

DECLARAÇÃO DE DESEMPENHO

DoP 0166

para fischer Zykon- Anchor FZA-Q (Ancoragem metálica para utilização em betão)

PT

1. <u>Código de identificação único do produto-tipo:</u>	DoP 0166		
2. <u>Utilização(ões) prevista(s):</u>	Fixação pós-instalada em betão fissurado ou não fissurado. Ver anexos, especialmente anexos B1- B4		
3. <u>Fabricante:</u>	fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Alemanha		
4. <u>Representante autorizado:</u>	—		
5. <u>Sistema(s) de avaliação e verificação da regularidade do desempenho (AVCP):</u>	1		
6. <u>Documento de Avaliação Europeu:</u>	EAD 330232-01-0601, (Edition 12/ 2019)		
Avaliação Técnica Europeia:	ETA-16/0338; 2020-03-30		
Organismo de Avaliação Técnica:	DIBt- Deutsches Institut für Bautechnik		
Organismo(s) notificado(s):	1343 MPA Darmstadt / 2873 TU Darmstadt		
7. <u>Desempenho(s) declarado(s):</u>			
Resistência mecânica e estabilidade (BWR 1)			
Características de resistência à tração (para ação estática e quase-estática):	Resistência à rotura do aço:	Anexo C1	E _s = 210 000 MPa
	Resistência à rotura por arranque:	Anexo C1	
	Resistência à rotura por cone de betão:	Anexo C1	
	Robustez:	Anexo C1	
	Distância mínima ao bordo e espaçamento:	Anexo C2	
	Distância ao bordo para prevenir rotura por fendilhação:	Anexo C1	
Características de resistência ao corte (para ação estática e quase-estática), Método A:	Resistência à rotura do aço (corte):	Anexo C1	
	Resistência do betão ao destacamento:	Anexo C1	
Resistência característica e Deslocamentos para as categorias de performance sísmica C1 e C2:	Resistência à tração, deslocamentos, categoria C1:	Anexo C4	
	Resistência à tração, deslocamentos, categoria C2:	Anexos C4, C5	
	Resistência ao corte, deslocamentos, categoria C1:	Anexo C4	
	Resistência ao corte, deslocamentos, categoria C2:	Anexos C3, C5	
	Factor espaço anular:	Anexo C4	
Resistência característica para design simplificado:	Método B:	NPD	
	Método C:	NPD	
Deslocamentos e durabilidade:	Deslocamentos sobre ações estáticas ou quase-estáticas:	Anexo C5	
	Durabilidade:	Anexos A2, B1	
Segurança em caso de incêndio (BWR 2)			
Reação ao fogo:	Classe (A1)		
Resistência ao fogo:	Resistência em caso de incêndio, rotura do aço	Anexo C3	
	Resistência em caso de incêndio, rotura por	Anexo C3	
	Resistência em caso de incêndio, rotura do aço	Anexo C3	



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:

Thilo Pregartner, Dr.-Ing.
Tumlingen, 2020-04-20

Peter Schillinger, Dipl.-Ing.

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 Zykon Anchor FZA-Q is an anchor made of hot-dipped galvanized steel which is placed into a drilled hole and anchored by torque controlled expansion and mechanical interlock.

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 C 1 and C 2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1
Displacements (static and quasi-static loading)	See Annex C 5
Durability	See Annex B 1
Characteristic resistance and displacements for seismic performance category C1 and C2	See Annex C 4 and C 5

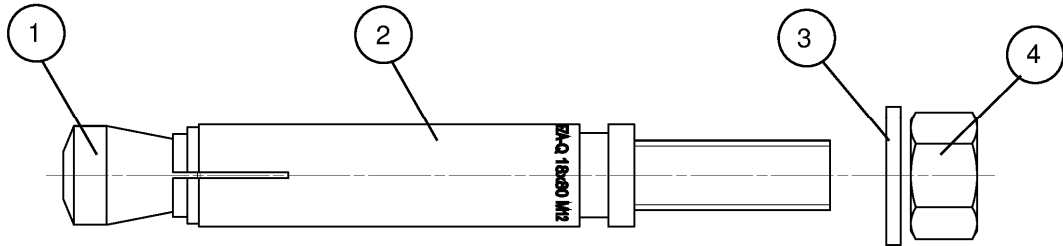
3.2 **Safety in case of fire (BWR 2)**

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 3

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

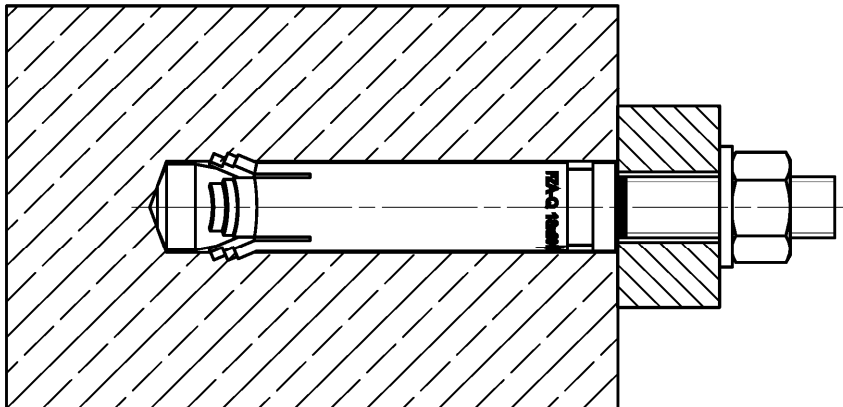
In accordance with the European Assessment Document EAD 330232-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1



- ① Cone bolt
- ② Expansion sleeve
- ③ Washer
- ④ Hexagon nut

Installed condition



(Fig. not to scale)

fischer Zykon Anchor FZA-Q

Product description
Installed condition

Annex A 1

Appendix 2/ 13

Product marking and dimensions

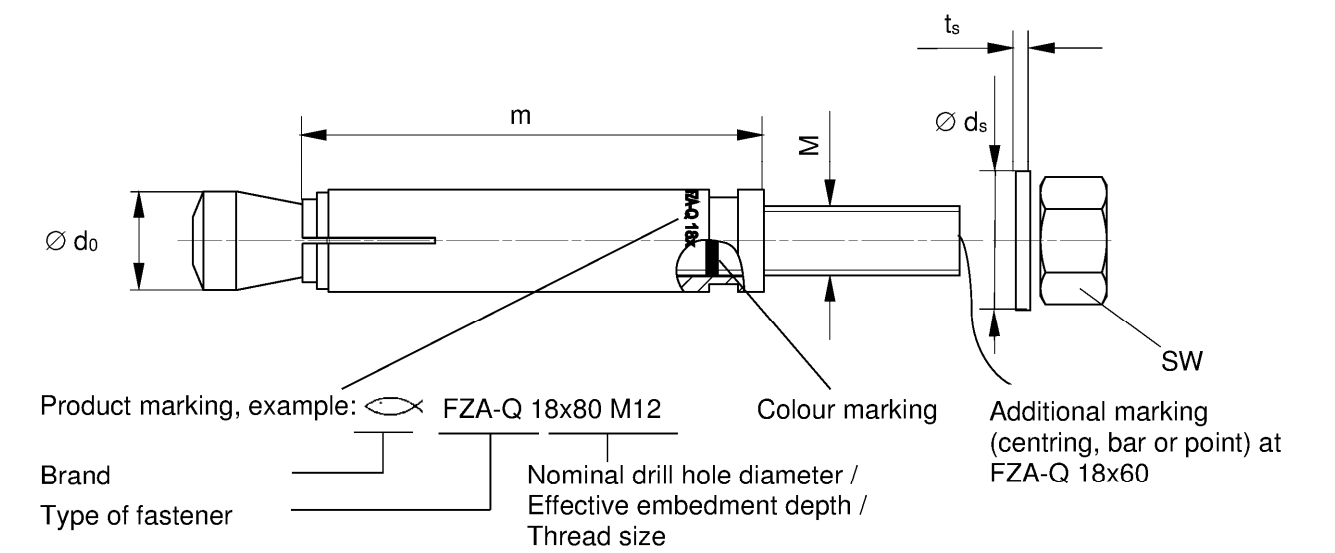


Table A2.1: Dimensions [mm]

Size	FZA-Q		
	14 x 50 M10	18 x 60 M12	18 x 80 M12
$M = d$	10	12	
$\varnothing d_0$	13,5	17	
m	50	60	80
SW	17	19	
t_s	1,8	2,3	
$\varnothing d_s$	19	23	

Table A2.2: Materials (hot-dip galvanised $\geq 50\mu\text{m}$, EN ISO 10684:2011¹⁾)

Part	Designation	Material
1	Cone bolt ²⁾	Cold form steel or free cutting steel class 8.8 acc. to EN ISO 898-1:2013 Nominal steel tensile strength $f_{uk} \leq 1000 \text{ N/mm}^2$
2	Expansion sleeve ²⁾	Steel
3	Washer	Cold strip, EN 10139:2016
4	Hexagon nut	Steel, property class min. 8, EN ISO 898-2:2012

¹⁾ Alternative method: sherardised $\geq 50 \mu\text{m}$, EN 13811:2003

²⁾ Optional: clear paint

(Fig. not to scale)

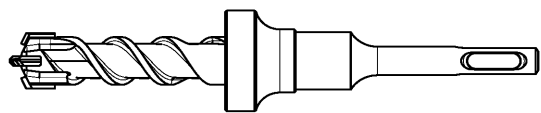
fischer Zykon Anchor FZA-Q

Product description
Product marking, dimensions and materials

Annex A 2

Tools

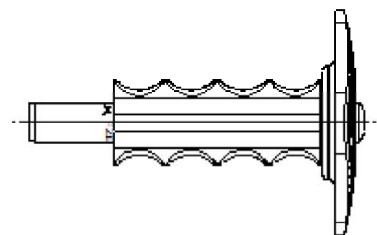
Drill bit FZBB



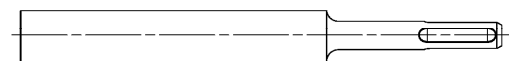
Standard drill bit



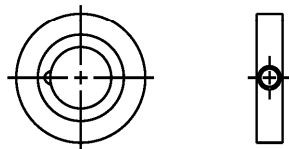
Setting tool FZE



Machine setting tool FZA-Q



Optional fischer filling disc FFD for e.g. seismic applications



fischer Zykon Anchor FZA-Q

Intended Use
Tools

Specifications of intended use

Size	FZA-Q			
	14 x 50 M10	18 x 60 M12	18 x 80 M12	
Hot-dip galvanised				
Static and quasi-static loads				
Cracked and uncracked concrete				
Seismic action for performance category				C1
				C2
Fire exposure				

Base materials:

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

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions

Design:

- Fastenings are designed under the responsibility of an engineer experienced in fastenings and concrete work
- 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

fischer Zykon Anchor FZA-Q

Intended Use
Specifications

Annex B 1

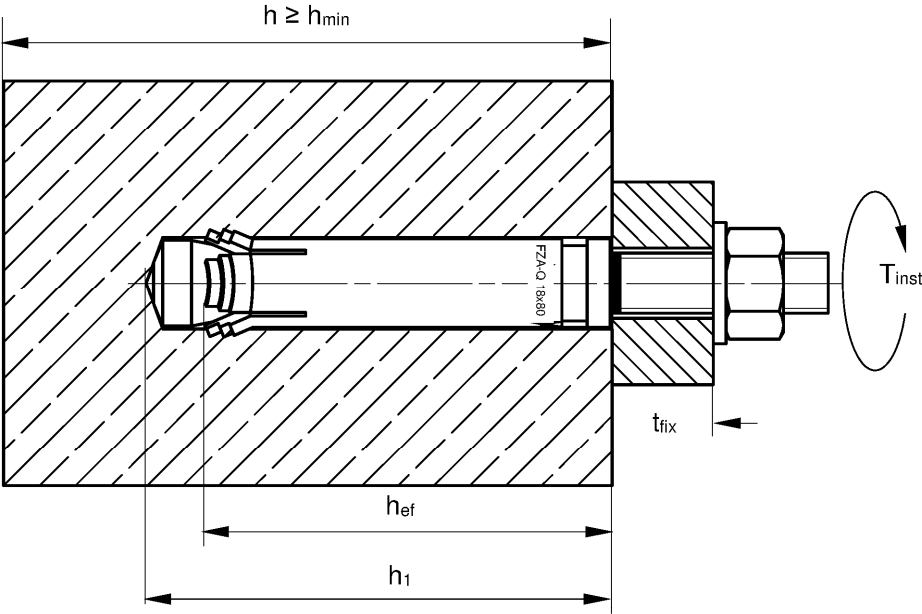
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Installation parameters

Table B2.1: Installation parameters

Size		FZA-Q		
		14 x 50 M10	18 x 60 M12	18 x 80 M12
Nominal drill hole diameter	d_0	14	18	
Depth of drill hole in concrete	h_1	58	74	94
Cutting diameter of drill bit	d_{cut}	14,50	18,50	
Diameter of clearance hole in the fixture	d_f	12	14	
Maximum installation torque ¹⁾	T_{inst}	20	45	

¹⁾ Minimum installation torque = hand - tightening



- h_{ef} = Effective embedment depth
- t_{fix} = Thickness of the fixture
- h_1 = Depth of drill hole to deepest point
- h = Thickness of the concrete member
- h_{min} = Minimum thickness of concrete member
- $T_{inst} \leq$ Maximum installation torque

fischer Zykon Anchor FZA-Q

Intended Use
Installation parameters

Annex B 2

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
- Checking before placing the fastener to ensure that the strength class of the concrete in which the fastener 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
- 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 is not in the direction of load application

fischer Zykon Anchor FZA-Q	Annex B 3 Appendix 7/ 13
Intended Use Installation instructions	

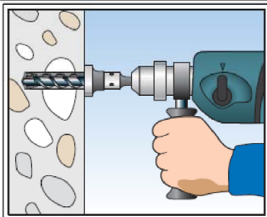
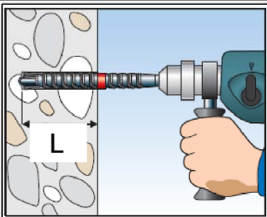
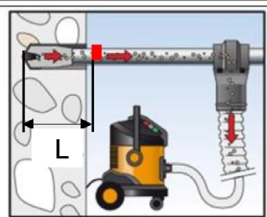
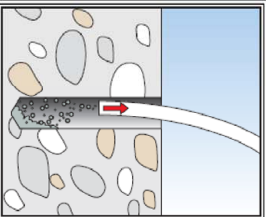
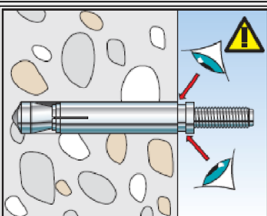
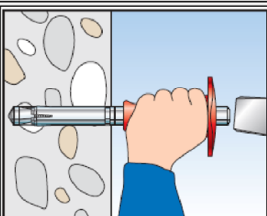
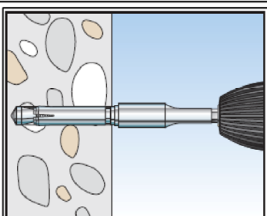
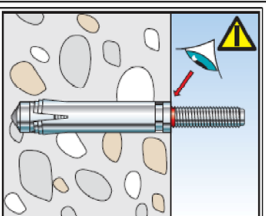
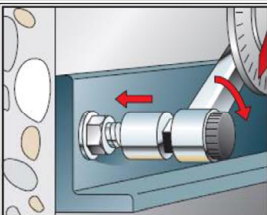
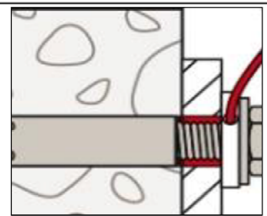
Drill and clean	 1a Stop drill FZBB	 1b Hammer drill	 1c (next step: 3) Drill the hole with hollow drill	 2 Clean drill hole								
Set fastener	 3 Check drill depth	 4a Hand-setting	 4b Machine-setting	 5 Check control colour								
Installation torque / marking length	 6 Apply T_{inst}	1b / 1c – marking length / stop length: <table><tr><td>Size</td><td>L</td></tr><tr><td>FZA-Q 14x50 M10</td><td>58</td></tr><tr><td>FZA-Q 18x60 M12</td><td>74</td></tr><tr><td>FZA-Q 18x80 M12</td><td>94</td></tr></table>			Size	L	FZA-Q 14x50 M10	58	FZA-Q 18x60 M12	74	FZA-Q 18x80 M12	94
Size	L											
FZA-Q 14x50 M10	58											
FZA-Q 18x60 M12	74											
FZA-Q 18x80 M12	94											
Optional	 7 Filling of the annular gap	The gap between bolt and fixture may be filled with mortar (compressive strength $\geq 50 \text{ N/mm}^2$ e.g. FIS SB) after step 6 (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.										
(Fig. not to scale)												
fischer Zykon Anchor FZA-Q				Annex B 4								
Intended Use Installation instructions												
				Appendix 8/ 13								

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

Size			FZA-Q			
			14 x 50 M10	18 x 60 M12	18 x 80 M12	
Steel failure						
Characteristic resistance	N _{Rk,s}	[kN]	40,7	60,1		
Partial factor for steel failure	γ _{Ms}	[-]	1,5			
Modulus of elasticity	E _s	[N/mm ²]	210.000			
Pullout failure						
Characteristic resistance in C20/25	cracked concrete	N _{Rk,p}	[kN]	10,0	16,0	22,2
	uncracked concrete			17,4	22,9	35,2
Increasing factor for N _{Rk,p}	ψ/c	[-]	(f _{ck} / 20) ^{0,5}			
Installation safety factor	γ _{inst}	[-]	1,0			
Concrete cone and splitting failure						
Effective embedment depth	h _{ef}	[mm]	50	60	80	
Factor for cracked concrete	k _{cr,N}	[-]	7,7			
Factor for uncracked concrete	k _{ucr,N}		11,0			
Characteristic spacing	s _{cr,N}	[mm]	3 h _{ef}			
Characteristic edge distance	c _{cr,N}		1,5 h _{ef}			
Characteristic spacing	s _{cr,sp}		3,5 h _{ef}			
Characteristic edge distance	c _{cr,sp}		1,75 h _{ef}			
Characteristic resistance to splitting	N ⁰ _{Rk,sp}	[kN]	min {N ⁰ _{Rk,c} ; N _{Rk,p} } ¹⁾			

¹⁾ $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C1.2: Characteristic **shear resistance** under static and quasi-static action

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Steel failure without lever arm					
Characteristic resistance	$V^0_{Rk,s}$	[kN]	20,4	33,7	
Partial factor for steel failure	γ_{Ms}	[-]	1,25		
Factor for ductility	k_7		1,0		
Steel failure with lever arm and concrete pryout failure					
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	60,0	105,0	
Partial factor for steel failure	γ_{Ms}	[-]	1,25		
Factor for ductility	k_7		1,0		
Factor for pryout failure	k_8		1,0	2,0	
Concrete edge failure					
Effective length in concrete	l_f	[mm]	50	60	80
Effective diameter of fastener	d_{nom}		14	18	

fischer Zykon Anchor FZA-Q

Performances

Characteristic tension resistance under static and quasi-static action
Characteristic shear resistance under static and quasi-static action

Annex C 1

Appendix 9/ 13

Table C2.1: Minimum thickness of concrete members, minimum spacings and edge distances

Size		FZA-Q		
		14 x 50 M10	14 x 50 M10 18 x 60 M12	14 x 50 M10 18 x 60 M12 18 x 80 M12
Minimum thickness of concrete member h_{min} [mm]		100	120	160
Cracked concrete				
Minimum	spacing s_{min} [mm]	120	120	75
	edge distance c_{min} [mm]	100	100	75
Uncracked concrete				
Minimum spacing	s_{min} [mm]	120	100	75
	for $c \geq$	120	120	90
Minimum edge distance	c_{min} [mm]	100	100	90
	for $s \geq$	180	160	75
Intermediate values for s_{min} and c_{min} by linear interpolation				

Table C3.1: Characteristic tension resistance under fire exposure

FZA-Q	R30			R60		
	$N_{Rk,s,fi}$	$N_{Rk,p,fi}$	$N_{Rk,c,fi}$	$N_{Rk,s,fi}$	$N_{Rk,p,fi}$	$N_{Rk,c,fi}$
14 x 50 M10	2,6	2,7	3,0	1,4	2,7	3,0
18 x 60 M12	8,4	4,0	4,8	4,2	4,0	4,8
18 x 80 M12		5,5	9,9		5,5	9,9

FZA-Q	R90			R120		
	$N_{Rk,s,fi}$	$N_{Rk,p,fi}$	$N_{Rk,c,fi}$	$N_{Rk,s,fi}$	$N_{Rk,p,fi}$	$N_{Rk,c,fi}$
14 x 50 M10	1,0	2,7	3,0	0,8	2,1	2,4
18 x 60 M12	2,5	4,0	4,8	1,7	3,2	3,8
18 x 80 M12		5,5	9,9		4,4	7,9

Table C3.2: Characteristic shear resistance under fire exposure

FZA-Q	R30		R60	
	$V_{Rk,s,fi}$ [kN]	$M^0_{Rk,s,fi}$ [Nm]	$V_{Rk,s,fi}$ [kN]	$M^0_{Rk,s,fi}$ [Nm]
14 x 50 M10	2,6	3,4	1,4	1,8
18 x 60 M12	8,4	13,1	4,2	6,5
18 x 80 M12				

FZA-Q	R90		R120	
	$V_{Rk,s,fi}$ [kN]	$M^0_{Rk,s,fi}$ [Nm]	$V_{Rk,s,fi}$ [kN]	$M^0_{Rk,s,fi}$ [Nm]
14 x 50 M10	1,0	1,3	0,8	1,0
18 x 60 M12	2,5	3,9	1,7	2,6
18 x 80 M12				

Table C3.3: Minimum spacings and minimum edge distances under fire exposure for tension and shear load

Size	FZA-Q		
	14 x 50 M10	18 x 60 M12	18 x 80 M12
Spacing $S_{min,fi}$	$4 \cdot h_{ef}$		
Edge distance $C_{min,fi}$	$C_{min,fi} = 2 \cdot h_{ef}$, for fire exposure from more than one side $C_{min,fi} \geq 300$ mm		

fischer Zykon Anchor FZA-Q

Performances

Characteristic resistance under fire exposure

Annex C 3

Appendix 11/ 13

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

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Steel failure					
Characteristic resistance tension load C1	$N_{Rk,s,C1}$	[kN]	40,7	60,1	
Partial factor for steel failure	$\gamma_{Ms,C1}$	[-]	1,5		
Pullout failure					
Characteristic resistance tension load in cracked concrete C1	$N_{Rk,p,C1}$	[kN]	10,0	16,0	22,0
Installation sensitivity factor	$\gamma_{2,C1}$	[-]	1,0		
Steel failure without lever arm					
Characteristic resistance shear load C1	$V_{Rk,s,C1}$	[kN]	15,9	30,3	
Partial factor for steel failure	$\gamma_{Ms,C1}$	[-]	1,25		

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

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Steel failure					
Characteristic resistance tension load C2	$N_{Rk,s,C2}$	[kN]	40,7	60,1	
Partial factor for steel failure	$\gamma_{Ms,C2}$	[-]	1,5		
Pullout failure					
Characteristic resistance tension load in cracked concrete C2	$N_{Rk,p,C2}$	[kN]	4,0	4,7	6,5
Installation safety factor	$\gamma_{2,C2}$	[-]	1,0		
Steel failure without lever arm					
Characteristic resistance shear load C2	$V_{Rk,s,C2}$	[kN]	11,8	23,3	
Partial factor for steel failure	$\gamma_{Ms,C2}$	[-]	1,25		

Table C4.3: Annular gap for **seismic performance categories C1 and C2**

Δ_{gap}								
$\Delta_{gap} = d_f - d$	[mm]	0,00 ¹⁾	0,25	0,50	0,75	1,00	1,25	$\geq 1,50$
α_{gap}		1,00	0,86	0,75	0,66	0,60	0,54	0,50

¹⁾ Filling of the Δ_{gap} according Annex B4

fischer Zykon Anchor FZA-Q

Performances

Characteristic resistance under seismic performance categories C1 and C2

Annex C 4

Appendix 12/ 13

Table C5.1: Displacements under static and quasi-static **tension** loads

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Tension load in cracked concrete C20/25	N	[kN]	5,1	10,5	
Displacements	δ_{N0}	[mm]	0,4	0,8	
	$\delta_{N\infty}$		0,9	1,7	
Tension load in uncracked concrete C20/25	N	[kN]	12,2	16,2	
Displacements	δ_{N0}	[mm]	0,9	1,0	
	$\delta_{N\infty}$		1,5	1,7	

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

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Shear load in cracked and uncracked concrete C20/25	V	[kN]	9,5	19,3	
Displacements	δ_{V0}	[mm]	0,9	2,1	
	$\delta_{V\infty}$		1,6	3,1	

Table C5.3: Displacements under **tension** loads for **seismic performance category C2**

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Displacement	DLS	$\delta_{N,C2}$	3,2	4,0	
	ULS	$\delta_{N,C2}$		12,9	

Table C5.4: Displacements under **shear** loads for **seismic performance category C2**

Size			FZA-Q		
			14 x 50 M10	18 x 60 M12	18 x 80 M12
Displacement	DLS	$\delta_{V,C2}$	3,6	4,6	4,6
	ULS	$\delta_{V,C2}$		6,8	6,6

fischer Zykon Anchor FZA-Q

Performances

Displacement under tension and shear loads

Annex C 5

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