

DECLARATION OF PERFORMANCE
DoP No. 2873-CPR-401-8 / 01.21-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	Multiple use
loading	static or quasi-static
material	<u>zinc-plated steel, steel with zinc flake coating :</u> dry internal conditions only <u>stainless steel</u> internal and external use without particular aggressive conditions <u>high corrosion resistant steel</u> 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

EAD 330747-00-0601

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 (static and quasi static loads)	-ETAG 001 Annex C -DIN EN 1992-4:2018 -EOTA TR 055	Annex C 1 and C2	EAD 3307747-00-0601
Characteristic resistance for shear load (static and quasi static loads)		Annex C 1 and C2	
Fire behaviour	-DIN EN 1992-4:2018 -EOTA TR 020	Class A1	
Fire resistance		Annex C 3	

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

Waldemar Gunkel

Dipl.-Wirtsch.-Ing. (FH), B.Eng.
Anwendungstechnik und Technische Dokumente

Nuernberg, 2023-02-15

Andreas Gerhard

Andreas Gerhard
CEO

Nuernberg, 2023-02-15

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	$\gamma_{Ms,N}$	[-]			1,5	
Characteristic shear load	$V_{Rk,s}$	[kN]	4,4		7,0	
Partial factor	$\gamma_{Ms,V}$	[-]			1,25	
Ductility factor	k_7	[-]			0,8	
Characteristic bending load	$M^0_{Rk,s}$	[Nm]	5,3		10,9	
Pull-out failure						
Characteristic 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 $N_{Rk,p} = N_{Rk,p(C20/25)} * \psi_c$	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	resistance	$N^0_{Rk,Sp}$	[kN]	$\min(N^0_{Rk,c}; N_{Rk,p})$		
	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	
TOGE concrete screw TSM High Performance						Annex C1
Performances Characteristic values for static and quasi-static loading						

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_{Rk}^0	[kN]	1	2	3
Edge distance	c_{cr}	[mm]	100		
Spacing	s_{cr}	[mm]	200		
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

TOGE concrete screw TSM High Performance

Performances

Characteristic values and limiting distances in precast prestressed hollow core slabs

Annex C2

Table 8: Fire exposure – characteristic values of resistance ¹⁾

TSM concrete screw size				TSM 5	TSM 6			
Material				TSM high performance	TSM high performance		TSM high performance A4/HCR	
Nominal embedment depth		h _{nom}		h _{nom1}	h _{nom1}	h _{nom2}	h _{nom1}	h _{nom2}
		[mm]		35	35	55	35	55
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)								
Characteristic Resistance	R30	$F_{Rk,s,fi30}$	[kN]	0,8	0,9		1,2	
	R60	$F_{Rk,s,fi60}$	[kN]	0,6	0,8		1,2	
	R90	$F_{Rk,s,fi90}$	[kN]	0,4	0,6		1,2	
	R120	$F_{Rk,s,fi120}$	[kN]	0,3	0,4		0,8	
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,5	0,7		0,9	
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,4	0,6		0,9	
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,2	0,5		0,9	
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,2	0,3		0,6	
Pull-out failure								
Characteristic Resistance	R30-R90	$N_{Rk,p,fi}$	[kN]	0,375	0,75	1,875	0,75	1,875
	R120	$N_{Rk,p,fi}$	[kN]	0,3	0,6	1,5	0,6	1,5
Concrete cone failure								
Characteristic Resistance	R30-R90	$N^0_{Rk,c,fi}$	[kN]	0,65	0,65	2,21	0,65	2,21
	R120	$N^0_{Rk,c,fi}$	[kN]	0,52	0,52	1,76	0,52	1,76
Edge distance								
R30 - 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 - R120		$s_{cr,fi}$	[mm]	4 x h _{ef}				
Pry-out failure								
R30 - R120		k_g	[-]	1,0				
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.								
¹⁾ Not for application in prestressed hollow core slabs								
TOGE concrete screw TSM High Performance							Annex C3	
Performances Characteristic values under fire exposure								