

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0450
of 9 February 2023

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

LFM-8, LFM-10, LFN-10, LFMG-10

Product family
to which the construction product belongs

Plastic anchor for fixing of external thermal insulation
composite systems with rendering

Manufacturer

Klimas Sp. z o.o.
Kuznica Kiedrzynska
ul. Wincentego Witosa 135/137
42-233 MYKANÓW
POLEN

Manufacturing plant

Plant 1, Plant 2 Poland

This European Technical Assessment
contains

18 pages including 3 annexes which form an integral part
of this assessment

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

EAD 330196-01-0604, Edition 10/2017

This version replaces

ETA-17/0450 issued on 23 September 2020

European Technical Assessment

ETA-17/0450

English translation prepared by DIBt

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Specific Part

1 Technical description of the product

The nailed-in anchor LFM-8 / LFM-10 / LFN-10 / LFMG-10 consists of an anchor sleeve with an enlarged shaft, spreading zone subsequently, an insulation plate made of virgin polyethylene and an accompanying specific nail of virgin polyamide or of steel with zinc coating. The serrated expanding part of the anchor is slotted.

The anchor may in addition be combined with the anchor plates TDX-P-90/TDX-90 and TDX-P-140/TDX-140.

The description of the product is given in Annex A.

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

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 25 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 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic load bearing capacity	
- Characteristic resistance under tension load	See Annex C 1, C 2
- Minimum edge distance and spacing	See Annex B 2
Displacements	See Annex C 4, C 5
Plate stiffness	See Annex C 3

3.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	See Annex C 3

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

In accordance with EAD No. 330196-01-0604, the applicable European legal act is: [97/463/EC].

The system to be applied is: 2+

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

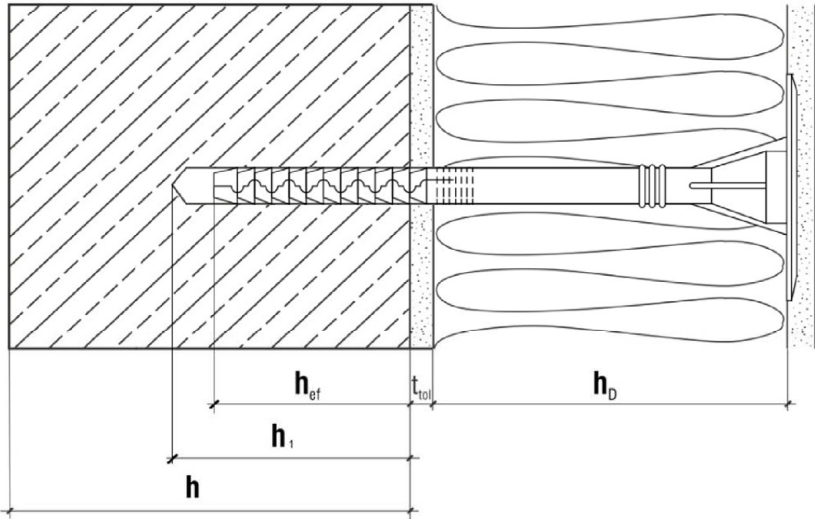
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 9 February 2023 by Deutsches Institut für Bautechnik

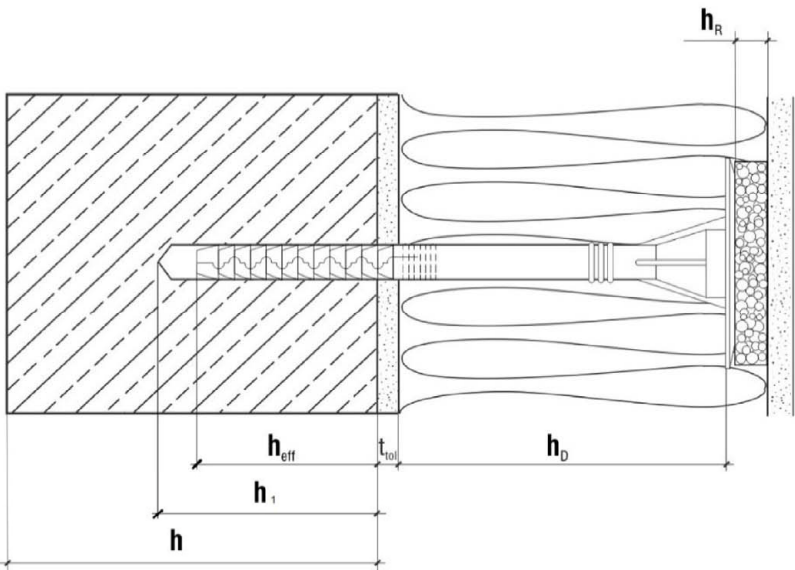
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

LFM-8 / LFM-10 / LFN-10 / LFMG-10



surface mount



immersed mount

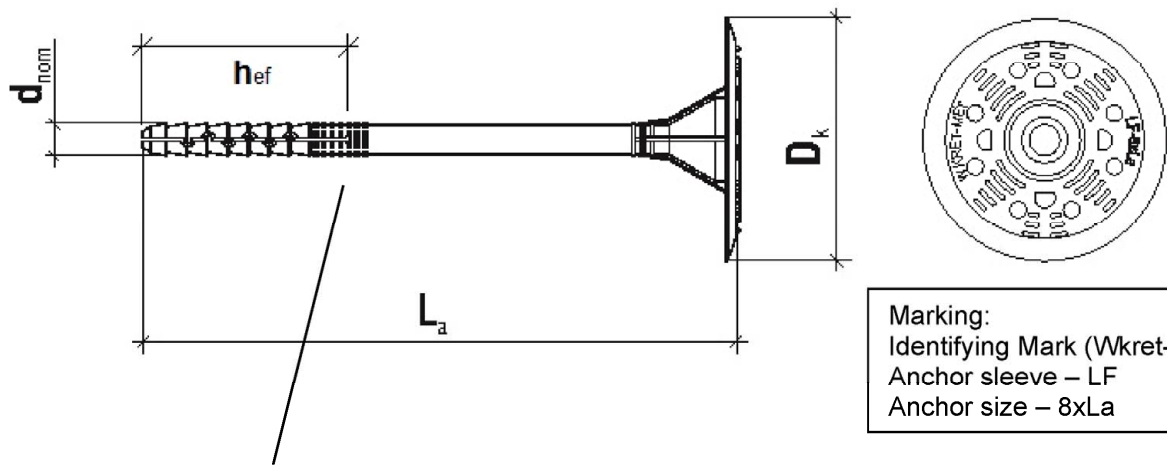
- Legend:
- h_D = thickness of insulation material
 - h_{ef} = effective anchorage depth
 - h = thickness of member (wall)
 - h_1 = depth of drilled hole to deepest point
 - t_{tol} = thickness of equalizing layer or non-load-bearing coating
 - h_R = thickness of insulation cover

LFM-8 / LFM-10 / LFN-10 / LFMG-10

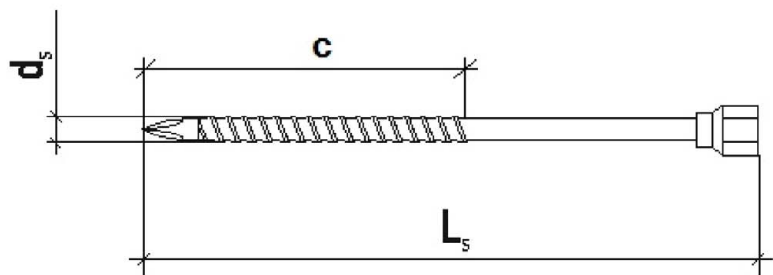
Product description
Installed condition – surface mount, immersed mount

Annex A 1

LFM-8



Marking of effective anchorage depth



Accompanying specific nail TN-5,1

Table A1: Dimensions

Anchor Type	Anchor Sleeve				Specific nail		
	D_k	d_{nom}	h_{ef}	min L_a max L_a	d_s	c	min L_s max L_s
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
LFM-8	60	8	50	100 200	5,1	60-90	105 205

Determination of maximum thickness of insulation h_D [mm] for LFM-8:

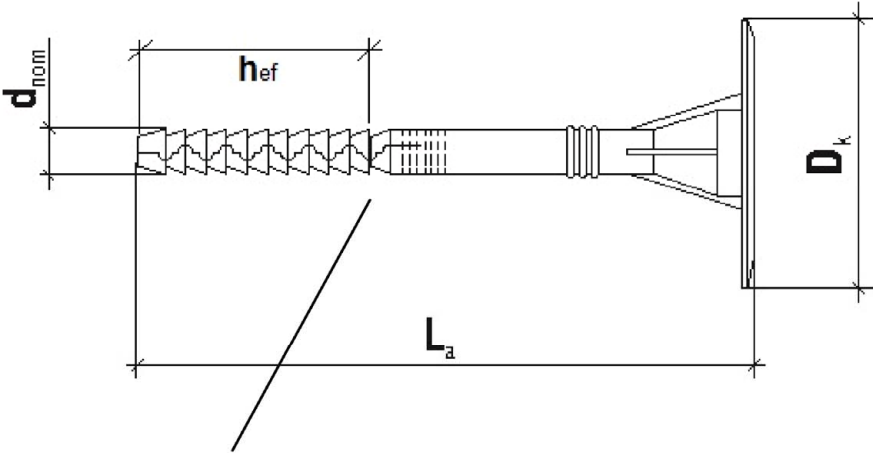
e.g. $h_D = L_a - t_{tol} - h_{ef}$ ($L_a = \text{e.g. } 100; t_{tol} = 10$)
 $h_D = 100 - 10 - 50$
 $h_{Dmax} = 40$

LFM-8 / LFM-10 / LFN-10 / LFMG-10

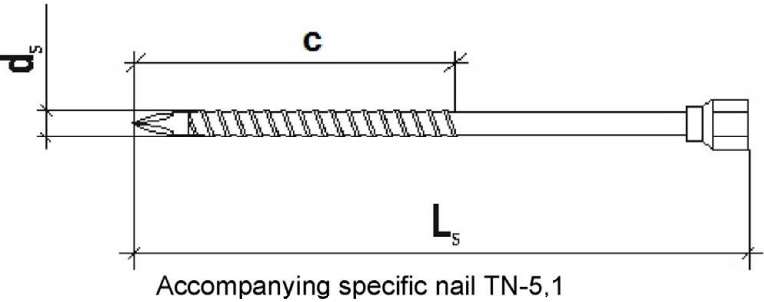
Product description
LFM-8 - marking and dimension of the anchor sleeve LF
Expansion element TN

Annex A 2

LFM-10



Marking of effective anchorage depth



Accompanying specific nail TN-5,1

Table A2: Dimensions

Anchor Type	Anchor Sleeve				Specific nail		
	D _k	d _{nom}	h _{ef}	min L _a max L _a	d _s	c	min L _s max L _s
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
LFM-10	60	10	70	140 300	5,1	60-90	145 305

Determination of maximum thickness of insulation h_D [mm] for LFM-10:

$$h_D = L_a - t_{tol} - h_{ef} \quad (L_a = \text{e.g. } 140; t_{tol} = 10)$$

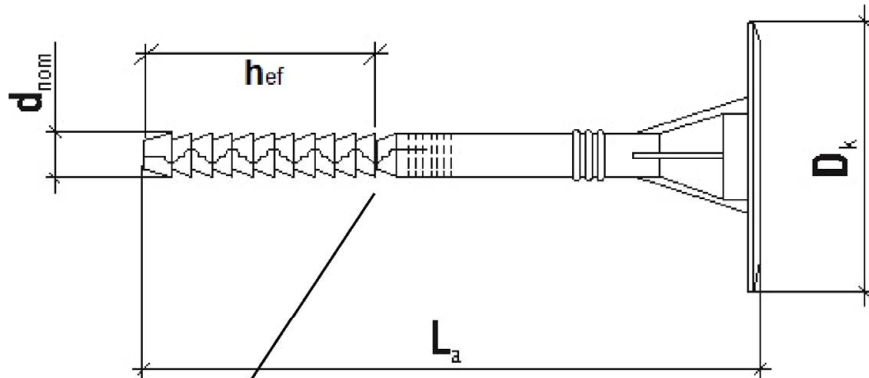
e.g.
$$h_D = 140 - 10 - 70$$
$$h_{Dmax} = 60$$

LFM-8 / LFM-10 / LFN-10 / LFMG-10

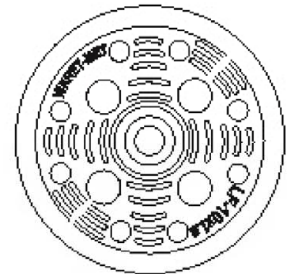
Annex A 3

Product description
LFM-10 - marking and dimension of the anchor sleeve LF
Expansion element TN

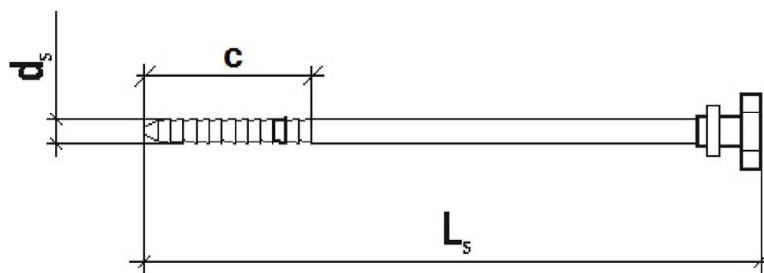
LFN-10



Marking of effective anchorage depth



Marking:
Identifying Mark (Wkret-Met)
Anchor sleeve – LF
Anchor size – 10xLa



Accompanying specific nail T-5,3

Table A3: Dimensions

Anchor Type	Anchor Sleeve				Specific nail		
	D _k [mm]	d _{nom} [mm]	h _{ef} [mm]	min L _a max L _a [mm]	d _s [mm]	c [mm]	min L _s max L _s [mm]
LFN-10	60	10	70	140 300	5,3	85	145 305

Determination of maximum thickness of insulation h_D [mm] for LFN-10:

$$h_D = L_a - t_{tol} - h_{ef} \quad (L_a = \text{e.g. } 140; t_{tol} = 10)$$

e.g. $h_D = 140 - 10 - 70 = 60$

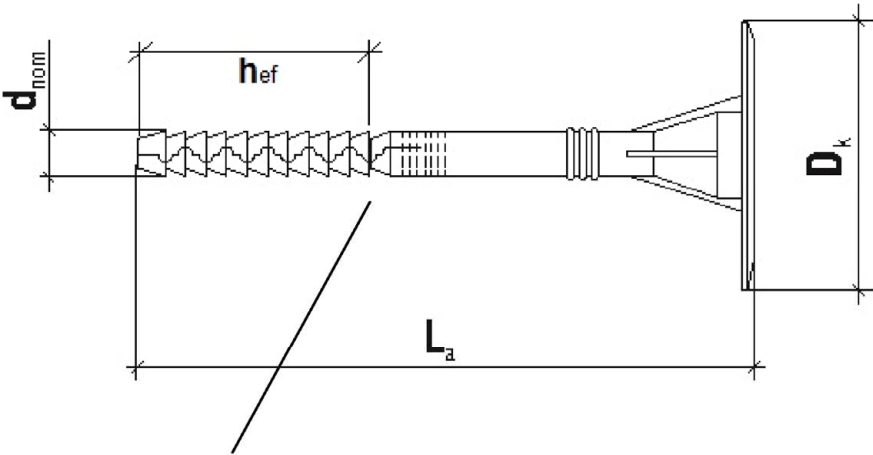
LFM-8 / LFM-10 / LFN-10 / LFMG-10

Product description

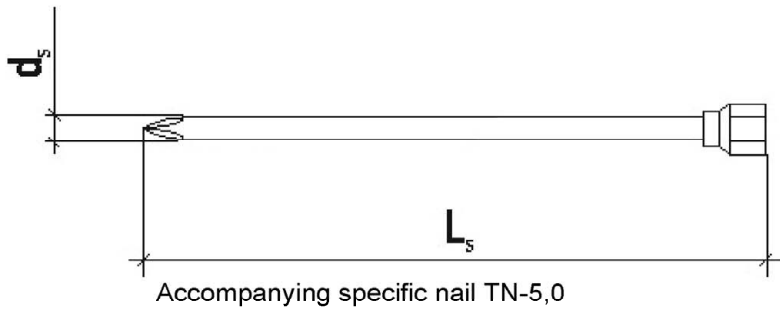
LFN-10 - marking and dimension of the anchor sleeve LF
Expansion element T

Annex A 4

LFMG-10



Marking of effective anchorage depth



Accompanying specific nail TN-5,0

Table A4: Dimensions

Anchor Type	Anchor Sleeve				Specific nail	
	D _k	d _{nom}	h _{ef}	min L _a max L _a	d _s	min L _s max L _s
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
LFMG-10	60	10	70	140 300	5,0	145 305

Determination of maximum thickness of insulation h_D [mm] for LFMG-10:

e.g.
$$\begin{aligned} h_D &= L_a - t_{tol} - h_{ef} & (L_a = \text{e.g. } 140; t_{tol} = 10) \\ h_D &= 140 - 10 - 70 \\ h_{Dmax} &= 60 \end{aligned}$$

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Product description
LFMG-10 - marking and dimension of the anchor sleeve LF
Expansion element TN-5,0

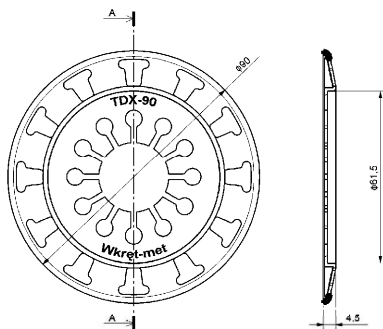
Annex A 5

Table A5: Materials

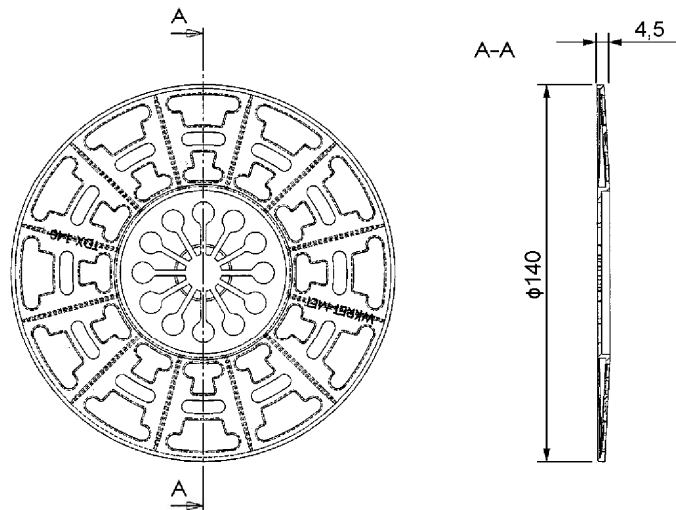
Name	Materials
Anchor sleeve	virgin Polyethylene, colour: natural
Specific nail T	virgin Polyamide + GF, colour: black or natural
Specific nail TN	Steel with zinc coating $\geq 5 \mu\text{m}$
Insulation cover	KS: Polystyrene (EPS), colour: white KSG: Polystyrene (EPS), colour: grey EDMW: mineral wool (MW), colour: natural

Table A6: Insulation discs, diameters and material

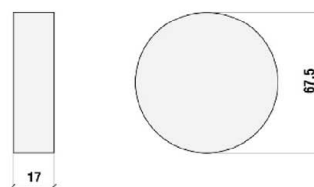
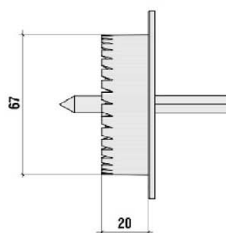
Plate type	Outer diameter [mm]	Material
TDX-P-90	90	Polyethylene, natural or grey
TDX-90	90	Polyamide +GF, natural or grey
TDX-P-140	140	Polyethylene, natural or grey
TDX-140	140	Polyamide + GF, natural or grey



TDX-P-90/TDX-90



TDX-P-140/TDX-140



Special drill tool WK-FT/WK-FM for immersed installation

Insulation cover KS/KSG and EDMW

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Product description

Materials,
Slip on plates with LFM-8 / LFM-10 / LFN-10 / LFMG-10

Annex A 6

Specifications of intended use

Anchorage subject to:

- The anchor may only be used for transmission of wind suction loads and shall not be used for the transmission of dead loads of the thermal insulation composite system.

Base materials:

- Compacted normal weight concrete without fibres (base material group A) according to Annex C 1, C 2
- Solid masonry (base material group B), according to Annex C 1, C 2
- Hollow or perforated masonry (base material group C), according to Annex C 1, C 2
- Lightweight aggregate concrete (base material group D), according to Annex C 1, C 2
- Autoclaved aerated concrete (base material group E), according to Annex C 1, C 2
- 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 $\gamma_M = 2,0$ and $\gamma_F = 1,5$ if there are no other national regulations.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple fixings of thermal insulation composite systems.

Installation:

- Hole drilling by the drill modes according to Annex C 1
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation temperature from 0°C to +40°C
- Exposure to UV due to solar radiation of the anchor not protected by rendering ≤ 6 weeks

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Intended use
Specifications

Annex B 1

Table B1: Installation parameters for LFM-8

		LFM-8 A B C D E
Drill hole diameter	d_0 [mm] =	8
Cutting diameter of drill bit	d_{cut} [mm] ≤	8,45
Depth of drilled hole to deepest point	h_1 [mm] ≥	55
Effective anchorage depth	h_{ef} [mm] ≥	50

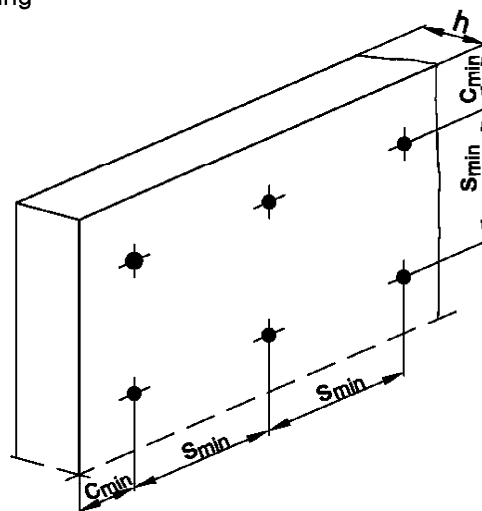
Table B2: Installation parameters for LFM-10 / LFMG-10 / LFN-10

		LFM-10 / LFMG-10 A B C D E	LFN-10 B C E
Drill hole diameter	d_0 [mm] =	10	10
Cutting diameter of drill bit	d_{cut} [mm] ≤	10,45	10,45
Depth of drilled hole to deepest point	h_1 [mm] ≥	75	75
Effective anchorage depth	h_{ef} [mm] ≥	70	70

Table B3: Anchor distances and dimensions of members

Minimum spacing	$s_{min} \geq$ [mm]	100
Minimum edge distance	$c_{min} \geq$ [mm]	100
Minimum thickness of member	$h \geq$ [mm]	100

Scheme of distance and spacing



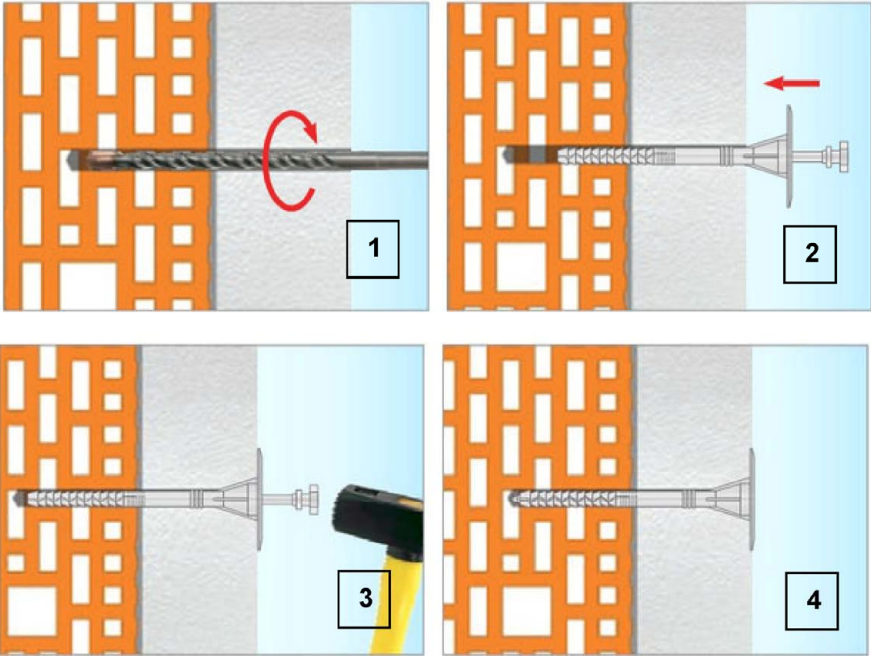
LFM-8 / LFM-10 / LFN-10 / LFMG-10

Intended use
Installation parameters,
Edge distances and spacing

Annex B 2

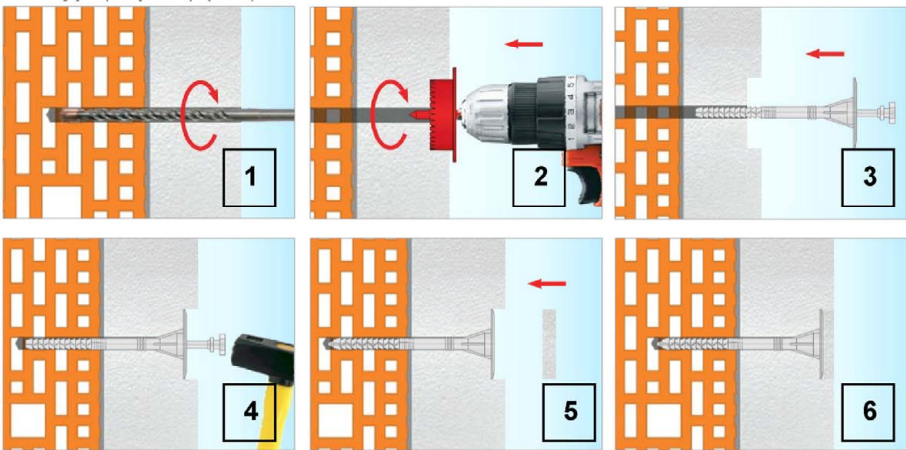
Installation instructions

surface mount



- 1) Drill the hole perpendicular to the substrate surface. Clean the drill hole.
- 2) Place the anchor into the drill hole. The bottom side of the plate must be flush with the ETICS.
- 3) Drive in the specific nail with the hammer.
- 4) Installed condition.

immersed mount



- 1) Drill the hole perpendicular to the substrate surface. Clean the drill hole.
- 2) Drill the recess for immersed installation with the special drilling tool WK-FT / WK-FM.
- 3) Place the anchor into the drill hole. The bottom side of the plate must be flush with the recess in the ETICS.
- 4) Drive in the specific nail with the hammer.
- 5) Insert the insulation cover.
- 6) Installed condition.

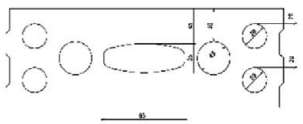
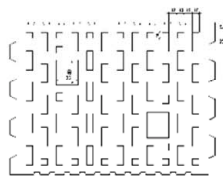
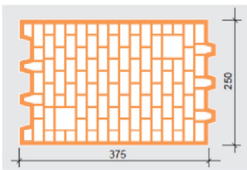
LFM-8 / LFM-10 / LFN-10 / LFMG-10

Intended use

Installation instructions – surface mount, immersed mount

Annex B 3

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

Anchor type					LFM-8
Base materials	Bulk density ρ [kg/dm ³]	compressive strength f_b [N/mm ²]	General remarks	Drill method	N_{Rk} [kN]
Concrete C12/15 as per EN 206:2013+A1:2016	$\geq 2,25$	≥ 15	Compacted concrete without fibres	hammer	0,5
Concrete C20/25 - C50/60 as per EN 206:2013+A1:2016	$\geq 2,30$	≥ 25		hammer	0,75
Clay bricks Mz as per EN 771-1:2011+A1:2015	$\geq 2,0$	≥ 20		hammer	0,5
Calcium silicate bricks KS as per EN 771-2:2011+A1:2015	$\geq 2,0$	≥ 20		hammer	0,5
Calcium silicate hollow block KSL as per EN 771-2:2011+A1:2015 	$\geq 1,6$	≥ 12	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 20\text{mm}$	rotary	0,4
Vertically perforated clay bricks HLZ as per EN 771-1:2011+A1:2015 	$\geq 1,2$	≥ 12	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 12\text{mm}$	rotary	0,1
Vertically perforated clay bricks porotherm 25 as per EN 771-1:2011+A1:2015 	$\geq 0,8$	≥ 10	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 10\text{mm}$	rotary	¹⁾
Autoclaved concrete blocks as per EN 771-4:2011+A1:2015	$\geq 0,35$	≥ 2		rotary	0,3
Autoclaved concrete blocks as per EN 771-4:2011+A1:2015	$\geq 0,65$	≥ 5		rotary	0,6
Lightweight concrete blocks LAC, as per EN 1520:2011 / EN 771-3:2011+A1:2015	$\geq 0,88$	≥ 5		rotary	0,8

¹⁾ No performance assessed

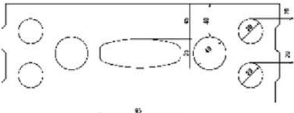
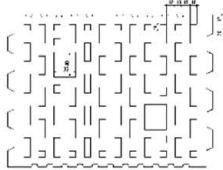
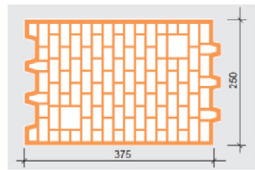
²⁾ Cross section reduced by perforation vertically to the resting area

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances
Characteristic resistance LFM-8

Annex C 1

Table C2: Characteristic resistance to tension loads N_{Rk} in concrete and masonry for a single anchor in kN

Anchor type					LFM-10	LFMG-10	LFN-10
Base materials	Bulk density ρ [kg/dm ³]	compr. strength f_b [N/mm ²]	General remarks	Drill method	N_{Rk} [kN]	N_{Rk} [kN]	N_{Rk} [kN]
Concrete C12/15 as per EN 206:2013+A1:2016	$\geq 2,25$	≥ 15	Compacted concrete without fibres	hammer	0,6	0,65	¹⁾
Concrete C20/25 - C50/60 as per EN 206:2013+A1:2016	$\geq 2,30$	≥ 25		hammer	0,9	0,9	¹⁾
Clay bricks Mz as per EN 771-1:2011+A1:2015	$\geq 2,0$	≥ 20		hammer	0,5	0,75	0,75
Calcium silicate bricks KS as per EN 771-2:2011+A1:2015	$\geq 2,0$	≥ 20		hammer	0,5	0,75	¹⁾
Calcium silicate hollow block KSL as per EN 771-2:2011+A1:2015 	$\geq 1,6$	≥ 12	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 20\text{mm}$	rotary	0,3	0,5	0,5
Vertically perforated clay bricks HLZ as per EN 771-1:2011+A1:2015 	$\geq 1,2$	≥ 12	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 12\text{mm}$	rotary	0,3	0,4	0,8
Vertically perforated clay bricks porotherm 25 as per EN 771-1:2011+A1:2015 	$\geq 0,8$	≥ 10	Vertically perforation >15% and $\leq 50\%$ ²⁾ , outer web thickness $\geq 10\text{mm}$	rotary	0,3	0,4	0,5
Autoclaved concrete blocks as per EN 771-4:2011+A1:2015	$\geq 0,35$	≥ 2		rotary	0,3	0,4	0,3
Autoclaved concrete blocks as per EN 771-4:2011+A1:2015	$\geq 0,65$	≥ 5		rotary	0,4	0,5	0,85
Lightweight concrete blocks LAC, as per EN 1520:2011 / EN 771-3:2011+A1:2015	$\geq 0,88$	≥ 5		rotary	0,75	0,75	¹⁾

¹⁾ No performance assessed

²⁾ Cross section reduced by perforation vertically to the resting area

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances
Characteristic resistance LFM-10 / LFMG-10 / LFN-10

Annex C 2

Table C3: Point thermal transmittance according EOTA Technical Report TR 025:2016-05

anchor type	insulation thickness h_D [mm]	point thermal transmittance χ [W/K]
LFM-8 surface mount	40-200	0,004
LFM-8 immersed mount	40-200	0,003
LFM-10 surface mount	80-300	0,004
LFM-10 immersed mount	80-300	0,003
LFN-10 surface mount	80-240	0,000
LFN-10 immersed mount	80-240	0,000
LFMG-10 surface mount	80-300	0,004
LFMG-10 immersed mount	80-300	0,003

Table C4: Plate stiffness according EOTA Technical Report TR 026:2016-05

anchor type	diameter of the anchor plate [mm]	load resistance of the anchor plate [kN]	plate stiffness [kN/mm]
LFM-8	60	1,44	0,3
LFM-10	60	1,34	0,3
LFN-10	60	1,33	0,3
LFMG-10	60	1,44	0,4

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances

Point thermal transmittance, plate stiffness

Annex C 3

Table C5: Displacements LFM-8

Base materials (refer Table C1, C2)	Bulk density ρ [kg/dm ³]	Minimum Compressive strength f_b [N/mm ²]	Tension load N [kN]	Displacements $\Delta\delta_N$ [mm]
			LFM-8	LFM-8
Concrete C20/25	≥ 2,25	≥ 30	0,17	0,5
Concrete C50/60	≥ 2,30	≥ 65	0,25	0,6
Clay bricks MZ	≥ 2,0	≥ 20	0,17	0,5
Calcium silicate bricks KS	≥ 2,0	≥ 20	0,17	0,5
Calcium silicate hollow block KSL	≥ 1,6	≥ 12	0,13	1,0
Vertically perforated clay bricks HLZ	≥ 1,2	≥ 12	0,03	0,7
Perforated clay bricks porotherm 25	≥ 0,8	≥ 10	¹⁾	¹⁾
Autoclaved concrete blocks	≥ 0,35	≥ 2	0,1	0,3
Autoclaved concrete blocks	≥ 0,65	≥ 5	0,2	0,8
Lightweight concrete blocks LAC	≥ 0,88	≥ 5	0,3	1,0

¹⁾ No performance assessed

Table C6: Displacements LFM-10 / LFN-10

Base materials (refer Table C1, C2)	Bulk density ρ [kg/dm ³]	Minimum Compressive strength f_b [N/mm ²]	Tension load N [kN]		Displacements $\Delta\delta_N$ [mm]	
			LFM-10	LFN-10	LFM-10	LFN-10
Concrete C20/25	≥ 2,25	≥ 30	0,2	¹⁾	0,8	¹⁾
Concrete C50/60	≥ 2,30	≥ 65	0,3	¹⁾	0,4	¹⁾
Clay bricks MZ	≥ 2,0	≥ 20	0,17	0,25	0,9	1,2
Calcium silicate bricks KS	≥ 2,0	≥ 20	0,17	¹⁾	0,6	¹⁾
Calcium silicate hollow block KSL	≥ 1,6	≥ 12	0,1	0,17	0,5	2,4
Vertically perforated clay bricks HLZ	≥ 1,2	≥ 12	0,1	0,25	0,3	1,8
Perforated clay bricks porotherm 25	≥ 0,8	≥ 10	0,1	0,17	0,4	2,5
Autoclaved concrete blocks	≥ 0,35	≥ 2	0,1	0,1	0,4	1,2
Autoclaved concrete blocks	≥ 0,65	≥ 5	0,13	0,3	0,7	0,9
Lightweight concrete blocks LAC	≥ 0,88	≥ 5	0,25	¹⁾	1,3	¹⁾

¹⁾ No performance assessed

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances
Displacements

Annex C 4

Table C7: Displacements LFMG-10

Base materials (refer Table C1, C2)	Bulk density ρ [kg/dm ³]	Minimum Compressive strength f_b [N/mm ²]	Tension load N [kN]	Displacements $\Delta\delta_N$ [mm]
			LFMG-10	LFMG-10
Concrete C20/25	$\geq 2,25$	≥ 30	0,22	0,3
Concrete C50/60	$\geq 2,30$	≥ 65	0,30	0,4
Clay bricks MZ	$\geq 2,0$	≥ 20	0,25	0,5
Calcium silicate bricks KS	$\geq 2,0$	≥ 20	0,25	0,5
Calcium silicate hollow block KSL	$\geq 1,6$	≥ 12	0,17	0,3
Vertically perforated clay bricks HLZ	$\geq 1,2$	≥ 12	0,13	0,7
Perforated clay bricks porotherm 25	$\geq 0,8$	≥ 10	0,13	0,8
Autoclaved concrete blocks	$\geq 0,35$	≥ 2	0,13	0,2
Autoclaved concrete blocks	$\geq 0,65$	≥ 5	0,17	0,2
Lightweight concrete blocks LAC	$\geq 0,88$	≥ 5	0,25	0,3

LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances
Displacements

Annex C 5