



LEISTUNGSERKLÄRUNG



Nr. 0080 – DE

1. Eindeutiger Kenncode des Produkttyps: **fischer Zykon Anker FZA-Q**

2. Verwendungszweck(e):

Produkt	Verwendungszweck (e)
Metalldübel zur Verwendung im Beton (hoch belastbar)	Nachträgliche Befestigung im gerissenen und ungerissenen Beton, siehe Anhang, insbesondere Anhänge B 1 bis B 4

3. Hersteller: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Straße 1, 72178 Waldachtal, Deutschland**

4. Bevollmächtigter: --

5. System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit: **1**

6a. Harmonisierte Norm: ---

Notifizierte Stelle(n): ---

6b. Europäisches Bewertungsdokument: **ETAG 001; 2013-04**

Europäische Technische Bewertung: **ETA-16/0338; 2016-08-17**

Technische Bewertungsstelle: **DIBt**

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

7. Erklärte Leistung(en):

Mechanische Festigkeit und Standsicherheit (BWR 1)

Wesentliches Merkmal	Leistung
Charakteristischer Widerstand für statische und quasi-statische Einwirkungen unter Zugbeanspruchung	Siehe Anhang, insbesondere Anhang C 1
Charakteristischer Widerstand für statische und quasi-statische Einwirkungen unter Querbeanspruchung	Siehe Anhang, insbesondere Anhang C 2
Charakteristische Werte für die seismische Leistungskategorien C 1 und C 2	Siehe Anhang, insbesondere Anhang C 4
Verschiebungen	Siehe Anhang, insbesondere Anhang C 5

Brandschutz (BWR 2)

Wesentliches Merkmal	Leistung
Brandverhalten	Der Dübel erfüllt die Anforderungen der Klasse A 1
Feuerwiderstand	Siehe Anhang, insbesondere Anhang C 3

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

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

Unterzeichnet für den Hersteller und im Namen des Herstellers von:

Andreas Bucher, Dipl.-Ing.

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

i.V. A. Bucher

i.V. W. Hengesbach

Tumlingen, 2016-08-24

- Diese Leistungserklärung wurde in verschiedenen Sprachversionen erstellt. Für den Fall unterschiedlicher Auslegung hat immer die englische Version Vorrang.

- Der Anhang enthält freiwillige und ergänzende Informationen in englischer Sprache. Diese gehen über die (sprachneutral angegebenen) gesetzlichen Anforderungen hinaus.

Specific Part**1 Technical description of the product**

The fischer Zykon Anchor FZA-Q is an anchor made of hot-dip galvanized steel which is placed in a cylindrical hole and anchored in the undercut created by the installation process by mechanical interlock with displacement-controlled installation.

The anchor consists of a conical bolt with external thread, an expansion sleeve and a hexagon nut with washer.

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 to tension	See Annex C1
Characteristic resistance for static and quasi static action to shear load	See Annex C2
Characteristic resistance for seismic performance categories C1 and C2	See Annex C4
Displacements	See Annex C5

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C3

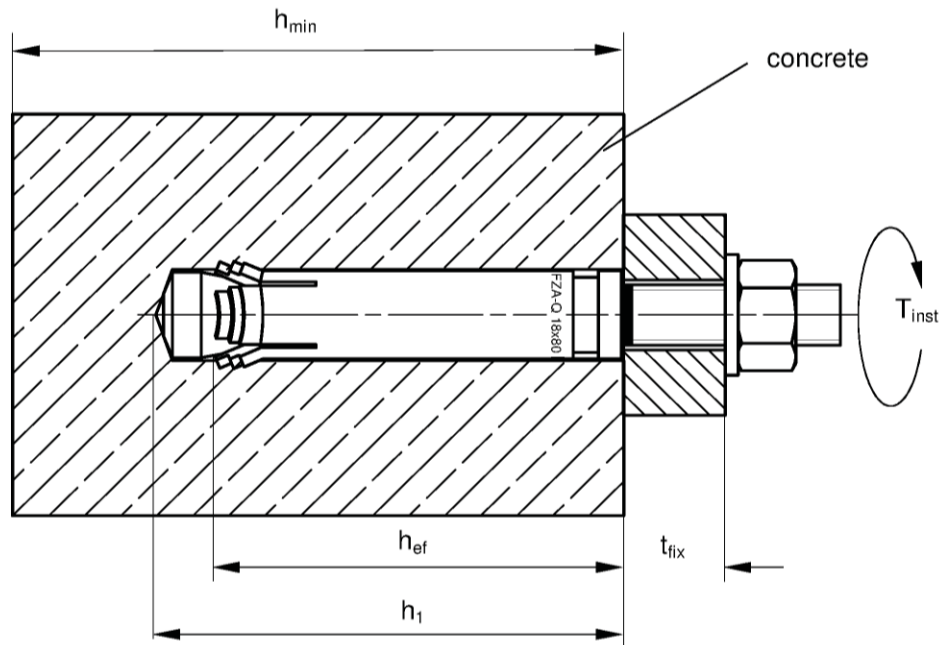
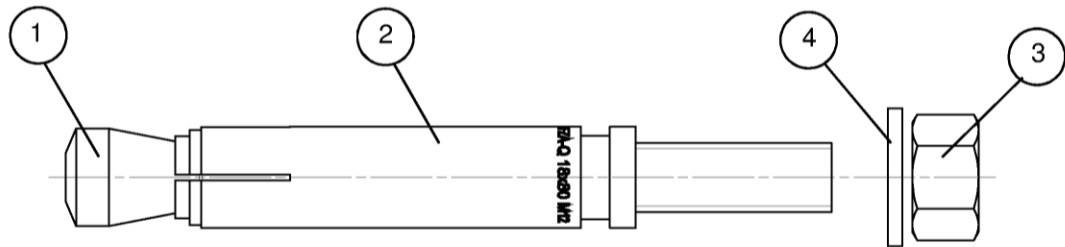
3.3 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

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

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 the applicable European legal act is: (96/582/EC)

The system to be applied is: 1



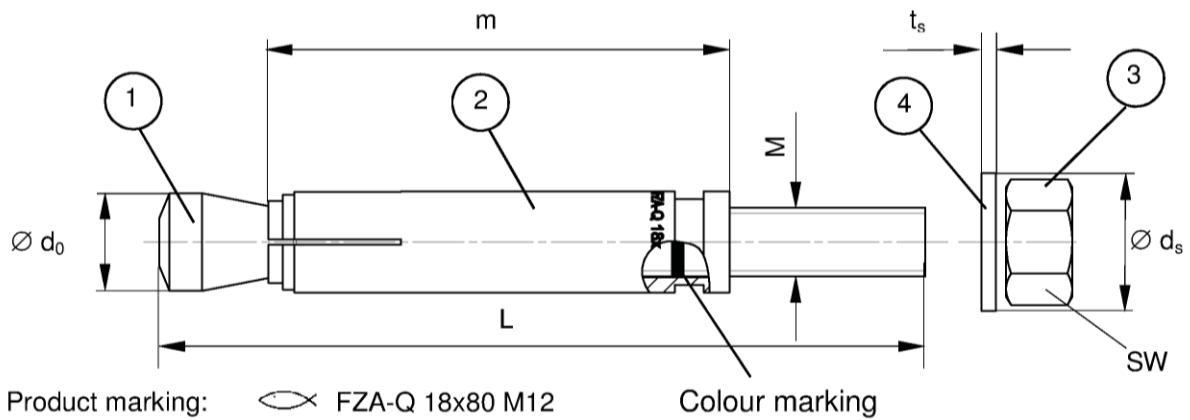
- ① Cone bolt
- ② Expansion sleeve
- ③ Hexagon nut
- ④ Washer

h_{ef} = Effective anchorage depth
 t_{fix} = Thickness of fixture
 h_1 = Drill hole depth
 h_{min} = Min. thickness of concrete member
 $T_{inst} \leq$ Max. installation torque

fischer Zykon Anchor FZA-Q

Product description
Installed condition

Annex A 1


Table A1: Anchor dimensions [mm]

Part	Designation			
1	Cone bolt	M	=	M12
		$\varnothing d_0$	=	17
2	Expansion sleeve	m	=	80
3	Hexagon nut	SW	=	19
4	Washer	t_s	$\geq$	2,3
		$\varnothing d_s$	$\geq$	23
	Thickness of fixture t_{fix}	min	$\geq$	0
		max	$\leq$	200
	Length of anchor	L_{min}	-	108
		L_{max}	-	308

Table A2: Materials FZA-Q (hot-dip galvanized $\geq 50\mu\text{m}$, ISO 10684: 2004 ¹⁾)

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 tube $f_{yk} = 275 \text{ N/mm}^2$, $f_{uk} = 415 \text{ N/mm}^2$; $A_5 > 20\%$
3	Hexagon nut	Steel, property class min. 8, EN ISO 898-2:2012
4	Washer	Cold strip, EN 10139:2016

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

²⁾ Clear paint

fischer Zykon Anchor FZA-Q
Product description
Anchor dimension and material

Annex A 2

Specifications of intended use

fischer Zykon Anchor FZA-Q	
Hot-dip galvanized	✓
Static and quasi-static action	✓
Cracked and uncracked concrete	✓
Seismic action for performance category C1	✓
Seismic action for performance category C2	✓
Fire exposure	✓

Base materials:

- Reinforced and unreinforced normal weight concrete (cracked and non-cracked) according to EN 206-1:2013
- Strength classes C20/25 to C50/60 according to EN 206-1:2013

Use conditions (Environmental conditions):

- Structures subject 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 anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages under static or quasi-static actions are to be designed in accordance with (please choose the relevant design method):
 - ETAG 001, Annex C, design method A, Edition August 2010 or
 - CEN/TS 1992-4:2009, design method A
- Anchorages under seismic actions (cracked concrete) are to be designed in accordance with:
 - EOTA Technical Report TR 045, Edition February 2013
 - Anchorages shall be positioned outside of critical regions (e.g. plastic hinges) of the concrete structure
 - Fastenings in stand-off installation or with a grout layer under seismic action are not allowed
- Anchorages under fire exposure are to be designed in accordance with:
 - EOTA Technical Report TR 020, Edition May 2004
 - CEN/TS 1992-4:2009, Annex D
 - It must be ensured that local spalling of the concrete cover does not occur

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the 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

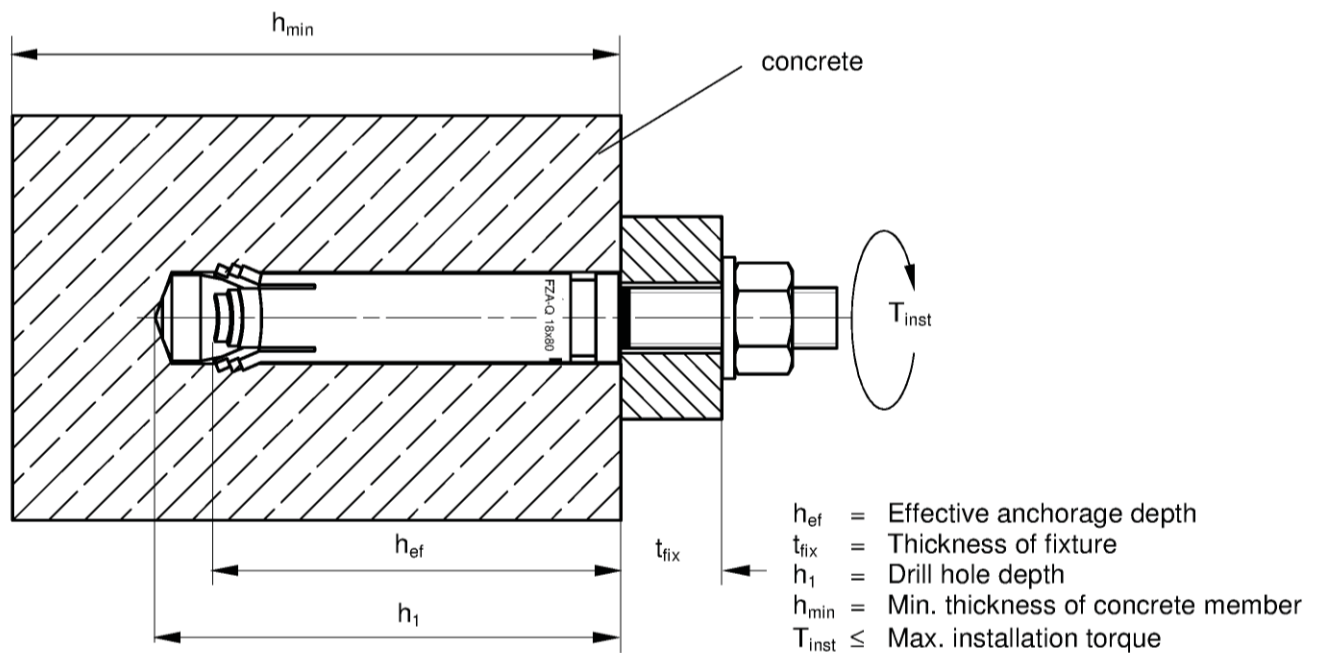
fischer Zykon Anchor FZA-Q

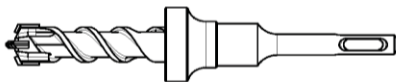
Intended Use
Specifications

Annex B 1

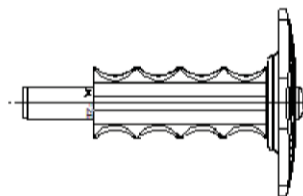
Table B1: Installation parameters

FZA-Q		18x80 M12
Nominal drill hole diameter	$d_0 =$ [mm]	18
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	18,50
Effective anchorage depth	$h_{ef} =$ [mm]	80
Depth of drill hole in concrete	$h_1 =$ [mm]	94
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	14
Max. installation torque ¹⁾	$T_{inst} \leq$ [Nm]	45

¹⁾ Min. installation torque = hand-tightening

Tools (drills and setting tools)
Drill bit

Marking:  FZBB 18x80

Standard drill bit $d_{cut} \leq 18,5$ mm

Setting tool FZE 18

Marking:  FZE 18

Machine setting tool FZA-Q M12

Marking:  FZA-Q

fischer Zykon Anchor FZA-Q
Intended Use
Installation instructions

Annex B 2

Table B2: Minimum thickness of concrete members, minimum spacing and minimum edge distance

FZA-Q		18x80 M12
Minimum thickness of concrete member	h_{min} [mm]	160
Uncracked concrete		
Minimum spacing	s_{min} [mm]	75
Minimum edge distance	c_{min} [mm]	90
Cracked concrete		
Minimum spacing	s_{min} [mm]	75
Minimum edge distance	c_{min} [mm]	75

Intermediate values for s_{min} and c_{min} by linear interpolation.

Table B3: Minimum spacing and minimum edge distances according to **TR 020 and ETAG 001, Annex C** under **fire exposure** and according to **CEN/TS 1992-4: 2009, Annex D** under **fire exposure**

FZA-Q		18x80 M12
Spacing	$s_{cr,fi} = 4h_{ef}$ [mm]	320
Edge distance	$c_{cr,fi} = 2h_{ef}$ [mm]	160

TR 020 covers design for fire exposure from one side. For fire attack from more than one side the edge distance must be increased to $c_{min} \geq 300$ mm.

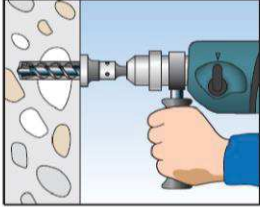
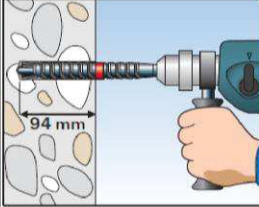
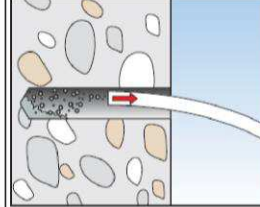
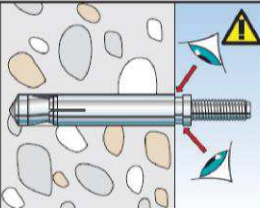
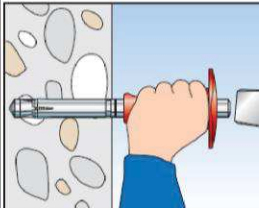
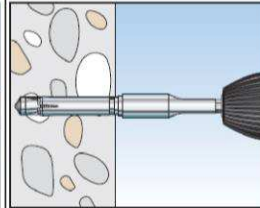
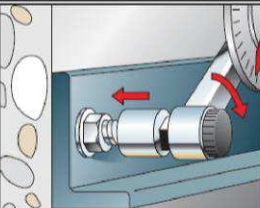
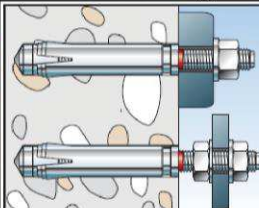
fischer Zykon Anchor FZA-Q

Intended Use

Minimum thickness of concrete members, minimum spacing and minimum edge distance

Annex B 3

Installation instructions

Steps	Description		
Drill and clean			
	1a Stop drill FZBB	1b Hammer drill	2 Clean drill hole
Set anchor			
	3 Check drill depth	4a Hand-setting	4b Machine-setting
Installation information			
	5 Check control colour	6 $T_{inst} \leq 45 \text{ Nm}$	7 Installation options

fischer Zykon Anchor FZA-Q

Intended Use
Installation instructions

Annex B 4

Table C1: Characteristic values of **tension** resistance under static and quasi-static action
(Design method A, according to **ETAG 001, Annex C** or **CEN/TS 1992-4:2009**)

FZA-Q			18x80 M12
Steel failure			
Characteristic resistance	$N_{Rk,s}$	[kN]	60,1
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5
Pullout failure			
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	20,0
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	2)
Increasing factors for $N_{Rk,p}$ for cracked and non – cracked concrete	ψ_c	C25/30	1,10
		C30/37	1,22
		C35/45	1,34
		C40/50	1,41
		C45/55	1,48
		C50/60	1,55
Installation safety factor	$\gamma_2^{3)} = \gamma_{inst}^{4)}$	[-]	1,0
Concrete cone and splitting failure			
Effective anchorage depth	h_{ef}	[mm]	80
Factor for non-cracked concrete	$k_{ucr}^{4)}$	[-]	10,1
Factor for cracked concrete	$k_{cr}^{4)}$	[-]	7,2
Min. thickness of concrete member	h_{min}	[mm]	160
Characteristic spacing	$s_{cr,N}$	[mm]	$3h_{ef}$
Characteristic edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$
Characteristic spacing	$s_{cr,sp}$	[mm]	$3,5h_{ef}$
Characteristic edge distance	$c_{cr,sp}$	[mm]	$1,75h_{ef}$

¹⁾ In absence of other national regulations

²⁾ Pullout failure not relevant

³⁾ Parameter relevant for design according to ETAG 001, Annex C

⁴⁾ Parameter relevant for design according to CEN/TS 1992-4:2009

fischer Zykon Anchor FZA-Q

Performances

Characteristic values of tension resistance under static and quasi-static action

Annex C 1

Table C2: Characteristic values of **shear** resistance under static and quasi-static action
(Design method A, according to **ETAG 001, Annex C** or **CEN/TS 1992-4:2009**)

FZA-Q			18x80 M12
Steel failure without lever arm			
Characteristic resistance	$V_{Rk,s}$	[kN]	33,7
Partial safety factor	γ_{Ms}	[-]	1,25
Factor for ductility	$k_2^{2)}$	[-]	1,0
Steel failure with lever arm			
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	105,0
Partial safety factor	γ_{Ms}	[-]	1,25
Factor for ductility	$k_2^{2)}$	[-]	1,0
Concrete pryout failure			
Factor k according to ETAG 001, Annex C or k_3 according to CEN/TS 1992-4	$k^{1)} = k_3^{2)}$	[-]	2,0
Concrete edge failure			
Effective length of anchor in shear loading	l_f	[mm]	80
Effective diameter of anchor	d_{nom}	[mm]	18
Installation safety factor	$\gamma_2^{1)} = \gamma_{inst}^{2)}$	[-]	1,0

¹⁾ Parameter relevant for design according to ETAG 001, Annex C

²⁾ Parameter relevant for design according to CEN/TS 1992-4:2009

fischer Zykon Anchor FZA-Q

Performances

Characteristic values of shear resistance under static and quasi-static action

Annex C 2

Table C3: Characteristic values of **tension** resistance under **fire exposure** in cracked and uncracked concrete (Design according to **TR 020** and **ETAG 001, Annex C** or **CEN/TS 1992-4: 2009, Annex D**)

	R30			R60		
	Fire resistance 30 minutes			Fire resistance 60 minutes		
	$N_{Rk,s,fi,30}$ [kN]	$N_{Rk,p,fi,30}$ [kN]	$N^0_{Rk,c,fi,30}$ [kN]	$N_{Rk,s,fi,60}$ [kN]	$N_{Rk,p,fi,60}$ [kN]	$N^0_{Rk,c,fi,60}$ [kN]
FZA-Q 18x80 M12	1,7	5,0	10,3	1,3	5,0	10,3

	R90			R120		
	Fire resistance 90 minutes			Fire resistance 120 minutes		
	$N_{Rk,s,fi,90}$ [kN]	$N_{Rk,p,fi,90}$ [kN]	$N^0_{Rk,c,fi,90}$ [kN]	$N_{Rk,s,fi,120}$ [kN]	$N_{Rk,p,fi,120}$ [kN]	$N^0_{Rk,c,fi,120}$ [kN]
FZA-Q 18x80 M12	1,1	5,0	10,3	0,8	4,0	8,2

Table C4: Characteristic values of **shear** resistance under **fire exposure** in cracked and uncracked concrete (Design according to **TR 020** and **ETAG 001, Annex C** or **CEN/TS 1992-4:2009, Annex D**)

	R30			R60		
	Fire resistance 30 minutes			Fire resistance 60 minutes		
	$V_{Rk,s,fi,30}$ [kN]	$M^0_{Rk,s,fi,30}$ [Nm]	k	$V_{Rk,s,fi,60}$ [kN]	$M^0_{Rk,s,fi,60}$ [Nm]	k
FZA-Q 18x80 M12	1,7	4,1	2	1,3	3,1	2

	R90			R120		
	Fire resistance 90 minutes			Fire resistance 120 minutes		
	$V_{Rk,s,fi,90}$ [kN]	$M^0_{Rk,s,fi,90}$ [Nm]	k	$V_{Rk,s,fi,120}$ [kN]	$M^0_{Rk,s,fi,120}$ [Nm]	k
FZA-Q 18x80 M12	1,1	2,6	2	0,8	2,0	2

Concrete pryout failure: In Equation (5.6) of ETAG 001, Annex C, 5.2.3.3 the k_3 -factor of Table C2 and the relevant values of $N^0_{Rk,c,fi}$ of Table C3 have to be considered.

Concrete edge failure: The characteristic resistance $V^0_{Rk,c,fi}$ in concrete C20/25 to C50/60 is determined by: $V^0_{Rk,c,fi} = 0,25 \times V^0_{Rk,c}$ (R30, R60, R90), $V^0_{Rk,c,fi} = 0,20 \times V^0_{Rk,c}$ (R120) with $V^0_{Rk,c}$ as initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature according to ETAG 001, Annex C, 5.2.3.4.

fischer Zykon Anchor FZA-Q

Performances:

Characteristic values of resistance under tension and shear loads under fire exposure

Annex C 3

Table C5: Characteristic values of **tension and shear** resistance under **seismic action**
(Design according to **TR 045: Performance category C1**)

FZA-Q	18x80 M12
Steel failure	
Characteristic resistance tension load C1 $N_{Rk,s,C1}$ [kN]	60,1
Partial safety factor $\gamma_{Ms,C1}$ ¹⁾ [-]	1,5
Pullout failure	
Characteristic resistance tension load in cracked concrete C1 $N_{Rk,p,C1}$ [kN]	20,0
Installation safety factor $\gamma_{2,C1}$ [-]	1,0
Steel failure without lever arm	
Characteristic resistance shear load C1 $V_{Rk,s,C1}$ [kN]	30,3
Partial safety factor $\gamma_{Ms,C1}$ ¹⁾ [-]	1,25

¹⁾ In absence of other national regulations

Table C6: Characteristic values of **tension and shear** resistance under **seismic action**
(Design according to **TR 045: Performance category C2**)

FZA-Q	18x80 M12
Steel failure	
Characteristic resistance tension load C2 $N_{Rk,s,C2}$ [kN]	60,1
Partial safety factor $\gamma_{Ms,C2}$ ¹⁾ [-]	1,5
Pullout failure	
Characteristic resistance tension load in cracked concrete C2 $N_{Rk,p,C2}$ [kN]	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]	23,3
Partial safety factor $\gamma_{Ms,C2}$ ¹⁾ [-]	1,25

¹⁾ In absence of other national regulations

fischer Zykon Anchor FZA-Q

Performances:

Characteristic values of resistance under tension and shear loads under seismic action category C1 and C2

Annex C 4

Table C7: Displacements due to tension loads in uncracked and cracked concrete C20/25

FZA-Q			18x80 M12
Tension load in uncracked concrete C20/25	N	[kN]	10,5
Displacements	δ_{N0}	[mm]	0,8
	$\delta_{N\infty}$	[mm]	1,7
Tension load in cracked concrete C20/25	N	[kN]	16,2
Displacements	δ_{N0}	[mm]	1,0
	$\delta_{N\infty}$	[mm]	1,7

Table C8: Displacements due to shear loads

FZA-Q			18x80 M12
Shear load	V	[kN]	19,3
Displacements	δ_{V0}	[mm]	2,1
	$\delta_{V\infty}$	[mm]	3,1

Table C9: Displacements due to tension loads (Design according to TR 045: Performance category C2)

FZA-Q			18x80 M12
Displacement DLS	$\delta_{N,C2 (DLS)}$	[mm]	4,04
Displacement ULS	$\delta_{N,C2 (ULS)}$	[mm]	12,87

Table C10: Displacements due to shear loads (Design according to TR 045: Performance category C2)

FZA-Q			18x80 M12
Displacement DLS	$\delta_{V,C2 (DLS)}$	[mm]	4,63
Displacement ULS	$\delta_{V,C2 (ULS)}$	[mm]	6,59

fischer Zykon Anchor FZA-Q**Performances**

Displacement under tension and shear loads

Annex C 5