



Annexes C1, C2

Annexes C1, C2

Annex B4 Annex C1, C2

Annexes C1, C2

Annexes C1, C2

ΕN

DECLARATION OF PERFORMANCE

Characteristic resistance to shear load (static and

quasi-static loading), Method A:

DoP 0227

for fischer concrete screw ULTRACUT FBS II (Mechanical fastener for use in concrete) DoP 0227 1. Unique identification code of the product-type: 2. Intended use/es: Post-installed fastening in cracked or uncracked concrete. See appendix, especially annexes B1- B6 fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Germany 3. Manufacturer: 4. Authorised representative: _ 5. System/s of AVCP: 1 6. European Assessment Document: EAD 330232-01-0601, (Edition 12/ 2019) European Technical Assessment: ETA-15/0352; 2020-10-05 Technical Assessment Body: DIBt- Deutsches Institut für Bautechnik Notified body/ies: 1343 MPA Darmstadt / 2873 TU Darmstadt 7. Declared performance/s: Mechanical resistance and stability (BWR 1) Characteristic resistance to tension load (static and Resistance to steel failure: Annexes C1, C2 E_S= 210 000 MPa quasi-static loading): Resistance to pull- out failure: Annexes C1, C2

Resistance to concrete cone failure:

Minimum edge distance and spacing:

Resistance to steel failure (shear load):

Resistance to prv-out failure:

Edge distance to prevent splitting under load:

Robustness:

Characteristic resistance and displacements for seismic performance categories C1 and C2:	Resistance to tension load, displacements, category C1:	Annex C3
	Resistance to tension load, displacements, category C2:	Annexes C4, C7
	Resistance to shear load, displacements, category C1:	Annex C3
	Resistance to shear load, displacements, category C2:	Annexes C4, C7
	Factor for annular gap:	Annex C3, C4
Characteristic Resistance for simplified design:	Method B:	NPD
	Method C:	NPD
Displacements and durability:	Displacements under static and quasi-static loading:	Annex C7
	Durability:	Annexes A4, B1
Safety in case of fire (BWR 2)		
Reaction to fire:	Class (A1)	
Resistance to fire:	Fire resistance to steel failure (tension load):	Annexes C5, C6
	Fire resistance to pull-out failure (tension load): Fire resistance to steel failure (shear load):	Annexes C5, C6 Annexes C5, C6





8. <u>Appropriate Technical Documentation and/or Specific</u> – <u>Technical Documentation:</u>

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

Signed for and on behalf of the manufacturer by:

ppc. The MA

Thilo Pregartner, Dr.-Ing. Tumlingen, 2020-10-19

i.V.P. Sot

Peter Schillinger, Dipl.-Ing.

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

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

Specific Part

1 Technical description of the product

The fischer concrete screw ULTRACUT FBS II is an anchor of sizes 6, 8, 10, 12 and 14 mm made of hardened carbon steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

The product description is given in Annex A.

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

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

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance			
Characteristic resistance to tension load (static and quasi-static loading)	See Annex B 4, Annex C 1 and C 2			
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1 and C 2			
Displacements and Durability	See Annex C 7 and Annex B 1			
Characteristic resistance and displacements for seismic performance categories C1 and C2	See Annex C 3, C 4 and C 7			

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 5 and C 6

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

4

In accordance with European Assessment Document EAD No. 330232-01-0601 the applicable European legal act is: [96/582/EC]. The system to be applied is: 1 Appendix 2/ 19

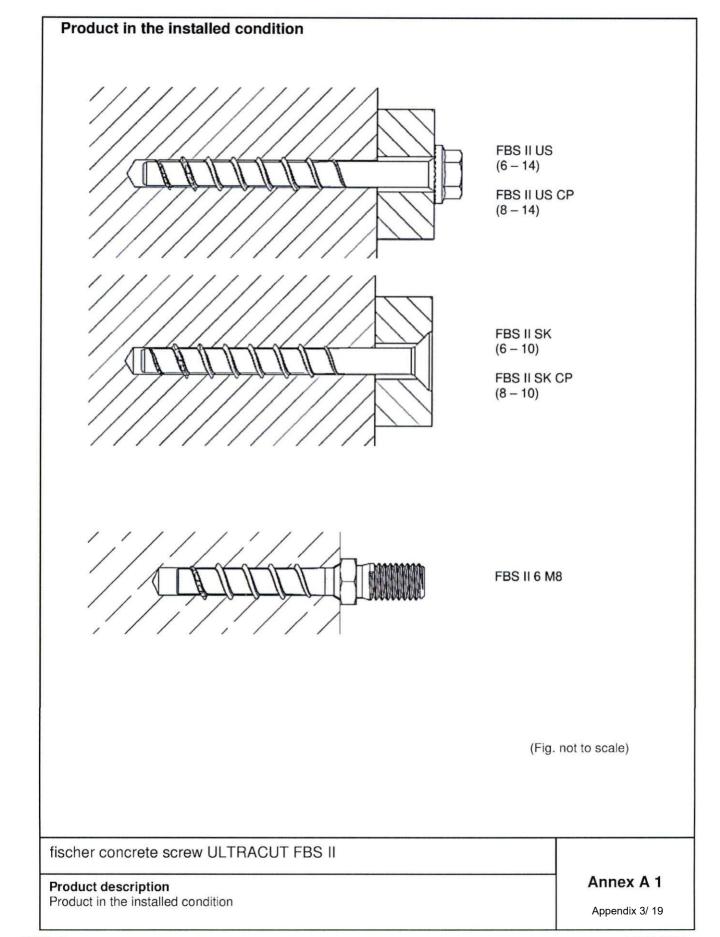
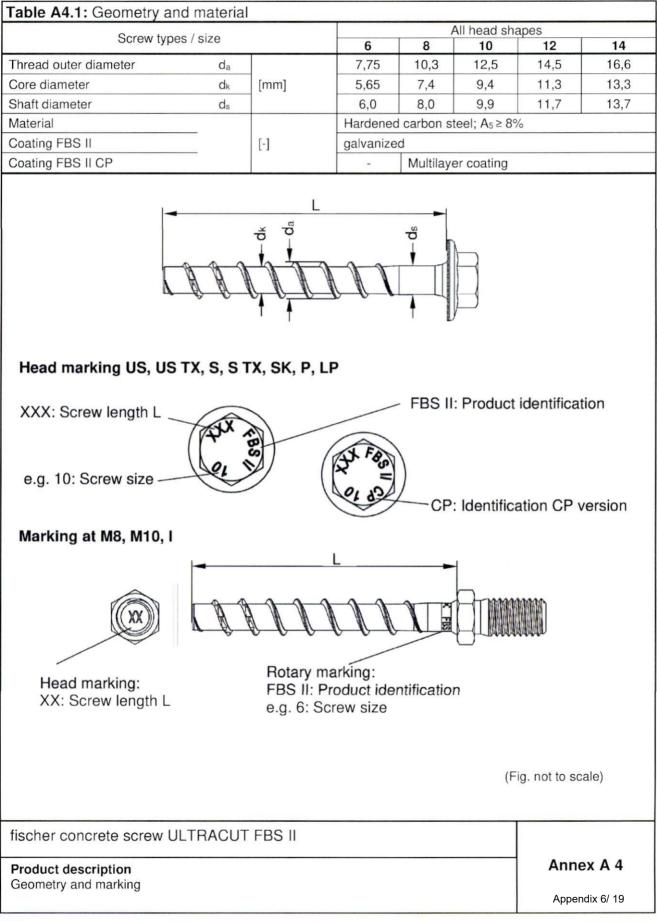


Table A2.1: Screw ty	pes FBS II 6		
FBS II 6			
Hexagon head with formed washer (US)	(15 BA		
Hexagon head with formed washer and TX-drive (US TX)		CEELINI (
Countersunk Head (SK)	SBA XXX XXX	TITTI	
Pan head (P)	FBS		
Large Pan head (LP)	FBS	ALLA	
Hexagon head and connection thread M8 or M10 (M)	XX	IIIIIII	
Hexagon connecting nut with metric internal thread (I)			
		(1	Fig. not to scale)
fischer concrete scre		ERS II	
	W ULI HACUI		
Product description Screw types FBS II 6			Annex A 2
			Appendix 4/ 19

Table A3.1: Screw type:	s FBS II 8 – 1	4	
FBS II 8 - 14			
Hexagon head with formed washer (US)		TTTTT	
Hexagon head with formed washer and TX-drive (US TX)		THILL	
Countersunk Head (SK)	FR21	<u>IAUUUU</u>	
Hexagon head (S)	A LEAN	<u>IIIII</u>	
Hexagon head with TX-drive (S TX)	a Case	<u>IIIIII</u>	
			(Fig. not to scale)
fischer concrete screw	ULTRACUT F	BS II	
Product description Screw types FBS II 8 to 14			Annex A 3
			Appendix 5/ 19



Specification of intended use

Table B1.1: Anchorages subject to

Size	6		8		10			12			14	
Nominal embedment depth [mm]	40- 55	50	65	55	65	85	60	75	100	65	85	115
Static and quasi-static loads in cracked and uncracked concrete						,	1					
Fire exposure												
Seismic performance category C1	\checkmark		\checkmark			\checkmark			1			1
Seismic performance category C2		1	•			•			•			v

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres (cracked and uncracked) according to EN 206:2013+A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016

Use conditions (Environmental conditions):

· Structures subjected to dry internal conditions

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.).

(e.g. position of the screw relative to reinforcement or to supports, etc.).

Design of fastenings according to EN 1992-4: 2018 and EOTA Technical Report TR 055.

Installation:

- Hammer drilling or hollow drilling: All sizes and embedment depths.
- Alternative diamond drilling: All sizes and embedment depths from diameter 8.
- 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 B4 for: All sizes and embedment depths.
- · Cleaning of drill hole is not necessary when using a hollow drill with functional suction 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_0 $\,$
- After correct installation further turning of the screw shall 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/mm² (e. g. FIS V, FIS HB, FIS SB or FIS EM Plus).

fischer concrete screw ULTRACUT FBS II

Intended use Specification Annex B 1

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FBS II 6						Id setting to		
Nominal embedment	depth	h _{nom}	1		<u>P</u>	$40 \le h_{nom} \le 5$		
Nominal drill hole diar		do	-			$40 \ge n_{nom} \ge 3$ 6		
			-					
Cutting diameter of dr		d _{cut} ≤	[mm]			6,4 8		
Clearance hole diame	eler	d₁≤	-					
Drill hole depth Drill hole depth		h₁≥				h _{nom} + 10 ¹⁾		
(with adjustable settin	ig)	111 2				h _{nom} + 20		
Torque impact screw	driver	T _{imp,max}	[Nm]			450		
Maximum installation metrical screws or he head shapes M and I	xagon nuts on	T _{max}	[Nm]		uarda	10		
¹⁾ Value can be redu Table B2.2: Instal								
FBS II 6	lation paran		JSTX	SK	P LP	M8	M10	I
Wrench size	SW [mm]	10/1	13		-	10	13	-
TX size	TX [-]	-		30				
Head diameter	dh	17		13,5	14,4 17,	5	-	
Thickness of fixture	t _{fix} ≤		L	- h _{nom}				
	$L_{min} = [mm]$				40			
Length of screw	L _{max} =			325			55	
· · · · ·	hnom	L						
	hnom				тх	dh FBS FBS FBS FBS FBS FBS FBS FBS FBS FBS		
	hnom				TX	SW		210)
fischer concrete s	hnom = L				TX	SW	ig. not to sc	ale)
fischer concrete s	hnom = L				TX	SW		
fischer concrete s	h _{nom} = L				TX	SW	ig. not to sc	

Size			FBS II											
Size		_	1	В		10			12			14		
Nominal embedment depth	h _{nom}		50	65	55	65	85	60	75	100	65	85	115	
Nominal drill hole diameter	do		1	В		10			12		14			
Cutting diameter of drill bits			8,	45		10,45			12,50			14,50		
Cutting diameter of diamond driller	d _{cut} ≤	[mm]	8,	10		10,30			12,30			14,30		
Clearance hole diameter	df]	10,6 -	- 12,0	12	.,8 – 14	1,0	14	,8 – 16	6,0	16	,9 – 18	3,0	
Wrench size (US,S)	SW		1	3		15			17		21			
Tx size	Тx	[-]	4	0		50								
Head diameter	dh		1	8		21				-				
Countersunk diameter in fixture	dc		2	0		23								
Drill hole depth			60	75	65	75	95	70	85	110	80	100	130	
Drill hole depth (with adjustable setting)	h₁≥	[mm]	70	85	75	85	105	80	95	120	90	110	140	
Thickness of fixture	$t_{fix} \leq$		L					L - h _{nom}						
Length of screw	$L_{min} = $		50	65	55	65	85	60	75	100	65	85	115	
Length of screw	L _{max} =		400	415	405	415	435	410	425	450	415	435	465	
Torque impact screw driver	T _{imp,max}	[Nm]	60	00					650					
		h.				X		SW		K		d,		

h_{et}

h,

h

t fux

(Fig. not to scale)

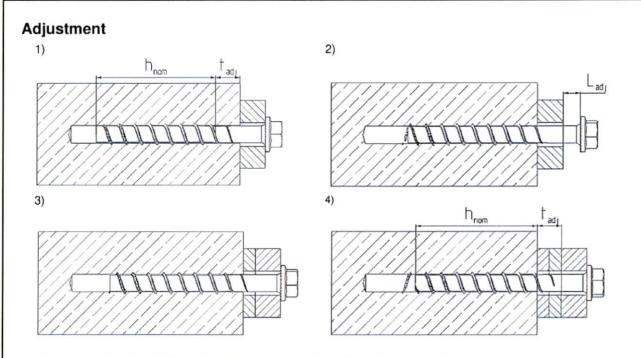
fischer concrete screw ULTRACUT FBS II

Intended use

Installation parameters FBS II 8 - 14

Annex B 3

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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 $t_{adj} = 10 \text{ mm}$

(Fig. not to scale)

Table B4.1: Minimum thickness of concrete members, minimum spacing and edge distance

Size								FBS I	l					
5120			6		8		10			12			14	
Nominal embedment depth	h _{nom}		40 to 55	50	65	55	65	85	60	75	100	65	85	115
Minimum thickness of concrete member	h _{min}	[mm]	max.(80; $h_1^{1)} + 30$)	100	120	100	120	140	110	130	150	120	140	180
Minimum spacing	Smin		35	3	35		40			50			60	
Minimum edge distance	Cmin		35	3	85	_	40			50		_	60	

¹⁾ Drill hole depth according to table B2.1

fischer concrete screw ULTRACUT FBS II

Intended use Adjustment

Minimum thickness of members, minimum spacing and edge distance

Annex B 4

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Step 1: Creation of the drill hole:
Drill the hole using hammer drill, hollow drill or diamond core drill (from diameter 8).
Drill hole diameter d_0 and drill hole depth h_1 according to table B2.1 and B3.1
Step 2: Cleaning of the drill hole - horizontal:
Clean the drill hole. This step can be omitted in the preparation of the hole by using a hollow drill bit or diamond core drill. (recommendation: use the fischer FHD hollow drill bit)
Step 2: Cleaning of the drill hole - vertical:
Cleaning of the drill hole can be omitted, if drilling vertically upwards or if drilling vertically downwards and the hole depth has been increased. It is recommended to increase the drill hole depth by an additional 3 x drilling ø when drilling vertically downwards.
Step 3: Installation:
Installation with any torque impact screw driver up to the maximum mentioned torque moment (T _{imp,max} according to table B2.1 and B3.1). (recommendation: use the fischer FSS 18V 400BL)
Alternatively, all other tools without an indicated torque
moment are allowed (e.g. ratchet spanner). The
indicated torque moments T _{imp,max} for impact screw
driver are not decisive for manual installation. Step 4: Checking of the correct installation:
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

fischer concrete screw ULTRACUT FBS II

Intended use

Installation instruction

Annex B 5

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Optional: It is permissible to adjust the screw twice. Therefore, the screw may be untightened to a maximum of Lag = 20 mm of the surface of the initia fixture. The total permissible thickness of shims added during the adjustment process is tag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 20 mm of the surface of shims added during the adjustment process is tag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 20 mm of the surface of shims added during the adjustment process is tag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 20 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 20 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a maximum of Lag = 10 mm. Image: The screw may be untightened to a ma	It is permissible to adjust the screen Therefore, the screw may be untig maximum of Ladj = 20 mm off the s fixture. The total permissible thick added during the adjustment proc is tadj = 10 mm. Filling of the annular gap For seismic performance category The gap between screw shaft and with mortar; mortar compressive s (e. g. FIS V, FIS HB, FIS SB or FIS aid for filling the gap, the filling dis	ghtened to a surface of the initial ness of shims ess y C2 applications: I fixture must be fille strength ≥ 50 N/mm ² S EM Plus). As an
Filling of the annular gap For seismic performance category C2 applications: The gap between screw shaft and fixture must be fill with mortar; mortar compressive strength ≥ 50 N/mr (e. g. FIS V, FIS HB, FIS SB or FIS EM Plus). As ar aid for filling the gap, the filling disc FFD is	For seismic performance category The gap between screw shaft and with mortar; mortar compressive s (e. g. FIS V, FIS HB, FIS SB or FI aid for filling the gap, the filling dis	I fixture must be fille strength \geq 50 N/mm ² S EM Plus). As an
For seismic performance category C2 applications: The gap between screw shaft and fixture must be fill with mortar; mortar compressive strength ≥ 50 N/mr (e. g. FIS V, FIS HB, FIS SB or FIS EM Plus). As an aid for filling the gap, the filling disc FFD is	For seismic performance category The gap between screw shaft and with mortar; mortar compressive s (e. g. FIS V, FIS HB, FIS SB or FI aid for filling the gap, the filling dis	I fixture must be fille strength \geq 50 N/mm ² S EM Plus). As an

Intended use

Installation instruction

Annex B 6

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Steel failure for to Characteristic resi	ent depth	hnom	[mm]	40	45	50	55		
Characteristic resi	ension load and	I shear I	oad	-					
	stance	N _{Rk,s}	[kN]		2	21			
Partial factor		γMs,N	[-]		1	,4			
Characteristic resi	stance	V ⁰ Rk,s	[kN]		9,0		13,3		
Partial factor		γMs,V	-[-] -		1	,5			
Factor for ductility		k7	[-]		1	,0			
Characteristic ben	ding resistance	M ⁰ Rk,s	[Nm]		17	7,1			
Pullout failure							a contractor		
Characteristic	uncracked	N _{Rk,p}		8,0	10,0	12,0	13,5		
resistance in concrete C20/25	cracked	N _{Rk,p}	[kN] -	2,5	3,5	4,0	5,0		
	C25/30					12			
	C30/37	-				22			
Increasing	C35/45	-				32			
Increasing factors concrete	C40/50	_Ψc	[-]						
	C40/50 C45/55	-		<u> </u>					
	C50/60	-		1,58					
Installation factor	030/00		[-]			,0			
Concrete cone fa	ilure and enlitti	Yinst		te prvout fai		,0			
Effective embedme	and the second	hef	[mm]	32	36	40	44		
Factor for uncrack		Kucr,N	lund	52		40	44		
Factor for cracked		Kucr,N Kcr,N	[·] -			,7			
Characteristic edg		Ccr,N		1,5 her					
Characteristic space		Scr,N	[mm]			h _{ef}			
Charakt. resistance		N ⁰ Rk,sp	[kN]		98.20	k,c ¹⁾ ;NRk,p)			
Charact. edge dist				1,5 het					
splitting	North Contraction	Ccr,sp	[mm]						
Charakt. spacing for	or splitting	Scr,sp			3	hef			
Factor for pryout fa	ailure	k ₈	[-]		2	,0			
Installation C. I		γinst		1,0					
installation factor	ilure		A Sherry						
	concrete	ŀ	[mm]	40	45	50	55		
Concrete edge fa	concrete		-[mm] -			6			
Concrete edge fa Effective length in		dnom							
Concrete edge fa Effective length in Nominal diameter		dnom							
Installation factor Concrete edge fa Effective length in Nominal diameter Adjustment Maximum thickness Max. number of ac	of screw s of shims	d _{nom} t _{adj}	[mm]		1	0			

Table C2.1: C	haracteristic	values	for st	atic a	ind q	uasi-	static		n with FBS II	_	SII8	- 14		
Size				1	В		10		1031	12			14	
Nominal embedm	ent depth	hnom	[mm]	50	65	55	65	85	60	75	100	65	85	115
Steel failure for	tension load a	nd shea	r load											
Characteristic res	sistance	NRk,s	[kN]	3	5		55			76			103	
Partial factor		γMs,N	[-]						1,4					
Characteristic res	sistance	V ⁰ Rk,s	[kN]	13,1	19,0	29	9,4	34,9	31	,9	42,7	46	5,5	61,7
Partial factor		γMs,V							1,5					1
Factor for ductility	/	k7	[-]						1,0					
Characteristic be		M ⁰ Rk,s	[Nm]	5	1		95			165			269	
resistance Pullout failure			-	1 and a state	No. Contraction	CAL-TAN MAR	No.	and the sea	-	1- p= 122		- Martin Market	1	and a second
												a have the second	- Andrew Parks	
Characteristic resistance in	uncracked	N _{Rk,p}	[kN]					2	N ⁰ Rk,c	1)				
concrete C20/25		N _{Rk,p}	[kN]	6	12	9	12			ì	≥ N ⁰ Rk,c	1)		
	C25/30	_							1,12					
	C30/37								1,22					
Increasing	C35/45	_Ψc	n						1,32					
factors concrete	C40/50		[-]						1,41					
	C45/55								1,50					
	C50/60	_			- 12		and the second second		1,58					
Installation factor		γinst	[-]						1,0					
Concrete cone f	ailure and spli	tting fail	ure; co	oncret	e pry	out fa	ilure		are a					
Effective embedn	nent depth	hef	[mm]	40	52	43	51	68	47	60	81	50	67	93
Factor for uncrac	ked concrete	kucr,N	[mm]						11,0					
Factor for cracked	d concrete	k _{cr,N}	[mm]						7,7					
Characteristic edg	ge distance	Ccr,N	[mm]						1,5 h _{ef}					
Characteristic spa	acing	Scr,N	[mm]						3 h _{ef}					
Charakt. resistan	ce for splitting	N ⁰ Rk,sp	[kN]					min (N	⁰ Rk,c ¹⁾ ;	NRk,p)				
Charact. edge dis splitting	stance for	Ccr,sp	[mm]						1,5 h _{ef}					
Charakt. spacing	for splitting	Scr,sp	[mm]						3 hef					
Factor for pryout	failure	k ₈	[-]	1,0	2,0	1,0				2	.,0			
Installation factor		γinst	[-]						1,0					
Concrete edge f	ailure				and the second					A Start				1995
Effective length in	n concrete	lt	[mm]	50	65	55	65	85	60	75	100	65	85	115
Nominal diameter	r of screw	dnom	[mm]	8	3		10			12			14	
Adjustment			and the second				NY RE				122.22	Sec. Sec.		
Maximum thickne	ss of shims	t _{adj}	[mm]						10					
Max. number of a	djustments	Na	[-]						2					
1) N ⁰ Rk,c accor	ding EN 1992-	4:2018												
fischer concre	ete screw UL	TRACL	JT FB	S II							<u> </u>			
Performances Characteristic va	alues for static :	and quas	i-static	actior	n with	FBS II	8 - 14	4				Anne		
											A	ppendi	x 14/ 1	y

Nominal embedment depth Steel failure for tension load an Characteristic resistance Without filling of the annular gap ¹ With filling of the annular gap ¹ Pullout failure	NRk,s,C VRk,s,C	oad	nm]	40	4	-		
Characteristic resistance Without filling of the annular gap ¹ With filling of the annular gap ¹⁾	NRk,s,C VRk,s,C1			10		5	50	55
Without filling of the annular gap ¹ . With filling of the annular gap ¹⁾	VRk,s,C1							
Nith filling of the annular gap ¹⁾)		N]				21	
Nith filling of the annular gap ¹⁾	α _{gap}	1	-			6,3	E	9,3
		[-]					,5 ,0	
rullout failure			1			1	,0	
Characteristic resistance in		-	1			1		1
cracked concrete	NRk,p,C	1 [kl	N]	2,5	3	,5	4,0	5,0
Concrete cone failure								
Effective embedment depth	hef			32	3	6	40	44
Characteristic edge distance	Ccr.N	m]	ım]				i h _{ef}	
Characteristic spacing	Scr,N	-				The local division of the local division of the	het	
nstallation factor	Yinst	[-]					,0	
Concrete pryout failure	Tinot	11.3	1				1-	
Factor for pryout failure	k ₈	[-]	1	and residence of		2	,0	
Concrete edge failure			l				Street on St	
Effective length in concrete	lf	T		40	4	5	50	55
Nominal diameter of screw	dnom	[m	ım] —				6	
Iominal embedment depth	hnom	[mm]		B 55	10 85		12 100	14 115
	the second s		6	5	85		100	
					ALL RACING AND ALL RACE		100	
iteel failure for tension load an		Jau		E	EE			
Characteristic resistance	NRk,s,C1	[kN]		35	55	,	76	103
Characteristic resistance	NRk,s,C1 VRk,s,C1			85 1,4	55		76 26,9	
Characteristic resistance Vithout filling of the annular gap ¹⁾	NRk,s,C1 VRk,s,C1					0,5	76 26,9	103
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾	NRk,s,C1 VRk,s,C1	[kN]					76 26,9	103
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure	NRk,s,C1 VRk,s,C1 - αgap	[kN] [-]	11	1,4		0,5	76 26,9	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾	NRk,s,C1 VRk,s,C1 - α _{gap}	[kN]	11			0,5	76 26,9	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in	NRk,s,C1 VRk,s,C1 - αgap	[kN] [-]	11	1,4		0,5	76 26,9	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete	NRk,s,C1 VRk,s,C1 - αgap	[kN] [-]	11	1,4		0,5	76 26,9	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1	[kN] [-]	11	2	22,3	0,5	76 26,9 5 2 8 1	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1	[kN] [-] [kN]	11	2	22,3	0,5	76 26,9 5 0 ≥ N ⁰ _{Rk,c} ²⁾ 81 Def	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth Characteristic edge distance	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Ccr,N	[kN] [-] [kN]	11	2	22,3	0,5 1,0	76 26,9 5 0 ≥ N ⁰ Rk,c ²⁾ 81 Def	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Concrete cone failure Effective embedment depth Characteristic edge distance Characteristic spacing Installation factor Concrete pryout failure	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Cor,N Scr,N	[kN] [-] [kN] [mm]	11	2	22,3	0,5 1,0 1,5 h 3 h	76 26,9 5 0 ≥ N ⁰ Rk,c ²⁾ 81 Def	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth Characteristic edge distance Characteristic spacing Installation factor	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Cor,N Scr,N	[kN] [-] [kN] [mm]	11	2	22,3	0,5 1,0 1,5 h 3 h	76 26,9 5) ≥ N ⁰ _{Rk,c} ²⁾ 81 Def ef	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth Characteristic edge distance Characteristic spacing Installation factor Concrete pryout failure Factor for pryout failure Concrete edge failure	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Ccr,N Scr,N γinst	[kN] [-] [kN] [mm] [-]		2	68	0,5 1,0 1,5 h 3 h 1,0 2,0	76 26,9 5 0 ≥ N ⁰ _{Rk,c} ²⁾ 81 Def ef	103 38,3 93
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth Characteristic edge distance Characteristic spacing Installation factor Concrete pryout failure Factor for pryout failure	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Ccr,N Scr,N γinst k8	[kN] [-] [kN] [mm] [-]		2	22,3	0,5 1,0 1,5 H 3 h 1,0 2,0	76 26,9 5) ≥ N ⁰ _{Rk,c} ²⁾ 81 Def ef	103 38,3
Characteristic resistance Vithout filling of the annular gap ¹⁾ Vith filling of the annular gap ¹⁾ Pullout failure Characteristic resistance in racked concrete Concrete cone failure Effective embedment depth Characteristic edge distance Characteristic spacing Installation factor	NRk,s,C1 VRk,s,C1 αgap NRk,p,C1 hef Cor,N Scr,N	[kN] [-] [kN] [mm]	11	2	22,3	0,5 1,0 1,5 h 3 h	76 26,9 5 0 ≥ N ⁰ Rk,c ²⁾ 81 Def	103

<u>Cinc</u>				FB	S II	
Size			8	10	12	14
Nominal embedment depth	hnom	[mm]	65	85	100	115
Steel failure for tension load a	ind shear	load				
Oberen de distin en sistemes	NRk,s,C2	0.00	35,0	55	76,0	103
Characteristic resistance	VRk,s,C2	[kN]	13,3	20,4	29,9	35,2
With filling of the annular gap ¹⁾	α _{gap}	[-]		1,	0	
Pullout failure						
Characteristic resistance in cracked concrete	NRk,p,C2	[kN]	2,1	6,0	8,9	17,1
Concrete cone failure						
Effective embedment depth	h _{ef}		52	68	81	93
Characteristic edge distance	Ccr,N	[mm]		1,5	het	
Characteristic spacing	Scr,N			31	lef	
Installation factor	Yinst	[-]		1,	0	
Concrete pryout failure		Sec. 2			Contract Prog	
Factor for pryout failure	k ₈	[-]		2,	0	
Concrete edge failure						
Effective length in concrete	lf	ſmm]	65	85	100	115
Nominal diameter of screw	dnom	[mm]	8	10	12	14

¹⁾ Filling of the annular gap according annex B 5. Application without filling of the annular gap not allowed.

fischer concrete screw ULTRACUT FBS II

Characteristic values for seismic performance category C2 with FBS II 8 - 14

Annex C 4

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FBS II 6											
Nominal embedment depth		hnom	[mm]	40	45	50	55				
Steel failure for tension load a	and shea	r load									
		R30			1,0	00					
		R60	1 1		0,6						
	N _{Rk,s,fi}	R90	1 1	0,50							
Characteristic resistance for all		R120		0,40							
head shapes		R30	[kN]	1,00							
nalizenti-trave kondititizza en en dese		R60	1 1		0,6						
	V _{Rk,s,fi}	R90	1		0,5						
		R120	1		0,4	2205					
		R30			0,8						
		1.									
Characteristic bending resistance for all head shapes	M ⁰ Rk,s,fi	R60	[Nm]		0,5		a				
resistance for all nead shapes		R90			0,4						
Dull out fellow		R120			0,3	SS					
Pullout failure		Dac	T T		1						
		R30	-								
Characteristic resistance	N _{Rk,p,fi}	R60	[kN]	0,6	0,9	1,0	1,2				
		R90									
		R120		0,5	0,7	0,8	1,0				
Edge distance			1 1								
R30 to R120	4h an an a	Ccr,fi	[mm]		21	And and an owner of the second s					
				a adrea diator							
In case of fire attack from more	than one	side, the	e minimur	n edge distar	nce shall be ≥ 3	00 mm					
Spacing R30 to R120 ¹⁾ The embedment depth has		Scr,fi	[mm]		2 c	cr,fi	iven				
Spacing R30 to R120		Scr,fi	[mm]		2 c	cr,fi	iven				

Table C6.1: Char	acterist	ic valu	es for	resist	ance	to fi	ire w	rith F	BS I	8 –	14 ¹)				
Size							1	10		FB			1			
	el e se tele		la .	[3	66	10	05	<u> </u>	12	100	CE	14		15
Nominal embedment			hnom	[mm]	50	65	55	65	85	60	75	100	65	85		115
Steel failure for tens	ion load	and sh		d			1			1			1			
			R30			33		3,45			4,62			6,4		
		N _{Rk,s,fi}	R60	1		82		2,73			3,66			5,1		
		1 106,5,8	R90		1,	30		2,00			2,69			3,7	'5	
	US, S		R120		1,	04		1,64			2,20			3,0		
	00,0		R30			33		3,45			4,62			6,4	20	
		V _{Rk,s,fi}	R60	[kN]		82		2,73			3,66			5,1		
		¥ ⊓K,S,II	R90			30		2,00			2,69			3,7		
			R120		1,	04		1,64			2,20			3,0	8	
01			R30		2,	12		2,96								
Characteristic resistance for the		N _{Rk,s,fi}	R60		1,	67		2,26								
head shapes		INHK,S,TI	R90		1,1	21		1,56								
	SK, US TX,		R120		0,9	99		1,21			No n	orforn		dool	aror	4
	S TX		R30		2,	12		2,96	_		NO P	enom	lance	decla	arec	<u>د</u>
	0 111	V	R60		1,	67		2,26								
		V _{Rk,s,fi}	R90		1,:	21		1,56								
			R120		0,9	99		1,21								
			R30		2,	62		4,92			7,83			12,	89	
	All	M ⁰ Rk,s,f	R60	1	2,	05		3,89			6,20			10,	19	
	head shapes		R90	[Nm]	1,	46		2,85			4,56			7,4	8	
	Shapes		R120	1	1,	17		2,34			3,73			6,1	4	
Pullout failure	an Rosen	6	1000				No.			-	-					
			R30													
Characteristic resista	nce	N _{Rk,p,fi}	R60 R90	[kN]	1,5	3,0	2,3	3,0	5,0	2,9	4,2	6,6	3,2	4,9	1	8,1
			R120		1,2	2,4	1,8	2,4	4,0	2,3	3,3	5,2	2,5	3,9	-	6,5
Edge distance					.,_			, .	.,.				-,-			
R30 to R120			Ccr,fi	[mm]						21	lef					
In case of fire attack f	rom more	e than o	ne side,	the m	inimu	m ed	ge di	stance	e sha	ll be 2	≥ 300	mm				
Spacing							- Hall		121005							
R30 to R120			Scr,fi	[mm]						2 c						
¹⁾ The embedment value.	depth ha	s to be	increase	ed for v	vet co	oncre	te by	at lea	st 30	mm d	comp	ared t	to the	giver	1	
fischer concrete	screw L	JLTRA	CUT F	BS II									An	nex	CF	}
Performances Characteristic values	s for resis	stance t	o fire wi	th FBS	i II 8 -	14								endix 1		

Table C7.1: Displacements due to tension loads (static)

Cizo								1	FBS II						
Size			6	1)		8		10			12			14	
Nominal embedment depth	h _{nom}	[mm]	40	55	50	65	55	65	85	60	75	100	65	85	115
Tension load in cracked concrete	Ν	[kN]	2,0	3,5	2,9	5,7	4,3	5,7	9,6	5,5	8,0	12,5	6,1	9,4	15,3
Displacement	δΝΟ	fmml	1,1	1,4	0,5	0,9	0,7	0,7	0,8	0,7	0,9	0,8	0,8	1,0	0,8
Displacement	δN∞	[mm]	2,5	2,5	1,3	1,0	0,7	0,7	0,8	1,3	0,9	0,8	1,1	1,0	1,1
Tension load in uncracked concrete	Ν	[kN]	4,0	7,0	7,9	12,0	6,8	8,8	13,5	7,7	11,0	17,4	8,5	13,2	21,6
Displacement	δΝΟ	[mm]	1,0	1,8	0,9	1,4	0,9	0,9	1,4	0,9	1,1	1,4	1,0	1,3	1,1
Displacement	δN∞	[mm]	1,7	2,6	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,1	1,3	1,1

1) Intermediate values by linear interpolation

Table C7.2: Displacements due to shear loads (static)

Size									FBS II						
Size			6	1)	8	В		10			12			14	
Nominal embedment depth	h _{nom}	[mm]	40	55	50	65	55	65	85	60	75	100	65	85	115
Shear load in cracked and uncracked concrete	V	[kN]	4,5	6,7	6,2	9,0	14,0	14,0	16,6	15,9	15,9	21,2	23,0	23,0	30,5
Diaplocoment	δνο	[mm]	2,0	2,9	1,4	1,4	3,2	3,2	3,2	2,5	2,5	3,4	2,8	2,8	5,4
Displacement	δv∞	[mm]	2,9	4,4	2,0	2,1	4,9	4,9	4,9	3,8	3,8	5,1	4,2	4,2	8,1

¹⁾ Intermediate values by linear interpolation

Table C7.3: Displacements due to tension loads (seismic performance category C2)

Cine				FB	SII	
Size			8	10	12	14
Nominal embedment depth	h _{nom}		65	85	100	115
Displacement DLS	δN,C2 (DLS)	[mm]	0,5	0,8	0,9	1,3
Displacement ULS	δN,C2 (ULS)		1,7	2,8	2,7	5,0

Table C7.4: Displacements due to shear loads (seismic performance category C2)

Cine				FB	SII	
Size			8	10	12	14
Nominal embedment depth	hnom		65	85	100	115
Displacement DLS	δv,c2 (DLS) [!	mm]	1,6	2,7	3,1	4,1
Displacement ULS	δv,c2 (ULS)		3,9	7,1	5,3	8,7

fischer concrete screw ULTRACUT FBS II

Performances

Displacements due to tension and shear loads

Annex C 7

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