Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-19/0774 of 28 January 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	TAB HE Concrete Screw
Product family to which the construction product belongs	Mechanical fastener for use in concrete
Manufacturer	TRUTEK Fasteners Polska Sp z o.o Al. Krakowski 38, Janki 05-090 RASZYN POLEN
Manufacturing plant	Trutek Plant No. 5
This European Technical Assessment contains	15 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	EAD 330232-00-0601

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Specific Part

1 Technical description of the product

The TAB HE Concrete Screw is an anchor made of galvanised steel of sizes 8, 10, 12, 14 and 16. 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.

The 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 to tension load (static and quasi-static loading)	See Annex C 1 and C 2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 3
Displacements (static and quasi-static loading)	See Annex C 6
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed
Durability	See Annex B 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 4 and C 5

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. 330232-00-0601 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 28 January 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

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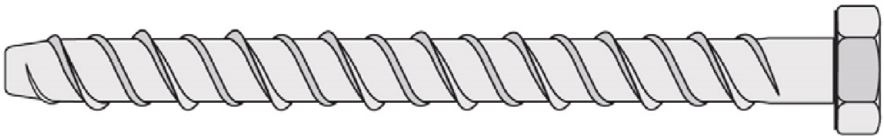
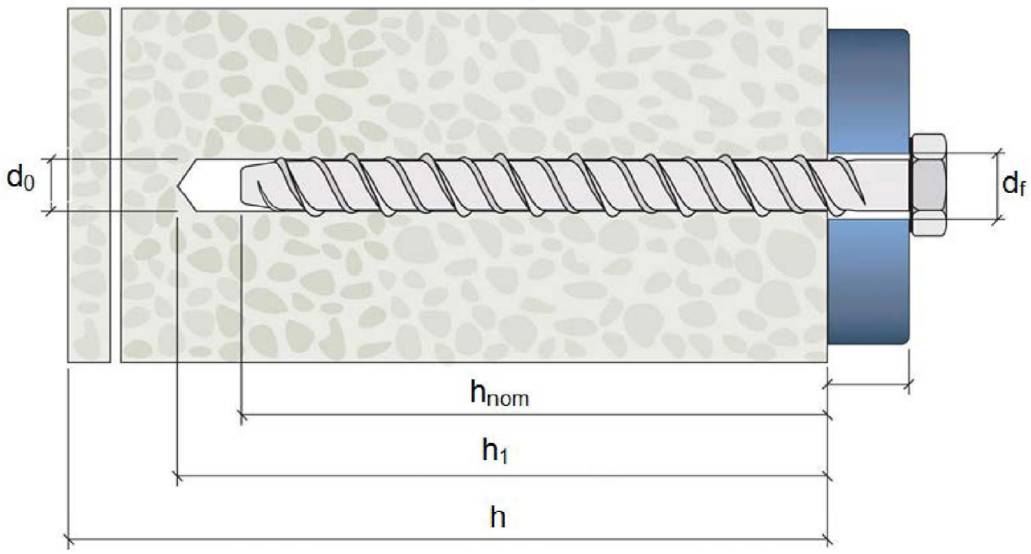
TAB HE Concrete Screw:



Intended use

Concrete strength classes C20/25 to C50/60



TAB HE Concrete Screw	**Annex A1**
Product description Product and intended use	

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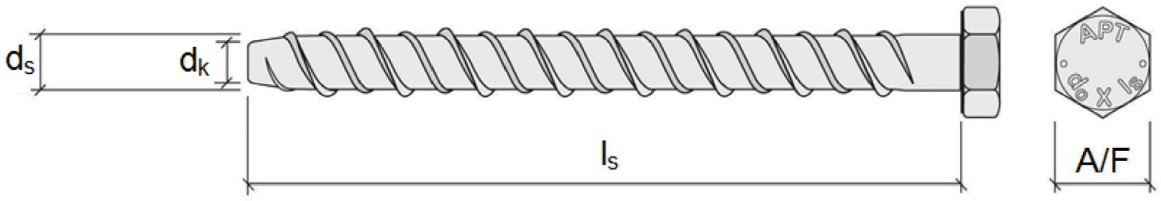

Marking

- Identifying mark of producer
- Nominal drill hole diameter
- Nominal anchor length

Table A1: Materials

Designation	Material
Concrete Screw	Carbon steel, heat treated and zinc plated

Table A2: Dimensions

Anchor size			8	10	12	14	16
Nominal anchor length	l_s	[mm]	80...150	100...150	100...200	130...200	150...200
Outside diameter of thread	d_s	[mm]	9,8	11,9	14,1	16,3	18,7
Core diameter	d_k	[mm]	7,5	9,5	11,4	13,4	15,3
Width across flats	A/F	[mm]	15	17	19	24	27

TAB HE Concrete Screw

Product description
Designation of anchor parts, materials and dimensions

Annex A2

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Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads: all sizes.
- Fire exposure: all sizes.

Base materials:
- Reinforced or unreinforced normal weight concrete according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Non-cracked concrete and cracked concrete: all sizes.

Use conditions (Environmental conditions):
- Structures subject to dry internal conditions.

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 are designed in accordance with EN 1992-4:2018 and Technical Report TR 055, February 2018.

Installation:
- Hole drilling by rotary hammer drilling mode: all sizes.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.
- After installation further turning of the anchor must not be possible.
- The head of the anchor must be supported on the fixture and is not damaged.

TAB HE Concrete Screw	**Annex B1**
Intended Use Specifications	

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Table B1: Installation parameters

Anchor size			8	10	12	14	16
Overall anchor embedment depth	h_{nom}	[mm]	75	85	95	110	120
Effective anchorage depth	h_{ef}	[mm]	55	62	69	79	86
Nominal drill hole diameter	d_0	[mm]	8	10	12	14	16
Drill hole depth	h_0	[mm]	90	100	110	130	145
Outside diameter of the anchor	d_{nom}	[mm]	10	12	14	16	18
Clearance hole in the fixture	d_f	[mm]	12	14	16	18	20
Setting torque	T_{inst}	[Nm]	40	60	80	90	100

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

Anchor size			8	10	12	14	16
Minimum thickness of concrete member	h_{min}	[mm]	120	125	140	170	190
Minimum spacing	s_{min}	[mm]	50	60	70	80	90
Minimum edge distance	c_{min}	[mm]	50	60	70	80	90

In case of fire attack from more than one side: $c_{min} \geq 300$ mm

TAB HE Concrete Screw

Intended Use
Installation parameters, minimum thickness of concrete member, minimum spacing and edge distance

Annex B2

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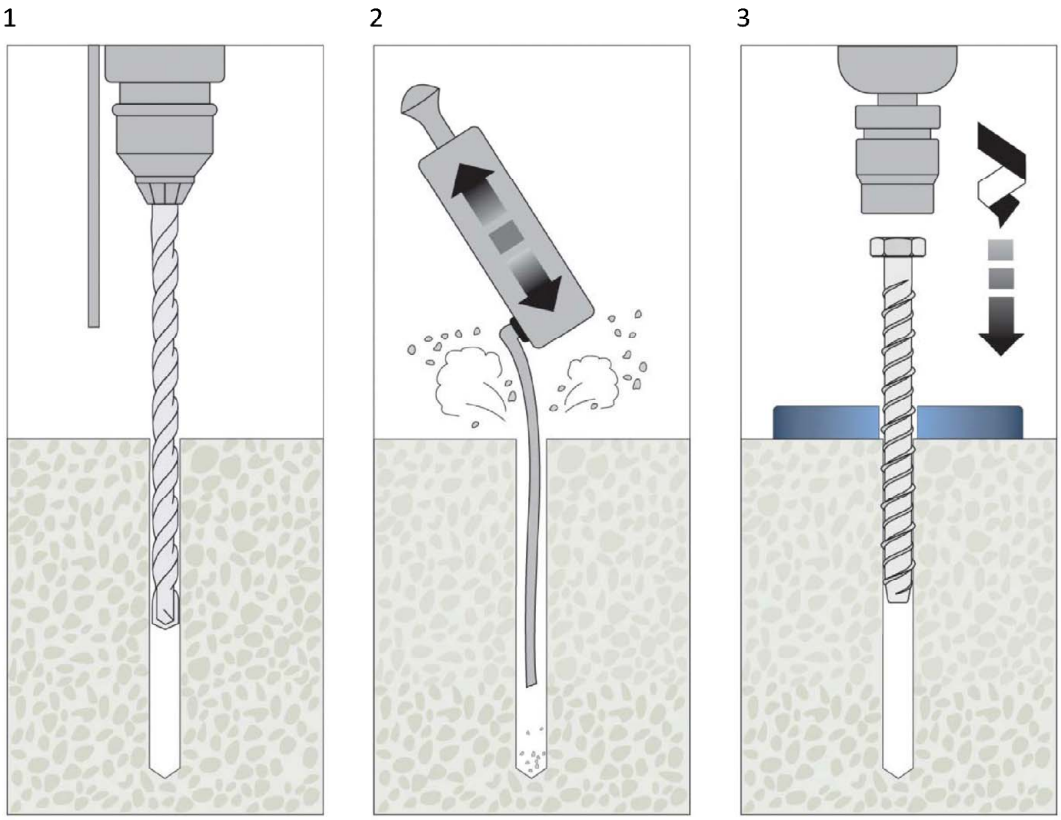
Installation instructions



1. Drill hole to correct diameter and depth using rotary hammer drilling machine
2. Remove dust from hole by blowing 3 times
3. Install anchor using electrical impact screwdriver Bosch GDS18E or Makita 6905H. Other electrical screwdrivers of equivalent force and performance may be used.

TAB HE Concrete Screw	Annex B3
Intended Use Installation instructions	

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Table C1: Characteristic values of resistance under tension loads in non-cracked concrete

Anchor size			**8**	**10**	**12**	**14**	**16**
Installation factor	γ_{inst}	[-]	1,2				
Steel failure							
Characteristic resistance	$N_{Rk,s}$	[kN]	44,2	70,1	101,2	140,0	183,9
Partial factor	γ_{MS} [1)]	[-]	1,4				
Pullout failure							
Characteristic resistance	$N_{Rk,P}$	[kN]	12	16	20	35	40
Increasing factor for $N_{Rk,P}$	Ψ_C	C30/37	1,17			1,22	
		C40/50	1,32			1,41	
		C50/60	1,42			1,55	
Factor for uncracked concrete	k_{ucr}	[-]	11,0				
Concrete cone failure							
Effective anchoring depth	h_{ef}	[mm]	55	62	69	79	86
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}				
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}				
Splitting failure							
Spacing	$s_{cr,sp}$	[mm]	176	190	214	250	260
Edge distance	$c_{cr,sp}$	[mm]	88	95	107	125	130

[1)] In absence of other national regulations.

TAB HE Concrete Screw

Performances
Characteristic values of resistance under tension loads in non-cracked concrete

Annex C1

Deutsches Institut für Bautechnik DIBt

Table C2: Characteristic values of resistance under tension loads in cracked concrete

Anchor size			**8**	**10**	**12**	**14**	**16**
Installation factor	γ_{inst}	[-]	1,2				
Steel failure							
Characteristic resistance	$N_{Rk,s}$	[kN]	44,2	70,1	101,2	140,0	183,9
Partial factor	γ_{MS} [1)]	[-]	1,4				
Pullout failure							
Characteristic resistance	$N_{Rk,P}$	[kN]	7,5	12	16	20	25
Increasing factor for $N_{Rk,P}$		C30/37	1,17			1,22	
	Ψ_C	C40/50	1,32			1,41	
		C50/60	1,42			1,55	
Factor for cracked concrete	k_{cr}	[-]	7,7				
Concrete cone failure							
Effective anchoring depth	h_{ef}	[mm]	55	62	69	79	86
Spacing	$s_{cr,N}$	[mm]	$3\ h_{ef}$				
Edge distance	$c_{cr,N}$	[mm]	$1,5\ h_{ef}$				
Splitting failure							
Spacing	$s_{cr,sp}$	[mm]	176	190	214	250	260
Edge distance	$c_{cr,sp}$	[mm]	88	95	107	125	130

[1)] In absence of other national regulations.

TAB HE Concrete Screw

Performances
Characteristic values of resistance under tension loads in cracked concrete

Annex C2

Deutsches Institut für Bautechnik DIBt

Table C3: Characteristic values of resistance under shear loads in cracked or non-cracked concrete

Anchor size			**8**	**10**	**12**	**14**	**16**
Steel failure without level arm							
Characteristic resistance	$V_{Rk,s}$	[kN]	28,5	46,4	57,2	80,4	84,4
Ductility factor	k_7	[-]	0,8				
Partial factor	γ_{MS} [1)]	[-]	1,5				
Steel failure with level arm							
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	40	80	138	224	338
Partial safety factor	γ_{MS} [1)]	[-]	1,5				
Concrete pry out failure							
k-Factor	k_8	[mm]	1,0	2,0			
Concrete edge failure							
Effective length of anchor in shear loading	l_f	[mm]	55	62	69	79	86
Effective external diameter of anchor	d_{nom}	[mm]	10	12	14	16	18

[1)] In absence of other national regulations.

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Table C4: Characteristic values for tension load under fire exposure in cracked or non-cracked concrete C20/25 to C50/60

Anchor size				8	10	12	14	16
Steel failure								
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,4	1,1	2,0	2,8	3,7
	R60	$N_{Rk,s,fi\ fi}$	[kN]	0,4	0,9	1,5	2,1	2,8
	R90	$N_{Rk,s,fi}$	[kN]	0,3	0,7	1,3	1,8	2,4
	R120	$N_{Rk,s,fi}$	[kN]	0,2	0,6	1,0	1,4	1,8
Pullout failure								
Characteristic resistance	R30 R60 R90	$N_{Rk,p,fi}$	[kN]	1,9	3,0	4,0	5,0	6,3
	R120	$N_{Rk,p,fi}$	[kN]	1,5	2,4	3,2	4,0	5,0
Concrete cone failure								
Characteristic resistance	R30 R60 R90	$N^0_{Rk,c,fi}$	[kN]	4,0	5,4	7,1	10,0	12,3
	R120	$N^0_{Rk,c,fi}$	[kN]	3,2	4,4	5,7	8,0	9,9
Characteristic spacing		$s_{cr,N}$	[mm]	$4 \times h_{ef}$				
Edge distance		$c_{cr,N}$	[mm]	$2 \times h_{ef}$				

TAB HE Concrete Screw

Performances
Characteristic values for tension load under fire exposure in cracked and non-cracked concrete C20/25 to C50/60

Annex C4

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Table C5: Characteristic values for shear load under fire exposure in cracked or non-cracked concrete C20/25 to C50/60

Anchor size				8	10	12	14	16
Steel failure without level arm								
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,4	1,1	2,0	2,8	3,7
	R60	$V_{Rk,s,fi\ fi}$	[kN]	0,4	0,9	1,5	2,1	2,8
	R90	$V_{Rk,s,fi}$	[kN]	0,3	0,7	1,3	1,8	2,4
	R120	$V_{Rk,s,fi}$	[kN]	0,2	0,6	1,0	1,4	1,8
Steel failure with level arm								
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,5	1,5	3,4	5,6	8,4
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,4	1,3	2,6	4,2	6,3
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,3	1,0	2,2	3,6	5,5
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,2	0,8	1,7	2,8	4,2
Concrete pryout failure								
k-Factor		k_8	[-]	1,0	2,0			
Characteristic resistance	R30 R60 R90	$V_{Rk,cp,fi}$	[kN]	4,0	10,9	14,2	20,0	24,7
	R120	$V_{Rk,cp,fi}$	[kN]	3,2	8,7	11,4	16,0	19,8
Concrete edge failure								

The initial value $V^0_{Rk,c,fi}$ of the characteristic resistance in concrete C20/25 to C50/60 under fire exposure may be determined by:

$V^0_{Rk,c,fi} = 0{,}25 \times V^0_{Rk,c}$ ($\leq$ R90) $\qquad V^0_{Rk,c,fi} = 0{,}20 \times V^0_{Rk,c}$ ($\leq$ R120)

With $V^0_{Rk,c}$ initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature.

$V^0_{Rk,c}$ = characteristic resistance for concrete edge failure in cracked concrete C20/C25 under normal temperature calculated acc. to EN 1992-4:2018.

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Table C6: Displacements under tension load

Anchor size			**8**	**10**	**12**	**14**	**16**
Tension load	N	[kN]	4,8	6,3	7,9	13,9	15,9
Displacement	δ_{N0}	[mm]	0,17	0,21	0,23	0,73	0,46
	$\delta_{N\infty}$	[mm]	1,75	1,88	1,82	1,54	0,96

Table C7: Displacements under shear load

Anchor size			**8**	**10**	**12**	**14**	**16**
Shear load	V	[kN]	11,3	18,4	22,7	31,9	33,5
Displacement	δ_{V0}	[mm]	1,61	1,53	1,94	2,74	2,66
	$\delta_{V\infty}$	[mm]	2,42	2,30	2,92	4,10	3,99