Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-17/0450 of 23 September 2020

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	Nailed-in plastic anchor for fixing of external thermal insulation composite systems with rendering in concrete and masonry
Manufacturer	Klimas Sp. z o.o. Kuznica Kiedrzynska ul. Wincentego Witosa 135/137 42-233 MYKANÓW POLEN
Manufacturing plant	Klimas plant 1
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 29 January 2018

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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 galvanised steel. 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 - Minimum edge distance and spacing	 See Annex C 1, C 2 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.

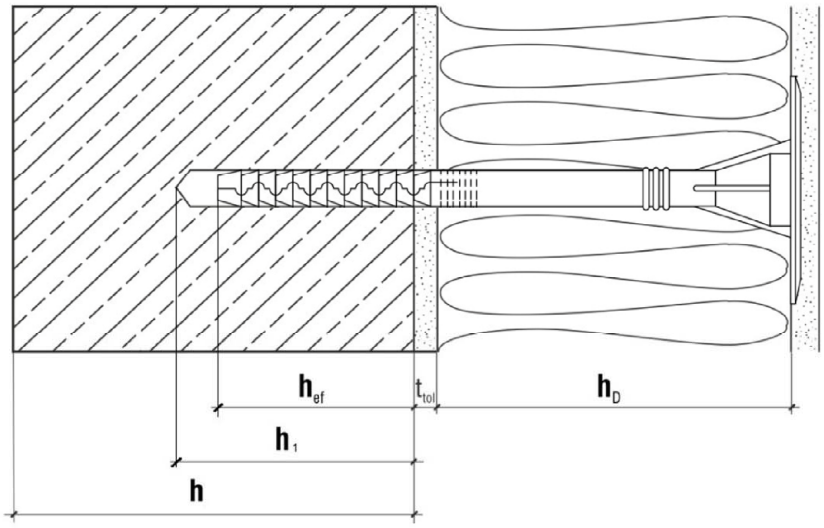
Issued in Berlin on 23 September 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

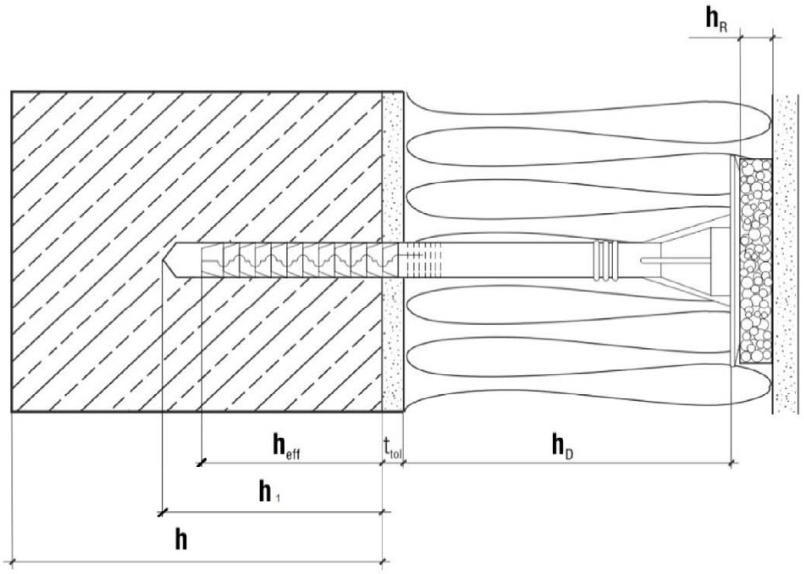
beglaubigt:
Ziegler

Deutsches Institut für Bautechnik DIBt

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



surface mount



immerged 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	**Annex A 1**
Product description Installed condition – surface mount, immerged mount	

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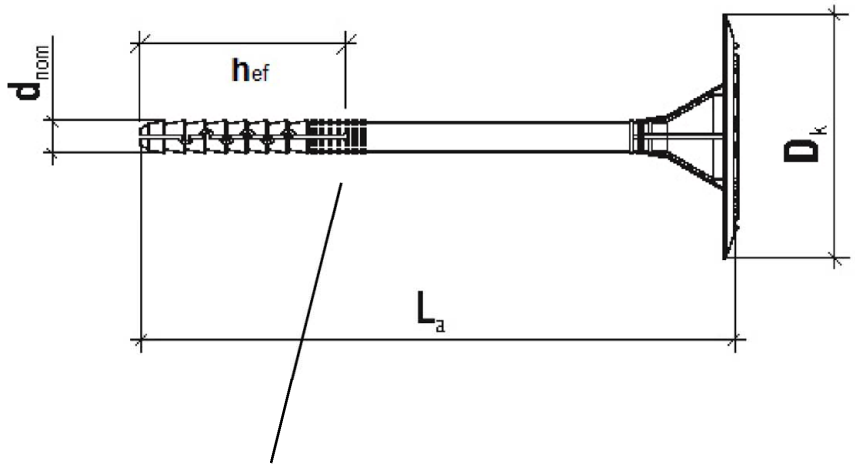
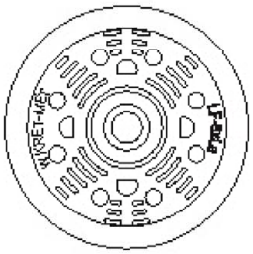
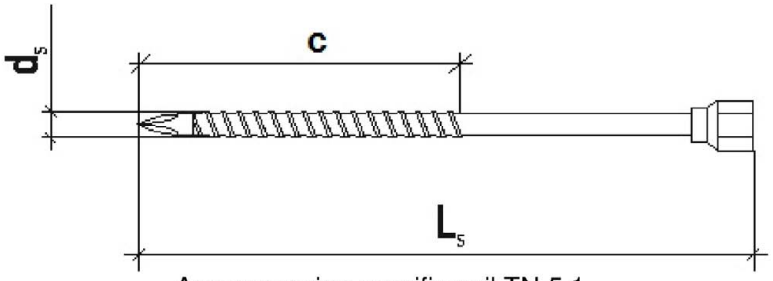
LFM-8





Marking:
Identifying Mark (Wkret-Met)
Anchor sleeve – LF
Anchor size – 8xLa

Marking of effective anchorage depth



Accompanying specific nail TN-5,1

Table A1: 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]
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:

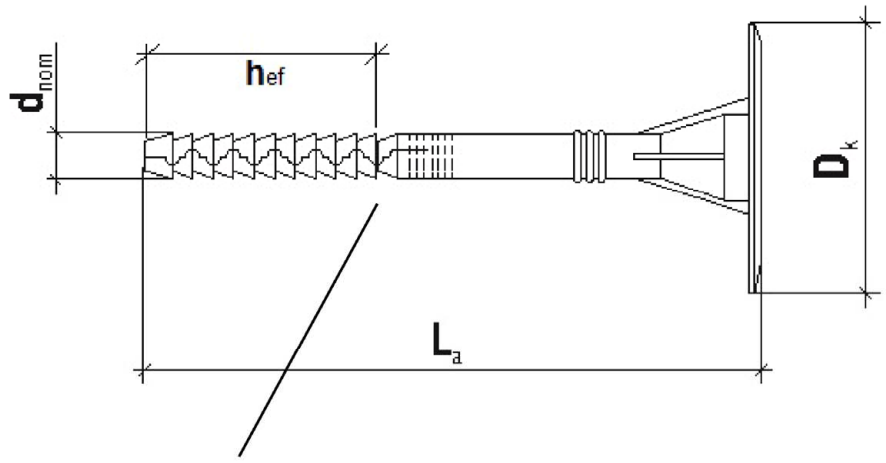
e.g. $h_D = L_a - t_{tol} - h_{ef}$ (L_a = e.g. 100; t_{tol} = 10)
$h_D = 100 - 10 - 50$
$h_{Dmax} = 40$

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

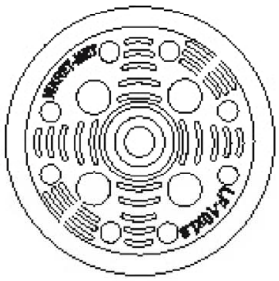
Product description
LFM-8 - marking and dimension of the anchor sleeve LF
Expansion element TN

Annex A 2

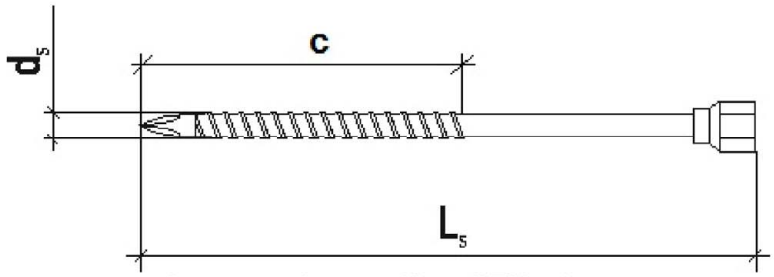
LFM-10



Marking of effective anchorage depth



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



Accompanying specific nail TN-5,1

Table A2: 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]
LFM-10	60	10	70	140 300	5,1	60-90	145 305

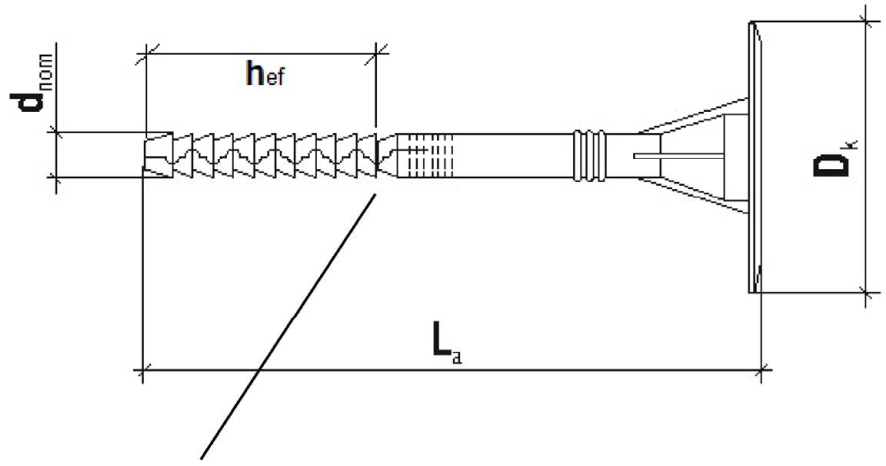
Determination of maximum thickness of insulation h_D [mm] for LFM-10:

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

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

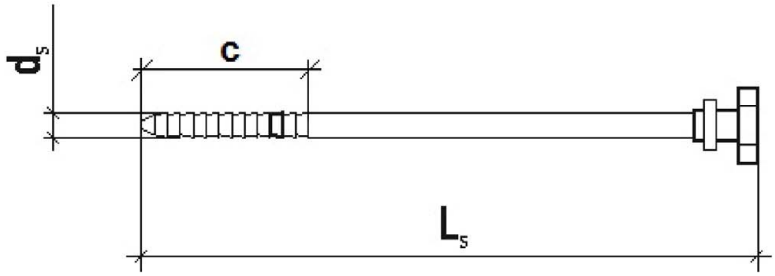
$h_{Dmax} = 60$

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:

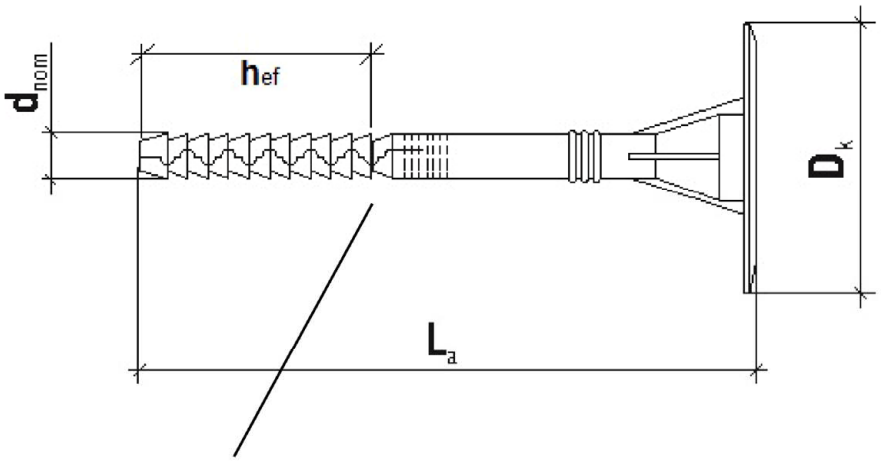
$h_D = L_a - t_{tol} - h_{ef}$ (L_a = e.g. 140; t_{tol} = 10)

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

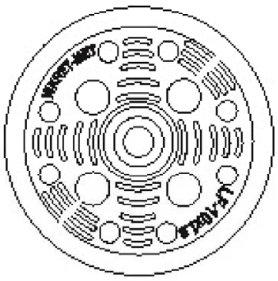
$h_{Dmax} = 60$

LFM-8 / LFM-10 / LFN-10 / LFMG-10	**Annex A 4**
Product description LFN-10 - marking and dimension of the anchor sleeve LF Expansion element T	

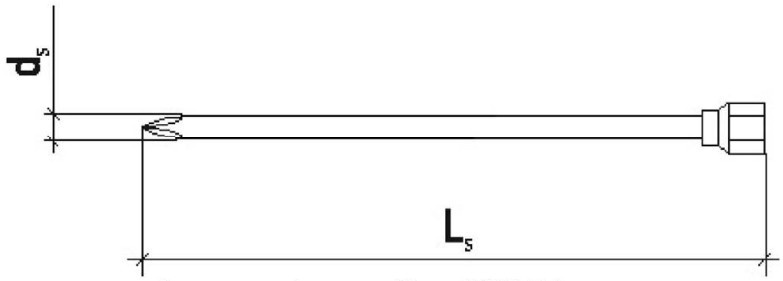
LFMG-10



Marking of effective anchorage depth



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



Accompanying specific nail TN-5,0

Table A4: 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]	min L_s max L_s [mm]
LFMG-10	60	10	70	140 300	5,0	145 305

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

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

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

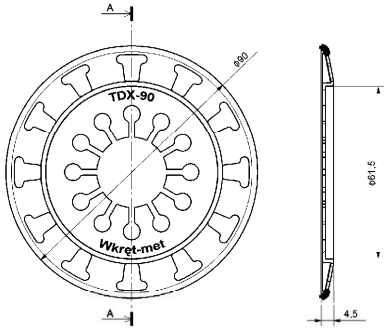
$h_{Dmax} = 60$

LFM-8 / LFM-10 / LFN-10 / LFMG-10	**Annex A 5**
Product description LFMG-10 - marking and dimension of the anchor sleeve LF Expansion element TN-5,0	

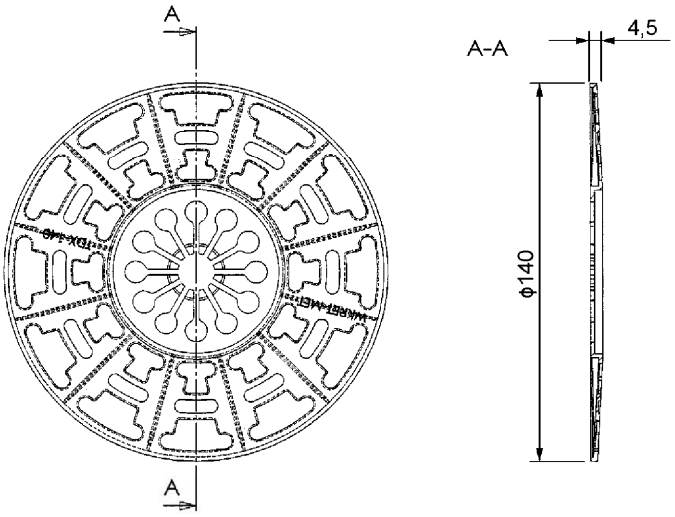
Table A5: Materials	
Name	Materials
Anchor sleeve	virgin Polyethylene, colour: natural
Specific nail T	virgin Polyamide + GF, colour: black or natural
Specific nail TN	Steel, electro galvanized ≥ 5 µm according to EN ISO 4042:1999, white passivated, f_{yk} ≥ 420 N/mm²
Insulation cover	KS: Polystyrene (EPS), colour: white KSG: Polystyrene (EPS), colour: grey EDMW: mineral wool (MW), colour: natural

Table A6: Insulation discs, diameters and material

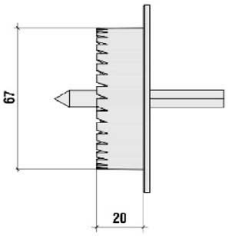
Plate type	Outer diameter [mm]	Material
TDX-P-90	90	Polyethylene, natural or grey
TDX-90	90	Polyamide +GF, natural or grey
TDX-P-140	140	Polyethylene, natural or grey
TDX-140	140	Polyamide + GF, natural or grey



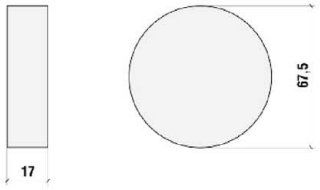
TDX-P-90/TDX-90



TDX-P-140/TDX-140



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



Insulation cover KS/KSG and EDMW

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

Annex A 6

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

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Specifications of intended use

Anchorages 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:

- Normal weight concrete (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 December 2016.

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 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	**Annex B 1**
Intended use Specifications	

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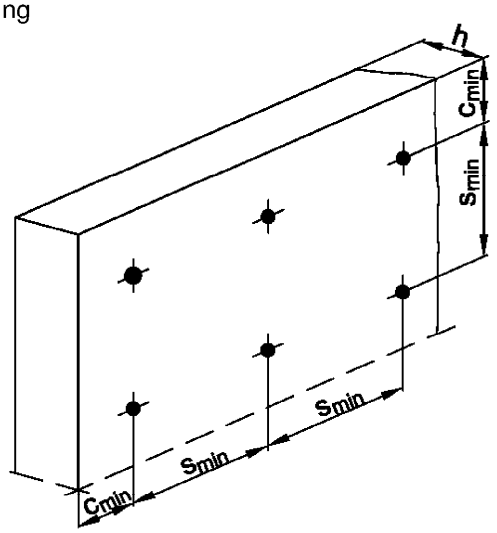
Table B1: Installation parameters for LFM-8		
		LFM-8 A B C D E
Drill hole diameter	d_0 [mm] =	8
Cutting diameter of drill bit	d_{cut} [mm] ≤	8,45
Depth of drilled hole to deepest point	h_1 [mm] ≥	55
Effective anchorage depth	h_{ef} [mm] ≥	50

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}	≥ [mm]	100
Minimum edge distance	c_{min}	≥ [mm]	100
Minimum thickness of member	h	≥ [mm]	100

Scheme of distance and spacing



LFM-8 / LFM-10 / LFN-10 / LFMG-10	**Annex B 2**
Intended use Installation parameters, Edge distances and spacing	

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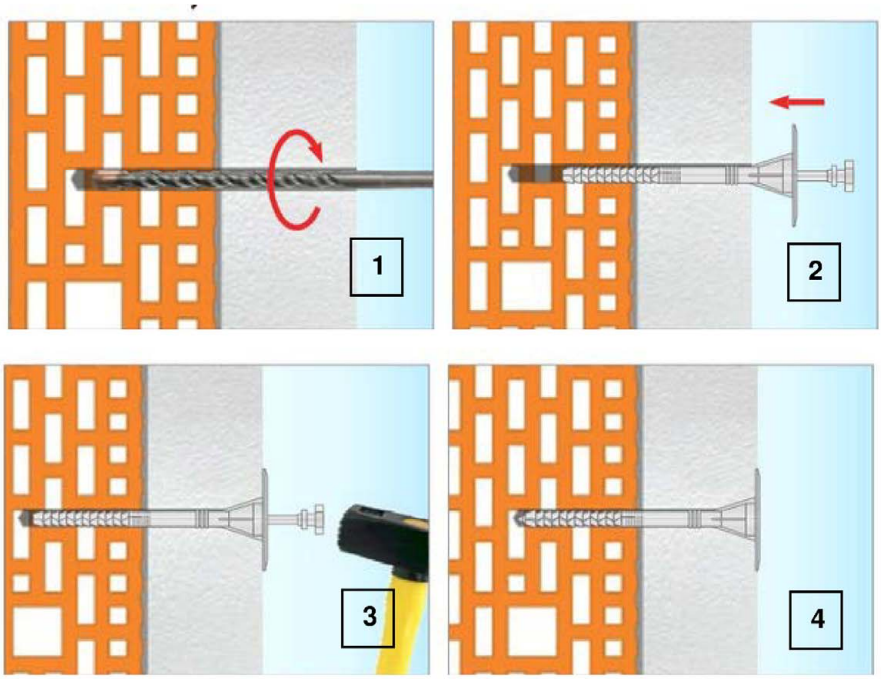
Installation instructions

surface mount



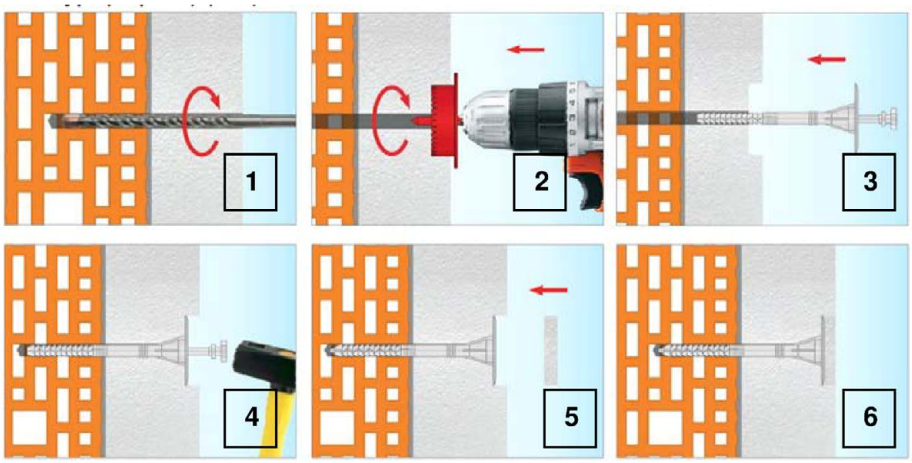
1) Drill the hole perpendicular to the substrate surface. Clean the drill hole.

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.

immerged mount



1) Drill the hole perpendicular to the substrate surface. Clean the drill hole.

2) Drill the recess for immerged 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	**Annex B 3**
Intended use Installation instructions – surface mount, immerged mount	

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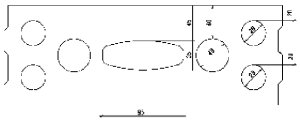
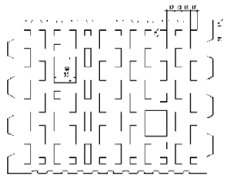
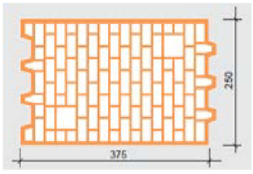
Table C1: Characteristic resistance to tension loads N_{Rk} in concrete and masonry for a single anchor in kN

Anchor type					LFM-8
Base materials	Bulk density ρ [kg/dm³]	minimum compressive strength f_b [N/mm²]	General remarks	Drill method	N_{Rk} [kN]
Concrete C12/15 (EN 206-1:2000)	≥ 2,25	≥ 15		hammer	0,5
Concrete C20/25 - C50/60 (EN 206-1:2000)	≥ 2,30	≥ 25		hammer	0,75
Clay bricks MZ e.g. according to EN 771-1:2011	≥ 2,0	≥ 20		hammer	0,5
Calcium silicate bricks KS e.g. according to EN 771-2:2011	≥ 2,0	≥ 20		hammer	0,5
Calcium silicate hollow block KSL e.g. according to EN 771-2:2011 	≥ 1,6	≥ 12	Vertically perforation more than 15% and less than 50%, outer web thickness ≥ 20mm	rotary	0,4
Vertically perforated clay bricks HLZ e.g. according to EN 771-1:2011 	≥ 1,2	≥ 12	Vertically perforation more than 15% and less than 50%, outer web thickness ≥ 12mm	rotary	0,1
Vertically perforated clay bricks porotherm 25 e.g. according to EN 771-1:2011 	≥ 0,8	≥ 10	Vertically perforation more than 15% and less than 50%, outer web thickness ≥ 12mm	rotary	[1]
Autoclaved concrete blocks e.g. according to EN 771-4:2011	≥ 0,35	≥ 2		rotary	0,3
Autoclaved concrete blocks e.g. according to EN 771-4:2011	≥ 0,65	≥ 5		rotary	0,6
Lightweight concrete blocks LAC, e.g. according to EN 1520:2011 / EN 771-3:2011	≥ 0,88	≥ 5		rotary	0,8

[1] No performance assessed

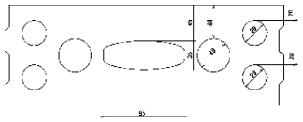
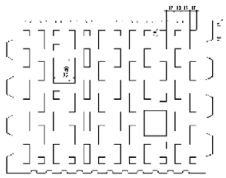
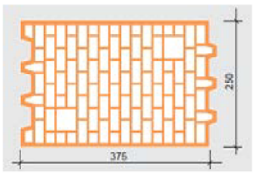
LFM-8 / LFM-10 / LFN-10 / LFMG-10

Performances
Characteristic resistance LFM-8

Annex C 1

Deutsches Institut für Bautechnik DIBt

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/dm³]	minimum compr. strength f_b [N/mm²]	General remarks	Drill method	N_{Rk} [kN]	N_{Rk} [kN]	N_{Rk} [kN]
Concrete C12/15 (EN 206-1:2000)	≥ 2,25	≥ 15		hammer	0,6	0,65	1)
Concrete C20/25 - C50/60 (EN 206-1:2000)	≥ 2,30	≥ 25		hammer	0,9	0,9	1)
Clay bricks MZ e.g. as per EN 771-1:2011	≥ 2,0	≥ 20		hammer	0,5	0,75	0,75
Calcium silicate bricks KS e.g. according to EN 771-2:2011	≥ 2,0	≥ 20		hammer	0,5	0,75	1)
Calcium silicate hollow block KSL e.g. according to EN 771-2:2011 	≥ 1,6	≥ 12	Vertically perforation ≥ 15% and ≤ 50%, outer web thickness ≥ 20mm	rotary	0,3	0,5	0,5
Vertically perforated clay bricks HLZ e.g. as per EN 771-1:2011 	≥ 1,2	≥ 12	Vertically perforation more than 15% and less than 50%, outer web thickness ≥ 12mm	rotary	0,3	0,4	0,8
Vertically perforated clay bricks porotherm 25 e.g. as per EN 771-1:2011) 	≥ 0,8	≥ 10	Vertically perforation more than 15% and less than 50%, outer web thickness ≥ 12mm	rotary	0,3	0,4	0,5
Autoclaved concrete blocks e.g. according to EN 771-4:2011	≥ 0,35	≥ 2		rotary	0,3	0,4	0,3
Autoclaved concrete blocks e.g. according to EN 771-4:2011	≥ 0,65	≥ 5		rotary	0,4	0,5	0,85
Lightweight concrete blocks LAC e.g. as per EN 1520:2011 / EN 771-3:2011	≥ 0,88	≥ 5		rotary	0,75	0,75	1)

1) No performance assessed

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 immerged mount	40-200	0,003
LFM-10 surface mount	80-300	0,004
LFM-10 immerged mount	80-300	0,003
LFN-10 surface mount	80-240	0,000
LFN-10 immerged mount	80-240	0,000
LFMG-10 surface mount	80-300	0,004
LFMG-10 immerged 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	**Annex C 3**
Performances Point thermal transmittance, plate stiffness	

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Table C5: Displacements LFM-8

Base materials (refer Table C1, C2)	Bulk density ρ [kg/dm³]	Minimum Compressive strength f_b [N/mm²]	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/dm³]	Minimum Compressive strength f_b [N/mm²]	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

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Table C7: Displacements LFMG-10

Base materials (refer Table C1, C2)	Bulk density ρ [kg/dm³]	Minimum Compressive strength f_b [N/mm²]	Tension load N [kN]	Displacements $\Delta\delta_N$ [mm]
			LFMG-10	**LFMG-10**
Concrete C20/25	≥ 2,25	≥ 30	0,22	0,3
Concrete C50/60	≥ 2,30	≥ 65	0,30	0,4
Clay bricks MZ	≥ 2,0	≥ 20	0,25	0,5
Calcium silicate bricks KS	≥ 2,0	≥ 20	0,25	0,5
Calcium silicate hollow block KSL	≥ 1,6	≥ 12	0,17	0,3
Vertically perforated clay bricks HLZ	≥ 1,2	≥ 12	0,13	0,7
Perforated clay bricks porotherm 25	≥ 0,8	≥ 10	0,13	0,8
Autoclaved concrete blocks	≥ 0,35	≥ 2	0,13	0,2
Autoclaved concrete blocks	≥ 0,65	≥ 5	0,17	0,2
Lightweight concrete blocks LAC	≥ 0,88	≥ 5	0,25	0,3

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

Performances
Displacements

Annex C 5