

DECLARAÇÃO DE DESEMPENHO



DoP: 00121

para Âncora de parafuso Fischer FAZ II (Âncora de expansão controlada por binário) - PT

- 1. Código de identificação único do produto-tipo: DoP: 00121
- 2. Utilização (ões) prevista(s): Fixação pós-instalada em betão fissurado ou não fissurado, Ver anexo, especialmente anexos B 1 B 6
- 3. Fabricante: fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Alemanha
- 4. Mandatário: --
- 5. Sistema(s) de avaliação e verificação da regularidade do desempenho (AVCP): 1
- 6. Documento de Avaliação Europeu EAD 330232-00-0601

Avaliação Técnica Europeia ETA-05/0069; 2017-07-03

Organismo de Avaliação Técnica: DIBt

Organismo(s) notificado(s): 1343 - MPA Darmstadt

7. Desempenho(s) declarado(s):

Resistência mecânica e estabilidade (BWR 1),

- Resistência característica para ação estática e quase estática: Ver anexo, especialmente anexos C 1 C 2
- Resistência característica para as categorias de performance sísmica C1 e C2: Ver anexo, especialmente anexo C 4
- Deslocamentos: Ver anexo, especialmente anexo C 5

Segurança em caso de incêndio (BWR 2)

- Reacção ao fogo: As fixações satisfazem os requisitos da Classe A 1
- Resistência característica sob exposição ao fogo: Ver anexo, especialmente Anexo C 3
- 8. Documentação Técnica Adequada e/ou Documentação Técnica Específica: ---

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

Assinado por e em nome do fabricante por:

1.V. A. Dun

Andreas Bucher, Dipl.-Ing.

Wolfgang Hengesbach, Dipl.-Ing., Dipl.-Wirtsch.-Ing.

i.V. W. Mylal

Tumlingen, 2017-07-10

- Este DoP foi preparado em diferentes línguas. Em caso de litígio sobre a interpretação, a versão em inglês prevalecerá sempre.
- O Anexo inclui informações voluntárias e complementares em inglês que excedem os requisitos legais (linguisticamente especificados).

Specific Part

1 Technical description of the product

The fischer Bolt Anchor FAZ II is an anchor made of galvanised steel (FAZ II) or made of stainless steel (FAZ II A4) or high corrosion resistant steel (FAZ II C) which is placed into a drilled hole and anchored by torque-controlled expansion.

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 for static and quasi static action	See Annex C 1 and C 2
Characteristic resistance for seismic performance categories C1 and C2	See Annex C 4
Displacements	See Annex C 5

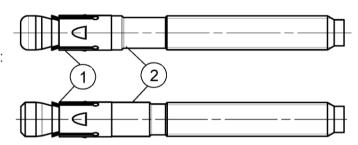
3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Characteristic resistance under fire exposure	See Annex C 3

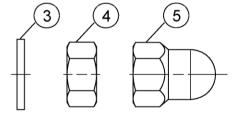
4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD 330232-00-0601, the applicable European legal act is: [96/582/EC]. The system to be applied is: 1

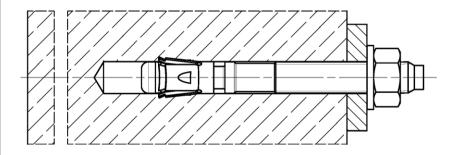
Cone bolt manufactured by cold - forming:

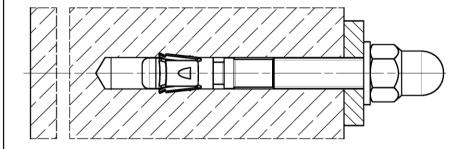


Cone bolt manufactured by turning:



- ① Expansion sleeve
- ② Cone bolt (cold formed or turned)
- ③ Washer
- 4 Hexagon nut
- (5) fischer FAZ II dome nut





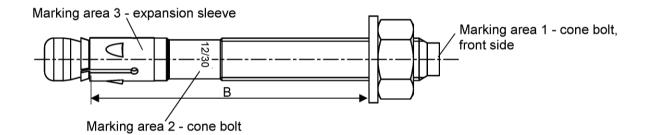
(Fig. not to scaled)

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C

Product description
Installed condition

Annex A 1

Product label and letter-code:



Product label, example:

Brand | type of fastener

FAZ II 12/30 A4

Thread s

FAZ II: carbon steel, galvanized

FAZ II A4: stainless steel

FAZ II C: high corrosion resistant steel

Table A2.1: Letter - code at marking area 1:

Marking		(a)	(b)	(c)	(d)	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(l)	(K)
Max. t _{fix}		5	10	15	20	5	10	15	20	25	30	35	40	45	50
	M6			-		45	50	55	60	65	70	75	80	85	90
	M8	40	45		-	50	55	60	65	70	75	80	85	90	95
	M10	45	50	55	60	65	70	75	80	85	90	95	100	105	110
B ≥ [mm]	M12	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	M16	70	75	80	85	90	95	100	105	110	115	120	125	130	135
	M20					105	110	115	120	125	130	135	140	145	150
	M24		-			130	135	140	145	150	155	160	165	170	175

Marking		(L)	(M)	(N)	(O)	(P)	(R)	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)
Max. t _{fix}		60	70	80	90	100	120	140	160	180	200	250	300	350	400
	M6	100	110	120	130	140	160	180	200	220	240	290	340	390	440
	M8	105	115	125	135	145	165	185	205	225	245	295	345	395	445
	M10	120	130	140	150	160	180	200	220	240	260	310	360	410	460
B ≥ [mm]	M12	130	140	150	160	170	190	210	230	250	270	320	370	420	470
	M16	145	155	165	175	185	205	225	245	265	285	335	385	435	485
	M20	160	170	180	190	200	220	240	260	280	300	350	400	450	500
	M24	185	195	205	215	225	245	265	285	305	325	375	425	475	525

Calculation existing her for installed fasteners:

existing $h_{ef} = B_{(according to table A2.1)} - existing t_{fix}$

Thickness of the fixture t_{fix} including thickness of fastener plate t and e.g. thickness of grout layer t_{grout} or other non-structural layers

(Fig. not to scaled)

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C

Product description

Product label and letter code

Annex A 2

Product dimensions

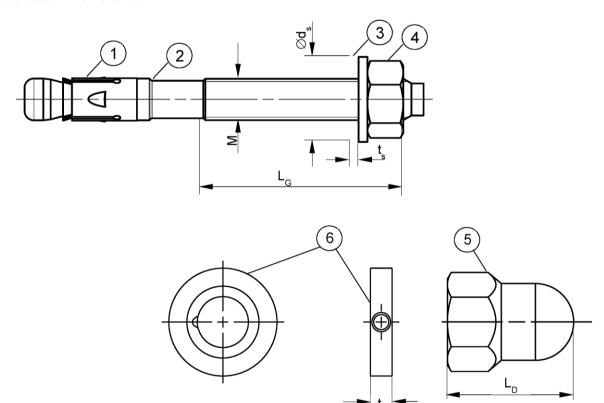


Table A3.1: Dimensions [mm]

Part	Designation		FAZ II, FAZ II A4, FAZ II C								
Fait	Part Designation				M8	M10	M12	M16	M20	M24	
1	Expansion sleeve	Sheet thickne	Sheet thickness		1,3	1,4	1,6	2,	4	3,0	
2	Cone bolt	Thread	size M	6	8	10	12	16	20	24	
2 Cone poit	L _G		10	19	26	31	40	50	57		
3	Washer	ts	≥	1	,4	1,8	2,3	2,7		3,7	
3	vvasilei	$\emptyset d_s$		11	15	19	23	29	36	43	
4 & 5	Hexagon nut / fischer FAZ II	Wrench	n size	10	13	17	19	24	30	36	
5	dome nut	L _D	≥		-	22	27	33		-	
6	fischer filling disc FFD	t	=		6	3		7	8	10	

(Fig. not to scaled)

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Product description Dimensions	Annex A 3

Specifications of intended use Anchorages subject to: FAZ II, FAZ II A4, FAZ II C Size **M6 M8** M12 M20 **M24** M10 M16 Static and quasi-static loads Cracked and uncracked concrete Fire exposure C1 Seismic performance / C2¹⁾ category /

Base materials:

- · Reinforced and unreinforced normal weight concrete (cracked and uncracked) according to EN 206-1: 2000
- Strength classes C20/25 to C50/60 according to EN 206-1: 2000

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (FAZ II, FAZ II A4, FAZ II C)
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (FAZ II A4, FAZ II C)
- Structures subject to external atmospheric exposure and permanently damp internal condition, if other particular aggressive conditions exist (FAZ II C)

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 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 anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or
 to supports, etc.)
- Design of fastenings according to FprEN 1992-4: 2016 and EOTA Technical Report TR 055
- For effective embedment depth h_{ef} < 40 mm and h_{min} ≥ 80 mm and < 100 mm only statically indeterminate fixings (e.g. light-weight suspended ceilings with internal exposure) are covered by the ETA

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Intended Use Specifications	Annex B 1

¹⁾ FAZ II C: Only valid for cold-formed version (according to Annex A1)

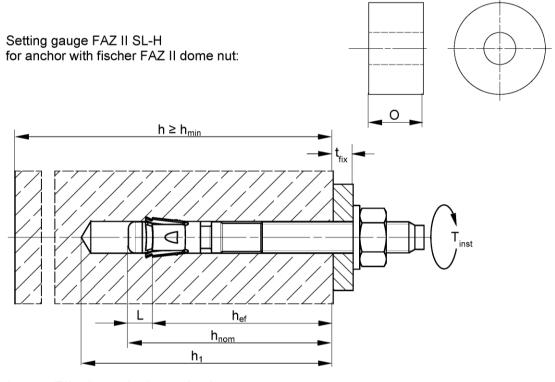
Table B2.1: Installation parameters											
Size			FAZ II, FAZ II A4, FAZ II C								
			M6	M8	M10	M12	M16	M20	M24		
Nominal drill hole diameter	d ₀ =	_	6	8	10	12	16	20	24		
Maximum bit diameter with hammer or hollow drilling	۵	[mm]	6,40	8,45	10.45	12,5	16,5	20,55	24,55		
Maximum bit diameter with diamond drilling	d _{cut,max}		-	8,15	10,45	12,25	16,45	20,50	24,40		
Overall fastener embedment depth in the concrete	$h_{nom} \ge (L)$	[mm]	46,5 (6,5)	44,5 (9,5)	52,0 (12)	63,5 (13,5)	82,5 (17,5)	120 (20)	148,5 (23,5)		
				Existing $h_{ef} + L = h_{nom}$							
Depth of drill hole to deepest point	$h_1 \geq$				h _{nom} + 5			h _{nom}	+ 10		
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	14	18	22	26		
Required setting torque	T _{inst} =	[Nm]	8	20	45	60	110	200	270		

O = [mm]

12

16

20



 h_{ef} = Effective embedment depth

Excess length after hammering-in the cone bolt (for fischer dome nut

applications according to Annex B6)

 t_{fix} = Thickness of the fixture

h₁ = Depth of drill hole to deepest point h = Thickness of the concrete member h_{min} = Minimum thickness of concrete member

h_{nom} = Overall fastener embedment depth in the concrete

T_{inst} = Required setting torque

(Fig. not to scaled)

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Intended Use Installation parameters	Annex B 2

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

Sizo	Size				FAZ II,	FAZ II A4	I, FAZ II (;		
Size			M6	M8	M10	M12	M16	M20	M24	
Minimum edge distance										
Uncracked concrete	— C _{min}		45	40	45	55	65	95	135	
Cracked concrete	— Cmin	'	40	40	7		00	85	100	
Minimum spacing	S _{min}	[mm]			acco	rding to A	nnex B4			
Minimum thickness of concrete member	h _{min}			80		100	140	160	200	
Thickness of concrete member	h≥			max. {h _{mi}	_n ; h ₁ ¹⁾ + 3	0}	max. $\{h_{min}; h_1^{(1)} + 2 \cdot d_o\}$			
Minimum spacing										
Uncracked concrete	6		35	40	40	50	65	95	100	
Cracked concrete	— S _{min}		33	35	40	30	03	95	100	
Minimum edge distance	C _{min}	[mm]			acco	ording to Annex B4				
Minimum thickness of concrete member	h _{min}			80		100	140	160	200	
Thickness of concrete member	h≥			max. {h _{mi}	_n ; h ₁ ¹⁾ + 3	0}	max. {	h _{min} ; h ₁ 1) ተ	- 2 · d _o }	
Minimal splitting area										
Uncracked concrete	_ ^	[·1000	5,1	18	37	54	67	100	117,5	
Cracked concrete	— A _{sp,req}	mm²]	1,5	12	27	40	50	77	87,5	

¹⁾ h₁ according to Annex B2

Splitting failure applied for minimum edge distance and spacing in dependence of the hef

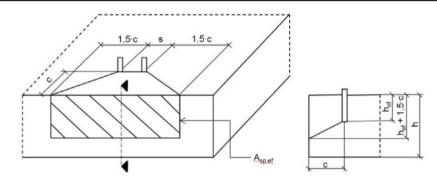
For the calculation of minimum spacing and minimum edge distance of anchors in combination with different embedment depths and thicknesses of concrete members the following equation shall be fulfilled:

$$A_{sp,req} < A_{sp,ef}$$

 $A_{sp,req}$ = required splitting area $A_{sp,ef}$ = effective splitting area (according to Annex B4)

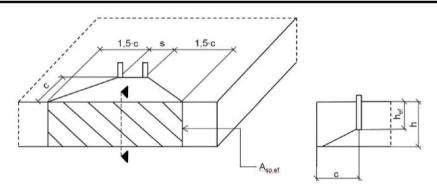
fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Intended Use Minimum thickness of member, minimum spacing and edge distance	Annex B 3

Table B4.1: Effective splitting area $A_{sp,ef}$ with member thickness $h > h_{ef} + 1.5 \cdot c$ and $h \ge h_{min}$



Single anchor and group of anchors with s > 3 · c	$A_{\rm sp,ef} = (6 \cdot c) \cdot (h_{\rm ef} + 1, 5 \cdot c)$	[mm²]	with c ≥ c _{min}
Group of anchors with s ≤ 3 · c	$A_{sp,ef} = (3 \cdot c + s) \cdot (h_{ef} + 1,5 \cdot c)$	[mm²]	with $c \ge c_{min}$ and $s \ge s_{min}$

Table B4.2: Effective splitting area $A_{sp,ef}$ with member thickness $h \le h_{ef} + 1,5 \cdot c$ and $h \ge h_{min}$



Single anchor and group of anchors with s > 3 · c	A _{sp,ef} = 6 · c · existing h	[mm²]	with c ≥ c _{min}
Group of anchors with s ≤ 3 · c	$A_{sp,ef} = (3 \cdot c + s) \cdot existing h$	[mm²]	with $c \ge c_{min}$ and $s \ge s_{min}$

Edge distance and axial spacing shall be rounded to at least 5 mm

(Fig. not to scaled)

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Intended Use Minimum thickness of member, minimum spacings and edge distances	Annex B 4

Installation instructions:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Use of the anchor only as supplied by the manufacturer without exchanging the components of the anchor Exception: fischer FAZ II dome nut.
- Checking before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply
- · Check of concrete being well compacted, e.g. without significant voids
- Hammer, hollow or diamond drilling according to Annex B5
- 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 oblique tension load it is not in the direction of load application
- · It must be ensured that in case of fire local spalling of the concrete cover does not occur
- Fastenings in stand-off installation or with a grout layer under seismic action are not covered
- In case of seismic applications the fastener shall be positioned outside of critical regions (e.g. plastic hinges) of the concrete structure

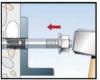
Installation instructions: Drilling and cleaning the hole

Types of drills and cleaning

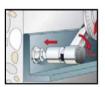
		Types of drills and cleaning	·	
Hammer drill	B4444000000000000000000000000000000000	1: Drill the hole	2: Clean the hole	
Hollow drill		1: Drill the hole with automatic cleaning		-
Diamond drill, for non seismic applications only and ≥ drill Ø 8		1: Drill the hole	2: Clean the hole	
		•	,	
fischer Bolt Anch Intended Use Installation instru	Annex B 5			

Installation instructions: Installation of the anchor

HEXAGON NUT:



3: Set the fastener



4: Apply Tinst



5: Installed fastener

fischer FAZ II DOME NUT:

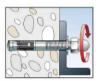
Option 1: Push through installation with setting gauge SL-H:



3: Set the fastener using setting gauge



4: Check offset



5: Turn on the washer and fischer FAZ II dome nut

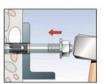


6: Apply T_{inst}

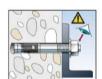


7: Installed fastener

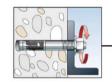
Option 2: Push through installation with hexagon nut:



3: Set the fastener



4: check setting position: Visible one turn of a thread



4.1: Remove nut

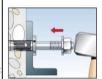
fischer FILLING DISC FFD optional for seismic C2 application or minimizing the annular gap:

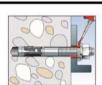
Optional

The gap between bolt and fixture may be filled with mortar (compressive strength ≥ 50 N/mm² e.g. FIS SB) after step 7 (for eliminating the annular gap).

The filling disc is additional to the standard washer.

The thickness of the filling disc must be considered for definition of t_{fix} Countersunk of the filling disc in direction to the anchor plate.





fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C

Intended Use Installation instructions Annex B 6

Size			FAZ II, FAZ II A4, FAZ II C											
Size			М6	M6 M8		M10	M12	M16	M20	M24				
Steel failure														
Characteristic resistance FAZ II	- N _{Rk,s}	[kN]	7,6	16	,6	28,3	43,2	67,0	123,3	176,7				
FAZ II A4/C		[[(, 1)]	11,4	17	,0	29,0	44,3	70,6	124,9	183,6				
Partial factor for steel failure	γ _{Ms}	[-]					1,5							
Pullout failure														
Effective embedment depth for	h_{ef}	[mm]	40	35 -	45	40 -	50 -	65 -	100	125				
calculation				< 45		60	70	85						
Characteristic resistance in cracked concrete C20/25	N	[LNI]	1,5	5,5	8	13	20		_ 2)					
Characteristic resistance in uncracked concrete C20/25	$ N_{Rk,p}$, [kN]	10,5	14		20	22	,						
		C25/30	<u> </u>				1,12							
	- Ψc - -	C30/37	1,22											
Increasing factors for N _{Rk,p} for		C35/45					1,32							
cracked and uncracked concrete		C40/50					1,41							
		C45/55					1,50							
	-	C50/60					1,58							
Installation sensitivity factor	γinst	[-]					1,0							
Concrete cone and splitting failure														
Factor for uncracked concrete	$k_1 = k_{ucr,N}$	r 1					11,0 ³⁾							
Factor for cracked concrete	$k_1 = k_{cr,N}$	[-]					7,7 ³⁾							
Characteristic spacing	S _{cr,N}	[mm]					$3 \cdot h_{\text{ef}}$							
Characteristic edge distance	$c_{cr,N}$	[111111]		1,5 · h										
Spacing	S _{cr,sp}						2 · c _{cr,sp}							
Edge distance for h = 80				2,4	h _{ef}	2·h _{ef}	-							
Edge distance for h = 100						2,4·h _{ef}	2·h _{ef}		-					
Edge distance for h = 120	_	[mm]	,				2,1·h _{ef}							
Edge distance for h = 140	$C_{cr,sp}$		40	2·h	ef	405				-				
Edge distance for h = 160						1,9·h _{ef}	1,5⋅h _{ef}	2·h _{ef}	0.4.5	-				
Edge distance for h = 200									2,4·h _{ef}	2,2·h _e				

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Performances Characteristic values of resistance under tension loads	Annex C 1

¹⁾ In absence of other national regulations 2) Pullout failure not relevant 3) Based on concrete strength as cylinder strength

Cina				FAZ II, FAZ II A4, FAZ II C							
Size			М6	M8	M10	M12	M16	M20	M24		
Steel failure without lever arm											
Characteristic resistance —	AZ II AZ II A4/C	$V_{Rk,s}$	[kN]	5,9	13,6 16,8	21,4 26,5	30,6	55,0	81,4	110,1	
Partial factor for steel failure	AZ II A4/C	γ _{Ms} 1)		8,8	10,0	26,5	38,3 1,25	69,8	106,3	148,5	
Factor for ductility		k ₇	[-]				1,0				
Steel failure with lever arm and	Concrete pryout	t failur	е								
Effective embedment depth for cal	culation	h_{ef}	[mm]	40	45	60	70	85	100	125	
	FAZ II	M ⁰ _{Rk,s}	0 FN17	11,4	26	52	92	233	513	865	
Characteristic bending resistance	FAZ II A4/C		[INM]	10,7	29	59	100	256	519	898	
Factor for pryout failure		k_8	[-]	2,6	2,8	3,2		3,0	2,6	2,4	
Effective embedment depth for cal	culation	$h_{ ext{ef}}$	[mm]		35 - < 45	40 - < 60	50 - < 70	65 - < 85			
Characteristic bending resistance	FAZ II	N4 ⁰	[Nm]	-	20	44	92	184		-	
Characteristic bending resistance	FAZ II A4/C	IVI Rk,s	נואוון		21	45	100	193			
Factor for pryout failure		k_8	[-]		2,5	2,6	3,1	3,2			
Partial factor for steel failure		$\gamma_{Ms}^{-1)}$	[-]	1,25							
Factor for ductility			[-]				1,0				
Concrete edge failure											
Effective embedment depth for cal	culation	$I_f =$	[mm]				h_{ef}				
Outside diameter of a fastener		d_{nom}	_	6	8	10	12	16	20	24	

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Performances Characteristic values of resistance under shear loads	Annex C 2

0:							F	AZ II. FA	Z II A4, F <i>A</i>	ZIIC			
Size						М6	M8	M10	M12	M1		M20	M24
				h _{ef} ≥	[mm]	40	35 / 45	40 / 60	50 / 70	65 /	85	100	125
Charact	toristic		_	R30		$0.6^{1)} / 0.9^{2)}$		2,8	5,0	9,		14,7	21,
resista		N_{Rk}	–	R60		$0,4^{1)} / 0,9^{2)}$		2,3	4,1	7,		12,0	17,
steel fa		·•RK,	s,ti —	R90		$0.3^{1)} / 0.9^{2)}$		1,9	3,2	6,		9,4	13,
				R120		$0,2^{1)} / 0,7^{2)}$	0,8	1,6	2,8	5,	2	8,1	11,
Charact resista		N_{Rk}	c.fi	R30 - R90	[kN])) ^{0,5} · h _{ef} / 2				
Concrete co	one failu	ıre		R120			7,7 · h _e	_f 1,5 · (20) ^{0,}	⁵ · h _{ef} / 20	0 / 100	00 · 0,	8	
Ob a read	4			R30			0,9 / 2,0						
Charact resista		N ₋ .		R60		0,4	0,8 / 2,0	2,2 / 3,3	3,0 / 5,0	4,5 /	6,8	8,6	12,
pullout		N_{Rk}	p,fi —	R90			0,5 / 2,0						
panoat	- Ianaro			R120		0,3	0,3 / 1,6	1,7 / 2,6	2,4 / 4,0	3,6 /	5,4	6,9	9,
	ize								R60				
FAZ II, FAZ	II A4, FA			V _{Rk,s,fi,3}		M ⁰ _{Rk,s,fi,30} [Nm]			$V_{Rk,s,fi,60}[kN]$		M ⁰ _{Rk,s,fi,60} [Nm]		<u>√m]</u>
M6		40		0,6 ¹⁾ /		0,5 ¹⁾ /0,2 ²⁾		0,	$0,4^{1)}/0,9^{2)}$		0,3 ¹⁾ /0,1 ²⁾		
M8		35		1,8	8	1,4			1,6		1,2		
M10		40				3,6		2,9			3,0		
M12	h _{ef} ≥	50		6,3		7,8		4,9			6,4		
M16		65		11,		19,9		9,1				16,3	
M20		100					39,0	_	14,2		31,8 55,0		
M24 125			25 26,3				67,3		20,5			55,0	
	Size					R90				R12			
FAZ II, FAZ	II A4, FA			V _{Rk,s,fi,9}		M ^o _{Rk,s}	s,fi,90 [Nm]		(,s,fi,120 [kN]		M [∨] _F	Rk,s,fi,120	<u>Nm]</u>
M6		40		0,3 ¹⁾ /			¹⁾ /0,1 ²⁾	0,	$2^{1)}/0,7^{2)}$		0),2 ¹⁾ /0,1	⁽²⁾
M8		35		1,3			1,0		1,2			0,8	
M10		40		2,2			2,4		1,9			2,1	
M12	h _{ef} ≥ ઼	50		3,			5,0		2,8			4,3	
M16		65		6,6			12,6		5,3			11,0	
M20		100		10,			24,6		8,3			21,4	
M24		125		14,			12,6		11,9			37,0	
Concrete pry	out failu		ding				,-	<u>'</u>	, -				
				nas ar	nd min	imum eda	e distand	es of ar	nchors u	nder 1	fire e	zposi	ure
Table C3.3		num sp e <mark>nsion</mark>										•	
Table C3.3								FAZ II A4	I, FAZ II C	 ;			

Edge distance	istance c_{min} [mm] $c_{min} = 2 \cdot h_{ef}$, for fire exposure from more than one side							
¹⁾ FAZ II gvz ²⁾ FAZ II A4 / C								
fischer Bolt Anchor								
Performances Characteristic value	Annex C 3							

Table C4.1: Characteristic values of tension	and shear	resistance	under	seismic act	ion
category C1					

Cina				FAZ II, FAZ II A4, FAZ II C							
Size			M6	M8	M10	M12	M16	M20	M24		
Length of anchor	L_{max}			167	186	221	285	394	477		
Effective embedment depth	h _{ef}	[mm]	-	45	40 - 60	50 - 70	65 - 85	100	125		
Steel failure											
Characteristic resistance tension load C1	$N_{Rk,s,C1}$	[kN]		16,0	27,0	41,0	66,0	111,0	150,0		
Partial factor for steel failure	γ _{Ms,C1}	[-]	_			1	,5				
Pullout failure											
Characteristic resistance tension load in cracked concrete C1	$N_{Rk,p,C1}$	[kN]	_	4,6	8,0	16,0	28,2	36,0	50,3		
Installation sensitivity factor	γinst	[-]		1,0							
Steel failure without lever arm											
Characteristic resistance shear load C1	$V_{Rk,s,C1}$	[kN]		11	17	27	47	56	69		
Partial factor for steel failure	,										

¹⁾ In absence of other national regulations

 $N_{Rks,eq} = N_{Rk,C1}$ for all failures

Table C4.2: Characteristic values of tension and shear resistance under seismic action category C2

category C2											
Sino			FAZ II, FAZ II A4, FAZ II C ¹⁾								
Size			М6	M8	M10	M12	M16	M20	M24		
Length of anchor	L _{max} [mi	m] [-	186	221	285	394	-		
Steel failure											
Characteristic resistance tension load C2	N _{Rk,s,C2} [kl	N]			27	41	66	111			
Partial factor for steel failure	γ _{Ms,C2} ²⁾ [-]		_		1		_			
Pullout failure											
Characteristic resistance tension load in	h _{ef} [m	m]			60	70	85	100			
	$N_{Rk,p,C2}$ [kl	N]			5,1	7,4	21,5	30,7	_		
cracked concrete C2	h _{ef} [m	m]	-		40-59	50-69	65-84				
	N _{Rk,p,C2} [kl	N]			2,7	4,4	16,4				
Installation sensitivity factor	γ _{inst} [-	.]				1,0					
Steel failure without lever arm											
	h _{ef} [m	m]			60	70	85	100			
Characteristic resistance shear load C2	$V_{Rk,s,C2}$ [kl	N]			10,0	17,4	27,5	39,9	-		
	h _{ef} [m	m]		-	40-59	50-69	65-84				
	V _{Rk,s,C2} [kl	N]			7,0	12,7	22,0				
Partial factor for steel failure	γ _{Ms,C2} ²⁾ [-	.]				1,25					

¹⁾ FAZ II C: Only valid for cold-formed version (according to Annex A1) ²⁾ In absence of other national regulations

 $N_{Rks,eq} = N_{Rk,C1}$ for all failures

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C	
Performances Characteristic values of resistance under tension and shear loads under seismic action	Annex C 4

Table CF 1. Diaplesomen	to under etetie en	d aveci etetie	tanaian laada
Table C5.1: Displacemen	its under Static and	a duasi static	tension loads

Sino		FAZ II, FAZ II A4, FAZ II C								
Size	Me	;	M8	M10	M12	M16	M20	M24		
Displacement – factor for tensile load ¹⁾										
S factor	0,1	3	0,22	0,12	0,09	0,08	0,07	0,05		
δ_{N0} - factor	m/kN] 1,0	0	0,78	0,40	0,19	0,	09	0,07		
	0,1	6	0,07	0,05	0,	06	0,05	0,04		
δ _{N∞} - factor	0,2	4	0,29	0,21	0,14	0,10	0,06	0,05		

Table C5.2: Displacements under static and quasi static shear loads

Size		FAZ II								
Size	М6	M8	M10	M12	M16	M20	M24			
Displacement – factor for shear load ²⁾										
S footor	[mm/kN]	0,6	0,35	0,37	0,27	0,10	0,09	0,07		
δ_{V0} - factor	[mm/kN]	0,9	0,52	0,55	0,40	0,14	0,15	0,11		
		FAZ II A4, FAZ II C								
S factor	[mama/lcN]	0,6	0,23	0,19	0,18	0,10	0,11	0,07		
$\delta_{V\infty}$ - factor [mm/kN]	[mm/kN]	0,9	0,27	0,22	0,16	0,11	0,05	0,09		

¹⁾ Calculation of effective displacement:

 $\delta_{N0} = \delta_{N0} - factor \cdot N_{ED}$

 $\delta_{N\infty} = \delta_{N\infty} - factor \cdot N_{ED}$

(N_{ED}: Design value of the applied tension force)

²⁾ Calculation of effective displacement:

 $\delta_{V0} = \delta_{V0} - factor \cdot V_{ED}$

 $\delta_{V\infty} = \delta_{V\infty} - factor \cdot V_{ED}$

(V_{ED}: Design value of the applied shear force)

Table C5.3: Displacements under tension loads for category C2 for all embedment depths

Size		FAZ II, FAZ II A4, FAZ II C							
		M6	M8	M10	M12	M16	M20	M24	
Displacement DLS	$\delta_{\text{N,C2(DLS)}}$	[mm]			2,7	4	,4	5,6	
Displacement ULS	$\delta_{\text{N,C2 (ULS)}}$	[mm]		•	11,5	13,0	12,3	14,4	-

Table C5.4: Displacements under shear loads for category C2 for all embedment depths

Size		FAZ II, FAZ II A4, FAZ II C							
		М6	M8	M10	M12	M16	M20	M24	
Displacement DLS	$\delta_{\text{V,C2 (DLS)}}$	[mm]			4,1	4,7	5,5	4,8	
Displacement ULS	$\delta_{V,C2(ULS)}$	[mm]			6,2	7,8	10,1	11,2	-

fischer Bolt Anchor FAZ II, FAZ II A4, FAZ II C

Performances

Displacements under tension and shear loads

Annex C 5