



INSTYTUT TECHNIKI BUDOWLANEJ



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European Technical Assessment

ETA-19/0276
of 19/11/2024



General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

TT Throughbolt

Product family to which the construction product belongs

Torque controlled expansion anchor of sizes M8, M10, M12, M16 and M20 for use in uncracked concrete

Manufacturer

Trutek Fasteners Polska Sp. z o.o.
ul. Wojska Polskiego 3
39-300 Mielec, Poland
e-mail: info@trutek.com.pl
www.trutek.com.pl
www.trutekfasteners.eu

Manufacturing plant

Plant no. 6

This European Technical Assessment contains

12 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

European Assessment Document (EAD)
330232-01-0601 "Mechanical fasteners for use in concrete"

This version replaces

ETA-19/0276 issued on 17/11/2021

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Specific Part

1 Technical description of the product

The TT Throughbolt anchor of sizes M8, M10, M12, M16 and M20 is made of galvanized steel. The anchor is placed into a drill hole and anchored by torque-controlled expansion.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

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 provisions made in this European Technical Assessment are based on an assumed working life of the fastener of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	Annex C1
Characteristic resistance to shear load (static and quasi-static loading)	Annex C3
Displacements	Annex C2, C3

3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

3.1.3 Aspects of durability

Essential characteristic	Performance
Durability	Annex A2, B1

3.2 Methods used for the assessment

The assessment has been made in accordance with EAD 330232-01-0601.

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

According to Decision 96/582/EC of the European Commission the system 1 of assessment and verification of constancy of performance applies (see Annex V to regulation (EU) No 305/2011).

5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 19/11/2024 by Instytut Techniki Budowlanej

A handwritten signature in blue ink, appearing to read 'Anna Panek'.

Anna Panek, MSc
Deputy Director of ITB

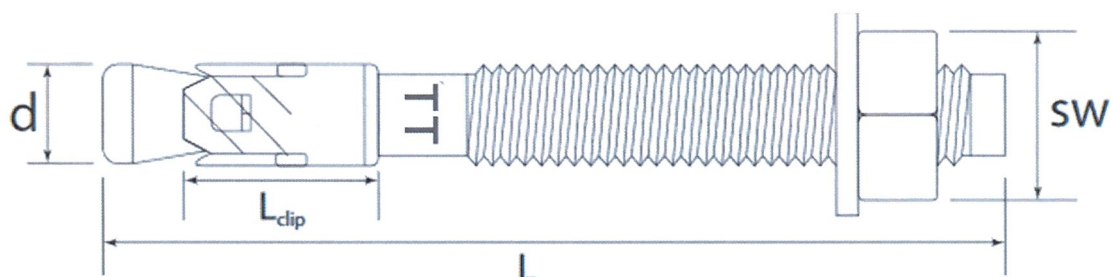


Table A1: TT Throughbolt anchor dimensions

Type of anchor				d [mm]	L [mm]	L _{clip} [mm]	SW [mm]
Size	Marking	t _{fix,STD} ¹⁾ [mm]	t _{fix,RED} ²⁾ [mm]				
M8	TT08	1 – 135	1 – 145	8	55 – 200	15,3	13
M10	TT10	1 – 145	1 – 155	10	65 – 220	17,9	17
M12	TT12	1 – 180	1 – 200	12	80 – 280	21,3	19
M16	TT16	1 – 175	1 – 195	16	105 – 300	24,4	24
M20	TT20	1 – 155	5 – 175	20	130 – 300	28,6	30

1) thickness of the fixed element for standard effective anchorage depth
2) thickness of the fixed element for reduced effective anchorage depth

Marking:

Marking on the bolt: “TT”

TT Throughbolt

Product description
Dimensions and marking

Annex A1
of European
Technical Assessment
ETA-19/0276

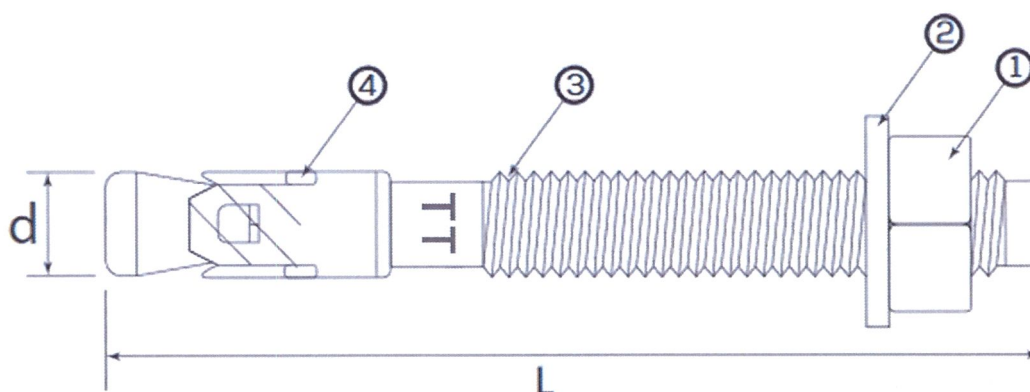


Table A2: Materials

Part	Designation	Material	Coating
1	Hexagon nut	EN ISO 898-2 carbon steel class 8 / DIN 934 / AISI 1008	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
2	Washer	DIN 125 or EN ISO 7089	
3	Bolt	Q195 Cold-formed steel $f_{uk} \geq 400 \text{ MPa}$ $f_{yk} \geq 320 \text{ MPa}$	
4	Expansion sleeve		

TT Throughbolt

Product description
Dimensions

Annex A2
of European
Technical Assessment
ETA-19/0276

Specification of intended use

Anchorage subject to:

- Static and quasi-static loads.

Base material:

- Reinforced or unreinforced normal weight concrete (without fibres) of strength classes C20/25 at minimum and C50/60 at maximum according to EN 206.
- Uncracked concrete.

Use conditions (environmental conditions):

- Structures subject to dry internal conditions.

Design:

- The anchorages under static loads and quasi-static loads are designed in accordance with EN 1992-4:2018 and EOTA Technical Report TR 055, under the responsibility of an engineer experienced in anchorages and concrete work.
- The position of the anchor is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Verifiable calculation notes and drawings are taking account of the loads to be transmitted.

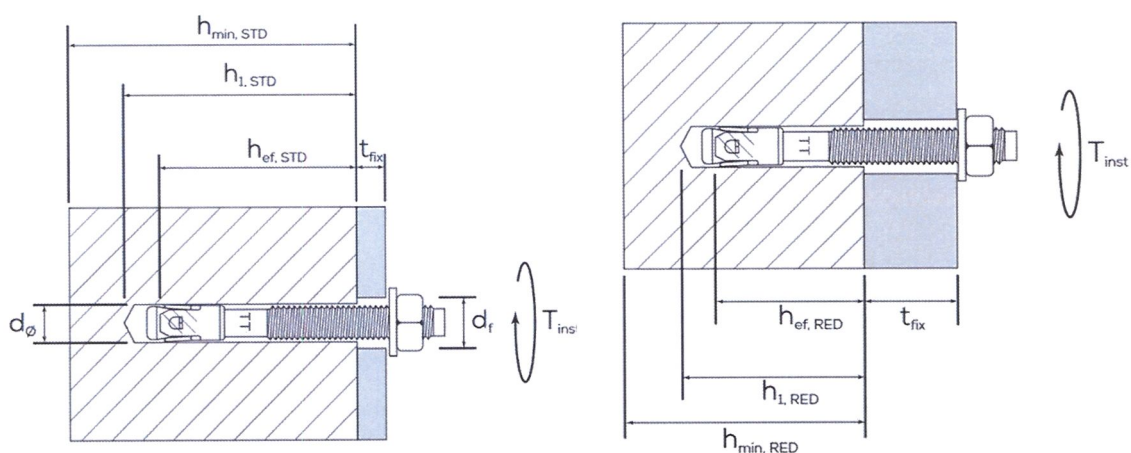
Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging any component of the anchor.
- Anchor installation in accordance with the manufacturer's specification and drawings and using the appropriate tools.
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply.
- Check of concrete being well compacted, e.g. without significant voids.
- Effective anchorage depth, edge distance and spacing not less than the specified values without minus tolerances.
- Positioning of the drill holes without damaging the reinforcement.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Application of the torque moment using a calibrated torque wrench.
- 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 drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.

TT Throughbolt

Intended use
Specifications

Annex B1
of European
Technical Assessment
ETA-19/0276

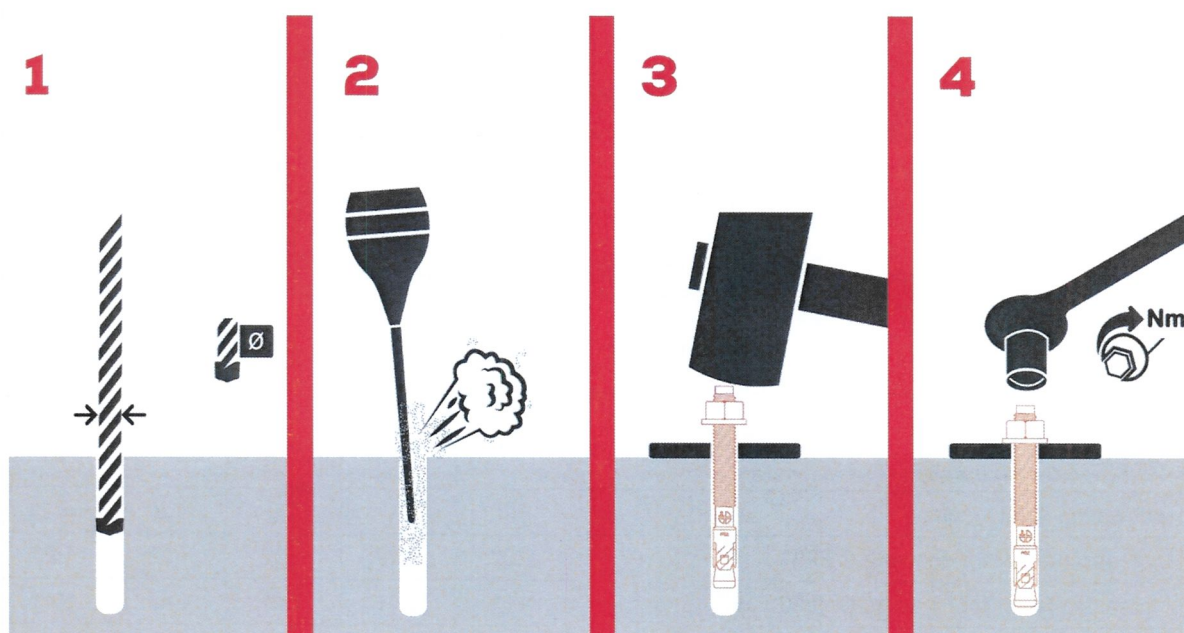
**Table B1: Installation parameters**

Anchor size		M8	M10	M12	M16	M20
Effective embedment depth (standard)	$h_{ef, STD} = [mm]$	45	50	70	85	100
Nominal embedment depth (standard)	$h_{nom, STD} = [mm]$	53	58	80	99	110
Depth of drill hole (standard)	$h_{1, STD} \geq [mm]$	60	65	90	110	120
Effective embedment depth (reduced)	$h_{ef, RED} = [mm]$	35	40	50	65	80
Nominal embedment depth (reduced)	$h_{nom, RED} = [mm]$	43	48	60	79	90
Depth of drill hole (reduced)	$h_{1, RED} \geq [mm]$	50	55	70	90	100
Nominal drill hole diameter	$d_o = d_{cut} = [mm]$	8	10	12	16	20
Diameter of clearance hole in the fixture	$d_f \leq [mm]$	9	12	14	18	22
Installation torque	$T_{inst} = [Nm]$	25	35	60	120	200
Minimum thickness of member (standard embedment depth)	$h_{min, STD} = [mm]$	100	100	140	170	200
Minimum thickness of member (reduced embedment depth)	$h_{min, RED} = [mm]$	100	100	100	130	160
Minimum spacing	$s_{min} = [mm]$	35	40	50	65	80
Minimum edge distance	$c_{min} = [mm]$	35	40	50	65	80

TT Throughbolt
Intended use
 Installation parameters

Annex B2
 of European
 Technical Assessment
 ETA-19/0276

Installation instruction



TT Throughbolt

Intended use
Installation instruction

Annex B3
of European
Technical Assessment
ETA-19/0276

Table C1: Design method A, characteristic values for tension loads

Anchor size		M8	M10	M12	M16	M20
Steel failure						
Characteristic resistance	$N_{Rk,s}$ [kN]	14,6	23,2	33,7	62,8	98,0
Modulus of elasticity	E_s [N/mm ²]	210 000				
Partial safety factor	$\gamma_{Ms}^{1)}$	1,5				
Pull-out failure						
Characteristic resistance in uncracked concrete C20/25 (standard depth)	$N_{Rk,p,STD}$ [kN]	9,5	11	20	26	48
Characteristic resistance in uncracked concrete C20/25 (reduced depth)	$N_{Rk,p,RED}$ [kN]	9,5	9,5	12	24	34
Installation safety factor	γ_{inst}	1,0	1,0	1,0	1,2	1,2
Increasing factor for concrete C30/37	ψ_c	1,22	1,22	1,22	1,22	1,22
Increasing factor for concrete C40/50		1,41	1,41	1,41	1,41	1,41
Increasing factor for concrete C50/60		1,55	1,55	1,55	1,55	1,55
Concrete cone failure and splitting failure						
Effective anchorage depth (standard)	$h_{ef,STD}$ = [mm]	45	50	70	85	100
Effective anchorage depth (reduced)	$h_{ef,RED}$ = [mm]	35	40	50	65	80
Factor for uncracked concrete	$k_{ucr,N}$	11,0	11,0	11,0	11,0	11,0
Spacing (standard depth)	$s_{cr,N,STD}$ [mm]	135	150	210	255	300
Edge distance (standard depth)	$c_{cr,N,STD}$ [mm]	67,5	75	105	127,5	150
Spacing (reduced depth)	$s_{cr,N,RED}$ [mm]	105	120	150	195	240
Edge distance (reduced depth)	$c_{cr,N,RED}$ [mm]	52,5	60	75	97,5	120
Characteristic resistance for splitting (standard depth)	$N^0_{Rk,sp,STD}$ [kN]	9,5	11	20	26	48
Characteristic resistance for splitting (reduced depth)	$N^0_{Rk,sp,RED}$ [kN]	9,5	9,5	12	24	34
Characteristic spacing (standard depth)	$s_{cr,sp,STD}$ [mm]	135	150	210	255	300
Characteristic edge distance (standard depth)	$c_{cr,sp,STD}$ [mm]	67,5	75	105	127,5	150
Characteristic spacing (reduced depth)	$s_{cr,sp,RED}$ [mm]	105	120	150	195	240
Characteristic edge distance (reduced depth)	$c_{cr,sp,RED}$ [mm]	52,5	60	75	97,5	120
Installation safety factor	γ_{inst}	1,0	1,0	1,0	1,2	1,2
1) in the absence of other national regulations						

TT Throughbolt**Performances**

Design method A, characteristic values for tension loads

Annex C1
of European
Technical Assessment
ETA-19/0276

Table C2: Displacements under tension loads

Anchor size		M8	M10	M12	M16	M20
Tension load	N [kN]	4,5	4,6	6,1	10,8	14,8
Displacement	δ_{NO} [mm]	2,0	1,00	1,6	1,0	0,4
	$\delta_{N\infty}$ [mm]	0,6	0,6	0,6	0,6	0,6

TT Throughbolt
Performances
Displacements under tension loads

Annex C2
of European
Technical Assessment
ETA-19/0276

Table C3: Design method A, characteristic values for shear loads

Anchor size		M8	M10	M12	M16	M20
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}^0$ [kN]	7,3	11,6	16,9	31,4	49,0
Ductility factor	k_7	0,8	0,8	0,8	0,8	0,8
Partial safety factor	$\gamma_{Ms}^{(1)}$	1,25	1,25	1,25	1,25	1,25
Steel failure with lever arm						
Characteristic bending resistance	$M_{Rk,s}^0$ [Nm]	15,0	29,9	52,4	133,2	259,6
Partial safety factor	$\gamma_{Ms}^{(1)}$	1,25	1,25	1,25	1,25	1,25
Concrete pry-out failure						
Factor	k_8	1,0	1,0	2,0	2,0	2,0
Partial safety factor	$\gamma_{Mc}^{(1)}$	1,5	1,5	1,5	1,8	1,8
Concrete edge failure						
Effective length of anchor under shear loading (standard depth)	$l_{f,STD}$ [mm]	45	50	70	85	100
Effective length of anchor under shear loading (reduced depth)	$l_{f,RED}$ [mm]	35	40	50	65	80
Outside diameter of anchor	d_{nom} [mm]	8	10	12	16	20
Partial safety factor	$\gamma_{Mc}^{(1)}$	1,5	1,5	1,5	1,8	1,8
¹⁾ in the absence of other national regulations						

Table C4: Displacements under shear loads

Anchor size		M8	M10	M12	M16	M20
Shear load	V [kN]	4,2	6,6	9,7	18,0	28,0
Displacement	δ_{VO} [mm]	1,4	1,3	1,2	2,1	1,5
	$\delta_{V\infty}$ [mm]	2,1	1,9	1,8	3,2	2,3

TT Throughbolt**Performances**

Design method A, characteristic values for shear loads, displacements under shear loads

Annex C3
of European
Technical Assessment
ETA-19/0276