# DECLARATION OF PERFORMANCE

## DoP 0232

for fischer injection system FIS V Plus (Metal injection anchors for use in masonry) EN

1. Unique identification code of the product-type: **DoP 0232**

2. Intended use/es: **Post-installed fastening in masonry units.**
   **See appendix, especially annexes B1- B20**

3. Manufacturer: **fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Germany**

4. Authorised representative: **–**

5. System/s of AVCP: **1**

6. European Assessment Document: **EAD 330076-00-0604, Edition 11/ 2017**
   European Technical Assessment: **ETA-20/0729; 2020-11-26**
   Technical Assessment Body: **DIBt- Deutsches Institut für Bautechnik**
   Notified body/ies: **2873 TU Darmstadt**

7. Declared performance/s:

**Mechanical resistance and stability (BWR 1)**

| | |
|---|---|
| Characteristic values for resistance: | Reduction factor: |
| Annex | C110 |

Characteristic resistance of a single anchor under tension loading:

| | |
|---|---|
| See appendix, especially annexes | B3, C1, C3, C5, C7, C9, C11, C13, C15, C17, C19, C22, C25, C27, C30, C34, C38, C42, C46, C50, C54, C58, C61, C63, C66, C69, C73, C77, C80, C82, C84, C87, C90, C93, C96, C99, C102, C104, C107, C109 |

Characteristic resistance of an anchor group under tension loading:

| | |
|---|---|
| Annex | B20 |

Characteristic resistance of a single anchor under shear loading:

| | |
|---|---|
| See appendix, especially annexes | B3, C2, C3, C5, C7, C9, C11, C13, C15, C17, C19, C23, C25, C27, C31, C35, C39, C43, C47, C51, C55, C59, C61, C64, C66, C70, C74, C78, C80, C82, C84, C88, C90, C94, C96, C100, C102, C104, C107, C109 |

Characteristic resistance of an anchor group under shear loading without and with edge influence:

| | |
|---|---|
| Annex | B20 |

Characteristic edge distance and spacing:

| | |
|---|---|
| See appendix, especially annexes | B20, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C26, C28, C29, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C62, C65, C67, C68, C71, C72, C75, C76, C79, C81, C83, C85, C86, C89, C91, C92, C95, C97, C98, C101, C103, C105, C108 |

Minimum edge distance and spacing:

| | |
|---|---|
| See appendix, especially annexes | B20, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C26, C28, C29, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C62, C65, C67, C68, C71, C72, C75, C76, C79, C81, C83, C85, C86, C89, C91, C92, C95, C97, C98, C101, C103, C105, C108 |

Group factor under tension and shear loading:

| | |
|---|---|
| See appendix, especially annexes | B20, C4, C6, C8, C10, C12, C14, C16, C18, C20, C21, C24, C26, C28, C29, C32, C33, C36, C37, C40, C41, C44, C45, C48, C49, C52, C53, C56, C57, C60, C62, C65, C67, C68, C71, C72, C75, C76, C79, C81, C83, C85, C86, C89, C91, C92, C95, C97, C98, C101, C103, C106, C108 |

Minimum member thickness:

| | |
|---|---|
| Annex | B2 |

| | | |
|---|---|---|
| Durability: | Annexes | A5, B2 |
| Displacements : | Annex | C110 |

**Safety in case of fire (BWR 2)**

| | |
|---|---|
| Reaction to fire: | Class (A1) |

**Hygiene, health and the environment (BWR 3)**

| | |
|---|---|
| Content, emission and/or release of dangerous substances: | NPD |

8. Appropriate Technical Documentation and/or Specific Technical Documentation: –

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr. Oliver Geibig, Managing Director Business Units & Engineering

Jürgen Grün, Managing Director Chemistry & Quality

Tumlingen, 2020-12-10

This DoP has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.

The Appendix includes voluntary and complementary information in English language exceeding the (language-neutrally specified) legal requirements.

**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 anchor 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 anchor 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 values for resistance | See Annexes B20, C 1 to C 110 |
| Displacements | See Annex C 110 |
| Durability | See annex B 2 |

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

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Class A1 |

### 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

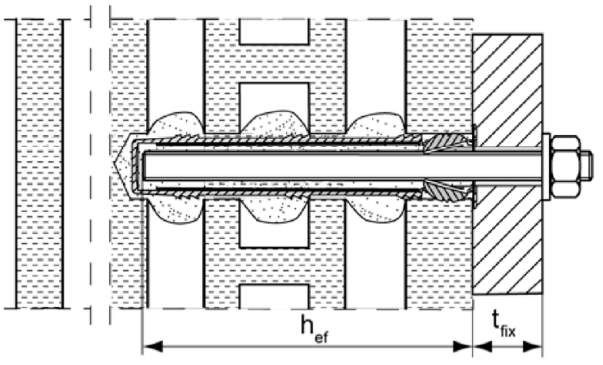
In accordance with the European Assessment Document EAD 330076-00-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

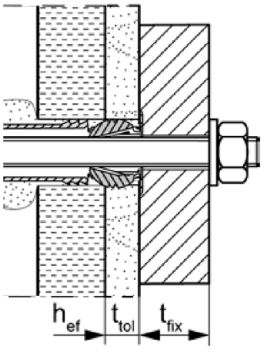
## Installation conditions part 1

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

**Pre-positioned anchorage:**

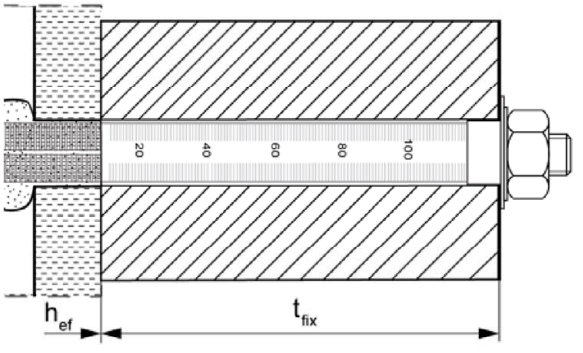



Installation with render bridge

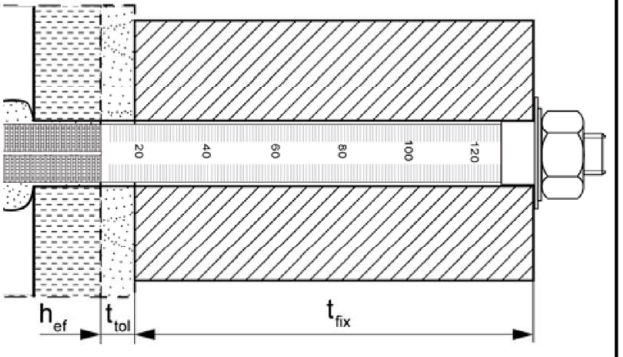



**Size of the perforated sleeve:** FIS H 12x50 K, FIS H 12x85 K, FIS H 16x85 K, FIS H 16x130 K, FIS H 20x85 K, FIS H 20x130 K, FIS H 20x200 K

**Push through anchorage:**



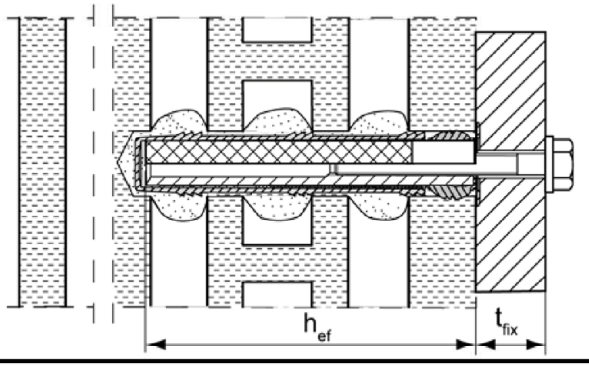

Installation with render bridge



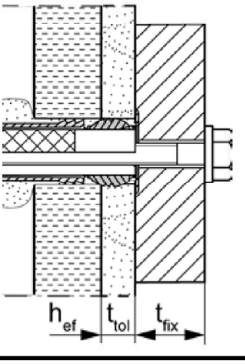

**Size of the perforated sleeve:** FIS H 18x130/200 K, FIS H 22x130/200 K

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

**Pre-positioned anchorage:**




Installation with render bridge




Pictures 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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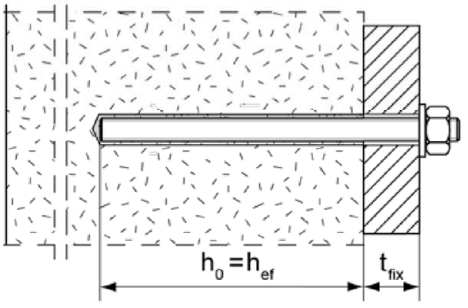
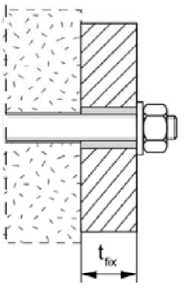
## Installation conditions part 2

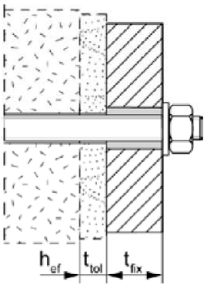
**Anchor rods without perforated sleeve FIS H K;**
**installation in solid brick masonry and autoclaved aerated concrete**

**Pre-positioned anchorage:**




**Push through anchorage:** Annular gap filled with mortar

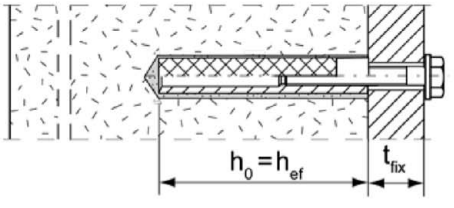


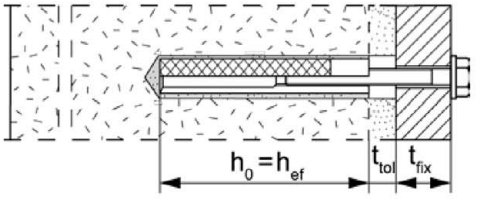

Installation with render bridge

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

**Pre-positioned anchorage:**

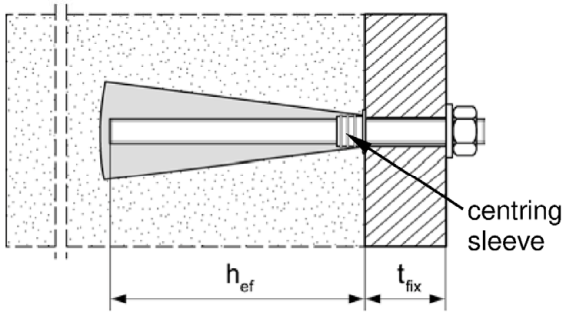



Installation with render bridge

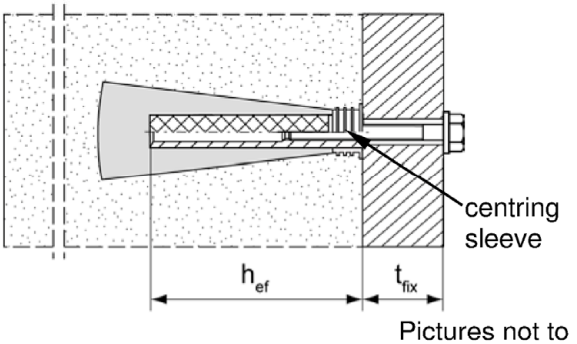



**Anchor rods and internal threaded anchors FIS E without perforated sleeve FIS H K; installation with centring sleeve in autoclaved aerated concrete with conical drill hole (installation with special conic drill bit PBB)**

**Pre-positioned anchorage:**
anchor rods M8, M10, M12




**Pre-positioned anchorage:**
Internal threaded anchor FIS E 11x85 M6 / M8




Pictures 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

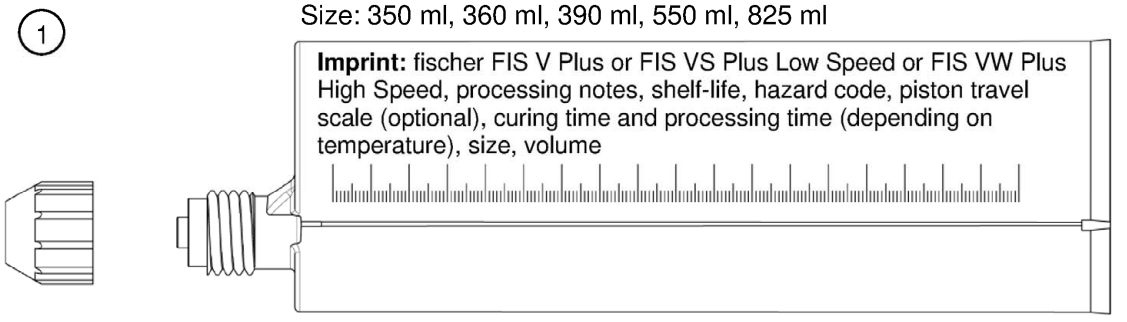
fischer injection system FIS V Plus for masonry

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

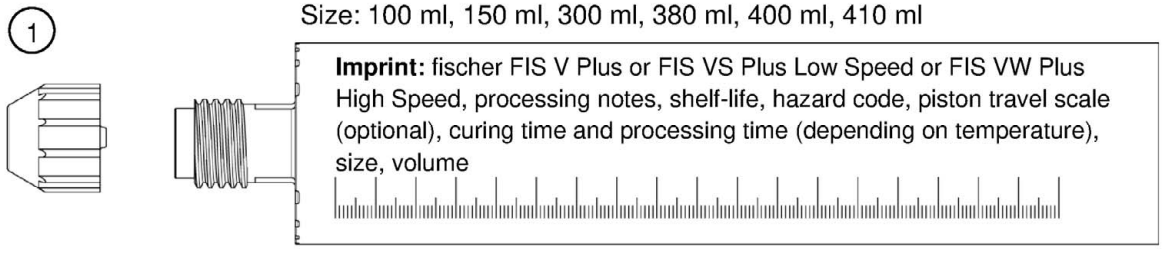
**Annex A 2**

# Overview system components part 1

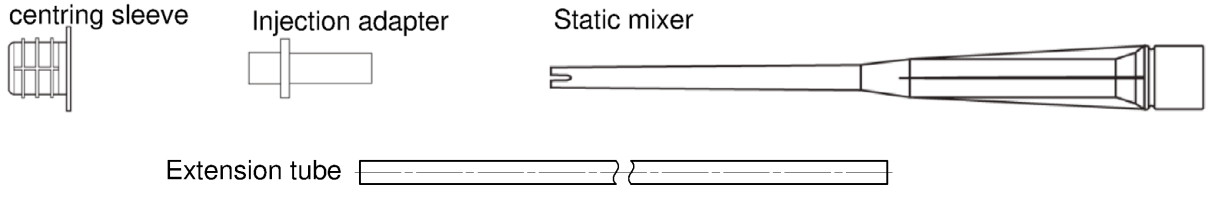
## Mortar cartridge (shuttle cartridge) with sealing cap



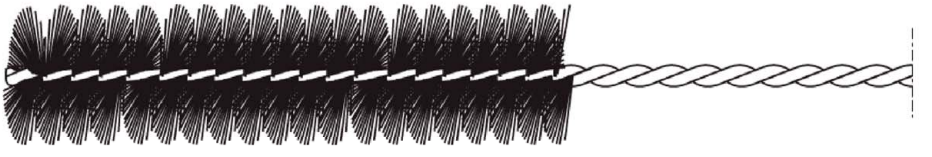

## Mortar cartridge (coaxial cartridge) with sealing cap



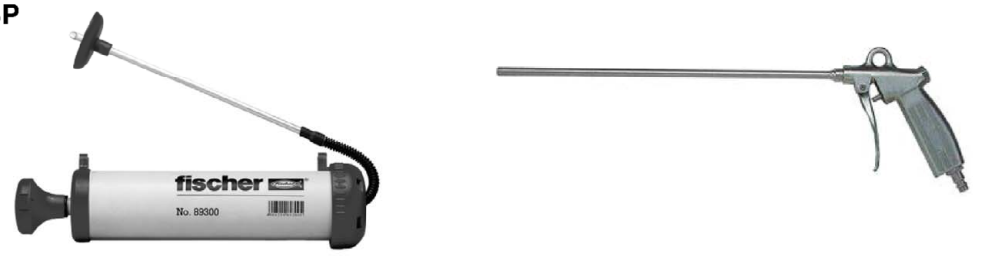

## Static mixer MR Plus with injection adapter and center sleeve for aerated concrete




## Cleaning brush BS



## Blow-out pump ABG or ABP




Pictures 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) 

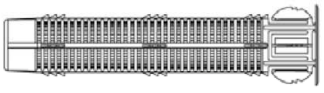
Size: M6, M8, M10, M12, M16

**Internal threaded anchor FIS E**

(5) 

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

**Perforated sleeve FIS H K**

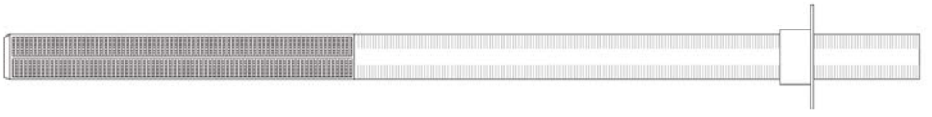
(7) 

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

(7) 

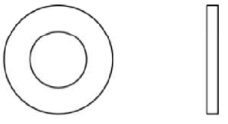
Size: FIS H 16x130 K
FIS H 20x130 K
FIS H 20x200 K

**Perforated sleeve FIS H K (push through anchorage)**

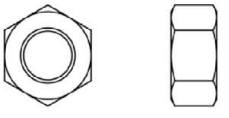
(7) 

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

**Washer**

(3) 

**Hexagon nut**

(4) 

Pictures not to scale

fischer injection system FIS V Plus for masonry

**Product description**
Overview system components part 2: steel parts / perforated 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<br>Corrosion resistance class CRC III<br>acc. to EN 1993-1-4:2015 | acc. to EN 10088-1:2014<br>Corrosion resistance class CRC V<br>acc. to EN 1993-1-4:2015 |
| 2 | Anchor rod | Property class 4.6; 4.8; 5.8 oder 8.8; EN ISO 898-1: 2013<br>zinc plated ≥ 5µm, ISO 4042:2018 Zn5/An(A2K)<br>or hot-dip galvanised EN ISO 10684:2004<br>$f_{uk}$ ≤ 1000 N/mm²<br>$A_5$ > 8% fracture elongation | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062; 1.4662; 1.4462;<br>EN 10088-1:2014<br>$f_{uk}$ ≤ 1000 N/mm²<br>$A_5$ > 8% fracture elongation | Property class 50 or 80<br>EN ISO 3506-1:2009<br>or property class 70 with $f_{yk}$= 560 N/mm²<br>1.4565; 1.4529<br>EN 10088-1:2014<br>$f_{uk}$ ≤ 1000 N/mm²<br>$A_5$ > 8% fracture elongation |
| 3 | Washer ISO 7089:2000 | zinc plated ≥ 5µm, ISO 4042:2018 Zn5/An(A2K)<br>or hot-dip galvanised EN ISO 10684:2004 | 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014 | 1.4565;1.4529<br>EN 10088-1:2014 |
| 4 | Hexagon nut | Property class 5 or 8; EN ISO 898-2:2012<br>zinc plated ≥ 5µm, ISO 4042:2018 Zn5/An(A2K)<br>or hot-dip galvanised ISO 10684:2004 | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014 | Property class 50, 70 or 80<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014 |
| 5 | Internal threaded anchor FIS E | Property class 5.8; EN 10277-1:2008-06<br>zinc plated ≥ 5µm, ISO 4042:2018 Zn5/An(A2K) | Property class 70<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014 | Property class 70<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014 |
| 6 | Commercial standard screw or threaded rod for internal threaded anchor FIS E | Property class 5.8 or 8.8; EN ISO 898-1:2013<br>zinc plated ≥ 5µm, ISO 4042:2018 Zn5/An(A2K) | Property class 70<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362;<br>EN 10088-1:2014 | Property class 70<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014 |
| 7 | Perforated sleeve and centring sleeve | PP / PE | | |

## 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;<br>without C28 to C48, C75 to C78 | |
| Hole drilling with rotary drill mode  | | all bricks | |
| Static and quasi static load, in masonry | | all bricks | |
| Use category | dry or wet masonry | all bricks | |
| 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)<br>Size: FIS H 12x50 K<br>FIS H 12x85 K<br>FIS H 16x85 K<br>FIS H 16x130 K<br>FIS H 20x85 K<br>FIS H 20x130 K<br>FIS H 20x200 K |
| | Push through anchorage | Anchor rod;<br>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)<br>Size: FIS H 18x130/200 K<br>FIS H 22x130/200 K |
| Installation conditions | category d/d<br>category w/d<br>category w/w | all bricks | |
| Installation direction | | D3 (downward and horizontal and upwards (e.g. overhead) installation) | |
| Installation temperature | | $T_{i,min}$ = 0 °C bis $T_{i,max}$ = +40 °C | |
| In-service temperature | Temperature range Tb | -40 °C to +80 °C | (max. short term temperature +80 °C<br>max. long term temperature +50 °C) |
| | Temperature range Tc | -40 °C to +120 °C | (max. short term temperature +120 °C;<br>max. long term temperature +72 °C) |

## Specifications of intended use (part 2)

**Anchorages subject to:**

- Static and quasi-static loads

**Base materials:**

- Solid brick masonry (Use category b) and autoclaved aerated concrete (Use category d), acc. to Annex B 13 / B 14
- Hollow brick masonry (use category c), according to Annex B 13 / B 14
- For minimum thickness of masonry member is $h_{ef}$+30mm
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010
- For other bricks in solid masonry, hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to EOTA Technical Report TR 053, Annex B under consideration of the β-factor according to Annex C 110, Table C110.1

  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):**

- **X1:** Structures subject to dry internal conditions exist
  (zinc coated steel, stainless steel or high corrosion resistant steel)
- **X2:** Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particulary aggressive conditions exist
  (stainless steel or high corrosion resistant steel)
- **X3:** Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particulary aggressive conditions exist (high corrosion resistant steel)

  Note: Particulary aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

## Specifications of intended use (part 2 continued)

**Design:**

- The anchorages have to be designed in accordance with EOTA Technical Report TR 054, 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:
  $N_{Rk} = N_{Rk,b} = N_{Rk,p}$
  $V_{Rk} = V_{Rk,b} = V_{Rk,c}$
  For the Calculation of pulling out a brick under tension load $\mathbf{N_{Rk,pb}}$ or
  pushing out a brick under shear load $\mathbf{V_{Rk,pb}}$ see EOTA Technical Report TR 054.
  $\mathbf{N_{Rk,s}}$, $\mathbf{V_{Rk,s}}$ and $\mathbf{M^0_{Rk,s}}$ see annex C1-C3
  Factors for job site tests and displacements see Annex C110
- 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:**

- Category d/d: - Installation and use in dry structures
- Category w/w: - Installation and use in dry and wet structures
- Category 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) 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 5.1
  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

**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 | $h_o$ [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, ≤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:**

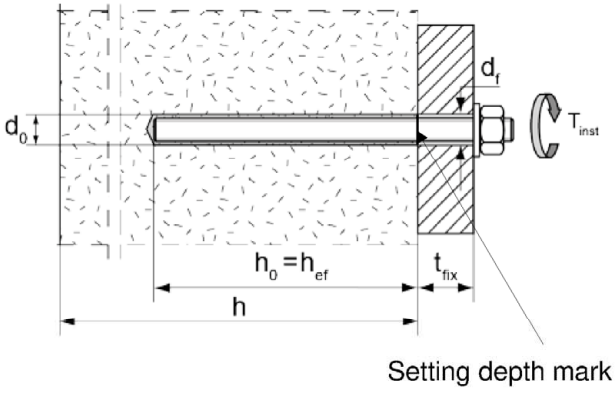
| | | | |
|---|---|---|---|
| Steel zinc plated PC[1] 8.8 | • or + | Steel hot-dip galvanised PC[1] 8.8 | • |
| High corrosion resistant steel HCR PC[1] 50 | • | High corrosion resistant steel HCR PC[1] 70 | – |
| High corrosion resistant steel HCR PC[1] 80 | ( | Stainless steel R property class 50 | ~ |
| 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

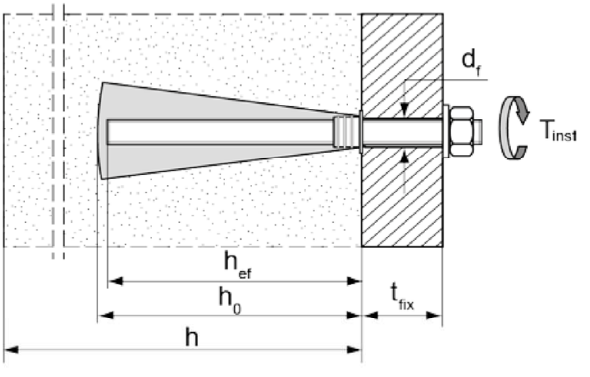
[1] PC = property class

**Installation conditions:**

Anchor rod in cylindrical drill hole




Anchor rod in conical drill hole




Pictures not to scale

fischer injection system FIS V Plus for masonry

**Intended Use**
Installation parameters for anchor rods without perforated sleeve

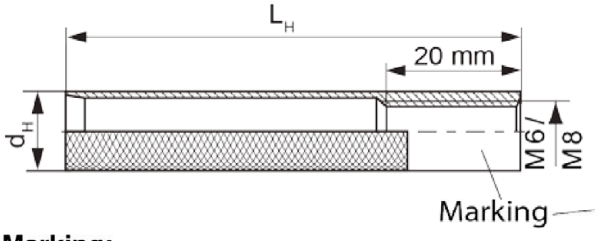
**Annex B 4**

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

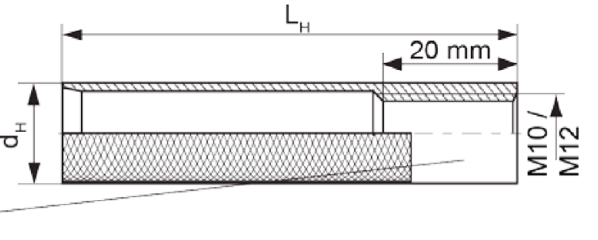
| Internal threaded anchor FIS E | | 11x85 M6 | 11x85 M8 | 15x85 M10 | 15x85 M12 |
|---|---|---|---|---|---|
| Diameter of anchor | $d_H$ [mm] | 11 | | 15 | |
| Nominal drill hole diameter | $d_0$ [mm] | 14 | | 18 | |
| Length of anchor | $L_H$ [mm] | 85 | | | |
| Effective anchorage depth | $h_0 = h_{ef}$ [mm] | 85 | | | |
| Effective anchorage depth $h_{ef}$ 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**

FIS E 11x85 M6, FIS E 11x85 M8




FIS E 15x85 M10, FIS E 15x85 M12

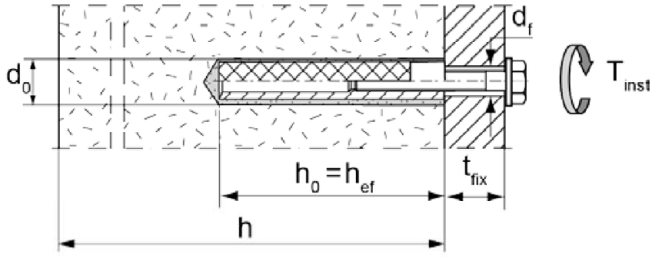



**Marking:**

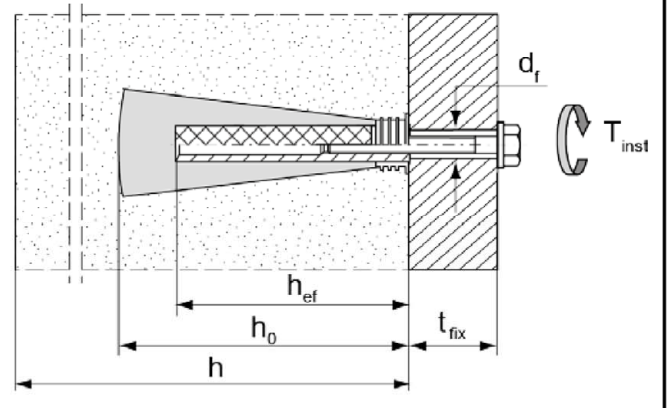
Size, e.g. **M8**, Stainless steel: R, e.g. **M8 R**, High corrosion-resistant steel: HCR, e.g. **M8 HCR**

**Installation conditions:**

Internal threaded anchor in cylindrical drill hole




Internal threaded anchor in conical drill hole




Pictures not to scale

fischer injection system FIS V Plus for masonry

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

**Annex B 5**

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

| perforated sleeve FIS H K | | 12x50 | 12x85[2)] | 16x85 | 16x130[2)] | 20x85 | 20x130[2)] | 20x200[2)] |
|---|---|---|---|---|---|---|---|---|
| Nominal drill hole diameter $d_0 = D_{sleeve,nom}$ | $d_0$ [mm] | 12 | | 16 | | 20 | | |
| Depth of drill hole | $h_0$ [mm] | 55 | 90 | 90 | 135 | 90 | 135 | 205 |
| Effective anchorage depth | $h_{ef,min}$ [mm] | 50 | 65 | 85 | 110 | 85 | 110 | 180 |
| | $h_{ef,max}$ [mm] | 50 | 85 | 85 | 130 | 85 | 130 | 200 |
| Size of threaded rod | [-] | M6 und M8 | | M8 und M10 | | M12 und 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 | | | | | | |

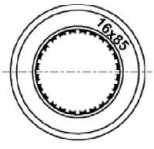
[1)] Only for solid areas in hollow bricks and solid bricks.

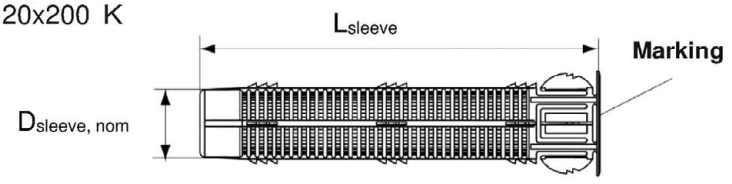
[2)] Bridging of unbearing layer (e.g. plaster) is possible. When reducing the effective anchorage depth $h_{ef,min}$, the values of the next shorter perforated sleeve of the same diameter must be used. The smaller value of charastereristic resistance must be taken.

**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

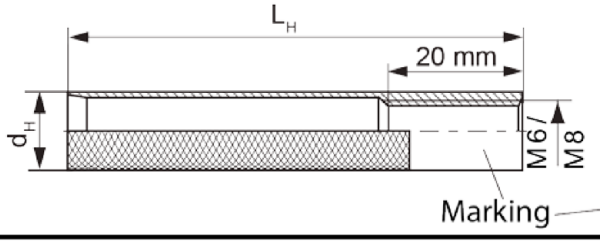
**Marking:**
Size $D_{sleeve,nom}$ x $L_{sleeve}$
(e.g.: 16x85)



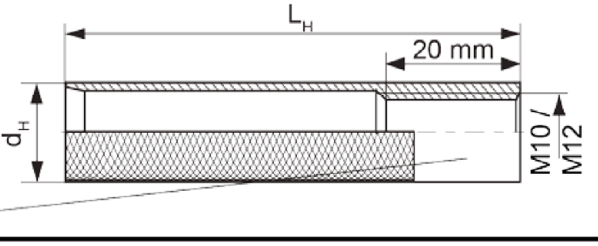




**fischer Internal threaded anchor FIS E**

FIS E 11x85 M6, FIS E 11x85 M8

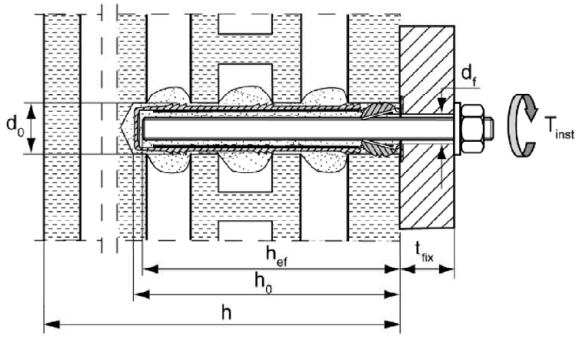



FIS E 15x85 M10, FIS E 15x85 M12

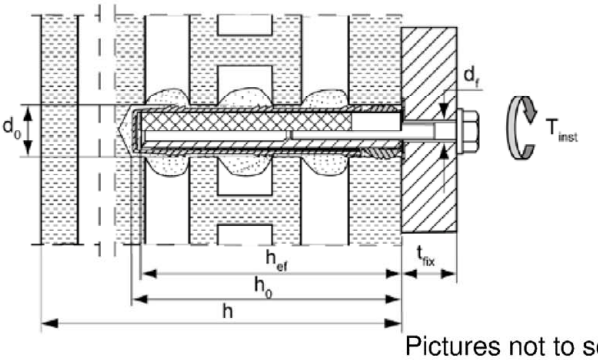



**Installation conditions:**

Anchor rod with perforated sleeve




Internal threaded anchor with perforated sleeve




Pictures not to scale

fischer injection system FIS V Plus for masonry

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

**Annex B 6**

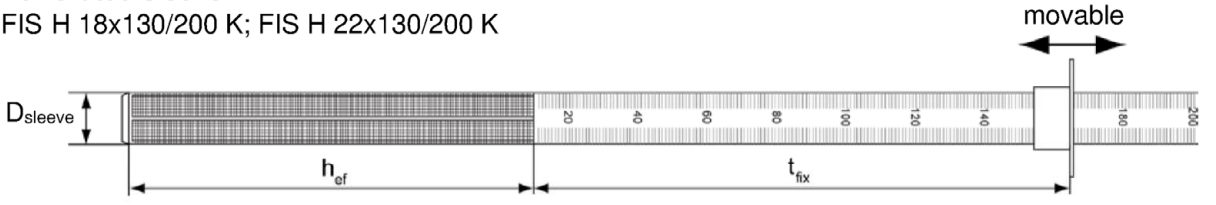
**Table B7.1:** Installation parameters for anchor rods with perforated sleeves (push through anchorage)

| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
|---|---|---|---|---|
| Nominal sleeve diameter | $D_{sleeve,nom}$ [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] | Siehe Tabelle B8.1 | | |
| Size of threaded rod | [-] | M10 | M12 | M16 |
| Maximum installation torque | $T_{inst}$ [Nm] | see parameters of brick | | |
| Thickness of fixture | $t_{fix,max}$ [mm] | 200 | | |

[1] Only for solid areas in hollow bricks and solid bricks.

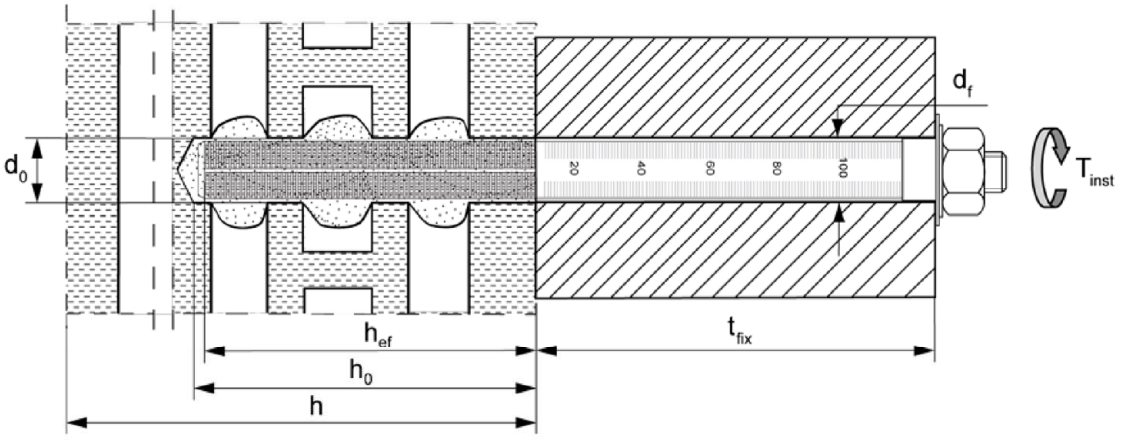
**Perforated sleeve**

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




**Installation conditions:**

Anchor rod with perforated sleeve




Pictures not to scale

fischer injection system FIS V Plus for masonry

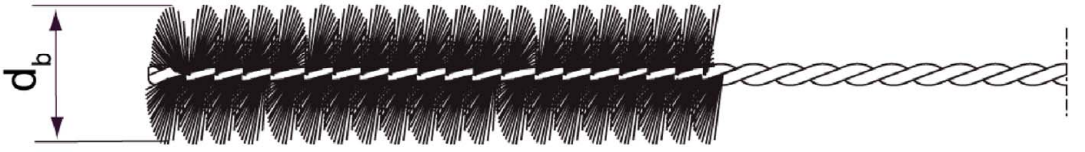
**Intended Use**
Installation parameters for anchor rods with perforated sleeves (push through anchorage)

**Annex B 7**

**Tabelle 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

**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 $t_{work}$ | | | Minimum curing time [1] $t_{cure}$ | | |
|---|---|---|---|---|---|---|
| | FIS VW Plus High Speed [3] | FIS V Plus [2] | FIS VS Plus Low Speed [2] | FIS VW Plus High Speed [3] | FIS V Plus [2] | FIS VS Plus Low Speed [2] |
| > 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

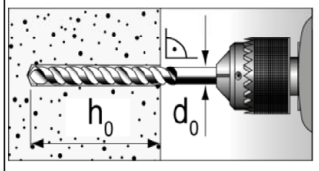
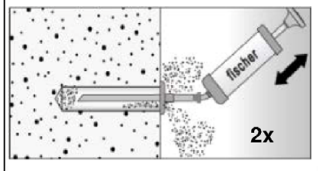
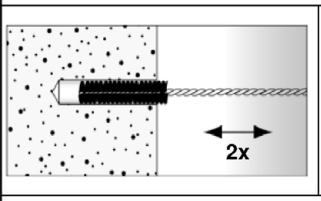
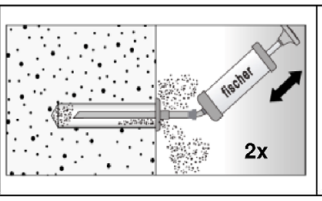
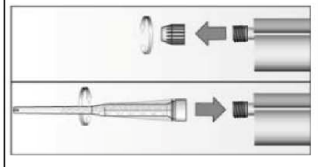
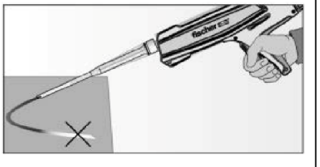
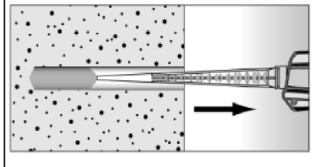
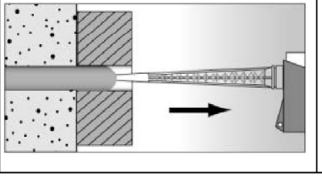
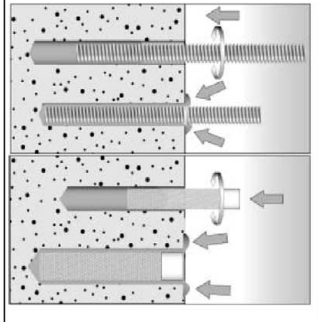
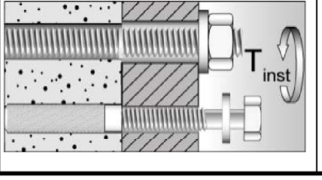
[2] Minimum cartridge temperature +5°C

[3] Minimum cartridge temperature ±0°C

Pictures not to scale

## Installation instruction part 1

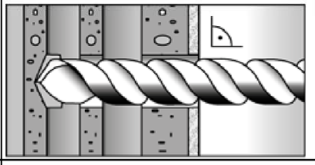
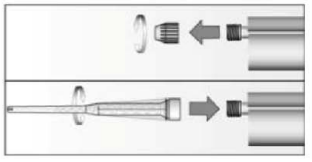
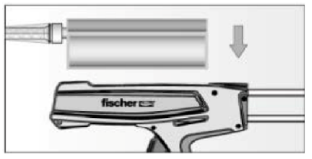
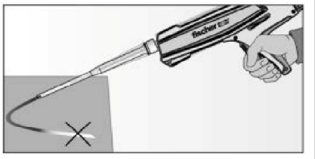
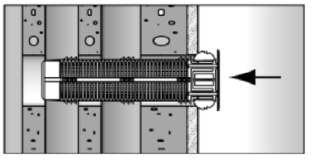
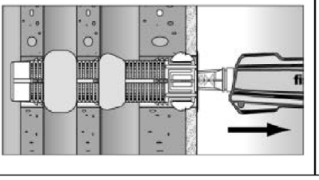
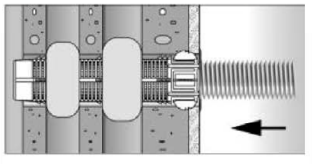
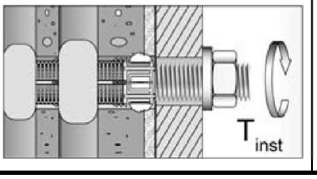
Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)

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

[1] Exact volume of mortar see manufacturer´s specification.

## Installation instruction part 2

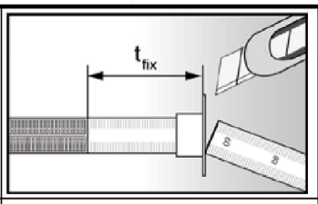
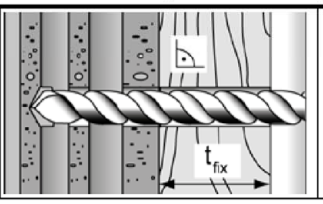
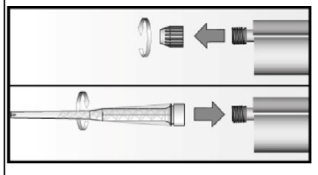
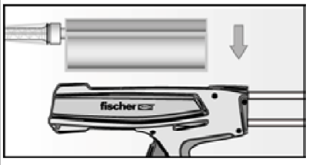
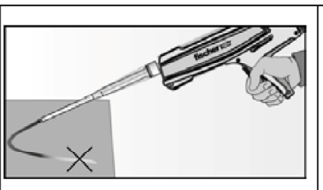
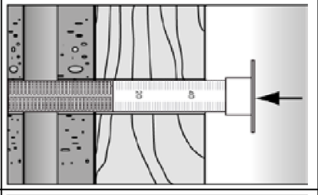
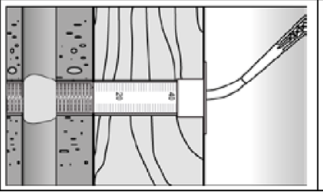
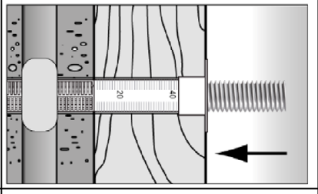
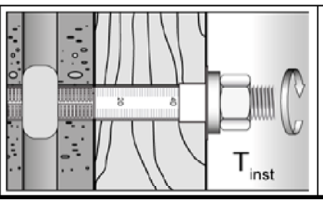
Installation in perforated or solid brick with perforated sleeve (pre-positioned anchorage)

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

[1] Exact volume of mortar see manufacturer´s specification.

## Installation instruction part 3

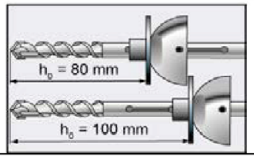
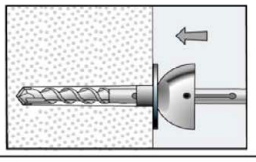
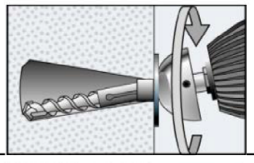
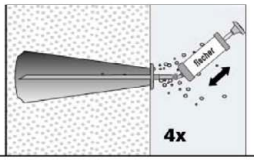
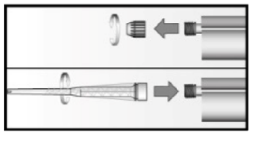
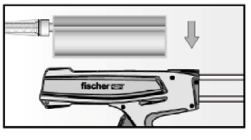
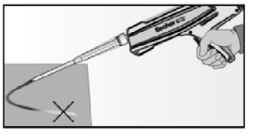
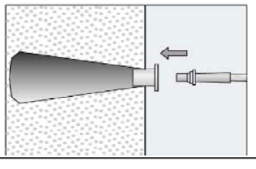
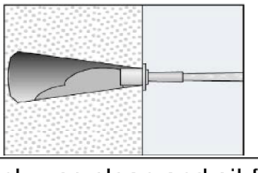
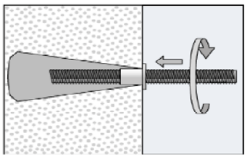
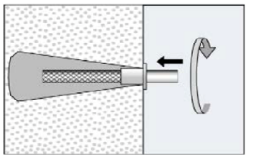
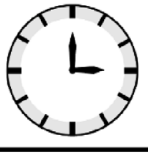
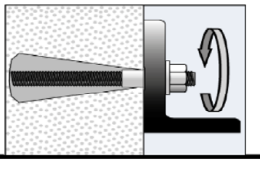
Installation in perforated or solid brick with perforated sleeve (push through anchorage)

| | | | | |
|---|---|---|---|---|
| 1 |  | Push the movable stop up to the correct thickness of fixture and cut the overlap. |  | Drill the hole through the fixture. Depth of drill hole **($h_0$ + $t_{fix}$)** and drill hole diameter see **Table B7.1** |
| 2 |  | Remove the sealing cap. Screw on the static mixer. (the spiral in the static mixer must be clearly visible) | | |
| 3 |  | Place the cartridge into a suitable dispenser. |  | Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of. |
| 4 |  | Insert the perforated sleeve flush with the surface of the fixture into the drill hole. |  | Fill the sleeve with mortar beginning from the bottom of the hole.[1] For deep drill holes use an extension tube. |
| 5 |  | Only use clean and oil-free metal parts. Mark the anchor rod for setting depth. Insert the anchor rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (anchor rod) or flush with the surface (internal threaded anchor). | | |
| 6 |  | Do not touch. Minimum curing time see Table **B8.2** |  | Mounting the fixture. $T_{inst}$ see parameter of brick. |

[1] Exact volume of mortar see manufacturer´s specification.

## Installation instruction part 4

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

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

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**

**Table B13.1:** Overview of controlled bricks (part 1)

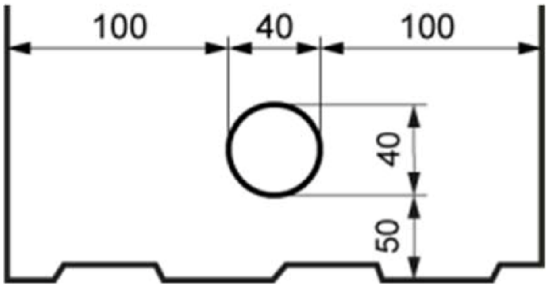
| Kind of masonry | Brick format [mm] | Compressive strength $f_b$ [N/mm²] | Producing counrty | Density ρ [kg/dm³] | Annex |
|---|---|---|---|---|---|
| **Solid brick Mz** | | | | | |
| **Solid brick Mz** | **NF** ≥240x115x71 | 12 - 20 | Germany | ≥1,8 | C4 - C7 |
| | **2DF** ≥240x115x113 | 10 - 16 | Germany | ≥1,8 | C8/C9 |
| | ≥ 245x118x54 | 10 - 20 | Italy | ≥1,8 | C10/C11 |
| | ≥ 230x108x55 | 10 - 20 | Denmark | ≥1,8 | C12/C13 |
| **Solid sand- lime brick KS / perforated Sand- lime brick KSL** | | | | | |
| **Solid sand - lime brick KS** | **NF** ≥240x115x71 | 12 - 28 | Germany | ≥2,0 | C14/C15 |
| | **8DF** ≥ 250x240x240 | 10 - 28 | Germany | ≥2,0 | C16/C17 |
| | ≥ 997x214x538 | 10 - 36 | Netherlands | ≥1,8 | C18/C19 |
| **Perforated sand - lime brick KSL** | **3DF** 240x175x113 | 8 - 20 | Germany | ≥1,4 | C20 - C23 |
| **Vertical perforated brick HLz** | | | | | |
| **Vertical perforated brick HLz** | 370x240x237 | 4 - 12 | Germany | ≥1,0 | C24/C25 |
| | 500x175x237 | 4 - 12 | Germany | ≥1,0 | C24/C25 |
| | **2DF** 240x115x113 | 6 - 28 | Germany | ≥1,4 | C26/C27 |
| | 248x365x248 | 4 - 8 | Germany | ≥0,6 | C28 - C31 |
| | 248x365x249 | 8 - 12 | Germany | ≥0,7 | C32 - C35 |
| | 248x365x249 | 4 - 6 | Germany | ≥0,5 | C36 - C39 |
| | 248x425x248 | 4 - 8 | Germany | ≥0,8 | C40 - C43 |
| | 248x425x248 | 4 - 8 | Germany | ≥0,6 | C44 - C47 |
| | 500x200x315 | 4 - 8 | France | ≥0,6 | C48 - C51 |
| | 500x200x300 | 4 - 10 | France | ≥0,7 | C52 - C55 |
| | 500x200x315 | 2 - 8 | France | ≥0,7 | C56 - C59 |
| | 560x200x275 | 4 - 8 | France | ≥0,7 | C60/C61 |
| | 255x120x118 | 2 - 12 | Italy | ≥1,0 | C62 - C64 |
| | 275x130x94 | 6 - 20 | Spain | ≥0,8 | C65/C66 |
| | 220x190x290 | 6 - 10 | Portugal | ≥0,7 | C67 - C70 |
| | 253x300x240 | 2 - 6 | Austria | ≥0,8 | C71 - C74 |
| | 250x440x250 | 6 - 10 | Austria | ≥0,7 | C75 - C78 |
| | 230x108x55 | 2 - 8 | Denmark | ≥1,4 | C79/C80 |
| **Horizontal perforated brick LLz** | | | | | |
| **Horizontal perforated brick LLz** | 248x78x250 | 2 - 6 | Italy | ≥0,7 | C81/C82 |
| | 128x88x275 | 2 | Spain | ≥0,8 | C83/C84 |
| **Light-weight concrete hollow block Hbl** | | | | | |
| **Light-weight concrete hollow block Hbl** | 362x240x240 | 2 - 4 | Germany | ≥1,0 | C85 - C88 |
| | 500x200x200 | 2 - 6 | France | ≥1,0 | C89/C90 |
| | 440x215x215 | 4 - 10 | Ireland | ≥1,2 | C91 - C94 |

**Table B14.1:** Overview of controlled bricks (part 2)

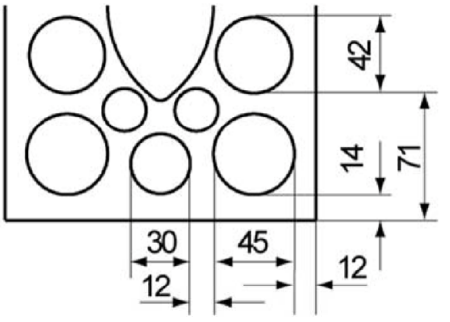
| Kind of masonry | Brick format [mm] | Compressive strength $f_b$ [N/mm²] | Producing counrty | Density ρ [kg/dm³] | Annex |
|---|---|---|---|---|---|
| **Light-weight concrete solid block Vbl** | | | | | |
| **Light-weight concrete solid block Vbl** | ≥ 372x300x254 | 2 | Germany | ≥0,6 | C95/C96 |
| | ≥ 250x240x239 | 4 - 8 | Germany | ≥1,6 | C97 - C100 |
| | ≥ 440x100x215 | 4 - 10 | Ireland | ≥2,0 | C101/C102 |
| | ≥ 440x95x215 | 6 - 12 | England | ≥2,0 | C103/C104 |
| **Autoclaved aerated concrete (AAC)** | | | | | |
| **PP2 / AAC** | - | 2 | Germany | 0,35 | C105 - C109 |
| **PP4 / AAC** | - | 4 | Germany | 0,5 | C105 - C109 |
| **PP6 / AAC** | - | 6 | Germany | 0,65 | C105 - C109 |

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

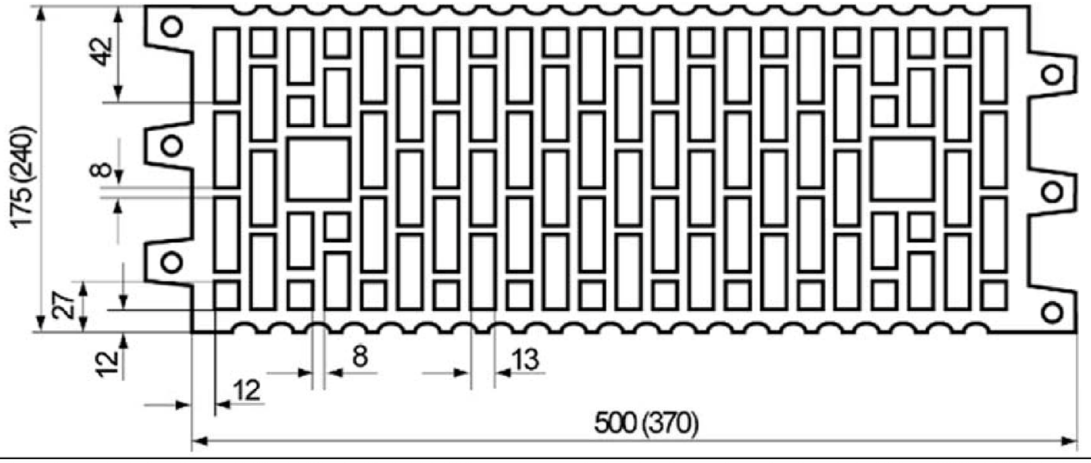
Solid sand-lime brick KS, 8DF, EN 771-2:2015 according to Annex C 16



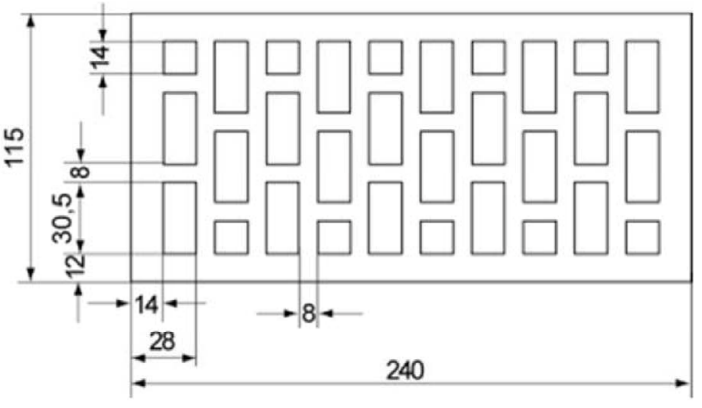

Perforated sand-lime brick KSL, 3DF, EN 771-2:2015; e.g. KS Wemding according to Annex C 20



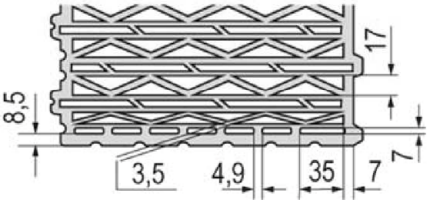

Vertical perforated brick HLz, EN 771-1:2015: e.g. Wienerberger, Poroton according to Annex C 24




Vertical perforated brick HLz, 2DF, EN 771-1:2015; e.g. Wienerberger according to Annex C 26




Vertical perforated brick HLz, T8, EN 771-1:2015; according to Annex C 28




Pictures not to scale

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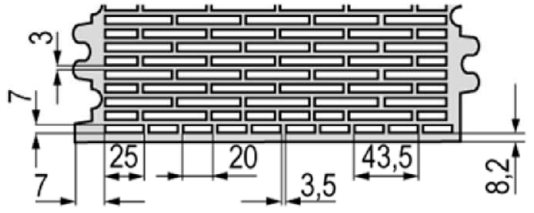
**Intended use**
Overview dimensions of perforated and hollow bricks (part 1)

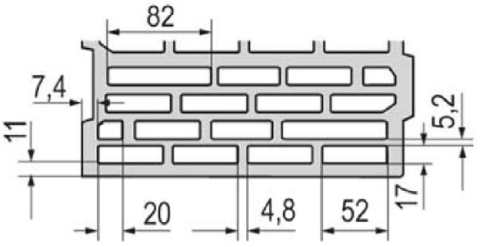
**Annex B 15**

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

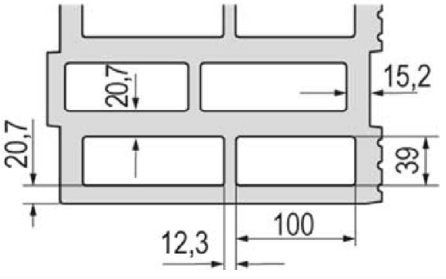
Vertical perforated brick HLz, T10, T11, EN 771-1:2015; according to Annex C32



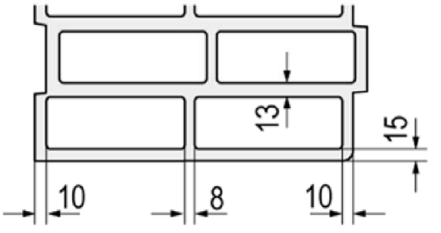

Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2015; according to Annex C 36



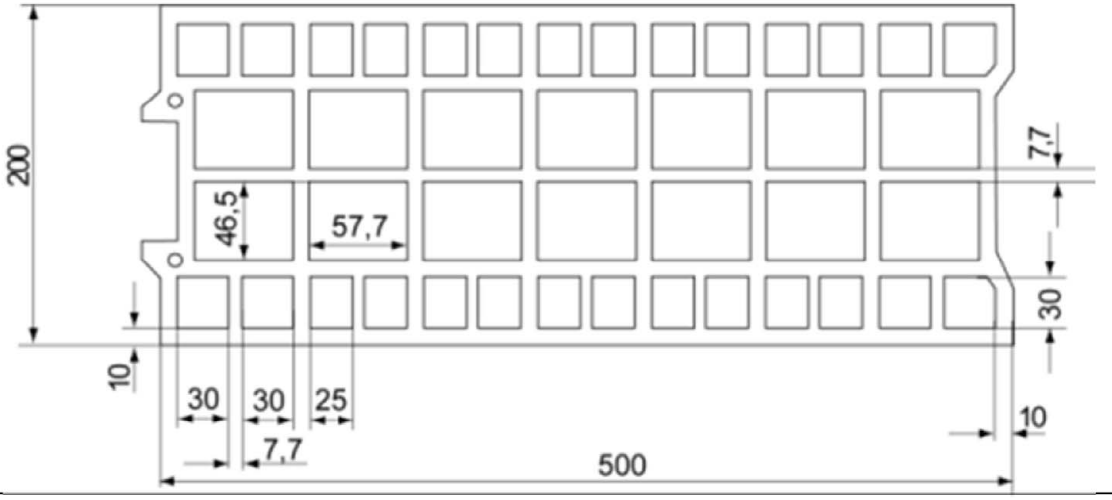

Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015; according to Annex C 40




Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015; according to Annex C 44




Vertical perforated brick HLz, EN 771-1:2015; e.g. Bouyer Leroux; According to Annex C 48




Pictures not to scale

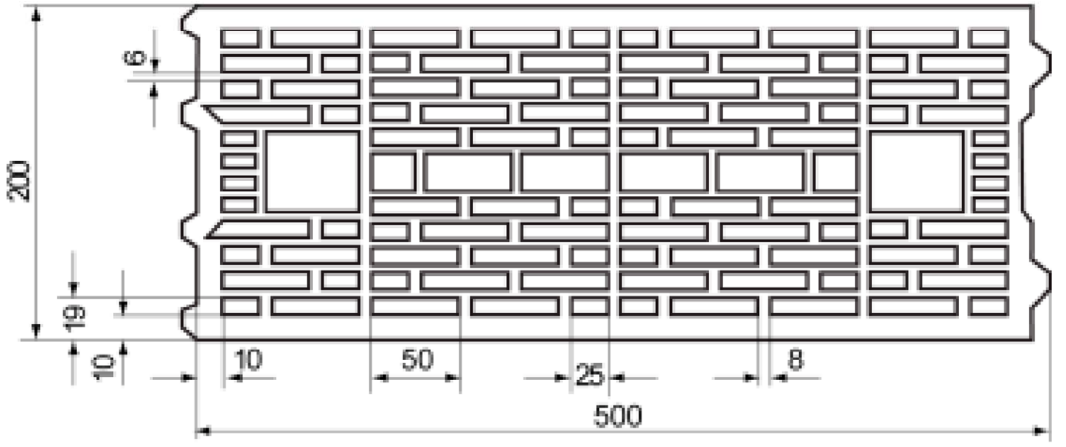
fischer injection system FIS V Plus for masonry

**Intended use**
Overview dimensions of perforated and hollow bricks (part 2)

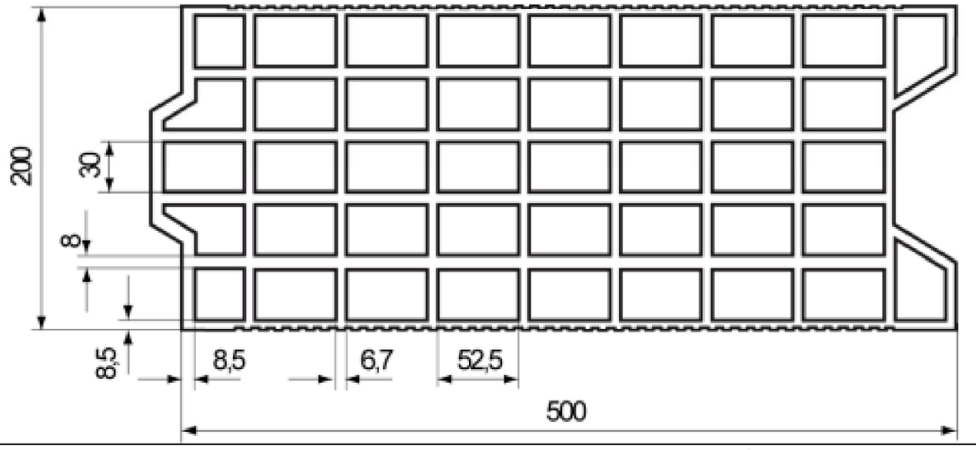
**Annex B 16**

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

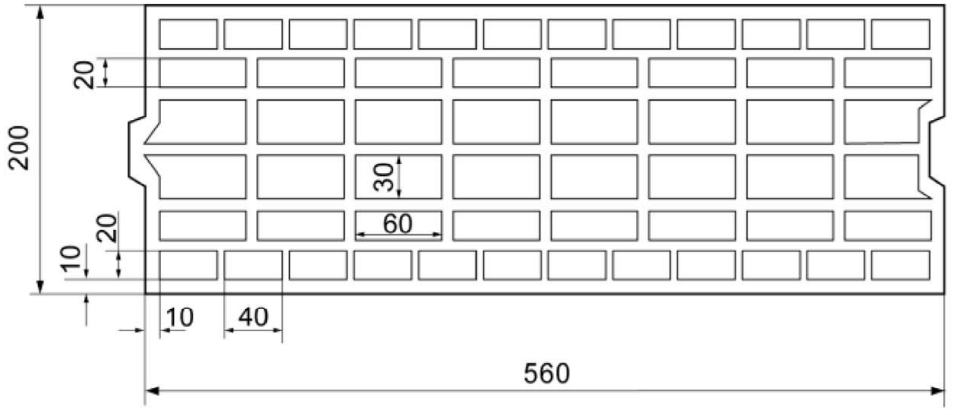
Vertical perforated brick HLz, EN 771-1:2015; e.g. Wienerberger according to Annex C 52




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



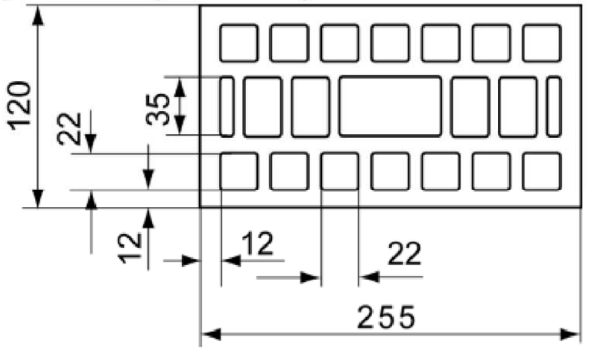

Vertical perforated brick HLz, EN 771-1:2015; e.g. Imery according to Annex C 60



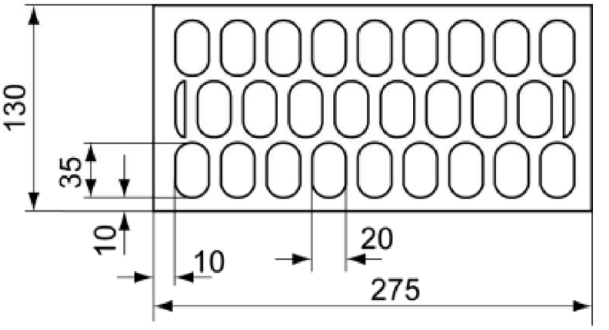

Pictures not to scale

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

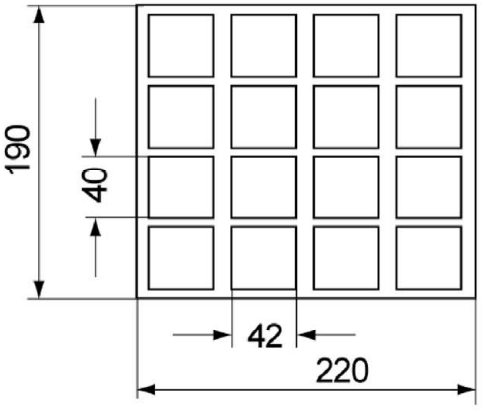
Vertical perforated brick HLz, EN 771-1:2015;
e.g. Wienerberger according to Annex C 62



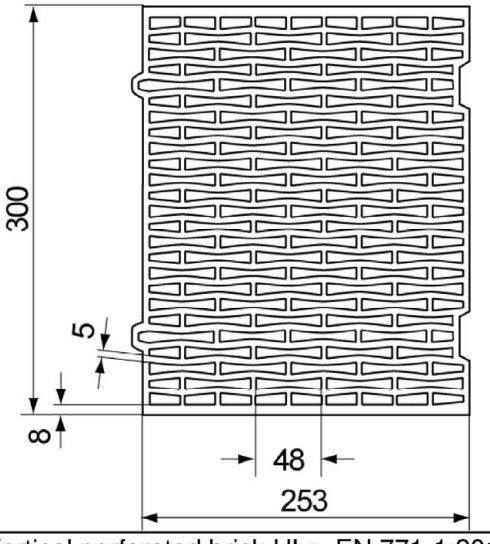

Vertical perforated brick HLz, EN 771-1:2015;
e.g. Cermanica Farreny S.A. according to Annex C 65



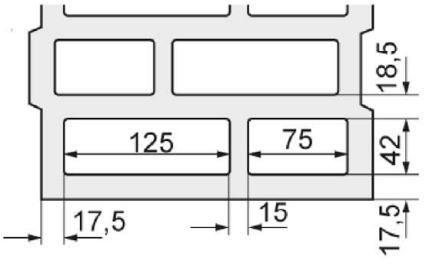

Vertical perforated brick HLz, EN 771-1:2015;
e.g. Perceram according to Annex C 67



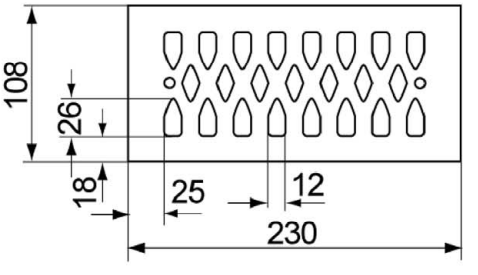

Vertical perforated brick HLz, EN 771-1:2015;
e.g. Ziegelwerk Brenna according to Annex C 71




Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015 according to Annex C 75




Vertical perforated brick HLz, EN 771-1:2015;
e.g. Wienerberger according to Annex C 79




Pictures not to scale

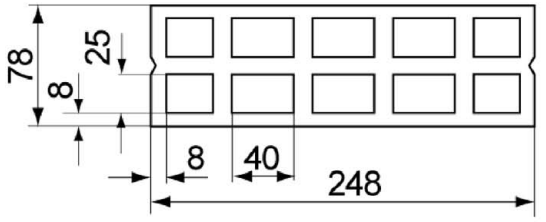
fischer injection system FIS V Plus for masonry

**Intended use**
Overview dimensions of perforated and hollow bricks (part 4)

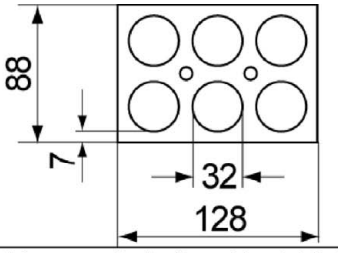
**Annex B 18**

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

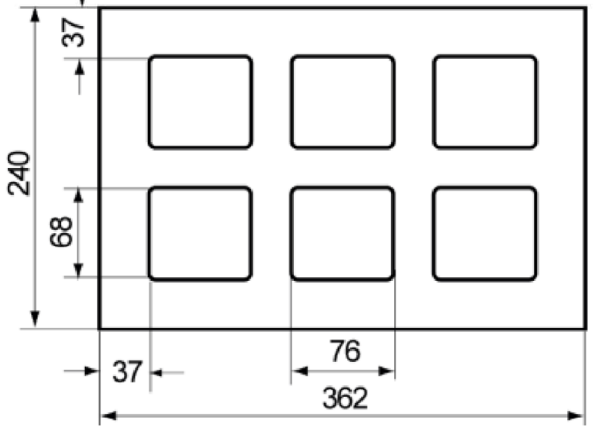
Horizontal perforated brick LLz, EN 771-1:2015;
according to Annex C 81



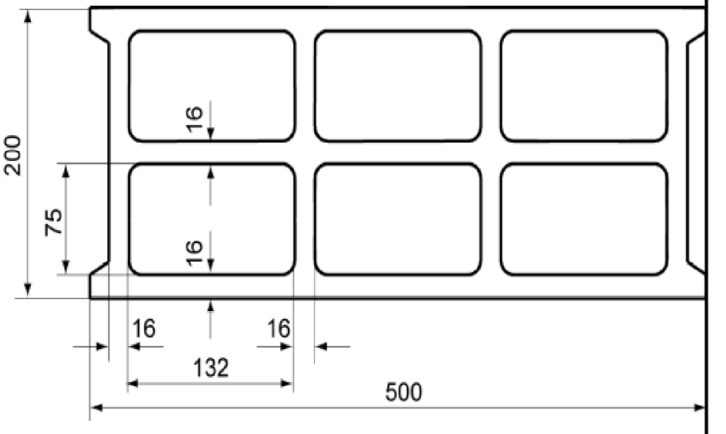

Horizontal perforated brick LLz, EN 771-1:2015;
e.g. Cermanica Farreny S.A according to Annex C 83



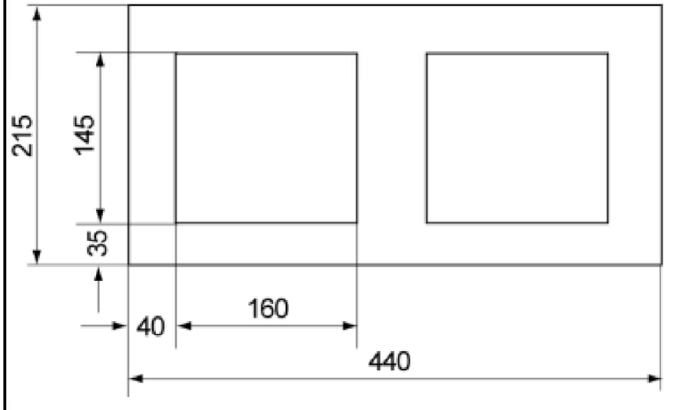

Light-weight concrete hollow block Hbl,
EN 771-3:2015; according to Annex C 85



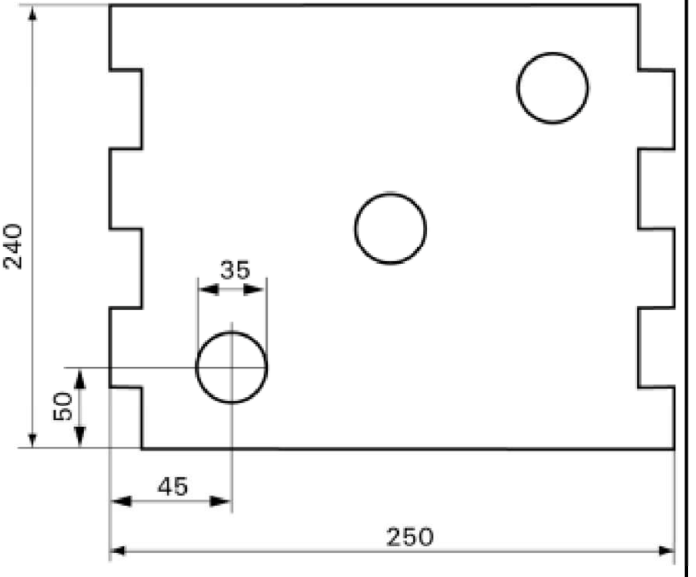

Light-weight concrete hollow block Hbl, EN 771-3:2015;
e.g. Sepa according to Annex C 89




Light-weight concrete hollow block Hbl,
EN 771-3:2015;
e.g. Roadstone wood according to Annex C 91




Light-weight concrete solid block Vbl, EN 771-3:2015;
e.g. Sepa according to Annex C 97



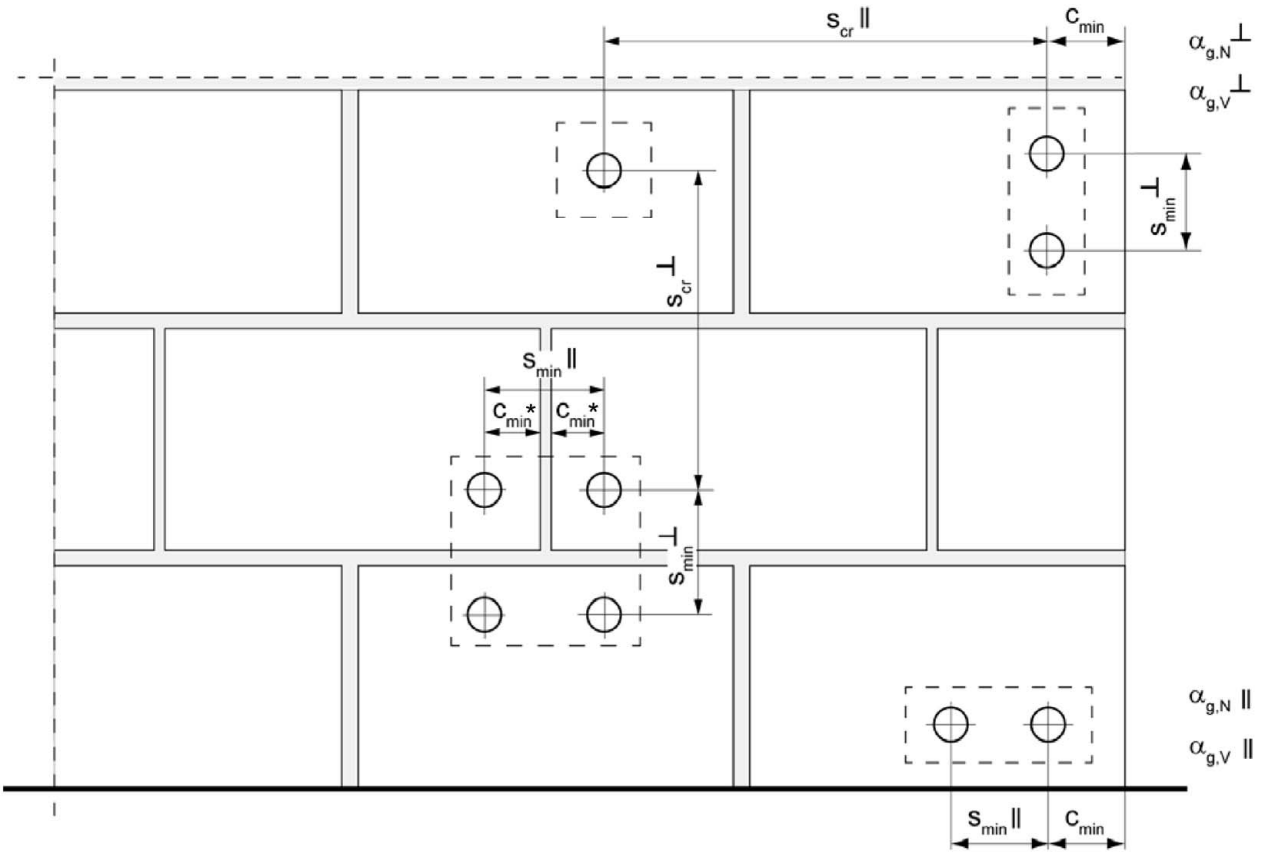

Pictures not to scale

fischer injection system FIS V Plus for masonry

**Intended use**
Overview dimensions of perforated and hollow bricks (part 5)

**Annex B 19**

## Spacing and edge distance




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

| | | |
|---|---|---|
| $s_{min}$ ‖ | = | Minimum spacing parallel to bed joint |
| $s_{min}$ ⊥ | = | Minimum spacing vertical to bed joint |
| $s_{cr}$ ‖ | = | Characteristic spacing parallel to bed joint |
| $s_{cr}$ ⊥ | = | Characteristic spacing vertical to bed joint |
| $c_{cr} = c_{min}$ | = | Edge distance |
| $\alpha_{g,N}$ ‖ | = | Group factor for tension resistance, anchor group parallel to bed joint |
| $\alpha_{g,V}$ ‖ | = | Group factor for shear resistance, anchor group parallel to bed joint |
| $\alpha_{g,N}$ ⊥ | = | Group factor for tension resistance, anchor group vertical to bed joint |
| $\alpha_{g,V}$ ⊥ | = | Group factor for shear resistance, anchor group vertical to bed joint |

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

For $s_{min} \leq s < s_{cr}$ $\alpha_g$ according to installation parameters of brick

$N^g_{Rk} = \alpha_{g,N} \bullet N_{Rk}$ ; $V^g_{Rk} = \alpha_{g,V} \bullet V_{Rk}$ (Group of 2 anchors)

$N^g_{Rk} = \alpha_{g,N}$ ‖ $\bullet$ $\alpha_{g,N}$⊥ $\bullet N_{Rk}$ ; $V^g_{Rk} = \alpha_{g,V}$ ‖ $\bullet$ $\alpha_{g,V}$⊥ $\bullet V_{Rk}$ (Group of 4 anchors)

**Table C1.1:** Characteristic values for the **resistance to steel failure** of **anchor rods** under tension load

| **Anchor rod** | | | | **M6** | **M8** | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|
| **Resistance under tension load, steel failure** | | | | | | | | |
| Characteristic resistance $N_{Rk,s}$ | Steel zinc plated | Property class | 4.6 | 8 | 15(13) [3] | 23(21) [3] | 33 | 63 |
| | | | 4.8 | 8 | 15(13) [3] | 23(21) [3] | 33 | 63 |
| | | | 5.8 | 10 | 19(17) [3] | 29(27) [3] | 43 | 79 |
| | | | 8.8 | 16 | 29(27) [3] | 47(43) [3] | 68 | 126 |
| | Stainless steel R and High corrosion resistant steel HCR | | 50 | 10 | 19 | 29 | 43 | 79 |
| | | | 70 | 14 | 26 | 41 | 59 | 110 |
| | | | 80 | 16 | 30 | 47 | 68 | 126 |
| | | | [kN] | | | | | |
| **Partial factors** [1] | | | | | | | | |
| Partial factor $\gamma_{Ms,N}$ | Steel zinc plated | Property class | 4.6 | 2,00 | | | | |
| | | | 4.8 | 1,50 | | | | |
| | | | 5.8 | 1,50 | | | | |
| | | | 8.8 | 1,50 | | | | |
| | Stainless steel R and High corrosion resistant steel HCR | | 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

**Table C2.1:** Characteristic values for the **resistance to steel failure** of **anchor rods** under shear load

| **Anchor rod** | | | | **M6** | **M8** | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|
| **Resistance under shear load, steel failure** | | | | | | | | |
| **without lever arm** | | | | | | | | |
| Characteristic resistance $V^0_{Rk,s}$ | Steel zinc plated | Property class | 4.6 | 4 | 9(8) [3] | 14(13) [3] | 20 | 38 |
| | | | 4.8 | 4 | 9(8) [3] | 14(13) [3] | 20 | 38 |
| | | | 5.8 | 6 | 11(10) [3] | 17(16) [3] | 25 | 47 |
| | | | 8.8 | 8 | 15(13) [3] | 23(21) [3] | 34 | 63 |
| | Stainless steel R and High corrosion resistant steel HCR | | 50 | 5 | 9 | 15 | 21 | 39 |
| | | | 70 | 7 | 13 | 20 | 30 | 55 |
| | | | 80 | 8 | 15 | 23 | 34 | 63 |
| | | [kN] | | | | | | |
| **with lever arm** | | | | | | | | |
| Characteristic resistance $M^0_{Rk,s}$ | Steel zinc plated | Property class | 4.6 | 6 | 15(13) [3] | 30(27) [3] | 52 | 133 |
| | | | 4.8 | 6 | 15(13) [3] | 30(27) [3] | 52 | 133 |
| | | | 5.8 | 7 | 19(16) [3] | 37(33) [3] | 65 | 166 |
| | | | 8.8 | 12 | 30(26) [3] | 60(53) [3] | 105 | 266 |
| | Stainless steel R and High corrosion resistant steel HCR | | 50 | 7 | 19 | 37 | 65 | 166 |
| | | | 70 | 10 | 26 | 52 | 92 | 232 |
| | | | 80 | 12 | 30 | 60 | 105 | 266 |
| | | [Nm] | | | | | | |
| **Partial factors** [1] | | | | | | | | |
| Partial factor $\gamma_{Ms,V}$ | 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

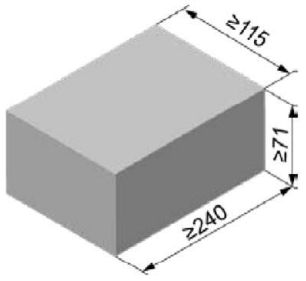
[3] Values in brackets are valid for undersized threaded rods with smaller stress area $A_s$ for hot dip galvanised standard threaded rods according to EN ISO 10684:2004+AC:2009.

**Table C3.1:** Characteristic values for the **resistance to steel failute** of **internal threaded anchors FIS E** under tension / shear load

| **fischer internal threaded anchor FIS E** | | | | | **M6** | **M8** | **M10** | **M12** |
|---|---|---|---|---|---|---|---|---|
| **Resistance under tension load, steel failure** | | | | | | | | |
| Characteristic resistance with screw | $N_{Rk,s}$ | Property class | 5.8 | [kN] | 10 | 18 | 29 | 42 |
| | | Property class 70 | R | | 14 | 26 | 41 | 59 |
| | | | HCR | | 14 | 26 | 41 | 59 |
| **Partial factors**[1)] | | | | | | | | |
| Partial factor | $\gamma_{Ms,N}$ | Property class | 5.8 | [-] | 1,50 | | | |
| | | Property class 70 | R | | 1,87 | | | |
| | | | HCR | | 1,87 | | | |
| **Resistance under shear load, steel failure** | | | | | | | | |
| **without lever arm** | | | | | | | | |
| Characteristic resistance with screw | $V_{Rk,s}$ | Property class | 5.8 | [kN] | 5 | 9 | 15 | 21 |
| | | Property class 70 | R | | 7 | 13 | 20 | 30 |
| | | | HCR | | 7 | 13 | 20 | 30 |
| **with lever arm** | | | | | | | | |
| Characteristic resistance | $M^0_{Rk,s}$ | Property class | 5.8 | [Nm] | 8 | 19 | 37 | 65 |
| | | Property class 70 | R | | 11 | 26 | 52 | 92 |
| | | | HCR | | 11 | 26 | 52 | 92 |
| **Partial factors**[1)] | | | | | | | | |
| Partial factor | $\gamma_{Ms,V}$ | Property class | 5.8 | [-] | 1,25 | | | |
| | | Property class 70 | R | | 1,56 | | | |
| | | | HCR | | 1,56 | | | |

[1)] In absence of other national regulations

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




| Solid brick Mz, NF, EN 771-1:2015 | | | | |
|---|---|---|---|---|
| Producer | | e.g. Wienerberger | | |
| Nominal dimensions | [mm] | length L | width W | height H |
| | | ≥ 240 | ≥ 115 | ≥ 71 |
| Density ρ | [kg/dm³] | ≥ 1,8 | | |
| Compressive strength $f_b$ | [N/mm²] | 12 / 20 | | |
| Standard or annex | | EN 771-1:2015 | | |

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

| **Anchor rod** | | | **M6** | **M8** | **M10** | **M12** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | **-** | **-** | **-** | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | **11x85** | | **15x85** | |
| **Anchor rod and internal threaded anchor FIS E without perforated sleeve** | | | | | | | | | | |
| Effective anchorage depth | $h_{ef}$ | [mm] | 50 | 50 | 50 | 50 | 85 | | | |
| | | | 80 | 80 | 80 | 80 | | | | |
| | | | 200 | 200 | 200 | 200 | | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 4 | 10 | | | 4 | 10 | | |
| **General installation parameters** | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 100 | | | | 100 | | | |
| Edge distance $h_{ef}$=200 | $c_{min}$ | | 150 | | | | -[1] | | | |
| Spacing | $s_{min}$ II,N | | 60 | | | | 60 | | | |
| | $h_{ef}$=200 $s_{min}$ II,N | | 240 | | | | -[1] | | | |
| | $s_{min}$ II,V | | 240 | | | | 240 | | | |
| | $s_{cr}$ II | | 240 | | | | 240 | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | | 75 | | | | 75 | | | |
| **Drilling method** | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | |

[1] 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 | $\alpha_{g,N}$ II | [-] | 1,5 | | | | | | | |
| | $\alpha_{g,V}$ II | | 2,0 | | | | | | | |
| | $h_{ef}$=200 $\alpha_{g,N}$ II | | 1,5 | | | | | | | |
| | $h_{ef}$=200 $\alpha_{g,V}$ II | | 2,0 | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 2,0 | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | 2,0 | | | | | | | |
| | $h_{ef}$=200 $\alpha_{g,N}$ ⊥ | | 2,0 | | | | | | | |
| | $h_{ef}$=200 $\alpha_{g,V}$ ⊥ | | 2,0 | | | | | | | |

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

**Table C5.1:** Characteristic resistance under tension load for edge distance c=100mm

| **Anchor rod** | | **M6** | **M8** | **M10** | | **M12** | | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | **-** | **-** | | **-** | | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | | **11x85** | | **15x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | |
| compressive strength $f_b$ | use categorie | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | |
| | | ≥50 | ≥50 | 50 | 80 | 200 | 50 | 80 | 200 | 85 | | |
| **12N/mm²** | w/w w/d | 2,5 | 2,5 | 2 | 3 | 7,5 | 2 | 3,5 | 5 | 3,5 | | |
| | d/d | 4 | 4 | 3,5 | 5 | 12 | 3 | 5,5 | 8 | 5,5 | | |
| **20N/mm²** | w/w w/d | 3,5 | 3,5 | 3 | 4,5 | 11 | 3 | 5 | 7 | 5 | | |
| | d/d | 5,5 | 5,5 | 5 | 7 | 12 | 4,5 | 8 | 11,5 | 8 | | |

Factor for temperature range 72/120°C: 0,83

**Table C5.2:** Characteristic resistance under shear load for edge distance c=100mm

| **Anchor rod** | | **M6** | **M8** | **M10** | | **M12** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | **-** | **-** | | **-** | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | **11x85** | | **15x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | |
| compressive strength $f_b$ | use categorie | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | |
| | | ≥50 | ≥50 | ≥50 | 200 | ≥50 | 200 | 85 | | | |
| **12N/mm²** | w/w w/d | 2,5 | 2,5 | 4 | 8,5 | 4 | 11,5 | 2,5 | | | |
| | d/d | | | | | | | | | | |
| **20N/mm²** | w/w w/d | 4,0 | 4,0 | 6 | 12 | 5,5 | 12 | 4 | | | |
| | d/d | | | | | | | | | | |

Factor for job site tests and displacements see annex C110

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

**Table C6.1:** Installation parameters for edge distance c=60mm

| **Anchor rod** | | | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | **-** | **-** | **-** | **-** | **M6** | **M8** | **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 | $T_{inst}$ | [Nm] | 4 | 10 | | | | 4 | 10 | | |
| **General installation parameters** | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | |
| Edge distance $h_{ef}$=200 | $c_{min}$ | | 60 | | | | | | | | |
| Spacing | $s_{min}$ II,N | | 80 | | | | | | | | |
| | $h_{ef}$=200 $s_{min}$ II,N | | 80 | | | | | | | | |
| | $s_{min}$ II,v | | 80 | | | | | | | | |
| | $s_{cr}$ II | | 3x $h_{ef}$ | | | | | | | | |
| | $s_{min}$ ⊥ | | 80 | | | | | | | | |
| | $s_{cr}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | |
| **Drilling method** | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | |

**Table C6.2:** Group factors

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

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

**Table C7.1:** Characteristic resistance under tension load for edge distance c=60mm

| Anchor rod | | M6 | | M8 | | M10 | | | M12 | | | M16 | | | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | - | | | - | | | - | | | M6 | M8 | M10 | M12 |
| | | | | | | | | | | | | | | | 11x85 | | 15x85 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | 200 | 85 | | | |
| 12N/mm² | w/w w/d | 1,5 | | 2,0 | 2,0 | 2,0 | 2,5 | -[1] | 2,0 | 2,5 | -[1] | 2,0 | 5,5 | -[1] | -[1] | | | |
| | 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 | -[1] | | | |
| 20N/mm² | w/w w/d | 2,0 | | 2,5 | 3,0 | 2,5 | 3,5 | -[1] | 3,0 | 3,5 | -[1] | 3,0 | 7,5 | -[1] | -[1] | | | |
| | d/d | 3,5 | | 4,5 | 5,5 | 4,5 | 5,5 | 12 | 4,5 | 5,5 | 12 | 4,5 | 12 | 12 | -[1] | | | |
| 28N/mm² | w/w w/d | 2,5 | | 3,0 | 4,0 | 3,0 | 4,0 | -[1] | 3,5 | 4,0 | -[1] | 3,5 | 9,0 | -[1] | -[1] | | | |
| | d/d | 4,0 | | 5,5 | 6,5 | 5,5 | 6,5 | 12 | 5,5 | 6,5 | 12 | 5,5 | 12 | 12 | -[1] | | | |

[1] No performance assessed

Factor for temperature range 72/120°C: 0,83

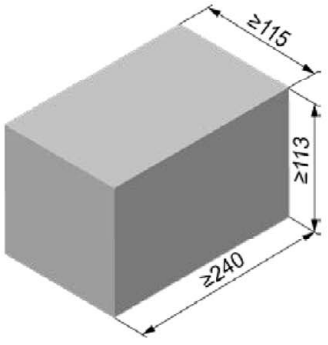
**Table C7.2:** Characteristic resistance under shear load for edge distance c=60mm

| Anchor rod | | M6 | | M8 | | M10 | | | M12 | | | M16 | | | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | - | | | - | | | - | | | M6 | M8 | M10 | M12 |
| | | | | | | | | | | | | | | | 11x85 | | 15x85 | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | 200 | 85 | | | |
| 12N/mm² | w/w w/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 | -[1] | | | |
| | d/d | | | | | | | | | | | | | | | | | |
| 20N/mm² | w/w w/d | 1,5 | 3,5 | 1,5 | 4,5 | 3,0 | 4,5 | 2,5 | 2,0 | 4,5 | 4,5 | 0,9 | 4,5 | 6,0 | -[1] | | | |
| | d/d | | | | | | | | | | | | | | | | | |
| 28N/mm² | w/w w/d | 2,0 | 4,0 | 2,0 | 5,0 | 3,5 | 5,0 | 3,0 | 2,5 | 5,0 | 5,0 | 1,2 | 5,0 | 7,5 | -[1] | | | |
| | d/d | | | | | | | | | | | | | | | | | |

[1] No performance assessed

Factor for job site tests and displacements see annex C110

## Solid brick Mz, 2DF, EN 771-1:2015




| Solid brick Mz, 2DF, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 240 | ≥ 115 | ≥ 113 |
| Density ρ [kg/dm³] | ≥ 1,8 | | |
| Compressive strength $f_b$ [N/mm²] | 10 / 16 | | |
| Standard or annex | EN 771-1:2015 | | |

**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 | 50 | 100 | 85 | | | |
| Max. installation torque | $T_{inst}$ | [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] | -[1] | | 85 | | -[1] | | | | | | 85 | | -[1] | |
| Max. installation torque | $T_{inst}$ | [Nm] | | | 10 | | | | | | | | 4 | 10 | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 120 | | | | | | | | | | | | | |
| | $s_{cr}$ ∥ | | 240 | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | | 115 | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

[1] 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 | $\alpha_{g,N}$ ∥ | [-] | 1,5 | | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | 1,4 | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 2 | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | | | | | | | | | |

fischer injection system FIS V Plus for masonry

**Performance**
Solid brick Mz, 2DF, dimensions, installation parameters

**Annex C 8**

## Solid brick Mz, 2DF, EN 771-1:2015

**Table C9.1:** Characteristic resistance under tension load

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

**$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)**

| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 85 | |
| **10N/mm²** | w/w w/d | 1,5 | 2,5 | 1,5 | 2,5 | 1,5 | 3 | 2 | 3,5 | 2 | 3,5 | 2 | 1,5 |
| | d/d | 3 | 4,0 | 3,0 | 4,0 | 3,0 | 4,5 | 3 | 5,5 | 3 | 5,5 | 3 | 3 |
| **16N/mm²** | w/w w/d | 2,5 | 4 | 2,5 | 4 | 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 | 5,5 | 8 | 5,5 | 4,5 |

Factor for temperature range 72/120°C: 0,83

**Table C9.2:** Characteristic resistance under shear load

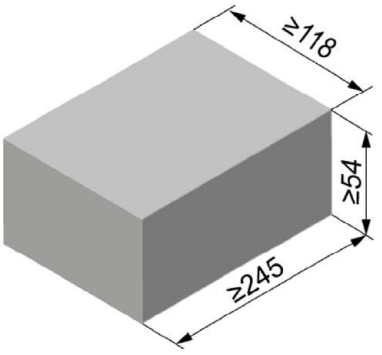
| **Anchor rod** | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | | **M8** | **M10** | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | **-** | **-** | **-** | **-** | **M6** | **M8** | **M10** | **M12** | **-** | **-**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

**$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)**

| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ≥ 50 | | | | | 85 | | | | | | | |
| **10N/mm²** | w/w w/d<br>d/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 |
| **16N/mm²** | w/w w/d<br>d/d | 4,0 | 5,0 | 5,5 | 5,5 | 5,0 | 4,0 | 5,0 | 5,0 | 5,0 | 5,0 | 6,0 | 4,0 | 5,0 |

Factor for job site tests and displacements see annex C110

## Solid brick Mz, EN 771-1:2015




| Solid brick Mz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Nigra | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 245 | ≥ 118 | ≥ 54 |
| Density ρ [kg/dm³] | ≥ 1,8 | | |
| Compressive strength $f_b$ [N/mm²] | 10 / 20 | | |
| Standard or annex | EN 771-1:2015 | | |

**Table C10.1:** Installation parameters

| **Anchor rod** | | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | | **-** | | **-** | | **-** | | **-** | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | | | | | | **11x85** | | **15x85** | |
| **Anchor rod and internal threaded anchor FIS E without perforated sleeve** | | | | | | | | | | | | | | | | |
| Effective anchorage depth | $h_{ef}$ | [mm] | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 85 | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 4 | | 10 | | | | | | | | 4 | | 10 | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | |
| Spacing | $s_{cr}$ II = $s_{min}$ II | [mm] | 245 | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 60 | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**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 | $\alpha_{g,N}$ II | [-] | 2 | | | | | | | | |
| | $\alpha_{g,V}$ II | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | | | | | | | | | |

## Solid brick Mz, EN 771-1:2015

**Table C11.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | - | - | - | - | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | **11x85** | | **15x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | | 85 | | | |
| **10N/mm²** | w/w w/d | 0,6 | 0,9 | 0,75 | 0,75 | 0,75 | 0,6 | 0,75 | | |
| | d/d | 1,2 | 1,5 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | | |
| **20N/mm²** | w/w w/d | 0,9 | 1,5 | 1,2 | 1,2 | 1,2 | 0,9 | 1,2 | | |
| | d/d | 1,5 | 2,5 | 2,0 | 2,0 | 2,0 | 1,5 | 2,0 | | |

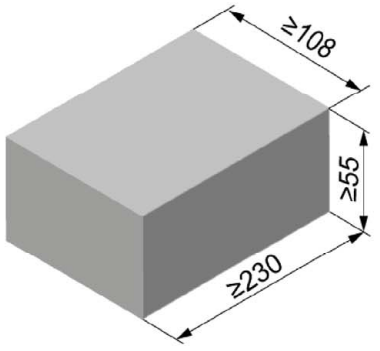
Factor for temperature range 72/120°C: 0,83

**Table C11.2:** Characteristic resistance under shear load

| **Anchor rod** | | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | - | - | - | - | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | **11x85** | | **15x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | | 85 | | | |
| **10N/mm²** | w/w w/d<br>d/d | 2,0 | 3,0 | 4,0 | 4,5 | 5,5 | 2,0 | 3,0 | 4,0 | 4,5 |
| **20N/mm²** | w/w w/d<br>d/d | 2,5 | 4,0 | 5,5 | 6,0 | 8,0 | 2,5 | 4,0 | 5,5 | 6,0 |

Factor for job site tests and displacements see annex C110

## Solid brick Mz, EN 771-1:2015




| Solid brick Mz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 230 | ≥ 108 | ≥ 55 |
| Density ρ [kg/dm³] | ≥ 1,8 | | |
| Compressive strength $f_b$ [N/mm²] | 10 / 20 | | |
| Standard or annex | EN 771-1:2015 | | |

**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 | 50 | 90 | 85 | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 4 | | 10 | | | | | | | | 4 | | 10 | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | |
| Spacing | $s_{cr}$ II = $s_{min}$ II | [mm] | 230 | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 60 | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**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 | $\alpha_{g,N}$ II | [-] | 2 | | | | | | | | |
| | $\alpha_{g,V}$ II | [-] | 2 | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | [-] | 2 | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | |

## Solid brick Mz, EN 771-1:2015

**Table C13.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | **-** | **-** | **-** | **-** | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | **11x85** | | **15x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | | 85 | | | |
| **10N/mm²** | w/w w/d | 0,6 | 0,9 | 0,75 | 0,75 | 0,75 | 0,75 | | | |
| | d/d | 1,2 | 1,5 | 1,2 | 1,2 | 1,2 | 1,2 | | | |
| **20N/mm²** | w/w w/d | 0,9 | 1,5 | 1,2 | 1,2 | 1,2 | 1,2 | | | |
| | d/d | 1,5 | 2,5 | 2,0 | 2,0 | 2,0 | 2,0 | | | |

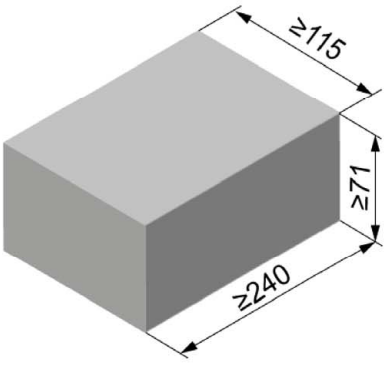
Factor for temperature range 72/120°C: 0,83

**Table C13.2:** Characteristic resistance under shear load

| **Anchor rod** | | **M6** | **M8** | **M10** | **M12** | **M16** | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | **-** | **-** | **-** | **-** | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | **11x85** | | **15x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | | 85 | | | |
| **10N/mm²** | w/w w/d | 2,0 | 3,0 | 4,0 | 4,5 | 5,5 | 2,0 | 3,0 | 4,0 | 4,5 |
| | d/d | | | | | | | | | |
| **20N/mm²** | w/w w/d | 2,5 | 4,0 | 5,5 | 6,0 | 8,0 | 2,5 | 4,0 | 5,5 | 6,0 |
| | d/d | | | | | | | | | |

Factor for job site tests and displacements see annex C110

## Solid sand-lime brick KS, NF, EN 771-2:2015




| Solid sand-lime brick KS, NF, EN 771-2:2015 | | | |
|---|---|---|---|
| Producer | | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 240 | ≥ 115 | ≥ 71 |
| Density ρ [kg/dm³] | ≥ 1,8 | | |
| Compressive strength $f_b$ [N/mm²] | 12 / 20 / 28 | | |
| Standard or annex | EN 771-2:2015 | | |

**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 | $T_{inst}$ | [Nm] | 3 | | 5 | | 15 | | 15 | | 25 | | 3 | 5 | 15 | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 80 | | | | | | | | | | | | | |
| | $s_{cr}$ ∥ | | 80 | | | | | | | | | | | | | |
| | $s_{min}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**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 | $\alpha_{g,N}$ ∥ | [-] | 0,7 | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | 1,3 | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 2,0 | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | 2,0 | | | | | | | |

## Solid sand-lime brick KS, NF, EN 771-2:2015

**Table C15.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | | - | | - | | - | | - | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | | | | | **11x85** | | **15x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 | 200 | 85 | 85 |
| **12N/mm²** | 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 |
| **20N/mm²** | 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 |
| **28N/mm²** | 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 |

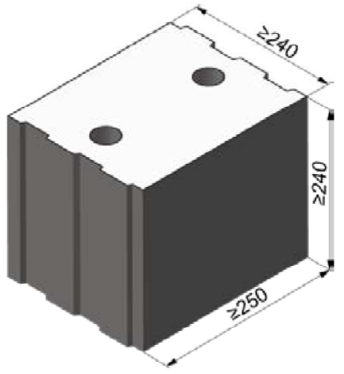
Factor for temperature range 72/120°C: 0,83

**Table C15.2:** Characteristic resistance under shear load

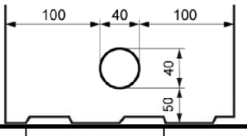
| **Anchor rod** | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | | - | | - | | - | | - | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | | | | | **11x85** | | **15x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | |
| | | 50 | 100 | 50 | 100 | 50 | ≥100 | 50 | ≥100 | 50 | ≥100 | 85 | | 85 | |
| **12N/mm²** | w/w w/d<br>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 | |
| **20N/mm²** | w/w w/d<br>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 | |
| **28N/mm²** | w/w w/d<br>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 | |

Factor for job site tests and displacements see annex C110

## Solid sand-lime brick KS, 8DF, EN 771-2:2015




| Solid sand-lime brick KS, 8DF, EN 771-2:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 250 | ≥ 240 | ≥ 240 |
| Density ρ [kg/dm³] | ≥ 2,0 | | |
| Compressive strength $f_b$ [N/mm²] | 10 / 20 / 28 | | |
| Standard or annex | EN 771-2:2015 | | |




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 | $T_{inst}$ | [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] | -[1] | | 85 | | | | -[1] | | | | 85 | | | -[1] |
| Max. installation torque | $T_{inst}$ | [Nm] | | | 10 | | | | | | | | 4 | 10 | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 80 | | | | | | | | | | | | | |
| | $s_{cr}$ ∥ | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| | $s_{min}$ ⊥ | | 80 | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

[1] 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 | $\alpha_{g,N}$ ∥ | [-] | 1,5 | | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | 1,2 | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 1,5 | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | | | | | | | |

fischer injection system FIS V Plus for masonry

**Performance**
Solid sand-lime brick KS, 8DF, dimensions, installation parameters

**Annex C 16**

## Solid sand-lime brick KS, 8DF, EN 771-2:2015

**Table C17.1:** Characteristic resistance under tension load

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

**$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)**

| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | | 85 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10N/mm² | 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 |
| 20N/mm² | 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 |
| 28N/mm² | 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 |

Factor for temperature range 72/120°C: 0,83

**Table C17.2:** Characteristic resistance under shear load

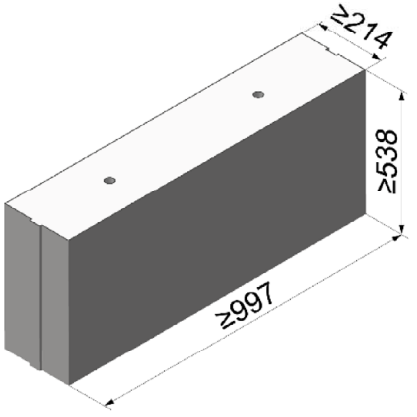
| Anchor rod | M6 | M8 | M10 | M12 | M16 | - | - | M8 | M10 | - |
|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | - | - | - | - | - | M6 M8 / 11x85 | M10 M12 / 15x85 | - | - | M6 M8 / 11x85 |
| Perforated sleeve FIS H K | - | - | - | - | - | - | - | 16x85 | | |

**$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)**

| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | 85 | | | |
|---|---|---|---|---|---|---|---|---|
| 10N/mm² | w/w w/d / d/d | 2,5 | 4,5 | | 2,5 | 4,5 | 4,5 | 2,5 4,5 |
| 20N/mm² | w/w w/d / d/d | 4,0 | 6,5 | | 4,0 | 6,5 | 6,5 | 4,0 6,5 |
| 28N/mm² | w/w w/d / d/d | 5,0 | 9,0 | | 5,0 | 9,0 | 9,0 | 5,0 9,0 |

Factor for job site tests and displacements see annex C110

## Solid sand-lime brick KS, EN 771-2:2015




| Solid sand-lime brick KS, EN 771-2:2015 | | | | |
|---|---|---|---|---|
| Producer | | e.g. Calduran | | |
| Nominal dimensions [mm] | | length L | width W | height H |
| | | ≥ 997 | ≥ 214 | ≥ 538 |
| Density ρ [kg/dm³] | | 1,8 | | 2,2 |
| Compressive strength $f_b$ [N/mm²] | | 10 / 20 | | 36 |
| Standard or annex | | EN 771-2:2015 | | |

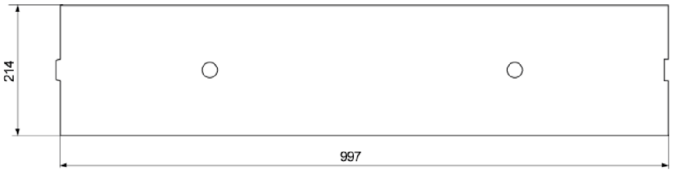



**Table C18.1:** Installation parameters

| **Anchor rod** | | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | | **-** | | **-** | | **-** | | **-** | | **M6** | **M8** | **M10** | **M12** |
| | | | | | | | | | | | | | **11x85** | | **15x85** | |
| **Anchor rod and internal threaded anchor FIS E without perforated sleeve** | | | | | | | | | | | | | | | | |
| Effective anchorage depth | $h_{ef}$ | [mm] | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 85 | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 4 | | 10 | | | | | | | | 4 | | 10 | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 75 | | | | | | | | | | | | | |
| Spacing | $s_{cr}$ II = $s_{min}$ II | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**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 | $\alpha_{g,N}$ II | [-] | 2 | | | | | | | | |
| | $\alpha_{g,V}$ II | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | | | | | | | | | |

## Solid sand-lime brick KS, EN 771-2:2015

**Table C19.1:** Characteristic resistance under tension load

| Anchor rod | | M6 | M8 | M10 | M12 | M16 | - | - |
|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | - | - | - | - | M6 \| M8: 11x85 | M10 \| M12: 15x85 |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | |
| | | 50 \| 100 | 50 \| 100 | 50 \| 100 | 50 \| 100 | 50 \| 100 | 50 \| 100 | 85 |
| 10N/mm² | 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 | |
| 20N/mm² | 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 | |
| 36N/mm² | 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 | |

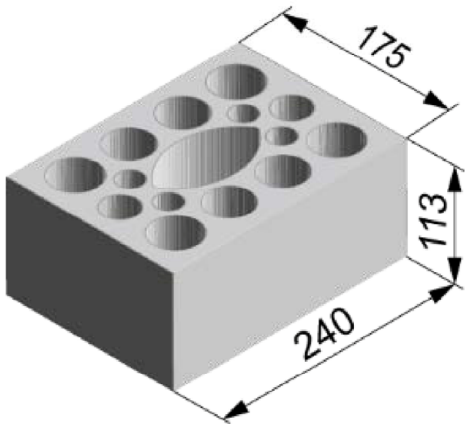
Factor for temperature range 72/120°C: 0,83

**Table C19.2:** Characteristic resistance under shear load

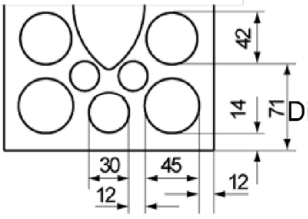
| Anchor rod | | M6 | M8 | M10 | M12 | M16 | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | - | - | - | - | M6 \| M8: 11x85 | | M10 \| M12: 15x85 | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | |
| | | ≥ 50 | | | | | 85 | | | |
| 10N/mm² | w/w \| w/d<br>d/d | 3,0 | 5,0 | 5,5 | 4,0 | 4,0 | 3,0 | 5,0 | 5,5 | 4,0 |
| 20N/mm² | w/w \| w/d<br>d/d | 4,5 | 7,0 | 7,5 | 6,0 | 6,0 | 4,5 | 7,0 | 7,5 | 6,0 |
| 36N/mm² | w/w \| w/d<br>d/d | 4,5 | 9,0 | 11,0 | 12,0 | 12,0 | 4,5 | 9,0 | 11,0 | 12,0 |

Factor for job site tests and displacements see annex C110

## Perforated sand-lime brick KSL, 3DF, EN 771-2:2015




| Perforated sand-lime brick KSL, 3DF, EN 771-2:2015 | | | |
|---|---|---|---|
| Producer | e.g. KS Wemding | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 240 | 175 | 113 |
| Density ρ [kg/dm³] | ≥ 1,4 | | |
| Compressive strength $f_b$ [N/mm²] | 8 / 10 / 12 / 16 / 20 | | |
| Standard or annex | EN 771-2:2015 | | |




Dimension see also Annex B 15

**Tabelle C20.1:** 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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 | $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | 80 | | | | | | |
| Spacing | $s_{min}$ ∥ | [mm] | 100 | | | | | | | | | | | |
| | $s_{cr}$ ∥ | [mm] | 240 | | | | | | | | | | | |
| | $s_{min}$ ⊥ | [mm] | 115 | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | [mm] | 115 | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**Table C20.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors | $\alpha_{g,N}$ ∥ = $\alpha_{g,V}$ ∥ | [-] | 1,5 | | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥ | [-] | 2,0 | | | | | | | | | | | |

## Perforated sand-lime brick KSL, 3DF, EN 771-2:2015

**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 | $T_{inst}$ | [Nm] | 2 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 80 | | |
| Spacing | $s_{min}$ ∥ | | 100 | | |
| | $s_{cr}$ ∥ | | 240 | | |
| | $s_{min}$ ⊥ | | 115 | | |
| | $s_{cr}$ ⊥ | | 115 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C21.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,5 | | |
| | $\alpha_{g,V}$ ∥ | | | | |
| | $\alpha_{g,N}$ ⊥ | | 2,0 | | |
| | $\alpha_{g,V}$ ⊥ | | | | |

## Perforated sand-lime brick KSL, 3DF, EN 771-2:2015

**Table C22.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| Anchor rod | | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 / 11x85 | M8 / 11x85 | - | - | | M10 / 15x85 | M12 / 15x85 | - | - | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | | 20x130 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | |
| 8 N/mm² | w/w | w/d | 1,5 | | | 2,0 | | | 2,0 | | 2,0 | | | 2,0 | |
| | d/d | | 1,5 | | | 2,0 | | | 2,5 | | 2,5 | | | 2,5 | |
| 10 N/mm² | w/w | w/d | 2,0 | | | 2,0 | | | 2,5 | | 2,5 | | | 2,5 | |
| | d/d | | 2,0 | | | 2,5 | | | 3,0 | | 3,0 | | | 3,0 | |
| 12 N/mm² | w/w | w/d | 2,5 | | | 2,5 | | | 3,0 | | 3,0 | | | 3,0 | |
| | d/d | | 2,5 | | | 3,0 | | | 3,5 | | 3,5 | | | 3,5 | |
| 16 N/mm² | w/w | w/d | 3,0 | | | 3,5 | | | 4,5 | | 4,5 | | | 4,5 | |
| | d/d | | 3,5 | | | 4,0 | | | 4,5 | | 4,5 | | | 4,5 | |
| 20 N/mm² | w/w | w/d | 4,0 | | | 4,5 | | | 5,5 | | 5,5 | | | 5,5 | |
| | d/d | | 4,5 | | | 5,0 | | | 6,0 | | 6,0 | | | 6,0 | |

**Table C22.2:** Characteristic resistance under tension load (Push through anchorage)

| Anchor rod | | M10 | M12 | M16 |
|---|---|---|---|---|
| Perforated sleeve FIS H K | | 18x130/200 | | 22x130/200 |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | |
| compressive strength $f_b$ | use category | | | |
| 8 N/mm² | w/w | w/d | 2,0 | |
| | d/d | | 2,5 | |
| 10 N/mm² | w/w | w/d | 2,5 | |
| | d/d | | 3,0 | |
| 12 N/mm² | w/w | w/d | 3,0 | |
| | d/d | | 3,5 | |
| 16 N/mm² | w/w | w/d | 4,5 | |
| | d/d | | 4,5 | |
| 20 N/mm² | w/w | w/d | 5,5 | |
| | d/d | | 6,0 | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Perforated sand-lime brick KSL, 3DF, EN 771-2:2015

**Table C23.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

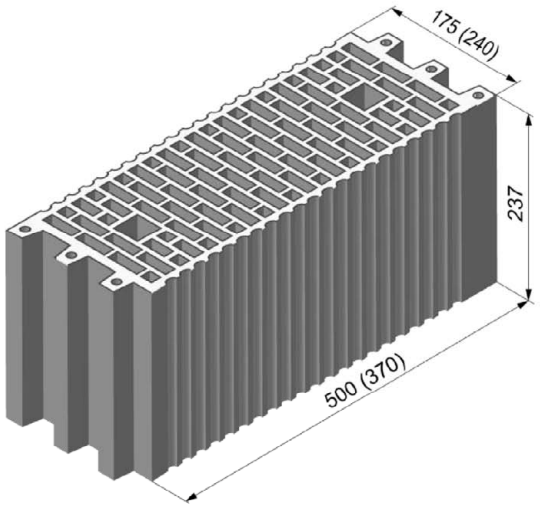
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **-** | | **M10** | **M12** | **-** | | **-** | |
| | | | | | | **11x85** | | | | | | **15x85** | | | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| **8 N/mm²** | w/w w/d d/d | 1,5 | | | | 3,0 | | | | | | | | 2,5 | | 3,0 | 2,5 |
| **10 N/mm²** | w/w w/d d/d | 2,0 | | | | 3,5 | | | | | | | | | | | |
| **12 N/mm²** | w/w w/d d/d | 2,5 | | | | 4,5 | | | | | | | | 4,0 | | 4,5 | 4,0 |
| **16 N/mm²** | w/w w/d d/d | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | | 6,0 | | | | | | 5,5 | | 6,0 | 5,5 |
| **20 N/mm²** | w/w w/d d/d | 4,0 | 4,5 | 4,0 | 4,5 | 4,0 | | 7,5 | | | | | | 6,5 | | 7,5 | 6,5 |

**Table C23.2:** Characteristic resistance under shear load (Push through anchorage)

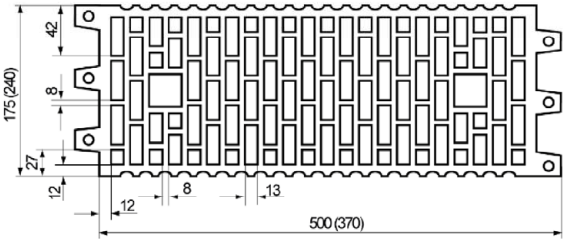
| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **8 N/mm²** | w/w w/d d/d | 3,0 | | 2,5 |
| **10 N/mm²** | w/w w/d d/d | 3,5 | | 3,5 |
| **12 N/mm²** | w/w w/d d/d | 4,5 | | 4,0 |
| **16 N/mm²** | w/w w/d d/d | 6,0 | | 5,5 |
| **20 N/mm²** | w/w w/d d/d | 7,5 | | 6,5 |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | | |
|---|---|---|---|---|
| Producer | | e.g. Wienerberger, Poroton | | |
| Nominal dimensions [mm] | | length L | width W | height H |
| | | 500 | 175 | 237 |
| | | 370 | 240 | 237 |
| Density ρ | [kg/dm³] | ≥ 1,0 | | |
| Compressive strength $f_b$ | [N/mm²] | 4 / 6 / 8 / 10 / 12 | | |
| Standard or annex | | EN 771-1:2015 | | |




Dimension see also Annex B 15

**Table C24.1:** Installation parameters

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 | $T_{inst}$ | [Nm] | 2 |
| **General installation parameters** | | | |
| Edge distance | $c_{min}$ | [mm] | 100 |
| Spacing | $s_{min}$ ∥ | | 100 |
| | $s_{cr}$ ∥ | | 500 (370) |
| | $s_{min}$ ⊥ | | 100 |
| | $s_{cr}$ ⊥ | | 240 |
| **Drilling method** | | | |
| Hammer drilling with hard metal hammer drill | | | |

**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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |

| | | | |
|---|---|---|---|
| Group factors | $\frac{\alpha_{g,N}\ \| = \alpha_{g,V}\ \|}{\alpha_{g,N}\ \perp = \alpha_{g,V}\ \perp}$ | [-] | 1 |

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

**Table C25.1:** Characteristic resistance under tension load

| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | - | | - | | M6 / M8 11x85 | - | | - | | M10 / M12 15x85 | - | | - | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | | 20x130 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | |
| 4 N/mm² | w/w | w/d | 0,3 | | 0,9 | | | | | | | | 1,2 | |
| | d/d | | 0,4 | | 0,9 | | | | | | | | 1,2 | |
| 6 N/mm² | w/w | w/d | 0,5 | | 1,5 | | | | | | | | 2,0 | |
| | d/d | | 0,6 | | 1,5 | | | | | | | | 2,0 | |
| 8 N/mm² | w/w | w/d | 0,75 | | 2,0 | | | | | | | | 2,5 | |
| | d/d | | 0,75 | | 2,0 | | | | | | | | 2,5 | |
| 10 N/mm² | w/w | w/d | 0,9 | | 2,5 | | | | | | | | 3,0 | |
| | d/d | | 0,9 | | 2,5 | | | | | | | | 3,5 | |
| 12 N/mm² | w/w | w/d | 0,9 | | 3,0 | | | | | | | | 3,5 | |
| | d/d | | 1,2 | | 3,0 | | | | | | | | 4,0 | |

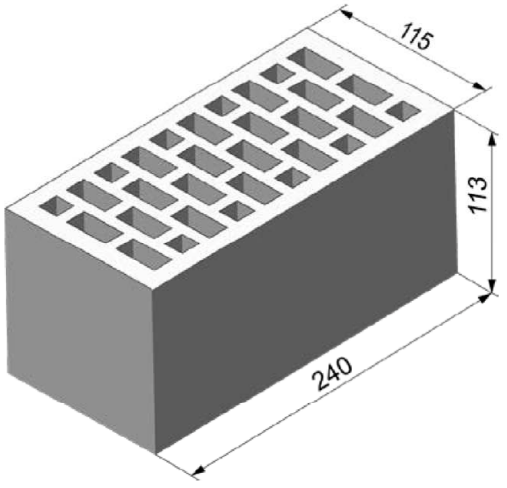
Factor for temperature range 72/120°C: 0,83

**Table C25.2:** Characteristic resistance under shear load

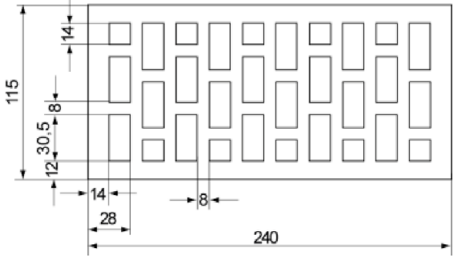
| Anchor rod | M6 | M8 | M6 | M8 | - | M8 | M10 | M8 | M10 | - | M12 | M16 | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | - | | - | | M6 / M8 11x85 | - | | - | | M10 / M12 15x85 | - | | - | |
| Perforated sleeve FIS H K | 12x50 | | 12x85 | | 16x85 | | | 16x130 | | 20x85 | | | 20x130 | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | |
| 4 N/mm² | w/w | w/d | 0,5 | | | | | 0,6 | | 0,5 | | | 0,6 | |
| | d/d | | | | | | | | | | | | | |
| 6 N/mm² | w/w | w/d | 0,75 | | | | | 0,9 | | 0,75 | | | 0,9 | |
| | d/d | | | | | | | | | | | | | |
| 8 N/mm² | w/w | w/d | 0,9 | | | | | 1,2 | | 0,9 | | | 1,2 | |
| | d/d | | | | | | | | | | | | | |
| 10 N/mm² | w/w | w/d | 1,2 | | | | | 1,5 | | 1,2 | | | 1,5 | |
| | d/d | | | | | | | | | | | | | |
| 12 N/mm² | w/w | w/d | 1,5 | | | | | 2,0 | | 1,5 | | | 2,0 | |
| | d/d | | | | | | | | | | | | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, 2DF, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 240 | 115 | 113 |
| Density ρ [kg/dm³] | ≥ 1,4 | | |
| Compressive strength $f_b$ [N/mm²] | 6 / 10 / 16 / 20 / 28 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 15

**Table C26.1:** Installation parameters

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **M10** / **15x85** | **M12** / **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 $T_{inst}$ | [Nm] | 2 | | | | | | | | |
| **General installation parameters** | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 80 | | | | | | | | |
| Spacing $s_{cr}$ II = $s_{min}$ II | [mm] | 240 | | | | | | | | |
| Spacing $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 115 | | | | | | | | |
| **Drilling method** | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | |

**Table C26.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **M10** / **15x85** | **M12** / **15x85** | **-** |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **20x85** | | |
| Group factors $\alpha_{g,N}$ II | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,V}$ II | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | |

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

**Table C27.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **-** | | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **M10** | **M12** | **-** | |
| | | | | | | **11x85** | | | | **15x85** | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **20x85** | | | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| **6 N/mm²** | w/w w/d | 0,75 | | 0,9 | | 0,75 | | | | 0,9 | | | |
| | d/d | 0,75 | | 1,2 | | 0,75 | | | | 0,9 | | | |
| **10 N/mm²** | w/w w/d | 1,2 | | 1,5 | | 1,2 | | | | 1,5 | | | |
| | d/d | 1,2 | | 2,0 | | 1,2 | | | | 1,5 | | | |
| **16 N/mm²** | w/w w/d | 2,0 | | 2,5 | | 2,0 | | | | 2,0 | | | |
| | d/d | 2,0 | | 3,0 | | 2,0 | | | | 2,5 | | | |
| **20 N/mm²** | w/w w/d | 2,5 | | 3,5 | | 2,5 | | | | 3,0 | | | |
| | d/d | 2,5 | | 4,0 | | 2,5 | | | | 3,0 | | | |
| **28 N/mm²** | w/w w/d | 3,0 | | 5,0 | | 3,5 | | | | 4,0 | | | |
| | d/d | 3,5 | | 5,5 | | 3,5 | | | | 4,5 | | | |

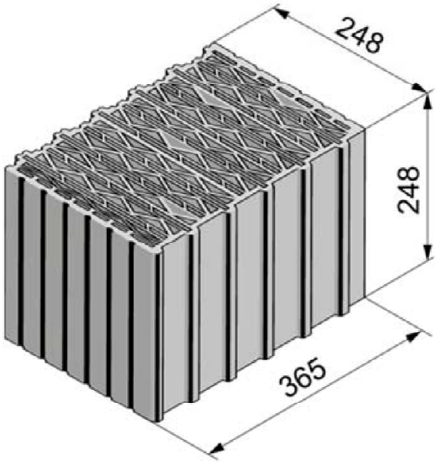
Factor for temperature range 72/120°C: 0,83

**Table C27.2:** Characteristic resistance under shear load

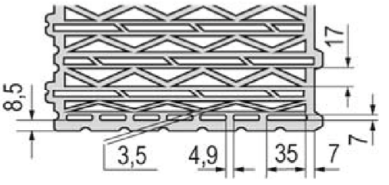
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **-** | | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **M10** | **M12** | **-** | |
| | | | | | | **11x85** | | | | **15x85** | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **20x85** | | | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| **6 N/mm²** | w/w w/d d/d | 1,2 | 1,5 | 1,2 | 2,0 | 1,2 | 1,5 | | | 2,5 | | | |
| **10 N/mm²** | w/w w/d d/d | 2,0 | 2,5 | 2,0 | 4,0 | 2,0 | 2,5 | | | 4,5 | | | |
| **16 N/mm²** | w/w w/d d/d | 3,0 | 3,5 | 3,0 | 6,0 | 3,0 | 3,5 | | | 7,0 | | | |
| **20 N/mm²** | w/w w/d d/d | 4,0 | 4,5 | 4,0 | 7,5 | 4,0 | 4,5 | | | 8,5 | | | |
| **28 N/mm²** | w/w w/d d/d | 5,0 | 6,5 | 5,0 | 9,5 | 5,0 | 6,5 | | | 12,0 | | | |

Factor for job site tests and displacements see annex C110

## Vertical perforated brick HLz, T8, EN 771-1:2015




| Vertical perforated brick HLz, T8, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 248 | 365 | 248 |
| Density ρ [kg/dm³] | 0,6 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 15

**Table C28.1:** 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 $T_{inst}$ [Nm] | 3 | 5 | 3 | 5 | 3 | 5 | 5 | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ [mm] | 80 | | | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ [mm] | 250 | | | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 80 | | | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 250 | | | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | | | |

**Table C28.2:** 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 $\alpha_{g,N}$ ∥ [-] | 1,3 | | | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ [-] | 1,2 | | | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 1,3 | | | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 1,0 | | | | | | | | | | | | | | | | | |

## Vertical perforated brick HLz, T8, EN 771-1:2015

**Table C29.1:** 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 | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 80 | | |
| | $s_{cr}$ ∥ | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C29.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,3 | | |
| | $\alpha_{g,V}$ ∥ | | 1,2 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,3 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,0 | | |

## Vertical perforated brick HLz, T8, EN 771-1:2015

**Table C30.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | - | | - | | **M6** / **11x85** | **M8** / **11x85** | - | | - | | **M10** / **15x85** | **M12** / **15x85** | - | | - | | - | |
| **Perforated sleeve FIS H K** | | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w | w/d | 1,2 | | | | 1,2 | | | | | | | | | | | | | |
| | d/d | | 1,2 | | | | 1,5 | | | | | | | | | | | | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | | | 1,5 | | | | | | | | | | | | | |
| | d/d | | 1,5 | | | | 1,5 | | | | | | | | | | | | | |
| **8 N/mm²** | w/w | w/d | 1,5 | | | | 2,0 | | | | | | | | | | | | | |
| | d/d | | 2,0 | | | | 2,0 | | | | | | | | | | | | | |

**Table C30.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **4 N/mm²** | w/w | w/d | 1,2 | | |
| | d/d | | 1,5 | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | |
| | d/d | | 1,5 | | |
| **8 N/mm²** | w/w | w/d | 2,0 | | |
| | d/d | | 2,0 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Vertical perforated brick HLz, T8, EN 771-1:2015

**Table C31.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

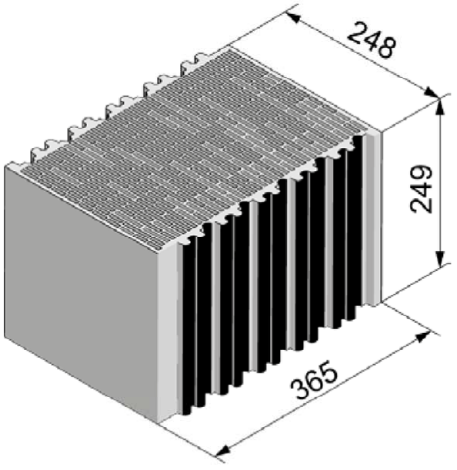
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w, w/d, d/d | | | | 1,2 | | | | | | | | | | | |
| **6 N/mm²** | w/w, w/d, d/d | | | | 1,5 | | | | | | | | | | | |
| **8 N/mm²** | w/w, w/d, d/d | | | | 1,5 | | | | | | | | | | | |

**Table C31.2:** Characteristic resistance under shear load (Push through anchorage)

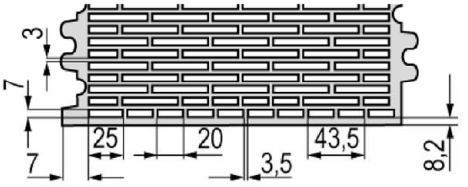
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **4 N/mm²** | w/w, w/d, d/d | 1,2 | |
| **6 N/mm²** | w/w, w/d, d/d | 1,5 | |
| **8 N/mm²** | w/w, w/d, d/d | 1,5 | |

Factor for job site tests and displacements see annex C108

## Vertical perforated brick HLz, T10, T11, EN 771-1:2015




| Vertical perforated brick HLz, T10, T11, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | | - | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 248 | 365 | 249 |
| Density ρ [kg/dm³] | 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 8 / 10 / 12 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 16

**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** / **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 $T_{inst}$ [Nm] | 3 | | | | | 5 | | 3 | | 5 | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ II [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ II [mm] | 250 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 250 | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | |

**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** / **11x85** | **-** | | **-** | | **M10 M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| Group factors $\alpha_{g,N}$ II [-] | 1,7 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ II [-] | 0,5 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 1,3 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 0,5 | | | | | | | | | | | | | | | |

## Vertical perforated brick HLz, T10, T11, EN 771-1:2015

**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 | $T_{inst}$ | [Nm] | 5 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 80 | | |
| | $s_{cr}$ ∥ | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C33.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,7 | | |
| | $\alpha_{g,V}$ ∥ | | 0,5 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,3 | | |
| | $\alpha_{g,V}$ ⊥ | | 0,5 | | |

## Vertical perforated brick HLz, T10, T11, EN 771-1:2015

**Table C34.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **8 N/mm²** | w/w | w/d | 1,5 | | 1,5 | | | | | | | | | | | |
| | d/d | | 1,5 | | 2,0 | | | | | | | | | | | |
| **10 N/mm²** | w/w | w/d | 1,5 | | 2,0 | | | | | | | | | | | |
| | d/d | | 2,0 | | 2,0 | | | | | | | | | | | |
| **12 N/mm²** | w/w | w/d | 2,0 | | 2,0 | | | | | | | | | | | |
| | d/d | | 2,0 | | 2,5 | | | | | | | | | | | |

**Table C34.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | |
| compressive strength $f_b$ / use category | | | |
| **8 N/mm²** w/w w/d | 1,5 | | 1,5 |
| d/d | 2,0 | | 2,0 |
| **10 N/mm²** w/w w/d | 2,0 | | 2,0 |
| d/d | 2,0 | | 2,0 |
| **12 N/mm²** w/w w/d | 2,0 | | 2,0 |
| d/d | 2,5 | | 2,5 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Vertical perforated brick HLz, T10, T11, EN 771-1:2015

**Table C35.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

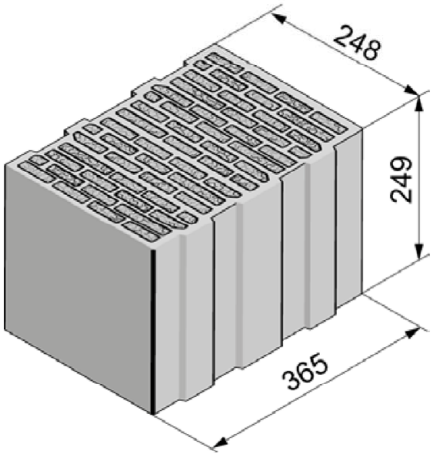
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **8 N/mm²** | w/w, w/d, d/d | | 0,9 | | 1,5 | | | 2,0 | | | | | | | | |
| **10 N/mm²** | w/w, w/d, d/d | | 0,9 | | 1,5 | | | 2,0 | | | | | | | | |
| **12 N/mm²** | w/w, w/d, d/d | | 1,2 | | 2,0 | | | 2,0 | | | | | | | | |

**Table C35.2:** Characteristic resistance under shear load (Push through anchorage)

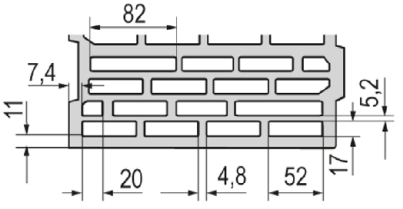
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **8 N/mm²** | w/w, w/d, d/d | 1,5 | 2,0 |
| **10 N/mm²** | w/w, w/d, d/d | 1,5 | 2,0 |
| **12 N/mm²** | w/w, w/d, d/d | 2,0 | 2,0 |

Factor for job site tests and displacements see annex C110

## Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2015




| Vertical perforated brick HLz, T7 PF, filled with perlit, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 248 | 365 | 249 |
| Density ρ [kg/dm³] | 0,5 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 | | |
| Standard or annex | EN 771-1:2015 | | |




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** / **11x85** | **-** | | **-** | | **M10 M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **Ankerstangen und Innengewindeanker FIS E mit Injektionsanker-Hülse FIS H K** | | | | | | | | | | | | | | | | |
| Max. installation torque $T_{inst}$ [Nm] | 2 | | | | | 5 | | 2 | | 5 | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ [mm] | 250 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 250 | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | |

**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** / **11x85** | **-** | | **-** | | **M10 M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| Group factors $\alpha_{g,N}$ ∥ [-] | 1,1 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ [-] | 1,2 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 1,1 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 1,2 | | | | | | | | | | | | | | | |

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

**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 | $T_{inst}$ | [Nm] | 5 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ II | | 80 | | |
| | $s_{cr}$ II | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C37.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ II | [-] | 1,1 | | |
| | $\alpha_{g,V}$ II | | 1,2 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,1 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | |

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

**Table C38.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** **M8** / **11x85** | **-** | | **-** | | **M10** / **15x85** **M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **4 N/mm²** | 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 | |
| **6 N/mm²** | 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 | |

**Table C38.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **4 N/mm²** | w/w w/d | 1,2 | 1,2 |
| | d/d | 1,5 | 1,5 |
| **6 N/mm²** | w/w w/d | 1,5 | 1,5 |
| | d/d | 2,0 | 2,0 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C39.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

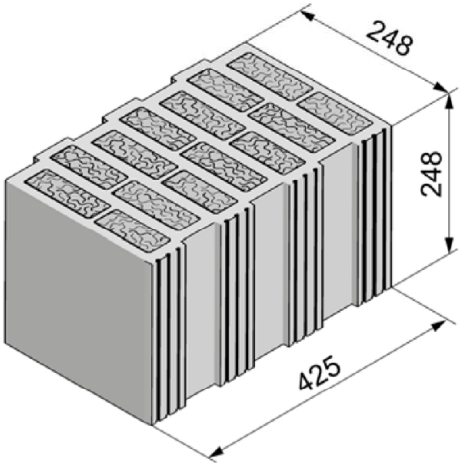
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6 / M8** 11x85 | **-** | | **-** | | **M10 / M12** 15x85 | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w, w/d, d/d | | 0,9 | | 1,5 | | | 1,2 | | | | | | | | |
| **6 N/mm²** | w/w, w/d, d/d | | 1,2 | | 2,0 | | | 1,5 | | | | | | | | |

**Table C39.2:** Characteristic resistance under shear load (Push through anchorage)

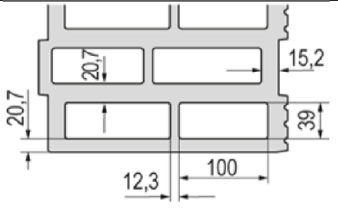
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **4 N/mm²** | w/w, w/d, d/d | 1,5 | 1,2 |
| **6 N/mm²** | w/w, w/d, d/d | 2,0 | 1,5 |

Factor for job site tests and displacements see annex C110

## Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015




| Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 248 | 425 | 248 |
| Density ρ [kg/dm³] | 0,8 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




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 $T_{inst}$ [Nm] | 3 | | | | | 5 | | 3 | | 5 | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ [mm] | 250 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 250 | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | |

**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 $\alpha_{g,N}$ ∥ [-] | 1,3 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ [-] | 1,2 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 0,6 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 1,2 | | | | | | | | | | | | | | | |

## Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015

**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 | $T_{inst}$ | [Nm] | 5 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 80 | | |
| | $s_{cr}$ ∥ | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C41.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,3 | | |
| | $\alpha_{g,V}$ ∥ | | 1,2 | | |
| | $\alpha_{g,N}$ ⊥ | | 0,6 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | |

## Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015

**Table C42.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | |
| **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 | | | |
| **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 | | | |
| **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 | | | |

**Table C42.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **4 N/mm²** | w/w w/d | 3,0 | | 4,0 |
| | d/d | 3,0 | | 4,5 |
| **6 N/mm²** | w/w w/d | 3,5 | | 5,0 |
| | d/d | 4,0 | | 5,5 |
| **8 N/mm²** | w/w w/d | 4,0 | | 6,0 |
| | d/d | 4,5 | | 6,5 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Vertical perforated brick HLz, S9 MW, filled with mineral wool, EN 771-1:2015

**Table C43.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

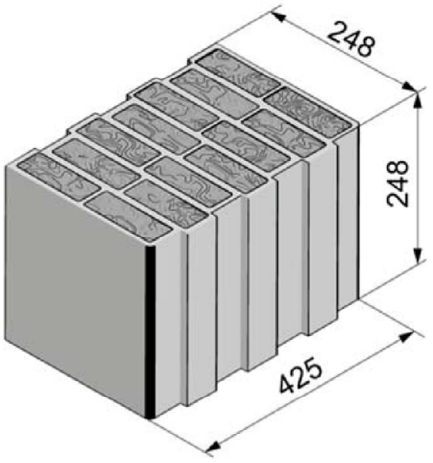
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** | **M8** | **-** | | **-** | | **M10** | **M12** | **-** | | **-** | | **-** | |
| | | | | | **11x85** | | | | | | **15x85** | | | | | | | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w | w/d | 2,0 | | 2,0 | | | | 2,5 | | 2,0 | | | | | | 1,5 | |
| | d/d | | | | | | | | | | | | | | | | | |
| **6 N/mm²** | w/w | w/d | 2,5 | | 2,5 | | | | 3,0 | | 2,5 | | | | | | 2,0 | |
| | d/d | | | | | | | | | | | | | | | | | |
| **8 N/mm²** | w/w | w/d | 2,5 | | 3,0 | | | | 4,0 | | 3,0 | | | | | | 2,5 | |
| | d/d | | | | | | | | | | | | | | | | | |

**Table C43.2:** Characteristic resistance under shear load (Push through anchorage)

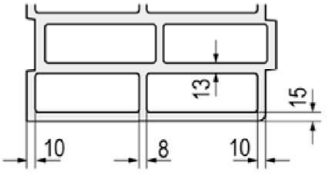
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **4 N/mm²** | w/w w/d d/d | 2,5 | 2,0 |
| **6 N/mm²** | w/w w/d d/d | 3,0 | 2,5 |
| **8 N/mm²** | w/w w/d d/d | 4,0 | 3,0 |

Factor for job site tests and displacements see annex C110

## Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015




| Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 248 | 425 | 248 |
| Density ρ [kg/dm³] | 0,6 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




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** / **11x85** | **M8** | - | | - | | **M10** / **15x85** | **M12** | - | | - | | - | |
| **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 | $T_{inst}$ | [Nm] | 2 | | | | | 5 | 2 | | | | 5 | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 80 | | | | | | | | | | | | | | | | | |
| | $s_{cr}$ ∥ | | 250 | | | | | | | | | | | | | | | | | |
| | $s_{min}$ ⊥ | | 80 | | | | | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 250 | | | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | | | | | |

**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** / **11x85** | **M8** | - | | - | | **M10** / **15x85** | **M12** | - | | - | | - | |
| **Perforated sleeve FIS H K** | | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,9 | | | | | | | | | | | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | 0,9 | | | | | | | | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 1,0 | | | | | | | | | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | 0,7 | | | | | | | | | | | | | | | | | |

## Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015

**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 | $T_{inst}$ | [Nm] | 5 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 80 | | |
| | $s_{cr}$ ∥ | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C45.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,9 | | |
| | $\alpha_{g,V}$ ∥ | | 0,9 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,0 | | |
| | $\alpha_{g,V}$ ⊥ | | 0,7 | | |

## Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015

**Table C46.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | - | | - | | **M6** / **11x85** | **M8** / **11x85** | - | | - | | **M10** / **15x85** | **M12** / **15x85** | - | | - | | - | |
| **Perforated sleeve FIS H K** | | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w | w/d | 0,6 | | 0,75 | | 1,5 | | | | 2,0 | | 1,2 | | | | 2,0 | | 2,0 | |
| | d/d | | 0,6 | | 0,9 | | 1,5 | | | | 2,0 | | 1,5 | | | | 2,0 | | 2,5 | |
| **6 N/mm²** | w/w | w/d | 0,75 | | 0,9 | | 1,5 | | | | 2,0 | | 1,5 | | | | 2,5 | | 2,5 | |
| | d/d | | 0,9 | | 0,9 | | 2,0 | | | | 2,5 | | 2,0 | | | | 2,5 | | 3,0 | |
| **8 N/mm²** | w/w | w/d | 0,9 | | 1,2 | | 2,0 | | | | 2,5 | | 2,0 | | | | 2,5 | | 3,0 | |
| | d/d | | 0,9 | | 1,2 | | 2,0 | | | | 3,0 | | 2,0 | | | | 3,0 | | 3,5 | |

**Table C46.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **4 N/mm²** | w/w | w/d | 2,0 | | 2,0 |
| | d/d | | 2,0 | | 2,0 |
| **6 N/mm²** | w/w | w/d | 2,0 | | 2,5 |
| | d/d | | 2,5 | | 2,5 |
| **8 N/mm²** | w/w | w/d | 2,5 | | 2,5 |
| | d/d | | 3,0 | | 3,0 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Vertical perforated brick HLz, T7 MW, filled with mineral wool, EN 771-1:2015

**Table C47.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

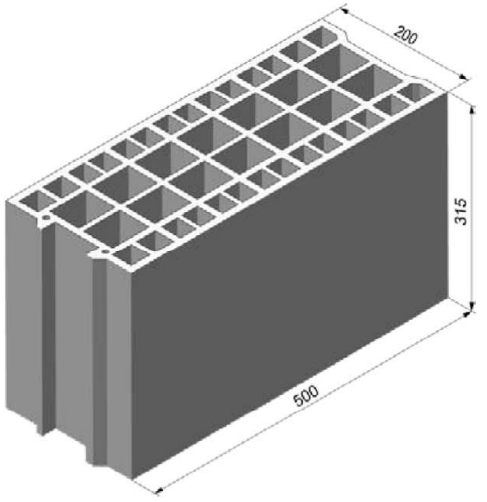
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w, w/d, d/d | | 1,2 | | 1,5 | | | | | | | | | | 1,5 | |
| **6 N/mm²** | w/w, w/d, d/d | | 1,5 | | 2,0 | | | | | | | | | | 1,5 | |
| **8 N/mm²** | w/w, w/d, d/d | | 1,5 | | 2,5 | | | | | | | | | | 2,0 | |

**Table C47.2:** Characteristic resistance under shear load (Push through anchorage)

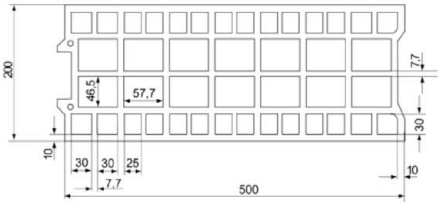
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **4 N/mm²** | w/w, w/d, d/d | 1,5 | |
| **6 N/mm²** | w/w, w/d, d/d | 2,0 | |
| **8 N/mm²** | w/w, w/d, d/d | 2,5 | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Bouyer Leroux | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 500 | 200 | 315 |
| Density ρ [kg/dm³] | ≥ 0,6 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




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** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 | $T_{inst}$ | [Nm] | 2 |
| **General installation parameters** | | | |
| Edge distance | $c_{min}$ | [mm] | 120 |
| Spacing | $s_{min}$ ∥ | | 120 |
| | $s_{cr}$ ∥ | | 500 |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 315 |
| **Drilling method** | | | |
| Hammer drilling with hard metal hammer drill | | | |

**Table C48.2:** Group factors

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

| | | | |
|---|---|---|---|
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,3 |
| | $\alpha_{g,V}$ ∥ | | 1,7 |
| | $\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥ | | 2 |

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

**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] | 2 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 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 C49.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ II | [-] | 1,3 | | |
| | $\alpha_{g,V}$ II | | 1,7 | | |
| | $\alpha_{g,N} \perp = \alpha_{g,V} \perp$ | | 2 | | |

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

**Table C50.1:** Characteristic resistance under tension load (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** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w | w/d | 0,5 | | 1,5 | | | | | | 0,75 | | 1,5 | | | | 1,5 | |
| | d/d | | 0,6 | | 1,5 | | | | | | 0,9 | | 1,5 | | | | 2,0 | |
| **6 N/mm²** | w/w | w/d | 0,75 | | 2,0 | | | | | | 1,2 | | 2,0 | | | | 2,5 | |
| | d/d | | 0,9 | | 2,5 | | | | | | 1,2 | | 2,5 | | | | 2,5 | |
| **8 N/mm²** | w/w | w/d | 0,9 | | 3,0 | | | | | | 1,5 | | 3,0 | | | | 3,5 | |
| | d/d | | 1,2 | | 3,0 | | | | | | 2,0 | | 3,0 | | | | 3,5 | |

**Table C50.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **4 N/mm²** | w/w | w/d | 0,75 | | 1,5 |
| | d/d | | 0,9 | | 2,0 |
| **6 N/mm²** | w/w | w/d | 1,2 | | 2,5 |
| | d/d | | 1,2 | | 2,5 |
| **8 N/mm²** | w/w | w/d | 1,5 | | 3,5 |
| | d/d | | 2,0 | | 3,5 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C51.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

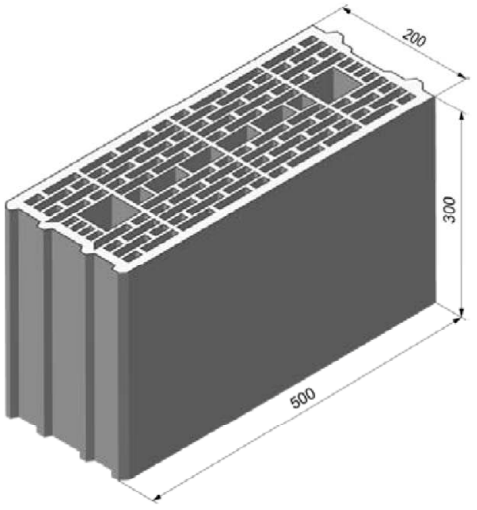
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **-** | | **M10** | **M12** | **-** | | **-** | |
| | | | | | | **11x85** | | | | | | **15x85** | | | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w w/d d/d | 1,5 | | | | | | | | 0,9 | | 1,5 | | 2,5 | | 0,9 | |
| **6 N/mm²** | w/w w/d d/d | 2,5 | | | | | | | | 1,5 | | 2,5 | | 3,5 | | 1,5 | |
| **8 N/mm²** | w/w w/d d/d | 3,5 | | | | | | | | 2,0 | | 3,5 | | 4,5 | | 2,0 | |

**Table C51.2:** Characteristic resistance under shear load (Push through anchorage)

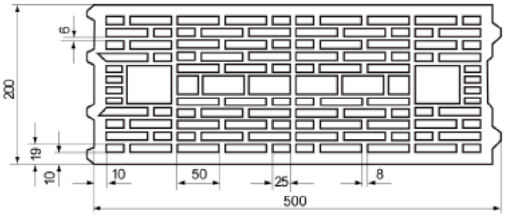
| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **4 N/mm²** | w/w w/d d/d | 0,9 | | |
| **6 N/mm²** | w/w w/d d/d | 1,5 | | |
| **8 N/mm²** | w/w w/d d/d | 2,0 | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 500 | 200 | 300 |
| Density ρ [kg/dm³] | ≥ 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 / 10 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 17

**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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 50 | | | | | | 80 | | | | 50 | | 80 |
| Spacing $s_{min}$ ∥ | [mm] | 100 | | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ | [mm] | 500 | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ = $s_{cr}$ ⊥ | [mm] | 300 | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors $\alpha_{g,N}$ ∥ | [-] | 1,4 | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ | [-] | 2 | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ = $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | | | | | |

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

**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 | $T_{inst}$ | [Nm] | 2 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 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 C53.2:** Group factors

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

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

**Table C54.1:** Characteristic resistance under tension load (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 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| 4 N/mm² | w/w | w/d | 0,5 | | | | 0,6 | | | | 1,2 | | 0,75 | | | | 1,5 | |
| | d/d | | 0,6 | | | | 0,75 | | | | 1,2 | | 0,9 | | | | 1,5 | |
| 6 N/mm² | w/w | w/d | 0,75 | | | | 0,9 | | | | 1,5 | | 1,2 | | | | 2,0 | |
| | d/d | | 0,9 | | | | 1,2 | | | | 2,0 | | 1,2 | | | | 2,5 | |
| 8 N/mm² | w/w | w/d | 0,9 | | | | 1,2 | | | | 2,0 | | 1,5 | | | | 2,5 | |
| | d/d | | 1,2 | | | | 1,5 | | | | 2,5 | | 1,5 | | | | 3,0 | |
| 10 N/mm² | w/w | w/d | 1,2 | | | | 1,5 | | | | 2,5 | | 2,0 | | | | 3,5 | |
| | d/d | | 1,5 | | | | 2,0 | | | | 3,0 | | 2,0 | | | | 4,0 | |

**Table C54.2:** Characteristic resistance under tension load (Push through anchorage)

| Anchor rod | | | M10 | M12 | M16 |
|---|---|---|---|---|---|
| Perforated sleeve FIS H K | | | 18x130/200 | | 22x130/200 |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | |
| compressive strength $f_b$ | use category | | | | |
| 4 N/mm² | w/w | w/d | 1,2 | | 1,5 |
| | d/d | | 1,2 | | 1,5 |
| 6 N/mm² | w/w | w/d | 1,5 | | 2,0 |
| | d/d | | 2,0 | | 2,5 |
| 8 N/mm² | w/w | w/d | 2,0 | | 2,5 |
| | d/d | | 2,5 | | 3,0 |
| 10 N/mm² | w/w | w/d | 2,5 | | 3,5 |
| | d/d | | 3,0 | | 4,0 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C55.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

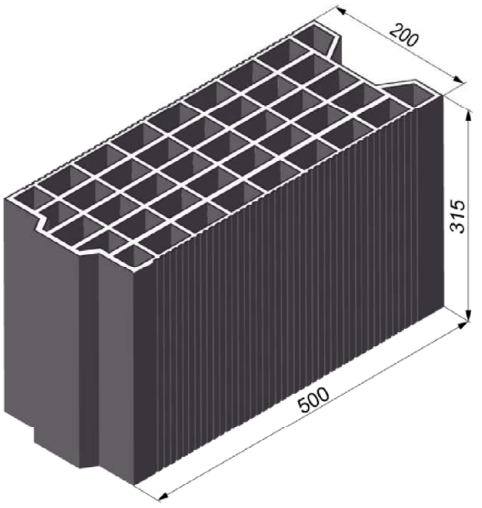
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **-** | | **M10** | **M12** | **-** | | **-** | |
| | | | | | | **11x85** | | | | | | **15x85** | | | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w w/d d/d | 0,9 | | 1,2 | | 0,9 | | 1,2 | | 0,6 | | 2,0 | | | | 0,6 | |
| **6 N/mm²** | w/w w/d d/d | 1,2 | | 1,5 | | 1,2 | | 1,5 | | 0,9 | | 3,0 | | | | 0,9 | |
| **8 N/mm²** | w/w w/d d/d | 1,5 | | 2,0 | | 1,5 | | 2,0 | | 1,2 | | 4,0 | | | | 1,2 | |
| **10 N/mm²** | w/w w/d d/d | 2,0 | | 3,0 | | 2,0 | | 3,0 | | 1,5 | | 5,0 | | | | 1,5 | |

**Table C55.2:** Characteristic resistance under shear load (Push through anchorage)

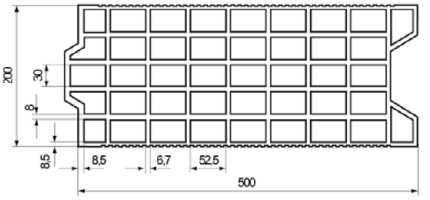
| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **4 N/mm²** | w/w w/d d/d | 0,6 | | |
| **6 N/mm²** | w/w w/d d/d | 0,9 | | |
| **8 N/mm²** | w/w w/d d/d | 1,2 | | |
| **10 N/mm²** | w/w w/d d/d | 1,5 | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Terreal | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 500 | 200 | 315 |
| Density ρ [kg/dm³] | ≥ 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 | $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 50 | | | | | 80 | | 50 | | | 80 | |
| Spacing | $s_{min}$ ∥ | [mm] | 100 | | | | | | | | | | | |
| | $s_{cr}$ ∥ | [mm] | 500 | | | | | | | | | | | |
| | $s_{min}$ ⊥ | [mm] | 100 | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | [mm] | 315 | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**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** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,1 | | | | | | | | | | | |
| | $\alpha_{g,V}$ ∥ | [-] | 1,2 | | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | [-] | 1,1 | | | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | [-] | 1,2 | | | | | | | | | | | |

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

**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 | $T_{inst}$ | [Nm] | 2 | | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 80 | | |
| Spacing | $s_{min}$ ∥ | | 100 | | |
| | $s_{cr}$ ∥ | | 500 | | |
| | $s_{min}$ ⊥ | | 100 | | |
| | $s_{cr}$ ⊥ | | 315 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C57.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,1 | | |
| | $\alpha_{g,V}$ ∥ | | 1,2 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,1 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | |

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

**Table C58.1:** Characteristic resistance under tension load (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** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| **2 N/mm²** | w/w | w/d | 0,5 | | | | | | | | | | | | | | | |
| | d/d | | 0,5 | | | | | | | | 0,6 | | 0,5 | | | | 0,6 | |
| **4 N/mm²** | w/w | w/d | 0,9 | | | | | | | | | | | | | | | |
| | d/d | | 0,9 | | 1,2 | | | | | | | | | | | | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | | | | | | | | | | | | | | |
| | d/d | | 1,5 | | | | | | | | | | | | | | | |
| **8 N/mm²** | w/w | w/d | 2,0 | | | | | | | | | | | | | | | |
| | d/d | | 2,0 | | | | | | | | | | | | | | | |

**Table C58.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **2 N/mm²** | w/w | w/d | 0,5 | | |
| | d/d | | 0,6 | | |
| **4 N/mm²** | w/w | w/d | 0,9 | | |
| | d/d | | 1,2 | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | |
| | d/d | | 1,5 | | |
| **8 N/mm²** | w/w | w/d | 2,0 | | |
| | d/d | | 2,0 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C59.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

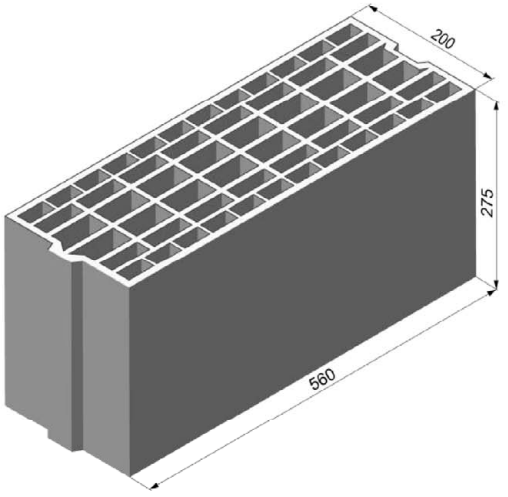
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** | **M8** | **-** | | **-** | | **M10** | **M12** | **-** | | **-** | |
| | | | | | | **11x85** | | | | | | **15x85** | | | | | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| **2 N/mm²** | w/w w/d d/d | 0,3 | | 0,6 | | 0,3 | | 0,6 | | 0,6 | | 0,9 | | | | 0,75 | |
| **4 N/mm²** | w/w w/d d/d | 0,75 | | 1,2 | | 0,75 | | 1,2 | | 1,2 | | 2,0 | | | | 1,5 | |
| **6 N/mm²** | w/w w/d d/d | 0,9 | | 2,0 | | 0,9 | | 2,0 | | 1,5 | | 3,0 | | | | 2,0 | |
| **8 N/mm²** | w/w w/d d/d | 1,5 | | 2,5 | | 1,5 | | 2,5 | | 2,0 | | 4,0 | | | | 3,0 | |

**Table C59.2:** Characteristic resistance under shear load (Push through anchorage)

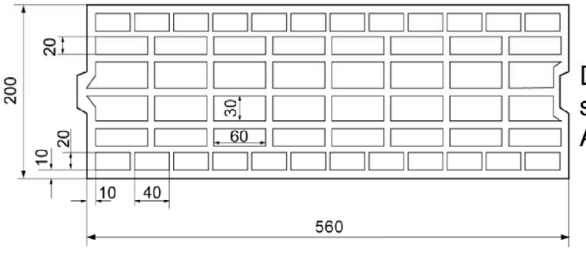
| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **2 N/mm²** | w/w w/d d/d | 0,6 | | 0,75 |
| **4 N/mm²** | w/w w/d d/d | 1,2 | | 1,5 |
| **6 N/mm²** | w/w w/d d/d | 1,5 | | 2,0 |
| **8 N/mm²** | w/w w/d d/d | 2,0 | | 3,0 |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Imery | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 560 | 200 | 275 |
| Density ρ [kg/dm³] | ≥ 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 17

**Table C60.1:** 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 | $T_{inst}$ | [Nm] | 2 | | | | | | |
| **General installation parameters** | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 80 | | | | | | |
| Spacing | $s_{min}$ II = $s_{cr}$ II | | 560 | | | | | | |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 275 | | | | | | |
| **Drilling method** | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | |

**Table C60.2:** Group factors

| Anchor rod | | M8 | M10 | M10 | M12 | M12 | M16 | M16 |
|---|---|---|---|---|---|---|---|---|
| Perforated sleeve FIS H K | | 16x130 | | 18x130/200 | | 20x130 | | 22x130/200 |
| Group factors | $\alpha_{g,N}$ II<br>$\alpha_{g,V}$ II<br>$\alpha_{g,N}$ ⊥<br>$\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | |

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

**Table C61.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M8** | **M10** | **M10** | **M12** | **M12** | **M16** | **M16** |
|---|---|---|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **16x130** | | **18x130/200** | | **20x130** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | |
| **4 N/mm²** | w/w w/d | 0,9 | | | | 1,2 | | |
| | d/d | 1,2 | | | | 1,5 | | |
| **6 N/mm²** | w/w w/d | 1,5 | | | | 2,0 | | |
| | d/d | 1,5 | | | | 2,0 | | |
| **8 N/mm²** | w/w w/d | 2,0 | | | | 2,5 | | |
| | d/d | 2,5 | | | | 3,0 | | |

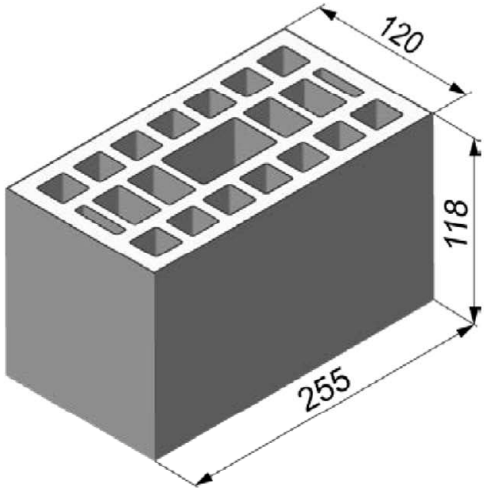
Factor for temperature range 72/120°C: 0,83

**Table C61.2:** Characteristic resistance under shear load

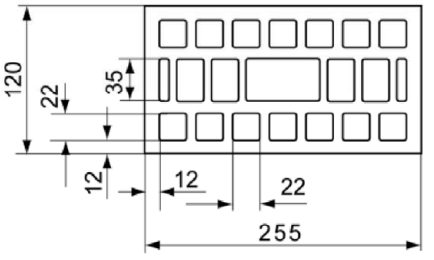
| **Anchor rod** | | **M8** | **M10** | **M10** | **M12** | **M12** | **M16** | **M16** |
|---|---|---|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **16x130** | | **18x130/200** | | **20x130** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | |
| **4 N/mm²** | w/w w/d | 0,9 | | | | | | |
| | d/d | | | | | | | |
| **6 N/mm²** | w/w w/d | 1,5 | | | | | | |
| | d/d | | | | | | | |
| **8 N/mm²** | w/w w/d | 2,0 | | | | | | |
| | d/d | | | | | | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 255 | 120 | 118 |
| Density ρ [kg/dm³] | ≥ 1,0 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 / 8 / 10 / 12 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 18

**Table C62.1:** 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 $T_{inst}$ | [Nm] | 2 | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 60 | | | | | | | | | | |
| Spacing $s_{cr}$ II = $s_{min}$ II | | 255 | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ = $s_{min}$ ⊥ | | 120 | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | |

**Table C62.2:** 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 $\alpha_{g,N}$ II<br>$\alpha_{g,V}$ II<br>$\alpha_{g,N}$ ⊥<br>$\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | | | |

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

**Table C63.1:** Characteristic resistance under tension load

| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| 2 N/mm² | w/w w/d | 0,4 | | 0,5 | | | | | | -[1] | | | |
| | d/d | 0,5 | | 0,5 | | | | | | -[1] | | | |
| 4 N/mm² | w/w w/d | 0,9 | | 0,9 | | | | | | 0,5 | | | |
| | d/d | 0,9 | | 1,2 | | | | | | 0,5 | | | |
| 6 N/mm² | w/w w/d | 1,2 | | 1,5 | | | | | | 0,75 | | | |
| | d/d | 1,5 | | 1,5 | | | | | | 0,75 | | | |
| 8 N/mm² | w/w w/d | 1,5 | | 2,0 | | | | | | 0,9 | | | |
| | d/d | 2,0 | | 2,0 | | | | | | 0,9 | | | |
| 10 N/mm² | w/w w/d | 2,0 | | 2,5 | | | | | | 1,2 | | | |
| | d/d | 2,5 | | 2,5 | | | | | | 1,2 | | | |
| 12 N/mm² | w/w w/d | 2,5 | | 3,0 | | | | | | 1,5 | | | |
| | d/d | 3,0 | | 3,5 | | | | | | 1,5 | | | |

[1] No performance assesses

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

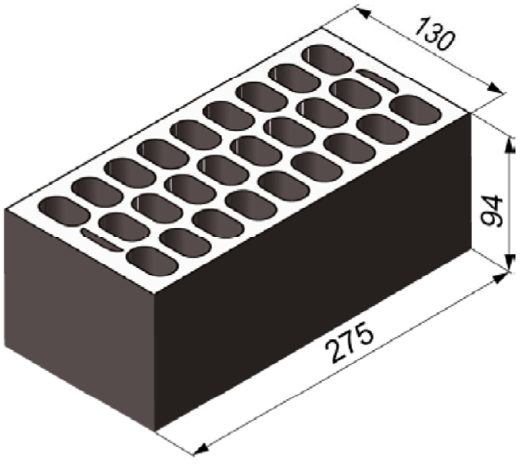
## Vertical perforated brick HLz, EN 771-1:2015

**Table C64.1:** Characteristic resistance under shear load

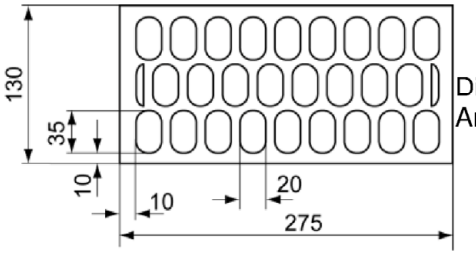
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **M10** / **15x85** | **M12** / **15x85** | **-** |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | **20x85** | | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | |
| compressivestrength $f_b$ | use category | | | | | | | | | | |
| **2 N/mm²** | w/w, w/d, d/d | 0,6 | 0,75 | 0,6 | 0,75 | 0,9 | | | | | |
| **4 N/mm²** | w/w, w/d, d/d | 1,2 | 1,5 | 1,2 | 1,5 | 2,0 | | | | | |
| **6 N/mm²** | w/w, w/d, d/d | 2,0 | 2,0 | 2,0 | 2,0 | 2,5 | | | | | |
| **8 N/mm²** | w/w, w/d, d/d | 2,5 | 3,0 | 2,5 | 3,0 | 3,5 | | | | | |
| **10 N/mm²** | w/w, w/d, d/d | 3,0 | 3,5 | 3,0 | 3,5 | 4,5 | | | | | |
| **12 N/mm²** | w/w, w/d, d/d | 4,0 | 4,5 | 4,0 | 4,5 | 5,5 | | | | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Cermanica Farreny S.A. | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 275 | 130 | 94 |
| Density ρ [kg/dm³] | ≥ 0,8 | | |
| Compressive strength $f_b$ [N/mm²] | 6 / 8 / 12 / 16 / 20 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 18

**Table C65.1:** Installation parameters

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **M10** / **15x85** | **M12** / **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 $T_{inst}$ | [Nm] | 2 | | | | | | | | |
| **General installation parameters** | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 100 | | | | | | 120 | | |
| Spacing $s_{cr}$ II = $s_{min}$ II | [mm] | 275 | | | | | | | | |
| Spacing $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 95 | | | | | | | | |
| **Drilling method** | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | |

**Table C65.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **M10** / **15x85** | **M12** / **15x85** | **-** |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **20x85** | | |
| Group factors $\alpha_{g,N}$ II | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,V}$ II | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ | [-] | 2 | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | |

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

**Table C66.1:** Characteristic resistance under tension load

| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| 6 N/mm² | w/w w/d | 0,4 | | 0,9 | | | | | | | | | |
| | d/d | 0,4 | | 0,9 | | | | | | | | | |
| 8 N/mm² | w/w w/d | 0,5 | | 1,2 | | | | | | | | | |
| | d/d | 0,6 | | 1,2 | | | | | | | | | |
| 12 N/mm² | w/w w/d | 0,75 | | 1,5 | | | | | | | | | |
| | d/d | 0,9 | | 2,0 | | | | | | | | | |
| 16 N/mm² | w/w w/d | 0,9 | | 2,0 | | | | | | | | | |
| | d/d | 1,2 | | 2,5 | | | | | | | | | |
| 20 N/mm² | w/w w/d | 1,2 | | 3,0 | | | | | | | | | |
| | d/d | 1,5 | | 3,0 | | | | | | | | | |

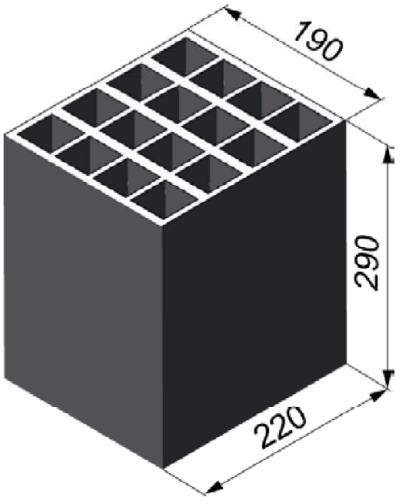
Factor for temperature range 72/120°C: 0,83

**Table C66.2:** Characteristic resistance under shear load

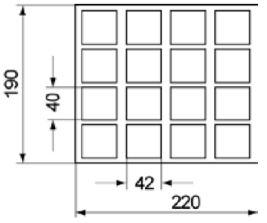
| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| 6 N/mm² | w/w w/d | 1,2 | | 1,2 | | | | | | | | | |
| | d/d | | | | | | | | | | | | |
| 8 N/mm² | w/w w/d | 1,5 | | 1,5 | | | | | | | | | |
| | d/d | | | | | | | | | | | | |
| 12 N/mm² | w/w w/d | 2,0 | | 2,5 | | | | | | | | | |
| | d/d | | | | | | | | | | | | |
| 16 N/mm² | w/w w/d | 3,0 | | 3,0 | | | | | | | | | |
| | d/d | | | | | | | | | | | | |
| 20 N/mm² | w/w w/d | 4,0 | | 4,0 | | | | | | | | | |
| | d/d | | | | | | | | | | | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Perceram | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 220 | 190 | 290 |
| Density ρ [kg/dm³] | ≥ 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 6 / 8 / 10 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 18

**Table C67.1:** 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** / **11x85** | **M8** | **-** | **-** | | **M10** / **15x85** | **M12** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| **Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K** | | | | | | | | | | | | | | |
| Max. installation torque $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 110 | | | | | | | | | | | | |
| Spacing $s_{min}$ II = $s_{cr}$ II | [mm] | 220 | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ = $s_{cr}$ ⊥ | [mm] | 290 | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**Table C67.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** | **-** | **-** | | **M10** / **15x85** | **M12** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors $\alpha_{g,N}$ II, $\alpha_{g,V}$ II, $\alpha_{g,N}$ ⊥, $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | | | | | |

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

**Table C68.1:** 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 | $c_{min}$ | [mm] | 110 | | |
| Spacing | $s_{min}$ II = $s_{cr}$ II | [mm] | 220 | | |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | [mm] | 290 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C68.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ II | [-] | 2 | | |
| | $\alpha_{g,V}$ II | [-] | 2 | | |
| | $\alpha_{g,N}$ ⊥ | [-] | 2 | | |
| | $\alpha_{g,V}$ ⊥ | [-] | 2 | | |

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

**Table C69.1:** Characteristic resistance under tension load (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 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| 6 N/mm² | w/w | w/d | 0,3 | | 1,2 | | 1,2 | | | | 1,5 | | 1,2 | | | | 1,5 | |
| | d/d | | 0,4 | | 1,5 | | 1,5 | | | | 1,5 | | 1,5 | | | | 1,5 | |
| 8 N/mm² | w/w | w/d | 0,5 | | 1,5 | | 1,5 | | | | 2,0 | | 1,5 | | | | 2,0 | |
| | d/d | | 0,5 | | 2,0 | | 2,0 | | | | 2,5 | | 2,0 | | | | 2,5 | |
| 10 N/mm² | w/w | w/d | 0,6 | | 2,0 | | 2,0 | | | | 2,5 | | 2,0 | | | | 2,5 | |
| | d/d | | 0,6 | | 2,5 | | 2,5 | | | | 3,0 | | 2,5 | | | | 3,0 | |

**Table C69.2:** Characteristic resistance under tension load (Push through anchorage)

| Anchor rod | | | M10 | M12 | M16 |
|---|---|---|---|---|---|
| Perforated sleeve FIS H K | | | 18x130/200 | | 22x130/200 |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | |
| compressive strength $f_b$ | use category | | | | |
| 6 N/mm² | w/w | w/d | 1,5 | | |
| | d/d | | 1,5 | | |
| 8 N/mm² | w/w | w/d | 2,0 | | |
| | d/d | | 2,5 | | |
| 10 N/mm² | w/w | w/d | 2,5 | | |
| | d/d | | 3,0 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C70.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

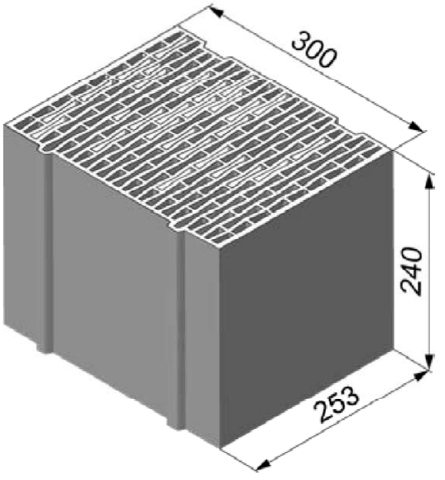
| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | M8 | M10 | - | | M12 | M16 | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | |
| | | | | | | 11x85 | | | | | | 15x85 | | | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 16x130 | | 20x85 | | | | 20x130 | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| 6 N/mm² | w/w w/d d/d | 1,5 | | 1,5 | | 1,5 | | | | 2,5 | | 1,5 | | | | 2,0 | |
| 8 N/mm² | w/w w/d d/d | 2,0 | | 2,0 | | 2,0 | | | | 3,5 | | 2,0 | | | | 3,0 | |
| 10 N/mm² | w/w w/d d/d | 2,5 | | 3,0 | | 3,0 | | | | 4,5 | | 3,0 | | | | 3,5 | |

**Table C70.2:** Characteristic resistance under shear load (Push through anchorage)

| Anchor rod | | M10 | M12 | M16 |
|---|---|---|---|---|
| Perforated sleeve FIS H K | | 18x130/200 | | 22x130/200 |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | |
| compressive strength $f_b$ | use category | | | |
| 6 N/mm² | w/w w/d d/d | 2,0 | | |
| 8 N/mm² | w/w w/d d/d | 3,0 | | |
| 10 N/mm² | w/w w/d d/d | 3,5 | | |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Ziegelwerk Brenna | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 253 | 300 | 240 |
| Density ρ [kg/dm³] | ≥ 0,8 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 | | |
| Standard or annex | EN 771-1:2015 | | |

Dimension see also Annex B 18

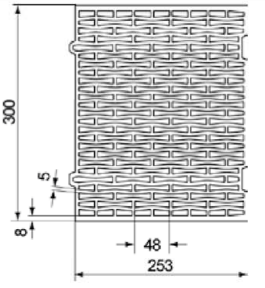



**Table C71.1:** Installation parameters
(Pre-positioned anchorage with perforated sleeve FIS H K)

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **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 $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 60 | | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ = $s_{cr}$ ∥ | [mm] | 255 | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ = $s_{cr}$ ⊥ | [mm] | 240 | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**Table C71.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors $\alpha_{g,N}$ ∥ | [-] | 2 | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ | [-] | 2 | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ | [-] | 2 | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ | [-] | 2 | | | | | | | | | | | | |

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

**Table C72.1:** 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 | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ II = $s_{cr}$ II | | 255 | | |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 240 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C72.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ II<br>$\alpha_{g,V}$ II<br>$\alpha_{g,N}$ ⊥<br>$\alpha_{g,V}$ ⊥ | [-] | 2 | | |

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

**Table C73.1:** Characteristic resistance under tension load (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** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| **2 N/mm²** | w/w | w/d | -[1] | | 0,5 | | 0,5 | | | | 0,4 | | 0,5 | | | | 0,4 | |
| | d/d | | 0,3 | | 0,5 | | 0,5 | | | | 0,5 | | 0,5 | | | | 0,5 | |
| **4 N/mm²** | w/w | w/d | 0,5 | | 0,9 | | 0,9 | | | | 0,9 | | 0,9 | | | | 0,9 | |
| | d/d | | 0,6 | | 0,9 | | 0,9 | | | | 0,9 | | 0,9 | | | | 0,9 | |
| **6 N/mm²** | w/w | w/d | 0,75 | | 1,5 | | 1,5 | | | | 1,2 | | 1,5 | | | | 1,2 | |
| | d/d | | 0,9 | | 1,5 | | 1,5 | | | | 1,5 | | 1,5 | | | | 1,5 | |

[1] No performance assessed

**Table C73.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **2 N/mm²** | w/w | w/d | 0,4 | | |
| | d/d | | 0,5 | | |
| **4 N/mm²** | w/w | w/d | 0,9 | | |
| | d/d | | 0,9 | | |
| **6 N/mm²** | w/w | w/d | 1,2 | | |
| | d/d | | 1,5 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C74.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

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

| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | |
|---|---|---|---|
| compressive strength $f_b$ | use category | | |
| 2 N/mm² | w/w, w/d, d/d | 0,5 | 0,6 |
| 4 N/mm² | w/w, w/d, d/d | 0,9 | 1,2 |
| 6 N/mm² | w/w, w/d, d/d | 1,5 | 1,5 |

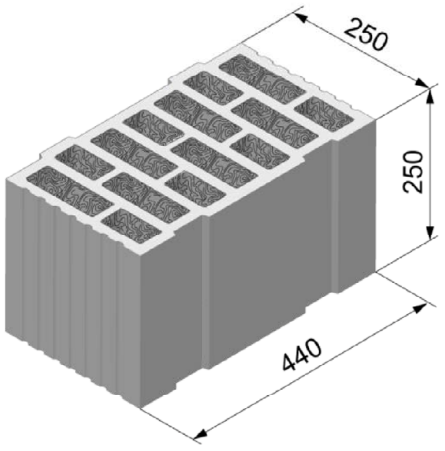
**Table C74.2:** Characteristic resistance under shear load (Push through anchorage)

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

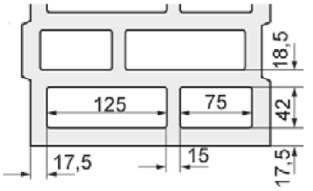
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | |
|---|---|---|---|
| compressive strength $f_b$ | use category | | |
| 2 N/mm² | w/w, w/d, d/d | 0,5 | 0,6 |
| 4 N/mm² | w/w, w/d, d/d | 0,9 | 1,2 |
| 6 N/mm² | w/w, w/d, d/d | 1,5 | 1,5 |

Factor for job site tests and displacements see annex C110

## Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015




| Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 250 | 440 | 250 |
| Density ρ [kg/dm³] | 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 6 / 8 / 10 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 18

**Table C75.1:** 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 $T_{inst}$ [Nm] | 2 | | | | | 5 | | 2 | | 5 | 6 | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ [mm] | 250 | | | | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 80 | | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 250 | | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Rotary drilling with carbide drill | | | | | | | | | | | | | | | | |

**Table C75.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6 M8** **11x85** | **-** | | **-** | | **M10 M12** **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| Group factors $\alpha_{g,N}$ ∥ [-] | 1,3 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ [-] | 1,3 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 0,8 | | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 1,3 | | | | | | | | | | | | | | | |

## Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015

**Table C76.1:** 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 | 6 | |
| **General installation parameters** | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 80 | | |
| | $s_{cr}$ ∥ | | 250 | | |
| | $s_{min}$ ⊥ | | 80 | | |
| | $s_{cr}$ ⊥ | | 250 | | |
| **Drilling method** | | | | | |
| Rotary drilling with carbide drill | | | | | |

**Table C76.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,3 | | |
| | $\alpha_{g,V}$ ∥ | | 1,3 | | |
| | $\alpha_{g,N}$ ⊥ | | 0,8 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,3 | | |

## Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015

**Table C77.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | | |
| **6 N/mm²** | w/w | w/d | 0,75 | | 1,5 | | 1,2 | | | | 1,5 | | | | | | | | 2,5 | |
| | d/d | | 0,9 | | 1,5 | | 1,2 | | | | 1,5 | | | | | | | | 2,5 | |
| **8 N/mm²** | w/w | w/d | 0,9 | | 1,5 | | 1,2 | | | | 1,5 | | | | | | | | 2,5 | |
| | d/d | | 0,9 | | 2,0 | | 1,5 | | | | 2,0 | | | | | | | | 3,0 | |
| **10 N/mm²** | w/w | w/d | 0,9 | | 2,0 | | 1,5 | | | | 2,0 | | | | | | | | 3,0 | |
| | d/d | | 1,2 | | 2,0 | | 1,5 | | | | 2,0 | | | | | | | | 3,5 | |

**Table C77.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | |
| | d/d | | 1,5 | | |
| **8 N/mm²** | w/w | w/d | 1,5 | | |
| | d/d | | 2,0 | | |
| **10 N/mm²** | w/w | w/d | 2,0 | | |
| | d/d | | 2,0 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Vertical perforated brick HLz, Porotherm W 44, filled with mineral wool, EN 771-1:2015

**Table C78.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

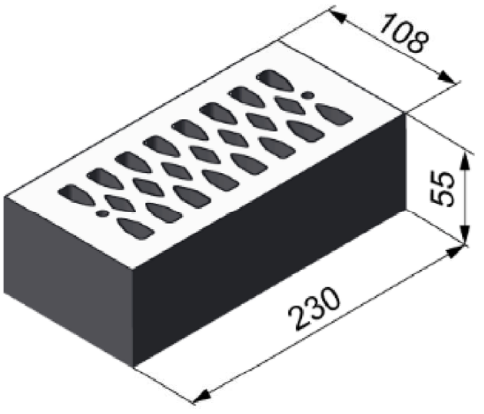
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | |
| **6 N/mm²** | w/w, w/d, d/d | 0,9 | | | | | | | | 1,2 | | 0,9 | | | | 1,2 | | 1,2 | |
| **8 N/mm²** | w/w, w/d, d/d | 0,9 | | | | | | | | 1,5 | | 0,9 | | | | 1,5 | | 1,2 | |
| **10 N/mm²** | w/w, w/d, d/d | 1,2 | | | | | | | | 1,5 | | 1,2 | | | | 1,5 | | 1,5 | |

**Table C78.2:** Characteristic resistance under shear load (Push through anchorage)

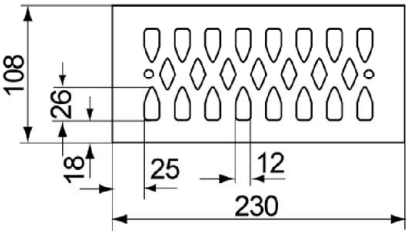
| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **6 N/mm²** | w/w, w/d, d/d | 1,2 | | 1,2 |
| **8 N/mm²** | w/w, w/d, d/d | 1,5 | | 1,5 |
| **10 N/mm²** | w/w, w/d, d/d | 1,5 | | 1,5 |

Factor for job site tests and displacements see annex C110

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




| Vertical perforated brick HLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Wienerberger. | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 230 | 108 | 55 |
| Density ρ [kg/dm³] | ≥ 1,4 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 / 8 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 18

**Table C79.1:** 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 $T_{inst}$ [Nm] | 2 | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 60 | | | | | | | | | | | |
| Spacing $s_{min}$ ∥ [mm] | 80 | | | | | | | | | | | |
| Spacing $s_{cr}$ ∥ [mm] | 230 | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ [mm] | 60 | | | | | | | | | | | |
| Spacing $s_{cr}$ ⊥ [mm] | 60 | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | |

**Table C79.2:** 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 $\alpha_{g,N}$ ∥ [-] | 2 | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ∥ [-] | 2 | | | | | | | | | | | |
| Group factors $\alpha_{g,N}$ ⊥ [-] | 2 | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ ⊥ [-] | 2 | | | | | | | | | | | |

fischer injection system FIS V Plus for masonry

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

**Annex C 79**

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

**Table C80.1:** Characteristic resistance under tension load [1)]

| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| 2 N/mm² | w/w w/d | 0,3 | | 0,9 | | 0,75 | | | | 0,5 | | | |
| | d/d | 0,3 | | 0,9 | | 0,9 | | | | 0,6 | | | |
| 4 N/mm² | w/w w/d | 0,6 | | 1,5 | | 1,5 | | | | 0,9 | | | |
| | d/d | 0,75 | | 2,0 | | 1,5 | | | | 1,2 | | | |
| 6 N/mm² | w/w w/d | 0,9 | | 2,5 | | 2,5 | | | | 1,5 | | | |
| | d/d | 0,9 | | 3,0 | | 2,5 | | | | 1,5 | | | |
| 8 N/mm² | w/w w/d | 1,2 | | 3,5 | | 3,0 | | | | 2,0 | | | |
| | d/d | 1,5 | | 4,0 | | 3,5 | | | | 2,5 | | | |

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

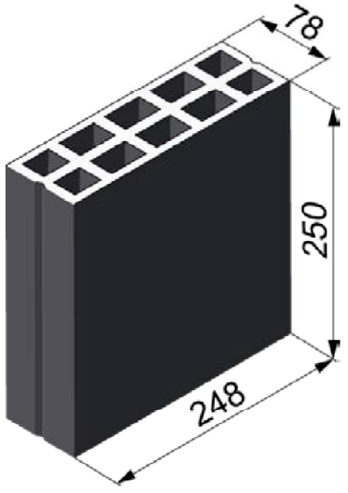
Factor for temperature range 72/120°C: 0,83

**Table C80.2:** Characteristic resistance under shear load

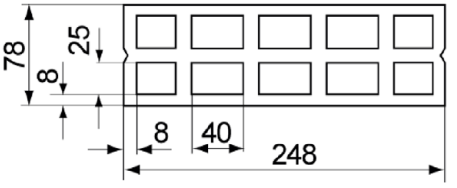
| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | - | | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | M10 | M12 | - | |
| | | | | | | 11x85 | | | | 15x85 | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 20x85 | | | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | |
| 2 N/mm² | w/w w/d | 0,6 | | | | | | | | 0,4 | | | |
| | d/d | | | | | | | | | | | | |
| 4 N/mm² | w/w w/d | 1,2 | | | | | | | | 0,9 | | | |
| | d/d | | | | | | | | | | | | |
| 6 N/mm² | w/w w/d | 1,5 | | | | | | | | 1,2 | | | |
| | d/d | | | | | | | | | | | | |
| 8 N/mm² | w/w w/d | 2,5 | | | | | | | | 1,5 | | | |
| | d/d | | | | | | | | | | | | |

Factor for job site tests and displacements see annex C110

## Horizontal perforated brick LLz, EN 771-1:2015




| Horizontal perforated brick LLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | | - | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 250 | 78 | 248 |
| Density ρ [kg/dm³] | ≥ 0,7 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 19

**Table C81.1:** 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 | $c_{min}$ | [mm] | 100 | |
| Spacing | $s_{min}$ ∥ | | 75 | |
| | $s_{cr}$ ∥ | | 250 | |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 250 | |
| **Drilling method** | | | | |
| Hammer drilling with hard metal hammer drill | | | | |

**Table C81.2:** Group factors

| **Anchor rod** | | | **M6** | **M8** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **12x50** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,6 | |
| | $\alpha_{g,V}$ ∥ | | 1,1 | |
| | $\alpha_{g,N}$ ⊥ | | 2,0 | |
| | $\alpha_{g,V}$ ⊥ | | | |

## Horizontal perforated brick LLz, EN 771-1:2015

**Table C82.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | **M8** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | | **12x50** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **2 N/mm²** | w/w w/d | 0,5 | |
| | d/d | 0,6 | |
| **4 N/mm²** | w/w w/d | 0,9 | |
| | d/d | 1,2 | |
| **6 N/mm²** | w/w w/d | 1,5 | |
| | d/d | 1,5 | |

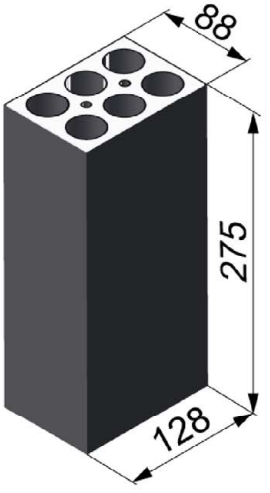
Factor for temperature range 72/120°C: 0,83

**Table C82.2:** Characteristic resistance under shear load

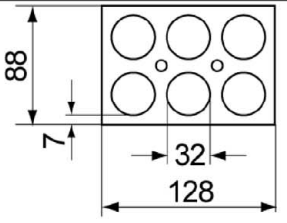
| **Anchor rod** | | **M6** | **M8** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | | **12x50** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **2 N/mm²** | w/w w/d | 0,5 | |
| | d/d | | |
| **4 N/mm²** | w/w w/d | 0,9 | |
| | d/d | | |
| **6 N/mm²** | w/w w/d | 1,5 | |
| | d/d | | |

Factor for job site tests and displacements see annex C110

## Horizontal perforated brick LLz, EN 771-1:2015




| Horizontal perforated brick LLz, EN 771-1:2015 | | | |
|---|---|---|---|
| Producer | e.g. Cermanica Farreny S.A. | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 275 | 88 | 128 |
| Density ρ [kg/dm³] | ≥ 0,8 | | |
| Compressive strength $f_b$ [N/mm²] | 2 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 19

**Table C83.1:** 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 | $c_{min}$ | [mm] | 60 | |
| Spacing | $s_{min}$ ∥ | | 75 | |
| | $s_{cr}$ ∥ | | 275 | |
| | $s_{min}$ ⊥ | | 75 | |
| | $s_{cr}$ ⊥ | | 130 | |
| **Drilling method** | | | | |
| Hammer drilling with hard metal hammer drill | | | | |

**Table C83.2:** Group factors

| **Anchor rod** | | | **M6** | **M8** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **12x50** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,3 | |
| | $\alpha_{g,V}$ ∥ | | 1,5 | |
| | $\alpha_{g,N}$ ⊥ | | 1,3 | |
| | $\alpha_{g,V}$ ⊥ | | 1,5 | |

## Horizontal perforated brick LLz, EN 771-1:2015

**Table C84.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | **M8** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | | **12x50** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **2 N/mm²** | w/w, w/d, d/d | 1,5 | |

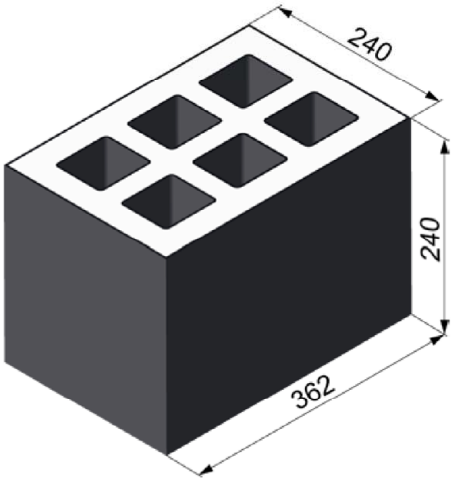
Factor for temperature range 72/120°C: 0,83

**Table C84.2:** Characteristic resistance under shear load

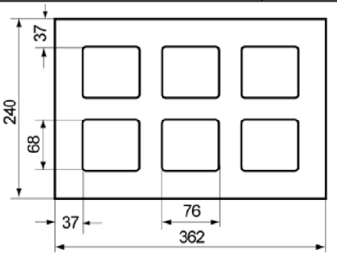
| **Anchor rod** | | **M6** | **M8** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | | **12x50** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **2 N/mm²** | w/w, w/d, d/d | 1,2 | |

Factor for job site tests and displacements see annex C110

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




| Light-weight concrete hollow block Hbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | - | | |
| Nominal dimensions [mm] | Länge L | Breite B | Höhe H |
| | 362 | 240 | 240 |
| Density ρ [kg/dm³] | ≥ 1,0 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 | | |
| Standard or annex | EN 771-3:2015 | | |




Dimension see also Annex B 19

**Table C85.1:** 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 $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 60 | | | | | | | | | | | | | | |
| Spacing $s_{min}$ II | | 100 | | | | | | | | | | | | | | |
| Spacing $s_{cr}$ II | | 362 | | | | | | | | | | | | | | |
| Spacing $s_{min} \perp = s_{cr} \perp$ | | 240 | | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**Table C85.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6 M8** 11x85 | **-** | | **-** | | **M10 M12** 15x85 | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| Group factors $\alpha_{g,N}$ II | [-] | 1,2 | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V}$ II | | 1,1 | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,N} \perp$ | | 2,0 | | | | | | | | | | | | | | |
| Group factors $\alpha_{g,V} \perp$ | | | | | | | | | | | | | | | | |

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

**Table C86.1:** 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 | $c_{min}$ | [mm] | 60 | | |
| Spacing | $s_{min}$ ∥ | | 100 | | |
| | $s_{cr}$ ∥ | | 362 | | |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 240 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C86.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,2 | | |
| | $\alpha_{g,V}$ ∥ | | 1,1 | | |
| | $\alpha_{g,N}$ ⊥ | | 2,0 | | |
| | $\alpha_{g,V}$ ⊥ | | | | |

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

**Table C87.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| **2 N/mm²** | w/w | w/d | 1,2 | | 1,5 | | | | | | | | | | | | 2,5 | |
| | d/d | | 1,2 | | 1,5 | | | | | | | | | | | | 2,5 | |
| **4 N/mm²** | w/w | w/d | 2,0 | | 3,0 | | | | | | | | | | | | 5,0 | |
| | d/d | | 2,5 | | 3,0 | | | | | | | | | | | | 5,5 | |

**Table C87.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | |
| compressive strength $f_b$ | use category | | | | |
| **2 N/mm²** | w/w | w/d | 1,5 | | |
| | d/d | | 1,5 | | |
| **4 N/mm²** | w/w | w/d | 3,0 | | |
| | d/d | | 3,0 | | |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C88.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

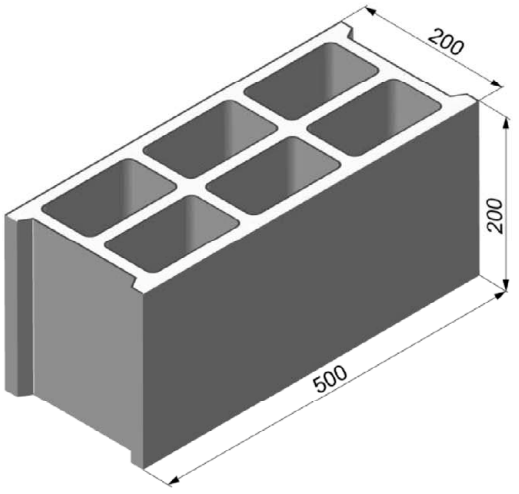
| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **M8** 11x85 | **-** | | **-** | | **M10** / **M12** 15x85 | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | |
| **2 N/mm²** | w/w / w/d / d/d | | | | 0,9 | | | | | | | | | | | |
| **4 N/mm²** | w/w / w/d / d/d | | | | 2,0 | | | | | | | | | | | |

**Table C88.2:** Characteristic resistance under shear load (Push through anchorage)

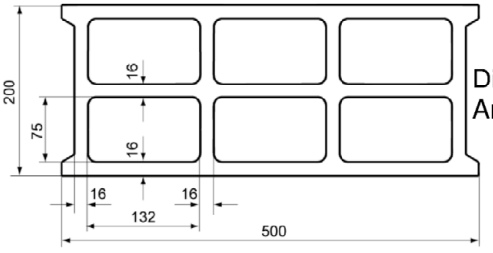
| **Anchor rod** | **M10** | **M12** | **M16** |
|---|---|---|---|
| **Perforated sleeve FIS H K** | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | |
| compressive strength $f_b$ | use category | | |
| **2 N/mm²** | w/w / w/d / d/d | 0,9 | |
| **4 N/mm²** | w/w / w/d / d/d | 2,0 | |

Factor for job site tests and displacements see annex C110

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




| Light-weight concrete hollow block Hbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | e.g. Sepa | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 500 | 200 | 200 |
| Density ρ [kg/dm³] | ≥ 1,0 | | |
| Compressive strength $f_b$ [N/mm²] | 2 / 4 / 6 | | |
| Standard or annex | EN 771-1:2015 | | |




Dimension see also Annex B 19

**Table C89.1:** Installation parameters

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **M10** | **M12** | **-** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** **M8** **11x85** | **-** | | **-** | | **-** | | **M10** **M12** **15x85** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **18x130/200** | | **20x85** | | |
| **Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K** | | | | | | | | | | | | | | |
| Max. installation torque $T_{inst}$ | [Nm] | 1 | | | 2 | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance $c_{min}$ | [mm] | 100 | | | | | | | | | | | | |
| Spacing $s_{min}$ II = $s_{cr}$ II | [mm] | 500 | | | | | | | | | | | | |
| Spacing $s_{min}$ ⊥ = $s_{cr}$ ⊥ | [mm] | 200 | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**Table C89.2:** Group factors

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

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

**Table C90.1:** Characteristic resistance under tension load

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

| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | |
|---|---|---|---|
| compressive strength $f_b$ | use category | | |
| 2 N/mm² | w/w | w/d | 0,4 |
| | d/d | | 0,5 |
| 4 N/mm² | w/w | w/d | 0,9 |
| | d/d | | 0,9 |
| 6 N/mm² | w/w | w/d | 1,2 |
| | d/d | | 1,5 |

Factor for temperature range 72/120°C: 0,83

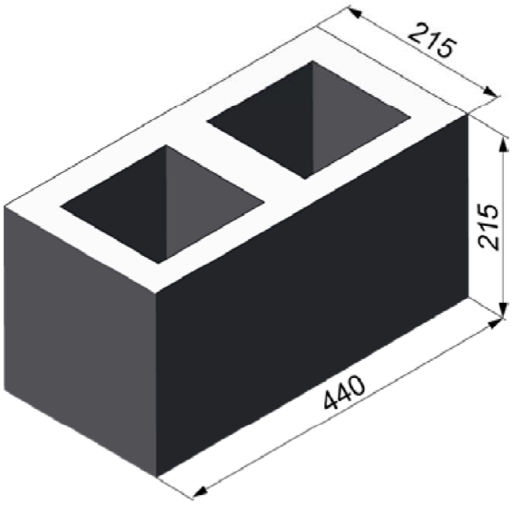
**Table C90.2:** Characteristic resistance under shear load

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

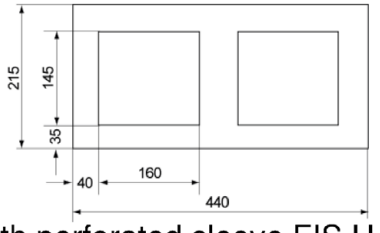
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | |
|---|---|---|---|
| compressive strength $f_b$ | use category | | |
| 2 N/mm² | w/w | w/d | 0,9 |
| | d/d | | |
| 4 N/mm² | w/w | w/d | 1,5 |
| | d/d | | |
| 6 N/mm² | w/w | w/d | 2,5 |
| | d/d | | |

Factor for job site tests and displacements see annex C110

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




| Light-weight concrete hollow block Hbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | e.g. Roadstone wood | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | 440 | 215 | 215 |
| Density ρ [kg/dm³] | ≥ 1,2 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 / 10 | | |
| Standard or annex | EN 771-3:2015 | | |




Dimension see also Annex B 19

**Table C91.1:** 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** / **11x85** | **M8** | **-** | **-** | | **M10** / **15x85** | **M12** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| **Anchor rod and internal threaded anchor FIS E with perforated sleeve FIS H K** | | | | | | | | | | | | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 2 | | | | | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 110 | | | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 100 | | | | | | | | | | | |
| | $s_{cr}$ ∥ | | 440 | | | | | | | | | | | |
| | $s_{min}$ ⊥ | | 100 | | | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 215 | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | |

**Table C91.2:** Group factors

| **Anchor rod** | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | **-** | | **-** | | **M6** / **11x85** | **M8** | **-** | **-** | | **M10** / **15x85** | **M12** | **-** | **-** | |
| **Perforated sleeve FIS H K** | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,4 | | | | | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | 2,0 | | | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | 1,4 | | | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | | | | | | | | | | |

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

**Table C92.1:** 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 | $c_{min}$ | [mm] | 110 | | |
| Spacing | $s_{min}$ ∥ | | 100 | | |
| | $s_{cr}$ ∥ | | 440 | | |
| | $s_{min}$ ⊥ | | 100 | | |
| | $s_{cr}$ ⊥ | | 215 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C92.2:** Group factors

| **Anchor rod** | | | **M10** | **M12** | **M16** |
|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | | **18x130/200** | | **22x130/200** |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,4 | | |
| | $\alpha_{g,V}$ ∥ | | 2,0 | | |
| | $\alpha_{g,N}$ ⊥ | | 1,4 | | |
| | $\alpha_{g,V}$ ⊥ | | 1,2 | | |

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

**Table C93.1:** Characteristic resistance under tension load (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 | |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | |
| 4 N/mm² | w/w | w/d | 0,9 | | | | 1,2 | | | | | | 2,0 | | | | | |
| | d/d | | 1,2 | | | | 1,5 | | | | | | 2,0 | | | | | |
| 6 N/mm² | w/w | w/d | 1,5 | | | | 2,0 | | | | | | 3,0 | | | | | |
| | d/d | | 1,5 | | | | 2,0 | | | | | | 3,0 | | | | | |
| 8 N/mm² | w/w | w/d | 2,0 | | | | 2,5 | | | | | | 3,5 | | | | | |
| | d/d | | 2,0 | | | | 3,0 | | | | | | 4,0 | | | | | |
| 10 N/mm² | w/w | w/d | 2,5 | | | | 3,0 | | | | | | 4,5 | | | | | |
| | d/d | | 3,0 | | | | 3,5 | | | | | | 5,0 | | | | | |

**Table C93.2:** Characteristic resistance under tension load (Push through anchorage)

| Anchor rod | | | M10 | M12 | M16 |
|---|---|---|---|---|---|
| Perforated sleeve FIS H K | | | 18x130/200 | | 22x130/200 |
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | |
| compressive strength $f_b$ | use category | | | | |
| 4 N/mm² | w/w | w/d | 1,2 | | 2,0 |
| | d/d | | 1,5 | | 2,0 |
| 6 N/mm² | w/w | w/d | 2,0 | | 3,0 |
| | d/d | | 2,0 | | 3,0 |
| 8 N/mm² | w/w | w/d | 2,5 | | 3,5 |
| | d/d | | 3,0 | | 4,0 |
| 10 N/mm² | w/w | w/d | 3,0 | | 4,5 |
| | d/d | | 3,5 | | 5,0 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

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

**Table C94.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

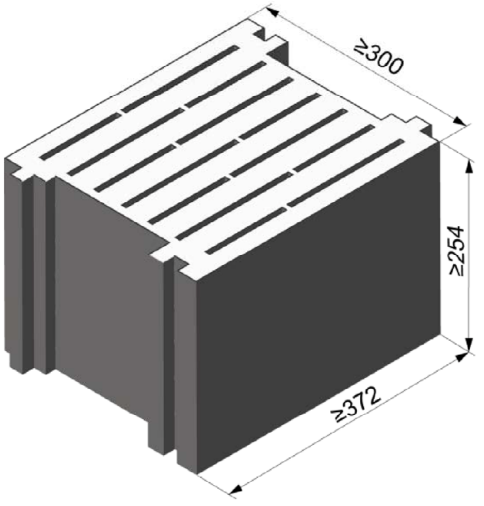
| Anchor rod | | M6 | M8 | M6 | M8 | - | | M8 | M10 | M8 | M10 | - | | M12 | M16 | M12 | M16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | - | | - | | M6 | M8 | - | | - | | M10 | M12 | - | | - | |
| | | | | | | 11x85 | | | | | | 15x85 | | | | | |
| Perforated sleeve FIS H K | | 12x50 | | 12x85 | | 16x85 | | | | 16x130 | | 20x85 | | | | 20x130 | |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| 4 N/mm² | w/w w/d d/d | 0,75 | 1,2 | 0,75 | 1,2 | 0,75 | 1,2 | | | | | | | | | | |
| 6 N/mm² | w/w w/d d/d | 1,2 | 2,0 | 1,2 | 2,0 | 1,2 | 2,0 | | | | | | | | | | |
| 8 N/mm² | w/w w/d d/d | 1,5 | 2,5 | 1,5 | 2,5 | 1,5 | 2,5 | | | | | | | | | | |
| 10 N/mm² | w/w w/d d/d | 2,0 | 3,0 | 2,0 | 3,0 | 2,0 | 3,0 | | | | | | | | | | |

**Table C94.2:** Characteristic resistance under shear load (Push through anchorage)

| Anchor rod | | M10 | M12 | M16 |
|---|---|---|---|---|
| Perforated sleeve FIS H K | | 18x130/200 | | 22x130/200 |
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | |
| compressive strength $f_b$ | use category | | | |
| 4 N/mm² | w/w w/d d/d | 1,2 | | |
| 6 N/mm² | w/w w/d d/d | 2,0 | | |
| 8 N/mm² | w/w w/d d/d | 2,5 | | |
| 10 N/mm² | w/w w/d d/d | 3,0 | | |

Factor for job site tests and displacements see annex C110

## Light-weight concrete solid block Vbl, EN 771-3:2015




| Light-weight concrete solid block Vbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | e.g. Sepa | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 372 | ≥ 300 | ≥ 254 |
| Density ρ [kg/dm³] | ≥ 0,6 | | |
| Compressive strength $f_b$ [N/mm²] | 2 | | |
| Standard or annex | EN 771-3:2015 | | |

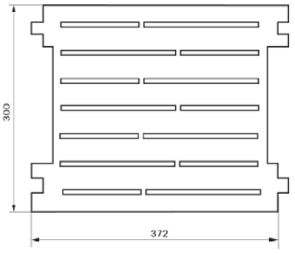



**Table C95.1:** Installation parameters

| 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 $T_{inst}$ [Nm] | 4 | | | | | | | | |
| **General installation parameters** | | | | | | | | | |
| Edge distance $c_{min}$ [mm] | 130 | | | | | | | | |
| Spacing $s_{min} \parallel = s_{cr} \parallel$ [mm] | 370 | | | | | | | | |
| Spacing $s_{min} \perp = s_{cr} \perp$ [mm] | 250 | | | | | | | | |
| **Drilling method** | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | |

**Table C95.2:** 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 $\alpha_{g,N} \parallel$, $\alpha_{g,V} \parallel$, $\alpha_{g,N} \perp$, $\alpha_{g,V} \perp$ [-] | 2 | | | | | | | | |

fischer injection system FIS V Plus for masonry

**Performance**
Light-weight concrete solid block Vbl, dimensions, installation parameters

**Annex C 95**

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## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C96.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M8** | **M10** | **M10** | **M12** | **M12** | **M16** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **16x130** | | **18x130/200** | | **20x130** | | **22x130/200** | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | |
| **2 N/mm²** | w/w | w/d | 2,0 | | | 2,5 | | | 3,0 | |
| | d/d | | 2,0 | | | 3,0 | | | 4,0 | |

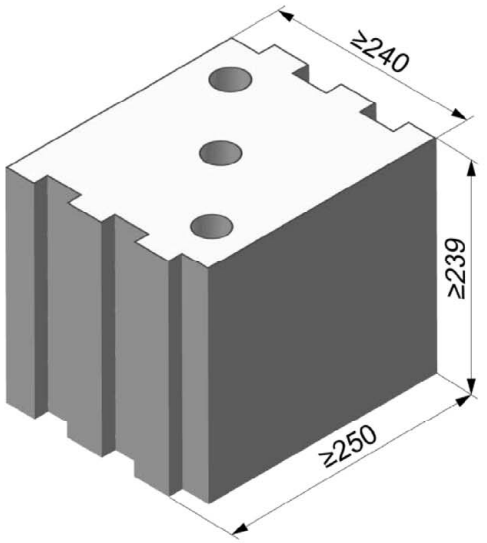
Factor for temperature range 72/120°C: 0,83

**Table C96.2:** Characteristic resistance under shear load

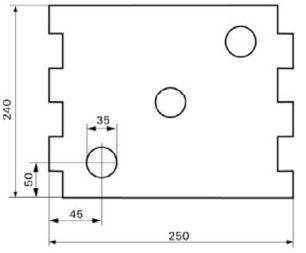
| **Anchor rod** | | **M8** | **M10** | **M10** | **M12** | **M12** | **M16** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **16x130** | | **18x130/200** | | **20x130** | | **22x130/200** | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | |
| **2 N/mm²** | w/w | w/d | 4,5 | | | | | 6,5 | | |
| | d/d | | | | | | | | | |

Factor for job site tests and displacements see annex C110

## Light-weight concrete solid block Vbl, EN 771-3:2015




| Light-weight concrete solid block Vbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | KLB | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 250 | ≥ 240 | ≥ 239 |
| Density ρ [kg/dm³] | ≥ 1,6 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 | | |
| Standard or annex | EN 771-3:2015 | | |




Dimension see also Annex B 19

**Table C97.1:** 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 | $T_{inst}$ | [Nm] | 4 |
| **General installation parameters** | | | |
| Edge distance | $c_{min}$ | [mm] | 130 |
| Spacing | $s_{min}$ ∥ = $s_{cr}$ ∥ | | 250 |
| | $s_{min}$ ⊥ = $s_{cr}$ ⊥ | | 250 |
| **Drilling method** | | | |
| Hammer drilling with hard metal hammer drill | | | |

**Table C97.2:** 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 | $\alpha_{g,N}$ ∥ | [-] | 2,0 |
| | $\alpha_{g,V}$ ∥ | | |
| | $\alpha_{g,N}$ ⊥ | | |
| | $\alpha_{g,V}$ ⊥ | | |

## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C98.1:** 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 | $c_{min}$ | [mm] | 130 | | |
| Spacing | $s_{min} \parallel = s_{cr} \parallel$ | [mm] | 250 | | |
| | $s_{min} \perp = s_{cr} \perp$ | [mm] | 250 | | |
| **Drilling method** | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | |

**Table C98.2:** Group factors

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

## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C99.1:** Characteristic resistance under tension load (Pre-positioned anchorage)

| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | **M8** | **M10** | **M8** | **M10** | **-** | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6 / M8** 11x85 | **-** | | **-** | | **M10 / M12** 15x85 | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | **16x130** | | **20x85** | | | **20x130** | | **20x200** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w | w/d | 1,2 | | 2,0 | | 2,5 | | | 3,0 | | | | | | | |
| | d/d | | 2,0 | | 3,5 | | 4,0 | | | 5,0 | | | | | | | |
| **6 N/mm²** | w/w | w/d | 1,5 | | 3,0 | | 4,0 | | | 5,0 | | | | | | | |
| | d/d | | 3,0 | | 5,0 | | 6,5 | | | 7,5 | | | | | | | |
| **8 N/mm²** | w/w | w/d | 2,0 | | 4,0 | | 5,0 | | | 6,5 | | | | | | | |
| | d/d | | 4,0 | | 7,0 | | 8,5 | | | 9,0 | | | | | | | |

**Table C99.2:** Characteristic resistance under tension load (Push through anchorage)

| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **4 N/mm²** | w/w w/d | 2,5 | | 3,0 |
| | d/d | 4,0 | | 5,0 |
| **6 N/mm²** | w/w w/d | 4,0 | | 5,0 |
| | d/d | 6,5 | | 7,5 |
| **8 N/mm²** | w/w w/d | 5,0 | | 6,5 |
| | d/d | 8,5 | | 9,0 |

Factor for job site tests and displacements see annex C110

Factor for temperature range 72/120°C: 0,83

## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C100.1:** Characteristic resistance under shear load (Pre-positioned anchorage)

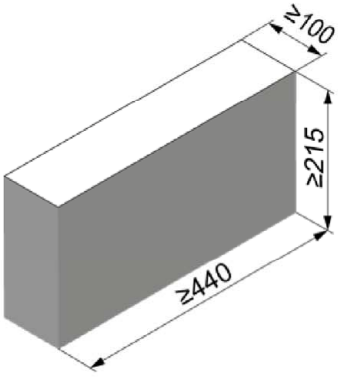
| **Anchor rod** | | **M6** | **M8** | **M6** | **M8** | **-** | | **M8** | **M10** | **M8** | **M10** | **-** | | **M12** | **M16** | **M12** | **M16** | **M12** | **M16** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **M6** / **11x85** | **M8** / **11x85** | **-** | | **-** | | **M10** / **15x85** | **M12** / **15x85** | **-** | | **-** | | **-** | |
| **Perforated sleeve FIS H K** | | **12x50** | | **12x85** | | **16x85** | | | | **16x130** | | **20x85** | | | | **20x130** | | **20x200** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | | | | | | | | | | | | | | | | | | |
| **4 N/mm²** | w/w, w/d, d/d | 2,0 | 3,0 | 2,0 | 3,0 | 2,0 | | 3,5 | | | | 4,5 | | | | | | | |
| **6 N/mm²** | w/w, w/d, d/d | 3,0 | 4,5 | 3,0 | 4,5 | 3,0 | | 5,5 | | | | 6,5 | | | | | | | |
| **8 N/mm²** | w/w, w/d, d/d | 4,0 | 6,0 | 4,0 | 6,0 | 4,0 | | 7,0 | | | | 8,5 | | | | | | | |

**Table C100.2:** Characteristic resistance under shear load (Push through anchorage)

| **Anchor rod** | | **M10** | **M12** | **M16** |
|---|---|---|---|---|
| **Perforated sleeve FIS H K** | | **18x130/200** | | **22x130/200** |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | |
| compressive strength $f_b$ | use category | | | |
| **4 N/mm²** | w/w, w/d, d/d | 3,5 | | 4,5 |
| **6 N/mm²** | w/w, w/d, d/d | 5,5 | | 6,5 |
| **8 N/mm²** | w/w, w/d, d/d | 7,0 | | 8,5 |

Factor for job site tests and displacements see annex C110

## Light-weight concrete solid block Vbl, EN 771-3:2015




| Light-weight concrete solid block Vbl, EN 771-3:2015 | | | |
|---|---|---|---|
| Producer | Roadstone wood | | |
| Nominal dimensions [mm] | length L | width W | height H |
| | ≥ 440 | ≥ 100 | ≥ 215 |
| Density ρ [kg/dm³] | ≥ 2,0 | | |
| Compressive strength $f_b$ [N/mm²] | 4 / 6 / 8 / 10 | | |
| Standard or annex | EN 771-3:2015 | | |

**Table C101.1:** 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 | $T_{inst}$ | [Nm] | 4 | | 10 | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 100 | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 75 | | | | | | | | | |
| | $s_{cr}$ ∥ | | 3x $h_{ef}$ | | | | | | | | | |
| | $s_{min}$ ⊥ | | 75 | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | |

**Table C101.2:** Group factors

| Anchor rod | | | M6 | M8 | M10 | M12 | M16 |
|---|---|---|---|---|---|---|---|
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,6 | | | | |
| | $\alpha_{g,V}$ ∥ | | 1,3 | | | | |
| | $\alpha_{g,N}$ ⊥ | | 1,4 | | | | |
| | $\alpha_{g,V}$ ⊥ | | 1,3 | | | | |

## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C102.1:** Characteristic resistance under tension load

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|---|---|---|---|---|---|---|
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | |
| 4 N/mm² | w/w w/d | 1,2 | 1,2 | | | |
| | d/d | 2,0 | 2,0 | | | |
| 6 N/mm² | w/w w/d | 1,5 | 2,0 | | | |
| | d/d | 3,0 | 3,5 | | | |
| 8 N/mm² | w/w w/d | 2,0 | 2,5 | | | |
| | d/d | 4,0 | 4,5 | | | |
| 10N/mm² | w/w w/d | 3,0 | 3,5 | | | |
| | d/d | 5,0 | 5,5 | | | |

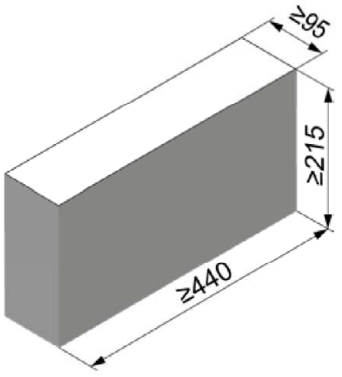
Factor for temperature range 72/120°C: 0,83

**Table C102.2:** Characteristic resistance under shear load

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|---|---|---|---|---|---|---|
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | |
| 4 N/mm² | w/w w/d<br>d/d | 1,2 | 1,5 | 1,5 | 1,5 | 1,5 |
| 6 N/mm² | w/w w/d<br>d/d | 2,0 | 2,0 | 2,5 | 2,5 | 2,5 |
| 8 N/mm² | w/w w/d<br>d/d | 2,5 | 2,5 | 3,0 | 3,0 | 3,5 |
| 10N/mm² | w/w w/d<br>d/d | 3,0 | 3,5 | 4,0 | 4,0 | 4,5 |

Factor for job site tests and displacements see annex C110

## Light-weight concrete solid block Vbl, EN 771-3:2015




| Light-weight concrete solid block Vbl, EN 771-3:2015 | | | | |
|---|---|---|---|---|
| Producer | | Tramac | | |
| Nominal dimensions [mm] | | length L | width W | height H |
| | | ≥ 440 | ≥ 95 | ≥ 215 |
| Density ρ | [kg/dm³] | ≥ 2,0 | | |
| Compressive strength $f_b$ | [N/mm²] | 6 / 8 / 10 / 12 | | |
| Standard or annex | | EN 771-3:2015 | | |

**Table C103.1:** 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 | $T_{inst}$ | [Nm] | 4 | | 10 | | | | | | | |
| **General installation parameters** | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 60 | | | | | | | | | |
| Spacing | $s_{min}$ ∥ | | 75 | | | | | | | | | |
| | $s_{cr}$ ∥ | | 3x $h_{ef}$ | | | | | | | | | |
| | $s_{min}$ ⊥ | | 75 | | | | | | | | | |
| | $s_{cr}$ ⊥ | | 3x $h_{ef}$ | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | |

**Table C103.2:** Group factors

| Anchor rod | | | M6 | M8 | M10 | M12 | M16 |
|---|---|---|---|---|---|---|---|
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 1,9 | | | | |
| | $\alpha_{g,V}$ ∥ | | 1,4 | | | | |
| | $\alpha_{g,N}$ ⊥ | | 1,9 | | | | |
| | $\alpha_{g,V}$ ⊥ | | 1,4 | | | | |

## Light-weight concrete solid block Vbl, EN 771-3:2015

**Table C104.1:** Characteristic resistance under tension load

| Anchor rod | | M6 | | M8 | | M10 | | M12 | | M16 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C) | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | |
| | | 50 | 70 | 50 | 70 | 50 | 70 | 50 | 70 | 50 | 70 |
| 6 N/mm² | 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 |
| 8 N/mm² | w/w w/d | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 3,0 | 2,0 | 3,0 | 2,0 | 3,0 |
| | d/d | 3,5 | 4,5 | 3,5 | 4,5 | 3,5 | 5,0 | 3,5 | 5,0 | 3,5 | 5,0 |
| 10N/mm² | w/w w/d | 2,5 | 3,5 | 2,5 | 3,5 | 2,5 | 3,5 | 2,5 | 3,5 | 2,5 | 3,5 |
| | d/d | 4,5 | 6,0 | 4,5 | 6,0 | 4,5 | 6,0 | 4,5 | 6,0 | 4,5 | 6,0 |
| 12N/mm² | w/w w/d | 3,0 | 4,0 | 3,0 | 4,0 | 3,0 | 4,5 | 3,0 | 4,5 | 3,0 | 4,5 |
| | d/d | 5,0 | 7,0 | 5,0 | 7,0 | 5,0 | 7,5 | 5,0 | 7,5 | 5,0 | 7,5 |

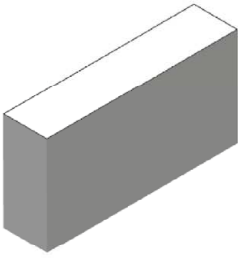
Factor for temperature range 72/120°C: 0,83

**Table C104.2:** Characteristic resistance under shear load

| Anchor rod | | M6 | M8 | M10 | M12 | M16 |
|---|---|---|---|---|---|---|
| $V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C) | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] ≥ 50 | | | | |
| 6 N/mm² | w/w w/d<br>d/d | 2,0 | 2,0 | 2,0 | 1,5 | 1,5 |
| 8 N/mm² | w/w w/d<br>d/d | 2,5 | 2,5 | 3,0 | 2,5 | 2,5 |
| 10N/mm² | w/w w/d<br>d/d | 3,5 | 3,5 | 4,0 | 3,0 | 3,0 |
| 12N/mm² | w/w w/d<br>d/d | 4,0 | 4,0 | 4,5 | 3,5 | 3,5 |

Factor for job site tests and displacements see annex C110

## Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2015



| Autoclaved aerated concrete, EN 771-4:2015 | | | | |
|---|---|---|---|---|
| Producer | | e.g. Ytong | | |
| Density ρ | [kg/dm³] | 0,35 | 0,5 | 0,65 |
| Compressive strength $f_b$ | [N/mm²] | 2 | 4 | 6 |
| Standard or annex | | EN 771-4:2015 | | |

**Table C105.1:** 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 | 85 | | | |
| Max. installation torque | $T_{inst}$ | [Nm] | 1 | 4 | 1 | 8 | 2 | 12 | 2 | 16 | 2 | 20 | 1 | | 2 | |
| **General installation parameters** | | | | | | | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 100 | | | | | | | | | | | | | |
| Spacing | $s_{cr}$ II = $s_{min}$ II | [mm] | 250 | | | | | | | | | | | | | |
| | $h_{ef}$=200mm $s_{min}$ II | [mm] | 80 | | | | | | | | | | | | | |
| | $h_{ef}$=200mm $s_{cr}$ II | [mm] | 3x $h_{ef}$ | | | | | | | | | | | | | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 250 | | | | | | | | | | | | | |
| | $h_{ef}$=200mm $s_{min}$ ⊥ | [mm] | 80 | | | | | | | | | | | | | |
| | $h_{ef}$=200mm $s_{cr}$ ⊥ | [mm] | 3x $h_{ef}$ | | | | | | | | | | | | | |
| **Drilling method** | | | | | | | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | | | | | | | |

**Table C106.1:** Group factors for autoclaved aerated concrete (Compressive strength $f_b$ =2 N/mm²)

| Anchor rod | | | M6 | M8 | M10 | M12 | M16 | - | - |
|---|---|---|---|---|---|---|---|---|---|
| Internal threaded anchor FIS E | | | - | - | - | - | - | M6 M8 | M10 M12 |
| | | | | | | | | 11x85 | 15x85 |
| Group factors | $h_{ef}$=200 $\alpha_{g,N}$ II | [-] | 1,6 | | | | | -[1] | -[1] |
| | $h_{ef}$=200 $\alpha_{g,V}$ II | | 1,1 | | | | | -[1] | -[1] |
| | $\alpha_{g,N}$ II, $\alpha_{g,V}$ II | | 2 | | | | | | |
| | $h_{ef}$=200 $\alpha_{g,N}\perp$ | | 1,6 | | | | | -[1] | -[1] |
| | $h_{ef}$=200 $\alpha_{g,V}\perp$ | | 0,8 | | | | | -[1] | -[1] |
| | $\alpha_{g,N}\perp$, $\alpha_{g,V}\perp$ | | 2 | | | | | | |

[1] No performance assessed

**Table C106.2:** Group factors for autoclaved aerated concrete (Compressive strength $f_b$ =4 N/mm²)

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

[1] No performance assessed

**Table C106.3:** Group factors for autoclaved aerated concrete (Compressive strength $f_b$ =6 N/mm²)

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

[1] No performance assessed

## Autoclaved aerated concrete (cylindrical drill hole), EN 771-4:2015

**Table C107.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **-** | | **-** | | **-** | | **M6** \| **M8** | | **M10** \| **M12** | |
| | | | | | | | | | | | | **11x85** | | **15x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | |
| | | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 85 | | | |
| **2 N/mm²** | 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 | |
| **4 N/mm²** | 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 | |
| **6 N/mm²** | 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

Factor for temperature range 72/120°C: 0,83

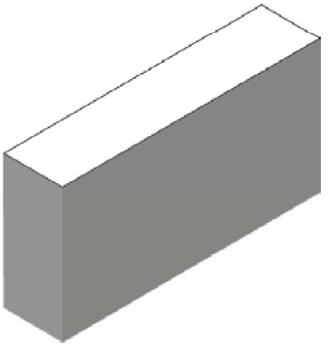
**Table C107.2:** Characteristic resistance under shear load

| **Anchor rod** | | **M6** | | **M8** | | **M10** | | **M12** | | **M16** | | **-** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | **-** | | **-** | | **-** | | **-** | | **-** | | **M6** \| **M8** | | **M10** \| **M12** | |
| | | | | | | | | | | | | **11x85** | | **15x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | | | | | | | |
| | | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 85 | | | |
| **2 N/mm²** | w/w \| w/d<br>d/d | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,5 | 1,2 | 1,2 | 1,2 | 1,2 | | 1,5 | |
| **4 N/mm²** | w/w \| w/d<br>d/d | 2,0 | -[1)] | 2,5 | 2,0 | 2,0 | 2,0 | 2,5 | 2,0 | 2,0 | 2,0 | 2,0 | | 2,5 | |
| **6 N/mm²** | w/w \| w/d<br>d/d | 2,5 | -[1)] | 3,0 | 2,5 | 3,0 | 3,0 | 3,5 | 4,0 | 4,5 | 4,5 | 2,5 | | 3,5 | |

[1)] No performance assessed

Factor for job site tests and displacements see annex C110

## Autoclaved aerated concrete (conical drill hole with special drill bit PBB), EN 771-4:2015



| Autoclaved aerated concrete, EN 771-4:2015 | | | | |
|---|---|---|---|---|
| Producer | | e.g. Ytong | | |
| Density ρ | [kg/dm³] | 0,35 | 0,5 | 0,65 |
| Compressive strength $f_b$ | [N/mm²] | 2 | 4 | 6 |
| Standard or annex | | EN 771-4:2015 | | |

**Table C108.1:** Installation parameters

| **Anchor rod** | | | **M8** | | **M10** | | **M12** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | - | - | - | - | - | - | **M6** | **M8** |
| | | | | | | | | | **11x85** | |
| **Anchor rod and internal threaded anchor FIS E without perforated sleeve** | | | | | | | | | | |
| Effective anchorage depth | $h_{ef}$ | [mm] | 75 | 95 | 75 | 95 | 75 | 95 | 85 | |
| Max. installation torque | $T_{inst}$ | [Nm] | 2 | | | | | | | |
| **General installation parameters** | | | | | | | | | | |
| Edge distance | $c_{min}$ | [mm] | 120 | 150 | 120 | 150 | 120 | 150 | 150 | |
| Spacing | $s_{cr}$ ∥ = $s_{min}$ ∥ | [mm] | 240 | 300 | 240 | 300 | 240 | 300 | 300 | |
| | $s_{cr}$ ⊥ = $s_{min}$ ⊥ | [mm] | 240 | 250 | 240 | 250 | 240 | 250 | 250 | |
| **Drilling method** | | | | | | | | | | |
| Hammer drilling with hard metal hammer drill | | | | | | | | | | |

**Table C108.2:** Group factors

| **Anchor rod** | | | **M8** | | **M10** | | **M12** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | | - | - | - | - | - | - | **M6** | **M8** |
| | | | | | | | | | **11x85** | |
| Group factors | $\alpha_{g,N}$ ∥ | [-] | 2 | | | | | | | |
| | $\alpha_{g,V}$ ∥ | | | | | | | | | |
| | $\alpha_{g,N}$ ⊥ | | | | | | | | | |
| | $\alpha_{g,V}$ ⊥ | | | | | | | | | |

**Autoclaved aerated concrete (conical drill hole with special drill bit PBB),**

**EN 771-4:2015**

**Table C109.1:** Characteristic resistance under tension load

| **Anchor rod** | | **M8** | | **M10** | | **M12** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | - | - | - | - | - | **M6** | **M8** |
| | | | | | | | | **11x85** | |
| **$N_{Rk} = N_{Rk,p} = N_{Rk,b}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C)** | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | |
| | | 75 | 95 | 75 | 95 | 75 | 95 | 85 | |
| **2 N/mm²** | w/w w/d | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | |
| | d/d | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | 2,5 | 2,0 | |
| **4 N/mm²** | w/w w/d | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | |
| | d/d | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | 3,5 | 3,0 | |
| **6 N/mm²** | w/w w/d | 3,5 | 4,0 | 3,5 | 4,0 | 3,5 | 4,0 | 3,5 | |
| | d/d | 4,0 | 4,5 | 4,0 | 4,5 | 4,0 | 4,5 | 4,0 | |

Factor for temperature range 72/120°C: 0,83

**Table C109.2:** Characteristic resistance under shear load

| **Anchor rod** | | **M8** | | **M10** | | **M12** | | **-** | |
|---|---|---|---|---|---|---|---|---|---|
| **Internal threaded anchor FIS E** | | - | - | - | - | - | - | **M6** | **M8** |
| | | | | | | | | **11x85** | |
| **$V_{Rk} = V_{Rk,b} = V_{Rk,c}$ [kN] depending on the compressive strength $f_b$ (temperature range 50/80°C and 72/120°C)** | | | | | | | | | |
| compressive strength $f_b$ | use category | Effective anchorage depth $h_{ef}$ [mm] | | | | | | | |
| | | 75 | 95 | 75 | 95 | 75 | 95 | 85 | |
| **2 N/mm²** | w/w w/d | 2,5 | | | | | | | |
| | d/d | | | | | | | | |
| **4 N/mm²** | w/w w/d | 4,5 | | | | | | | |
| | d/d | | | | | | | | |
| **6 N/mm²** | w/w w/d | 6,0 | | | | | | | |
| | d/d | | | | | | | | |

Factor for job site tests and displacements see annex C110

## β-factors for job site tests; displacements

**Table C110.1:** β-factors for job site tests

| use category | | w/w and w/d | | d/d | |
|---|---|---|---|---|---|
| temperature range | | 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<br>FIS E 11x85 | 0,6 | 0,54 | | |
| | M16<br>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 | 0,8 |
| 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 C110.2:** Displacements

| Material | N<br>[kN] | $\delta N_0$<br>[mm] | $\delta N_\infty$<br>[mm] | V<br>[kN] | $\delta V_0$<br>[mm] | $\delta V_\infty$<br>[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<br>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<br>annex C 14 / C 15 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,2 | 0,4 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,91 | 1,37 |
| AAC $h_{ef}$=200 mm<br>annex C 105 - C 107 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,03 | 2,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 1,25 | 1,88 |
| brick<br>Annex C 89 / C 90 | $\frac{N_{Rk}}{1,4 * \gamma_{Mm}}$ | 0,03 | 0,06 | $\frac{V_{Rk}}{1,4 * \gamma_{Mm}}$ | 6,44 | 9,66 |

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