LEISTUNGSERKLÄRUNG

DoP: 0108

für fischer Injektionssystem FIS AB zur Verankerung im Mauerwerk (Injektionsdübel aus Metall zur Verwendung im Mauerwerk) – **DE**

1. Eindeutiger Kenncode des Produkttyps: **DoP: 0108**

2. Verwendungszweck(e): **Verankerungen in Mauerwerk, die Anforderungen an die mechanische Festigkeit und Standsicherheit sowie Nutzungssicherheit erfüllen.. Sie dienen zur Befestigung und/oder Verankerung von Tragwerksteilen (die zur Stabilität der Systeme beitragen) oder schweren Elementen, siehe Anhang, insbesondere Anhänge B 1 bis B 10**

3. Hersteller: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Deutschland**

4. Bevollmächtigter: **--**

5. System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit: **1**

6. Europäisches Bewertungsdokument: **ETAG 029; 2013-04**

   Europäische Technische Bewertung: **ETA-17/0352; 2017-12-14**

   Technische Bewertungsstelle: **DIBt**

   Notifizierte Stelle(n): **1343 – MPA Darmstadt**

7. Erklärte Leistung(en):

Mechanische Festigkeit und Standsicherheit (BWR 1), Sicherheit bei der Nutzung (BWR 4)

- **Charakteristische Werte für Zug- und Querbeanspruchung: Siehe Anhang, insbesondere Anhänge C 1 bis C 4**
- **Charakteristische Biegemomente: Siehe Anhang, insbesondere Anhang C 5**
- **Verschiebungen unter Zug- und Querbeanspruchung: Siehe Anhang, insbesondere Anhang C 5**
- **Reduktionsfaktor für Baustellenversuche (ß-Faktor): Siehe Anhang, insbesondere Anhang C 6**
- **Rand- und Achsabstände: Siehe Anhang, insbesondere Anhänge C 7 bis C 8**

Brandschutz (BWR 2)

- **Brandverhalten: Der Dübel erfüllt die Anforderungen der Klasse A 1**
- **Feuerwiderstand: KLF**

8. Angemessene Technische Dokumentation und/oder Spezifische Technische Dokumentation: ---

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Für die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein der obengenannte Hersteller verantwortlich.

Unterzeichnet für den Hersteller und im Namen des Herstellers von:

Andreas Bucher, Dipl.-Ing.

Wolfgang Hengesbach, Dipl.-Ing., Dipl.-Wirtsch.-Ing.

Tumlingen, 2017-12-21

- Diese Leistungserklärung wurde in verschiedenen Sprachversionen erstellt. Für den Fall unterschiedlicher Auslegung hat immer die englische Version Vorrang.
- Der Anhang enthält freiwillige und ergänzende Informationen in englischer Sprache. Diese gehen über die (sprachneutral angegebenen) gesetzlichen Anforderungen hinaus.

Specific Part

1 Technical description of the product

The fischer Injection system FIS AB for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar FIS AB, FIS AB Low Speed and FIS AB High Speed, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod. The steel elements are made of zinc coated steel, stainless steel or high corrosion resistant steel.

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

The product description is given in Annex A.

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

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

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annex C 1 – C 4
Characteristic resistance for bending moments	See Annex C 5
Displacements under shear and tension loads	See Annex C 5
Reduction Factor for job site tests (β-Factor)	See Annex C 6
Edge distances and spacing	See Annex C 7 – C8

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

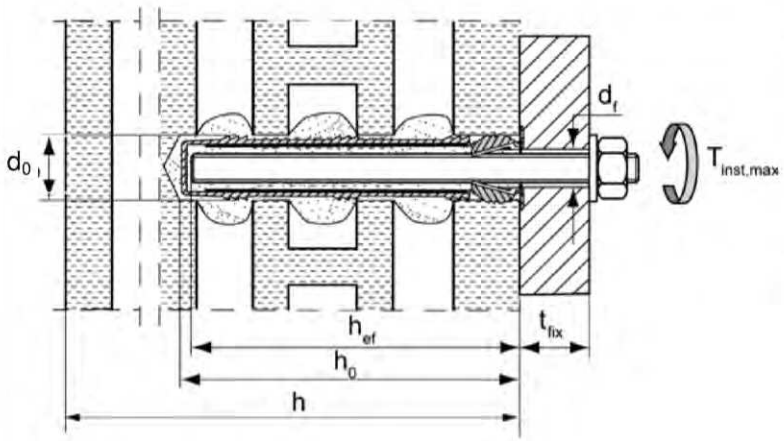
4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with guideline for European technical approval ETAG 029, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

Installation conditions part 1

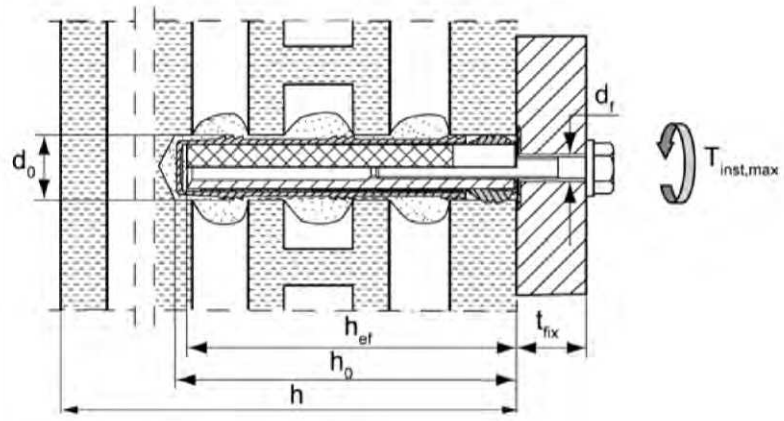
Threaded rods with perforated sleeve FIS H K; Installation in perforated and solid brick masonry



Pre-positioned installation

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

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



Pre-positioned installation

FIS H 16x85 K – FIS E 11x85 M6 and M8
FIS H 20x85 K – FIS E 15x85 M10 and M12

h_{ef} = effective anchorage depth
h_0 = depth of drill hole
t_{fix} = thickness of fixture
h = thickness of masonry

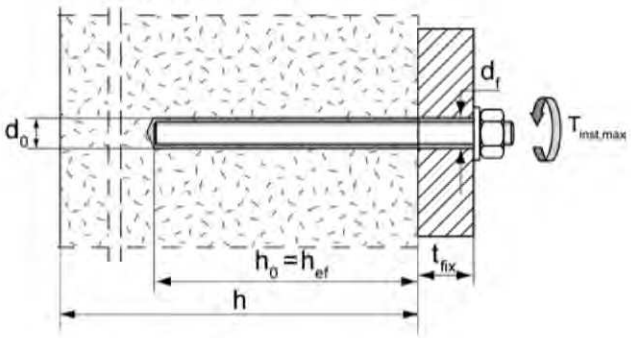
d_0 = nominal drill bit diameter
d_f = diameter of clearance hole in the fixture
$T_{inst,max}$ = maximum torque moment

fischer Injectionsystem FIS AB for masonry	**Annex A 1**
Product description Installation condition, part 1: in perforated and solid brick masonry	

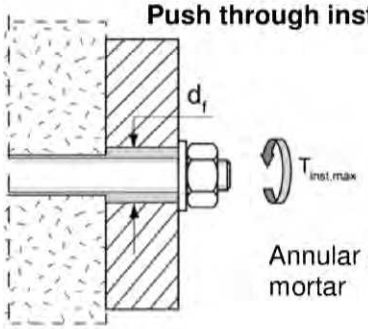
Installation conditions part 2

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

Pre-positioned installation

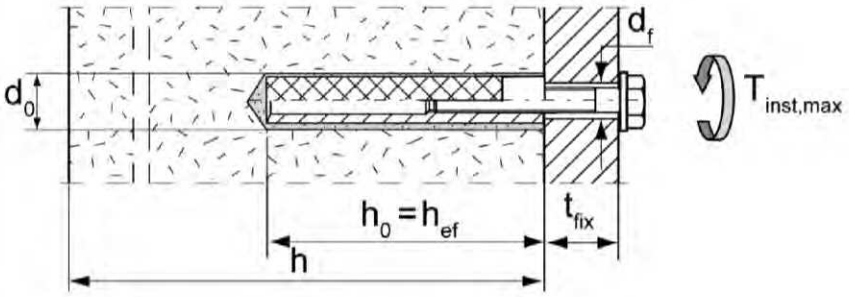


Push through installation



Annular gap filled with mortar

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



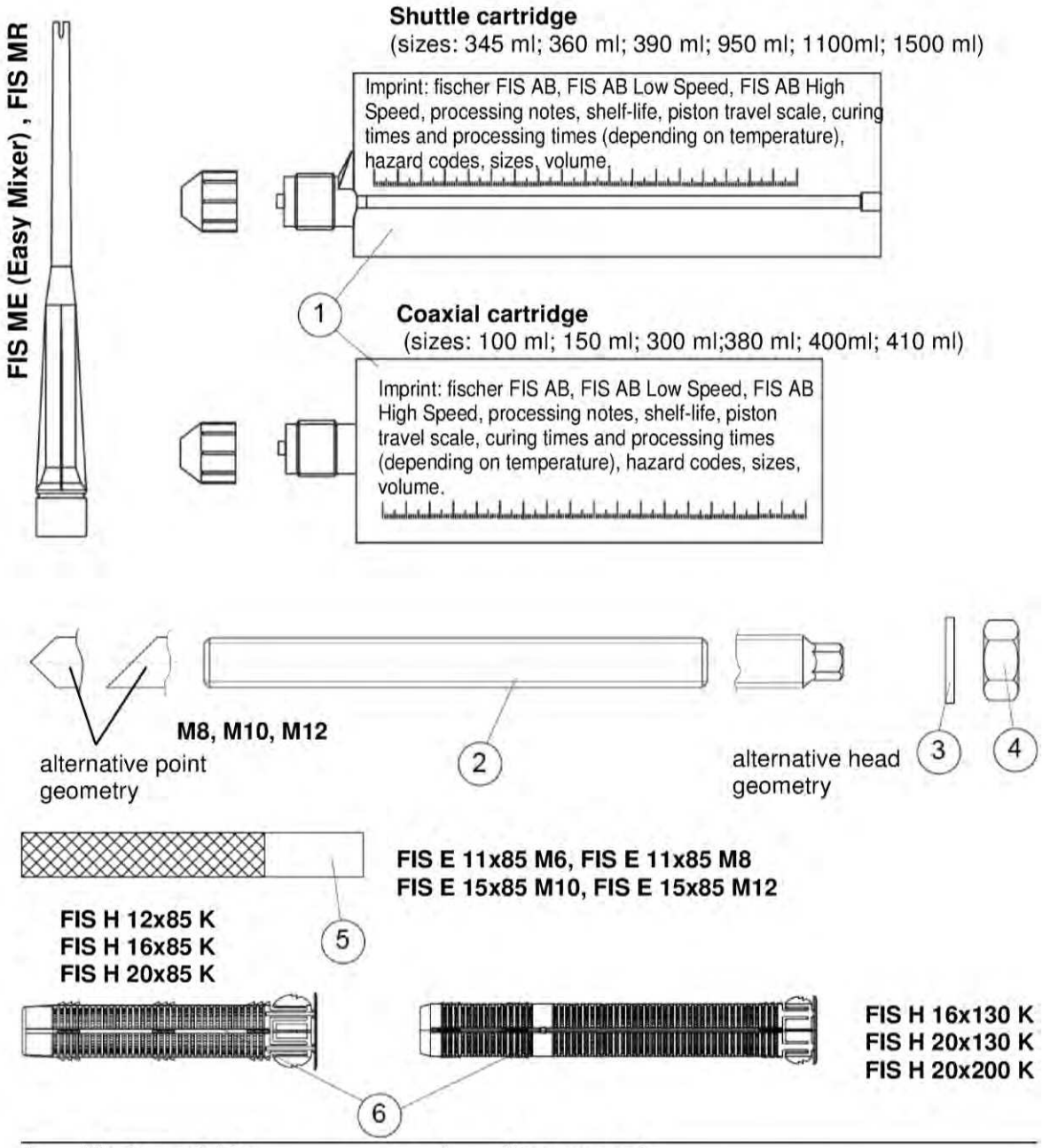
Pre-positioned installation

FIS E 11x85 M6
FIS E 11x85 M8
FIS E 15x85 M10
FIS E 15x85 M12

h_{ef} = effective anchorage depth
h_0 = depth of drill hole
t_{fix} = thickness of fixture
h = thickness of masonry

d_0 = nominal drill bit diameter
d_f = diameter of clearance hole in the fixture
$T_{inst,max}$ = maximum torque moment

fischer Injectionsystem FIS AB for masonry	**Annex A 2**
Product description Installation condition, part 2: in solid brick masonry and autoclaved aerated concrete	



1.	**Mortar cartridge**	4.	**Hexagon nut**
2.	**Threaded rod**	5.	**Internal threaded anchor FIS E**
3.	**Washer**	6.	**Perforated sleeve FIS H K**

fischer Injectionsystem FIS AB for masonry	**Annex A 3**
Product description Cartridges, anchor rods, internal threaded anchors, perforated sleeves	

Table A1: Materials

Part	Designation	Material		
1	Mortar cartridge	mortar, hardener; filler		
		Steel, zinc plated	Stainless steel A4	High corrosion-resistant steel C
2	Threaded rod	Property class 5.8 or 8.8; ISO 898-1:2013 zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$	Property class 50 or 80 EN ISO 3506-1:2009 or property class 70 with f_{yk}= 560 N/mm² 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8\%$
3	Washer ISO 7089:2000	zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised ISO 10684:2004	1.4401; 1.4404; 1.4578;1.4571; 1.4439; 1.4362 EN 10088-1:2014	1.4565;1.4529 EN 10088-1:2014
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2012 zinc plated ≥ 5µm, ISO 4042:1999 A2K or hot-dip galvanised ISO 10684:2004	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
5	Internal threaded anchor FIS E	Property class 5.8; EN 10277-1:2008-06 zinc plated ≥ 5µm, EN ISO 4042:1999 A2K	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
	Screw or threaded rod for internal threaded anchor FIS E	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, ISO 4042:1999 A2K	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
6	Perforated sleeve FIS H K	PP / PE		

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads

Base materials:

- Solid brick masonry (Use category b) and autoclaved aerated concrete (Use category d), acc. to Annex B8.
  Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annex B8
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010
- For other bricks in solid masonry, hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to ETAG 029, Annex B under consideration of the β-factor according to Annex C6, Table C4

Temperature Range:

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

Use conditions (Environmental conditions):

- Dry and wet structure (regarding injection mortar)
- Structures subject to dry internal conditions exist
  (zinc coated steel, stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particular aggressive conditions exist
  (stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel)
  Note: 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)

Specifications of intended use

Design:

- The anchorages have to be designed in accordance with the ETAG 029, Annex C, Design method A under the responsibility of an engineer experienced in anchorages and masonry work
  Applies to all bricks, if no other values are specified:

  $N_{Rk} = N_{Rk,s} = N_{Rk,p} = N_{Rk,b} = N_{Rk,pb}$

  $V_{Rk} = V_{Rk,s} = V_{Rk,b} = V_{Rk,c} = V_{Rk,pb}$

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

Installation:

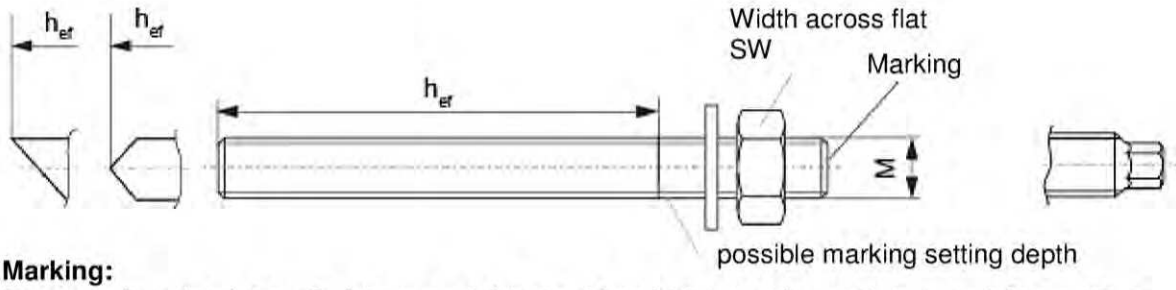
- Category d/d: -Installation and use in dry structures
- Category w/w: -Installation and use in dry and wet structures
- Hole drilling by hammer drill mode
- In case of aborted hole: The hole shall be filled with mortar
- Bridging of unbearing layer (e.g. plaster) see Annex B 4 (Table B1.3)
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Fastening screws or threaded rods (including nut and washer) must comply with the appropriate material and property class of the fischer internal threaded anchor FIS E
- minimum curing time see Annex B5. Table B3
- Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

  Material dimensions and mechanical properties of the metal parts according to the specifications are given in Annex A4, Table A1

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

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

fischer Injectionsystem FIS AB for masonry	**Annex B 2**
Intended Use Specifications	



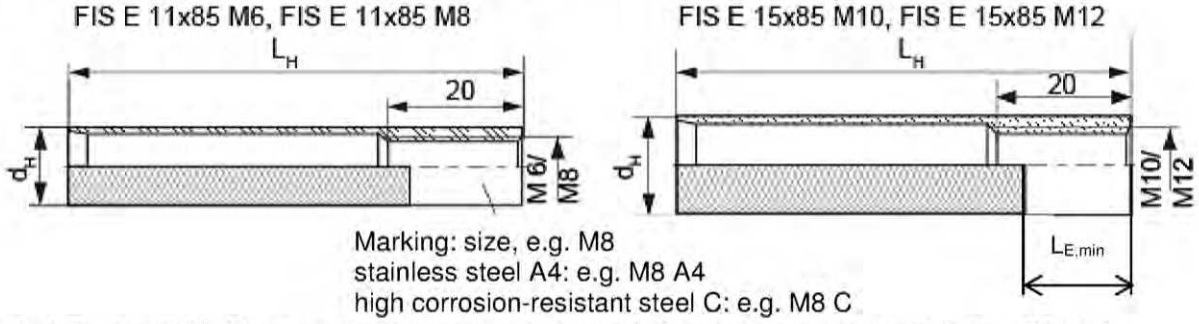
Marking:
Property class (p.c.) 8.8, Stainless steel A4, p.c. 80 or high corrosion-resistant steel C, p.c. 80: •
Stainless steel A4, property class 50 and high corrosion-resistant steel C, property class 50: ••

Table B1.1: Installation parameters for threaded rod without perforated sleeve

Size				M8	M10	M12
Nominal drill hole diameter		$d_{nom}=d_0$	[mm]	10	12	14
Width across flat		SW	[mm]	13	17	19
Effective anchorage depth[1)]		$h_{ef,min}$	[mm]	50		
Depth of drill hole $h_0 = h_{ef}$		$h_{ef,max}$	[mm]	h-30 and ≤ 200 mm		
Effective anchorage depth AAC		$h_{ef,min}$	mm]	100		
		$h_{ef,max}$	[mm]	120		
Maximum torque moment		$T_{inst,max}$	[Nm]	10		
Max. torque moment for autoclaved aerated concrete		$T_{inst,max}$	[Nm]	1	2	
Diameter of clearance hole in the fixture	Pre-position anchorage	$d_f \leq$	[mm]	9	12	14
	Push through anchorage	$d_f \leq$	[mm]	11	14	16

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

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

Table B1.2: Installation parameters for internal threaded anchor FIS E without perforated sleeve

Size FIS E				11x85 M6	11x85 M8	15x85 M10	15x85 M12
diameter of internal threaded anchor		d_H	[mm]	11		15	
Nominal drill hole diameter		$d_{nom}=d_0$	[mm]	14		18	
Depth of drill hole		h_0	[mm]	85			
Effective anchorage depth		$L_H=h_{ef}$	[mm]	85			
Maximum torque moment		$T_{inst,max}$	[Nm]	4	10		
Max. torque moment for autoclaved aerated concrete		$T_{inst,max}$	[Nm]	1		2	
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	7	9	12	14
Screw-in depth		$L_{E,min}$	[mm]	6	8	10	12

fischer Injectionsystem FIS AB for masonry

Intended Use
Installation parameters, part 1

Annex B 3

Perforated sleeves FIS H 12x85; 16x85; 16x130; 20x85; 20x130; 20x200 K

Marking:size
D_{Sleeve} x L_{Sleeve}
e.g. 16x85

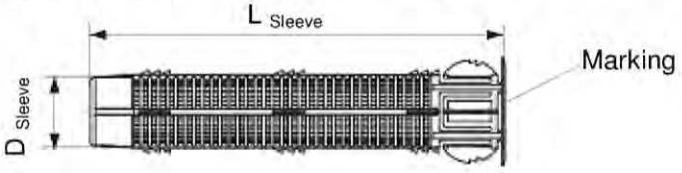


Table B1.3: Installation parameters (threaded rod and internal threaded anchor with perforated sleeve; only pre-positioned anchorage)

Size FIS H...K			12x85	16x85	16x130[2)]	20x85	20x130[2)]	20x200[2)]
Nominal drill hole diameter ($d_0 = D_{Sleeve}$)	$d_{nom}=d_0$	[mm]	12	16		20		
Depth of drill hole	h_0	[mm]	90	90	135	90	135	205
Effective anchorage depth[1)]	$h_{ef,min}$	[mm]	85	85	110	85	110	180
	$h_{ef,max}$	[mm]	85	85	130	85	130	200
Size of threaded rod		[-]	M8	M8, M10		M12		
Size of internal threaded anchor		[-]	----	11x85	----	15x85	----	----
Maximum torque moment threaded rod and internal threaded anchor	$T_{inst,max}$	[mm]	2					

[1)] $h_{ef,min} \le h_{ef} \le h_{ef,max}$ is possible.
[2)] Bridging of unbearing layer (e.g. plaster) possible

Cleaning brush BS (Steel brush)

Only for solid bricks and autoclaved aerated concrete

Table B2: Parameters of steel brush

Drill hole diameter	d_0	[mm]	10	12	14	16	18	20
Brush diameter	$d_{b,nom}$	[mm]	11	14	16	20	20	25

Table B3: Maximum processing time of the mortar and minimum curing time

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

Temperature at anchoring base [°C]	Minimum curing time [1] t_{cure} [minutes]		
	FIS AB High Speed[3]	FIS AB[2]	FIS AB Low Speed[2]
-10 to -5	12 hours		
>-5 to ±0	3 hours	24 hours	
>±0 to +5	90	3 hours	6 hours
>+5 to +10	45	90	3 hours
>+10 to +20	30	60	2 hours
>+20 to +30		45	60
>+30 to +40		35	30

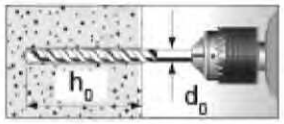
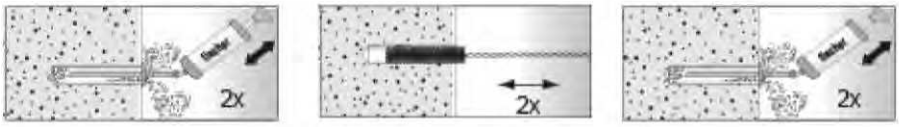
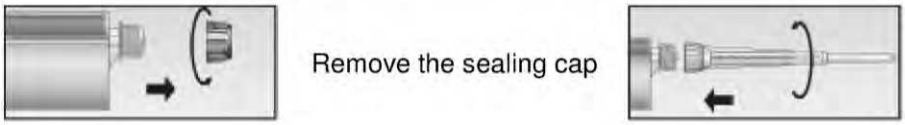
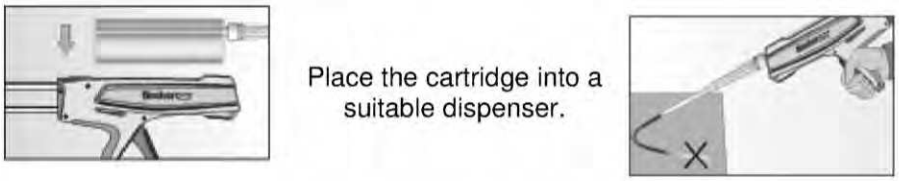
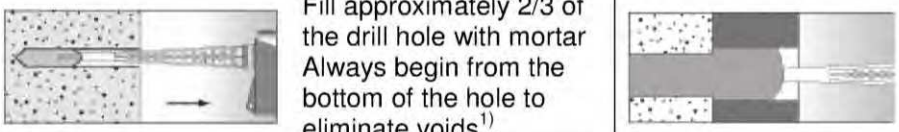
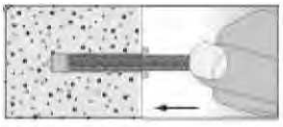
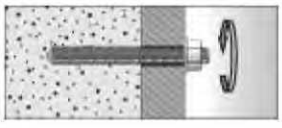
System-temperature (mortar) [°C]	Maximum processing time t_{work} [minutes]		
	FIS AB High Speed	FIS AB[2]	FIS AB Low Speed[2]
±0	5		
+5	5	13	20
+10	3	9	20
+20	1	5	10
+30		4	6
+40		2	4

[1] For wet bricks the curing time must be doubled
[2] Minimum cartridge temperature +5°C
[3] Minimum cartridge temperature ±0°C

fischer Injectionsystem FIS AB for masonry	**Annex B 5**
Intended Use Steel brush Processing times and curing times	

Installation instructions Part 1

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

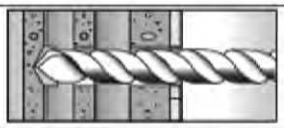
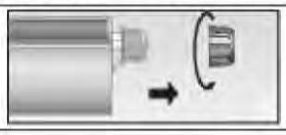
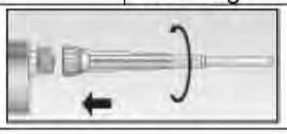
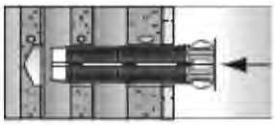
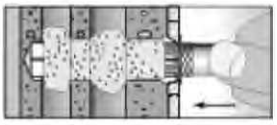
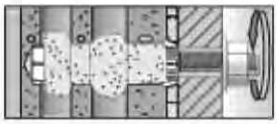
1		Drill the hole. Depth of drill hole h_0 and drill hole diameter d_0 see Table **B1.1** or **B1.2**
2		Blow out the drill hole two times. Brush the drill hole two times (see Table B2) and blow out two times again
3		Remove the sealing cap Screw on the static mixer (the spiral in the static mixer must be clearly visible)
4		Place the cartridge into a suitable dispenser. Press out approximately 10 cm of material until the mortar is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed off.
5		Fill approximately 2/3 of the drill hole with mortar Always begin from the bottom of the hole to eliminate voids[1]. For push through installation (not FIS E) fill the annular gap also with mortar.
6		Only use clean and oil-free anchor elements. Mark the threaded rod for setting depth. Press the threaded rod or internal threaded anchor FIS E down to the bottom of the hole, turning it slightly by hand while doing. After inserting the anchor element, excess mortar must emerge around the anchor element.
7		Do not touch. Minimum curing time t_{cure} see Table **B3**  Mounting the fixture $T_{inst,max}$ see Table **B1.1** or **B1.2**

[1] For the exact quantity of mortar see manufacturer`s specification.

fischer Injectionsystem FIS AB for masonry	**Annex B 6**
Intended Use Installation instructions part 1 in solid brick and autoclaved aerated concrete	

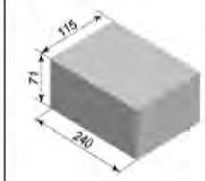
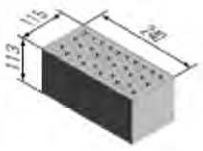
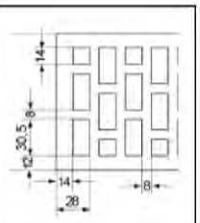
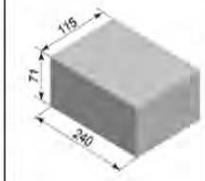
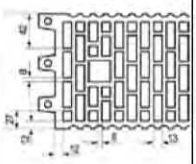
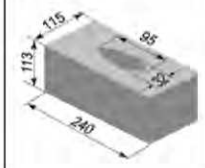
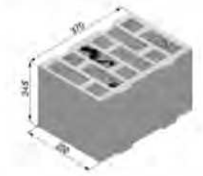
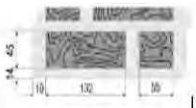
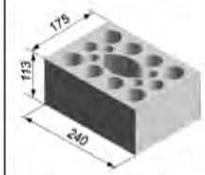
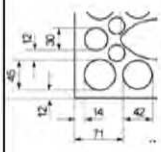
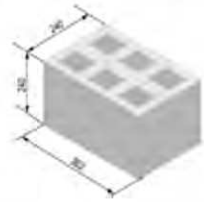
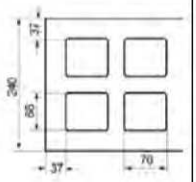
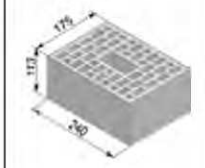
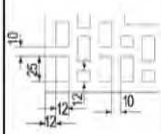
Installation instructions Part 2

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

1		Drill the hole (hammer drill). Depth of drill hole h_0 and drill hole diameter d_0 see Table **B1.3**	When install perforated sleeves in solid bricks or solid areas of hollow bricks, also clean the hole by blowing out and brushing	
2		Remove the sealing cap		Screw on the static mixer (the spiral in the static mixer must be clearly visible)
3		Place the cartridge into a suitable dispenser		Press out approximately 10 cm of material until the mortar is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed off
4		Insert the perforated sleeve flush with the surface of the masonry or plaster .		Fill the perforated sleeve completely with mortar beginning from the bottom of the hole[1].
5	 		Only use clean and oil-free anchor elements. Mark the threaded rod for setting depth. Insert the threaded rod or the internal threaded anchor FIS E by hand using light turning motions until reaching the setting depth marking (threaded rod) or flush with the surface (internal threaded anchor).	
6		Do not touch. Minimum curing time t_{cure} see Table **B3**		Mounting the fixture. $T_{inst,max}$ see Table B1.3

[1] For the exact quantity of mortar see manufacturer`s specification.

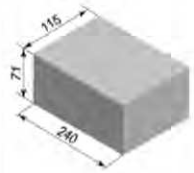
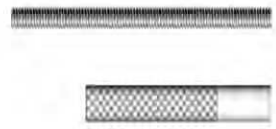
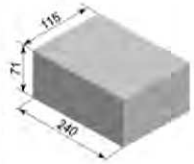
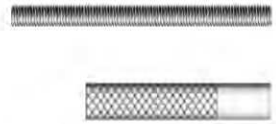
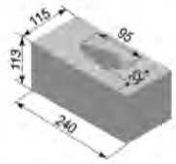
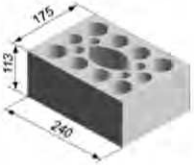
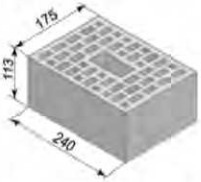
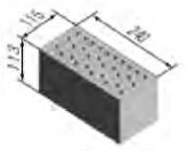
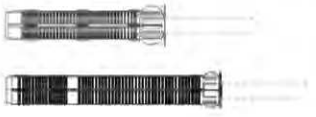
Table B 4: Summary of bricks and blocks

Brick No. 1 Solid brick Mz according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm^3] fb ≥ 10 or 20 [N/mm^2]			**Brick No. 6** Perforated brick HLz according to EN 771-1 $\rho \geq 1{,}4$ [kg/dm^3] fb ≥ 20 [N/mm^2]		
Brick No. 2 Solid sand-lime brick according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm^3] fb ≥ 10 or 20 [N/mm^2]			**Brick No. 7** Perforated brick HLz according to EN 771-1 $\rho \geq 1{,}0$ [kg/dm^3] fb ≥ 10 [N/mm^2]		
Brick No. 3 Solid sand-lime brick according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm^3] fb ≥ 10 or 20 [N/mm^2]			**Brick No. 8** Perforated brick HLz filled with mineral wool according to EN 771-1 $\rho \geq 0{,}6$ [kg/dm^3] fb ≥ 8 [N/mm^2]		
Brick No. 4 Sand-lime hollow brick according to EN 771-2 $\rho \geq 1{,}4$ [kg/dm^3] fb ≥ 12 or 20 [N/mm^2]			**Brick-No. 9** Light-weight concrete hollow block **Hbl** according to EN 771-1 $\rho \geq 1{,}0$ [kg/dm^3] fb ≥ 4 [N/mm^2]		
Brick No. 5 Perforated brick HLz according to EN 771-1 $\rho \geq 0{,}9$ [kg/dm^3] fb ≥ 10 [N/mm^2]			**Brick No. 10** Autoclaved aerated concrete block $\rho \geq 0{,}35$, 0,5 or 0,65 [kg/dm^3] fb ≥ 2, 4 or 6 [N/mm^2]		

Imaging of the bricks are not scaled

fischer Injectionsystem FIS AB for masonry	**Annex B 8**
Intended Use Types and dimensions of blocks and bricks	

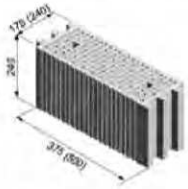
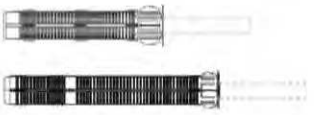
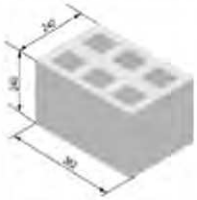
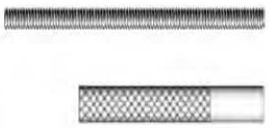
Table B5.1: Allocation of anchor rods[1], perforated sleeves[1)2)] and perforated or solid bricks

Kind of masonry	Brick	Valid anchor rods, internal threaded rods and perforated sleeves	
Brick No. 1 Solid brick Mz according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm³] fb ≥ 10 or 20 [N/mm²]			M8; M10; M12 FIS E 11x85
Brick No. 2 Solid sand-lime brick according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm³] fb ≥ 10 or 20 [N/mm²]			M8; M10; M12 FIS E 11x85
Brick No. 3 Solid sand-lime brick according to EN 771-2 $\rho \geq 1{,}8$ [kg/dm³] fb ≥ 10 or 20 [N/mm²]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 16x130 K FIS H 20x130 K
Brick No. 4 Sand-lime hollow brick according to EN 771-2 $\rho \geq 1{,}4$ [kg/dm³] fb ≥ 12 or 20 [N/mm²]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 16x130 K FIS H 20x130 K
Brick No. 5 Perforated brick HLz according to EN 771-1 $\rho \geq 0{,}9$ [kg/dm³] fb ≥ 10 [N/mm²]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 16x130 K FIS H 20x130 K
Brick No. 6 Perforated brick HLz according to EN 771-1 $\rho \geq 1{,}4$ [kg/dm³] fb ≥ 20 [N/mm²]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K

[1)] Other combinations can be used after job site tests acc. to ETAG 029, Annex B.
[2)] Sleeve/anchor rod combination see table B1.3

The β- factor for this job site tests are given in Table C4
Imaging of the bricks are not scaled

Table B5.2: Allocation of anchor rods[1], perforated sleeves[1)2)] and perforated or solid bricks

Kind of masonry	Brick	Valid anchor rods internal threaded rods and perforated sleeves	
Brick No. 7 Perforated brick HLz according to EN 771-1 $\rho \geq 1{,}0$ [kg/dm^3] fb ≥ 10 [N/mm^2]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 20x130 K
Brick No. 8 Perforated brick HLz filled with mineral wool according to EN 771-1 $\rho \geq 0{,}6$ [kg/dm^3] fb ≥ 8 [N/mm^2]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 16x130 K FIS H 20x130 K FIS H 20x200 K
Brick-No. 9 Light-weight concrete hollow block Hbl according to EN 771-1 $\rho \geq 1{,}0$ [kg/dm^3] fb ≥ 4 [N/mm^2]			FIS H 12x85 K FIS H 16x85 K FIS H 20x85 K FIS H 16x130 K FIS H 20x130 K
Brick No. 10 Autoclaved aerated concrete block $\rho \geq 0{,}35$, 0,5 or 0,65 [kg/dm^3] fb $\geq$ 2, 4 or 6 [N/mm^2]			M8; M10; M12 FIS E 11x85 M6 FIS E 11x85 M8 FIS E 15x85 M10 FIS E 15x85 M12

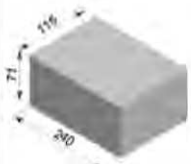
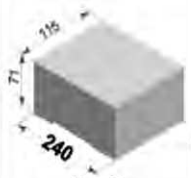
[1)] Other combinations can be used after job site tests acc. to ETAG 029, Annex B.
[2)] Sleeve/anchor rod combination see table B1.3

The β- factor for this job site tests are given in Table C4

Imaging of the bricks are not scaled

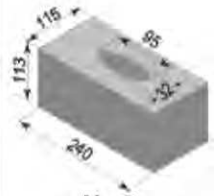
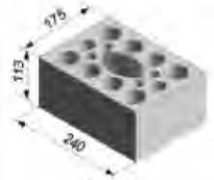
fischer Injectionsystem FIS AB for masonry	**Annex B 10**
Intended Use Allocation of anchor rods, perforated sleeves and bricks, part 2	

Table C1.1: Characteristic values of resistance under tension loads and under shear loads

Brick	Density ρ [kg/dm³] - Compressive strength f_b [N/mm²]	Perforated sleeve FIS H...K	Anchor size or screw size in internal threaded anchor	Effective anchorage depth		Characteristic resistance [kN]		
						N_{Rk}		V_{Rk}
						Temp. 50/80°C		All categories
				$h_{ef,min}$ [mm]	$h_{ef,max}$ [mm]	d/d	w/w	
 **No.1** Solid brick Mz	ρ ≥ 1,8 f_b ≥ 10	without	M8	50	200	4,0	2,5	2,5
			M10	50	79	3,5	2,0	4,0
			M10	80	199	5,0	3,0	
			M10	200	200	8,5	7,5	8,5
			M12	50	79	3,0	2,0	4,0
			M12	80	199	5,5	3,5	
			M12	200	200	8,0	5,0	8,5
			FIS E11x85 M6/ M8,	85	85	5,5	3,5	2,5
	ρ ≥ 1,8 f_b ≥ 20		M8	50	200	5,5	3,5	4,0
			M10	50	79	5,0	3,0	6,0
			M10	80	199	7,0	4,5	
			M10	200	200	8,5	8,5	8,5
			M12	50	79	4,5	3,0	5,5
			M12	80	199	8,0	5,0	
			M12	200	200	8,5	7,0	8,5
			FIS E11x85 M6/ M8,	85	85	8,0	5,0	4,0
 **No.2** Solid sand-lime brick	ρ ≥ 1,8 f_b ≥ 10	without	M8	50	200	2,5	1,5	4,0
			M10	50	79			
			M10	80	199			
			M10	200	200	8,5	6,0	
			M12	50	79	2,5	1,5	5,0
			M12	80	199			
			M12	200	200	8,5	6,5	
			FIS E11x85 M6/ M8,	85	85	2,5	1,5	3,0
	ρ ≥ 1,8 f_b ≥ 20		M8	50	200	3,5	2,0	5,5
			M10	50	79			
			M10	80	199			
			M10	200	200	8,5	8,5	
			M12	50	79	3,5	2,0	7,0
			M12	80	199			
			M12	200	200	8,5	8,5	
			FIS E11x85 M6/ M8,	85	85	3,5	2,0	4,0

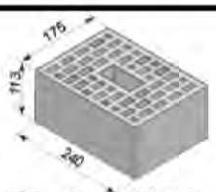
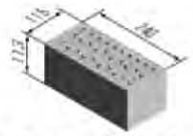
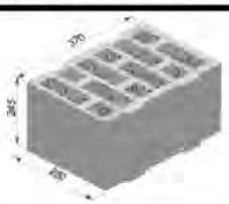
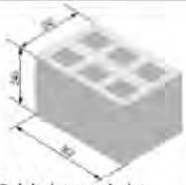
Imaging of the bricks are not scaled

Table C1.2: Characteristic values of resistance under tension loads and under shear loads

Brick	Density ρ [kg/dm³] - Compressive strength f_b [N/mm²]	Perforated sleeve FIS H...K	Anchor size or screw size in internal threaded anchor	Effective anchorage depth		Characteristic resistance [kN]		
						N_{Rk}		V_{Rk}
						Temp. 50/80°C		All categories
				$h_{ef,min}$ [mm]	$h_{ef,max}$ [mm]	d/d	w/w	
 **No.3** Solid sand-lime brick	ρ ≥ 1,8 f_b ≥ 10	12x85	M8	85	85	6,0	3,5	3,0
		16x85	FIS E 11x85 M6	85	85	3,5	2,0	
		16x85	M8/M10, FIS E 11x85 M8	85	85	3,5	2,0	3,5
		20x85	M12, FIS E 15x85	85	85	8,5	6,5	
		16x130	M8/M10	110	130	3,5	2,0	
		20x130	M12	110	130	7,0	4,5	
	ρ ≥ 1,8 f_b ≥ 20	12x85	M8	85	85	8,5	5,0	4,5
		16x85	FIS E 11x85 M6	85	85	5,5	3,0	
		16x85	M8/M10, FIS E 11x85 M8	85	85	5,5	3,0	5,5
		20x85	M12, FIS E 15x85	85	85	8,5	8,5	
		16x130	M8/M10	110	130	5,0	3,0	
		20x130	M12	110	130	8,5	6,0	
 **No.4** Sand-lime hollow brick	ρ ≥ 1,4 f_b ≥ 12	12x85	M8	85	85	2,5	2,5	2,5
		16x85	FIS E 11x85 M6	85	85	3,0	2,5	
		16x85	M8/M10, FIS E 11x85 M8	85	85	3,0	2,5	4,5
		20x85	M12, FIS E 15x85	85	85	3,5	3,0	4,5
		16x130	M8/M10	110	130			
		20x130	M12	110	130			
	ρ ≥ 1,4 f_b ≥ 20	12x85	M8	85	85	4,5	4,0	4,5
		16x85	FIS E 11x85 M6	85	85	5,0	4,0	4,0
		16x85	M8/M10, FIS E 11x85 M8	85	85	5,0	4,5	7,5
		20x85	M12, FIS E 15x85	85	85	6,0	5,5	7,5
		16x130	M8/M10	110	130			
		20x130	M12	110	130			

Imaging of the bricks are not scaled

Table C1.3: Characteristic values of resistance under tension loads and under shear loads

Brick	Density ρ [kg/dm³] - Compressive strength f_b [N/mm²]	Perforated sleeve FIS H...K	Anchor size or screw size in internal threaded anchor	Effective anchorage depth		Characteristic resistance [kN]		
						N_{Rk}		V_{Rk}
						Temp. 50/80°C		All categories
				$h_{ef,min}$ [mm]	$h_{ef,max}$ [mm]	d/d	w/w	
 **No.5** Perforated brick	ρ ≥ 0,9 f_b ≥ 10	12x85	M8	85	85	4,0	3,5	4,0
		16x85	FIS E 11x85 M6	85	85	3,5	3,5	4,0
		16x85	M8/M10, FIS E 11x85 M8	85	85	3,5	3,5	5,5
		20x85	M12, FIS E 15x85	85	85	5,0	4,5	6,0
		16x130	M8/M10	110	130	5,0	4,5	5,5
		20x130	M12	110	130	5,0	4,5	6,0
 **No.6** Perforated brick	ρ ≥ 1,4 f_b ≥ 20	12x85	M8	85	85	4,0	3,5	7,5 (5,5)[1]
		16x85	FIS E 11x85 M6	85	85	2,5		4,0
		16x85	M8/M10, FIS E 11x85 M8	85	85	2,5		4,5
		20x85	M12, FIS E 15x85	85	85	3,0		8,5 (5,5)[1]
 **No.7** Perforated brick	ρ ≥ 1,0 f_b ≥ 10	12x85	M8	85	85	0,9		1,2
		16x85	M8/M10, FIS E 11x85	85	85	2,5		
		20x85	M12, FIS E 15x85	85	85			
		16x130	M8/M10	110	130			1,5
		20x130	M12	110	130	3,5	3,0	1,5
 **No.8** Perforated brick	ρ ≥ 0,6 f_b ≥ 8	12x85	M8	85	85	2,0	2,0	2,5
		16x85	FIS E 11x85 M6	85	85	2,0	1,5	2,5
		16x85	M8/M10, FIS E 11x85 M8	85	85	2,0	1,5	3,0
		20x85	M12, FIS E 15x85	85	85	2,0	2,0	1,5
		16x130	M8/M10	130	130	3,0	2,5	3,0
		20x130	M12	110	130	2,0	2,0	1,5
		20x200	M12	180	200	3,0	3,0	1,5
 **No.9** Light-weight concrete hollow block	ρ ≥ 1,0 f_b ≥ 4	12x85	M8	85	85	3,0		2,0
		16x85	M8/M10, FIS E 11x85	85	85			
		20x85	M12, FIS E 15x85	85	85			
		16x130	M8/M10	110	130			
		20x130	M12	110	130			

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

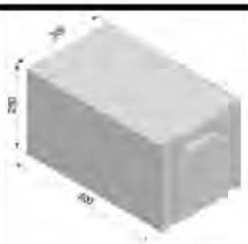
Imaging of the bricks are not scaled

fischer Injectionsystem FIS AB for masonry

Performances
Characteristic values of resistance under tension loads and under shear loads, part 3

Annex C 3

Table C1.4: Characteristic values of resistance under tension loads and under shear loads

Brick	Density ρ [kg/dm³] - Compressive strength f_b [N/mm²]	Perforated sleeve FIS H...K	Anchor size or screw size in internal threaded anchor	Effective anchorage depth		Characteristic resistance [kN]		
						N_{Rk}		V_{Rk}
						Temp. 50/80°C		All categories
				$h_{ef,min}$ [mm]	$h_{ef,max}$ [mm]	d/d	w/w	
 **No.10** Autoclaved Aerated concrete block	ρ ≥ 0,35 f_b ≥ 2	without	M8	100	120	1,5		1,2
			M10	100	120			1,2
			M12	100	120			1,5
			FIS E 11x85 FIS E 15x85	85				1,2
	ρ ≥ 0,5 f_b ≥ 4	without	M8	100	120	2,0		2,5
			M10	100	120	2,5		2,0
			M12	100	120			2,5
			FIS E 11x85 FIS E 15x85	85		2,0		2,0
	ρ ≥ 0,65 f_b ≥ 6	without	M8	100	120	3,5	3,0	3,0
			M10	100	120	5,0	4,5	3,0
			M12	100	120			3,5
			FIS E 11x85 FIS E 15x85	85		3,5		2,5

Imaging of the bricks are not scaled

Table C2: Characteristic bending moments for threaded rods

Size				M8	M10	M12
Characteristic bending moment $M_{Rk,s}$	Zinc-plated steel	Property class	5.8 [Nm]	19	37	65
			8.8 [Nm]	30	60	105
	Stainless steel A4	Property class	50 [Nm]	19	37	65
			70 [Nm]	26	52	92
			80[Nm]	30	60	105
	High corrosion-resistant steel C	Property class	50 [Nm]	19	37	65
			70[1)] [Nm]	26	52	92
			80 [Nm]	30	60	105

[1)] f_{uk}= 700 N/mm²; f_{yk}=560 N/mm²

Table C2.1: Characteristic bending moments for internal threaded anchors FIS E

Size FIS E				11x85 M6	11x85 M8	15x85 M10	15x85 M12
Characteristic bending moments $M_{Rk,s}$	zinc plated steel,	Property class of screw	5.8 [Nm]	8	19	37	65
			8.8 [Nm]	12	30	60	105
	stainless steel A4	Property class of screw	70 [Nm]	11	26	52	92
	high corrosion resistant steel C	Property class of screw	70 [Nm]	11	26	52	92

Tabelle C3: Displacements under tension loads and shear loads

Material	N [kN]	δN_0 [mm]	δN_∞ [mm]	V [kN]	δV_0 [mm]	δV_∞ [mm]
solid units and autoclaved aerated concrete	$\frac{N_{Rk}}{1,4 * \gamma_M}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_M}$	0,59	0,88
hollow units	$\frac{N_{Rk}}{1,4 * \gamma_M}$	0,03	0,06	$\frac{V_{Rk}}{1,4 * \gamma_M}$	1,71	2,56

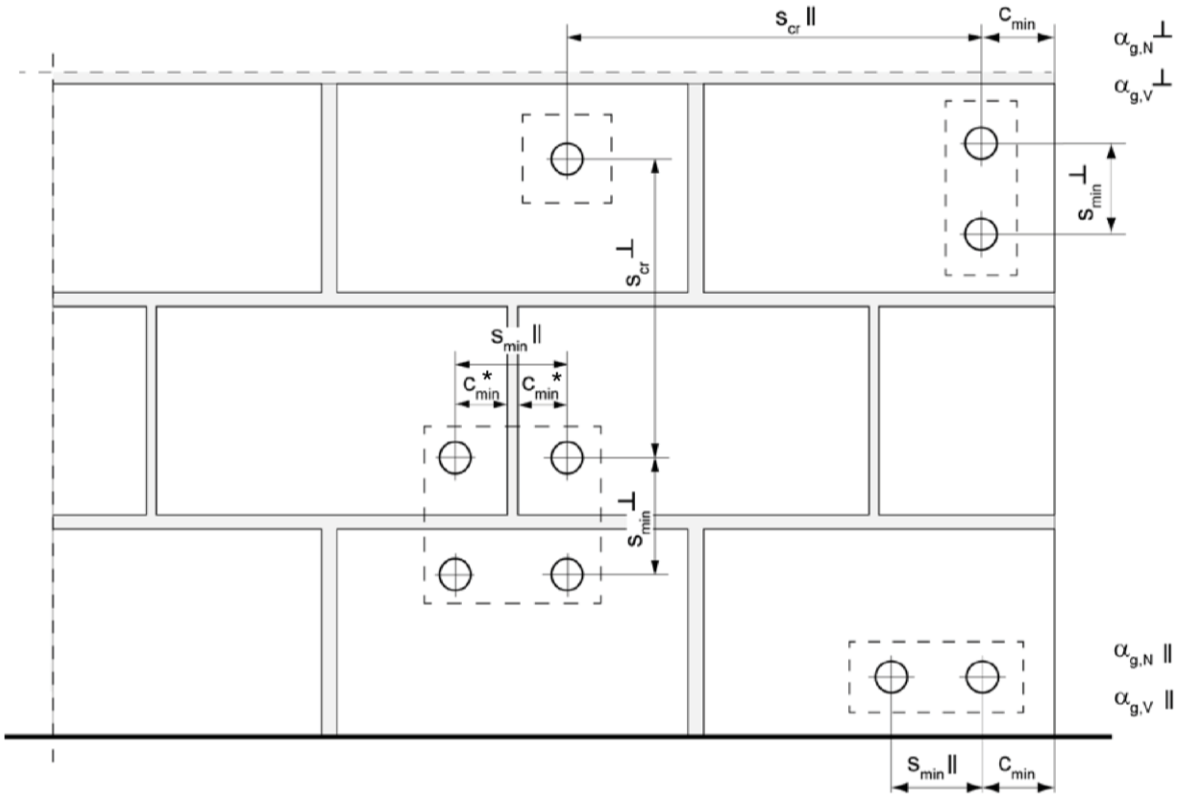
Table C4: β- factor for job site tests according to ETAG 029, Annex B

Using categories		w/w	d/d
Temperature range [°C]		50/80	50/80
Brick	Size		
Solid brick	M8	0,57	0,96
	M10	0,59	
	M12 FIS E 11x85 FIS E 15x85	0,60	
Hollow brick	All sizes	0,86	0,96
Autoclaved aerated concrete	All size	0,73	0,81

Table C5: Edge distance and spacing

Direction to bed joint			⊥		∥		Group factor				Min. thickness of the masonry members
Brick No.	h_{ef} [mm]	$c_{cr} = c_{min}$	s_{min}	s_{cr}	s_{min}	s_{cr}	⊥		∥		
		[mm]	[mm]	[mm]	[mm]	[mm]	$\alpha_{g,N}$	$\alpha_{g,V}$	$\alpha_{g,N}$	$\alpha_{g,V}$	[mm]
1	50	100	75		60[1]	150	2	2	1,5	1,4	h_{ef} + 30 (≥ 80)
	80	100	75		60[1]	240	2	2	1,5	1,4	
	200	150	75		240		2				
2	50	100	75		240		2				
	80	100	75		240		2				
	200	150	75		240		2				
3	85	100	115		240		2				
	130	100	115		240		2				
4	all sizes	100	115		100	240	2	2	1,5	1,5	
5	all sizes	100	115		240		2				
6	all sizes	100	115		240		2				
7	all sizes	100	100	240	100	375 (500)[2]	1	1	1	1	
8	all sizes	120	245		250		2				
9	all sizes	80	240		365		2				
10	all sizes	100	250		300		2				

[1] only valid for tension loads, for shear loads $s_{min}\| = s_{cr}\|$
[2] spacing depending on brick dimension, brick dimension see table B4, brick 7



* Only, if joints are visible and vertical joints are not filled with mortar

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

For $s > s_{cr}$ $\alpha_g = 2$
For $s_{min} \leq s \leq s_{cr}$ α_g according to table C5
$N^g_{Rk} = \alpha_{g,N} \bullet N_{Rk}$; $V^g_{Rk} = \alpha_{g,V} \bullet V_{Rk}$ (Group of 2 anchors)
$N^g_{Rk} = \alpha_{g,N}$ || $\bullet$ $\alpha_{g,N}$ ⊥ $\bullet N_{Rk;}$ $V^g_{Rk} = \alpha_{g,V}$ || $\bullet$ $\alpha_{g,V}$ ⊥ $\bullet V_{Rk}$ (Group of 4 anchors)

fischer Injectionsystem FIS AB for masonry	**Annex C 8**
Performances Definition of minimum edge distance, minimum spacing and group factors	

LEISTUNGSERKLÄRUNG

DoP: 0109

für fischer Injektionssystem FIS AB (Verbundanker für die Verwendung in Beton) – **DE**

1. Eindeutiger Kenncode des Produkttyps: **DoP: 0109**

2. Verwendungszweck(e): **Nachträgliche Befestigung im gerissenen und ungerissenen Beton, siehe Anhang, insbesondere Anhänge B 1 bis B 8**

3. Hersteller: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Deutschland**

4. Bevollmächtigter: **--**

5. System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit: **1**

6. Europäisches Bewertungsdokument: **ETAG 001; 2013-04**

   Europäische Technische Bewertung: **ETA-17/0350; 2017-12-13**

   Technische Bewertungsstelle: **DIBt**

   Notifizierte Stelle(n): **1343 – MPA Darmstadt**

7. Erklärte Leistung(en):

Mechanische Festigkeit und Standsicherheit (BWR 1), Sicherheit bei der Nutzung (BWR 4)

- **Charakteristische Werte unter statischer und quasi-statischer Belastung, Verschiebungen: Siehe Anhang, insbesondere Anhänge C 1 bis C 6**

Brandschutz (BWR 2)

- **Brandverhalten: Der Dübel erfüllt die Anforderungen der Klasse A 1**
- **Feuerwiderstand: KLF**

8. Angemessene Technische Dokumentation und/oder Spezifische Technische Dokumentation: ---

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Für die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein der obengenannte Hersteller verantwortlich.

Unterzeichnet für den Hersteller und im Namen des Herstellers von:

Andreas Bucher, Dipl.-Ing. — Wolfgang Hengesbach, Dipl.-Ing., Dipl.-Wirtsch.-Ing.

i. V. A. Bucher — i. V. W. Hengesbach

Tumlingen, 2017-12-21

- Diese Leistungserklärung wurde in verschiedenen Sprachversionen erstellt. Für den Fall unterschiedlicher Auslegung hat immer die englische Version Vorrang.
- Der Anhang enthält freiwillige und ergänzende Informationen in englischer Sprache. Diese gehen über die (sprachneutral angegebenen) gesetzlichen Anforderungen hinaus.

Specific Part

1 Technical description of the product

The fischer injection system FIS AB is a bonded anchor consisting of a cartridge with injection mortar FIS AB, FIS AB High Speed or FIS AB Low Speed and a steel element.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The product description is given in Annex A.

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

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

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic values for static and quasi-static action, displacements	See Annex C 1 to C 6

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

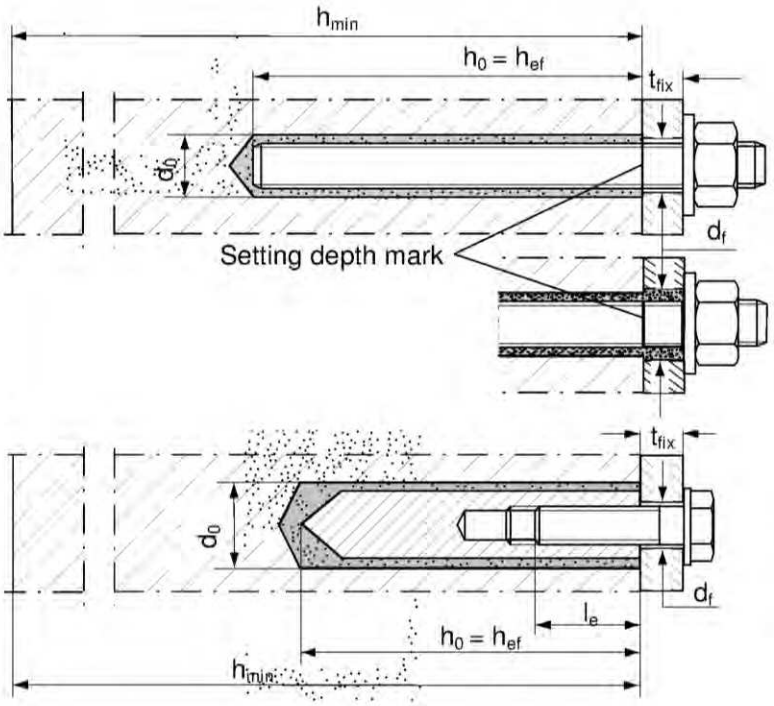
The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

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

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

Installation conditions

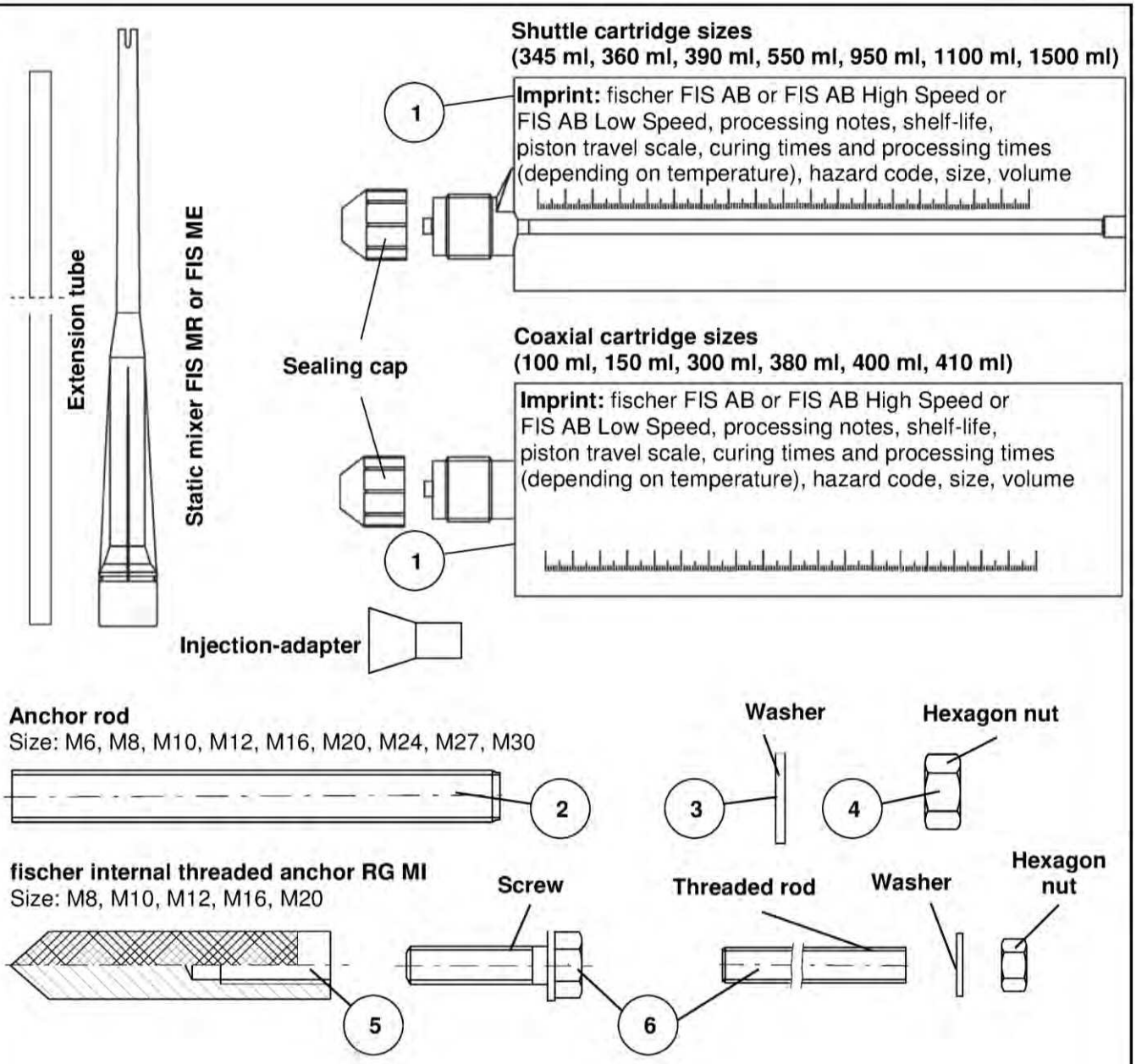


Anchor rod
Pre-positioned anchor

Anchor rod
Push through anchor
(annular gap filled with mortar)

fischer
internal threaded anchor RG MI
Pre-positioned anchor only

fischer injection system FIS AB	**Annex A 1**
Product description Installation conditions	



fischer injection system FIS AB	
Product description Cartridges / Static mixer / Steel elements	**Annex A 2**

Table A1: Materials

Part	Designation	Material		
1	Mortar cartridge	Mortar, hardener, filler		
	Steel grade	Steel, zinc plated	Stainless steel A4	High corrosion resistant steel C
2	Anchor rod	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5 µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004 $f_{uk} \leq 1000$ N/mm² $A_5 > 8$ % fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8$ % fracture elongation	Property class 50 or 80 EN ISO 3506-1:2009 or property class 70 with f_{yk}= 560 N/mm² 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \leq 1000$ N/mm² $A_5 > 8$ % fracture elongation
3	Washer ISO 7089:2000	zinc plated ≥ 5 µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004	1.4401; 1.4404; 1.4578;1.4571; 1.4439; 1.4362 EN 10088-1:2014	1.4565;1.4529 EN 10088-1:2014
4	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2012 zinc plated ≥ 5 µm, ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
5	fischer internal threaded anchor RG MI	Property class 5.8 ISO 898-1:2013 zinc plated ≥ 5 µm, ISO 4042:1999 A2K	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014
6	Commercial standard screw or anchor / threaded rod for fischer internal threaded anchor RG MI	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5 µm, ISO 4042:1999 A2K fracture elongation $A_5 > 8$ %	Property class 70 EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014 fracture elongation $A_5 > 8$ %	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014 fracture elongation $A_5 > 8$ %

Specifications of intended use (part 1)

Table B1: Overview use and performance categories

Anchorages subject to		**FIS AB, FIS AB High Speed or FIS AB Low Speed with …**			
		Anchor rod 		fischer internal threaded anchor RG MI 	
Hammer drilling with standard drill bit		all sizes			
Hammer drilling with hollow drill bit (Heller "Duster Expert" or Hilti "TE-CD, TE-YD") 		Nominal drill bit diameter (d_0) 12 mm to 35 mm			
Static and quasi static load, in	uncracked concrete	M6 to M30	Tables: C1, C3, C4, C6	M8 to M20	Tables: C2, C3, C5, C7
	cracked concrete	M10 to M20		not assessed	
Use category	dry or wet concrete	M6 to M30		M8 to M20	
	flooded hole[1)]	M12 to M30		M8 to M20	
Installation temperature		-10 °C to +40 °C			
In-service temperature	Temperature range I	-40 °C to +80 °C	(max. long term temperature +50 °C and max. short term temperature +80 °C)		
	Temperature range II	-40 °C to +120 °C	(max. long term temperature +72 °C and max. short term temperature +120 °C)		

[1)] Only with coaxial cartridges: 380 ml, 400 ml, 410 ml

Specifications of intended use (part 2)

Base materials:

- Reinforced or unreinforced normal weight concrete Strength classes C20/25 to C50/60 according to EN 206-1:2000

Use conditions (Environmental conditions):

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

  Note: 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)

Design:

- Anchorages have to be designed by a responsible engineer with experience of concrete anchor design
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages under static or quasi-static actions are designed in accordance with EOTA Technical Report TR 029 "Design of bonded anchors" Edition September 2010 or CEN/TS 1992-4: 2009

Installation:

- Anchor installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- In case of aborted hole: The hole shall be filled with mortar
- Anchorage depth should be marked and adhered to on installation
- Overhead installation is allowed

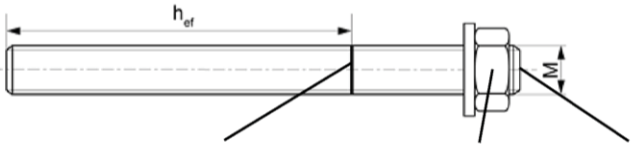
Table B2: Installation parameters for anchor rods

Size				M6	M8	M10	M12	M16	M20	M24	M27	M30
Width across flats		SW	[mm]	10	13	17	19	24	30	36	41	46
Nominal drill bit diameter		d_0		8	10	12	14	18	24	28	30	35
Drill hole depth		h_0		$h_0 = h_{ef}$								
Effective anchorage depth		$h_{ef,min}$		50	60	60	70	80	90	96	108	120
		$h_{ef,max}$		72	160	200	240	320	400	480	540	600
Minimum spacing and minimum edge distance		s_{min} = c_{min}		40	40	45	55	65	85	105	125	140
Diameter of clearance hole in the fixture[1)]	pre-positioned anchorage	d_f		7	9	12	14	18	22	26	30	33
	push through anchorage	d_f		9	11	14	16	20	26	30	32	40
Minimum thickness of concrete member		h_{min}		$h_{ef} + 30$ (≥ 100)				$h_{ef} + 2d_0$				
Maximum installation torque		$T_{inst,max}$	[Nm]	5	10	20	40	60	120	150	200	300

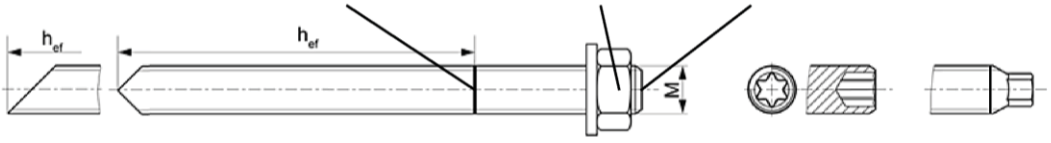
[1)] For larger clearance holes in the fixture see TR 029, 4.2.2.1 or CEN/TS 1992-4-1:2009, 5.2.3.1

Anchor rods:

fischer FIS A



fischer RG M



Marking (on random place) fischer anchor rod:
Property class 8.8, stainless steel A4 property class 80 and high corrosion resistant steel C property class 80: •
Stainless steel A4 property class 50 and high corrosion resistant steel C property class 50: ••
Or colour coding according to DIN 976-1

Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

- Materials, dimensions and mechanical properties according Annex A 3, Table A1
- Inspection certificate 3.1 according to EN 10204:2004, the documents have to be stored
- Setting depth is marked

fischer injection system FIS AB

Intended Use
Installation parameters anchor rods

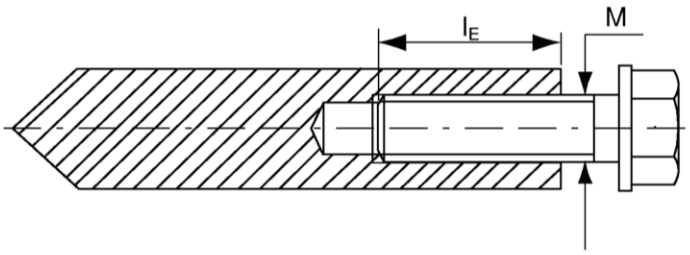
Annex B 3

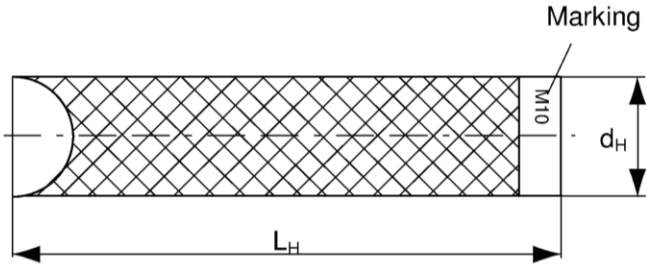
Table B3: Installation parameters for fischer internal threaded anchors RG MI

Size			M8	M10	M12	M16	M20
Diameter of anchor	d_H		12	16	18	22	28
Nominal drill bit diameter	d_0		14	18	20	24	32
Drill hole depth	h_0		$h_0 = h_{ef} = L_H$				
Effective anchorage depth ($h_{ef} = L_H$)	h_{ef}		90	90	125	160	200
Minimum spacing and minimum edge distance	s_{min} = c_{min}	[mm]	55	65	75	95	125
Diameter of clearance hole in the fixture[1)]	d_f		9	12	14	18	22
Minimum thickness of concrete member	h_{min}		120	125	165	205	260
Maximum screw-in depth	$l_{E,max}$		18	23	26	35	45
Minimum screw-in depth	$l_{E,min}$		8	10	12	16	20
Maximum installation torque	$T_{inst,max}$	[Nm]	10	20	40	80	120

[1)] For larger clearance holes in the fixture see TR 029, 4.2.2.1 or CEN/TS 1992-4-1: 2009, 5.2.3.1

fischer internal threaded anchor RG MI





Marking: Anchor size
e. g.: **M10**

Stainless steel additional **A4**
e. g.: **M10 A4**

High corrosion resistant steel additional **C**
e. g.: **M10 C**

Retaining bolt or threaded rods (including nut and washer) must comply with the appropriate material and strength class of Annex A 3, Table A1

fischer injection system FIS AB

Intended Use
Installation parameters fischer internal threaded anchors RG MI

Annex B 4

Table B4: Diameters of cleaning brush BS (steel brush)

The size of the steel brush refers to the nominal drill bit diameter

Nominal drill bit diameter d_0	[mm]	8	10	12	14	16	18	20	24	25	28	30	35
Steel brush diameter d_b		9	11	14	16	20		25	26	27	30	40	

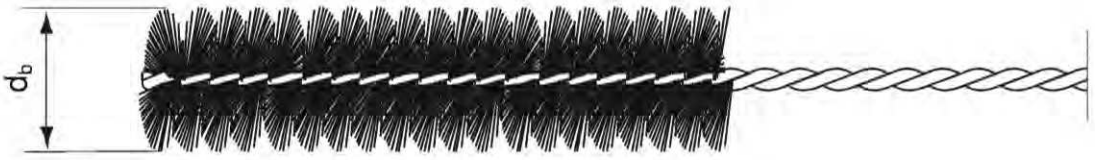


Table B5: Maximum processing time of the mortar and minimum curing time

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

System temperature [°C]	Maximum processing time t_{work}			Minimum curing time[1] t_{cure}		
	FIS AB High Speed	FIS AB	FIS AB Low Speed	FIS AB High Speed	FIS AB	FIS AB Low Speed
-10 to -5	---	---	---	12 h	---	---
> -5 to ±0	5 min	---	---	3 h	24 h	---
> ±0 to +5	5 min	13 min	---	3 h	3 h	6 h
> +5 to +10	3 min	9 min	20 min	50 min	90 min	3 h
> +10 to +20	1 min	5 min	10 min	30 min	60 min	2 h
> +20 to +30	---	4 min	6 min	---	45 min	60 min
> +30 to +40	---	2 min	4 min	---	35 min	30 min

[1] In wet concrete or flooded holes the curing times must be doubled

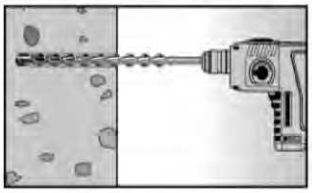
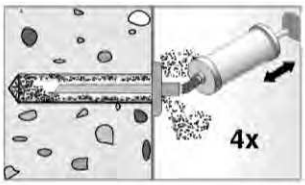
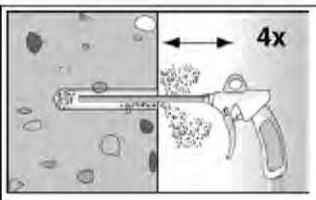
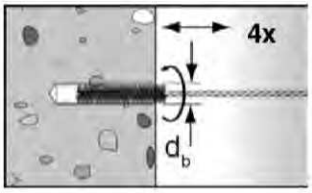
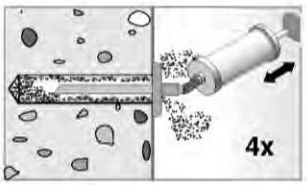
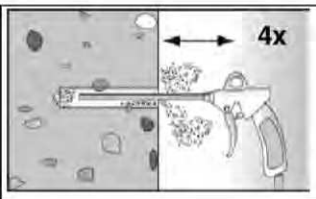
fischer injection system FIS AB

Intended Use
Cleaning tools
Processing times and curing times

Annex B 5

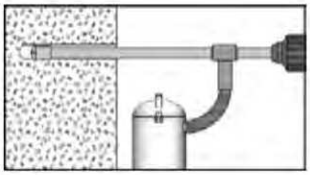
Installation instructions part 1

Drilling and cleaning the hole (hammer drilling with standard drill bit)

1		Drill the hole. Drill hole diameter $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables B2, B3**
2		Clean the drill hole: For $h_{ef} \leq 12d$ and $d_0 < 18$ mm blow out the hole four times by hand  For $h_{ef} > 12d$ and / or $d_0 \geq 18$ mm blow out the hole four times with oil-free compressed air ($p \geq 6$ bar)
3		Brush the drill hole four times. For deep holes use an extension. Corresponding brushes see **Table B4**
4		Clean the drill hole: For $h_{ef} \leq 12d$ and $d_0 < 18$ mm blow out the hole four times by hand  For $h_{ef} > 12d$ and / or $d_0 \geq 18$ mm blow out the hole four times with oil-free compressed air ($p \geq 6$ bar)

Go to step 5

Drilling and cleaning the hole (hammer drilling with hollow drill bit)

1		Check a suitable hollow drill (see **Table B1**) for correct operation of the dust extraction
2		Use a suitable dust extraction system, e. g. Bosch GAS 35 M AFC or a comparable dust extraction system with equivalent performance data Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Diameter of drill hole $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables B2, B3**

Go to step 5

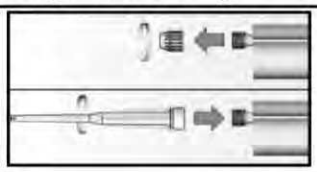
fischer injection system FIS AB

Intended use
Installation instructions part 1

Annex B 6

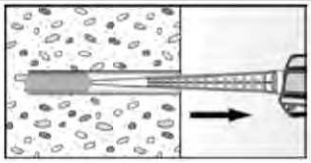
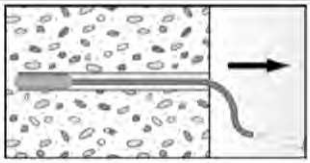
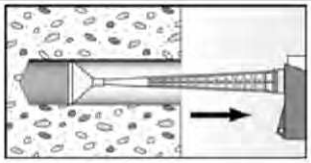
Installation instructions part 2

Preparing the cartridge

5		Remove the sealing cap Screw on the static mixer (the spiral in the static mixer must be clearly visible)
6	 	Place the cartridge into the dispenser
7	 	Extrude approximately 10 cm of material until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey

Go to step 8

Mörtelinjektion

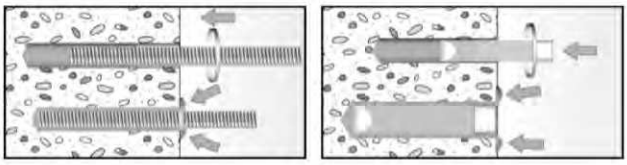
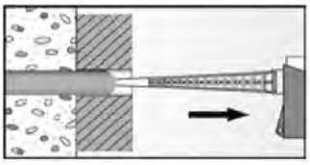
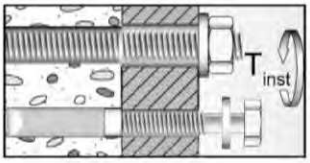
8	 Fill approximately 2/3 of the drill hole with mortar. Always begin from the bottom of the hole and avoid bubbles	 For drill hole depth ≥ 150 mm use an extension tube	 For overhead installation, deep holes (h_0 > 250 mm) or drill hole diameter (d_0 ≥ 40 mm) use an injection-adapter

Go to step 9

fischer injection system FIS AB	**Annex B 7**
Intended use Installation instructions part 2	

Installation instructions part 3

Installation of anchor rods or fischer internal threaded anchors RG MI

9		Only use clean and oil-free anchor elements. Mark the setting depth of the anchor. Push the anchor rod or fischer internal threaded RG MI anchor down to the bottom of the hole, turning it slightly while doing so. After inserting the anchor element, excess mortar must be emerged around the anchor element.	
		For overhead installations support the anchor rod with wedges. (e. g. fischer centering wedges)	 For push through installation fill the annular gap with mortar
10		Wait for the specified curing time t_{cure} see **Table B5**	11  Mounting the fixture $T_{inst,max}$ see **Tables B2 and B3**

fischer injection system FIS AB

Intended use
Installation instructions part 3

Annex B 8

Table C1: Characteristic values for the **steel bearing capacity** of **anchor rods** under tensile / shear load

Size				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Bearing capacity under tensile load, steel failure												
Charact.bearing capacity $N_{Rk,s}$	Steel zinc plated	Property class	5.8	10	19	29	43	79	123	177	230	281
			8.8	16	29	47	68	126	196	282	368	449
	Stainless steel A4 and High corrosion resistant steel C		50	10	19	29	43	79	123	177	230	281
			70	14	26	41	59	110	172	247	322	393
			80	16	30	47	68	126	196	282	368	449
[kN]												
Partial safety factors[1]												
Partial safety factor $\gamma_{Ms,N}$	Steel zinc plated	Property class	5.8	1,50								
			8.8	1,50								
	Stainless steel A4 and High corrosion resistant steel C		50	2,86								
			70	1,50[2] / 1,87								
			80	1,60								
[-]												
Bearing capacity under shear load, steel failure												
without lever arm												
Charact.bearing capacity $V_{Rk,s}$	Steel zinc plated	Property class	5.8	5	9	15	21	39	61	89	115	141
			8.8	8	15	23	34	63	98	141	184	225
	Stainless steel A4 and High corrosion resistant steel C		50	5	9	15	21	39	61	89	115	141
			70	7	13	20	30	55	86	124	161	197
			80	8	15	23	34	63	98	141	184	225
[kN]												
Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1		k_2	[-]	1,0								
with lever arm												
Charact. bending moment $M^0_{Rk,s}$	Steel zinc plated	Property class	5.8	7	19	37	65	166	324	560	833	1123
			8.8	12	30	60	105	266	519	896	1333	1797
	Stainless steel A4 and High corrosion resistant steel C		50	7	19	37	65	166	324	560	833	1123
			70	10	26	52	92	232	454	784	1167	1573
			80	12	30	60	105	266	519	896	1333	1797
[Nm]												
Partial safety factors[1]												
Partial safety factor $\gamma_{Ms,V}$	Steel zinc plated	Property class	5.8	1,25								
			8.8	1,25								
	Stainless steel A4 and High corrosion resistant steel C		50	2,38								
			70	1,25[2] / 1,56								
			80	1,33								
[-]												

[1] In absence of other national regulations
[2] Only for fischer FIS A and RG M made of high corrosion-resistant steel C

fischer injection system FIS AB

Performances
Characteristic steel bearing capacity anchor rods

Annex C 1

Table C2: Characteristic values for the **steel bearing capacity** of **fischer internal threaded anchors RG MI** under tensile / shear load

Size					M8	M10	M12	M16	M20
Bearing capacity under tensile load, steel failure									
Characteristic bearing capacity with screw	$N_{Rk,s}$	Property class	5.8	[kN]	19	29	43	79	123
			8.8		29	47	68	108	179
		Property class 70	A4		26	41	59	110	172
			C		26	41	59	110	172
Partial safety factors[1)]									
Partial safety factor	$\gamma_{Ms,N}$	Property class	5.8	[-]	1,50				
			8.8		1,50				
		Property class 70	A4		1,87				
			C		1,87				
Bearing capacity under shear load, steel failure									
without lever arm									
Characteristic bearing capacity with screw	$V_{Rk,s}$	Property class	5.8	[kN]	9,2	14,5	21,1	39,2	62,0
			8.8		14,6	23,2	33,7	54,0	90,0
		Property class 70	A4		12,8	20,3	29,5	54,8	86,0
			C		12,8	20,3	29,5	54,8	86,0
Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1			k_2	[-]	1,0				
with lever arm									
Characteristic bending moment with screw	$M^0_{Rk,s}$	Property class	5.8	[Nm]	20	39	68	173	337
			8.8		30	60	105	266	519
		Property class 70	A4		26	52	92	232	454
			C		26	52	92	232	454
Partial safety factors[1)]									
Partial safety factor	$\gamma_{Ms,V}$	Property class	5.8	[-]	1,25				
			8.8		1,25				
		Property class 70	A4		1,56				
			C		1,56				

[1)] In absence of other national regulations

Table C3: General design factors for the bearing capacity under tensile / shear load; **uncracked or cracked concrete**

Size				**All sizes**								
Bearing capacity under tensile load												
Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3												
Uncracked concrete	k_{ucr}	[-]		10,1								
Cracked concrete	k_{cr}	[-]		7,2								
Factors for the compressive strength of concrete > C20/25												
Increasing factor for τ_{Rk}	C25/30	Ψ_c	[-]	1,05								
	C30/37			1,10								
	C35/45			1,15								
	C40/50			1,19								
	C45/55			1,22								
	C50/60			1,26								
Splitting failure												
Edge distance	$h / h_{ef} \geq 2,0$	$c_{cr,sp}$	[mm]	$1,0\ h_{ef}$								
	$2,0 > h / h_{ef} > 1,3$			$4,6\ h_{ef} - 1,8\ h$								
	$h / h_{ef} \leq 1,3$			$2,26\ h_{ef}$								
Spacing		$s_{cr,sp}$		$2\ c_{cr,sp}$								
Concrete cone failure acc. to CEN/TS 1992-4-5:2009 Section 6.2.3.2												
Edge distance		$c_{cr,N}$	[mm]	$1,5\ h_{ef}$								
Spacing		$s_{cr,N}$		$2\ c_{cr,N}$								
Bearing capacity under shear load												
Installation safety factors												
All installation conditions		$\gamma_2 = \gamma_{inst}$	[-]	1,2								
Concrete pry-out failure												
Factor k acc. to TR029 Section 5.2.3.3 resp. k_3 acc. to CEN/TS 1992-4-5:2009 Section 6.3.3		$k_{(3)}$	[-]	2,0								
Concrete edge failure												
The value of h_{ef} (= l_f) under shear load			[mm]	$\min(h_{ef}; 8d)$								
Calculation diameters												
Size				M6	M8	M10	M12	M16	M20	M24	M27	M30
Anchor rods		d	[mm]	6	8	10	12	16	20	24	27	30
fischer internal threaded anchors RG MI		d_{nom}		---	12	16	18	22	28	---	---	---

fischer injection system FIS AB

Performances
General design factors relating to the characteristic bearing capacity under tensile / shear load

Annex C 3

Table C4: Characteristic values of **resistance** for **anchor rods** in hammer drilled holes; **uncracked or cracked concrete**

Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Combined pullout and concrete cone failure											
Calculation diameter	d	[mm]	6	8	10	12	16	20	24	27	30
Uncracked concrete											
Characteristic bond resistance in uncracked concrete C20/25											
Hammer-drilling with standard drill bit or hollow drill bit (dry and wet concrete)											
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	9,0	11,0	11,0	11,0	10,0	9,5	9,0	8,5	8,5
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	6,5	9,5	9,5	9,0	8,5	8,0	7,5	7,0	7,0
Hammer-drilling with standard drill bit or hollow drill bit (flooded hole)[1]											
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	---	---	---	9,5	8,5	8,0	7,5	7,0	7,0
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	---	---	---	7,5	7,0	6,5	6,0	6,0	6,0
Installation safety factors											
Dry and wet concrete	$\gamma_2 = \gamma_{inst}$	[-]	1,2								
Flooded hole	$\gamma_2 = \gamma_{inst}$	[-]	---			1,4[1]					
Cracked concrete											
Characteristic bond resistance in cracked concrete C20/25											
Hammer-drilling with standard drill bit or hollow drill bit (dry and wet concrete)											
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,cr}$	[N/mm²]	---	---	6,0	6,0	6,0	5,5	---	---	---
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,cr}$	[N/mm²]	---	---	5,0	5,0	5,0	5,0	---	---	---
Hammer-drilling with standard drill bit or hollow drill bit (flooded hole)[1]											
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,cr}$	[N/mm²]	---	---	---	5,0	5,0	4,5	---	---	---
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,cr}$	[N/mm²]	---	---	---	4,0	4,0	4,0	---	---	---
Installation safety factors											
Dry and wet concrete	$\gamma_2 = \gamma_{inst}$	[-]	1,2								
Flooded hole	$\gamma_2 = \gamma_{inst}$	[-]	---			1,4[1]					

[1] Only with coaxial cartridges: 380 ml, 400 ml, 410 ml

fischer injection system FIS AB

Performances
Characteristic values for static or quasi-static action under tensile load for anchor rods (uncracked or cracked concrete)

Annex C 4

Table C5: Characteristic values of **resistance** for **fischer internal threaded anchors RG MI** in hammer drilled holes; **uncracked concrete**

Size			**M8**	**M10**	**M12**	**M16**	**M20**
Combined pullout and concrete cone failure							
Calculation diameter	d	[mm]	12	16	18	22	28
Uncracked concrete							
Characteristic bond resistance in uncracked concrete C20/25							
Hammer-drilling with standard drill bit or hollow drill bit (dry and wet concrete)							
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	10,5	10,0	9,5	9,0	8,5
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	9,0	8,0	8,0	7,5	7,0
Hammer-drilling with standard drill bit or hollow drill bit (flooded hole)[1]							
Temperature range I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,0	9,0	8,5	8,0
Temperature range II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	7,5	6,5	6,5	6,0	6,0
Installation safety factors							
Dry and wet concrete	$\gamma_2 = \gamma_{inst}$	[-]	1,2				
Flooded hole	$\gamma_2 = \gamma_{inst}$	[-]	1,4[1]				

[1] Only with coaxial cartridges: 380 ml, 400 ml, 410 ml

Table C6: Displacements for **anchor rods**

Size		M6	M8	M10	M12	M16	M20	M24	M27	M30
Displacement-Factors for tensile load[1)]										
Uncracked concrete; Temperature range I, II										
$\delta_{N0\text{-Faktor}}$	[mm/(N/mm²)]	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,12
$\delta_{N\infty\text{-Faktor}}$		0,10	0,10	0,10	0,12	0,12	0,12	0,13	0,13	0,14
Cracked concrete; Temperature range I, II										
$\delta_{N0\text{-Faktor}}$	[mm/(N/mm²)]	---	---	0,12	0,12	0,13	0,13	---	---	---
$\delta_{N\infty\text{-Faktor}}$		---	---	0,27	0,30	0,30	0,30	---	---	---
Displacement-Factors for shear load[2)]										
Uncracked or cracked concrete; Temperature range I, II										
$\delta_{V0\text{-Faktor}}$	[mm/kN]	0,11	0,11	0,11	0,10	0,10	0,09	0,09	0,08	0,07
$\delta_{V\infty\text{-Faktor}}$		0,12	0,12	0,12	0,11	0,11	0,10	0,10	0,09	0,09

[1)] Calculation of effective displacement:

$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau_{Ed}$

$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau_{Ed}$

(τ_{Ed}: Design value of the applied tensile stress)

[2)] Calculation of effective displacement:

$\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V_{Ed}$

$\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V_{Ed}$

(V_{Ed}: Design value of the applied shear force)

Table C7: Displacements for **fischer internal threaded anchors RG MI**

Size		M8	M10	M12	M16	M20
Displacement-Factors for tensile load[1)]						
Uncracked concrete; Temperature range I, II						
$\delta_{N0\text{-Faktor}}$	[mm/(N/mm²)]	0,10	0,11	0,12	0,13	0,14
$\delta_{N\infty\text{-Faktor}}$		0,13	0,14	0,15	0,16	0,18
Displacement-Factors for shear load[2)]						
Uncracked concrete; Temperature range I, II						
$\delta_{V0\text{-Faktor}}$	[mm/kN]	0,12	0,12	0,12	0,12	0,12
$\delta_{V\infty\text{-Faktor}}$		0,14	0,14	0,14	0,14	0,14

[1)] Calculation of effective displacement:

$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau_{Ed}$

$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau_{Ed}$

(τ_{Ed}: Design value of the applied tensile stress)

[2)] Calculation of effective displacement:

$\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V_{Ed}$

$\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V_{Ed}$

(V_{Ed}: Design value of the applied shear force)