



#### **DECLARATION OF PERFORMANCE**

#### DoP 0353

for fischer Highbond-Anchor FHB / FHB dyn / FDA (Bonded expansion fastener for use in concrete)

EN

1. <u>Unique identification code of the product-type:</u> **DoP 0353** 

2. Intended use/es: Post-installed fastening for use in cracked or uncracked concrete, see appendix,

especially annexes B1 - B19.

3. Manufacturer: fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Germany

4. Authorised representative:

5. System/s of AVCP: 1

6. European Assessment Document: EAD 330499-02-0601, Edition 12/2023

European Technical Assessment: ETA-06/0171; 2024-02-15

Technical Assessment Body: DIBt- Deutsches Institut für Bautechnik

Notified body/ies: 2873 TU Darmstadt

7. Declared performance/s:

#### Mechanical resistance and stability (BWR 1)

#### Characteristic resistance to tension load (static and quasi-static loading):

- 1) Resistance to steel failure: see appendix, especially annex C1
- 2) Resistance to pull-out failure: see appendix, especially annexes C2,C3
- 3) Resistance to concrete cone failure: see appendix, especially annex C2
- 4) Edge distance to prevent splitting under load: see appendix, especially annex C2
- 5) Robustness: see appendix, especially annexes C2, C3
- 6) Installation torque: see appendix, especially annexes B5-B8
- 7) Minimum edge distance and spacing, member thickness: see appendix, especially annexes B5-B8

#### Characteristic resistance to shear load (static and quasi-static loading):

- 8) Resistance to steel failure: see appendix, especially annex C1
- 9) Resistance to pry-out failure: see appendix, especially annex C2
- 10) Resistance to concrete edge failure: see appendix, especially annex C2

#### Displacements under short-term and long-term loading:

- 11) Displacements under short-term and long-term loading: see appendix, especially annex C4
- 12) Resistance in steel fibre reinforced concrete: see appendix, especially annexes B3, B4, C1-C4

### Characteristic resistance and displacements for seismic performance categories C1 and C2:

- 13) Resistance to tension for seismic performance category C1: NPD
- 14) Resistance to tension for seismic performance category C2: NPD
- 15) Resistance to shear for seismic performance category C1: NPD
- 16) Resistance to shear for seismic performance category C2: NPD

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

17) Reaction to fire: Class (A1)

## Resistance to fire:

- 18) Fire resistance to steel failure (tension load): NPD
- 19) Bond resistance under fire conditions: NPD
- 20) Fire resistance to steel failure under shear loading: NPD

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

- 21) Content, emission and/or release of dangerous substances: NPD
- 8. Appropriate Technical Documentation and/or Specific

Technical Documentation:

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr.-Ing. Oliver Geibig, Managing Director Business Units & Engineering

Tumlingen, 2024-02-23

Jürgen Grün, Managing Director Chemistry & Quality

This DoP has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.

The Appendix includes voluntary and complementary information in English language exceeding the (language-neutrally specified) legal requirements.

Fischer DATA DOP\_ECs\_V94.xlsm 1 / 1



Translation guidance Essential Characteristics and Performance Parameters for Annexes

I Resistance to steel failure:  Resistance to combined pull- out and concrete cone failure:  Resistance to combined pull- out and concrete cone failure:  Resistance to pull-out failure:  Resistance to pull-out failure:  Resistance to pull-out failure:  Resistance to prevent splitting under load:  Resistance to steel failure:  Resista			
Resistance to combined pull- out and concrete cone failure:  Resistance to combined pull- out and concrete cone failure:  Resistance to pull-out failure:  Resistance to pull-out failure:  Resistance to concrete cone failure:  Resistance to concrete cone failure:  Resistance to prevent splitting under load:  Robustness:  Maximum installation torque:  Installation torque:  Minimum edge distance, spacing and member thickness:  Maximum installation torque:  Resistance to shear load (static and quasi-static loading):  Resistance to steel failure:  Resistance to shear failure:  Resistance to steel failure:  Resistance to oncrete edge failure:  Resistance to encrete edge failure:  Resistance to oncrete edge failure:  Resistance to tension for seismic performance category C1  Resistance to steel fine resistance entry of the failure failure entry of the failure failure failure entry of the failure failure entry of the failure failure failure failure entry of the failu	ha	racteristic resistance to tension load (static and quasi-static loading):	
W <sub>c</sub> · W <sup>*</sup> <sub>co.e.</sub> W <sub>co.c.</sub> (c)   (BF)	1	Resistance to steel failure:	N <sub>RK,s</sub> [kN]
We, W <sup>*</sup> size, Waze, Tot     (BF)	2	Resistance to combined pull- out and concrete cone failure:	$\tau_{Rk}$ and/or $\tau_{Rk,100}$ [N/mm <sup>2</sup> ],
Resistance to concrete cone failure:    Edge distance to prevent splitting under load:			
Edge distance to prevent splitting under load:    C_{C,D,D} [mm]		Resistance to pull-out failure:	$N_{Rk,p}$ and/or $N_{Rk,p,100}$ [kN], $\psi_c$ [-] (BEF)
So Robustness:  Note: [1]  Maximum installation torque:  Installation torque:  Test [Nm] (BEF)  Test [Nm] (B	3	Resistance to concrete cone failure:	c <sub>cr,N</sub> [mm], k <sub>cr,N</sub> , k <sub>ucr,N</sub> [-]
Maximum installation torque:  Installation torque:  Total [Nm] (BEF)  Minimum edge distance, spacing and member thickness:  Cmis. Smin. Pum [mm]  Areacteristic resistance to shear load (static and quasi-static loading):  Resistance to steel failure:  Resistance to steel failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Displacements under short-term and long-term loading:  Displacements under short-term and long-term loading:  Displacements under short-term and long-term loading:  Resistance in steel fibre reinforced concrete:  Description  Description  Resistance to tension for seismic performance category C1  Resistance to tension for seismic performance category C2  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C2  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C2  Resistance to shear for seismic performance category C3  Resistance to shear for seismic performance category C3  Resistance to shear for seismic performance category C3  Resistance to shear for seismic performance category C4  Resistance to shear for seismic performance category C5  Resistance to shear for seismic performance category C7  Resistance to shear for seismic performance category C7  Resistance to shear for seismic performance category C8  Resistance to shear for seismic performance category C9  Resistance to shear for seismic performance category C9  Resistance to shear for seismic pe	4	Edge distance to prevent splitting under load:	c <sub>cr,sp</sub> [mm]
Installation torque:  Installation torque:  Installation torque:  Installation torque:  Total [Nm] (BEF)  Minimum edge distance, spacing and member thickness:  cms, Smp, Pmm [mm]  Application to steel failure:  Resistance to steel failure:  Resistance to steel failure:  Resistance to pny-out failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Resistance to dear short-term and long-term loading:  Displacements under short-term and long-term loading:  Resistance in steel fibre reinforced concrete:  Description  Resistance to tension for seismic performance category C1  Resistance to tension for seismic performance category C2  Resistance to tension for seismic performance category C2  Resistance to tension for seismic performance category C2  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C2  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C2  Resistance to shear for seismic performance category C3  Resistance to shear for seismic performance category C4  Resistance to shear for seismic performance category C5  Resistance to shear for seismic performance category C7  Resistance to shear for seismic performance category C7  Resistance to shear for seismic performance category C8  Resistance to shear for seismic performance category C9  Resistance to shear for s	5	Robustness:	V <sub>inst</sub> [-]
Installation torque:  7 Minimum edge distance, spacing and member thickness:  Cmin. Smin. hm. [mm]  characteristic resistance to shear load (static and quasi-static loading):  8 Resistance to steel failure:  9 Resistance to steel failure:  10 Resistance to concrete edge failure:  10 Resistance to concrete edge failure:  11 Displacements under short-term and long-term loading:  12 Resistance in steel fibre reinforced concrete:  13 Resistance in steel fibre reinforced concrete:  14 Resistance to tension for seismic performance category C1  15 Resistance to tension for seismic performance category C2  16 Resistance to tension for seismic performance category C2  17 Resistance to shear for seismic performance category C1  18 Resistance to shear for seismic performance category C2  19 Resistance to shear for seismic performance category C2  10 Resistance to shear for seismic performance category C2  11 Vis.a.cz [kNi] (ali)  12 Resistance to shear for seismic performance category C2  13 Resistance to shear for seismic performance category C2  14 Resistance to shear for seismic performance category C2  15 Resistance to shear for seismic performance category C2  16 Resistance to shear for seismic performance category C2  17 Reaction to fire  Class  Class  Class  Class  Class  Class  Class  Presistance to steel failure (tension load):  Nam.s.s[kN], Min.s.s.s[kN], Min.s.s.s	6	Maximum installation torque	
To Minimum edge distance, spacing and member thickness:    Comin. Simin. hom. [mm]	0	maximum installation torque.	
theracteristic resistance to shear load (static and quasi-static loading):    Resistance to steel failure:   V^*_Rs.s. [kN], M^*_Rs.s. [Nm], ky [-]		Installation torque:	T <sub>inst</sub> [Nm] (BEF)
9 Resistance to pry-out failure:  10 Resistance to concrete edge failure:  11 Displacements under short-term and long-term loading:  12 Resistance in steel fibre reinforced concrete:  13 Resistance in steel fibre reinforced concrete:  14 Characteristic resistance and displacements for seismic performance categories C1 and C2:  15 Resistance to tension for seismic performance category C1  16 Resistance to tension for seismic performance category C2  17 Resistance to shear for seismic performance category C1  18 Resistance to shear for seismic performance category C1  19 Resistance to shear for seismic performance category C1  10 Resistance to shear for seismic performance category C1  10 Resistance to shear for seismic performance category C1  18 Resistance to shear for seismic performance category C1  19 Reaction to fire  10 Class  10 Reaction to fire  10 Class  11 Displacements under short-term and long-term loading:  11 Displacements under short-term and long-term loading:  12 Resistance to shear for seismic performance category C1  19 Bond resistance to steel failure (tension load):  10 Resistance to steel failure under shear loading:  10 Resistance to steel failure under shear loading:  11 Displacements under short-term and long-term loading:  12 Resistance to performance category C1  13 Resistance to steel failure under shear loading:  14 Resistance to steel failure under shear loading:  15 Resistance to steel failure under shear loading:  16 Resistance to steel failure under shear loading:  17 Resistance to steel failure under shear loading:  18 Pire resistance to steel failure under shear loading:  19 Pire resistance to steel failure under shear loading:  10 Pire resistance to steel failure under shear loading:  11 Displacements under short-term and long-term loading:  12 Resistance to steel failure under shear loading:  13 Resistance to steel failure under shear loading:  14 Resistance to steel failure under shear loading:	7	Minimum edge distance,spacing and member thickness:	c <sub>min</sub> , s <sub>min</sub> , h <sub>min</sub> [mm]
Resistance to pry-out failure:  Resistance to pry-out failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Resistance to concrete edge failure:  Resistance in steel fibre reinforced concrete:  Resistance in steel fibre reinforced concrete:  Resistance in steel fibre reinforced concrete:  Resistance to tension for seismic performance category C1  Resistance to tension for seismic performance category C2  Resistance to shear for seismic performance category C1  Resistance to shear for seismic performance category C2  Resistance to tension to tension to tension to tension to te	ha	racteristic resistance to shear load (static and quasi-static loading):	
Resistance to concrete edge failure:   d <sub>nom.</sub> I <sub>1</sub> [mm]	8	Resistance to steel failure:	V <sup>0</sup> <sub>Rk,s</sub> [kN], M <sup>0</sup> <sub>Rk,s</sub> [Nm], k <sub>7</sub> [-]
Displacements under short-term and long-term loading:    To Displacements under short-term and long-term loading:   Displacements under short-term and long-term loading:   Displacements under short-term and long-term loading:   Description	9	Resistance to pry-out failure:	k <sub>8</sub> [-]
Displacements under short-term and long-term loading:   δ <sub>0</sub> , δ <sub>-</sub> [mm or mm/(N/mm²)]     Resistance in steel fibre reinforced concrete:   Description     Description	0	Resistance to concrete edge failure:	d <sub>nom</sub> , I <sub>f</sub> [mm]
Resistance in steel fibre reinforced concrete:  Description  Descripti	)is <sub> </sub>	blacements under short-term and long-term loading:	1
Characteristic resistance and displacements for seismic performance categories C1 and C2:    Characteristic resistance and displacements for seismic performance category C1   N <sub>Rk,B,C1</sub> [kN] (all)   T <sub>Rk,C1</sub> [kN] (BF)   N <sub>Rk,B,C1</sub> [kN] (BEF)   N <sub>Rk,B,C2</sub> [kN] (BEF) (BEF)   N <sub>Rk,B,C2</sub> [kN] (BEF) (BEF)   N <sub>Rk,B,C2</sub> [kN] (BEF) (BEF) (BEF) (BEF) (BEF) (BEF) (BEF) (BEF	11	Displacements under short-term and long-term loading:	$\delta_0,\delta_\infty$ [mm or mm/(N/mm²)]
T <sub>Rk,C1</sub> [N/mm²] (BF) N <sub>Rk,p,C1</sub> [kN] (BEF)  14 Resistance to tension for seismic performance category C2  Resistance to tension for seismic performance category C2  N <sub>Rk,DC</sub> [N/m²] (BF)	12	Resistance in steel fibre reinforced concrete:	Description
T <sub>Rk,C1</sub> [N/mm²] (BF) N <sub>Rk,p,C1</sub> [kN] (BEF)  14 Resistance to tension for seismic performance category C2  T <sub>Rk,C2</sub> [N/m²] (BF) N <sub>Rk,p,C2</sub> [N/m²] (BF) N <sub>Rk,p,C2</sub> [N/m²] (BF) N <sub>Rk,p,C2</sub> [N/m²] (BF) N <sub>Rk,p,C2</sub> [N/m²] (all)  15 Resistance to shear for seismic performance category C1  V <sub>Rk,p,C2</sub> [kN] (all) V <sub>Rk,p,C2</sub> [kN] (all)  16 Resistance to shear for seismic performance category C2  V <sub>Rk,p,C2</sub> [kN] (all) S <sub>V,C2</sub> [mm] (all)  17 Reaction to fire  Class  Resistance to steel failure (tension load):  N <sub>Rk,p,fi</sub> [kN]  N <sub>Rk,p,fi</sub> [kN]  S <sub>Rk,p,fi</sub> [kN]  P <sub>Rk,p,fi</sub> [kN]  S <sub>Rk,p,fi</sub> [kN]  Resistance to steel failure under shear loading:  V <sub>Rk,p,fi</sub> [kN], M <sup>0</sup> <sub>Rk,p,fi</sub> [Nm]  Regiene, health and the environment (BWR 3)	ha	racteristic resistance and displacements for seismic performance categories C1 and C2:	
NRIA,D,C] [kN] (BEF)	13	Resistance to tension for seismic performance category C1	N <sub>Rk,s,C1</sub> [kN] (all)
Resistance to tension for seismic performance category C2    N <sub>Rk,S,C2</sub> [kN] (all)   T <sub>Rk,C2</sub> [kN] (BEF)   N <sub>Rk,p,C2</sub> [kN] (BEF)   N <sub>Rk,p,C2</sub> [kN] (BEF)   N <sub>Rk,p,C2</sub> [kN] (BEF)   N <sub>Rk,p,C2</sub> [kN] (all)   N <sub>Rk,S,C1</sub> [kN] (all)   N <sub>Rk,S,C1</sub> [kN] (all)   N <sub>Rk,S,C1</sub> [kN] (all)   N <sub>Rk,S,C2</sub> [kN] (al			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
$\begin{array}{c} N_{Rk,p,C2}\left[kN\right] \left(BEF\right) \\ \delta_{N,C2}\left[mm\right] \left(all\right) \\ \end{array}$ $15 \text{ Resistance to shear for seismic performance category C1} \\ V_{Rk,s,C1}\left[kN\right] \left(all\right) \\ V_{Rk,s,C2}\left[kN\right] \left(all\right) \\ V_{Rk,s,C2}\left[kN\right] \left(all\right) \\ \delta_{V,C2}\left[mm\right] \left(all\right) \\ \end{array}$ $16 \text{ Resistance to shear for seismic performance category C2} \\ V_{Rk,s,C2}\left[kN\right] \left(all\right) \\ \delta_{V,C2}\left[mm\right] \left(all\right) \\ \end{array}$ $17 \text{ Reaction to fire} \\ \begin{array}{c} \text{Class} \\ \\ \text{Resistance to fire} \\ \end{array}$ $18 \text{ Fire resistance to steel failure (tension load):} \\ \begin{array}{c} N_{Rk,s,fl}\left[kN\right] \\ \\ \text{Ignorization to fire} \\ \end{array}$ $19 \text{ Bond resistance under fire conditions:} \\ \begin{array}{c} N_{Rk,s,fl}\left[kN\right] \\ \\ \text{True, in}\left(\theta\right)\left[N/mm^2\right] \\ \text{(BF)} \\ \end{array}$ $20 \text{ Fire resistance to steel failure under shear loading:} \\ \begin{array}{c} V_{Rk,s,fl}\left[kN\right], M_{Rk,s,fl}^{0}\left[Nm\right] \\ \\ \text{Resistance to steel failure under shear loading:} \\ \end{array}$	14	Resistance to tension for seismic performance category C2	
$\delta_{N,C2}$ [mm] (all)         15 Resistance to shear for seismic performance category C1 $V_{Rk,s,C2}$ [kN] (all)         16 Resistance to shear for seismic performance category C2 $V_{Rk,s,C2}$ [kN] (all)         16 Resistance to shear for seismic performance category C2 $V_{Rk,s,C2}$ [kN] (all)         17 Reaction to fire       Class         18 Fire resistance to fire $N_{Rk,s,f}$ [kN]         19 Bond resistance under fire conditions: $N_{Rk,s,f}$ [kN]         19 Fire resistance to steel failure under shear loading: $V_{Rk,s,f}$ [kN], $N_{Rk,s,f}$ [Nm]         19 Suppleme, health and the environment (BWR 3)			
Resistance to shear for seismic performance category C1 $V_{Rk,s,C1}$ [kN] (all)  Resistance to shear for seismic performance category C2 $V_{Rk,s,C2}$ [kN] (all)  Safety in case of fire (BWR 2)  Reaction to fire $Class$ Resistance to steel failure (tension load): $V_{Rk,s,f}$ [kN]  By Bond resistance under fire conditions: $V_{Rk,s,f}$ [kN]  Fire resistance to steel failure under shear loading: $V_{Rk,s,f}$ [kN], $V_{Rk,s,f}$			
Resistance to shear for seismic performance category C2 $V_{Rk,s,C2}$ [kN] (all) $\delta_{V,C2}$ [mm] (all)  Reaction to fire  Class  Resistance to fire  Resistance to steel failure (tension load): $V_{Rk,s,f}$ [kN]  Reaction to fire $V_{Rk,s,f}$ [kN]  Resistance to steel failure onditions: $V_{Rk,s,f}$ [kN],	15	Posistance to chear for colomic performance entergry C1	
δ <sub>V,C2</sub> [mm] (all)  Safety in case of fire (BWR 2)  Reaction to fire  Class  Resistance to fire    N <sub>Rk,s,fi</sub> [kN]	13	Resistance to snear for seismic performance category of	V <sub>Rk,s,C1</sub> [KN] (all)
Reaction to fire    Class	16	Resistance to shear for seismic performance category C2	
Resistance to fire    N <sub>Rk,s,fi</sub> [kN]	Saf	ety in case of fire (BWR 2)	V,02 k J (** /
88 Fire resistance to steel failure (tension load): $N_{Rk,s,fi}[kN]$ 19 Bond resistance under fire conditions: $k_{fi,p}(\theta)[\cdot],$ $T_{Rk,fi}(\theta)[N/mm^2]$ (BF)  20 Fire resistance to steel failure under shear loading: $V_{Rk,s,fi}[kN], M^0_{Rk,s,fi}[Nm]$	17	Reaction to fire	Class
Bond resistance under fire conditions: $ k_{f_i,p} (\theta) [-], \\  \tau_{Rk,fi} (\theta) [N/mm^2]  (BF) $ 20 Fire resistance to steel failure under shear loading: $ V_{Rk,s,fi} [kN], M^0_{Rk,s,fi} [Nm] $ dygiene, health and the environment (BWR 3)	es	I istance to fire	l
T <sub>Rk,fi</sub> (Θ) [N/mm²] (BF)  T <sub>Rk,fi</sub> (Θ) [N/mm²] (BF)  V <sub>Rk,s,fi</sub> [kN], M <sup>0</sup> <sub>Rk,s,fi</sub> [Nm]  Additionally givene, health and the environment (BWR 3)	18	Fire resistance to steel failure (tension load):	$N_{Rk,s,fi}$ [kN]
V <sub>Rk,s,fi</sub> [kN], M <sup>0</sup> <sub>Rk,s,fi</sub> [Nm]  dygiene, health and the environment (BWR 3)	19	Bond resistance under fire conditions:	***************************************
dygiene, health and the environment (BWR 3)	20	Fire resistance to steel failure under shear loading:	
M Contest spinion and/or allow of decourage 1.1	łyg	lene, health and the environment (BWR 3)	
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Fischer DATA DOP\_ECs\_V94.xlsm Appendix 0

### **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 and displacements for seismic performance categories C1 and C2	No performance assessed	

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

Essential characteristic	Performance	
Reaction to fire	Class A1	

### 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

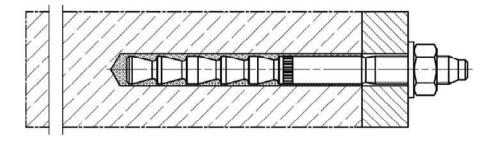
In accordance with the European Assessment Document EAD 330499-02-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

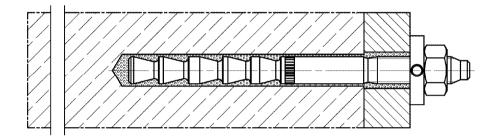
# Installation conditions part 1, FHB / FHB N

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

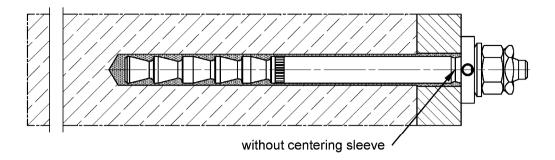
**Annex A1** 

Appendix 3 / 38

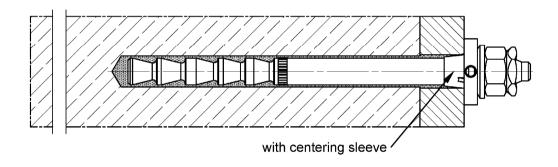
## Installation conditions part 2, FHB dyn

fischer Highbond-Anchor dynamic FHB dyn with fischer injection system FIS HB

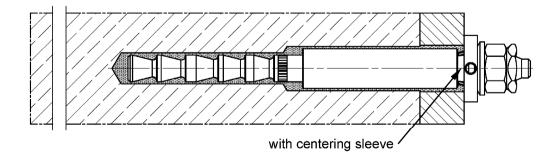
Pre-positioned installation without shear force sleeve, FHB dyn (annular gap filled with mortar)



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

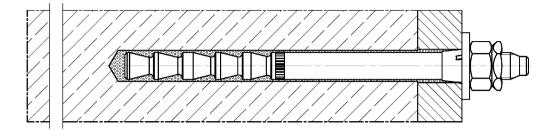
Annex A2

Appendix 4 / 38

# 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

Appendix 5 / 38

# Overview system components part 1 Injection cartridge (shuttle cartridge) with sealing cap Size: 360 ml, 825 ml Imprint: fischer FIS HB, processing notes, shelf-life, piston travel scale (optional), curing times and processing times (depending on temperature), hazard code, size, volume Injection cartridge (coaxial cartridge) with sealing cap Size: 150 ml, 300 ml, 380 ml, 400 ml, 410 ml Imprint: fischer FIS HB, processing notes, shelf-life, piston travel scale (optional), curing times and processing times (depending on temperature), hazard code, size, volume laataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataalaataal 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 Annex A4 **Product description** Overview system components part 1 Appendix 6 / 38 cartridges / static mixer / accessories

# 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 fischer Highbond-Anchor dynamic FHB dyn V with shear force sleeve spherical contact surface (in assembled condition) fischer anchor rod FHB-A dyn; Size: M12, M16, M20, M24 alternative fischer Dynamic-Anchor FDA fischer anchor rod FDA-A; Size: M12, M16 alternative Figures not to scale fischer Highbond-Anchor FHB / FHB dyn / FDA Annex A5 **Product description** Overview system components part 2 Appendix 7 / 38 Metal parts

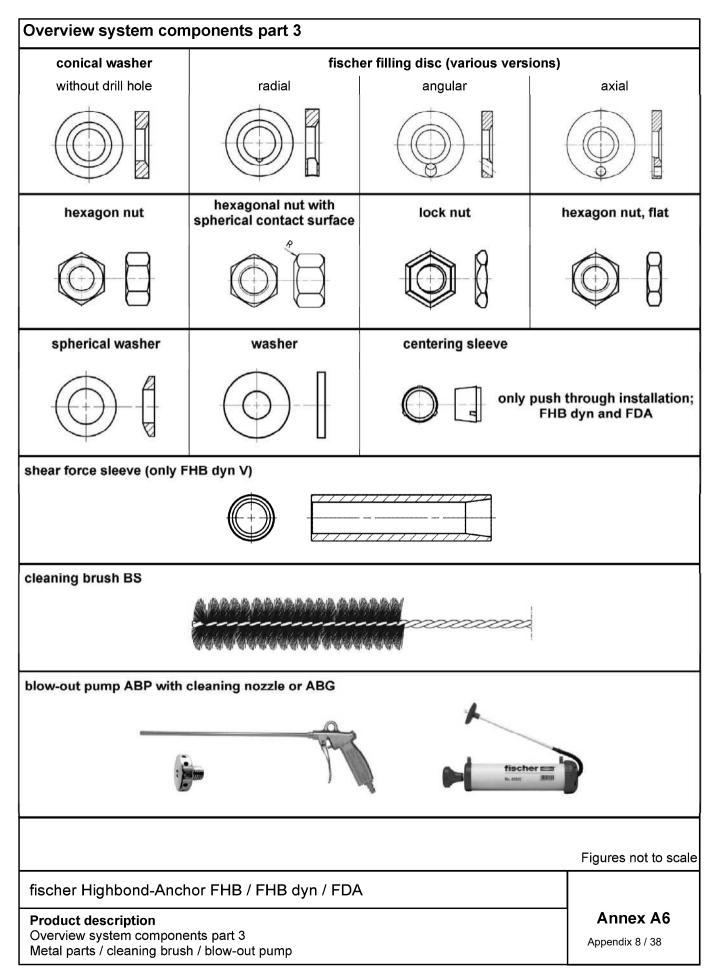
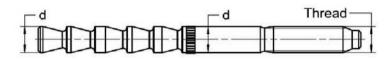


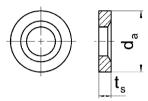
Table A7.1: Dimensions system components, FHB / FHB N								
Designation		FHB 10x60	FHB 12x80	FHB 12x100	FHB 16x125	FHB 20x170	FHB 24x220	
Thread		[-]	M10	M12	M12	M16	M20	M24
Anchor rod	d		10	12	12	16,5	22	24,5
Conical washer /	≥ d <sub>a</sub>	[mm]	26	30	30	38	46	54
fischer filling disc	t <sub>s</sub>		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

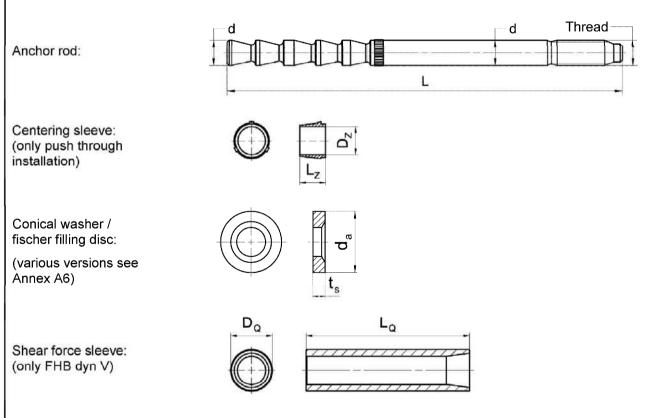
**Product description** 

Dimensions system components, FHB / FHB N

Annex A7

Appendix 9 / 38

Table A8.1: Dimensions system components, FHB dyn / FHB dyn V								
Designation	FHB dyn without shear force sleeve				FHB dyn V with shear force sleeve			
			FHB dyn 12x100	FHB dyn 16x125	FHB dyn 20x170	FHB dyn 24x220	FHB dyn 12x100 V	FHB dyn 16x125 V
Thread		[-]	M12	M16	M20	M24	M12	M16
	d		12	16,5	22	24,5	12	16,5
Anchor rod	L <sub>min</sub>		135	168	220	280	140	173
	L <sub>max</sub>		467	530	575	475	337	367
Contoring alaska	Dz		11,8	16,3	21,8	24,3	11,8	16,3
Centering sleeve	Lz	[mm]	11	13	15	15	11	13
Conical washer /	≥ d <sub>a</sub>	[mm]	30	38	46	54	30	38
fischer filling disc	ts		6	7	8	10	6	7
	$L_{Q,min}$		-	-	-	-	40	55
Shear force sleeve	L <sub>Q,max</sub>		-	-	-	-	230	245
	DQ		-	_	-	-	17,5	23,5



Figures not to scale

fische	r Highbon	d-Anchor FHI	3 / FHB dyn	/ FDA
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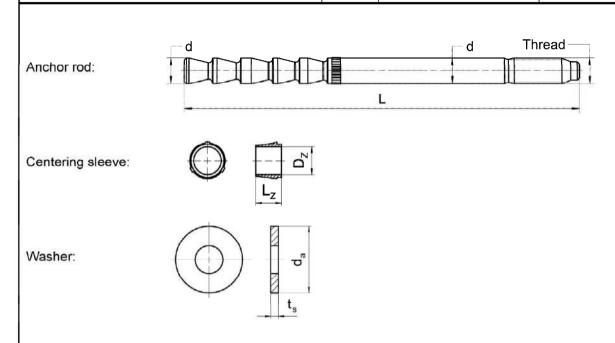
## **Product description**

Dimensions system components, FHB dyn / FHB dyn V

Annex A8

Appendix 10 / 38

Table A9.1: Dimensions system components, FDA					
Designation			FDA 12x100	FDA 16x125	
Thread		[-]	M12	M16	
	d		12	16,5	
Anchor rod	L <sub>min</sub>		135	168	
	L <sub>max</sub>		467	530	
Contoring along	Dz	[mana]	11,8	16,3	
Centering sleeve	Lz	[mm]	11	13	
	≥ d <sub>a</sub>		30	40	
Washer	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

Annex A9

Appendix 11 / 38

Table A10.1: Materials, FHB / FHB N zinc plated (zp; hdg)						
Part	Designation		Material			
1	Injection cartridge		Mortar, hardener, fille	er		
			Steel	_		
	Steel grade	zinc pl	ated (zp)	hot dip galvanised (hdg)		
		M10 to M16	M20 to M24	M10 to M24		
		Property class 5.8	f <sub>uk</sub> = 550 N/mm <sup>2</sup>	Property class 8.8		
		Property class 8.8	$f_{yk} = 440 \text{ N/mm}^2$	EN ISO 898-1:2013		
	fischer anchor rod FHB-A and FHB-A N	EN ISO 898-1:2013	EN ISO 898-1:2013	hot dip galvanised ≥ 40 µm		
2		zinc plated ≥ 5 μm		EN ISO 10684:2004+AC:2009		
-		-A and Frib-A N	ISO 4042:2022	A <sub>5</sub> > 12%		
		A <sub>5</sub> > 12%	A <sub>5</sub> > 12%	fracture elongation		
		fracture elongation	fracture elongation	varnish layer		
		coated	coated	coated (M16 to M24)		
3	Washer	•	ed ≥ 5 μm	hot dip galvanised ≥ 40 µm		
	ISO 7089:2000	ISO 40	)42:2022	EN ISO 10684:2004+AC:2009		
4	Conical washer or fischer filling disc	zinc plat	ed ≥ 5 µm	hot dip galvanised ≥ 40 μm		
4	similar to DIN 6319-G	ISO 40	)42:2022	EN ISO 10684:2004+AC:2009		
		Property class 8		Property class 8		
5	Hexagon nut	EN ISO 8	398-2:2012	EN ISO 898-2:2012		
	TIOAAGOII IIUL		ed ≥ 5 μm 042:2022	hot dip galvanised ≥ 40 µm		
		180 40	EN ISO 10684:2004+AC:2009			

Product description

Materials, FHB / FHB N zinc plated (zp; hdg)

Annex A10

Appendix 12 / 38

Table A11.1: Materials, FHB / FHB N stainless steel									
Part	Designation		Material						
1	Injection cartridge		Mortar, hardener, fille	r					
		Stainles	ss steel R	High corrosion resistant steel HCR					
	Steel grade	Corrosion class CR	10088-1:2014 resistance C III acc. to 2006+A1:2015	acc. to EN 10088-1:2014 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	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		Property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ EN ISO 3506-1:2020 1.4565; 1.4529 EN 10088-1:2014 $A_5 > 12\%$ fracture elongation coated					
3	Washer ISO 7089:2000	1.4571; 1.4	404; 1.4578; 439; 1.4362; 38-1:2014	1.4565; 1.4529; EN 10088-1:2014					
4	Conical washer or fischer filling disc similar to DIN 6319-G	1.4401; 1.4 1.4571; 1.4 EN 1008	1.4565; 1.4529; EN 10088-1:2014						
5	Hexagon nut	Property cl EN ISO 3 1.4401; 1.4 1.4571; 1.4 EN 1008	Property class 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529; EN 10088-1:2014						

Product description

Materials, FHB / FHB N stainless steel

Annex A11

Appendix 13 / 38

Table A12.1: Materials, FHB dyn							
Part	Designation	Material					
1	Injection cartridge	Mortar, hardener, filler					
		Steel	High corrosion resistant steel HCR				
	Steel grade	zinc plated (zp)	acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015				
		M12 to M24	M12 to M16				
2 fischer anchor rod		Property class 8.8 EN ISO 898-1:2013 zinc plated ≥ 5 μm	Property class 70 with f <sub>yk</sub> = 560 N/mm <sup>2</sup> EN ISO 3506-1:2020 1.4529				
_	FHB-A dyn	ISO 4042:2022 A <sub>5</sub> > 12% fracture elongation coated	EN 10088-1:2014  A <sub>5</sub> > 12 % fracture elongation coated				
3	Centering sleeve	Pla	astic				
4	Conical washer or fischer filling disc similar to DIN 6319-G	zinc plated ≥ 5 μm ISO 4042:2022	1.4529 EN 10088-1:2014				
5	Spherical washer	zinc plated ≥ 5 μm ISO 4042:2022	1.4529 EN 10088-1:2014				
6a	Hexagon nut	Property class 8	Property class 70 or 80				
6b	hexagonal nut with spherical contact surface	EN ISO 898-2:2012 zinc plated ≥ 5 μm ISO 4042:2022	EN ISO 3506-2:2020 1.4529 EN 10088-1:2014				
7a	Lock nut	Tine plated > F um	1.4520				
7b	hexagon nut, flat	zinc plated ≥ 5 µm ISO 4042:2022	1.4529 EN 10088-1:2014				
8	Shear force sleeve	zinc plated ≥ 5 μm ISO 4042:2022					

Product description Materials, FHB dyn Annex A12

Table A13.1: Materials, FDA						
Part	Designation	Material				
1	Injection cartridge	Mortar, hardener, filler				
		Steel				
	Steel grade	zinc plated (zp)				
		M12 to M16				
		Property class 8.8				
		EN ISO 898-1:2013				
2	fischer anchor rod	zinc plated ≥ 5 μm				
2	FDA-A	ISO 4042:2022				
		$A_5 > 12$ % fracture elongation				
		coated				
3	Centering sleeve	Plastic				
4	Washer	zinc plated ≥ 5 μm				
4	vvasner	ISO 4042:2022				
		Property class 8				
5	Hoyagan nut	EN ISO 898-2:2012				
5	Hexagon nut	zinc plated ≥ 5 μm				
		ISO 4042:2022				
6	Lock nut	zinc plated ≥ 5 μm				
O	LOCK HUL	ISO 4042:2022				

Product description Materials, FDA Annex A13

Appendix 15 / 38

# 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 dr standard dr Hammer dr nollow drill (fischer "FH Expert"; Bo Hilti "TE-CI DreBo "D-F	rill bit rilling with bit HD"; Helle osch "Spee D, TE-YD'	ed Clean"; ;	all sizes; Nominal drill bit diameter (d₀) 12 mm to 28 mm				
DreBo "D-Plus"; DreBo "D-Max")  Static and quasi uncracked static loading, in concrete concrete without fibers concrete			all sizes; M10 to M24	Tables: C1.1 C2.1 C3.1			
Static and o static loading concrete w	ng, in	uncracked concrete cracked concrete	sizes: M12x100 M16x125	Tables: C1.1 C2.1 C3.2			
Jse	l1 dry	or wet concrete	all sizes	s; M10 to M24			
category	12	water filled hole	all sizes	M10 to M24			
Installation	direction		D3 Downwards, horizontal and upwards (overhead) installation				
Installation	method		pre-positioned or push through installation				
Installation temperature			FIS HB: $T_{i,min} = -5$ °C to $T_{i,max} = +40$ °C for the standard variation of temperature after installation				
In-service		Temperature range I:		short term temperature +40 °C; long term temperature +24 °C)			
temperatur	е	Temperature range II:		short term temperature +80 °C; long term temperature +50 °C)			

fischer Highbond-Anchor FHB	/ FHB dyn / FDA
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Specifications (part 1), FHB / FHB N

## Annex B1

# 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 FHB-A dyn, without shear force sleeve (picture with centering sleeve; use only for push through installation) FHB-A dyn V, with shear force sleeve FHB dyn FHB dyn V Hammer drilling with standard drill bit all sizes; Hammer drilling with Nominal drill bit diameter (d<sub>0</sub>) all sizes: hollow drill bit 14 mm and 18 mm Nominal drill bit diameter (d<sub>0</sub>)

(fischer "FHD", Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD"; DreBo "D-Plus"; DreBo "D-Max")			14 mm t	o 28 mm	Nominal drill bit diameter (d <sub>1</sub> ) 20 mm and 28 mm			
Static and o		uncracked concrete	all sizes;	Tables: C1.1	all sizes;	Tables: C1.1		
concrete wi fibers	_	cracked concrete	M12 to M24	C2.1 C3.1	M12 and M16	C2.1 C3.1		
Static and o		uncracked concrete	sizes: M12x100	Tables: C1.1	sizes: M12x100	Tables: C1.1		
static loading, in concrete with fibers		ers cracked concrete	M16x125	C2.1 C3.2	M16x125	C2.1 C3.2		
Use I1 dry or wet concrete			all sizes; M	/112 to M24	all sizes; M12 and M16			
category	12	water filled hole	all sizes; N	/112 to M24	all sizes; M12 and M16			
Installation	direct	ion	D3  Downwards, horizontal and upwards (overhead) installation					
Installation	metho	od		tioned or h installation	push through installation			
Installation temperature			FIS HB: $T_{i,min} = -5$ °C to $T_{i,max} = +40$ °C for the standard variation of temperature after installation					
Temperature In-service range I:			-40 °C to +40 °C (max. short term temperature +40 °C; max. long term temperature +24 °C)					
temperature	Э	Temperature range II:	-40 °C to		ort term temperature +80 °C;  g term temperature +50 °C)			

fischer Highbond-Anchor FHB / FHB dyn / FDA	
Intended use Specifications (part 2), FHB dyn	,

Annex B2

#### 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 Hammer drilling with all sizes: hollow drill bit Nominal drill bit diameter (d<sub>0</sub>) (fischer "FHD"; Heller "Duster 14 mm and 18 mm Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD"; DreBo "D-Plus"; DreBo "D-Max") uncracked Tables: Static and quasi concrete static loading, in C1.1 all sizes; concrete without M12 and M16 C2.1 cracked fibers C3.1 concrete uncracked Tables: Static and quasi sizes: concrete C1.1 static loading, in M12x100 C2.1 cracked concrete with fibers M16x125 C3.2 concrete 11 dry or wet concrete all sizes: M12 and M16 Use category 12 water filled hole all sizes; M12 and M16 D3 Installation direction Downwards, horizontal and upwards (overhead) installation Installation method push through installation FIS HB: $T_{i,min}$ = -5 °C to $T_{i,max}$ = +40 °C Installation temperature for the standard variation of temperature after installation Temperature (max. short term temperature +40 °C; -40 °C to +40 °C max. long term temperature +24 °C) range I: In-service temperature Temperature (max. short term temperature +80 °C: -40 °C to +80 °C range II: max. long term temperature +50 °C)

fischer Highbond-Anchor	FHB / FHB	dyn / FDA
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## 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/m³.

#### 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.

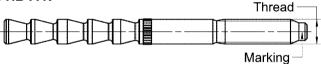
#### Installation:

- 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
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Table B5.1: Installation parameters for fischer Highbond-Anchor FHB / FHB N											
Designation				FHB 10x60	FHB 12x80		1B 100		HB :125	FHB 20x170	FHB 24x220
Thread			[-]	M10	M12	M	12	М	16	M20	M24
Nominal drill hol	e diameter	$d_0$		12	14	1	4	1	8	24	28
Drill hole depth		$h_0$					h <sub>ef</sub>	+ 5			
Effective embed	ment depth	$h_{ef}$		60	80	10	00	12	25	170	220
Minimum thickne member	Minimum thickness of concrete member h <sub>min</sub>			120	160	13	30	16	60	220	440
Minimum spacin	g	Smin		60	80	100	100	100	100	00	400
Minimum edge o	Minimum edge distance c <sub>min</sub>			60	80	200	100	200	100	80	180
Thickness of cor	ncrete member	h		≥ 120	≥ 160	≥ 130	≥ 200	≥ 160	≥ 250	≥ 220	≥ 440
h <sub>min</sub> ≤ h ≤ 2h <sub>ef</sub> :	$S_1 \ge S_{min} = 10$ $C_1 \ge C_{min} = 10$		[mm]			$[(3 \cdot c_1 + s_1) \cdot h] \ge 88000$		8000			
Calculation c <sub>req</sub> : s <sub>1</sub> and h available				-	Creq ?	≥ (8800	0/h – s	1) / 3		-	
Calculation s <sub>req</sub> : c <sub>1</sub> and h availab				s <sub>req</sub> ≥ 88000/h − 3 • c <sub>1</sub>				• <b>C</b> 1			
Diameter of clearance hole	pre-positioned installation	d <sub>f</sub>		12	14	1	4	1	8	22	26
of the fixture	push through installation	d <sub>f</sub>		14	16	1	6	2	:0	26	30
Installation torqu	ie	T <sub>inst</sub>	[Nm]	20	40	4	0	6	0	100	120

## fischer anchor rod FHB-A / FHB-A N



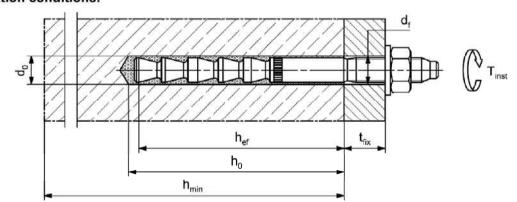
## Marking fischer anchor rod:

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** 

Appendix 20 / 38

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

Designation				dyn 100	l .	dyn 125	FHB dyn 20x170	FHB dyn 24x220
Thread		[-]	M	12	М	16	M20	M24
Nominal drill hole diameter	<b>d</b> o		1	4	1	8	24	28
Drill hole depth	h <sub>0,min</sub>					h <sub>ef</sub>	+ 5	
Effective embedment denth	$h_{\text{ef,min}}$		10	00	12	25	170	220
Effective embedment depth	h <sub>ef,max</sub>		23	35	29	90	330	-
Minimum thickness of concrete member	$h_{min}$		h <sub>ef</sub> ∃	h <sub>ef</sub> + 30			h <sub>ef</sub> + 2d <sub>0</sub>	440
Minimum spacing	Smin		100	100	100	100	80	180
Minimum edge distance	Minimum edge distance c <sub>min</sub>		200	100	200	100	80	180
Thickness of concrete member	h	[mm]	≥ 130	≥ 200	≥ 160	≥ 250	≥ 220	≥ 440
	$h_{min} \le h \le 2 \ h_{ef,min}$ : $s_1 \ge s_{min} = 100 \ mm$ $c_1 \ge c_{min} = 100 \ mm$		$[(3 \cdot c_1 + s_1) \cdot h] \ge 88000$			000		
Calculation c <sub>req</sub> : (s <sub>1</sub> and h availa	Calculation c <sub>req</sub> : (s <sub>1</sub> and h available)		c <sub>req</sub> ≥ (88000/h − s <sub>1</sub> ) / 3			/ 3		-
Calculation s <sub>req</sub> : (c <sub>1</sub> and h availa	able)		Sre	q ≥ 8800	0/h – 3 •	<b>C</b> 1		
Diameter of the clearance hole of the fixture	d <sub>f</sub>		15		19		25	29
Thickness of fixture	<b>t</b> fix,min		8	3	1	0	12	14
THICKHESS OF HXIUTE	t <sub>fix,max</sub>				20		00	
Minimum projection length	$h_{p,min}$		30 + t <sub>fix</sub>		35 + t <sub>fix</sub>		40 + t <sub>fix</sub>	50 + t <sub>fix</sub>
Installation torque	$T_{inst}$	[Nm]	4	0	6	0	100	120

<sup>1)</sup> Only valid for hef = 125 mm

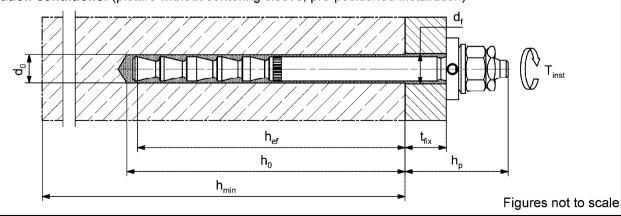
# fischer anchor rod FHB-A dyn



### 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)



# fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

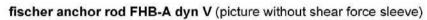
Installation parameters fischer Highbond-Anchor dynamic FHB dyn (without shear force sleeve)

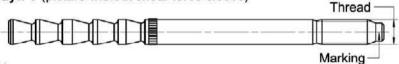
Annex B6

Appendix 21 / 38

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		[-]	M	12	M16		
Nominal drill hole diameter	<b>d</b> o		1	4	1	8	
Drill hole depth	h <sub>0,min</sub>		1.	10	13	35	
Nominal drill hole diameter	d <sub>1</sub>		2	0	2	8	
Drill hole depth	h <sub>1,min</sub>		3	5	5	0	
Effective embedment depth	h <sub>ef,</sub>		10	05	13	30	
Minimum thickness of concrete member	h <sub>min</sub>		130		16	60	
Minimum spacing	Smin		100	100	100	100	
Minimum edge distance	Cmin		200	100	200	100	
Thickness of concrete member	h	[mm]	≥ 130	≥ 200	≥ 160	≥ 250	
		_ <b>-</b>		$[(3 \cdot c_1 + s_1)]$	• h] ≥ 88000		
Calculation c <sub>req</sub> : s <sub>1</sub> and h available			C <sub>req</sub> ≥ (88000/h − s <sub>1</sub> ) / 3				
Calculation s <sub>req</sub> : 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	df		2	1	29		
Thickness of fixture	$t_{\text{fix,min}}$		8		10		
THICKHESS OF HARME	$\mathbf{t}_{fix,max}$			20	00		
Installation torque	Tinst	[Nm]	4	0	6	0	

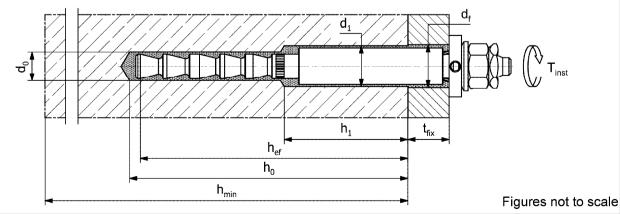




## Marking fischer anchor rod:

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

## Installation conditions:



# fischer Highbond-Anchor FHB / FHB dyn / FDA

#### Intended use

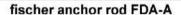
Installation parameters fischer Highbond-Anchor dynamic FHB dyn V (with shear force sleeve)

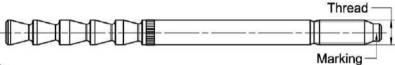
Annex B7

Appendix 22 / 38

Table B8.1: Installation parameters for fischer Dynamic-Anchor FDA								
Designation			FDA 1	2x100	FDA 1	6x125		
Thread		[-]	M	12	M <sup>2</sup>	16		
Nominal drill hole diameter	d₀		1	4	18	3		
Drill hole depth	$h_{0,min}$			h <sub>ef</sub>	+ 5			
Effective embedment depth	h <sub>ef,min</sub>		10	00	12	5		
Effective embedment depth	h <sub>ef,max</sub>		23	35	29	0		
Minimum thickness of concrete member	h <sub>min</sub>		h <sub>ef</sub> + 30		h <sub>ef</sub> + 2d <sub>0</sub> (160) <sup>1)</sup>			
Minimum spacing	Smin		100	100	100	100		
Minimum edge distance	Cmin		200	100	200	100		
Thickness of concrete member	h	[	≥ 130	≥ 200	≥ 160	≥ 250		
$h_{min} \le h \le 2h_{ef,min}$ : $s_1 \ge s_{min} = 3$ $c_1 \ge c_{min} = 3$		[mm] <b>-</b>		[(3 • c <sub>1</sub> + s <sub>1</sub> )	• h] ≥ 88000			
Calculation c <sub>req</sub> : s <sub>1</sub> and h available			$c_{req} \ge (88000/h - s_1) / 3$					
Calculation s <sub>req</sub> : c <sub>1</sub> and h available				s <sub>req</sub> ≥ 8800	0/h − 3 • c₁			
Diameter of the clearance hole of the fixture	d <sub>f</sub>		1	5	19			
Thickness of fixture	<b>t</b> fix,min		1	2	10	6		
THICKHESS OF HARDE	t <sub>fix,max</sub>			20	00	0		
Installation torque	$T_{inst}$	[Nm]	4	0	60	)		

<sup>1)</sup> Only valid for h<sub>ef</sub> = 125 mm

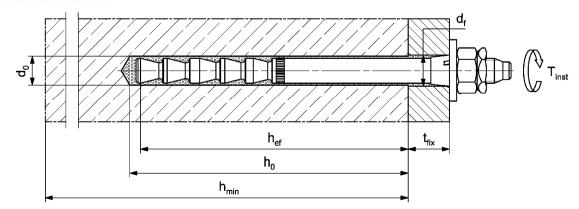




## Marking fischer anchor rod:

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** 

Appendix 23 / 38

# Table B9.1: Paramet

ers 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	<b>d</b> <sub>0</sub>	[mm]	12	14	18	24	28
Steel brush diameter	d <sub>b</sub>	[mm] -	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 [°C]	Maximum processing time twork	Minimum curing time 1) t <sub>cure</sub>
-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.

Figures not to scale

fischer Highbond-Anchor FHB / FHB dyn / FDA	
Intended use	Annex B9
Parameters of the cleaning brush (steel brush); Processing time and curing time	Appendix 24 / 38

<sup>&</sup>lt;sup>2)</sup> Minimal cartridge temperature +5 °C.

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

**Intended use**Overview installation instructions

Annex B10

Appendix 25 / 38

# 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) Drill the hole. Nominal drill hole diameter d₀ and drill hole depth h₀ see tables: FHB / FHB N → Table B5.1 1a FHB dyn → Table B6.1 FDA → Table B8.1 Clean the drill hole. Blow out the drill hole twice For drill hole diameter do < 24 mm and drill hole depth ho < 10d blow out the hole by hand or oilfree compressed air (≥ 6 bar). 2a For drill hole diameter d<sub>0</sub> ≥ 24 mm or drill hole depth $h_0 \ge 10d$ blow out the hole with oil-free compressed air (≥ 6 bar). Use a cleaning nozzle. Brush the drill hole twice with steel brush. 3a Corresponding brushes see Table B9.1 Clean the drill hole. Blow out the drill hole twice For drill hole diameter d₀ < 24 mm and drill hole depth ho < 10d blow out the hole by hand or oilfree compressed air (≥ 6 bar). 4a For drill hole diameter d<sub>0</sub> ≥ 24 mm or drill hole depth h<sub>0</sub> ≥ 10d blow out the hole with oil-free compressed air (≥ 6 bar). Use a cleaning nozzle. Go to step 5a (Annex B13) Drilling and cleaning the drill hole (hammer drilling with hollow drill bit) Check a suitable hollow drill (see Table B1.1, B2.1 resp. B3.1) 1b for correct operation of the dust extraction Use a suitable dust extraction system, e.g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data. Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. 2b Nominal drill hole diameter do and drill hole depth ho see tables: FHB / FHB N → Table B5.1 FHB dyn → Table B6.1 FDA → Table B8.1 Go to step 5a (Annex B13) fischer Highbond-Anchor FHB / FHB dyn / FDA Annex B11 Intended use Installation instructions part 1 Appendix 26 / 38 Drilling and cleaning the drill hole FHB, FHB N, FHB dyn and FDA

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

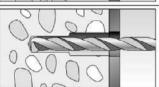
Drilling and cleaning the hole (hammer drilling with standard drill bit)



Drill hole 1 of the stepped borehole.

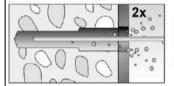
Nominal drill hole diameter d<sub>1</sub> and drill hole depth h<sub>1</sub> see **Table B7.1** 

1c



Drill hole 2 of the stepped borehole. Nominal drill hole diameter  $d_0$  and drill hole depth  $h_0$  see Table B7.1

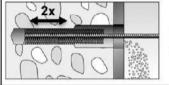
2c



Clean the drill hole. Blow out the drill hole twice by hand or oil-free compressed air (≥ 6 bar).

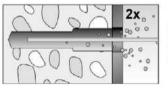


3с



Brush the drill hole 2 of the borehole twice with a steel brush. Corresponding brushes see **Table B9.1** 

4c



Clean the drill hole. Blow out the drill hole twice by hand or oil-free compressed air (≥ 6 bar).



Go to step 5a (Annex B13)

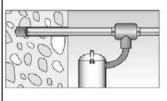
Drilling and cleaning the hole (hammer drilling with hollow drill bit)

1d



Check a suitable hollow drill (see **Table B2.1**) 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.

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.

First drill hole 1 of the stepped borehole with nominal drill hole diameter  $d_1$  and drill hole depth  $h_1$  (see **Table B7.1**).

Then drill hole 2 of the stepped borehole with nominal drill hole diameter  $d_0$  and drill hole depth  $h_0$  (see **Table B7.1**).

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 / 38

# Installation instructions part 3; injection mortar system FIS HB Preparing the cartridge Remove the sealing cap Screw on the static mixer 5a (the spiral in the static mixer must be clearly visible) 6a Place the cartridge into the dispenser Extrude approximately 10 cm of material out until the resin is evenly grey in colour. 7a 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 dvn V - Push through installation see Annex B18 8f: FDA - Push through installation see Annex B19

# Installation instructions part 4; Pre-positioned installation FHB / FHB N Pre-positioned installation FHB / FHB N 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<sub>0</sub> ≥ 150 mm use an 8a extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection adapter. 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 9a If not, pull out the anchor rod immediately and reinject mortar. For overhead installations support the anchor rod with wedges. (e.g. fischer centering wedges). Wait for the specified curing time tcure 10a see Table B9.2. Attach the fixture and install the washer and hexagon nut. Ensure the correct position of the metal parts. 11a Tighten the hexagon nut with installation torque T<sub>inst</sub> (see **Table B5.1**). The gap between metal parts and fixture (annular gap) may be filled with mortar (FIS HB) via the fischer filling disc. 12a Option ATTENTION: Using fischer filling disc reduces tfix (usable length of the anchor)

fischer Highbond-Anchor FHB	/ FHB dyn / FDA
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#### Intended use

# Installation instructions part 5; Push through installation FHB / FHB N Push through installation FHB / FHB N Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles. 8b For drill hole depth h₀ ≥ 150 mm use an extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection adapter. 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. Ensure the correct position of the metal parts. Only use clean and oil-free metal parts. 9b After inserting the pre-assembled anchor rod, excess mortar has to emerge under the washer. If not, pull out the assembled anchor rod immediately and reinject mortar. Wait for the specified curing time tcure 10b see Table B9.2. Tighten the hexagon nut with installation torque Tinst (see Table B5.1). 11b

Intended use

Installation instructions part 5 Push through installation FHB / FHB N

fischer Highbond-Anchor FHB / FHB dyn / FDA

Annex B15

Appendix 30 / 38

# Installation instructions part 6; Pre-positioned installation FHB dyn Pre-positioned installation FHB dvn 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<sub>0</sub> ≥ 150 mm use an 8c extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection adapter. Push the anchor rod down to the bottom of the hole, turning it slightly while doing so. Observe projection length hp (see Table B6.1) Only use clean and oil-free metal parts. After inserting the anchor rod, excess mortar must be emerged around the anchor element 9c If not, pull out the anchor rod immediately and reinject mortar. For overhead installations support the anchor rod with wedges. (e.g. fischer centering wedges) Wait for the specified curing time tcure 10c see Table B9.2 Attach the fixture and install the fischer filling disc, the spherical washer and nuts (without centering sleeve). Ensure the correct position of the metal parts. Tighten the hexagon nut with installation torque Tinst (see Table B6.1). 11c Tighten lock nut manually, then use wrench to give another quarter or half turn. In the high corrosion resistant steel version, the lock nut is a thin nut. Tighten it with a torque of 1/4 Tinst. The gap between metal parts and fixture (annular gap) has to be filled with mortar (FIS HB) via the fischer filling disc. 12c 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

Appendix 31 / 38

# Installation instructions part 7; Push through installation FHB dyn Push through installation FHB dyn Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles. 8d For drill hole depth h₀ ≥ 150 mm use an extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection-adapter. 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. Ensure the correct position of the metal parts and the centering sleeve. Only use clean and oil-free metal parts. 9d After inserting the pre-assembled anchor rod, excess mortar must be emerged around the fischer filling disc (minimum on one point). If not, pull out the assembled anchor rod immediately and reinject mortar. Wait for the specified curing time tcure 10d see Table B9.2. Tighten the hexagon nut with installation torque T<sub>inst</sub> (see **Table B6.1**). Tighten lock nut manually, then use wrench to give another quarter to half 11d In the high corrosion resistant steel version, the lock nut is a thin nut. Tighten it with a torque of 1/4 Tinst.

#### Intended use

Installation instructions part 7
Push through installation FHB dyn

Annex B17

Appendix 32 / 38

# Installation instructions part 8; Push through installation FHB dyn V Push through installation FHB dvn V Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles. 8e For drill hole depth $h_0 \ge 150$ mm use an extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection adapter. 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. Ensure the correct position of the metal parts and the centering sleeve. Only use clean and oil-free metal parts. 9e After inserting the pre-assembled anchor rod, excess mortar must be emerged around the fischer filling disc (minimum on one point). If not, pull out the assembled anchor rod immediately and reinject mortar. Wait for the specified curing time toure 10e see Table B9.2. Tighten the hexagon nut with installation torque Tinst (see Table B7.1). Tighten lock nut manually, then use wrench to give another quarter to half 11e turn.

fischer Highbond-Anchor FHB / FHB dyn / FDA

Intended use

Installation instructions part 8 Push through installation FHB dyn V Annex B18

Appendix 33 / 38

# Installation instructions part 9; Push through installation FDA Push through installation FDA Fill approximately 2/3 of the drill hole incl. fixture with mortar. Always begin from the bottom of the hole and avoid bubbles. 8f For drill hole depth h₀ ≥ 150 mm use an extension tube. For overhead installation or deep holes (h<sub>0</sub> > 250 mm) use an injection adapter. 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. Gently hammer the anchor to the setting depth. Ensure the correct position of the metal parts and the centering sleeve. 9f Only use clean and oil-free metal parts. After inserting the pre-assembled anchor rod, excess mortar must be emerged under the entire washer. If not, pull out the assembled anchor rod immediately and reinject mortar. Wait for the specified curing time tcure 10f see Table B9.2. Tighten the hexagon nut with installation torque T<sub>inst</sub> (see **Table B8.1**). 11f Tighten lock nut manually, then use wrench to give another quarter to half turn.

fischer Highbond-Anchor FHB / FHB dyn / FDA

Intended use Installation instructions part 9 Push through installation FDA Annex B19

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 Anchor rod size 10x60 12x80 12x100 16x125 20x170 24x220 Characteristic resistance to steel failure under tension loading 179.8 2) 44,3 44,3 81.7 130,8 2) 8.8 25,8 zp Characteristic resistance 27,7 \_3) \_3) 5.8 16,1 27.7 51.1 ΖÞ 261.5 FHB-A / FHB-A N 8.8 25,8 44,3 44,3 81,7 190.2 hda R 80 25,8 44,3 44,3 81,7 166,5<sup>4)</sup> 228,8 4) 22,5 228,8 HCR 70 38,8 38,8 71,5 166,5 [kN] \_3) \_3) 81,7 8.8 44,3 190.2 261.5 zp FHB-A dyn \_3) \_3) 71,5 \_3) \_3) **HCR** 70 38,8 \_3) \_3) \_3) \_3) FHB-A dyn V 8.8 44,3 81,7 zρ 8.8 \_3) \_3) 44.3 81,7 \_3) \_3) FDA zp Partial factors 1) Partial factor YMs.N [-] 1.50 Characteristic resistance to steel failure under shear loading without lever arm 61,1<sup>2)</sup> 90 8 2) zp 8.8 16,6 28,1 28.1 52.2 Characteristic resistance \_3) \_3) 5.8 10,4 17,6 17,6 32,7 zp 16,6 52,2 98.0 141.2 FHB-A / FHB-A N hda 8.8 28,1 28,1 85.8 <sup>4)</sup> 152.6 <sup>4)</sup> 24.8 32.8 32.8 62.8 R 80 25,1 36.9 55,0 85,8 HCR 70 [kN] 36.9 141,1 \_3) \_3) 8.8 28,1 52,2 98,0 zp FHB-A dyn \_3) \_3) \_3) \_3) **HCR** 70 36.9 55,0 \_3) \_3) \_3) \_3) 8.8 56.9 96.2 FHB-A dyn V zp \_3) \_3) \_3) \_3) 28,1 52,2 **FDA** zp 8.8 **Ductility factor**  $k_7$ [-] 1.0 with lever arm 104,8 104,8 357,0<sup>2)</sup> 617,4<sup>2)</sup> 8.8 59.8 266,4 Characteristic resistance zp 65,5 166.5 \_3) \_3) 5.8 37,4 65.5 zp 519,3 104.8 104.8 266.4 FHB-A / FHB-A N 8.8 59.8 898.0 hdg 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 [Nm] \_3) \_3) 8.8 104.8 266.4 519.3 898.0 zp FHB-A dyn 70 \_3) \_3) \_3) \_3) **HCR** 91,7 233,1 \_3) \_3) \_3) \_3) 8.8 104,8 266,4 FHB-A dyn V zp \_3) \_3) \_3) \_3) **FDA** 8.8 104,8 266,4 zp Partial factors 1) Partial factor 1,25 [-] γMs,V

1) In	absence	of other	national	regulations
				•

 $<sup>^{2)}</sup>$  f<sub>yk</sub> = 440 N/mm<sup>2</sup> / f<sub>uk</sub> = 550 N/mm<sup>2</sup>  $^{3)}$  No performance assessed

#### **Performance**

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

## **Annex C1**

Appendix 35 / 38

 $<sup>^{4)}</sup>$  f<sub>yk</sub> = 560 N/mm<sup>2</sup> / f<sub>uk</sub> = 700 N/mm<sup>2</sup>

Effective length of anchor I <sub>f</sub> 60 80 100 105 125 130 170 22	FHB / FHB N / FHB dyn (V) / FDA											
Installation factor	Size All sizes											
Factors for the compressive strength of concrete > C20/25	Tension loading											
Increasing factor   V/c for concrete   V/c   C35/45   V/c   N/Rk,p (C20)25)   C45/55   C50/60	Installation factor		γinst	[-]				See Ar	nex C3			
Increasing factor   V/o for concrete   C35/45   V/o   C40/50   V/o   C45/55   C50/60   V/o   C45/55   C50/60   V/o   C45/55   C50/60   C	Factors for the c	ompressi	ve str	ength	of concr	ete > C2	0/25					
V <sub>c</sub> for concrete   C35/45   N <sub>Rk,p (C20/25)</sub>   C40/50   C45/55   C50/60		C25/30						1,	10			
N <sub>Rk,p (C20/25)   V<sub>C</sub> ⋅ N<sub>Rk,p (C20/25)   V<sub>C</sub> ⋅ N<sub>Rk,p (C20/25)   C26/56   C26</sub></sub></sub>	Increasing factor	C30/37						1,	22			
NRk,p (X,Y) =	$\psi_{\text{c}}$ for concrete	C35/45	)T(	, ,				1,	34			
C50/60	$N_{Rk,p(X,Y)} =$	C40/50	Ψc	[-]				1,	41			
Edge distance   C <sub>cr,sp</sub>   Concrete failure   C <sub>cr,sp</sub>   C <sub>cr,sp</sub>	$\psi_c \cdot N_{Rk,p\;(C20/25)}$	C45/55						1,	48			
Edge distance   C <sub>cr,sp</sub>   Spacing   S <sub>cr,sp</sub>   Spacing   S <sub>cr,sp</sub>   Spacing   S <sub>cr,sp</sub>   Scr,sp   Spacing   S <sub>cr,sp</sub>   Scr,sp   Scr,sp   Spacing   S <sub>cr,N</sub>   Shear loading   S <sub>cr,N</sub>		C50/60						1,	55			
Spacing   Scr,sp   mm   2 Ccr,sp   Concrete failure	Splitting failure											
Spacing   Scr,sp	Edge distance		C <sub>cr,sp</sub>	[mm]	2 h <sub>ef</sub>							
Uncracked concrete         k <sub>ucr,N</sub> [-]         11,0           Cracked concrete         k <sub>cr,N</sub> 7,7           Edge distance         c <sub>cr,N</sub> mml         1,5 h <sub>ef</sub> Spacing         2 c <sub>cr,N</sub> Shear loading           Installation factor         γ <sub>inst</sub> [-]         1,0           Concrete pry-out failure           Factor for pry-out failure         k <sub>8</sub> [-]         2,0           Concrete edge failure           Anchor size         10x60         12x80         12x100         12x100 V         16x125 V         20x170         24x2           Effective length of anchor         I <sub>f</sub> 60         80         100         105         125         130         170         22	Spacing		S <sub>cr,sp</sub>	[[[]]	2 c <sub>cr,sp</sub>							
Cracked concrete   K <sub>cr,N</sub>   Cracked concrete   K <sub>cr,N</sub>   Core   Cor,N   Concrete   Cor,N   Concrete   Cor,N   Concrete   Core   Concrete	Concrete failure											
Cracked concrete       k <sub>cr,N</sub> 7,7         Edge distance       C <sub>cr,N</sub> 1,5 h <sub>ef</sub> Spacing       s <sub>cr,N</sub> 2 c <sub>cr,N</sub> Shear loading         Installation factor       γ <sub>inst</sub> [-]       1,0         Concrete pry-out failure         Factor for pry-out failure       k <sub>8</sub> [-]       2,0         Concrete edge failure         Anchor size       10x60       12x80       12x100       12x100 V       16x125 V       20x170       24x2         Effective length of anchor       I <sub>f</sub> 60       80       100       105       125       130       170       22	Uncracked concre	ete	$\mathbf{k}_{\text{ucr},N}$	I	11,0							
Spacing   S <sub>cr,N</sub>   mm   2 c <sub>cr,N</sub>   Shear loading	Cracked concrete		$\mathbf{k}_{\text{cr},N}$	i  -								
Spacing   Scr,N   2 Ccr,N   2 Ccr,N   Shear loading   Installation factor   γ <sub>inst</sub>   [-]   1,0	Edge distance		C <sub>cr,N</sub>	[mm]	1,5 h <sub>ef</sub>							
Installation factor   γ <sub>inst</sub>   [-]   1,0	Spacing		S <sub>cr,N</sub>	[[,,,,,,,	2 C <sub>cr,N</sub>							
Concrete pry-out failure  Factor for pry-out failure	Shear loading											
Factor for pry-out failure         k <sub>8</sub> [-]         2,0           Concrete edge failure         Anchor size         10x60         12x80         12x100         12x100 V         16x125 V         20x170         24x2           Effective length of anchor         If         60         80         100         105         125         130         170         22	Installation factor		γinst	[-]				1	,0			
Concrete edge failure           Anchor size         10x60         12x80         12x100         12x100 V         16x125 V         20x170         24x2           Effective length of anchor         If         60         80         100         105         125         130         170         22	Concrete pry-out	t failure										
Anchor size         10x60         12x80         12x100         12x100         V         16x125         V         20x170         24x2           Effective length of anchor         I <sub>f</sub> 60         80         100         105         125         130         170         22	Factor for pry-out	failure	k <sub>8</sub>	[-]				2	,0			
Effective length of anchor I <sub>f</sub> 60 80 100 105 125 130 170 22	Concrete edge failure											
Effective diameter of [mm]	Anchor size				10x60	12x80	12x100	12x100 V	16x125	16x125 V	20x170	24x220
Effective diameter of [mm]	Effective length of	anchor	lf		60	80	100	105	125	130	170	220
the fastener d <sub>nom</sub>   12   14   14   20   18   28   24   28	Effective diameter the fastener	of	$d_{nom}$	[mm]	12	14	14	20	18	28	24	28

Characteristic resistance to concrete failure under tension / shear loading

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	uncraci	ed concr	ete C20/25					
Tem- I: 24 °C / 40 °C		[kNI]	26,9	41,3	42,1	70,5	113,6	122,2
range II: 50 °C / 80 °C	— N <sub>Rk,p</sub>	[kN]	23,7	36,3	37,0	62,0	100,0	107,5
Cracked concrete								
Characteristic resistance in	cracked	concrete	C20/25					
Tem- I: 24 °C / 40 °C		N <sub>Rk,p</sub> [kN]	15,5	25,0	30,0	47,8	58,9	89,4
range II: 50 °C / 80 °C	INRk,p		13,6	22,0	26,4	42,1	51,8	78,7
Installation factors								
Dry or wet concrete		r 1			1	,0		_
Water filled hole	— γinst	[-]	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 f	failure						
Calculation	on diameter	d	[mm]	12	16		
Uncracke	ed concrete						
Characte	ristic resistance in ι	ıncrack	ed concr	ete C20/25			
Tem-	I: 24 °C / 40 °C			42,1	70,5		
perature range	II: 50 °C / 80 °C	$N_{Rk,p}$	[kN]	37,0	62,0		
Cracked concrete							
Characteristic resistance in cracked concrete C20/25							
Tem-	I: 24 °C / 40 °C	NI	FIAN 17	30,0	47,8		
perature range	II: 50 °C / 80 °C	N <sub>Rk,p</sub>	[kN]	26,4	42,1		
Installation factors							
Dry or wet	concrete		гэ	1,	0		
Water fille	d hole	γinst	[-]	1,0	1,2		

fischer Highbond-Anchor	FHB / FHB dy	n / FDA
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## Performance

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

Annex C3

Appendix 37 / 38

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 1)								
Uncracked concrete;	Temperature	range I, II						
Displacements	δηο	[mm/kN]	0,025	0,010	0,010	0,007	0,006	0,006
	δν∞		0,050	0,020	0,020	0,014	0,012	0,012
Cracked concrete; Te	mperature rai	nge I, II						
Displacements	δησ	[mm/kN]	0,040	0,020	0,020	0,020	0,020	0,020
	δN∞		0,060	0,030	0,030	0,030	0,030	0,030
Displacement-Factors for shear loading <sup>2)</sup>								
Uncracked or cracked	l concrete; Te	mperature	range I, II					
Displacements	δνο	-  [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:			2) 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)

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

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

(V: acting shear loading)

fischer Highbond-Anchor FHB / FHB dyn / FDA

Performance

Displacements for fischer anchor rods FHB-A / FHB-A N / FHB-A dyn (V) / FDA

Annex C4

Appendix 38 / 38