



## PROHLÁŠENÍ O VLASTNOSTECH



DoP: 0130

pro kotva pro vysoká zatížení fischer FHB II (Lepená kotva pro použití v betonu) – CS

1. Jedinečný identifikační kód typu výrobku: **DoP: 0130**
2. Zamýšlené/zamýšlená použití: **Dodatečné upevnění v tažené a tlačené zóně betonu, viz. doplněk, obzvláště Přílohy B 1 - B 9**
3. Výrobce: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Německo**
4. Zplnomocněný zástupce: --
5. Systém/systémy POSV: **1**
6. Evropský dokument pro posuzování: **ETAG 001; 2013-04**  
Evropské technické posouzení: **ETA-05/0164; 2017-12-14**  
Subjekt pro technické posuzování: **DIBt**  
Oznámený subjekt/oznámené subjekty: **1343 – MPA Darmstadt**

### 7. Deklarovaná vlastnost/Deklarované vlastnosti:

#### **Mechanická odolnost a stabilita (BWR 1), Bezpečnost při použití (BWR 4)**

- **Charakteristická únosnost v tahu a ve smyku: Viz. doplněk, obzvláště Přílohy C 1 - C 4**
- **Posuny při zatížení smykem a tahem: Viz. doplněk, obzvláště Přílohy C 5 - C 6**

#### **Bezpečnost v případě požáru (BWR 2)**

- **Odolnost proti ohni: Kotvení splňuje požadavky Třídy A 1**
- **Požární odolnost: VNS**

### 8. Příslušná technická dokumentace a/nebo specifická technická dokumentace: ---

Vlastnosti výše uvedeného výrobku jsou ve shodě se souborem deklarovaných vlastností. Toto prohlášení o vlastnostech se v souladu s nařízením (EU) č. 305/2011 vydává na výhradní odpovědnost výrobce uvedeného výše.

Podepsáno za výrobce a jeho jménem:

Andreas Bucher, Dipl.-Ing.

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

Tumlingen, 2017-12-20

- Toto PoV bylo připraveno v různých jazykových mutacích.. V případě rozporu vždy rozhoduje interpretace verze v anglickém jazyce.
- Příloha obsahuje nepovinné a doplňkové informace v anglickém jazyce na rámec zákonných požadavků.

## Specific Part

### 1 Technical description of the product

The fischer Highbond-Anchor FHB II is a torque controlled bonded anchor 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 L or FHB II - 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 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).

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 under tension and shear load | See Annex C 1 to C 4  |
| Displacements under tension and shear loads        | See Annex C 5 and C 6 |

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

| Essential characteristic | Performance                                 |
|--------------------------|---------------------------------------------|
| Reaction to fire         | Anchorage 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**

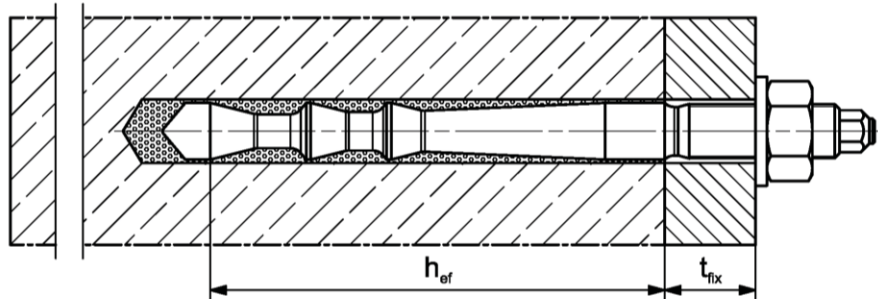
In accordance with guideline for European technical approval ETAG 001, April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

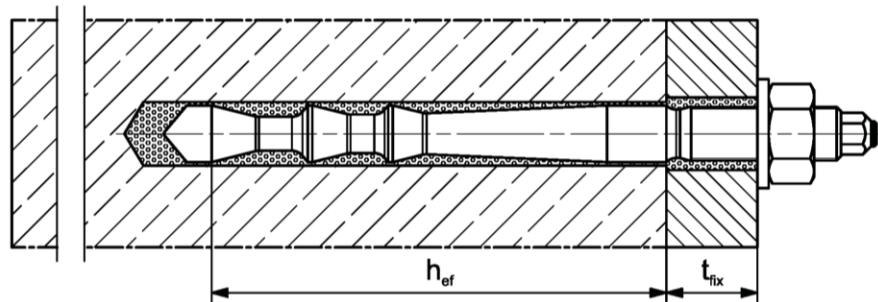
# Installation conditions part 1

fischer Highbond - Anchor FHB II - A L

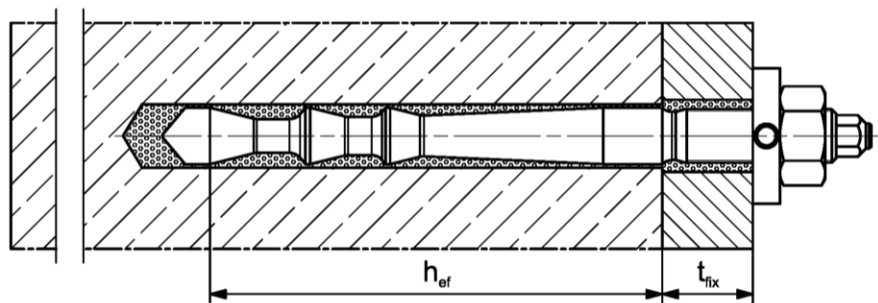
Pre-positioned installation



Push through installation not with mortar capsule (annular gap filled with mortar)



Pre-positioned or push through installation with subsequently pressed filling disk  
(annular gap filled with mortar)



Pictures not to scale

$h_{ef}$  = effective anchorage depth

$t_{fix}$  = thickness of fixture

fischer Highbond-Anchor FHB II

**Product description**

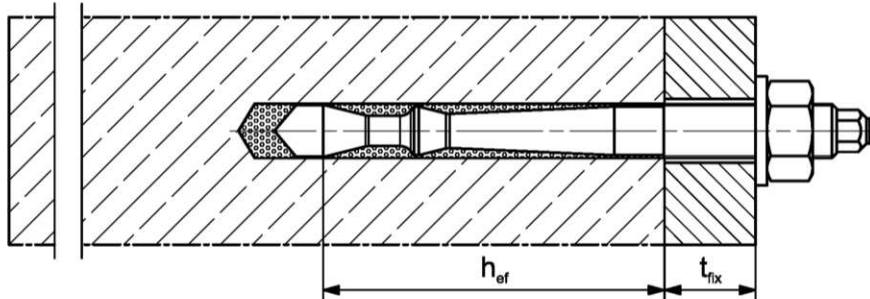
Installation conditions part 1; FHB II – A L

**Annex A 1**

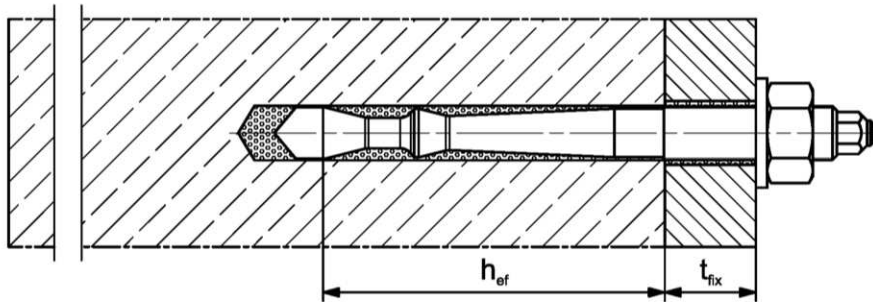
## Installation conditions part 2

### fischer Highbond - Anchor FHB II - A S

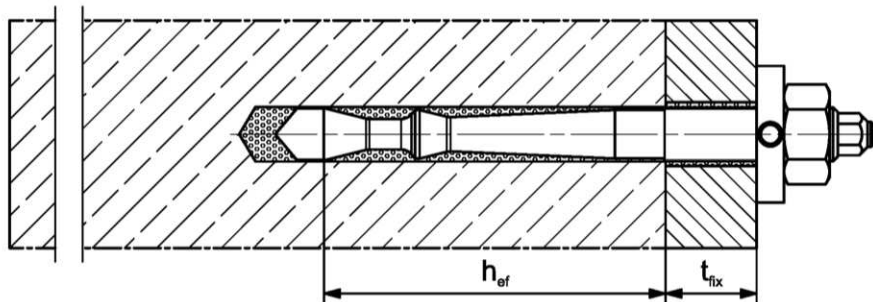
#### Pre-positioned installation



#### Push through installation



#### Pre-positioned or push through installation with subsequently pressed filling disk (annular gap filled with mortar)



Pictures not to scale

$h_{ef}$  = effective anchorage depth

$t_{fix}$  = thickness of fixture

fischer Highbond-Anchor FHB II

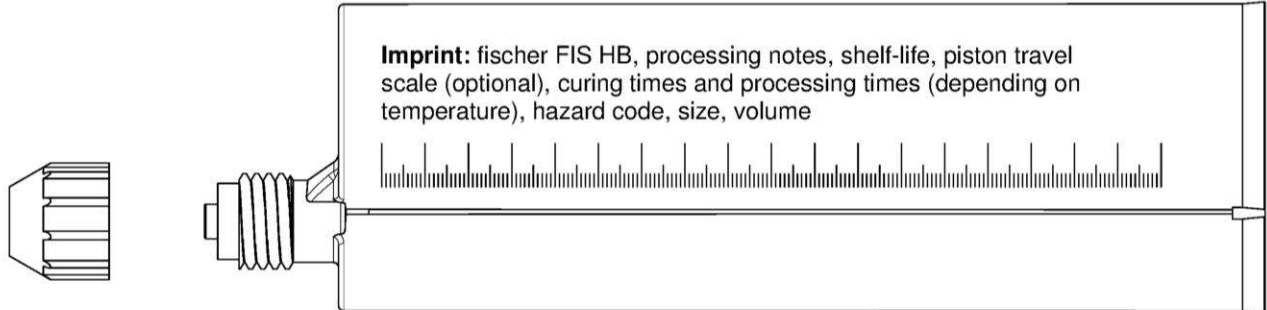
#### Product description

Installation conditions part 2; FHB II – A S

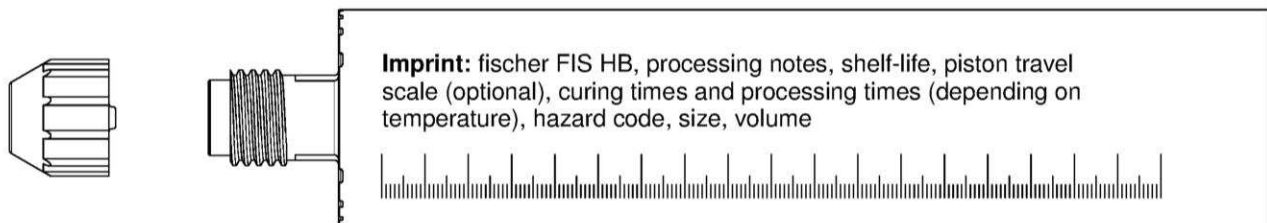
**Annex A 2**

## Overview system components part 1

### Mortar cartridge (shuttle cartridge) with sealing cap; Size: 360 ml, 950 ml



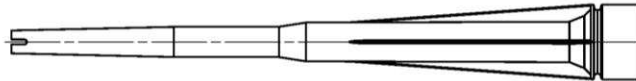
### Mortar cartridge (coaxial cartridge) with sealing cap; Size: 150 ml, 300 ml



### Mortar capsule



### Static mixer MR or UMR



### Extension tube for static mixer



### Cleaning brush BS



### Blow-out pump ABG or ABP with cleaning nozzle



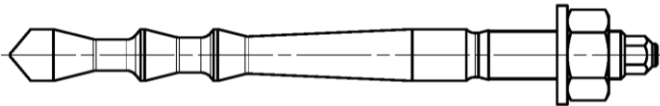
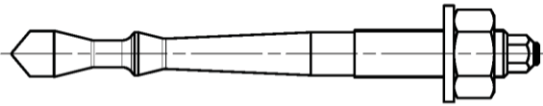
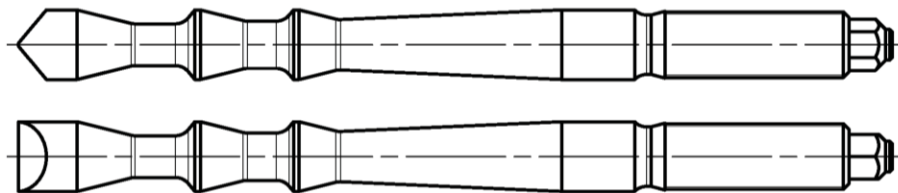
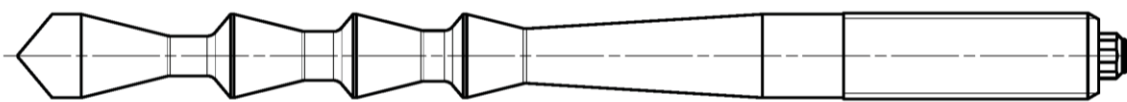
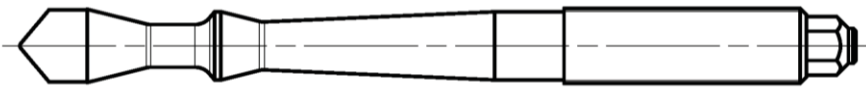
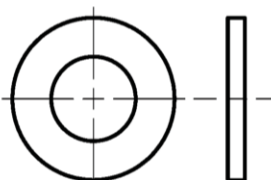
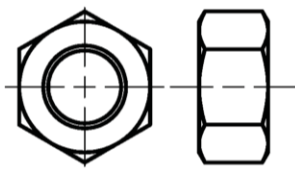
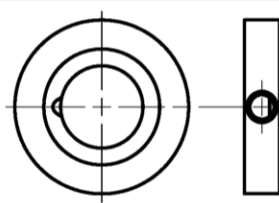
Pictures not to scale

fischer Highbond-Anchor FHB II

#### System description

Overview system components part 1;  
cartridges / mortar capsule / accessories

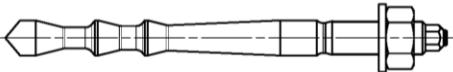
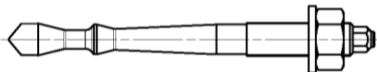
**Annex A 3**

| Overview system components part 2                                                                                               |                                                                                     |                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| fischer Highbond - Anchor rod; pre-assembled condition                                                                          |                                                                                     |                                                                                    |
| fischer Highbond - Anchor rod FHB II - A L                                                                                      |                                                                                     | fischer Highbond - Anchor rod FHB II - A S                                         |
|                                                |                                                                                     |  |
| <b>Anchor rod FHB II - A L</b><br>Size: M8, M10, M12, M16, M20                                                                  |                                                                                     |                                                                                    |
|                                               |                                                                                     |                                                                                    |
| <b>Anchor rod FHB II - A L</b><br>Size: M24                                                                                     |                                                                                     |                                                                                    |
|                                              |                                                                                     |                                                                                    |
| <b>Anchor rod FHB II - A S</b><br>Size: M10, M12, M16, M20, M24                                                                 |                                                                                     |                                                                                    |
|                                             |                                                                                     |                                                                                    |
| Washer                                                                                                                          |  |                                                                                    |
| Hexagon nut                                                                                                                     |  |                                                                                    |
| fischer filling disk FFD                                                                                                        |  |                                                                                    |
| fischer Highbond-Anchor FHB II                                                                                                  |                                                                                     | Pictures not to scale<br><br><b>Annex A 4</b>                                      |
| <b>System description</b><br>Overview system components part 2;<br>Anchor rod / washer / hexagon nut / fischer filling disk FFD |                                                                                     |                                                                                    |

| Table A5.1: Materials |                                                          |                                                                                                                                                                   |                                                                                                                                                                                                                |                                                                                                                                                        |
|-----------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part                  | Designation                                              | Material                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                        |
| 1                     | Mortar cartridge                                         | Mortar, hardener, filler                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                        |
| 2                     | Mortar capsule                                           | Mortar, hardener, filler                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                        |
|                       | Steel grade                                              | Steel, zinc plated                                                                                                                                                | Stainless steel A4                                                                                                                                                                                             | High corrosion resistant steel C                                                                                                                       |
| 3                     | Fischer Highbond-Anchor rod FHB II - A L or FHB II - A S | Property class 8.8; EN ISO 898-1:2013 zinc plated ≥ 5 μm, EN ISO 4042:1999 A2K f <sub>uk</sub> ≤ 1000 N/mm <sup>2</sup> A <sub>5</sub> > 12 % fracture elongation | Property class 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 <sub>uk</sub> ≤ 1000 N/mm <sup>2</sup> A <sub>5</sub> > 12 % fracture elongation | Property class 80 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014 f <sub>uk</sub> ≤ 1000 N/mm <sup>2</sup> A <sub>5</sub> > 12 % fracture elongation |
| 4                     | Washer ISO 7089:2000                                     | zinc plated ≥ 5 μm EN ISO 4042:1999 A2K                                                                                                                           | 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; EN ISO 898-2:2012 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                     | fischer filling disk FFD similar to DIN 6319-G           | zinc plated ≥ 5 μm, EN ISO 4042:1999 A2K                                                                                                                          | 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014                                                                                                                                                | 1.4565;1.4529 EN 10088-1:2014                                                                                                                          |
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|                       |                                                          |                                                                                                                                                                   |                                                                                                                                                                                                                |                                                                                                                                                        |

# Specifications of intended use (part 1)

**Table B1.1:** Overview use and performance categories

| Anchorage subject to                                                                                                                                                                                                |                          | fischer injection mortar FIS HB or<br>fischer mortar capsule FHB II-P or FHB II-PF with ...  |                             |                                                                                     |                             |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|-----------------------------|--|
|                                                                                                                                                                                                                     |                          | FHB II – A L                                                                                 |                             | FHB II – A S                                                                        |                             |  |
|                                                                                                                                                                                                                     |                          |            |                             |  |                             |  |
| Hammer drilling<br>with standard<br>drill bit                                                                                      |                          | all sizes                                                                                    |                             |                                                                                     |                             |  |
| Hammer drilling<br>with hollow drill<br>bit (Heller<br>"Duster Expert"<br>or Bosch<br>"SpeedClean"<br>or Hilti "TE-CD,<br>TE-YD")  |                          | Nominal drill bit diameter (d <sub>0</sub> ) ≥ 12 mm                                         |                             |                                                                                     |                             |  |
| Static or quasi<br>static load, in                                                                                                                                                                                  | uncracked<br>concrete    | all sizes                                                                                    | Tables:<br>C1.1, C3.1, C5.1 | all sizes                                                                           | Tables:<br>C2.1, C4.1, C6.1 |  |
|                                                                                                                                                                                                                     | cracked<br>concrete      |                                                                                              |                             |                                                                                     |                             |  |
| Use category                                                                                                                                                                                                        | dry or wet<br>concrete   | all sizes                                                                                    |                             |                                                                                     |                             |  |
|                                                                                                                                                                                                                     | flooded hole             | all sizes<br>(only with mortar capsule allowed)                                              |                             |                                                                                     |                             |  |
| Kind of<br>installation                                                                                                                                                                                             | Pre-positioned<br>anchor | all sizes                                                                                    |                             |                                                                                     |                             |  |
|                                                                                                                                                                                                                     | Push through<br>anchor   | all sizes<br>(only with injection mortar FIS HB<br>allowed)                                  |                             | all sizes                                                                           |                             |  |
| Installation temperature                                                                                                                                                                                            |                          | -5 C to +40 C                                                                                |                             |                                                                                     |                             |  |
| In-service temperature                                                                                                                                                                                              |                          | -40°C to +80°C (max. short term temperature +80 °C and<br>max. long term temperature +50 °C) |                             |                                                                                     |                             |  |
|                                                                                                                                                                                                                     |                          |                                                                                              |                             |                                                                                     |                             |  |
| fischer Highbond-Anchor FHB II                                                                                                                                                                                      |                          |                                                                                              |                             |                                                                                     | Annex B 1                   |  |
| Intended use<br>Specifications (part 1)                                                                                                                                                                             |                          |                                                                                              |                             |                                                                                     |                             |  |

## 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 ETAG 001 Annex C, 08/2010 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
- Observe the effective anchorage depth
- Overhead installation is allowed

fischer Highbond-Anchor FHB II

**Intended Use**  
Specifications (part 2)

**Annex B 2**

**Table B3.1:** Installation parameters for fischer Highbond - Anchor rods FHB II – A L

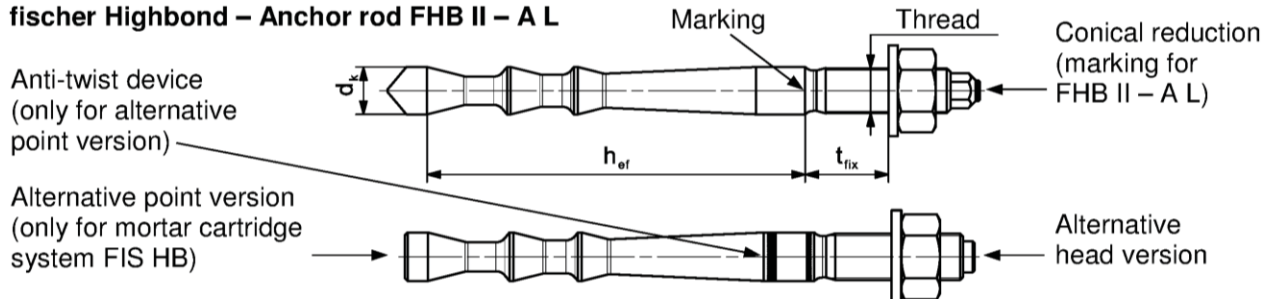
| Anchor rod FHB II – A L                                       |                                                          | Thread | M8x<br>60 | M10x<br>95 | M12x<br>100   120 |            | M16x<br>125   145   160 |            |            | M20x<br>210 | M24x<br>210 |
|---------------------------------------------------------------|----------------------------------------------------------|--------|-----------|------------|-------------------|------------|-------------------------|------------|------------|-------------|-------------|
| Correspondending mortar capsules<br>FHB II-P or FHB II-PF     |                                                          | [-]    | 8x<br>60  | 10x<br>95  | 12x<br>100        | 12x<br>120 | 16x<br>125              | 16x<br>145 | 16x<br>160 | 20x<br>210  | 24x<br>210  |
| Cone diameter                                                 | d <sub>k</sub>                                           | [mm]   | 9,4       | 10,7       | 12,5              |            | 16,8                    |            |            | 23,0        |             |
| Width across flats                                            | SW                                                       |        | 13        | 17         | 19                |            | 24                      |            |            | 30          | 36          |
| Nominal drill hole diameter                                   | d <sub>0</sub>                                           |        | 10        | 12         | 14                |            | 18                      |            |            | 25          |             |
| Drill hole depth                                              | h <sub>0</sub>                                           |        | 75        | 110        | 115               | 135        | 140                     | 160        | 175        | 235         |             |
| Effective anchorage depth                                     | h <sub>ef</sub>                                          |        | 60        | 95         | 100               | 120        | 125                     | 145        | 160        | 210         |             |
| Minimum spacing and<br>minimum edge distance                  | s <sub>min</sub> = c <sub>min</sub>                      |        | 40        |            | 50                |            | 55                      | 60         | 70         | 90          |             |
| Diameter of<br>clearance hole<br>in the fixture <sup>1)</sup> | pre-positioned<br>anchorage d <sub>f</sub> ≤             |        | 9         | 12         | 14                |            | 18                      |            |            | 22          | 26          |
|                                                               | push through<br>anchorage <sup>2)</sup> d <sub>f</sub> ≤ |        | 11        | 14         | 16                |            | 20                      |            |            | 26          |             |
| Min. thickness of concrete member                             | h <sub>min</sub>                                         |        | 100       | 140        |                   | 170        |                         | 190        | 220        | 280         |             |
| Installation torque                                           | T <sub>inst</sub>                                        | [Nm]   | 15        | 20         | 40                |            | 60                      |            |            | 100         |             |
| Thickness of fixure                                           | t <sub>fix</sub> ≤                                       |        | 1500      |            |                   |            |                         |            |            |             |             |
| fischer filling disk FFD <sup>3)</sup>                        | ≥ d <sub>a</sub>                                         | [mm]   | -         | 26         | 30                |            | 38                      |            |            | 46          | 54          |
|                                                               | t <sub>s</sub>                                           |        | -         | 6          | 6                 |            | 7                       |            |            | 8           | 10          |

<sup>1)</sup> For larger clearance holes in the fixture see EOTA ETAG 001 Annex C, 08/2010 or CEN/TS 1992-4:2009

<sup>2)</sup> Only with mortar cartridge system FIS HB

<sup>3)</sup> Using fischer filling disk FFD reduces  $t_{fix}$  (usable length of the anchor)

#### fischer Highbond – Anchor rod FHB II – A L

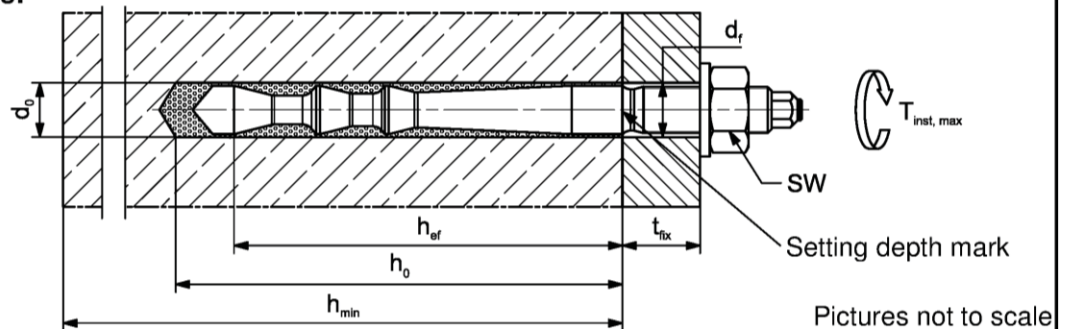


**Marking:** work symbol, size of anchor, setting depth. e.g.:  M10x95

For stainless steel additional **A4**. For high corrosion resistant steel additional **C**.

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

#### Installation conditions:



fischer Highbond-Anchor FHB II

#### Intended Use

Installation parameters fischer Highbond-Anchor rod FHB II – A L

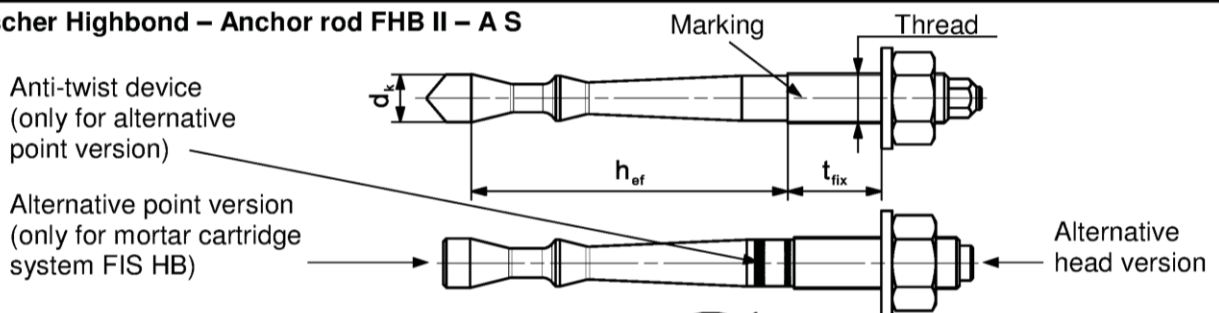
**Annex B 3**

**Table B4.1:** Installation parameters for fischer Highbond – Anchor rods FHB II – A S

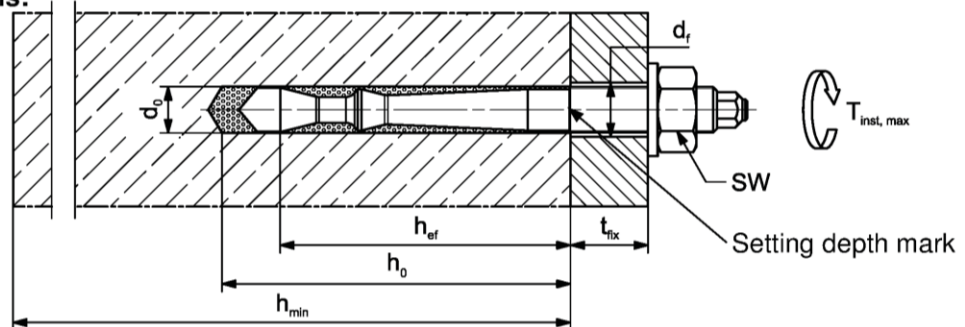
| Anchor rod FHB II – A S                                       |                                                 | Thread | M10x  |       | M12x  | M16x  | M20x   | M24x   |
|---------------------------------------------------------------|-------------------------------------------------|--------|-------|-------|-------|-------|--------|--------|
|                                                               |                                                 |        | 60    | 75    | 75    | 95    | 170    | 170    |
| Correspondending mortar capsules<br>FHB II-P or FHB II-PF     |                                                 | [-]    | 10x60 | 10x75 | 12x75 | 16x95 | 20x170 | 24x170 |
| Cone diameter                                                 | d <sub>k</sub>                                  | [mm]   | 9,4   |       | 11,3  | 14,5  | 23,0   |        |
| Width across flats                                            | SW                                              |        | 17    |       | 19    | 24    | 30     | 36     |
| Nominal drill hole diameter                                   | d <sub>0</sub>                                  |        | 10    |       | 12    | 16    | 25     |        |
| Drill hole depth                                              | h <sub>0</sub>                                  |        | 75    | 90    | 90    | 110   | 190    |        |
| Effective anchorage depth                                     | h <sub>ef</sub>                                 |        | 60    | 75    | 75    | 95    | 170    |        |
| Minimum spacing and<br>minimum edge distance                  | s <sub>min</sub> = c <sub>min</sub>             |        | 40    |       |       | 50    | 80     |        |
| Diameter of<br>clearance hole<br>in the fixture <sup>1)</sup> | pre-positioned<br>anchorage<br>d <sub>f</sub> ≤ |        | 12    |       | 14    | 18    | 22     | 26     |
|                                                               | push through<br>anchorage<br>d <sub>f</sub> ≤   |        | 12    |       | 14    | 18    | 26     |        |
| Min. thickness of concrete member                             | h <sub>min</sub>                                |        | 100   | 120   |       | 150   | 240    |        |
| Installation torque                                           | T <sub>inst</sub>                               | [Nm]   | 15    |       | 30    | 50    | 100    |        |
| Thickness of fixure                                           | t <sub>fix</sub> ≤                              | [mm]   | 1500  |       |       |       |        |        |
| fischer filling disk FFD <sup>2)</sup>                        | ≥ d <sub>a</sub>                                |        | 26    |       | 30    | 38    | 46     | 54     |
|                                                               | t <sub>s</sub>                                  |        | 6     |       | 6     | 7     | 8      | 10     |

<sup>1)</sup> For larger clearance holes in the fixture see EOTA ETAG 001 Annex C, 08/2010 or CEN/TS 1992-4-:2009

<sup>2)</sup> Using fischer filling disk FFD reduces  $t_{fix}$  (usable length of the anchor)

**fischer Highbond – Anchor rod FHB II – A S**


**Marking:** work symbol, size of anchor, setting depth. e.g.: M10x75  
For stainless steel additional **A4**. For high corrosion resistant steel additional **C**.  
For high corrosion resistant steel additional marking **C** also on the face side

**Installation conditions:**


Pictures not to scale

fischer Highbond-Anchor FHB II

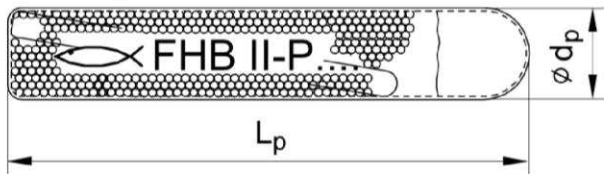
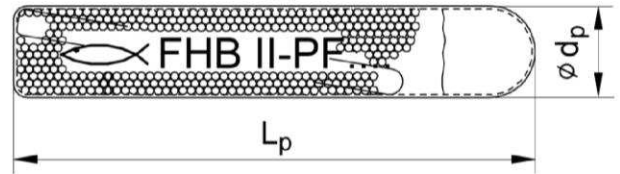
**Intended Use**

Installation parameters fischer Highbond-Anchor rod FHB II – A S

**Annex B 4**

**Table B5.1:** Dimensions of mortar capsules FHB II-P and FHB II-PF

| Mortar capsule      |                  | 8x   | 10x |    | 12x |     |      | 16x |      |     |     | 20x  |     | 24x |     |     |
|---------------------|------------------|------|-----|----|-----|-----|------|-----|------|-----|-----|------|-----|-----|-----|-----|
|                     |                  | 60   | 60  | 75 | 95  | 75  | 100  | 120 | 95   | 125 | 145 | 160  | 170 | 210 | 170 | 210 |
| Length of capsule   | L <sub>p</sub>   | [mm] | 85  |    | 90  | 115 | 95   | 120 |      | 150 | 155 |      | 185 | 210 | 185 | 210 |
| Diameter of capsule | Ø d <sub>p</sub> |      | 9   |    | 11  |     | 12,5 |     | 14,5 | 17  |     | 21,5 |     |     |     |     |

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

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

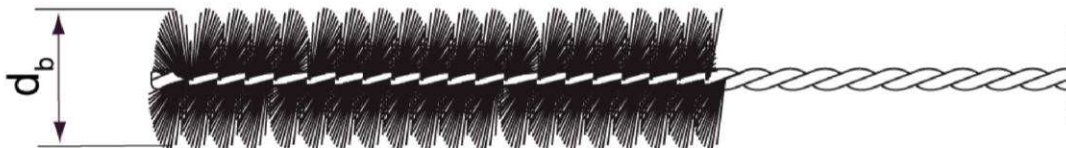
e.g.:  FHB II-P 12x100 or

 FHB II-PF 12x100

**Table B5.2:** Parameters of the cleaning brush BS (steel brush)  
(only when using injection mortar)

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

|                     |       |      |    |    |    |    |    |    |
|---------------------|-------|------|----|----|----|----|----|----|
| Drill hole diameter | $d_0$ | [mm] | 10 | 12 | 14 | 16 | 18 | 25 |
| Brush diameter      | $d_b$ |      | 11 | 13 | 16 | 20 |    | 27 |



Pictures not to scale

fischer Highbond-Anchor FHB II

**Intende use**

Dimensions of mortar capsules; parameters of the cleaning brush

**Annex B 5**

**Table B6.1:** Maximum processing time of the mortar **FIS HB** and minimum curing time (During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature)

| System temperature<br>[°C] | Maximum processing time<br>$t_{work}$ | Minimum curing time <sup>1)</sup><br>$t_{cure}$ |
|----------------------------|---------------------------------------|-------------------------------------------------|
| -5 to -1                   | ---                                   | 6 h                                             |
| 0 to +4                    | ---                                   | 3 h                                             |
| > +5 to +9                 | 15 min                                | 90 min                                          |
| > +10 to +19               | 6 min                                 | 35 min                                          |
| > +20 to +29               | 4 min                                 | 20 min                                          |
| > +30 to +40               | 2 min                                 | 12 min                                          |

<sup>1)</sup> In wet concrete the curing times must be doubled

**Table B6.2:** Minimum curing time for mortar capsules **FHB II-P** and **FHB II-PF** (During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature)

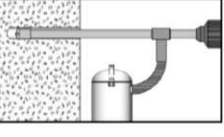
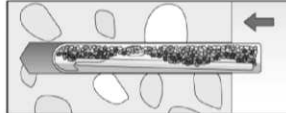
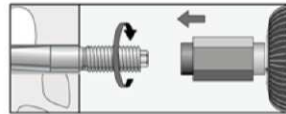
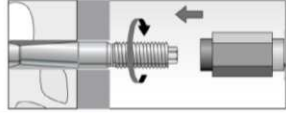
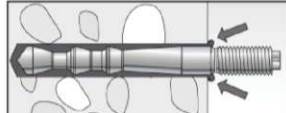
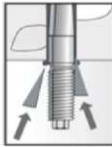
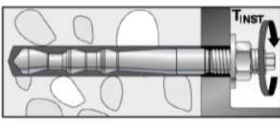
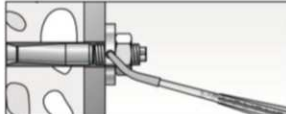
| Mortar capsule <b>FHB II-P</b> (standard) |                                                 | Mortar capsule <b>FHB II-PF</b> (fast curing) |                                                 |
|-------------------------------------------|-------------------------------------------------|-----------------------------------------------|-------------------------------------------------|
| System temperature<br>[°C]                | Minimum curing time <sup>1)</sup><br>$t_{cure}$ | System temperature<br>[°C]                    | Minimum curing time <sup>1)</sup><br>$t_{cure}$ |
| -5 to ±0                                  | 4 h                                             | -5 to ±0                                      | 8 min                                           |
| > +1 to +10                               | 45 min                                          | > +1 to +10                                   | 6 min                                           |
| > +11 to +20                              | 20 min                                          | > +11 to +20                                  | 4 min                                           |
| > +20                                     | 10 min                                          | > +20                                         | 2 min                                           |

<sup>1)</sup> In wet concrete or flooded holes the curing times must be doubled

fischer Highbond-Anchor FHB II

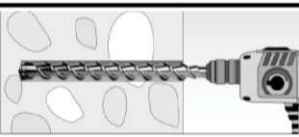
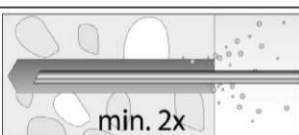
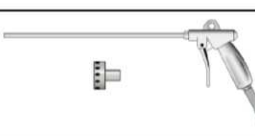
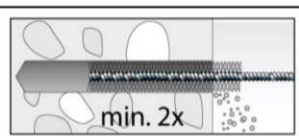
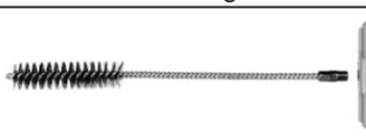
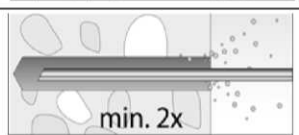
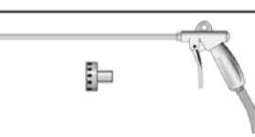
**Intended use**  
Processing times and curing times

**Annex B 6**

| Installation instructions part 1; Installation with mortar capsule FHB II-P or FHB II-PF |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drilling the hole (hammer drilling with standard drill bit)                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| 1                                                                                        |    | Drill the hole with hammer drill.<br>Drill hole diameter $d_0$ and drill hole depth $h_0$ see <b>Tables B3.1, B4.1</b><br>Cleaning of the bore hole is not necessary                                                                                                                                                                                                                                         |   |                                                                                                                                                      |
| Go to step 3                                                                             |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| Drilling and cleaning the hole (hammer drilling with hollow drill bit)                   |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| 1                                                                                        |    | Check a suitable hollow drill (see <b>Table B1.1</b> ) 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<br>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.<br>Diameter of drill hole $d_0$ and drill hole depth $h_0$ see <b>Tables B3.1, B4.1</b> |   |                                                                                                                                                      |
| Go to step 3                                                                             |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| Installation Highbond-Anchor rod FHB II – A L and FHB II – A S                           |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| 3                                                                                        |   | Put the mortar capsule FHB II-P or FHB II-PF into the bore hole                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| 4                                                                                        |  | <b>Pre-positioned anchor:</b> Only use Highbond-Anchor rods <b>FHB II - A L</b> or <b>FHB II – A S</b> with <b>roof-shaped point</b> . Drive in the Anchor rod using a hammer drill or impact drill. When reaching the setting depth mark stop the drill immediately.                                                                                                                                        |   |                                                                                                                                                      |
|                                                                                          |  | <b>Push through anchor:</b> Only use Highbond-Anchor rods <b>FHB II – A S</b> with <b>roof-shaped point</b> . Drive in the anchor rod using a hammer drill or impact drill. When reaching the setting depth mark stop the drill immediately.                                                                                                                                                                 |   |                                                                                                                                                      |
| 5                                                                                        |  | After inserting the anchor, excess mortar must be emerged around the anchor.                                                                                                                                                                                                                                                                                                                                 |   |                                                                                                                                                      |
| 5a                                                                                       |  | For overhead installations support the anchor rod with wedges.<br>(e.g. fischer centering wedges)                                                                                                                                                                                                                                                                                                            |   |                                                                 |
| 6                                                                                        |  | Wait for the specified curing time $t_{cure}$ see <b>Table B.2</b>                                                                                                                                                                                                                                                                                                                                           | 7 |  Mounting the fixture<br>$T_{inst}$ see <b>Tables B3.1, B4.1</b> |
| Option                                                                                   |  | After the minimum curing time is reached, the gap between anchor and fixture (annular clearance) may be filled with mortar via the fischer filling disc FFD. compressive strength $\geq 50 \text{ N/mm}^2$ (e.g. FIS HB). ATTENTION: Using fischer filling disc FFD reduces $t_{fix}$ (usable length of the anchor)                                                                                          |   |                                                                                                                                                      |
| fischer Highbond-Anchor FHB II                                                           |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   |                                                                                                                                                      |
| Intended use<br>Installation instructions part 1; Installation with mortar capsule       |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                              |   | Annex B 7                                                                                                                                            |

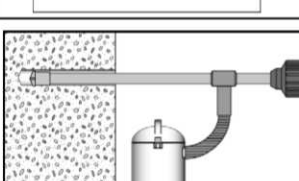
## Installation instructions part 2; Installation with injection mortar FIS HB

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

|   |                                                                                      |                                                                                                                        |
|---|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 1 |     | Drill the hole with hammer drill.<br>Drill hole diameter $d_0$ and drill hole depth $h_0$ see <b>Tables B3.1, B4.1</b> |
| 2 |     | Blow out the drill hole twice.<br>If necessary, remove standing water out of the bore hole                             |
|   |     | For drill hole diameter $d_0 < 25$ mm with hand-blowout or oil-free compressed air                                     |
|   |    | For drill hole diameter $d_0 = 25$ mm with oil-free compressed air ( $p \geq 6$ bar)<br>Use a cleaning nozzle          |
| 3 |     | Brush the bore hole twice.<br>Corresponding brushes see <b>Table B5.2</b>                                              |
|   |   |                                                                                                                        |
| 4 |    | Blow out the drill hole twice                                                                                          |
|   |   | For drill hole diameter $d_0 < 25$ mm with hand-blowout or oil-free compressed air                                     |
|   |  | For drill hole diameter $d_0 = 25$ mm with oil-free compressed air ( $p \geq 6$ bar)<br>Use a cleaning nozzle          |

Go to step 5

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

|   |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                               |
|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | Check a suitable hollow drill (see <b>Table B1.1</b> )<br>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.<br>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.<br>Diameter of drill hole $d_0$ and drill hole depth $h_0$ see <b>Tables B3.1, B4.1</b> |

Go to step 5

fischer Highbond-Anchor FHB II

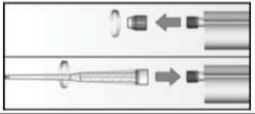
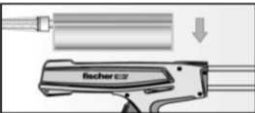
#### Intended use

Installation instructions part 2; Installation with injection mortar

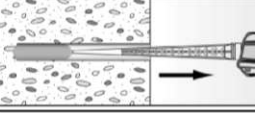
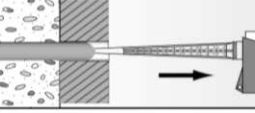
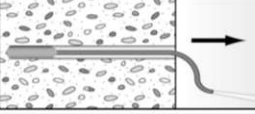
**Annex B 8**

### Installation instruction part 3; Installation with injection mortar FIS HB

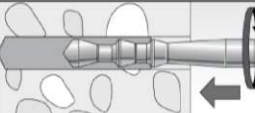
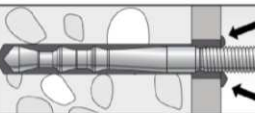
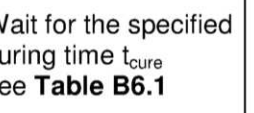
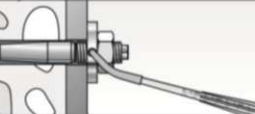
#### Preparing the cartridge

|   |                                                                                   |                                                                                                                                                                                                                  |
|---|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 |  | Remove the sealing cap<br>Screw on the static mixer<br>(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 |

#### Injection of the mortar

|   |                                                                                     |                                                                                                                                                                                                                                  |
|---|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 |    | Fill approximately 2/3 of the drill hole with mortar. Exact quantity of mortar (travel scale on the cartridge) see instruction sheet. Fill the drill hole with mortar, always begin from the bottom of the hole to avoid bubbles |
|   |   | <b>Push-through installation:</b> By using Highbond-Anchor rods <b>FHB II - AL</b> the drill hole in the fixture must be also filled with mortar. By using Highbond-Anchor rods <b>FHB II - AS</b> is this not necessary.        |
|   |  | For drill hole depth $\geq 170$ mm use an extension tube                                                                                                                                                                         |

#### Installation Highbond-Anchor rod FHB II – A L and FHB II – A S

|        |                                                                                     |                                                                                                                                                                                                                                                                                                                        |
|--------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9      |  | Only use clean and oil-free anchor rods.<br>Push the anchor rod down to the bottom of the hole, turning it slightly while doing so.                                                                                                                                                                                    |
| 10     |  | After inserting the anchor rod <b>FHB II - AL</b> , surplus mortar must be escaped from the fixture.<br>After inserting the anchor rod <b>FHB II - AS</b> , surplus mortar must be escaped from the bore hole or must be visible in the fixture.                                                                       |
|        |  | For overhead installations support the anchor rod with wedges.<br>(e.g. fischer centering wedges)                                                                                                                                                                                                                      |
| 11     |  | Wait for the specified curing time $t_{cure}$ see <b>Table B6.1</b>                                                                                                                                                                                                                                                    |
| 12     |  | Mounting the fixture<br>$T_{inst}$ see <b>Tables B3.1, B4.1</b>                                                                                                                                                                                                                                                        |
| Option |  | After the minimum curing time is reached, the gap between anchor and fixture (annular clearance) may be filled with mortar via the fischer filling disc FFD. compressive strength $\geq 50$ N/mm <sup>2</sup> (e.g. FIS HB). ATTENTION: Using fischer filling disc FFD reduces $t_{fix}$ (usable length of the anchor) |

fischer Highbond-Anchor FHB II

#### Intended use

Installation instructions part 3; Installation with injection mortar

Annex B 9

|                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Table C1.1:</b> Characteristic values under static and quasi-static <b>tension load</b> for <b>fischer Highbond-Anchor FHB II – A L</b></p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|

| Ancher rod FHB II – A L                                                                                                                                                                                                                                                                                                                                                    |                                  |          | M8x<br>60         | M10x<br>95 | M12x<br>100 | M12x<br>120 | M16x<br>125   145   160 |     |     | M20x<br>210       | M24x<br>210 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------|-------------------|------------|-------------|-------------|-------------------------|-----|-----|-------------------|-------------|
| <b>Bearing capacity under tensile load, steel failure</b>                                                                                                                                                                                                                                                                                                                  |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Characteristic resistance<br>$N_{Rk,s}$                                                                                                                                                                                                                                                                                                                                    | Steel, zinc plated               | [kN]     | 25,1              | 34,4       | 49,8        |             | 96,6                    |     |     | 137,6             |             |
|                                                                                                                                                                                                                                                                                                                                                                            | Stainless steel A4               |          | 25,1              | 34,4       | 49,8        |             | 96,6                    |     |     | 137,6             |             |
|                                                                                                                                                                                                                                                                                                                                                                            | High corrosion resistant steel C |          | 25,1              | 34,4       | 49,8        |             | 96,6                    |     |     | 137,6             |             |
| <b>Partial safety factors<sup>1)</sup></b>                                                                                                                                                                                                                                                                                                                                 |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Partial safety factor<br>$\gamma_{Ms,N}$                                                                                                                                                                                                                                                                                                                                   | Steel, zinc plated               | [-]      | 1,5 <sup>1)</sup> |            |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | Stainless steel A4               |          | 1,5 <sup>1)</sup> |            |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | High corrosion resistant steel C |          | 1,5 <sup>1)</sup> |            |             |             |                         |     |     |                   |             |
| <b>Pullout failure in cracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                                          |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>3)</sup> |            |             |             |                         |     |     |                   |             |
| <b>Pullout and splitting failure in uncracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                          |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>3)</sup> |            |             |             |                         |     |     |                   |             |
| Edge distance                                                                                                                                                                                                                                                                                                                                                              | $c_{cr,sp}$                      | [mm]     | 300               | 476        | 380         | 600         | 375                     | 500 | 580 | 630               |             |
| Spacing                                                                                                                                                                                                                                                                                                                                                                    | $s_{cr,sp}$                      |          | 150               | 238        | 190         | 300         | 188                     | 250 | 290 | 315               |             |
| <b>Pullout and splitting failure in uncracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                          |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                  | $N_{Rk,p}$ <sup>2)</sup>         | [kN]     | 20                | 35         | 40          | 50          | --- <sup>3)</sup>       | 75  | 95  | --- <sup>3)</sup> |             |
| Edge distance                                                                                                                                                                                                                                                                                                                                                              | $c_{cr,sp}$                      | [mm]     | 1,5 $h_{ef}$      |            |             |             |                         |     |     |                   |             |
| Spacing                                                                                                                                                                                                                                                                                                                                                                    | $s_{cr,sp}$                      |          | 3,0 $h_{ef}$      |            |             |             |                         |     |     |                   |             |
| <b>Factors for the compressive strength of concrete &gt; C20/25</b>                                                                                                                                                                                                                                                                                                        |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Increasing factor<br>for $N_{Rk,p}$                                                                                                                                                                                                                                                                                                                                        | C25/30                           | $\Psi_c$ | [-]               | 1,10       |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | C30/37                           |          |                   | 1,22       |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | C35/45                           |          |                   | 1,34       |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | C40/50                           |          |                   | 1,41       |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | C45/55                           |          |                   | 1,48       |             |             |                         |     |     |                   |             |
|                                                                                                                                                                                                                                                                                                                                                                            | C50/60                           |          |                   | 1,55       |             |             |                         |     |     |                   |             |
| <b>Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3</b>                                                                                                                                                                                                                                                                                                                  |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Uncracked concrete                                                                                                                                                                                                                                                                                                                                                         | $k_{ucr}$                        | [-]      | 10,1              |            |             |             |                         |     |     |                   |             |
| Cracked concrete                                                                                                                                                                                                                                                                                                                                                           | $k_{cr}$                         |          | 7,2               |            |             |             |                         |     |     |                   |             |
| <b>Concrete cone failure</b>                                                                                                                                                                                                                                                                                                                                               |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Effective anchorage depth                                                                                                                                                                                                                                                                                                                                                  | $h_{ef}$                         | [mm]     | 60                | 95         | 100         | 120         | 125                     | 145 | 160 | 210               |             |
| Partial safety factor <sup>1) 5)</sup>                                                                                                                                                                                                                                                                                                                                     | $\gamma_{Mc}$                    | [-]      | 1,5 <sup>4)</sup> | 1,5        |             |             |                         |     |     |                   |             |
| <sup>1)</sup> In absence of other national regulations<br><sup>2)</sup> Proof of splitting failure acc. ETAG 001, Annex C, (Section 5.3). Instead of $N^0_{Rk,c}$ use $N_{Rk,p}$<br><sup>3)</sup> Not decisive (proof of splitting failure acc. ETAG 001, Annex C)<br><sup>4)</sup> With mortar capsule: $\gamma_{Mc} = 1,8$<br><sup>5)</sup> $\gamma_2 = 1,0$ is included |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| fischer Highbond-Anchor FHB II                                                                                                                                                                                                                                                                                                                                             |                                  |          |                   |            |             |             |                         |     |     | Annex C 1         |             |
| <b>Performances</b>                                                                                                                                                                                                                                                                                                                                                        |                                  |          |                   |            |             |             |                         |     |     |                   |             |
| Characteristic values under static and quasi-static tension load for fischer Highbond-Anchor FHB II – A L                                                                                                                                                                                                                                                                  |                                  |          |                   |            |             |             |                         |     |     |                   |             |

**Table C2.1:** Characteristic values under static and quasi-static **tension load** for **fischer Highbond-Anchor FHB II – A S**

| Anchor rod FHB II – A S                                                                                                                                                                                                                                                                                                                                                      |                                  |          | M10x              |      | M12x | M16x              | M20x  | M24x |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------|-------------------|------|------|-------------------|-------|------|
|                                                                                                                                                                                                                                                                                                                                                                              |                                  |          | 60                | 75   | 75   | 95                | 170   | 170  |
| <b>Bearing capacity under tensile load, steel failure</b>                                                                                                                                                                                                                                                                                                                    |                                  |          |                   |      |      |                   |       |      |
| Characteristic resistance<br>$N_{Rk,s}$                                                                                                                                                                                                                                                                                                                                      | Steel, zinc plated               | [kN]     | 25,1              |      | 34,4 | 61,6              | 128,5 |      |
|                                                                                                                                                                                                                                                                                                                                                                              | Stainless steel A4               |          | 25,1              |      | 34,4 | 61,6              | 128,5 |      |
|                                                                                                                                                                                                                                                                                                                                                                              | High corrosion resistant steel C |          | 25,1              |      | 34,4 | 61,6              | 128,5 |      |
| <b>Partial safety factors<sup>1)</sup></b>                                                                                                                                                                                                                                                                                                                                   |                                  |          |                   |      |      |                   |       |      |
| Partial safety factor<br>$\gamma_{Ms,N}$                                                                                                                                                                                                                                                                                                                                     | Steel, zinc plated               | [-]      | 1,5 <sup>1)</sup> |      |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | Stainless steel A4               |          | 1,5 <sup>1)</sup> |      |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | High corrosion resistant steel C |          | 1,5 <sup>1)</sup> |      |      |                   |       |      |
| <b>Pullout failure in cracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                                            |                                  |          |                   |      |      |                   |       |      |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                    | $N_{Rk,p}$                       | [kN]     | --- <sup>3)</sup> |      |      |                   |       |      |
| <b>Pullout and splitting failure in uncracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                            |                                  |          |                   |      |      |                   |       |      |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                    | $N_{Rk,p}$                       | [kN]     | --- <sup>3)</sup> |      |      |                   |       |      |
| Edge distance                                                                                                                                                                                                                                                                                                                                                                | $c_{cr,sp}$                      | [mm]     | 300               |      | 340  | 510               |       |      |
| Spacing                                                                                                                                                                                                                                                                                                                                                                      | $s_{cr,sp}$                      |          | 150               |      | 170  | 255               |       |      |
| <b>Pullout and splitting failure in uncracked concrete C20/25</b>                                                                                                                                                                                                                                                                                                            |                                  |          |                   |      |      |                   |       |      |
| Characteristic resistance                                                                                                                                                                                                                                                                                                                                                    | $N_{Rk,p}$ <sup>2)</sup>         | [kN]     | 20                | 25   | 40   | --- <sup>3)</sup> |       |      |
| Edge distance                                                                                                                                                                                                                                                                                                                                                                | $c_{cr,sp}$                      | [mm]     | 1,5 $h_{ef}$      |      |      |                   |       |      |
| Spacing                                                                                                                                                                                                                                                                                                                                                                      | $s_{cr,sp}$                      |          | 3,0 $h_{ef}$      |      |      |                   |       |      |
| <b>Factors for the compressive strength of concrete &gt; C20/25</b>                                                                                                                                                                                                                                                                                                          |                                  |          |                   |      |      |                   |       |      |
| Increasing factor for $N_{Rk,p}$                                                                                                                                                                                                                                                                                                                                             | C25/30                           | $\Psi_c$ | [-]               | 1,10 |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | C30/37                           |          |                   | 1,22 |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | C35/45                           |          |                   | 1,34 |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | C40/50                           |          |                   | 1,41 |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | C45/55                           |          |                   | 1,48 |      |                   |       |      |
|                                                                                                                                                                                                                                                                                                                                                                              | C50/60                           |          |                   | 1,55 |      |                   |       |      |
| <b>Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3</b>                                                                                                                                                                                                                                                                                                                    |                                  |          |                   |      |      |                   |       |      |
| Uncracked concrete                                                                                                                                                                                                                                                                                                                                                           | $k_{ucr}$                        | [-]      | 10,1              |      |      |                   |       |      |
| Cracked concrete                                                                                                                                                                                                                                                                                                                                                             | $k_{cr}$                         |          | 7,2               |      |      |                   |       |      |
| <b>Concrete cone failure</b>                                                                                                                                                                                                                                                                                                                                                 |                                  |          |                   |      |      |                   |       |      |
| Effective anchorage depth                                                                                                                                                                                                                                                                                                                                                    | $h_{ef}$                         | [mm]     | 60                | 75   | 95   | 170               |       |      |
| Partial safety factor <sup>1) 5)</sup>                                                                                                                                                                                                                                                                                                                                       | $\gamma_{Mc}$                    | [-]      | 1,5 <sup>4)</sup> | 1,5  |      |                   |       |      |
| <sup>1)</sup> In absence of other national regulations<br><sup>2)</sup> Proof of splitting failure acc. ETAG 001, Annex C, (Section 5.3). Instead of $N^0_{Rk,c}$ use $N_{Rk,p}$ .<br><sup>3)</sup> Not decisive (proof of splitting failure acc. ETAG 001, Annex C)<br><sup>4)</sup> With mortar capsule: $\gamma_{Mc} = 1,8$<br><sup>5)</sup> $\gamma_2 = 1,0$ is included |                                  |          |                   |      |      |                   |       |      |
| fischer Highbond-Anchor FHB II                                                                                                                                                                                                                                                                                                                                               |                                  |          |                   |      |      | <b>Annex C 2</b>  |       |      |
| <b>Performances</b><br>Characteristic values under static and quasi-static tension load for fischer Highbond-Anchor FHB II – A S                                                                                                                                                                                                                                             |                                  |          |                   |      |      |                   |       |      |

**Table C3.1:** Characteristic values under static and quasi-static **shear load** for **fischer Highbond-Anchor FHB II – A L**

| Anchor rod FHB II – A L                                                                                                 |                                                         |                 |      | M8x<br>60 | M10x<br>95 | M12x<br>100   120 |     | M16x<br>125   145   160 |     |           | M20x<br>210 | M24x<br>210 |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|------|-----------|------------|-------------------|-----|-------------------------|-----|-----------|-------------|-------------|
| Bearing capacity under shear load, steel failure                                                                        |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| without lever arm                                                                                                       |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| Characteristic resistance                                                                                               | Steel, zinc plated                                      | $V_{Rk,s}$      | [kN] | 13,7      | 20,8       | 30,3              |     | 56,3                    |     |           | 87,9        | 126,9       |
|                                                                                                                         | Stainless steel A4 and High corrosion resistant steel C |                 |      | 15,2      | 23,2       | 33,7              |     | 62,7                    |     |           | 97,9        | 141         |
| with lever arm                                                                                                          |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| Characteristic bending moment                                                                                           | Steel, zinc plated                                      | $M^0_{Rk,s}$    | [Nm] | 31        | 62         | 105               |     | 266                     |     |           | 519         | 896         |
|                                                                                                                         | Stainless steel A4 and High corrosion resistant steel C |                 |      | 31        | 62         | 105               |     | 266                     |     |           | 519         | 896         |
| Partial safety factors                                                                                                  |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| Partial safety factors <sup>1)</sup>                                                                                    |                                                         | $\gamma_{Ms,V}$ | [-]  | 1,25      |            |                   |     |                         |     |           |             |             |
| Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1                                                           |                                                         | $k_2$           | [-]  | 1,0       |            |                   |     |                         |     |           |             |             |
| Concrete pry-out failure                                                                                                |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| Factor k acc. TR029 Section 5.2.3.3 or. $k_3$ acc.CEN/TS 1992-4-5:2009 Section 6.3.3                                    |                                                         | $k_{(3)}$       | [-]  | 2,0       |            |                   |     |                         |     |           |             |             |
| Partial safety factors <sup>1)</sup>                                                                                    |                                                         | $\gamma_{Mcp}$  |      | 1,5       |            |                   |     |                         |     |           |             |             |
| Concrete edge failure                                                                                                   |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| Effective length of anchor                                                                                              |                                                         | $l_f$           | [mm] | 60        | 95         | 100               | 112 | 125                     | 144 |           |             | 200         |
| Calculation diameter                                                                                                    |                                                         | d               |      | 10        | 12         | 14                |     | 18                      |     |           | 25          |             |
| Partial safety factor <sup>1)</sup>                                                                                     |                                                         | $\gamma_{Mc}$   | [-]  | 1,5       |            |                   |     |                         |     |           |             |             |
| <sup>1)</sup> In absence of other national regulations                                                                  |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |
| fischer Highbond-Anchor FHB II                                                                                          |                                                         |                 |      |           |            |                   |     |                         |     | Annex C 3 |             |             |
| Performances<br>Characteristic values under static and quasi-static shear load for fischer Highbond-Anchor FHB II – A L |                                                         |                 |      |           |            |                   |     |                         |     |           |             |             |

**Table C4.1:** Characteristic values under static and quasi-static **shear load** for **fischer Highbond-Anchor FHB II – A S**

| Anchor rod FHB II – A S                                                                                                        |                                                         |                 | M10x |      | M12x | M16x | M20x             | M24x  |
|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|------|------|------|------|------------------|-------|
|                                                                                                                                |                                                         |                 | 60   | 75   | 75   | 95   | 170              | 170   |
| <b>Bearing capacity under shear load, steel failure</b>                                                                        |                                                         |                 |      |      |      |      |                  |       |
| <b>Without lever arm</b>                                                                                                       |                                                         |                 |      |      |      |      |                  |       |
| Characteristic resistance                                                                                                      | Steel, zinc plated                                      | $V_{Rk,s}$      | [kN] | 19,7 | 27,3 | 50,8 | 80,3             | 114,2 |
|                                                                                                                                | Stainless steel A4                                      |                 |      | 24,1 | 33,7 | 62,7 | 97,9             | 124,5 |
|                                                                                                                                | High corrosion resistant steel C                        |                 |      | 24,1 | 33,7 | 62,7 | 97,9             | 141   |
| <b>With lever arm</b>                                                                                                          |                                                         |                 |      |      |      |      |                  |       |
| Characteristic bending moment                                                                                                  | Steel, zinc plated                                      | $M^0_{Rk,s}$    | [Nm] | 62   | 105  | 266  | 519              | 896   |
|                                                                                                                                | Stainless steel A4 and High corrosion resistant steel C |                 |      | 62   | 105  | 266  | 519              | 896   |
|                                                                                                                                |                                                         |                 |      |      |      |      |                  |       |
| <b>Partial safety factors</b>                                                                                                  |                                                         |                 |      |      |      |      |                  |       |
| Partial safety factor <sup>1)</sup>                                                                                            |                                                         | $\gamma_{Ms,V}$ | [-]  | 1,25 |      |      |                  |       |
| Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1                                                                  |                                                         | $k_2$           | [-]  | 1,0  |      |      |                  |       |
| <b>Concrete pryout failure</b>                                                                                                 |                                                         |                 |      |      |      |      |                  |       |
| Factor k acc. TR029 Section 5.2.3.3 or. $k_3$ acc.CEN/TS 1992-4-5:2009 Section 6.3.3                                           |                                                         | $k_{(3)}$       | [-]  | 2,0  |      |      |                  |       |
| Partial safety factor <sup>1)</sup>                                                                                            |                                                         | $\gamma_{Mcp}$  | [-]  | 1,5  |      |      |                  |       |
| <b>Concrete edge failure</b>                                                                                                   |                                                         |                 |      |      |      |      |                  |       |
| Effective length of anchor                                                                                                     | $l_f$                                                   | [mm]            | 60   | 75   | 95   | 170  |                  |       |
| Calculation diameter                                                                                                           | d                                                       |                 | 10   | 12   | 16   | 25   |                  |       |
| Partial safety factor <sup>1)</sup>                                                                                            |                                                         | $\gamma_{Mc}$   | [-]  | 1,5  |      |      |                  |       |
| <sup>1)</sup> In absence of other national regulations                                                                         |                                                         |                 |      |      |      |      |                  |       |
| fischer Highbond-Anchor FHB II                                                                                                 |                                                         |                 |      |      |      |      | <b>Annex C 4</b> |       |
| <b>Performances</b><br>Characteristic values under static and quasi-static shear load for fischer Highbond-Anchor FHB II – A S |                                                         |                 |      |      |      |      |                  |       |

**Table C5.1: Displacement for fischer Highbond-Anchor FHB II – A L**

| Anchor rod<br>FHB II – A L       | M8x<br>60 | M10x<br>95 | M12x<br>100   120 |      | 125  | M16x<br>145 | 160  | M20x<br>210 | M24x<br>210 |
|----------------------------------|-----------|------------|-------------------|------|------|-------------|------|-------------|-------------|
| Displacement under tension load  |           |            |                   |      |      |             |      |             |             |
| Cracked concrete                 |           |            |                   |      |      |             |      |             |             |
| Tension load [kN]                | 6,6       | 15,9       | 17,1              | 22,5 | 24,0 | 30,0        | 34,7 | 52,2        | 52,2        |
| $\delta_{N0}$ [mm]               | 0,8       |            |                   |      | 0,6  |             |      |             |             |
| $\delta_{N\infty}$               | 1,7       |            |                   |      |      |             |      |             |             |
| Uncracked concrete               |           |            |                   |      |      |             |      |             |             |
| Tension load [kN]                | 9,3       | 22,3       | 24,0              | 31,6 | 33,6 | 42,0        | 48,7 | 73,2        | 73,2        |
| $\delta_{N0}$ [mm]               | 0,2       | 0,4        |                   |      |      |             |      | 0,6         |             |
| $\delta_{N\infty}$               | 1,7       |            |                   |      |      |             |      |             |             |
| Displacement under shear load    |           |            |                   |      |      |             |      |             |             |
| Uncracked or cracked concrete    |           |            |                   |      |      |             |      |             |             |
| Steel zinc plated                |           |            |                   |      |      |             |      |             |             |
| Shear load [kN]                  | 7,8       | 11,9       | 17,3              |      | 32,2 |             |      | 50,2        | 72,5        |
| $\delta_{V0}$ [mm]               | 1,2       |            | 1,3               |      |      |             | 3,5  |             |             |
| $\delta_{V\infty}$               | 1,8       |            | 2,0               |      |      |             | 5,3  |             |             |
| Stainless steel A4               |           |            |                   |      |      |             |      |             |             |
| Shear load [kN]                  | 8,7       | 13,3       | 19,3              |      | 35,8 |             |      | 55,9        | 80,6        |
| $\delta_{V0}$ [mm]               | 1,0       |            | 1,1               |      | 2,2  |             |      | 3,5         |             |
| $\delta_{V\infty}$               | 1,5       |            | 1,7               |      | 3,3  |             |      | 5,3         |             |
| High corrosion resistant steel C |           |            |                   |      |      |             |      |             |             |
| Shear load [kN]                  | 8,7       | 13,3       | 19,3              |      | 35,8 |             |      | 55,9        | 80,6        |
| $\delta_{V0}$ [mm]               | 1,2       |            | 1,3               |      | 2,4  |             |      | 3,7         | 5,0         |
| $\delta_{V\infty}$               | 1,8       |            | 2,0               |      | 3,6  |             |      | 5,6         | 7,5         |
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**Table C6.1:** Displacement for **fischer Highbond-Anchor FHB II – A S**

| Anchor rod<br>FHB II – A S                                                   | M10x<br>60 | 75   | M12x<br>75 | M16x<br>95 | M20x<br>170      | M24x<br>170 |
|------------------------------------------------------------------------------|------------|------|------------|------------|------------------|-------------|
| <b>Displacement under tension load</b>                                       |            |      |            |            |                  |             |
| <b>Cracked concrete</b>                                                      |            |      |            |            |                  |             |
| Tension load [kN]                                                            | 6,6        | 11,1 | 15,9       | 38,0       |                  |             |
| $\delta_{N0}$ [mm]                                                           | 0,8        | 0,3  | 0,4        | 0,6        |                  |             |
| $\delta_{N\infty}$                                                           | 1,7        |      |            |            |                  |             |
| <b>Uncracked concrete</b>                                                    |            |      |            |            |                  |             |
| Tension load [kN]                                                            | 9,3        | 15,6 | 22,3       | 53,3       |                  |             |
| $\delta_{N0}$ [mm]                                                           | 0,2        |      |            |            | 0,5              |             |
| $\delta_{N\infty}$                                                           | 1,7        |      |            |            |                  |             |
| <b>Displacement under shear load</b>                                         |            |      |            |            |                  |             |
| <b>Cracked or uncracked concrete</b>                                         |            |      |            |            |                  |             |
| <b>Steel zinc plated</b>                                                     |            |      |            |            |                  |             |
| Shear load [kN]                                                              | 11,3       | 12,7 | 29,0       | 45,9       | 65,3             |             |
| $\delta_{V0}$ [mm]                                                           | 1,2        | 1,5  | 2,8        |            |                  |             |
| $\delta_{V\infty}$                                                           | 1,8        | 2,3  | 4,2        |            |                  |             |
| <b>Stainless steel A4</b>                                                    |            |      |            |            |                  |             |
| Shear load [kN]                                                              | 13,8       | 19,3 | 35,8       | 55,9       | 71,1             |             |
| $\delta_{V0}$ [mm]                                                           | 1,0        | 1,1  | 2,2        | 3,5        |                  |             |
| $\delta_{V\infty}$                                                           | 1,5        | 1,7  | 3,3        | 5,3        |                  |             |
| <b>High corrosion resistant steel C</b>                                      |            |      |            |            |                  |             |
| Shear load [kN]                                                              | 13,8       | 19,3 | 35,8       | 55,9       | 80,6             |             |
| $\delta_{V0}$ [mm]                                                           | 1,2        | 1,3  | 2,4        | 3,7        | 5,0              |             |
| $\delta_{V\infty}$                                                           | 1,8        | 2,0  | 3,6        | 5,6        | 7,5              |             |
|                                                                              |            |      |            |            |                  |             |
| fischer Highbond-Anchor FHB II                                               |            |      |            |            | <b>Annex C 6</b> |             |
| <b>Performances</b><br>Displacement for fischer Highbond-Anchor FHB II – A S |            |      |            |            |                  |             |