INSTYTUT TECHNIKI BUDOWLANEJ

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

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European Technical Assessment

ETA-23/0351 of 30/12/2024

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA
Product family to which the construction product belongs	Nailed-in and screwed-in plastic anchors for fixing of external thermal insulation composite systems (ETICS)
Manufacturer	ZIEL-PLAST Zielińscy Spółka Komandytowa ul. Zamkowa 28 32-652 Bulowice Poland
Manufacturing plant	ZIEL-PLAST Zielińscy Spółka Komandytowa ul. Zamkowa 28 32-652 Bulowice Poland
This European Technical Assessment contains	25 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) 330196-01-0604 "Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering"
This version replaces	ETA-23/0351 issued on 19/06/2023

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Specific Part

1 Technical description of the product

The ETX-M nailed-in plastic anchor consists of an anchor sleeve with a plate made of polypropylene (virgin material) and an accompanying specific steel nail as an expansion pin.

The ETX-MT nailed in and screwed in plastic anchor consists of anchor sleeve with a plate made of polypropylene (virgin material) and an accompanying specific steel threaded nail as an expansion pin.

The ETX-S nailed-in plastic anchor consists of an anchor sleeve with a plate made of polypropylene (virgin material) and an accompanying specific steel nail as an expansion pin.

The ETX-ST screwed in plastic anchor consists of anchor sleeve with a plate made of polypropylene (virgin material) and an accompanying specific steel screw as an expansion pin.

The ETX-PA nailed-in plastic anchor consists of an anchor sleeve with a plate made of polypropylene (virgin material) and an accompanying specific nail as an expansion pin made of the glass fibre reinforced polyamide (virgin material).

The plastic anchor sleeve is expanded by hammering or screwing an expansion pin, which press the sleeve against the wall of the drilled hole.

The ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA anchors may in addition be combined with the plastic plates TDW 90, TDW 110, TDW 130 and TDW 110 G.

The description of the products is given in Annex A.

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

The performances given in Annex C 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 anchor of 25 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 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance	Annex C1
Edge distances and spacings	Annex B2
Plate stiffness	Annex C2
Displacements	Annex C3

3.1.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	Annex C2

3.2 Methods used for the assessment

The assessment has been made in accordance with EAD 330196-01-0604.

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

According to Decision 97/463/EC of the European Commission the system 2+ of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) applies.

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.

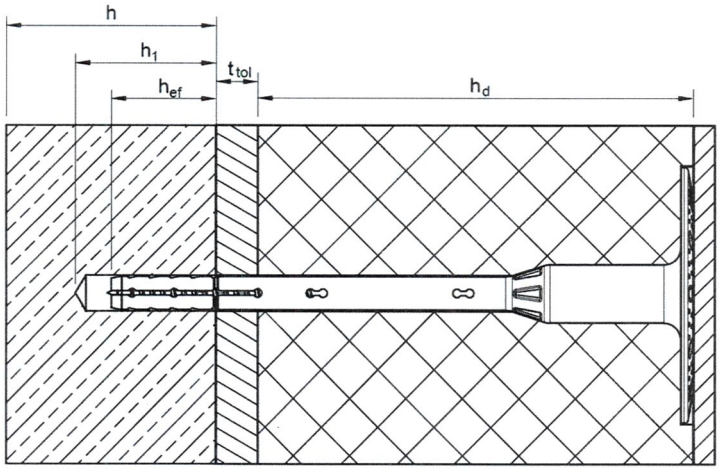
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 30/12/2024 by Instytut Techniki Budowlanej

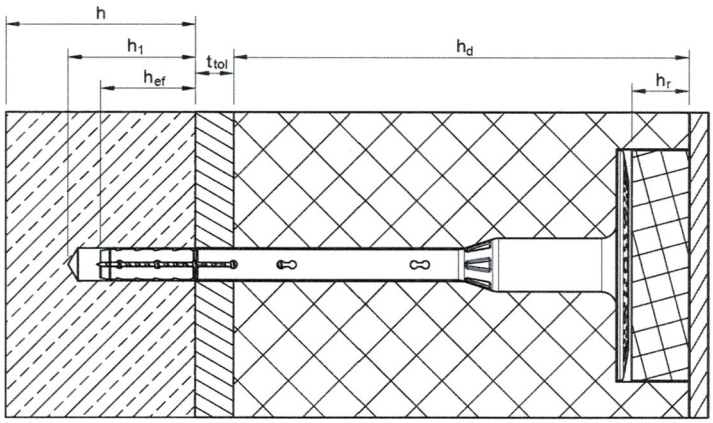
Anna Panek, MSc

Deputy Director of ITB

Surface assembly:



Countersunk assembly:



Intended Use:

Fixing of external thermal insulation composite systems (ETICS) in concrete and masonry

Legend:

h_{nom} = h_{ef} = effective anchorage depth

h_1 = depth of drill hole in base material

h = thickness of base material

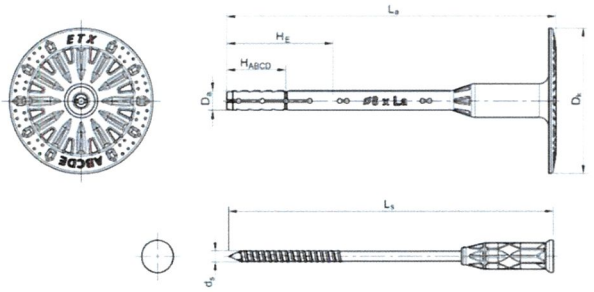
h_d = thickness of insulation material

h_r = thickness of insulation cap

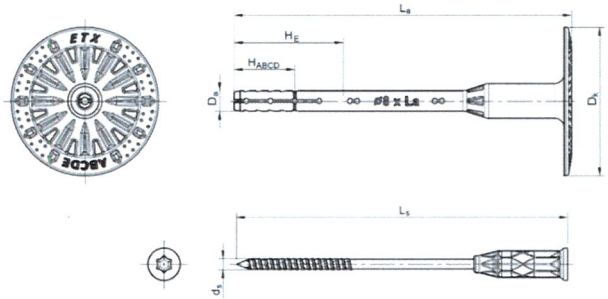
t_{tol} = thickness of equalizing and/or non-load-bearing layer

ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	**Annex A1** of European Technical Assessment ETA-23/0351
Product description Installation conditions	

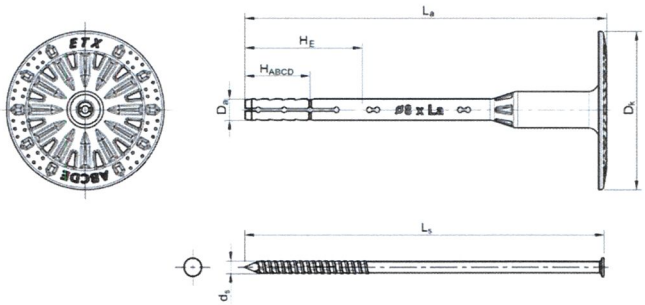
ETX-M:



ETX-MT:

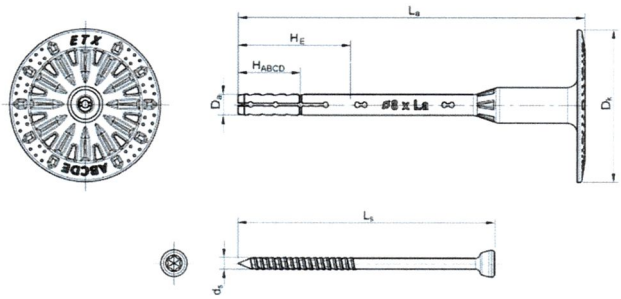


ETX-S:

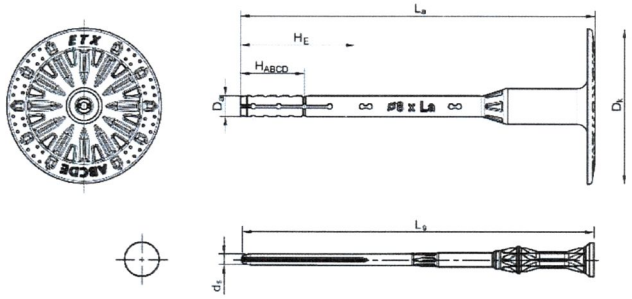


ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	**Annex A2** of European Technical Assessment ETA-23/0351
Product description Marking of the anchor sleeve and expansion element of ETX-M, ETX-MT and ETX-S anchors	

ETX-ST:



ETX-PA:



ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	**Annex A3** of European Technical Assessment ETA-23/0351
Product description Marking of the anchor sleeve and expansion element of ETX-ST and ETX-PA anchors	

Table A1: ETX-M, ETX-MT, ETX-S, ETX-ST and EXT-PA anchor types and dimensions [mm]

Anchor type	Anchor sleeve				Expansion pin	
	$D_a \pm 0,1$	$L_a \pm 2$	$D_k \pm 1,5$	$h_{ef} = h_{nom}$	$d_s \pm 0,1$	$L_s \pm 2$
ETX-M (d_{nom}) x L_a	8	75 - 555	60	25[1] / 45[2]	4,4	79 - 559
ETX-MT (d_{nom}) x L_a	8	75 - 555	60	25[1] / 45[2]	4,4	79 - 559
ETX-S (d_{nom}) x L_a	8	75 - 555	60	25[1] / 45[2]	4,4	80 - 560
ETX-ST (d_{nom}) x L_a	8	75 - 555	60	25[1] / 45[2]	4,4	45 - 525
ETX-PA (d_{nom}) x L_a	8	75 - 555	60	25[1] / 45[2]	5,3	80 - 560

[1] For base material group A, B, C and D

[2] For base material group E

Determination of maximum thickness of insulation material:

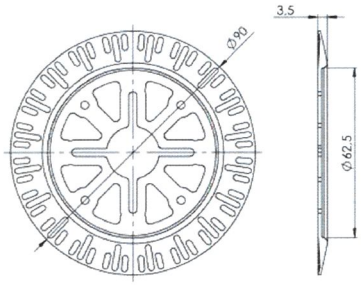
For surface assembly: $h_d = L_a - t_{tol} - h_{ef}$

For countersunk assembly: $h_d = L_a - t_{tol} - h_{ef} + 20$ mm

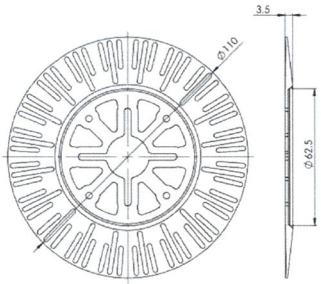
ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	Annex A4 of European Technical Assessment ETA-23/0351
Product description Types and dimensions of the anchor sleeve and expansion element of ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA anchors	

Table A2: Materials

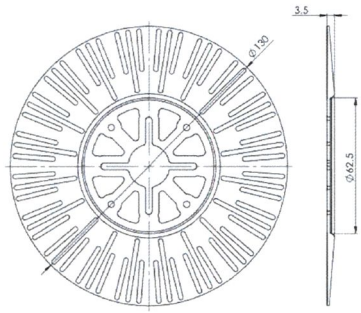
Designation		Material
Anchor sleeve		Virgin plastic: polypropylene PP, natural, grey, orange or blue
Expansion pin	ETX-M, ETX-MT, ETX-S and ETX-ST	Carbon steel, electroplated ≥ 5 µm according to EN ISO 4042
	ETX-PA	Virgin plastic: polyamide PA6 reinforced with glass fibre GF30, natural or black



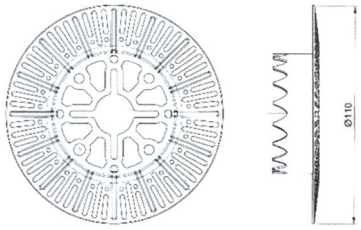
TDW 90



TDW 110



TDW 130

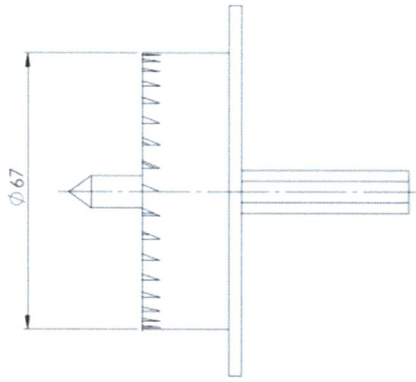


TDW 110 G

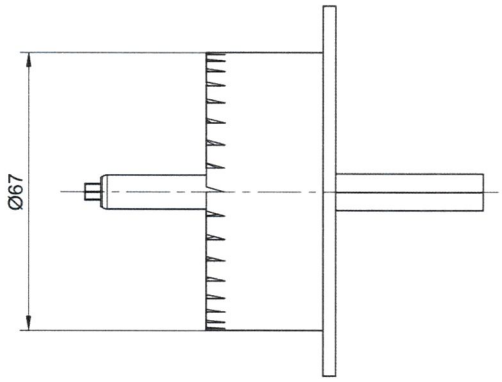
Table A3: Additional plates TDW 90, TDW 110, TDW 130 and TDW 110 G

Plate type	Outer diameter [mm]	Material
TDW 90	90	Polyamide PA6 reinforced with glass fibre GF30 (natural or grey) or polypropylene PP (natural or grey)
TDW 110	110	
TDW 130	130	
TDW 110 G	110	

Cutters for countersunk assembly:



ZP-FS



ETX-Tool

Insulation cap:

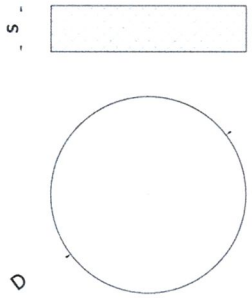


Table A4: Insulation cap

Thickness, s [mm]	Diameter, D [mm]	Material
17	67	expanded polystyrene (EPS) or mineral wool (MW)

Specification of intended use

Anchorages subject to:

- Wind suction loads.

Note: The anchor shall not be used for the transmission of dead loads of the external thermal insulation composite system (ETICS).

Base materials:

- Normal weight concrete (base material group A), according to Annex C1.
- Solid masonry (base material group B), according to Annex C1.
- Hollow or perforated masonry (base material group C), according to Annex C1.
- Lightweight aggregate concrete (base material group D), according to Annex C1.
- Autoclaved aerated concrete (base material group E), according to Annex C1.
- For other base materials of the base material groups A, B, C, D or E the characteristic resistance of the anchor may be determined by job site tests according to EOTA Technical Report TR 051, edition April 2018.

Temperature range:

- 0°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C).

Design:

- The anchorages are designed under the responsibility of an engineer experienced in anchorages and masonry work with the partial safety factors γ_M = 2,0 and γ_F = 1,5, if there are no other national regulations.
- Verifiable calculation notes and drawings with anchor positions are prepared taking into account of the loads to be anchored.
- Fasteners are only to be used for multiple fixings of external thermal insulation composite system (ETICS), according to EAD 330196-01-0604.

Installation:

- Hole shall be drilled by the drill modes according to Annex C1.
- Anchor installation shall be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation shall be executed in temperature from 0°C to +40°C.
- Exposure to UV due to solar radiation of the anchor not protected by rendering shall not exceed 6 weeks.

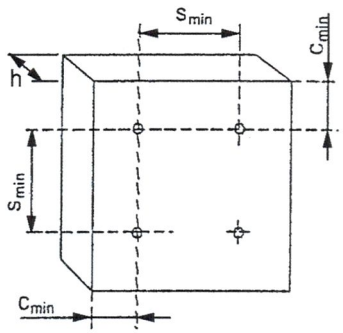
ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	**Annex B1** of European Technical Assessment ETA-23/0351
Intended use Specifications	

Table B1: Installation characteristics

Anchor type		ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	
Base material group		A, B, C, D	E
Drill hole diameter	d_o [mm]	8,00	
Cutting diameter of drill bit	d_{cut} [mm]	≤ 8,45	
Depth of drill hole	h_1 [mm]	≥ 35	≥ 55
Effective anchorage depth	$h_{ef} = h_{nom}$ [mm]	≥ 25	≥ 45

Table B2: Minimum thickness of base material, spacing and edge distance

Anchor type		ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA
Minimum thickness of base material	h [mm]	100
Minimum spacing	s_{min} [mm]	100
Minimum edge distance	c_{min} [mm]	100



ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	Annex B2 of European Technical Assessment ETA-23/0351
Intended use Installation characteristics, minimum thickness of base material, spacing and edge distance	

Table B3: Installation instruction of ETX-M anchor – surface and countersunk assembly

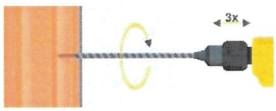
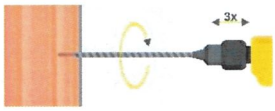
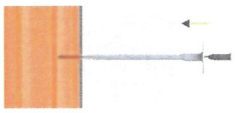
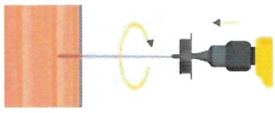
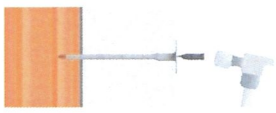
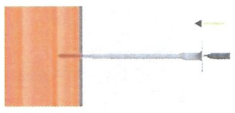
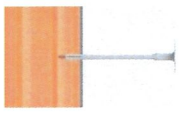
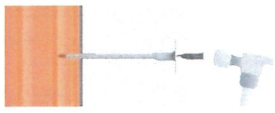
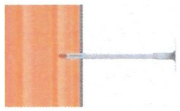
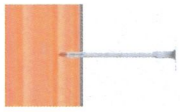
Surface assembly:		Countersunk assembly with ZP-FS cutter:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.		1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.		2. Drill a slot for countersunk installation using the drill with the ZP-FS cutter.
	3. Drive in a specific nail using the hammer.		3. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	4. Assembled anchor.		4. Drive in a specific nail using the hammer.
			5. Install the insulation cover.
			6. Assembled anchor.

Table B4: Installation instruction of ETX-MT anchor – surface assembly

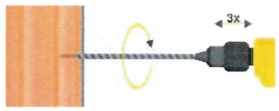
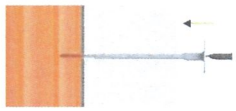
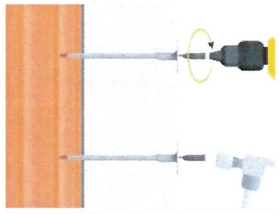
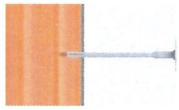
Surface assembly:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	3. Drive in a specific nail using the screwdriver or the hammer.
	4. Assembled anchor.

Table B5: Installation instruction of ETX-MT anchor – countersunk assembly

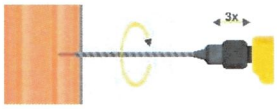
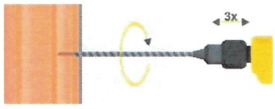
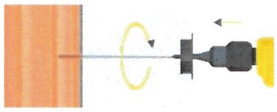
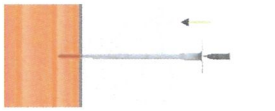
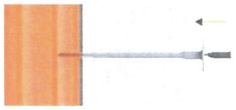
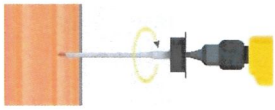
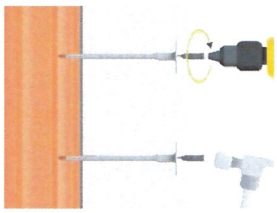
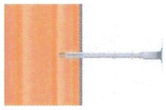
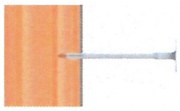
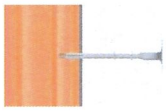
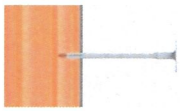
Countersunk assembly with ZP-FS cutter:		Countersunk assembly with ETX-Tool cutter:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.		1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Drill a slot for countersunk installation with the ZP-FS cutter.		2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	3. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.		3. Drive in a specific nail using the screwdriver with the ETX-Tool.
	4. Drive in a specific nail using the screwdriver or the hammer.		4. Install the insulation cover.
	5. Install the insulation cover.		5. Assembled anchor.
	6. Assembled anchor.		

Table B6: Installation instruction of ETX-S anchor – surface and countersunk assembly

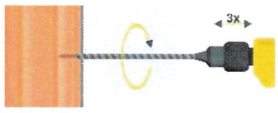
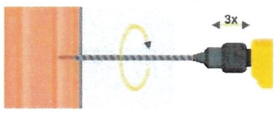
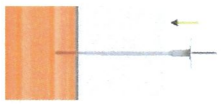
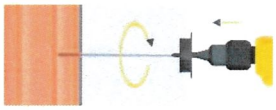
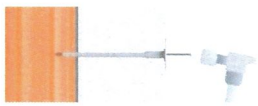
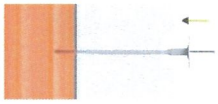
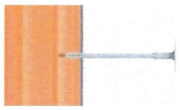
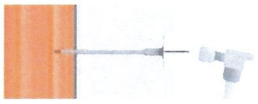
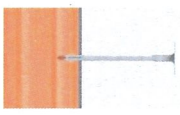
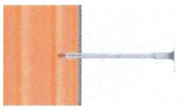
Surface assembly:		Countersunk assembly with ZP-FS cutter:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.		1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.		2. Drill a slot for countersunk installation using the drill with the ZP-FS cutter.
	3. Drive in a specific nail using the hammer.		3. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	4. Assembled anchor.		4. Drive in a specific nail using the hammer.
			5. Install the insulation cover.
			6. Assembled anchor.

Table B7: Installation instruction of ETX-ST anchor – surface assembly

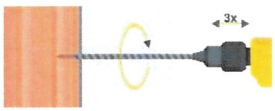
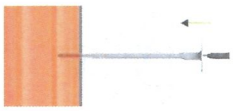
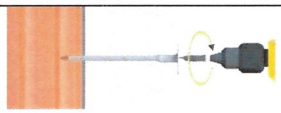
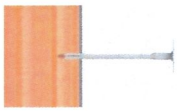
Surface assembly:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	3. Drive in a specific nail using the screwdriver.
	4. Assembled anchor.

Table B8: Installation instruction of ETX-ST anchor – countersunk assembly

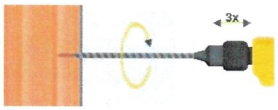
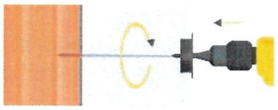
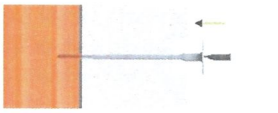
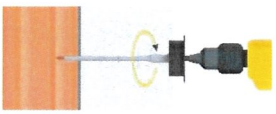
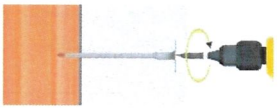
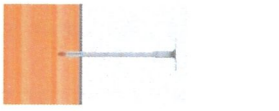
Countersunk assembly with ZP-FS cutter:		Countersunk assembly with ETX-Tool cutter:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.		1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Drill a slot for countersunk installation with the ZP-FS cutter.		2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	3. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.		3. Drive in a specific nail using the screwdriver with the ETX-Tool.
	4. Drive in a specific nail using the screwdriver.		4. Install the insulation cover.
	5. Install the insulation cover.		5. Assembled anchor.
	6. Assembled anchor.		

Table B3: Installation instruction of ETX-PA anchor – surface and countersunk assembly

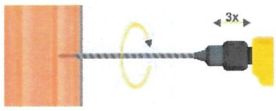
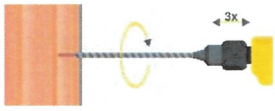
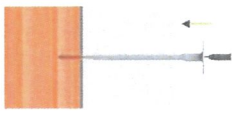
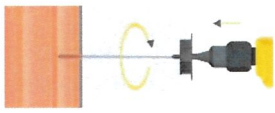
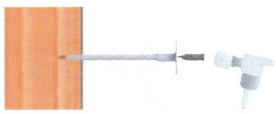
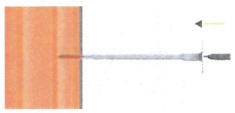
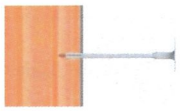
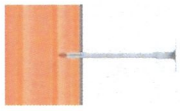
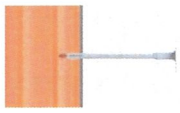
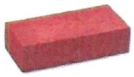
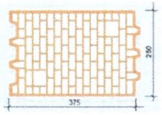
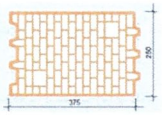
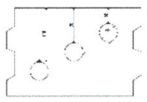
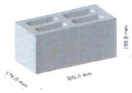
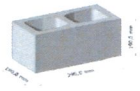
Surface assembly:		Countersunk assembly with ZP-FS cutter:	
	1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.		1. Drill the hole perpendicular to the substrate surface. Clean the drill hole.
	2. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.		2. Drill a slot for countersunk installation using the drill with the ZP-FS cutter.
	3. Drive in a specific nail using the hammer.		3. Place an anchor sleeve in the drill hole. The bottom side of the plate must be flush with the ETICS.
	4. Assembled anchor.		4. Drive in a specific nail using the hammer.
			5. Install the insulation cover.
			6. Assembled anchor.

Table C1.1: Characteristic resistance under tension loads N_{Rk} in concrete and in masonry for single anchor

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]		Drill method
					ETX-M EXT-MT ETX-S ETX-ST	ETX-PA	
A	Concrete C12/15			EN 206-1	0,90	0,90	hammer
	Concrete C16/20 – C50/60			EN 206-1	1,30	1,30	hammer
	Thin concrete members C16/20 – C50/60			EN 206-1	1,30	1,30	hammer
B	Clay brick MZ 	≥ 1,80	≥ 15,0	EN 771-1	1,30	1,20	hammer
	Calcium silicate brick KS 	≥ 1,80	≥ 15,0	EN 771-2	1,30	1,20	hammer
C	Calcium silicate hollow block KSL  a [1] = 40 mm	≥ 1,60	≥ 12,0	EN 771-2	1,30	1,20	hammer
	Vertically perforated clay bricks Porotherm 25  a [1] = 12 mm	≥ 0,80	≥ 15,0	EN 771-1	0,50	0,50	rotary
	Vertically perforated clay bricks Porotherm 25  a [1] = 17 mm	≥ 0,80	≥ 15,0	EN 771-1	0,70	0,70	rotary

[1] Minimum values "a". For elements with lower value of "a" the load tests on the construction site are required

Table C1.2: Characteristic resistance under tension loads N_{Rk} in concrete and in masonry for single anchor

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]		Drill method
					ETX-M EXT-MT ETX-S ETX-ST	ETX-PA	
C	Lightweight concrete hollow block HBL a [1] = 33 mm 	≥ 0,80	≥ 2,0	EN 771-3	0,60	0,60	rotary
	Lightweight concrete hollow block Tekno Amerblok PK17,8 a [1] = 30 mm 	≥ 1,50	≥ 25,0	EN 771-3	1,30	1,30	rotary
	Lightweight concrete hollow block Tekno Amerblok PK19 a [1] = 30 mm 	≥ 1,10	≥ 20,0	EN 771-3	1,30	1,30	rotary
D	Lightweight concrete block LAC	≥ 0,88	≥ 5,0	EN 771-3	0,60	0,60	rotary
E	Autoclaved aerated concrete block AAC2	≥ 0,35	≥ 2,0	EN 771-4	0,50	0,50	rotary
	Autoclaved aerated concrete block AAC7	≥ 0,65	≥ 5,0	EN 771-4	0,90	0,90	rotary
Partial safety factor for anchor resistance, γ_M [2]		2,0					

[1] Minimum values "a". For elements with lower value of "a" the load tests on the construction site are required

[2] Valid in absence of other national regulations

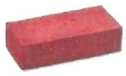
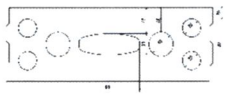
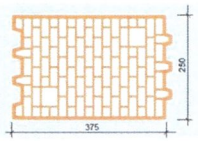
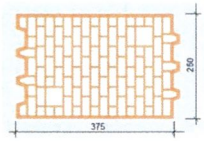
Table C2.1: Point thermal transmittance according to EOTA Technical Report TR 025

Anchor type	Insulation thickness H_D [mm]	Point thermal transmittance χ [W/K]
Surface installation		
ETX-M and ETX-MT	70	0,002
	150	0,002
	530	0,001
ETX-S	70	0,004
	150	0,003
	530	0,002
ETX-ST	70	0,001
	150	0,002
	530	0,001
ETX-PA	70	0,000
	150	0,000
	530	0,000
Countersunk installation		
ETX-M and ETX-MT	90	0,002
	150	0,002
	550	0,001
ETX-S	90	0,002
	150	0,002
	550	0,001
ETX-ST	90	0,001
	150	0,002
	550	0,001
ETX-PA	90	0,000
	150	0,000
	550	0,000

Table C2.2: Plate stiffness according to EOTA Technical Report TR 026

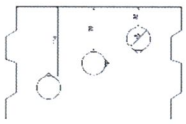
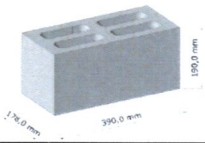
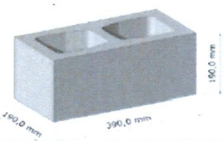
Anchor type	Diameter of the anchor plate d_{plate} [mm]	Load resistance of the anchor plate $N_{u,m}$ [kN]	Plate stiffness $N_{0,m}$ [kN/mm]
ETX-M, ETX-MT, ETX-S, ETX-ST and ETX-PA	60	1,95	1,0

Table C3.1: Displacements

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]		$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]	
				ETX-M EXT-MT ETX-S ETX-ST	ETX-PA	ETX-M EXT-MT ETX-S ETX-ST	ETX-PA
A	Concrete C12/15	–	–	0,30	0,30	0,09	0,07
	Concrete C16/20 – C50/60	–	–	0,43	0,43	0,14	0,09
	Thin concrete members C16/20 – C50/60	–	–	0,43	0,43	0,14	0,09
B	Clay brick MZ 	≥ 1,80	≥ 15,0	0,43	0,40	0,09	0,06
	Calcium silicate brick KS 	≥ 1,80	≥ 15,0	0,43	0,40	0,09	0,06
C	Calcium silicate hollow block KSL  a [1] = 40 mm	≥ 1,60	≥ 12,0	0,43	0,40	0,09	0,06
	Verticaly perforated porosited block Porotherm 25  a [1] = 12 mm	≥ 0,80	≥ 15,0	0,17	0,17	0,09	0,06
	Verticaly perforated porosited block Porotherm 25  a [1] = 17 mm	≥ 0,80	≥ 15,0	0,23	0,23	0,09	0,06

[1] Minimum values "a". For elements with lower value of "a" the load tests on the construction site are required

Table C3.2: Displacements

Base material group	Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]		$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]	
				ETX-M EXT-MT ETX-S ETX-ST	ETX-PA	ETX-M EXT-MT ETX-S ETX-ST	ETX-PA
C	Lightweight concrete hollow block HBL a [1] = 33 mm 	≥ 0,80	≥ 2,0	0,20	0,20	0,09	0,06
	Lightweight concrete hollow block Tekno Amerblok PK17,8 a [1] = 30 mm 	≥ 1,50	≥ 25,0	0,43	0,43	0,14	0,09
	Lightweight concrete hollow block Tekno Amerblok PK19 a [1] = 30 mm 	≥ 1,10	≥ 20,0	0,43	0,43	0,14	0,09
D	Lightweight concrete block LAC	≥ 0,88	≥ 5,0	0,20	0,20	0,21	0,06
E	Autoclaved aerated concrete block AAC2	≥ 0,35	≥ 2,0	0,17	0,17	0,17	0,05
	Autoclaved aerated concrete block AAC7	≥ 0,65	≥ 5,0	0,30	0,30	0,17	0,05

[1] Minimum values "a". For elements with lower value of "a" the load tests on the construction site are required