

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-10/0115**  
**of 3 December 2014**

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

TOGE Concrete screw TSM 6

Product family  
to which the construction product belongs

Concrete screw of size 6 for use in concrete

Manufacturer

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

Manufacturing plant

TOGE Dübel GmbH & Co. KG

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 Regulation (EU)  
No 305/2011, on the basis of

Guideline for European technical approval of "Metal  
anchors for use in concrete", ETAG 001 Part 3: "Undercut  
anchors", Edition April 2013,  
used as European Assessment Document (EAD)  
according to Article 66 Paragraph 3 of Regulation (EU)  
No 305/2011.

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## Specific Part

### 1 Technical description of the product

The TOGE Concrete screw in size of 6 is an anchor made of zinc-plated steel respectively steel with zinc flake coating (TSM B, TSM BC) or made of stainless steel (TSM BS, TSM BSH). The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and 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
Characteristic resistance for tension and shear loads as well as bending moments in concrete	See Annex C 1
Edge distances and spacing	See Annex C 1
Displacements under tension and shear loads	See Annex C 2

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C 3

#### 3.3 Hygiene, health and the environment (BWR 3)

Not applicable.

#### 3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

**3.5 Protection against noise (BWR 5)**

Not applicable.

**3.6 Energy economy and heat retention (BWR 6)**

Not applicable.

**3.7 Sustainable use of natural resources (BWR 7)**

The sustainable use of natural resources was not investigated.

**3.8 General aspects**

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

**4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

According to Decision of the Commission of 24 June 1996 (96/582/EC) (OJ L 254 of 08.10.96 p. 62-65), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use(s)	Level or class	System
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	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 at Deutsches Institut für Bautechnik.

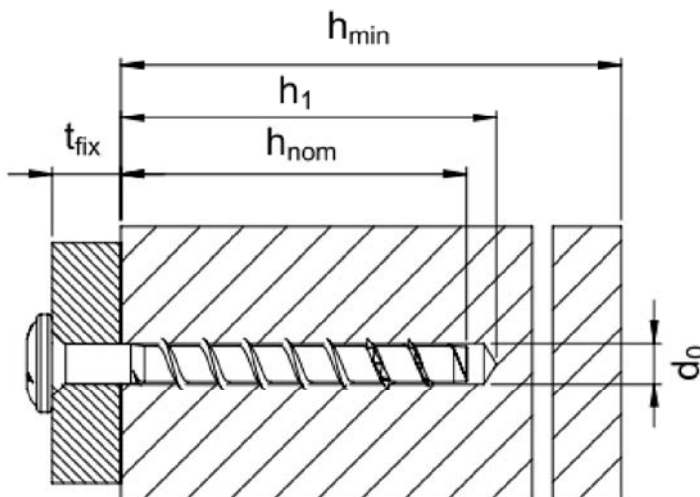
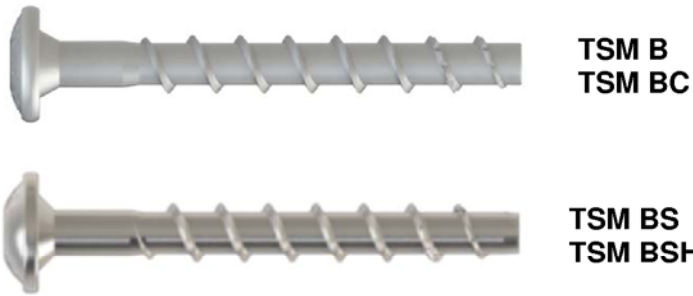
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Uwe Bender  
Head of Department

*beglaubigt:*  
Tempel

**product and installed condition**

**Toqe concrete screw TSM 6**



- $d_0$  = nominal drill bit diameter
- $h_{nom}$  = nominal anchorage depth
- $h_1$  = depth of the drill hole
- $h_{min}$  = minimum thickness of member
- $t_{fix}$  = thickness of fixture

**TOGE concrete screw TSM B, BC, BS, BSH**

















**Product description**

Installed condition

**Annex A 1**

**Table A1: materials and variants**

part	name	Material		
1, 2, 3, 4, 5, 6, 7, 8	Screw anchor	TSM B, BC	Steel EN 10263-4 galvanized acc. to EN ISO 4042 or zinc flake coating acc. to EN ISO 10683 ( $\geq 5\mu\text{m}$ )	
		TSM BS	1.4401, 1.4404, 1.4571, 1.4578	
		TSM BSH	1.4529	
		nominal characteristic steel yield strength	$f_{yk}$ [N/mm <sup>2</sup> ]	600
		nominal characteristic steel ultimate strength	$f_{uk}$ [N/mm <sup>2</sup> ]	700

		1)	Anchor version with connection thread
		2)	Anchor version with washer, hexagon head and TORX
		3)	Anchor version with washer, hexagon head and
		4)	Anchor version with hexagon head
		5)	Anchor version with countersunk head
		6)	Anchor version with pan head
		7)	Anchor version with countersunk head and connection thread
		8)	Anchor version with hexagon head and connection thread

**TOGE concrete screw TSM B, BC, BS, BSH**

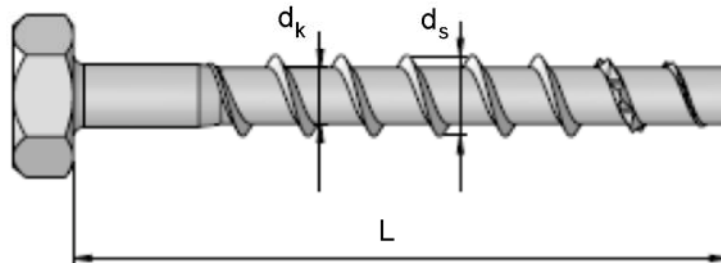
**Product description**

Material and variants

**Annex A 2**

**Table A2: dimensions and markings**

Anchor size			TSM 6
Length of the anchor	$L \leq$	[mm]	200
Diameter of shaft	$d_k$	[mm]	5,2
Diameter of thread	$d_s$	[mm]	7,5



Marking:

Anchor type: TSM B, TSM BC, TSM BS, TSM BSH

Anchor size: 6

Length of the anchor: 60

**TOGE concrete screw TSM B, BC, BS, BSH**

**Product descriptions**

Dimensions and markings

**Annex A 3**

## Intended use

### Anchorage subject to:

- static and quasi static loads
- Used for anchorages with requirements related to resistance of fire

### Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000
- strength classes C20/25 to C50/60 according to EN 206-1:2000
- cracked and non-cracked concrete

### Use conditions (Environmental conditions):

- The anchor may only be used in dry internal conditions: All screw types
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if no particular aggressive conditions exists: screw types made of stainless steel with marking BS
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exists: screw types made of stainless steel with marking BSH

### Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi-static actions are designed for design method A in accordance with:
  - ETAG 001, Annex C, Edition August 2010
  - CEN/TS 1992-4:2009.
- Anchorages under fire exposure are designed in accordance with:
  - EOTA Technical Report TR 020, Edition May 2004 or
  - CEN/TS 1992-4:2009, Annex D (It must be ensured that local spalling of the concrete cover does not occur).

### Installation:

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.

**TOGE concrete screw TSM B, BC, BS, BSH**

**Intended use**

Specifications

**Annex B 1**

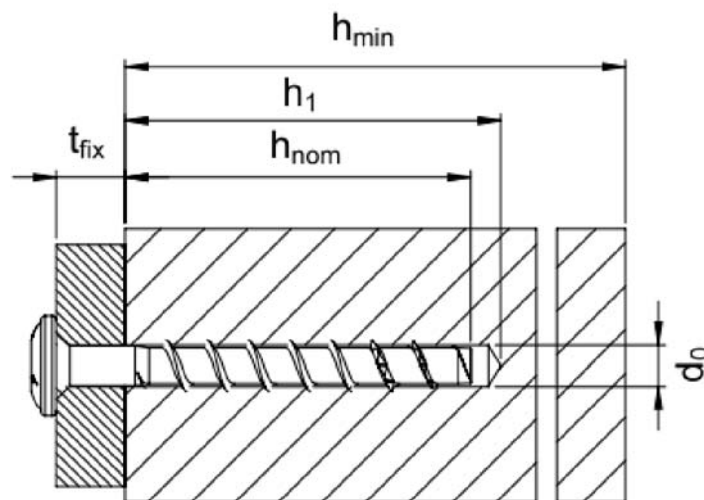


**Table B1: Installation parameters**

Anchorsize			TSM 6
Nominal embedment depth			$h_{nom} = 55 \text{ mm}$
nominal drill bit diameter	$d_0$	[mm]	6
cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40
depth of drill hole	$h_1 \geq$	[mm]	60
Nominal embedment depth	$h_{nom} \geq$	[mm]	55
diameter of clearing hole in the fixture	$d_f \geq$	[mm]	8

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

Anchorsize			TSM 6
Nominal embedment depth			$h_{nom} = 55 \text{ mm}$
minimum thickness of member	$h_{min}$	[mm]	100
minimum edge distance	$c_{min}$	[mm]	40
minimum spacing	$s_{min}$	[mm]	40



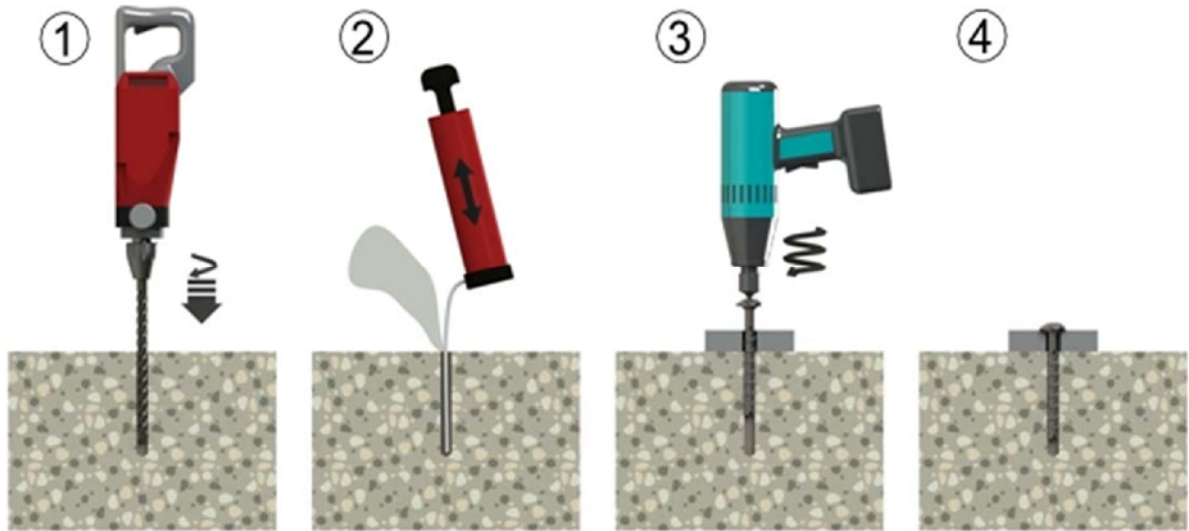
TOGE concrete screw TSM B, BC, BS, BSH

**Intended use**

Installation parameters

**Annex B 2**

### Installation instructions



**TOGE concrete screw TSM B, BC, BS, BSH**

**Intended use**

Installation instruction

**Annex B 3**

**Table C1: Characteristic values for design method A according to ETAG 001, Annex C  
or CEN TS 1992-4**

Anchorsize			TSM 6
Nominal embedment depth			$h_{nom} = 55 \text{ mm}$
<b>steel failure for tension- and sear load</b>			
characteristic load	$N_{RK,s}$	[kN]	13,7
	$V_{RK,s}$	[kN]	7,0
	$M^0_{RK,s}$	[Nm]	10,0
<b>Poll-out failure</b>			
characteristic tension load in cracked concrete C20/25	$N_{RK,p}$	[kN]	3,0
characteristic tension load in non-cracked concrete C20/25	$N_{RK,p}$	[kN]	9,0
increasing factor concrete for $N_{RK,p}$	$\Psi_C$	C30/37	1,22
		C40/50	1,41
		C50/60	1,55
<b>concrete cone and splitting failure</b>			
effective anchorage depth	$h_{ef}$	[mm]	44
factor for	cracked	$k_{cr}^{1)}$	[-]
	non cracked	$k_{ucr}^{1)}$	[-]
concrete cone failure	spacing	$s_{cr,N}$	[mm]
	edge distance	$c_{cr,N}$	[mm]
splitting failure	spacing	$s_{cr,Sp}$	160
	edge distance	$c_{cr,Sp}$	80
installation safety factor	$\gamma_2^{1)} = \gamma_{inst}^{2)}$	[-]	1,0 <sup>2)</sup>
<b>concrete pry out failure (pry-out)</b>			
k-Factor	$k^{1)} = k_3^{2)}$	[-]	1,0
<b>concrete edge failure</b>			
effective length of anchor	$l_f = h_{ef}$	[mm]	44
outside diameter of anchor	$d_{nom}$	[-]	6

<sup>1)</sup> Parameter relevant only for design according to CEN/TS 1992-4:2009

<sup>2)</sup> Parameter relevant only for design according ETAG 001 Annex C

**TOGE concrete screw TSM B, BC, BS, BSH**

**Performances**

Characteristic values for design method A

**Annex C 1**

**Table C2: Displacements under tension load**

anchor identity			TSM 6
Nominal embedment depth			$h_{nom} = 55 \text{ mm}$
tension load	cracked concrete	N [kN]	4,3
tension load	in non cracked concrete	N [kN]	1,4
displacement		$\delta_{N0}$ [mm]	0,3
		$\delta_{\infty}$ [mm]	0,6

**Table C3 : Displacements under shear load**

anchor identity			TSM 6
Nominal embedment depth			$h_{nom} = 55 \text{ mm}$
shear load	V	[mm]	3,33
displacement		$\delta_{V0}$ [mm]	1,55
		$\delta_{\infty}$ [mm]	3,10

**TOGE concrete screw TSM B, BC, BS, BSH**

**Performances**

displacements under tension and shear load

**Annex C 2**

**Table C4: Characteristic values of resistance to fire exposure**

Anchorsize				TSM 6	
Nominal embedment depth				$h_{nom} = 55 \text{ mm}$	
				B, BC	BS, BSH
fire resistance class					
R 30	characteristic resistance	$F_{Rk,fi30}$	[kN]	0,7	0,7
R 60	characteristic resistance	$F_{Rk,fi60}$	[kN]	0,7	0,7
R 90	characteristic resistance	$F_{Rk,fi90}$	[kN]	0,6	0,7
R 120	characteristic resistance	$F_{Rk,fi120}$	[kN]	0,4	0,6
R 30 bis R 120	spacing	$S_{cr,fi}$	[mm]	120	
	edge distance	$C_{cr,fi}$		60	

**TOGE concrete screw TSM B, BC, BS, BSH**

**Performances**

Characteristic values of resistance to fire exposure

**Annex C 3**