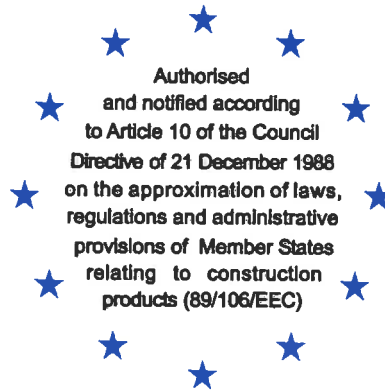


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Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-05/0164

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

fischer Highbond-Anker FHB II
fischer Highbond-Anchor FHB II

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*

Kraftkontrolliert spreizender Verbunddübel in den Größen M8, M10, M12, M16, M20 und M24 zur Verankerung im Beton
Torque controlled bonded anchor of sizes M8, M10, M12, M16, M20 and M24 for use in concrete

Geltungsdauer:
Validity: vom
from
bis
to

8 September 2008
7 September 2010

Herstellwerk
Manufacturing plant

fischerwerke

Diese Zulassung umfasst
This Approval contains

19 Seiten einschließlich 11 Anhänge
19 pages including 11 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-05/0164 mit Geltungsdauer vom 01.02.2008 bis 07.09.2010
ETA-05/0164 with validity from 01.02.2008 to 07.09.2010



Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

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, zuletzt geändert durch Gesetz vom 06.01.2004⁵;
 - 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 anchors for use in concrete - Part 5: Bonded anchors", ETAG 001-05.
- 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, 11.02.1989, p. 12
2 Official Journal of the European Communities L 220, 30.08.1993, p. 1
3 Official Journal of the European Union L 284, 31.10.2003, p. 25
4 Bundesgesetzblatt I, p. 812
5 Bundesgesetzblatt I, p.2, 15
6 Official Journal of the European Communities L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of construction product and intended use

1.1 Definition of the product

The fischer Highbond-Anchor FHB II in the range of M8, M10, M12, M16, M20 and M24 is a torque controlled bonded anchor consisting of a mortar cartridge with mortar fischer FIS HB or a glass capsule FHB II – P(F) and an anchor rod FHB II - A L or FHB II - A S with hexagon nut, washer and an element for in-place anchorage. The glass capsule is set into a drilled hole in the concrete. The special formed anchor rod is driven into the glass capsule by machine with simultaneous hammering and turning. For the injection system the anchor rod is placed into a drilled hole filled with injection mortar. The load transfer is realised by mechanical interlock of several cones in the bonding mortar and then via a combination of bonding and friction forces in the anchorage ground (concrete).

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

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. Safety in case of fire (Essential Requirement 2) is not covered in this European technical approval. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206:2000-12.

The anchor rod may be used in cracked and non-cracked concrete.

The capsule system may be used in dry or wet concrete or in flooded holes excepting sea water. The injection system may be used in dry or wet concrete; it must not be installed in flooded holes.

The anchor may be used in the following temperature range:

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

Galvanised steel:

The anchor may only be used in structures subject to dry internal conditions.

Stainless steel 1.4401, 1.4404, 1.4362 or 1.4571 (marking "A4"):

The anchor rod 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).

Stainless steel 1.4529 (marking "C"):

The anchor rod 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 product and methods of verification

2.1 Characteristics of product

The anchor corresponds to the drawings and provisions given in Annexes 1 to 4. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 1 to 4 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 Annexes 5 to 11.

Each anchor rod shall be marked with the identifying mark of the manufacturer (works symbol), with the anchor size and with the effective anchorage depth in accordance with Annex 2. Each anchor rod made of stainless steel 1.4401, 1.4404, 1.4362 or 1.4571 is marked with the additional letter "A4" and each anchor rod made of stainless steel 1.4529 is marked with the additional letter "C".

Each glass capsule shall be marked with the identifying mark of the manufacturer and with the trade name in accordance with Annex 4.

Each mortar cartridge shall be marked with the identifying mark of the manufacturer and with the trade name in accordance with Annex 3.

The two components of the injection mortar fischer FIS HB are delivered in unmixed condition in mortar cartridges according to Annex 3.

The anchor shall only be packaged and supplied as a complete unit, mortar cartridges or glass capsules may be packed separately from anchor rods (including nut and washer).

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 Anchors for use in concrete", Part 1 "Anchors in general" and Part 5 "Bonded anchors" as well as the Technical Report TR 018 "Torque-controlled bonded anchors", on the basis of Option 1.

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 EU 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 96/582/EG of the European Commission⁸ the system 2(i) (referred to as system 1) of 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 of 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 plan of September 7th, 2005 relating to this European technical approval 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.⁹

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 of 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 3.3. 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 254 of 08.10.1996.

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 of 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 relating to this European technical approval.

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,
- the number of the guideline for European technical approval,
- use category (ETAG 001-1 Option 1),
- 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 European technical approval and consequently the validity of the CE marking on the basis of the European technical approval and if so whether further assessment or alterations to the European technical approval shall be necessary.

4.2 Installation

4.2.1 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 "Guideline for European Technical Approval of Metal Anchors for Use in Concrete", Annex C, Method A, under the responsibility of an engineer experienced in anchorages and concrete work.

Verifiable calculation notes and drawings are 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.).

4.2.2 Installation of anchors

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 strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply,
- Check of concrete being well compacted, e.g. without significant voids,
- Edge distance and spacing not less than the specified values without minus tolerances,
- Positioning of the drill holes without damaging the reinforcement,
- In case of aborted hole: The hole shall be filled with mortar,
- Cleaning of the drill hole by at least 2x blowing / 2x brushing / 2x blowing following the manufacturers installation instructions,
- The injection system must not be installed in flooded holes,
- anchor installation such that the effective anchorage depth is complied with. This compliance is ensured when the embedment mark of the anchor does no more exceed the concrete surface,
- a) Injection system: mortar injection by using the equipment including the static mixer shown in Annex 1; discarding the first swings of mortar (the specific number is given in the manufacturer's installation instruction) of each new cartridge; the injection mortar is sufficiently mixed when the colour has turned into a uniform grey; taking from the manufacturer's installation instruction the admissible processing time (open time) of a cartridge including pressing-in of the anchor rod as a function of the anchor component installation temperature and the ambient temperature of the concrete; filling the drill hole uniformly starting from the drill hole bottom, in order to avoid entrapment of air; removing the mixer slowly bit by bit during pressing-out; filling the drill hole with the minimum quantity of the injection mortar given in the manufacturer's installation instruction (appr. 2/3 of the drill hole); pressing the anchor rod by manual turning into the mortar-filled drill hole up to the marked anchorage depth; achieving the anchorage depth (installation depth), injection mortar must be visible at the member surface; replacing the static mixer if work is interrupted for a time exceeding the indicated processing time of the cartridge; the anchor component installation temperature shall be at least +5 °C; during curing of the injection mortar the temperature of the concrete must not fall below -5 °C; observing the curing time according to Annex 3, Table 5 until the anchor may be loaded; after the curing time fixing the fixture to be anchored by using a calibrated torque wrench by not exceeding the torque moment given in Annex 5, Table 9 for FHB II - A L and Annex 6, Table 11 for FHB II - A S, respectively.
- b) glass capsule: the glass capsule is set into the drilled hole. Connecting the anchor rod with the percussion drill by using a corresponding adapter. Driving the anchor rod into the glass capsule by simultaneous hammering and turning of the drill. If the anchorage depth is achieved the drill must stopped immediately by using some pressure. If the anchor is proper installed mortar must be visible at the member surface. The anchor component installation temperature shall be at least +5 °C. During curing of the injection mortar the

temperature of the concrete must not fall below -5 °C. The curing time until the anchor may be loaded as given in Annex 4, Table 8 has to be observed. After the curing time the member to be anchored shall be fixed by using the torque wrench by not exceeding the torque moment given in Annex 5, Table 9 for FHB II – A L and Annex 6, Table 11 for FHB II - A S, respectively.

4.2.3 Responsibility of the manufacturer

The manufacturer is responsible to ensure that the information on the specific conditions according to section 1 and 2 including Annexes referred to and 4.2.1 and 4.2.2 as well as 5 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:

- Diameter of drill bit,
- Hole depth,
- Diameter of anchor rod,
- Minimum effective anchorage depth,
- Maximum thickness of the fixture,
- Information on the installation procedure, including cleaning of the hole with the cleaning equipments, preferably by means of an illustration,
- Anchor component installation temperature,
- Ambient temperature of the concrete during installation of the anchor,
- Admissible processing time (open time) of a cartridge,
- Curing time until the anchor may be loaded as a function of the ambient temperature in the concrete during installation,
- max. torque moment,
- Identification of the manufacturing batch.

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

5 Indications to the manufacturer

5.1 Packaging, transport and storage

The mortar cartridges and the glass capsules shall be protected against sun radiation and shall be stored according to the manufacturer instructions in dry condition at temperatures of at least +5 °C to not more than +25 °C (Short time storage up to +35 °C is admissible).

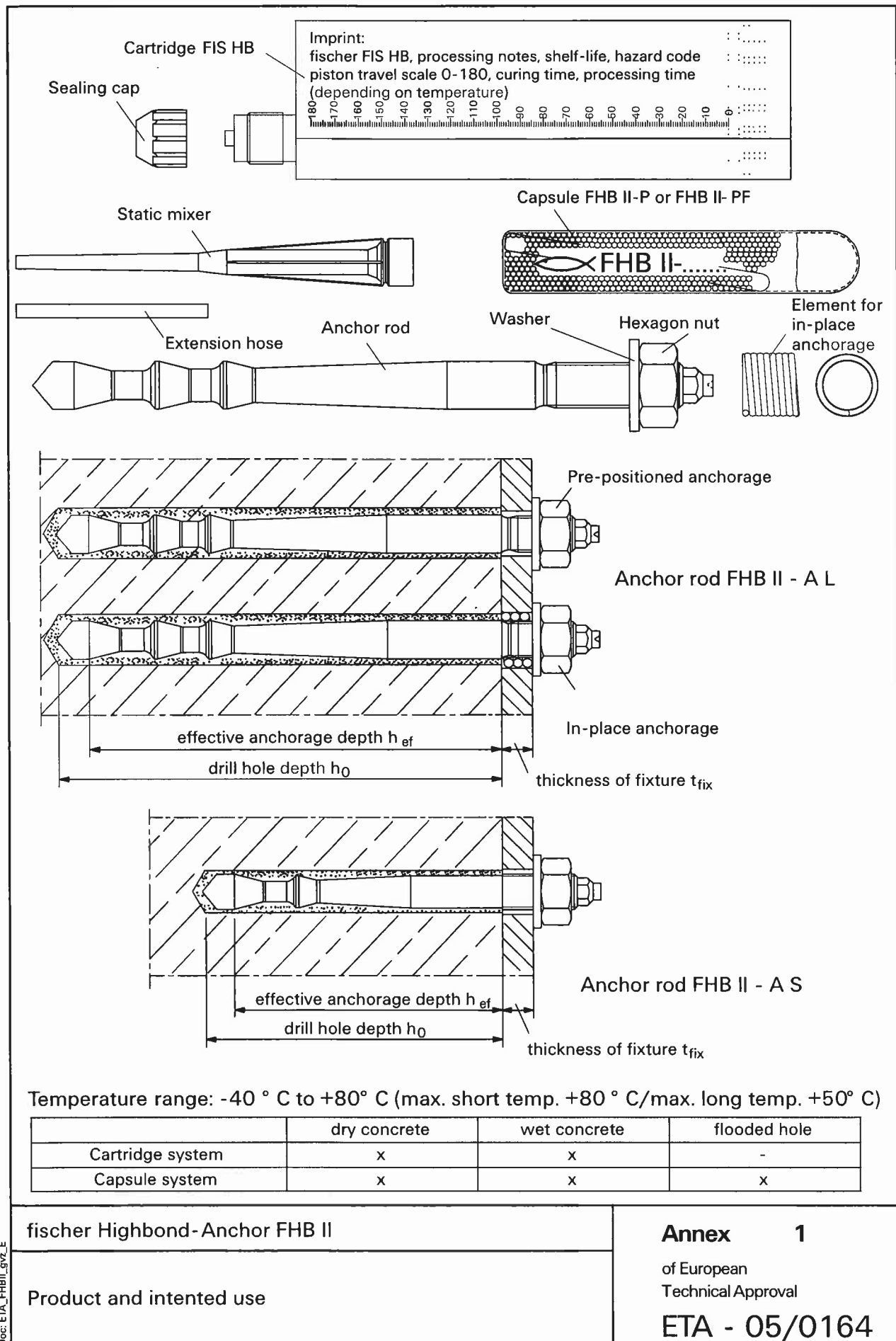
Mortar cartridges and glass capsules with expired shelf life must no longer be used.

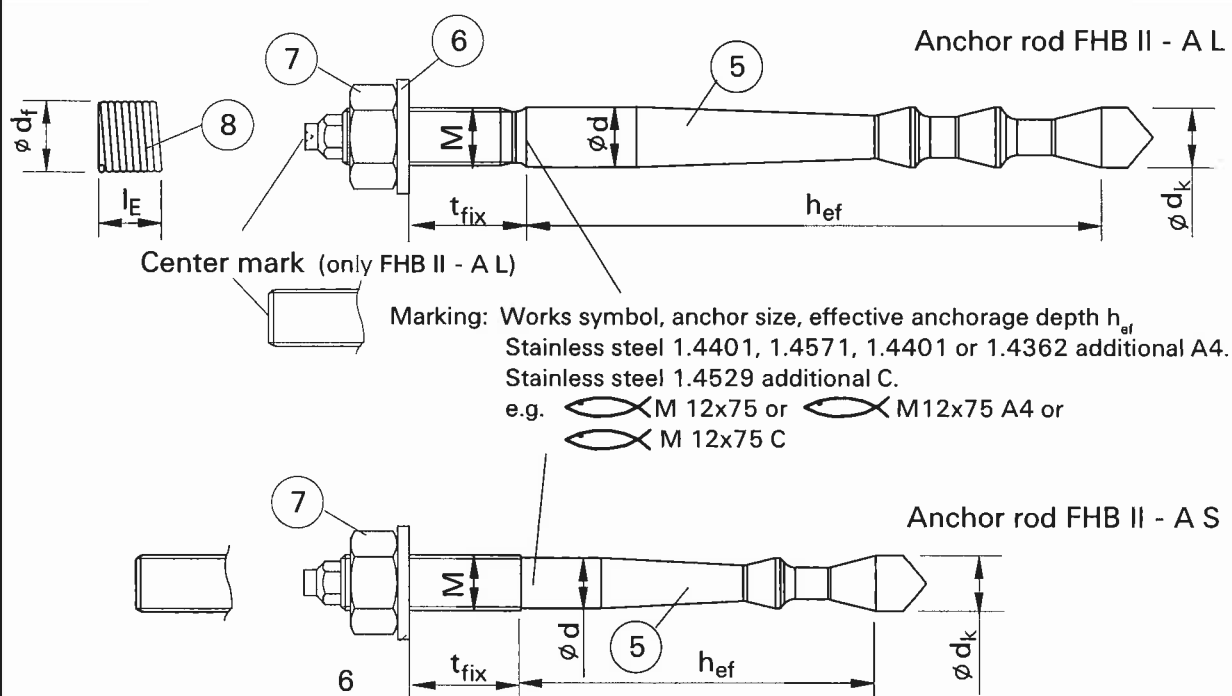
The anchor shall only be packaged and supplied as a complete unit. The mortar cartridges and glass capsules may be packed separately from anchor rods (including nut, washer and element for in-place anchorage).

The manufacturer's installation instruction shall indicate that the mortar cartridges and glass capsules can be used only with the corresponding anchor rods of the manufacturer.

i. V. Dipl.-Ing. Seyfert
Vice-president of Deutsches Institut für Bautechnik
Berlin, 8 September 2008

beglaubigt:
Giessmann



**Table 1:** Anchor dimensions FHB II - A L

Size				Pre- positioned anchorage	In- place anchorage ¹⁾	Element for in-place anchorage	
	ϕd [mm]	ϕd_k [mm]	h_{ef} [mm]	$t_{fix} \leq$ [mm]	$t_{fix} \leq$ [mm]	ϕd_f [mm]	l_E [mm]
M 8	8,9	9,6	60	1500	25	10	12,5 - 25
M 10	10,6	10,6	95		30	12	15 - 30
M 12	12,5	12,5	120		40	15	20 - 40
M 16	17,0	17,0	160		50	19	25 - 50
M 20	23,0	23,0	210		60	24	30 - 60

¹⁾ not with capsule**Table 2:** Anchor dimensions FHB II - A S

Size				Pre- positioned and In-place anchorage
	ϕd [mm]	ϕd_k [mm]	h_{ef} [mm]	$t_{fix} \leq$ [mm]
M 10	8,9	9,6	60	1500
M 12	10,7	11,6	75	
M 16	14,5	14,5	95	
M 24	23,0	23,0	170	

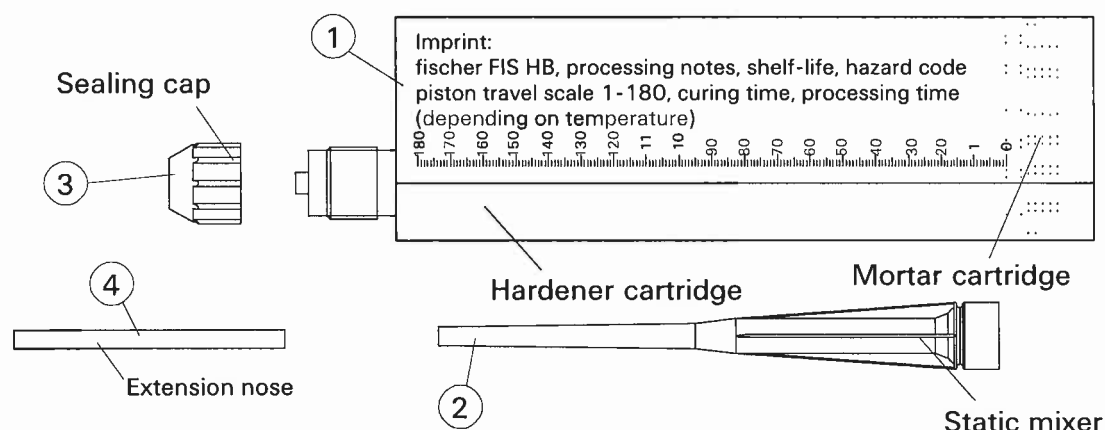
fischer Highbond- Anchor FHB II

Anchor dimensions

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Table 3: Materials

Part	Designation	Steel, zinc plated	A4	HCR
5	Anchor rod FHB II - A L FHB II - A S	$f_{uk}=800 \text{ N/mm}^2$; $f_{yk}=640 \text{ N/mm}^2$ (EN ISO 898-1) zinc plated $\geq 5 \mu\text{m}$ A2K (EN ISO 4042)	EN 10 088 $f_{uk}=800 \text{ N/mm}^2$; $f_{yk}=640 \text{ N/mm}^2$ (EN ISO 898-1)	1.4529; EN 10088 $f_{uk}=800 \text{ N/mm}^2$; $f_{yk}=640 \text{ N/mm}^2$ (EN ISO 898-1)
6	Washer	Steel, zinc plated $\geq 5 \mu\text{m}$ A2K (EN ISO 4042)	1.4401/ 1.4571/ 1.4404/1.4362	1.4529
7	Hexagon nut	Steel, class 8; (EN 20 898-2) zinc plated $\geq 5 \mu\text{m}$ A2K (EN ISO 4042)	1.4401/ 1.4571/ 1.4404/1.4362 $\geq \text{A4- 70 EN ISO 3506}$	1.4529; class ≥ 70 EN ISO 3506
8	Element for in-place anchorage	1.4401/ 1.4571/ 1.4404/ 1.4362		
9	Capsule FHB II- P and FHB II- PF	Bonding agent: Vinylester resin, styrene free Hardener: Dibenzoyl peroxide Additive: mineral aggregates		

FIS HB, Mortar cartridge**Table 4: Components mortar cartridge**

Part	Designation	Trade name	Contents
1	Mortar cartridge	FIS HB (different container)	Bonding agent: Vinylester resin, styrene free Hardener: Dibenzoyl peroxide Additive: mineral aggregates
2	Static mixer		
3	Sealing cap		
4	Extension hose	using when $h_0 \geq 170 \text{ mm}$	

Table 5: Minimum curing time

Concrete temperature	Minimum curing time ¹⁾
- 5 °C to 0 °C	6 hours
0 °C to 5 °C	3 hours
5 °C to 20 °C	90 minutes
20 °C to 30 °C	35 minutes
30 °C to 40 °C	20 minutes
> 40 °C	12 minutes

¹⁾ For wet concrete the curing time must be doubled

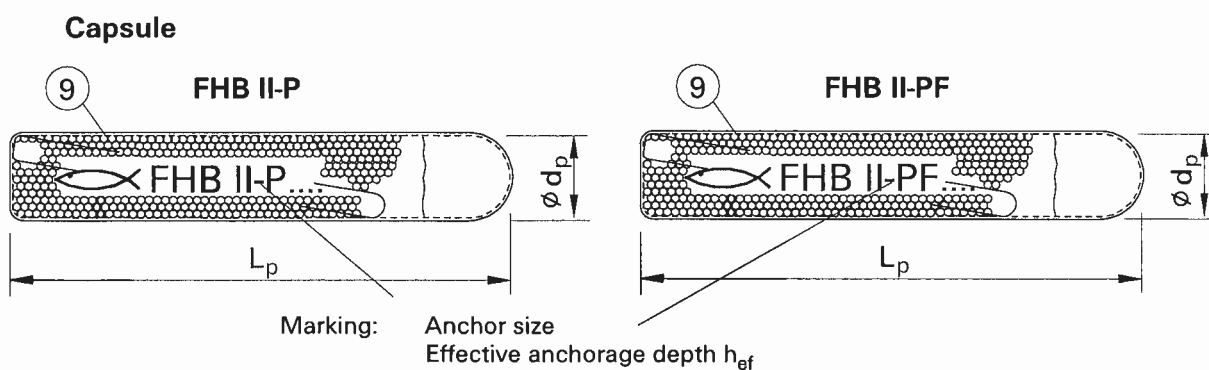
fischer Highbond- Anchor FHB II

Materials
Mortar cartridge components and curing times

Annex 3

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**Table 6: Capsule**

Part	Designation	Trade name	Contents
9	Capsule	FHB II-P FHB II-PF	Bonding agent: Vinylester resin, styrene free Hardener: Dibenzoyl peroxide Additive: mineral aggregates

Table 7: Dimensions Capsule

Designation	Capsule length L_p [mm]	Capsule diameter $\varnothing d_p$ [mm]
8x60	80	9,0
10x60		
10x95	110	11,0
12x75	85	
12x120	120	12,5
16x95	110	14,5
16x160	125	17,0
20x210	210	21,5
24x170	185	

Table 8: Minimum curing time

Capsule FHB II-P	
Concrete temperature	Minimum curing time ¹⁾
-5°C to -1°C	4 hours
0°C to +9°C	45 minutes
+10°C to +20°C	20 minutes
> +20°C	10 minutes

Capsule FHB II-PF	
Concrete temperature	Minimum curing time ¹⁾
-5°C to -1°C	8 minutes
0°C to +9°C	6 minutes
+10°C to +20°C	4 minutes
+21°C to +30°C	2 minutes

¹⁾ For wet concrete the curing time must be doubled

fischer Highbond- Anchor FHB II

Capsule
Materials, dimensions and curing times

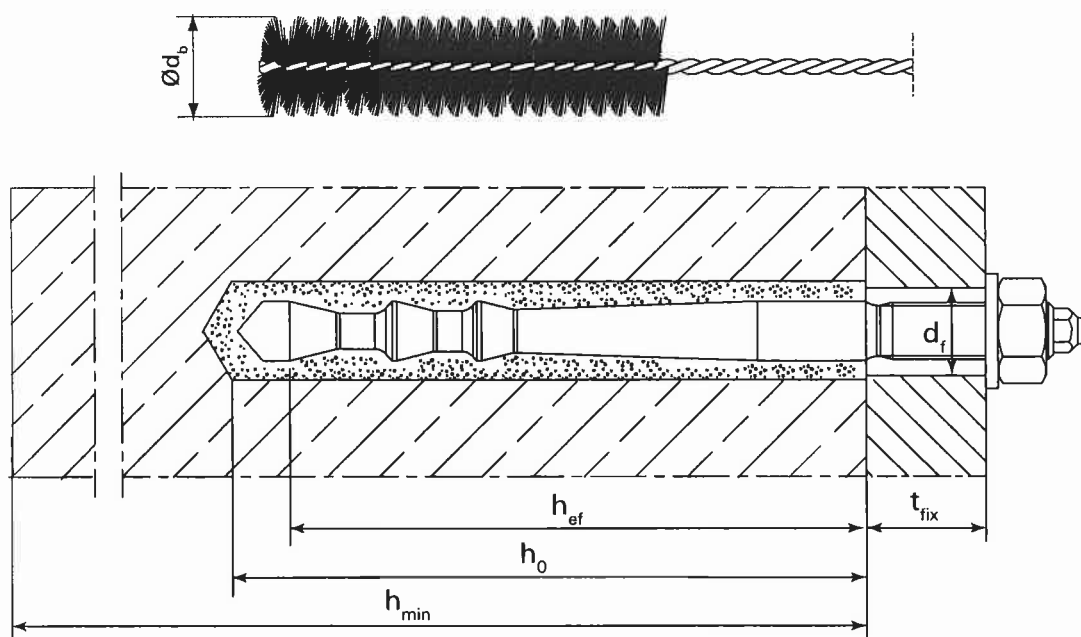
Annex 4

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Table 9: Installation parameters anchor rod FHB II - A L

Size		FHB II - A L M8x60	FHB II - A L M10x95	FHB II - A L M12x120	FHB II - A L M16x160	FHB II - A L M20x210
Nominal drill diameter	$d_0 = [\text{mm}]$	10	12	14	18	25
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$	10,45	12,5	14,5	18,5	25,55
Depth of drill hole	$h_0 = [\text{mm}]$	75	110	135	175	235
Diameter of clearance hole in the fixture	Pre-positioned anchorage $d_f \leq [\text{mm}]$	9	12	14	18	22
	In-place anchorage $d_f \leq [\text{mm}]$	11	14	16	20	26
Diameter of steel brush	$d_b = [\text{mm}]$	11	13	16	20	27
Maximum torque moment	$T_{\text{inst}} = [\text{Nm}]$	15	20	40	60	100

Steel brush**Table 10:** Minimum distance and minimum member thickness

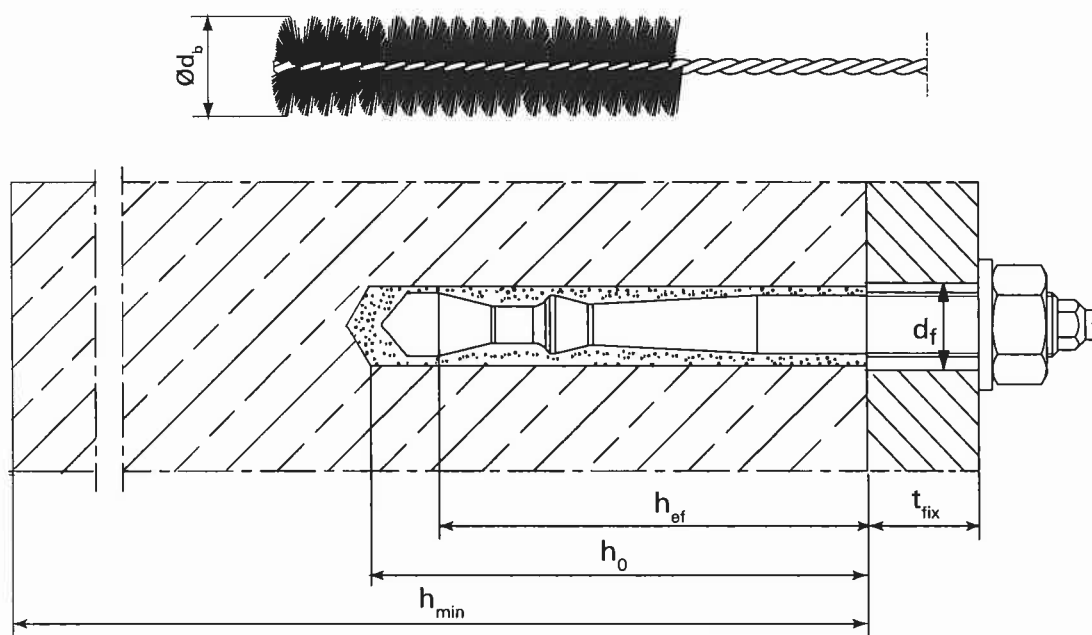
Size	Minimum thickness of concrete member $h_{\text{min}} [\text{mm}]$	Minimum free edge distance and minimum spacing $c_{\text{min}} = s_{\text{min}} [\text{mm}]$
FHB II - A L M 8x60	100	40
FHB II - A L M10x95	140	40
FHB II - A L M12x120	170	50
FHB II - A L M16x160	220	70
FHB II - A L M20x210	280	90

fischer Highbond- Anchor FHB II

Installation parameters
Anchor rod FHB II - A L**Annex 5**of European
Technical Approval**ETA -05/0164**

Table 11: Installation parameters anchor rod FHB II - A S

Size		FHB II - A S M10x60	FHB II - A S M12x75	FHB II - A S M16x95	FHB II - A S M24x170
Nominal drill diameter	$d_o = [\text{mm}]$	10	12	16	25
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$	10,45	12,5	16,5	25,55
Depth of drill hole	$h_o = [\text{mm}]$	75	90	110	190
Diameter of clearance hole in the fixture	Pre-positioned anchorage	$d_i \leq [\text{mm}]$	12	14	18
	In-place anchorage	$d_i \leq [\text{mm}]$	12	14	18
Diameter of steel brush	$d_b = [\text{mm}]$	11	13	18	27
Maximum torque moment	$T_{\text{inst}} = [\text{Nm}]$	15	30	50	100

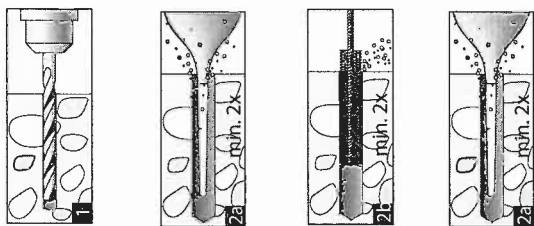
Steel brush**Table 12:** Minimum distance and minimum member thickness

Size	Minimum thickness of concrete member $h_{\text{min}} [\text{mm}]$	Minimum free edge distance and minimum spacing $c_{\text{min}} = s_{\text{min}} [\text{mm}]$
FHB II - A S M10x60	100	40
FHB II - A S M12x75	120	40
FHB II - A S M16x95	150	50
FHB II - A S M24x170	240	80

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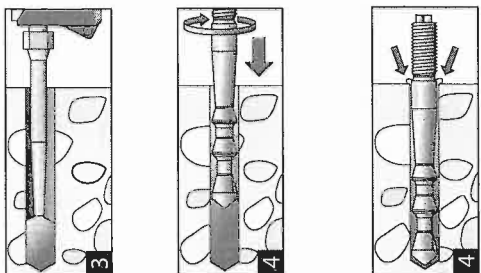
Installation parameters
Anchor rod FHB II - A S**Annex 6**of European
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Installation instruction



Drill the hole (h_0 und d_0 see Table 9 and 11).
Clean the hole. About anchor size M20 use
oilfree pressure air.

Mounting with FIS HB mortar cartridge

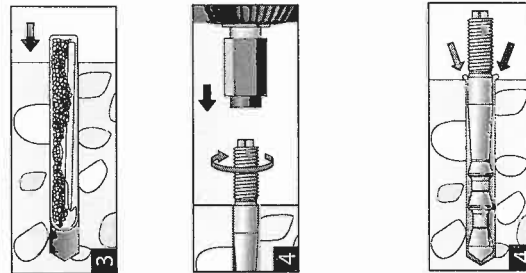


Fill the hole
with mortar

Mounting the
fischer- anchor
rod by hand.

When reaching
the setting depth
mortar must be
visible on the
surface

Mounting with FHB II-P or FHB II-PF mortar capsule



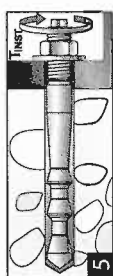
Put the mortar
capsule into
the hole

Mounting the
fischer- anchor
rod by using a
hammer-action
drill.

When reaching the
setting depth
mortar must be
visible on the
surface



Do not touch. t_{cure} see table 5 or 8



Mounting the fixture
 T_{inst} see table 9 or 11

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Installation instruction

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Table 13: Characteristic values of resistance to tension loads for design method A

Size	FHB II - AL M8x60	FHB II - AS M10x60	FHB II - AL M10x95	FHB II - AS M12x75	FHB II - AL M12x120	FHB II - AS M16x95	FHB II - AL M16x160	FHB II - AL M20x210	FHB II - AS M24x170
Steel failure (steel, zinc plated; A4; 1.4529)									
Characteristic resistance	$N_{Rk,s}$ [kN]	21,9	21,9	34,4	49,8	61,6	96,6	137,6	128,5
Partial safety factor	γ_{Ms} ⁴⁾	1,5							
Pullout failure in cracked concrete C20/25									
Characteristic resistance	$N_{Rk,p}$ [kN]	- 1)							
Pullout and splitting failure in uncracked concrete C20/25									
	$N_{Rk,p}$ [kN]	- 1)							
Characteristic resistance	$S_{cr,sp}$ [mm]	300	300	475	300	600	580	630	510
	$C_{cr,sp}$ [mm]	150	150	238	150	300	290	315	255
Pullout and splitting failure in uncracked concrete C20/25									
Characteristic resistance	$N_{Rk,p}$ [kN]	20	20	35	25	50	40	75	- 1)
	$S_{cr,sp}$ [mm]	3,0 h_{ef}							
	$C_{cr,sp}$ [mm]	1,5 h_{ef}							
	C25/30	1,10							
	C30/37	1,22							
	C35/45	1,34							
	C40/50	1,41							
	C45/55	1,48							
	C50/60	1,55							
Partial safety factor	γ_{Mc} ^{3) 4)}	1,5 ²⁾							
Concrete cone failure									
Effective anchoring depth	h_{ef} [mm]	60	60	95	75	120	160	210	170
Spacing	$S_{cr,N}$ [mm]	3,0 h_{ef}							
Edge distance	$C_{cr,N}$ [mm]	1,5 h_{ef}							
Partial safety factor	γ_{Mc} ^{3) 4)}	1,5 ²⁾							

¹⁾ Pullout failure is not decisive²⁾ With FHB II- Capsule $\gamma_2 = 1,2$ ³⁾ The partial safety factor $\gamma_2 = 1,0$ is included.⁴⁾ If no other national regulations exist

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Design method A
Characteristic values to tension loads**Annex 8**
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Table 14: Displacements under tension loads for non-cracked and cracked concrete

Size	FHB II - AL M8x60	FHB II - AS M10x60	FHB II - AL M10x95	FHB II - AS M12x75	FHB II - AL M12x120	FHB II - AS M16x95	FHB II - AL M16x160	FHB II - AL M20x210	FHB II - AS M24x170
Tension load in cracked concrete	[kN]	6,6	15,9	11,1	22,5	15,9	34,7	52,2	38,0
Displacements	δ_{N0} [mm] $\delta_{N\infty}$ [mm]	0,8	0,8	0,3	0,8	0,4	0,6	0,6	0,6
		1,7							
Tension load in non-cracked concrete	[kN]	9,3	22,3	15,6	31,6	22,3	48,7	73,2	53,3
Displacements	δ_{N0} [mm] $\delta_{N\infty}$ [mm]	0,2	0,4	0,2	0,4	0,2	0,4	0,6	0,5
		1,7							

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Displacements

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Table 15: Characteristic values of resistance to shear loads for design method A

Size	FHB II - AL M8x60	FHB II - AS M10x60	FHB II - AL M10x95	FHB II - AS M12x75	FHB II - AL M12x120	FHB II - AS M16x95	FHB II - AL M16x160	FHB II - AL M20x210	FHB II - AS M24x170
Steel failure without lever arm									
Characteristic shear load resistance	Steel, zinc plated [kN]								
	A4 [kN]								
	14,6	23,2		33,7		62,7		87,9	114,2
	14,6	23,2		33,7		62,7		97,9	124,5
	14,6	23,2		33,7		62,7		97,9	141,0
Partial safety factor	γ_{Ms}^1 [-]								
	1,25								
Steel failure with lever arm									
Characteristic bending moment	$M_{Rk,s}^0$ [Nm]								
	30	60		105		266		519	896
Partial safety factor	γ_{Ms}^1 [-]								
	1,25								
Concrete pryout failure									
Factor k in equation (5.6) of ETAG Annex C, Section 5.2.3.3	[-]								
	2,0								
Partial safety factor	γ_{Mcp}^1 [-]								
	1,5								
Concrete edge failure									
Effective length of anchor in shear load	l_f [mm]	60	95	75	112	95	144	200	170
Effective diameter of anchor	d_{nom} [mm]	10		12	14	16	18		25
Partial safety factor	γ_{Mc}^1 [-]	1,5							

¹⁾ If no other national regulations exist

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Design method A
Characteristic values to shear loads**Annex 10**of European
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Table 16: Displacements under shear loads for non-cracked and cracked concrete, anchor steel, zinc plated

Size	FHB II - AL M8x60	FHB II - AS M10x60	FHB II - AL M10x95	FHB II - AS M12x75	FHB II - AL M12x120	FHB II - AS M16x95	FHB II - AL M16x160	FHB II - AL M20x210	FHB II - AS M24x170
Shear load	[kN]	7,5	10,7	11,9	12,7	17,3	29,0	32,2	50,2
Displacements	δ_{V0} [mm]		1,2		1,5	1,3	1,5	1,3	3,5
	$\delta_{V\infty}$ [mm]		1,8		2,3	2,0	2,3	2,0	5,3

Table 17: Displacements under shear loads for non-cracked and cracked concrete, anchor A4

Size	FHB II - AL M8x60 A4	FHB II - AS M10x60 A4	FHB II - AL M10x95 A4	FHB II - AS M12x75 A4	FHB II - AL M12x120 A4	FHB II - AS M16x95 A4	FHB II - AL M16x160 A4	FHB II - AL M20x210 A4	FHB II - AS M24x170 A4
Shear load	[kN]	8,3	13,3		19,3		35,8	55,9	71,1
Displacements	δ_{V0} [mm]		1,0		1,1		2,2		3,5
	$\delta_{V\infty}$ [mm]		1,5		1,7		3,3		5,3

Table 18: Displacements under shear loads for non-cracked and cracked concrete, anchor 1.4925

Size	FHB II - AL M8x60 C	FHB II - AS M10x60 C	FHB II - AL M10x95 C	FHB II - AS M12x75 C	FHB II - AL M12x120 C	FHB II - AS M16x95 C	FHB II - AL M16x160 C	FHB II - AL M20x210 C	FHB II - AS M24x170 C
Shear load	[kN]	8,3	13,3		19,3		35,8	55,9	80,6
Displacements	δ_{V0} [mm]		1,2		1,3		2,4	3,7	5,0
	$\delta_{V\infty}$ [mm]		1,8		2,0		3,6	5,6	7,5

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Displacements

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