



European Technical Approval ETA-10/0383

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

fischer Injektionssystem FIS V zur Verankerung im Mauerwerk
fischer injection system FIS V for use in masonry

Zulassungsinhaber
Holder of approval

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

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Injektionssystem zur Verankerung im Mauerwerk
Injection system for use in masonry

Geltungsdauer:
Validity:

vom
from
bis
to

27 June 2013

27 June 2018

Herstellwerk
Manufacturing plant

fischerwerke

Diese Zulassung umfasst
This Approval contains

79 Seiten einschließlich 71 Anhänge
79 pages including 71 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-10/0383 mit Geltungsdauer vom 30.09.2011 bis 26.11.2015
ETA-10/0383 with validity from 30.09.2011 to 26.11.2015

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Metal Injection Anchors for Use in Masonry", ETAG 029.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2011*, p. 2178
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The Injection system fischer FIS V is a bonded anchor (injection type) consisting of a mortar cartridge with fischer injection mortar FIS V, FIS VW or FIS VS, a perforated sleeve FIS HK, an anchor rod with hexagon nut and washer in the range of M6 to M16 or an internal threaded anchor in the range of M6 to M12. 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.

An illustration of the product and intended use is given in Annex 1 and Annex 2.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences.

The anchor is to be used only for anchorages subject to static or quasi-static loading in solid masonry (use category b), in hollow or perforated masonry (use category c) or in autoclaved aerated concrete masonry (use category d) according to Annex 11 to Annex 13. The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2010 at minimum.

The anchor may be used in the following service temperature ranges:

Temperature range I: -40 °C to +80 °C (Maximum long term temperature +50 °C and
Maximum short term temperature +80 °C)

Temperature range II: -40 °C to +120 °C (Maximum long term temperature +72 °C and
Maximum short term temperature +120 °C)

The anchor may be installed and used in dry or wet structures. Category d/d applies for installation and use in dry structures and Category w/w applies for installation and use in wet structures.

Regarding the steel elements of the anchor following use conditions applies:

Steel elements made of zinc coated steel:

The steel elements made of electroplated or hot-dipped galvanised steel may only be used in structures subject to dry internal conditions.

Steel elements made of stainless steel A4:

The steel element made of stainless steel may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular 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).

Steel elements made of high corrosion resistant steel C:

The steel element made of high corrosion resistant steel may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure, in permanently damp internal conditions or in other particular aggressive conditions. Such particular 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 chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European technical approval are based on an assumed working life of the anchor of 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.

2 Characteristics of the product and methods of verification

2.1 Characteristics of product

The anchor corresponds to the drawings and provisions given in the annexes. The characteristic material values, dimensions and tolerances of the anchor not indicated in annexes shall correspond to the respective values laid down in the technical documentation⁷ of this European technical approval.

The characteristic anchor values for the design of anchorages are given in Annex 10 to Annex 71.

The anchor satisfies the requirements for class A1 of the characteristic reaction to fire.

Regarding resistance to fire no performance is determined.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Injection Anchors for Use in Masonry", ETAG 029, based on the Use Categories b, c and d in respect of the base material and Category d/d and w/w in respect of installation and use.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

⁷ The technical documentation of this European technical approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 97/177/EC of the European Commission⁸ System 1 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
 - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks for the approved body:
 - (3) initial type-testing of the product;
 - (4) initial inspection of factory and of factory production control;
 - (5) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial/raw/constituent materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan⁹ which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Deutsches Institut für Bautechnik. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2 For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

⁸ Official Journal of the European Communities L 073 of 14.03.1997

⁹ The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- ETAG 029,
- use category (b, c, or d and d/d or w/w) and
- size.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced.

Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the ETAG 029, Annex C¹⁰, Design method A under the responsibility of an engineer experienced in anchorages and masonry work.

The characteristic values of resistance of a single anchor to tension load (N_{Rk}) and to shear load (V_{Rk}) are given in Annex 16 to Annex 71. For design according to ETAG 029, Annex C is

$$N_{Rk} = N_{Rk,s} = N_{Rk,p} = N_{Rk,b} = N_{Rk,pb} \quad \text{and} \quad V_{Rk} = V_{Rk,s} = V_{Rk,b} = V_{Rk,pb} = V_{Rk,c}$$

The characteristic values of resistance of a group of two anchors (see also Annex 14) are calculated by using the group-factors (α_g according to Annex 16 to Annex 71):

$$N_{Rk}^g = \alpha_{g,N} \cdot N_{Rk} \quad \text{and} \quad V_{Rk}^g = \alpha_{g,V} \cdot V_{Rk}$$

The characteristic values of resistance of a group of four anchors (see also Annex 14) are calculated by using the group-factors (α_g according to Annex 16 to Annex 71):

$$N_{Rk}^g = \alpha_{g,N \parallel} \cdot \alpha_{g,N \perp} \cdot N_{Rk} \quad \text{and} \quad V_{Rk}^g = \alpha_{g,V \parallel} \cdot \alpha_{g,V \perp} \cdot V_{Rk}$$

Verifiable calculation notes and drawings are prepared taking into account the relevant masonry in the region of the anchorage (nature and strength of the base materials), 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.

The characteristic resistances are only valid for kind of bricks according to Annexes 16 to Annex 71. The characteristic resistance for use in solid masonry are also valid for larger brick sizes and larger compressive strength of the masonry unit.

It is to ensure that the use category applies and that the characteristic values of the base material, in which the anchor is to be placed, is identical with the values, which the characteristic resistances apply for.

For other bricks in solid masonry and in hollow or perforated masonry, the characteristic resistance of the anchor may be determined by job site tests according to ETAG, Annex B¹¹ under consideration of the β -factor according to Annex 15, Table 10.

4.3 Installation

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor,
- anchor installation in accordance with the manufacturer's specifications and drawings using the tools indicated in the technical documentation of this European technical approval,
- checks before placing the anchor to ensure that the use category applies,
- 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 given in Annex 6, Table 5,

¹⁰ The Guideline ETAG 029, "Metal Injection Anchors for Use in Masonry, Annex C: Design Methods for Anchorages" is published in English on EOTA website www.eota.eu.

¹¹ The Guideline ETAG 029, "Metal Injection Anchors for Use in Masonry, Annex B: Recommendations for tests to be carried out on construction works" is published in English on EOTA website www.eota.eu.

- confirmation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204:2004, the documents should be stored,
- marking of the threaded rod with the envisage embedment depth. This may be done by the manufacturer of the rod or the person on jobsite.
- holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit,
- in case of aborted drill hole the drill hole shall be filled with mortar,
- hole cleaning and anchor installation in accordance with manufacturer's installation instructions (Annex 7 to Annex 9),
- keeping the installation parameters (Annex 4 and Annex 5),
- marking and keeping the effective anchorage depth,
- keeping edge distance and spacing according to Annex 16 to Annex 71 without minus tolerances,
- observing the curing time according to Annex 6, Table 6 until the anchor may be loaded,
- fastening screws or threaded rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E.

5 Indications to the manufacturer

5.1 Manufacturer's responsibilities

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 to as well as sections 4.2, 4.3 and 5.2 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

- installation parameters according to Annex 4 and 5,
- material and property class of metal parts according to Annex 6, Table 5,
- information on the installation procedure, including cleaning of the hole with the cleaning equipments, preferably by means of an illustration,
- exact volume of injection mortar depend on the relevant installation,
- storage temperature of anchor components, minimum and maximum temperature of the base material, processing time (open time) of the mortar and curing time until the anchor may be loaded according to Annex 6,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

5.2 Recommendations regarding packaging, transport and storage

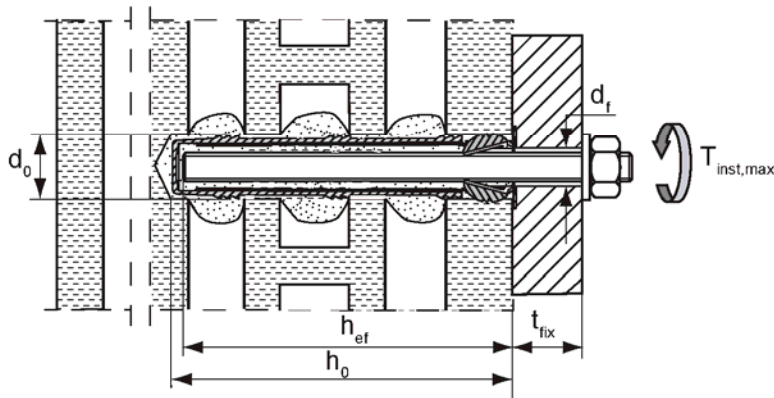
The injection cartridges shall be protected against sun radiation and shall be stored according to the manufacture's installation instructions in dry condition at temperatures of at least +5°C to not more than +25°C.

Mortar cartridges with expired shelf life must no longer be used.

Andreas Kummerow
p.p. Head of Department

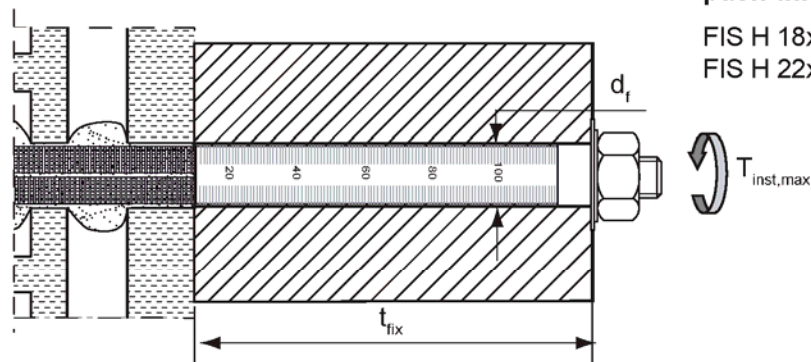
beglaubigt:
Wittstock

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



Pre-positioned installation

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

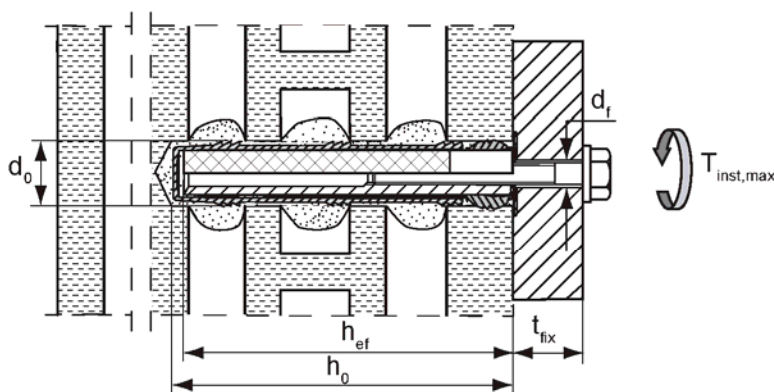


push-through installation

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

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

Pre-positioned installation



h_{ef} = effective anchorage depth

h_0 = depth of drill hole

t_{fix} = thickness of fixture

d_0 = nominal drill bit diameter

d_f = diameter of clearance hole in the fixture

$T_{inst,max}$ = maximum torque moment

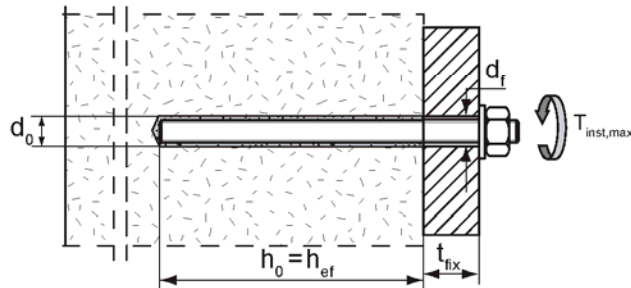
fischer injection system FIS V masonry

Intended use with perforated sleeve

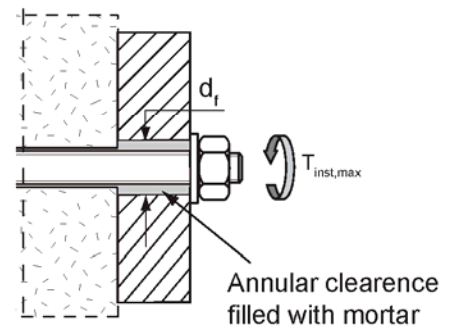
Annex 1

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

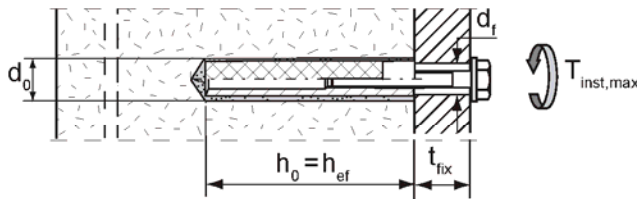
Pre-positioned installation



Push-through installation



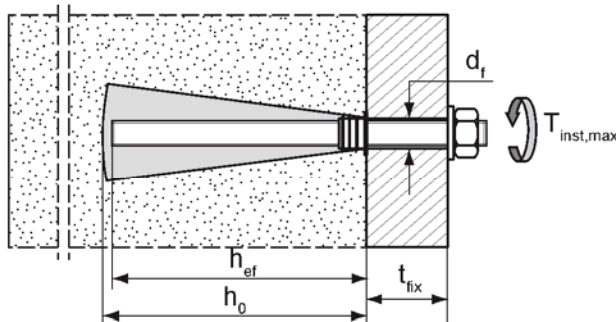
Internal threaded anchors FIS E without perforated sleeve FIS H K; Installation in solid brick masonry and aerated concrete



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

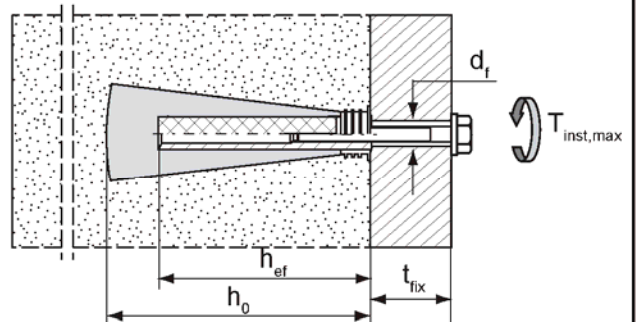
Anchor rods M8, M10, M12

Pre-positioned installation



Internal threaded anchor FIS E 11x85 M6
and FIS E 11x85 M8

Pre-positioned installation



h_{ef} = effective anchorage depth

h_0 = depth of drill hole

t_{fix} = thickness of fixture

d_0 = nominal drill bit diameter

d_t = diameter of clearance hole in the fixture

$T_{inst,max}$ = maximum torque moment

fischer injection system FIS V masonry

Intended use without perforated sleeve

Annex 2

Shuttle cartridge:
360ml, 585ml, 950ml
Imprint: fischer FIS V or FIS VS or FIS VW, processing notes, shelf-life, hazard code, piston travel scale, curing time, processing time (depending on temperature)

Coaxial cartridge:
100ml, 150ml, 300ml, 380ml, 400ml, 410 ml
Imprint: fischer FIS V or FIS VS or FIS VW, processing notes, shelf-life, hazard code, piston travel scale, curing time, processing time (depending on temperature)

FIS A
Size: M6, M8, M10, M12, M16

fischer internal threaded anchor FIS E
Size: FIS E 11x85 M6, FIS E 11x85 M8, FIS E 15x85 M10, FIS E 15x85 M12

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

FIS H 16x130 K
FIS H 20x130 K
FIS H 20x200 K

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

① Mortar cartridge
② Sealing cap
③ Mixing nozzle
④ Injection adapter and center nozzle for aerated concrete
⑤ Anchor rod
⑥ Washer
⑦ Hexagon nut
⑧ Internal threaded anchor FIS E
⑨ Perforated sleeve

Use categories:
base material: use category b, c and d (solid, hollow or perforated masonry or autoclaved aerated concrete)
Installation and use: category d/d and w/w (installation and use in dry and wet structure)
Service temperature range I: -40°C to + 80°C (max. long term temperature +50°C and max. short term temperature +80°C)
Service temperature range II: -40°C to +120°C (max. long term temperature +72°C and max. short term temperature +120°C)

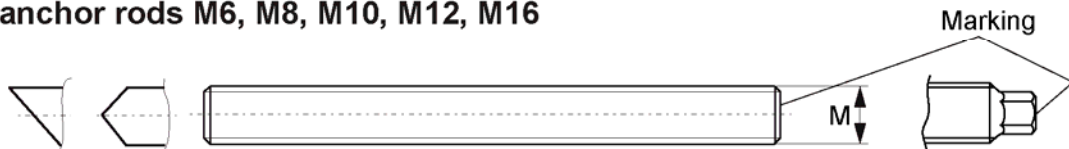
fischer injection system FIS V masonry	Annex 3
Product Use categories	

Table 1: Installation parameters anchor rods in solid bricks (without perforated sleeves)

Size		M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0 [mm]	8	10	12	14	18
Effective anchorage depth $h_{ef}^{1)}$	$h_{ef,min}$ [mm]	50				64
Depth of drill hole $h_0 = h_{ef}$	$h_{ef,max}$ [mm]	≥100				
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 steel brush	$d_b \geq$ [mm]	9	11	13	16	20
Maximum installation torque	$T_{inst,max}$ [Nm]	see parameters of brick				
Thickness of fixture	$t_{fix,max}$ [mm]	1500				

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

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



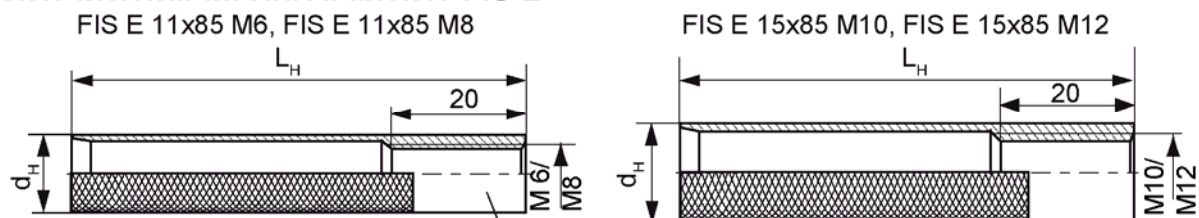
Marking:

Property class 8.8 or high corrosion-resistant steel, property class 80: •
Stainless steel A4, property class 50 and high corrosion-resistant steel, property class 50: ••

Table 2: Installation parameters fischer internal threaded anchors FIS E in solid bricks (without perforated sleeves)

Size FIS E...		11x85 M6	11x85 M8	15x85 M10	15x85 M12
Diameter of anchor	d_H [mm]	11		15	
Nominal drill bit diameter	d_0 [mm]	14		18	
Length of anchor	L_H [mm]	85			
Drill hole depth	h_0 [mm]	90			
Effective anchorage depth	h_{ef} [mm]	85			
Diameter of steel brush	$d_b \geq$ [mm]	16		20	
Diameter of clearance hole in the fixture	d_f [mm]	7	9	12	14
	$l_{E,min}$ [mm]	6	8	10	12
Screw-in depth	$l_{E,max}$ [mm]	60			

fischer internal threaded anchor FIS E



Marking: Size, e.g. M8
Stainless steel: A4, e.g. M8 A4
High corrosion-resistant steel: C, e.g. M8 C

Steel brush



fischer injection system FIS V masonry

Installation parameters anchor rods and internal threaded anchors FIS E
without perforated sleeves
Steel brush

Annex 4

Table 3: Installation parameters anchor rods and internal threaded anchors FIS E with perforated sleeves (pre-positioned anchorage)

Size FIS H K	12x50	12x85	16x85	16x130	20x85	20x130	20x200
Nominal drill hole diameter $d_0 = D_{\text{sleeve,nom}}$ [mm]	12		16		20		
Depth of drill hole h_0 [mm]	55	90	90	135	90	135	205
Effective anchorage depth $h_{\text{ef,min}}$ [mm] $h_{\text{ef,max}}$ [mm]	50	85	85	110	85	110	180
	50	85	85	130	85	130	200
Size of anchor rod [-]	M6 or M8		M8 or M10		M12 or M16		
Size of internal threaded anchor FIS E	—	—	11x85	—	15x85	—	—
Diameter of steel brush ¹⁾ $d_b \geq$ [mm]	13		18		24		
Maximum installation torque $T_{\text{inst,max}}$ [Nm]	see parameters of brick						
Thickness of fixture $t_{\text{fix,max}}$ [mm]	1500						

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

Perforated sleeves

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

Marking:

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

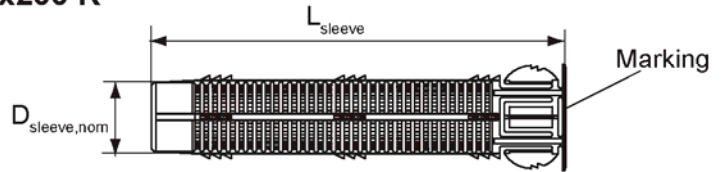
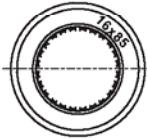
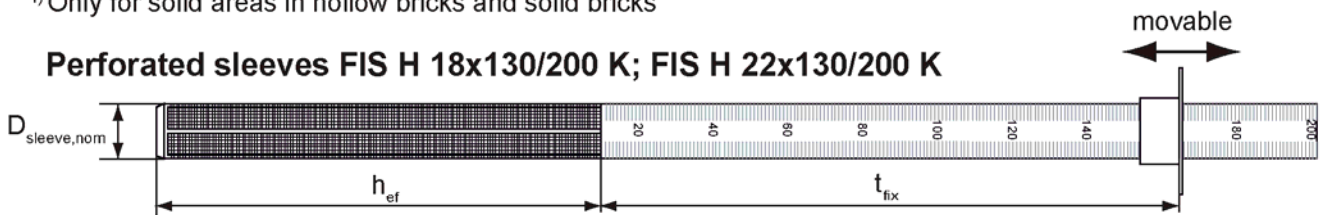


Table 4: Installation parameters anchor rods with perforated sleeves (push through anchorage)

Size FIS H K	18x130/200	22x130/200	
Nominal sleeve diameter $D_{\text{sleeve,nom}}$ [mm]	16	20	
Nominal drill hole diameter d_0 [mm]	18	22	
Depth of drill hole h_0 [mm]	$135 + t_{\text{fix}}$		
Effective anchorage depth h_{ef} [mm]	≥ 130		
Diameter of steel brush ¹⁾ $d_b \geq$ [mm]	20	24	
Size of anchor rod [-]	M10	M12	M16
Torque moment $T_{\text{inst,max}}$ [Nm]	see parameters of brick		
Thickness of fixture $t_{\text{fix,max}}$ [mm]	200		

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

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



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Installation parameters anchor rods and internal threaded anchors FIS E with perforated sleeves

Annex 5

Table 5: Materials

Part	Designation	Materials		
1	Chemical mortar	Reaction resin mortar, hardener, additive		
		Steel, zinc plated	Stainless steel A4	High corrosion resistant steel C
5	Anchor rod	Property class 5.8 or 8.8 EN ISO 898-1 zinc plated ≥ 5µm, EN ISO 4042 A2K or hot-dip galvanised EN ISO 10684	Property class 50 or 70 EN ISO 3506 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088 or 1.4062 pr EN 10088:2011	Property class 50 or 80 EN ISO 3506 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4529; 1.4565 EN 10088
6	Washer EN ISO 7089	EN ISO 7089 zinc plated ≥ 5µm, EN ISO 4042 A2K or hot-dip galvanised EN ISO 10684	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088	1.4529; 1.4565 EN 10088
7	Hexagon nut according to EN 24032	Property class 5 or 8; EN ISO 898-2 zinc plated ≥ 5µm, EN ISO 4042 A2K or hot-dip galvanised EN ISO 10684	Property class 50 or 70 EN ISO 3506 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088	Property class 50, 70 or 80 EN ISO 3506 1.4529; 1.4565 EN 10088
8	Internal threaded anchor FIS E	Property class 5.8 EN ISO 898-1 zinc plated ≥ 5µm, EN ISO 4042 A2K	Property class 70 EN ISO 3506 1.4401; 1.4571 EN 10088	Property class 70 EN ISO 3506 1.4529 EN 10088
9	Perforated sleeve	PP / PE		

Table 6: Maximum processing times and minimum curing times

fischer FIS V²⁾

Masonry temperature [°C]	Maximum processing time [Minutes]	Minimum curing time ¹⁾ [Minutes]
-5 to ±0	—	24 hours
>+0 to +5	13	180
>+5 to +10	9	90
>+10 to +20	5	60
>+20 to +30	4	45
>+30 to +40	2	35

fischer FIS VS / FIS V Low Speed²⁾

Masonry temperature [°C]	Maximum processing time [Minutes]	Minimum curing time ¹⁾ [Minutes]
±0 to +5	—	360
>+5 to +10	20	180
>+10 to +20	10	120
>+20 to +30	6	60
>+30 to +40	4	30

fischer FIS VW / FIS V High Speed³⁾

Masonry temperature [°C]	Maximum processing time [Minutes]	Minimum curing time ¹⁾ [Minutes]
-5 to ±0	—	3 hours
>±0 to +5	5	90
>+5 to +10	3	45
>+10 to +20	1	30

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

²⁾ Minimum cartridge temperature +5°C.

³⁾ Minimum cartridge temperature ±0°C.

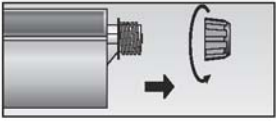
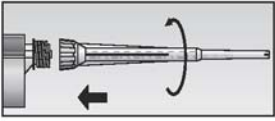

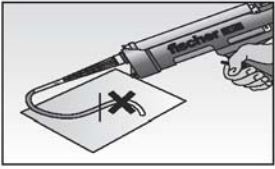
fischer injection system FIS V masonry

Materials
Maximum processing times and minimum curing times

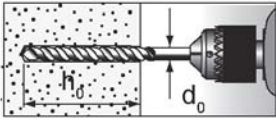
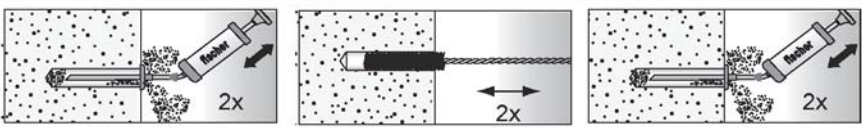
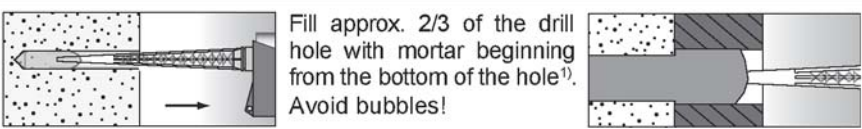
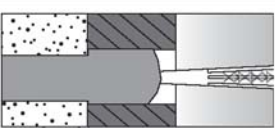
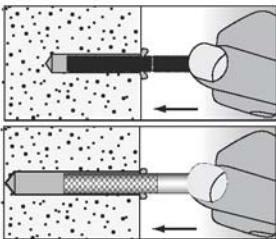
Annex 6

Installation instruction


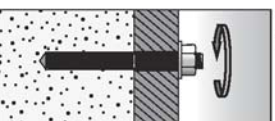
Preparing the cartridge

- | | | | | |
|----------|---|---|--|--|
| 1 |  | Remove the sealing cap. |  | Screw on the static mixer. (the spiral in the static mixer must be clearly visible) |
| 2 |  | Place the cartridge into the dispenser. |  | Press approx 10 cm of material out until the resin is well mixed. Don't use mortar that is not well mixed. |

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

- | | | | | |
|----------|--|---|--|---|
| 3 |  | Drill the hole (hammerdrill). Depth of drill hole h_0 and drill hole diameter d_0 see Table 1. | | |
| 4 |  | | | Blow out the drill hole twice. Brush twice and blow out twice again. |
| 5 |  | Fill approx. 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 also with mortar. |
| 6 |  | Only use clean and oil-free anchor elements. Mark the anchor rod for setting depth. Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions. When reaching the setting depth marking, excess mortar must emerge from the mouth of the drill hole. | | |

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

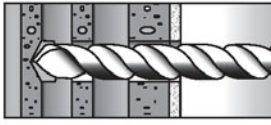
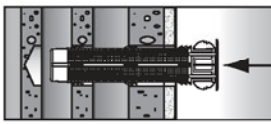
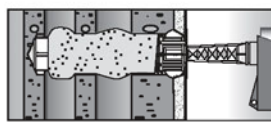
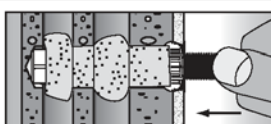

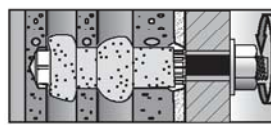
- | | | | | |
|----------|---|--|--|---|
| 7 |  | Do not touch. Minimum curing time see Table 6. |  | Mounting the fixture. $T_{inst,max}$ see parameter of brick |
|----------|---|--|--|---|

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Installation instruction (without perforated sleeve)
Part 1

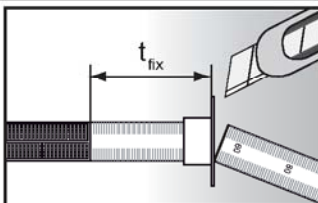
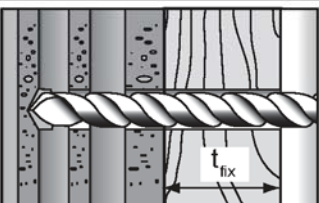
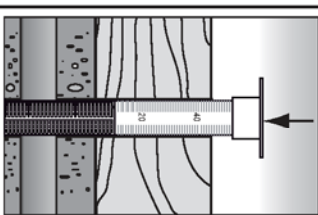
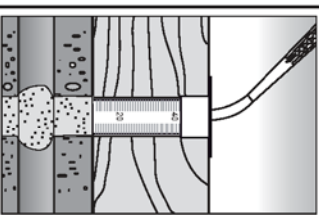
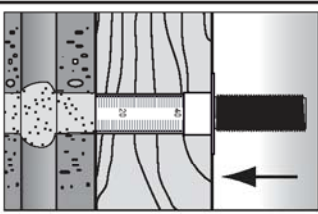

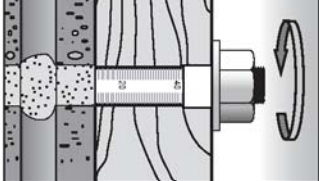
Annex 7

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

3		Drill the hole (hammerdrill). Depth of drill hole h_0 and drill hole diameter d_0 see Table 3 .	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing.	
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		Insert the anchor rod or internal threaded anchor FIS E by hand using light turning motions.		
6		Do not touch. Minimum curing time see Table 6		Mounting the fixture. $T_{inst,max}$ see parameter of brick

¹⁾ The exact quantity of mortar see manufacturer's specification.

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

3		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 4 .
4		Insert the perforated sleeve flush with the surface of the fixture.		Fill the sleeve with mortar beginning from the bottom of the hole. ¹⁾ For deep drill holes use an extension tube.
5		Insert the anchor rod by hand using light turning motions.		
6		Do not touch. Minimum curing time see Table 6		Tighten the hexagon nut. $T_{inst,max}$ see parameters of brick

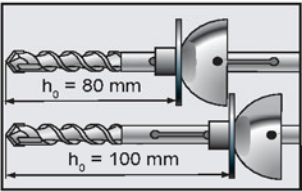
¹⁾ The exact quantity of mortar see manufacturer's specification.

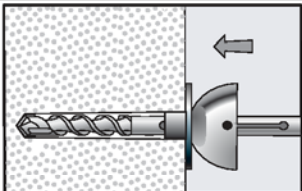
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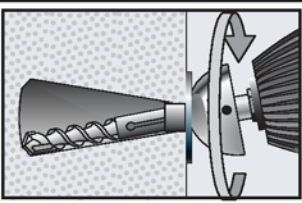
Installation instruction (with perforated sleeve)
Part 2

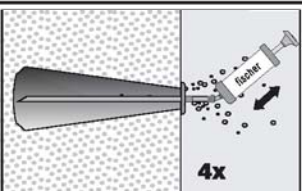
Annex 8

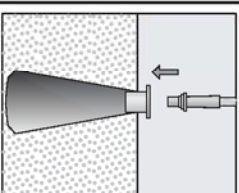
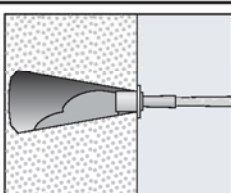
**Installation in aerated and reinforced aerated concrete with special conic drill bit PBB
(pre-positioned anchorage)**

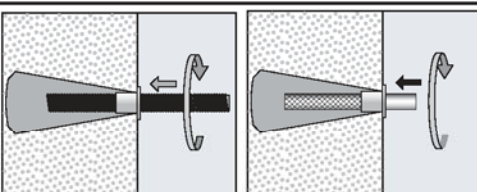
3		<p>Position the movable drill bit arrester on the used drill hole depth. For this, unlock the clamp screw and slide the arrester. Now fix the clamp screw.</p>
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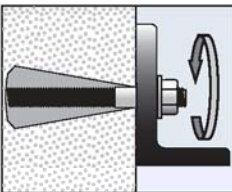
4		<p>Drill the cylindrical hole with rotating drill until the arrester contact the material surface.</p>
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5		<p>Deviate the working power drill circulate to generate an conic undercut in the material.</p>
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6		<p>Blow out the drill hole four times.</p>
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7		<p>Put the center sleeve into the drill hole and adapted the injection adapter onto the static mixer.</p>		<p>Fill the drill hole with injection mortar FIS V, FIS FS or FIS VW.</p>
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8		<p>Mark the anchor rod for seating depth. Insert the anchor rod or internal threaded anchor FIS E, up to the setting depth marking, by hand using light turning motions.</p>
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9	 <p>Do not touch. Minimum curing time see Table 6.</p>	 <p>Tighten the hexagon nut. $T_{inst,max}$ see parameter of brick</p>
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Installation instruction (aerated concrete with conical drill hole). Part 3

Annex 9

Table 7: Characteristic bending moments for anchor rods

Size			M6	M8	M10	M12	M16	
Characteristic bending moments $M_{Rk,s}$	Property class	5.8 [Nm]	8	19	37	65	166	
		8.8 [Nm]	12	30	60	105	266	
	stainless steel A4	Property class	50 [Nm]	8	19	37	65	166
		class	70 [Nm]	11	26	52	92	232
	high corrosion-resistant steel C	Property class	50 [Nm]	8	19	37	65	166
			70 ²⁾ [Nm]	11	26	52	92	232
80 [Nm]			12	30	60	105	266	
Partial safety factors $\gamma_{Ms,v}$ ¹⁾	Property class	5.8 [-]	1,25					
		8.8 [-]	1,25					
	stainless steel A4	Property class	50 [-]	2,38				
		class	70 [-]	1,56				
	high corrosion-resistant steel C	Property class	50 [-]	2,38				
			70 ²⁾ [-]	1,25				
80 [-]			1,33					

¹⁾ If no other national regulations exist.

²⁾ $f_{uk} = 700 \text{ N/mm}^2$; $f_{yk} = 560 \text{ N/mm}^2$

Table 8: Characteristic bending moments for internal threaded anchors FIS E

Size FIS E			11x85 M6	11x85 M8	15x85 M10	15x85 M12	
Characteristic bending moments $M_{Rk,s}$	Property class of screw	5.8 [Nm]	8	19	37	65	
		8.8 [Nm]	12	30	60	105	
	stainless steel A4	Property class	70 [Nm]	11	26	52	92
		class	70 [Nm]	11	26	52	92
Partial safety factors $\gamma_{Ms,v}$ ¹⁾	Property class of screw	5.8 [-]	1,25				
		8.8 [-]	1,25				
	stainless steel A4	Property class	70 [-]	1,56			
		class	70 [-]	1,25			
	high corrosion-resistant steel C	Property class	70 [-]	1,25			
			70 [-]	1,25			

¹⁾ If no other national regulations exist.

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Characteristic bending moments

Annex 10

Table 9.1: Summary of especially German bricks and blocks

Solid bricks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Solid brick Mz EN 771-1	≥ 240x115x113	10 / 16	≥1,8	16 / 17
Solid sand- lime brick KS EN 771-2	≥ 250x240x240	10 / 20 / 28	≥2,0	18 / 19
Solid light-weight concrete block Vbl	≥ 372x300x254	2	≥0,6	20 / 21
Solid light-weight concrete block Vbl	≥ 250x240x239	4 / 6 / 8	≥1,6	22 / 23
Perforated bricks and hollow blocks				
Perforated brick HLz EN 771-1 e.g. Poroton	≥ 366x239x237	6 / 8 / 10 / 12 / 16	≥1,0	24 / 25
Perforated brick HLz EN 771-1	≥ 240x115x113	6 / 10 / 16 / 20 / 28	≥1,4	26 / 27
Sand- lime hollow block KSL EN 771-2	≥ 240x175x113	8 / 10 / 12 / 16 / 20	≥1,4	28 / 29
Light-weight concrete hollow block Hbl	≥ 362x240x240	2 / 4	≥1,0	30 / 31

Table 9.2: Summary of especially French bricks and blocks

Perforated bricks and hollow blocks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Perforated brick HLz EN 771-1	≥ 560x200x275	4 / 6 / 8	≥0,7	32 / 33
Perforated brick HLz EN 771-1	≥ 500x200x300	4 / 6 / 8 / 10	≥0,7	34 / 35
Perforated brick HLz EN 771-1	≥ 500x200x315	2 / 4 / 6 / 8	≥0,7	36 / 37
Perforated brick HLz EN 771-1	≥ 500x200x315	4 / 6 / 8	≥0,6	38 / 39
Light-weight concrete hollow block Hbl	≥ 500x200x200	2 / 4 / 6	≥1,0	40 / 41

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Summary of especially German and French bricks and blocks

Annex 11

Table 9.3: Summary of especially Italian bricks

Solid bricks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Solid brick Mz EN 771-1	≥ 245x118x54	10 / 20	≥1,8	42 / 43
Perforated bricks				
Perforated brick HLz EN 771-1	≥ 255x120x118	2 / 4 / 6 / 8 / 10 / 12	≥1,0	44 / 45
Perforated brick LLz EN 771-1	≥ 248x78x250	2 / 4 / 6	≥0,7	46 / 47

Table 9.4: Summary of especially Spanish and Portuguese bricks

Perforated bricks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Perforated brick HLz EN 771-1	≥ 275x130x94	6 / 8 / 12 / 16 / 20	≥0,8	48 / 49
Perforated brick LLz EN 771-1	≥ 128x88x275	2	≥0,8	50 / 51
Perforated brick HLz EN 771-1	≥ 190x290x220	6 / 8 / 10	≥0,7	52 / 53

Table 9.5: Summary of especially Austrian bricks

Perforated bricks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Perforated brick HLz EN 771-1	≥ 253x300x240	2 / 4 / 6	≥0,8	54 / 55

Table 9.6: Summary of especially Irish and English blocks

Solid blocks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Solid light-weight concrete block Vbl	≥ 440x100x215	4 / 6 / 8 / 10	≥2,0	56 / 57
Solid light-weight concrete block Vbl	≥ 440x95x215	6 / 8 / 10 / 12	≥2,0	58 / 59
Perforated blocks				
Light-weight concrete hollow block Hbl	≥ 440x215x215	4 / 6 / 8 / 10	≥1,2	60 / 61

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Summary of especially Italian, Spanish, Portuguese, Austrian, Irish and English bricks and blocks

Annex 12

Table 9.7: Summary of especially Dutch and Danish bricks and blocks

Solid bricks				
Kind of masonry	Brick format [mm]	Compressive strength [N/mm ²]	Density [kg/dm ³]	Annex
Solid brick Mz EN 771-1	≥ 230x108x55	10 / 20	≥1,8	62 / 63
Solid sand-lime brick KS EN 771-2	≥ 997x214x538	10 / 20 / 36	≥1,8	64 / 65
Perforated bricks				
Perforated brick HLz EN 771-1	≥ 230x108x55	2 / 4 / 6 / 8	≥1,4	66 / 67

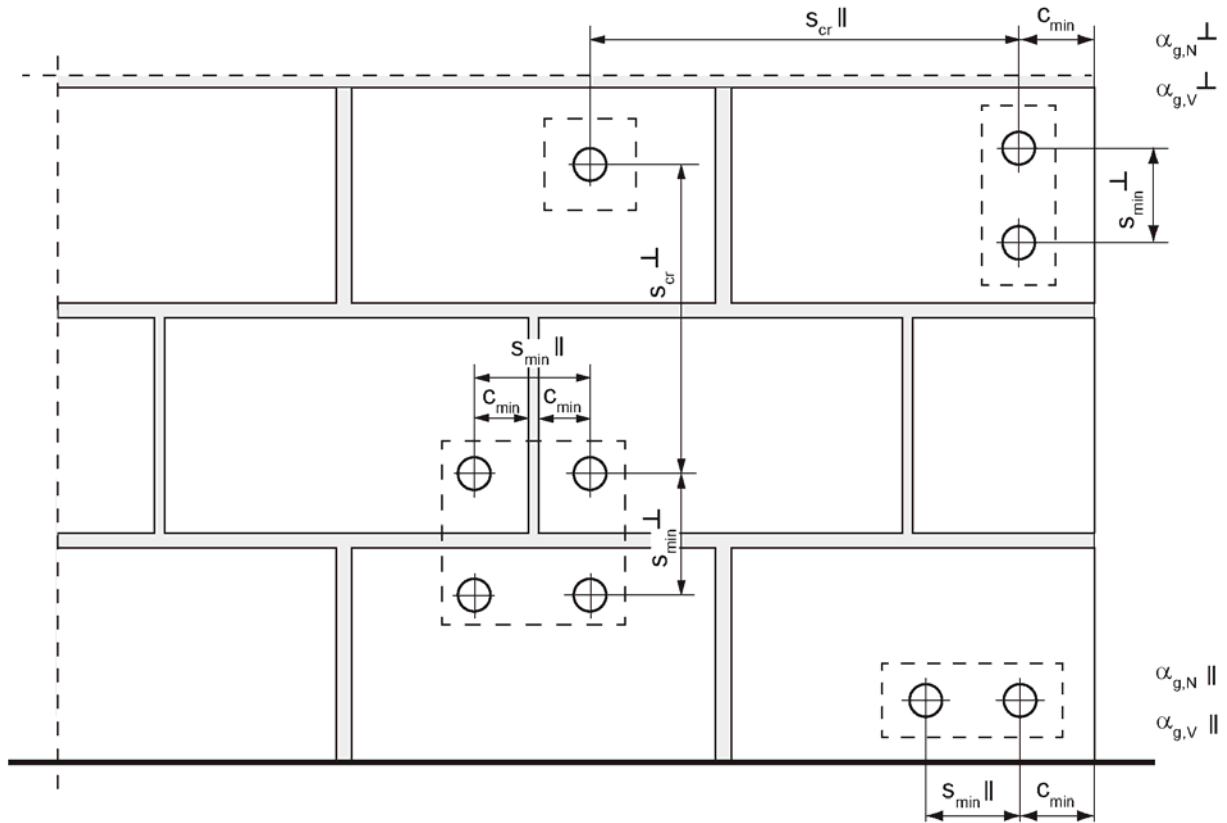
Table 9.8: Summary of autoclaved aerated concrete

Autoclaved aerated concrete			
Property class		Density [kg/m ³]	Annex
2 / 4 / 6	Cylindrical drill hole	350, 500, 650	68 / 69
	Conical drill hole (special drill bit)	350, 500, 650	70 / 71

fischer injection system FIS V masonry

Summary of especially Danish and Dutch bricks and blocks
Summary of autoclaved aerated concrete

Annex 13



$s_{min \parallel}$ = Minimum spacing anchor group parallel to bed joint

$s_{min \perp}$ = Minimum spacing anchor group vertical to bed joint

$s_{cr \parallel}$ = Characteristic spacing anchor group parallel to bed joint

$s_{cr \perp}$ = Characteristic spacing anchor group vertical to bed joint

$c_{cr} = c_{min}$ = Edge distance

$\alpha_{g,N \parallel}$ = Group factor for tension load parallel to bed joint

$\alpha_{g,V \parallel}$ = Group factor for shear load parallel to bed joint

$\alpha_{g,N \perp}$ = Group factor for tension load vertical to bed joint

$\alpha_{g,V \perp}$ = Group factor for shear load vertical to bed joint

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Definition of minimum edge distance,
minimum spacing and group factors

Annex 14

Table 10: β - factors for job site tests

Tension load

Use category		w/w		d/d	
Temperature range		I	II	I	II
Material	Size				
solid units	M6	0,55	0,46	0,96	0,8
	M8	0,57	0,51		
	M10	0,59	0,52		
	M12	0,6	0,54		
	M16	0,62	0,52		
16x85	0,55	0,46			
hollow units	all sizes	0,86	0,72	0,96	0,8

Table 11: Displacements

Material	N [kN]	δN_0 [mm]	δN_∞ [mm]	V [kN]	δV_0 [mm]	δV_∞ [mm]
solid unit	$\frac{N_{Rk}}{1,4 * \gamma_M}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_M}$	0,59	0,88
hollow unit	$\frac{N_{Rk}}{1,4 * \gamma_M}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_M}$	1,71	2,56
brick annex 40 - 41	$\frac{N_{Rk}}{1,4 * \gamma_M}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_M}$	6,44	9,66

fischer injection system FIS V masonry

β - factors for job site tests
Displacements

Annex 15

Kind of masonry: Solid brick Mz, 2DF

Table 12: Parameters of brick

Species of brick		Solid brick Mz, 2DF
Density	$\rho \geq$ [kg/dm ³]	1,8
Compressive strength	$f_b \geq$ [N/mm ²]	10 or 16
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	$\geq 240 \times 115 \times 113$
Minimum thickness of brick	h_{min} [mm]	115

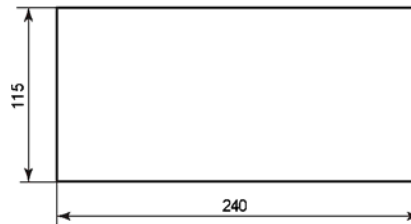


Table 13: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		11x85 ¹⁾ M6/M8	15x85 M10/M12
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance c_{min} [mm]	60											
Spacing	$s_{min \parallel}$ [mm]											
	$s_{cr \parallel}$ [mm]											
	$s_{cr \perp} = s_{min \perp}$ [mm]											
Group-factor	$\alpha_{g,N \parallel}$ [-]											
	$\alpha_{g,v \parallel}$ [-]											
	$\alpha_{g,N \perp}$ [-]											
	$\alpha_{g,v \perp}$ [-]											
Max. installation torque $T_{inst,max}$ [Nm]	4				10							

¹⁾For FIS E 11x85 with screw M6: $T_{inst,max} = 4$ Nm

Table 14: Installation parameters (anchor rod and internal threaded anchor with perforated sleeve)

Size of perforated sleeve	16x85			
Size of anchor rod	M8	M10	M6	M8
Size of internal threaded anchor FIS E	11x85			
Edge distance c_{min} [mm]	60			
Spacing	$s_{min \parallel}$ [mm]			
	$s_{cr \parallel}$ [mm]			
	$s_{cr \perp} = s_{min \perp}$ [mm]			
Group-factor	$\alpha_{g,N \parallel}$ [-]			
	$\alpha_{g,v \parallel}$ [-]			
	$\alpha_{g,N \perp}$ [-]			
	$\alpha_{g,v \perp}$ [-]			
Max. installation torque $T_{inst,max}$ [Nm]	10	4	10	

fischer injection system FIS V masonry

Solid brick Mz, 2DF
Species of brick, installation parameters

Annex 16

Kind of masonry: Solid brick Mz

Table 15: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	Characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
50	M6	16	2,50	2,00	4,50	4,00
		10	1,50	1,50	3,00	2,50
50	M8	16	2,50	2,00	4,50	4,00
		10	1,50	1,50	3,00	2,50
50	M10	16	2,50	2,00	4,50	3,50
		10	1,50	1,50	3,00	2,50
50	M12 M16	16	3,50	2,50	5,50	4,50
		10	2,00	1,50	3,00	2,50
85	11x85 15x85	16	3,50	2,50	5,50	4,50
		10	2,00	1,50	3,00	2,50
100	M6 M8	16	4,00	3,00	7,00	5,50
		10	2,50	2,00	4,00	3,50
100	M10	16	4,50	4,00	7,50	6,50
		10	3,00	2,50	4,50	4,00
100	M12 M16	16	5,50	4,50	8,00	7,00
		10	3,50	2,50	5,50	4,50
perforated sleeve 16x85	M8 M10 11x85 M6 11x85 M8	16	2,50	2,00	4,50	4,00
		10	1,50	1,20	3,00	2,50
Partial safety factor		γ_{Mm} [-]	2,5			

Table 16: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Anchor size	Embedment depth	f_b [N/mm ²]	Characteristic values of resistance			
			[kN]			
M6 11x85 M6	≥ 50	16	4,00			
		10	2,50			
M8 11x85 M8	≥ 50	16	5,00			
		10	3,00			
M10	≥ 50	16	5,50			
		10	3,50			
M12	≥ 50	16	5,50			
		10	3,50			
M16 15x85 M10 15x85 M12	≥ 50	16	5,00			
		10	3,00			
Partial safety factor		γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid brick Mz, 2DF
Characteristic values

Annex 17

Kind of masonry: Solid sand-lime block

Table 17 : Parameters of brick

Species of brick	Solid sand-lime block	
Density	$\rho \geq$ [kg/dm ³]	2,0
Compressive strength	$f_b \geq$ [N/mm ²]	10, 20 or 28
Standard or approval	EN 771	
Producer		
Size, dimensions	[mm]	$\geq 250 \times 240 \times 240$
Minimum thickness of brick	h_{min} [mm]	240

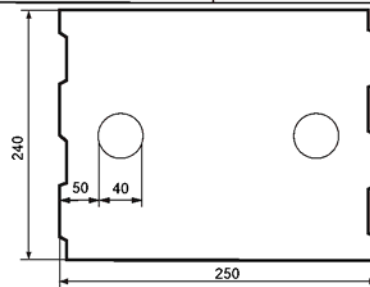


Table 18: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		11x85 ¹⁾	15x85	
											M6/M8	M10/M12	
Effective anchorage depth	h_{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance	c_{min} [mm]	60											
Spacing	$s_{min \parallel}$ [mm]	80											
	$s_{cr \parallel}$ [mm]	250											
	$s_{min \perp}$ [mm]	80											
	$s_{cr \perp}$ [mm]	240											
Group-factor	$\alpha_{g,N \parallel}$ [-]	1,5											
	$\alpha_{g,v \parallel}$ [-]	1,2											
	$\alpha_{g,N \perp}$ [-]	1,5											
	$\alpha_{g,v \perp}$ [-]	1,2											
Max. installation torque	$T_{inst,max}$ [Nm]	4				10							

¹⁾ For FIS E 11x85 with screw M6: $T_{inst,max} = 4$ Nm

Table 19: Installation parameters (anchor rod and internal threaded anchor with perforated sleeve)

Size of perforated sleeve	16x85			
Size of anchor rod	M8	M10	M6	M8
Size of internal threaded anchor FIS E	11x85			
Edge distance	c_{min} [mm]	60		
Spacing	$s_{min \parallel}$ [mm]	80		
	$s_{cr \parallel}$ [mm]	250		
	$s_{min \perp}$ [mm]	80		
	$s_{cr \perp}$ [mm]	240		
Group-factor	$\alpha_{g,N \parallel}$ [-]	1,5		
	$\alpha_{g,v \parallel}$ [-]	1,2		
	$\alpha_{g,N \perp}$ [-]	1,5		
	$\alpha_{g,v \perp}$ [-]	1,2		
Max. installation torque	$T_{inst,max}$ [Nm]	10	4	10

fischer injection system FIS V masonry

Solid sand-lime block
Species of brick, installation parameters

Annex 18

Kind of masonry: Solid sand-lime block

Table 20: Characteristic values of resistance; tension load (N_{RK})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	Characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
≥ 50	M6 11x85 M6	28	5,00	4,00	8,50	8,50
		20	4,50	3,50	7,50	6,50
		10	3,00	2,50	5,00	4,50
≥ 50	M8	28	8,00	7,00	12,00 (9,0) ¹⁾	11,50
		20	6,00	5,00	10,00 (9,0) ¹⁾	8,00
		10	4,00	3,50	7,00	5,50
≥ 50	M10 M12	28	8,50	7,00	12,00 (9,0) ¹⁾	11,50 (9,0) ¹⁾
		20	6,00	5,00	10,00 (9,0) ¹⁾	8,00
		10	4,50	3,50	7,00	5,50
≥ 50	M16 11x85 M8 15x85	28	7,00	6,00	11,00 (9,0) ¹⁾	9,00
		20	5,00	4,00	7,50	6,50
		10	3,50	3,00	5,50	4,50
perforated sleeve 16x85	11x85 M6	28	5,00	4,00	8,50	8,50
		20	4,50	3,50	7,50	6,50
		10	3,00	2,50	5,00	4,50
	M8, M10 11x85 M8	28	8,50	7,00	12,00 (9,0) ¹⁾	12,00 (9,0) ¹⁾
		20	6,50	5,00	11,00 (9,0) ¹⁾	9,00
		10	4,50	3,50	8,00	6,50
Partial safety factor γ_{Mm} [-]			2,5			

¹⁾ Characteristic value of pulling out of one brick $N_{RK, pb} = 9,0$ kN

Table 21: Characteristic values of resistance; shear load (V_{RK})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	Characteristic values of resistance			
			[kN]			
≥ 50	M6 11x85 M6	28	5,00			
		20	4,00			
		10	2,50			
≥ 50	M8, M10, M12, M16, 11x85 M8, 15x85 M10 15x85 M12	28	9,00			
		20	6,50			
		10	4,50			
perforated sleeve 16x85	11x85 M6	28	5,00			
		20	4,00			
		10	2,50			
	M8, M10 11x85 M8	28	9,00			
		20	6,50			
		10	4,50			
Partial safety factor γ_{Mm} [-]			2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid sand-lime block
Characteristic values

Annex 19

Kind of masonry: Light-weight concrete block Vbl

Table 22 : Parameters of brick

Species of brick	Light-weight concrete block Vbl	
Density	$\rho \geq$ [kg/dm ³]	0,6
Compressive strength	$f_b \geq$ [N/mm ²]	2
Standard or approval	EN 771-3	
Producer	e.g. Sepa	
Size, dimensions	[mm]	$\geq 372 \times 300 \times 254$
Minimum thickness of brick	h_{min} [mm]	300

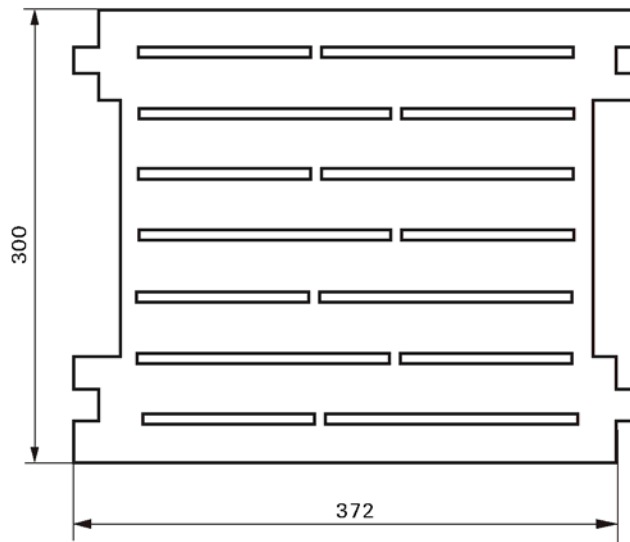


Table 23: Installation parameters (anchor rod with perforated sleeve)

Size of perforated sleeve	16x130	18x130/200	20x130	22x130/200	20x200
Size of anchor rod	M8	M10	M10	M12	M16
Edge distance c_{min} [mm]	130				
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]				
	370				
Group-factor	$s_{cr \perp} = s_{min \perp}$ [mm]				
	250				
Max. installation torque	$\alpha_{g,N \parallel}$ [-]				
	$\alpha_{g,V \parallel}$ [-]				
	$\alpha_{g,N \perp}$ [-]				
	$\alpha_{g,V \perp}$ [-]				
Max. installation torque	$T_{inst,max}$ [Nm]				
4					

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Species of brick, installation parameters

Annex 20

Kind of masonry: Solid light-weight concrete block VbI

Table 24: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
16x130 M8 M10	18x130/200 M10 M12	2	2,00	1,50	2,00	2,00
20x130 M12 M16	22x130/200 M16	2	2,50	2,50	3,00	2,50
20x200 M12 M16		2	3,50	3,00	4,00	3,00
Partial safety factor γ_{Mm} [-]			2,5			

Table 25: Characteristic values of resistance; shear load (V_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
16x130 M8 M10	18x130/200 M10 M12	20x130 M12 M16	20x200 M12	2	4,50			
20x200 M16	22x130/200 M16			2	6,50			
Partial safety factor γ_{Mm} [-]					2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid light-weight concrete block VbI
Characteristic values

Annex 21

Kind of masonry: Solid light-weight concrete block Vbl

Table 26: Parameters of brick

Species of brick	Solid light-weight concrete block Vbl	
Density	$\rho \geq$ [kg/dm ³]	1,6
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6 or 8
Standard or approval	EN 771-3	
Producer	KLB	
Size, dimensions	[mm]	$\geq 250 \times 240 \times 239$
Minimum thickness of brick	h_{min} [mm]	240

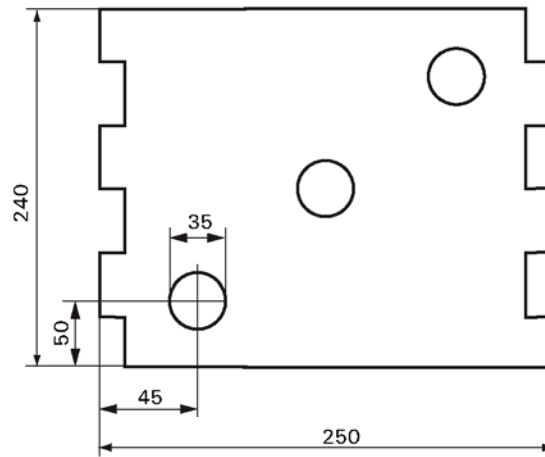


Table 27: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200	20x200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16	M12 M16
Size of internal threaded anchor			11x85 M6/M8			15x85 M10/M12			
Edge distance c_{min} [mm]	130								
Spacing $s_{or \parallel} = s_{min \parallel}$ [mm]	250								
$s_{or \perp} = s_{min \perp}$ [mm]	250								
Group-factor	$\alpha_{g,N \parallel}$ [-]								
	$\alpha_{g,V \parallel}$ [-]								
	$\alpha_{g,N \perp}$ [-]	2							
	$\alpha_{g,V \perp}$ [-]								
Max. installation torque $T_{inst,max}$ [Nm]	4								

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Species of brick, installation parameters

Annex 22

Kind of masonry: Solid light-weight concrete block Vbl

Table 28: Characteristic values of resistance; tension load (N_{RK})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
12x50 M6 M8				8	2,00	2,00	4,00	3,00
				6	1,50	1,50	3,00	2,50
				4	1,20	0,90	2,00	1,50
12x85 M6 M8				8	4,00	3,00	7,00	5,50
				6	3,00	2,50	5,00	4,00
				4	2,00	1,50	3,50	3,00
16x85 M8, M10 11x85 M6 11x85 M8	16x130 M8 M10	18x130/200 M10 M12		8	5,00	4,00	8,50	7,00
				6	4,00	3,00	6,50	5,50
				4	2,50	2,00	4,00	3,50
20x85 M12, M16 15x85 M10 15x85 M12	20x130 M12 M16	22x130/200 M12 M16	20x200 M12 M16	8	6,50	5,50	9,00	8,50
				6	5,00	4,00	7,50	6,50
				4	3,00	2,50	5,00	4,50
Partial safety factor γ_{Mm}					[-]		2,5	

Table 29: Characteristic values of resistance; shear load (V_{RK})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]			
12x50 M6	12x85 M6	16x85 11x85 M6		8	4,00			
				6	3,00			
				4	2,00			
12x50 M8	12x85 M8			8	6,00			
				6	4,50			
				4	3,00			
16x85 M8; M10 11x85 M8	16x130 M8 M10	18x130/200 M10 M12		8	7,00			
				6	5,50			
				4	3,50			
20x85 M12, M16 15x85 M12 15x85 M16	20x130 M12 M16	20x200 M12 M16	22x130/200 M16	8	8,50			
				6	6,50			
				4	4,50			
Partial safety factor γ_{Mm}					[-]		2,5	

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Characteristic values

Annex 23

Kind of masonry: Perforated block form B, HLz

Table 30: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \geq$ [kg/dm ³]	1,0
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6, 8 or 16
Standard or approval		EN 771-1
Producer		e.g. Wienerberger, Poroton
Size, dimensions	[mm]	$\geq 366 \times 240 \times 237$
Minimum thickness of brick	h_{min} [mm]	240

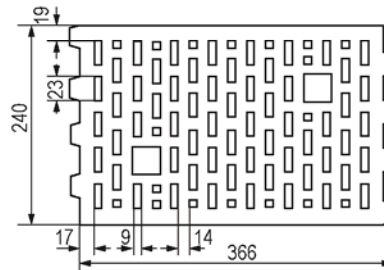


Table 31: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		20x85	
Size of anchor rod	M6	M8	M6	M8	M8	M10	M12	M16
Size of internal threaded anchor					11x85 M6/M8		15x85 M10/M12	
Edge distance	c_{min} [mm]		100					
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]		365					
	$s_{cr \perp} = s_{min \perp}$ [mm]		240					
Group-factor	$\alpha_{g,N \parallel}$ [-]		2,0					
	$\alpha_{g,V \parallel}$ [-]							
	$\alpha_{g,N \perp}$ [-]							
	$\alpha_{g,V \perp}$ [-]							
Max. installation torque	$T_{inst,max}$ [Nm]		2					

fischer injection system FIS V masonry

Perforated block form B, HLz
Species of brick, installation parameters

Annex 24

Kind of masonry: Perforated block form B, HLz

Table 32: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d		
Temperature range				I	II	I	II	
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance				
				[kN]	[kN]	[kN]	[kN]	
12x50 M6 M8			16	2,50	2,00	3,00	2,50	
			12	2,00	1,50	2,00	2,00	
			10	1,50	1,50	2,00	1,50	
			8	1,20	1,20	1,50	1,20	
			6	0,90	0,75	1,20	0,90	
12x85 M6 M8	16x85 M8	20x85 M12	16	3,50	3,00	4,00	3,50	
			12	3,00	2,50	3,00	2,50	
	M8	11x85 M6 11x85 M8	15x85 M10 15x85 M12	10	2,50	2,00	2,50	2,00
				8	2,00	1,50	2,00	1,50
				6	1,50	1,20	1,50	1,20
Partial safety factor γ_{Mm}			[-]	2,5				

Table 33: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d		
Temperature range				I	II	I	II	
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance				
				[kN]				
12x50 M6 M8			16	1,50				
			12	1,20				
			10	0,90				
			8	0,90				
			6	0,60				
12x85 M6 M8	16x85 M8	20x85 M12	16	2,00				
			12	1,50				
	M8	11x85 M6 11x85 M8	15x85 M10 15x85 M12	10	1,20			
				8	0,90			
				6	0,75			
Partial safety factor γ_{Mm}			[-]	2,5				

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated block form B, HLz
Characteristic values

Annex 25

Kind of masonry: Perforated brick HLz, 2DF

Table 34: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	1,4
Compressive strength	$f_b \geq$ [N/mm ²]	6, 10, 16, 20 or 28
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	$\geq 2DF \geq 240 \times 115 \times 113$
Minimum thickness of brick	h_{min} [mm]	115

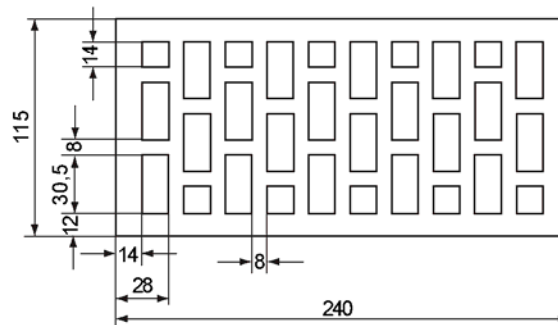


Table 35: Installation parameters (anchor rod and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		20x85	
Size of anchor rod	M6	M8	M6	M8	M8	M10	M12	M16
Size of internal threaded anchor FIS E					11x85 M6/M8		15x85 M10/M12	
Edge distance c_{min}	[mm] 80							
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]				240			
	$s_{cr \perp} = s_{min \perp}$ [mm]				115			
Group-factor	$\alpha_{g,N \parallel}$ [-]				2			
	$\alpha_{g,V \parallel}$ [-]							
	$\alpha_{g,N \perp}$ [-]							
	$\alpha_{g,V \perp}$ [-]							
Max. installation torque	$T_{inst, max}$	[Nm] 2						

fischer injection system FIS V masonry

Perforated brick HLz, 2DF
Species of brick, installation parameters

Annex 26

Kind of masonry: Perforated brick HLz

Table 36: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6 M8			28	3,00	2,50	3,50	3,00
			20	2,50	2,00	2,50	2,00
			16	2,00	1,50	2,00	1,50
			10	1,20	0,90	1,20	0,90
			6	0,75	0,60	0,75	0,60
12x85 M6 M8			28	5,00	4,00	5,50	4,50
			20	3,50	3,00	4,00	3,00
			16	2,50	2,00	3,00	2,50
			10	1,50	1,50	2,00	1,50
			6	0,90	0,90	1,20	0,90
16x85 M8 M10 11x85 M6 11x85 M8			28	3,50	3,00	3,50	3,00
			20	2,50	2,00	2,50	2,00
			16	2,00	1,50	2,00	1,50
			10	1,20	0,90	1,20	1,20
			6	0,75	0,60	0,75	0,60
20x85 M12 M16 15x85 M10 15x85 M12			28	4,00	3,50	4,50	3,50
			20	3,00	2,50	3,00	2,50
			16	2,00	2,00	2,50	2,00
			10	1,50	1,20	1,50	1,20
			6	0,90	0,75	0,90	0,75
Partial safety factor			γ_{Mm} [-]	2,5			

Table 37: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]			
12x50 M6	12x85 M6	16x85 11x85 M6	28	5,00			
			20	4,00			
			16	3,00			
			10	2,00			
			6	1,20			
12x85 M8			28	9,50 (5,5) ¹⁾			
			20	7,50 (5,5) ¹⁾			
			16	6,00 (5,5) ¹⁾			
			10	4,00			
			6	2,00			
16x85 M8 M10 11x85 M8	12x50 M8		28	6,50 (5,5) ¹⁾			
			20	4,50			
			16	3,50			
			10	2,50			
			6	1,50			
20x85 M12 M16			28	12,00 (5,5) ¹⁾			
			20	8,50 (5,5) ¹⁾			
			16	7,00 (5,5) ¹⁾			
			10	4,50			
			6	2,50			
Partial safety factor			γ_{Mm} [-]	2,5			

¹⁾ Characteristic value of pushing out of one brick $V_{Rk, pb} = 5,5$ kN

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 27

Kind of masonry: Sand-lime hollow block KSL

Table 38: Parameters of brick

Species of brick		Sand-lime hollow block KSL
Density	$\rho \geq$ [kg/dm ³]	1,4
Compressive strength	$f_b \geq$ [N/mm ²]	8, 10, 12, 16 or 20
Standard or approval		EN 771-2
Producer		e.g. KS Wemding
Size, dimensions	[mm]	$\geq 240 \times 175 \times 113$
Minimum thickness of brick	h_{min} [mm]	175

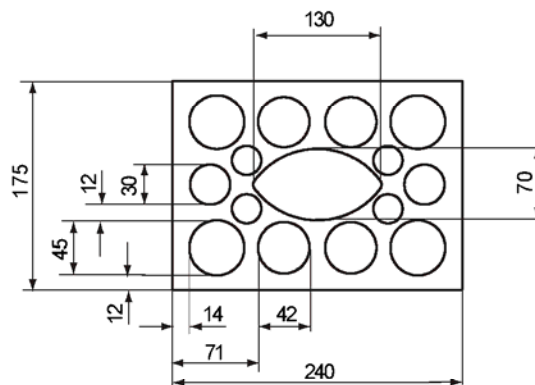


Table 39: Installation parameters (anchor rod and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16
Size of internal threaded anchor FIS E			11x85 M6/M8			15x85 M10/M12		
Edge distance c_{min} [mm]	60			80				
Spacing	$s_{min \parallel}$ [mm]	100						
	$s_{cr \parallel}$ [mm]	240						
	$s_{cr \perp} = s_{min \perp}$ [mm]	115						
Group-factor	$\alpha_{g,N \parallel}$ [-]	1,5						
	$\alpha_{g,v \parallel}$ [-]	1,5						
	$\alpha_{g,N \perp}$ [-]	2						
	$\alpha_{g,v \perp}$ [-]	2						
Max. installation torque $T_{inst,max}$ [Nm]	2							

fischer injection system FIS V masonry

Sand-lime hollow block KSL
Species of brick, installation parameters

Annex 28

Kind of masonry: Sand-lime hollow block KSL

Table 40: Characteristic values of resistance; tension load (N_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
12x50 M6 M8	12x85 M6 M8			20	4,00	3,50	4,50	3,50
				16	3,00	2,50	3,50	3,00
				12	2,50	2,00	2,50	2,00
				10	2,00	1,50	2,00	2,00
				8	1,50	1,20	1,50	1,50
16x85 M8, M10 11x85 M6 11x85 M8				20	4,50	4,00	5,00	4,00
				16	3,50	3,00	4,00	3,50
				12	2,50	2,00	3,00	2,50
				10	2,00	2,00	2,50	2,00
				8	2,00	1,50	2,00	1,50
16x130 M8 M10	18x130/200 M10 M12	20x85 M12, M16 15x85 M10 15x85 M12	20x130 22x130/200 M12 M16	20	5,50	4,50	6,00	5,00
				16	4,50	3,50	4,50	4,00
				12	3,00	2,50	3,50	3,00
				10	2,50	2,00	3,00	2,50
				8	2,00	1,50	2,50	2,00
Partial safety factor					γ_{Mm} [-]		2,5	

Table 41: Characteristic values of resistance; shear load (V_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]			
12x50 M6	12x85 M6	16x85 11x85 M6		20	4,00			
				16	3,00			
				12	2,50			
				10	2,00			
				8	1,50			
12x50 M8	12x85 M8			20	4,50			
				16	3,50			
				12	2,50			
				10	2,00			
				8	1,50			
16x85 M8, M10 11x85 M8	16x130 18x130/200 M10 M12	20x85 M12, M16 15x85 M10 15x85 M12	20x130 M12	20	6,00			
				16	6,00			
				12	4,50			
				10	3,50			
				8	3,00			
20x85 M16	20x130 M16	22x130/200 M16		20	6,00			
				16	5,50			
				12	4,00			
				10	3,50			
				8	2,50			
Partial safety factor					γ_{Mm} [-]		2,5	

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Sand-lime hollow block KSL
Characteristic values

Annex 29

Kind of masonry: Light-weight concrete hollow block Hbl

Table 42: Parameters of brick

Species of brick	Light-weight concrete hollow block Hbl	
Density	$\rho \geq$ [kg/dm ³]	1,0
Compressive strength	$f_b \geq$ [N/mm ²]	2 or 4
Standard or approval	EN 771-3	
Producer		
Size, dimensions	[mm]	$\geq 362 \times 240 \times 240$
Minimum thickness of brick	h_{min} [mm]	240

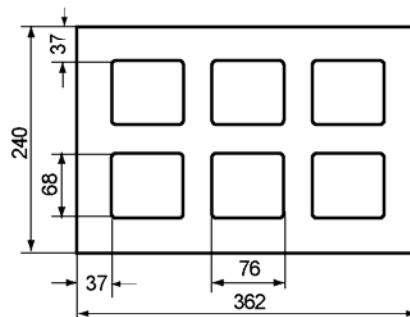


Table 43: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200	20x200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16	M12 M16
Size of internal threaded anchor FIS E			11x85 M6/M8			15x85 M10/M12			
Edge distance c_{min} [mm]	60								
Spacing	$s_{min }$ [mm]								
	$s_{cr }$ [mm]								
	$s_{cr\perp} = s_{min\perp}$ [mm]								
Group-factor	$\alpha_{g,N }$ [-]								
	$\alpha_{g,V }$ [-]								
	$\alpha_{g,N\perp}$ [-]								
	$\alpha_{g,V\perp}$ [-]								
Max. installation torque	$T_{inst,max}$ [Nm]								
									2

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Species of brick, installation parameters

Annex 30

Kind of masonry: Light-weight concrete hollow block Hbl

Table 44: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6, M8			4	2,00	2,00	2,50	2,00
			2	1,20	0,90	1,20	0,90
12x85 M6	16x130 M8, M10	18x130/200 M10, M12	4	3,00	2,50	3,00	2,50
			2	1,50	1,20	1,50	1,20
16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12, M16 15x85 M10 15x85 M12	20x130 M12, M16 22x130/200 M16	4	3,00	2,50	3,00	2,50
			2	1,50	1,20	1,50	1,20
20x200 M12, M16			4	5,00	4,00	5,50	4,50
			2	2,50	2,00	2,50	2,00
Partial safety factor			γ_{Mm} [-]	2,5			

Table 45: Characteristic values of resistance; shear load (V_{Rk})

Use category						w/w		d/d	
Temperature range						I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance [kN]			
12x50 M6, M8	16x85 M8, M10 11x85 M6 11x85 M8	18x130/200 M10 M12	20x130 M12 M16	20x200 M12 M16	4	2,00			
					2	0,90			
12x85 M6, M8	16x130 M8 M10		22x130/200 M16		2	0,90			
Partial safety factor					γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Characteristic values

Annex 31

Kind of masonry: Perforated block form B, HLz

Table 46: Parameters of brick

Species of brick	Perforated block form B, HLz	
Density	$\rho \geq$ [kg/dm ³]	0,6
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6, 8
Standard or approval	EN 771-1	
Producer	e.g. Bouyer Leroux	
Size, dimensions	[mm]	$\geq 500 \times 200 \times 315$
Minimum thickness of brick	h_{min} [mm]	200

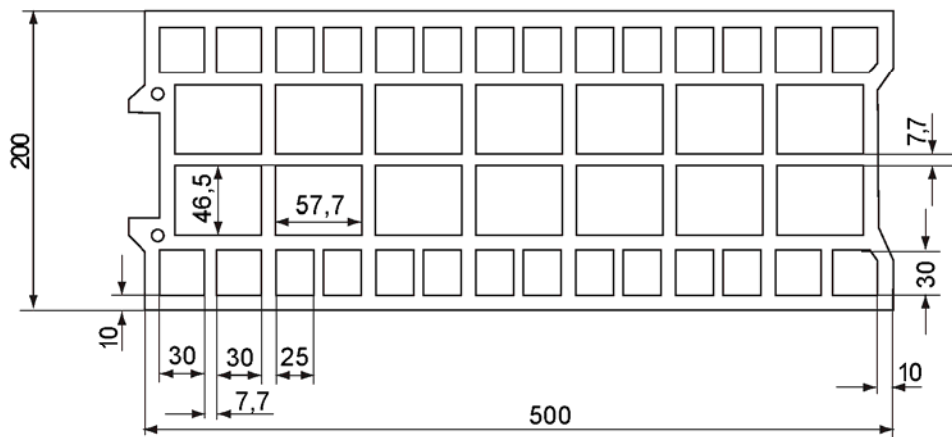


Table 47: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		16x130		18x130/200		20x85		20x130		22x130/200
Size of anchor rod	M6	M8	M6	M8	M8	M10	M8	M10	M10	M12	M12	M16	M12	M16	M16
Size of internal threaded anchor FIS E					11x85 M6/M8						15x85 M10/M12				
Edge distance	a_{min} [mm]	120													
Spacing	$s_{min II}$ [mm]	120													
	$s_{cr II}$ [mm]	500													
	$s_{cr \perp} = s_{min \perp}$ [mm]	315													
Group-factor	$\alpha_{g,N II}$ [-]	1,3													
	$\alpha_{g,v II}$ [-]	1,7													
	$\alpha_{g,N \perp}$ [-]	2													
	$\alpha_{g,v \perp}$ [-]	2													
Max. installation torque	$T_{inst max}$ [Nm]	2													

fischer injection system FIS V masonry

Perforated block form B, HLz
Species of brick, installation parameters

Annex 32

Kind of masonry: Perforated block form B, HLz

Table 48: Characteristic values of resistance; tension load (N_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
12x50 M6 M8				8	0,90	0,90	1,20	0,90
				6	0,75	0,60	0,90	0,75
				4	0,50	0,40	0,60	0,50
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12, M16 15x85 M10 15x85 M12		8	3,00	2,50	3,00	2,50
				6	2,00	2,00	2,50	2,00
				4	1,50	1,20	1,50	1,20
16x130 18x130/200 M8, M10				8	1,50	1,20	2,00	1,50
				6	1,20	0,90	1,20	1,20
				4	0,75	0,60	0,90	0,75
20x130 22x130/200 M12, M16				8	3,50	2,50	3,50	3,00
				6	2,50	2,00	2,50	2,00
				4	1,50	1,20	2,00	1,50
Partial safety factor				γ_{Mm} [-]	2,5			

Table 49: Characteristic values of resistance; shear load (V_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]			
12x50 M6 M8	12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12	8	3,50			
				6	2,50			
				4	1,50			
20x85 M16				8	4,50			
				6	3,50			
				4	2,50			
16x130 M8 M10	20x130 M12 M16	18x130/20 M10 M12	22x130/200 M16	8	2,00			
				6	1,50			
				4	0,90			
Partial safety factor				γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated block form B, HLz
Characteristic values

Annex 33

Kind of masonry: Perforated block form B, HLz

Table 50: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \geq$ [kg/dm ³]	0,7
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6, 8, 10
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	$\geq 500 \times 200 \times 300$
Minimum thickness of brick	h_{min} [mm]	200

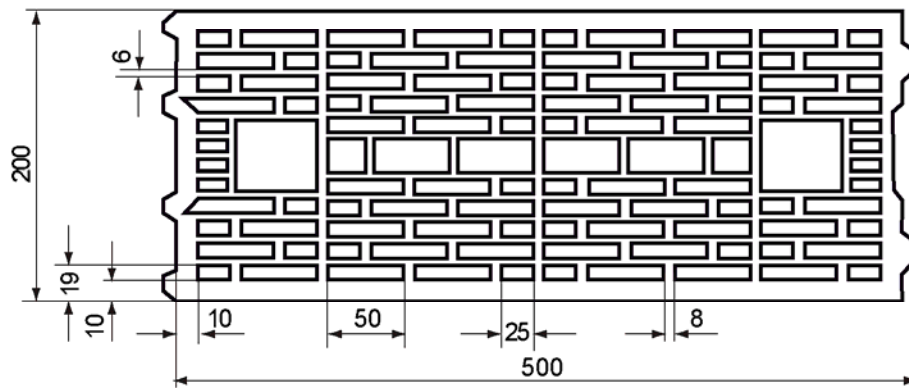


Table 51: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16
Size of internal threaded anchor			11x85 M6/M8			15x85 M10/M12		
Edge distance c_{min} [mm]	50			80		50	80	
Spacing	$s_{min \parallel}$ [mm]				100			
	$s_{gr \parallel}$ [mm]				500			
	$s_{gr \perp} = s_{min \perp}$ [mm]				300			
Group-factor	$\alpha_{g,N \parallel}$ [-]				1,4			
	$\alpha_{g,V \parallel}$ [-]							
	$\alpha_{g,N \perp}$ [-]				2			
	$\alpha_{g,V \perp}$ [-]							
Max. installation torque $T_{inst,max}$ [Nm]					2			

fischer injection system FIS V masonry

Perforated block form B, HLz
Species of brick, installation parameters

Annex 34

Kind of masonry: Perforated block form B, HLz

Table 52: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6 M8	12x85		10	1,20	0,90	1,50	1,20
			8	0,90	0,90	1,20	0,90
			6	0,75	0,60	0,90	0,75
			4	0,50	0,40	0,60	0,50
16x85 M8, M10 11x85 M6 11x85 M8			10	1,50	1,20	2,00	1,50
			8	1,20	1,20	1,50	1,20
			6	0,90	0,75	1,20	0,90
			4	0,60	0,50	0,75	0,60
20x85 M12, M16 15x85 M10 15x85 M12			10	2,00	1,50	2,00	2,00
			8	1,50	1,20	1,50	1,50
			6	1,20	0,90	1,20	1,20
			4	0,75	0,60	0,90	0,75
16x130 M8 M10	18x130/200 M10 M12		10	2,50	2,00	3,00	2,50
			8	2,00	2,00	2,50	2,00
			6	1,50	1,20	2,00	1,50
			4	1,20	0,90	1,20	0,90
20x130 M12 M16	22x130/200 M12 M16		10	3,50	3,00	4,00	3,00
			8	2,50	2,50	3,00	2,50
			6	2,00	1,50	2,50	2,00
			4	1,50	1,20	1,50	1,20
Partial safety factor			γ_{Mm} [-]	2,5			

Table 53: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]			
12x50 M6	16x85 11x85 M6		10	2,00			
			8	1,50			
			6	1,20			
			4	0,90			
12x50 M8	12x85 M6 M8	16x85 11x85 M8	10	3,00			
			8	2,00			
			6	1,50			
			4	1,20			
20x85 M12, M16 15x85 M10 15x85 M12			10	5,00			
			8	4,00			
			6	3,00			
			4	2,00			
16x130 M8 M10	18x130/200 M10 M12	20x130 22x130/200 M12 M16	10	1,50			
			8	1,20			
			6	0,90			
			4	0,60			
Partial safety factor			γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated block form B, HLz
Characteristic values

Annex 35

Kind of masonry: Perforated block form B, HLz

Table 54: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \geq$ [kg/dm ³]	0,7
Compressive strength	$f_b \geq$ [N/mm ²]	2, 4, 6 or 8
Standard or approval		EN 771-1
Producer		e.g. Terreal
Size, dimensions	[mm]	$\geq 500 \times 200 \times 315$
Minimum thickness of brick	h_{min} [mm]	200

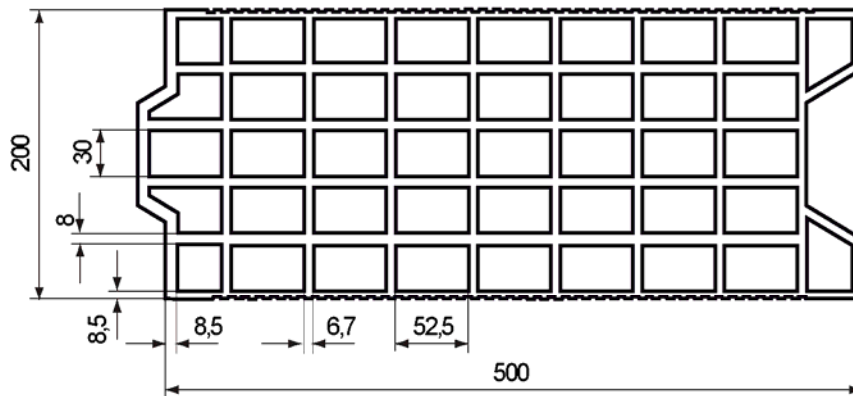


Table 55: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		16x130		18x130/200		20x85		20x130		22x130/200
Size of anchor rod	M6	M8	M6	M8	M8	M10	M8	M10	M10	M12	M12	M16	M12	M16	M16
Size of internal threaded anchor					11x85 M6/M8						15x85 M10/M12				
Edge distance	c_{min} [mm]		50				80				50		80		
Spacing	$s_{min \parallel}$ [mm]						100								
	$s_{cr \parallel}$ [mm]						500								
	$s_{min \perp}$ [mm]						100								
	$s_{cr \perp}$ [mm]						315								
Group-factor	$\alpha_{g,N \parallel}$ [-]						1,1								
	$\alpha_{g,v \parallel}$ [-]						1,2								
	$\alpha_{g,N \perp}$ [-]						1,1								
	$\alpha_{g,v \perp}$ [-]						1,2								
Max. installation torque	$T_{inst,max}$ [Nm]						2								

fischer injection system FIS V masonry

Perforated block form B, HLz
Species of brick, installation parameters

Annex 36

Kind of masonry: Perforated block form B, HLz

Table 56: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6 M8			8	2,00	1,50	2,00	1,50
			6	1,50	1,20	1,50	1,20
			4	0,90	0,75	0,90	0,90
			2	0,50	0,40	0,50	0,40
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12, M16 15x85 M10 15x85 M12	8	2,00	1,50	2,00	2,00
			6	1,50	1,20	1,50	1,20
			4	0,90	0,75	1,20	0,90
			2	0,50	0,40	0,50	0,40
20x130 22x130/200 M12 M16	16x130 18x130/200 M8 M10		8	2,00	1,50	2,00	2,00
			6	1,50	1,20	1,50	1,50
			4	0,90	0,90	1,20	0,90
			2	0,50	0,40	0,60	0,50
Partial safety factor			γ_{Mm} [-]	2,5			

Table 57: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]			
12x50 M6	16x85 11x85 M6		8	1,50			
			6	0,90			
			4	0,75			
			2	0,30			
12x50M8	12x85 M6 M8	16x85 M8 11x85 M8	8	2,50			
			6	2,00			
			4	1,20			
			2	0,60			
20x85 M12, M16 15x85 M10 15x85 M12			8	4,00			
			6	3,00			
			4	2,00			
			2	0,90			
16x130 M8 M10		18x130/200 M10 M12	8	2,00			
			6	1,50			
			4	1,20			
			2	0,60			
20x130 M12 M16	22x130/200 M12 M16		8	3,00			
			6	2,00			
			4	1,50			
			2	0,75			
Partial safety factor			γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated block form B, HLz
Characteristic values

Annex 37

Kind of masonry: Perforated block form B, HLz

Table 58: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \geq$ [kg/dm ³]	0,7
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6 or 8
Standard or approval		EN 771-1
Producer		e.g. Imery
Size, dimensions	[mm]	$\geq 560 \times 200 \times 275$
Minimum thickness of brick	h_{min} [mm]	200

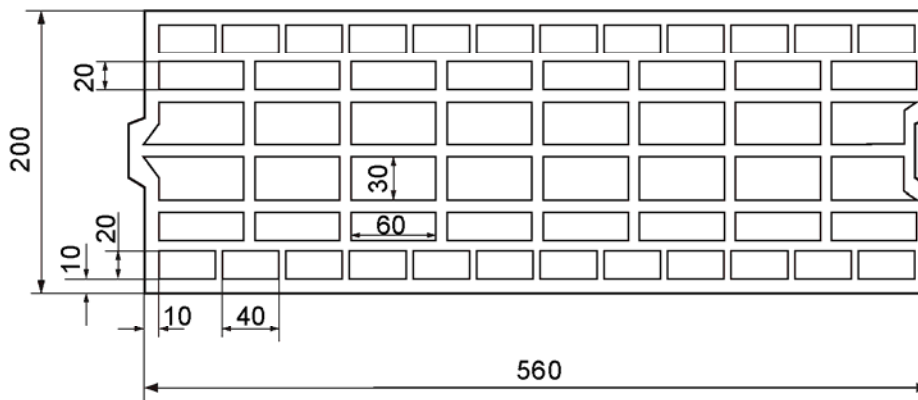


Table 59: Installation parameters (anchor rod with perforated sleeve)

Size of perforated sleeve	16x130		20x130	
	M8	M10	M12	M16
Edge distance c_{min} [mm]	80			
Spacing $s_{cr \parallel} = s_{min \parallel}$ [mm]	560			
	$s_{cr \perp} = s_{min \perp}$ [mm]	275		
Group-factor	$\alpha_{g,N \parallel}$ [-]	2		
	$\alpha_{g,V \parallel}$ [-]			
	$\alpha_{g,N \perp}$ [-]			
	$\alpha_{g,V \perp}$ [-]			
Max. installation torque $T_{inst,max}$ [Nm]	2			

fischer injection system FIS V masonry

Perforated block form B, HLz
Species of brick, installation parameters

Annex 38

Kind of masonry: Perforated block form B, HLz

Table 60: Characteristic values of resistance; tension load (N_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
16x130 M8 M10	18x130/20 M10 M12			8	2,00	1,50	2,50	2,00
				6	1,50	1,20	1,50	1,50
				4	0,90	0,90	1,20	0,90
20x130 M12 M16	22x130/200 M12 M16			8	2,50	2,00	3,00	2,50
				6	2,00	1,50	2,00	2,00
				4	1,20	1,20	1,50	1,20
Partial safety factor γ_{Mm}					[-] 2,5			

Table 61: Characteristic values of resistance; shear load (V_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]			
16x130 M8 M10	18x130/20 M10 M12	20x130 M12 M16	22x130/200 M12 M16	8	2,00			
				6	1,50			
				4	0,90			
Partial safety factor γ_{Mm}					[-] 2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated block form B, HLz
Characteristic values

Annex 39

Kind of masonry: Light-weight concrete hollow block Hbl

Table 62: Parameters of brick

Species of brick		Light-weight concrete hollow block Hbl
Density	$\rho \geq$ [kg/dm ³]	1,0
Compressive strength	$f_b \geq$ [N/mm ²]	6,0
Standard or approval		EN 771-3
Producer		e.g. Sepa
Size, dimensions	[mm]	$\geq 500 \times 200 \times 200$
Minimum thickness of brick	h_{min} [mm]	200

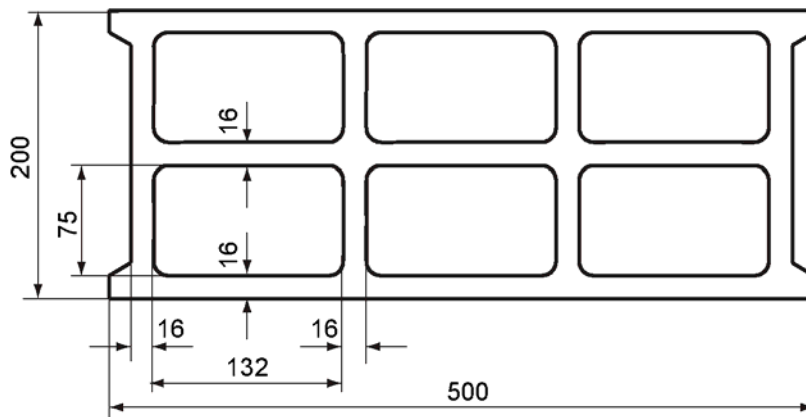


Table 63: Installation parameters (anchor rod with perforated sleeve)

Size of perforated sleeve	12x50	16x130	18x130/200	20x130	22x130/200
Size of anchor rod	M6 M8	M8 M10	M10 M12	M12 M16	M16
Edge distance c_{min} [mm]	100				
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]				
	$s_{cr \perp} = s_{min \perp}$ [mm]				
Group-factor	$\alpha_{g,N \parallel}$ [-]				
	$\alpha_{g,v \parallel}$ [-]				
	$\alpha_{g,N \perp}$ [-]				
	$\alpha_{g,v \perp}$ [-]				
Max. installation torque $T_{inst max}$ [Nm]	1	2			

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Species of brick, installation parameters

Annex 40

Kind of masonry: Light-weight concrete hollow block Hbl

Table 64: Characteristic values of resistance; tension load (N_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
		[kN]	[kN]	[kN]	[kN]
all sizes	6	1,20	1,20	1,50	1,20
	4	0,90	0,75	0,90	0,75
	2	0,40	0,40	0,50	0,40
Partial safety factor γ_{Mm} [-]		2,5			

Table 65: Characteristic values of resistance; shear load (V_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
		[kN]	[kN]	[kN]	[kN]
all sizes	6	2,50	2,50	2,50	2,50
	4	1,50	1,50	1,50	1,50
	2	0,90	0,90	0,90	0,90
Partial safety factor γ_{Mm} [-]		2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Characteristic values

Annex 41

Kind of masonry: Solid brick Mz

Table 66: Parameters of brick

Species of brick		Solid brick Mz
Density	$\rho \geq$ [kg/dm ³]	1,8
Compressive strength	$f_b \geq$ [N/mm ²]	10 or 20
Standard or approval		EN 771-2
Producer		e.g. Nigra
Size, dimensions	[mm]	$\geq 245 \times 118 \times 54$
Minimum thickness of brick	h_{min} [mm]	118

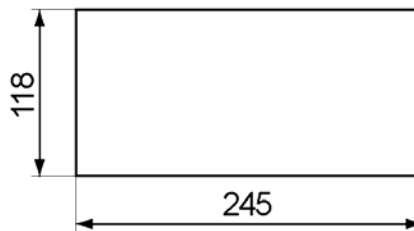


Table 67: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		11x85 ¹⁾ M6/M8	15x85 M10/M12
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance c_{min} [mm]	60											
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]		245									
	$s_{cr \perp} = s_{min \perp}$ [mm]		60									
Group-factor	$\alpha_{g,N \parallel}$ [-]											
	$\alpha_{g,V \parallel}$ [-]											
	$\alpha_{g,N \perp}$ [-]		2									
	$\alpha_{g,V \perp}$ [-]											
Max. installation torque $T_{inst,max}$ [Nm]	4		10									

¹⁾ For FIS E 11x85 with screw M6: $T_{inst,max} = 4$ Nm

fischer injection system FIS V masonry

Solid brick Mz
Species of brick, installation parameters

Annex 42

Kind of masonry: Solid brick Mz

Table 68: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
≥ 50	M6	20	0,90	0,75	1,50	1,20
		10	0,60	0,50	1,20	0,90
≥ 50	M8	20	1,50	1,20	2,50	2,00
		10	0,90	0,90	1,50	1,50
≥ 50	M10 M12; M16	20	1,20	0,90	2,00	1,50
		10	0,75	0,60	1,20	1,20
Partial safety factor		γ_{Mm} [-]	2,5			

Table 69: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
≥ 50	M6 11x85 M6	20	2,50			
		10	2,00			
≥ 50	M8 11x85 M8	20	4,00			
		10	3,00			
≥ 50	M10 15x85 M10	20	5,50			
		10	4,00			
≥ 50	M12 15x85 M12	20	6,00 (5,5) ¹⁾			
		10	4,50			
≥ 50	M16	20	8,00 (5,5) ¹⁾			
		10	5,50			
Partial safety factor		γ_{Mm} [-]	2,5			

¹⁾ Characteristic value of pushing out of one brick $V_{Rk,pb} = 5,5$ kN

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid brick Mz
Characteristic values

Annex 43

Kind of masonry: Perforated brick HLz

Table 70: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	1,0
Compressive strength	$f_b \geq$ [N/mm ²]	2, 4, 6, 8, 10 or 12
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	$\geq 255 \times 120 \times 118$
Minimum thickness of brick	h_{min} [mm]	120

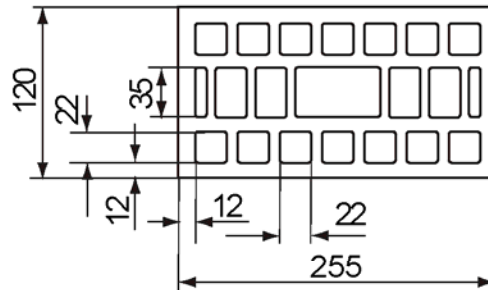


Table 71: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		20x85	
Size of anchor rod	M6	M8	M6	M8	M8	M10	M12	M16
Size of internal threaded anchor FIS E					11x85 M6/M8		15x85 M10/M12	
Edge distance	c_{min} [mm]				60			
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]				255			
	$s_{cr \perp} = s_{min \perp}$ [mm]				120			
Group-factor	$\alpha_{g,N \parallel}$ [-]							
	$\alpha_{g,v \parallel}$ [-]				2			
	$\alpha_{g,N \perp}$ [-]							
	$\alpha_{g,v \perp}$ [-]							
Max. installation torque	$T_{inst, max}$	[Nm]			2			

fischer injection system FIS V masonry

Perforated brick HLz
Species of brick, installation parameters

Annex 44

Kind of masonry: Perforated brick HLz

Table 72: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
12x50 M6 M8		12	2,50	2,00	3,00	2,50
		10	2,00	1,50	2,50	2,00
		8	1,50	1,50	2,00	1,50
		6	1,20	0,90	1,50	1,20
		4	0,90	0,75	0,90	0,75
		2	0,40	0,30	0,50	0,40
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	12	3,00	2,50	3,50	2,50
		10	2,50	2,00	2,50	2,50
		8	2,00	1,50	2,00	2,00
		6	1,50	1,20	1,50	1,50
		4	0,90	0,90	1,20	0,90
		2	0,50	0,40	0,50	0,50
20x85 M12, M16 15x85 M10 15x85 M12		12	1,50	1,20	1,50	1,20
		10	1,20	0,90	1,20	1,20
		8	0,90	0,75	0,90	0,90
		6	0,75	0,60	0,75	0,60
		4	0,50	0,40	0,50	0,40
		2	--	--	--	--
Partial safety factor		γ_{Mm} [-]	2,5			

Table 73: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
12x50 M6	12x85 M6	12	4,00			
		10	3,00			
		8	2,50			
		6	2,00			
		4	1,20			
		2	0,60			
12x50 M8	12x85 M8	12	4,50			
		10	3,50			
		8	3,00			
		6	2,00			
		4	1,50			
		2	0,75			
20x85 M12, M16 15x85 M10 15x85 M12	16x85 M8, M10 11x85 M6 11x85 M8	12	5,50			
		10	4,50			
		8	3,50			
		6	2,50			
		4	2,00			
		2	0,90			
Partial safety factor		γ_{Mm} [-]	2,5			

Factor for job site tests
and displacements see
Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 45

Kind of masonry: Perforated brick LLz

Table 74: Parameters of brick

Species of brick		Perforated brick LLz
Density	$\rho \geq$ [kg/dm ³]	0,7
Compressive strength	$f_b \geq$ [N/mm ²]	6,0
Standard or approval		EN 771-1
Producer		
Size, dimensions	[mm]	$\geq 248 \times 78 \times 248$
Minimum thickness of brick	h_{min} [mm]	80

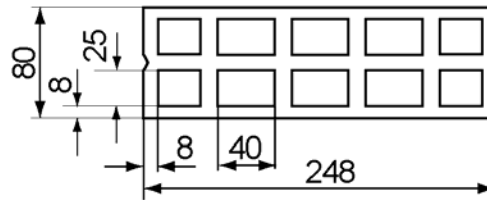


Table 75: Installation parameters
(anchor rod with perforated sleeve)

Size of perforated sleeve	12x50	
Size of anchor rod	M6	M8
Edge distance	c_{min} [mm]	100
Spacing	$s_{min \parallel}$ [mm]	75
	$s_{cr \parallel}$ [mm]	250
	$s_{cr \perp} = s_{min \perp}$ [mm]	250
Group-factor	$\alpha_{g,N \parallel}$ [-]	1,6
	$\alpha_{g,v \parallel}$ [-]	1,1
	$\alpha_{g,N \perp}$ [-]	2
	$\alpha_{g,v \perp}$ [-]	
Max. installation torque	$T_{inst, max}$ [Nm]	2

fischer injection system FIS V masonry

Perforated brick LLz
Species of brick, installation parameters

Annex 46

Kind of masonry: Perforated brick LLz

Table 76: Characteristic values of resistance; tension load (N_{RK})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b	characteristic values of resistance			
	[N/mm ²]	[kN]	[kN]	[kN]	[kN]
12x50	6	1,50	1,20	1,50	1,50
M6	4	0,90	0,90	1,20	0,90
M8	2	0,50	0,40	0,60	0,50
Partial safety factor γ_{Mm} [-]		2,5			

Table 77: Characteristic values of resistance; shear load (V_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b	characteristic values of resistance			
	[N/mm ²]	[kN]			
12x50	6	1,50			
M6	4	0,90			
M8	2	0,50			
Partial safety factor γ_{Mm} [-]		2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick LLz
Characteristic values

Annex 47

Kind of masonry: Perforated brick HLz

Table 78: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	1,8
Compressive strength	$f_b \geq$ [N/mm ²]	6, 8, 12, 16 or 20
Standard or approval		EN 771-1
Producer		e.g. Ceramica Farreny S.A.
Size, dimensions	[mm]	$\geq 275 \times 130 \times 94$
Minimum thickness of brick	h_{min} [mm]	130

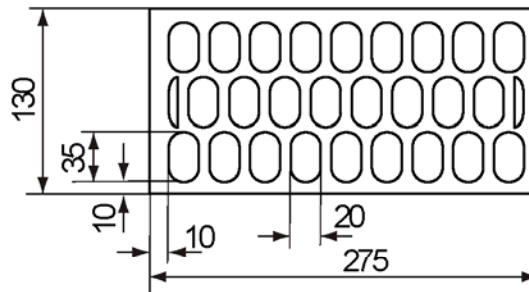


Table 79: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	20x85
Size of anchor rod	M6 M8	M6 M8	M8 M10	M12 M16
Size of internal threaded anchor FIS E			11x85 M6/M8	15x85 M10/M12
Edge distance c_{min} [mm]	100			120
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]			
	275			
Spacing	$s_{cr \perp} = s_{min \perp}$ [mm]			
	95			
Group-factor	$\alpha_{g,N \parallel}$ [-]			
	$\alpha_{g,v \parallel}$ [-]			
	2			
	$\alpha_{g,N \perp}$ [-]			
Max. installation torque	$T_{inst,max}$ [Nm]			
	2			

fischer injection system FIS V masonry

Perforated brick HLz
Species of brick, installation parameters

Annex 48

Kind of masonry: Perforated brick HLz

Table 80: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance [kN]			
12x50 M6 M8			20	1,20	1,20	1,50	1,20
			16	0,90	0,90	1,20	0,90
			12	0,75	0,60	0,90	0,75
			8	0,50	0,40	0,60	0,50
			6	0,40	0,30	0,40	0,40
12x85 M6 M8	16x85 M8	20x85 M12	20	3,00	2,50	3,00	2,50
			16	2,00	2,00	2,50	2,00
	11x85 M6 11x85 M8	15x85 M10 15x85 M12	12	1,50	1,50	2,00	1,50
			8	1,20	0,90	1,20	0,90
			6	0,90	0,75	0,90	0,75
Partial safety factor			γ_{Mm} [-]	2,5			

Table 81: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance [kN]			
12x50 M6 M8			20	4,0			
			16	3,0			
			12	2,0			
			8	1,5			
			6	1,2			
12x85 M6 M8	16x85 M8	20x85 M12	20	4,0			
			16	3,0			
	11x85 M6 11x85 M8	15x85 M10 15x85 M12	12	2,5			
			8	1,5			
			6	1,2			
Partial safety factor			γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 49

Kind of masonry: Perforated brick LLz

Table 82: Parameters of brick

Species of brick			Perforated brick LLz
Density	$\rho \geq$ [kg/dm ³]		0,8
Compressive strength	$f_b \geq$ [N/mm ²]		2
Standard or approval			EN 771-1
Producer			e.g. Ceramica Farreny S.A.
Size, dimensions	[mm]		$\geq 128 \times 88 \times 275$
Minimum thickness of brick	h_{min}	[mm]	88

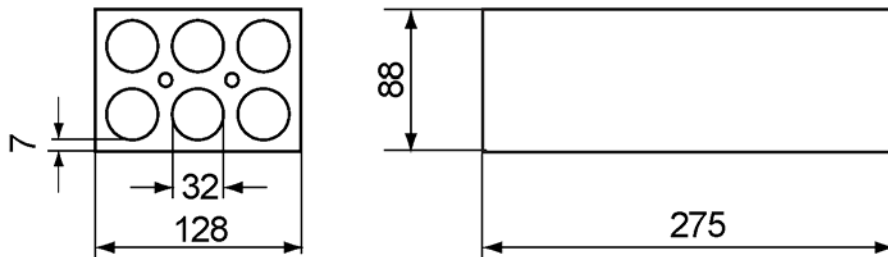


Table 83: Installation parameters (anchor rod with perforated sleeve)

Size of perforated sleeve	12x50	
Size of anchor rod	M6	M8
Edge distance	c_{min} [mm]	60
Spacing	$s_{min }$ [mm]	75
	$s_{cr }$ [mm]	275
	$s_{min\perp}$ [mm]	75
	$s_{cr\perp}$ [mm]	130
Group-factor	$\alpha_{g,N }$ [-]	1,3
	$\alpha_{g,v }$ [-]	1,5
	$\alpha_{g,N\perp}$ [-]	1,3
	$\alpha_{g,v\perp}$ [-]	1,5
Max. installation torque	$T_{inst,max}$ [Nm]	2

fischer injection system FIS V masonry

Perforated brick LLz
Species of brick, installation parameters

Annex 50

Kind of masonry: Perforated brick LLz

Table 84: Characteristic values of resistance; tension load (N_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
		[kN]	[kN]	[kN]	[kN]
12x50 M6 M8	2	1,50	1,20	1,50	1,20
Partial safety factor	γ_{Mm} [-]	2,5			

Table 85: Characteristic values of resistance; shear load (V_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
		[kN]			
12x50 M6 M8	2	1,20			
Partial safety factor	γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick LLz
Characteristic values

Annex 51

Kind of masonry: Perforated brick HLz

Table 86: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	0,7
Compressive strength	$f_b \geq$ [N/mm ²]	1,0
Standard or approval		EN 771-1
Producer		e.g. Preceram
Size, dimensions	[mm]	$\geq 220 \times 190 \times 290$
Minimum thickness of brick	h_{min} [mm]	190

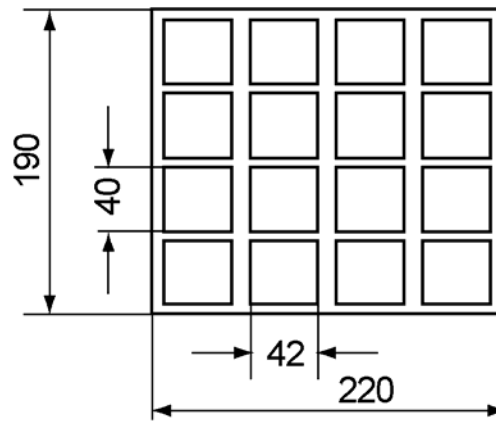


Table 87: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16
Size of internal threaded anchor FIS E			11x85 M6/M8			15x85 M10/M12		
Edge distance c_{min} [mm]	110							
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]							
	$s_{cr \perp} = s_{min \perp}$ [mm]							
Group-factor	$\alpha_{g,N \parallel}$ [-]							
	$\alpha_{g,V \parallel}$ [-]							
	$\alpha_{g,N \perp}$ [-]							
	$\alpha_{g,V \perp}$ [-]							
Max. installation torque	$T_{inst,max}$ [Nm]							
								2

fischer injection system FIS V masonry

Perforated brick HLz
Species of brick, installation parameters

Annex 52

Kind of masonry: Perforated brick HLz

Table 88: Characteristic values of resistance; tension load (N_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6 M8			10	0,60	0,50	0,60	0,50
			8	0,50	0,40	0,50	0,40
			6	0,30	--	0,40	0,30
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12, M16 15x85 M10 15x85 M12	10	2,00	2,00	2,50	2,00
			8	1,50	1,50	2,00	1,50
			6	1,20	1,20	1,50	1,20
20x130 22x130/200 M12, M16	16x130 18x130/200 M8, M10		10	2,50	2,00	3,00	2,50
			8	2,00	1,50	2,50	2,00
			6	1,50	1,20	1,50	1,50
Partial safety factor			γ_{Mm} [-]	2,5			

Table 89: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]			
12x50 M6 M8			10	2,50			
			8	2,00			
			6	1,50			
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M12, M16 15x85 M10 15x85 M12	10	3,00			
			8	2,00			
			6	1,50			
16x130 M8 M10	18x130/200 M12		10	4,50			
			8	3,50			
			6	2,50			
20x130 M12 M16	22x130/200 M12 M16		10	3,50			
			8	3,00			
			6	2,00			
Partial safety factor			γ_{Mm} [-]	2,5			

Factor for job and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 53

Kind of masonry: Perforated brick HLz

Table 90: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	0,8
Compressive strength	$f_b \geq$ [N/mm ²]	2, 4 or 6
Standard or approval		EN 771-1
Producer		e.g. Ziegelwerk Brenna
Size, dimensions	[mm]	$\geq 253 \times 300 \times 240$
Minimum thickness of brick	h_{min} [mm]	300

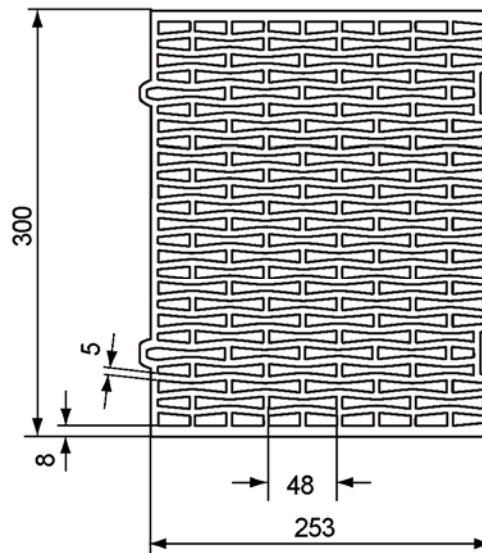


Table 91: Installation parameters (anchor rod and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200							
Size of anchor rod	M6	M8	M6	M8	M10	M8	M10	M10	M12	M12	M16	M12	M16	M16	M16
Size of internal threaded anchor FIS E				11x85					15x85						
Edge distance	c_{min} [mm]		60												
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]		255												
	$s_{cr \perp} = s_{min \perp}$ [mm]		240												
Group-factor	$\alpha_{g,N \parallel}$ [-]														
	$\alpha_{g,v \parallel}$ [-]														
	$\alpha_{g,N \perp}$ [-]		2												
	$\alpha_{g,v \perp}$ [-]														
Max. installation torque	$T_{inst,max}$ [Nm]		2												

fischer injection system FIS V masonry

Perforated brick HLz
Species of brick, installation parameters

Annex 54

Kind of masonry: Perforated brick HLz

Table 92: Characteristic values of resistance; tension load (N_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]	[kN]	[kN]	[kN]
12x50 M6 M8				6	0,75	0,60	0,90	0,75
				4	0,50	0,40	0,60	0,50
				2	--	--	0,30	--
12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8		20x85 M12, M16 15x85 M10 15x85 M12	6	1,50	1,20	1,50	1,20
				4	0,90	0,75	0,90	0,90
				2	0,50	0,40	0,50	0,40
20x130 M12 M16	16x130 M8 M10	18x130/200 M10 M12	22x130/200 M16	6	1,20	0,90	1,50	1,20
				4	0,90	0,75	0,90	0,75
				2	0,40	0,30	0,50	0,40
Partial safety factor				γ_{Mm} [-]	2,5			

Table 93: Characteristic values of resistance; shear load (V_{Rk})

Use category					w/w		d/d	
Temperature range					I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
					[kN]			
12x50 M6 M8	12x85 M6 M8	16x85 11x85 M6		6	1,50			
				4	0,90			
				2	0,50			
16x130 M8 M10	16x85 M8, M10 11x85 M8	18x130/200 M10	20x85 15x85 M10	6	1,50			
				4	0,90			
				2	0,50			
20x130 M12 M16	20x85 M12, M16 15x85 M12	22x130/200 M12 M16		6	1,50			
				4	1,20			
				2	0,60			
Partial safety factor				γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 55

Kind of masonry: Solid light-weight concrete block Vbl

Table 94: Parameters of brick

Species of brick	Solid light-weight concrete block Vbl	
Density $\rho \geq$ [kg/dm ³]	2,0	
Compressive strength $f_b \geq$ [N/mm ²]	4, 6, 8 or 10	
Standard or approval		
Producer	e.g. Roadstone wood	
Size, dimensions [mm]	$\geq 440 \times 100 \times 215$	
Minimum thickness of brick h_{min} [mm]	100	

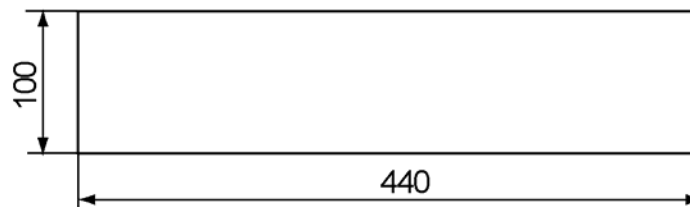


Table 95: Installation parameters (anchor rod without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16	
Effective anchorage depth h_{ef} [mm]	50	70	50	70	50	70	50	70	50	70
Edge distance a_{min} [mm]	100									
Spacing	$s_{min \parallel}$ [mm]		75							
	$s_{cr \parallel}$ [mm]		440							
	$s_{min \perp}$ [mm]		75							
	$s_{cr \perp}$ [mm]		215							
Group-factor	$\alpha_{g,N \parallel}$ [-]		1,6							
	$\alpha_{g,V \parallel}$ [-]		1,3							
	$\alpha_{g,N \perp}$ [-]		1,4							
	$\alpha_{g,V \perp}$ [-]		1,3							
Max. installer torque $T_{inst,max}$ [Nm]	4		10							

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Species of brick, installation parameters

Annex 56

Kind of masonry: Solid light-weight concrete block Vbl

Table 96: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
≥ 50	M6	10	3,00	2,50	5,00	4,00
		8	2,00	2,00	4,00	3,00
		6	1,50	1,50	3,00	2,50
		4	1,20	0,90	2,00	1,50
≥ 50	M8	10	3,50	2,50	5,50	4,50
	M10	8	2,50	2,00	4,50	3,50
	M12	6	2,00	1,50	3,50	2,50
	M16	4	1,20	1,20	2,00	2,00
Partial safety factor		γ_{Mm} [-]	2,5			

Table 97: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
≥ 50	M6	10	3,00			
		8	2,50			
		6	2,00			
		4	1,20			
≥ 50	M8	10	3,50			
		8	2,50			
		6	2,00			
		4	1,50			
≥ 50	M10, M12	10	4,00			
		8	3,00			
		6	2,50			
		4	1,50			
≥ 50	M16	10	4,50			
		8	3,50			
		6	2,50			
		4	1,50			
Partial safety factor		γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Characteristic values

Annex 57

Kind of masonry: Solid light-weight concrete block Vbl

Table 98: Parameters of brick

Species of brick	Solid light-weight concrete block Vbl	
Density $\rho \geq$ [kg/dm ³]	2,0	
Compressive strength $f_b \geq$ [N/mm ²]	6, 8, 10 or 12	
Standard or approval		
Producer	e.g. Tarmac	
Size, dimensions [mm]	$\geq 440 \times 95 \times 215$	
Minimum thickness of brick h_{min} [mm]	95	

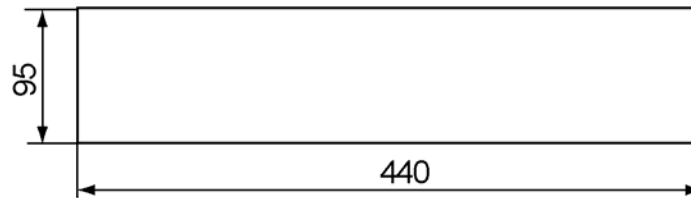


Table 99: Installation parameters (anchor rod without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		
Effective anchorage depth h_{ef} [mm]	50	70	50	70	50	70	50	70	50	70	
Edge distance c_{min} [mm]	60										
Spacing	$s_{min \parallel}$ [mm]	75									
	$s_{cr \parallel}$ [mm]	440									
	$s_{min \perp}$ [mm]	75									
	$s_{cr \perp}$ [mm]	215									
Group-factor	$\alpha_{g,N \parallel}$ [-]	1,9									
	$\alpha_{g,V \parallel}$ [-]	1,4									
	$\alpha_{g,N \perp}$ [-]	1,9									
	$\alpha_{g,V \perp}$ [-]	1,4									
Max. installation torque $T_{inst,max}$ [Nm]	4				10						

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Species of brick, installation parameters

Annex 58

Kind of masonry: Solid light-weight concrete block Vbl

Table 100: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
50	M6, M8, M10, M12, M16	12	3,00	2,50	5,00	4,50
		10	2,50	2,00	4,50	3,50
		8	2,00	1,50	3,50	3,00
		6	1,50	1,20	2,50	2,00
70	M6, M8	12	4,00	3,50	7,00	6,00
		10	3,50	3,00	6,00	5,00
		8	2,50	2,00	4,50	4,00
		6	2,00	1,50	3,50	3,00
70	M10, M12, M16	12	4,50	3,50	7,50	6,00
		10	3,50	3,00	6,00	5,00
		8	3,00	2,50	5,00	4,00
		6	2,00	2,00	3,50	3,00
Partial safety factor		γ_{Mm} [-]	2,5			

Table 101: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
≥ 50	M6 M8	12	4,00			
		10	3,50			
		8	2,50			
		6	2,00			
≥ 50	M10	12	4,50			
		10	4,00			
		8	3,00			
		6	2,00			
≥ 50	M12 M16	12	3,50			
		10	3,00			
		8	2,50			
		6	1,50			
Partial safety factor		γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid light-weight concrete block Vbl
Characteristic values

Annex 59

Kind of masonry: Light-weight concrete hollow block Hbl

Table 102: Parameters of brick

Species of brick	Light-weight concrete hollow block Hbl	
Density	$\rho \geq$ [kg/dm ³]	1,2
Compressive strength	$f_b \geq$ [N/mm ²]	4, 6, 8 or 10
Standard or approval	EN 771-3	
Producer	e.g. Roadstone wood	
Size, dimensions	[mm]	$\geq 440 \times 215 \times 215$
Minimum thickness of brick	h_{min} [mm]	215

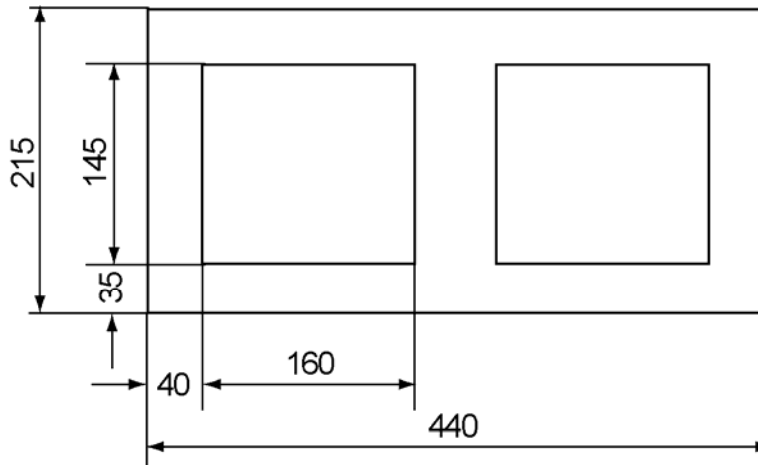


Table 103: Installation parameters (anchor rod and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200	20x200
Size of anchor rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16	M12 M16
Size of internal threaded anchor FIS E				11x85 M6/M8			15x85 M10/M12		
Edge distance	c_{min} [mm]				110				
Spacing	$s_{min \parallel}$ [mm]				100				
	$s_{of \parallel}$ [mm]				440				
	$s_{min \perp}$ [mm]				100				
	$s_{of \perp}$ [mm]				215				
Group-factor	$\alpha_{g,N \parallel}$ [-]				1,4				
	$\alpha_{g,V \parallel}$ [-]				2				
	$\alpha_{g,N \perp}$ [-]				1,4				
	$\alpha_{g,V \perp}$ [-]				1,2				
Max. installation torque	$T_{inst,max}$ [Nm]				2				

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Species of brick, installation parameters

Annex 60

Kind of masonry: Light-weight concrete hollow block Hbl

Table 104: Characteristic values of resistance; tension load (N_{Rk})

Use category						w/w		d/d	
Temperature range						I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
						[kN]	[kN]	[kN]	[kN]
12x50 M6 M8	12x85 M6 M8				10	2,50	2,00	3,00	2,50
					8	2,00	1,50	2,00	2,00
					6	1,50	1,20	1,50	1,50
					4	0,90	0,90	1,20	0,90
16x85 M8, M10 11x85 M6 11x85 M8	16x130 M8 M10	18x130/200 M10 M12			10	3,00	2,50	3,50	3,00
					8	2,50	2,00	3,00	2,50
					6	2,00	1,50	2,00	1,50
					4	1,20	0,90	1,50	1,20
20x85 M12 M16	20x130 M12 M16	22x130/200 M16			10	4,50	4,00	5,00	4,50
					8	3,50	3,00	4,00	3,50
					6	3,00	2,50	3,00	2,50
					4	2,00	1,50	2,00	1,50
Partial safety factor					γ_{Mm} [-]	2,5			

Table 105: Characteristic values of resistance; shear load (V_{Rk})

Use category						w/w		d/d	
Temperature range						I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
						[kN]			
12x50 M6	12x85 M6	16x85 11x85 M6			10	2,00			
					8	1,50			
					6	1,20			
					4	0,75			
12x50 12x85 M8	16x85 M8, M10 11x85 M6 11x85 M8	20x85 M10 M12	16x130 M8, M10 18x130/200 M12	22x130/200 M12	10	3,00			
					8	2,50			
					6	2,00			
					4	1,20			
Partial safety factor					γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Light-weight concrete hollow block Hbl
Characteristic values

Annex 61

Kind of masonry: Solid brick Mz

Table 106: Parameters of brick

Species of brick	Solid brick Mz	
Density $\rho \geq$ [kg/dm ³]	1,8	
Compressive strength $f_b \geq$ [N/mm ²]	10 or 20	
Standard or approval	EN 771-2	
Producer	e.g. Wienerberger	
Size, dimensions [mm]	$\geq 228 \times 108 \times 54$	
Minimum thickness of brick h_{min} [mm]	108	

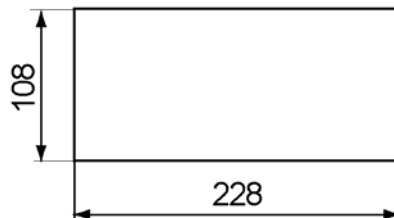


Table 107: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		11x85 ¹⁾ M6/M8	15x85 M10/M12
Effective anchorage depth h_{ef} [mm]	50	90	50	90	50	90	50	90	50	90	85	85
Edge distance c_{min} [mm]	60											
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]											230
	$s_{cr \perp} = s_{min \perp}$ [mm]											60
Group-factor	$\alpha_{g,N \parallel}$ [-]											2
	$\alpha_{g,V \parallel}$ [-]											
	$\alpha_{g,N \perp}$ [-]											
	$\alpha_{g,V \perp}$ [-]											
Max. installation torque $T_{inst,max}$ [Nm]	4		10									

¹⁾ For FIS E 11x85 with screw M6: $T_{inst,max} = 4$ Nm

fischer injection system FIS V masonry

Solid brick Mz
Species of brick, installation parameters

Annex 62

Kind of masonry: Solid brick Mz

Table 108: Characteristic values of resistance; tension load (N_{RK})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
≥ 50	M6	20	0,90	0,75	1,50	1,20
		10	0,60	0,50	1,20	0,90
≥ 50	M8	20	1,50	1,20	2,50	2,00
		10	0,90	0,90	1,50	1,50
≥ 50	M10; M12; M16; 11x85; 15x85	20	1,20	0,90	2,00	1,50
		10	0,75	0,60	1,20	1,20
Partial safety factor		γ_{Mm} [-]	2,5			

Table 109: Characteristic values of resistance; shear load (V_{RK})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
≥ 50	M6 11x85 M6	20	2,50			
		10	2,00			
≥ 50	M8 11x85 M8	20	4,00			
		10	3,00			
≥ 50	M10 15x85 M10	20	5,50			
		10	4,00			
≥ 50	M12 15x85 M12	20	6,00 (5,5) ¹⁾			
		10	4,50			
≥ 50	M16	20	8,00 (5,5) ¹⁾			
		10	5,50			
Partial safety factor		γ_{Mm} [-]	2,5			

¹⁾ Characteristic value of pushing out of one brick $V_{RK, pb} = 5,5$ kN

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid brick Mz
Characteristic values

Annex 63

Kind of masonry: Solid sand-lime block KS

Table 110: Parameters of brick

Species of brick		Solid sand-lime block KS
Density	$\rho \geq$ [kg/dm ³]	1,8 2,2
Compressive strength	$f_b \geq$ [N/mm ²]	10, 20 36
Standard or approval		EN 771-2
Producer		e.g. Calduran
Size, dimensions	[mm]	$\geq 997 \times 214 \times 538$
Minimum thickness of brick	h_{min} [mm]	214

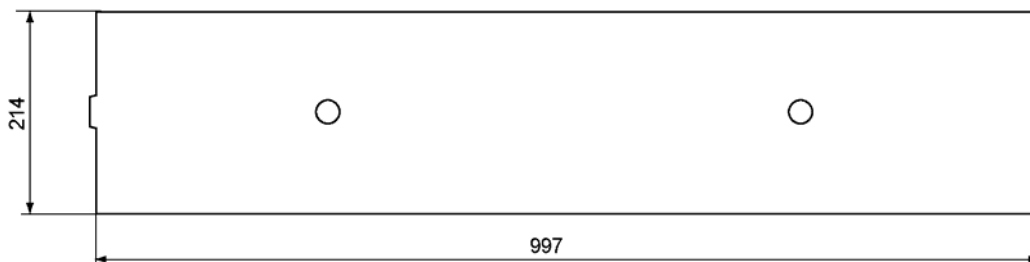


Table 111: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6		M8		M10		M12		M16		11x85 ¹⁾ M6/M8	15x85 M10/M12
Effective anchorage depth h_{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance c_{min} [mm]	75											
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]		300									
	$s_{cr \perp} = s_{min \perp}$ [mm]		300									
Group-factor	$\alpha_{g,N \parallel}$ [-]		2									
	$\alpha_{g,v \parallel}$ [-]		2									
	$\alpha_{g,N \perp}$ [-]		2									
	$\alpha_{g,v \perp}$ [-]		2									
Max. installation torque $T_{inst,max}$ [Nm]	4		10									

¹⁾ For FIS E 11x85 with screw M6: $T_{inst,max} = 4$ Nm

fischer injection system FIS V masonry

Solid sand-lime block KS
Species of brick, installation parameters

Annex 64

Kind of masonry: Solid sand-lime block KS

Table 112: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]	[kN]	[kN]	[kN]
50 100	M6	36	4,50	3,50	8,00	6,50
		20	5,50	4,50	8,50	8,00
		10	4,00	3,00	7,00	5,50
50	M8	36	8,00	6,50	12,00	11,00
		20	6,00	5,00	10,50	8,50
		10	4,00	3,50	7,00	6,00
100	M8	36	12,00	12,00	12,00	12,00
		20	10,00	8,50	12,00	12,00
		10	7,00	6,00	12,00	10,00
50	M10	36	11,50	9,50	12,00	12,00
		20	7,00	6,00	11,50	10,00
		10	5,00	4,00	8,00	7,00
100	M10	36	12,00	12,00	12,00	12,00
		20	8,50	7,00	12,00	10,00
		10	6,00	5,00	9,50	8,00
50	M12	36	12,00	11,50	12,00	12,00
		20	7,00	6,00	11,00	9,50
		10	5,00	4,00	8,00	6,50
100	M12	36	12,00	12,00	12,00	12,00
		20	9,00	7,50	12,00	12,00
		10	6,00	5,00	10,00	8,00
≥ 50	M16 11x85 15x85	36	12,00	12,00	12,00	12,00
		20	8,00	7,00	12,00	10,50
		10	5,50	4,50	9,00	7,50
100	M16	36	12,00	12,00	12,00	12,00
		20	11,00	9,00	12,00	12,00
		10	7,50	6,00	11,50	9,50
Partial safety factor		γ_{Mm} [-]	2,5			

Table 113: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
≥ 50	M6 11x85 M6	36	4,50			
		20	4,50			
		10	3,00			
≥ 50	M8 11x85 M8	36	9,00			
		20	7,00			
		10	5,00			
≥ 50	M10 15x85 M10	36	11,00			
		20	7,50			
		10	5,50			
≥ 50	M12; M16 15x85 M12	36	12,00			
		20	6,00			
		10	4,00			
Partial safety factor		γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Solid sand-lime block KS,
Characteristic values

Annex 65

Kind of masonry: Perforated brick HLz

Table 114: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \geq$ [kg/dm ³]	$\geq 1,4$
Compressive strength	$f_b \geq$ [N/mm ²]	2, 4, 6 or 8
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	$\geq 230 \times 108 \times 55$
Minimum thickness of brick	h_{min} [mm]	108

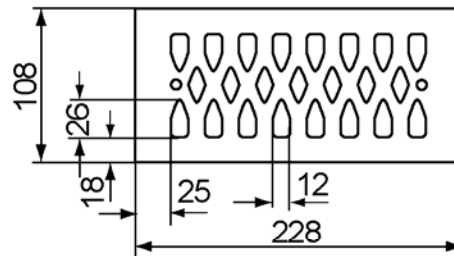


Table 115: Installation parameters (anchor rod with perforated sleeve and internal threaded anchor FIS E with perforated sleeve)

Size of perforated sleeve	12x50		12x85		16x85		20x85	
Size of anchor rod	M6	M8	M6	M8	M8	M10	M12	M16
Size of internal threaded anchor FIS E					11x85 M6/M8		15x85 M10/M12	
Edge distance	c_{min}	[mm]	60					
Spacing	$s_{min \parallel}$	[mm]	80					
	$s_{cr \parallel}$	[mm]	230					
	$s_{cr \perp} = s_{min \perp}$	[mm]	60					
Group-factor	$\alpha_{g,N \parallel}$	[-]	2					
	$\alpha_{g,V \parallel}$	[-]	2					
	$\alpha_{g,N \perp}$	[-]	2					
	$\alpha_{g,V \perp}$	[-]	2					
Max. installation torque	$T_{inst, max}$	[Nm]	2					

fischer injection system FIS V masonry

Perforated brick HLz
Species of brick, installation parameters

Annex 66

Kind of masonry: Perforated brick HLz

Table 116: Characteristic values of resistance; tension load (N_{Rk})¹⁾

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]	[kN]	[kN]	[kN]
12x50 M6 M8			8	1,20	0,90	1,50	1,20
			6	0,90	0,75	0,90	0,90
			4	0,60	0,50	0,75	0,60
			2	0,30	--	0,30	0,30
12x85 M6 M8			8	3,50	3,00	4,00	3,00
			6	2,50	2,00	3,00	2,50
			4	1,50	1,50	2,00	1,50
			2	0,90	0,75	0,90	0,75
16x85 M8, M10 11x85 M6 11x85 M8			8	3,00	2,50	3,50	3,00
			6	2,50	2,00	2,50	2,00
			4	1,50	1,20	1,50	1,50
			2	0,75	0,60	0,90	0,75
20x85 M12, M16 15x85 M10 15x85 M12			8	2,00	1,50	2,50	2,00
			6	1,50	1,20	1,50	1,50
			4	0,90	0,90	1,20	0,90
			2	0,50	0,40	0,60	0,50
Partial safety factor			γ_{Mm} [-]	2,5			

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

Table 117: Characteristic values of resistance; shear load (V_{Rk})

Use category				w/w		d/d	
Temperature range				I	II	I	II
sleeve/ anchor combination	sleeve/ anchor combination	sleeve/ anchor combination	f_b [N/mm ²]	characteristic values of resistance			
				[kN]			
12x50 M6 M8	12x85 M6 M8	16x85 M8, M10 11x85 M6 11x85 M8	8	2,50			
			6	1,50			
			4	1,20			
			2	0,60			
20x85 M12, M16 15x85 M10 15x85 M12			8	1,50			
			6	1,20			
			4	0,90			
			2	0,40			
Partial safety factor			γ_{Mm} [-]	2,5			

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Perforated brick HLz
Characteristic values

Annex 67

Kind of masonry: Autoclaved aerated concrete

Cylindrical drill hole

Table 118: Parameters of brick

Species of brick		Autoclaved aerated concrete
Density	$\rho \geq$ [kg/m ³]	350 500 650
Compressive strength	$f_b \geq$ [N/mm ²]	2 4 6
Standard or approval		EN 771-4
Producer		e.g. Ytong

Table 119: Installation parameters (anchor rod and internal threaded anchor without perforated sleeve)

Size of anchor rod	M6	M8	M10	M12	M16	11x85	15x85
Effective anchorage depth h_{ef} [mm]	100					85	
Edge distance c_{min} [mm]	100						
Spacing	$s_{cr \parallel} = s_{min \parallel}$ [mm]						
	$s_{cr \perp} = s_{min \perp}$ [mm]						
Group-factor	$\alpha_{g,N \parallel}$ [-]						
	$\alpha_{g,v \parallel}$ [-]						
	2						
	$\alpha_{g,N \perp}$ [-]						
	$\alpha_{g,v \perp}$ [-]						
Max. installation torque $T_{inst, max}$ [Nm]	1		2			1	2

fischer injection system FIS V masonry

Autoclaved aerated concrete
Cylindrical drill hole
Installation parameters

Annex 68

Kind of masonry: Autoclaved aerated concrete Cylindrical drill hole

Table 120: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]		[kN]	
100	M6	6	1,50		1,50	
		4	1,20		1,50	
		2	1,20		1,50	
100	M8	6	3,00		3,50	
		4	2,00		2,00	
		2	1,50		1,50	
100	M10	6	4,50		5,00	
		4	2,50		3,00	
		2	1,50		1,50	
100	M12	6	4,50		5,00	
		4	2,50		2,50	
		2	1,50		2,00	
100	M16	6	3,00		3,00	
		4	2,00		2,00	
		2	2,00		2,00	
85	11x85	6	3,50		3,50	
		4	2,00		2,00	
		2	1,50		1,50	
85	15x85	6	2,50		2,50	
		4	1,50		1,50	
		2	1,50		1,50	
Partial safety factor γ_{MAAC}			[-]		2,00	

Calculation of pulling out of one brick (tension load) : $N_{Rk,pb} = 2 \cdot l_{brick} \cdot b_{brick} (0,5 \cdot f_{vko} + 0,4 \cdot \sigma_d)$

Table 121: Characteristic values of resistance; shear load (V_{Rk})

Use category			w/w		d/d	
Temperature range			I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance			
			[kN]			
100 (85)	M6 (11x85 M6)	6			2,50	
		4			2,00	
		2			1,20	
100 (85)	M8; M10 (11x85 M8) (15x85 M10)	6			3,00	
		4			2,00	
		2			1,20	
100 (85)	M12 (15x85 M12)	6			3,50	
		4			2,50	
		2			1,50	
100	M16	6			4,50	
		4			2,00	
		2			1,20	
Partial safety factor γ_{MAAC}			[-]		2,00	

Calculation of pushing out of one brick (shear load) : $V_{Rk,pb} = 2 \cdot l_{brick} \cdot b_{brick} (0,5 \cdot f_{vko} + 0,4 \cdot \sigma_d)$

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Autoclaved aerated concrete
Cylindrical drill hole
Characteristic values

Annex 69

Kind of masonry: Autoclaved aerated concrete
Conical drill hole (with special drill bit PBB)

Table 122: Parameters of brick

Species of brick	Autoclaved aerated concrete	
Density $\rho \geq$ [kg/m ³]	350 500 650	
Compressive strength $f_b \geq$ [N/mm ²]	2 4 6	
Standard or approval	EN 771-4	
Producer	e.g. Ytong	

Table 123: Installation parameters (anchor rod without perforated sleeve)

Size of anchor rod	M8	M10	M12	M8	M10	M12	11x85 M6/M8
Effective anchorage depth h_{ef} [mm]	75			95			85
Edge distance c_{min} [mm]	120			150			
Spacing $s_{cr \parallel} = s_{min \parallel}$ [mm]	240			300			
	$s_{cr \perp} = s_{min \perp}$ [mm]			300			
Group-factor	$\alpha_{g,N \parallel}$ [-]			2			
	$\alpha_{g,V \parallel}$ [-]						
	$\alpha_{g,N \perp}$ [-]						
	$\alpha_{g,V \perp}$ [-]						
Max. installation torque $T_{inst \max}$ [Nm]				2			

fischer injection system FIS V masonry

Autoclaved aerated concrete
Conical drill hole with drill bit PBB
Installation parameters

Annex 70

Kind of masonry: Autoclaved aerated concrete

Conical drill hole (with special drill bit PBB)

Table 124: Characteristic values of resistance; tension load (N_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance		
			[kN]		
75	M8	6	3,50	4,00	
	M10	4	3,00	3,00	
	M12	2	2,00	2,00	
95	M8	6	4,00	4,50	
	M10	4	3,50	3,50	
	M12	2	2,50	2,50	
85	11x85 M6	6	3,50	4,00	
	11x85 M8	4	3,00	3,00	
		2	2,00	2,00	
Partial safety factor		γ_{MAAC} [-]	2,00		

Calculation of pulling out of one brick (tension load) : $N_{Rk,pb} = 2 \cdot l_{brick} \cdot b_{brick} (0,5 \cdot f_{vkc} + 0,4 \cdot \sigma_c)$

Table 125: Characteristic values of resistance; shear load (V_{Rk})

Use category		w/w		d/d	
Temperature range		I	II	I	II
Embedment depth	Anchor size	f_b [N/mm ²]	characteristic values of resistance		
			[kN]		
75	all sizes	6	6,00		
85		4	4,50		
95		2	2,50		
Partial safety factor		γ_{MAAC} [-]	2,00		

Calculation of pushing out of one brick (shear load) : $V_{Rk,pb} = 2 \cdot l_{brick} \cdot b_{brick} (0,5 \cdot f_{vkc} + 0,4 \cdot \sigma_c)$

Factor for job site tests and displacements see Annex 15.

fischer injection system FIS V masonry

Autoclaved aerated concrete
Conical drill hole with drill bit PBB
Characteristic values

Annex 71