



PRESTATIEVERKLARING

DoP 0355

voor fischer Highbond-Anchor FHB / FHB dyn / FDA (Verbonden expansiebevestiging voor gebruik in beton)

NL

1. Unieke identificatiecode van het producttype:

DoP 0355
2. Beoogd(e) gebruik(en):

Bevestigingen in gescheurd of ongescheurd beton, zie bijlage, met name de bijlagen B1 - B19.
3. Fabrikant:

fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Duitsland
4. Gemachtigde:

-
5. Het systeem of de systemen voor de beoordeling en verificatie van de prestatiebestendigheid:

1
6. Europees beoordelingsdocument:

EAD 330499-02-0601, Edition 12/2023

Europese technische beoordeling:

ETA-06/0171; 2024-07-10

Technische beoordelingsinstantie:

DIBt- Deutsches Institut für Bautechnik

Aangemelde instantie(s):

2873 TU Darmstadt
7. Aangegeven prestatie(s):

Mechanische weerstand en stabiliteit (BWR 1)

Kenmerkende weerstand tegen trekbelasting (statische en quasi-statische belasting):

1) Weerstand tegen staalbreuk: zie bijlage, met name bijlage C1

2) Weerstand tegen uittrekken: zie bijlage, met name de bijlagen C2, C3

3) Weerstand tegen betonnen kegelbreuk: zie bijlage, met name bijlage C2

4) Randafstand om spleetbreuk onder belasting te voorkomen: zie bijlage, met name bijlage C2

5) Robuustheid: zie bijlage, met name de bijlagen C2, C3

6) Montagekoppel: zie bijlage, met name de bijlagen B5-B8

7) Minimale rand- en hartafstand, Dikte van het onderdeel: zie bijlage, met name de bijlagen B5-B8

Kenmerkende weerstand tegen schuifbelasting (statische en quasi-statische belasting):

8) Weerstand tegen staalbreuk: zie bijlage, met name bijlage C1

9) Weerstand tegen uitbreken (pryout): zie bijlage, met name bijlage C2

10) Weerstand tegen bezwijken van betonranden: zie bijlage, met name bijlage C2

Verplaatsingen onder korte- en langetermijnbelading:

11) Verplaatsingen onder korte- en langetermijnbelading: zie bijlage, met name bijlage C4

12) Weerstand in staalvezelversterkt beton: zie bijlage, met name de bijlagen B3, B4, C1-C4

Kenmerkende weerstand en verplaatsingen voor de seismische prestatiecategorieën C1 en C2:

13) Trekkraftweerstand, categorie C1: zie bijlage, met name bijlage C5

14) Trekkraftweerstand, categorie C2: NPD

15) Weerstand afschuifbelasting, categorie C1: zie bijlage, met name bijlage C5

16) Weerstand afschuifbelasting, categorie C2: NPD

Veiligheid in geval van brand (BWR 2)

17) Reactie op brand: Klasse (A1)

Weerstand tegen vuur:

18) Weerstand bij brand, staalbreuk (trekbelasting): NPD

19) Weerstand tegen hechting onder brandomstandigheden: NPD

20) Weerstand bij brand, staalbreuk (afschuifbelasting): NPD

Hygiëne, gezondheid en milieu (BWR 3)

21) Content, emission and/or release of dangerous substances: NPD

8. Geëigende technische documentatie en/of specifieke technische documentatie:

-

De prestaties van het hierboven omschreven product zijn conform de aangegeven prestaties. Deze prestatieverklaring wordt in overeenstemming met Verordening (EU) nr. 305/2011 onder de exclusieve verantwoordelijkheid van de hierboven vermelde fabrikant verstrekt.

Ondertekend voor en namens de fabrikant door:

Dr. Ronald Mihala, Hoofd ontwikkeling en productiebeheer  
Tumlingen, 2024-10-08

Jürgen Grün, Directeur Chemie & Kwaliteit

Deze DoP is opgesteld in meerdere talen. In het geval van geschillen over de interpretatie zal de Engelse tekst altijd prevaleren.

Het aanhangsel bevat vrijwillige en aanvullende informatie in het Engels die de (taal-neutraal gespecificeerde) wettelijke vereisten overschrijdt.

Fischer DATA DOP\_EC\_s\_V102.xlsm

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Translation guidance Essential Characteristics and Performance Parameters for Annexes

Vertaal assistent van de essentiële kenmerken en eigenschappen voor bijlagen

|                                                                                           |                                                                                                                              |                                                                                                                                                               |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mechanical resistance and stability (BWR 1)                                               |                                                                                                                              |                                                                                                                                                               |
| Mechanische weerstand en stabiliteit (BWR 1)                                              |                                                                                                                              |                                                                                                                                                               |
| Characteristic resistance to tension load (static and quasi-static loading):              |                                                                                                                              |                                                                                                                                                               |
| Kenmerkende weerstand tegen trekbelasting (statische en quasi-statische belasting):       |                                                                                                                              |                                                                                                                                                               |
| 1                                                                                         | Resistance to steel failure:<br>Weerstand tegen staalbreuk:                                                                  | $N_{Rk,s}$ [kN]                                                                                                                                               |
| 2                                                                                         | Resistance to combined pull- out and concrete cone failure:<br>Weerstand tegen uittrekken:                                   | $\tau_{Rk}$ and/or $\tau_{Rk,100}$ [N/mm <sup>2</sup> ],<br>$\psi_c$ , $\psi_{sus}^0$ , $\psi_{sus,100}$ [-] (BF)                                             |
|                                                                                           | Resistance to pull-out failure:<br>Weerstand tegen uittrekken:                                                               | $N_{Rk,p}$ and/or $N_{Rk,p,100}$ [kN], $\psi_c$ [-] (BEF)                                                                                                     |
| 3                                                                                         | Resistance to concrete cone failure:<br>Weerstand tegen betonnen kegelbreuk:                                                 | $c_{cr,N}$ [mm], $k_{cr,N}$ , $k_{ucr,N}$ [-]                                                                                                                 |
| 4                                                                                         | Edge distance to prevent splitting under load:<br>Randafstand om spleetbreuk onder belasting te voorkomen:                   | $c_{cr,sp}$ [mm]                                                                                                                                              |
| 5                                                                                         | Robustness:<br>Robuustheid:                                                                                                  | $\gamma_{inst}$ [-]                                                                                                                                           |
| 6                                                                                         | Maximum installation torque:<br>Montagekoppel:                                                                               | $\max T_{inst}$ [Nm] (BF)                                                                                                                                     |
|                                                                                           | Installation torque:<br>Montagekoppel:                                                                                       | $T_{inst}$ [Nm] (BEF)                                                                                                                                         |
| 7                                                                                         | Minimum edge distance,spacing and member thickness:<br>Minimale rand- en hartafstand, Dikte van het onderdeel:               | $c_{min}$ , $s_{min}$ , $h_{min}$ [mm]                                                                                                                        |
| Characteristic resistance to shear load (static and quasi-static loading):                |                                                                                                                              |                                                                                                                                                               |
| Kenmerkende weerstand tegen schuifbelasting (statische en quasi-statische belasting):     |                                                                                                                              |                                                                                                                                                               |
| 8                                                                                         | Resistance to steel failure:<br>Weerstand tegen staalbreuk:                                                                  | $V_{Rk,s}^0$ [kN], $M_{Rk,s}^0$ [Nm], $k_7$ [-]                                                                                                               |
| 9                                                                                         | Resistance to pry-out failure:<br>Weerstand tegen uitbreken (pryout):                                                        | $k_8$ [-]                                                                                                                                                     |
| 10                                                                                        | Resistance to concrete edge failure:<br>Weerstand tegen bezwijken van betonranden:                                           | $d_{nom}$ , $l_f$ [mm]                                                                                                                                        |
| Displacements under short-term and long-term loading:                                     |                                                                                                                              |                                                                                                                                                               |
| Verplaatsingen onder korte- en langetermijnbelading:                                      |                                                                                                                              |                                                                                                                                                               |
| 11                                                                                        | Displacements factors under short-term and long-term loading:<br>Verplaatsingen onder korte- en langetermijnbelading:        | $\delta_0$ , $\delta_\infty$ [mm/(N/mm <sup>2</sup> )] or [mm/kN]                                                                                             |
| 12                                                                                        | Resistance in steel fibre reinforced concrete:<br>Weerstand in staalvezelversterkt beton:                                    | Description                                                                                                                                                   |
| Characteristic resistance and displacements for seismic performance categories C1 and C2: |                                                                                                                              |                                                                                                                                                               |
| Kenmerkende weerstand en verplaatsingen voor de seismische prestatiecategorieën C1 en C2: |                                                                                                                              |                                                                                                                                                               |
| 13                                                                                        | Resistance to tension for seismic performance category C1<br>Trekkrachtweerstand, categorie C1:                              | $N_{Rk,s,C1}$ [kN] (all)<br>$\tau_{Rk,C1}$ [N/mm <sup>2</sup> ] (BF)<br>$N_{Rk,p,C1}$ [kN] (BEF)                                                              |
| 14                                                                                        | Resistance to tension and displacements for seismic performance category C2<br>Trekkrachtweerstand, categorie C2:            | $N_{Rk,s,C2}$ [kN] (all)<br>$\tau_{Rk,C2}$ [N/mm <sup>2</sup> ] (BF)<br>$N_{Rk,p,C2}$ [kN] (BEF)<br>$\delta_{N,C2(50\%)}$ , $\delta_{N,C2(100\%)}$ [mm] (all) |
| 15                                                                                        | Resistance to shear for seismic performance category C1<br>Weerstand afschuifbelasting, categorie C1:                        | $V_{Rk,s,C1}$ [kN] (all)                                                                                                                                      |
| 16                                                                                        | Resistance to shear load and displacements for seismic performance category C2<br>Weerstand afschuifbelasting, categorie C2: | $V_{Rk,s,C2}$ [kN] (all)<br>$\delta_{V,C2(50\%)}$ , $\delta_{V,C2(100\%)}$ [mm] (all)                                                                         |
| Safety in case of fire (BWR 2)                                                            |                                                                                                                              |                                                                                                                                                               |
| Veiligheid in geval van brand (BWR 2)                                                     |                                                                                                                              |                                                                                                                                                               |
| 17                                                                                        | Reaction to fire<br>Reactie op brand:                                                                                        | Class<br>Klasse (A1)                                                                                                                                          |
| Resistance to fire                                                                        |                                                                                                                              |                                                                                                                                                               |
| Weerstand tegen vuur:                                                                     |                                                                                                                              |                                                                                                                                                               |
| 18                                                                                        | Fire resistance to steel failure (tension load):<br>Weerstand bij brand, staalbreuk (trekbelasting):                         | $N_{Rk,s,fi}$ [kN]                                                                                                                                            |
| 19                                                                                        | Bond resistance under fire conditions:<br>Weerstand tegen hechting onder brandomstandigheden:                                | $k_{fi,p}(\theta)$ [-],<br>$\tau_{Rk,fi}(\theta)$ [N/mm <sup>2</sup> ] (BF)                                                                                   |
| 20                                                                                        | Fire resistance to steel failure under shear loading:<br>Weerstand bij brand, staalbreuk (afschuifbelasting):                | $V_{Rk,s,fi}$ [kN], $M_{Rk,s,fi}^0$ [Nm]                                                                                                                      |
| Hygiene, health and the environment (BWR 3)                                               |                                                                                                                              |                                                                                                                                                               |
| Hygiëne, gezondheid en milieu (BWR 3)                                                     |                                                                                                                              |                                                                                                                                                               |
| 21                                                                                        | Content, emission and/or release of dangerous substances:<br>Content, emission and/or release of dangerous substances:       | Description/Level                                                                                                                                             |

## Specific Part

### 1 Technical description of the product

The fischer Highbond-Anchor FHB / FHB dyn / FDA is a bonded expansion fastener consisting of an injection cartridge FIS HB and a steel element. The steel element is made of zinc plated or stainless steel.

The load transfer is realized by mechanical interlock of several cones in the bonding mortar and a combination of bonding and friction forces in the 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 resistance to tension load (static and quasi-static loading)       | See Annex C1 to C3, B5 to B8 |
| Characteristic resistance to shear load (static and quasi-static loading)         | See Annex C1 and C2          |
| Displacements under short-term and long-term loading                              | See Annex C4                 |
| Characteristic resistance for seismic performance categories C1                   | See Annex C5                 |
| Characteristic resistance and displacements for seismic performance categories C2 | No performance assessed      |

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

| Essential characteristic | Performance             |
|--------------------------|-------------------------|
| Reaction to fire         | Class A1                |
| Resistance to fire       | No performance assessed |

#### 3.3 Hygiene, health and the environment (BWR 3)

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

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

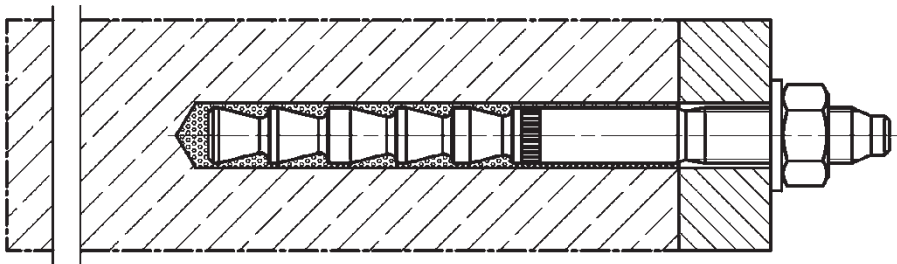
In accordance with the European Assessment Document EAD 330499-02-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

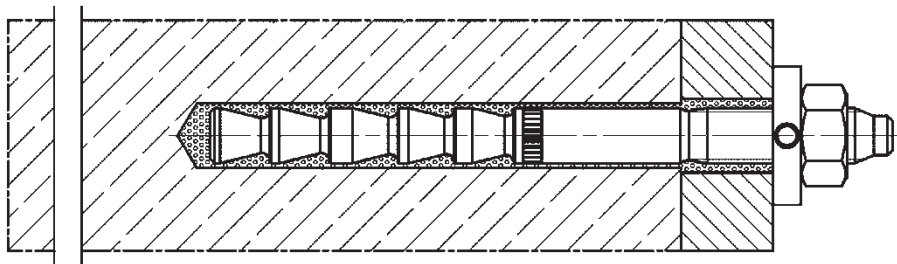
**Installation conditions part 1, FHB / FHB N**

**fischer Highbond-Anchor FHB / FHB N with fischer injection system FIS HB**

**Pre-positioned installation**



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



Figures not to scale

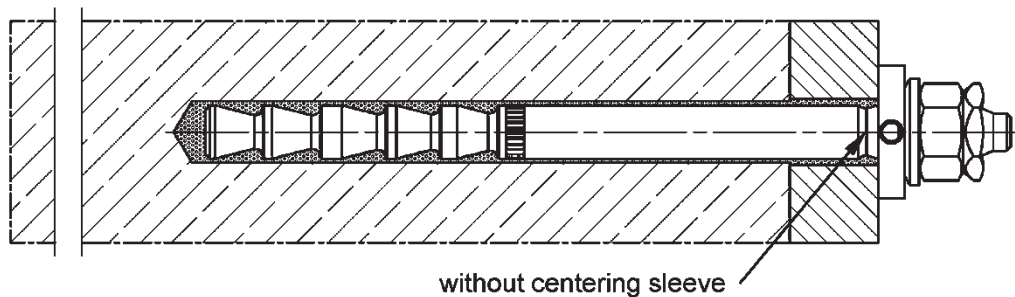
**fischer Highbond-Anchor FHB / FHB dyn / FDA**

**Product description**  
Installation conditions part 1, fischer Highbond-Anchor FHB / FHB N

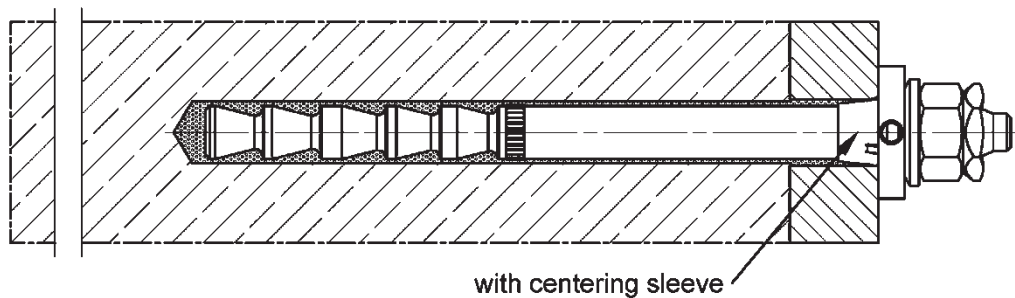
**Annex A1**  
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**Installation conditions part 2, FHB dyn**

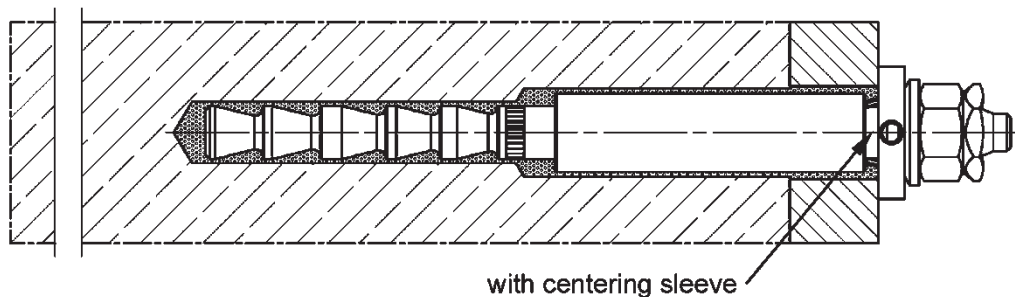
**fischer Highbond-Anchor dynamic FHB dyn with fischer injection system FIS HB**  
**Pre-positioned installation without shear force sleeve, FHB dyn (annular gap filled with mortar)**



**Push through installation without shear force sleeve, FHB dyn (annular gap filled with mortar)**



**Push through installation with shear force sleeve, FHB dyn V (annular gap filled with mortar)**



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

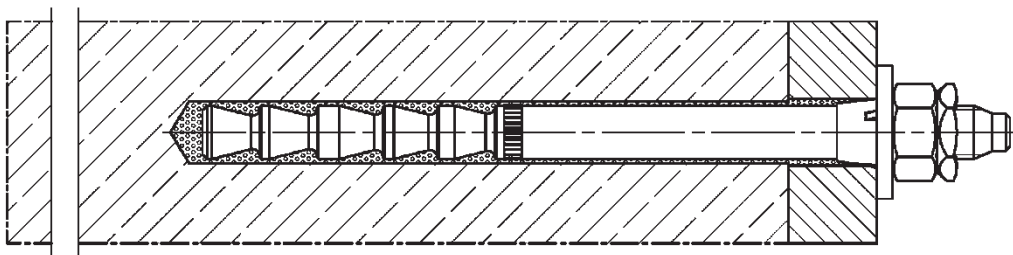
**Product description**  
Installation conditions part 2, fischer Highbond-Anchor FHB dyn

**Annex A2**  
Appendix 4 / 39

**Installation conditions part 3, FDA**

**fischer Dynamic-Anchor FDA with fischer injection system FIS HB**

**Push through installation (annular gap filled with mortar)**



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

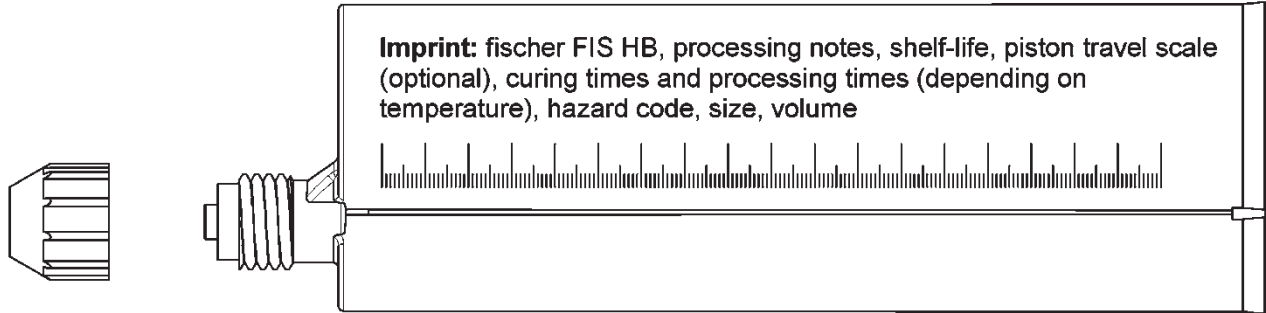
**Product description**  
Installation conditions part 3, fischer Dynamic-Anchor FDA

**Annex A3**

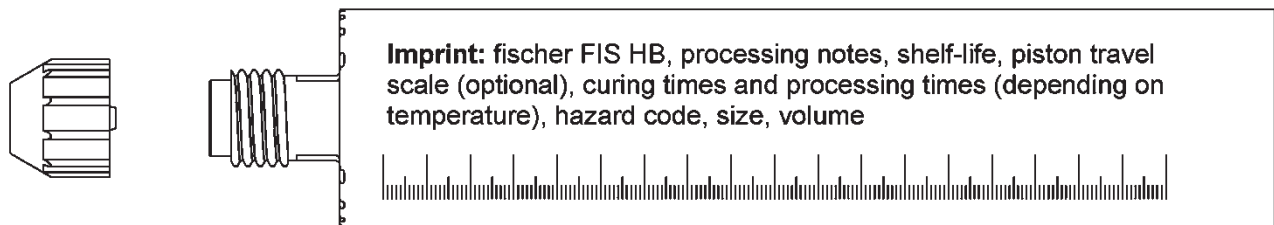
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# Overview system components part 1

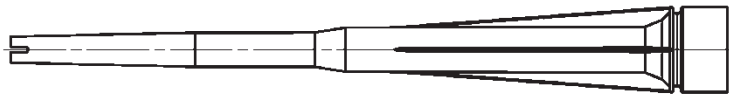
**Injection cartridge (shuttle cartridge) with sealing cap**  
Size: 360 ml, 825 ml



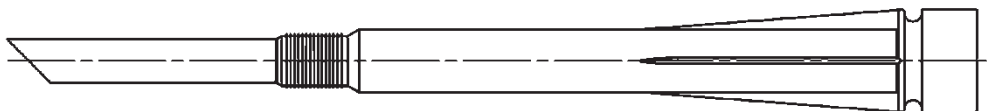
**Injection cartridge (coaxial cartridge) with sealing cap**  
Size: 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



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



**Static mixer FIS JMR for injection cartridge 825 ml**



**Injection adapter and extension tube Ø 9 for static mixer FIS MR Plus;**  
**Injection adapter and extension tube Ø 9 or Ø 15 for static mixer FIS JMR**



**Injection adapter**



Figures not to scale

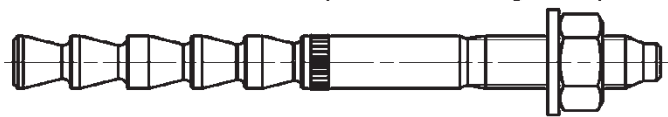
fischer Highbond-Anchor FHB / FHB dyn / FDA

**Product description**  
Overview system components part 1  
cartridges / static mixer / accessories

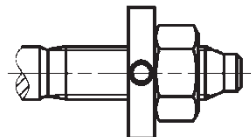
**Annex A4**  
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Overview system components part 2

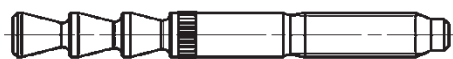
fischer Highbond-Anchor FHB / FHB N (alternative designation)



fischer anchor rod FHB-A / FHB-A N; Size: M10x60



alternative version



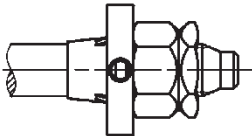
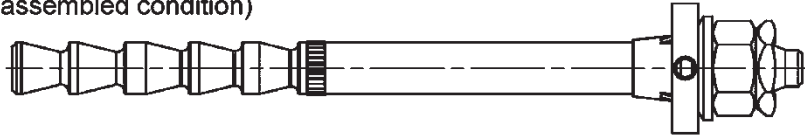
fischer anchor rod FHB-A / FHB-A N; Size: M12x80



fischer anchor rod FHB-A / FHB-A N; Size: M12x100, M16x125, M20x170, M24x220

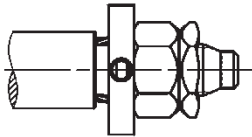
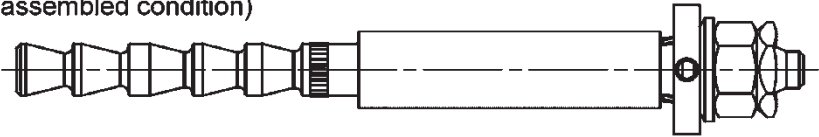


fischer Highbond-Anchor dynamic FHB dyn without shear force sleeve  
(in assembled condition)



alternative version:  
hexagonal nut with  
spherical contact surface

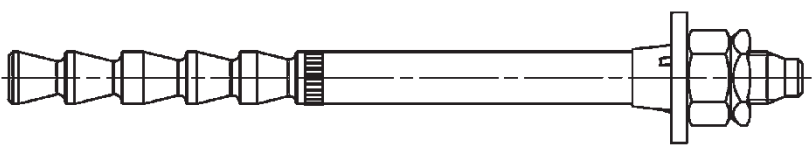
fischer Highbond-Anchor dynamic FHB dyn V with shear force sleeve  
(in assembled condition)



fischer anchor rod FHB-A dyn; Size: M12, M16, M20, M24



fischer Dynamic-Anchor FDA



fischer anchor rod FDA-A; Size: M12, M16

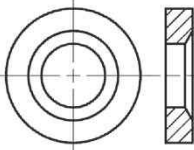
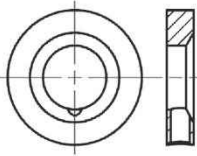
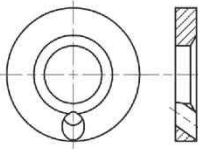
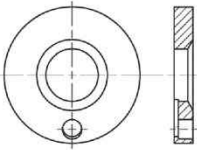
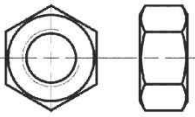
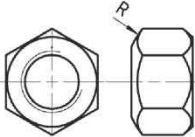
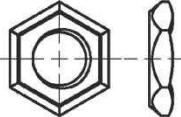
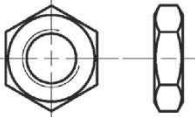
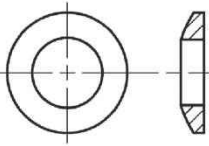
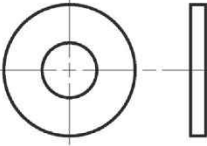
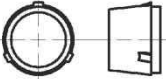


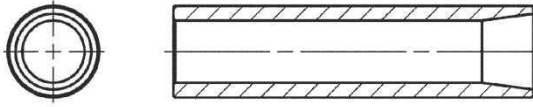
Figures not to scale

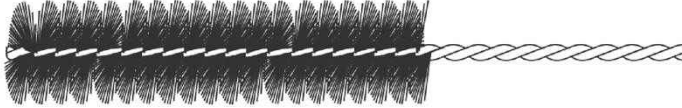
fischer Highbond-Anchor FHB / FHB dyn / FDA

Product description  
Overview system components part 2  
Metal parts

Overview system components part 3

|                                                                                                             |                                                                                                                                          |                                                                                                                                                                         |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>conical washer</b><br>without drill hole                                                                 | <b>fischer filling disc (various versions)</b>                                                                                           |                                                                                                                                                                         |                                                                                                                 |
|                             | <b>radial</b><br>                                       | <b>angular</b><br>                                                                     | <b>axial</b><br>             |
| <b>hexagon nut</b><br>     | <b>hexagonal nut with spherical contact surface</b><br> | <b>lock nut</b><br>                                                                    | <b>hexagon nut, flat</b><br> |
| <b>spherical washer</b><br> | <b>washer</b><br>                                       | <b>centering sleeve</b><br> <b>only push through installation;<br/>FHB dyn and FDA</b> |                                                                                                                 |

|                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------|
| <b>shear force sleeve (only FHB dyn V)</b><br> |
|----------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|
| <b>cleaning brush BS</b><br> |
|------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>blow-out pump ABP with cleaning nozzle or ABG</b><br> |
|----------------------------------------------------------------------------------------------------------------------------------------------|

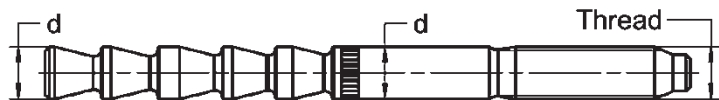
|                                                                                                                 |                                    |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>fischer Highbond-Anchor FHB / FHB dyn / FDA</b>                                                              |                                    |
| <b>Product description</b><br>Overview system components part 3<br>Metal parts / cleaning brush / blow-out pump | <b>Annex A6</b><br>Appendix 8 / 39 |

Figures not to scale

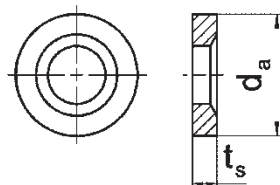
Table A7.1: Dimensions system components, FHB / FHB N

| Designation                              |            | FHB<br>10x60 | FHB<br>12x80 | FHB<br>12x100 | FHB<br>16x125 | FHB<br>20x170 | FHB<br>24x220 |
|------------------------------------------|------------|--------------|--------------|---------------|---------------|---------------|---------------|
| Thread                                   | [-]        | M10          | M12          | M12           | M16           | M20           | M24           |
| Anchor rod                               | d          | 10           | 12           | 12            | 16,5          | 22            | 24,5          |
| Conical washer /<br>fischer filling disc | $\geq d_a$ | 26           | 30           | 30            | 38            | 46            | 54            |
|                                          | $t_s$      | 6            | 6            | 6             | 7             | 8             | 10            |

Anchor rod:



Conical washer /  
fischer filling disc:  
(various versions see  
Annex A6)



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

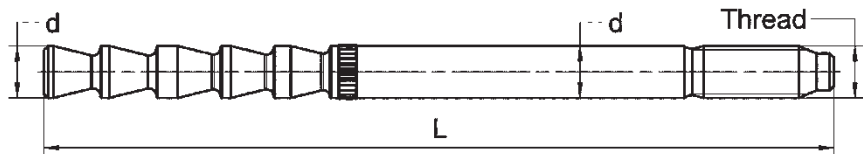
**Product description**  
Dimensions system components, FHB / FHB N

**Annex A7**  
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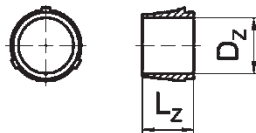
**Table A8.1: Dimensions system components, FHB dyn / FHB dyn V**

| Designation                              |                    | [-]  | FHB dyn<br>without<br>shear force sleeve |                   |                   |                   | FHB dyn V<br>with<br>shear force sleeve |                     |
|------------------------------------------|--------------------|------|------------------------------------------|-------------------|-------------------|-------------------|-----------------------------------------|---------------------|
|                                          |                    |      | FHB dyn<br>12x100                        | FHB dyn<br>16x125 | FHB dyn<br>20x170 | FHB dyn<br>24x220 | FHB dyn<br>12x100 V                     | FHB dyn<br>16x125 V |
| Thread                                   |                    |      | M12                                      | M16               | M20               | M24               | M12                                     | M16                 |
| Anchor rod                               | d                  | [mm] | 12                                       | 16,5              | 22                | 24,5              | 12                                      | 16,5                |
|                                          | L <sub>min</sub>   |      | 135                                      | 168               | 220               | 280               | 140                                     | 173                 |
|                                          | L <sub>max</sub>   |      | 467                                      | 530               | 575               | 475               | 337                                     | 367                 |
| Centering sleeve                         | D <sub>z</sub>     |      | 11,8                                     | 16,3              | 21,8              | 24,3              | 11,8                                    | 16,3                |
|                                          | L <sub>z</sub>     |      | 11                                       | 13                | 15                | 15                | 11                                      | 13                  |
| Conical washer /<br>fischer filling disc | ≥ d <sub>a</sub>   |      | 30                                       | 38                | 46                | 54                | 30                                      | 38                  |
|                                          | t <sub>s</sub>     |      | 6                                        | 7                 | 8                 | 10                | 6                                       | 7                   |
| Shear force sleeve                       | L <sub>Q,min</sub> |      | -                                        | -                 | -                 | -                 | 40                                      | 55                  |
|                                          | L <sub>Q,max</sub> |      | -                                        | -                 | -                 | -                 | 230                                     | 245                 |
|                                          | D <sub>Q</sub>     |      | -                                        | -                 | -                 | -                 | 17,5                                    | 23,5                |

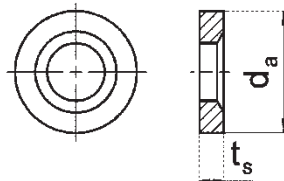
Anchor rod:



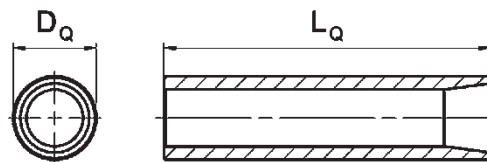
Centering sleeve:  
(only push through  
installation)



Conical washer /  
fischer filling disc:  
(various versions see  
Annex A6)



Shear force sleeve:  
(only FHB dyn V)



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Product description**

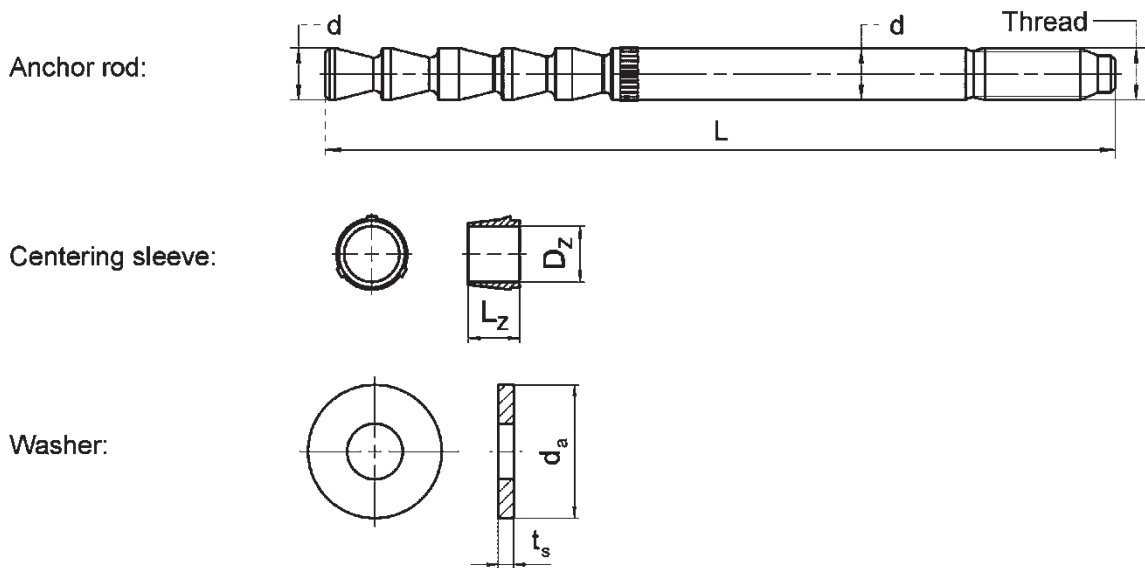
Dimensions system components, FHB dyn / FHB dyn V

**Annex A8**

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**Table A9.1: Dimensions system components, FDA**

| Designation      |                    |      | FDA 12x100 | FDA 16x125 |
|------------------|--------------------|------|------------|------------|
| Thread           |                    | [-]  | M12        | M16        |
| Anchor rod       | d                  | [mm] | 12         | 16,5       |
|                  | L <sub>min</sub>   |      | 135        | 168        |
|                  | L <sub>max</sub>   |      | 467        | 530        |
| Centering sleeve | D <sub>z</sub>     |      | 11,8       | 16,3       |
|                  | L <sub>z</sub>     |      | 11         | 13         |
| Washer           | ≥ d <sub>a</sub>   |      | 30         | 40         |
|                  | t <sub>s,min</sub> |      | 3,5        | 4          |
|                  | t <sub>s,max</sub> |      | 7          | 8          |



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Product description**  
Dimensions system components, FDA

**Table A10.1: Materials, FHB / FHB N zinc plated (zp) and hot dip galvanised (hdg)**

| Part | Designation                                                        | Material                                                                                                                                                            |                                                                                                                                                                                           |                                                                                                                                                                                                 |
|------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Injection cartridge                                                | Mortar, hardener, filler                                                                                                                                            |                                                                                                                                                                                           |                                                                                                                                                                                                 |
|      | Steel grade                                                        | Steel                                                                                                                                                               |                                                                                                                                                                                           |                                                                                                                                                                                                 |
|      |                                                                    | zinc plated (zp)                                                                                                                                                    |                                                                                                                                                                                           | hot dip galvanised (hdg)                                                                                                                                                                        |
|      |                                                                    | M10 to M16                                                                                                                                                          | M20 to M24                                                                                                                                                                                | M10 to M24                                                                                                                                                                                      |
| 2    | fischer anchor rod<br>FHB-A and FHB-A N                            | Property class 5.8<br>Property class 8.8<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022<br>$A_5 > 12\%$<br>fracture elongation<br>coated | $f_{uk} = 550 \text{ N/mm}^2$<br>$f_{yk} = 440 \text{ N/mm}^2$<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022<br>$A_5 > 12\%$<br>fracture elongation<br>coated | Property class 8.8<br>EN ISO 898-1:2013<br>hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004+AC:2009<br>$A_5 > 12\%$<br>fracture elongation<br>varnish layer<br>coated (M16 to M24) |
| 3    | Washer<br>ISO 7089:2000                                            | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                                                   |                                                                                                                                                                                           | hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004+AC:2009                                                                                                                           |
| 4    | Conical washer or<br>fischer filling disc<br>similar to DIN 6319-G | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                                                   |                                                                                                                                                                                           | hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004+AC:2009                                                                                                                           |
| 5    | Hexagon nut                                                        | Property class 8<br>EN ISO 898-2:2022<br>zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                          |                                                                                                                                                                                           | Property class 8<br>EN ISO 898-2:2022<br>hot dip galvanised $\geq 40 \mu\text{m}$<br>EN ISO 10684:2004+AC:2009                                                                                  |

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Product description**

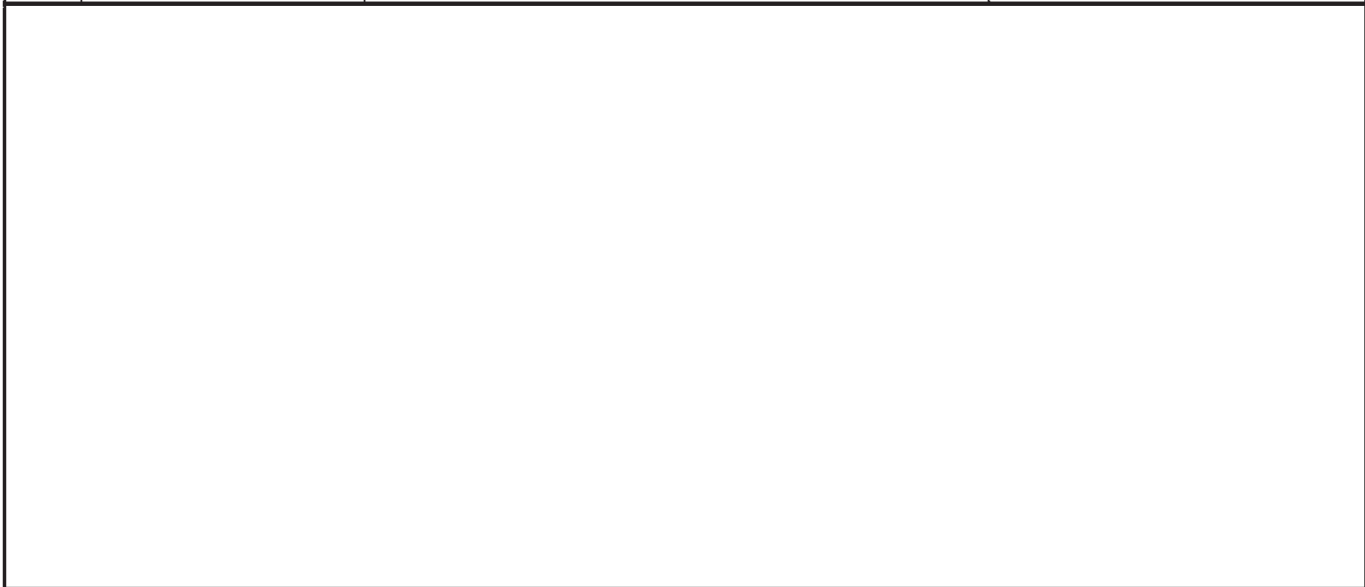
Materials, FHB / FHB N zinc plated (zp) and hot dip galvanised (hdg)

**Annex A10**

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**Table A11.1: Materials, FHB / FHB N stainless steel**

| Part | Designation                                                        | Material                                                                                                                                                                                          |                                                                                                                                                                                                                                                    |                                                                                                                                                                                     |
|------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Injection cartridge                                                | Mortar, hardener, filler                                                                                                                                                                          |                                                                                                                                                                                                                                                    |                                                                                                                                                                                     |
|      | Steel grade                                                        | Stainless steel R                                                                                                                                                                                 |                                                                                                                                                                                                                                                    | High corrosion resistant steel HCR                                                                                                                                                  |
|      |                                                                    | acc. to EN 10088-1:2023<br>Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015                                                                                                    |                                                                                                                                                                                                                                                    | acc. to EN 10088-1:2023<br>Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015                                                                                        |
|      |                                                                    | M10 to M16                                                                                                                                                                                        | M20 to M24                                                                                                                                                                                                                                         | M10 to M24                                                                                                                                                                          |
| 2    | fischer anchor rod FHB-A and FHB-A N                               | Property class 80<br>EN ISO 3506-1:2020<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>1.4062, 1.4662, 1.4462;<br>EN 10088-1:2023<br>A <sub>5</sub> > 12%<br>fracture elongation coated | Property class 70 with<br>f <sub>yk</sub> = 560 N/mm <sup>2</sup><br>EN ISO 3506-1:2020<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: 2023<br>A <sub>5</sub> > 12%<br>fracture elongation coated | Property class 70 with<br>f <sub>yk</sub> = 560 N/mm <sup>2</sup><br>EN ISO 3506-1:2020<br>1.4565; 1.4529<br>EN 10088-1: 2023<br>A <sub>5</sub> > 12%<br>fracture elongation coated |
| 3    | Washer<br>ISO 7089:2000                                            | 1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1: 2023                                                                                                                            |                                                                                                                                                                                                                                                    | 1.4565; 1.4529;<br>EN 10088-1: 2023                                                                                                                                                 |
| 4    | Conical washer or<br>fischer filling disc<br>similar to DIN 6319-G | 1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1: 2023                                                                                                                            |                                                                                                                                                                                                                                                    | 1.4565; 1.4529;<br>EN 10088-1: 2023                                                                                                                                                 |
| 5    | Hexagon nut                                                        | Property class 70 or 80<br>EN ISO 3506-2:2020<br>1.4401; 1.4404; 1.4578;<br>1.4571; 1.4439; 1.4362;<br>EN 10088-1: 2023                                                                           |                                                                                                                                                                                                                                                    | Property class 70 or 80<br>EN ISO 3506-2:2020<br>1.4565; 1.4529;<br>EN 10088-1: 2023                                                                                                |



**Table A12.1: Materials, FHB dyn**

| Part | Designation                                                        | Material                                                                                                                                   |                                                                                                                                                           |
|------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Injection cartridge                                                | Mortar, hardener, filler                                                                                                                   |                                                                                                                                                           |
|      | Steel grade                                                        | Steel                                                                                                                                      | High corrosion resistant steel HCR                                                                                                                        |
|      |                                                                    | zinc plated (zp)                                                                                                                           | acc. to EN 10088-1:2023<br>Corrosion resistance class CRC V<br>acc. to EN 1993-1-4:2006+A1:2015                                                           |
|      |                                                                    | M12 to M24                                                                                                                                 | M12 to M16                                                                                                                                                |
| 2    | fischer anchor rod<br>FHB-A dyn                                    | Property class 8.8<br>EN ISO 898-1:2013<br>zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022<br>$A_5 > 12\%$ fracture elongation<br>coated | Property class 70 with<br>$f_{yk} = 560 \text{ N/mm}^2$<br>EN ISO 3506-1:2020<br>1.4529<br>EN 10088-1:2023<br>$A_5 > 12 \%$ fracture elongation<br>coated |
| 3    | Centering sleeve                                                   | Plastic                                                                                                                                    |                                                                                                                                                           |
| 4    | Conical washer or<br>fischer filling disc<br>similar to DIN 6319-G | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                          | 1.4529<br>EN 10088-1: 2023                                                                                                                                |
| 5    | Spherical washer                                                   | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                          | 1.4529<br>EN 10088-1:2023                                                                                                                                 |
| 6a   | Hexagon nut                                                        | Property class 8<br>EN ISO 898-2:2022<br>zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                 | Property class 70 or 80<br>EN ISO 3506-2:2020<br>1.4529<br>EN 10088-1: 2023                                                                               |
| 6b   | hexagonal nut with<br>spherical contact<br>surface                 |                                                                                                                                            |                                                                                                                                                           |
| 7a   | Lock nut                                                           | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                          | 1.4529<br>EN 10088-1: 2023                                                                                                                                |
| 7b   | hexagon nut,<br>flat                                               |                                                                                                                                            |                                                                                                                                                           |
| 8    | Shear force sleeve                                                 | zinc plated $\geq 5 \mu\text{m}$<br>ISO 4042:2022                                                                                          | ---                                                                                                                                                       |

**fischer Highbond-Anchor FHB / FHB dyn / FDA**

**Product description**  
Materials, FHB dyn

## Annex A12

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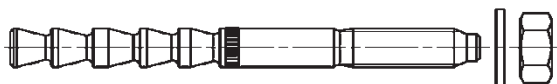
| Table A13.1: Materials, FDA |                             |                                                                                                                                                   |
|-----------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Part                        | Designation                 | Material                                                                                                                                          |
| 1                           | Injection cartridge         | Mortar, hardener, filler                                                                                                                          |
|                             | Steel grade                 | Steel                                                                                                                                             |
|                             |                             | zinc plated (zp)                                                                                                                                  |
|                             |                             | M12 to M16                                                                                                                                        |
| 2                           | fischer anchor rod<br>FDA-A | Property class 8.8<br>EN ISO 898-1:2013<br>zinc plated $\geq 5\text{ }\mu\text{m}$<br>ISO 4042:2022<br>$A_5 > 12\%$ fracture elongation<br>coated |
| 3                           | Centering sleeve            | Plastic                                                                                                                                           |
| 4                           | Washer                      | zinc plated $\geq 5\text{ }\mu\text{m}$<br>ISO 4042:2022                                                                                          |
| 5                           | Hexagon nut                 | Property class 8<br>EN ISO 898-2:2022<br>zinc plated $\geq 5\text{ }\mu\text{m}$<br>ISO 4042:2022                                                 |
| 6                           | Lock nut                    | zinc plated $\geq 5\text{ }\mu\text{m}$<br>ISO 4042:2022                                                                                          |

|  |  |  |
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|                                              |  |                                      |
|----------------------------------------------|--|--------------------------------------|
| fischer Highbond-Anchor FHB / FHB dyn / FDA  |  | <b>Annex A13</b><br>Appendix 15 / 39 |
| <b>Product description</b><br>Materials, FDA |  |                                      |

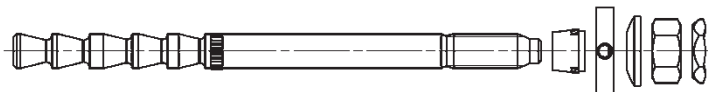
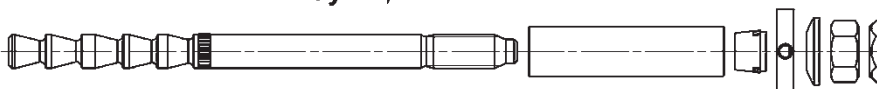
# Specifications of intended use (part 1), FHB / FHB N

**Table B1.1:** Overview use and performance categories, FHB / FHB N

| fischer Highbond-Anchor FHB / FHB N with FIS HB                                                                                                            |                                                                                         |                                                                                                                                   |                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                                                                          |                                                                                         |                                                                                                                                   |                                                                            |
| Hammer drilling with standard drill bit                                                                                                                    | <div>all sizes;<br/>Nominal drill bit diameter (d<sub>0</sub>)<br/>12 mm to 28 mm</div> |                                                                                                                                   |                                                                            |
| Hammer drilling with hollow drill bit<br>(fischer "FHD"; Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD"; DreBo „D-Plus“; DreBo „D-Max“) |                                                                                         |                                                                                                                                   |                                                                            |
| Static and quasi-static loading, in concrete without fibers                                                                                                | uncracked concrete<br>cracked concrete                                                  | all sizes;<br>M10 to M24                                                                                                          | Tables:<br>C1.1<br>C2.1<br>C3.1                                            |
| Static and quasi-static loading, in concrete with fibers                                                                                                   | uncracked concrete<br>cracked concrete                                                  | sizes:<br>M12x100<br>M16x125                                                                                                      | Tables:<br>C1.1<br>C2.1<br>C3.2                                            |
| Seismic performance category C1                                                                                                                            |                                                                                         | _1)                                                                                                                               |                                                                            |
| Use category                                                                                                                                               | I1 dry or wet concrete                                                                  | all sizes; M10 to M24                                                                                                             |                                                                            |
|                                                                                                                                                            | I2 water filled hole                                                                    | all sizes; M10 to M24                                                                                                             |                                                                            |
| Installation direction                                                                                                                                     |                                                                                         | D3<br>Downwards, horizontal and upwards (overhead) installation                                                                   |                                                                            |
| Installation method                                                                                                                                        |                                                                                         | pre-positioned or push through installation                                                                                       |                                                                            |
| Installation temperature                                                                                                                                   |                                                                                         | FIS HB: T <sub>i,min</sub> = -5 °C to T <sub>i,max</sub> = +40 °C<br>for the standard variation of temperature after installation |                                                                            |
| In-service temperature                                                                                                                                     | Temperature range I:                                                                    | -40 °C to +40 °C                                                                                                                  | (max. short term temperature +40 °C;<br>max. long term temperature +24 °C) |
|                                                                                                                                                            | Temperature range II:                                                                   | -40 °C to +80 °C                                                                                                                  | (max. short term temperature +80 °C;<br>max. long term temperature +50 °C) |
| 1) no performance assessed.                                                                                                                                |                                                                                         |                                                                                                                                   |                                                                            |
| fischer Highbond-Anchor FHB / FHB dyn / FDA                                                                                                                |                                                                                         |                                                                                                                                   | Annex B1<br>Appendix 16 / 39                                               |
| Intended use<br>Specifications (part 1), FHB / FHB N                                                                                                       |                                                                                         |                                                                                                                                   |                                                                            |

# Specifications of intended use (part 2), FHB dyn

**Table B2.1:** Overview use and performance categories, FHB dyn

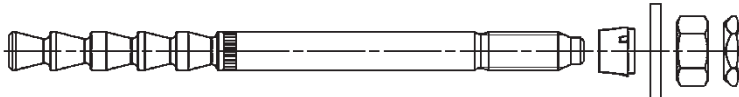
| fischer Highbond-Anchor dynamic FHB dyn with FIS HB                                                                                                                                                                                                                |                        |                                                                                                                                                                                                                |                                                                            |                                                                                                                                                  |                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|                                                                                                                                                                                                                                                                    |                        | <b>FHB-A dyn</b> , without shear force sleeve<br>(picture with centering sleeve; use only for push through installation)<br> |                                                                            |                                                                                                                                                  |                                 |
|                                                                                                                                                                                                                                                                    |                        | <b>FHB-A dyn V</b> , with shear force sleeve<br>                                                                             |                                                                            |                                                                                                                                                  |                                 |
|                                                                                                                                                                                                                                                                    |                        | <b>FHB dyn</b>                                                                                                                                                                                                 |                                                                            | <b>FHB dyn V</b>                                                                                                                                 |                                 |
| Hammer drilling with standard drill bit                                                                                                                                           |                        | all sizes;<br>Nominal drill bit diameter (d <sub>0</sub> )<br>14 mm to 28 mm                                                                                                                                   |                                                                            | all sizes;<br>Nominal drill bit diameter (d <sub>0</sub> )<br>14 mm and 18 mm<br>Nominal drill bit diameter (d <sub>1</sub> )<br>20 mm and 28 mm |                                 |
| Hammer drilling with hollow drill bit <br>(fischer "FHD", Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD"; Hilti "TE-CD, TE-YD"; DreBo „D-Plus“; DreBo „D-Max“) |                        |                                                                                                                                                                                                                |                                                                            |                                                                                                                                                  |                                 |
| Static and quasi-static loading, in concrete without fibers                                                                                                                                                                                                        | uncracked concrete     | all sizes;<br>M12 to M24                                                                                                                                                                                       | Tables:<br>C1.1<br>C2.1<br>C3.1                                            | all sizes;<br>M12 and M16                                                                                                                        | Tables:<br>C1.1<br>C2.1<br>C3.1 |
|                                                                                                                                                                                                                                                                    | cracked concrete       |                                                                                                                                                                                                                |                                                                            |                                                                                                                                                  |                                 |
| Static and quasi-static loading, in concrete with fibers                                                                                                                                                                                                           | uncracked concrete     | sizes:<br>M12 and M16                                                                                                                                                                                          | Tables:<br>C1.1<br>C2.1<br>C3.2                                            | all sizes;<br>M12 and M16                                                                                                                        | Tables:<br>C1.1<br>C2.1<br>C3.2 |
|                                                                                                                                                                                                                                                                    | cracked concrete       |                                                                                                                                                                                                                |                                                                            |                                                                                                                                                  |                                 |
| Seismic performance category C1 in concrete without fibres                                                                                                                                                                                                         |                        | Size: M16                                                                                                                                                                                                      | Tables:<br>C5.1-C5.3                                                       | _1)                                                                                                                                              | _1)                             |
| Use category                                                                                                                                                                                                                                                       | I1 dry or wet concrete | all sizes; M12 to M24                                                                                                                                                                                          |                                                                            | all sizes; M12 and M16                                                                                                                           |                                 |
|                                                                                                                                                                                                                                                                    | I2 water filled hole   | all sizes; M12 to M24                                                                                                                                                                                          |                                                                            | all sizes; M12 and M16                                                                                                                           |                                 |
| Installation direction                                                                                                                                                                                                                                             |                        | D3<br>Downwards, horizontal and upwards (overhead) installation                                                                                                                                                |                                                                            |                                                                                                                                                  |                                 |
| Installation method                                                                                                                                                                                                                                                |                        | pre-positioned or push through installation                                                                                                                                                                    |                                                                            | push through installation                                                                                                                        |                                 |
| Installation temperature                                                                                                                                                                                                                                           |                        | FIS HB: T <sub>i,min</sub> = -5 °C to T <sub>i,max</sub> = +40 °C<br>for the standard variation of temperature after installation                                                                              |                                                                            |                                                                                                                                                  |                                 |
| In-service temperature                                                                                                                                                                                                                                             | Temperature range I:   | -40 °C to +40 °C                                                                                                                                                                                               | (max. short term temperature +40 °C;<br>max. long term temperature +24 °C) |                                                                                                                                                  |                                 |
|                                                                                                                                                                                                                                                                    | Temperature range II:  | -40 °C to +80 °C                                                                                                                                                                                               | (max. short term temperature +80 °C;<br>max. long term temperature +50 °C) |                                                                                                                                                  |                                 |

<sup>1)</sup> no performance assessed.

|                                                  |  |                                     |
|--------------------------------------------------|--|-------------------------------------|
| fischer Highbond-Anchor FHB / FHB dyn / FDA      |  | <b>Annex B2</b><br>Appendix 17 / 39 |
| Intended use<br>Specifications (part 2), FHB dyn |  |                                     |

# Specifications of intended use (part 3), FDA

**Table B3.1:** Overview use and performance categories, FDA

| fischer Dynamic-Anchor FDA with FIS HB                                                                            |                                                                                   |                                                                                                                                      |                                                                            |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                                                                                                                   |                                                                                   |                                                    |                                                                            |
| Hammer drilling with standard drill bit                                                                           |  | all sizes;<br>Nominal drill bit diameter (d <sub>0</sub> )<br>14 mm and 18 mm                                                        |                                                                            |
| Hammer drilling with hollow drill bit                                                                             |  |                                                                                                                                      |                                                                            |
| (fischer "FHD"; Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD"; DreBo „D-Plus“; DreBo „D-Max“) |                                                                                   |                                                                                                                                      |                                                                            |
| Static and quasi-static loading, in concrete without fibers                                                       | <div>uncracked concrete</div> <div>cracked concrete</div>                         | all sizes;<br>M12 and M16                                                                                                            | Tables:<br>C1.1<br>C2.1<br>C3.1                                            |
| Static and quasi-static loading, in concrete with fibers                                                          | <div>uncracked concrete</div> <div>cracked concrete</div>                         | all sizes;<br>M12 and M16                                                                                                            | Tables:<br>C1.1<br>C2.1<br>C3.2                                            |
| Seismic performance category C1                                                                                   |                                                                                   | _1)                                                                                                                                  |                                                                            |
| Use category                                                                                                      | I1    dry or wet concrete                                                         | all sizes; M12 and M16                                                                                                               |                                                                            |
|                                                                                                                   | I2    water filled hole                                                           | all sizes; M12 and M16                                                                                                               |                                                                            |
| Installation direction                                                                                            |                                                                                   | D3<br>Downwards, horizontal and upwards (overhead) installation                                                                      |                                                                            |
| Installation method                                                                                               |                                                                                   | push through installation                                                                                                            |                                                                            |
| Installation temperature                                                                                          |                                                                                   | FIS HB:    T <sub>i,min</sub> = -5 °C to T <sub>i,max</sub> = +40 °C<br>for the standard variation of temperature after installation |                                                                            |
| In-service temperature                                                                                            | Temperature range I:                                                              | -40 °C to +40 °C                                                                                                                     | (max. short term temperature +40 °C;<br>max. long term temperature +24 °C) |
|                                                                                                                   | Temperature range II:                                                             | -40 °C to +80 °C                                                                                                                     | (max. short term temperature +80 °C;<br>max. long term temperature +50 °C) |

<sup>1)</sup> no performance assessed.

|                                                             |                                             |
|-------------------------------------------------------------|---------------------------------------------|
| fischer Highbond-Anchor FHB / FHB dyn / FDA                 | <p><b>Annex B3</b><br/>Appendix 18 / 39</p> |
| <p><b>Intended use</b><br/>Specifications (part 3), FDA</p> |                                             |

## Specifications of intended use (part 4)

### Base materials:

- Compacted reinforced or unreinforced normal weight concrete of strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021.
- For steel fibre reinforced concrete according to EN 206:2013+A2:2021 with steel fibers in accordance to EN 14889-1:2006, clause 5, group I. The maximum content of steel fibres is 80 kg/m<sup>3</sup>.

### Use conditions (Environmental conditions):

- Fastener intended for use in structures subject to dry internal conditions (all materials).
- For all other conditions according to EN 1993-1-4: 2006+A1:2015 corresponding to corrosion resistance classes to Annex A11 table A11.1 (FHB / FHB N) or Annex A12 table A12.1 (FHB dyn).

### Design:

- Fastenings 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.)
- Fastenings are designed in accordance with:
  - EN 1992-4:2018 and
  - EOTA Technical Report TR 055, Edition February 2018.
- Fastenings in steel fibre reinforced concrete can be designed according to EN 1992-4:2018. The performance for normal weight concrete of strength classes C20/25 to C50/60 without fibres applies.

### Installation:

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

fischer Highbond-Anchor FHB / FHB dyn / FDA

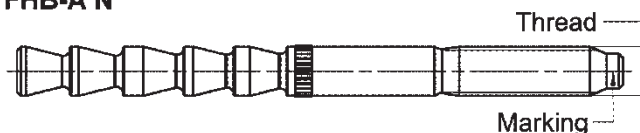
**Intended use**  
Specifications (part 4)

**Annex B4**

Appendix 19 / 39

**Table B5.1: Installation parameters for fischer Highbond-Anchor FHB / FHB N**

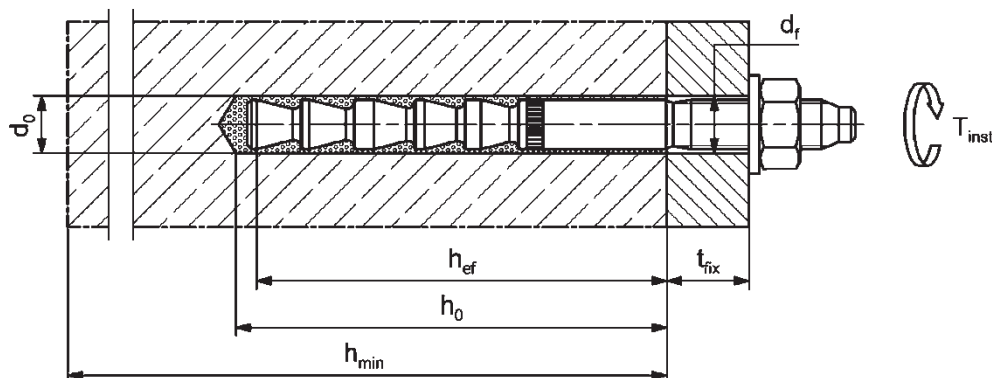
| Designation                                                                                                                           |                                               |                                                    | FHB<br>10x60        | FHB<br>12x80 | FHB<br>12x100 |                                                      | FHB<br>16x125 |       | FHB<br>20x170 | FHB<br>24x220 |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|---------------------|--------------|---------------|------------------------------------------------------|---------------|-------|---------------|---------------|
| Thread                                                                                                                                |                                               | [-]                                                | M10                 | M12          | M12           |                                                      | M16           |       | M20           | M24           |
| Nominal drill hole diameter                                                                                                           | d <sub>0</sub>                                | [mm]                                               | 12                  | 14           | 14            |                                                      | 18            |       | 24            | 28            |
| Drill hole depth                                                                                                                      | h <sub>0</sub>                                |                                                    | h <sub>ef</sub> + 5 |              |               |                                                      |               |       |               |               |
| Effective embedment depth                                                                                                             | h <sub>ef</sub>                               |                                                    | 60                  | 80           | 100           |                                                      | 125           |       | 170           | 220           |
| Minimum thickness of concrete member                                                                                                  | h <sub>min</sub>                              |                                                    | 120                 | 160          | 130           |                                                      | 160           |       | 220           | 440           |
| Minimum spacing                                                                                                                       | s <sub>min</sub>                              |                                                    | 60                  | 80           | 100           | 100                                                  | 100           | 100   | 80            | 180           |
| Minimum edge distance                                                                                                                 | c <sub>min</sub>                              |                                                    |                     |              | 200           | 100                                                  | 200           | 100   |               |               |
| Thickness of concrete member                                                                                                          | h                                             |                                                    | ≥ 120               | ≥ 160        | ≥ 130         | ≥ 200                                                | ≥ 160         | ≥ 250 | ≥ 220         | ≥ 440         |
| h <sub>min</sub> ≤ h ≤ 2h <sub>ef</sub> :<br>s <sub>1</sub> ≥ s <sub>min</sub> = 100 mm<br>c <sub>1</sub> ≥ c <sub>min</sub> = 100 mm |                                               |                                                    | [mm]                | -            |               | [(3 • c <sub>1</sub> + s <sub>1</sub> ) • h] ≥ 88000 |               |       |               | -             |
| Calculation c <sub>req</sub> :<br>s <sub>1</sub> and h available                                                                      |                                               | c <sub>req</sub> ≥ (88000/h – s <sub>1</sub> ) / 3 |                     |              |               |                                                      |               |       |               |               |
| Calculation s <sub>req</sub> :<br>c <sub>1</sub> and h available                                                                      |                                               | s <sub>req</sub> ≥ 88000/h – 3 • c <sub>1</sub>    |                     |              |               |                                                      |               |       |               |               |
| Diameter of clearance hole of the fixture                                                                                             | pre-positioned installation<br>d <sub>f</sub> | [mm]                                               | 12                  | 14           | 14            |                                                      | 18            |       | 22            | 26            |
|                                                                                                                                       | push through installation<br>d <sub>f</sub>   |                                                    | 14                  | 16           | 16            |                                                      | 20            |       | 26            | 30            |
| Installation torque                                                                                                                   | T <sub>inst</sub>                             | [Nm]                                               | 20                  | 40           | 40            |                                                      | 60            |       | 100           | 120           |

**fischer anchor rod FHB-A / FHB-A N****Marking fischer anchor rod:**

work symbol, thread diameter, embedment depth e.g.:  16 x 125

For anchor rod property class 5.8 additional "5.8"

For stainless steel additional "R" and for high corrosion resistant steel additional "HCR".

**Installation conditions:**

Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Intended use**

Installation parameters fischer Highbond-Anchor FHB / FHB N

**Annex B5**

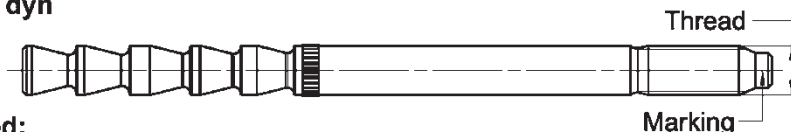
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**Table B6.1: Installation parameters for fischer Highbond-Anchor dynamic without shear force sleeve FHB dyn**

| Designation                                                                                                        |                 | FHB dyn<br>12x100                          | FHB dyn<br>16x125                      | FHB dyn<br>20x170 | FHB dyn<br>24x220 |
|--------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------|----------------------------------------|-------------------|-------------------|
| Thread                                                                                                             | [-]             | M12                                        | M16                                    | M20               | M24               |
| Nominal drill hole diameter                                                                                        | $d_0$           | 14                                         | 18                                     | 24                | 28                |
| Drill hole depth                                                                                                   | $h_{0,min}$     | $h_{ef} + 5$                               |                                        |                   |                   |
| Effective embedment depth                                                                                          | $h_{ef,min}$    | 100                                        | 125                                    | 170               | 220               |
|                                                                                                                    | $h_{ef,max}$    | 235                                        | 290                                    | 330               | -                 |
| Minimum thickness of concrete member                                                                               | $h_{min}$       | $h_{ef} + 30$                              | $h_{ef} + 2d_0$<br>(160) <sup>1)</sup> | $h_{ef} + 2d_0$   | 440               |
| Minimum spacing                                                                                                    | $s_{min}$       | 100                                        | 100                                    | 80                | 180               |
| Minimum edge distance                                                                                              | $c_{min}$       | 200                                        | 100                                    | 80                | 180               |
| Thickness of concrete member                                                                                       | $h$             | $\geq 130$                                 | $\geq 200$                             | $\geq 160$        | $\geq 250$        |
| $h_{min} \leq h \leq 2 h_{ef,min}$ :<br>$s_1 \geq s_{min} = 100 \text{ mm}$<br>$c_1 \geq c_{min} = 100 \text{ mm}$ |                 | $[(3 \cdot c_1 + s_1) \cdot h] \geq 88000$ |                                        |                   |                   |
| Calculation $c_{req}$ : ( $s_1$ and $h$ available)                                                                 |                 | $c_{req} \geq (88000/h - s_1) / 3$         |                                        |                   |                   |
| Calculation $s_{req}$ : ( $c_1$ and $h$ available)                                                                 |                 | $s_{req} \geq 88000/h - 3 \cdot c_1$       |                                        |                   |                   |
| Diameter of the clearance hole of the fixture                                                                      | $d_f$           | 15                                         | 19                                     | 25                | 29                |
| Thickness of fixture                                                                                               | $t_{fix,min}$   | 8                                          | 10                                     | 12                | 14                |
|                                                                                                                    | $t_{fix,max}$   | 200                                        |                                        |                   |                   |
| Minimum projection length                                                                                          | $h_{p,min}$     | $30 + t_{fix}$                             | $35 + t_{fix}$                         | $40 + t_{fix}$    | $50 + t_{fix}$    |
| Installation torque                                                                                                | $T_{inst}$ [Nm] | 40                                         | 60                                     | 100               | 120               |

<sup>1)</sup> Only valid for  $h_{ef} = 125 \text{ mm}$

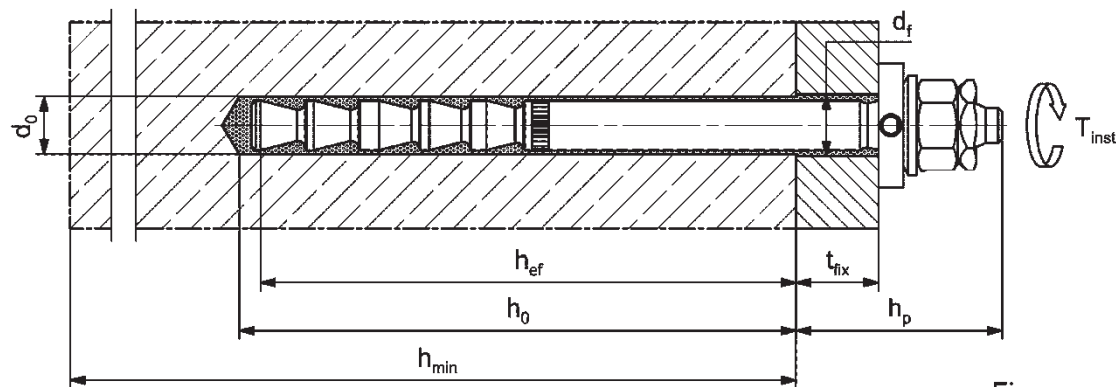
#### fischer anchor rod FHB-A dyn



#### Marking fischer anchor rod:

work symbol, thread diameter, embedment depth, intended use e.g.  16 x 125 dyn  
For high corrosion resistant steel additional "HCR".

#### Installation conditions: (picture without centering sleeve; pre-positioned installation)



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

Installation parameters fischer Highbond-Anchor dynamic FHB dyn  
(without shear force sleeve)

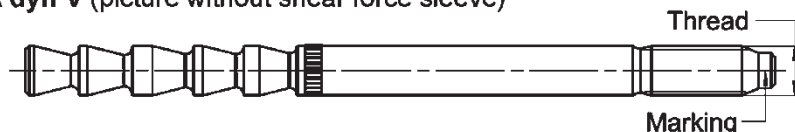
#### Annex B6

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**Table B7.1: Installation parameters for fischer Highbond-Anchor dynamic with shear force sleeve FHB dyn V**

| Designation                                                                                                                            |                      | FHB dyn 12x100 V |                                                      | FHB dyn 16x125 V |       |       |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|------------------------------------------------------|------------------|-------|-------|
| Thread                                                                                                                                 |                      | [-]              | M12                                                  | M16              |       |       |
| Nominal drill hole diameter                                                                                                            | d <sub>0</sub>       | [mm]             | 14                                                   | 18               |       |       |
| Drill hole depth                                                                                                                       | h <sub>0,min</sub>   |                  | 110                                                  | 135              |       |       |
| Nominal drill hole diameter                                                                                                            | d <sub>1</sub>       |                  | 20                                                   | 28               |       |       |
| Drill hole depth                                                                                                                       | h <sub>1,min</sub>   |                  | 35                                                   | 50               |       |       |
| Effective embedment depth                                                                                                              | h <sub>ef</sub>      |                  | 105                                                  | 130              |       |       |
| Minimum thickness of concrete member                                                                                                   | h <sub>min</sub>     |                  | 130                                                  | 160              |       |       |
| Minimum spacing                                                                                                                        | s <sub>min</sub>     |                  | 100                                                  | 100              | 100   | 100   |
| Minimum edge distance                                                                                                                  | c <sub>min</sub>     |                  | 200                                                  | 100              | 200   | 100   |
| Thickness of concrete member                                                                                                           | h                    |                  | ≥ 130                                                | ≥ 200            | ≥ 160 | ≥ 250 |
| h <sub>min</sub> ≤ h ≤ 2 h <sub>ef</sub> :<br>s <sub>1</sub> ≥ s <sub>min</sub> = 100 mm<br>c <sub>1</sub> ≥ c <sub>min</sub> = 100 mm |                      |                  | [(3 • c <sub>1</sub> + s <sub>1</sub> ) • h] ≥ 88000 |                  |       |       |
| Calculation c <sub>req</sub> :<br>s <sub>1</sub> and h available                                                                       |                      |                  | c <sub>req</sub> ≥ (88000/h – s <sub>1</sub> ) / 3   |                  |       |       |
| Calculation s <sub>req</sub> :<br>c <sub>1</sub> and h available                                                                       |                      |                  | s <sub>req</sub> ≥ 88000/h – 3 • c <sub>1</sub>      |                  |       |       |
| Diameter of the clearance hole of the fixture                                                                                          | d <sub>f</sub>       | 21               |                                                      | 29               |       |       |
| Thickness of fixture                                                                                                                   | t <sub>fix,min</sub> | 8                |                                                      | 10               |       |       |
|                                                                                                                                        | t <sub>fix,max</sub> | 200              |                                                      |                  |       |       |
| Installation torque                                                                                                                    | T <sub>inst</sub>    | [Nm]             | 40                                                   |                  | 60    |       |

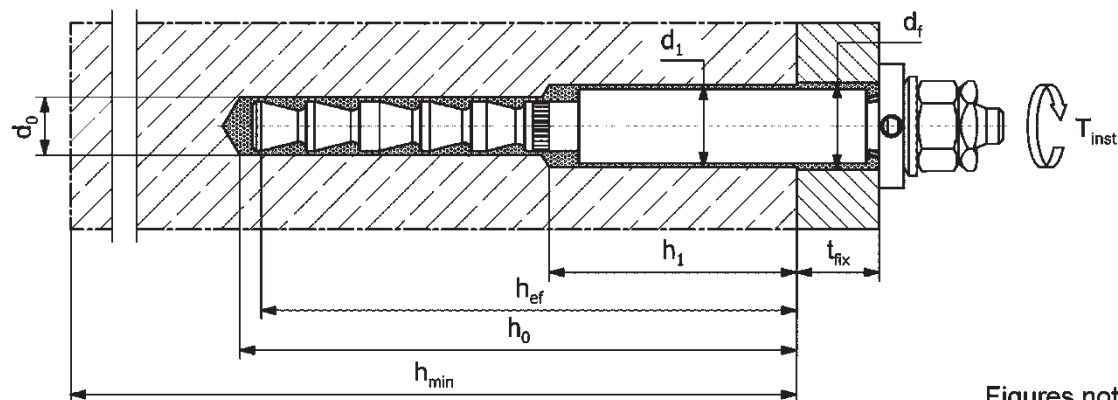
**fischer anchor rod FHB-A dyn V** (picture without shear force sleeve)



**Marking fischer anchor rod:**

work symbol, thread diameter, embedment depth, intended use e.g.:  16 x 125 dyn V

**Installation conditions:**



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Intended use**

Installation parameters fischer Highbond-Anchor dynamic FHB dyn V  
(with shear force sleeve)

**Annex B7**

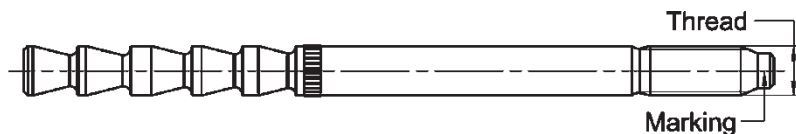
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**Table B8.1: Installation parameters for fischer Dynamic-Anchor FDA**

| Designation                                                                                                                               |                      |                                                 | FDA 12x100                                           |       | FDA 16x125                                               |       |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------|------------------------------------------------------|-------|----------------------------------------------------------|-------|
| Thread                                                                                                                                    |                      | [-]                                             | M12                                                  |       | M16                                                      |       |
| Nominal drill hole diameter                                                                                                               | d <sub>0</sub>       | [mm]                                            | 14                                                   |       | 18                                                       |       |
| Drill hole depth                                                                                                                          | h <sub>0,min</sub>   |                                                 | h <sub>ef</sub> + 5                                  |       |                                                          |       |
| Effective embedment depth                                                                                                                 | h <sub>ef,min</sub>  |                                                 | 100                                                  |       | 125                                                      |       |
|                                                                                                                                           | h <sub>ef,max</sub>  |                                                 | 235                                                  |       | 290                                                      |       |
| Minimum thickness of concrete member                                                                                                      | h <sub>min</sub>     |                                                 | h <sub>ef</sub> + 30                                 |       | h <sub>ef</sub> + 2d <sub>0</sub><br>(160) <sup>1)</sup> |       |
| Minimum spacing                                                                                                                           | s <sub>min</sub>     |                                                 | 100                                                  | 100   | 100                                                      | 100   |
| Minimum edge distance                                                                                                                     | c <sub>min</sub>     |                                                 | 200                                                  | 100   | 200                                                      | 100   |
| Thickness of concrete member                                                                                                              | h                    |                                                 | ≥ 130                                                | ≥ 200 | ≥ 160                                                    | ≥ 250 |
| h <sub>min</sub> ≤ h ≤ 2h <sub>ef,min</sub> :<br>s <sub>1</sub> ≥ s <sub>min</sub> = 100 mm<br>c <sub>1</sub> ≥ c <sub>min</sub> = 100 mm |                      |                                                 | [(3 • c <sub>1</sub> + s <sub>1</sub> ) • h] ≥ 88000 |       |                                                          |       |
| Calculation c <sub>req</sub> :<br>s <sub>1</sub> and h available                                                                          |                      |                                                 | c <sub>req</sub> ≥ (88000/h – s <sub>1</sub> ) / 3   |       |                                                          |       |
| Calculation s <sub>req</sub> :<br>c <sub>1</sub> and h available                                                                          |                      | s <sub>req</sub> ≥ 88000/h – 3 • c <sub>1</sub> |                                                      |       |                                                          |       |
| Diameter of the clearance hole of the fixture                                                                                             | d <sub>f</sub>       |                                                 | 15                                                   |       | 19                                                       |       |
| Thickness of fixture                                                                                                                      | t <sub>fix,min</sub> |                                                 | 12                                                   |       | 16                                                       |       |
|                                                                                                                                           | t <sub>fix,max</sub> |                                                 | 200                                                  |       |                                                          |       |
| Installation torque                                                                                                                       | T <sub>inst</sub>    | [Nm]                                            | 40                                                   |       | 60                                                       |       |

<sup>1)</sup> Only valid for  $h_{ef} = 125 \text{ mm}$

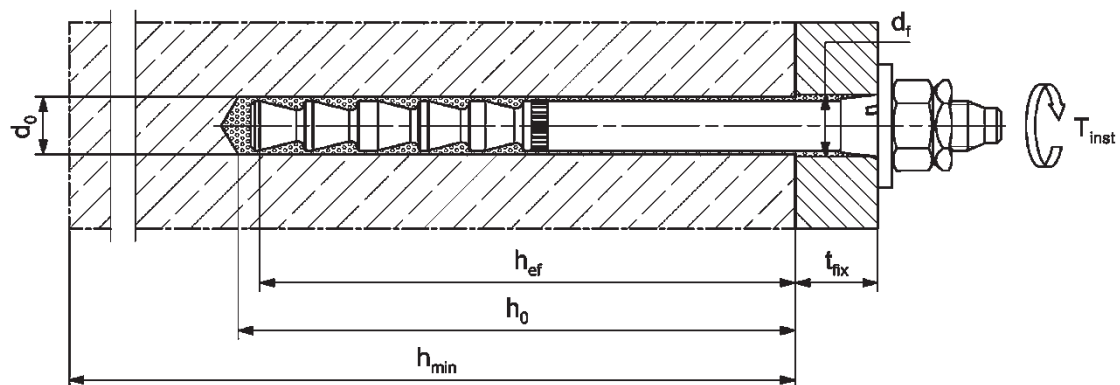
#### fischer anchor rod FDA-A



#### Marking fischer anchor rod:

work symbol, thread diameter, embedment depth, intended use e.g.:  16 x 125 dyn

#### Installation conditions:



Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

Installation parameters fischer Dynamic-Anchor FDA

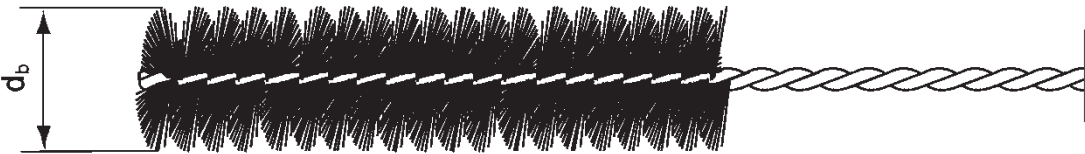
#### Annex B8

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**Table B9.1: Parameters of the cleaning brush BS (steel brush with steel bristles)**

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

|                             |       |      |    |    |    |    |    |
|-----------------------------|-------|------|----|----|----|----|----|
| Nominal drill hole diameter | $d_o$ | [mm] | 12 | 14 | 18 | 24 | 28 |
| Steel brush diameter        | $d_b$ |      | 14 | 16 | 20 | 26 | 30 |



**Table B9.2: 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)

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

<sup>1)</sup> In wet concrete or water filled holes the curing time must be doubled.

<sup>2)</sup> Minimum cartridge temperature +5 °C.

Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA

**Intended use**  
Parameters of the cleaning brush (steel brush);  
Processing time and curing time

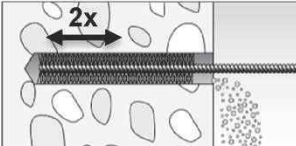
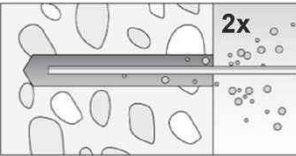
# Overview installation instructions

|                                                                            | Anchor type                 |                             |                             |                             |
|----------------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                                                                            | FHB / FHB N                 | FHB dyn                     | FHB dyn V                   | FDA                         |
| <b>Drilling and cleaning</b><br>hammer drilling with<br>standard drill bit | Annex B11<br>Step 1a to 4a  | Annex B11<br>Step 1a to 4a  | Annex B12<br>Step 1c to 4c  | Annex B11<br>Step 1a to 4a  |
| <b>Drilling and cleaning</b><br>hammer drilling with<br>hollow drill bit   | Annex B11<br>Step 1b to 2b  | Annex B11<br>Step 1b to 2b  | Annex B12<br>Step 1d to 2d  | Annex B11<br>Step 1b to 2b  |
| <b>Preparing the cartridge</b>                                             | Annex B13<br>Step 5a to 7a  |                             |                             |                             |
| <b>Pre-positioned installation</b>                                         | Annex B14<br>Step 8a to 12a | Annex B16<br>Step 8c to 12c | -                           | -                           |
| <b>Push through installation</b>                                           | Annex B15<br>Step 8b to 11b | Annex B17<br>Step 8d to 11d | Annex B18<br>Step 8e to 11e | Annex B19<br>Step 8f to 11f |



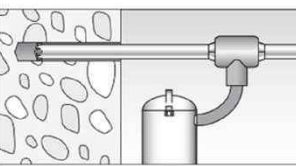
# Installation instructions part 1; Drilling and cleaning FHB, FHB N, FHB dyn and FDA

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

|    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1a |   | <p>Drill the hole.<br/>Nominal drill hole diameter <math>d_0</math> and drill hole depth <math>h_0</math> see tables:<br/>FHB / FHB N → <b>Table B5.1</b><br/>FHB dyn → <b>Table B6.1</b><br/>FDA → <b>Table B8.1</b></p>                                                                                                                                                                                                                                                                                                                                                                     |
| 2a |   | <p>Clean the drill hole.<br/>Blow out the drill hole twice</p> <p>For drill hole diameter <math>d_0 &lt; 24 \text{ mm}</math> and drill hole depth <math>h_0 &lt; 10d</math> blow out the hole by hand or oil-free compressed air (<math>\geq 6 \text{ bar}</math>).</p> <p>For drill hole diameter <math>d_0 \geq 24 \text{ mm}</math> or drill hole depth <math>h_0 \geq 10d</math> blow out the hole with oil-free compressed air (<math>\geq 6 \text{ bar}</math>).</p> <p>Use a cleaning nozzle.</p>   |
| 3a |   | <p>Brush the drill hole twice with steel brush.<br/>Corresponding brushes see <b>Table B9.1</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4a |  | <p>Clean the drill hole.<br/>Blow out the drill hole twice</p> <p>For drill hole diameter <math>d_0 &lt; 24 \text{ mm}</math> and drill hole depth <math>h_0 &lt; 10d</math> blow out the hole by hand or oil-free compressed air (<math>\geq 6 \text{ bar}</math>).</p> <p>For drill hole diameter <math>d_0 \geq 24 \text{ mm}</math> or drill hole depth <math>h_0 \geq 10d</math> blow out the hole with oil-free compressed air (<math>\geq 6 \text{ bar}</math>).</p> <p>Use a cleaning nozzle.</p>  |

Go to step 5a (Annex B13)

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

|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1b |  | <p>Check a suitable hollow drill (see <b>Table B1.1, B2.1 resp. B3.1</b>) for correct operation of the dust extraction</p>                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2b |  | <p>Use a suitable dust extraction system, e.g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.</p> <p>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.</p> <p>Nominal drill hole diameter <math>d_0</math> and drill hole depth <math>h_0</math> see tables:<br/>FHB / FHB N → <b>Table B5.1</b><br/>FHB dyn → <b>Table B6.1</b><br/>FDA → <b>Table B8.1</b></p> |

Go to step 5a (Annex B13)

fischer Highbond-Anchor FHB / FHB dyn / FDA

### Intended use

Installation instructions part 1

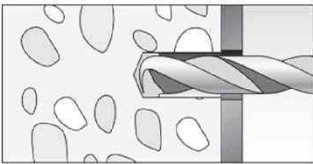
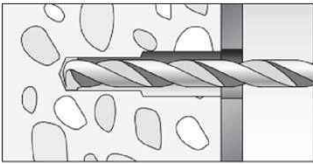
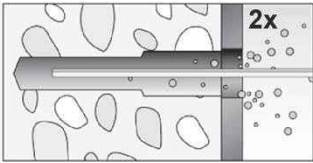
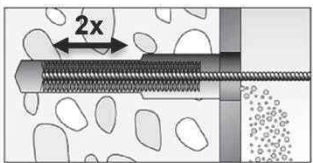
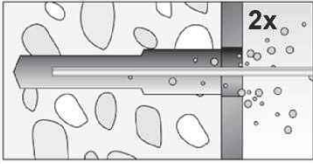
Drilling and cleaning the drill hole FHB, FHB N, FHB dyn and FDA

**Annex B11**

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## Installation instructions part 2; Drilling and cleaning FHB dyn V

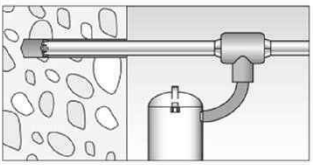
### Drilling and cleaning the hole (hammer drilling with standard drill bit)

|    |                                                                                    |                                                                                                                                |
|----|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1c |   | Drill hole 1 of the stepped borehole.<br>Nominal drill hole diameter $d_1$ and drill hole depth $h_1$<br>see <b>Table B7.1</b> |
|    |   | Drill hole 2 of the stepped borehole.<br>Nominal drill hole diameter $d_0$ and drill hole depth $h_0$<br>see <b>Table B7.1</b> |
| 2c |   | Clean the drill hole.<br>Blow out the drill hole twice by hand<br>or oil-free compressed air ( $\geq 6$ bar).                  |
| 3c |   | Brush the drill hole 2 of the borehole twice with a steel brush.<br>Corresponding brushes see <b>Table B9.1</b>                |
| 4c |  | Clean the drill hole.<br>Blow out the drill hole twice by hand<br>or oil-free compressed air ( $\geq 6$ bar).                  |



Go to step 5a (Annex B13)

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

|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1d |  | Check a suitable hollow drill (see <b>Table B2.1</b> )<br>for correct operation of the dust extraction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2d |  | Use a suitable dust extraction system, e.g. fischer FVC 35 M 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>First drill hole 1 of the stepped borehole with nominal drill hole diameter $d_1$ and drill hole depth $h_1$ (see <b>Table B7.1</b> ).<br>Then drill hole 2 of the stepped borehole with nominal drill hole diameter $d_0$ and drill hole depth $h_0$ (see <b>Table B7.1</b> ). |

Go to step 5a (Annex B13)

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

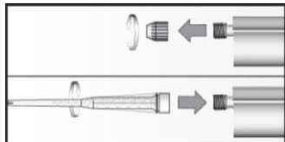
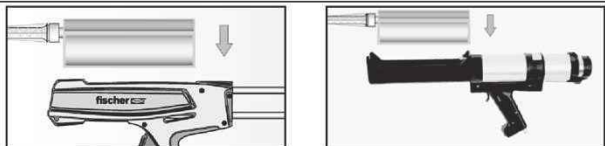
Installation instructions part 2  
Drilling and cleaning the drill hole FHB dyn V

#### Annex B12

Appendix 27 / 39

## Installation instructions part 3; injection mortar system FIS HB

### Preparing the cartridge

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

Go to step:

- 8a: FHB / FHB N - Pre-positioned installation see Annex B14
- 8b: FHB / FHB N - Push through installation see Annex B15
- 8c: FHB dyn - Pre-positioned installation see Annex B16
- 8d: FHB dyn - Push through installation see Annex B17
- 8e: FHB dyn V - Push through installation see Annex B18
- 8f: FDA - Push through installation see Annex B19

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

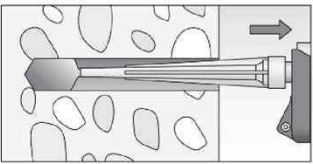
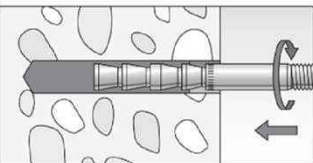
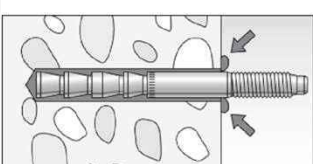
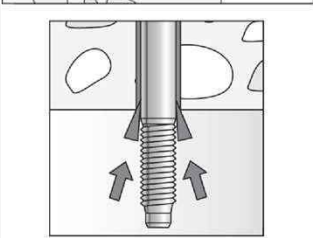
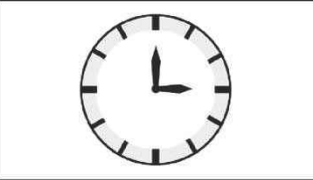
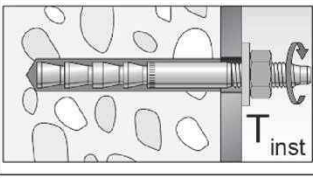
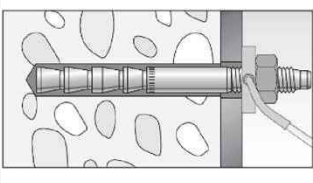
Installation instructions part 3  
Preparing the cartridge

**Annex B13**

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## Installation instructions part 4; Pre-positioned installation FHB / FHB N

### Pre-positioned installation FHB / FHB N

|               |                                                                                     |                                                                                                                                                                                                                                                                     |
|---------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8a            |    | Fill approximately 2/3 of the drill hole with mortar. Always begin from the bottom of the hole and avoid bubbles. For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection adapter. |
| 9a            |    | Push the anchor rod down to the bottom of the hole, turning it slightly while doing so. Only use clean and oil-free metal parts.                                                                                                                                    |
|               |    | After inserting the anchor rod, excess mortar must be emerged around the anchor element.<br>If not, pull out the anchor rod immediately and reinject mortar.                                                                                                        |
|               |    | For overhead installations support the anchor rod with wedges.<br>(e.g. fischer centering wedges).                                                                                                                                                                  |
| 10a           |   | Wait for the specified curing time $t_{cure}$<br>see <b>Table B9.2</b> .                                                                                                                                                                                            |
| 11a           |  | Attach the fixture and install the washer and hexagon nut.<br>Ensure the correct position of the metal parts.<br>Tighten the hexagon nut with installation torque $T_{inst}$ (see <b>Table B5.1</b> ).                                                              |
| 12a<br>Option |  | The gap between metal parts and fixture (annular gap) may be filled with mortar (FIS HB) via the fischer filling disc.<br><b>ATTENTION:</b> Using fischer filling disc reduces $t_{fix}$ (usable length of the anchor)                                              |

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

Installation instructions part 4

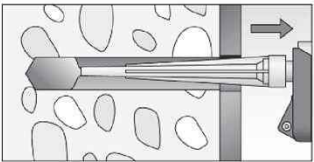
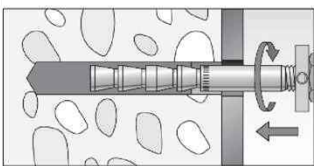
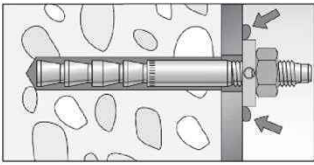
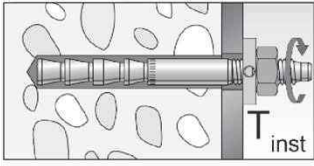
Pre-positioned installation FHB / FHB N

#### Annex B14

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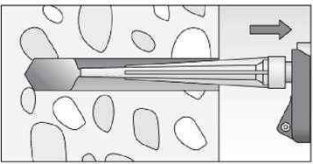
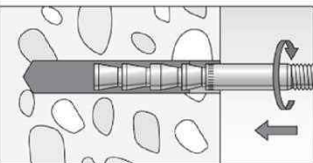
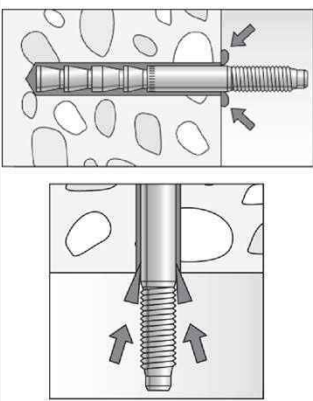
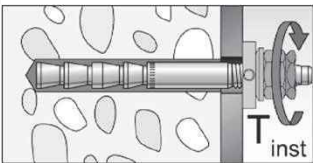
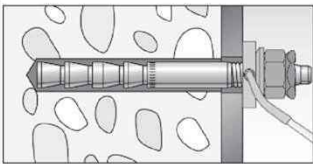
Installation instructions part 5; Push through installation FHB / FHB N

Push through installation FHB / FHB N

|     |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8b  |                                                                                       | Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles.<br>For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection adapter.                                                                                                                                                                                                |
| 9b  | <br> | Push the pre-assembled fischer anchor rod (with washer and hexagon nut) into the drill hole until the fischer filling disc is in full contact with the surface, turning it slightly while doing so.<br>Ensure the correct position of the metal parts.<br>Only use clean and oil-free metal parts.<br><br>After inserting the pre-assembled anchor rod, excess mortar has to emerge under the washer.<br>If not, pull out the assembled anchor rod immediately and reinject mortar. |
| 10b |                                                                                       | Wait for the specified curing time $t_{cure}$ see <b>Table B9.2</b> .                                                                                                                                                                                                                                                                                                                                                                                                               |
| 11b |                                                                                      | Tighten the hexagon nut with installation torque $T_{inst}$ (see <b>Table B5.1</b> ).                                                                                                                                                                                                                                                                                                                                                                                               |

## Installation instructions part 6; Pre-positioned installation FHB dyn

### Pre-positioned installation FHB dyn

|     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8c  |    | Fill approximately 2/3 of the drill hole with mortar. Always begin from the bottom of the hole and avoid bubbles. For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection adapter.                                                                                                                                                                                                                                |
| 9c  |    | Push the anchor rod down to the bottom of the hole, turning it slightly while doing so. Observe projection length $h_p$ (see <b>Table B6.1</b> )<br>Only use clean and oil-free metal parts.                                                                                                                                                                                                                                                                                                       |
|     |    | After inserting the anchor rod, excess mortar must be emerged around the anchor element.<br>If not, pull out the anchor rod immediately and reinject mortar.<br><br>For overhead installations support the anchor rod with wedges. (e.g. fischer centering wedges).                                                                                                                                                                                                                                |
| 10c |   | Wait for the specified curing time $t_{cure}$ see <b>Table B9.2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11c |  | Attach the fixture and install the fischer filling disc, the spherical washer and nuts ( <b>without centering sleeve</b> ).<br>Ensure the correct position of the metal parts.<br>Tighten the hexagon nut with installation torque $T_{inst}$ (see <b>Table B6.1</b> ).<br>Tighten lock nut manually, then use wrench to give another quarter or half turn.<br><br>In the high corrosion resistant steel version, the lock nut is a thin nut. Tighten it with a torque of $\frac{1}{4} T_{inst}$ . |
| 12c |  | The gap between metal parts and fixture (annular gap) has to be filled with mortar (FIS HB) via the fischer filling disc.<br>This installation step can be omitted for anchors with pure tension loading.                                                                                                                                                                                                                                                                                          |

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

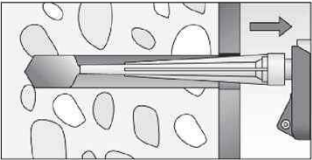
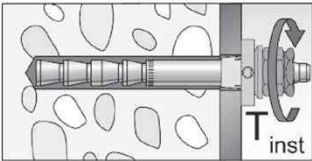
Installation instructions part 6  
Pre-positioned installation FHB dyn

#### Annex B16

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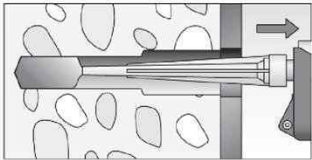
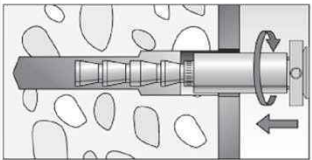
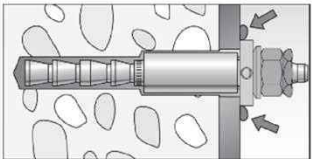
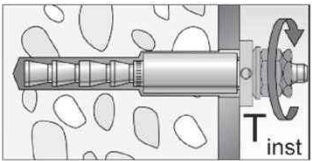
Installation instructions part 7; Push through installation FHB dyn

Push through installation FHB dyn

|     |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8d  |                                                                                       | Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles.<br>For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection-adapter.                                                                                                                                                                                                                                                                                                                             |
| 9d  | <br> | Push the pre-assembled fischer anchor rod (with centering sleeve, fischer filling disc, spherical washer, hexagon nut and lock nut) into the drill hole until the fischer filling disc is in full contact with the surface, turning it slightly while doing so.<br>Ensure the correct position of the metal parts and the centering sleeve.<br>Only use clean and oil-free metal parts.<br><br>After inserting the pre-assembled anchor rod, excess mortar must be emerged around the fischer filling disc (minimum on one point).<br>If not, pull out the assembled anchor rod immediately and reinject mortar. |
| 10d |                                                                                       | Wait for the specified curing time $t_{\text{cure}}$<br>see <b>Table B9.2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 11d |                                                                                      | Tighten the hexagon nut with installation torque $T_{\text{inst}}$ (see <b>Table B6.1</b> ).<br>Tighten lock nut manually, then use wrench to give another quarter to half turn.<br><br>In the high corrosion resistant steel version, the lock nut is a thin nut. Tighten it with a torque of $\frac{1}{4} T_{\text{inst}}$ .                                                                                                                                                                                                                                                                                   |

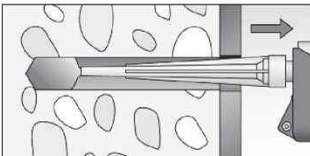
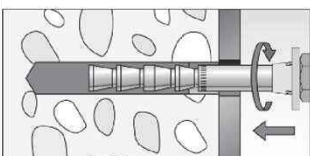
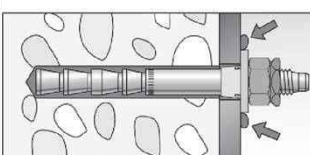
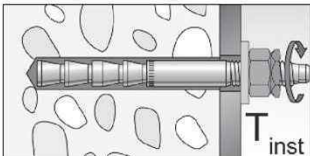
Installation instructions part 8; Push through installation FHB dyn V

Push through installation FHB dyn V

|     |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8e  |                                                                                       | Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles.<br>For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection adapter.                                                                                                                                                                                                                                                                                                                                                 |
| 9e  | <br> | Push the pre-assembled fischer anchor rod (with shear force sleeve, centering sleeve, fischer filling disc, spherical washer, hexagon nut and lock nut) into the drill hole until the fischer filling disc is in full contact with the surface, turning it slightly while doing so.<br>Ensure the correct position of the metal parts and the centering sleeve.<br>Only use clean and oil-free metal parts.<br><br>After inserting the pre-assembled anchor rod, excess mortar must be emerged around the fischer filling disc (minimum on one point).<br>If not, pull out the assembled anchor rod immediately and reinject mortar. |
| 10e |                                                                                       | Wait for the specified curing time $t_{cure}$<br>see <b>Table B9.2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11e |                                                                                      | Tighten the hexagon nut with installation torque $T_{inst}$ (see <b>Table B7.1</b> ).<br>Tighten lock nut manually, then use wrench to give another quarter to half turn.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

# Installation instructions part 9; Push through installation FDA

## Push through installation FDA

|     |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8f  |                                                                                       | Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles.<br>For drill hole depth $h_0 \geq 150$ mm use an extension tube. For overhead installation or deep holes ( $h_0 > 250$ mm) use an injection adapter.                                                                                                                                                                                                                                                                                                  |
| 9f  | <br> | Push the pre-assembled fischer anchor rod (with centering sleeve, washer, hexagon nut and lock nut) into the drill hole until the washer is in full contact with the surface, turning it slightly while doing so.<br>Gently hammer the anchor to the setting depth.<br>Ensure the correct position of the metal parts and the centering sleeve.<br>Only use clean and oil-free metal parts.<br><br>After inserting the pre-assembled anchor rod, excess mortar must be emerged under the entire washer.<br>If not, pull out the assembled anchor rod immediately and reinject mortar. |
| 10f |                                                                                       | Wait for the specified curing time $t_{cure}$ see <b>Table B9.2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 11f |                                                                                      | Tighten the hexagon nut with installation torque $T_{inst}$ (see <b>Table B8.1</b> ).<br>Tighten lock nut manually, then use wrench to give another quarter to half turn.                                                                                                                                                                                                                                                                                                                                                                                                             |

**Table C1.1: Characteristic resistance to steel failure under tension / shear loading for fischer Anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA-A**

| Anchor rod size                                                  |                 |     |                 | 10x60 | 12x80           | 12x100          | 16x125 | 20x170 | 24x220              |                     |
|------------------------------------------------------------------|-----------------|-----|-----------------|-------|-----------------|-----------------|--------|--------|---------------------|---------------------|
| Characteristic resistance to steel failure under tension loading |                 |     |                 |       |                 |                 |        |        |                     |                     |
| Characteristic resistance<br>$N_{Rk,s}$                          | FHB-A / FHB-A N | zp  | 8.8             | [kN]  | 25,8            | 44,3            | 44,3   | 81,7   | 130,8 <sup>2)</sup> | 179,8 <sup>2)</sup> |
|                                                                  |                 | zp  | 5.8             |       | 16,1            | 27,7            | 27,7   | 51,1   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  |                 | hdg | 8.8             |       | 25,8            | 44,3            | 44,3   | 81,7   | 190,2               | 261,5               |
|                                                                  |                 | R   | 80              |       | 25,8            | 44,3            | 44,3   | 81,7   | 166,5 <sup>4)</sup> | 228,8 <sup>4)</sup> |
|                                                                  |                 | HCR | 70              |       | 22,5            | 38,8            | 38,8   | 71,5   | 166,5               | 228,8               |
|                                                                  | FHB-A dyn       | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 44,3   | 81,7   | 190,2               | 261,5               |
|                                                                  |                 | HCR | 70              |       | — <sup>3)</sup> | — <sup>3)</sup> | 38,8   | 71,5   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FHB-A dyn V     | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 44,3   | 81,7   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FDA-A           | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 44,3   | 81,7   | — <sup>3)</sup>     | — <sup>3)</sup>     |
| Partial factors <sup>1)</sup>                                    |                 |     |                 |       |                 |                 |        |        |                     |                     |
| Partial factor                                                   |                 |     | $\gamma_{Ms,N}$ | [-]   | 1,50            |                 |        |        |                     |                     |
| Characteristic resistance to steel failure under shear loading   |                 |     |                 |       |                 |                 |        |        |                     |                     |
| without lever arm                                                |                 |     |                 |       |                 |                 |        |        |                     |                     |
| Characteristic resistance<br>$V_{Rk,s}^0$                        | FHB-A / FHB-A N | zp  | 8.8             | [kN]  | 16,6            | 28,1            | 28,1   | 52,2   | 61,1 <sup>2)</sup>  | 90,8 <sup>2)</sup>  |
|                                                                  |                 | zp  | 5.8             |       | 10,4            | 17,6            | 17,6   | 32,7   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  |                 | hdg | 8.8             |       | 16,6            | 28,1            | 28,1   | 52,2   | 98,0                | 141,2               |
|                                                                  |                 | R   | 80              |       | 24,8            | 32,8            | 32,8   | 62,8   | 85,8 <sup>4)</sup>  | 152,6 <sup>4)</sup> |
|                                                                  |                 | HCR | 70              |       | 25,1            | 36,9            | 36,9   | 55,0   | 85,8                | 141,1               |
|                                                                  | FHB-A dyn       | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 28,1   | 52,2   | 98,0                | 141,2               |
|                                                                  |                 | HCR | 70              |       | — <sup>3)</sup> | — <sup>3)</sup> | 36,9   | 55,0   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FHB-A dyn V     | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 56,9   | 96,2   | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FDA-A           | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 28,1   | 52,2   | — <sup>3)</sup>     | — <sup>3)</sup>     |
| Ductility factor                                                 |                 |     | k <sub>7</sub>  | [-]   | 1,0             |                 |        |        |                     |                     |
| with lever arm                                                   |                 |     |                 |       |                 |                 |        |        |                     |                     |
| Characteristic resistance<br>$M_{Rk,s}^0$                        | FHB-A / FHB-A N | zp  | 8.8             | [Nm]  | 59,8            | 104,8           | 104,8  | 266,4  | 357,0 <sup>2)</sup> | 617,4 <sup>2)</sup> |
|                                                                  |                 | zp  | 5.8             |       | 37,4            | 65,5            | 65,5   | 166,5  | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  |                 | hdg | 8.8             |       | 59,8            | 104,8           | 104,8  | 266,4  | 519,3               | 898,0               |
|                                                                  |                 | R   | 80              |       | 59,8            | 104,8           | 104,8  | 266,4  | 454,4 <sup>4)</sup> | 785,8 <sup>4)</sup> |
|                                                                  |                 | HCR | 70              |       | 52,3            | 91,7            | 91,7   | 233,1  | 454,4               | 785,8               |
|                                                                  | FHB-A dyn       | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 104,8  | 266,4  | 519,3               | 898,0               |
|                                                                  |                 | HCR | 70              |       | — <sup>3)</sup> | — <sup>3)</sup> | 91,7   | 233,1  | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FHB-A dyn V     | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 104,8  | 266,4  | — <sup>3)</sup>     | — <sup>3)</sup>     |
|                                                                  | FDA-A           | zp  | 8.8             |       | — <sup>3)</sup> | — <sup>3)</sup> | 104,8  | 266,4  | — <sup>3)</sup>     | — <sup>3)</sup>     |
| Partial factors <sup>1)</sup>                                    |                 |     |                 |       |                 |                 |        |        |                     |                     |
| Partial factor                                                   |                 |     | $\gamma_{Ms,V}$ | [-]   | 1,25            |                 |        |        |                     |                     |

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

<sup>2)</sup>  $f_{yk} = 440 \text{ N/mm}^2$  /  $f_{uk} = 550 \text{ N/mm}^2$

<sup>3)</sup> No performance assessed

<sup>4)</sup>  $f_{yk} = 560 \text{ N/mm}^2$  /  $f_{uk} = 700 \text{ N/mm}^2$

fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Performance

Characteristic resistance to steel failure under tension / shear loading for fischer Anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA-A

#### Annex C1

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

|                                                                                                    |        |                 |                                 |               |        |          |        |          |        |        |
|----------------------------------------------------------------------------------------------------|--------|-----------------|---------------------------------|---------------|--------|----------|--------|----------|--------|--------|
|                                                                                                    |        |                 | FHB / FHB N / FHB dyn (V) / FDA |               |        |          |        |          |        |        |
| Size                                                                                               |        |                 | All sizes                       |               |        |          |        |          |        |        |
| Tension loading                                                                                    |        |                 |                                 |               |        |          |        |          |        |        |
| Installation factor                                                                                |        | $\gamma_{inst}$ | [-]                             | See Annex C3  |        |          |        |          |        |        |
| Factors for the compressive strength of concrete > C20/25                                          |        |                 |                                 |               |        |          |        |          |        |        |
| Increasing factor<br>$\Psi_c$ for concrete<br>$N_{Rk,p}(X,Y) =$<br>$\Psi_c \cdot N_{Rk,p}(C20/25)$ | C25/30 | $\Psi_c$        | [-]                             | 1,12          |        |          |        |          |        |        |
|                                                                                                    | C30/37 |                 |                                 | 1,22          |        |          |        |          |        |        |
|                                                                                                    | C35/45 |                 |                                 | 1,32          |        |          |        |          |        |        |
|                                                                                                    | C40/50 |                 |                                 | 1,41          |        |          |        |          |        |        |
|                                                                                                    | C45/55 |                 |                                 | 1,50          |        |          |        |          |        |        |
|                                                                                                    | C50/60 |                 |                                 | 1,58          |        |          |        |          |        |        |
| Splitting failure                                                                                  |        |                 |                                 |               |        |          |        |          |        |        |
| Edge distance                                                                                      |        | $C_{cr,sp}$     | [mm]                            | 2 $h_{ef}$    |        |          |        |          |        |        |
| Spacing                                                                                            |        | $S_{cr,sp}$     |                                 | 2 $C_{cr,sp}$ |        |          |        |          |        |        |
| Concrete failure                                                                                   |        |                 |                                 |               |        |          |        |          |        |        |
| Uncracked concrete                                                                                 |        | $k_{ucr,N}$     | [-]                             | 11,0          |        |          |        |          |        |        |
| Cracked concrete                                                                                   |        | $k_{cr,N}$      |                                 | 7,7           |        |          |        |          |        |        |
| Edge distance                                                                                      |        | $C_{cr,N}$      | [mm]                            | 1,5 $h_{ef}$  |        |          |        |          |        |        |
| Spacing                                                                                            |        | $S_{cr,N}$      |                                 | 2 $C_{cr,N}$  |        |          |        |          |        |        |
| Shear loading                                                                                      |        |                 |                                 |               |        |          |        |          |        |        |
| Installation factor                                                                                |        | $\gamma_{inst}$ | [-]                             | 1,0           |        |          |        |          |        |        |
| Concrete pry-out failure                                                                           |        |                 |                                 |               |        |          |        |          |        |        |
| Factor for pry-out failure                                                                         |        | $k_8$           | [-]                             | 2,0           |        |          |        |          |        |        |
| Concrete edge failure                                                                              |        |                 |                                 |               |        |          |        |          |        |        |
| Anchor size                                                                                        |        |                 | 10x60                           | 12x80         | 12x100 | 12x100 V | 16x125 | 16x125 V | 20x170 | 24x220 |
| Effective length of anchor                                                                         |        | $l_f$           | 60                              | 80            | 100    | 105      | 125    | 130      | 170    | 220    |
| Effective diameter of the fastener                                                                 |        | $d_{nom}$       | 12                              | 14            | 14     | 20       | 18     | 28       | 24     | 28     |

fischer Highbond-Anchor FHB / FHB dyn / FDA

## Performance

Characteristic resistance to concrete failure under tension / shear loading

## Annex C2

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**Table C3.1: Characteristic resistance to pull-out failure for fischer Anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA in compacted reinforced or unreinforced normal weight concrete **without** fibers**

|                                                        |                   |                   |                   |       |        |        |        |        |       |       |
|--------------------------------------------------------|-------------------|-------------------|-------------------|-------|--------|--------|--------|--------|-------|-------|
| Anchor rod size                                        |                   |                   | 10x60             | 12x80 | 12x100 | 16x125 | 20x170 | 24x220 |       |       |
| Pull-out failure                                       |                   |                   |                   |       |        |        |        |        |       |       |
| Calculation diameter                                   |                   | d                 | [mm]              | 10    | 12     | 12     | 16     | 20     | 24    |       |
| Uncracked concrete                                     |                   |                   |                   |       |        |        |        |        |       |       |
| Characteristic resistance in uncracked concrete C20/25 |                   |                   |                   |       |        |        |        |        |       |       |
| Temperature range                                      | I: 24 °C / 40 °C  |                   | N <sub>RK,p</sub> | [kN]  | 26,9   | 41,3   | 42,1   | 70,5   | 113,6 | 122,2 |
|                                                        | II: 50 °C / 80 °C |                   |                   |       | 23,7   | 36,3   | 37,0   | 62,0   | 100,0 | 107,5 |
| Cracked concrete                                       |                   |                   |                   |       |        |        |        |        |       |       |
| Characteristic resistance in cracked concrete C20/25   |                   |                   |                   |       |        |        |        |        |       |       |
| Temperature range                                      | I: 24 °C / 40 °C  |                   | N <sub>RK,p</sub> | [kN]  | 15,5   | 25,0   | 30,0   | 47,8   | 58,9  | 89,4  |
|                                                        | II: 50 °C / 80 °C |                   |                   |       | 13,6   | 22,0   | 26,4   | 42,1   | 51,8  | 78,7  |
| Installation factors                                   |                   |                   |                   |       |        |        |        |        |       |       |
| Dry or wet concrete                                    |                   | γ <sub>inst</sub> | [-]               | 1,0   |        |        |        |        |       |       |
| Water filled hole                                      |                   |                   |                   | 1,0   | 1,0    | 1,0    | 1,2    | 1,0    | 1,0   |       |

**Table C3.2: Characteristic resistance to pull-out failure for fischer Anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA in compacted reinforced or unreinforced normal weight concrete **with** fibers**

| Anchor rod size                                        |                   |                   | 12x100 | 16x125 |
|--------------------------------------------------------|-------------------|-------------------|--------|--------|
| Pull-out failure                                       |                   |                   |        |        |
| Calculation diameter                                   | d                 | [mm]              | 12     | 16     |
| Uncracked concrete                                     |                   |                   |        |        |
| Characteristic resistance in uncracked concrete C20/25 |                   |                   |        |        |
| Temperature range                                      | I: 24 °C / 40 °C  | N <sub>Rk,p</sub> | [kN]   | 42,1   |
|                                                        | II: 50 °C / 80 °C |                   |        | 70,5   |
|                                                        |                   |                   |        | 37,0   |
|                                                        |                   |                   |        | 62,0   |
| Cracked concrete                                       |                   |                   |        |        |
| Characteristic resistance in cracked concrete C20/25   |                   |                   |        |        |
| Temperature range                                      | I: 24 °C / 40 °C  | N <sub>Rk,p</sub> | [kN]   | 30,0   |
|                                                        | II: 50 °C / 80 °C |                   |        | 47,8   |
|                                                        |                   |                   |        | 26,4   |
|                                                        |                   |                   |        | 42,1   |
| Installation factors                                   |                   |                   |        |        |
| Dry or wet concrete                                    | γ <sub>inst</sub> | [-]               | 1,0    |        |
| Water filled hole                                      |                   |                   | 1,0    | 1,2    |

fischer Highbond-Anchor FHB / FHB dyn / FDA

## Performance

Characteristic resistance to pull-out failure for fischer anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA

## Annex C3

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**Table C4.1: Displacements for fischer Anchor rods**  
**FHB-A / FHB-A N / FHB-A dyn (V) / FDA**

| Anchor rod size                                        |                    |         | 10x60 | 12x80 | 12x100 | 16x125 | 20x170 | 24x220 |
|--------------------------------------------------------|--------------------|---------|-------|-------|--------|--------|--------|--------|
| Displacement-Factors for tension loading <sup>1)</sup> |                    |         |       |       |        |        |        |        |
| Uncracked concrete; Temperature range I, II            |                    |         |       |       |        |        |        |        |
| Displacements                                          | $\delta_{N0}$      | [mm/kN] | 0,025 | 0,010 | 0,010  | 0,007  | 0,006  | 0,006  |
|                                                        | $\delta_{N\infty}$ |         | 0,050 | 0,020 | 0,020  | 0,014  | 0,012  | 0,012  |
| Cracked concrete; Temperature range I, II              |                    |         |       |       |        |        |        |        |
| Displacements                                          | $\delta_{N0}$      | [mm/kN] | 0,040 | 0,020 | 0,020  | 0,020  | 0,020  | 0,020  |
|                                                        | $\delta_{N\infty}$ |         | 0,060 | 0,030 | 0,030  | 0,030  | 0,030  | 0,030  |
| Displacement-Factors for shear loading <sup>2)</sup>   |                    |         |       |       |        |        |        |        |
| Uncracked or cracked concrete; Temperature range I, II |                    |         |       |       |        |        |        |        |
| Displacements                                          | $\delta_{V0}$      | [mm/kN] | 0,025 | 0,010 | 0,010  | 0,007  | 0,006  | 0,006  |
|                                                        | $\delta_{V\infty}$ |         | 0,050 | 0,020 | 0,020  | 0,014  | 0,012  | 0,012  |

- 1) Calculation of effective displacement:  
 $\delta_{N0} = \delta_{N0\text{-Factor}} \cdot N$   
 $\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot N$   
(N: acting tension loading)

2) Calculation of effective displacement:  
 $\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$   
 $\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$   
(V: acting shear loading)

|                                                                                                                                                                                                   |                   |                 |      |                                     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------|------|-------------------------------------|--|
| <b>Table C5.1:</b> Characteristic resistance to <b>steel failure</b> under tension and shear loading for <b>fischer Anchor rods FHB-A dyn</b> under seismic action performance category <b>C1</b> |                   |                 |      |                                     |  |
| Anchor rod size                                                                                                                                                                                   |                   |                 |      | 16x125                              |  |
| Characteristic resistance to steel failure under tension loading                                                                                                                                  |                   |                 |      |                                     |  |
| Characteristic resistance<br>FHB-A dyn<br>$N_{Rk,s,C1}$                                                                                                                                           | zp                | 8.8             | [kN] | 81,7                                |  |
|                                                                                                                                                                                                   | HCR               | 70              |      | 71,5                                |  |
| Characteristic resistance to steel failure under shear loading without lever arm                                                                                                                  |                   |                 |      |                                     |  |
| Characteristic resistance<br>FHB-A dyn<br>$V_{Rk,s,C1}$                                                                                                                                           | zp                | 8.8             | [kN] | 52,5                                |  |
|                                                                                                                                                                                                   | HCR               | 70              |      | 55,0                                |  |
| 1) Partial factors for performance category C1 see Table C5.2.                                                                                                                                    |                   |                 |      |                                     |  |
| <b>Table C5.2:</b> Partial factors for <b>fischer Anchor rods FHB-A dyn</b> under seismic action performance category <b>C1</b>                                                                   |                   |                 |      |                                     |  |
| Anchor rod size                                                                                                                                                                                   |                   |                 |      | 16x125                              |  |
| Tension loading, steel failure                                                                                                                                                                    |                   |                 |      |                                     |  |
| Partial factor<br>FHB-A dyn<br>$\gamma_{Ms,N}$                                                                                                                                                    | zp                | 8.8             | [kN] | 1,50                                |  |
|                                                                                                                                                                                                   | HCR               | 70              |      |                                     |  |
| Shear loading, steel failure                                                                                                                                                                      |                   |                 |      |                                     |  |
| Partial factor<br>FHB-A dyn<br>$\gamma_{Ms,V}$                                                                                                                                                    | zp                | 8.8             | [kN] | 1,25                                |  |
|                                                                                                                                                                                                   | HCR               | 70              |      |                                     |  |
| Factor for the annular gap                                                                                                                                                                        |                   | $\alpha_{gap}$  | [-]  | 1,00                                |  |
| <b>Table C5.3:</b> Characteristic resistance under tension loading for <b>fischer Anchor rods FHB-A dyn</b> under seismic action performance category <b>C1</b>                                   |                   |                 |      |                                     |  |
| Anchor rod size                                                                                                                                                                                   |                   |                 |      | 16x125                              |  |
| Characteristic bond resistance, combined pullout and concrete cone failure                                                                                                                        |                   |                 |      |                                     |  |
| Temperature range                                                                                                                                                                                 | I: 24 °C / 40 °C  | $N_{Rk,p,C1}$   | [kN] | 47,8                                |  |
|                                                                                                                                                                                                   | II: 50 °C / 80 °C |                 |      | 42,1                                |  |
| Installation factors                                                                                                                                                                              |                   |                 |      |                                     |  |
| Dry or wet concrete                                                                                                                                                                               |                   | $\gamma_{inst}$ | [-]  | 1,0                                 |  |
| Water filled hole                                                                                                                                                                                 |                   |                 |      | 1,2                                 |  |
|                                                                                                                                                                                                   |                   |                 |      |                                     |  |
| fischer Highbond-Anchor FHB / FHB dyn / FDA                                                                                                                                                       |                   |                 |      | <b>Annex C5</b><br>Appendix 39 / 39 |  |
| <b>Performance</b><br>Partial factors; characteristic resistance to combined pull-out and concrete failure for Anchor rod FHB-A dyn                                                               |                   |                 |      |                                     |  |