



## DECLARACIÓN DE PRESTACIONES



**DoP: 0084**

para fischer Highbond-Anchor FHB II Inject (servidumbre de anclaje para su uso en hormigón) – ES

1. Código de identificación única del producto tipo: **DoP: 0084**
2. Usos previstos: **Fijación instalada posteriormente en hormigón agrietado y no agrietado, Véase el apéndice, especialmente los anexos B 1 - B 7**
3. Fabricante: **fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Germany**
4. Representante autorizado: --
5. Sistemas de evaluación y verificación de la constancia de las prestaciones (EVCP): **1**
6. Documento de evaluación europeo: **ETAG 001; 2013-04**  
Evaluación técnica europea: **ETA-16/0637; 2017-01-24**  
Organismo de evaluación técnica: **DIBt**  
Organismos notificados: **1343 – MPA Darmstadt**

7. Prestaciones declaradas:

**Resistencia mecánica y estabilidad (BWR 1), Seguridad durante el uso (BWR 4)**

- valores característicos para solicitaciones a tracción y a cortante: Ver anexo, especialmente anexo C 1 - C 4
- desplazamientos bajo solicitaciones a tracción y a cortante: Ver anexo, especialmente anexo C 5 - C 6

**protección contra incendios (BWR 2)**

- Reacción al fuego: el anclaje cumple con las exigencias de la clase A1.
- resistencia al fuego: SRD

8. Documentación técnica adecuada o documentación técnica específica: ---

Las prestaciones del producto identificado anteriormente son conformes con el conjunto de prestaciones declaradas. La presente declaración de prestaciones se emite, de conformidad con el Reglamento (UE) no 305/2011, bajo la sola responsabilidad del fabricante arriba identificado.

Firmado por y en nombre del fabricante por:

Andreas Bucher, Dipl.-Ing.

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

Tumlingen, 2017-01-31

- Este DoP ha sido redactado en varios idiomas. En caso de disputa acerca de la interpretación siempre prevalecerá la versión en inglés.
- el anexo contiene información voluntaria y complementaria en inglés, que va más allá de las exigencias legales.

## 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 and an anchor rod FHB II - A L or FHB II - A S with hexagon nut and washer.

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)

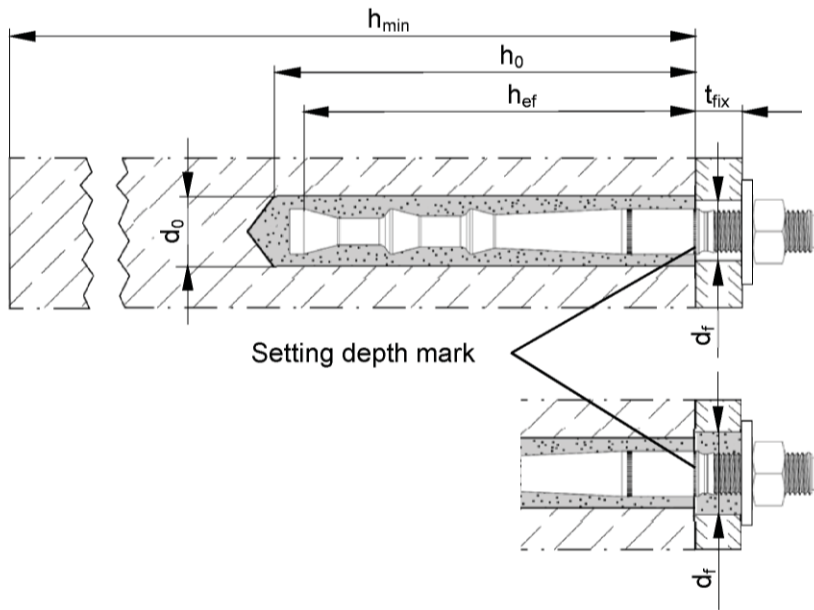
The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

**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



**Highbond-Anchors  
FHB II Inj-A L**  
Pre-positioned anchor

**Highbond-Anchors  
FHB II Inj-A S**  
Push through anchor  
annular gap filled with mortar

**Highbond-Anchors  
FHB II Inj-A S**  
Pre-positioned anchor  
and push through anchor

fischer Highbond-Anchors FHB II Inject

**Product description**  
Installation conditions

**Annex A 1**

Sealing cap

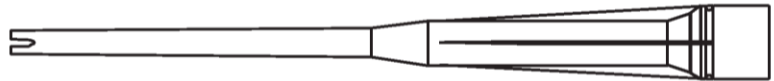
1

**Cartridge sizes** 150 ml, 300 ml (Coaxial cartridge)  
360 ml, 950 ml (Shuttle cartridge)

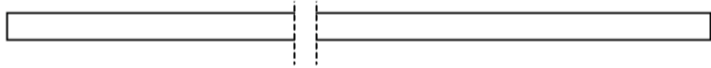
**Imprint:** fischer FIS HB, processing notes, shelf-life, piston travel scale, curing times and processing times (depending on temperature), hazard code, size, volume



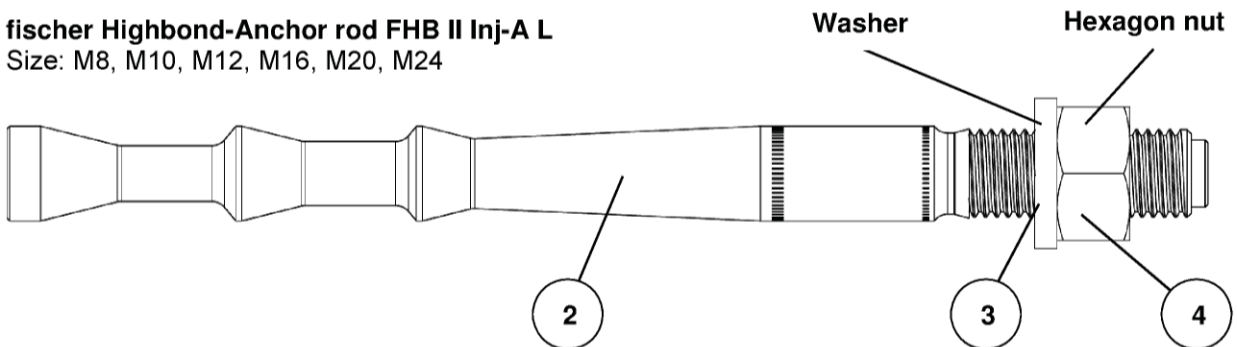
**Static mixer FIS MR or FIS UMR**



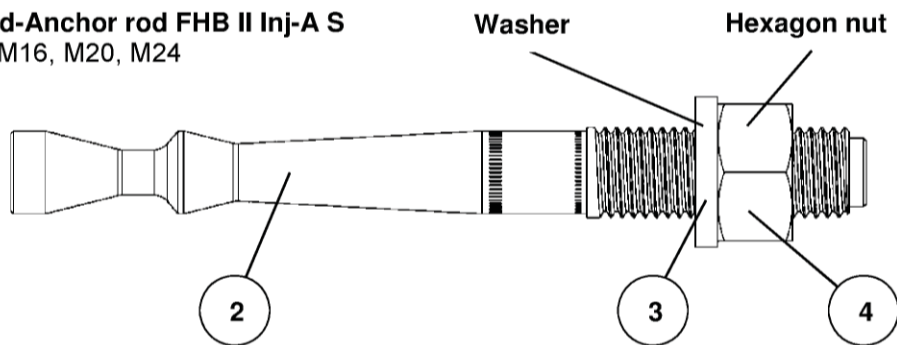
**Extension tube**



**fischer Highbond-Anchor rod FHB II Inj-A L**  
Size: M8, M10, M12, M16, M20, M24



**fischer Highbond-Anchor rod FHB II Inj-A S**  
Size: M10, M12, M16, M20, M24



fischer Highbond-Anchor FHB II Inject

**Product description**

Cartridges / Static mixer / Steel elements

**Annex A 2**

**Table A1: Materials**

| Part | Designation                                                        | Material                                                                                                                                                                            |                                                                                                                                                                                                                         |                                                                                                                                                           |
|------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Mortar cartridge                                                   | Mortar, hardener, filler                                                                                                                                                            |                                                                                                                                                                                                                         |                                                                                                                                                           |
|      | Steel grade                                                        | Steel, zinc plated                                                                                                                                                                  | Stainless steel A4                                                                                                                                                                                                      | High corrosion resistant steel C                                                                                                                          |
| 2    | fischer Highbond-Anchor rod<br>FHB II Inj-A L or<br>FHB II Inj-A S | Property class 8.8;<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>EN ISO 4042:1999 A2K<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12 \%$<br>fracture elongation | Property class 80<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>1.4062, 1.4662, 1.4462<br>EN 10088-1:2014<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12 \%$<br>fracture elongation | Property class 80<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014<br>$f_{uk} \leq 1000 \text{ N/mm}^2$<br>$A_5 > 12 \%$<br>fracture elongation |
| 3    | Washer<br>ISO 7089:2000                                            | zinc plated $\geq 5 \mu\text{m}$ ,<br>EN ISO 4042:1999 A2K                                                                                                                          | 1.4401; 1.4404;<br>1.4578; 1.4571; 1.4439;<br>1.4362<br>EN 10088-1:2014                                                                                                                                                 | 1.4565; 1.4529<br>EN 10088-1:2014                                                                                                                         |
| 4    | Hexagon nut                                                        | Property class 8;<br>EN ISO 898-2:2012<br>zinc plated $\geq 5 \mu\text{m}$ ,<br>ISO 4042:1999 A2K                                                                                   | Property class 70<br>EN ISO 3506-1:2009<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362<br>EN 10088-1:2014                                                                                                         | Property class 70<br>EN ISO 3506-1:2009<br>1.4565; 1.4529<br>EN 10088-1:2014                                                                              |

fischer Highbond-Anchor FHB II Inject

**Product description**  
 Materials
**Annex A 3**

**Specifications of intended use (part 1)****Table B1:** Overview use and performance categories

| Anchorages subject to                                                                                                     |                       | fischer Injection mortar FIS HB with...                                                     |                       |                |                       |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------|-----------------------|----------------|-----------------------|
|                                                                                                                           |                       | FHB II Inj-A L                                                                              |                       | FHB II Inj-A S |                       |
|                                         |                       |                                                                                             |                       |                |                       |
| Hammer drilling with standard drill bit  |                       | all sizes                                                                                   |                       |                |                       |
| Static or quasi static load, in                                                                                           | uncracked concrete    | all sizes                                                                                   | Tables:<br>C1, C3, C5 | all sizes      | Tables:<br>C2, C4, C6 |
|                                                                                                                           | cracked concrete      |                                                                                             |                       |                |                       |
| Use category                                                                                                              | dry or wet concrete   | all sizes                                                                                   |                       |                |                       |
| Kind of intallation                                                                                                       | Pre-positioned anchor | all sizes                                                                                   |                       |                |                       |
|                                                                                                                           | Push through anchor   | all sizes                                                                                   |                       |                |                       |
| Installation temperature                                                                                                  |                       | -5 °C to +40 °C                                                                             |                       |                |                       |
| In-service temperature                                                                                                    |                       | -40 °C to +80 °C (max. long term temperature +50 °C and max. short term temperature +80 °C) |                       |                |                       |

fischer Highbond-Anchor FHB II Inject

**Intended Use**  
 Specifications (part 1)
**Annex B 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:

- Anchorage 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.)
- Anchorage 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 Inject

**Intended Use**  
Specifications (part 2)

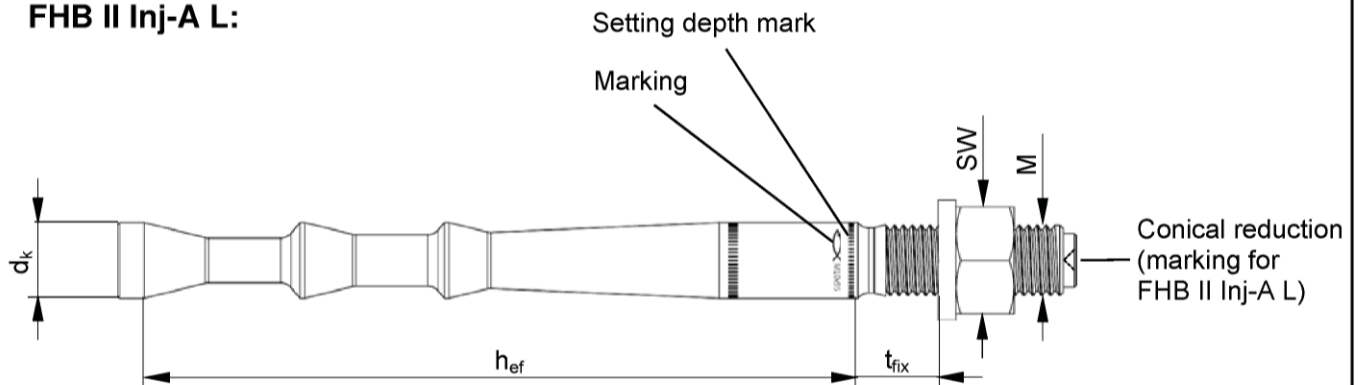
**Annex B 2**

**Table B2:** Installation parameters for fischer Highbond-Anchor rods FHB II Inj-A L

| Size FHB II Inj-A L                                     |                                              |      | M8      | M10     | M12      |          | M16      |          |          | M20      | M24      |
|---------------------------------------------------------|----------------------------------------------|------|---------|---------|----------|----------|----------|----------|----------|----------|----------|
|                                                         |                                              |      | x<br>60 | x<br>95 | x<br>100 | x<br>120 | x<br>125 | x<br>145 | x<br>160 | x<br>210 | x<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 bit diameter                              | d <sub>0</sub>                               |      | 10      | 12      | 14       |          | 18       |          |          | 25       |          |
| Drill hole depth                                        | h <sub>0</sub>                               |      | 66      | 101     | 106      | 126      | 131      | 151      | 166      | 216      |          |
| Effective anchorage depth                               | h <sub>ef</sub>                              |      | 60      | 95      | 100      | 120      | 125      | 145      | 160      | 210      |          |
| Minimum spacing and minimum edge distance               | $s_{min} = c_{min}$                          |      | 40      |         | 50       |          | 55       | 60       | 70       | 90       |          |
| Diameter of clearance hole in the fixture <sup>1)</sup> | pre-positioned anchorage<br>d <sub>f</sub> ≤ |      | 9       | 12      | 14       |          | 18       |          |          | 22       | 26       |
|                                                         | push through anchorage<br>d <sub>f</sub> ≤   |      | 11      | 14      | 16       |          | 20       |          |          | 26       |          |
| Minimum 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> ≤                           | [mm] | 1500    |         |          |          |          |          |          |          |          |

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

### FHB II Inj-A L:



### Marking:

Work symbol, size of anchor, setting depth. e. g.:  $\oslash$  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.

fischer Highbond-Anchor FHB II Inject

### Intended Use

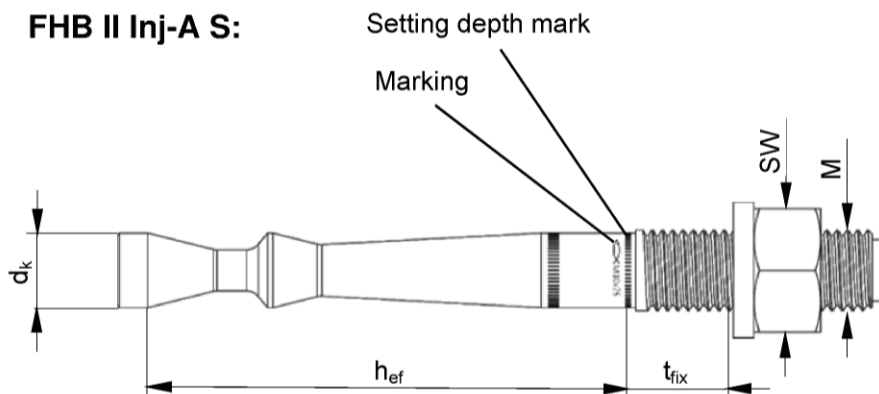
Installation parameters fischer Highbond-Anchor rod FHB II Inj-A L

**Annex B 3**

**Table B3:** Installation parameters for fischer Highbond-Anchor rods FHB II Inj-A S

| Size FHB II Inj-A S                                     |                                                                                          | M10     |         | M12     | M16     | M20      | M24      |    |
|---------------------------------------------------------|------------------------------------------------------------------------------------------|---------|---------|---------|---------|----------|----------|----|
|                                                         |                                                                                          | x<br>60 | x<br>75 | x<br>75 | x<br>95 | x<br>170 | x<br>170 |    |
| 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 bit diameter                              | d <sub>0</sub>                                                                           |         | 10      |         | 12      | 16       | 25       |    |
| Drill hole depth                                        | h <sub>0</sub>                                                                           |         | 66      | 81      | 81      | 101      | 176      |    |
| Effective anchorage depth                               | h <sub>ef</sub>                                                                          |         | 60      | 75      | 75      | 95       | 170      |    |
| Minimum spacing and minimum edge distance               | $\begin{matrix} s_{min} \\ = \\ c_{min} \end{matrix}$                                    |         | 40      |         |         | 50       | 80       |    |
| Diameter of clearance hole in the fixture <sup>1)</sup> | $\begin{matrix} \text{pre-positioned} \\ \text{anchorage} \end{matrix}$ d <sub>f</sub> ≤ |         | 12      |         | 14      | 18       | 22       | 26 |
|                                                         | $\begin{matrix} \text{push through} \\ \text{anchorage} \end{matrix}$ d <sub>f</sub> ≤   |         | 12      |         | 14      | 18       | 26       |    |
| Minimum 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    |         |         |          |          |    |

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

**FHB II Inj-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.

fischer Highbond-Anchor FHB II Inject

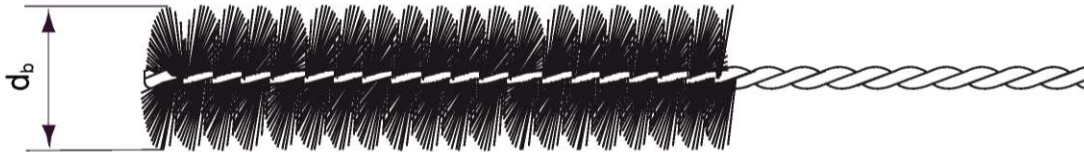
**Intended Use**

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

**Annex B 4**

**Table B4:** Parameters of steel brush FIS BS

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



**Table B5:** 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>$t_{work}$<br>[minutes] | Minimum curing time <sup>1)</sup><br>$t_{cure}$<br>[minutes] |
|----------------------------|----------------------------------------------------|--------------------------------------------------------------|
| -5 to $\pm 0$              | ----                                               | 6 hours                                                      |
| > +1 to +5                 | ----                                               | 3 hours                                                      |
| > +6 to +10                | 15                                                 | 90                                                           |
| > +11 to +20               | 6                                                  | 35                                                           |
| > +21 to +30               | 4                                                  | 20                                                           |
| > +31 to +40               | 2                                                  | 12                                                           |

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

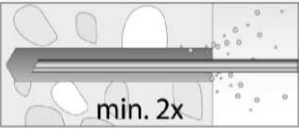
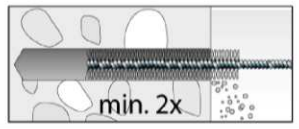
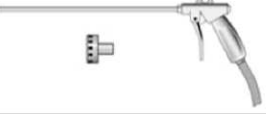
fischer Highbond-Anchor FHB II Inject

**Intended Use**

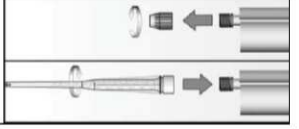
Parameters of steel brush  
 Processing times and curing times

**Annex B 5**

**Installation instruction part 1****Installation with injection mortar FIS HB****Drilling and cleaning the hole**

|   |                                                                                     |                                                                                                                    |                                                                                                                                                                                                     |
|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |    | Drill the hole with hammer drill.<br>Drill hole diameter $d_0$ and drill hole depth $h_0$ see <b>Tables B2, B3</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 B4</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. |

**Preparing the cartridge**

|   |                                                                                     |                                                                                                                     |                                                                                                                                |
|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 5 |  | Remove the sealing cap<br><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 |
|   |  | Observe the processing time, $t_{work}$ see <b>Table B5</b>                                                         | If the processing time is exceeded, use a new static mixer and if necessary remove encrusted material in the cartridge mouth.  |

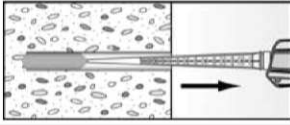
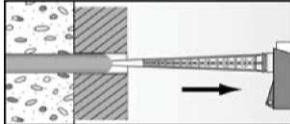
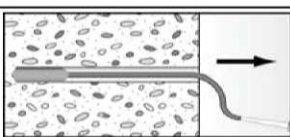
fischer Highbond-Anchor FHB II Inject

**Intended use**  
Installation instruction part 1

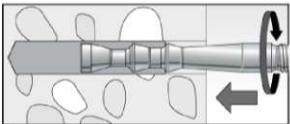
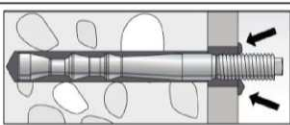
**Annex B 6**

## Installation instruction part 2

### 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.<br>Fill the drill hole with mortar, always begin from the bottom of the hole to avoid bubbles       |
|   |  | <b>Push-through installation:</b><br>By using Highbond-Anchor rods <b>FHB II Inj-A L</b> the drill hole in the fixture must be also filled with mortar.<br>If Highbond-Anchor rods <b>FHB II Inj-A S</b> are used, this is not necessary. |
|   |  | For drill hole depth $\geq 170$ mm<br>use an extension tube                                                                                                                                                                               |

### Installation Highbond-Anchor rod FHB II Inj-A L and FHB II Inj-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, excess mortar must be emerged around the anchor rod                                                 |
|    |   | For overhead installations support the anchor rod with wedges.<br>(e.g. fischer centering wedges)                                   |
| 11 |   | Wait for the specified curing time<br>$t_{\text{cure}}$ see <b>Table B5</b>                                                         |
| 12 |  | Mounting the fixture<br>$T_{\text{inst}}$ see <b>Tables B2 and B3</b>                                                               |

fischer Highbond-Anchor FHB II Inject

**Intended use**  
Installation instruction part 2

**Annex B 7**

**Table C1: Characteristic values under static or quasi-static tension load for fischer Highbond-Anchors FHB II Inj-A L**

| Size FHB II Inj-A L                                        |                                  |          | M8                | M10  | M12  |      | M16               |     |     | M20               | M24 |
|------------------------------------------------------------|----------------------------------|----------|-------------------|------|------|------|-------------------|-----|-----|-------------------|-----|
|                                                            |                                  |          | x                 | x    | x    | x    | x                 | x   | x   | x                 | x   |
|                                                            |                                  |          | 60                | 95   | 100  | 120  | 125               | 145 | 160 | 210               | 210 |
| Bearing capacity under tensile load, steel failure         |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| 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 |          |                   |      |      |      |                   |     |     |                   |     |
| Partial safety factors <sup>1)</sup>                       |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| 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> |      |      |      |                   |     |     |                   |     |
| Pullout failure in cracked concrete C20/25                 |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>2)</sup> |      |      |      |                   |     |     |                   |     |
| Pullout and splitting failure in uncracked concrete C20/25 |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>2)</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               |     |
| Pullout and splitting failure in uncracked concrete C20/25 |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$ <sup>3)</sup>         | [kN]     | 20                | 35   | 40   | 50   | --- <sup>2)</sup> | 75  | 95  | --- <sup>2)</sup> |     |
| Edge distance                                              | $c_{cr,sp}$                      | [mm]     | 1,5 $h_{ef}$      |      |      |      |                   |     |     |                   |     |
| Spacing                                                    | $s_{cr,sp}$                      |          | 3,0 $h_{ef}$      |      |      |      |                   |     |     |                   |     |
| Factors for the compressive strength of concrete > C20/25  |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| 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 |      |      |                   |     |     |                   |     |
| Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3         |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| Uncracked concrete                                         | $k_{ucr}$                        | [-]      | 10,1              |      |      |      |                   |     |     |                   |     |
| Cracked concrete                                           | $k_{cr}$                         |          | 7,2               |      |      |      |                   |     |     |                   |     |
| Concrete cone failure                                      |                                  |          |                   |      |      |      |                   |     |     |                   |     |
| Effective anchorage depth                                  | $h_{ef}$                         | [mm]     | 60                | 95   | 100  | 120  | 125               | 145 | 160 | 210               |     |
| Partial safety factor <sup>1)4)</sup>                      | $\gamma_{Mc}$                    | [-]      | 1,5               | 1,5  |      |      |                   |     |     |                   |     |

<sup>1)</sup> In absence of other national regulations<sup>2)</sup> Not decisive (proof of splitting failure acc. ETAG 001, Annex C)<sup>3)</sup> Proof of splitting failure acc. ETAG 001, Annex C, (Section 5.3). Instead of  $N_{Rk,c}^0$  use  $N_{Rk,p}$ .<sup>4)</sup>  $\gamma_2 = 1,0$  is included

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**Performances**

Characteristic values under static or quasi-static tension load for fischer Highbond-Anchor FHB II Inj-A L (uncracked or cracked concrete)

**Annex C 1**

**Table C2: Characteristic values under static or quasi-static tension load for fischer Highbond-Anchors FHB II Inj-A S**

| Size FHB II Inj-A S                                        |                                  |          | M10               |      | M12  | M16  | M20               | M24 |
|------------------------------------------------------------|----------------------------------|----------|-------------------|------|------|------|-------------------|-----|
|                                                            |                                  |          | x                 | x    | x    | x    | x                 | x   |
|                                                            |                                  |          | 60                | 75   | 75   | 95   | 170               | 170 |
| Bearing capacity under tensile load, steel failure         |                                  |          |                   |      |      |      |                   |     |
| 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 |          |                   |      |      |      |                   |     |
| Partial safety factors <sup>1)</sup>                       |                                  |          |                   |      |      |      |                   |     |
| 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> |      |      |      |                   |     |
| Pullout failure in cracked concrete C20/25                 |                                  |          |                   |      |      |      |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>2)</sup> |      |      |      |                   |     |
| Pullout and splitting failure in uncracked concrete C20/25 |                                  |          |                   |      |      |      |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$                       | [kN]     | --- <sup>2)</sup> |      |      |      |                   |     |
| Edge distance                                              | $c_{cr,sp}$                      | [mm]     | 300               |      |      | 340  | 510               |     |
| Spacing                                                    | $s_{cr,sp}$                      |          | 150               |      |      | 170  | 255               |     |
| Pullout and splitting failure in uncracked concrete C20/25 |                                  |          |                   |      |      |      |                   |     |
| Characteristic resistance                                  | $N_{Rk,p}$ <sup>3)</sup>         | [kN]     | 20                | 25   |      | 40   | --- <sup>2)</sup> |     |
| Edge distance                                              | $c_{cr,sp}$                      | [mm]     | 1,5 $h_{ef}$      |      |      |      |                   |     |
| Spacing                                                    | $s_{cr,sp}$                      |          | 3,0 $h_{ef}$      |      |      |      |                   |     |
| Factors for the compressive strength of concrete > C20/25  |                                  |          |                   |      |      |      |                   |     |
| 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 |      |      |                   |     |
| Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3         |                                  |          |                   |      |      |      |                   |     |
| Uncracked concrete                                         | $k_{ucr}$                        | [-]      | 10,1              |      |      |      |                   |     |
| Cracked concrete                                           | $k_{cr}$                         |          | 7,2               |      |      |      |                   |     |
| Concrete cone failure                                      |                                  |          |                   |      |      |      |                   |     |
| Effective anchorage depth                                  | $h_{ef}$                         | [mm]     | 60                | 75   |      | 95   | 170               |     |
| Partial safety factor <sup>1)4)</sup>                      | $\gamma_{Mc}$                    | [-]      | 1,5               | 1,5  |      |      |                   |     |

<sup>1)</sup> In absence of other national regulations

<sup>2)</sup> Not decisive (proof of splitting failure acc. ETAG 001, Annex C)

<sup>3)</sup> Proof of splitting failure acc. ETAG 001, Annex C, (Section 5.3). Instead of  $N_{Rk,c}^0$  use  $N_{Rk,p}$ .

<sup>4)</sup>  $\gamma_2 = 1,0$  is included

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#### Performances

Characteristic values under static or quasi-static tension load for fischer Highbond-Anchor FHB II Inj-A S (uncracked or cracked concrete)

**Annex C 2**

**Table C3: Characteristic values under static or quasi-static shear load for fischer Highbond-Anchor FHB II Inj-A L (uncracked and cracked concrete)**

| Size FHB II Inj-A L                                                                          |                                                                  |                 |      | M8   | M10  | M12  |     | M16  |     | M20  | M24   |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------|------|------|------|------|-----|------|-----|------|-------|
|                                                                                              |                                                                  |                 |      | x    | x    | x    | x   | x    | x   | x    | x     |
|                                                                                              |                                                                  |                 |      | 60   | 95   | 100  | 120 | 125  | 145 | 160  | 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<br>High corrosion<br>resistant steel C        |                 |      | 14,6 | 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<br>and<br>High corrosion<br>resistant steel C |                 |      | 31   | 62   | 105  |     | 266  |     | 519  | 896   |
| Partial safety factors                                                                       |                                                                  |                 |      |      |      |      |     |      |     |      |       |
| 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  |      |      |     |      |     |      |       |
| Concrete pry-out failure                                                                     |                                                                  |                 |      |      |      |      |     |      |     |      |       |
| Factor k acc. TR029<br>Section 5.2.3.3 or<br>$k_3$ acc.CEN/TS 1992-4-5:2009<br>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

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**Leistungen**

Charakteristische Werte für statische oder quasi-statische Querkzugbelastung von fischer Highbond- Ankern FHB II – A L (ungerissener oder gerissener Beton)

**Annex C 3**

**Table C4: Characteristic values under static or quasi-static shear load for fischer Highbond-Anchor FHB II Inj-A S (uncracked and cracked concrete)**

| Size FHB II Inj-A S                                                                          |                                                         |                                | M10     |         | M12     | M16     | M20      | M24      |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------|---------|---------|---------|---------|----------|----------|
|                                                                                              |                                                         |                                | x<br>60 | x<br>75 | x<br>75 | x<br>95 | x<br>170 | x<br>170 |
| Bearing capacity under shear load, steel failure                                             |                                                         |                                |         |         |         |         |          |          |
| without lever arm                                                                            |                                                         |                                |         |         |         |         |          |          |
| Characteristic resistance                                                                    | Steel, zinc plated                                      | V <sub>Rk,s</sub>              | [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      |
| with lever arm                                                                               |                                                         |                                |         |         |         |         |          |          |
| Characteristic bending moment                                                                | Steel, zinc plated                                      | M <sup>0</sup> <sub>Rk,s</sub> | [Nm]    | 62      | 105     | 266     | 519      | 896      |
|                                                                                              | Stainless steel A4 and High corrosion resistant steel C |                                |         | 62      | 105     | 266     | 519      | 896      |
|                                                                                              |                                                         |                                |         |         |         |         |          |          |
| Partial safety factors                                                                       |                                                         |                                |         |         |         |         |          |          |
| Partial safety factor <sup>1)</sup>                                                          |                                                         | γ <sub>Ms,V</sub>              | [-]     | 1,25    |         |         |          |          |
| Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1                                |                                                         | k <sub>2</sub>                 | [-]     | 1,0     |         |         |          |          |
| Concrete pry-out failure                                                                     |                                                         |                                |         |         |         |         |          |          |
| Factor k acc. TR029 Section 5.2.3.3 or k <sub>3</sub> acc.CEN/TS 1992-4-5:2009 Section 6.3.3 |                                                         | k <sub>(3)</sub>               | [-]     | 2,0     |         |         |          |          |
| Partial safety factors <sup>1)</sup>                                                         |                                                         | γ <sub>Mcp</sub>               | [-]     | 1,5     |         |         |          |          |
| Concrete edge failure                                                                        |                                                         |                                |         |         |         |         |          |          |
| Effective length of anchor                                                                   |                                                         | l <sub>f</sub>                 | [mm]    | 60      | 75      | 95      | 170      |          |
| Calculation diameter                                                                         |                                                         | d                              |         | 10      | 12      | 16      | 25       |          |
| Partial safety factor <sup>1)</sup>                                                          |                                                         | γ <sub>Mc</sub>                | [-]     | 1,5     |         |         |          |          |

<sup>1)</sup> In absence of other national regulations

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**Performances**

Characteristic values under static or quasi-static shear load for fischer Highbond-Anchor FHB II Inj-A S (uncracked and cracked concrete)

**Annex C 4**

**Table C5: Displacement** for fischer **Highbond-Anchor FHB II Inj-A L**

| Size FHB II Inj-A L              | M8<br>x<br>60 | M10<br>x<br>95 | M12<br>x<br>100    x<br>120 |      | x<br>125 | M16<br>x<br>145 | x<br>160 | M20<br>x<br>210 | M24<br>x<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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**Performances**

Displacement for fischer Highbond-Anchor FHB II Inj-A L

**Annex C 5**

**Table C6: Displacement** for fischer **Highbond-Anchor FHB II Inj-A S**

| Size FHB II Inj-A S              | M10  |      | M12  | M16  | M20  | M24 |
|----------------------------------|------|------|------|------|------|-----|
|                                  | x    | x    | x    | x    | x    | x   |
|                                  | 60   | 75   | 75   | 95   | 170  | 170 |
| Displacement under tension load  |      |      |      |      |      |     |
| Cracked concrete                 |      |      |      |      |      |     |
| 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  |      |      |      |      |     |
| Uncracked concrete               |      |      |      |      |      |     |
| Tension load [kN]                | 9,3  | 15,6 | 22,3 | 53,3 |      |     |
| $\delta_{N0}$ [mm]               | 0,2  |      |      |      | 0,5  |     |
| $\delta_{N\infty}$               | 1,7  |      |      |      |      |     |
| Displacement under shear load    |      |      |      |      |      |     |
| Uncracked or cracked concrete    |      |      |      |      |      |     |
| Steel zinc plated                |      |      |      |      |      |     |
| 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  |      |      |     |
| Stainless steel A4               |      |      |      |      |      |     |
| 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  |      |     |
| High corrosion resistant steel C |      |      |      |      |      |     |
| 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 Inject

**Performances**

Displacement for fischer Highbond-Anchor FHB II Inj-A S

**Annex C 6**