | | | | |
|--|-----------------------|--------------------------------|---------|----------|
| Producer | e.g. Perceram | | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | 220 | 190 | 290 |
| Mean gross dry density ρ | [kg/dm ³] | $\geq 0,7$ | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | [N/mm ²] | 7,5 / 6 or 10 / 8 or 12,5 / 10 | | |
| Standard or annex | EN 771-1:2011+A1:2015 | | | |



Dimension see also Annex B 18

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

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

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

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

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

Table C72.2: Group factors

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

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

Table C73.2: Group factors

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

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

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

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

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

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

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

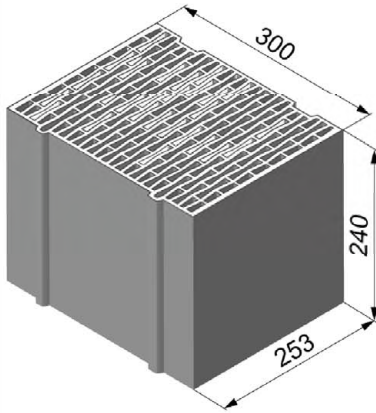
fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

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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] | $\geq 0,8$ | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | [N/mm ²] | 2,5 / 2 or 5 / 4 or 8 / 6 | | |
| Standard or annex | | EN 771-1:2011+A1:2015 | | |

Dimension see also Annex B 18

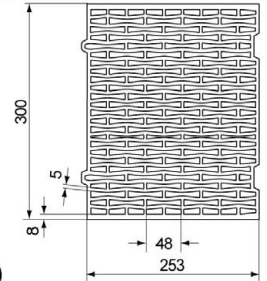


Table C76.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS H K)

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

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

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

General installation parameters

| | | | | | | | | | | | | | | |
|----------------------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Edge distance $c_{min} = c_{cr}$ | 60 | | | | | | | | | | | | | |
| Spacing | $s_{min \parallel} = s_{cr \parallel}$ [mm] | | | | | | | | | | | | | |
| | 255 | | | | | | | | | | | | | |
| | $s_{min \perp} = s_{cr \perp}$ | | | | | | | | | | | | | |
| | 240 | | | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C76.2: Group factors

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

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

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

Table C77.2: Group factors

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

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Performance
Vertical perforated brick HLz, dimensions, installation parameters

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

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|---|----------------|-----|-----------------|------|-------|------|------|--------|------|-------|-------|------|--------|------|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | |
| | | | | | 11x85 | | | | | | 15x85 | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | | 20x130 | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | |
| 2,5 / 2 N/mm ² | w/w | w/d | - ³⁾ | 0,50 | 0,50 | 0,40 | 0,50 | 0,40 | 0,50 | 0,50 | 0,50 | 0,50 | 0,40 | 0,40 |
| | d/d | | 0,30 | 0,50 | 0,50 | 0,50 | 0,50 | 0,50 | 0,50 | 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 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 |
| | d/d | | 0,60 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 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 | 1,50 | 1,50 | 1,50 | 1,50 | 1,20 | 1,20 |
| | d/d | | 0,90 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 |

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

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

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 anchorage)

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

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

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

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

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Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | |
|--|----------------|-----|-----|
| 2,5 / 2 N/mm² | w/w w/d | 0,5 | 0,6 |
| | d/d | | |
| 5 / 4 N/mm² | w/w w/d | 0,9 | 1,2 |
| | d/d | | |
| 8 / 6 N/mm² | w/w w/d | 1,5 | 1,5 |
| | d/d | | |

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | |
|--|----------------|-----|-----|
| 2,5 / 2 N/mm² | w/w w/d | 0,5 | 0,6 |
| | d/d | | |
| 5 / 4 N/mm² | w/w w/d | 0,9 | 1,2 |
| | d/d | | |
| 8 / 6 N/mm² | w/w w/d | 1,5 | 1,5 |
| | d/d | | |

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

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

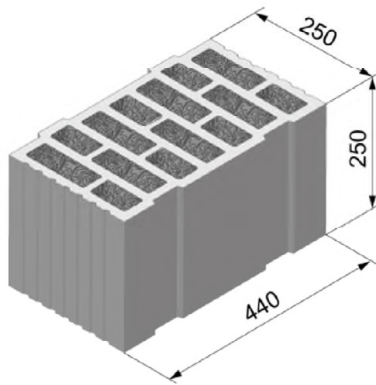
fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

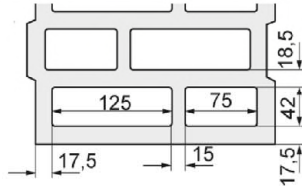
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**Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool,
EN 771-1:2011+A1:2015**



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



Dimension see also Annex B 18

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

| | | | | | | | | | | | | | | | | |
|---|------------------------------------|-----|-------|----|-------|----|-----|--------|-----|-------|-----|--------|-----|--------|-----|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | - | M6 | M8 | 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 | | | | 5 | 2 | 5 | 6 | | | | | | | |
| General installation parameters | | | | | | | | | | | | | | | | |
| Edge distance | c _{min} = c _{cr} | 60 | | | | | | | | | | | | | | |
| Spacing | s _{min} | 80 | | | | | | | | | | | | | | |
| | s _{cr} | 250 | | | | | | | | | | | | | | |
| | s _{min} ⊥ | 80 | | | | | | | | | | | | | | |
| | s _{cr} ⊥ | 250 | | | | | | | | | | | | | | |
| Drilling method | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | |

Table C80.2: Group factors

| | | | | | | | | | | | | | | | | |
|---------------------------------------|--|-----|-------|----|-------|----|-----|--------|-----|-------|-----|--------|-----|--------|-----|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | - | M6 | M8 | 11x85 | - | - | M10 | M12 | 15x85 | - | - | - | - | - | - |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | 20x130 | | 20x200 | | |
| Group factors | α _{g,N} (s _{min}) | 1,3 | | | | | | | | | | | | | | |
| | α _{g,V} (s _{min}) | 1,3 | | | | | | | | | | | | | | |
| | α _{g,N} (s _{min} ⊥) | 0,8 | | | | | | | | | | | | | | |
| | α _{g,V} (s _{min} ⊥) | 1,3 | | | | | | | | | | | | | | |

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

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

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

| Anchor rod | | M10 | M12 | M16 |
|--|------------------------------------|------------|-----|------------|
| Perforated sleeve FIS H K | | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | | |
| Max. installation torque | max T _{inst} [Nm] | 5 | 6 | |
| General installation parameters | | | | |
| Edge distance | C _{min} = C _{cr} | | | 60 |
| Spacing | S _{min} | | | 80 |
| | S _{cr} | [mm] | | 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 | α _{g,N} (S _{min}) | | | 1,3 |
| | α _{g,V} (S _{min}) | | | 1,3 |
| | α _{g,N} (S _{min} ⊥) | [-] | | 0,8 |
| | α _{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

Annex C 81

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use con- ditions | | | | | | | | | |
|--|------------------------|-----|------|------|------|--|------|--|------|--|
| | w/w | w/d | | | | | | | | |
| 8 / 6 N/mm² | 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/mm² | 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/mm² | w/w | w/d | 0,90 | 2,00 | 1,50 | | 2,00 | | 3,00 | |
| | d/d | | 1,20 | 2,00 | 1,50 | | 2,00 | | 3,50 | |

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

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use con- ditions | | | |
|--|------------------------|-----|-----|--|
| | w/w | w/d | | |
| 8 / 6 N/mm² | w/w | w/d | 1,5 | |
| | d/d | | 1,5 | |
| 10 / 8 N/mm² | w/w | w/d | 1,5 | |
| | d/d | | 2,0 | |
| 12,5 / 10 N/mm² | w/w | w/d | 2,0 | |
| | d/d | | 2,0 | |

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

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

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

fischer injection system FIS V Plus for masonry

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

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

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

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

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

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

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

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

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

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

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

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

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

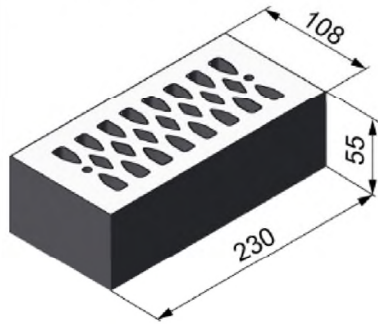
fischer injection system FIS V Plus for masonry

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

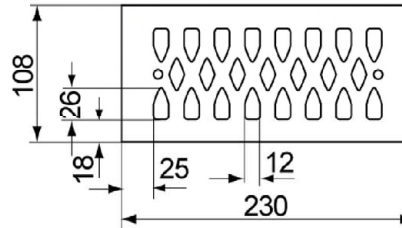
Annex C 83

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



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



Dimension see also Annex B 18

Table C84.1: Installation parameters

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

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

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

General installation parameters

| | | | | | | | | | | |
|---------------|--------------------|-----|--|--|--|--|--|--|--|--|
| Edge distance | $c_{min} = c_{cr}$ | 60 | | | | | | | | |
| | $s_{min II}$ | 80 | | | | | | | | |
| | $s_{scr II}$ [mm] | 230 | | | | | | | | |
| | $s_{min \perp}$ | 60 | | | | | | | | |
| | $s_{scr \perp}$ | 60 | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C84.2: Group factors

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

| | | | | | | | | | | |
|---------------|--------------------------------|-----|---|--|--|--|--|--|--|--|
| Group factors | $\alpha_{g,N} (s_{min II})$ | [-] | 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

Annex C 84

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

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

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

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

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

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength. Factor for job site tests and displacements see annex C123.

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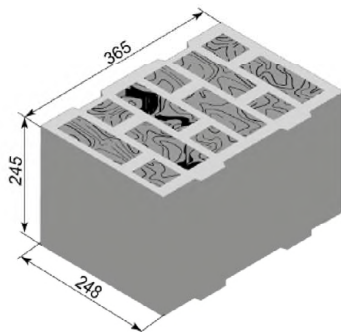
Performance

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

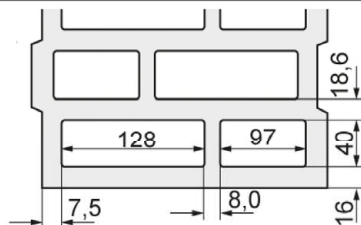
Annex C 85

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



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



Dimension see also Annex B 19

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

| Anchor rod | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|--------------------------------|-------|----|-------|----|-----|--------|-----|-------|-------|-----|--------|-----|
| Internal threaded anchor FIS E | - | | M6 | M8 | - | | - | | M10 | M12 | - | |
| | | | 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 | $c_{min} = c_{cr}$ | [mm] | 100 |
| | $s_{min \parallel}$ | | 250 |
| | $s_{cr \parallel}$ | | 245 |
| | $s_{min \perp}$ | | 245 |
| Spacing | $s_{cr \perp}$ | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C86.2: Group factors

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

fischer injection system FIS V Plus for masonry

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

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

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

| Anchor rod | M10 | M12 | M16 |
|--|------------------------------------|------|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque | max T _{inst} [Nm] | 4 | |
| General installation parameters | | | |
| Edge distance | C _{min} = C _{cr} | 100 | |
| Spacing | S _{min} | 250 | |
| | S _{cr} | [mm] | |
| | 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 | α _{g,N} (S _{min}) | α _{g,V} (S _{min}) | 2 |
| | α _{g,N} (S _{min} ⊥) | α _{g,V} (S _{min} ⊥) | |
| | [-] | | |
| | | | |

fischer injection system FIS V Plus for masonry

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

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.
2) For temperature range 72/120°C no performance assessed.

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | |
|--|----------------|-----|--|
| 10 / 8 N/mm ² | w/w | 1.5 | |
| | d/d | 2,0 | |

- 1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
2) For temperature range 72/120°C no performance assessed.

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

fischer injection system FIS V Plus for masonry

Performance

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

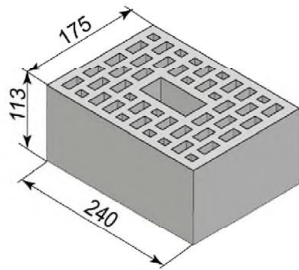
Performance

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

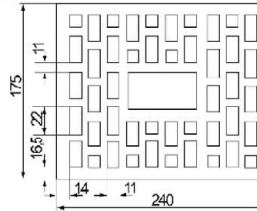
Annex C 89

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



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



Dimension see also Annex B 19

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

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

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

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

General installation parameters

| | | |
|---------------|---------------------|-----|
| Edge distance | $C_{min} = C_{cr}$ | 100 |
| Spacing | $s_{min \parallel}$ | 240 |
| | $s_{cr \parallel}$ | |
| | $s_{min \perp}$ | 115 |
| | $s_{cr \perp}$ | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C90.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, dimensions, installation parameters

Annex C 90
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Vertical perforated brick HLz, EN 771-1:2011+A1:2015

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

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

Table C91.2: Group factors

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under tension loading

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

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

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | | |
|--|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 12,5 / 10 N/mm ² | w/w | 4,0 | 5,5 | 4,0 | 5,5 | 5,5 | 7,0 | 5,5 | 7,0 | 7,0 | 6,0 | 6,0 | 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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

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

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

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

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

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

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

Factor for job site tests and displacements see annex C 123

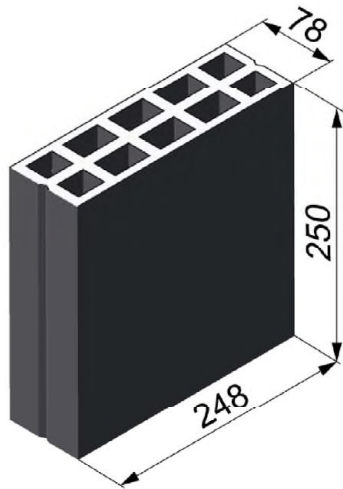
fischer injection system FIS V Plus for masonry

Performance
Vertical perforated brick HLz, Characteristic resistance under shear loading

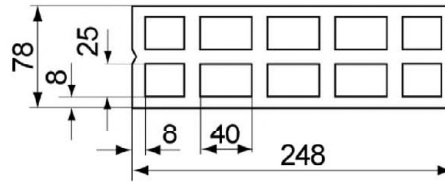
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Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



| | | | | |
|--|-----------------------|---------------------------|---------|----------|
| 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 B 19

Table C94.1: Installation parameters

| | | | |
|--|--------------|-----|-----------|
| Anchor rod | M6 | | M8 |
| Perforated sleeve FIS H K | 12x50 | | |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque $\max T_{inst}$ | [Nm] | 2 | |
| General installation parameters | | | |
| Edge distance $c_{min} = c_{cr}$ | [mm] | 100 | |
| Spacing $s_{min II}$ | | 75 | |
| Spacing $s_{cr II}$ | | 250 | |
| Spacing $s_{min \perp} = s_{cr \perp}$ | | 250 | |
| Drilling method | | | |
| Hammer drilling with hard metal hammer drill | | | |

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

Table C94.2: Group factors

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

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Performance
Horizontal perforated brick LLz, dimensions, installation parameters

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

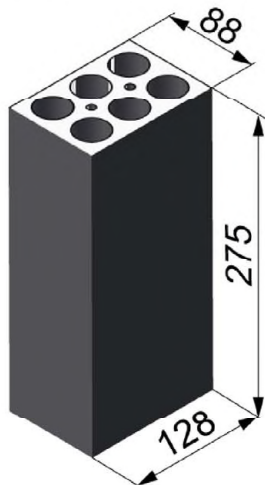
Performance

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

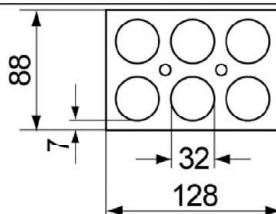
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Horizontal perforated brick LLz, EN 771-1:2011+A1:2015



| | | | | |
|--|----------------------------|----------|---------|----------|
| Producer | e.g. Ceramica 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 B 19

Table C96.1: Installation parameters

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

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

Table C96.2: Group factors

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

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Performance
Horizontal perforated brick LLz, dimensions, installation parameters

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

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

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

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

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

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

Factor for job site tests and displacements see annex C123.

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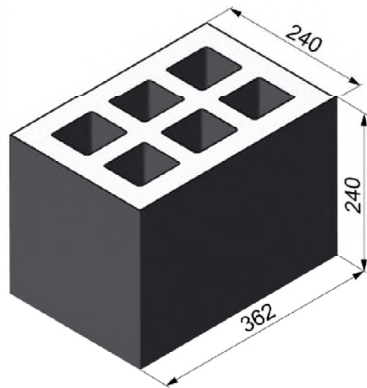
Performance

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

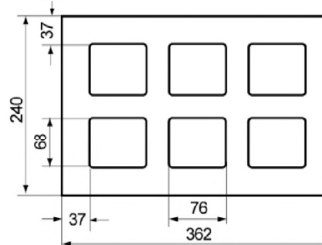
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Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015



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



Dimension see also Annex B 19

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

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

General installation parameters

| | | | | | | | | | | | | | | | | |
|----------------------------------|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Edge distance $c_{min} = c_{cr}$ | 60 | | | | | | | | | | | | | | | |
| Spacing [mm] | $s_{min \parallel}$ | | | | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | | | | |
| | $s_{cr \parallel}$ | | | | | | | | | | | | | | | |
| 362 | | | | | | | | | | | | | | | | |
| $s_{min \perp} = s_{cr \perp}$ | | | | | | | | | | | | | | | | |
| 240 | | | | | | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C98.2: Group factors

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

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

fischer injection system FIS V Plus for masonry

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

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

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

| Anchor rod | M10 | M12 | M16 |
|--|--------------------------------|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 2 | | |
| General installation parameters | | | |
| Edge distance $c_{min} = c_{cr}$ | 60 | | |
| Spacing | $s_{min \parallel}$ | 100 | |
| | $s_{cr \parallel}$ | 362 | |
| | $s_{min \perp} = s_{cr \perp}$ | 240 | |
| Drilling method | | | |
| Hammer drilling with hard metal hammer drill | | | |

Table C99.2: Group factors

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

fischer injection system FIS V Plus for masonry

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

Annex C 99

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

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

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 | |
|---|----------------|-----|-------|----|-------|----|-----|--------|-----|---|-------|-----|-----|--------|-----|--------|--|
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | | |
| | | | | | 11x85 | | | | | | 15x85 | | | | | | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | | 20x85 | | | 20x130 | | 20x200 | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | | | | |
| 2,5 / 2 N/mm ² | w/w | w/d | 1,2 | | | | | | | | 1,5 | | | 2,5 | | | |
| | d/d | | 1,2 | | | | | | | | 1,5 | | | 2,5 | | | |
| 5 / 4 N/mm ² | w/w | w/d | 2,0 | | | | | | | | 3,0 | | | 5,0 | | | |
| | d/d | | 2,5 | | | | | | | | 3,0 | | | 5,5 | | | |

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

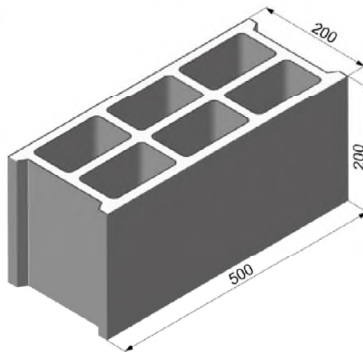
fischer injection system FIS V Plus for masonry

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

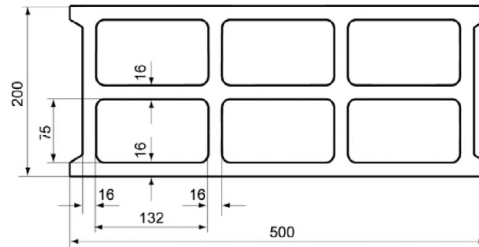
Annex C 101

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



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



Dimension see also Annex B 19

Table C102.1: Installation parameters

| | | | | | | | | | | | | | | |
|---|-------|----|-------|----|-------|----|-----|--------|-----|------------|-----|-------|-------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | M10 | M12 | - | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | - | | M10 | M12 |
| | | | | | 11x85 | | | | | | | | 15x85 | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 18x130/200 | | 20x85 | | |
| Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K | | | | | | | | | | | | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 1 | | | | 2 | | | | | | | | | |
| General installation parameters | | | | | | | | | | | | | | |
| Edge distance $c_{min} = c_{cr}$ | | | | | 100 | | | | | | | | | |
| Spacing $s_{min \parallel} = s_{cr \parallel}$ | | | | | 500 | | | | | | | | | |
| $s_{min \perp} = s_{cr \perp}$ | | | | | 200 | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C102.2: Group factors

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

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

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

Table C103.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

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

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

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

- ¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
²⁾ For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$.

Table C103.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

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

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

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

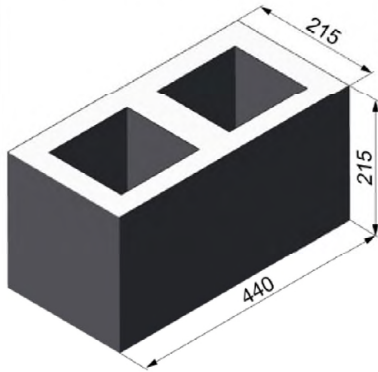
- ¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.
 Factor for job site tests and displacements see annex C 123.

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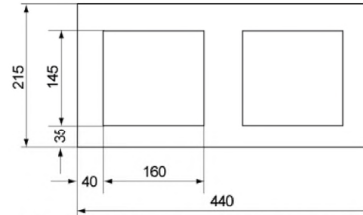
Performance
 Light-weight concrete hollow block Hbl,
 Characteristic resistance under tension and shear loading

Annex C 103
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Light-weight concrete hollow block Hbl, EN 771-3:2011+A1:2015



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



Dimension see also Annex B 20

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

| | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|--------|-----|-------|-------|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | |
| | | | | | 11x85 | | | | | | 15x85 | | | |
| 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 | | | | | | | | | | | | | | |
| Spacing | $s_{min II}$ | 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 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

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

Table C105.1: Installation parameters

(Push through anchorage with perforated sleeve FIS H K)

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

Drilling method

Hammer drilling with hard metal hammer drill

Table C105.2: Group factors

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

fischer injection system FIS V Plus for masonry

Performance

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

Annex C 105

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

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

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

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

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

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

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

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

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

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

fischer injection system FIS V Plus for masonry

Performance

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

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

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

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

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

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

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

Table C107.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

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

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

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

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

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

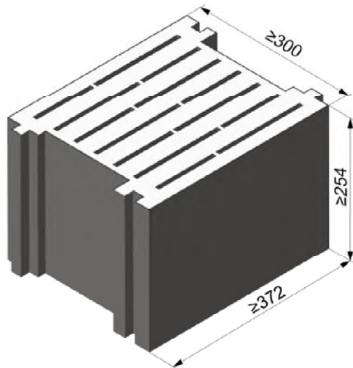
fischer injection system FIS V Plus for masonry

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

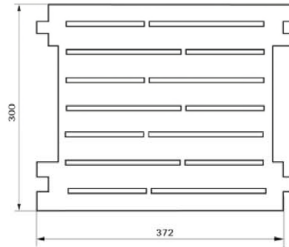
Annex C 107

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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/dm ³] | ≥ 0,6 | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | [N/mm ²] | 2,5 / 2 | | |
| Standard or annex | EN 771-3:2011+A1:2015 | | | |



Dimension see also Annex B 20

Table C108.1: Installation parameters

| Anchor rod | M8 | M10 | M10 | M12 | M12 | M16 | M16 | M12 | M16 |
|--|---|-----|------------|-----|--------|-----|------------|-----|--------|
| Perforated sleeve FIS H K | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 | | 20x200 |
| Anchor rod with perforated sleeve FIS H K | | | | | | | | | |
| Max. installation torque | max T _{inst} [Nm] | | 4 | | | | | | |
| General installation parameters | | | | | | | | | |
| Edge distance | c _{min} = c _{cr} | | 130 | | | | | | |
| Spacing | s _{min} = s _{cr} [mm] | | 370 | | | | | | |
| | s _{min} ⊥ = s _{cr} ⊥ | | 250 | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table C108.2: Group factors

| Anchor rod | M8 | M10 | M10 | M12 | M12 | M16 | M16 | M12 | M16 |
|---------------------------|--------------------------------|-----|------------|-----|--------|-----|------------|-----|--------|
| Perforated sleeve FIS H K | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 | | 20x200 |
| Group factors | $\alpha_{g,N} (s_{min})$ | | [-] | | | | | | |
| | $\alpha_{g,V} (s_{min})$ | | | | | | | | |
| | $\alpha_{g,N} (s_{min} \perp)$ | | | | | | | | |
| | $\alpha_{g,V} (s_{min} \perp)$ | | | | | | | | |
| 2 | | | | | | | | | |

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Performance
Light-weight concrete solid block Vbl, dimensions, installation parameters

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C109.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | M8 | M10 | M10 | M12 | M12 | M16 | M16 | M12 | M16 |
|---|----------------|-----|------------|-----|--------|-----|------------|-----|--------|
| Perforated sleeve FIS H K | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 | | 20x200 |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | |
| 2,5 / 2 N/mm ² | w/w | w/d | 2,0 | | | 2,5 | | | 3,0 |
| | d/d | | 2,0 | | | 3,0 | | | 4,0 |

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

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

Table C109.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | M8 | M10 | M10 | M12 | M12 | M16 | M16 | M12 | M16 |
|--|----------------|-----|------------|-----|--------|-----|------------|-----|--------|
| Perforated sleeve FIS H K | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 | | 20x200 |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | |
| 2,5 / 2 N/mm ² | w/w | w/d | 4,5 | | | 6,5 | | | |
| | d/d | | | | | | | | |

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

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

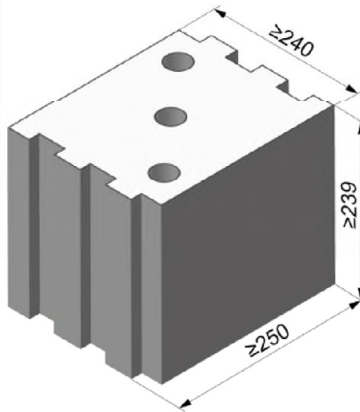
fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

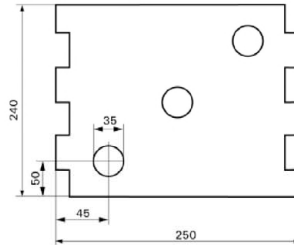
Annex C 109

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015



| | | | | |
|--|-----------------------|--------------------------|---------|----------|
| Producer | | KLB | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | ≥ 250 | ≥ 240 | ≥ 239 |
| Mean gross dry density ρ | [kg/dm ³] | ≥ 1,6 | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | [N/mm ²] | 5 / 4 or 8 / 6 or 10 / 8 | | |
| Standard or annex | | EN 771-3:2011+A1:2015 | | |



Dimension see also Annex B 20

Table C110.1: Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS H K)

| | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|----|-------|----|-------|----|-----|--------|-----|---|-------|-----|--------|-----|--------|-----|
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
| Internal threaded anchor FIS E | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | |
| | | | | | 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 $s_{min \parallel} = s_{cr \parallel}$ | 250 | | | | | | | | | | | | | | | |
| | $s_{min \perp} = s_{cr \perp}$ | 250 | | | | | | | | | | | | | | |

Drilling method

Hammer drilling with hard metal hammer drill

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

Table 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 | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 2,0 | | | | | | | | | | | | | |
| | $\alpha_{g,V} (s_{min \parallel})$ | | | | | | | | | | | | | | | |
| | $\alpha_{g,N} (s_{min \perp})$ | | | | | | | | | | | | | | | |
| | $\alpha_{g,V} (s_{min \perp})$ | | | | | | | | | | | | | | | |

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Performance
Light-weight concrete solid block Vbl, dimensions, installation parameters

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C111.1: Installation parameters
(Push through anchorage with perforated sleeve FIS H K)

| Anchor rod | M10 | M12 | M16 |
|--|--|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |
| Anchor rod with perforated sleeve FIS H K | | | |
| Max. installation torque $\max T_{inst}$ [Nm] | 2,0 | | |
| General installation parameters | | | |
| Edge distance $c_{min} = c_{cr}$ | 130 | | |
| Spacing s_{min} [mm] | $s_{min \parallel} = s_{cr \parallel}$ | | |
| | $s_{min \perp} = s_{cr \perp}$ | | |
| 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 | [-] | | 2,0 |
| | $\alpha_{g,N} (s_{min \parallel})$ | | |
| | $\alpha_{g,V} (s_{min \parallel})$ | | |
| | $\alpha_{g,N} (s_{min \perp})$ | | |
| | $\alpha_{g,V} (s_{min \perp})$ | | |

fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block Vbl, dimensions, installation parameters

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C112.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Pre-positioned anchorage)

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 | M12 | M16 |
|---|----------------|-------|-------|-----|-----|--------|-----|----|-------|-----|-----|--------|-----|--------|-----|-----|
| Internal threaded anchor FIS E | - | - | M6 | M8 | - | - | - | - | M10 | M12 | - | - | - | - | - | - |
| | | | 11x85 | | | | | | 15x85 | | | | | | | |
| Perforated sleeve FIS H K | 12x50 | 12x85 | 16x85 | | | 16x130 | | | 20x85 | | | 20x130 | | 20x200 | | |
| Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 1,2 | 2,0 | 2,5 | | | | | 3,0 | | | | | | |
| | d/d | | 2,0 | 3,5 | 4,0 | | | | | 5,0 | | | | | | |
| 8 / 6 N/mm ² | w/w | w/d | 1,5 | 3,0 | 4,0 | | | | | 5,0 | | | | | | |
| | d/d | | 3,0 | 5,0 | 6,5 | | | | | 7,5 | | | | | | |
| 10 / 8 N/mm ² | w/w | w/d | 2,0 | 4,0 | 5,0 | | | | | 6,5 | | | | | | |
| | d/d | | 4,0 | 7,0 | 8,5 | | | | | 9,0 | | | | | | |

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

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

Table C112.2: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading (Push through anchorage)

| Anchor rod | M10 | | M12 | | M16 | |
|---|----------------|-----|-----|--|------------|-----|
| Perforated sleeve FIS H K | 18x130/200 | | | | 22x130/200 | |
| Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 2,5 | | | 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 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 C 123.

fischer injection system FIS V Plus for masonry

Performance

Light-weight concrete solid block Vbl, Characteristic resistance under tension loading

Annex C 112

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C113.1: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Pre-positioned anchorage)

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

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

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | | |
|--|----------------|-------------------------------|-----------|-----|-----|-----|-----|-----|-----|--|--|--|-----|--|
| | | 5 / 4 N/mm² | w/w w/d | 2,0 | 3,0 | 2,0 | 3,0 | 2,0 | 3,5 | | | | | |
| | d/d | | | | | | | | | | | | | |
| 8 / 6 N/mm² | w/w w/d | 3,0 | 4,5 | 3,0 | 4,5 | 3,0 | 5,5 | | | | | | 6,5 | |
| | d/d | | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w w/d | 4,0 | 6,0 | 4,0 | 6,0 | 4,0 | 7,0 | | | | | | 8,5 | |
| | d/d | | | | | | | | | | | | | |

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

Table C113.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading (Push through anchorage)

| Anchor rod | M10 | M12 | M16 |
|---------------------------|------------|-----|------------|
| Perforated sleeve FIS H K | 18x130/200 | | 22x130/200 |

Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength f_b ; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C)

| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | | | | | | | | | | | | |
|--|----------------|-------------------------------|-----------|-----|--|--|--|-----|--|-----|--|--|--|
| | | 5 / 4 N/mm² | w/w w/d | 3,5 | | | | | | 4,5 | | | |
| | d/d | | | | | | | | | | | | |
| 8 / 6 N/mm² | w/w w/d | 5,5 | | | | | | 6,5 | | | | | |
| | d/d | | | | | | | | | | | | |
| 10 / 8 N/mm² | w/w w/d | 7,0 | | | | | | 8,5 | | | | | |
| | d/d | | | | | | | | | | | | |

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

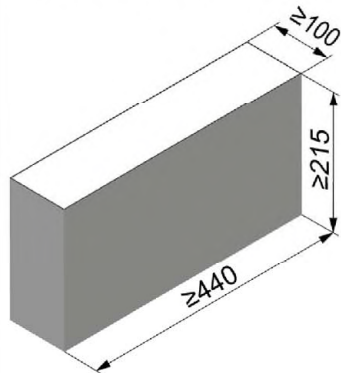
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Performance
Light-weight concrete solid block Vbl, Characteristic resistance under shear loading

Annex C 113

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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 $c_{min} = c_{cr}$ | | 100 | | | | | | | | | |
| 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 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

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Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C115.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|---|----------------|---|----|-----|-----|-----|
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | |
| | | ≥ 50 | | | | |
| 5 / 4 N/mm ² | w/w w/d | 1,2 | | | 1,2 | |
| | d/d | 2,0 | | | 2,0 | |
| 8 / 6 N/mm ² | w/w w/d | 1,5 | | | 2,0 | |
| | d/d | 3,0 | | | 3,5 | |
| 10 / 8 N/mm ² | w/w w/d | 2,0 | | | 2,5 | |
| | d/d | 4,0 | | | 4,5 | |
| 12,5 / 10 N/mm ² | w/w w/d | 3,0 | | | 3,5 | |
| | d/d | 5,0 | | | 5,5 | |

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

²⁾ For temperature range 72/120°C: $N_{Rk(72/120°C)} = 0,83 \cdot N_{Rk(50/80°C)}$.

Table C115.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|--|----------------|---|-----|-----|-----|-----|
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | |
| | | ≥ 50 | | | | |
| 5 / 4 N/mm ² | w/w w/d | 1,2 | 1,5 | 1,5 | 1,5 | 1,5 |
| | d/d | | | | | |
| 8 / 6 N/mm ² | w/w w/d | 2,0 | 2,0 | 2,5 | 2,5 | 2,5 |
| | d/d | | | | | |
| 10 / 8 N/mm ² | w/w w/d | 2,5 | 2,5 | 3,0 | 3,0 | 3,5 |
| | d/d | | | | | |
| 12,5 / 10 N/mm ² | w/w w/d | 3,0 | 3,5 | 4,0 | 4,0 | 4,5 |
| | d/d | | | | | |

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

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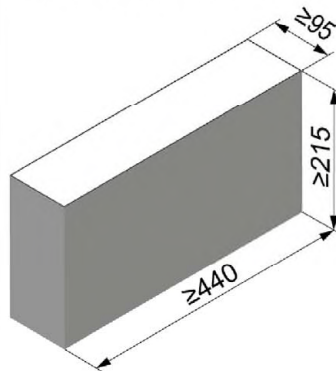
Performance

Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C 115

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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 $c_{min} = c_{cr}$ | | 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 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

Light-weight concrete solid block Vbl, EN 771-3:2011+A1:2015

Table C117.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | | M6 | M8 | M10 | M12 | M16 | | | | | |
|---|----------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | |
| | | 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 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 C117.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|--|----------------|---|-----|-----|-----|-----|
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,I}$ [kN] depending on the mean compressive strength f_b; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | |
| | | ≥ 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 compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

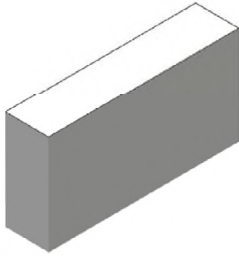
fischer injection system FIS V Plus for masonry

Performance
Light-weight concrete solid block Vbl,
Characteristic resistance under tension and shear loading

Annex C 117

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Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015



| | | | | |
|--|-----------------------|---------|-------|-------|
| Producer | e.g. Ytong | | | |
| Mean gross dry density ρ | [kg/dm ³] | 0,35 | 0,5 | 0,65 |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | [N/mm ²] | 2,5 / 2 | 5 / 4 | 8 / 6 |
| Standard or annex | EN 771-4:2011+A1:2015 | | | |

Table C118.1: Installation parameters

| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | - | | |
|--------------------------------|-------|----|-------|-----|-----|----|----|-----|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | M10 | M12 |
| | 11x85 | | 15x85 | | | | | | |

Anchor rod and internal threaded anchor FIS E without perforated sleeve

| Effective anchorage depth h_{ef} | [mm] | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 85 |
|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| Max. installation torque $\max T_{inst}$ | [Nm] | 1 | 4 | 1 | 8 | 2 | 12 | 2 | 16 | 2 | 20 | 1 | 2 | |

General installation parameters

| | | |
|--|--|-------------|
| Edge distance $c_{min} = c_{cr}$ | | 100 |
| $s_{cr \parallel} = s_{min \parallel}$ | | 250 |
| $h_{ef}=200mm$ $s_{min \parallel}$ [mm] | | 80 |
| $h_{ef}=200mm$ $s_{cr \parallel}$ | | 3x h_{ef} |
| Spacing $s_{cr \perp} = s_{min \perp}$ | | 250 |
| $h_{ef}=200mm$ $s_{min \perp}$ | | 80 |
| $h_{ef}=200mm$ $s_{cr \perp}$ | | 3x h_{ef} |

Drilling method

Hammer drilling with hard metal hammer drill

¹⁾ The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

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Performance
Autoclaved aerated concrete (cylindrical drill hole), dimensions, installation parameters

Annex C 118

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Table C119.1: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 2 \text{ N/mm}^2$)

| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | | - | |
|--------------------------------|--|-----|-----|-----|-----|-----------------|----|-----------------|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | 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 | | | | | | | |
| | $h_{ef}=200 \alpha_{g,N} (S_{min \perp})$ | 1,6 | | | | - ¹⁾ | | - ¹⁾ | |
| | $h_{ef}=200 \alpha_{g,V} (S_{min \perp})$ | 0,8 | | | | - ¹⁾ | | - ¹⁾ | |
| | $\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$ | 2 | | | | | | | |

¹⁾ No performance assessed.

Table C119.2: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 4 \text{ N/mm}^2$)

| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | | - | |
|--------------------------------|--|-----|-----|-----|-----|-----------------|----|-----------------|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | 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 | | | | | | | |
| | $h_{ef}=200 \alpha_{g,N} (S_{min \perp})$ | 0,7 | | | | - ¹⁾ | | - ¹⁾ | |
| | $h_{ef}=200 \alpha_{g,V} (S_{min \perp})$ | 1,2 | | | | - ¹⁾ | | - ¹⁾ | |
| | $\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$ | 2 | | | | | | | |

¹⁾ No performance assessed.

Table C119.3: Group factors for autoclaved aerated concrete
(Compressive strength $f_b = 6 \text{ N/mm}^2$)

| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | | - | |
|--------------------------------|--|-----|-----|-----|-----|-----------------|----|-----------------|-----|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 | M8 | 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 | | | | | | | |
| | $h_{ef}=200 \alpha_{g,N} (S_{min \perp})$ | 0,7 | | | | - ¹⁾ | | - ¹⁾ | |
| | $h_{ef}=200 \alpha_{g,V} (S_{min \perp})$ | 1,2 | | | | - ¹⁾ | | - ¹⁾ | |
| | $\alpha_{g,N \perp}, \alpha_{g,V} (S_{min \perp})$ | 2 | | | | | | | |

¹⁾ No performance assessed.

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Performance
Autoclaved aerated concrete (cylindrical drill hole), Group factors

Annex C 119

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Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2011+A1:2015

Table C120.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | M6 | | M8 | | M10 | | M12 | | M16 | | - | | - | |
|--|----------------|---|-----|-----------------|-----|-----|-----|-----|-----|-----|-------|------|-------|-----|
| Internal threaded anchor FIS E | - | | - | | - | | - | | - | | M6 | M8 | M10 | M12 |
| | | | | | | | | | | | 11x85 | | 15x85 | |
| Tension resistance $N_{RK} = N_{RK,p} = N_{RK,b} = N_{RK,p,c} = N_{RK,b,c}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C)³⁾ | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ²⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | |
| | | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 85 |
| 2,5 / 2 N/mm ² | w/w | w/d | 1,2 | 1,2 | 1,5 | 2,0 | 1,5 | 3,0 | 1,5 | 3,0 | 2,0 | 3,0 | 1,5 | 1,5 |
| | d/d | | 1,5 | 3,0 | 1,5 | 3,0 | 1,5 | 3,5 | 2,0 | 4,0 | 2,0 | 4,0 | 1,5 | 1,5 |
| 5 / 4 N/mm ² | w/w | w/d | 1,2 | - ¹⁾ | 2,0 | 1,5 | 2,5 | 3,5 | 2,5 | 3,5 | 2,0 | 3,5 | 2,0 | 1,5 |
| | d/d | | 1,5 | - ¹⁾ | 2,0 | 3,0 | 3,0 | 5,0 | 2,5 | 5,0 | 2,0 | 5,0 | 2,0 | 1,5 |
| 8 / 6 N/mm ² | w/w | w/d | 1,5 | - ¹⁾ | 3,0 | 2,5 | 4,5 | 5,0 | 4,5 | 7,0 | 3,0 | 8,5 | 3,5 | 2,5 |
| | d/d | | 1,5 | - ¹⁾ | 3,5 | 4,0 | 5,0 | 7,0 | 5,0 | 9,0 | 3,0 | 11,5 | 3,5 | 2,5 |

1) No performance assessed.

2) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

3) For temperature range 72/120°C: $N_{RK(72/120^\circ C)} = 0,83 \cdot N_{RK(50/80^\circ C)}$.

Table C120.2: Characteristic resistance to local brick failure or brick edge failure of a single anchor under shear loading

| Anchor rod | M6 | | M8 | | M10 | | M12 | | M16 | | - | | - | |
|--|----------------|---|-----|-----------------|-----|-----|-----|-----|-----|-----|-------|-----|-------|-----|
| Internal threaded anchor FIS E | - | | - | | - | | - | | - | | M6 | M8 | M10 | M12 |
| | | | | | | | | | | | 11x85 | | 15x85 | |
| Shear resistance $V_{RK} = V_{RK,b} = V_{RK,c,II} = V_{RK,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ²⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | | | | | | |
| | | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 85 |
| 2,5 / 2 N/mm ² | w/w | w/d | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,5 | 1,2 | 1,2 | 1,2 | 1,2 | 1,5 |
| | d/d | | | | | | | | | | | | | |
| 5 / 4 N/mm ² | w/w | w/d | 2,0 | - ¹⁾ | 2,5 | 2,0 | 2,0 | 2,0 | 2,5 | 2,0 | 2,0 | 2,0 | 2,0 | 2,5 |
| | d/d | | | | | | | | | | | | | |
| 8 / 6 N/mm ² | w/w | w/d | 2,5 | - ¹⁾ | 3,0 | 2,5 | 3,0 | 3,0 | 3,5 | 4,0 | 4,5 | 4,5 | 2,5 | 3,5 |
| | d/d | | | | | | | | | | | | | |

1) No performance assessed.

2) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

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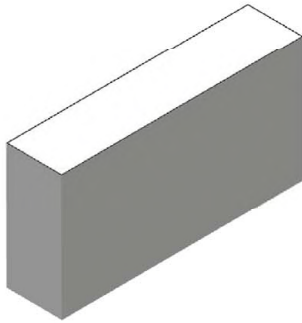
Performance

Autoclaved aerated concrete (cylindrical drill hole),
Characteristic resistance under tension and shear loading

Annex C 120

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**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 |
| 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 | $s_{cr \parallel} = s_{min \parallel}$ | 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 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 | | |
| Group factors | $\alpha_{g,N} (s_{min \parallel})$ | [-] | 2 | | | | | | 11x85 | |
| | $\alpha_{g,V} (s_{min \parallel})$ | | | | | | | | | |
| | $\alpha_{g,N} (s_{min \perp})$ | | | | | | | | | |
| | $\alpha_{g,V} (s_{min \perp})$ | | | | | | | | | |

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
dimensions, installation parameters

Annex C 121

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**Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
EN 771-4:2011+A1:2015**

Table C122.1: Characteristic resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

| Anchor rod | | M8 | | M10 | | M12 | | - | |
|---|----------------|---|-----|-----|-----|-----|-----|-----|-----|
| Internal threaded anchor FIS E | | - | - | - | - | - | - | M6 | M8 |
| | | 11x85 | | | | | | | |
| Tension resistance $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,p,c} = N_{Rk,b,c}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C) ²⁾ | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | |
| | | 75 | 95 | 75 | 95 | 75 | 95 | 85 | |
| 2,5 / 2 N/mm ² | w/w w/d | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,0 |
| | d/d | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,0 |
| 5 / 4 N/mm ² | w/w w/d | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,0 |
| | d/d | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,0 |
| 8 / 6 N/mm ² | w/w w/d | 3,5 | 4,0 | 3,5 | 4,0 | 3,5 | 4,0 | 3,5 | 3,5 |
| | d/d | 4,0 | 4,5 | 4,0 | 4,5 | 4,0 | 4,5 | 4,0 | 4,0 |

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

2) For temperature range 72/120°C: $N_{Rk(72/120^\circ C)} = 0,83 \cdot N_{Rk(50/80^\circ C)}$.

Table C122.2: Characteristic resistance under shear loading

| Anchor rod | | M8 | | M10 | | M12 | | - | |
|--|----------------|---|----|-----|----|-----|----|----|----|
| Internal threaded anchor FIS E | | - | - | - | - | - | - | M6 | M8 |
| | | 11x85 | | | | | | | |
| Shear resistance $V_{Rk} = V_{Rk,b} = V_{Rk,c,II} = V_{Rk,c,\perp}$ [kN] depending on the mean compressive strength $f_{c,m}$; Installation and use condition w/w, w/d, d/d; (temperature range 50/80°C and 72/120°C) | | | | | | | | | |
| Mean compressive strength / Min. compressive strength single brick ¹⁾ | Use conditions | Effective anchorage depth h_{ef} [mm] | | | | | | | |
| | | 75 | 95 | 75 | 95 | 75 | 95 | 85 | |
| 2,5 / 2 N/mm ² | w/w w/d | 2,5 | | | | | | | |
| | d/d | 2,5 | | | | | | | |
| 5 / 4 N/mm ² | w/w w/d | 4,5 | | | | | | | |
| | d/d | 4,5 | | | | | | | |
| 8 / 6 N/mm ² | w/w w/d | 6,0 | | | | | | | |
| | d/d | 6,0 | | | | | | | |

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

Factor for job site tests and displacements see annex C 123.

fischer injection system FIS V Plus for masonry

Performance

Autoclaved aerated concrete (conical drill hole with special drill bit PBB),
Characteristic resistance under tension and shear loading

Annex C 122

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β-factors for job site tests; displacements

Table C123.1: β-factors for job site tests

| use conditions | | w/w and w/d | | d/d | |
|---|--------------------|-------------|--------|-------|--------|
| temperature range [°C] | | 50/80 | 72/120 | 50/80 | 72/120 |
| Material | Size | | | | |
| solid units | M6 | 0,55 | 0,46 | 0,96 | 0,80 |
| | M8 | 0,57 | 0,51 | | |
| | M10 | 0,59 | 0,52 | | |
| | M12 FIS E 11x85 | 0,60 | 0,54 | | |
| | M16 FIS E 15x85 | 0,62 | 0,52 | | |
| | FIS H 16x85 K | 0,55 | 0,46 | | |
| hollow units | all sizes | 0,86 | 0,72 | 0,96 | 0,80 |
| Autoclaved aerated concrete cylindrical drill hole | all sizes | 0,73 | 0,73 | 0,81 | 0,81 |
| Autoclaved aerated concrete conical drill hole | all sizes | 0,66 | 0,59 | 0,73 | 0,66 |

Table C123.2: Displacements

| Material | N [kN] | δN ₀ [mm] | δN _∞ [mm] | V [kN] | δV ₀ [mm] | δV _∞ [mm] |
|---|------------------------------------|-------------------------|-------------------------|------------------------------------|-------------------------|-------------------------|
| solid units and autoclaved aerated concrete h _{ef} =100mm | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,03 | 0,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,82 | 0,88 |
| hollow units | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,48 | 0,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,71 | 2,56 |
| solid brick Mz NF annex C 4 - C 7 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,74 | 1,48 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,23 | 1,85 |
| solid brick KS NF annex C 14 / C 15 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,20 | 0,40 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,91 | 1,37 |
| AAC h _{ef} =200 mm annex C 118 - C 120 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,03 | 2,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,25 | 1,88 |
| brick Annex C 101 / C 102 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,03 | 0,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 6,44 | 9,66 |

For anchorage in autoclaved aerated concrete, the partial factor γ_{MAAC} shall be used instead of γ_{Mm} .

fischer injection system FIS V Plus for masonry

Performance
β-factors for job site tests; displacements

Annex C 123

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Fire resistance under tension and shear loading

Table C124.1: Fire resistance under tension and shear loading

| Brick | Solid brick Mz,NF, acc. to Annex C 4 | | | Solid calcium silicate brick KS, NF,acc. to Annex C 14 | | | Perforated calcium silicate brick KSL, acc to Annex C 24 | | | Vertical perforated brick HLz, acc to Annex C 30 | | | Vertical perforated brick HLz, acc to Annex C 28 | | |
|---|---|-------------|-----|---|-------------|-----|--|------------|--------|--|-------------|--------|--|-----------|--------|
| | Mean compressive strength / Min. compressive strength single brick ³⁾ | ≥ 15 / ≥ 12 | | | ≥ 15 / ≥ 12 | | | ≥ 10 / ≥ 8 | | | ≥ 7,5 / ≥ 6 | | | ≥ 5 / ≥ 4 | |
| Size | M8 | M10 | M12 | M8 | M10 | M12 | M8 | M10 | M12 | M8 | M10 | M12 | M8 | M10 | M12 |
| Perforated Sleeve | - | | | - | | | 16x130 | | 20x130 | 16x85 | | 20x85 | 16x130 | | 20x130 |
| Perforated Sleeve for bridging of unbearing layer | - | | | - | | | - | | 20x200 | 16x130 | | 20x130 | - | | 20x200 |
| h _{ef} | [mm] ≥ 80 | | | ≥ 50 | | | ≥ 130 | | ≥ 130 | ≥ 85 | | ≥ 85 | ≥ 130 | | ≥ 130 |

Characteristic resistance to failure under tension loading

| N _{Rk,s,fi} = N _{Rk,p,fi} = N _{Rk,b,fi} ²⁾ | R30 | [kN] | 0,82 | 0,32 | 1,07 | 1,09 | 1,10 | 0,28 | 0,30 | 0,35 | 0,31 | |
|--|------|------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | R60 | | 0,73 | 0,31 | 0,66 | 0,61 | 0,56 | 0,19 | 0,22 | 0,22 | 0,22 | 0,22 |
| | R90 | | 0,64 | 0,29 | 0,25 | 0,13 | - ¹⁾ | 0,10 | 0,10 | 0,10 | 0,10 | 0,13 |
| | R120 | | 0,59 | 0,28 | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ |

Characteristic resistance to failure under shear loading ²⁾

without lever arm

| V _{Rk,s,fi} | R30 | [kN] | 0,82 | 0,32 | 1,07 | 1,09 | 1,10 | 0,28 | 0,30 | 0,35 | 0,31 |
|----------------------|------|------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | R60 | | 0,73 | 0,31 | 0,66 | 0,61 | 0,56 | 0,19 | 0,22 | 0,22 | 0,22 |
| | R90 | | 0,64 | 0,29 | 0,25 | 0,13 | - ¹⁾ | 0,10 | 0,10 | 0,10 | 0,13 |
| | R120 | | 0,59 | 0,28 | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ |

with lever arm

| M ⁰ _{Rk,s,fi} | R30 | [Nm] | 0,83 | 1,05 | 1,27 | 0,33 | 0,42 | 0,50 | 1,09 | 1,40 | 1,71 | 0,29 | 0,39 | 0,54 | 0,32 | 0,40 | 0,48 |
|-----------------------------------|------|------|------|------|------|------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | R60 | | 0,74 | 0,93 | 1,13 | 0,31 | 0,39 | 0,47 | 0,67 | 0,78 | 0,86 | 0,19 | 0,28 | 0,34 | 0,22 | 0,28 | 0,34 |
| | R90 | | 0,65 | 0,82 | 0,99 | 0,29 | 0,37 | 0,44 | 0,26 | 0,17 | - ¹⁾ | 0,10 | 0,12 | 0,15 | 0,13 | 0,16 | 0,20 |
| | R120 | | 0,60 | 0,76 | 0,92 | 0,28 | 0,35 | 0,43 | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ | - ¹⁾ |

General installation Parameters

| Edge distance and spacing | C _{cr,fi} | [mm] | 100 | 60 | 80 | 80 | 100 |
|---------------------------|--------------------|------|-----|-----|-----|-----|-----|
| | S _{cr,fi} | | 320 | 200 | 520 | 340 | 520 |

1) No performance assessed.

2) V_{Rk,b,fi} = N_{Rk,b,fi}.

3) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

In absence of national regulations, the recommended partial factor γ_{M,fi} = 1,0.

fischer injection system FIS V Plus for masonry

Performance

Fire resistance to failure under tension and shear loading; Fire resistance to pull-out failure or brick breakout failure of a single anchor under tension loading

Annex C 124

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