Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

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Designated in accordance with Article 39 of Regulation (EU) No 2024/3110 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-26/0594 of 21 August 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	TILCA concrete screw TSM high performance
Product family to which the construction product belongs	Connector for Strengthening of existing concrete structures by concrete overlay
Manufacturer	EFCO Befestigungstechnik AG Grabenstraße 1 8606 NÄNIKON SCHWEIZ
Manufacturing plant	Werk 3, Deutschland
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 TILCA concrete screw TSM high performance is an anchor 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 TILCA 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.

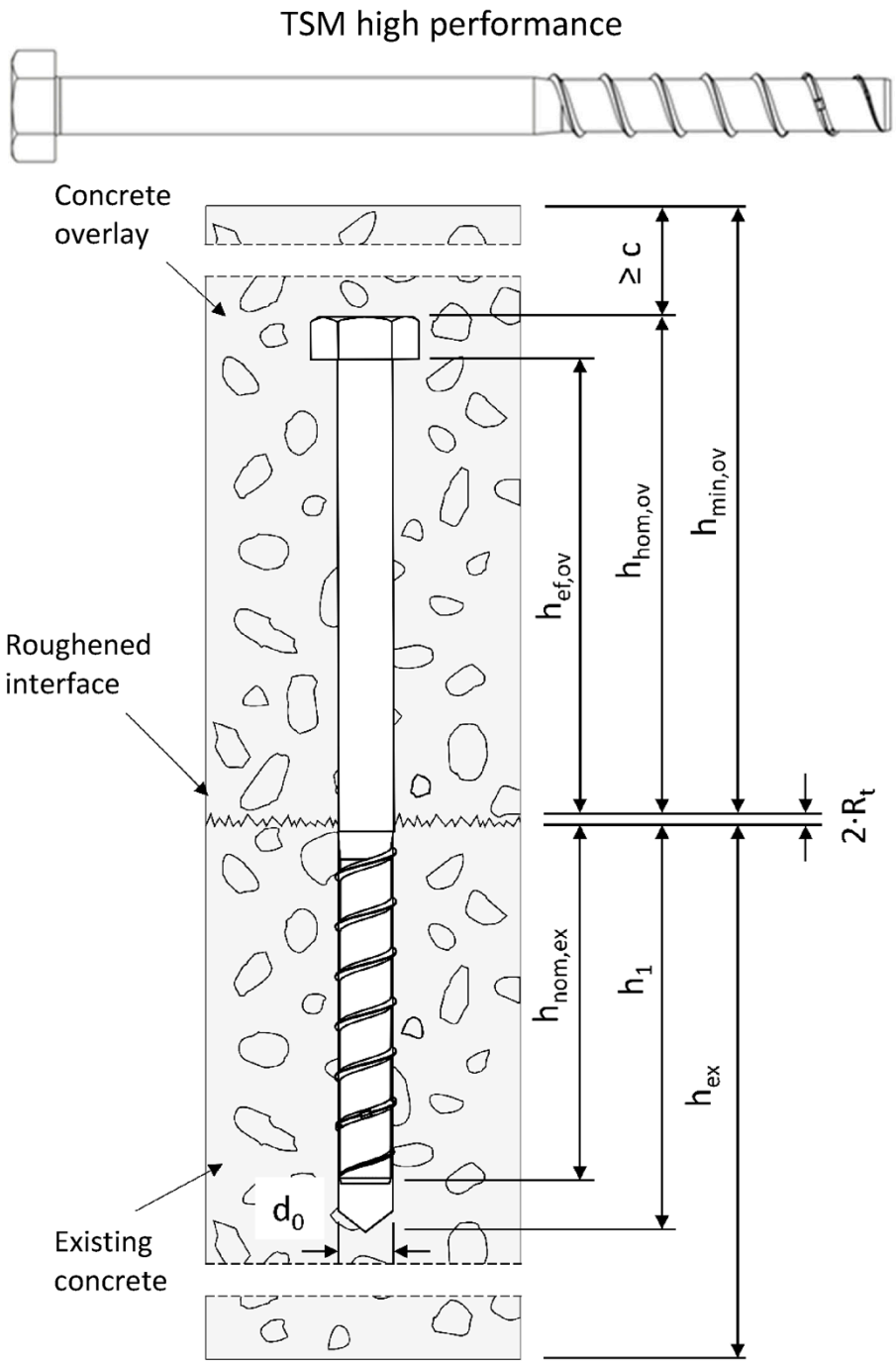
Issued in Berlin on 21 August 2026 by Deutsches Institut für Bautechnik

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Head of Section

beglaubigt:
Tempel

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Product in installed condition

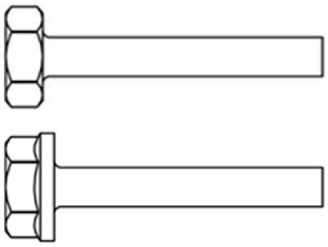


$h_{nom,ex}$ = nominal embedment depth in existing concrete
$h_{ef,ov}$ = effective embedment depth in concrete overlay
$h_{nom,ov}$ = nominal embedment depth in concrete overlay
R_t = Roughness according to EOTA TR 066
h_{ex} = thickness of existing concrete
h_{ov} = thickness of concrete overlay
h_1 = drill hole depth
d_0 = nominal drill hole diameter

TILCA 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

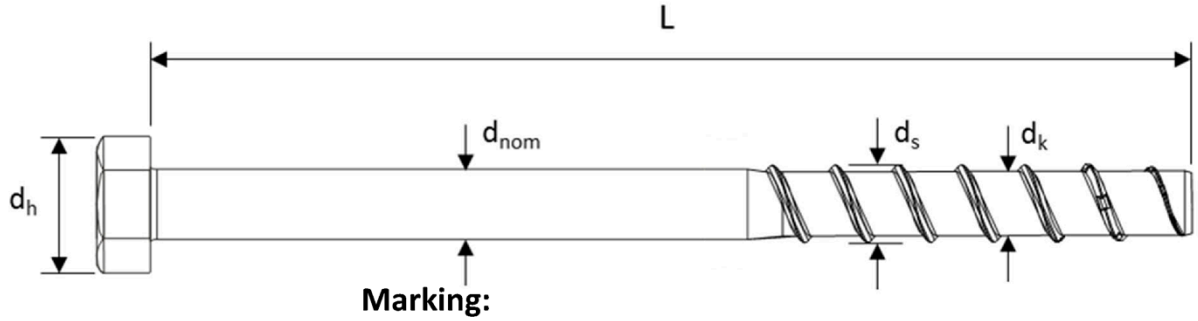
Table 1: Material

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/mm²]	Ultimate strength f_{uk} [N/mm²]	
all types	TSM high performance	850	680	≤ 8

Table 2: Dimensions

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



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



TILCA concrete screw TSM high performance

Product description
Screw types, Material, Dimensions and markings

Annex A2

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Specification of Intended use

Anchorages 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 law shrinkage is recommended.
  - Slum of fresh concrete f ≥ 380 mm, slump value f ≥ 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 es recommended to increase the drill hole depth additional $3xd_0$.
- The requirements for construction works given in EOTA Technical Report TR 066, Amendment November 2020 have to be observed.

TILCA concrete screw TSM high performance	Annex B1
Intended use Specification	

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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	[mm]	8			10			12			14		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45			10,45			12,50			14,50		
Drill hole depth	$h_1 \geq$	[mm]	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	$h_{ef,ov}$	[mm]	40-245	40-245	40-210	40-185
Minimum thickness of member	$h_{min,ov}$	[mm]	$h_{ef,ov}$ + c			
Minimum spacing	$s_{min,ov}$	[mm]	30	30	35	35
Minimum edge distance	$c_{min,ov}$	[mm]	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	$h_{min,ex}$	[mm]	100	100	120	100	130	130	120	130	150	130	150	170
Minimum spacing	$s_{min,ex}$	[mm]	40	50	50	50	50	50	50	50	70	50	70	70
Minimum edge distance	$c_{min,ex}$	[mm]	40	50	50	50	50	50	50	50	70	50	70	70

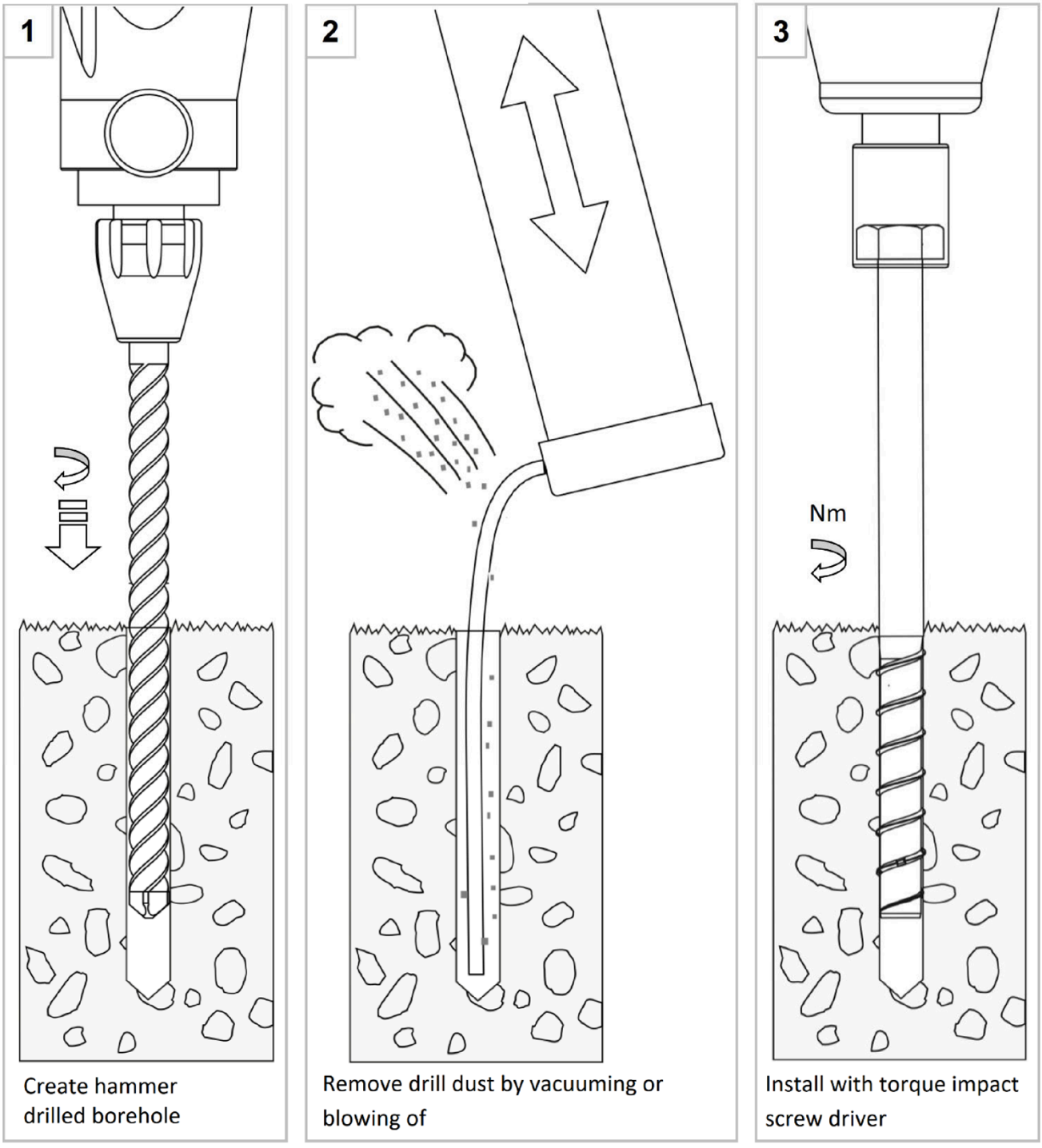
TILCA concrete screw TSM high performance

Intended use
Installation instruction

Annex B2

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Installation Instruction



TILCA concrete screw TSM high performance

Intended use
Installation instruction

Annex B3

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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	≥ $N^0_{Rk,c,ex}$	
	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 x $h_{ef,ex}$					
	edge distance	$c_{cr,N,ex}$	[mm]	1,5 x $h_{ef,ex}$					
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

TILCA concrete screw TSM high performance

Performances
Characteristic resistance in the existing concrete, size 8-10

Annex C1

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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		$h_{nom,ex}$		1	2	3	1	2	3
			[mm]	65	85	100	75	100	115
Steel failure for tension loading									
Characteristic resistance to tension load		$N_{Rk,s,ex}$	[kN]	81,1			113,7		
Partial factor		$\gamma_{Ms,N,ex}$	[-]	1,5					
Pull-out failure									
Characteristic resistance C20/25	cracked	$N_{Rk,p,ex}$	[kN]	12,0	≥ $N^0_{Rk,c,ex}$				
	uncracked	$N_{Rk,p,ex}$	[kN]	16,0					
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		$h_{ef,ex}$	[mm]	50	67	80	58	79	92
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 x $h_{ef,ex}$					
	edge distance	$c_{cr,N,ex}$	[mm]	1,5 x $h_{ef,ex}$					
Installation factor		γ_{inst}	[-]	1,0					
Splitting	spacing	$s_{cr,sp,ex}$	[mm]	150	210	240	180	240	280
	edge distance	$c_{cr,sp,ex}$	[mm]	75	105	120	90	120	140

TILCA concrete screw TSM high performance

Performances
Characteristic resistance in the existing concrete, size 12-14

Annex C2

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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	[mm²]	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 x $h_{ef,ov}$			
	edge distance	$c_{cr,N,ov}$	[mm]	1,5 x $h_{ef,ov}$			
Splitting	spacing	$s_{cr,sp,ov}$	[mm]	3 x $h_{ef,ov}$			
	edge distance	$c_{cr,sp,ov}$	[mm]	6 x $h_{ef,ov}$			

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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/mm²]	680	680	680	680
Product specific factor for ducility	α_{k1}	[-]	0,8	0,8	0,8	0,8
Stressed cross section	A_s	[mm²]	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			

TILCA concrete screw TSM high performance

Performances
Characteristic values in the interface

Annex C4