

SUORITUSTASOILMOITUS

DoP 0379

for fischer Kiila-ankkuri FWA Plus (mekaaninen kiinnitin betoniin)

FI

1. Tuotetyypin yksilöllinen tunniste: DoP 0379
2. Aiottu käyttötarkoitus (aiotut käyttötarkoitukset): Jälkikäteen tehtäviin kiinnityksiin halkeilemattomassa betonissa, katso lisäys, erityisesti liitteet B1 - B3.
3. Valmistaja: fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Saksa
4. Valtuutettu edustaja: -
5. Suoritusasteen pysyvyyden arvioinnissa ja varmentamisessa käytetty järjestelmä/käytetyt järjestelmät: 1
6. Eurooppalainen arviointiasiakirja: EAD 330232-01-0601
Eurooppalainen tekninen arviointi: ETA-24/0714; 2025-04-22
Teknisestä arvioinnista vastaava laitos: ETA-Danmark A/S
Ilmoitettu laitos/ilmoitetut laitokset: 2873 TU Darmstadt

7. Ilmoitettu suoritusaste/ilmoitetut suoritusasteet:

Mekaaninen lujuus ja vakaus (BWR 1)

Tyypillinen kestävyys kuormitukselle (staattinen ja lähes staattinen kuormitus) Menetelmä A:

Teräksen murtokuorma: Liite C1

Ulosvetoarvon murtokuorma: Liite C1

Betonimassan murtokuorma: Liite C1

Kestävyys: Liite C1

Pienin reuna- ja keskinäis etäisyys: Liite C2

Reunaetäisyys halkeamien estämiseksi kuormituksessa: Liite C1

Tyypillinen kestävyys leikkauskuormalle (staattinen ja näennäisstaattinen kuormitus):

Teräksen murtokuorma (leikkauskuorma): Liite C2

Taivutusvoiman murtokuorma: Liite C2

Ominaisvastus yksinkertaistetulle suunnittelulle:

Menetelmä B: NPD

Menetelmä C: NPD

Siirtymät:

Siirtymät staattisella ja lähes staattisella kuormituksella: Liite C2

Ominainen kestävyys ja siirtymät seismisille suoritusluokille C1 ja C2:

Kestävyys kuormitukselle, siirtymät, luokka C1: NPD

Kestävyys kuormitukselle, siirtymät, luokka C2: NPD

Leikkauskuorman kestävyys, siirtymät, luokka C1: NPD

Leikkauskuorman kestävyys, siirtymät, luokka C2: NPD

Rengasmaisen aukon kerroin: NPD

Paloturvallisuus (BWR 2)

Reagointi tuleen: Class (A1)

Palonkestävyys:

Palonkestävyys ennen teräksen murtumista (vetokuorma): NPD

Palonkestävyys ennen ulosvedon murtumista (vetokuorma): NPD

Palonkestävyys ennen teräksen murtumista (leikkauskuorma): NPD

Kestävyys:

Kestävyys: Liitteet A3, B1

8. Asianmukainen tekninen asiakirja ja/tai tekninen erityisasiakirja: -

Edellä yksilöidyn tuotteen suoritustaso on ilmoitettujen suoritustasojen joukon mukainen. Tämä suoritustasoilmoitus on asetuksen (EU) N:o 305/2011 mukaisesti annettu edellä ilmoitetun valmistajan yksinomaisella vastuulla.

Valmistajan puolesta allekirjoittanut:



Dr. Ronald Mihala, Kehitys- ja tuotantojohtaja
Tumlingen, 2025-05-02



Dieter Pfaff, Kansainvälisen tuotantoliiton ja laadunhallinnan johtaja

Tämä suoritustasoilmoitus on laadittu useilla kielillä. Jos tulkinnasta syntyy erimielisyyttä, englanninkielinen versio on aina katsottava ensisijaiseksi.

Lisäys sisältää vapaaehtoisesti ilmoitettua ja täydentävää englanninkielistä tietoa, joka ylittää (kielestä riippumatta määritellyt) lakisääteiset vaatimukset.

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Käännösopas oleellisten piirteiden ja suorituskyvyn parametrien liitteille

Mekaaninen lujuus ja vakaus (BWR 1)

Characteristic resistance under static and quasi-static loading, Method A
Tyypillinen kestävyys kuormitukselle (staattinen ja lähes staattinen kuormitus) Menetelmä A:

1	Resistance to steel failure: Teräksen murtokuorma:	$N_{Rk,s}$ [kN], E_s [N/mm ²]
2	Resistance to pull-out failure: Ulosvetoarvon murtokuorma:	$N_{Rk,p}$ [kN], ψ_c
3	Resistance to concrete cone failure: Betonimassan murtokuorma:	$k_{cr,N}$, $k_{ucr,N}$ [-], h_{ef} , $c_{cr,N}$ [mm]
4	Robustness: Kestävyys:	γ_{inst} [-]
5	Minimum edge distance and spacing: Pienin reuna- ja keskinäis etäisyys:	c_{min} , s_{min} , h_{min} [mm]
6	Edge distance to prevent splitting under load: Reunaetäisyys halkeamien estämiseksi kuormituksessa:	$N^0_{Rk,sp}$ [kN], $c_{cr,sp}$ [mm]

Characteristic resistance to shear load (static and quasi-static loading), Method A

Tyypillinen kestävyys leikkauskuormalle (staattinen ja näennäisstaattinen kuormitus):

7	Resistance to steel failure under shear load: Teräksen murtokuorma (leikkauskuorma):	$V^0_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm], k_7 [-]
8	Resistance to pry-out failure: Taivutusvoiman murtokuorma:	k_9 [-]

Characteristic Resistance for simplified design

Ominaisvastus yksinkertaistetulle suunnittelulle:

9	Method B: Menetelmä B:	F^0_{Rk} [kN], c_{cr} , s_{cr} [mm]
10	Method C: Menetelmä C:	F_{Rk} [kN]

Displacements

Siirtymät:

11	Displacements under static and quasi-static loading: Siirtymät staattisella ja lähes staattisella kuormituksella:	δ_{N0} , $\delta_{N\infty}$, δ_{V0} , $\delta_{V\infty}$ [mm]
12	Stiffness characteristics for tension loading for non-linear spring models:	$k_{1,ucr}$, $k_{2,ucr}$, $k_{3,ucr}$, $k_{4,ucr}$, $k_{1,cr}$, $k_{2,cr}$, $k_{3,cr}$, $k_{4,cr}$ [kN/mm]

Characteristic resistance and displacements for seismic performance categories C1 and C2

Ominainen kestävyys ja siirtymät seismisille suoritusluokille C1 ja C2:

13	Resistance to tension load, displacements, category C1: Kestävyys kuormitukselle, siirtymät, luokka C1:	$N_{Rk,s,C1}$ [kN], $N_{Rk,p,C1}$ [kN]
	Resistance to tension load, displacements, category C2: Kestävyys kuormitukselle, siirtymät, luokka C2:	$N_{Rk,s,C2}$ [kN], $N_{Rk,p,C2}$ [kN], $\delta_{N,C2}$ [mm]
14	Resistance to shear load, displacements, category C1: Leikkauskuorman kestävyys, siirtymät, luokka C1:	$V_{Rk,s,C1}$ [kN]
	Resistance to shear load, displacements, category C2: Leikkauskuorman kestävyys, siirtymät, luokka C2:	$V_{Rk,s,C2}$ [kN], $\delta_{V,C2}$ [mm]
15	Factor for annular gap Rengasmaisen aukon kerroin:	α_{gap} [-]

Safety in case of fire (BWR 2)

Paloturvallisuus (BWR 2)

16	Reaction to fire: Reagointi tuleen:	Class
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Resistance to fire:

Palonkestävyys:

17	Fire resistance to steel failure (tension load): Palonkestävyys ennen teräksen murtumista (vetokuorma):	$N_{Rk,s,fi}$ [kN]
18	Fire resistance to pull-out failure (tension load): Palonkestävyys ennen ulosvedon murtumista (vetokuorma):	$N_{Rk,p,fi}$ [kN]
19	Fire resistance to steel failure (shear load): Palonkestävyys ennen teräksen murtumista (leikkauskuorma):	$V_{Rk,s,fi}$ [kN], $M^0_{Rk,s,fi}$ [Nm]

Aspects of durability

Kestävyys:

20	Durability: Kestävyys:	Class
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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The FWA Plus is a torque-controlled expansion anchor made of galvanised steel. It is available in the sizes M8, M10, M12 and M16. The expansion is achieved by torque acting on the bolt. As the anchor is prestressed, the cone is pulled into the expansion sleeve and the load applied to the anchor is transferred to the concrete mainly by friction. The anchor body of sizes M8 to M16 is cold-formed. The FWA Plus is suitable for use in uncracked concrete of strength classes C20/25 to C50/60

The product description is given in Annex A and the intended use specifications of the product are detailed in Annex B.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter 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

Characteristic	Assessment of characteristic
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3.1 Mechanical resistance and stability (BWR1)

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

Resistance to steel failure	Annex C1
Resistance to pull-out failure	Annex C1
Resistance to concrete cone failure	Annex C1
Robustness	Annex B
Minimum edge distance and spacing	Annex C2
Edge distance to prevent splitting under load	Annex C1

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

Resistance to steel failure under shear load	Annex C2
Resistance to pry-out failure	Annex C2

Characteristic resistance for simplified design

Method B	Not relevant
Method C	Not relevant

Displacements

Displacements under static and quasi-static loading	Annex C2
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Characteristic resistance and displacements for seismic performance categories C1 and C2

Resistance to tension load, displacements	No performance assessed
Resistance to shear load, displacements	No performance assessed
Factor for annual gap	No performance assessed

Characteristic

Assessment of characteristic

3.2 Safety in case of fire (BWR2)

Reaction to fire

The anchors are made from steel classified as performance **class A1** of the characteristic reaction to fire, in accordance with the provisions of EC decision 96/603/EC, amended by EC Decision 2000/605/EC.

Resistance to fire

Fire resistance to steel failure (tension load)

No performance assessed

Fire resistance to pull-out failure (tension load)

No performance assessed

Fire resistance to steel failure (shear load)

No performance assessed

3.3 Aspects of durability

Durability

Annex B

See additional information in section 3.9

3.9 General aspects related to the performance of the product

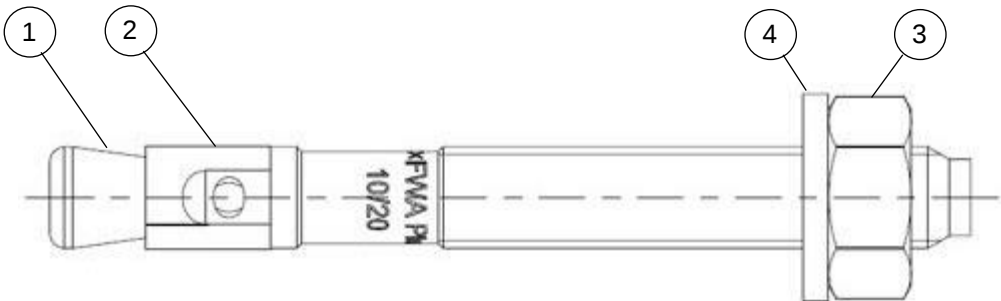
The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

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

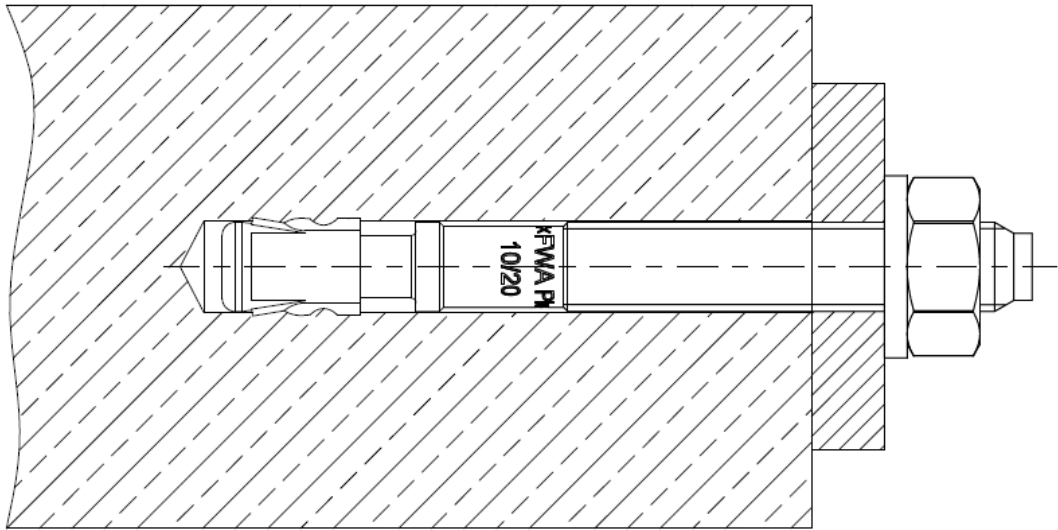
4.1 AVCP system

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.

Cone bolt manufactured by cold - forming:



- ① Cone bolt (cold formed)
- ② Expansion sleeve
- ③ Hexagon nut
- ④ Washer

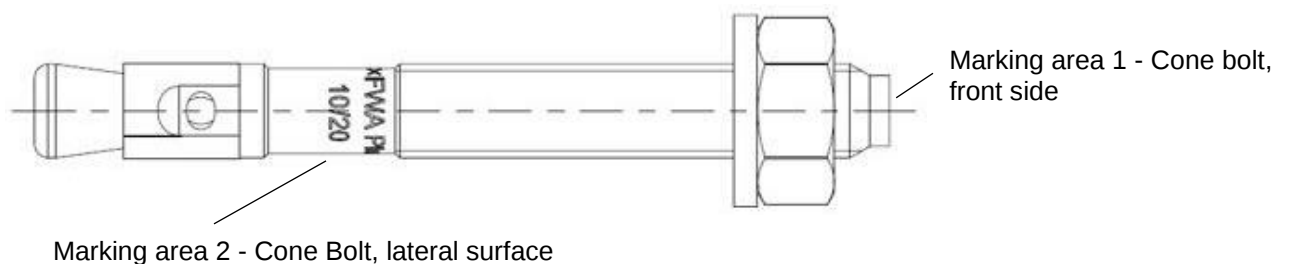


(Fig. not to scale)

fischer Bolt Anchor FWA Plus

Product description
Installed condition

Annex A1



Product marking, example: FWA Plus 10/20x94

Brand | type of fastener placed at marking area 2

Thread size / max. thickness of fixture (t_{fix}) x fastener length (L) placed at marking area 2

Table A2.1: Letter-code on marking area 1 and maximum thickness of fixture t_{fix} :

Marking	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z
Max. t_{fix}	5	10	15	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	250	300	350	400

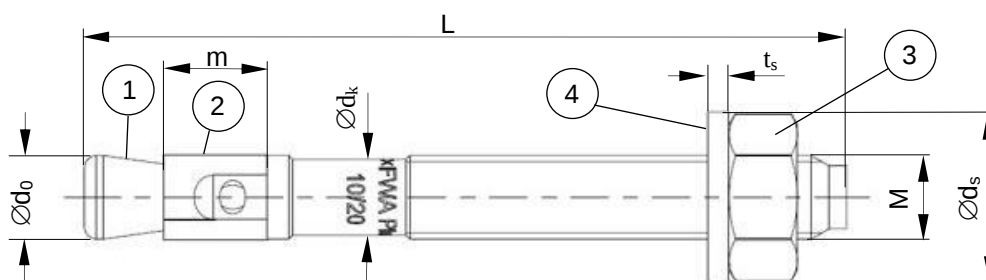


Table A2.2: Fastener dimensions [mm]

Part	Designation		FWA Plus			
			M8	M10	M12	M16
1	Cone bolt	M	8	10	12	16
		Ø d ₀	7,8	9,8	11,8	15
		Ø d _k	7,1	8,9	10,7	14,6
2	Expansion sleeve	m	10,0	12,0	14,0	20,0
3	Hexagon nut	SW	13	17	19	24
4	Washer	t _s	1,6	2,0	2,5	3,0
		Ø d _s	16	20	24	30
Thickness of fixture		t _{fix}	0			
			100	200	200	300
Length of fastener		L _{min}	71	84	108	144
		L _{max}	166	274	202	421

(Fig. not to scale)

fischer Bolt Anchor FWA Plus

Product description
Product marking, letter code and fastener dimensions

Annex A2

Appendix 6 / 12

Table A3.1: Materials FWA Plus (zinc plated $\geq 5\mu\text{m}$, ISO 4042:2022)

Part	Designation	Material
1	Cone bolt	Cold form steel
2	Expansion sleeve	Cold strip
3	Hexagon nut	Steel, property class min. 8
4	Washer	Cold strip

fischer Bolt Anchor FWA Plus

Product description
Materials

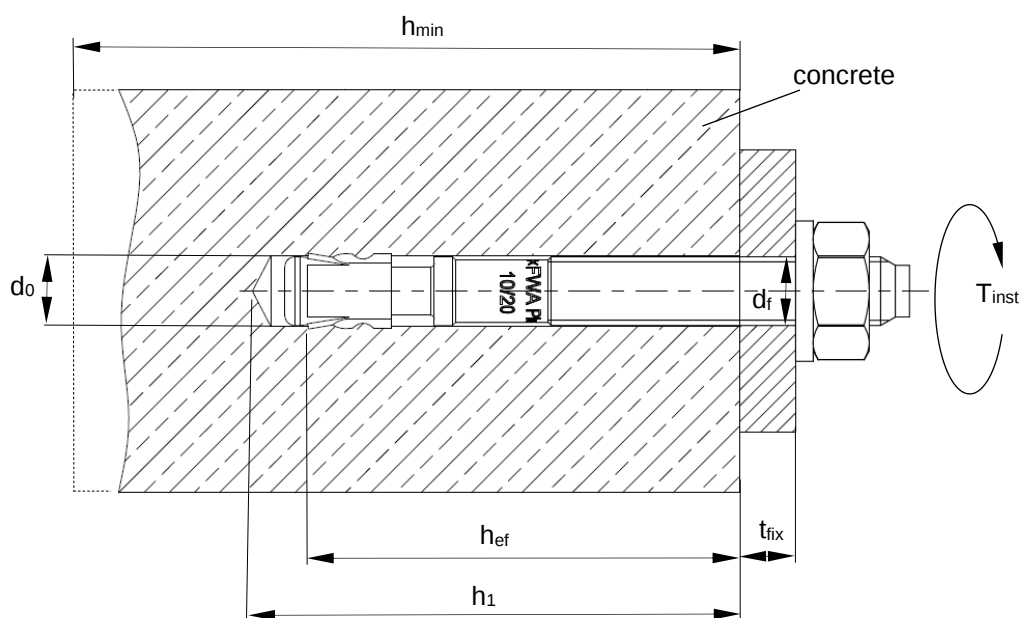
Annex A3

Appendix 7 / 12

Specifications of intended use				
fischer Bolt Anchor FWA Plus	M8	M10	M12	M16
Material: steel, zinc plated	✓			
Static and quasi-static loads				
Uncracked concrete				
Base materials: - Reinforced or unreinforced normal concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021 Use conditions (Environmental conditions): - Structures subject to dry internal conditions. Design: - The structural design is conducted under responsibility of a designer experienced in the field of fastenings and concrete works. - 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.) - Design of fastenings according to EN 1992-4:2018 and TR 055:2018.				
fischer Bolt Anchor FWA Plus				Annex B1 Appendix 8 / 12
Intended Use Specifications				

Table B2.1: Installation parameters

Type of fastener / size		FWA Plus			
		M8	M10	M12	M16
Nominal drill hole diameter	$d_o =$	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	8,45	10,45	12,5	16,5
Effective embedment depth	$h_{ef} \geq$ [mm]	48	50	70	84
Depth of drill hole in concrete	$h_1 \geq$	65	75	100	120
Diameter of clearance hole in the fixture	$d_f \leq$	9	12	14	18
Required setting torque	$T_{inst} =$ [Nm]	10	15	35	110



h_{ef} = Effective embedment depth
 t_{fix} = Thickness of the fixture
 h_1 = Depth of drill hole to deepest point
 h_{min} = Minimum thickness of concrete member
 T_{inst} = Required setting torque

(Fig. not to scale)

fischer Bolt Anchor FWA Plus

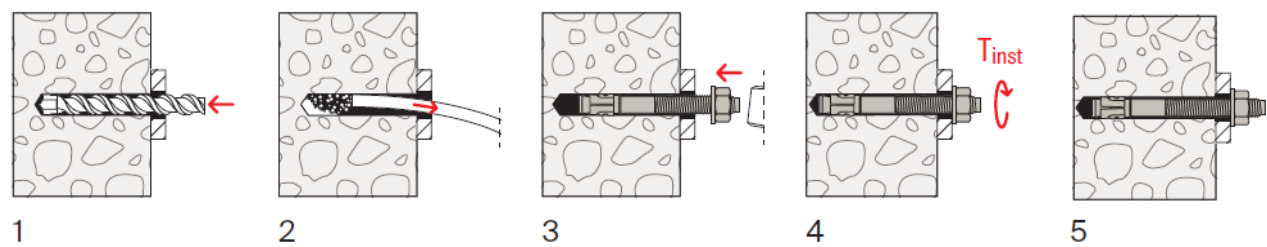
Intended Use
Installation parameters

Annex B2

Appendix 9 / 12

Installation instructions

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener
- Hammer drilling
- Drill hole created perpendicular +/- 5° to concrete surface, positioning without damaging the reinforcement
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or combined shear/tension load it is not in the direction of load application



No.	Description
1	Drill the hole by hammer drilling.
2	Clean the hole.
3	Set the fastener.
4	Apply required setting torque T_{inst}
5	Installed fastener

(Fig. not to scale)

fischer Bolt Anchor FWA Plus	Annex B3 Appendix 10 / 12
Intended Use Installation instructions	

Table C1.1: Characteristic values of **tension** resistance under static and quasi-static action

Type of fastener / size			FWA Plus			
			M8	M10	M12	M16
Steel failure						
Characteristic resistance	N _{Rk,s}	[kN]	15,5	22,0	35,0	46,0
Partial factor	γ _{Ms} ¹⁾	[-]	1,50			
Pullout failure						
Characteristic resistance in uncracked concrete C20/25	N _{Rk,p}	[kN]	10,4	13,8	22,8	29,0
Increasing factors ψ _c for N _{Rk,p} N _{Rk,p} = ψ _c · N _{Rk,p} (C20/25)	ψ _c	C25/30	1,12			
		C30/37	1,22			
		C35/45	1,32			
		C40/50	1,41			
		C45/55	1,50			
		C50/60	1,58			
Partial installation factor	γ _{inst}	[-]	1,0			
Concrete cone and splitting failure						
Effective embedment depth	h _{ef}	[mm]	48	50	70	84
Factor for uncracked concrete	k _{ucr,N}	[-]	11,0 ²⁾			
Characteristic spacing	s _{cr,N}	[mm]	3 h _{ef}			
Characteristic edge distance	c _{cr,N}		1,5 h _{ef}			
Characteristic spacing for splitting failure	s _{cr,sp}		192	250	350	504
Characteristic distance for splitting failure	c _{cr,sp}		96	125	175	252
Characteristic resistance to splitting	N ⁰ _{Rk,sp}		[kN]	min {N ⁰ _{Rk,c} , N _{Rk,p} } ³⁾		
¹⁾ In absence of other national regulations ²⁾ Based on concrete strength as cylinder strength ³⁾ N⁰_{Rk,c} according to EN 1992-4:2018						
fischer Bolt Anchor FWA Plus					Annex C1	
Performance Characteristic values of tension resistance under static and quasi-static action						
					Appendix 11 / 12	

Table C2.1: Characteristic values of **shear** resistance under static and quasi-static action

Type of fastener / size			FWA Plus			
			M8	M10	M12	M16
Installation factor γ_{inst} [-]			1,0			
Steel failure without lever arm						
Characteristic resistance $V^0_{Rk,s}$ [kN]			11,0	17,0	25,3	30,0
Partial factor for steel failure $\gamma_{Ms}^{1)}$ [-]			1,25			
Steel failure with lever arm and concrete pryout failure						
Characteristic bending moment $M^0_{Rk,s}$ [Nm]			22,5	44,8	78,6	199,0
Partial factor for steel failure $\gamma_{Ms}^{1)}$			1,25			
Factor for ductility k_7 [-]			0,8			
Factor for pryout k_8			1		2	
Concrete edge failure						
Effective length of fastener l_f [mm]			48	50	70	84
Effective diameter of fastener d_{nom}			8	10	12	16

¹⁾ In absence of other national regulations

Table C2.2: Minimum thickness of concrete members, minimum spacing and minimum edge distances

Type of fastener / size		FWA Plus			
		M8	M10	M12	M16
Minimum thickness of member	h_{min}	100	120	140	170
Minimum spacing	s_{min} [mm]	65	95	100	115
Minimum edge distance	c_{min}	65	95	100	115

Table C2.3: Displacements under static and quasi static **tension** action

Type of fastener / size		FWA Plus			
		M8	M10	M12	M16
Tension load	N [kN]	4,9	6,5	10,8	13,8
Displacements	δ_{N0}	0,8	1,0	1,2	1,3
	$\delta_{N\infty}$ [mm]	1,2	1,5	1,8	2,0

Table C2.4: Displacements under static and quasi static **shear** action

Type of fastener / size		FWA Plus			
		M8	M10	M12	M16
Shear load	V [kN]	6,3	9,7	14,5	17,1
Displacements	δ_{V0}	1,9	2,7	3,5	3,5
	$\delta_{V\infty}$ [mm]	2,9	4,1	5,3	3,5

fischer Bolt Anchor FWA Plus

Performance

Characteristic values of shear resistance, minimum thickness of concrete members, minimum spacing and edge distances, displacements due to tension and shear action

Annex C2

Appendix 12 / 12