

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-22/0720
of 9 November 2022

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

Deutsches Institut für Bautechnik

TURBO SMART TSM concrete screw

Mechanical fasteners for use in concrete

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Manufacturing plant 3

19 pages including 3 annexes which form an integral part
of this assessment

EAD 330232-01-0601, Edition 05/2021

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Specific Part

1 Technical description of the product

The TURBO SMART TSM concrete screw is an anchor in size 6, 8 and 10 mm made of stainless steel. 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 are 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 to tension load (static and quasi-static loading)	See Annex B4, C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C1 and C2
Displacements (static and quasi-static loading)	See Annex C5
Characteristic resistance and displacements for seismic performance categorie C1	See Annex C3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C4

3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	Performance
Durability	See Annex B1

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. 330232-01-0601 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 at Deutsches Institut für Bautechnik.

Issued in Berlin on 9 November 2022 by Deutsches Institut für Bautechnik

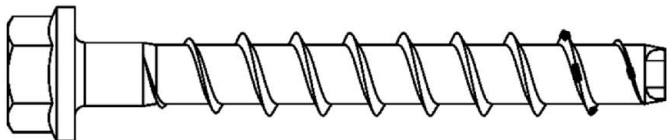
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Tempel

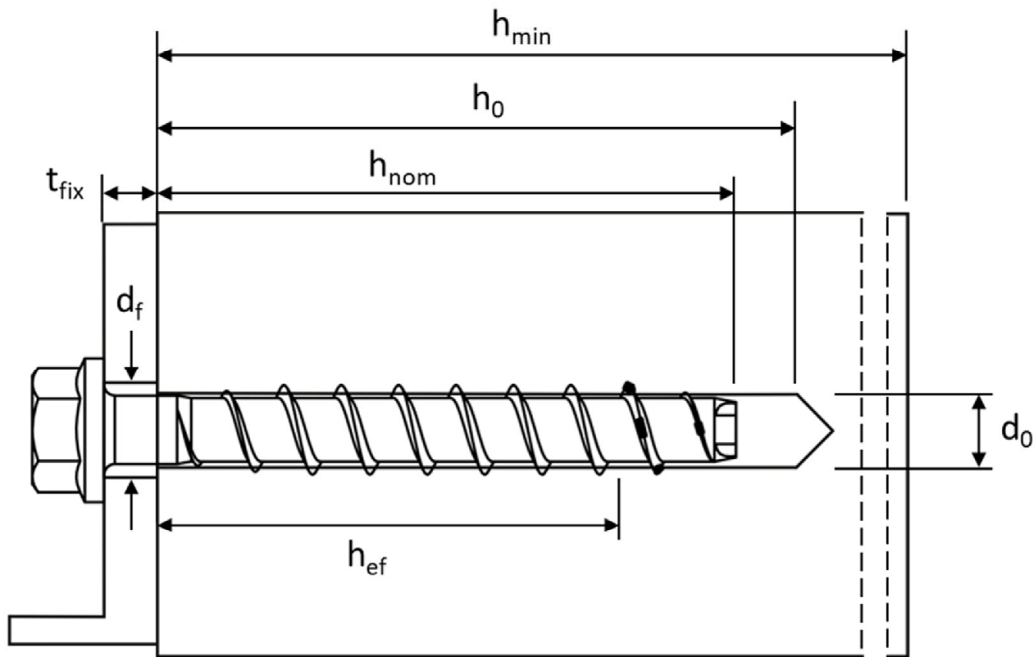
Product in installed condition

TURBO SMART TSM concrete screw

- stainless steel A4
- high corrosion resistant steel HCR

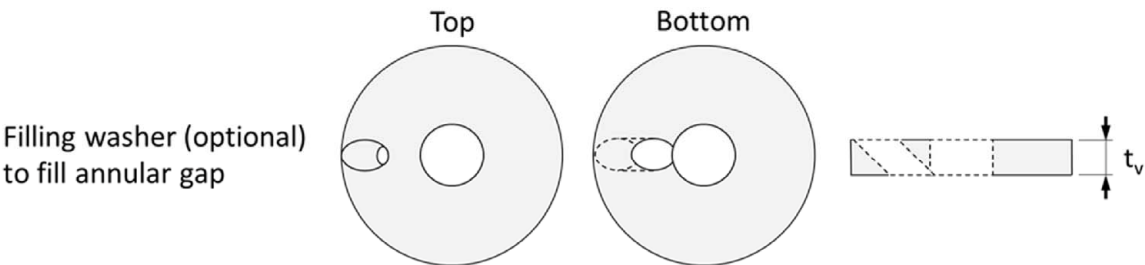


e.g. TSM concrete screw with hexagon head and fixture



d_0 = nominal diameter of drill hole
 t_{fix} = thickness of fixture
 d_f = diameter of clearance hole





















h_{min} = minimum thickness of member
 h_{nom} = nominal embedment depth
 h_0 = depth of drill hole
 h_{ef} = effective embedment depth



TURBO SMART TSM concrete screw

Product description
Product in installed condition

Annex A1

1			TURBO SMART S-BSZ	Concrete screw version with hexagon head with pressed-on washer
2			TURBO SMART S-BSM	Concrete screw version with hexagon head with pressed-on washer and T-drive
3			TURBO SMART S-BSH	Concrete screw version with hexagon head
4			TURBO SMART S-BSV	Concrete screw with countersunk head
5			TURBO SMART S-BSP	Concrete screw with pan head
6			TURBO SMART S-BSF	Concrete screw with large pan head
7			TURBO SMART S-BSE	Concrete screw with countersunk head and connection thread
8			TURBO SMART S-BSB	Concrete screw with hexagonal head and connection thread
9			TURBO SMART S-BSS	Concrete screw with hexagon drive and connection thread
10			TURBO SMART S-BSI	Concrete screw with internal metric thread and hexagon drive

TURBO SMART TSM concrete screw

Product description
Material, dimensions and markings

Annex A2

Table 1: Material

Part	Product name	Material		
all types	TURBO SMART A4	1.4401; 1.4404; 1.4571; 1.4578		
	TURBO SMART HCR	1.4529		
Part	Product name	Nominal characteristic steel		Rupture elongation A_5 [%]
		Yield strength f_{yk} [N/mm ²]	Ultimate strength f_{uk} [N/mm ²]	
all types	TURBO SMART A4	560	700	≤ 8
	TURBO SMART HCR			

Table 2: Dimensions

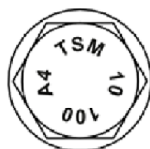
Concrete screw size		6			8			10		
Nominal embedment depth	h_{nom}	1 ¹⁾	2	3	1	2	3	1	2	3
	[mm]	35	45	55	45	55	65	55	75	85
Screw length	≤ L	[mm] 500								
Core diameter	d_k	[mm] 5,1			7,2			9,2		
Thread outer diameter	d_s	[mm] 7,6			10,5			12,5		
Thickness of filling washer	t_v	[mm] 5			5			5		

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

Marking:

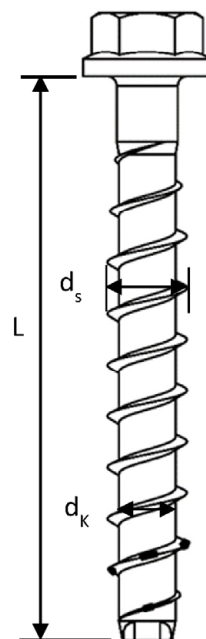
TURBO SMART A4

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



TURBO SMART HCR

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



TURBO SMART TSM concrete screw

Product description

Material, dimensions and markings

Annex A3

Specification of Intended use

Table 3: Anchorages subject to

Concrete screw size		6			8			10		
Nominal embedment depth	h _{nom}	h _{nom1} ¹⁾	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}	h _{nom1}	h _{nom2}	h _{nom3}
	[mm]	35	45	55	45	55	65	55	75	85
Static and quasi-static loads		All sizes and all embedment depths								
Fire exposure										
C1 category - seismic		x	✓	✓	✓	x	✓	✓	x	✓

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

x no performance assessed

Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2006 + A1:2015
 - Stainless steel according to Annex A3, screw with marking A4: CRC III
 - High corrosion resistant steel according to Annex A3, screw with marking HCR: CRC V

TURBO SMART TSM concrete screw

Intended use
Specification

Annex B1

Specification of Intended use - continuation

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 anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed according to EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.

The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters d_f of clearance hole in the fixture in Annex B3, Table 4.

Installation:

- Hammer drilling or hollow drilling. Hollow drilling only for size 8-10.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer, if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The head of the anchor is supported in the fixture and is not damaged.
- The borehole may be filled with injection mortar SMART S-IRV, S-IRW or S-IRE.
- Adjustability according to Annex B6 for sizes 6-10 except for applications with filled borehole and not for seismic applications.
- Cleaning of borehole is not necessary, if using a hollow drill.

TURBO SMART TSM concrete screw

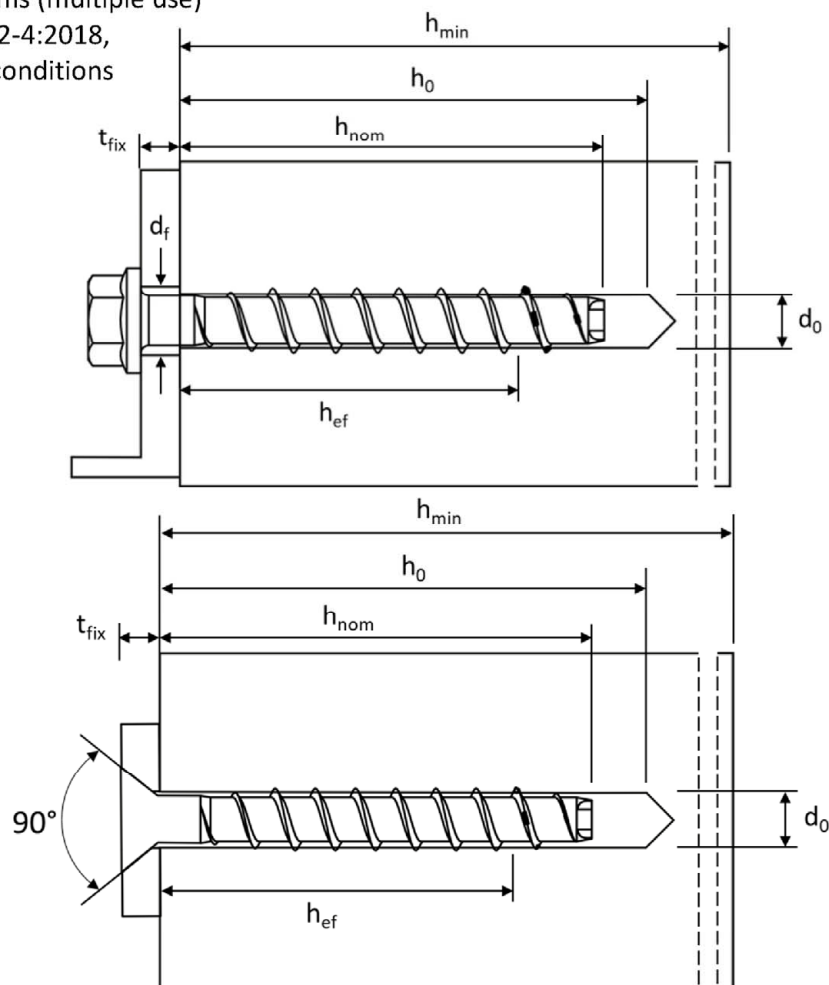
Intended use
Specification continuation

Annex B2

Table 4: Installation parameters

Concrete screw size			6			8			10		
Nominal embedment depth		h_{nom}	$h_{nom1}^{1)}$	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	35	45	55	45	55	65	55	75	85
Nominal drill hole diameter	d_0	[mm]	6			8			10		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40			8,45			10,45		
Depth of drill hole	$h_0 \geq$	[mm]	40	50	60	55	65	75	65	85	95
Clearance hole diameter	$d_f \leq$	[mm]	8			12			14		
Installation torque (version with connection thread)	T_{inst}	[Nm]	10			20			40		
Torque impact screw driver		[-]	Max. torque according to manufacturer's instructions								
			160			300			450		

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions



TURBO SMART TSM concrete screw

Intended use
Installation parameters

Annex B3

Table 5: Minimum thickness of member, minimum edge distance and minimum spacing

Concrete screw size			6			8			10		
Nominal embedment depth	h_{nom}	h_{nom} [mm]	$h_{nom1}^{1)}$	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			35	45	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	80	80	100	80	100	120	100	130	130
Minimum edge distance	c_{min}	[mm]	35	35	35	35	35	35	40	40	40
Minimum spacing	s_{min}	[mm]	35	35	35	35	35	35	40	40	40

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

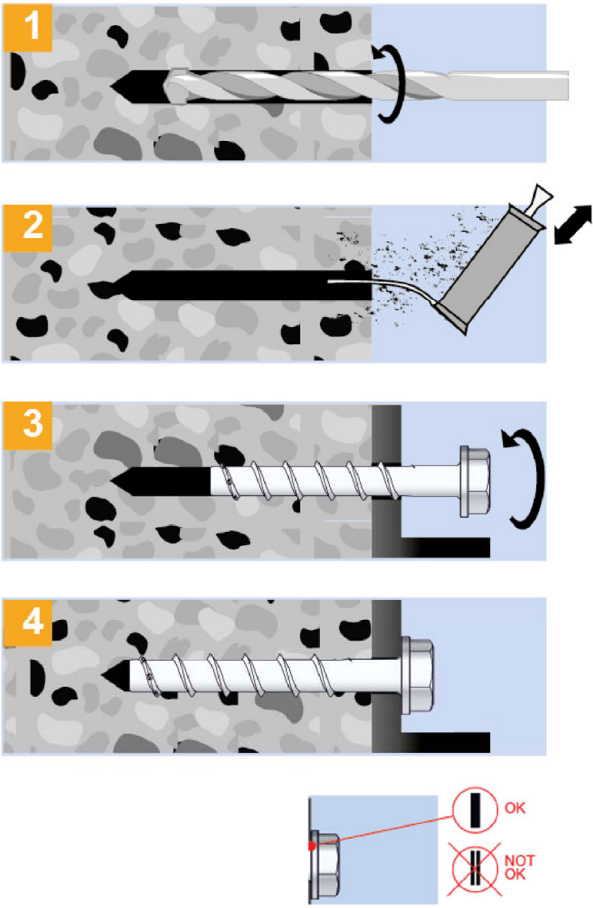
TURBO SMART TSM concrete screw

Intended use

Minimum thickness of member, minimum edge distance and minimum spacing

Annex B4

Installation instructions

	<ol style="list-style-type: none"> 1. Drilling: Choose the correct drill diameter (d_0) and drilling depth (h_1). Create hammer drilled or hollow drilled borehole. 2. Cleaning of the drill hole: Remove drill dust by vacuuming or blowing. 3. Installation: Install the anchor by impact screwdriver or torque wrench. 4. Complete: verify that the head is pressed to the fixture.
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Remark : cleaning of borehole is not necessary when using an hollow drill bit

For screw size 6 with $h_{nom} = 35\text{mm}$, installation only with impact screw drivers.

TURBO SMART TSM concrete screw

Intended use
Installation instructions - adjustability

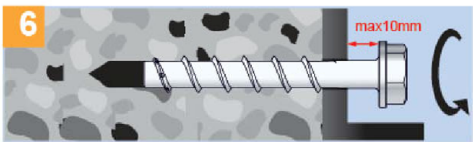
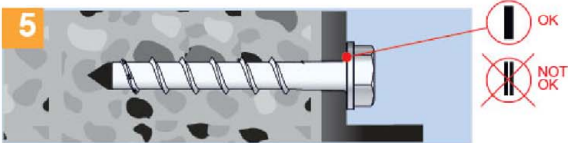
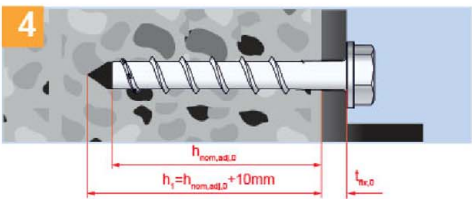
Annex B6

Installation instructions for adjustability

Adjustment after installation



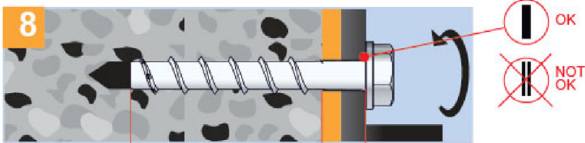
1st
Adjustment



Screw may be untightened max 10mm



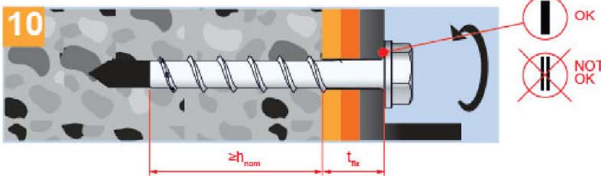
After adjustment, tighten the screw again



The head must be undamaged and in contact with the fixture



Screw may be untightened max 10mm

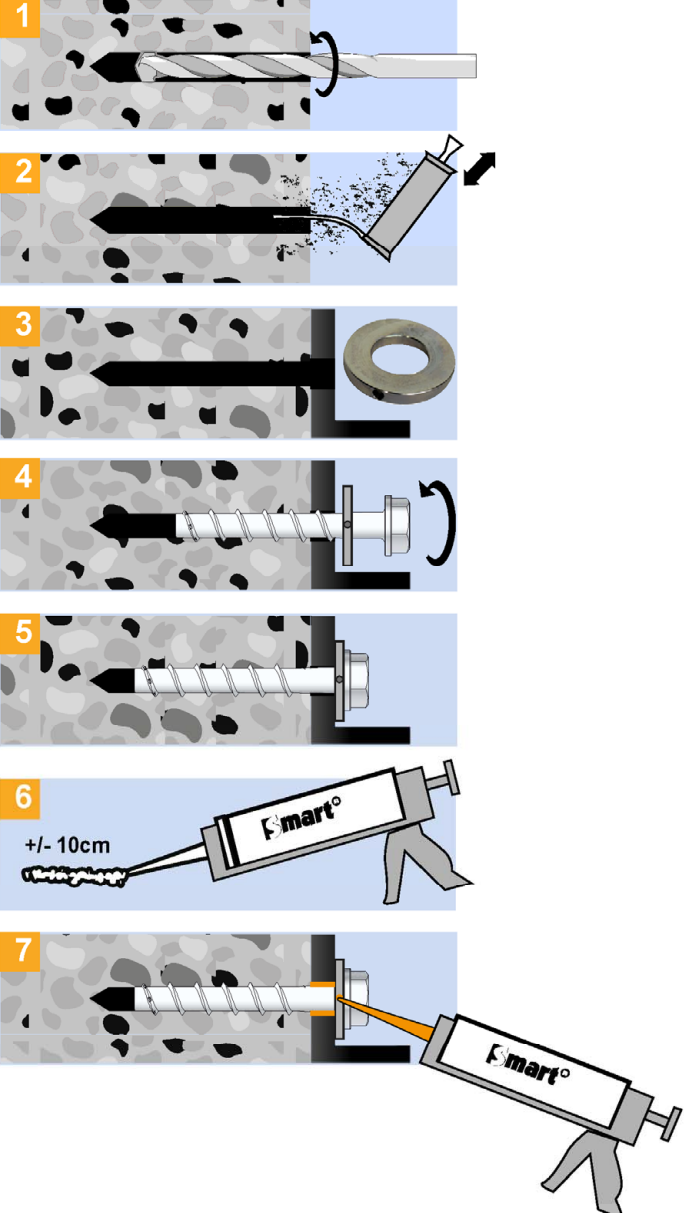


After adjustment, tighten the screw again.
The head must be undamaged and in contact with the fixture

TURBO SMART anchor may be adjusted maximum two times while the anchor may turn back at most 10 mm.
The total allowed thickness of shims added during the adjustment process is 10mm.
The final embedment depth after adjustment process must be equal or larger than h_{nom} .

TURBO SMART TSM concrete screw		Annex B6
Intended use Installation instructions - adjustability		

Installation instructions – filling annular gap

 <p>The diagram illustrates the installation process in seven steps:</p> <ol style="list-style-type: none"> Drilling: A drill bit is used to create a hole in the concrete. Cleaning of the drill hole: The hole is cleaned using a vacuum or air blower to remove dust. Filling washer: A washer is placed into the hole. Installation: The concrete screw is driven into the hole using an impact screwdriver or torque wrench. Installed condition without injected mortar in the filling washer: The screw is fully seated in the hole. Preparation for annular gap filling: A cartridge of F-mart mortar is shown, with a note indicating a distance of +/- 10cm from the washer. Filling the annular gap: The mortar is injected into the gap around the screw using a syringe. 	<ol style="list-style-type: none"> Drilling: Choose the correct drill diameter (d_0) and drilling depth (h_1). Create hammer drilled or hollow drilled borehole. Cleaning of the drill hole: Remove drill dust by vacuuming or blowing. Filling washer: After preparing the borehole (Annex B5, figure 1+2), position first the fixture and then the filling washer. Installation: Install the anchor by impact screwdriver or torque wrench. Installed condition without injected mortar in the filling washer Follow the instructions displayed on the chemical anchor cartridge and discard the mortar until the colour is constant. Filling the annular gap: Fill the annular gap with the injection mortar (minimum compression strength of 40 N/mm²)
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Note:

For seismic loading the installation with filled and without filled annular gap is approved.
Differences in performance can be found in Annex C3.

TURBO SMART TSM concrete screw

Intended use
Installation instructions

Annex B7

Table 6: Characteristic values for static and quasi-static loading

Concrete screw size			6			8			10			
Nominal embedment depth		h_{nom}	$h_{nom1}^{1)}$	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	
		[mm]	35	45	55	45	55	65	55	75	85	
Steel failure for tension and shear loading												
Characteristic tension load	$N_{Rk,s}$	[kN]	14,0			27,0			45,0			
Partial factor	$\gamma_{Ms,N}$	[-]	1,5									
Characteristic shear load	$V^0_{Rk,s}$	[kN]	7,0			13,5		17,0	22,5	34,0		
Partial factor	$\gamma_{Ms,V}$	[-]	1,25									
Ductility factor	k_7	[-]	0,8									
Characteristic bending load	$M^0_{Rk,s}$	[Nm]	10,9			26,0			56,0			
Pull-out failure in uncracked concrete												
Characteristic tension load C20/25		$N_{Rk,p}$	[kN]	3,5 ¹⁾	4,0	8,5	9,0	12,0	17,0	11,0	19,0	25,0
Increasing factor for $N_{Rk,p} = N_{Rk,p} (C20/25) \cdot \psi_c$	C25/30	ψ_c	[-]	1,08	1,12	1,09	1,12		1,07	1,12		
	C30/37			1,15	1,22	1,17	1,22		1,13	1,22		
	C40/50			1,27	1,41	1,30	1,41		1,23	1,41		
	C50/60			1,38	1,58	1,42	1,58		1,32	1,58		
Pull-out failure in cracked concrete												
Characteristic tension load C20/25		$N_{Rk,p}$	[kN]	2,5 ¹⁾	1,5	3,0	3,0	5,5	8,0	6,0	13,0	17,0
Increasing factor for $N_{Rk,p} = N_{Rk,p} (C20/25) \cdot \psi_c$	C25/30	ψ_c	[-]	1,10	1,08	1,12	1,12		1,12		1,09	
	C30/37			1,18	1,15	1,22	1,22		1,22		1,17	
	C40/50			1,32	1,27	1,41	1,41		1,41		1,31	
	C50/60			1,45	1,38	1,58	1,58		1,58		1,43	

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

TURBO SMART TSM concrete screw

Performances

Characteristic values for static and quasi-static loading

Annex C1

Table 7: Characteristic values for static and quasi-static loading continuation

Concrete screw size			6				8			10		
Nominal embedment depth		h_{nom}	$h_{nom1}^{1)}$	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	
		[mm]	35	45	55	45	55	65	55	75	85	
Concrete failure: concrete cone failure and splitting failure												
Effective embedment depth		h_{ef}	[mm]	25	34	42	32	41	49	40	57	65
k-factor	cracked	k_{cr}	[-]	7,7								
	uncracked	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 case 1	resistance	$N^0_{Rk,sp}$	[kN]	3,5 ¹⁾	4,0	8,5	9,0	12,0	17,0	11,0	19,0	25,0
	spacing	$S_{cr,sp}$	[mm]	120	160	240	200	240	290	230	280	320
	edge distance	$C_{cr,sp}$	[mm]	60	80	120	100	120	145	115	140	160
Splitting failure case 2	resistance	$N^0_{Rk,sp}$	[kN]	2 ²⁾	2,5	5,5	5,5	8,0	11,0	7,0	15,0	20,0
	spacing	$S_{cr,sp}$	[mm]	2 ²⁾	116	168	128	164	196	160	224	260
	edge distance	$C_{cr,sp}$	[mm]	2 ²⁾	58	84	64	82	98	80	114	130
Pry-out failure												
Factor for pry-out failure		k_g	[-]	1,0	1,6	2,1	2,8	2,5				
Installation factor		γ_{inst}	[-]	1,0								
Concrete edge failure												
Effective length in concrete		l_f	[mm]	35	45	55	45	55	65	55	75	85
Nominal outer diameter of screw		d_{nom}	[mm]	6			8			10		

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

²⁾ no performance assessed

TURBO SMART TSM concrete screw

Performances

Characteristic values for static and quasi-static loading (continued)

Annex C2

Table 8: Seismic category C1 – Characteristic load values (only type BSZ, type BSV, type BSS, type BSE¹⁾, type BSB¹⁾, type BSP, type BSF and type BSI¹⁾)

Concrete screw size			6		8		10	
Nominal embedment depth	h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom3}	h_{nom1}	h_{nom3}	
	[mm]	45	55	45	65	55	85	
Steel failure for tension and shear load (BSZ, BSV, BSS, BSE ¹⁾ , BSB ¹⁾ , BSP, BSF, BSI ¹⁾)								
Characteristic tension load	$N_{Rk,s,C1}$	[kN]	14,0		27,0		45,0	
Partial factor	$\gamma_{Ms,N}$	[-]	1,5					
Characteristic shear load Type S, Type ST, Type P	$V_{Rk,s,C1}$	[kN]	3,5	4,0	8,0	10,0	14,0	16,0
Characteristic shear load Type SK	$V_{Rk,s,C1}$	[kN]	2,5	2)	4,5	7,0	14,0	10,0
Partial factor	$\gamma_{Ms,V}$	[-]	1,25					
Without filling of the annular gap ³⁾	α_{gap}	[-]	0,5					
With filling of the annular gap ⁴⁾	α_{gap}	[-]	1,0					
Pull-out failure (BSZ, BSV, BSS, BSE ¹⁾ , BSB ¹⁾ , BSP, BSF, BSI ¹⁾)								
Characteristic tension load in cracked concrete C20/25	$N_{Rk,p,C1}$	[kN]	1,5	3,0	3,0	8,5	6,0	17,0
Concrete cone failure (BSZ, BSV, BSS, BSE ¹⁾ , BSB ¹⁾ , BSP, BSF, BSI ¹⁾)								
Effective embedment depth	h_{ef}	[mm]	34	42	32	49	40	65
Edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}					
Spacing	$s_{cr,N}$	[mm]	3 x h_{ef}					
Installation safety factor	γ_{inst}	[-]	1,0					
Concrete pry-out failure (BSZ, BSV, BSS, BSP, BSF)								
Factor for pry-out failure	k_8	[-]	1,6		2,1	2,8	2,5	
Concrete edge failure (BSZ, BSV, BSS, BSP, BSF)								
Effective length in concrete	l_f	[mm]	45	55	45	65	55	85
Nominal outer diameter of screw	d_{nom}	[mm]	6		8		10	

¹⁾ only tension load

²⁾ no performance assessed

³⁾ without filling of the annular gap according to annex B5

⁴⁾ with filling of the annular gap according to annex B7

TURBO SMART TSM concrete screw

Performances

Seismic category C1 – Characteristic load values

Annex C3

Table 9: Fire exposure – characteristic values of resistance

Concrete screw size				6			8			10		
Nominal embedment depth			h_{nom}	1 ¹⁾	2	3	1	2	3	1	2	3
			[mm]	35	45	55	45	55	65	55	75	85
Steel failure for tension and shear load												
characteristic Resistance	R30	$N_{Rk,s,fi30}$	[kN]	0,9			2,4			4,4		
	R60	$N_{Rk,s,fi60}$	[kN]	0,8			1,7			3,3		
	R90	$N_{Rk,s,fi90}$	[kN]	0,6			1,1			2,3		
	R120	$N_{Rk,s,fi120}$	[kN]	0,4			0,7			1,7		
	R30	$V_{Rk,s,fi30}$	[kN]	0,9			2,4			4,4		
	R60	$V_{Rk,s,fi60}$	[kN]	0,8			1,7			3,3		
	R90	$V_{Rk,s,fi90}$	[kN]	0,6			1,1			2,3		
	R120	$V_{Rk,s,fi120}$	[kN]	0,4			0,7			1,7		
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,7			2,4			5,9		
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,6			1,8			4,5		
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,5			1,2			3,0		
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,3			0,9			2,3		
Pull-out failure												
characteristic Resistance	R30-90	$N_{Rk,p,fi}$	[kN]	0,6	0,4	0,8	0,8	1,4	2,0	1,5	3,3	4,3
	R120	$N_{Rk,p,fi}$	[kN]	0,5	0,3	0,6	0,6	1,1	1,6	1,2	2,6	3,4
Concrete cone failure												
characteristic Resistance	R30-90	$N^0_{Rk,c,fi}$	[kN]	0,5	1,2	2,0	1,0	1,9	2,9	1,7	4,2	5,9
	R120	$N^0_{Rk,c,fi}$	[kN]	0,4	0,9	1,6	0,8	1,5	2,3	1,4	3,4	4,7
Edge distance												
R30 - R120		$C_{cr,fi}$	[mm]	$2 \times h_{ef}$								
In case of fire attack from more than one side, the minimum edge distance shall be $\geq 300\text{mm}$.												
Spacing												
R30 bis R120		$S_{cr,fi}$	[mm]	$4 \times h_{ef}$								
Pry-out failure												
R30 bis R120		k_8	[-]	1,0	1,6	2,1	2,8	2,5				
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.												

¹⁾ only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

TURBO SMART TSM concrete screw

Performances

Fire exposure – characteristic values of resistance

Annex C4

Table 10: Displacements under static and quasi-static tension load

Concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	45	55	45	55	65	55	75	85
Cracked concrete	tension load	N	[kN]	0,72	1,45	1,63	2,74	4,06	3,04	6,22	8,46
	displacement	δ_{N0}	[mm]	0,19	0,27	0,27	0,53	0,45	0,26	0,58	0,61
		$\delta_{N\infty}$	[mm]	0,55	0,84	0,49	0,66	0,61	0,69	0,92	1,1
Uncracked concrete	tension load	N	[kN]	2,11	4,07	4,24	5,97	8,03	5,42	9,17	12,28
	displacement	δ_{N0}	[mm]	0,42	0,43	0,33	0,49	0,58	0,84	0,62	0,79
		$\delta_{N\infty}$	[mm]	0,42	0,43	0,58			0,79		

Table 11: Displacements under static and quasi-static shear load

Concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	45	55	45	55	65	55	75	85
Cracked and uncracked concrete	shear load	V	[kN]	3,3		8,6			16,2		
	displacement	δ_{V0}	[mm]	1,55		2,7			2,7		
		$\delta_{V\infty}$	[mm]	3,1		4,1			4,3		

TURBO SMART TSM concrete screw

Performances

Displacements under static and quasi-static loads

Annex C5