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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-23/0475
of 20 April 2026

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

TOGE concrete screw TSM high performance

Product family
to which the construction product belongs

Connector for Strengthening of existing concrete
structures by concrete overlay

Manufacturer

TOGE Dübel GmbH & Co. KG
Illesheimer Straße 10
90431 Nürnberg
DEUTSCHLAND

Manufacturing plant

TOGE Plant

This European Technical Assessment
contains

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

This European Technical Assessment is
issued in accordance with Article 95(4) of
Regulation (EU) 2024/3110, on the basis of

EAD 332347-00-0601

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Specific Part

1 Technical description of the product

The Connector TOGE TSM high performance is a concrete screw made of galvanised steel anchored into a predrilled cylindrical drill hole in existing concrete. The special thread of the concrete screw cuts an internal thread into the member while setting. The TOGE concrete screw TSM high performance is connecting two layers of concrete cast at different times (existing concrete and concrete overlay). The side with head of concrete screw is finally embedded in the concrete overlay.

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
Existing concrete, characteristic resistance to tension load (static and quasi-static loading): - resistances, robustness, edge distance to prevent splitting - minimum edge distance and spacing	See Annex C1 and C2 See Annex B2
Concrete overlay, characteristic resistance to tension load (static and quasi-static loading): - resistances, edge distance to prevent splitting - minimum edge distance and spacing	See Annex C3 See Annex B2
Shear interface parameter under static, quasi-static and fatigue cyclic loading - material and geometric parameters - factor for fatigue cyclic loading	See Annex C4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

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. 332347-00-0601 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

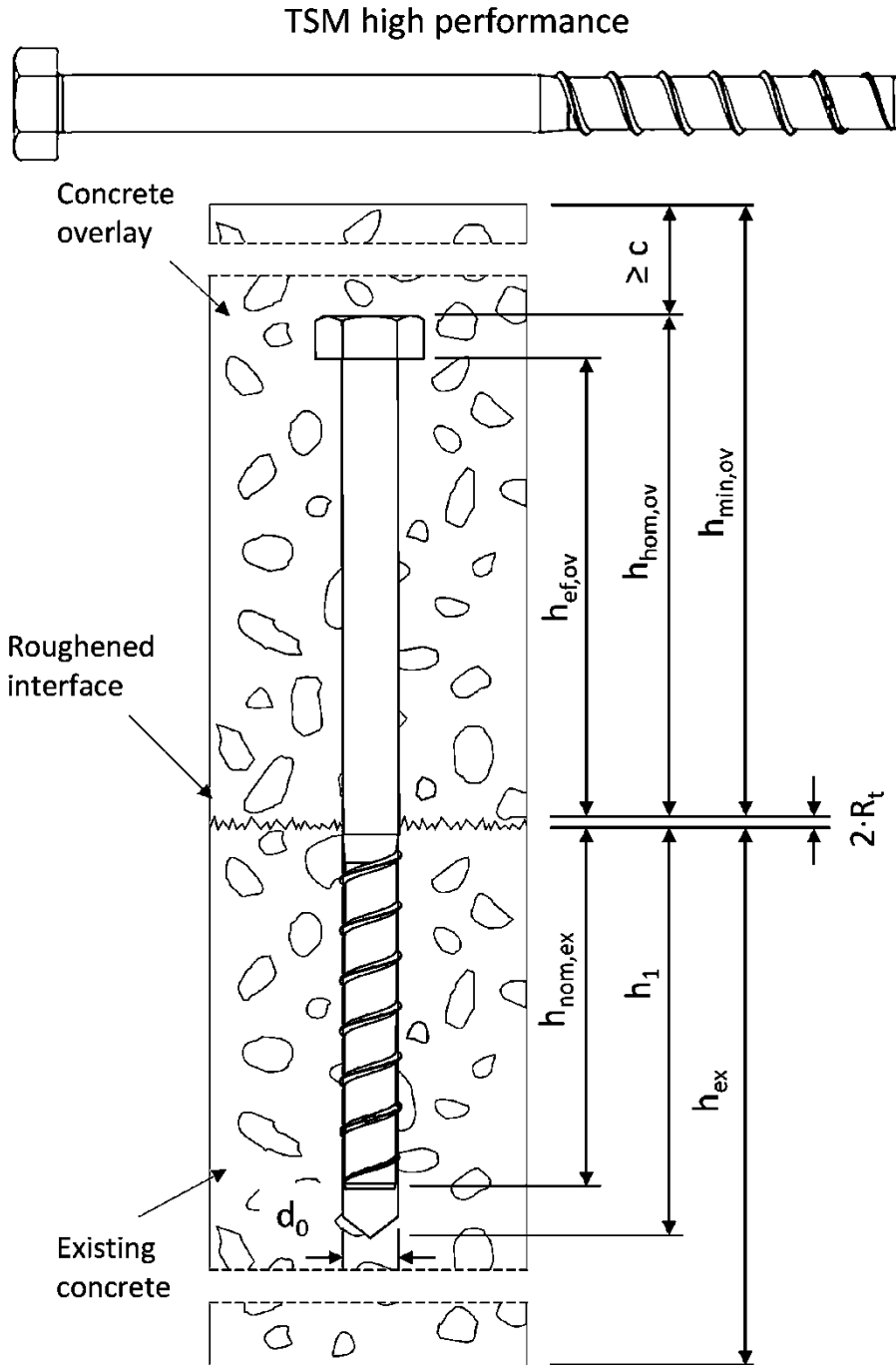
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 20 April 2026 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Tempel

Product in installed condition



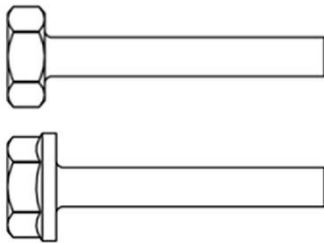
$h_{nom,ex}$ = nominal embedment depth in existing concrete
 $h_{ef,ov}$ = effective embedment depth in concrete overlay
 $h_{nom,ov}$ = nominal embedment depth in concrete overlay
 R_t = Roughness according to EOTA TR 066

h_{ex} = thickness of existing concrete
 h_{ov} = thickness of concrete overlay
 h_1 = drill hole depth
 d_0 = nominal drill hole diameter

TOGE concrete screw TSM high performance

Product description
Product in installed condition

Annex A1



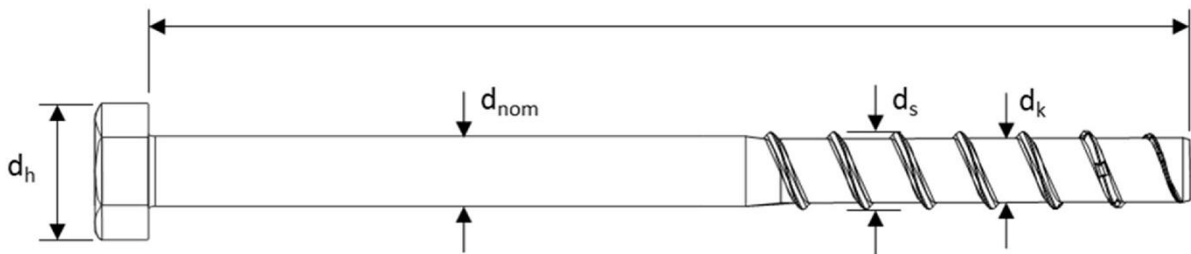
1. Configuration with hexagon head
e.g. TSM HP 10x100 SW15
2. Configuration with washer and hexagon head
e.g. TSM HP 10x100 SW15

Table 1: Material

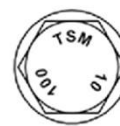
Part	Product name	Material		
all types	TSM high performance	Steel acc. to EN 10263-4:2018-02		
Part	Product name	Nominal characteristic steel		Rupture elongation A_5 [%]
		Yield strength f_{yk} [N/mm ²]	Ultimate strength f_{uk} [N/mm ²]	
all types	TSM high performance	850	680	≤ 8

Table 2: Dimensions

Anchor size		8			10			12			14		
Nominal embedment depth	$h_{nom,ex}$	1	2	3	1	2	3	1	2	3	1	2	3
	[mm]	45	55	65	55	75	85	65	85	100	75	100	115
Screw length	$L \geq$	105			125			140			165		
	$L \leq$	310			310			310			310		
Diameter of the head	d_h	16			20			22			28		
Core diameter	d_k	7,1			9,1			11,1			13,1		
Thread outer diameter	d_s	10,6			12,6			14,6			16,6		
Shaft diameter	d_{nom}	7,9			9,9			11,7			13,7		
High of the head	t_h	9			10			10			12		



Marking:
TSM high performance
 Screw type: TSM
 Screw size: 10
 Screw length: 100



TOGE concrete screw TSM high performance

Product description
 Screw types, Material, Dimensions and markings

Annex A2

Specification of Intended use

Anchorage subject to:

- Static, quasi-static actions and fatigue
- Surface roughness „very smooth“ to „very rough“ of the shear interface according to EOTA Technical Report TR 066, Amendment November 2020

Base materials:

- For use to strengthen existing concrete by concrete overlay. Both concrete members are compacted reinforced or unreinforced normal weight (cracked and uncracked) concrete without fibres in the range C20/25 to C50/60 according to EN 206:2013 + A1:2016
- Cracked and uncracked concrete

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 screw is indicated on the design drawings (e.g. position of the screw relative to reinforcement or to support. etc.).
- Post-installed shear connections are designed in accordance with EOTA Technical Report TR066, Amendment November 2020
- For the concrete overlay the following requirements on the mixture according to TR 066, chapter 3.2 apply:
 - Concrete compressive strength of the new concrete shall be higher than the concrete compressive strength of the existing concrete.
 - Use of concrete with low shrinkage is recommended.
 - Slump of fresh concrete $f \geq 380$ mm, slump value $f \geq 450$ mm is recommended, if applicable.
 - Concrete consolidation with vibratory screed. With thickness of the overlay concrete > 10 cm specific vibratory screed must be checked for its maximum working depth.
 - Very good posttreatment.

Installation:

- The screw installation is executed by trained personal, ensuring that the installation instruction and the specifications by the engineer are observed.
- Hammer drilling or hollow drilling.
All sizes and embedment depth.
- Cleaning of borehole is not necessary:
 - using a hollow drill
 - If drilling is vertically upwards
 - If drilling vertically downwards or in the wall and the drill hole depth has been increased. It is recommended to increase the drill hole depth additional $3x d_0$.
- The requirements for construction works given in EOTA Technical Report TR 066, Amendment November 2020 have to be observed.

TOGE concrete screw TSM high performance

**Intended use
Specification**

Annex B1

Table3: Installation parameters

concrete screw size		8			10			12			14		
Nominal embedment depth	$h_{nom,ex}$	1	2	3	1	2	3	1	2	3	1	2	3
	[mm]	45	55	65	55	75	85	65	85	100	75	100	115
Nominal drill hole diameter	d_0	8			10			12			14		
Cutting diameter of drill bit	$d_{cut} \leq$	8,45			10,45			12,50			14,50		
Drill hole depth	$h_1 \geq$	cleaned: $h_{nom}+10$, uncleaned: $h_{nom}+ 10 +3xd_0$											
Torque impact screw driver	[Nm]	Max. torque according to manufacturer's instructions											
		300			400			650			650		

Table 4: Concrete overlay – Minimum thickness of member, minimum edge distance and minimum spacing

concrete screw size		8		10		12		14	
Effective embedment depth	$h_{ef,ov}$	40-245		40-245		40-210		40-185	
Minimum thickness of member	$h_{min,ov}$	$h_{ef,ov} + c$							
Minimum spacing	$s_{min,ov}$	30		30		35		35	
Minimum edge distance	$c_{min,ov}$	$8 + C_{nom}$		$10 + C_{nom}$		$11+ C_{nom}$		$14 + C_{nom}$	

C_{nom} = nominal concrete cover according EN 1992-1-1:2004 + AC:2010

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

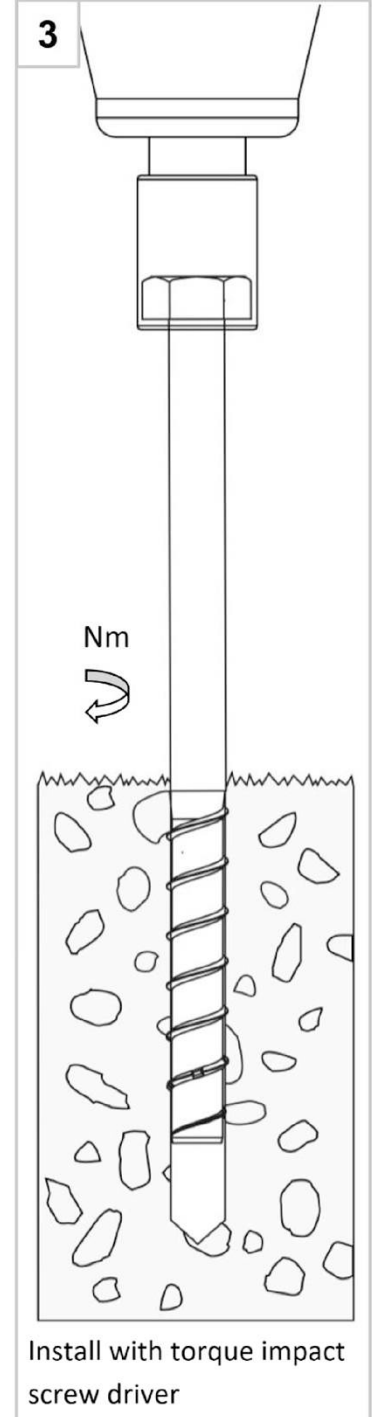
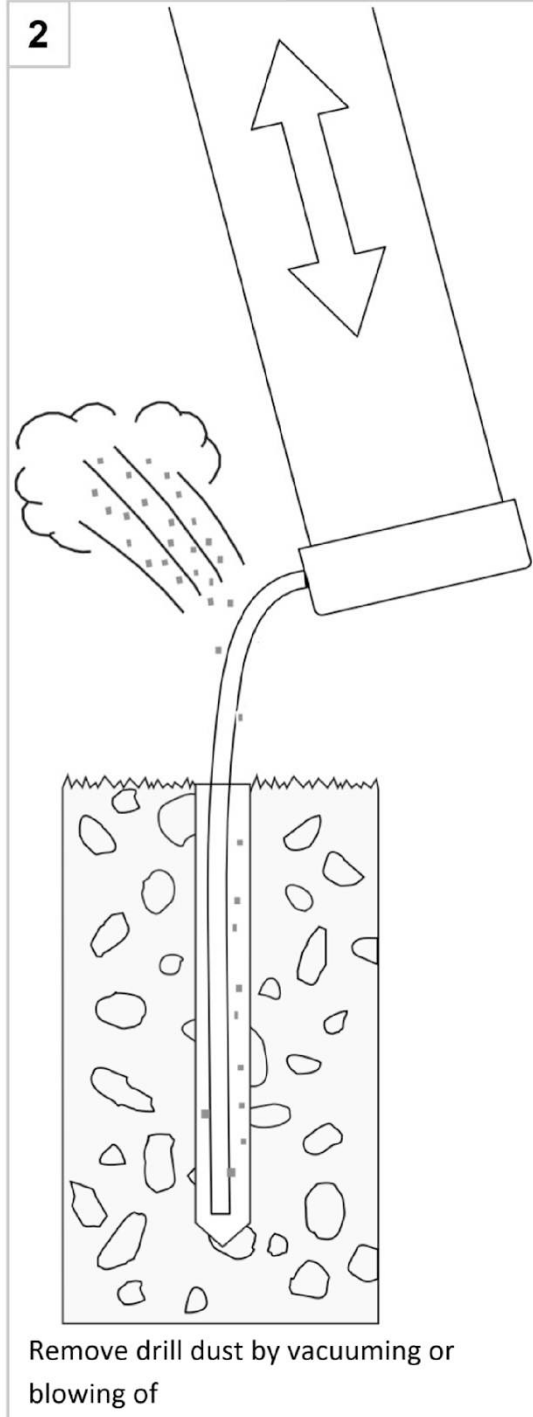
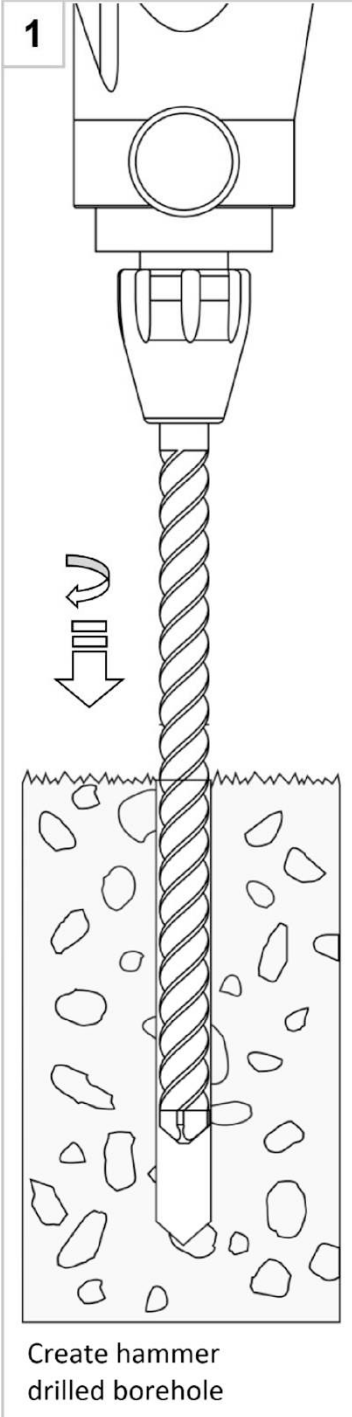
concrete screw size		8			10			12			14		
Nominal embedment depth	$h_{nom,ex}$	1	2	3	1	2	3	1	2	3	1	2	3
	[mm]	45	55	65	55	75	85	65	85	100	75	100	115
Minimum thickness of member	$h_{min,ex}$	100	100	120	100	130	130	120	130	150	130	150	170
Minimum spacing	$s_{min,ex}$	40	50	50	50	50	50	50	50	70	50	70	70
Minimum edge distance	$c_{min,ex}$	40	50	50	50	50	50	50	50	70	50	70	70

TOGE concrete screw TSM high performance

Intended use
Installation instruction

Annex B2

Installation Instruction



TOGE concrete screw TSM high performance

Intended use
Installation instruction

Annex B3

Table 6: Characteristic values for static and quasi-static loading in the existing concrete, size 8 - 10

TSM concrete screw size				8			10		
Nominal embedment depth	$h_{nom,ex}$			1	2	3	1	2	3
	[mm]			45	55	65	55	75	85
Steel failure for tension loading									
Characteristic tension load	$N_{Rk,s,ex}$	[kN]		32,8			54,6		
Partial factor	$\gamma_{Ms,N,ex}$	[-]		1,5					
Pull-out failure									
Characteristic tension load C20/25	cracked	$N_{Rk,p,ex}$	[kN]	5,0	9,0	12,0	9,0	$\geq N_{Rk,c,ex}^0$	
	uncracked	$N_{Rk,p,ex}$	[kN]	7,5	12,0	16,0	12,0	20,0	26,0
Increasing factor for $N_{Rk,p,ex} = N_{Rk,p,ex(C20/25)} * \Psi_{c,ex}$	C25/30	$\Psi_{c,ex}$	[-]	1,12					
	C30/37			1,22					
	C40/50			1,41					
	C50/60			1,58					
Concrete failure and splitting failure									
Effective embedment depth	$h_{ef,ex}$	[mm]		35	43	52	43	60	68
k-Factor	cracked	$k_{cr,N,ex}$	[-]	7,7					
	uncracked	$k_{ucr,N,ex}$	[-]	11,0					
Concrete failure	spacing	$s_{cr,N,ex}$	[mm]	$3 \times h_{ef,ex}$					
	edge distance	$c_{cr,N,ex}$	[mm]	$1,5 \times h_{ef,ex}$					
Installation factor	γ_{inst}	[-]		1,0					
Splitting	spacing	$s_{cr,sp,ex}$	[mm]	120	140	150	140	180	210
	edge distance	$c_{cr,sp,ex}$	[mm]	60	70	75	70	90	105

TOGE concrete screw TSM high performance

Performances

Characteristic resistance in the existing concrete, size 8-10

Annex C1

Table 7: Characteristic values for static and quasi-static loading in the existing concrete, size 12 - 14

concrete screw size				12			14		
Nominal embedment depth	$h_{\text{nom,ex}}$			1	2	3	1	2	3
	[mm]			65	85	100	75	100	115
Steel failure for tension loading									
Characteristic resistance to tension load	$N_{\text{Rk,s,ex}}$	[kN]		81,1			113,7		
Partial factor	$\gamma_{\text{Ms,N,ex}}$	[-]		1,5					
Pull-out failure									
Characteristic resistance C20/25	cracked	$N_{\text{Rk,p,ex}}$	[kN]	12,0	$\geq N_{\text{Rk,c,ex}}^0$				
	uncracked	$N_{\text{Rk,p,ex}}$	[kN]	16,0					
Increasing factor for $N_{\text{Rk,p,ex}} = N_{\text{Rk,p,ex(C20/25)}} * \psi_{\text{c,ex}}$	C25/30	$\psi_{\text{c,ex}}$	[-]	1,12					
	C30/37			1,22					
	C40/50			1,41					
	C50/60			1,58					
Concrete failure and splitting failure									
Effective embedment	$h_{\text{ef,ex}}$	[mm]		50	67	80	58	79	92
k-Factor	cracked	$k_{\text{cr,N,ex}}$	[-]	7,7					
	uncracked	$k_{\text{ucr,N,ex}}$	[-]	11,0					
Concrete failure	spacing	$s_{\text{cr,N,ex}}$	[mm]	$3 \times h_{\text{ef,ex}}$					
	edge distance	$c_{\text{cr,N,ex}}$	[mm]	$1,5 \times h_{\text{ef,ex}}$					
Installation factor	γ_{inst}	[-]		1,0					
Splitting	spacing	$s_{\text{cr,sp,ex}}$	[mm]	150	210	240	180	240	280
	edge distance	$c_{\text{cr,sp,ex}}$	[mm]	75	105	120	90	120	140

TOGE concrete screw TSM high performance

Performances

Characteristic resistance in the existing concrete, size 12-14

Annex C2

Table 8: Characteristic values for static and quasi-static loading in concrete overlay

concrete screw size			8	10	12	14	
Steel failure for tension loading							
Characteristic resistance to tension load	$N_{Rk,s,ov}$	[kN]	25	42	64	90	
Partial factor	$\gamma_{Ms,N,ov}$	[-]	1,4				
Pull-out failure							
Thickness of the head	t_h	[mm]	9	10	10	11	
Projected area of the head	A_h	[mm ²]	152	237	272	468	
Characteristic resistance C20/25	cracked	$N_{Rk,p,ov}$	[kN]	10,3	16,6	24,3	33,5
	uncracked	$N_{Rk,p,ov}$	[kN]	14,5	23,2	34,0	46,9
Increasing factor for $N_{Rk,p,ov} = N_{Rk,p,ov}(C20/25) * \psi_{c,ov}$	C30/37	$\psi_{c,ov}$	[-]	1,50			
	C40/50			2,00			
	C50/60			2,50			
Concrete failure and splitting failure							
Effective embedment depth	$h_{ef,ov}$	[mm]	40-245	40-245	40-210	40-185	
k-Factor	cracked	$k_{cr,ov}$	[-]	8,9			
	uncracked	$k_{ucr,ov}$	[-]	12,7			
Concrete failure	spacing	$s_{cr,N,ov}$	[mm]	$3 \times h_{ef,ov}$			
	edge distance	$c_{cr,N,ov}$	[mm]	$1,5 \times h_{ef,ov}$			
Splitting	spacing	$s_{cr,sp,ov}$	[mm]	$3 \times h_{ef,ov}$			
	edge distance	$c_{cr,sp,ov}$	[mm]	$6 \times h_{ef,ov}$			

TOGE concrete screw TSM high performance

Performances
Characteristic resistance in concrete overlay

Annex C3

Table 9: Characteristic values for static, quasi-static loading and fatigue in the interface

concrete screw size			8	10	12	14
Characteristic yield strength	f_{yk}	[N/mm ²]	680	680	680	680
Product specific factor for ductility	α_{k1}	[-]	0,8	0,8	0,8	0,8
Stressed cross section	A_s	[mm ²]	49,0	77,0	107,5	147,4
Product specific factor for geometry	α_{k2}	[-]	1,0			
Reduction factor for fatigue	η_{sc}	[-]	0,40			

TOGE concrete screw TSM high performance

Performances
Characteristic values in the interface

Annex C4