

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-16/0637
of 24 January 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

fischer Highbond-Anchor FHB II Inject

Product family
to which the construction product belongs

Torque controlled bonded anchor
for use in concrete

Manufacturer

fischerwerke GmbH & Co. KG
Otto-Hahn-Straße 15
79211 Denzlingen
DEUTSCHLAND

Manufacturing plant

fischerwerke

This European Technical Assessment
contains

20 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

Guideline for European technical approval of "Metal
anchors for use in concrete", ETAG 001 Part 5: "Bonded
anchors", April 2013,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

This version replaces

ETA-16/0637 issued on 22 November 2016

European Technical Assessment

ETA-16/0637

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Specific Part**1 Technical description of the product**

The fischer Highbond-Anchor FHB II is a torque controlled bonded anchor consisting of a mortar cartridge with mortar fischer FIS HB and an anchor rod FHB II - A L or FHB II - A S with hexagon nut and washer.

The anchor rod is placed into a drilled hole filled with injection mortar. The load transfer is realised by mechanical interlock of several cones in the bonding mortar and then via a combination of bonding and friction forces in the anchorage ground (concrete).

The product description is given in Annex A.

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

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

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

3 Performance of the product and references to the methods used for its assessment**3.1 Mechanical resistance and stability (BWR 1)**

Essential characteristic	Performance
Characteristic values under tension and shear load	See Annex C 1 to C 4
Displacements under tension and shear loads	See Annex C 5 and C 6

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

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

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

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

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

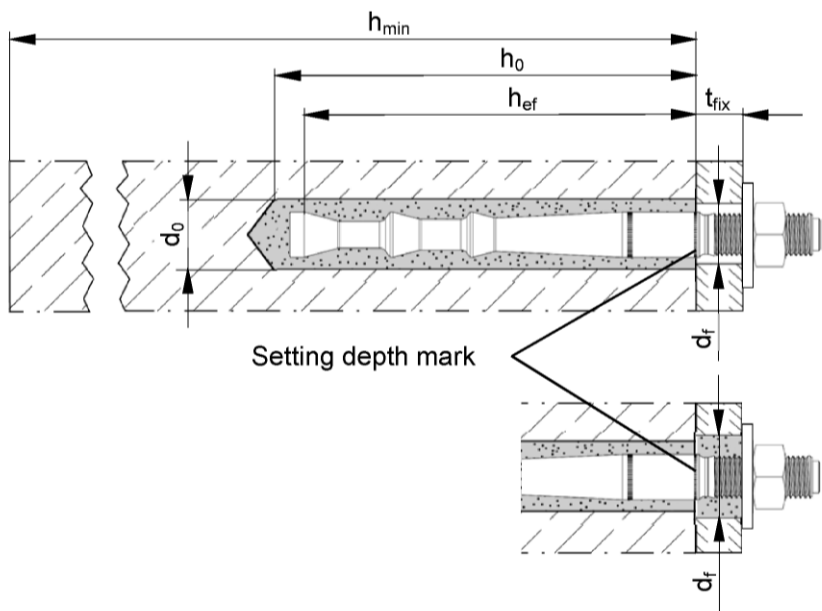
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 24 January 2017 by Deutsches Institut für Bautechnik

Andreas Kummerow
p.p. Head of Department

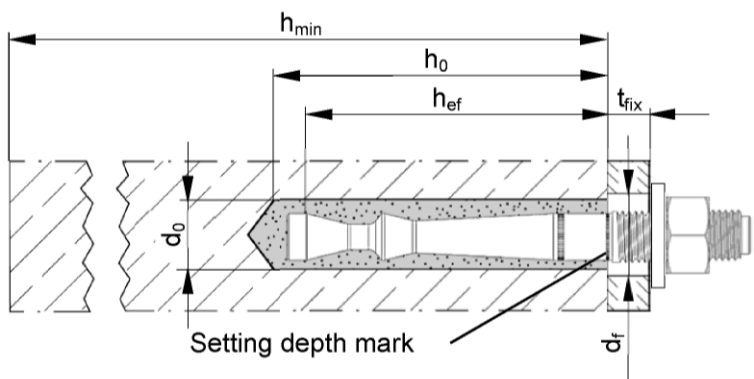
beglaubigt:
Baderschneider

Installation conditions



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

**Highbond-Anchor
FHB II Inj-A L**
Push through anchor
annular gap filled with mortar



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

fischer Highbond-Anchor FHB II Inject

Product description
Installation conditions

Annex A 1

Cartridge sizes 150 ml, 300 ml (Coaxial cartridge) 360 ml, 950 ml (Shuttle cartridge) Imprint: fischer FIS HB, processing notes, shelf-life, piston travel scale, curing times and processing times (depending on temperature), hazard code, size, volume Sealing cap 1 Static mixer FIS MR or FIS UMR Extension tube	
fischer Highbond-Anchor rod FHB II Inj-A L Size: M8, M10, M12, M16, M20, M24 Washer Hexagon nut 2 3 4	
fischer Highbond-Anchor rod FHB II Inj-A S Size: M10, M12, M16, M20, M24 Washer Hexagon nut 2 3 4	
fischer Highbond-Anchor FHB II Inject Product description Cartridges / Static mixer / Steel elements	Annex A 2

Table A1: Materials

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

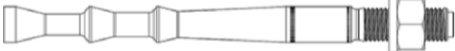
fischer Highbond-Anchor FHB II Inject

Product description
Materials

Annex A 3

Specifications of intended use (part 1)

Table B1: Overview use and performance categories

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

fischer Highbond-Anchor FHB II Inject

Intended Use
Specifications (part 1)

Annex B 1

Specifications of intended use (part 2)

Base materials:

- Reinforced or unreinforced normal weight concrete Strength classes C20/25 to C50/60 according to EN 206-1:2000

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure, to permanently damp internal conditions or in other particular aggressive conditions (high corrosion resistant steel)

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

Design:

- Anchorage have to be designed by a responsible engineer with experience of concrete anchor design
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorage under static or quasi-static actions are designed in accordance with
- EOTA ETAG 001 Annex C, 08/2010 or CEN/TS 1992-4:2009

Installation:

- Anchor installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- In case of aborted hole: The hole shall be filled with mortar
- Observe the effective anchorage depth
- Overhead installation is allowed

fischer Highbond-Anchor FHB II Inject

Intended Use
Specifications (part 2)

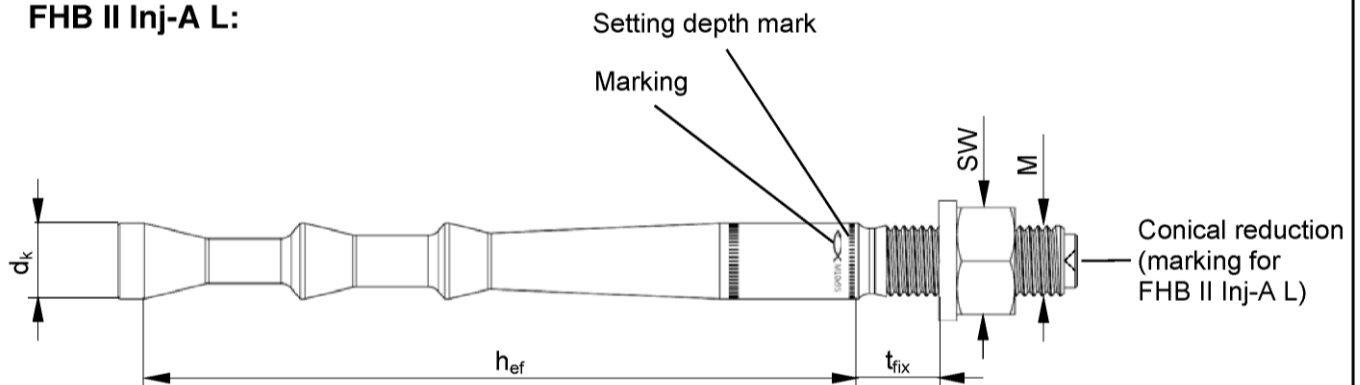
Annex B 2

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

Size FHB II Inj-A L		M8	M10	M12		M16			M20	M24	
		x 60	x 95	x 100	x 120	x 125	x 145	x 160	x 210	x 210	
Cone diameter	d _k	[mm]	9,4	10,7	12,5		16,8			23,0	
Width across flats	SW		13	17	19		24			30	36
Nominal drill bit diameter	d ₀		10	12	14		18			25	
Drill hole depth	h ₀		66	101	106	126	131	151	166	216	
Effective anchorage depth	h _{ef}		60	95	100	120	125	145	160	210	
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$		40		50		55	60	70	90	
Diameter of clearance hole in the fixture ¹⁾	pre-positioned anchorage d _f ≤		9	12	14		18			22	26
	push through anchorage d _f ≤		11	14	16		20			26	
Minimum thickness of concrete member	h _{min}		100	140		170		190	220	280	
Installation torque	T _{inst}	[Nm]	15	20	40		60			100	
Thickness of fixure	t _{fix} ≤	[mm]	1500								

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

FHB II Inj-A L:



Marking:

Work symbol, size of anchor, setting depth. e. g.: $\oslash$ M10x95

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

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

fischer Highbond-Anchor FHB II Inject

Intended Use

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

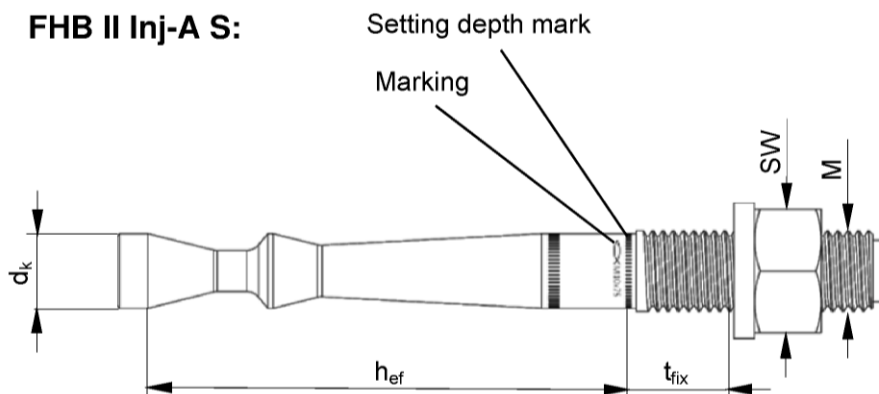
Annex B 3

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

Size FHB II Inj-A S		M10		M12	M16	M20	M24	
		x 60	x 75	x 75	x 95	x 170	x 170	
Cone diameter	d _k	[mm]	9,4		11,3	14,5	23,0	
Width across flats	SW		17		19	24	30	36
Nominal drill bit diameter	d ₀		10		12	16	25	
Drill hole depth	h ₀		66	81	81	101	176	
Effective anchorage depth	h _{ef}		60	75	75	95	170	
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$		40			50	80	
Diameter of clearance hole in the fixture ¹⁾	pre-positioned anchorage d _f ≤		12		14	18	22	26
	push through anchorage d _f ≤		12		14	18	26	
Minimum thickness of concrete member	h _{min}	100	120		150	240		
Installation torque	T _{inst}	[Nm]	15		30	50	100	
Thickness of fixure	t _{fix} ≤	[mm]	1500					

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

FHB II Inj-A S:



Marking:

Work symbol, size of anchor, setting depth. e. g.:  M10x75

For stainless steel additional **A4**. For high corrosion resistant steel additional **C**.
For high corrosion resistant steel additional marking **C** also on the face.

fischer Highbond-Anchor FHB II Inject

Intended Use

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

Annex B 4

Table B4: Parameters of steel brush FIS BS

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



Table B5: Maximum processing time of the mortar **FIS HB** and minimum curing time
(During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature)

System temperature [°C]	Maximum processing time t_{work} [minutes]	Minimum curing time ¹⁾ t_{cure} [minutes]
-5 to ±0	----	6 hours
> +1 to +5	----	3 hours
> +6 to +10	15	90
> +11 to +20	6	35
> +21 to +30	4	20
> +31 to +40	2	12

¹⁾ In wet concrete the curing times must be doubled

fischer Highbond-Anchor FHB II Inject

Intended Use

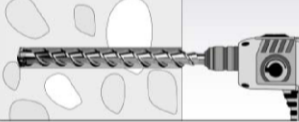
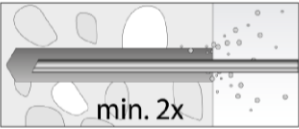
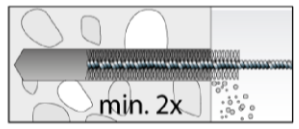
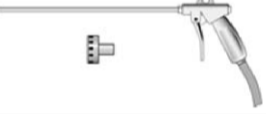
Parameters of steel brush
Processing times and curing times

Annex B 5

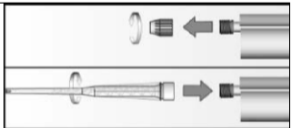
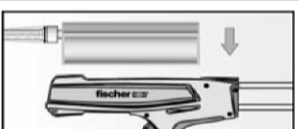
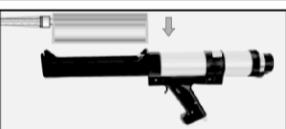
Installation instruction part 1

Installation with injection mortar FIS HB

Drilling and cleaning the hole

1		Drill the hole with hammer drill. Drill hole diameter d_0 and drill hole depth h_0 see Tables B2, B3
2		Blow out the drill hole twice. If necessary, remove standing water out of the bore hole.
		For drill hole diameter $d_0 < 25$ mm with hand- blowout or oil-free compressed air
		For drill hole diameter $d_0 = 25$ mm with oil-free compressed air ($p \geq 6$ bar) Use a cleaning nozzle.
3		Brush the bore hole twice. Corresponding brushes see Table B4
		
4		Blow out the drill hole twice.
		For drill hole diameter $d_0 < 25$ mm with hand- blowout or oil-free compressed air
		For drill hole diameter $d_0 = 25$ mm with oil-free compressed air ($p \geq 6$ bar) Use a cleaning nozzle.

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 until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey
		Observe the processing time, t_{work} see Table B5 If the processing time is exceeded, use a new static mixer and if necessary remove encrusted material in the cartridge mouth.

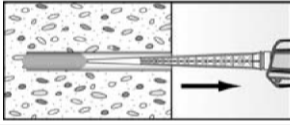
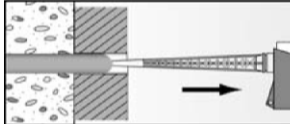
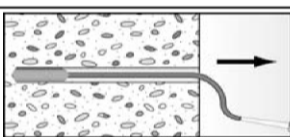
fischer Highbond-Anchor FHB II Inject

Intended use
Installation instruction part 1

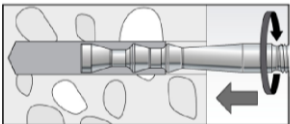
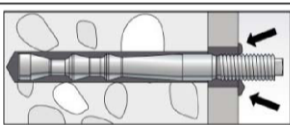
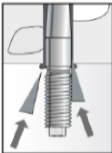
Annex B 6

Installation instruction part 2

Injection of the mortar

8		Fill approximately 2/3 of the drill hole with mortar. Exact quantity of mortar (travel scale on the cartridge) see instruction sheet. Fill the drill hole with mortar, always begin from the bottom of the hole to avoid bubbles
		Push-through installation: By using Highbond-Anchor rods FHB II Inj-A L the drill hole in the fixture must be also filled with mortar. If Highbond-Anchor rods FHB II Inj-A S are used, this is not necessary.
		For drill hole depth ≥ 170 mm use an extension tube

Installation Highbond-Anchor rod FHB II Inj-A L and FHB II Inj-A S

9		Only use clean and oil-free anchor rods. Push the anchor rod down to the bottom of the hole, turning it slightly while doing so.
10		After inserting the anchor rod, excess mortar must be emerged around the anchor rod
		For overhead installations support the anchor rod with wedges. (e.g. fischer centering wedges)
11		Wait for the specified curing time t_{cure} see Table B5
12		Mounting the fixture T_{inst} see Tables B2 and B3

fischer Highbond-Anchor FHB II Inject

Intended use
Installation instruction part 2

Annex B 7

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

Size FHB II Inj-A L			M8	M10	M12		M16			M20	M24
			x	x	x	x	x	x	x	x	x
			60	95	100	120	125	145	160	210	210
Bearing capacity under tensile load, steel failure											
Characteristic resistance N _{Rk,s}	Steel, zinc plated	[kN]	25,1	34,4	49,8		96,6			137,6	
	Stainless steel A4		25,1	34,4	49,8	96,6	137,6				
	High corrosion resistant steel C										
Partial safety factors ¹⁾											
Partial safety factor γ _{Ms,N}	Steel, zinc plated	[-]	1,5 ¹⁾								
	Stainless steel A4		1,5 ¹⁾								
	High corrosion resistant steel C		1,5 ¹⁾								
Pullout failure in cracked concrete C20/25											
Characteristic resistance	N _{Rk,p}	[kN]	--- ²⁾								
Pullout and splitting failure in uncracked concrete C20/25											
Characteristic resistance	N _{Rk,p}	[kN]	--- ²⁾								
Edge distance	c _{cr,sp}	[mm]	300	476	380	600	375	500	580	630	
Spacing	s _{cr,sp}		150	238	190	300	188	250	290	315	
Pullout and splitting failure in uncracked concrete C20/25											
Characteristic resistance	N _{Rk,p} ³⁾	[kN]	20	35	40	50	--- ²⁾	75	95	--- ²⁾	
Edge distance	c _{cr,sp}	[mm]	1,5 h _{ef}								
Spacing	s _{cr,sp}		3,0 h _{ef}								
Factors for the compressive strength of concrete > C20/25											
Increasing factor for N _{Rk,p}	C25/30	Ψ _c	[-]	1,10							
	C30/37			1,22							
	C35/45			1,34							
	C40/50			1,41							
	C45/55			1,48							
	C50/60			1,55							
Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3											
Uncracked concrete	k _{ucr}	[-]	10,1								
Cracked concrete	k _{cr}		7,2								
Concrete cone failure											
Effective anchorage depth	h _{ef}	[mm]	60	95	100	120	125	145	160	210	
Partial safety factor ¹⁾⁴⁾	γ _{Mc}	[-]	1,5	1,5							

¹⁾ In absence of other national regulations

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

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

⁴⁾ $\gamma_2 = 1,0$ is included

fischer Highbond-Anchor FHB II Inject

Performances

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

Annex C 1

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

Size FHB II Inj-A S			M10		M12	M16	M20	M24
			x	x	x	x	x	x
			60	75	75	95	170	170
Bearing capacity under tensile load, steel failure								
Characteristic resistance $N_{Rk,s}$	Steel, zinc plated	[kN]	25,1		34,4	61,6	128,5	
	Stainless steel A4		25,1		34,4	61,6	128,5	
	High corrosion resistant steel C							
Partial safety factors ¹⁾								
Partial safety factor $\gamma_{Ms,N}$	Steel, zinc plated	[-]	1,5 ¹⁾					
	Stainless steel A4		1,5 ¹⁾					
	High corrosion resistant steel C		1,5 ¹⁾					
Pullout failure in cracked concrete C20/25								
Characteristic resistance	$N_{Rk,p}$	[kN]	--- ²⁾					
Pullout and splitting failure in uncracked concrete C20/25								
Characteristic resistance	$N_{Rk,p}$	[kN]	--- ²⁾					
Edge distance	$c_{cr,sp}$	[mm]	300			340	510	
Spacing	$s_{cr,sp}$		150			170	255	
Pullout and splitting failure in uncracked concrete C20/25								
Characteristic resistance	$N_{Rk,p}$ ³⁾	[kN]	20	25		40	--- ²⁾	
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}					
Spacing	$s_{cr,sp}$		3,0 h_{ef}					
Factors for the compressive strength of concrete > C20/25								
Increasing factor for $N_{Rk,p}$	C25/30	Ψ_c	[-]	1,10				
	C30/37			1,22				
	C35/45			1,34				
	C40/50			1,41				
	C45/55			1,48				
	C50/60			1,55				
Factors acc. to CEN/TS 1992-4:2009 Section 6.2.2.3								
Uncracked concrete	k_{ucr}	[-]	10,1					
Cracked concrete	k_{cr}		7,2					
Concrete cone failure								
Effective anchorage depth	h_{ef}	[mm]	60	75		95	170	
Partial safety factor ¹⁾⁴⁾	γ_{Mc}	[-]	1,5	1,5				

¹⁾ In absence of other national regulations

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

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

⁴⁾ $\gamma_2 = 1,0$ is included

fischer Highbond-Anchor FHB II Inject

Performances

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

Annex C 2

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

Size FHB II Inj-A L				M8	M10	M12		M16			M20	M24
				x	x	x	x	x	x	x	x	x
				60	95	100	120	125	145	160	210	210
Bearing capacity under shear load, steel failure												
without lever arm												
Characteristic resistance	Steel, zinc plated	$V_{Rk,s}$	[kN]	13,7	20,8	30,3		56,3			87,9	126,9
	Stainless steel A4 High corrosion resistant steel C			14,6	23,2	33,7		62,7			97,9	141
with lever arm												
Characteristic bending moment	Steel, zinc plated	$M^0_{Rk,s}$	[Nm]	31	62	105		266			519	896
	Stainless steel A4 and High corrosion resistant steel C			31	62	105		266			519	896
Partial safety factors												
Partial safety factor ¹⁾		$\gamma_{Ms,V}$	[-]	1,25								
Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1		k_2	[-]	1,0								
Concrete pry-out failure												
Factor k acc. TR029 Section 5.2.3.3 or k_3 acc.CEN/TS 1992-4-5:2009 Section 6.3.3		$k_{(3)}$	[-]	2,0								
Partial safety factors ¹⁾		γ_{Mcp}		1,5								
Concrete edge failure												
Effective length of anchor		l_f	[mm]	60	95	100	112	125	144		200	
Calculation diameter		d		10	12	14		18			25	
Partial safety factor ¹⁾		γ_{Mc}	[-]	1,5								

¹⁾ In absence of other national regulations

fischer Highbond-Anchor FHB II Inject

Leistungen

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

Annex C 3

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

Size FHB II Inj-A S			M10		M12	M16	M20	M24
			x 60	x 75	x 75	x 95	x 170	x 170
Bearing capacity under shear load, steel failure								
without lever arm								
Characteristic resistance	Steel, zinc plated	V _{Rk,s}	[kN]	19,7	27,3	50,8	80,3	114,2
	Stainless steel A4			24,1	33,7	62,7	97,9	124,5
	High corrosion resistant steel C			24,1	33,7	62,7	97,9	141
with lever arm								
Characteristic bending moment	Steel, zinc plated	M ⁰ _{Rk,s}	[Nm]	62	105	266	519	896
	Stainless steel A4 and			62	105	266	519	896
	High corrosion resistant steel C							
Partial safety factors								
Partial safety factor ¹⁾		γ _{Ms,V}	[-]	1,25				
Ductility factor acc. to CEN/TS 1992-4-5:2009 Section 6.3.2.1		k ₂	[-]	1,0				
Concrete pry-out failure								
Factor k acc. TR029 Section 5.2.3.3 or k ₃ acc.CEN/TS 1992-4-5:2009 Section 6.3.3		k ₍₃₎	[-]	2,0				
Partial safety factors ¹⁾		γ _{Mcp}	[-]	1,5				
Concrete edge failure								
Effective length of anchor		l _f	[mm]	60	75	95	170	
Calculation diameter		d		10	12	16	25	
Partial safety factor ¹⁾		γ _{Mc}	[-]	1,5				

¹⁾ In absence of other national regulations

fischer Highbond-Anchor FHB II Inject

Performances

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

Annex C 4

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

Size FHB II Inj-A L	M8 x 60	M10 x 95	M12 x 100 x 120		x 125	M16 x 145	x 160	M20 x 210	M24 x 210
Displacement under tension load									
Cracked concrete									
Tension load [kN]	6,6	15,9	17,1	22,5	24,0	30,0	34,7	52,2	52,2
δ_{N0} [mm]	0,8				0,6				
$\delta_{N\infty}$	1,7								
Uncracked concrete									
Tension load [kN]	9,3	22,3	24,0	31,6	33,6	42,0	48,7	73,2	73,2
δ_{N0} [mm]	0,2	0,4						0,6	
$\delta_{N\infty}$	1,7								
Displacement under shear load									
Uncracked or cracked concrete									
Steel zinc plated									
Shear load [kN]	7,8	11,9	17,3		32,2			50,2	72,5
δ_{V0} [mm]	1,2		1,3					3,5	
$\delta_{V\infty}$	1,8		2,0					5,3	
Stainless steel A4									
Shear load [kN]	8,7	13,3	19,3		35,8			55,9	80,6
δ_{V0} [mm]	1,0		1,1		2,2			3,5	
$\delta_{V\infty}$	1,5		1,7		3,3			5,3	
High corrosion resistant steel C									
Shear load [kN]	8,7	13,3	19,3		35,8			55,9	80,6
δ_{V0} [mm]	1,2		1,3		2,4			3,7	5,0
$\delta_{V\infty}$	1,8		2,0		3,6			5,6	7,5

fischer Highbond-Anchor FHB II Inject

Performances

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

Annex C 5

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

Size FHB II Inj-A S	M10		M12	M16	M20	M24
	x 60	x 75	x 75	x 95	x 170	x 170
Displacement under tension load						
Cracked concrete						
Tension load [kN]	6,6	11,1	15,9	38,0		
δ_{N0} [mm]	0,8	0,3	0,4	0,6		
$\delta_{N\infty}$	1,7					
Uncracked concrete						
Tension load [kN]	9,3	15,6	22,3	53,3		
δ_{N0} [mm]	0,2				0,5	
$\delta_{N\infty}$	1,7					
Displacement under shear load						
Uncracked or cracked concrete						
Steel zinc plated						
Shear load [kN]	11,3	12,7	29,0	45,9	65,3	
δ_{V0} [mm]	1,2	1,5		2,8		
$\delta_{V\infty}$	1,8	2,3		4,2		
Stainless steel A4						
Shear load [kN]	13,8	19,3	35,8	55,9	71,1	
δ_{V0} [mm]	1,0	1,1	2,2	3,5		
$\delta_{V\infty}$	1,5	1,7	3,3	5,3		
High corrosion resistant steel C						
Shear load [kN]	13,8	19,3	35,8	55,9	80,6	
δ_{V0} [mm]	1,2	1,3	2,4	3,7	5,0	
$\delta_{V\infty}$	1,8	2,0	3,6	5,6	7,5	