



DEKLARACJA WŁAŚCIWOŚCI UŻYTKOWYCH

DoP 0293

dla kotwy fischer Highbond-Anchor FHB II (Rozprężne łączniki wklejane do zastosowania w betonie)

PL

1. Niepowtarzalny kod identyfikacyjny typu wyrobu: **DoP 0293**
2. Zamierzone zastosowanie: **Mocowanie w betonie zarysowanym lub niezarysowanym, zobacz załącznik, w szczególności aneksy B1 - B11.**
3. Producent: **fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Niemcy**
4. Upoważniony przedstawiciel: **-**
5. System(-y) oceny i weryfikacji stałości właściwości użytkowych: **1**
6. Europejski dokument oceny: **EAD 330499-01-0601
Europejska ocena techniczna:
Jednostka ds. oceny technicznej:
Jednostka lub jednostki notyfikowane:**
**ETA-21/0948; 2021-12-21
DIBt- Deutsches Institut für Bautechnik
2873 TU Darmstadt**
7. Deklarowane właściwości użytkowe:
Wystarczającość mechaniczna i stabilność osadzenia (BWR 1)
Nośność charakterystyczna na wyrywanie (nośności statyczne i quasi-statyczne):
Nośność do uszkodzenia stali: Aneks C1
Nośność na wyrywanie i zniszczenie stożka betonu: Aneksy C2-C4
Nośność do wyrwania stożka betonu: Aneks C2
Odległość od krawędzi zapobiegająca pękaniu pod obciążeniem: Aneks C2
Solidność: Aneksy C2-C4
Moment dokręcania: Aneksy B3, B4
Minimalne odstępy osiowe i krawędziowe: Aneksy B3, B4
Nośność charakterystyczna na ścinanie (nośności statyczne i quasi-statyczne):
Nośność do uszkodzenia stali: Aneks C1
Nośność do uszkodzenia wyważenia: Aneks C2
Nośność do zniszczenia krawędzi betonu: Aneks C2
Przemieszczenia pod obciążeniem krótko- i długoterminowym:
Przemieszczenia pod obciążeniem krótko- i długoterminowym: Aneksy C5
Nośność charakterystyczna i przemieszczenia w warunkach sejsmicznych dla kategorii C1 i C2:
Nośność na wyrywanie, zmiany, kategoria C1: NPD
Nośność na wyrywanie, zmiany kategoria C2: NPD
Nośność na ścinanie, zmiany, kategoria C1: NPD
Nośność na ścinanie, zmiany, kategoria C2: NPD
Współczynnik szczereliny pierścieniowej: NPD

Higiena, zdrowie i środowisko (BWR 3)

Treść, emisja i / lub uwalnianie substancji niebezpiecznych: NPD

8. Odpowiednia dokumentacja techniczna lub specjalna – dokumentacja techniczna: **-**

Właściwości użytkowe określonego powyżej wyrobu są zgodne z zestawem deklarowanych właściwości użytkowych. Niniejsza deklaracja właściwości użytkowych wydana zostaje zgodnie z rozporządzeniem (UE) nr 305/2011 na wyjątkową odpowiedzialność producenta określonego powyżej.

W imieniu producenta podpisał(-a):

Dr.-Ing. Oliver Geibig, Dyrektor Zarządzający ds. Jednostek Biznesowych i Inżynierii
Tumlingen, 2022-01-03

Jürgen Grün, Dyrektor Zarządzający ds. Chemii i Jakości

Niniejsza Deklaracja Właściwości Użytkowych została przygotowana w różnych językach. W razie wątpliwości w interpretacji, wersja angielska jest zawsze miarodajna.

Załącznik zawiera dobrowolne i uzupełniające informacje w języku angielskim (neutralne językowo), a wykraczające poza wymagania prawne.

Specific Part

1 Technical description of the product

The "fischer Highbond-Anchor FHB II for diamond drilling / extended working life" consisting of a mortar cartridge with mortar fischer FIS HB or fischer mortar capsule FHB II-P(F) and an anchor rod FHB II - A S or FHB II Inject - A S with hexagon nut and washer.

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 realized 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).

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 and/or 100 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 to tension load (static and quasi-static loading) | See Annex C1 to C4, B3 to B4 |
| Characteristic resistance to shear load (static and quasi-static loading) | See Annex C1 to C2 |
| Displacements under short-term and long-term loading | See Annex C5 |
| Characteristic resistance and displacements for seismic performance categories C1 and C2 | No performance assessed |

3.2 Hygiene, health and the environment (BWR 3)

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

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

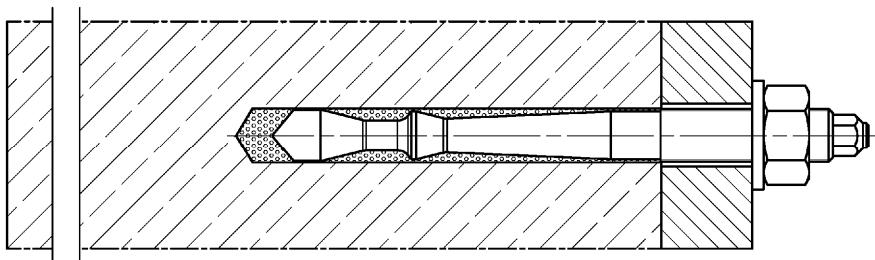
In accordance with the European Assessment Document EAD 330499-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

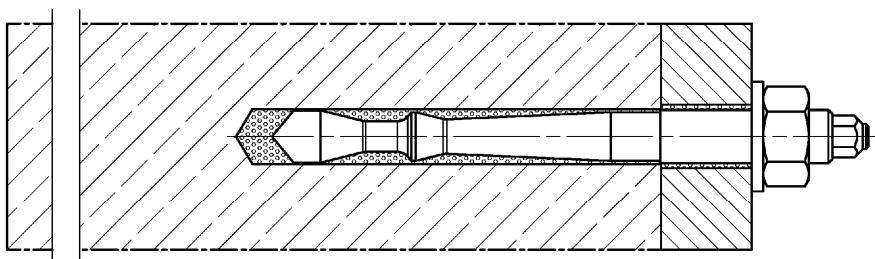
Installation conditions part 1

Highbond - Anchor FHB II - A S

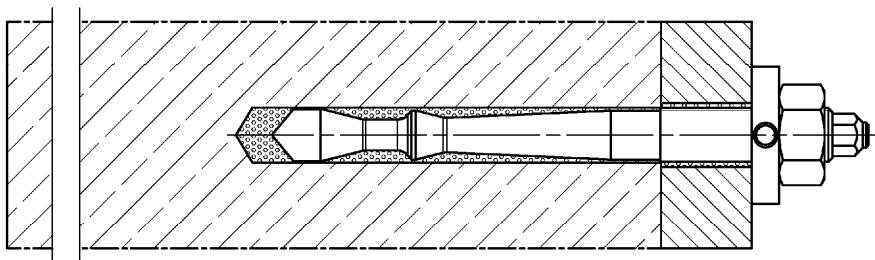
Pre-positioned installation



Push through installation



Pre-positioned or push through installation with subsequently injected fischer filling disc
(annular gap filled with mortar)



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Product description

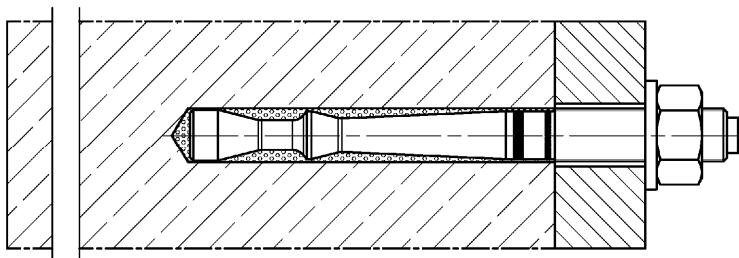
Installation conditions part 1; FHB II - A S

Annex A 1
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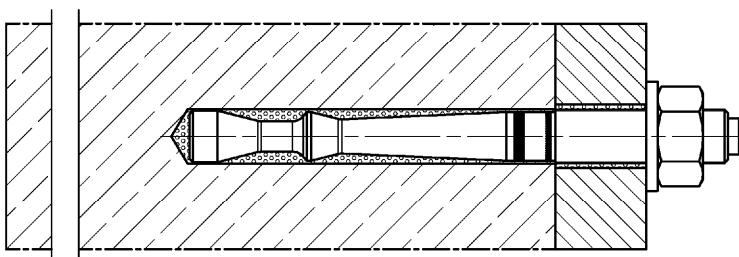
Installation conditions part 2

Highbond - Anchor FHB II Inject - A S (only with injection cartridge system FIS HB)

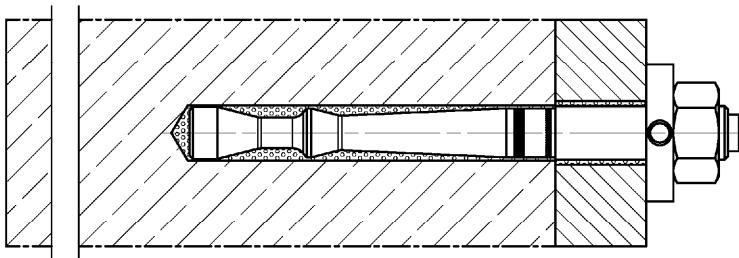
Pre-positioned installation



Push through installation



Pre-positioned or push through installation with subsequently injected fischer filling disc
(annular gap filled with mortar)



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Product description

Installation conditions part 2; FHB II Inject - A S

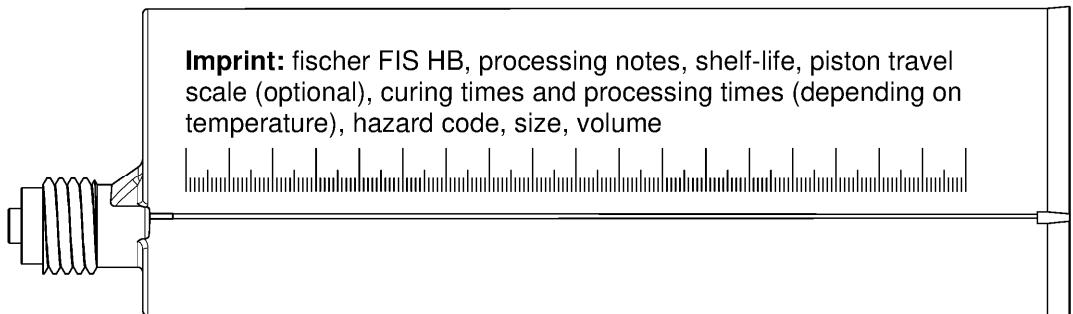
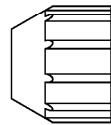
Annex A 2

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Overview system components part 1

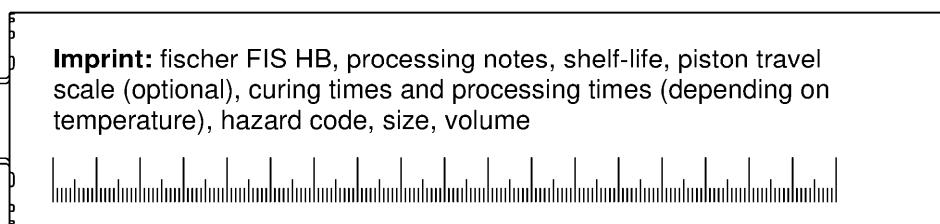
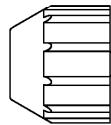
Injection cartridge (shuttle cartridge) with sealing cap;

Size: 360 ml, 825 ml



Injection cartridge (coaxial cartridge) with sealing cap;

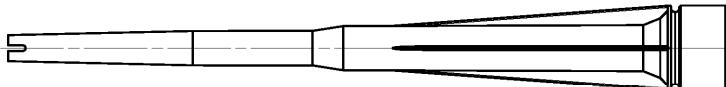
Size: 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



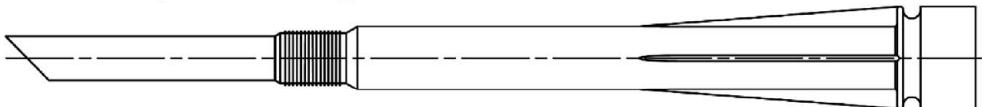
Resin capsule



Static mixer FIS MR Plus for injection cartridges up to 410 ml



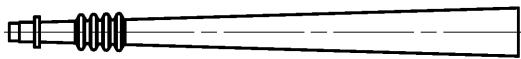
Static mixer FIS JMR for injection cartridge 825 ml



Extension tube Ø 9 for static mixer FIS MR Plus;
Extension tube Ø 9 or Ø 15 for static mixer FIS JMR



Injection adapter



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Product description

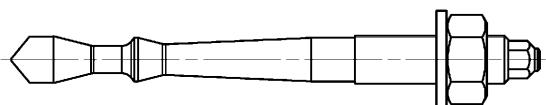
Overview system components part 1
cartridges / resin capsule / static mixer / accessories

Annex A 3
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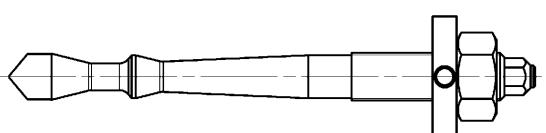
Overview system components part 2

fischer Highbond - Anchor FHB II and FHB II Inject; pre-assembled condition

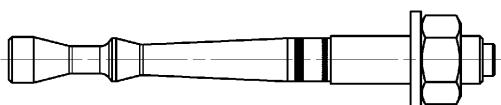
Highbond - Anchor FHB II - A S



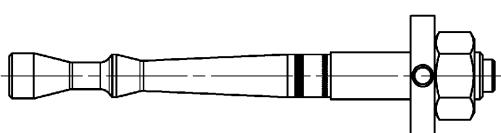
alternative version



Highbond - Anchor FHB II Inject - A S

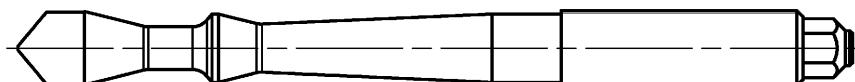


alternative version



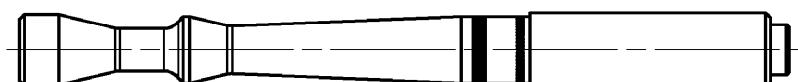
Highbond anchor rod FHB II - A S

Size: M16, M20, M24



Highbond anchor rod FHB II Inject - A S

Size: M16, M20, M24



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Product description

Overview system components part 2
anchor rod

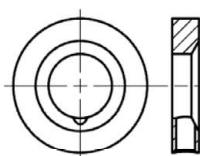
Annex A 4

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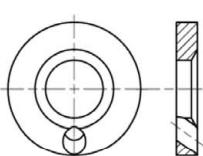
Overview system components part 3

fischer filling disc (various versions)

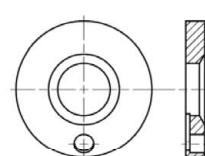
radial



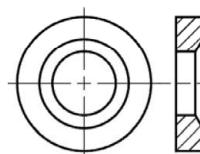
angular



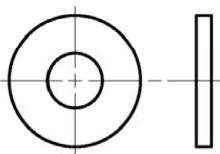
axial



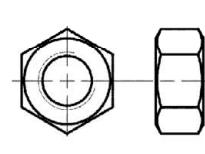
conical washer



washer



hexagon nut



Cleaning brush BS



Compressed-air cleaning tool ABP with compressed-air nozzle:



or blow-out pump ABG:



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Product description

Overview system components part 3
metal parts / cleaning brush / blow-out pump

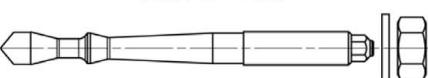
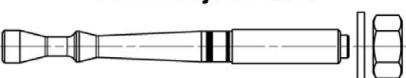
Annex A 5
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Table A6.1: Materials

| Part | Designation | Material | | |
|---|--|---|--|--|
| 1 | Injection cartridge | Mortar, hardener, filler | | |
| 2 | Resin capsule | Mortar, hardener, filler | | |
| Steel grade | Steel | Stainless steel R | High corrosion resistant steel HCR | |
| | zink plated | acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015 | acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015 | |
| 3 | Highbond-Anchor rod FHB II - A S or FHB II Inject - A S | Property class 8.8 EN ISO 898-1:2013 electroplated $\geq 5 \mu\text{m}$ ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018 $A_5 > 12\%$ fracture elongation | Property class 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462; EN 10088-1:2014 $A_5 > 12\%$ fracture elongation | Property class 80 EN ISO 3506-1:2020 1.4565; 1.4529; EN 10088-1:2014 $A_5 > 12\%$ fracture elongation |
| 4 | Washer ISO 7089:2000 | electroplated $\geq 5 \mu\text{m}$ ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018 | 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | 1.4565; 1.4529; EN 10088-1:2014 |
| 5 | Hexagon nut | Property class 8 acc. to EN ISO 898-2:2012 electroplated $\geq 5 \mu\text{m}$, ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018 | Property class 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | Property class 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529; EN 10088-1:2014 |
| 6 | Conical washer or fischer filling disc | electroplated $\geq 5 \mu\text{m}$, ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018 | 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 | 1.4565; 1.4529; EN 10088-1:2014 |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | | | |
| Product description Materials | | | | Annex A 6 Appendix 8 / 24 |

Specifications of intended use part 1

Table B1.1: Overview installation und use

| | | fischer Highbond-Anchor FHB II with injection mortar FIS HB or resin capsule FHB II-P / FHB II-PF | | | |
|---|--|---|--|--|--|
| | | FHB II - A S | FHB II Inject - A S | | |
| | |  |  | | |
| Hammer drilling with standard drill bit | | injection mortar FIS HB or resin capsule FHB II-P / FHB II-PF | | | |
| Hammer drilling with hollow drill bit | | injection mortar FIS HB | | | |
| Diamond drilling |  | all sizes (only with resin capsule allowed) | no performance assessed | | |
| Static or quasi static load, in | uncracked concrete | all sizes | all sizes | | |
| | cracked concrete | Tables: C1.1, C2.1, C3.1, C3.2, C4.1, C5.1, C5.2 | Tables: C1.1, C2.1, C4.1, C5.2 | | |
| Installation and use condition | I1 dry or wet concrete | all sizes | | | |
| | I2 water-filled hole | all sizes (only with resin capsule allowed) | no performance assessed | | |
| seismic performance category C1 and C2 | | no performance assessed | | | |
| Installation direction | | D3 (downwards, horizontal and upwards (overhead) installation) | | | |
| Installation | Pre-positioned | all sizes | | | |
| | Push through | all sizes | | | |
| Installation temperature ¹⁾ | FIS HB: $T_{i,min} = -5 \text{ }^{\circ}\text{C}$ to $T_{i,max} = +40 \text{ }^{\circ}\text{C}$ | | | | |
| | FHB II-P / PF: $T_{i,min} = -5 \text{ }^{\circ}\text{C}$ to $T_{i,max} = +40 \text{ }^{\circ}\text{C}$ | | | | |
| Service temperature | Temperature range T2 | -40 $\text{ }^{\circ}\text{C}$ to +80 $\text{ }^{\circ}\text{C}$ (max. short term temperature +80 $\text{ }^{\circ}\text{C}$; max. long term temperature +50 $\text{ }^{\circ}\text{C}$) | | | |
| ¹⁾ For the standard variation of temperature after installation | | | | | |
| Figures not to scale | | | | | |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | | Annex B 1 Appendix 9 / 24 | | |
| Intended use Specifications part 1 | | | | | |

Specifications of intended use part 2

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel)
- For all other conditions according to EN1993-1-4: 2006+A1:2015 corresponding to corrosion resistance classes to Annex A 6 table 6.1.

Design:

- Fastenings are designed under the responsibility of an engineer experienced in fastenings and concrete work
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.)
- Fastenings are designed in accordance with:
EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018

Installation:

- Fastener installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Overhead installation is allowed (necessary equipment see installation instruction)

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended Use
Specifications part 2

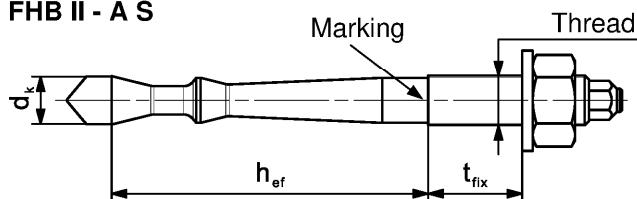
Annex B 2
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Table B3.1: Installation parameters for Highbond – Anchor rod FHB II - A S

| Anchor rod FHB II - A S | Thread | M16x95 | M20x170 | M24x170 |
|--|--------|--------|---------|---------|
| Corresponding resin capsules FHB II-P or FHB II-PF | [-] | 16x95 | 20x170 | 24x170 |
| Cone diameter d_k | [mm] | 14,5 | 23,0 | |
| Width across flats SW | | 24 | 30 | 36 |
| Nominal drill hole diameter d_0 | | 16 | 25 | |
| Drill hole depth h_0 | | 110 | 190 | |
| Effective embedment depth h_{ef} | | 95 | 170 | |
| Minimum spacing and minimum edge distance $s_{min} = c_{min}$ | | 50 | 80 | |
| Diameter of clearance hole of the fixture $d_f \leq$ | | 18 | 22 | 26 |
| push through installation $d_f \leq$ | | 18 | 26 | |
| Min. thickness of concrete member h_{min} | | 150 | 240 | |
| Installation torque T_{inst} | [Nm] | 50 | 100 | |
| Thickness of fixture $t_{fix} \leq$ | [mm] | | 1500 | |
| fischer filling disc ¹⁾ $\geq d_a$ | | 38 | 46 | 54 |
| t_s | | 7 | 8 | 10 |

¹⁾ Using fischer filling disc reduces t_{fix} (usable length of the anchor)

Highbond – Anchor rod FHB II - A S

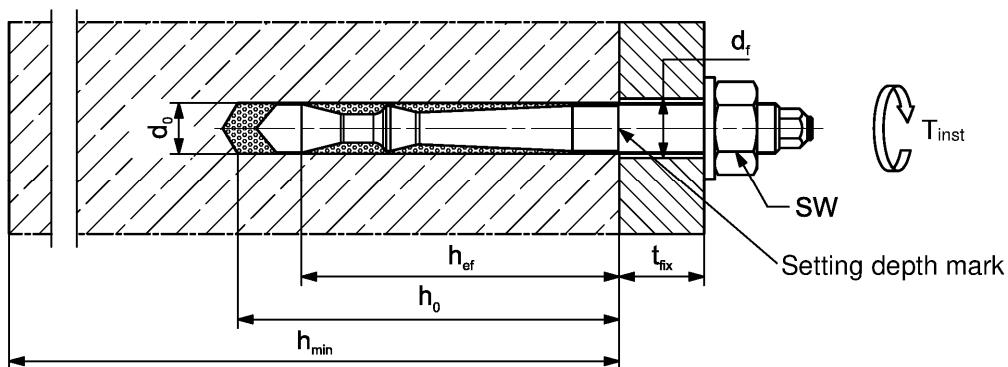


Marking: work symbol, thread diameter, embedment depth e.g.: M16x95

For stainless steel additional **R**. For high corrosion resistant steel additional **HCR**.

For high corrosion resistant steel additional marking ““ also on the face side

Installation conditions:



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Installation parameters for Highbond - Anchor FHB II - A S

Annex B 3

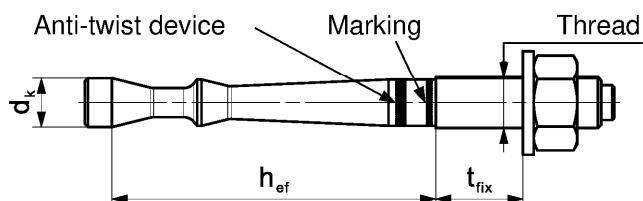
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Table B4.1: Installation parameters for Highbond - Anchor rod FHB II Inject - A S with injectionmortar FIS HB

| Anchor rod FHB II Inject - A S | | Thread | M16x95 | M20x170 | M24x170 |
|---|--------------------------------|--------|--------|---------|---------|
| Cone diameter | d_k | [mm] | 14,5 | 23,0 | |
| Width across flats | SW | | 24 | 30 | 36 |
| Nominal drill hole diameter | d_0 | | 16 | 25 | |
| Drill hole depth | h_0 | | 101 | 176 | |
| Effective embedment depth | h_{ef} | | 95 | 170 | |
| Minimum spacing and minimum edge distance | $s_{min} = c_{min}$ | | 50 | 80 | |
| Diameter of clearance hole of the fixture | pre-positioned installation | | 18 | 22 | 26 |
| | push through installation | | 20 | 26 | |
| Min. thickness of concrete member | h_{min} | | 150 | 240 | |
| Installation torque | T_{inst} | [Nm] | 50 | 100 | |
| Thickness of fixture | $t_{fix} \leq$ | [mm] | 1500 | | |
| fischer filling disc ¹⁾ | $\geq d_a$ | | 38 | 46 | 54 |
| | t_s | | 7 | 8 | 10 |

¹⁾ Using fischer filling disc reduces t_{fix} (usable length of the fastener)

Highbond – Anchor rod FHB II Inject - A S

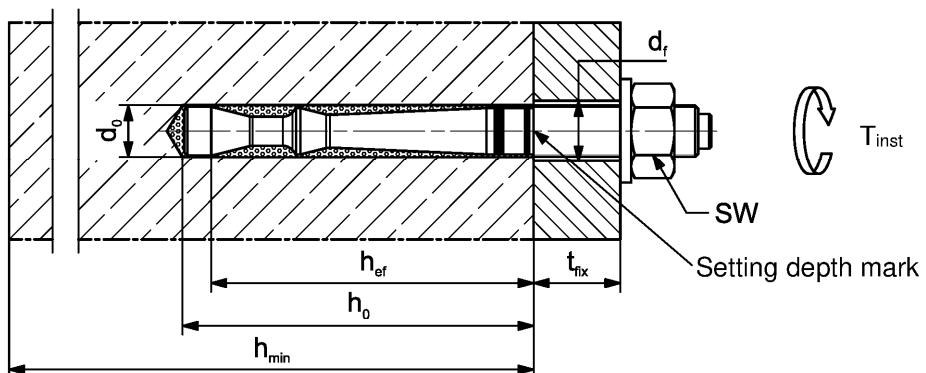


Marking: work symbol, thread diameter, embedment depth e.g.:  M16x95

For stainless steel additional **R**. For high corrosion resistant steel additional **HCR**.

For high corrosion resistant steel additional marking ““ also on the face side

Installation conditions:



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

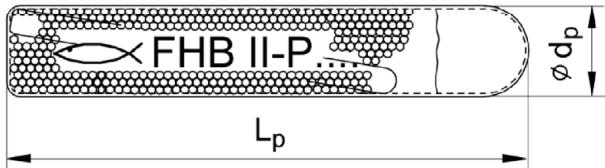
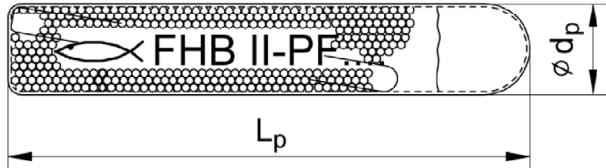
Installation parameters for Highbond - Anchor FHB II Inject - A S

Annex B 4

Appendix 12 / 24

Table B5.1: Dimensions of resin capsule FHB II-P and FHB II-PF

| | | | | |
|----------------------|-----------------|-------|--------|--------|
| Resin capsule | | 16x95 | 20x170 | 24x170 |
| Capsule length | L_p | 120 | 185 | 185 |
| Capsule diameter | $\emptyset d_p$ | [mm] | 14,5 | 21,5 |

FHB II-P (standard)**FHB II-PF (fast curing)**

Imprint: work symbol, marking, anchor size and effective embedment depth.

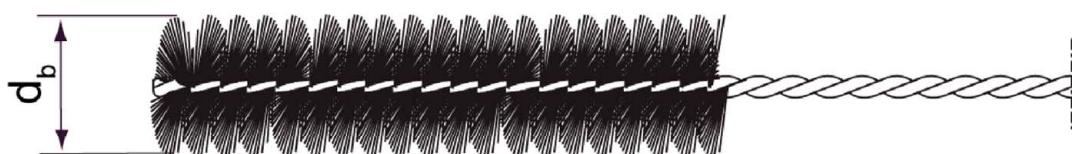
e.g.: FHB II-P 16x95 or

FHB II-PF 16x95

Table B5.2: Parameters of the cleaning brush BS (steel brush with steel bristles; only when using injection mortar or resin capsule with diamond drill bit)

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

| | | | | |
|-----------------------------|-------|------|----|----|
| Nominal drill hole diameter | d_0 | | 16 | 25 |
| Steel brush diameter BS | d_b | [mm] | 20 | 27 |



Figures not to scale

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Dimensions resin capsule

Parameters cleaning brush (steel brush)

Annex B 5

Appendix 13 / 24

Table B6.1: Processing time and curing time of the injection mortar FIS HB

| Temperature at anchoring base ¹⁾ [°C] | Maximum processing time t_{work} | Minimum curing time ²⁾ t_{cure} |
|---|---------------------------------------|---|
| -5 to 0 ³⁾ | - | 6 h |
| > 0 to 5 ³⁾ | - | 3 h |
| > 5 to 10 | 15 min | 90 min |
| > 10 to 20 | 6 min | 35 min |
| > 20 to 30 | 4 min | 20 min |
| > 30 to 40 | 2 min | 12 min |

¹⁾ During the curing time of the mortar the temperature of the anchoring base may not fall below the listed minimum temperature

²⁾ In wet concrete the curing time must be doubled

³⁾ Minimal cartridge temperature +5 °C

Table B6.2: Curing time of the resin capsule FHB II-P and FHB II-PF

| Resin capsule FHB II-P (standard) | | Resin capsule FHB II-PF (fast curing) | |
|---|---|---|---|
| Temperature at anchoring base ¹⁾ [°C] | Minimum curing time ²⁾ t_{cure} | Temperature at anchoring base ¹⁾ [°C] | Minimum curing time ²⁾ t_{cure} |
| -5 to 0 | 4 h | -5 to 0 | 8 min |
| > 0 to 10 | 45 min | > 0 to 10 | 6 min |
| > 10 to 20 | 20 min | > 10 to 20 | 4 min |
| > 20 | 10 min | > 20 | 2 min |

¹⁾ During the curing time of the mortar the temperature of the anchoring base may not fall below the listed minimum temperature.

²⁾ In wet concrete or water-filled holes the curing times must be doubled

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Processing time and curing time

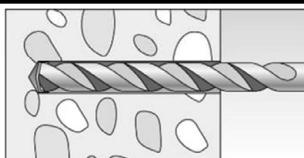
Annex B 6

Appendix 14 / 24

Installation instructions part 1; Installation with resin capsule FHB II-P or FHB II-PF

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

1



Drill the hole.

Nominal drill hole diameter d_0 and drill hole depth h_0 see **table B3.1**
Cleaning of the drill hole is not necessary

Go to step 6 (Annex B 8)

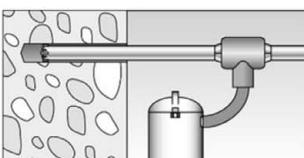
Drilling and cleaning the drill hole (hammer drilling with hollow drill bit)

1



Check a suitable hollow drill (see **table B1.1**)
for correct operation of the dust extraction

2



Use a suitable dust extraction system, e.g. fischer FVC 35 M 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.

Nominal drill hole diameter d_0 and drill hole depth h_0 see **table B3.1**

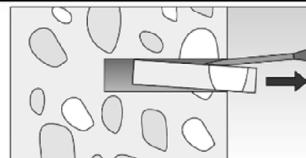
Go to step 6 (Annex B 8)

Drilling and cleaning the drill hole (wet drilling with diamond drill bit)

1

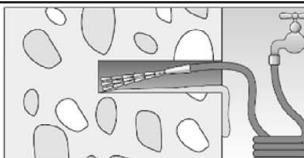


Drill the hole.
Drill hole diameter d_0 and
nominal drill hole depth h_0
see **table B3.1**



Break the drill core
and remove it

2



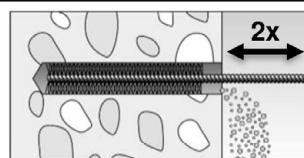
Flush the drill hole, until clear water emerges from the drill hole.

3



Blow out the drill hole twice, using oil-free compressed air ($p \geq 6$ bar)

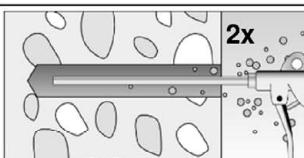
4



Brush the drill hole twice.
Corresponding cleaning brush BS see
table B5.2



5



Blow out the drill hole twice, using oil-free compressed air ($p \geq 6$ bar)

Go to step 6 (Annex B 8)

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Installation instructions part 1

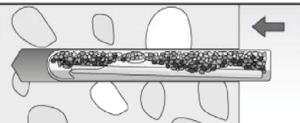
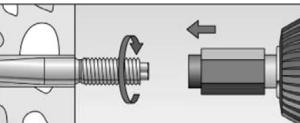
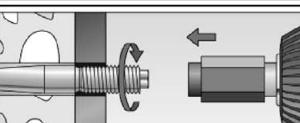
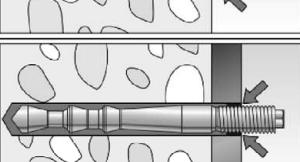
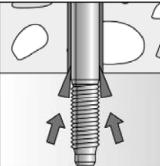
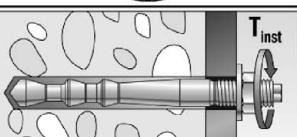
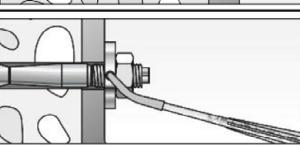
Installation with resin capsule FHB II-P or FHB II-PF

Annex B 7

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Installation instructions part 2; Installation with resin capsule FHB II-P or FHB II-PF

Installation Highbond-Anchor rod FHB II - A S

| | | |
|--------|---|--|
| 6 |  | Insert the resin capsule FHB II-P or FHB II-PF into the drill hole by hand. |
| 7 |  | Pre-positioned installation: Only use Highbond-Anchor rods FHB II - A S with roof-shaped point . Drive in the Anchor rod using a hammer drill or impact drill. When reaching the setting depth mark stop the drill immediately. |
| 7 |  | Push through installation: Only use Highbond-Anchor rods FHB II - A S with roof-shaped point . Drive in the anchor rod using a hammer drill or impact drill. When reaching the setting depth mark stop the drill immediately. |
| 8 |  | Pre-positioned installation: After inserting the anchor rod, excess mortar must be emerged around the anchor. |
| 8 |  | Push through installation: After inserting the anchor rod, excess mortar must be emerged from the drill hole and must be visible in the fixture. |
| 8a |  | For overhead installations support the anchor rod with wedges. (e.g. fischer centering wedges) |
| 9 |  | Wait for the specified curing time t_{cure} see table B6.2 |
| 10 |  | Installation torque for the hexagon nut T_{inst} see table B3.1, B4.1 |
| Option |  | The gap between metal parts and fixture (annular gap) may be filled with mortar via the fischer filling disc. Compressive strength $\geq 50 \text{ N/mm}^2$ (e.g. FIS HB, FIS SB, FIS V, FIS V Plus, FIS EM Plus). ATTENTION: Using fischer filling disc reduces t_{fix} (usable length of the anchor) |

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Installation instructions part 2

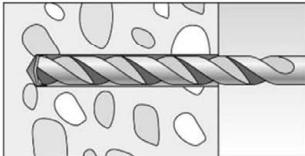
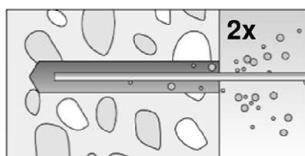
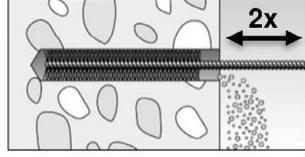
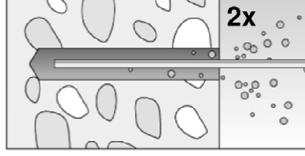
Installation with resin capsule FHB II-P or FHB II-PF

Annex B 8

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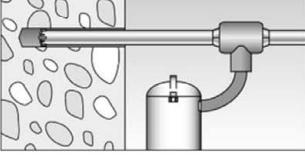
Installation instructions part 3; Installation with injection mortar FIS HB

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

| | |
|---|--|
| 1 |  <p>Drill the hole Nominal drill hole diameter d_0 and drill hole depth h_0 see tables B3.1, B4.1</p> |
| 2 |  <p>Clean the drill hole. Blow out the drill hole twice. If necessary, remove standing water out of the bore hole For drill hole diameter $d_0 = 16 \text{ mm}$ blow out the hole by hand or oil-free compressed air ($\geq 6 \text{ bar}$). For drill hole diameter $d_0 = 25 \text{ mm}$ blow out the hole with oil-free compressed air ($\geq 6 \text{ bar}$). Use a compressed-air nozzle.</p> |
| 3 |  <p>Brush the bore hole twice. Corresponding cleaning brush BS see table B5.2</p> |
| 4 |  <p>Clean the drill hole. Blow out the drill hole twice. For drill hole diameter $d_0 = 16 \text{ mm}$ blow out the hole by hand or oil-free compressed air ($\geq 6 \text{ bar}$). For drill hole diameter $d_0 = 25 \text{ mm}$ blow out the hole with oil-free compressed air ($\geq 6 \text{ bar}$). Use a compressed-air nozzle.</p> |

Go to step 5 (Annex B 10)

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

| | |
|---|--|
| 1 |  <p>Check a suitable hollow drill (see table B1.1) for correct operation of the dust extraction</p> |
| 2 |  <p>Use a suitable dust extraction system, e.g. fischer FVC 35 M 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. Nominal drill hole diameter d_0 and drill hole depth h_0 see tables B3.1, B4.1</p> |

Go to step 5 (Annex B 10)

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Installation instructions part 3

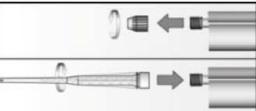
Installation with injection mortar FIS HB

Annex B 9

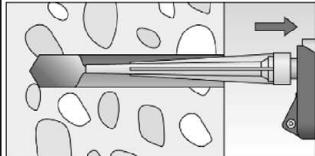
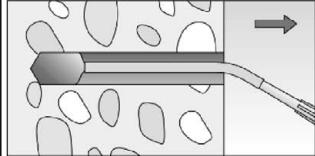
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Installation instruction part 4; Installation with injection mortar FIS HB

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 out until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey |

Injection of the mortar

| | | |
|---|---|---|
| 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 ≥ 170 mm use an extension tube |

Go to step 9 (Annex B 11)

fischer Highbond-Anchor FHB II for diamond drilling / extended working life

Intended use

Installation instructions part 4

Installation with injection mortar

Annex B 10

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Installation instruction part 5; Installation with injection mortar FIS HB

Installation Highbond-Anchor rod FHB II - A S or FHB II Inject - A S

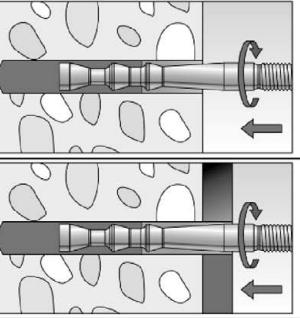
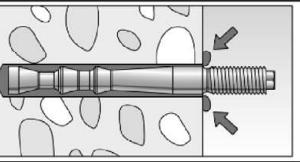
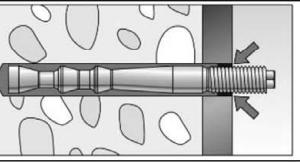
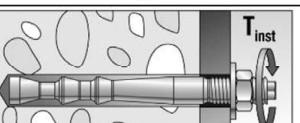
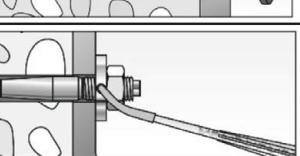
| | | |
|---|---|---|
| 9 |  | <p>Pre-positioned or push through installation: Push the anchor rod down to the bottom of the hole, turning it slightly while doing so. Only use clean and oil-free metal parts.</p> |
| 10 |  | <p>Pre-positioned installation: After inserting the anchor rod, excess mortar must be emerged around the anchor.</p> |
| 10a |  | <p>Push through installation: After inserting the anchor rod, excess mortar must be emerged from the drill hole and must be visible in the fixture.</p> |
| 11 |  | <p>Wait for the specified curing time t_{cure} see table B6.1</p> |
| 12 |  | <p>Installation torque for the hexagon nut T_{inst} see table B3.1, B4.1</p> |
| Option |  | <p>The gap between metal parts and fixture (annular gap) may be filled with mortar via the fischer filling disc. Compressive strength $\geq 50 \text{ N/mm}^2$ (e.g. FIS HB, FIS SB, FIS V, FIS V Plus, FIS EM Plus). ATTENTION: Using fischer filling disc reduces t_{fix} (usable length of the anchor)</p> |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | |
| Intended use | | Annex B 11 |
| Installation instructions part 5 | | Appendix 19 / 24 |
| Installation with injection mortar | | |

Table C1.1: Characteristic resistance to **steel failure** under **tension / shear loading** of **Highbond-Anchor rods FHB II - A S and FHB II Inject - A S**

| Ancher rod FHB II - A S / FHB II Inject - A S | | M16x95 | M20x170 | M24x170 | | |
|---|------------------------------------|--------|-------------------|--------------------------------------|--|--|
| Characteristic resistance to steel failure under tension loading | | | | | | |
| Characteristic resistance $N_{Rk,s}$ | Steel, zinc plated | [kN] | 61,6 | 128,5 | | |
| | Stainless steel R | | | | | |
| | High corrosion resistant steel HCR | | 61,6 | 128,5 | | |
| Partial factors ¹⁾ | | | | | | |
| $\gamma_{Ms,N}$ | Steel, zinc plated | [-] | 1,5 ¹⁾ | | | |
| | Stainless steel R | | 1,5 ¹⁾ | | | |
| | High corrosion resistant steel HCR | | 1,5 ¹⁾ | | | |
| Characteristic resistance to steel failure under shear loading | | | | | | |
| without lever arm | | | | | | |
| Characteristic resistance $V^0_{Rk,s}$ | Steel, zinc plated | [kN] | 50,8 | 80,3 | | |
| | Stainless steel R | | 62,7 | 97,9 | | |
| | High corrosion resistant steel HCR | | 62,7 | 97,9 | | |
| Ductility factor | k_7 | [-] | 1,0 | | | |
| with lever arm | | | | | | |
| Characteristic resistance $M^0_{Rk,s}$ | Steel, zinc plated | [Nm] | 266 | 519 | | |
| | Stainless steel R | | | | | |
| | High corrosion resistant steel HCR | | 266 | 519 | | |
| Partial factors ¹⁾ | | | | | | |
| Partial factor | $\gamma_{Ms,V}$ | [-] | 1,25 | | | |
| ¹⁾ In absence of other national regulations | | | | | | |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | | | | | |
| Performance Characteristic resistance to steel failure under tension / shear loading of Highbond-Anchor rods FHB II - A S and FHB II Inject - A S | | | | Annex C 1 Appendix 20 / 24 | | |

Table C2.1: Characteristic resistance to concrete failure under tension / shear loading

| Anchor rod FHB II - A S / FHB II Inject - A S | | | All sizes | |
|---|------------------------|--------|--------------------------------------|--|
| Characteristic resistance to concrete failure under tension loading | | | | |
| Installation factor | γ_{inst} | [-] | See annex C 3 to C 4 | |
| Factors for the compressive strength of concrete > C20/25 | | | | |
| Increasing factor for uncracked or cracked concrete $N_{Rk,p} = \psi_c N_{Rk,p}$ (C20/25) | C25/30 | [-] | 1,12 | |
| | C30/37 | | 1,22 | |
| | C35/45 | | 1,32 | |
| | C40/50 | | 1,41 | |
| | C45/55 | | 1,50 | |
| | C50/60 | | 1,58 | |
| | | | | |
| Splitting failure | | | | |
| Edge distance | $c_{\text{cr,sp}}$ | [mm] | 2 h_{ef} | |
| Spacing | $s_{\text{cr,sp}}$ | | 4 h_{ef} | |
| Concrete cone failure | | | | |
| Uncracked concrete | $k_{\text{ucr,N}}$ | [-] | 11,0 ¹⁾ | |
| Cracked concrete | $k_{\text{cr,N}}$ | | 7,7 ¹⁾ | |
| Edge distance | $c_{\text{cr,N}}$ | [mm] | 1,5 h_{ef} | |
| Spacing | $s_{\text{cr,N}}$ | | 3 h_{ef} | |
| Characteristic resistance to concrete failure under shear loading | | | | |
| Installation factor | γ_{inst} | [-] | 1,0 | |
| Concrete pry-out failure | | | | |
| Factor for pry-out failure | k_8 | [-] | 2,0 | |
| Concrete edge failure | | | | |
| Anchor rod FHB II - A S and FHB II Inject - A S | | M16x95 | M20x170 | |
| Effective length of fastener in shear loading | l_f | [mm] | 95 | |
| Calculation diameter | d_{nom} | | 16 | |
| 1) Related to concrete cylinder compressive strength | | | | |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | | | |
| Performance Characteristic resistance to concrete failure under tension / shear loading | | | Annex C 2 Appendix 21 / 24 | |

Table C3.1: Characteristic resistance to pull-out failure for **Highbond-Anchor rods FHB II - A S** with **resin capsule FHB II-P or FHB II-PF** in diamond drilled holes; **50 years**

| Highbond-Anchor rod FHB II - A S ¹⁾ | M16x95 | M20x170 | M24x170 |
|---|--------|---------|---------|
| Characteristic resistance to pull-out failure | | | |
| Calculation diameter d [mm] | 16 | 25 | |
| Uncracked concrete | | | |
| Characteristic resistance in uncracked concrete C20/25 | | | |
| Diamond-drilling (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 50 °C / 80 °C N _{Rk,p,ucr} [kN] | 51,5 | 118,5 | |
| Cracked concrete | | | |
| Characteristic resistance in cracked concrete C20/25 | | | |
| Diamond-drilling (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 50 °C / 80 °C N _{Rk,p,cr} [kN] | 42,8 | 101,4 | |
| Installation factors | | | |
| Dry or wet concrete | | 1,2 | |
| Water-filled hole γ _{inst} [-] | | 1,2 | |

¹⁾ Highbond-Anchor rod FHB II - A S with resin capsule FHB II-P / FHB II-PF

Table C3.2: Characteristic resistance to pull-out failure for **Highbond-Anchor rods FHB II - A S** with **resin capsule FHB II-P or FHB II-PF** in diamond drilled holes; **100 years**

| Highbond-Anchor rod FHB II - A S ¹⁾ | M16x95 | M20x170 | M24x170 |
|---|--------|---------|--------------------------------------|
| Characteristic resistance to pull-out failure | | | |
| Calculation diameter d [mm] | 16 | 25 | |
| Uncracked concrete | | | |
| Characteristic resistance in uncracked concrete C20/25 | | | |
| Diamond-drilling (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 50 °C / 80 °C N _{Rk,p,ucr,100} [kN] | 51,5 | 118,5 | |
| Cracked concrete | | | |
| Characteristic resistance in cracked concrete C20/25 | | | |
| Diamond-drilling (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 50 °C / 80 °C N _{Rk,p,cr,100} [kN] | 36,0 | 86,0 | |
| Installation factors | | | |
| Dry or wet concrete | | 1,2 | |
| Water-filled hole γ _{inst} [-] | | 1,2 | |
| ¹⁾ Highbond-Anchor rod FHB II - A S with resin capsule FHB II-P / FHB II-PF | | | |
| fischer Highbond-Anchor FHB II for diamond drilling / extended working life | | | Annex C 3 Appendix 22 / 24 |
| Performance Characteristic resistance to pull-out failure for Highbond-Anchor rods FHB II - A S in diamond drilled holes; 50 or 100 years | | | |

Table C4.1: Characteristic resistance to pull-out failure for **Highbond-Anchor rods FHB II - A S** with **resin capsule FHB II-P / FHB II-PF** or **injection mortar FIS HB** and **FHB II Inject - A S** with **injection mortar FIS HB** in hammer drilled holes; **100 years**

| Anchor rod FHB II - A S ¹⁾ FHB II Inject - A S ²⁾ | M16x95 | M20x170 | M24x170 |
|---|-------------------|--------------------------------|---------|
| Characteristic resistance to pull-out failure | | | |
| Calculation diameter d [mm] | 16 | 25 | |
| Uncracked concrete | | | |
| Characteristic resistance in uncracked concrete C20/25 | | | |
| Hammer-drilling with standard or hollow drill bit (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 | 50 °C / 80 °C | N _{Rk,p,ucr,100} [kN] | 52,4 |
| | | | 118,5 |
| Cracked concrete | | | |
| Characteristic resistance in cracked concrete C20/25 | | | |
| Hammer-drilling with standard or hollow drill bit (dry or wet concrete / water-filled hole) | | | |
| Temperature range T2 | 50 °C / 80 °C | N _{Rk,p,cr,100} [kN] | 36,0 |
| | | | 86,0 |
| Installation factors | | | |
| Dry or wet concrete | | | 1,0 |
| Water-filled hole (only with resin capsule) | γ _{inst} | [·] | 1,0 |

¹⁾ Highbond-Anchor rod FHB II - A S with resin capsule FHB II-P / FHB II-PF or injection mortar FIS HB

²⁾ Highbond-Anchor rod FHB II Inject - A S with injection mortar FIS HB

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Performance

Characteristic resistance to pull-out failure for Highbond-Anchor rods FHB II - A S / FHB II Inject - A S in hammer drilled holes; 100 years

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Table C5.1: Displacements for Highbond-Anchor rod FHB II - A S; 50 years

| Anchor rod FHB II – A S | | M16x95 | M20x170 | M24x170 | |
|---|---------|--------|---------|---------|--|
| Displacement-Factors for tension loading ¹⁾ | | | | | |
| Uncracked concrete; Temperature range T2 | | | | | |
| δ_{N0} -Factor | [mm/kN] | 0,030 | 0,020 | 0,016 | |
| | | 0,120 | 0,045 | 0,045 | |
| Cracked concrete; Temperature range T2 | | | | | |
| $\delta_{N\infty}$ -Factor | [mm/kN] | 0,030 | 0,020 | 0,016 | |
| | | 0,120 | 0,045 | 0,045 | |
| Displacement-Factors for shear loading ²⁾ | | | | | |
| Uncracked or cracked concrete; Temperature range T2 | | | | | |
| δ_{V0} -Factor | [mm/kN] | 0,02 | 0,02 | 0,02 | |
| | | 0,03 | 0,03 | 0,03 | |

¹⁾ Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0}\text{-Factor} \cdot N$$

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

N = acting tension loading

²⁾ Calculation of effective displacement:

$$\delta_{V0} = \delta_{V0}\text{-Factor} \cdot V$$

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

V = acting shear loading

Table C5.2: Displacements for Highbond-Anchor rod FHB II - A S and FHB II Inject - A S; 100 years

| Anchor rod FHB II – A S / FHB II Inject - A S | | M16x95 | M20x170 | M24x170 | |
|---|---------|--------|---------|---------|--|
| Displacement-Factors for tension loading ¹⁾ | | | | | |
| Uncracked concrete; Temperature range T2 | | | | | |
| δ_{N0} -Factor | [mm/kN] | 0,030 | 0,020 | 0,016 | |
| | | 0,120 | 0,045 | 0,045 | |
| Cracked concrete; Temperature range T2 | | | | | |
| $\delta_{N\infty}$ -Factor | [mm/kN] | 0,030 | 0,020 | 0,016 | |
| | | 0,120 | 0,045 | 0,045 | |
| Displacement-Factors for shear loading ²⁾ | | | | | |
| Uncracked or cracked concrete; Temperature range T2 | | | | | |
| δ_{V0} -Factor | [mm/kN] | 0,02 | 0,02 | 0,02 | |
| | | 0,03 | 0,03 | 0,03 | |

¹⁾ Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0}\text{-Factor} \cdot N$$

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

N = acting tension loading

²⁾ Calculation of effective displacement:

$$\delta_{V0} = \delta_{V0}\text{-Factor} \cdot V$$

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

V = acting shear loading

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Performances

Displacements for Highbond-Anchor rod FHB II - A S and FHB II Inject - A S;
50 or 100 years

Annex C 5

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