Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-15/0388 of 5 October 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 torque-controlled expansion anchor
Product family to which the construction product belongs	Torque controlled expansion anchor for use in concrete
Manufacturer	SPIT SAS 150 Avenue de Lyon - BP 104 26501 BOURG LES VALENCE CEDEX FRANKREICH
Manufacturing plant	Spit
This European Technical Assessment contains	32 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330232-01-0601 Edition 12/2019
This version replaces	ETA-15/0388 issued on 23 February 2016

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

The SPIT FIX Z XTREM, FIX Z XTREM/A4 Torque-controlled expansion anchor is made of galvanized steel or stainless steel A4 version - which is placed into a drilled hole and anchored by application of the installation torque.

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) Method A	See Annex B4 to B5, C1 to C4
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C5 to C6
Displacements and Durability	See Annex C7 to C9, B1
Characteristic resistance and displacements for seismic performance category C1 and C2	See Annex C10 to C15

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C16 to C18

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

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

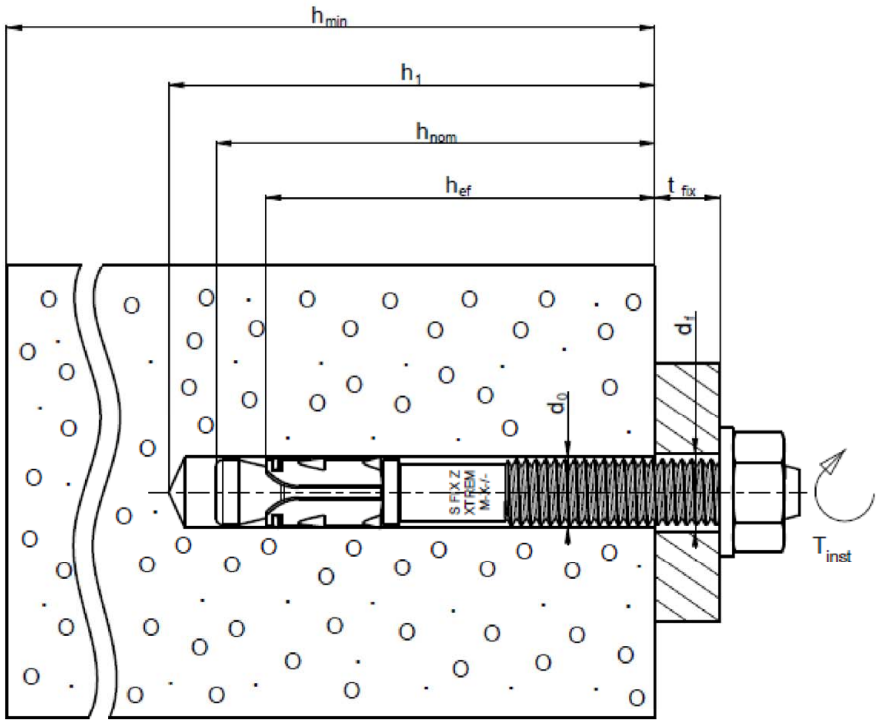
Issued in Berlin on 5 October 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Lange

Deutsches Institut für Bautechnik DIBt

Product and intended



h_{min}	:	Minimum thickness of concrete member
h_1	:	Depth of drilled hole to deepest point
d_0	:	Diameter of drilled hole
d_f	:	Diameter of clearance hole in the fixture
h_{nom}	:	Installation depth
h_{ef}	:	Effective embedment depth
t_{fix}	:	Thickness of the fixture
T_{inst}	:	Installation torque

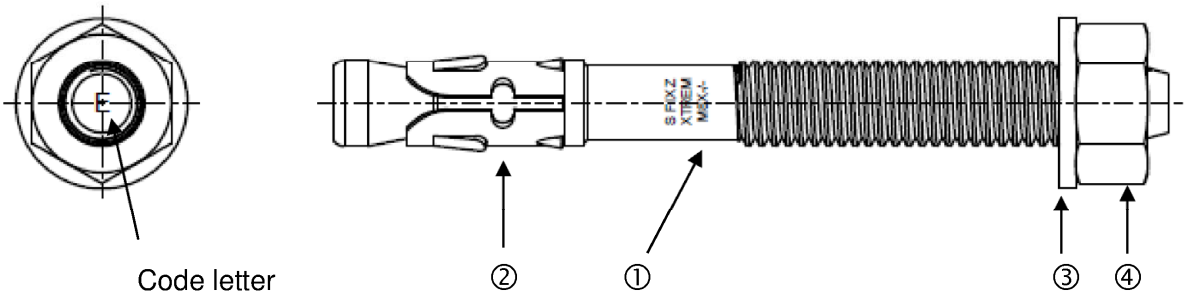
SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Annex A1

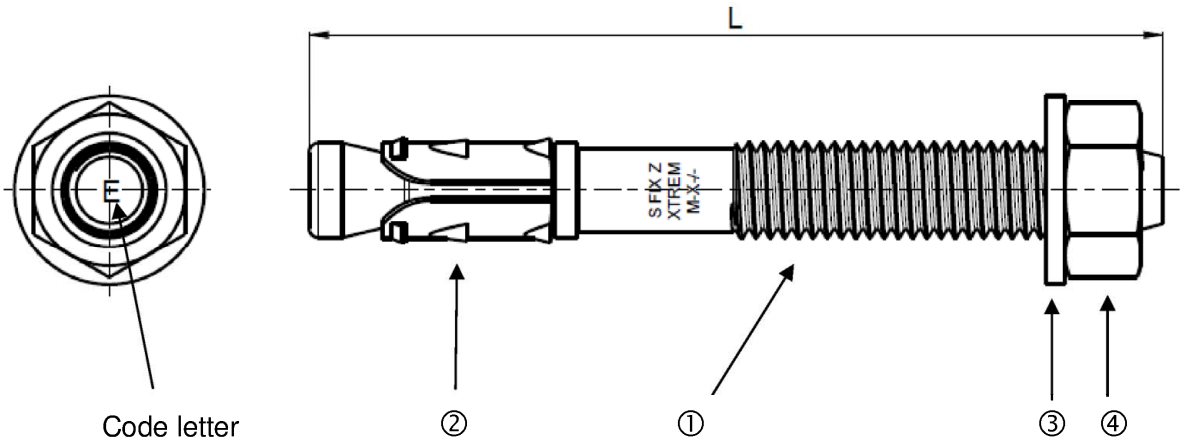
Product description
Installation condition

Different parts of the anchor:

- Size M8 - Galvanized steel version



- Size M10 to M20 - Galvanized steel version



Designation of ① to ④, see Table A1, Annex A4

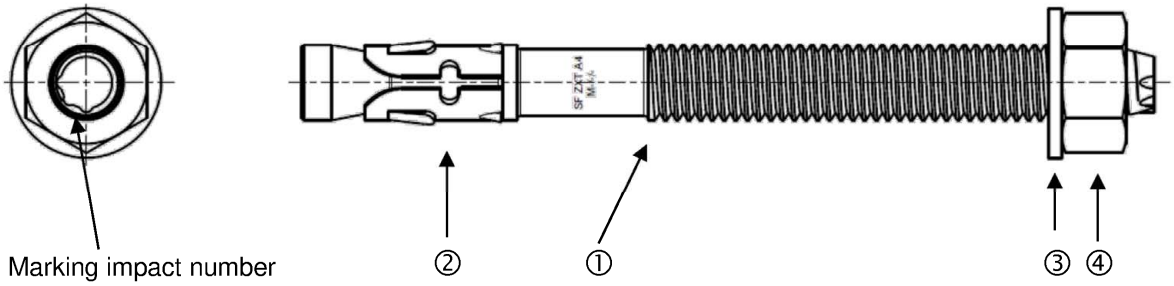
Marking e.g.: **S FIX Z XTREM 10x100/40-20**

S :	Manufacturer SPIT
FIX Z XTREM :	Trade name
M12 :	Size of anchor
100 :	Length of the bolt
40 :	Maximum thickness of the fixture for Reduced Embedment depth $h_{nom,2}$
20 :	Maximum thickness of the fixture for maximum embedment depth $h_{nom,1}$

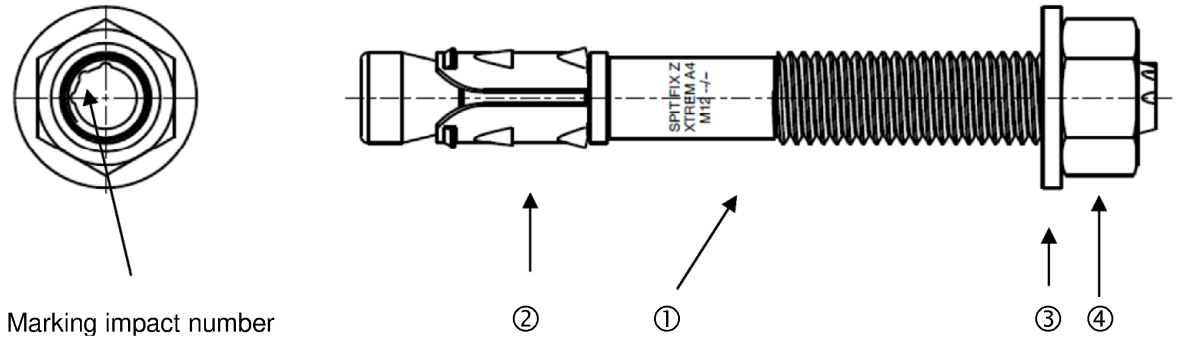
SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	**Annex A2**
Product description **Product and marking**	

Deutsches Institut für Bautechnik DIBt

- Size M8 - Stainless steel version



- Size M10 to M16 - Stainless steel version



Designation of ① to ④, see Table A2, Annex A4.

Marking e.g.: S FIX Z XTREM/A4 M10x95/35-15

S :	Manufacturer SPIT
FIX Z XTREM :	Trade name
A4:	Stainless steel
M10 :	Size of anchor
95 :	Length of the bolt
35 :	Maximum thickness of the fixture for Reduced Embedment depth $h_{nom,2}$
15 :	Maximum thickness of the fixture for maximum embedment depth $h_{nom,1}$

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	**Annex A3**
Product description **Product and marking**	

Deutsches Institut für Bautechnik DIBt

Table A1: Materials

Part (see Annex A2 & A3)	Designation	Material
FIX Z XTREM (Galvanized steel version)		
①	Bolt	M8 : Carbon steel, Zinc electroplated (> 5µm), EN ISO 4042:2018
		M10 - M20 : Carbon steel, Zinc electroplated (>5µm) EN ISO 4042:2018, coated
②	Clip	M8 : Stainless steel (1.4404), scouring
		M10 - M20 : Carbon steel Zinc electroplated (> 5µm) EN ISO 4042:2018
③	Washer[1)]	M8-M20 : EN ISO 7092:2000, Zinc electroplated (> 5µm) EN ISO 4042:2018
④	Nut	M8 - M10 : Steel , strength class 8, ISO 898-2:2012, Zinc electroplated (> 5µm) EN ISO 4042:2018
		M12 - M20 : Steel , strength class 8, ISO 898-2:2012, Zinc electroplated (> 5µm) EN ISO 4042:2018, coated
FIX Z XTREM/A4 (Stainless steel version)		
①	Bolt	M8 - M16 : Stainless steel A4, EN 10088.3:2014, coated
②	Clip	M8 - M16 : Stainless steel A4, EN 10088.3:2014
③	Washer	M8 - M16 : EN ISO 7092:2000, Stainless steel A4
④	Nut	M8 - M16 : Stainless steel A4-80, EN ISO 3506-2:2009, coated

[1)] Different washer versions are available (see Table A2)

Table A2 : Washer dimensions

Washer type		**M8**	**M10**	**M12**	**M16**	**M20**
Narrow (standard version)	d_1 [mm] inner Ø	8,4	10,5	13	17	21
	d_2 [mm] outer Ø	16	20	24	30	36
Broad	d_1 [mm] inner Ø	8,4	10,5	13	17	21
	d_2 [mm] outer Ø	22.5	22	32	40	50
X-broad acc. to EN ISO 7094:2000	d_1 [mm] inner Ø	9	11	13,5	17,5	-
	d_2 [mm] outer Ø	28	34	44	56	-

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Product description
Material, Washer dimensions

Annex A4

Specifications of intended use

Table B1 : Overview of use and performance categories FIX Z XTREM, FIX Z XTREM/A4

Anchorages subject to	**FIX Z XTREM, FIX Z XTREM/A4**	
Static, quasi-static	FIX Z XTREM FIX Z XTREM/A4	M8 to M20 M8 to M16
Seismic performance category C1	FIX Z XTREM FIX Z XTREM/A4	M8 to M20 M8 to M16
Seismic performance category C2	FIX Z XTREM FIX Z XTREM/A4	M10 to M20 (for $h_{ef,1}$) M10 to M16 (for $h_{ef,1}$)
Fire exposure	FIX Z XTREM FIX Z XTREM/A4	M8 to M20 M8 to M16

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016
- Cracked or uncracked concrete

Table B2: Use conditions (Environmental conditions)

FIX Z XTREM **Galvanized steel version** **FIX Z XTREM/A4** **Stainless steel version**	Structure subject to dry internal conditions,
FIX Z XTREM/A4 **Stainless steel version**	Structures subject to all other conditions corrosion resistance class CRC I - III according to EN 1993-1-4:2015 Annex A Table A.3

Design:

- The anchorages are designed in accordance with EN 1992-4 : 2018 and EOTA Technical Report TR 055, 12/2016 under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings are 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.).

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Intended use **Specifications**	**Annex B1**

Deutsches Institut für Bautechnik DIBt

Installation:

- 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 an anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Effective anchorage depth, edge distances and spacing not less than the specified values without minus tolerances.

In case of aborted hole, drilling of new hole at a minimum distance away of twice the depth of the aborted hole, or smaller distance provided that the aborted drill hole is filled with high strength mortar and no shear or oblique tension loads in the direction of aborted hole.

Table B3: Setting data for FIX Z XTREM

			Standard embedment					Reduced embedment					Diameter - T_{inst}		
Spit FIX Z XTREM Galvanized Steel version	L [mm]	Code letter	$h_{nom,1}$ [mm]	$h_{ef,1}$ [mm]	$t_{fix,max,1}$ [mm]	$h_{1,1}$ [mm]	$h_{min,1}$ [mm]	$h_{nom,2}$ [mm]	$h_{ef,2}$ [mm]	$t_{fix,max,2}$ [mm]	$h_{1,2}$ [mm]	$h_{min,2}$ [mm]	d_0 [mm]	d_f [mm]	T_{inst} [Nm]
	(0)		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8x65/5	68	B	55	46	5	65	100	-	-	-	-	-	8	9	20
8x75/15	78	D			15										
8x90/30	93	E			30										
8x120/60	123	G			60										
8x130/70	133	H			70										
8x140/80	143	I			80										
10x85/25-5	85	D	68	60	5	75	120	48	40	25	55	100	10	12	45
10x90/30-10	90	E			10					30					
10x100/40-20	100	F			20					40					
10x120/60-40	120	G			40					60					
10x140/80-60	140	I			60					80					
10x160/100-80	160	-			80					100					
12x105/30-10	100	F	80	70	10	90	140	60	50	30	70	100	12	14	60
12x115/40-20	115	G			20					40					
12x135/60-40	135	I			40					60					
12x155/80-60	155	J			60					80					
12x180/105-85	180	L			85					105					
16x145/45-25	142,5	I	98	85	25	110	170	78	65	45	90	130	16	18	110
16x170/70-50	167,5	K			50					70					
16x180/80-60	177,5	L			60					80					
20x170/30	168	K	113	100	30	130	200	-	-	-	-	-	20	22	160
20x200/60	198	M			60										
20x220/80	218	O			80										

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Intended use
Specifications

Annex B2

Deutsches Institut für Bautechnik DIBt

Table B4: Setting data for for FIX Z XTREM/A4

			Standard embedment					Reduced embedment					Diameter - T_{inst}		
Spit FIX Z XTREM/A4 Stainless steel version	L [mm]	Marking impact number	$h_{nom,1}$ [mm]	$h_{ef,1}$ [mm]	$t_{fix,max,1}$ [mm]	$h_{1,1}$ [mm]	$h_{min,1}$ [mm]	$h_{nom,2}$ [mm]	$h_{ef,2}$ [mm]	$t_{fix,max,2}$ [mm]	$h_{1,2}$ [mm]	$h_{min,2}$ [mm]	d_0 [mm]	d_f [mm]	T_{inst} [Nm]
	(0)		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8x55/5	56	0	55	48	-	65	100	42	35	-	52	100	8	9	20
8x70/20-7	71	1			7					20					
8x90/40-27	91	3			27					40					
10x70/10	70	1	68	60	10	75	120	48	40	-	55	100	10	12	45
10x95/35-15	95	2			15					35					
10x105/45-25	105	3			25					45					
10x130/70-50	130	4			50					70					
12x95/20	95	1	80	70	20	90	140	60	50	-	70	100	12	14	75
12x110/35-15	110	2			15					35					
12x120/45-25	120	3			25					45					
12x140/65-45	140	4			45					65					
16x120/20	120	1	98	85	20	110	170	78	65	-	90	130	16	18	110
16x140/40-20	140	2			20					40					

Dimensions illustrated in Annex A1 and A2: Installation

(0) Total length of the bolt [mm]
(1) Installation depth, h_{nom} [mm]
(2) Effective embedment depth, h_{ef} [mm]
(3) Maximum thickness of the fixture, $t_{fix,max}$ [mm]
(4) Depth of drilled hole to deepest point, h_1 [mm]
(5) Minimum thickness of concrete member, h_{min} [mm]
(6) Diameter of drilled hole, d_0 [mm]
(7) Diameter of clearance hole in the fixture, d_f [mm]
(8) Installation torque, T_{inst} [Nm]

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Intended use
Specifications

Annex B3

Deutsches Institut für Bautechnik DIBt

Table B5 : Minimum member thickness, spacing and edge distance for FIX Z XTREM

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
$h_{ef,1}$			**46**	**60**	**70**	**85**	**100**
Minimum thickness of concrete member $h_{min,1}$			100	120	140	170	200
Cracked concrete							
Minimum spacing	S_{min}	[mm]	50	55	60	90	100
	for C ≥	[mm]	65	70	100	100	120
Minimum edge distance	C_{min}	[mm]	50	55	60	80	100
	for S ≥	[mm]	75	90	145	110	130
Uncracked concrete							
Minimum spacing	S_{min}	[mm]	50	55	60	90	130
	for C ≥	[mm]	90	70	100	105	120
Minimum edge distance	C_{min}	[mm]	50	60	60	90	100
	for S ≥	[mm]	75	120	145	140	160
$h_{ef,2}$			- [1]	**40**	**50**	**65**	- [1]
Minimum thickness of concrete member $h_{min,2}$		[mm]	- [1]	120	140	170	- [1]
Cracked concrete							
Minimum spacing	S_{min}	[mm]	- [1]	55	60	90	- [1]
	for C ≥	[mm]	- [1]	70	100	100	- [1]
Minimum edge distance	C_{min}	[mm]	- [1]	55	60	80	- [1]
	for S ≥	[mm]	- [1]	90	145	110	- [1]
Uncracked concrete							
Minimum spacing	S_{min}	[mm]	- [1]	55	60	90	- [1]
	for C ≥	[mm]	- [1]	70	100	105	- [1]
Minimum edge distance	C_{min}	[mm]	- [1]	60	60	90	- [1]
	for S ≥	[mm]	- [1]	120	145	140	- [1]

[1] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Intended use
Minimum thickness of member, spacing and edge distance

Annex B4

Deutsches Institut für Bautechnik DIBt

Table B6 : Minimum member thickness, spacing and edge distance for for FIX Z XTREM/A4

Anchor size			**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4						
$h_{ef,1}$			**46**	**60**	**70**	**85**
Minimum thickness of concrete member $h_{min,1}$		[mm]	100	120	140	170
Cracked concrete						
Minimum spacing	S_{min}	[mm]	60	55	60	90
	for C ≥	[mm]	60	65	100	100
Minimum edge distance	C_{min}	[mm]	60	55	60	80
	for S ≥	[mm]	60	90	145	110
Uncracked concrete						
Minimum spacing	S_{min}	[mm]	50	55	60	90
	for C ≥	[mm]	60	65	100	105
Minimum edge distance	C_{min}	[mm]	60	60	60	90
	for S ≥	[mm]	50	120	145	140
$h_{ef,2}$			**35**	**40**	**50**	**65**
Minimum thickness of concrete member $h_{min,2}$		[mm]	100	120	140	170
Cracked concrete						
Minimum spacing	S_{min}	[mm]	60	55	60	90
	for C ≥	[mm]	60	65	100	100
Minimum edge distance	C_{min}	[mm]	60	55	60	80
	for S ≥	[mm]	60	90	145	110
Uncracked concrete						
Minimum spacing	S_{min}	[mm]	60	55	60	90
	for C ≥	[mm]	60	65	100	105
Minimum edge distance	C_{min}	[mm]	60	60	60	90
	for S ≥	[mm]	60	120	145	140

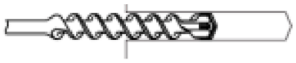
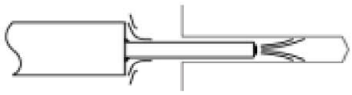
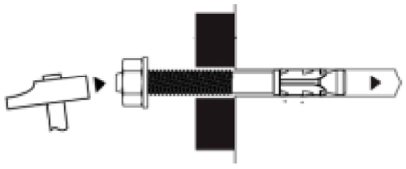
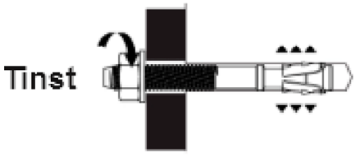
SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Intended used
Minimum thickness of member, spacing and edge distance

Annex B5

Deutsches Institut für Bautechnik DIBt

Installation instruction

	Drill hole perpendicular to concrete surface, positioning of the drill holes without damaging the reinforcement. In case of aborted hole : new drilling at a minimum distance away of twice the depth of the aborted 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 the load application.
	blow out dust beginning from the depth of the bore hole
	Drive in anchor, such that h_{ef} is met. This is ensured, if the thickness of fixture is not greater than the maximum thickness of fixture marked on the anchor according to Annex B2.
	Apply installation torque T_{inst} by using calibrated torque wrench.

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Intended used **Installation instructions**	**Annex B6**

Deutsches Institut für Bautechnik DIBt

Table C1 : Characteristic resistance under tension loads for FIX Z XTREM for static and quasi-static actions in cracked and uncracked concrete

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
Steel failure							
Characteristic resistance	$N_{Rk,s}$	[kN]	22,1	29,3	38,2	64,7	99,1
Partial safety factor	γ_{Ms} [1)]	-	1,4	1,48	1,48	1,48	1,5
Pull-out failure							
Standard Embedment depth $h_{ef,1}$							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	9	20	30	40	49,2
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	5	9	16	20	30
Partial safety factor	γ_{inst}	-	1,0				
Reduced Embedment depth $h_{ef,2}$							
Effective anchorage depth	$h_{ef,2}$	[mm]	- [2)]	40	50	65	- [2)]
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	- [2)]	12,4	17,4	25,8	- [2)]
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	- [2)]	8,7	12,2	18,0	- [2)]
Partial safety factor	γ_{inst}	-	1,0				
Increasing factor for $N_{Rk,p}$	ψ_c	C25/30	1,12	1,05	1,05	1,08	1,12
		C30/37	1,22	1,08	1,08	1,15	1,22
		C35/45	1,32	1,12	1,12	1,22	1,32
		C40/50	1,41	1,15	1,15	1,27	1,41
		C45/55	1,50	1,18	1,18	1,33	1,50
		C50/60	1,58	1,20	1,20	1,38	1,58

1) In absence of other national regulation,
2) No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic resistance under tension loads for static and quasi-static actions

Annex C1

Deutsches Institut für Bautechnik DIBt

Table C1 continued

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
Concrete cone failure and splitting failure							
Standard Embedment depth $h_{ef,1}$							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Factor for uncracked concrete	$k_{ucr,N}$	-	11,0				
Factor for cracked concrete	$k_{cr,N}$	-	7,7				
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}; N^0_{Rk,c}$ (2))				
Spacing	$s_{cr,N}$	[mm]	138	180	210	255	300
	$s_{cr,sp}$	[mm]	276	226	252	306	370
Edge distance	$c_{cr,N}$	[mm]	69	90	105	127,5	150
	$c_{cr,sp}$	[mm]	138	113	126	153	185
Partial safety factor	γ_{inst}	-	1,0				
Reduced Embedment depth $h_{ef,2}$							
Effective anchorage depth	$h_{ef,2}$	[mm]	- 1)	40	50	65	- 1)
Factor for uncracked concrete	$k_{ucr,N}$	-	11,0				
Factor for cracked concrete	$k_{cr,N}$	-	7,7				
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}; N^0_{Rk,c}$ (2))				
Spacing	$s_{cr,N}$	[mm]	- 1)	120	150	195	- 1)
	$s_{cr,sp}$	[mm]	- 1)	226	252	306	- 1)
Edge distance	$c_{cr,N}$	[mm]	- 1)	60	75	97,5	- 1)
	$c_{cr,sp}$	[mm]	- 1)	113	126	153	- 1)
Partial safety factor	γ_{inst}	-	1,0				

1) No performance assessed

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

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic resistance under tension loads for static and quasi-static actions

Annex C2

Deutsches Institut für Bautechnik DIBt

Table C2 : Characteristic resistance under tension loads for FIX Z XTREM/A4 for static and quasi-static actions in cracked and uncracked concrete

Anchor size			**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4						
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	16,7	36,0	52,3	91,1
Partial safety factor	γ_{Ms} [1)]	-	1,81	1,76	1,76	2,11
Pull-out failure						
Standard Embedment depth $h_{ef,1}$						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	12	20	30	40
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	4	9	16	20
Partial safety factor	γ_{Inst}	-	1,0			
Reduced Embedment depth $h_{ef,2}$						
Effective anchorage depth	$h_{ef,2}$	[mm]	35	40	50	65
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	9	12,4	17,4	25,8
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	3	8,7	12,2	18,0
Partial safety factor	γ_{inst}	-	1,0			
Increasing factor for $N_{Rk,p}$	ψ_c	C25/30	1,12	1,05	1,05	1,08
		C30/37	1,22	1,08	1,08	1,15
		C35/45	1,32	1,12	1,12	1,22
		C40/50	1,41	1,15	1,15	1,27
		C45/55	1,50	1,18	1,18	1,33
		C50/60	1,58	1,20	1,20	1,38

1) In absence of other national regulation,

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic resistance under tension load for static and quasi-static actions	**Annex C3**

Deutsches Institut für Bautechnik DIBt

Table C2 continued

Anchor size			**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4						
Concrete cone failure and splitting failure						
Standard Embedment depth $h_{ef,1}$						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Factor for uncracked concrete	$k_{ucr,N}$	-	11,0			
Factor for cracked concrete	$k_{cr,N}$	-	7,7			
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}$; $N^0_{Rk,c}$ (1))			
Spacing	$s_{cr,N}$	[mm]	144	180	210	255
	$s_{cr,sp}$	[mm]	290	226	252	306
Edge distance	$c_{cr,N}$	[mm]	72	90	105	127,5
	$c_{cr,sp}$	[mm]	145	113	126	153
Partial safety factor	γ_{inst}	-	1,0			
Reduced Embedment depth $h_{ef,2}$						
Effective anchorage depth	$h_{ef,2}$	[mm]	35	40	50	65
Factor for uncracked concrete	$k_{ucr,N}$	-	11,0			
Factor for cracked concrete	$k_{cr,N}$	-	7,7			
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}$; $N^0_{Rk,c}$ (1))			
Spacing	$s_{cr,N}$	[mm]	105	120	150	195
	$s_{cr,sp}$	[mm]	210	226	252	306
Edge distance	$c_{cr,N}$	[mm]	52,5	60	75	97,5
	$c_{cr,sp}$	[mm]	105	113	126	153
Partial safety factor	γ_{inst}	-	1,0			

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

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic resistance under tension loads for static and quasi-static actions

Annex C4

Deutsches Institut für Bautechnik DIBt

Table C3: Characteristic resistance under shear loads for FIX Z XTREM for static and quasi-static actions in cracked and uncracked concrete

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
Steel failure without lever arm							
Characteristic resistance	$V^0_{Rk,s}$	[kN]	13,7	16	23	45	61
Partial safety factor	γ_{Ms} 1)	-	1,5	1,27	1,27	1,25	1,50
Steel failure with lever arm							
Characteristic resistance	$M^0_{Rk,s}$	[N,m]	28	52,8	91,3	194,0	315,7
Partial safety factor	γ_{Ms} 1)	-	1,5	1,27	1,27	1,25	1,50
Concrete pry-out failure							
Standard Embedment depth $h_{ef,1}$							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Pryout factor	k_8	-	1	2	2	2	2
Partial safety factor	γ_{inst}	-	1,0				
Reduced Embedment depth $h_{ef,2}$							
Effective anchorage depth	$h_{ef,2}$	[mm]	- 2)	40	50	65	- 2)
Pryout factor	k_8	-	- 2)	1	1	2	- 2)
Partial safety factor	γ_{inst}	-	1,0				
Concrete edge failure							
Effective length of anchor under shear loading	$l_{f,1}$	[mm]	46	60	70	85	100
Effective length of anchor under shear loading with Reduced Embedment depth	$l_{f,2}$	[mm]	- 2)	40	50	65	- 2)
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20
Partial safety factor	γ_{inst}	-	1,0				

1) In absence of other national regulation.
2) No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	**Annex C5**
Characteristic resistance under shear loads for static and quasi-static actions	

Deutsches Institut für Bautechnik DIBt

Table C4: Characteristic shear resistance under shear loads for FIX Z XTREM/A4 for static and quasi-static actions in cracked and uncracked concrete

Anchor size			**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4						
Steel failure without lever arm						
Characteristic resistance	$V^0_{Rk,s}$	[kN]	12,4	18,7	28,2	51,9
Partial safety factor	γ_{Ms} 1)	-	1,51	1,47	1,47	1,75
Steel failure with lever arm						
Characteristic resistance	$M^0_{Rk,s}$	[N,m]	25	44,9	77,5	187,5
Partial safety factor	γ_{Ms} 1)	-	1,51	1,47	1,47	1,75
Concrete pry-out failure						
Standard Embedment depth $h_{ef,1}$						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Pryout factor	k_8	-	1	2	2	2
Partial safety factor	γ_{inst}	-	1,0			
Reduced Embedment depth $h_{ef,2}$						
Effective anchorage depth	$h_{ef,2}$	[mm]	35	40	50	65
Pryout factor	k_8	-	1	1	1	2
Partial safety factor	γ_{inst}	-	1,0			
Concrete edge failure						
Effective length of anchor under shear loading	$l_{f,1}$	[mm]	48	60	70	85
Effective length of anchor under shear loading with Reduced Embedment depth	$l_{f,2}$	[mm]	35	40	50	65
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16
Partial safety factor	γ_{inst}	-	1,0			

1) In absence of other national regulation,

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic resistance under shear loads for static and quasi-static actions	**Annex C6**

Deutsches Institut für Bautechnik DIBt

Table C5 : Displacement under tension loads for static and quasi-static actions for FIX Z XTREM

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
Displacement under tension loading							
Standard Embedment depth $h_{ef,1}$							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Tension load in cracked concrete C20/25	N	[kN]	1,4	4,3	7,6	9,5	14,3
Displacements in cracked concrete under tension	δ_{N0}	[mm]	0,3	0,4	0,4	0,4	0,4
	$\delta_{N\infty}$	[mm]	1,3	1,6	1,7	1,7	1,7
Tension load in uncracked concrete C20/25	N	[kN]	3,6	9,5	14,3	19,0	23,8
Displacements in uncracked concrete under tension	δ_{N0}	[mm]	0,1	0,4	0,4	0,4	0,4
	$\delta_{N\infty}$	[mm]	1,3	1,6	1,7	1,7	1,7
Reduced Embedment depth $h_{ef,2}$							
Effective anchorage depth	$h_{ef,2}$	[mm]	- [1)]	40	50	65	- [1)]
Tension load in cracked concrete C20/25	N	[kN]	- [1)]	4,1	5,8	8,6	- [1)]
Displacements in cracked concrete under tension	δ_{N0}	[mm]	- [1)]	0,3	0,3	0,4	- [1)]
	$\delta_{N\infty}$	[mm]	- [1)]	1,6	1,7	1,7	- [1)]
Tension load in uncracked concrete C20/25	N	[kN]	- [1)]	5,9	8,3	13,3	- [1)]
Displacements in uncracked concrete under tension	δ_{N0}	[mm]	- [1)]	0,3	0,3	0,4	- [1)]
	$\delta_{N\infty}$		- [1)]	1,6	1,7	1,7	- [1)]

[1)] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Displacements under tension loadsfor static and quasi-static actions	**Annex C7**

Deutsches Institut für Bautechnik DIBt

Table C6 : Displacement under tension loads for static and quasi-static actions for FIX Z XTREM/A4

Anchor size			**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4						
Displacement under tension loading						
Standard Embedment depth $h_{ef,1}$						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Tension load in cracked concrete C20/25	N	[kN]	1,6	4,3	7,6	9,5
Displacements in cracked concrete under tension	δ_{N0}	[mm]	0,6	0,4	0,4	0,4
	$\delta_{N\infty}$	[mm]	1,0	1,6	1,7	1,7
Tension load in uncracked concrete C20/25	N	[kN]	3,6	9,5	14,3	19,0
Displacements in uncracked concrete under tension	δ_{N0}	[mm]	0,1	0,4	0,4	0,4
	$\delta_{N\infty}$	[mm]	0,4	1,6	1,7	1,7
Reduced Embedment depth $h_{ef,2}$						
Effective anchorage depth	$h_{ef,2}$	[mm]	35	40	50	65
Tension load in cracked concrete C20/25	N	[kN]	1,2	4,1	5,8	8,6
Displacements in cracked concrete under tension	δ_{N0}	[mm]	0,4	0,3	0,3	0,4
	$\delta_{N\infty}$	[mm]	0,5	1,6	1,7	1,7
Tension load in uncracked concrete C20/25	N	[kN]	3,6	5,9	8,3	13,3
Displacements in uncracked concrete under tension	δ_{N0}	[mm]	0,1	0,3	0,3	0,4
	$\delta_{N\infty}$	[mm]	0,4	1,6	1,7	1,7

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Displacements under tension loads for static and quasi-static actions

Annex C8

Deutsches Institut für Bautechnik DIBt

Table C7 : Displacement under shear loads for static and quasi-static actions for FIX Z XTREM

Anchor size			M8	M10	M12	M16	M20
FIX Z XTREM							
Displacement under shear loading							
Standard Embedment depth $h_{ef,1}$							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Shear load	V	[kN]	6,5	9	12,9	25,4	34,5
Displacements	δ_{V0}	[mm]	2,0	1,5	1,5	1,5	1,5
	$\delta_{V\infty}$	[mm]	3,0	2,3	2,3	2,3	2,3
Reduced Embedment depth $h_{ef,2}$							
Effective anchorage depth	$h_{ef,2}$	[mm]	- [1)]	40	50	65	- [1)]
Shear load	V	[kN]	- [1)]	9,0	12,9	25,4	- [1)]
Displacements	δ_{V0}	[mm]	- [1)]	1,5	1,5	1,5	- [1)]
	$\delta_{V\infty}$	[mm]	- [1)]	2,3	2,3	2,3	- [1)]

Table C8 : Displacement under shear loads for static and quasi-static actions for FIX Z XTREM/A4

Anchor size			M8	M10	M12	M16
FIX Z XTREM/A4						
Displacement under shear loading (cracked and uncracked concrete)						
Standard Embedment depth $h_{ef,1}$						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Shear load	V	[kN]	5,4	9,1	13,7	21,2
Displacements	δ_{V0}	[mm]	4,2	1,6	1,6	1,7
	$\delta_{V\infty}$	[mm]	5,1	2,4	2,4	2,6
Reduced Embedment depth $h_{ef,2}$						
Effective anchorage depth	$h_{ef,2}$	[mm]	- [1)]	40	50	65
Shear load	V	[kN]	- [1)]	9,1	13,7	21,2
Displacements	δ_{V0}	[mm]	- [1)]	1,6	1,6	1,7
	$\delta_{V\infty}$	[mm]	- [1)]	2,4	2,4	2,6

[1)] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Displacements under shear loads for static and quasi-static actions

Annex C9

Deutsches Institut für Bautechnik DIBt

Table C9: Characteristic tension resistance for seismic loading for FIX Z XTREM, category C1

Anchor size			M8	M10	M12	M16	M20
FIX Z XTREM							
Steel failure							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Characteristic resistance	$N_{Rk,s,eq,C1}$	[kN]	18,5	29,3	38,2	64,7	99,1
Pull-out failure							
Effective anchorage depth	$h_{ef,1}$	[mm]	46	60	70	85	100
Characteristic resistance	$N_{Rk,p,eq,C1}$	[kN]	4,7	7,4	16,0	20,0	30,0

Table C10 : Characteristic tension resistances under seismic loading for FIX Z XTREM/A4, category C1

Anchor size			M8	M10	M12	M16
FIX Z XTREM/A4						
Steel failure						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Characteristic resistance	$N_{Rk,s,eq,C1}$	[kN]	16,7	36,0	52,3	91,1
Pull-out failure						
Effective anchorage depth	$h_{ef,1}$	[mm]	48	60	70	85
Characteristic resistance	$N_{Rk,p,eq,C1}$	[kN]	4,0	7,4	16,0	20,0

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic values of tension resistance under seismic actions, category C1

Annex C10

Deutsches Institut für Bautechnik DIBt

Table C11 : Characteristic shear resistances for seismic loading for FIX Z XTREM, category C1

Anchor size				**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM								
Steel failure								
Characteristic resistance		$V_{Rk,s,eq,C1}$	[kN]	6	16	23	45	61
Factor for anchorages	with annular gap	α_{gap}	-	0,5				
	without annular gap	α_{gap}	-	- [1)]				

[1)] No performance assessed

Table C12 : Characteristic shear resistances for seismic loading for FIX Z XTREM/A4, category C1

Anchor size				**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4							
Steel failure							
Characteristic resistance		$V_{Rk,s,eq,C1}$	[kN]	5,7	12,2	17,8	33,7
Factor for anchorages	with annular gap	α_{gap}	-	0,5			
	without annular gap	α_{gap}	-	- [1)]			

[1)] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic shear resistances under seismic actions, category C1	**Annex C11**

Deutsches Institut für Bautechnik DIBt

Table C13 : Characteristic tension resistances under seismic loading for FIX Z XTREM, category C2

Anchor size			**M10**	**M12**	**M16**	**M20**
FIX Z XTREM						
Effective anchorage depth	$h_{ef,1}$	[mm]	60	70	85	100
Steel failure						
Characteristic resistance	$N_{Rk,s,eq,C2}$	[kN]	29,3	38,2	64,7	99,1
Pull-out failure						
Characteristic resistance	$N_{Rk,p,eq,C2}$	[kN]	2,8	6,0	18,0	25,6

Table C14 : Displacement under tension loads for seismic loading for FIX Z XTREM, category C2

Anchor size			**M10**	**M12**	**M16**	**M20**
FIX Z XTREM						
Displacement DLS	$\delta_{N,seis\ (DLS)}$	[mm]	3,1	2,1	5,1	5,0
Displacement ULS	$\delta_{N,seis\ (ULS)}$	[mm]	14	7	14	13

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic tension resistance and displacements under tension loads under seismic loading, category C2

Annex C12

Deutsches Institut für Bautechnik DIBt

Table C15 : Characteristic tension resistances under seismic loading for FIX Z XTREM/A4, category C2

Anchor size			**M10**	**M12**	**M16**
FIX Z XTREM/A4					
Effective anchorage depth	$h_{ef,1}$	[mm]	60	70	85
Steel failure					
Characteristic resistance	$N_{Rk,s,eq,C2}$	[kN]	36,0	52,3	91,1
Pull-out failure					
Characteristic resistance	$N_{Rk,p,eq,C2}$	[kN]	2,6	6,0	14,6

Table C16 : Displacement under tension loads for seismic loading for FIX Z XTREM/A4, category C2

Anchor size			**M10**	**M12**	**M16**
FIX Z XTREM/A4					
Displacement DLS	$\delta_{N,seis\ (DLS)}$	[mm]	0,5	4,3	5,0
Displacement ULS	$\delta_{N,seis\ (ULS)}$	[mm]	14,4	14,8	20,6

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic tension resistances and displacements under tension loads under seismic loading, category C2

Annex C13

Deutsches Institut für Bautechnik DIBt

Table C17 : Characteristic shear resistances under seismic loading for FIX Z XTREM, category C2

Anchor size				**M10**	**M12**	**M16**	**M20**
FIX Z XTREM							
Steel failure							
Characteristic resistance		$V_{Rk,s,eq,C2}$	[kN]	9,7	14,0	33,9	44,7
Factor for anchorages	with annular gap	α_{gap}	-	0,5			
	without annular gap	α_{gap}	-	- [1)]			

[1)] No performance assessed

Table C18 : Displacement under shear loads for seismic loading for FIX Z XTREM, category C2

Anchor size			**M10**	**M12**	**M16**	**M20**
FIX Z XTREM						
Displacement DLS	$\delta_{V,seis\ (DLS)}$	[mm]	3,8	4,1	4,7	4,9
Displacement ULS	$\delta_{V,seis\ (ULS)}$	[mm]	6,0	6,3	9,0	9,0

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic shear resistances and displacements under shear loads under seismic loading, category C2	**Annex C14**

Deutsches Institut für Bautechnik DIBt

Table C19 : Characteristic shear resistances under seismic loading for FIX Z XTREM/A4, category C2

Anchor size				**M10**	**M12**	**M16**
FIX Z XTREM/A4						
Steel failure						
Characteristic resistance		$V_{Rk,s,eq,C2}$	[kN]	7,3	10,7	25,3
Factor for anchorages	with annular gap	α_{gap}	-	0,5		
	without annular gap	α_{gap}	-	-[1)]		

[1)] No performance assessed

Table C20 : Displacement under shear loads for seismic loading for FIX Z XTREM/A4, category C2

Anchor size			**M10**	**M12**	**M16**
FIX Z XTREM/A4					
Displacement DLS	$\delta_{V,seis\ (DLS)}$	[mm]	3,8	4,1	4,8
Displacement ULS	$\delta_{V,seis\ (ULS)}$	[mm]	6,0	6,3	8,9

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic values of shear resistance and displacements under shear loads under seismic loading, category C2	**Annex C15**

Table C21 : Characteristic tension resistance under fire exposure in cracked and uncracked concrete for FIX Z XTREM

Anchor size				**M8**	**M10**	**M12**	**M16**	**M20**
FIX Z XTREM								
Steel failure								
Effective anchorage depth		$h_{ef,1}$	[mm]	**46**	**60**	**70**	**85**	**100**
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,9	2,8	3,6	6,6	10,4
	R60	$N_{Rk,s,fi}$	[kN]	0,7	2,3	3,1	5,7	9,0
	R90	$N_{Rk,s,fi}$	[kN]	0,5	1,8	2,6	4,9	7,6
	R120	$N_{Rk,s,fi}$	[kN]	0,4	1,6	2,4	4,4	6,9

Table C22 : Characteristic tension resistance under fire exposure in cracked and uncracked concrete for FIX Z XTREM/A4

Anchor size				**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4							
Steel failure							
Effective anchorage depth		$h_{ef,1}$	[mm]	**48**	**60**	**70**	**85**
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	4,9	9,9	9,2	16,1
	R60	$N_{Rk,s,fi}$	[kN]	3,2	6,3	6,5	11,3
	R90	$N_{Rk,s,fi}$	[kN]	1,5	2,6	3,7	6,5
	R120	$N_{Rk,s,fi}$	[kN]	0,7	0,8	2,3	4,1
Effective anchorage depth		$h_{ef,2}$	[mm]	**35**	**40**	**50**	**65**
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	- [1)]	9,9	9,2	16,1
	R60	$N_{Rk,s,fi}$	[kN]	-[1)]	6,3	6,5	11,3
	R90	$N_{Rk,s,fi}$	[kN]	- [1)]	2,6	3,7	6,5
	R120	$N_{Rk,s,fi}$	[kN]	- [1)]	0,8	2,3	4,1

- In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,fi}$ = 1,0 is recommended
- $N_{Rk,p,fi}$ according to EN 1992-4:2018

[1)] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 **Torque-controlled expansion anchor**	
Characteristic values of tension resistance under fire exposure	**Annex C16**

Deutsches Institut für Bautechnik DIBt

Table C23 : Characteristic shear resistance under fire exposure in cracked and uncracked concrete for FIX Z XTREM

Anchor size				M8	M10	M12	M16	M20
FIX Z XTREM								
Effective anchorage depth		$h_{ef,1}$	[mm]	**46**	**60**	**70**	**85**	**100**
Steel failure without level arm								
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,9	2,8	3,6	6,6	10,4
	R60	$V_{Rk,s,fi}$	[kN]	0,7	2,3	3,1	5,7	9,0
	R90	$V_{Rk,s,fi}$	[kN]	0,5	1,8	2,6	4,9	7,6
	R120	$V_{Rk,s,fi}$	[kN]	0,4	1,6	2,4	4,4	6,9
Steel failure with level arm								
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,9	3,5	5,5	14,1	27,5
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,7	2,9	4,8	12,2	23,8
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,5	2,3	4,0	10,3	20,1
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,4	2,0	3,7	9,3	18,2

In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,fi}$ = 1,0 is recommended

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic shear resistance under fire exposure

Annex C17

Deutsches Institut für Bautechnik DIBt

Table C24 : Characteristic shear resistance under fire exposure in cracked and uncracked concrete for FIX Z XTREM/A4

Anchor size				**M8**	**M10**	**M12**	**M16**
FIX Z XTREM/A4							
Steel failure without level arm							
Effective anchorage depth		$h_{ef,1}$	**[mm]**	**48**	**60**	**70**	**85**
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	4,9	9,9	9,2	16,1
	R60	$V_{Rk,s,fi}$	[kN]	3,2	6,3	6,5	11,3
	R90	$V_{Rk,s,fi}$	[kN]	1,5	2,6	3,7	6,5
	R120	$V_{Rk,s,fi}$	[kN]	0,7	0,8	2,3	4,1
Effective anchorage depth		$h_{ef,2}$	**[mm]**	**35**	**40**	**50**	**65**
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	-[1)]	9,9	9,2	16,1
	R60	$V_{Rk,s,fi}$	[kN]	-[1)]	6,3	6,5	11,3
	R90	$V_{Rk,s,fi}$	[kN]	-[1)]	2,6	3,7	6,5
	R120	$V_{Rk,s,fi}$	[kN]	-[1)]	0,8	2,3	4,1
Steel failure with level arm							
Effective anchorage depth		$h_{ef,1}$	**[mm]**	**48**	**60**	**70**	**85**
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	5,0	12,7	14,4	34,1
	R60	$M^0_{Rk,s,fi}$	[Nm]	3,3	8,1	10,1	23,9
	R90	$M^0_{Rk,s,fi}$	[Nm]	1,5	3,3	5,7	13,8
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,7	1,0	3,6	8,7
Effective anchorage depth		$h_{ef,2}$	**[mm]**	**35**	**40**	**50**	**65**
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	-[1)]	12,7	14,4	34,1
	R60	$M^0_{Rk,s,fi}$	[Nm]	-[1)]	8,1	10,1	23,9
	R90	$M^0_{Rk,s,fi}$	[Nm]	-[1)]	3,3	5,7	13,8
	R120	$M^0_{Rk,s,fi}$	[Nm]	-[1)]	1,0	3,6	8,7

In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,fi}$ = 1,0 is recommended

[1)] No performance assessed

SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4
Torque-controlled expansion anchor

Characteristic shear resistance under fire exposure

Annex C18