



## LEISTUNGSERKLÄRUNG



DoP: 0148

für fischer Betonschraube ULTRACUT FBS II A4 (Metalldübel zur Verwendung im Beton (hoch belastbar)) – DE

1. Eindeutiger Kenncode des Produkttyps: **DoP: 0148**
2. Verwendungszweck(e): **Nachträgliche Befestigung im gerissenen und ungerissenen Beton, siehe Anhang, insbesondere Anhänge B 1 bis B 4**
3. Hersteller: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Deutschland**
4. Bevollmächtigter: --
5. System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit: **1**
6. Europäisches Bewertungsdokument: **EAD 330232-00-0601**

Europäische Technische Bewertung: **ETA-17/0740; 2018-10-23**

Technische Bewertungsstelle: **ETA-Danmark A/S**

Notifizierte Stelle(n): **1343 – MPA Darmstadt**

7. Erklärte Leistung(en):

### **Mechanische Festigkeit und Standsicherheit (BWR 1)**

- **Wesentliche Merkmale: Siehe Anhang, insbesondere Anhang C 1, C 2 und C 4**

### **Brandschutz (BWR 2)**

- **Wesentliche Merkmale: Siehe Anhang, insbesondere Anhang C 3**

8. Angemessene Technische Dokumentation und/oder Spezifische Technische Dokumentation: ---

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Für die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein der obengenannte Hersteller verantwortlich.

Unterzeichnet für den Hersteller und im Namen des Herstellers von:

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*i.V. A. Bucher*

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Tumlingen, 2018-10-30

- Diese Leistungserklärung wurde in verschiedenen Sprachversionen erstellt. Für den Fall unterschiedlicher Auslegung hat immer die englische Version Vorrang.
- Der Anhang enthält freiwillige und ergänzende Informationen in englischer Sprache. Diese gehen über die (sprachneutral angegebenen) gesetzlichen Anforderungen hinaus.

## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product and intended use**

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

fischer concrete screw ULTRACUT FBS II A4 is a concrete screw made of stainless steel. The anchor is installed in a drilled hole and anchored by mechanical interlock.

An illustration of the product is given in Annex A.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex B, Table B2.1. The intended use specifications of the product are detailed in the Annex B1.

### **2 Specification of the intended use in accordance with the applicable EAD**

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 provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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 Characteristics of product**

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

The essential characteristics are detailed in the Annex C1, C2 and C4.

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

The essential characteristics are detailed in the Annex C3.

Other Basic Requirements are not relevant.

#### **3.2 Methods of assessment**

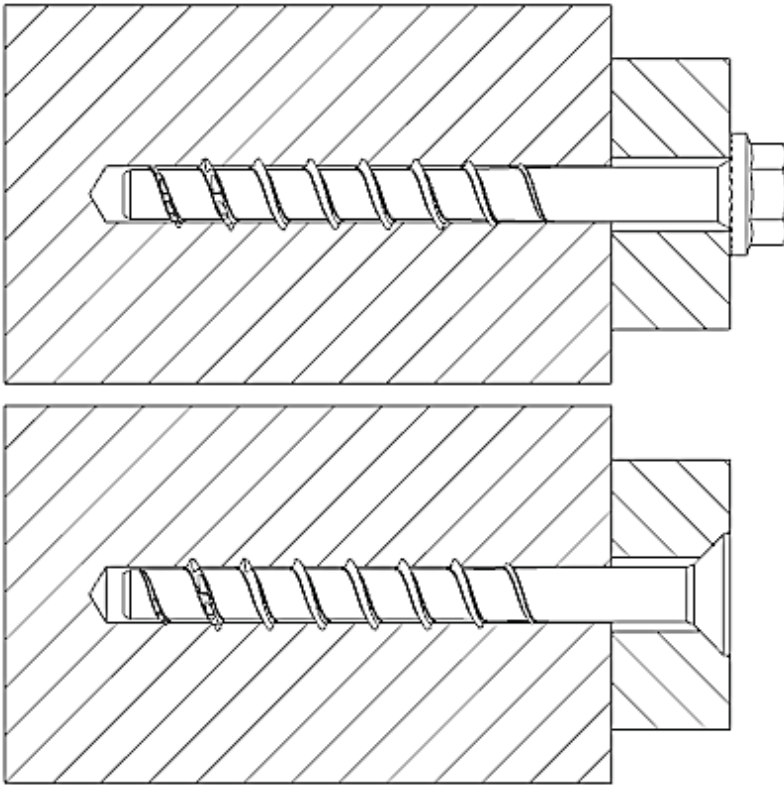
The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirement 1 has been made in accordance with EAD 330232-00-0601; Mechanical fasteners for use in concrete.

## **4 Assessment and verification of constancy of performance (AVCP)**

### **4.1 AVCP system**

According to the decision 1996/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 1.

**Product in the installed condition**



FBS II US A4 /  
FBS II US TX A4


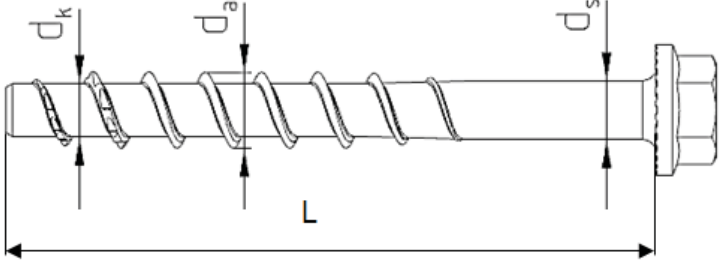

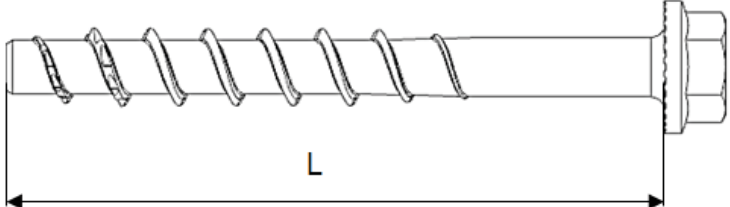

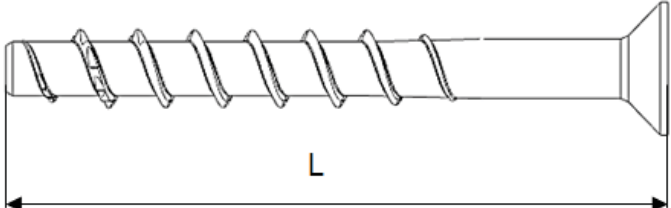

FBS II SK A4

**fischer concrete screw ULTRACUT FBS II A4**

Product description  
Product in the installed condition

**Annex A1**  
of European  
Technical Assessment  
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**Table A2.1: Geometry and material**

Type of screw / size		FBS II A4 US / SK			
		8	10	12	
Thread outer diameter	$d_a$	[mm]	10,3	12,5	14,6
Core diameter	$d_k$		7,5	9,4	11,1
Shaft diameter	$d_s$		8,0	9,9	11,7
Material		Tip: hardened steel; Shaft and head: stainless steel			
Hexagon head with formed washer <b>(US)</b>					
	Hexagon head with formed washer and TX-drive <b>(US TX)</b>				
		Countersunk Head <b>(SK)</b>			
<b>Head Marking</b>					
10: Screw size			XXX: Screw length L		
A4: Material type			FBS II: Product short name		
fischer concrete screw ULTRACUT FBS II A4			Annex A2 of European Technical Assessment ETA-17/0740		
Product description Geometry and material					

**Specification of intended use:**

Size	FBS II A4							
	8		10			12		
Nominal embedment depth [mm]	50	65	55	65	85	60	75	100
Static and quasi-static loads	✓							
Cracked and uncracked concrete								
Fire exposure								
Seismic performance category C1 and C2		✓			✓			✓

**Base materials:**

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013
- Strength classes C20/25 to C50/60 according to EN 206:2013
- Uncracked or cracked concrete

**Use conditions (Environmental conditions):**

- Structures subjected to dry internal conditions
- Structures subjected to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist.

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

**Design:**

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the screw is indicated on the design drawings (e.g. position of the screw relative to reinforcement or to supports, etc.).
- Design of fastenings according to FprEN 1992-4: 2016 and EOTA Technical Report TR 055
- Seismic design according EOTA Technical Report TR 049

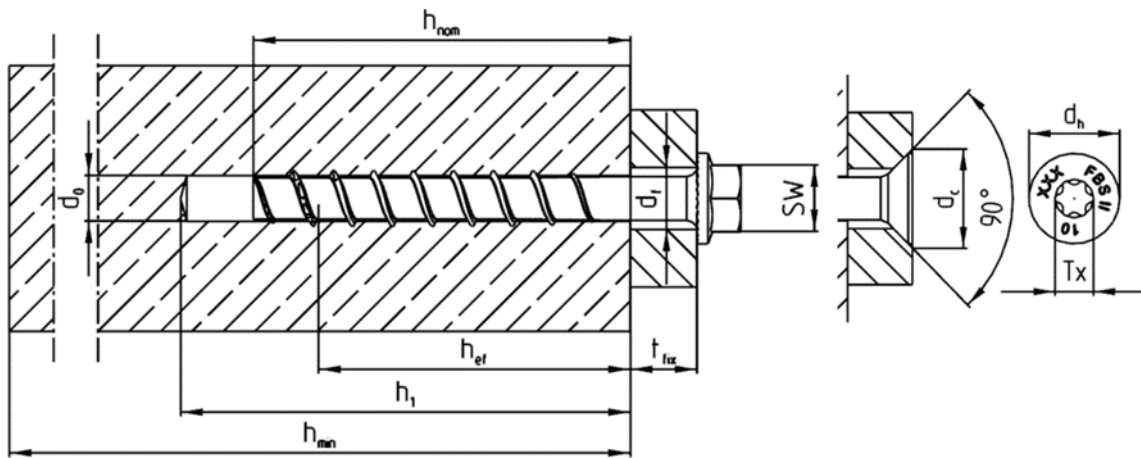
**Installation:**

- Hammer drilling or diamond drilling or hollow drilling according to Annex B4
- Screw installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: New hole must be drilled at a minimum distance of twice the depth of the aborted hole or closer, if the hole is filled with a high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- Adjustability according to Annex B3
- Cleaning of drill hole is not necessary when using a hollow drill or:
  - If drilling vertically upwards
  - If drilling vertical downwards and the drill hole depth has been increased. It is recommended to increase the drill depth with additional 3 d<sub>0</sub>.
- After correct installation further turning of the screw head should not be possible.
- The head of the screw must be fully engaged on the fixture and show no signs of damage.
- For seismic performance category C2 applications: The gap between screw shaft and fixture must be filled with mortar; mortar compressive strength ≥ 50 N/mm<sup>2</sup>. (e.g. FIS V, FIS HB, FIS SB or FIS EM Plus)

<b>fischer concrete screw ULTRACUT FBS II A4</b>	<b>Annex B1</b> of European Technical Assessment ETA-17/0740
Intended use Specification	

**Table B2.1: Installation parameters**

FBS II A4			8		10			12		
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100
Nominal drill hole diameter	$d_0$		8		10			12		
Cutting diameter of drill bits	$d_{cut} \leq$		8,45		10,45			12,50		
Cutting diameter for diamond drillers			8,10		10,30			12,30		
Clearance hole diameter	$d_f$		10,6 – 12,0		12,8 – 14,0			14,8 – 16,0		
Wrench size (US,S)	SW		13		15			17		
Tx-size	Tx		40		50			-		
Countersunk head diameter	$d_h$	18		21						
Countersunk diameter in fixture	$d_c$	20		23						
Drill hole depth	$h_1 \geq$	[mm]	60	75	65	75	95	70	85	110
Drill hole depth (with adjustable setting)			70	85	75	85	105	80	95	120
Thickness of fixture	$t_{fix} \leq$	L - $h_{nom}$								
Length of screw	$L_{min} =$	50	65	55	65	85	60	75	100	
	$L_{max} =$	400	415	405	415	435	410	425	450	
Torque impact screw driver	$T_{imp,max}$	[Nm]	450					650		
Torque impact screw driver (with adjustable setting process)	$T_{imp,max}$		300					450		



**fischer concrete screw ULTRACUT FBS II A4**

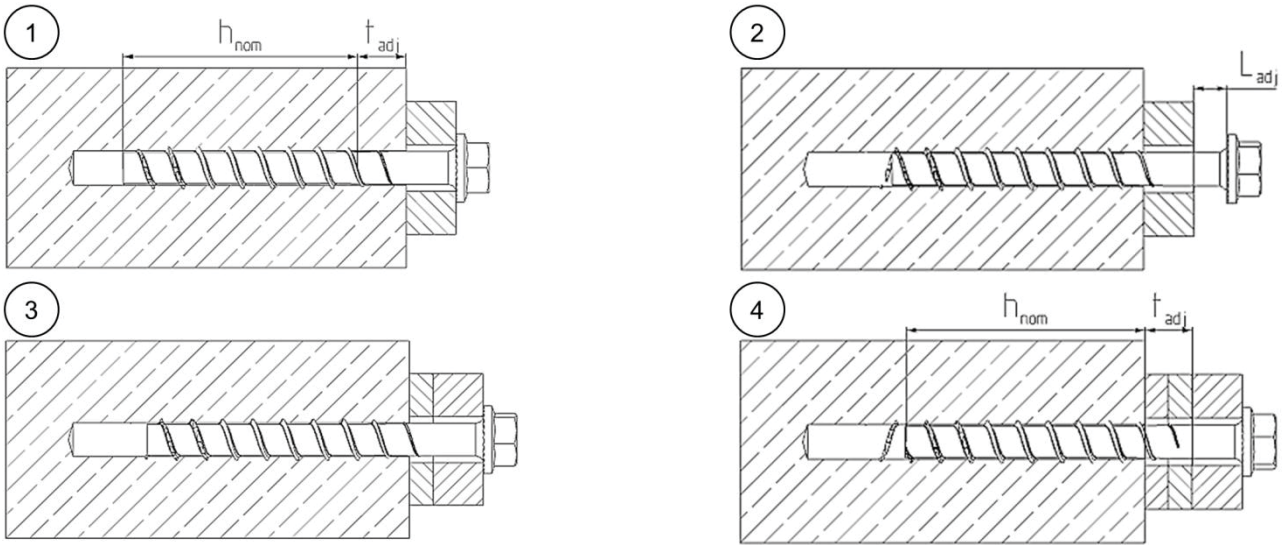
Intended use  
Installation parameters

**Annex B2**

of European  
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**Adjustment**



It is permissible to untighten the screw up to two times for adjustment purposes. Therefore the screw may be untightened to a maximum of  $L_{adj} = 20$  mm to the surface of the initial fixture. The total permissible thickness of shims added during the adjustment process is  $t_{adj} = 10$  mm.

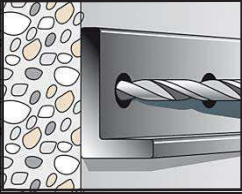
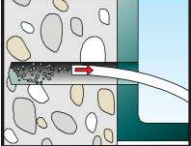
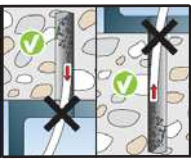
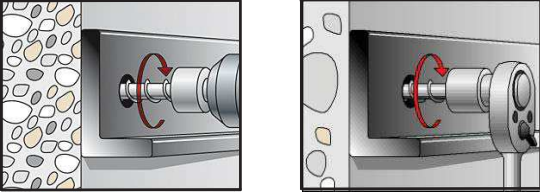
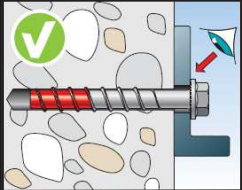
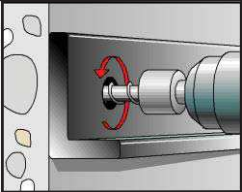
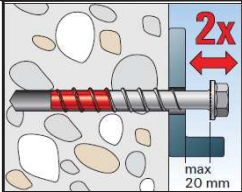
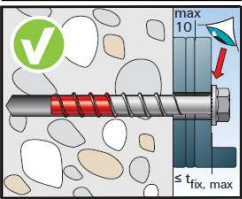
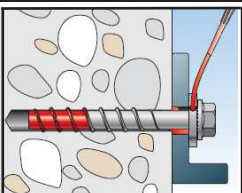
**Table B3.1: Minimum thickness of concrete members, minimum spacing and edge distance**

FBS II A4		8		10			12			
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100
Minimum thickness of concrete member	$h_{min}$		100	120	100	120	140	110	130	150
Minimum spacing	$s_{min}$		35		40			50		
Minimum edge distance	$c_{min}$		35		40			50		

**fischer concrete screw ULTRACUT FBS II A4**

Intended use – Adjustment  
Minimum thickness of members, minimum spacing and edge distance

**Annex B3**  
of European  
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ETA-17/0740

<b>Installation instruction</b>		
<b>Installation of fischer concrete screw ULTRACUT FBS II A4</b>		
	<p>Drill the hole using hammer drill, hollow drill or diamond core drill.</p> <p>Drill hole diameter <math>d_0</math> and drill hole depth <math>h_1</math> according to table B2.1</p>	
<p>a)</p>  <p>b)</p> 	<p>Option a) Clean the drill hole</p> <p>Option b) Cleaning of drill hole is not necessary when using a hollow drill or:</p> <ul style="list-style-type: none"> <li>- If drilling vertically upwards or</li> <li>- If drilling vertically downwards and the drill hole depth has been increased. It is recommended to increase the drill hole depth additional 3 times <math>d_0</math>.</li> </ul>	
	<p>Installation with any torque impact screw driver up to the maximum mentioned torque moment (<math>T_{imp,max}</math>). Alternatively, all other tools without an indicated torque moment are allowed (e.g. ratchet spanner). The indicated torque moments for impact screw driver are therefore not decisive.</p>	
	<p>After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and is not damaged.</p>	
<p>1.</p>  <p>2.</p>  <p>3.</p> 	<p><b>OPTIONAL:</b></p> <p>It is permissible to adjust the screw two times. Therefore, the screw may be untightened to a maximum of <math>L_{adj} = 20</math> mm off the surface of the initial fixture. The total permissible thickness of shims added during the adjustment process is <math>t_{adj} = 10</math> mm. If screw is adjusted, only permissible impact screw driver according to table B2.1 is allowed.</p>	
	<p>For seismic performance category C2 applications:          The gap between screw shaft and fixture must be filled with mortar;          mortar compressive strength <math>\geq 50</math> N/mm<sup>2</sup> (e.g. FIS V, FIS HB, FIS SB or FIS EM Plus)</p>	
<b>fischer concrete screw ULTRACUT FBS II A4</b>		<b>Annex B4</b> of European Technical Assessment ETA-17/0740
Installation Instructions		

**Table C1.1: Characteristic values for static and quasi-static action**

<b>FBS II A4</b>			<b>8</b>		<b>10</b>			<b>12</b>			
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100	
<b>Steel failure for tension load and shear load</b>											
Characteristic resistance	$N_{Rk,s}$	[kN]	27,8		43,8			67,7			
Partial factor	$\gamma_{Ms}$	-	1,5								
Characteristic resistance	$V_{Rk,s}$	[kN]	18,0	27,8	13,2	19,3	36,6	20,4	40,1	45,8	
Partial factor	$\gamma_{Ms}$	-	1,25								
Factor for ductility	$k_7$	[-]	1,0								
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	31,3		68,5			112,8			
<b>Pullout failure</b>											
Charact. resistance in concrete C20/25	uncracked	$N_{Rk,p}$	[kN]	7,0	14,0	8,5	14,0	- <sup>1)</sup>	10,0	12,0	- <sup>1)</sup>
	cracked	$N_{Rk,p}$	[kN]	4,0	9,0	4,5	6,0	16,0	4,5	11,0	- <sup>1)</sup>
Increasing factors concrete	C25/30	$\psi_c$	[-]	1,12							
	C30/37			1,22							
	C35/45			1,32							
	C40/50			1,41							
	C45/55			1,50							
	C50/60			1,58							
Installation factor	$\gamma_{inst}$	[-]	1,0								
<b>Concrete cone failure and splitting failure; concrete pryout failure</b>											
Effective embedment depth	$h_{ef}$	[mm]	40	52	43	51	68	47	60	81	
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0								
Factor for cracked concrete	$k_{cr,N}$		7,7								
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 $h_{ef}$								
Characteristic spacing	$s_{cr,N}$		3 $h_{ef}$								
Char. resistance for splitting	$N^0_{Rk,Sp}$	[kN]	12,0	18,4	13,0	17,9	- <sup>1)</sup>	15,8	22,9	- <sup>1)</sup>	
Char. edge distance for splitting	$c_{cr,sp}$	[mm]	1,5 $h_{ef}$								
Char. spacing for splitting	$s_{cr,sp}$		3 $h_{ef}$								
Factor for pryout failure	$k_8$	[-]	1,0				2,0	1,0	2,0		
Installation factor	$\gamma_{inst}$		1,0								
<b>Concrete edge failure</b>											
Effective length in concrete	$l_f = h_{nom}$	[mm]	50	65	55	65	85	60	75	100	
Nominal diameter of screw	$d_{nom}$		8		10			12			
<b>Adjustment</b>											
Maximum thickness of shims	$t_{adj}$	[mm]	10								
Max. number of adjustments	$n_a$		2								

<sup>1)</sup> Pullout failure not decisive.

**fischer concrete screw ULTRACUT FBS II A4**

Characteristic values for static and quasi-static action

**Annex C1**  
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**Table C2.1: Characteristic values for Seismic Performance Category C1**

<b>FBS II A4</b>			<b>8</b>	<b>10</b>	<b>12</b>	
Nominal embedment depth	$h_{nom}$	[mm]	65	85	100	
<b>Steel failure for tension load and shear load C1</b>						
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	27,8	43,8	67,7	
	$V_{Rk,s,eq}$		18,1	29,3	36,6	
<b>Pullout failure</b>						
Characteristic resistance in cracked concrete	$N_{Rk,p,eq}$	[kN]	9,0	16,0	- <sup>1)</sup>	
<b>Concrete cone failure</b>						
Effective embedment depth	$h_{ef}$	[mm]	52	68	81	
Concrete cone failure	Edge distance		$C_{cr,N}$	1,5 $h_{ef}$		
	Spacing		$S_{cr,N}$	3 $h_{ef}$		
Installation factor	$\gamma_{inst}$	[-]	1,0			
<b>Concrete pryout failure</b>						
Factor for pryout failure	$k_8$	[-]	1,0	2,0		
<b>Concrete edge failure</b>						
Effective length in concrete	$l_f = h_{nom}$	[mm]	65	85	100	
Nominal diameter of screw	$d_{nom}$		8	10	12	

<sup>1)</sup> Pullout failure not decisive.

**Table C2.2: Characteristic values for Seismic Performance Category C2**

Gap between screw shaft and fixture must be filled with mortar

<b>FBS II A4</b>			<b>8</b>	<b>10</b>	<b>12</b>	
Nominal embedment depth	$h_{nom}$	[mm]	65	85	100	
<b>Steel failure for tension load and shear load C2</b>						
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	27,8	43,8	67,7	
	$V_{Rk,s,eq}$		9,7	8,8	19,7	
<b>Pullout failure</b>						
Characteristic resistance in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,8	5,0	7,3	
<b>Concrete cone failure</b>						
Effective embedment depth	$h_{ef}$	[mm]	52	68	81	
Concrete cone failure	Edge distance		$C_{cr,N}$	1,5 $h_{ef}$		
	Spacing		$S_{cr,N}$	3 $h_{ef}$		
Installation factor	$\gamma_{inst}$	[-]	1,0			
<b>Concrete pryout failure</b>						
Factor for pryout failure	$k_8$	[-]	1,0	2,0		
<b>Concrete edge failure</b>						
Effective length in concrete	$l_f = h_{nom}$	[mm]	65	85	100	
Nominal diameter of screw	$d_{nom}$		8	10	12	

**fischer concrete screw ULTRACUT FBS II A4**

Characteristic values for Seismic Performance Category C1 and C2

**Annex C2**  
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**Table C3.1: Characteristic values for resistance to fire**

<b>FBS II A4</b>			<b>8</b>		<b>10</b>			<b>12</b>			
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100	
<b>Steel failure for tension load and shear load (<math>F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}</math>)</b>											
Characteristic resistance for the head shapes	US, US TX	$F_{Rk,s,fi}$	[kN]	R30	2,3	6,4	3,5	11,0	4,6	15,2	
				R60	1,8	4,7	2,7	8,1	3,7	11,2	
				R90	1,3	2,9	2,0	5,2	2,7	7,3	
				R120	1,0	2,0	1,6	3,8	2,2	5,3	
	SK	$F_{Rk,s,fi}$	[kN]	R30	2,1		3,0		-		
				R60	1,7		2,3				
				R90	1,2		1,6				
				R120	1,0		1,2				
	US, US TX	$M^0_{Rk,s,fi}$	[Nm]	R30	2,6	7,2	7,6	15,4	16,8	25,3	
				R60	2,0	5,2	6,0	11,4	13,3	18,7	
				R90	1,5	3,3	4,4	7,3	9,8	12,1	
				R120	1,2	2,3	3,6	5,3	8,0	8,8	
	SK	$M^0_{Rk,s,fi}$	[Nm]	R30	2,4		4,2		-		
				R60	1,9		3,2				
				R90	1,4		2,2				
				R120	1,1		1,7				
<b>Pullout failure</b>											
Characteristic resistance	$N_{Rk,p,fi}$	[kN]	R30	1,7	2,4	2,1	3,5	4,3	2,5	3,0	6,3
			R60								
			R90								
			R120								
<b>Concrete cone failure</b>											
Characteristic resistance	$N_{Rk,c,fi}$	[kN]	R30	1,6	3,4	2,1	3,2	6,6	2,6	4,8	10,2
			R60								
			R90								
			R120								
<b>Edge distance</b>											
R30 to R120	$C_{cr,fi}$	[mm]	2 $h_{ef}$								
In case of fire attack from more than one side, the minimum edge distance shall be $\geq 300$ mm											
<b>Spacing</b>											
R30 to R120	$S_{cr,fi}$	[mm]	2 $C_{cr,fi}$								
<b>Concrete pryout failure</b>											
R30 to R120	$k_8$	[-]	1,0				2,0	1,0	2,0		
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.											
<b>fischer concrete screw ULTRACUT FBS II A4</b>								<b>Annex C3</b> of European Technical Assessment ETA-17/0740			
Characteristic values for resistance to fire											

**Table C4.1: Displacements due to tension loads (static and quasi-static)**

FBS II A4			8		10			12		
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100
Tension load in uncracked concrete	N	[kN]	3,5	7,1	4,2	7,0	11,9	5,0	6,0	17,1
Displacement in uncracked concrete	$\delta_{N0}$	[mm]	0,5	0,7	0,4	0,6	0,8	1,0	0,9	1,25
	$\delta_{N\infty}$		0,7	0,7	0,8	0,8	0,8	1,25	1,25	1,25
Tension load in cracked concrete	N	[kN]	3,5	4,5	4,2	7,0	8,1	5,0	6,0	12,0
Displacement in cracked concrete	$\delta_{N0}$	[mm]	0,6	0,4	0,4	0,6	0,7	0,9	0,9	1,4
	$\delta_{N\infty}$		1,5	1,1	1,0	1,8	1,8	1,4	1,7	1,9

**Table C4.2: Displacements due to shear loads (static and quasi-static)**

FBS II A4			8		10			12		
Nominal embedment depth	$h_{nom}$	[mm]	50	65	55	65	85	60	75	100
Shear load in cracked and uncracked concrete	V	[kN]	11,0	15,9	10,4	11,9	20,9	12,7	24,9	26,2
Displacement (the gap between fastener and fixture is subtracted)	$\delta_{V0}$	[mm]	4,1	2,7	1,2	1,2	3,5	1,1	2,5	2,9
	$\delta_{V\infty}$		6,2	4,1	1,8	1,8	5,3	1,7	3,8	4,4

**Table C4.3: Displacements due to tension loads (Seismic Performance Category C2)**

FBS II A4			8	10	12
Nominal embedment depth	$h_{nom}$	[mm]	65	85	100
Displacement DLS	$\delta_{N,eq (DLS)}$		0,9	0,9	1,1
Displacement ULS	$\delta_{N,eq (ULS)}$		2,5	2,7	3,2

**Table C4.4: Displacements due to shear loads (Seismic Performance Category C2)**

FBS II A4			8	10	12
Nominal embedment depth	$h_{nom}$	[mm]	65	85	100
Displacement DLS	$\delta_{V,eq (DLS)}$		1,6	1,7	2,6
Displacement ULS	$\delta_{V,eq (ULS)}$		5,0	3,8	6,6

fischer concrete screw ULTRACUT FBS II A4

Displacements due to tension and shear loads

**Annex C4**  
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