



CPC BELGELENDİRME
MUAYENE VE DENEY
HİZMETLERİ TİC. LTD. ŞTİ.
Çamlıca Mah. (Timko Eti) Anadolu
Blv.No:20-R Blok No:4
Yenimahalle/Ankara
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European Technical Assessment

ETA-24/0738
of (11.04.2025)

Technical Assessment Body issuing the European Technical Assessment:

CPC Belgelendirme Muayene ve Deney Hizmetleri Tic. Ltd. Şti.

Trade name of the construction product

THK Undercut Fastener

Product family to which the construction product belongs

Product Area Code: 33

Manufacturer

Handan Tedun Fastener Group Co., Ltd

2303 Sunshine Building, Handan City, Hebei Province
057150, China

23-0893 Manufacturing plant(s)

Handan Tedun Fastener Group Co., Ltd

This European Technican Assessment contains

12 pages including 9 Annexes which forms an integral
part of this assessment

Annex may contain confidential information and is/are
not included in the European Technical Assessment
when that assessment is publicly disseminated

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

EAD 330232-01-0601 Mechanical fasteners for use in
concrete

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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1. Technical description of the product

The undercut fasteners are available in sizes M10, M12, and M16 are manufactured from high-quality carbon steel with a durable hot-dip galvanized coating and electro galvanizing surface treatment to enhance corrosion resistance. For additional options, the M10 and M12 sizes are also offered with a zinc-plated coating, providing flexibility based on specific application requirements.

These fasteners are designed to be installed into a pre-drilled hole made using a specialized stop drill bit. The process involves a self-cutting mechanism that is performed with the assistance of a dedicated setting tool, ensuring a precise and secure fit. Once positioned, the fastening is completed by torque-tightening the nut, which firmly secures the fixture and ensures long-term stability and load-bearing capability.

For comprehensive illustrations and detailed descriptions of the product features, installation procedures, and specifications, please refer to Annex A.

2. Specification of the intended use in accordance with the applicable EAD

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annexes 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 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 tension resistance	See Annex C 1
Characteristic shear resistance	See Annex C 2
Displacements under static or quasi static loading	See Annex C 3
Characteristic resistance under seismic action C1	See Annex C 4

3.2 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European technical assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.3 Safety in use (BWR 4)

For basic requirement safety in use the same criteria are valid as for basic requirement mechanical resistance and stability.

3.4 Protection against noise (BWR 5)

Not relevant.

3.5 Energy economy and heat retention (BWR 6)

Not relevant.

3.6 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.7 General aspects relating to fitness for use

Durability and Serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

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

According to the Decision 96/582/EC of the European Commission¹ the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units	-	1

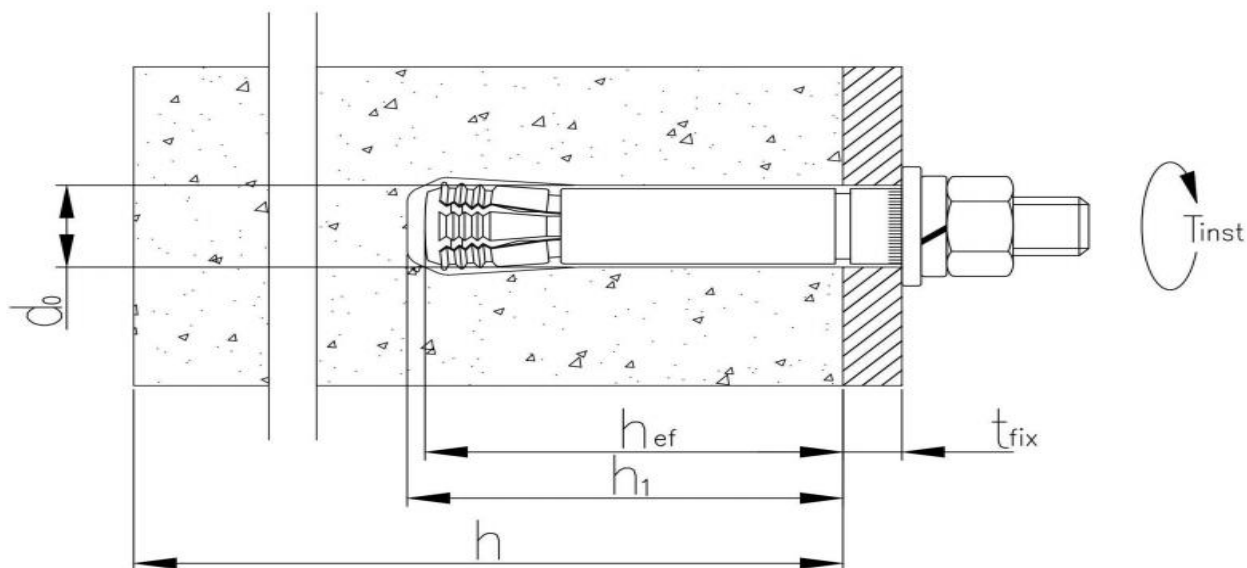
5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited by the Technical Assessment Body. The notified product certification body shall visit the factory at least once a year for surveillance of the manufacturer.

Issued in Ankara on 11.04.2025

by
UĞUR GEDİK

Installed condition



Product description

Undercut fastener THK 	Marking on the sleeve: followed by MX × Y where MX=thread diameter Y=effective embedment depth e.g THK M16x100
Stop drill bit 	Marking on the drill bit: followed by MX × Y where MX=thread diameter Y=effective embedment depth e.g.M10x60
Setting tool 	Marking on the setting tool: followed by MX where MX=thread diameter e.g.·M12

THK Undercut Fastener

Product description

Installed condition and Product description

Annex A1

Table A1: Required stop drill bits and setting tools for THK

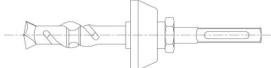
Fastener 	Stop drill bit 	Setting tool 
THK M10x60	M10X60	M10
THK M12x80	M12x80	M12
THK M16x100	M16x100	M16
THK M16x125	M16x125	M16

Table A2: Materials

Designation	Material
Electro galvanizing surface treatment	
Threaded bolt with cone	Cold formed heat treated steel, elongation at failure $\geq 12\%$, necking at failure $\geq 52\%$, wax coated (after zinc plating), electroplated zinc coated $\geq 5\mu\text{m}$
Sleeve	Steel tube, electroplated zinc coated $\geq 5\mu\text{m}$
Washer	Acc.to DIN 125-1140 HV March 1990, electroplated zinc coated $\geq 5\mu\text{m}$
Nut	Hexagon nut acc.to DIN 934, electroplated zinc coated $\geq 5\mu\text{m}$
Hot dip galvanizing surface treatment	
Threaded bolt with cone	Cold formed heat treated steel, elongation at failure $\geq 12\%$, necking at failure $\geq 52\%$, wax coated (after hot dip galvanization), hot dip galvanized $\geq 50\mu\text{m}$
Sleeve	Steel tube, hot dip galvanized $\geq 50\mu\text{m}$
Washer	Acc.to DIN 125-1140 HV March 1990, hot dip galvanized $\geq 50\mu\text{m}$
Nut	Hexagon nut acc.to DIN 934, hot dip galvanized $\geq 50\mu\text{m}$

THK Undercut Fastener**Product description**

Required stop drill bits and setting tools

Materials

Annex A2

Specifications of intended use

•Fasteners subject to:

- Static or quasi-static loads.

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013+ A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

Structures subject to dry indoor conditions, indoor with temporary condensation.

Design:

- The fasteners are designed in accordance with EN 1992-4 "Design of concrete structures - Part 4. Design of fastenings for use in concrete" under the responsibility of an engineer experienced in fasteners and concrete work.
- For seismic application the fasteners are designed in accordance with EN 1992-4, Annex C "Design of fastenings under seismic actions".
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored.
- The position of the fastener is indicated on the design drawings.

Installation:

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the fastener only as supplied by the manufacturer without exchanging the components of a fastener.
- Fastener installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Effective anchorage depth, edge distances and spacing not less than the specified values without minus tolerances.
- In case of aborted hole, drilling of new hole at a minimum distance of twice the depth of the aborted hole, or smaller distance provided the aborted drill hole is filled with high strength mortar and no shear or oblique tension loads in the direction of aborted hole.

THK Undercut Fastener

Intended use
Specifications

Annex B1

Table B1: Specifications of intended use

Fasteners subject to:	Electrogalvanizing surface treatment	Hot dip galvanizing surface treatment
Static and quasi static loading in cracked and uncracked concrete	M10-M16	M10-M16
Seismic performance category C1	M10-M16	M10-M16

Table B2: Fastener dimensions

Undercut fastener THK		M10	M12	M16	M16
Length of the fastener	L_{min} [mm]	80	110	130	180
	L_{max} [mm]	130	170	215	240
Expansion sleeve length	l_{sleeve} [mm]	60	80	100	125
Height of nut	h_{nut} [mm]	8.5	11.5	15.0	

Table B3: Installation parameters

Undercut fastener THK			M10	M12	M16	M16
Effective embedment depth	h_{ef}	[mm]	60	80	100	125
Nominal diameter of drill bit	d_0	[mm]	16	18	22	22
Max. cutting diameter of drill bit	d_{cut}	[mm]	16.5	18.5	22.5	22.5
Max. diameter of clearance hole in the fixture	d_f	[mm]	12	14	18	18
Fixture thickness	t_{fix}	[mm]	2 ¹⁾ ~ 50	2 ¹⁾ ~ 65	0 ¹⁾ ~ 60	0 ¹⁾ ~ 75
Min. depth of drill hole	h_1	[mm]	65	90	110	135
Min. thickness of concrete member	h_{min}	[mm]	100	120	150	170
Torque wrench width	SW	[mm]	18	20	24	24
Installation torque	T_{inst}	[Nm]	30	45	120	120
Minimum spacing	s_{min}	[mm]	60	80	100	120
	$c \geq$	[mm]	55	90	100	100
Minimum edge distance	c_{min}	[mm]	55	90	100	100
	$s \geq$	[mm]	60	90	100	100

1) When thickness of attachment is less than 3 mm, big washer acc. to DIN1052 standard needs to be used.

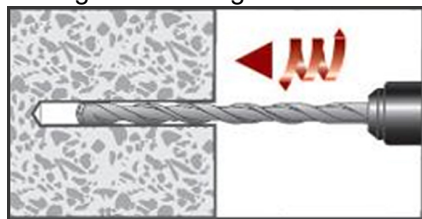
THK Undercut Fastener**Intended use**

Specifications of intended use of fastener dimensions

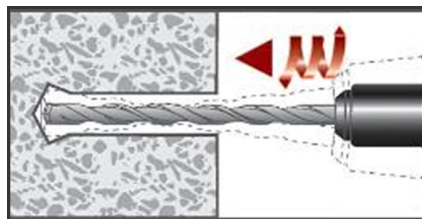
Installation Parameters

Annex B2**Installation Instructions**

Drilling and reaming

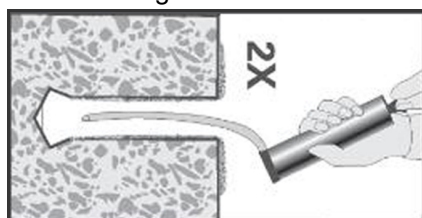


Drill holes of corresponding diameter and depth using a straight hole drill bit.



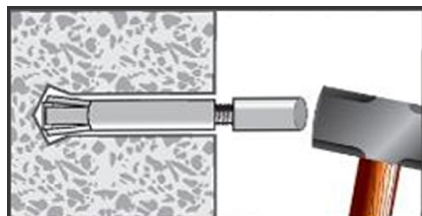
Use a specialized drilling bit to shake the bottom and expand it into a wedge-shaped hole.

Hole cleaning

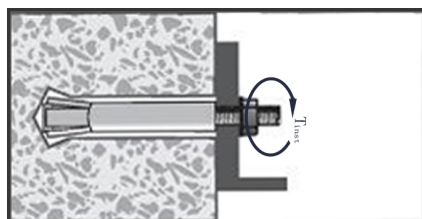


Use a soot blower to align with the hole and blow soot until there is no dust overflowing from the hole.

Knocking fasteners and fastener torque



Tap the fasteners to expand the bottom.



Apply torque and complete installation.

THK Undercut Fastener

Intended use

Installation Instruction

Annex B3

Table C1:Characteristic resistance under tension load in case of static and quasi- static loading

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embed ment depth	h_{ef}	[mm]	60	80	100	125
Steel failure						
Partial safety factor	$\gamma_{MS}^{2)}$	[-]	1.5			
Characteristic resistance	$N_{Rk,s}$	[kN]	46.4	67.4	125.6	
Pullout failure						
Characteristic resistance in concrete C20/25						
Installation safety factor	γ_{inst}	[-]	1.2			
Uncracked concrete	$N_{Rk,p,ucr}$	[kN]	12	20	26	34
Cracked concrete	$N_{Rk,p,cr}$	[kN]	9	15	20	26
Increasing factor concrete strength ψ_c	C30/37	[-]	1.22			
	C40/50	[-]	1.41			
	C50/60	[-]	1.58			
Concrete cone and splitting failure						
Installation safety factor	γ_{inst}	[-]	1.2			
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11			
Factor for cracked concrete	$k_{cr,N}$	[-]	7.7			
Spacing	$S_{cr,N}$	[mm]	180	240	300	375
Edge distance	$C_{cr,N}$	[mm]	90	120	150	188
Spacing (splitting)	$S_{cr,sp}$	[mm]	180	240	300	375
Edge distance(splitting)	$C_{cr,sp}$	[mm]	90	120	150	188
Characteristic resistance to splitting	$N_{Rk,sp}^0$	[kN]	$\min [N_{Rk,c}^0)^1);N_{Rk,p}]$			

¹⁾ $N_{Rk,c}^0$ According to EN 1992-4:2018.

²⁾ In absanse of national regulations.

THK Undercut Fastener

Performances

Characteristic resistance under tension load

Annex C1

Table C2: Characteristic resistance under shear load in case of static and quasi-static loading

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embed ment depth	h_{ef}	[mm]	60	80	100	125
Steel failure without lever arm						
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1.25			
Ductility factor	k_7	[-]	1.00			
Characteristic resistance	$V^0_{Rk,s}$	[kN]	23.2	33.7	62.8	
Steel failure with lever arm						
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1.25			
Ductility factor	k_7	[-]	1.0			
Characteristic resistance	$M^0_{Rk,s}$	[kN]	59.8	104.8	266.4	
Concrete pryout failure						
Pry-out factor	k_8	[-]	2.0			
Installation safety factor	γ_{inst}	[-]	1.2			
Concrete edge failure						
Effective length of fastener under shear loading	$l_f=h_{ef}$	[mm]	60	80	100	125
Outside diameter of fastener	d_{nom}	[mm]	14.0	17.5	21.3	
Installation safety factor	γ_{inst}	[-]	1.2			

¹⁾ In absanse of national regulations.

THK Undercut Fastener

Performances

Characteristic resistance under shear load

Annex C2

Table C3: Displacements under tension load in case of static and quasi-static loading

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embedment depth	h_{ef}	[mm]	60	80	100	125
Tension load in cracked and uncracked concrete C20/25	N	[kN]	5.7	9.5	12.4	16.2
Displacement	δ_{N_0}	[mm]	0.21	0.41	0.53	0.57
	δ_{N_∞}	[mm]	0.65	0.69	0.82	0.93

Table C4: Displacements under shear load in case of static and quasi-static loading

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embedment depth	h_{ef}	[mm]	60	80	100	125
Tension load in cracked and uncracked concrete C20/25 to C50/60	V	[kN]	15.7	22.3	39.90	40.30
Displacement	δ_{N_0}	[mm]	3.22	3.46	3.81	3.93
	δ_{N_∞}	[mm]	4.83	5.19	5.72	5.90

¹⁾ Additional displacement due to annular gap between fastener and fixture is to be taken into account.

THK Undercut Fastener

Performances

Displacements under static or quasi static loading

Annex C3

Table C5: Characteristic resistance under tension load in case of seismic category C1

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embed ment depth	h_{ef}	[mm]	60	80	100	125
Factor for annular gap	α_{gap}	[-]	0.5			
Steel failure						
Partial safety factor	$\gamma_{Ms,C1}^{1)}$	[-]	1.5			
Characteristic resistance	$N_{RK,S,C1}$	[kN]	46.4	67.4	125.6	
Pullout failure						
Installation safety factor	γ_{inst}	[-]	1.2			
Characteristic resistance	$N_{RK,P,C1}$	[kN]	6.8	11.3	15.0	19.5
Concrete cone failure						
Installation safety factor	γ_{inst}	[-]	1.2			

¹⁾In absence of other national regulations

Table C6: Characteristic resistance under shear load in case of seismic category C1

Size	Parameter	Unit	THK M10	THK M12	THK M16	THK M16
Effective embed ment depth	h_{ef}	[mm]	60	80	100	125
Steel failure with lever arm						
Partial safety factor	$\gamma_{Ms,C1}^{1)}$	[-]	1.25			
Characteristic resistance	$V_{RK,S,C1}$	[kN]	23.2	33.7	62.8	
Concrete pryout failure						
Installation safety factor	γ_{inst}	[-]	1.2			
Concrete edge failure						
Installation safety factor	γ_{inst}	[-]	1.2			

¹⁾In absence of other national regulations

THK Undercut Fastener

Performances

Characteristic resistance under seismic action category C1

Annex C4