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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-20/0849 of 18/01/2022

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX
Product family to which the construction product belongs	Nailed-in plastic anchors for fixing of external thermal insulation composite systems with rendering in concrete and masonry
Manufacturer	Mag-Krak Sp. z o.o. ul. Łowińskiego 7 PL 31-752 Kraków Poland
Manufacturing plant	Mag-Krak Sp. z o.o. ul. Łowińskiego 7 PL 31-752 Kraków Poland
This European Technical Assessment contains	26 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-20/0849 issued on 08/06/2021

Specific Part

1 Technical description of the product

The ŁIN and ŁIPN nailed-in plastic anchors consist of a plastic expansion sleeve with a plate made of polypropylene (virgin material) and an accompanying nail as an expansion pin made of polyamide PA6 reinforced with glass fibers GF30 (virgin material).

The ŁIMO, ŁIMOX, ŁIPMO and ŁIPMOX nailed-in plastic anchors consist of a plastic expansion sleeve with a plate made of polypropylene (virgin material) and an accompanying nail as an expansion pin made of carbon steel with zinc coating.

The plastic anchor sleeve is expanded by hammering in a nail, which press the sleeve against the wall of the drilled hole.

The ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO and ŁIPMOX anchors may in addition be combined with the additional plate type KWL140, made of polypropylene, polyamide PA6 or polyamide PA6 reinforced with glass fibers (virgin materials).

The drawings and the description of the products are given in Annex A.

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

The performances given in clause 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 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 spacing	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 of an anchor	No performance assessed

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

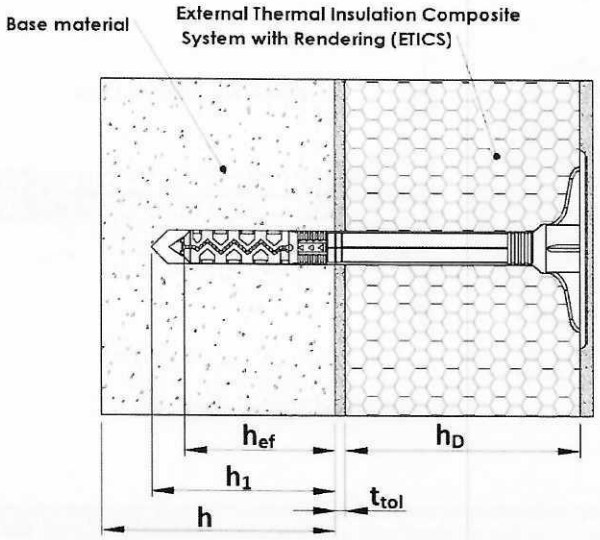
5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

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

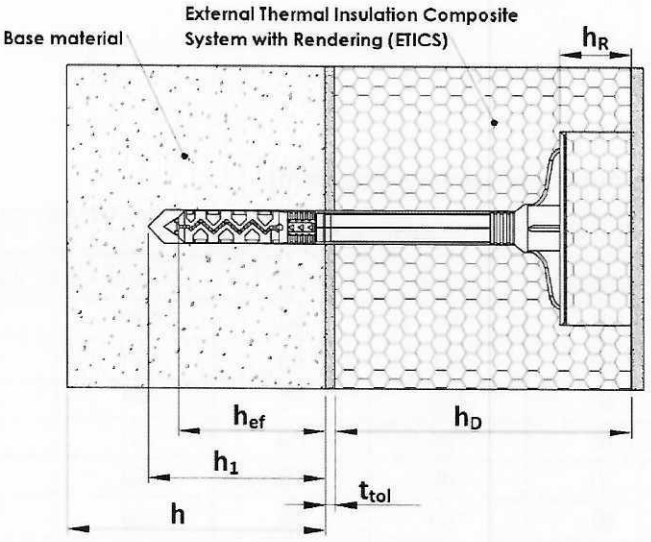
For the type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified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

Issued in Warsaw on 18/01/2022 by Instytut Techniki Budowlanej

Anna Panek, MSc
Deputy Director of ITB



Surface assembly



Countersunk assembly

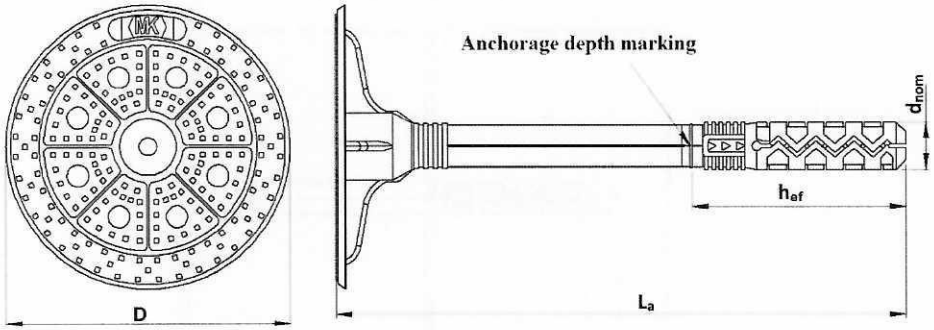
Intended Use

Fixing of external thermal insulation composite systems in concrete and masonry

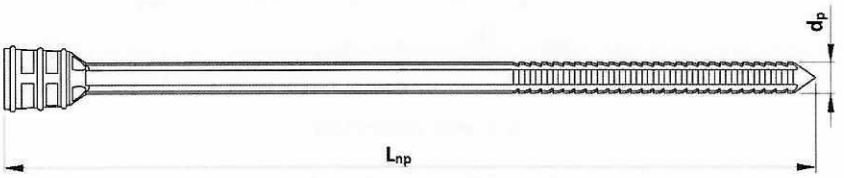
Legend

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

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex A1** of European Technical Assessment ETA-20/0849
Product description Installation conditions	



Plastic expansion sleeve



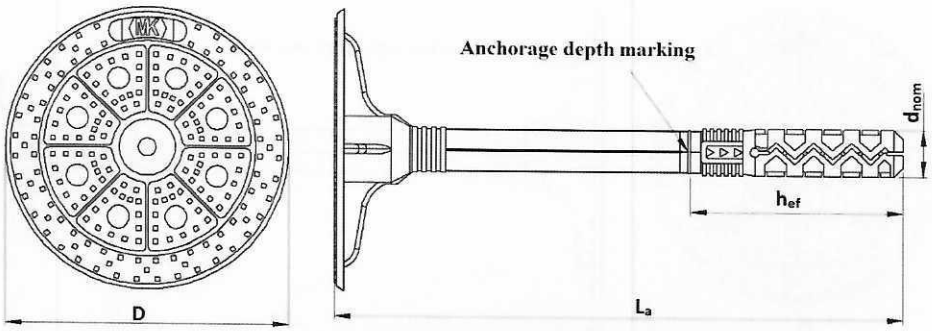
Plastic expansion pin

Table A1: ŁIN anchor types and dimensions [mm]

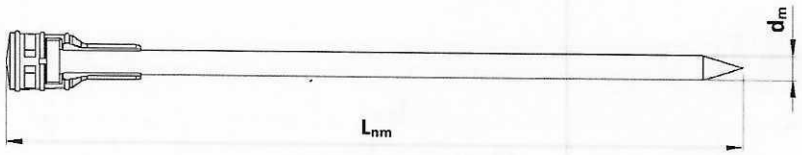
Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_p ± 0,1	L_{np} ± 2
ŁIN 10x70	10	70	60	50	5,7	75
ŁIN 10x90	10	90	60	50	5,7	95
ŁIN 10x100	10	100	60	50	5,7	105
ŁIN 10x120	10	120	60	50	5,7	125
ŁIN 10x140	10	140	60	50	5,7	145
ŁIN 10x160	10	160	60	50	5,7	165
ŁIN 10x180	10	180	60	50	5,7	185
ŁIN 10x200	10	200	60	50	5,7	205
ŁIN 10x220	10	220	60	50	5,7	225
ŁIN 10x260	10	260	60	50	5,7	265
ŁIN 10x300	10	300	60	50	5,7	305
ŁIN 10x350	10	350	60	50	5,7	355
ŁIN 10x400	10	400	60	50	5,7	405

Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex A2** of European Technical Assessment ETA-20/0849
Product description Dimensions of the ŁIN anchor elements	



Plastic expansion sleeve



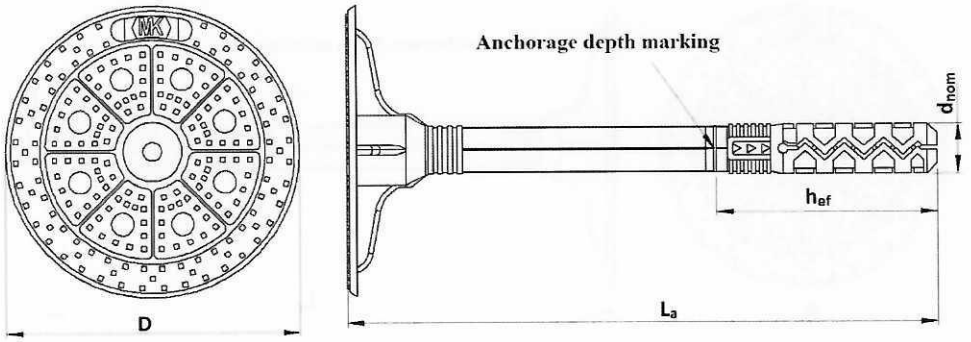
Steel expansion pin

Table A2: ŁIMO anchor types and dimensions [mm]

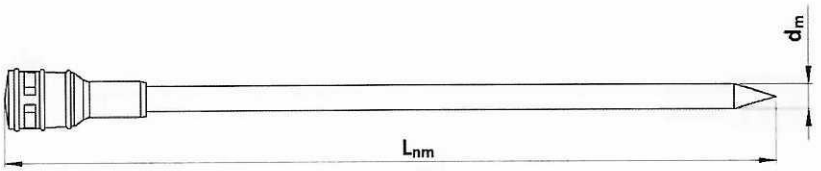
Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_m ± 0,1	L_{nm} ± 2
ŁIMO 10x70	10	70	60	50	5,5	75
ŁIMO 10x90	10	90	60	50	5,5	95
ŁIMO 10x100	10	100	60	50	5,5	105
ŁIMO 10x120	10	120	60	50	5,5	125
ŁIMO 10x140	10	140	60	50	5,5	145
ŁIMO 10x160	10	160	60	50	5,5	165
ŁIMO 10x180	10	180	60	50	5,5	185
ŁIMO 10x200	10	200	60	50	5,5	205
ŁIMO 10x220	10	220	60	50	5,5	225
ŁIMO 10x260	10	260	60	50	5,5	265
ŁIMO 10x300	10	300	60	50	5,0	305
ŁIMO 10x350	10	350	60	50	5,0	355
ŁIMO 10x400	10	400	60	50	5,0	405

Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex A2** of European Technical Assessment ETA-20/0849
Product description Dimensions of the ŁIMO anchor elements	



Plastic expansion sleeve



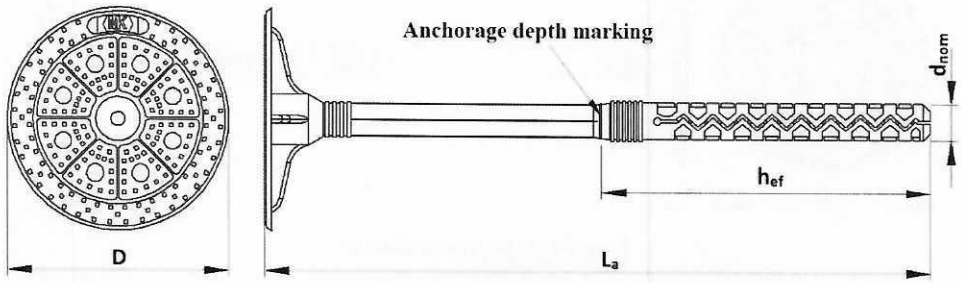
Steel expansion pin

Table A3: ŁIMOX anchor types and dimensions [mm]

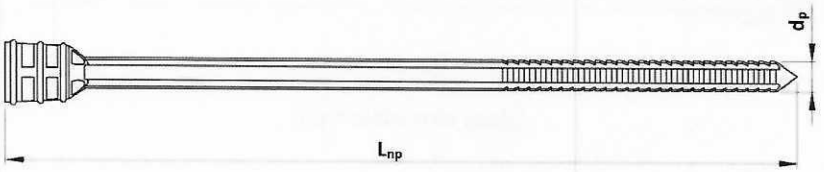
Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_m ± 0,1	L_{nm} ± 2
ŁIMOX 10x70	10	70	60	50	5,5	75
ŁIMOX 10x90	10	90	60	50	5,5	95
ŁIMOX 10x100	10	100	60	50	5,5	105
ŁIMOX 10x120	10	120	60	50	5,5	125
ŁIMOX 10x140	10	140	60	50	5,5	145
ŁIMOX 10x160	10	160	60	50	5,5	165
ŁIMOX 10x180	10	180	60	50	5,5	185
ŁIMOX 10x200	10	200	60	50	5,5	205
ŁIMOX 10x220	10	220	60	50	5,5	225
ŁIMOX 10x260	10	260	60	50	5,5	265
ŁIMOX 10x300	10	300	60	50	5,0	305
ŁIMOX 10x350	10	350	60	50	5,0	355
ŁIMOX 10x400	10	400	60	50	5,0	405

Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	Annex A2 of European Technical Assessment ETA-20/0849
Product description Dimensions of the ŁIMOX anchor elements	



Plastic expansion sleeve

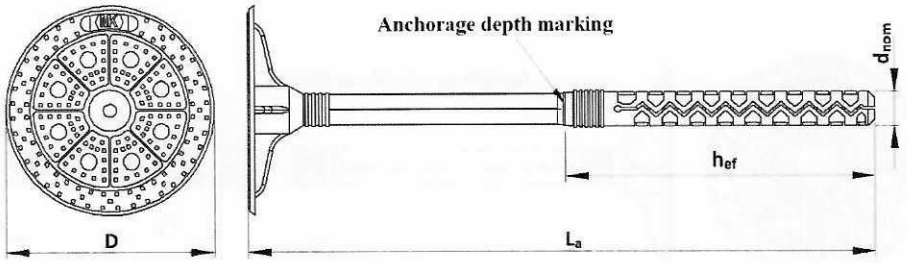


Plastic expansion pin

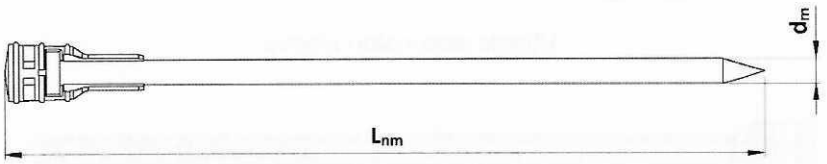
Table A4: ŁIPN anchor types and dimensions [mm]

Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_p ± 0,1	L_{np} ± 2
ŁIPN 10x140	10	140	60	80	5,7	145
ŁIPN 10x160	10	160	60	80	5,7	165
ŁIPN 10x180	10	180	60	80	5,7	185
ŁIPN 10x200	10	200	60	80	5,7	205
ŁIPN 10x220	10	220	60	80	5,7	225
ŁIPN 10x260	10	260	60	80	5,7	265
ŁIPN 10x300	10	300	60	80	5,7	305
ŁIPN 10x350	10	350	60	80	5,7	355
ŁIPN 10x400	10	400	60	80	5,7	405

Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$



Plastic expansion sleeve



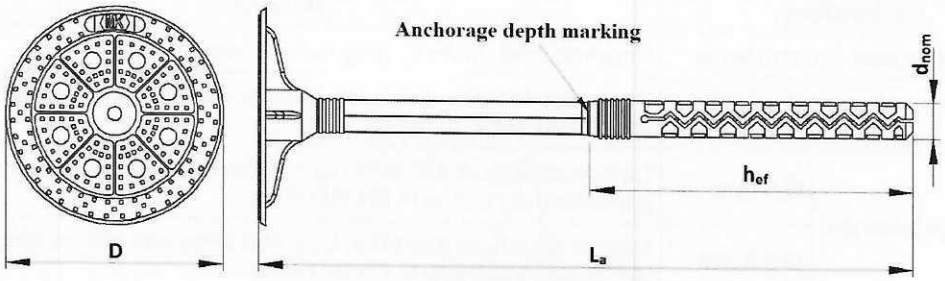
Steel expansion pin

Table A5: ŁIPMO anchor types and dimensions [mm]

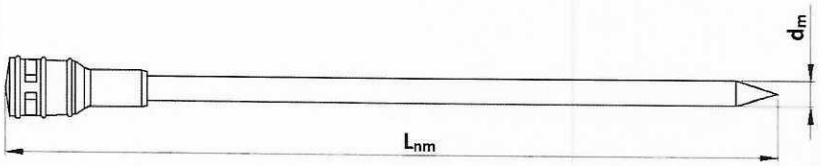
Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_m ± 0,1	L_{nm} ± 2
ŁIPMO 10x140	10	140	60	80	5,0	145
ŁIPMO 10x160	10	160	60	80	5,0	165
ŁIPMO 10x180	10	180	60	80	5,0	185
ŁIPMO 10x200	10	200	60	80	5,0	205
ŁIPMO 10x220	10	220	60	80	5,0	225
ŁIPMO 10x260	10	260	60	80	5,0	265
ŁIPMO 10x300	10	300	60	80	5,0	305
ŁIPMO 10x350	10	350	60	80	5,0	355
ŁIPMO 10x400	10	400	60	80	5,0	405

Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex A2** of European Technical Assessment ETA-20/0849
Product description Dimensions of the ŁIPMO anchor elements	



Plastic expansion sleeve



Steel expansion pin

Table A6: ŁIPMOX anchor types and dimensions [mm]

Anchor type	Anchor sleeve				Expansion pin	
	d_{nom} ± 0,1	L_a ± 2	D +3/-1	h_{ef}	d_m ± 0,1	L_{nm} ± 2
ŁIPMOX 10x140	10	140	60	80	5,0	145
ŁIPMOX 10x160	10	160	60	80	5,0	165
ŁIPMOX 10x180	10	180	60	80	5,0	185
ŁIPMOX 10x200	10	200	60	80	5,0	205
ŁIPMOX 10x220	10	220	60	80	5,0	225
ŁIPMOX 10x260	10	260	60	80	5,0	265
ŁIPMOX 10x300	10	300	60	80	5,0	305
ŁIPMOX 10x350	10	350	60	80	5,0	355
ŁIPMOX 10x400	10	400	60	80	5,0	405

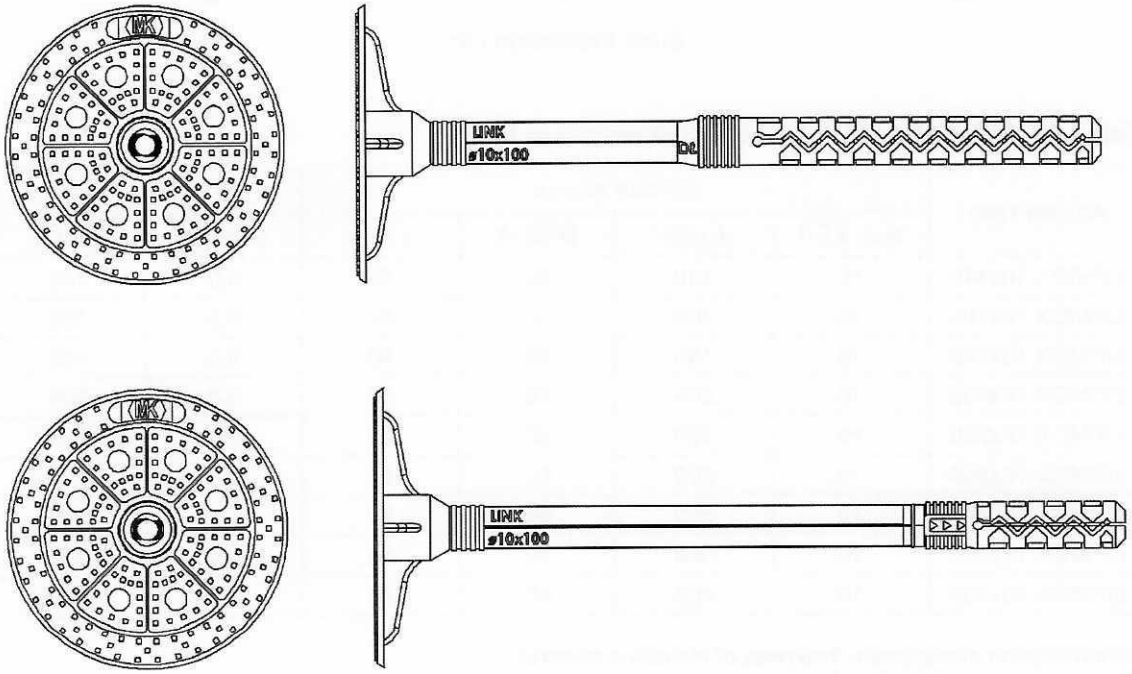
Determination of maximum thickness of insulation material:
For surface assembly: $h_D = L_a - t_{tol} - h_{ef}$
For countersunk assembly: $h_D = L_a - t_{tol} - h_{ef} + h_R$

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	Annex A2 of European Technical Assessment ETA-20/0849
Product description Dimensions of the ŁIPMOX anchor elements	

Table A7: Materials

Designation		Material
Plastic expansion anchor sleeve		Polypropylene (orange / grey / white), virgin material
Plastic expansion pin Ø 5,7 mm		Polyamide PA6 (natural / grey / orange / black) reinforced with glass fibre GF30, virgin material
Steel expansion pin	Ø 5 mm	Carbon steel ($f_{y,k} \geq 490$ MPa, $f_{u,k} \geq 650$ MPa) with zinc coating ≥ 5 µm; galvanized according to EN ISO 4042
	Ø 5,5 mm	Carbon steel ($f_{y,k} \geq 450$ MPa, $f_{u,k} \geq 600$ MPa) with zinc coating ≥ 5 µm; galvanized according to EN ISO 4042

Marking:



Diameter and length of anchor: e.g. ø10 x 100

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex A3** of European Technical Assessment ETA-20/0849
Product description Materials and marking	

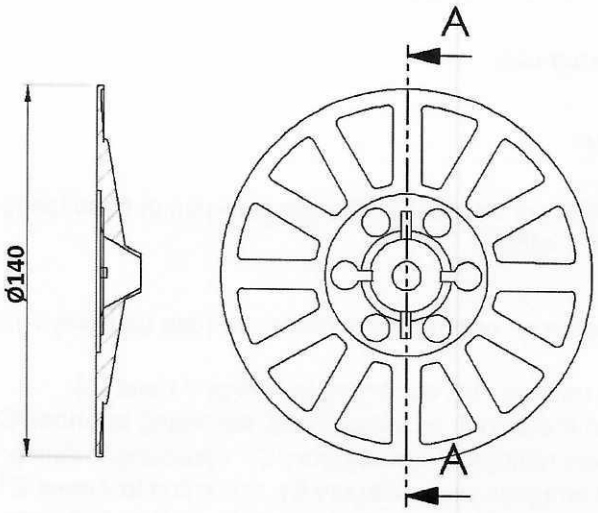
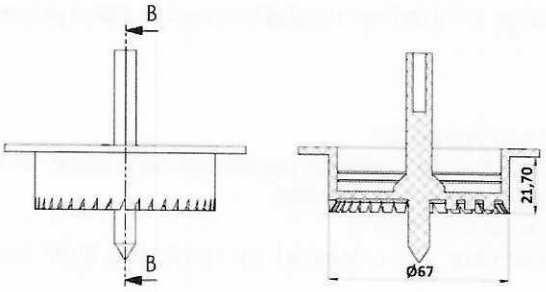


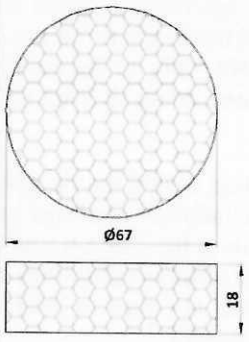
Table A8: Additional plate KWL140

Plate type	Outer diameter [mm]	Material
KWL140	140	Polypropylene, polyamide PA6 reinforced with glass fibre or not reinforced (orange / white / grey / natural)

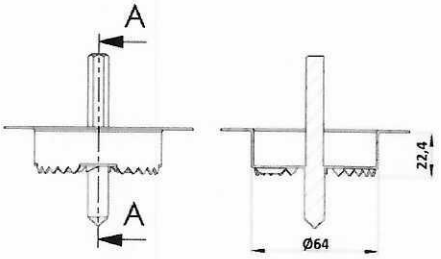
Equipment for countersunk assembly



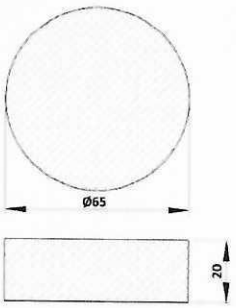
Cutter STYR01 for styrofoam



Plug STYR02 or STYR03 made of styrofoam



Cutter STYR06 for mineral wool (MW)



Plug STYR05 made of mineral wool (MW)

ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	Annex A4 of European Technical Assessment ETA-20/0849
Product description Additional plate KWL140 and equipment for countersunk assembly used with ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX anchors	

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.

Base materials:

- Reinforced or unreinforced normal weight concrete (use category A), according to Annex C1 and C3.
- Solid masonry (use category B), according to Annex C1 and C3.
- Hollow or perforated masonry (use category C), according to Annex C1 and C3.
- Lightweight aggregate concrete (use category D), according to Annex C1 and C3.
- Autoclaved aerated concrete (use category E), according to Annex C1 and C3.
- For other base materials of the use categories 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 December 2016.

Application 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.
- Anchors are only to be used for multiple fixings of 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.

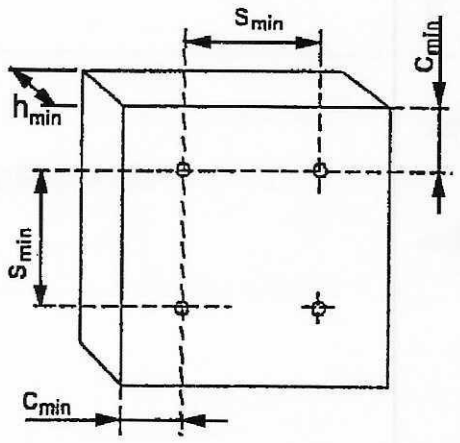
Table B1: Installation characteristics

Anchor type		ŁIN, ŁIMO, ŁIMOX	ŁIPN, ŁIPMO, ŁIPMOX
Nominal diameter	d_{nom} [mm]	10	10
Nominal diameter of drill bit	d_o [mm]	10	10
Cutting diameter of drill bit	d_{cut} [mm]	≤ 10,45	≤ 10,45
Depth of drill hole for base material category A, B, C, D, E	h_1 [mm]	≥ 60	≥ 90
Effective anchorage depth for base material category A, B, C, D, E	h_{ef} [mm]	≥ 50	≥ 80

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

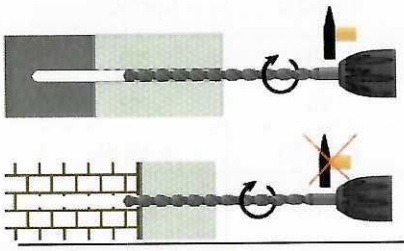
Anchor type		ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX
Minimum thickness of base material	h_{min} [mm]	100
Minimum spacing	s_{min} [mm]	100
Minimum edge distance	c_{min} [mm]	100

Diagram of spacing



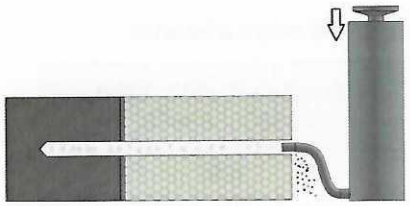
ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	Annex B2 of European Technical Assessment ETA-20/0849
Intended use Installation characteristics, minimum thickness of base material, edge distance and spacing	

Installation instruction – surface assembly

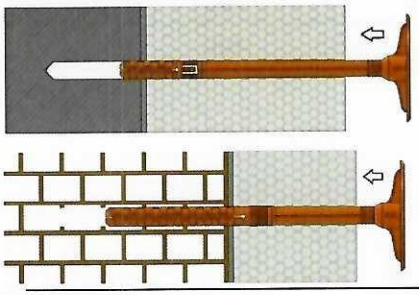


Drill perpendicular hole by corresponding method acc. to Annex C1.

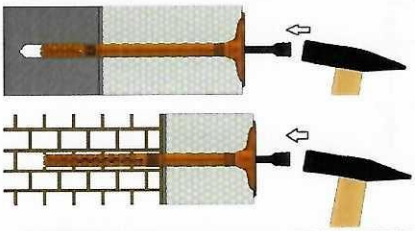
or



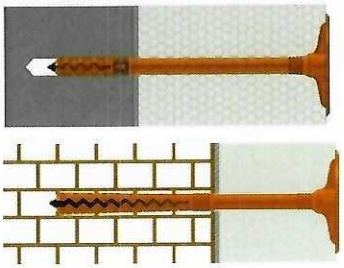
In case of installation in solid base materials clean correctly the hole by removing dust.



Set-in the anchor and make sure that the plate bottom is flush with the ETICS surface.



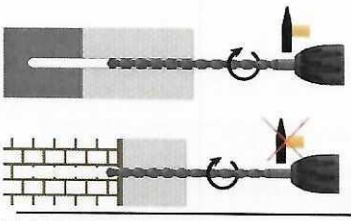
Nail-in the expansion pin.



Correctly installed anchor.

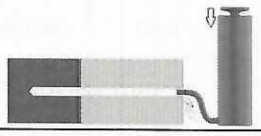
ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex B3** of European Technical Assessment ETA-20/0849
Intended use Installation instruction – surface assembly	

Installation instruction – countersunk assembly

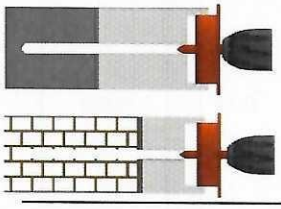


Drill prendicular hole by corresponding method acc. to Annex C1.

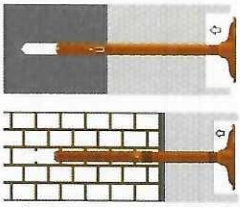
or



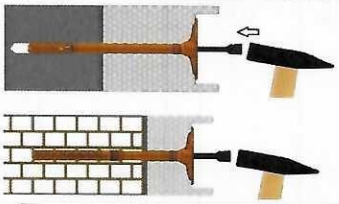
In case of installation in solid base materials clean correctly the hole by removing dust.



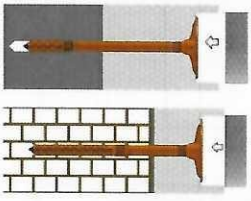
Using the cutter make a hole in insulation material.



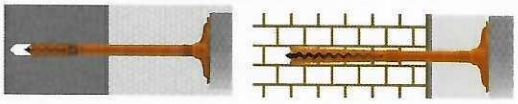
Set-in the anchor and make sure that the plate bottom is flush with the ETICS surface.



Nail-in the expansion pin.



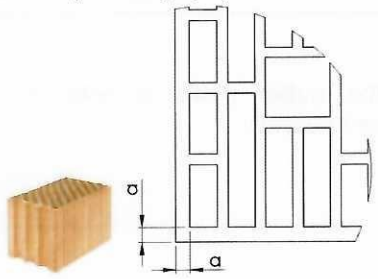
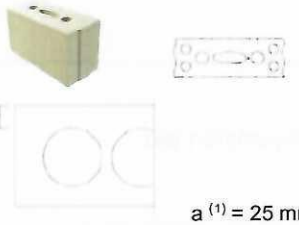
Set-in the plug.



Correctly installed anchor.

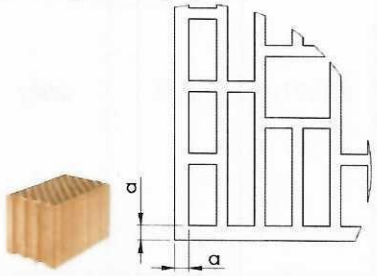
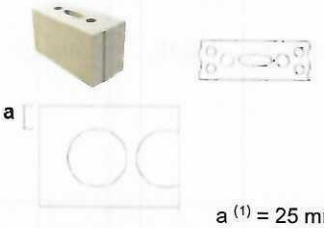
ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	**Annex B3** of European Technical Assessment ETA-20/0849
Intended use Installation instruction – countersunk assembly	

Table C1: Characteristic resistance to tension loads N_{Rk} in concrete and in masonry for single ŁIN anchor

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]	Drill method
Concrete C12/15 (use category A)			EN 206	0,55	hammer
Concrete C16/20 to C50/60 (use category A)			EN 206	0,80	hammer
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	EN 771-1	1,00	hammer
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	EN 771-2	0,40	hammer
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	EN 771-1	0,10	rotary
Calcium silicate hollow blocks KSL (use category C)  a (1) = 25 mm	≥ 1,6	≥ 15,0	EN 771-2	0,65	rotary
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	EN 771-3	0,20	rotary
Partial safety factor for anchor resistance, γ_M (2)	2,0				

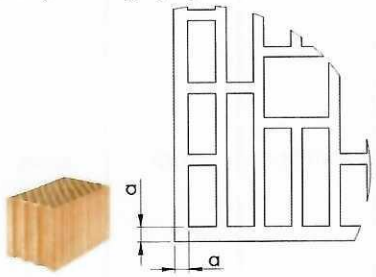
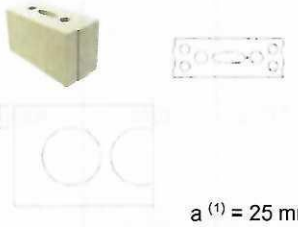
(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required
(2) in the absence of other national regulations

Table C2: Characteristic resistance to tension loads N_{Rk} in concrete and in masonry for single ŁIMO and ŁIMOX anchors

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]	Drill method
Concrete C12/15 (use category A)			EN 206	0,40	hammer
Concrete C16/20 to C50/60 (use category A)			EN 206	0,55	hammer
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	EN 771-1	0,65	hammer
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	EN 771-2	0,35	hammer
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	EN 771-1	0,10	rotary
Calcium silicate hollow blocks KSL (use category C)  a (1) = 25 mm	≥ 1,6	≥ 15,0	EN 771-2	0,40	rotary
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	EN 771-3	0,30	rotary
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	EN 771-4	0,10	rotary
Partial safety factor for anchor resistance, γ_M (2)	2,0				

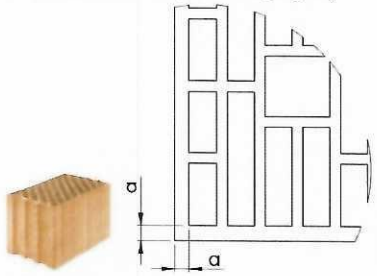
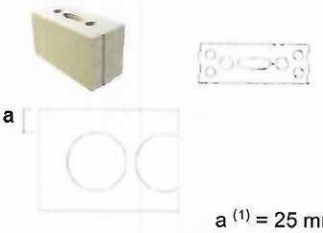
(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required
(2) in the absence of other national regulations

Table C3: Characteristic resistance to tension loads N_{Rk} in concrete and in masonry for single ŁIPN anchor

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]	Drill method
Concrete C12/15 (use category A)			EN 206	0,30	hammer
Concrete C16/20 to C50/60 (use category A)			EN 206	0,45	hammer
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	EN 771-1	0,45	hammer
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	EN 771-2	0,25	hammer
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	EN 771-1	0,15	rotary
Calcium silicate hollow blocks KSL (use category C)  a (1) = 25 mm	≥ 1,6	≥ 15,0	EN 771-2	0,15	rotary
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	EN 771-3	0,15	rotary
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	EN 771-4	0,10	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) in the absence of other national regulations

Table C4: Characteristic resistance to tension loads N_{Rk} in concrete and in masonry for single ŁIPMO and ŁIPMOX anchors

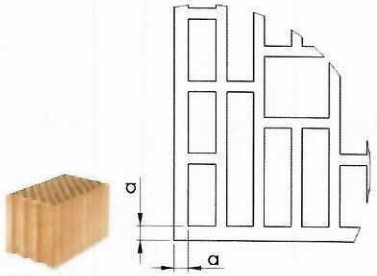
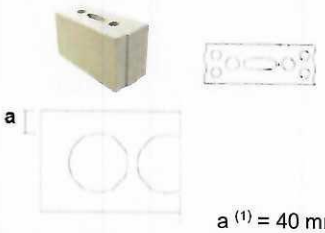
Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	Referring standard	N_{Rk} [kN]	Drill method
Concrete C12/15 (use category A)			EN 206	0,55	hammer
Concrete C16/20 to C50/60 (use category A)			EN 206	0,80	hammer
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	EN 771-1	0,60	hammer
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	EN 771-2	0,65	hammer
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	EN 771-1	0,25	rotary
Calcium silicate hollow blocks KSL (use category C)  a (1) = 25 mm	≥ 1,6	≥ 15,0	EN 771-2	0,25	rotary
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	EN 771-3	0,30	rotary
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	EN 771-4	0,10	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) in the absence of other national regulations

Table C5: Plate stiffness according to EOTA Technical Report TR 026

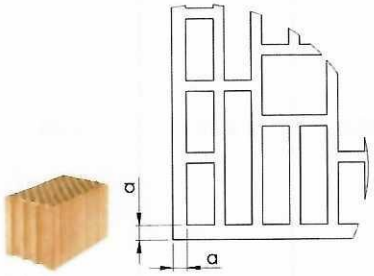
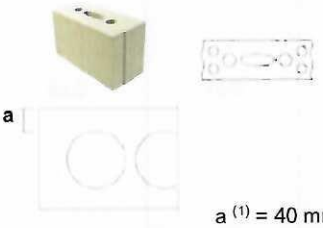
Anchor type	Diameter of the anchor plate d_{plate} [mm]	Characteristic load resistance of the anchor plate [kN]	Plate stiffness [kN/mm]
ŁIN, ŁIMO, ŁIMOX, ŁIPN, ŁIPMO, ŁIPMOX	60	0,84	0,20

Table C6: Displacement of ŁIN anchors

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]	$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]
Concrete C12/15 (use category A)			0,18	0,40
Concrete C16/20 to C50/60 (use category A)			0,27	0,70
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	0,33	1,00
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	0,13	0,42
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	0,03	0,09
Calcium silicate hollow blocks KSL (use category C)  a (1) = 40 mm	≥ 1,6	≥ 12,0	0,22	0,88
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	0,06	0,13

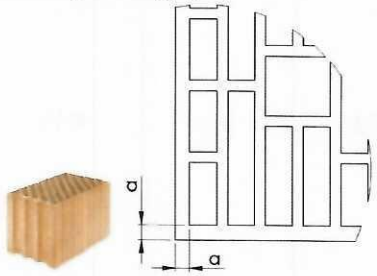
(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required

Table C7: Displacement of ŁIMO and ŁIMOX anchors

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]	$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]
Concrete C12/15 (use category A)			0,13	0,40
Concrete C16/20 to C50/60 (use category A)			0,18	0,70
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	0,22	0,90
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	0,12	0,57
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	0,03	0,13
Calcium silicate hollow blocks KSL (use category C)  a (1) = 40 mm	≥ 1,6	≥ 12,0	0,13	0,70
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	0,10	0,45
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	0,03	0,08

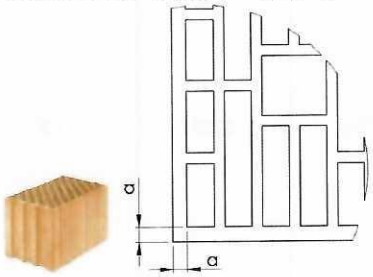
(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required

Table C8: Displacement of ŁIPN anchor

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]	$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]
Concrete C12/15 (use category A)			0,10	0,32
Concrete C16/20 to C50/60 (use category A)			0,15	0,34
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	0,15	0,36
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	0,08	0,10
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	0,05	0,06
Calcium silicate hollow blocks KSL (use category C)  a a (1) = 40 mm	≥ 1,6	≥ 12,0	0,05	0,08
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	0,05	0,07
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	0,03	0,05

(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required

Table C9: Displacement of ŁIPMO and ŁIPMOX anchors

Base material	Bulk density [kg/dm³]	Compressive strength [N/mm²]	$\frac{N_{Rk}}{3}$ [kN]	$\delta\left(\frac{N_{Rk}}{3}\right)$ [mm]
Concrete C12/15 (use category A)			0,18	0,47
Concrete C16/20 to C50/60 (use category A)			0,27	0,70
Clay bricks MZ (use category B)	≥ 2,0	≥ 20,0	0,20	0,77
Calcium silicate bricks KS (use category B)	≥ 2,0	≥ 20,0	0,22	0,70
Vertically perforated clay bricks Porotherm 25 P+D (use category C)  a (1) = 11 mm	≥ 0,8	≥ 15,0	0,08	0,14
Calcium silicate hollow blocks KSL (use category C)  a a (1) = 40 mm	≥ 1,6	≥ 12,0	0,08	0,25
Lightweight concrete blocks LAC (use category D) 	≥ 0,88	≥ 5,0	0,10	0,31
Autoclaved concrete blocks AAC 2 (use category E)	≥ 0,35	≥ 2,0	0,03	0,04

(1) minimum values "a", for elements with lower value of "a" the load tests on the construction site are required