DECLARATION OF PERFORMANCE
DoP No. 1343-CPR-M 561-7 / 11.14-EN

1. Unique identification code of the product-type: **Toge concrete screw TSM high performance**
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 2
   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) covered sizes: 6, 8,10,12,14
option / category	Option 1 Seismic category C1
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, 8,10,12,14

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 1**
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-15/0514

   on the basis of

   ETAG 001-1, Option 1

   The notified body **1343-CPR** performed
   i) determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product ;
   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 1343-CPR-M 561-7 /11.14.

9. Declared performance:

Essential Characteristics	**Design Method**	**Performance**	**Harmonized Technical Specification**
Characteristic resistance for tension load	ETAG 001 Annex C	Annex C 1, C 2	ETAG 001-01 ETAG 001-3 EOTA TR 020 ETAG Annex E EAD 330011-00-0601
Characteristic resistance for shear load	ETAG 001 Annex C	Annex C 1, C 2	
Minimum spacing and minimum edge distance	ETAG 001 Annex C	Annex B 2	
Displacement for serviceability limit state	ETAG 001 Annex C	Annex C 3	
Characteristic resistance for seismic	ETAG 001 Annex E	Annex C 4	
Characteristic resistance under fire exposure	TR 020	Annex C 5	

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, 2016-02-10

Andreas Gerhard
CEO

Nuernberg, 2016-02-10

Table A1: materials and variants

part	name	Material			
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Concrete screw	TSM high performance	Steel EN 10263-4 galvanized acc. to EN ISO 4042 or zinc flake coating acc. to EN ISO 10683 (≥ 5µm)		
		TSM high performance A4	1.4401, 1.4404, 1.4571, 1.4578		
		TSM high performance HCR	1.4529		
					TSM high performance TSM high performance A4 TSM high performance HCR
		nominal characteristic steel yield strength	f_{yk}	[N/mm²]	560
		nominal characteristic steel ultimate strength	f_{uk}	[N/mm²]	700

1) Anchor version with connection thread and hexagon socket
e.g. TSM 8x105 M10 SW5

2) Anchor version with connection thread and hexagon drive
e.g. TSM 8x105 M10 SW7

3) Anchor version with washer, hexagon head and TORX
e.g. TSM 8x80 SW13 VZ 40

4) Anchor version with washer and hexagon head
e.g. TSM 8x80 SW13

5) Anchor version with washer, hexagon head and
e.g. TSM 8x80 SW13 OS

6) Anchor version with countersunk head
e.g. TSM 8x80 C VZ 40

7) Anchor version with pan head
e.g. TSM 8x80 P VZ 40

8) Anchor version with large pan head
e.g. TSM 8x80 LP VZ 40

9) Anchor version with countersunk head and connection thread
e.g. TSM 6x55 AG M8

10) Anchor version with hexagon drive and connection thread
e.g. TSM 6x55 M8 SW10

11) Anchor version with internal thread and hexagon drive
e.g. TSM 6x55 IM M8/10

TOGE concrete screw TSM high performance

Product descriptions

Materials und versions

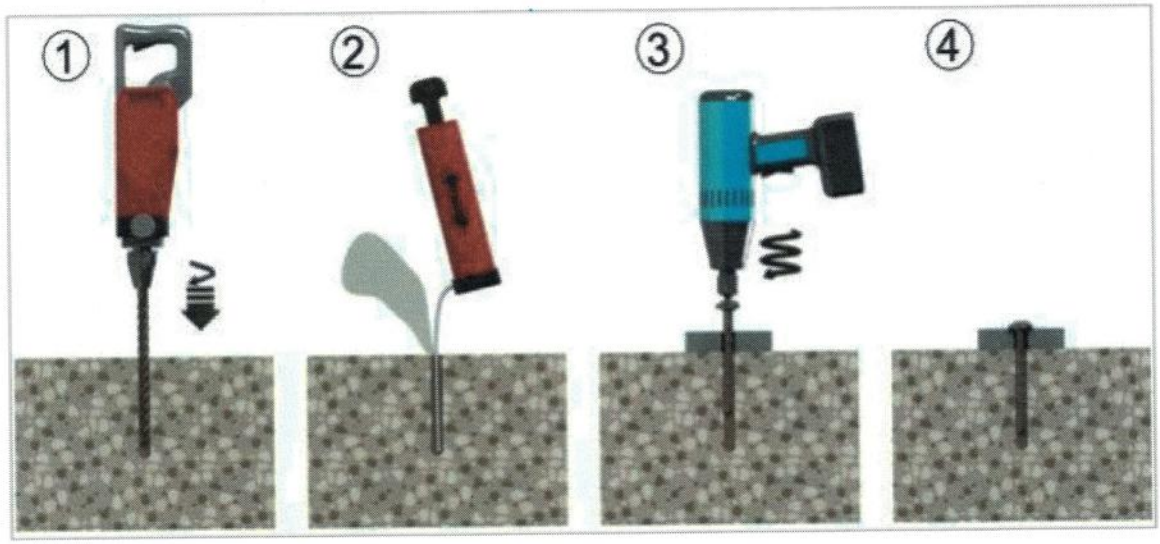
Annex A 2

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

Anchor size TSM high performance			6		8			10		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			40	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	100		100		120	100	130	130
Minimum edge distance	c_{min}	[mm]	40		40	50		50		
Minimum spacing	s_{min}	[mm]	40		40	50		50		

Anchor size TSM high performance			12			14		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			65	85	100	75	100	115
Minimum thickness of member	h_{min}	[mm]	120	130	150	130	150	170
Minimum edge distance	c_{min}	[mm]	50		70	50	70	
Minimum spacing	s_{min}	[mm]	50		70	50	70	

Installation instructions



TOGE concrete screw TSM high performance

Intended use

Minimum thickness of member, minimum spacing, minimum edge distance and installation instructions

Annex B 3

Table C1: Characteristic values for design method A according to ETAG 001, Annex C or CEN TS 1992-4 for TSM high performance 6, 8 and 10

Anchor size TSM high performance				6		8			10		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				40	55	45	55	65	55	75	85
steel failure for tension- and sear load											
characteristic load		$N_{Rk,s}$	[kN]	14,0		27,0			45,0		
		$V_{Rk,s}$	[kN]	7,0		17,0			34,0		
		k_2 [1]	[-]	0,8		0,8			0,8		
		$M^0_{Rk,s}$	[Nm]	10,0		26,0			56,0		
pull-out failure											
characteristic tension load in cracked concrete C20/25		$N_{Rk,p}$	[kN]	2,0	4,0	5,0	9,0	12,0	9,0	Pull-out failure is not decisive	
characteristic tension load in non-cracked concrete C20/25		$N_{Rk,p}$	[kN]	4,0	9,0	7,5	12,0	16,0	12,0	20,0	25,0
increasing factor for $N_{Rk,p}$		Ψ_C	C30/37	1,22							
			C40/50	1,41							
			C50/60	1,55							
concrete cone and splitting failure											
effective anchorage depth		h_{ef}	[mm]	31	44	35	43	52	43	60	68
factor for	cracked	k_{cr} [1]	[-]	7,2							
	non cracked	k_{ucr} [1]	[-]	10,1							
concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}							
	edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}							
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
installation safety factor		γ_2 [2]	[-]	1,0							
		γ_{inst} [1]	[-]								
concrete pry out failure (pry-out)											
k-Factor		k [2]	[-]	1,0					2,0		
		k_3 [1]									
concrete edge failure											
effective length of anchor		$l_f = h_{ef}$	[mm]	31	44	35	43	52	43	60	68
outside diameter of anchor		d_{nom}	[mm]	6		8			10		

[1] Parameter relevant only for design according to CEN/TS 1992-4:2009

[2] Parameter relevant only for design according to ETAG 001, Annex C

TOGE concrete screw TSM high performance

Performances

Characteristic values for TSM high performance 6, 8 and 10

Annex C 1

Table C2: Characteristic values for design method A according to ETAG 001, Annex C or CEN TS 1992-4 for TSM high performance 12 and 14

Anchor size TSM high performance				12			14		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				65	85	100	75	100	115
steel failure for tension- and sear load									
characteristic load		$N_{Rk,s}$	[kN]	67,0			94,0		
		$V_{Rk,s}$	[kN]	40,0			56,0		
		k_2 [1]	[-]	0,8			0,8		
		$M^0_{Rk,s}$	[Nm]	113,0			185,0		
pull-out failure									
characteristic tension load in cracked concrete C20/25		$N_{Rk,p}$	[kN]	12,0	Pull-out failure is not decisive		Pull-out failure is not decisive		
characteristic tension load in non-cracked concrete C20/25		$N_{Rk,p}$	[kN]	16,0					
increasing factor for $N_{Rk,p}$		Ψ_C	C30/37	1,22					
			C40/50	1,41					
			C50/60	1,55					
concrete cone and splitting failure									
effective anchorage depth		h_{ef}	[mm]	50	67	80	58	79	92
factor for	cracked	k_{cr} [1]	[-]	7,2					
	non cracked	k_{ucr} [1]	[-]	10,1					
concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}					
	edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}					
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
installation safety factor		γ_2 [2]	[-]	1,0					
		γ_{inst} [1]	[-]						
concrete pry out failure (pry-out)									
k-Factor		k [2]	[-]	1,0	2,0		1,0	2,0	
		k_3 [1]							
concrete edge failure									
effective length of anchor		$l_f = h_{ef}$	[mm]	50	67	80	58	79	92
outside diameter of anchor		d_{nom}	[mm]	12			14		

[1] Parameter relevant only for design according to CEN/TS 1992-4:2009

[2] Parameter relevant only for design according to ETAG 001, Annex C

Table C3: Displacements under tension load for TSM high performance

Anchor size TSM high performance				6		8			10		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				40	55	45	55	65	55	75	85
Cracked concrete	tension load	N	[kN]	0,95	1,9	2,4	4,3	5,7	4,3	7,9	9,6
	displacement	δ_{N0}	[mm]	0,3	0,6	0,6	0,7	0,8	0,6	0,5	0,9
		$\delta_{N\infty}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2
Non-cracked concrete	tension load	N	[kN]	1,9	4,3	3,6	5,7	7,6	5,7	9,5	11,9
	displacement	δ_{N0}	[mm]	0,4	0,6	0,7	0,9	0,5	0,7	1,1	1,0
		$\delta_{N\infty}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2

Anchor size TSM high performance				12			14		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				65	85	100	75	100	115
Cracked concrete	tension load	N	[kN]	5,7	9,4	12,3	7,6	12,0	15,1
	displacement	δ_{N0}	[mm]	0,9	0,5	1,0	0,5	0,8	0,7
		$\delta_{N\infty}$	[mm]	1,0	1,2	1,2	0,9	1,2	1,0
Non-cracked concrete	tension load	N	[kN]	7,6	13,2	17,2	10,6	16,9	21,2
	displacement	δ_{N0}	[mm]	1,0	1,1	1,2	0,9	1,2	0,8
		$\delta_{N\infty}$	[mm]	1,0	1,2	1,2	0,9	1,2	1,0

Table C4 : Displacements under shear load for TSM high performance

Anchor size TSM high performance			6		8			10		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			40	55	45	55	65	55	75	85
shear load	V	[kN]	3,3		8,6			16,2		
displacement	δ_{V0}	[mm]	1,55		2,7			2,7		
	$\delta_{V\infty}$	[mm]	3,10		4,1			4,3		

Anchor size TSM high performance			12			14		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			65	85	100	75	100	115
shear load	N	[kN]	20,0			30,5		
displacement	δ_{V0}	[mm]	4,0			3,1		
	$\delta_{V\infty}$	[mm]	6,0			4,7		

TOGE concrete screw TSM high performance

Performances

Displacements under tension and shear loads

Annex C 3

Table C5: Characteristic values for seismic category C1

Anchor size TSM high performance				**8**	**10**	**12**	**14**
Nominal embedment depth h_{nom} [mm]				**h_{nom3}**			
				65	**85**	**100**	**115**
steel failure for tension- and sear load							
characteristic load		$N_{Rk,s,seis}$	[kN]	27,0	45,0	67,0	94,0
		$V_{Rk,s,seis}$	[kN]	8,5	15,3	21,0	22,4
pull-out failure							
characteristic tension load in cracked concrete C20/25		$N_{Rk,p,seis}$	[kN]	12,0	Pull-out failure is not decisive		
characteristic tension load in non-cracked concrete C20/25		$N_{Rk,p,seis}$	[kN]	16,0			
concrete cone failure							
effective anchorage depth		h_{ef}	[mm]	52	68	80	92
concrete cone failure	spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$			
	edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$			
installation safety factor		γ_2	[-]	1,0			
concrete pry out failure (pry-out)							
k-Factor		k	[-]	1,0			
concrete edge failure							
effective length of anchor		$l_f = h_{ef}$	[mm]	52	68	80	92
outside diameter of anchor		d_{nom}	[mm]	8	10	12	14

Table C6: Characteristic values of resistance to fire exposure for TSM high performance

Anchor size TSM high performance			6		8			10		
Nominelle embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			40	55	45	55	65	55	75	85
Fire resistance class	Characteristic resistance									
R30	$F_{Rk,fi\ 30}$	[kN]	0,5	0,7	1,3	2,3	2,3	1,3	4,0	4,0
R60	$F_{Rk,fi\ 60}$	[kN]	0,5	0,7	1,3	1,7	1,7	1,3	3,3	3,3
R90	$F_{Rk,fi\ 90}$	[kN]	0,5	0,6	1,1	1,1	1,1	1,3	2,2	2,2
R120	$F_{Rk,fi\ 120}$	[kN]	0,4	0,4	0,8	0,8	0,8	1,0	1,7	1,7
R 30 to R 120	Spacing $s_{cr,fi}$	[mm]	$4 \times h_{ef}$							
	Edge distance $c_{cr,fi}$		$2 \times h_{ef}$							

Anchor size TSM high performance			12			14		
Nominell embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			65	85	100	75	100	115
Fire resistance class	Characteristic resistance							
R30	$F_{Rk,fi\ 30}$	[kN]	3,0	4,9	6,3	4,0	6,3	9,1
R60	$F_{Rk,fi\ 60}$	[kN]	3,0	4,9	5,8	4,0	6,3	8,1
R90	$F_{Rk,fi\ 90}$	[kN]	3,0	4,2	4,2	4,0	5,9	5,9
R120	$F_{Rk,fi\ 120}$	[kN]	2,4	3,4	3,4	3,2	4,8	4,8
R 30 to R 120	Spacing $s_{cr,fi}$	[mm]	$4 \times h_{ef}$					
	Edge distance $c_{cr,fi}$		$2 \times h_{ef}$					