



Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments



European Technical Assessment

ETA-16/0276 of 4 November 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Trade name of the construction product

Product family to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment contains

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

SPIT TAPCON 6 SPIT TAPCON XTREM 8, 10, 12, 14 mm

Mechanical fasteners for use in concrete

SPIT Route de Lyon 26500 BOURG-LÉS-VALENCE FRANKREICH

Plant 1

22 pages including 3 annexes which form an integral part of this assessment

EAD 330232-00-0601, Edition 10/2016

ETA-16/0276 issued on 23 September 2016



European Technical Assessment ETA-16/0276 English translation prepared by DIBt

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Specific Part

1 Technical description of the product

The concrete screw SPIT TAPCON respectively SPIT TAPCON XTREM is an anchor in size 6, 8, 10, 12 and 14 mm made of galvanised steel, made of stainless or high corrosion resistant steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description are 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 B 4, Annex C 1 and C 2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1 and C 2
Displacements and Durability	See Annex C 7 and Annex B 1
Characteristic resistance and displacements for seismic performance categories C1 and C2	See Annex C 3, C 4, C 5 and C 8

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 6



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

In accordance with European Assessment Document EAD No. 330232-00-0601 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 European Assessment Document

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

Issued in Berlin on 4 November 2020 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock Head of Section

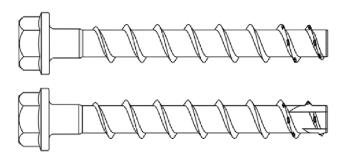
beglaubigt: Tempel



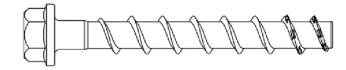
Product in installed condition

SPIT TAPCON XTREM

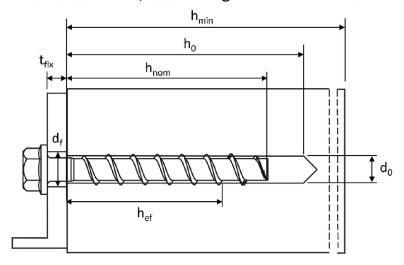
- Galvanized carbon steel



- Stainless steel A4
- Stainless steel HCR



e.g. SPIT TAPCON concrete screw, with hexagon head and fixture



d₀ = nominal drill hole diameter

 t_{fix} = thickness of fixture

d_f = clearance hole diameter

h_{min} = minimum thickness of member

h_{nom} = nominal embedment depth

 h_0 = drill hole depth

h_{ef} = effective embedment depth

SPIT TAPCON XTREM

Product description

Product in installed condition

Annex A1



	©	Configuration with metric connection and hexagon socket e.g. TAPCON XT SW5					
	0	Configuration with metric connection and hexagon drive e.g. TAPCON XTR					
	TSA OOL O	Configuration with washer and hexa e.g. TAPCON XTREM 8x80 SW13 VZ	_				
	(SA)	Configuration with washer, hexagon TORX drive e.g. TAPCON XTREM 8x8					
	OCT AND BC BL	Configuration with washer and bund e.g. TAPCON XTREM BC ST 14x130 SW					
	(SA)	Configuration with hexagon head e.g. TAPCON XTREM 8x80 SW13 OS					
	(SA)	Configuration with countersunk hea e.g. TAPCON XTREM 8x80 C VZ 40	d and TORX drive				
	(SA)	Configuration with pan head and TORX drive e.g. TAPCON XTREM 8x80 P VZ 40					
	(SM)	Configuration with large pan head a drive e.g. TAPCON XTREM 8x80 LP V					
		Configuration with countersunk hea connection thread e.g. TAPCON XTR					
		Configuration with hexagon drive an connection thread e.g. TAPCON XTR					
		Configuration with internal thread a hexagon drive e.g. TAPCON XTREM 6					
SPIT TAPCON XT	REM						
Product descri Screw types	Product description Screw types						



Table 1: Material

Part	Product name	Material
	TAPCON XTREM	Steel EN 10263-4:2017 galvanized acc. to EN ISO 4042:2018
all types	TAPCON XTREM A4	1.4401; 1.4404; 1.4571; 1.4578
	TAPCON XTREM HCR	1.4529

		Nominal chara	Rupture		
Part	Product name	Yield strength f _{yk} [N/mm²]	Ultimate strength f _{uk} [N/mm²]	elongation A ₅ [%]	
	TAPCON XTREM				
all types	TAPCON XTREM A4	560	700	≤8	
types	TAPCON XTREM HCR				

Table 2: Dimensions

Anchor size			6	5	8			10			12			14			
Nominal embedment		h_{nom}	1	2	1	2	3	1	2	3	1	2	3	1	2	3	
depth		[mm]	40	55	45	55	65	55	75	85	65	85	100	75	100	115	
Screw length	≤L	[mm]								500							
Core diameter	d_{K}	[mm]	5,	5,1 7,1					9,1			11,1			13,1		
Thread outer diameter	d _s	[mm]	7,	,5		10,6		12,6		14,6		5	16,6				

Marking: TAPCON XTREM

Screw type: TSM Screw size: 10 Screw length: 100



TAPCON XTREM BC ST Screw

type: TSM BC ST Screw size: 10 Screw length: 100



TAPCON XTREM A4

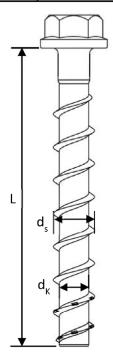
Screw type: TSM
Screw size: 10
Screw length: 100
Material: A4



TAPCON XTREM HCR

Screw type: TSM
Screw size: 10
Screw length: 100
Material: HCR





SPIT TAPCON XTREM

Product description

Material, Dimensions and markings

Annex A3



Specification of Intended use

Table 3: Anchorages subject to

TAPCON XTREM concrete		(6		8		10			12			14		
Nominal embedment depth		h _{nom1}	h _{nom2}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}
	[mm]	40	55	45	55	65	55	75	85	65	85	100	65	85	115
Static and quasi-static loads			All sizes and all embedment depths												
Fire exposure			All				iii sizes and all embed			ment deptils					
C1 category - seismic		ok	ok				ok								
C2 category – seismic (A4 and HCR: no performance assessed)		,	κ	,	Κ	ok	х	х	ok	>	(ok	>	(ok

Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exits: screw types made of stainless steel with marking A4.
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exits: screw types made of stainless steel with marking HCR.

 Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in
 - Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

SPIT TAPCON XTREM	
Intended use Specification	Annex B1



Specification of Intended use - continuation

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 are designed according to EN 1992-4:2018 and EOTA Technical Report TR 055.
 The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters d_f of clearance hole in the fixture in Annex B3, Table 4.

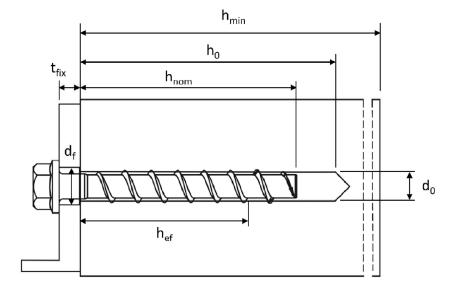
Installation:

- Hammer drilling or hollow drilling; hollow drilling only for sizes 8-14.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer, if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The head of the anchor is supported in the fixture and is not damaged.
- The borehole may be filled with injection mortar SPIT EPCON C8 XTREM or VIPER XTREM
- Adjustability according to Annex B6 for sizes 8-14, all embedment depths
- Cleaning of borehole is not necessary, if using a hollow drill

SPIT TAPCON XTREM	
Intended use Specification continuation	Annex B2



TAPCON XTREM concrete s	crew si	ze	e	5		8			10		
Naminal ambadment denth		h _{nom}	h _{nom1}	h _{nom2}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}	
Nominal embedment depth		[mm]	40	55	45	55	65	55	75	85	
Nominal drill hole diameter	d ₀	[mm]	E	5		8			10		
Cutting diameter of drill bit	d _{cut} ≤	[mm]	6,4	40		8,45			10,45		
Drill hole depth	h₀≥	[mm]	45	60	55	65	75	65	85	95	
Clearance hole diameter	d _f ≤	[mm]	8	3		12			14		
Installation torque (version with connection thread)	T _{inst}	[Nm]	1	0		20		40			
Torque impact screw driver		[Nm]	Max. torque according to manufacturer's					turer's i	instruct	ions	
Torque impact screw unver		נואווון	16	0	300			400			
TAPCON XTREM concrete s	crew si	ze		1	2		14				
Nominal embedment depth		h _{nom}	h _{nom1}	nom1 h _{nom2} h _{nom3}		I _{nom3}	h _{nom1} h _{nom2}		_{n2} ł	1 _{nom3}	
Nominal embeament depth		[mm]	65	85		100	75	75 100		115	
Nominal drill hole diameter	d_0	[mm]		1	2			1	4		
Cutting diameter of drill bit	d _{cut} ≤	[mm]		12	,50			14,	,50		
Drill hole depth	h ₀ ≥	[mm]	75	95		110	85	110)	125	
Clearance hole diameter	d _f ≤	[mm]		1	6			1	8		
cicarance note alameter	Installation torque (version with connection thread)			60			80				
Installation torque (version	T _{inst}	[Nm]		6	0			8 			
Installation torque (version	T _{inst}	[Nm]	Max			ling to r	nanufac			ions	



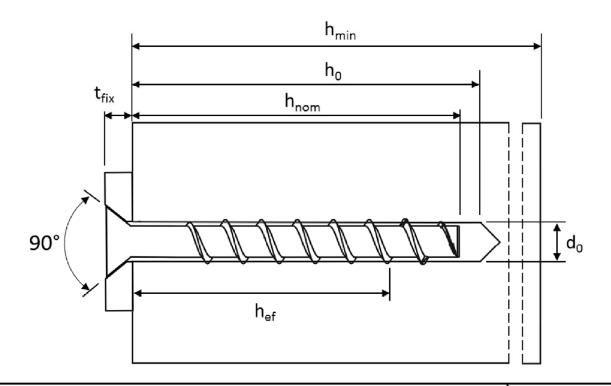
Intended use Installation parameters **Annex B3**



Table 5: Minimum thickness of member, minimum edge distance and minimum spacing

TAPCON XTREM concrete screw size			(5		8		10			
Nominal embedment depth		h _{nom}	h _{nom1}	h _{nom2}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}	
		[mm]	40	55	45	55	65	55	75	85	
Minimum thickness of member	h _{min}	[mm]			8	30			90	102	
Minimum edge distance	C _{min}	[mm]	4	.0	40	5	0		50		
Minimum spacing	S _{min}	[mm]	4	40		5	0		50		

TAPCON XTREM conci	ete sci	rew		12			14	
Nominal embedment d	onth	h _{nom}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}
Norminal embedment d	ерин	[mm]	65	85	100	75	100	115
Minimum thickness of member	h _{min}	[mm]	80	101	120	87	119	138
Minimum edge distance	C _{min}	[mm]	5	0	70	50	-	70
Minimum spacing	S _{min}	[mm]	5	0	70	50	-	70

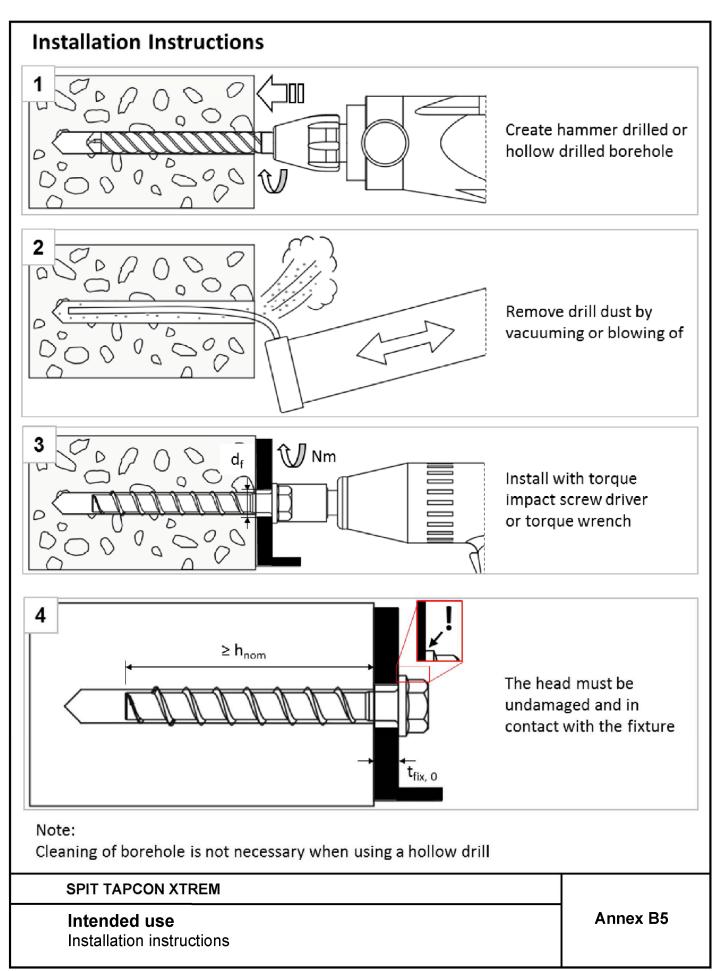


Intended use Minimum thickness of member, minimum edge distance and minimum

Annex B4

spacing

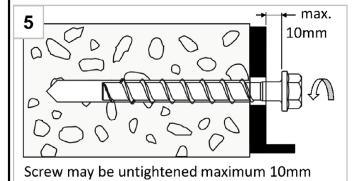




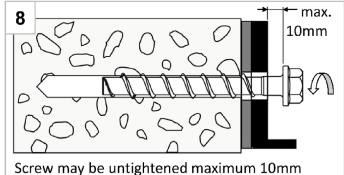


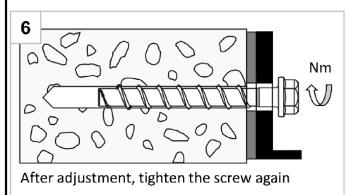
Installation Instructions - Adjustment

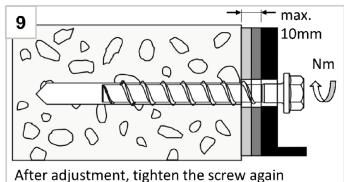
1. Adjustment

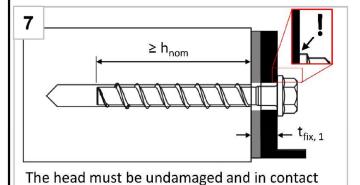


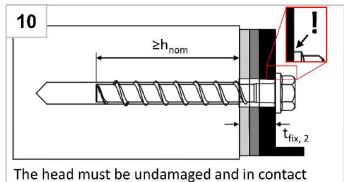
2. Adjustment











Note:

with the fixture

The fastener can be adjusted maximum two times. The total allowed thickness of shims added during the adjustment process is 10mm. The final embedment depth after adjustment process must be larger or equal than h_{nom} .

with the fixture

SPIT TAPCON XTREM

Intended use

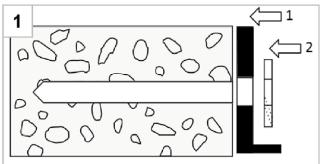
Installation instructions - Adjustment

Annex B6

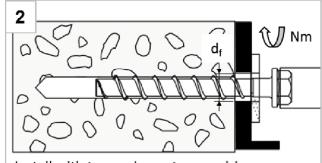


Installation Instructions - Filling annular gap

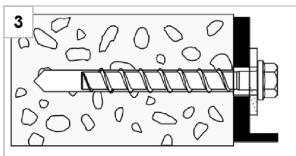
Positioning of fixture and filling washer



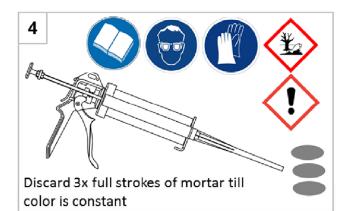
After preparing borehole (Annex B5, figure 1+2), position first fixture (1), than filling washer (2)



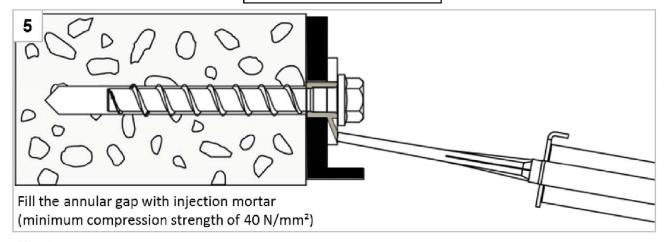
Install with torque impact screw driver or torque wrench



Installed condition without injected mortar in the filling washer



Filling the annular gap



Note:

For seismic loading the installation with filled and without filled annular gap is approved. Differences in performance can be found in Annex C5 - C7.

SPIT TAPCON XTREM

Intended use

Installation instructions - Filling annular gap

Annex B7



Table 6: Cha	racteristic val	ues fo	r static	and q	uasi-st	atic loa	ading,	sizes 6	-10				
TAPCON XTR	EM concrete se	crew si	ze	(5		8			10			
Moneinal and	admant death		h _{nom}	h _{nom1}	h _{nom2}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}		
Nominal emb	edment depth		[mm]	40	55	45	55	65	55	75	85		
Steel failure	for tension and	shear	loadin	g									
Characteristic	tension load	$N_{Rk,s}$	[kN]	14	14,0 27,0 45,0								
Partial factor		γ _{Ms,N}	[-]				1,	,5					
Characteristic	Characteristic shear load $V_{Rk,s}^0$ [kN]					13	3,5	17,0	22,5	34	.,0		
Partial factor	[-]				1,	25							
Ductility facto	or	k ₇	[-]				0,	,8					
Characteristic	bending load	$M^0_{Rk,s}$	[Nm]	10),9		26,0			56,0			
Pull-out failu	re												
Characte-	cracked	$N_{Rk,p}$	[kN]	2,0	4,0	5,0	9,0	12,0	9,0	≥ N ⁰	Rk,c ¹⁾		
ristic tension load C20/25	uncracked	$N_{Rk,p}$	[kN]	4,0	9,0	7,5	12,0	16,0	12,0	20,0	26,0		
	C25/30						1,	12					
Increasing factor for	C30/37	Ψς	[-]				1,	22					
N _{Rk,p}	C40/50	С					1,			$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	C50/60						1,	58		$ \begin{array}{c c} 56,0 \\ 9,0 & \geq N^{0}_{Rk,c}^{1} \\ 2,0 & 20,0 & 26 \end{array} $			
Concrete fail	ure: Splitting fa	ailure, d	concret	e cone	failure	and pr	y-out fa	ilure					
Effective emb	edment depth	h _{ef}	[mm]	31	44	35	43	52	43	60	68		
k-factor	cracked	k _{cr}	[-]				7,	,7					
K-IdCtOI	uncracked	k _{ucr}	[-]				11	.,0					
Concrete	spacing	S _{cr,N}	[mm]				3 x	h _{ef}					
cone failure	edge distance	C _{cr,N}	[mm]				1,5	x h _{ef}					
6 1:	resistance	N ⁰ Rk,sp	[kN]	2,0	4,0	5,0	9,0	12,0	9,0	16,0	19,0		
Splitting failure	spacing	S _{cr,Sp}	[mm]	120	160	120	140	150	140	180	210		
	edge distance	C _{cr,Sp}	[mm]	60	80	60	70	75	70	90	105		
Factor for pry	-out failure	k ₈	[-]			1	,0			2,	.0		
Installation fa	ctor	γinst	[-]				1,	,0					
Concrete edg	ge failure												
Effective lengt		I _f = h _{ef}	[mm]	31	44	35	43	52	43	60	68		
Nominal oute screw	[mm]	6			8			10					
¹⁾ N ⁰ _{Rk,c} according to EN 1992-4:2018													
SPIT T	APCON XTREM	1											
	Performances Characteristic values for st				static lo	oading,	sizes 6	6-10	A	nnex (C1		



Table 7: Char	acteristic values fo	or static	and o	ıuasi-sta	atic load	ding, size	es 12-1 4	1			
TAPCON XTR	EM concrete screw	size			12			14			
No main al a mala	- due cut do uth		h _{nom}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}		
Nominal emp	edment depth		[mm]	65	85	100	75	100	115		
Steel failure	for tension and shea	ar loadin	g								
Characteristic	tension load	$N_{Rk,s}$	[kN]		67,0			94,0			
Partial factor		γMs,N	[-]			1,	,5				
Characteristic	shear load	$V^0_{Rk,s}$	[kN]	33,5	42	2,0	56,0				
Partial factor		γ _{Ms,V}	[-]			1,	25				
Ductility facto	r	k ₇	[-]			0,	,8				
Characteristic	bending load	M ⁰ _{Rk,s}	[Nm]		113,0			185,0			
Pull-out failu	re										
Characteristic	cracked	$N_{Rk,p}$	[kN]	12,0			0 1)				
tension load C20/25	uncracked	$N_{Rk,p}$	[kN]	16,0			$\geq N^{0}_{Rk,c}$ ¹⁾	1			
	C25/30					1,	12				
Increasing	C30/37	111	,			1,	22				
factor for N _{Rk,i}	C40/50	Ψ_{c}	[-]			1,	41	94,0 56,0 185,0			
	C50/60					1,	58				
Concrete fail	ure: Splitting failure	, concre	te con	e failure	and pry	-out fail	ure				
	edment depth	h _{ef}	[mm]	50	67	80	58	79	92		
	cracked	k ₁ =k _{cr}	[-]			7,	,7				
k-factor	uncracked	k ₁ = k _{ucr}	[-]			11	.,0				
Concrete	spacing	S _{cr,N}	[mm]			3 x	h _{ef}				
cone failure	edge distance	C _{cr,N}	[mm]			1,5	x h _{ef}				
Calittia	resistance	N ⁰ _{Rk,sp}	[kN]	12,0	18,5	24,5	15,0	24,0	30,0		
Splitting failure	spacing	S _{cr,Sp}	[mm]	150	210	240	180	240	280		
	edge distance	C _{cr,Sp}	[mm]	75	105	120	90	120	140		
Factor for pry-	-out failure	k ₈	[-]	1,0	2,0 1,0 2,0						
Installation fa	ctor	γinst	[-]		1,0						
Concrete edg	ge failure										
Effective lengt	th in concrete	I _f = h _{ef}	[mm]	50	67	80	58	79	92		
Nominal oute	r diameter of screw	d_{nom}	[mm]		12			14			
1) N ⁰ _{Rk,c} according	ng to EN 1992-4:2018										
SPIT TA	APCON XTREM										
Perfor	mances							Annex	C2		

Characteristic values for static and quasi-static loading, sizes 12-14



Table 8: Seismic category C1 -	- Charac	terist	ic load	value	S				
TAPCON XTREM concrete screw	size		6	5	8	1	0	12	14
Naminal ambadment denth		h _{nom}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom3}	h _{nom3}	h _{nom3}
Nominal embedment depth		[mm]	40	55	65	55	85	100	115
Steel failure for tension and she	ar load								
Characteristic load	N _{Rk,s,eq}	[kN]	14	.,0	27,0	45	5,0	67,0	94,0
Partial factor	γ Ms,eq	[-]				1,5	ı		
Characteristic load	$V_{Rk,s,eq}$	[kN]	4,7	5,5	8,5	13,5	15,3	21,0	22,4
Partial factor	γ _{Ms,eq}	[-]				1,25	5		
With filling of the annular gap 1)	$lpha_{\sf gap}$	[-]				1,0)		
Without filling of the annular gap	$\alpha_{\sf gap}$	[-]				0,5	1		
Pull-out failure									
Characteristic tension load in cracked concrete C20/25	$N_{Rk,p,eq}$	[kN]	2,0	4,0	12,0	9,0		≥ N ⁰ _{Rk,c}	2)
Concrete cone failure									
Effective embedment depth	h _{ef}	[mm]	31	44	52	43	68	80	92
Edge distance	C _{cr,N}	[mm]				1,5 x	h _{ef}		
Spacing	S _{cr,N}	[mm]				3 x h	lef		
Installation factor	γinst	[-]				1,0	١		
Concrete pry-out failure									
Factor for pry-out failure	k ₈	[-]		1	,0			2,0	
Concrete edge failure									
Effective length in concrete	I _f = h _{ef}	[mm]	31	44	52	43	68	80	92
Nominal outer diameter of screw	d_{nom}	[mm]	6	6	8	10	10	12	14

 $^{^{\}rm 1)}$ Filling of the annular gap according to annex B7, figure 5

SPIT TAPCON XTREM

Performances

Seismic category C1 – Characteristic load values

Annex C3

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



TAPCON XTREM concrete screw	/ size		8	10	12	14
Name to all and a discount density		h _{nom}		h _n	om3	
Nominal embedment depth		[mm]	65	85	100	115
Steel failure for tension						
Characteristic load	N _{Rk,s,eq}	[kN]	27,0	45,0	67,0	94,0
Partial factor	γMs,eq	[-]		1	,5	
With filling of the annular gap	$lpha_{\sf gap}$	[-]		1	,0	
Pull-out failure						
Characteristic load in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,4	5,4	7,1	10,5
Steel failure for shear load						
Characteristic load	$V_{Rk,s,eq}$	[kN]	9,9	18,5	31,6	40,7
Partial factor	γMs,eq	[-]		1,	25	
With filling of the annular gap	$lpha_{\sf gap}$	[-]		1	,0	
Concrete cone failure						
Effective embedment depth	h _{ef}	[mm]	52	68	80	92
Edge distance	C _{cr,N}	[mm]		1,5	x h _{ef}	
Spacing	S _{cr,N}	[mm]		3 x	h _{ef}	
Installation factor	γinst	[-]		1	,0	
Concrete pry-out failure						
Factor for pry-out failure	k ₈	[-]	1,0		2,0	

1) A4	and	HCR	not	suita	ble
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Effective length in concrete

Nominal outer diameter of screw

SPIT TAPCON XTREM	
Performances Seismic category C2 – Characteristic load values with filled annular gap	

 $I_f = h_{ef}$

 d_{nom}

[mm]

[mm]

52

8

Annex C4

80

12

68

10

92

14



TAPCON XTREM concrete screw	size		8	10	12	14
		h _{nom}		h _r	om3	ı
Nominal embedment depth		[mm]	65	85	100	115
Steel failure for tension (hexago	n head t	ype)				
Characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0	67,0	94,0
Partial factor	γ _{Ms,eq}	[-]		1	.,5	
Pull-out failure (hexagon head ty	/pe)					
Characteristic load in cracked concrete	N _{Rk,p,eq}	[kN]	2,4	5,4	7,1	10,5
Steel failure for shear load (hexa	gon hea	d type)				
Characteristic load	$V_{Rk,s,eq}$	[kN]	10,3	21,9	24,4	23,3
Partial factor	γ _{Ms,eq}	[-]		1,	.25	
Without filling of the annular gap	$lpha_{\sf gap}$	[-]		C	,5	
Steel failure for tension (counter	sunk he	ad type)			
Characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0		
Partial factor	γ _{Ms,eq}	[-]	1	.,5	no performa	ance assessec
Pull-out failure (countersunk hea	ad type)					
Characteristic load in cracked concrete	$N_{Rk,p,eq}$	[kN]	2,4	5,4	no performa	ance assessec
Steel failure for shear load (coun	tersunk	head ty	/pe)			
Characteristic load	$V_{Rk,s,eq}$	[kN]	3,6	13,7		
Partial factor	γ _{Ms,eq}	[-]	1,	.25	no performa	ance assessed
Without filling of the annular gap	$lpha_{\sf gap}$	[-]	0	,5		
Concrete cone failure						
Effective embedment depth	h _{ef}	[mm]	52	68	80	92
Edge distance	C _{cr,N}	[mm]		1,5	x h _{ef}	
Spacing	S _{cr,N}	[mm]		3 >	ເ h _{ef}	
Installation factor	γinst	[-]		1	.,0	
Concrete pry-out failure						
Factor for pry-out failure	k ₈	[-]	1,0		2,0	
Concrete edge failure						
Effective length in concrete	$I_f = h_{ef}$	[mm]	52	68	80	92
Nominal outer diameter of screw	d _{nom}	[mm]	8	10	12	14
1) A4 and HCR not suitable	<u> </u>					

Seismic category C2 – Characteristic load values without filled annular gap

Performances



Steel failure South Sou	TAPCON XTF	REM co	ncrete scr	ew	(5		8			10			12			14			
Steel failure For tension and shear load Steel failure Fo				h _{nom}	1	2	1	2	3	1	2	3	1	2	3	1	2	3		
R30	Nominal emb	edmen	it depth		40	55	45	55	65	55	75	85	65	85	100	75	100	11		
R60	Steel failure	for ter	sion and	shear l	load															
R60		R30	N _{Rk,s,fi30}	[kN]	0,	,9	2,4		4,4		7,3		10,3							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		R60	1	[kN]	0,	,8					3,3			5,8			8,2			
Characteristic Resistance Re		R90	N _{Rk,s,fi90}	[kN]	0,	,6		1,1			2,3			4,2			5,9			
Resistance Resistance R60 VRk,s,fi60 VRk,s,fi60 VRk,s,fi60 VRk,s,fi90 VRR,s,fi90		R120	N _{Rk,s,fi120}	[kN]	0,	,4		0,7			1,7			3,4			4,8			
Resistance		R30	V _{Rk,s,fi30}	[kN]	0,	,9		2,4			4,4			7,3			10,3			
R120	characteristic	R60	V _{Rk,s,fi60}	[kN]	0,	,8		1,7			3,3			5,8			8,2			
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Resistance	R90	$V_{Rk,s,fi90}$	[kN]	0,	,6		1,1			2,3			4,2			5,9			
R60 M ⁰ _{Rk,s,fi90} Rm 0,6 1,8 3,0 3,0 7,0 11,6		R120		[kN]	0,	,4		0,7						3,4						
R90 M ⁰ _{Rk,s,fi120} [Nm] 0,5 1,2 3,0 7,0 11,6 R120 M ⁰ _{Rk,s,fi120} [Nm] 0,3 0,9 2,3 5,7 9,4 Pull-out failure Characteristic Resistance R30- R90 N _{Rk,p,fi} [kN] 0,5 1,0 1,3 2,3 3,0 2,3 4,0 4,8 3,0 4,7 6,2 3,8 6,0 R120 N _{Rk,p,fi} [kN] 0,4 0,8 1,0 1,8 2,4 1,8 3,2 3,9 2,4 3,8 4,9 3,0 4,8 Concrete cone failure Characteristic Resistance R30- R90 N ⁰ _{Rk,c,fi} [kN] 0,9 2,2 1,2 2,1 3,4 2,1 4,8 6,6 3,0 6,3 9,9 4,4 9,6 2,1 R20 N ⁰ _{Rk,c,fi} [kN] 0,7 1,8 1,0 1,7 2,7 1,7 3,8 5,3 2,4 5,1 7,9 3,5 7,6 2,5 Edge distance R30 bis R120 C _{cr,fi} [mm] 2 x h _{ef} In case of fire attack from more than one side, the minimum edge distance shall be ≥300mm. Spacing R30 bis R120 S _{cr,fi} [mm] 4 x h _{ef} Pry-out failure R30 bis R120 R ₈ [-] 1,0 2,0 1,0 2,0 1,0 2,0 The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given				-																
Pull-out failure Characteristic Resistance R30- R90 NRk,p,fi R10 NRk,p,fi R20 R120 NRu R20 R120																				
Pull-out failure Characteristic Resistance Characteristic Resistance R120																8,2 5,9 4,8 20,4 15,9 11,6 9,4	ı			
Characteristic Resistance $R30$ - $R90$ $R_{R,k,p,fi}$ $R80$ $R120$ $R_{R,k,p,fi}$ $R80$ $R120$ $R_{R,k,p,fi}$ $R80$ $R120$ $R_{R,k,p,fi}$ $R80$ $R120$ $R80$ $R80$ $R120$ $R80$ R		R120	M ^U Rk,s,fi120	[Nm]	0,	,3		0,9			2,3			5,7		8,2 5,9 4,8 20,4 15,9 11,6 9,4 5,2 3,8 6,0 7				
Characteristic Resistance $ R90 N_{Rk,p,fi} [kN] 0,5 1,0 1,3 2,3 3,0 2,3 4,0 4,8 3,0 4,7 6,2 3,8 6,0 R120 N_{Rk,p,fi} [kN] 0,4 0,8 1,0 1,8 2,4 1,8 3,2 3,9 2,4 3,8 4,9 3,0 4,8 R120 N_{Rk,c,fi} [kN] 0,9 2,2 1,2 2,1 3,4 2,1 4,8 6,6 3,0 6,3 9,9 4,4 9,6 3,0 4,8 R120 N_{Rk,c,fi} [kN] 0,7 1,8 1,0 1,7 2,7 1,7 3,8 5,3 2,4 5,1 7,9 3,5 7,6 2,4 3,8 3,0 3,0 3,0 4,8 3,0 4,7 6,2 3,8 6,0 4,8 4,9 3,0 4,8 4,9 4,$	Pull-out failu	ıre																		
Concrete cone failure Characteristic Resistance R120 N _{Rk,p,fi} [kN] 0,4 0,8 1,0 1,8 2,4 1,8 3,2 3,9 2,4 3,8 4,9 3,0 4,8 Characteristic Resistance R30-R90 N ⁰ _{Rk,c,fi} [kN] 0,9 2,2 1,2 2,1 3,4 2,1 4,8 6,6 3,0 6,3 9,9 4,4 9,6 3,0 4,8 4,9 4,4 4,8 4,9 4,8 4,9 4,8 4,9 4,8 4,9 4,8 4,9 4,4 4,8 4,9 4,8 4,9 4,8 4,9 4,8 4,9 4,4 4,8 4,9 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,8 4,9 4,4 4,	Characteristic	R30- R90	N _{Rk,p,fi}	[kN]	0,5	1,0	1,3	2,3	3,0	2,3	4,0	4,8	3,0	4,7	6,2	3,8	6,0	7,		
Characteristic R30- R90 N ⁰ Rk,c,fi [kN] 0,9 2,2 1,2 2,1 3,4 2,1 4,8 6,6 3,0 6,3 9,9 4,4 9,6 2 R120 N ⁰ Rk,c,fi [kN] 0,7 1,8 1,0 1,7 2,7 1,7 3,8 5,3 2,4 5,1 7,9 3,5 7,6 2 Edge distance R30 bis R120 $c_{cr,fi}$ [mm] c_{cr,fi	Resistance	R120	N _{Rk,p,fi}	[kN]	0,4	0,8	1,0	1,8	2,4	1,8	3,2	3,9	2,4	3,8	4,9	3,0	4,8	6,		
Characteristic R30- R90 N ⁰ Rk,c,fi [kN] 0,9 2,2 1,2 2,1 3,4 2,1 4,8 6,6 3,0 6,3 9,9 4,4 9,6 2 Resistance R120 N ⁰ Rk,c,fi [kN] 0,7 1,8 1,0 1,7 2,7 1,7 3,8 5,3 2,4 5,1 7,9 3,5 7,6 2 Edge distance R30 bis R120 $c_{cr,fi}$ [mm]	Concrete co	ne failı	ıre												•					
Characteristic Resistance $\begin{bmatrix} R90 \\ R120 \end{bmatrix}$ $\begin{bmatrix} N^0Rk,c,fi \\ R120 \end{bmatrix}$ $\begin{bmatrix} [kN] \\ 0,9 \end{bmatrix}$ 2,2 $\begin{bmatrix} 1,2 \\ 2,1 \end{bmatrix}$ 3,4 $\begin{bmatrix} 2,1 \\ 3,4 \end{bmatrix}$ 2,1 $\begin{bmatrix} 4,8 \\ 6,6 \end{bmatrix}$ 3,0 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 9,9 $\begin{bmatrix} 4,4 \\ 9,6 \end{bmatrix}$ 3.7 $\begin{bmatrix} 6,5 \\ 3,0 \end{bmatrix}$ 2,2 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,5 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,6 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,7 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,5 $\begin{bmatrix} 7,6 \end{bmatrix}$ 2. Edge distance R30 bis R120 $\begin{bmatrix} 6,3 \\ 2,0 \end{bmatrix}$ $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,5 $\begin{bmatrix} 6,3 \\ 3,0 \end{bmatrix}$ 3,5 $\begin{bmatrix} 7,6 \end{bmatrix}$ 3,8 $\begin{bmatrix} 7,6 \end{bmatrix}$ 3,9 $\begin{bmatrix} 7,$		R30-																		
Edge distance R30 bis R120 $c_{cr,fi}$ [mm] $2 \times h_{ef}$ In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm. Spacing R30 bis R120 $s_{cr,fi}$ [mm] $4 \times h_{ef}$ Pry-out failure R30 bis R120 k_8 [-] 1,0 2,0 1,0 2,0 1,0 2,0 1,0 2,0 The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given	Characteristic Resistance	R90		` '	·				_			·				<u> </u>		14		
R30 bis R120 $c_{cr,fi}$ [mm] $2 \times h_{ef}$ In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm. Spacing R30 bis R120 $s_{cr,fi}$ [mm] $4 \times h_{ef}$ Pry-out failure R30 bis R120 k_8 [-] $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given		R120	N ^u Rk,c,fi	[kN]	0,7	1,8	1,0	1,7	2,7	1,7	3,8	5,3	2,4	5,1	7,9	3,5	7,6	11		
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm. Spacing R30 bis R120 s _{cr,fi} [mm] 4 x h _{ef} Pry-out failure R30 bis R120 k ₈ [-] 1,0 2,0 1,0 2,0 1,0 2,0 1,0 2,0 The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given	Edge distand	e																		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	R30 bis R120		C _{cr,fi}	[mm]							2	x he	f							
R30 bis R120 $s_{cr,fi}$ [mm] $4 \times h_{ef}$ Pry-out failure R30 bis R120 k_8 [-] $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given	In case of fire	attack	from more	than o	one s	side,	the i	minir	num	edg	e dis	tanc	e sha	all be	≥300)mm				
R30 bis R120 $s_{cr,fi}$ [mm] $4 \times h_{ef}$ Pry-out failure R30 bis R120 k_8 [-] $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ $1,0$ $2,0$ The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given																				
Pry-out failure R30 bis R120 k_8 [-] 1,0 2,0 1,0 2,0 1,0 2,0 1,0 2,0 The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given			Scrfi	[mm]							4	x he	f							
R30 bis R120 k_8 [-] 1,0 2,0 1,0 2,0 1,0 2,0 The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given		<u> </u>	- 61,11																	
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given																				
value.		ge deptl			sed 1	for w			ete b	y at										

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Fire exposure – characteristic values of resistance

Annex C6



TAPCON XT	TREM concrete	screw	size	6	5		8			10				
Nominal om	shadmant danth		h _{nom}	h _{nom1}	h _{nom2}	h _{nom1}	h _{nor}	_{m2} h _{nom3}	h_{nom1}	h _{nom2}	h _{non}			
Nominal en	nbedment depth		[mm]	40	55	45	55	65	55	75	85			
Constant	tension load	N	[kN]	0,95	1,9	2,4	4,3	3 5,7	4,3	7,9	9,6			
Cracked concrete	displacement	$\delta_{ extsf{N0}}$	[mm]	0,3	0,6	0,6	0,	7 0,8	0,6	0,5	0,9			
	displacement	$\delta_{N^{\infty}}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2			
Uncracked	tension load	N	[kN]	1,9	4,3	3,6	5,	7 7,6	5,7	9,5	11,			
concrete	displacement	$\delta_{ extsf{N0}}$	[mm]	0,4	0,6	0,7	0,9	0,5	0,7	1,1	1,0			
	displacement	δ _{N∞}	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2			
TAPCON XT	REM concrete	screw	size		12				14					
Naminal am	hadmant danth		h _{nom}	h _{nom1}	h _{nom2}	h _n	om3	h _{nom1}	h _{nom} ;	h _{nom2} h _{nom}				
nominai em	nbedment depth		[mm]	65	85		00	75	100		115			
Consider al	tension load	N	[kN]	5,7	9,4	12	2,3	7,6	12,0)	15,1			
Cracked concrete	displacement	$\delta_{ extsf{N0}}$	[mm]	0,9	0,5	_ 1	,0	0,5	0,8		0,7			
Concrete	uispiacement	$\delta_{N^{\infty}}$	[mm]	1,0	1,2	1	,2	0,9	1,2		1,0			
Uncracked	tension load	N	[kN]	7,6	13,2	1	7,2	10,6	16,9	+	21,2			
Uncracked		$\delta_{ extsf{N0}}$	[mm]	1,0	1,1	l 1	2	0,9	1,2		0,8			
concrete	displacement		+	1,0		1,2		-,-			-,-			
concrete	displacement	$\delta_{N\infty}$	[mm]	1,0	1,2	_		0,9	1,2		1,0			
	displacement splacements un	$\delta_{N^{\infty}}$	[mm]	1,0	1,2	1	,2							
able 13: Dis	<u> </u>	δ _{N∞} nder sta	[mm] atic and	1,0 d quasi-	1,2	1	,2	0,9		10				
able 13: Dis	Splacements un	δ _{N∞} nder sta	[mm] atic and	1,0 d quasi-	1,2 static s	1	,2 ad	0,9		10 h _{nom2}	1,0			
able 13: Dis	splacements un	δ _{N∞} nder sta	[mm] atic and size	1,0 quasi-	1,2 static s	hear lo	,2 oad 8	0,9	1,2		1,0 h _{no}			
able 13: Dis	Splacements un	δ _{N∞} nder sta screw s	[mm] atic and size h _{nom} [mm] [kN]	1,0 d quasi- (h _{nom1} 40	static s h _{nom2} 55 ,3	hear lo	,2 pad 8 h _{nor}	0,9 n ₂ h _{nom3} 6 65	1,2 h _{nom1}	h _{nom2}				
TAPCON XT Nominal em Cracked and	REM concrete sbedment depth shear load	δ _{N∞} nder sta	[mm] atic and size hnom [mm]	1,0 d quasi- (h _{nom1} 40	1,2 static s h _{nom2} 55	hear lo	,2 oad 8 h _{nor} 55	0,9 n2 h _{nom3} 6 65	1,2 h _{nom1}	h _{nom2}	1,0 h _{no}			
able 13: Dis TAPCON XT Nominal em Cracked	splacements un TREM concrete	δ _{N∞} nder sta screw s	[mm] atic and size h _{nom} [mm] [kN]	1,0 quasi- (h _{nom1} 40 3	static s h _{nom2} 55 ,3	hear lo	,2 pad 8 h _{nor} 55	0,9 n ₂ h _{nom3} 65 65	1,2 h _{nom1}	h _{nom2} 75 16,2	1,0 h _{no}			
TAPCON XT Nominal em Cracked and uncracked concrete	splacements un TREM concrete bedment depth shear load displacement	$\begin{array}{c} \delta_{\text{N}\infty} \\ \text{oder sta} \\ \text{screw} \\ \text{s} \\ \\ V \\ \delta_{\text{V}0} \\ \\ \delta_{\text{V}\infty} \\ \end{array}$	[mm] atic and size hnom [mm] [kN] [mm]	1,0 quasi- (h _{nom1} 40 3	1,2 static s h _{nom2} 55 .3 55	hear Id	,2 9ad 8 h _{nor} 55 8,0 2,7	0,9 n ₂ h _{nom3} 65 65	1,2 h _{nom1} 55	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no}			
TAPCON XT Nominal em Cracked and uncracked concrete	splacements un TREM concrete bedment depth shear load displacement TREM concrete	$\delta_{N\infty}$ nder state of the st	[mm] atic and size hnom [mm] [kN] [mm] [mm]	1,0 quasi- h _{nom1} 40 3,	1,2 static s h _{nom2} 55 .3 55 .1	hear Id	8 h _{nor} 55 8,0 2,1	0,9 h _{nom3} 65 67	1,2 h _{nom1} 55	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 85			
TAPCON XT Nominal em Cracked and uncracked concrete	splacements un TREM concrete abedment depth shear load displacement	$\delta_{N\infty}$ nder state of the st	[mm] atic and size hnom [mm] [kN] [mm] [mm] size hnom	1,0 quasi- h _{nom1} 40 3 1, 3	1,2 static s h _{nom2} 55 3 55 1 12 h _{nom2}	hear Id	8 hnor 55 8,0 2,7 4,5 om3	0,9 h _{nom3} 65 7 1 h _{nom1}	1,2 h _{nom1} 55	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 85			
TAPCON XT Nominal em Cracked and uncracked concrete TAPCON XT	splacements un TREM concrete bedment depth shear load displacement TREM concrete bedment depth	$\delta_{N\infty}$ nder state of the screw state of the scr	[mm] atic and size hnom [mm] [kN] [mm] size hnom [mm]	1,0 quasi- h _{nom1} 40 3,	1,2 static s h _{nom2} 55 .3 55 .1 12 h _{nom2} 85	hear Id	8 h _{nor} 55 8,0 2,1	0,9 h _{nom3} 65 67	1,2 h _{nom1} 55 14 h _{nom2} 100	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 85			
TAPCON XT Nominal em Cracked and uncracked concrete TAPCON XT Nominal em Cracked	splacements un TREM concrete bedment depth shear load displacement TREM concrete	$\delta_{N\infty}$ nder state of the st	[mm] atic and size hnom [kN] [mm] [mm] size hnom [mm]	1,0 quasi- h _{nom1} 40 3 1, 3	1,2 static s h _{nom2} 55 3 55 1 12 h _{nom2} 85 20,0	hear Id	8 hnor 55 8,0 2,7 4,5 om3	0,9 h _{nom3} 65 7 1 h _{nom1}	1,2 h _{nom1} 55 14 h _{nom2} 100 30,5	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 85			
TAPCON XT Nominal em Cracked and uncracked concrete TAPCON XT	splacements un TREM concrete bedment depth shear load displacement TREM concrete bedment depth	$\delta_{N\infty}$ nder state of the screw state of the scr	[mm] atic and size hnom [mm] [kN] [mm] size hnom [mm]	1,0 quasi- h _{nom1} 40 3 1, 3	1,2 static s h _{nom2} 55 .3 55 .1 12 h _{nom2} 85	hear Id	8 hnor 55 8,0 2,7 4,5 om3	0,9 h _{nom3} 65 7 1 h _{nom1}	1,2 h _{nom1} 55 14 h _{nom2} 100	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 8!			
TAPCON XT Nominal em Cracked and uncracked concrete TAPCON XT Nominal em Cracked and uncracked	splacements un FREM concrete bedment depth shear load displacement FREM concrete bedment depth shear load	$\begin{array}{c} \delta_{\text{N}\infty} \\ \text{oder sta} \\ \text{screw} \\ \text{s} \\ \\ \hline \delta_{\text{V}0} \\ \\ \text{screw} \\ \text{s} \\ \\ \\ \hline \\ V \\ \\ \delta_{\text{V}0} \\ \\ \end{array}$	[mm] atic and size hnom [mm] [kN] [mm] size hnom [mm] [kN] [mm]	1,0 quasi- h _{nom1} 40 3 1, 3	1,2 static s h _{nom2} 55 .3 55 .1 12 h _{nom2} 85 20,0 4,0	hear Id	8 hnor 55 8,0 2,7 4,5 om3	0,9 h _{nom3} 65 7 1 h _{nom1}	1,2 h _{nom1} 55 14 h _{nom2} 100 30,5 3,1	h _{nom2} 75 16,2 2,7 4,3	1,0 h _{no} 85			

Displacements under static and quasi-static loads



Table 14: Seismic category C2 according to annex B7, figure	-	icemen	ts with fill	ed annular	gap			
TAPCON XTREM concrete screen	w size		8	10	12	14		
Name in all analyses also asked		h _{nom}		h _n	om3			
Nominal embedment depth		[mm]	65	85	100	115		
Displacements under tension I	oads (hexa	gon hea	d type)					
Displacement DLS	$\delta_{\text{N,eq(DLS)}}$	[mm]	0,66	0,32	0,57	1,16		
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36	2,36	4,39		
Displacements under shear loa	ds (hexago	n head	type with h	ole clearan	ce)			
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	1,68	2,91	1,88	2,42		
Displacement ULS	$\delta_{\text{V,eq(ULS)}}$	[mm]	5,19	6,72	5,37	9,27		
TAPCON XTREM concrete screen		h _{nom}	8	10	12	14		
Nominal embedment depth		h _{nom}		I	om3	445		
		[mm]	65	85	100	115		
Displacements under tension I	1	T		T	l			
Displacement DLS	$\delta_{N,eq(DLS)}$	[mm]	0,66	0,32	0,57	1,16		
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36	2,36	4,39		
Displacements under tension I					Г			
Displacement DLS	$\delta_{N,eq(DLS)}$	[mm]	0,66	0,32	no performa	nce assessed		
Displacement ULS	$\delta_{N,eq(ULS)}$	[mm]	1,74	1,36	·			
Displacements under shear loa	ds (hexago	n head	type with h	ole clearan	ce)			
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	4,21	4,71	4,42	5,60		
Displacement ULS	$\delta_{V,eq(ULS)}$	[mm]	7,13	8,83	6,95	12,63		
Displacements under shear loads (countersunk head type with hole clearance)								
Displacement DLS	$\delta_{V,eq(DLS)}$	[mm]	2,51	2,98	no noufour-	nee access -		
Displacement ULS	$\delta_{V,eq(ULS)}$	[mm]	7,76	6,25	ן no pertorma	nce assessed		

1) A4	and	HCR	not	suitable	6
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SPIT TAPCON XTREM	
Performances Displacements under seismic loads	Annex C8