DECLARATION OF PERFORMANCE
DoP No. 2873-CPR-401-8 / 12.20-EN

1. Unique identification code of the product-type: **Toge concrete screw TSM high performance 5 and 6**
2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):

Annex A 3
Batch number: see packaging of the product.

3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:

generic type	concrete screw
for use in	Cracked and non-cracked concrete C 20/25-C 50/60 (EN 206), only for multiple use of non-structural applications covered sizes: 5,6
option / category	Part 6
loading	static or quasi-static
material	zinc-plated steel, steel with zinc flake coating : dry internal conditions only stainless steel internal and external use without particular aggressive conditions high corrosion resistant steel internal and external use with particular aggressive conditions covered sizes: 6

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

Toge Dübel GmbH & Co. KG, Illesheimer Strasse 10, 90431 Nuernberg

5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2): --
6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V: **System 2+**
7. In case of the declaration of performance concerning a construction product covered by a harmonised standard: --
8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

Deutsches Institut für Bautechnik, Berlin

has issued the following:

ETA-16/0123

on the basis of

ETAG 001-1, ETAG 001-6

The notified body 2873-**CPR** performed
ii) factory production control.
iii) testing of samples taken at the factory in accordance with a prescribed test plan.
and has issued the following: certificate of conformity 2873-CPR-401-8.

9. Declared performance:

Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
Characteristic resistance for tension load	EN 1992-4	Annex C 1	EAD 330747-00-0601
Characteristic resistance for shear load	EN 1992-4	Annex C 1	
Minimum spacing and minimum edge distance	EN 1992-4	Annex B 2	
Characteristic resistance in precast prestressed hollow core slabs	EN 1992-4	Annex C 2	
Characteristic resistance under fire exposure	EN 1992-4	Annex C 2	

Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies: --

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

Waldemar Gunkel
Dipl.-Wirtsch.-Ing. (FH), B.Eng.
Anwendungstechnik und Technsiche Dokumente

Nuernberg, 2021-03-12

Andreas Gerhard
CEO

Nuernberg, 2021-03-12

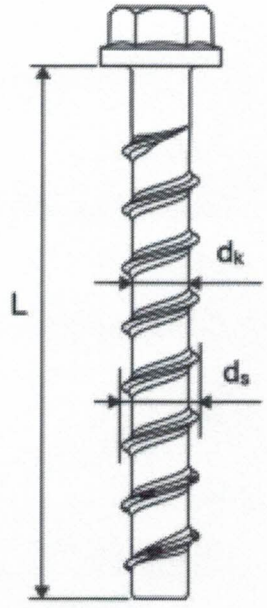
Table 1: Material

Part	Product name	Material
all types	TSM high performance	- Steel EN 10263-4:2017 galvanized acc. to EN ISO 4042:2018 - Zinc flake coating according to EN ISO 10683:2018 (≥5µm)
	TSM high performance A4	1.4401; 1.4404; 1.4571; 1.4578
	TSM high performance HCR	1.4529

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	560	700	≤ 8
	TSM high performance A4			
	TSM high performance HCR			

Table 2: Dimensions

Anchor size			TSM 5	TSM 6
Screw length	≤ L	[mm]	200	
Core diameter	d_k	[mm]	4,0	5,1
Thread outer diameter	d_s	[mm]	6,5	7,5



Marking:

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

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

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

Marking "k" or "x" for anchors with connection thread and h_{nom}= 35mm

TOGE concrete screw TSM High Performance

Product description
Material, Dimensions and markings

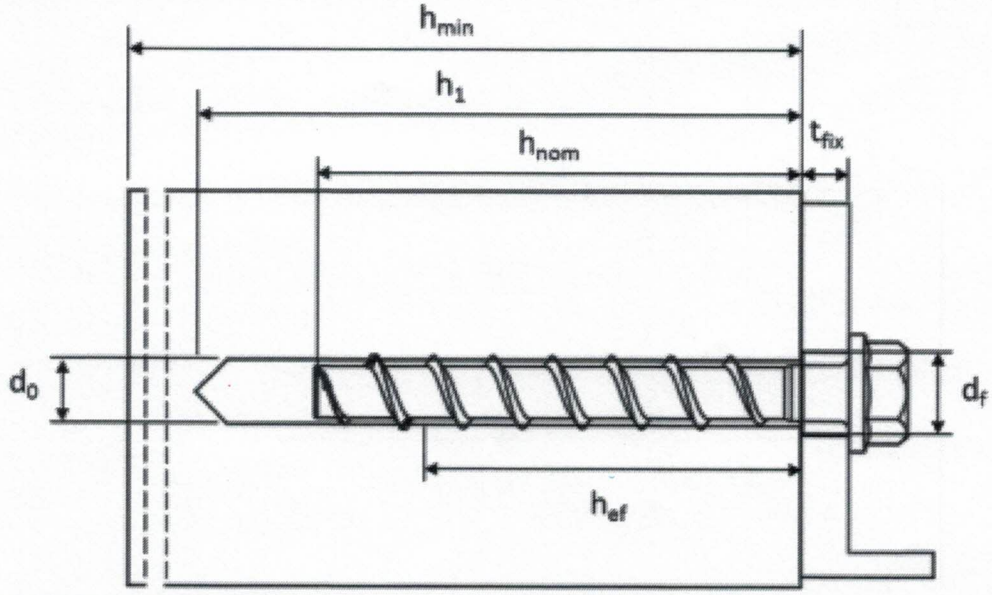
Annex A4

Table 3: Installation parameters

TSM concrete screw size			TSM 5	TSM 6	
Nominal embedment depth		h_{nom}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Nominal drill hole diameter	d_0	[mm]	5	6	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40	
Drill hole depth	$h_1 \geq$	[mm]	40	40	60
Clearance hole diameter	$d_f \leq$	[mm]	7	8	
Installation torque (version with connection thread)	$T_{inst} \leq$	[Nm]	8	10	
Recommended torque impact screw driver		[Nm]	Max. torque according to manufacturer's instructions		
			110	160	

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

TSM concrete screw size			TSM 5	TSM 6	
Nominal embedment depth		h_{nom1}	h_{nom1}	h_{nom1}	h_{nom2}
		[mm]	35	35	55
Minimum thickness of member	h_{min}	[mm]	80	80	100
Minimum edge distance	c_{min}	[mm]	35	35	40
Minimum spacing	s_{min}	[mm]	35	35	40



TOGE concrete screw TSM High Performance	
Intended use Installation parameters	**Annex B2**

Table 5: Characteristic values for static and quasi-static loading

TSM concrete screw size				TSM 5	TSM 6	
Nominal embedment depth		h_{nom}		h_{nom1}	h_{nom1}	h_{nom2}
		[mm]		35	35	55
Steel failure for tension and shear loading						
Characteristic tension load		$N_{Rk,s}$	[kN]	8,7	14,0	
Partial factor tension load		$\gamma_{Ms,N}$	[-]	1,5		
Characteristic shear load		$V_{Rk,s}$	[kN]	4,4	7,0	
Partial factor shear load		$\gamma_{Ms,V}$	[-]	1,25		
Ductility factor		k_7	[-]	0,8		
Characteristic bending load		$M^0_{Rk,s}$	[Nm]	5,3	10,9	
Pull-out failure						
Character-istic tension load C20/25	cracked	$N_{Rk,p}$	[kN]	1,5	3,0	7,5
	uncracked	$N_{Rk,p}$	[kN]	1,5	3,0	7,5
Increasing factor for $N_{Rk,p}$	C25/30	Ψ_c	[-]	1,12		
	C30/37			1,22		
	C40/50			1,41		
	C50/60			1,58		
Concrete failure: Splitting failure, concrete cone failure and pry-out failure						
Effective embedment depth		h_{ef}	[mm]	27	27	44
k-factor	cracked	$k_1 = k_{cr}$	[-]	7,7		
	uncracked	$k_1 = k_{ucr}$	[-]	11,0		
Concrete cone failure	spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$		
	edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$		
Splitting failure	spacing	$s_{cr,Sp}$	[mm]	120	120	160
	edge distance	$c_{cr,Sp}$	[mm]	60	60	80
Factor for pry-out failure		k_8	[-]	1,0		
Installation factor		γ_{inst}	[-]	1,2	1,0	1,0
Concrete edge failure						
Effective length in concrete		$l_f = h_{ef}$	[mm]	27	27	44
Nominal outer diameter of screw		d_{nom}	[mm]	5	6	

Table 6: Characteristic values of resistance in precast prestressed hollow core slabs C30/37 to C50/60

TSM concrete screw size			TSM 6		
Bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
Characteristic resistance	F^0_{Rk}	[kN]	1	2	3
Installation factor	γ_{inst}	[-]	1,0		

Table 7: Limiting distances for application in precast prestressed hollow core slabs

Distances for application in precast prestressed hollow core slabs			
Minimum edge distance	c_{min}	[mm]	≥ 100
Minimum anchor spacing	s_{min}	[mm]	≥ 100
Minimum distance between anchor groups	a_{min}	[mm]	≥ 100
Distance of core	l_c	[mm]	≥ 100
Distance of prestressing steel	l_p	[mm]	≥ 100
Distance between anchor position and prestressing steel	a_p	[mm]	≥ 50