

## DECLARAÇÃO DE DESEMPENHO

### DoP 0327

para argamassa de injeção fischer Highbond-Anchor FHB II ( fixação química e expansiva para uso em betão)

PT

1. Código de identificação único do produto-tipo: DoP 0327
2. Utilização(ões) prevista(s): Fixação pós-instalada em betão fissurado ou não fissurado, ver anexos, especialmente anexos B1 - B11.
3. Fabricante: fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Alemanha
4. Representante autorizado: -
5. Sistema(s) de avaliação e verificação da regularidade do desempenho (AVCP): 1
6. Documento de Avaliação Europeu:  
Avaliação Técnica Europeia:  
Organismo de Avaliação Técnica:  
Organismo(s) notificado(s):  
  
EAD 330499-01-0601  
ETA-21/0948: 2022-09-09  
DIBt- Deutsches Institut für Bautechnik  
2873 TU Darmstadt
7. Desempenho(s) declarado(s):  
**Resistência mecânica e estabilidade (BWR 1)**  
**Características de resistência à tração (para acção estática e quase-estática):**  
Resistência à rotura do aço: Anexo C1  
Resistência à rotura combinada por arranque e cone de betão: Anexos C2-C4  
Resistência à rotura por cone de betão: Anexo C2  
Distância ao bordo para prevenir rotura por fendilhamento: Anexo C2  
Robustez: Anexos C2-C4  
Torque de instalação: Anexos B3, B4  
Distância mínima ao bordo e espaçamento: Anexos B3, B4  
  
**Características de resistência ao corte (para acção estática e quase-estática):**  
Resistência à rotura do aço: Anexo C1  
Resistência do betão ao destacamento: Anexo C2  
Resistência do bordo do betão: Anexo C2  
  
**Deslocamentos sob carregamento de curto e longo prazo:**  
Deslocamentos sob carregamento de curto e longo prazo: Anexos C5  
  
**Resistência característica e Deslocamentos para as categorias de performance sísmica C1 e C2:**  
Resistência à tração, deslocamentos, categoria C1: NPD  
Resistência à tração, deslocamentos, categoria C2: NPD  
Resistência ao corte, deslocamentos, categoria C1: NPD  
Resistência ao corte, deslocamentos, categoria C2: NPD  
Factor espaço anular: NPD
8. Documentação Técnica Adequada e/ou Documentação Técnica Específica: -

O desempenho do produto identificado acima está em conformidade com o conjunto de desempenhos declarados. A presente declaração de desempenho é emitida, em conformidade com o Regulamento (UE) n.o 305/2011, sob a exclusiva responsabilidade do fabricante identificado acima.

Assinado por e em nome do fabricante por:



Dr.-Ing. Oliver Geibig, Diretor Administrativo de Unidades de Negócios e Engenharia  
Tumlingen, 2022-09-16



Jürgen Grün, Diretor Administrativo de Química e Qualidade

Este DoP foi preparado em diferentes línguas. Em caso de litígio sobre a interpretação, a versão em inglês prevalecerá sempre.

O Anexo inclui informações voluntárias e complementares em inglês que excedem os requisitos legais (linguisticamente especificados).

Translation guidance Essential Characteristics and Performance Parameters for Annexes

**Guia de tradução das Características Essenciais e Parâmetros de Desempenho para os Anexos**

Mechanical resistance and stability (BWR 1)

**Resistência mecânica e estabilidade (BWR 1)**

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

**Características de resistência à tração (para acção estática e quase-estática):**

1	Resistance to steel failure: <b>Resistência à rotura do aço:</b>	$N_{Rk,s}$ [kN]
2	Resistance to combined pull-out and concrete cone failure: <b>Resistência à rotura combinada por arranque e cone de betão:</b>	$T_{Rk}$ and/or $T_{Rk,100}$ [N/mm <sup>2</sup> ], $\psi_{sus}^0$ [-] (BF) $N_{Rk,p}$ and/or $N_{Rk,p,100}$ [kN] (BEF)
3	Resistance to concrete cone failure: <b>Resistência à rotura por cone de betão:</b>	$c_{cr,N}$ [mm], $k_{cr,N}$ , $k_{ucr,N}$ [-]
4	Edge distance to prevent splitting under load: <b>Distância ao bordo para prevenir rotura por fendação:</b>	$c_{cr,sp}$ [mm]
5	Robustness: <b>Robustez:</b>	$\gamma_{inst}$ [-]
6	Maximum installation torque:  Installation torque: <b>Torque de instalação:</b>	$\max T_{inst}$ [Nm] (BF)  $T_{inst}$ [Nm] (BEF)
7	Minimum edge distance and spacing: <b>Distância mínima ao bordo e espaçamento:</b>	$c_{min}$ , $s_{min}$ , $h_{min}$ [mm]

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

**Características de resistência ao corte (para acção estática e quase-estática):**

8	Resistance to steel failure: <b>Resistência à rotura do aço:</b>	$V_{Rk,s}^0$ [kN], $M_{Rk,s}^0$ [Nm], $k_7$ [-]
9	Resistance to pry-out failure: <b>Resistência do betão ao destacamento:</b>	$k_8$ [-]
10	Resistance to concrete edge failure: <b>Resistência do bordo do betão:</b>	$d_{nom}$ , $l_f$ [mm]

Displacements under short-term and long-term loading:

**Deslocamentos sob carregamento de curto e longo prazo:**

11	Displacements under short-term and long-term loading: <b>Deslocamentos sob carregamento de curto e longo prazo:</b>	$\delta_0$ , $\delta_\infty$ [mm or mm/(N/mm <sup>2</sup> )]
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Characteristic resistance and displacements for seismic performance categories C1 and C2:

**Resistência característica e Deslocamentos para as categorias de performance sísmica C1 e C2:**

12	Resistance to tension load, displacements:  <b>Resistência à tração, deslocamentos, categoria C1:</b>	C1 $N_{Rk,s,C1}$ [kN] (all) $T_{Rk,C1}$ [N/mm <sup>2</sup> ] (BF) $N_{Rk,p,C1}$ [kN] (BEF)
	<b>Resistência à tração, deslocamentos, categoria C2:</b>	C2 $N_{Rk,s,C2}$ [kN] (all) $T_{Rk,C2}$ [N/mm <sup>2</sup> ] (BF) $N_{Rk,p,C2}$ [kN] (BEF) $\delta_{N,C2}$ [mm] (all)

Resistance to shear load, displacements:

13	<b>Resistência ao corte, deslocamentos, categoria C1:</b>	C1 $V_{Rk,s,C1}$ [kN] (all)
	<b>Resistência ao corte, deslocamentos, categoria C2:</b>	C2 $V_{Rk,s,C2}$ [kN] (all) $\delta_{V,C2}$ [mm] (all)

Factor annular gap:

**Factor espaço anular:**

Hygiene, health and the environment (BWR 3)

**Higiene, saúde e meio ambiente (BWR 3)**

15	Content, emission and/or release of dangerous substances: <b>Conteúdo, emissão e / ou liberação de substâncias perigosas:</b>	-
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## **Specific Part**

### **1 Technical description of the product**

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

The glass capsule is set into a drilled hole in the concrete. The special formed anchor rod is driven into the glass capsule by machine with simultaneous hammering and turning. For the injection system the anchor rod is placed into a drilled hole filled with injection mortar. The load transfer is realized by mechanical interlock of several cones in the bonding mortar and then via a combination of bonding and friction forces in the anchorage ground (concrete).

The product description is given in Annex A.

### **2 Specification of the intended use in accordance with the applicable European Assessment Document**

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 and/or 100 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

### **3 Performance of the product and references to the methods used for its assessment**

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

<b>Essential characteristic</b>	<b>Performance</b>
Characteristic resistance to tension load (static and quasi-static loading)	See Annex C 1 to C 4, B 3 to B 4
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1 to C 2
Displacements under short-term and long-term loading	See Annex C 5
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

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

<b>Essential characteristic</b>	<b>Performance</b>
Content, emission and/or release of dangerous substances	No performance assessed

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

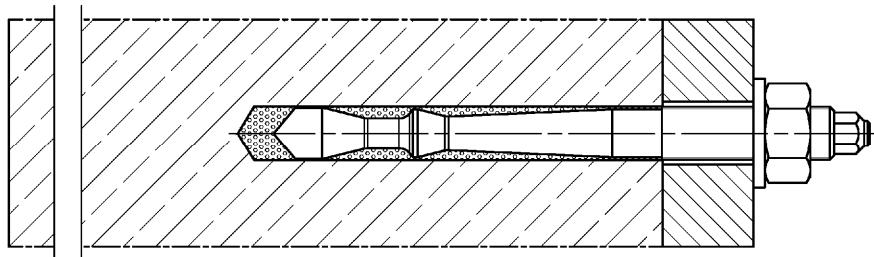
In accordance with the European Assessment Document EAD 330499-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

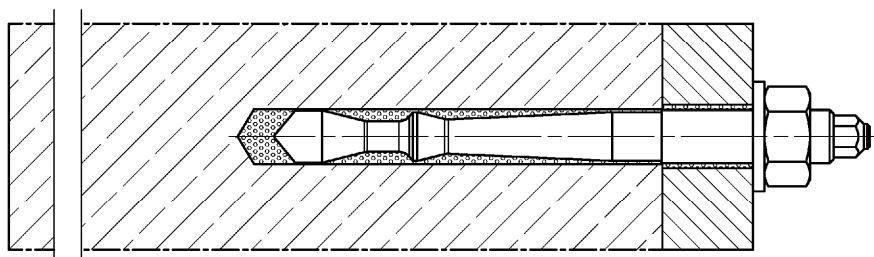
## Installation conditions part 1

### Highbond - Anchor FHB II - A S

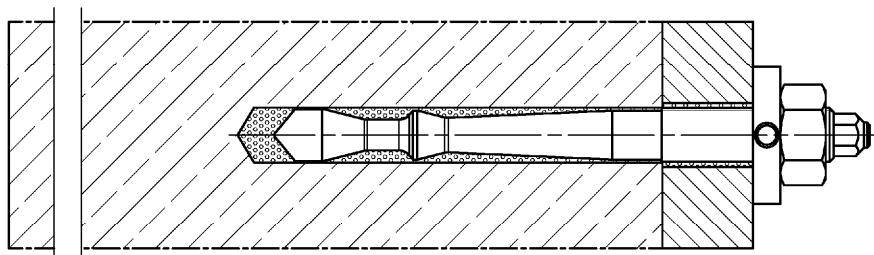
#### Pre-positioned installation



#### Push through installation



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



Figures not to scale

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

#### Product description

Installation conditions part 1; FHB II - A S

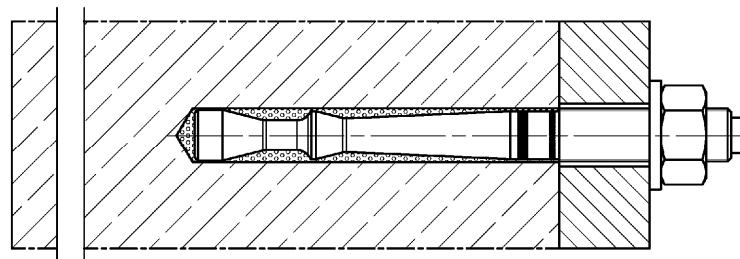
Annex A 1

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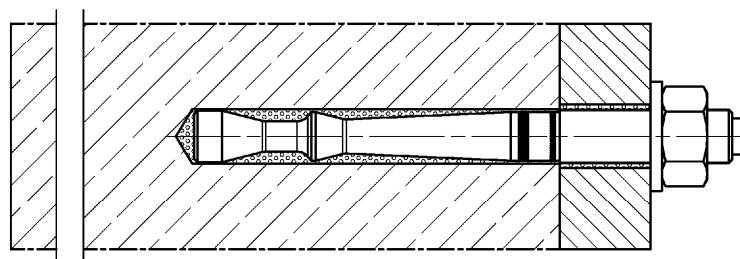
## Installation conditions part 2

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

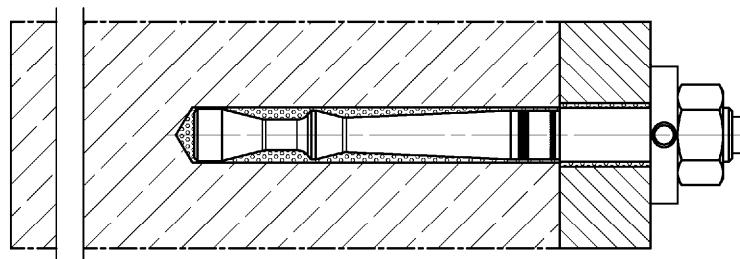
### Pre-positioned installation



### Push through installation



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



Figures not to scale

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

### Product description

Installation conditions part 2; FHB II Inject - A S

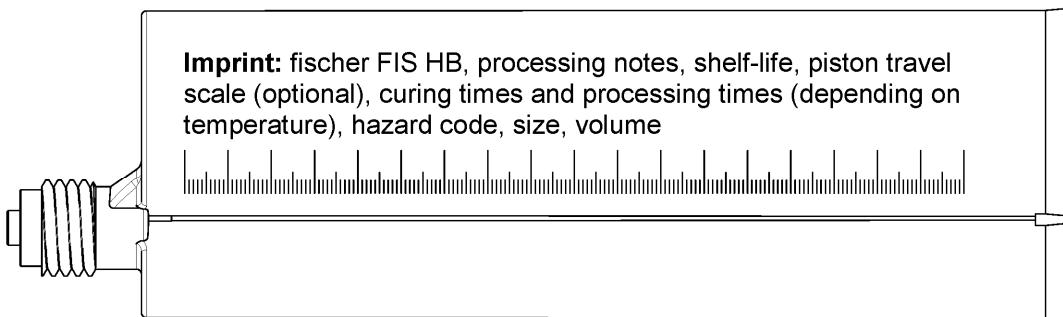
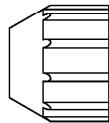
Annex A 2

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## Overview system components part 1

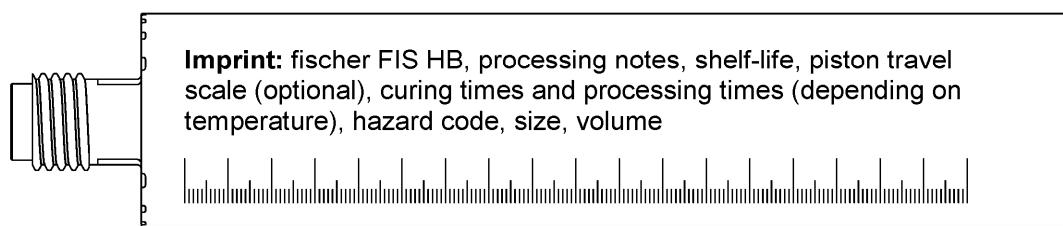
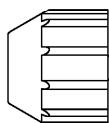
### Injection cartridge (shuttle cartridge) with sealing cap;

Size: 360 ml, 825 ml



### Injection cartridge (coaxial cartridge) with sealing cap;

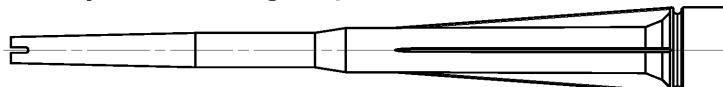
Size: 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



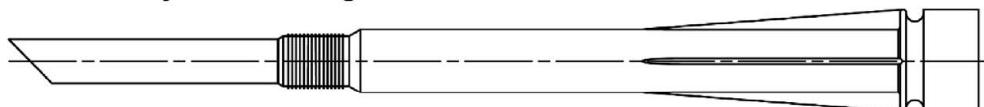
### Resin capsule



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



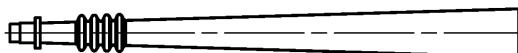
### Static mixer FIS JMR for injection cartridge 825 ml



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



### Injection adapter



Figures not to scale

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

### Product description

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

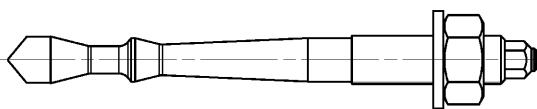
Annex A 3

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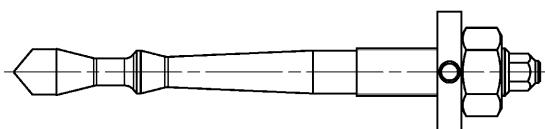
## Overview system components part 2

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

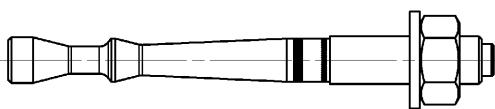
Highbond - Anchor FHB II - A S



alternative version



Highbond - Anchor FHB II Inject - A S

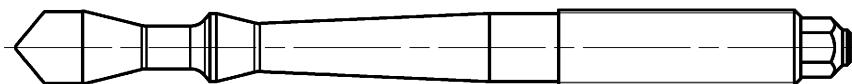


alternative version



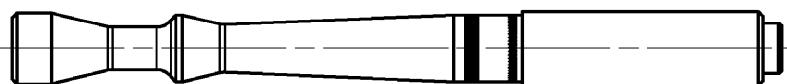
**Highbond anchor rod FHB II - A S**

Size: M16, M20, M24



**Highbond anchor rod FHB II Inject - A S**

Size: M16, M20, M24



Figures not to scale

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

### Product description

Overview system components part 2  
anchor rod

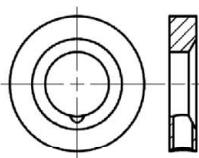
**Annex A 4**

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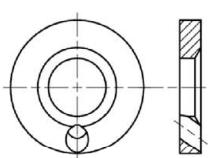
## Overview system components part 3

### fischer filling disc (various versions)

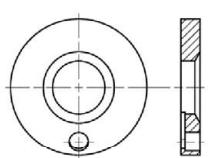
radial



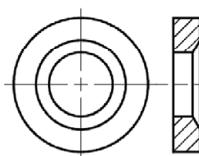
angular



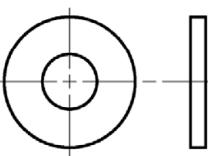
axial



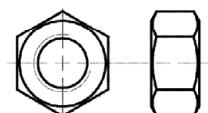
conical washer



washer



hexagon nut



Cleaning brush BS



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



or blow-out pump ABG:



Figures not to scale

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

#### Product description

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

#### Annex A 5

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**Table A6.1:** Materials

Part	Designation	Material		
1	Injection cartridge	Mortar, hardener, filler		
2	Resin capsule	Mortar, hardener, filler		
Steel grade	Steel	Stainless steel A4	High corrosion resistant steel C	
	zink plated	acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015	
3	Highbond-Anchor rod FHB II - A S or FHB II Inject - A S	Property class 8.8 EN ISO 898-1:2013  electroplated $\geq 5 \mu\text{m}$ ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018  $A_5 > 12\%$ fracture elongation	Property class 80 EN ISO 3506-1:2020  1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462; EN 10088-1:2014  $A_5 > 12\%$ fracture elongation	Property class 80 EN ISO 3506-1:2020  1.4565; 1.4529; EN 10088-1:2014  $A_5 > 12\%$ fracture elongation
4	Washer ISO 7089:2000	electroplated $\geq 5 \mu\text{m}$ ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565; 1.4529; EN 10088-1:2014
5	Hexagon nut	Property class 8 acc. to EN ISO 898-2:2012  electroplated $\geq 5 \mu\text{m}$ , ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018	Property class 70 or 80 EN ISO 3506-2:2020  1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 or 80 EN ISO 3506-2:2020  1.4565; 1.4529; EN 10088-1:2014
6	Conical washer or fischer filling disc	electroplated $\geq 5 \mu\text{m}$ , ISO 4042:2018/Zn5/An(A2K) acc. to EN ISO 4042:2018	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565; 1.4529; EN 10088-1:2014

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

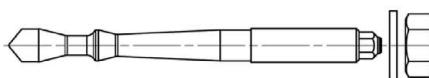
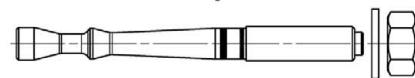
**Product description**  
Materials

**Annex A 6**

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## Specifications of intended use part 1

**Table B1.1:** Overview installation und use

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

## Specifications of intended use part 2

### Base materials:

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

### Use conditions (Environmental conditions):

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

### Design:

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

### Installation:

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

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

Intended Use  
Specifications part 2

Annex B 2

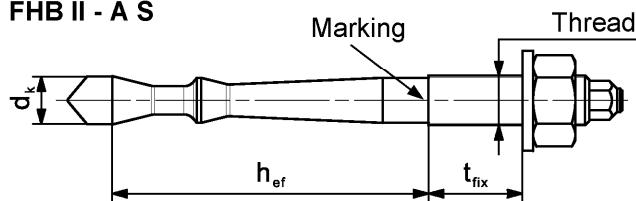
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**Table B3.1: Installation parameters for Highbond – Anchor rod FHB II - A S**

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

<sup>1)</sup> Using fischer filling disc reduces  $t_{fix}$  (usable length of the anchor)

#### Highbond – Anchor rod FHB II - A S

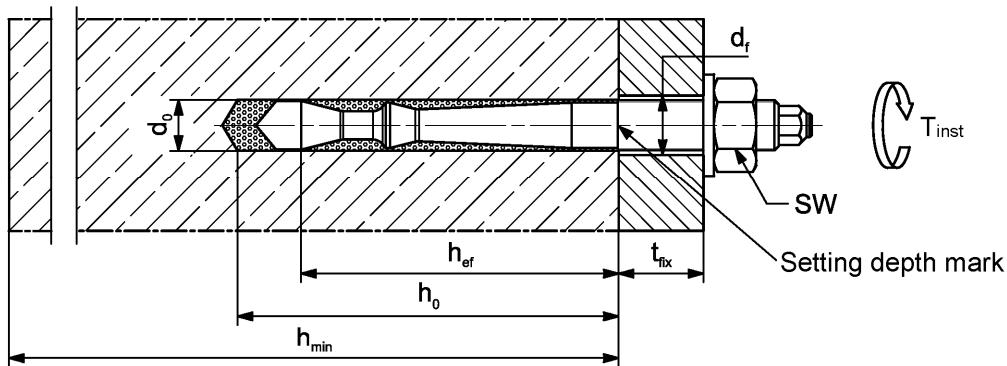


**Marking:** work symbol, thread diameter, embedment depth e.g.: M16x95

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

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

#### Installation conditions:



Figures not to scale

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

#### Intended use

Installation parameters for Highbond - Anchor FHB II - A S

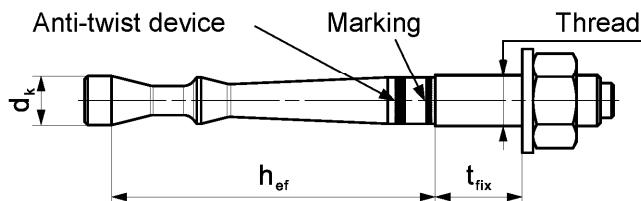
#### Annex B 3

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

Anchor rod FHB II Inject - A S	Thread	M16x95	M20x170	M24x170
Cone diameter	d <sub>k</sub> [mm]	14,5	23,0	
Width across flats		24	30	36
Nominal drill hole diameter		16	25	
Drill hole depth		101	176	
Effective embedment depth		95	170	
Minimum spacing and minimum edge distance		50	80	
Diameter of clearance hole of the fixture		18	22	26
pre-positioned installation		20	26	
push through installation		150	240	
Min. thickness of concrete member	t <sub>min</sub>	50	100	
Installation torque	T <sub>inst</sub>	[Nm]		
Thickness of fixture	t <sub>fix</sub> ≤		1500	
fischer filling disc <sup>1)</sup>	≥ d <sub>a</sub>	[mm]	38	46
	t <sub>s</sub>		7	8
				10

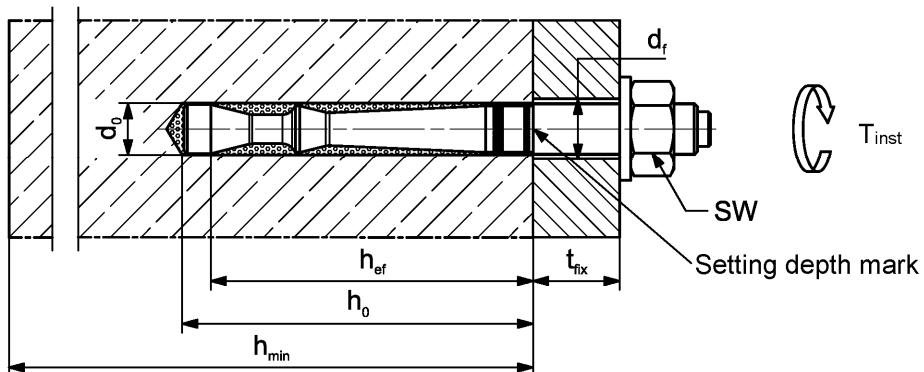
<sup>1)</sup> Using fischer filling disc reduces t<sub>fix</sub> (usable length of the fastener)

### Highbond – Anchor rod FHB II Inject - A S



**Marking:** work symbol, thread diameter, embedment depth e.g.: M16x95  
 For stainless steel additional "A4". For high corrosion resistant steel additional "C".  
 For high corrosion resistant steel additional marking "(" also on the face side

### Installation conditions:



Figures not to scale

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

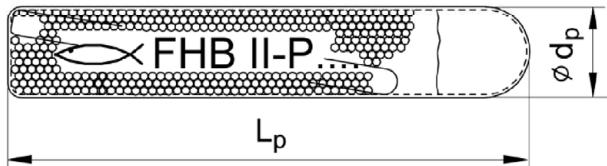
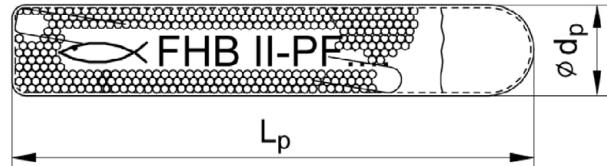
### Intended use

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

### Annex B 4

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

Resin capsule		16x95	20x170	24x170
Capsule length	$L_p$	120	185	185
Capsule diameter	$\varnothing d_p$	14,5	21,5	

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

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

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

FHB II-PF 16x95

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

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

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



Figures not to scale

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

#### Intended use

Dimensions resin capsule

Parameters cleaning brush (steel brush)

#### Annex B 5

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

Temperature at anchoring base <sup>1)</sup> [°C]	Maximum processing time $t_{work}$	Minimum curing time <sup>2)</sup> $t_{cure}$
-5 to 0 <sup>3)</sup>	-	6 h
> 0 to 5 <sup>3)</sup>	-	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> During the curing time of the mortar the temperature of the anchoring base may not fall below the listed minimum temperature

<sup>2)</sup> In wet concrete the curing time must be doubled

<sup>3)</sup> Minimal cartridge temperature +5 °C

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

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

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

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

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

**Intended use**

Processing time and curing time

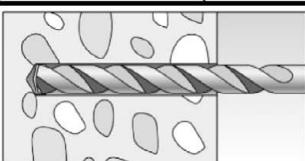
**Annex B 6**

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

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

1



Drill the hole.

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

Go to step 6 (Annex B 8)

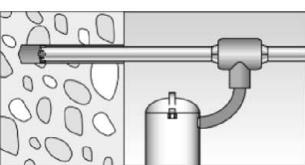
## Drilling and cleaning the drill hole (hammer drilling with hollow drill bit)

1



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

2



Use a suitable dust extraction system, e.g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.

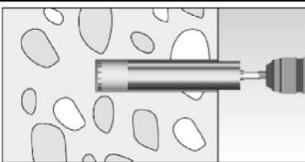
Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power.

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

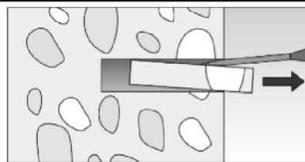
Go to step 6 (Annex B 8)

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

1

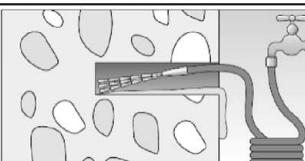


Drill the hole.  
Drill hole diameter  $d_0$  and  
nominal drill hole depth  $h_0$   
see **table B3.1**



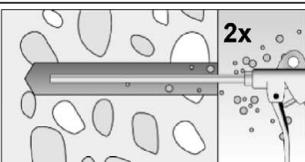
Break the drill core  
and remove it

2



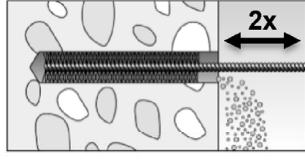
Flush the drill hole, until clear water emerges from the drill hole.

3



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

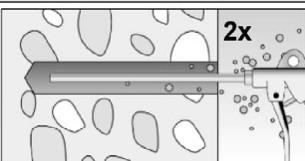
4



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



5



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

Go to step 6 (Annex B 8)

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

### Intended use

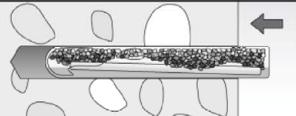
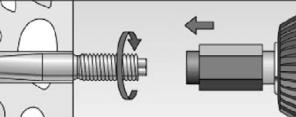
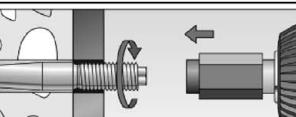
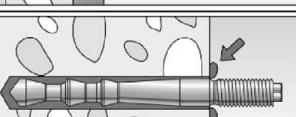
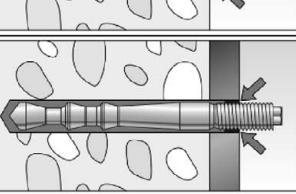
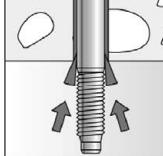
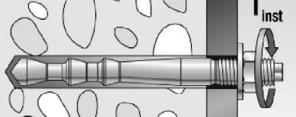
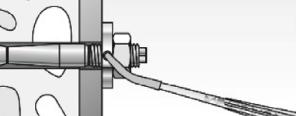
Installation instructions part 1

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

### Annex B 7

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

## Installation Highbond-Anchor rod FHB II - A S

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

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

### Intended use

Installation instructions part 2

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

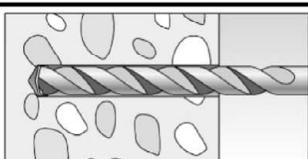
Annex B 8

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

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

1



Drill the hole

Nominal drill hole diameter  $d_0$  and drill hole depth  $h_0$  see **tables B3.1, B4.1**

2



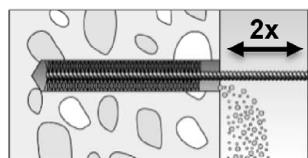
Clean the drill hole.

Blow out the drill hole twice.

If necessary, remove standing water out of the bore hole



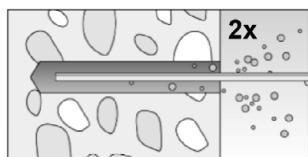
3



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



4



Clean the drill hole.

Blow out the drill hole twice.

For drill hole diameter  $d_0 = 16 \text{ mm}$  blow out the hole by hand or oil-free compressed air ( $\geq 6 \text{ bar}$ ).

For drill hole diameter  $d_0 = 25 \text{ mm}$  blow out the hole with oil-free compressed air ( $\geq 6 \text{ bar}$ ). Use a compressed-air nozzle.



Go to step 5 (Annex B 10)

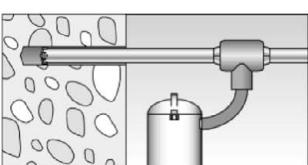
### Drilling and cleaning the drill hole (hammer drilling with hollow drill bit)

1



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

2



Use a suitable dust extraction system, e.g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.

Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power.

Nominal drill hole diameter  $d_0$  and drill hole depth  $h_0$  see **tables B3.1, B4.1**

Go to step 5 (Annex B 10)

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

#### Intended use

Installation instructions part 3

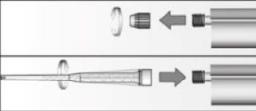
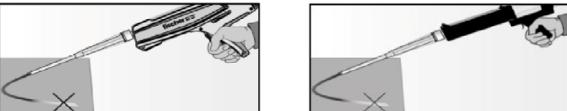
Installation with injection mortar FIS HB

**Annex B 9**

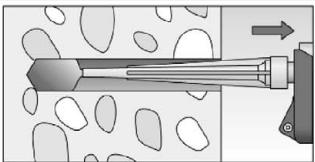
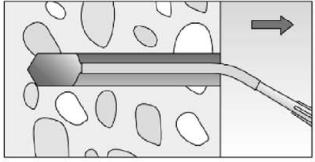
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# Installation instruction part 4; Installation with injection mortar FIS HB

## Preparing the cartridge

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

## Injection of the mortar

8		Fill approximately 2/3 of the drill hole with mortar. Always begin from the bottom of the hole and avoid bubbles
		For drill hole depth $\geq 170$ mm use an extension tube

Go to step 9 (Annex B 11)

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

### Intended use

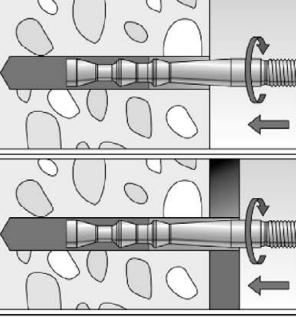
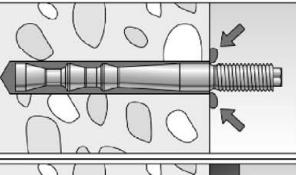
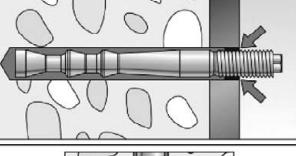
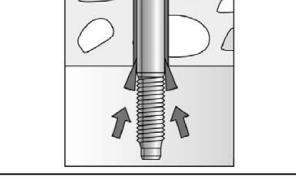
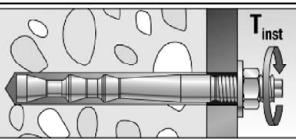
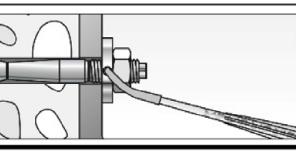
Installation instructions part 4  
Installation with injection mortar

Annex B 10

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# Installation instruction part 5; Installation with injection mortar FIS HB

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

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

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

Anchor rod FHB II - A S / FHB II Inject - A S		M16x95	M20x170	M24x170		
<b>Characteristic resistance to steel failure under tension loading</b>						
Characteristic resistance $N_{Rk,s}$	Steel, zinc plated	[kN]	61,6	128,5		
	Stainless steel A4					
	High corrosion resistant steel C		61,6	128,5		
<b>Partial factors<sup>1)</sup></b>						
Partial factor $\gamma_{Ms,N}$	Steel, zinc plated	[-]	1,5 <sup>1)</sup>			
	Stainless steel A4		1,5 <sup>1)</sup>			
	High corrosion resistant steel C		1,5 <sup>1)</sup>			
<b>Characteristic resistance to steel failure under shear loading</b>						
<b>without lever arm</b>						
Characteristic resistance $V^0_{Rk,s}$	Steel, zinc plated	[kN]	50,8	80,3		
	Stainless steel A4		62,7	97,9		
	High corrosion resistant steel C		62,7	97,9		
Ductility factor	$k_7$	[-]	1,0			
<b>with lever arm</b>						
Characteristic resistance $M^0_{Rk,s}$	Steel, zinc plated	[Nm]	266	519		
	Stainless steel A4			896		
	High corrosion resistant steel C		266	519		
<b>Partial factors<sup>1)</sup></b>						
Partial factor	$\gamma_{Ms,V}$	[-]	1,25			
1) In absence of other national regulations						
fischer Highbond-Anchor FHB II for diamond drilling / extended working life						
<b>Performance</b> Characteristic resistance to steel failure under tension / shear loading of Highbond-Anchor rods FHB II - A S and FHB II Inject - A S			<b>Annex C 1</b> Appendix 20 / 24			

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

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

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

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

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

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

Highbond-Anchor rod FHB II - A S <sup>1)</sup>	M16x95	M20x170	M24x170
<b>Characteristic resistance to pull-out failure</b>			
Calculation diameter d [mm]	16	25	
<b>Uncracked concrete</b>			
<b>Characteristic resistance in uncracked concrete C20/25</b>			
Diamond-drilling (dry or wet concrete / water-filled hole)			
Temperature range T2 50 °C / 80 °C N <sub>Rk,p,ucr,100</sub> [kN]	51,5	118,5	
<b>Cracked concrete</b>			
<b>Characteristic resistance in cracked concrete C20/25</b>			
Diamond-drilling (dry or wet concrete / water-filled hole)			
Temperature range T2 50 °C / 80 °C N <sub>Rk,p,cr,100</sub> [kN]	36,0	86,0	
<b>Installation factors</b>			
Dry or wet concrete		1,2	
Water-filled hole γ <sub>inst</sub> [-]		1,2	

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

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

#### Performance

Characteristic resistance to pull-out failure for Highbond-Anchor rods FHB II - A S in diamond drilled holes; 50 or 100 years

**Annex C 3**

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

Anchor rod FHB II - A S <sup>1)</sup> FHB II Inject - A S <sup>2)</sup>	M16x95	M20x170	M24x170
<b>Characteristic resistance to pull-out failure</b>			
Calculation diameter d [mm]	16	25	
<b>Uncracked concrete</b>			
<b>Characteristic resistance in uncracked concrete C20/25</b>			
Hammer-drilling with standard or hollow drill bit (dry or wet concrete / water-filled hole)			
Temperature range T2 50 °C / 80 °C N <sub>Rk,p,ucr,100</sub>	[kN]	52,4	118,5
<b>Cracked concrete</b>			
<b>Characteristic resistance in cracked concrete C20/25</b>			
Hammer-drilling with standard or hollow drill bit (dry or wet concrete / water-filled hole)			
Temperature range T2 50 °C / 80 °C N <sub>Rk,p,cr,100</sub>	[kN]	36,0	86,0
<b>Installation factors</b>			
Dry or wet concrete			1,0
Water-filled hole (only with resin capsule)	γ <sub>inst</sub> [-]		1,0
1) Highbond-Anchor rod FHB II - A S with resin capsule FHB II-P / FHB II-PF or injection mortar FIS HB			
2) Highbond-Anchor rod FHB II Inject - A S with injection mortar FIS HB			
fischer Highbond-Anchor FHB II for diamond drilling / extended working life			
<b>Performance</b> Characteristic resistance to pull-out failure for Highbond-Anchor rods FHB II - A S / FHB II Inject - A S in hammer drilled holes; 100 years		<b>Annex C 4</b> Appendix 23 / 24	

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

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

<sup>1)</sup> 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

<sup>2)</sup> Calculation of effective displacement:

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

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

V = acting shear loading

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

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

<sup>1)</sup> 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

<sup>2)</sup> Calculation of effective displacement:

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

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

V = acting shear loading

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#### Performances

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

#### Annex C 5