Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-19/0573 of 17 January 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	FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K
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	Ziel-Plast Bozena Zielinska i Karolina Zielinska Spólka Jawna ul. Zamkowa 28 32-652 BULOWICE POLEN
Manufacturing plant	Ziel-Plast Bozena Zielinska Spólka Jawna
This European Technical Assessment contains	23 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

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Specific Part

1 Technical description of the product

The nailed-in anchor FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K consists of a plastic sleeve made of polypropylene (virgin material), a plate and an accompanying specific nail made of glass fibre reinforced polyamide (virgin material) or galvanized steel.

The anchor may in addition be combined with the slip-on-plate TDW 90, TDW 110 and TDW 130.

The product description 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 tension resistance	See Annex C 1 – C 2
Edge distances and spacing	See Annex B 2
Plate stiffness	See Annex C 3
Displacements	See Annex C 3 – C 4

3.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	See Annex C 5

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.

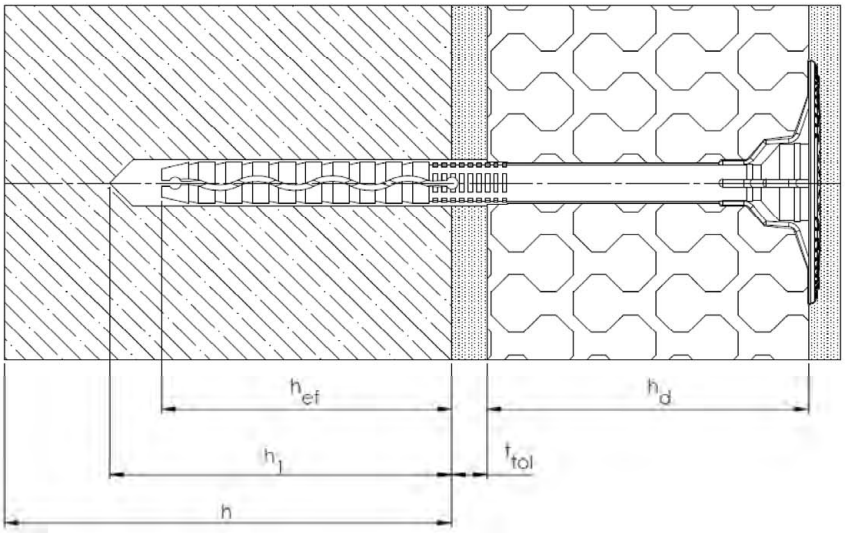
Issued in Berlin on 17 January 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

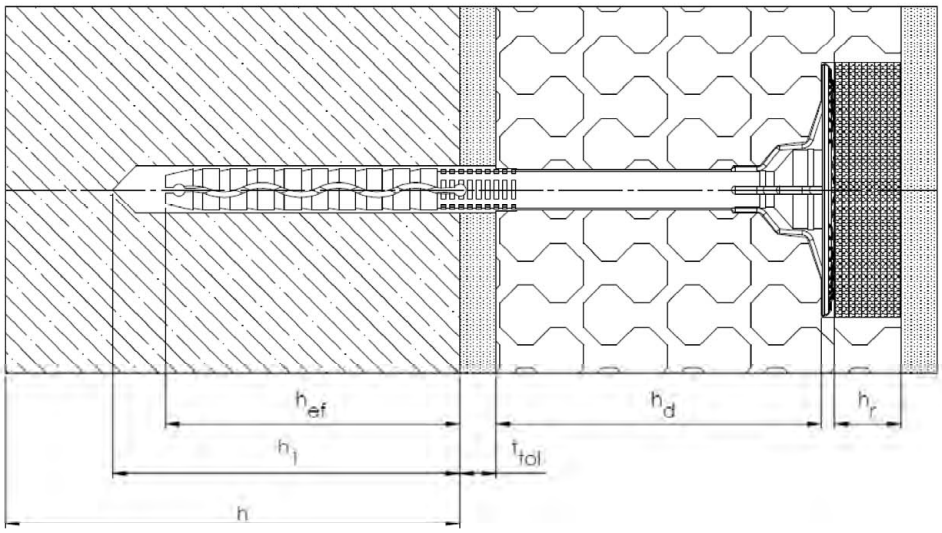
beglaubigt:
Ziegler

Deutsches Institut für Bautechnik DIBt

Product FIX-M / FIX-PA / FIX-S



SURFACE MOUNT



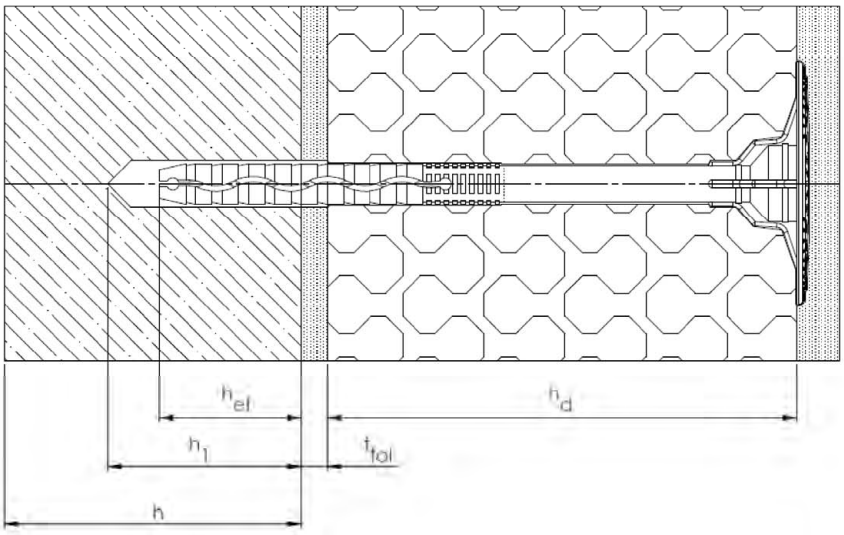
IMMERGED MOUNT

Legend:

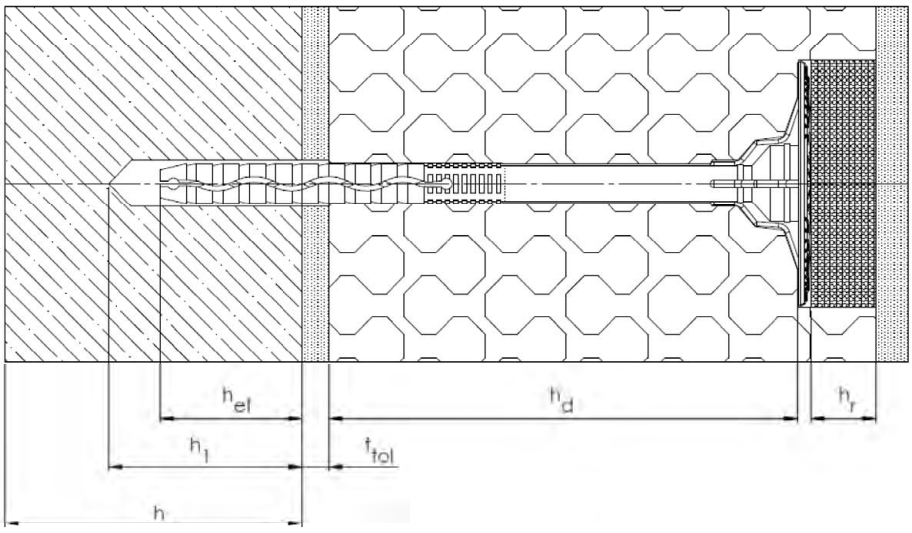
h_d	=	thickness of insulation material
h_{ef}	=	effective anchorage depth
h	=	thickness of member (wall)
h_1	=	depth of drilled hole to deepest point
t_{tol}	=	thickness of equalizing layer or non-load-bearing coating
h_r	=	thickness of insulation cover

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 1**
Product description Installed condition – surface mount, immerged mount FIX-M / FIX-PA / FIX-S	

Product FIX-M-K / FIX-PA-K / FIX-S-K



SURFACE MOUNT



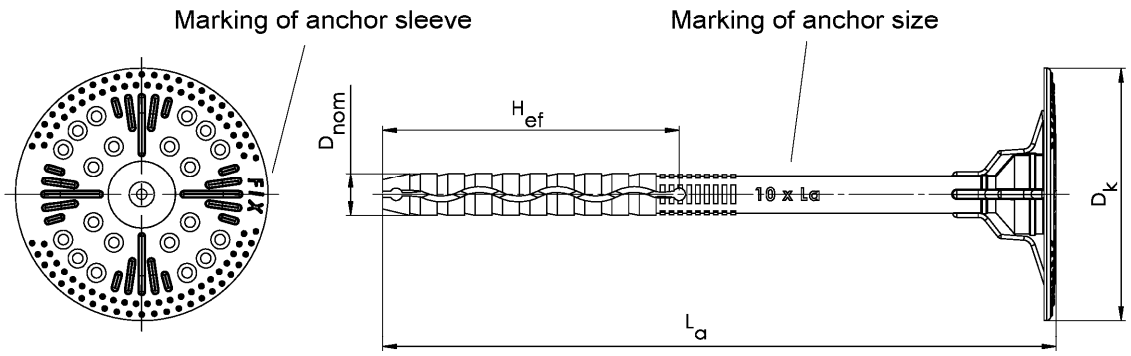
IMMERGED MOUNT

Legend:

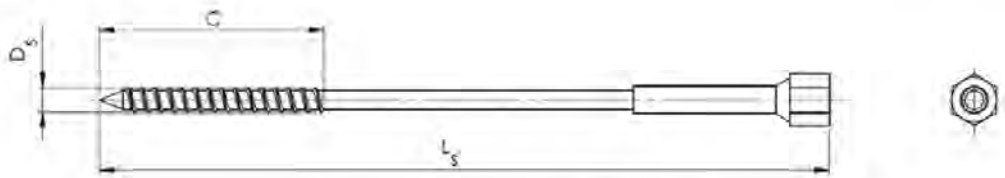
h_d	=	thickness of insulation material
h_{ef}	=	effective anchorage depth
h	=	thickness of member (wall)
h_1	=	depth of drilled hole to deepest point
t_{tol}	=	thickness of equalizing layer or non-load-bearing coating
h_r	=	thickness of insulation cover

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 2**
Product description Installed condition – surface mount, immerged mount FIX-M-K / FIX-PA-K / FIX-S-K	

FIX-M



Marking:
Anchor sleeve - FIX
Anchor size - 10 x L_a



Accompanying specific nail M

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]
FIX-M	60	10	70	100 420	4,4	50	105 425

Determination of maximum thickness of insulation h_d [mm] for FIX-M:

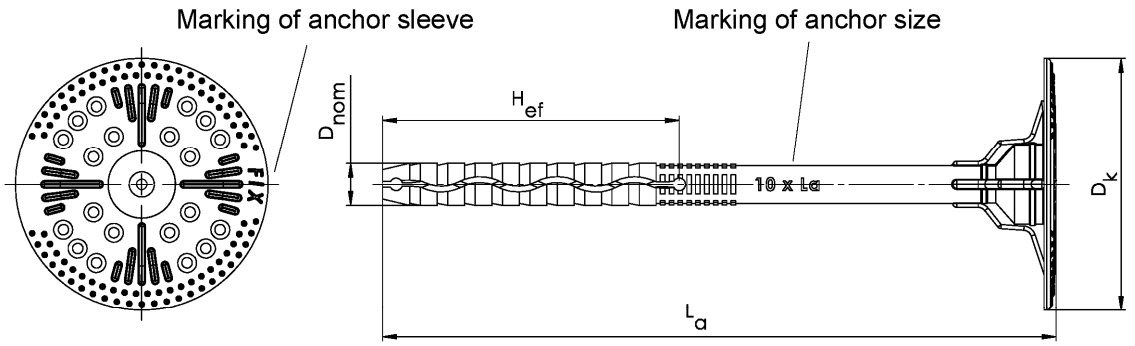
$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

e.g. $h_d = 160 - 10 - 70$

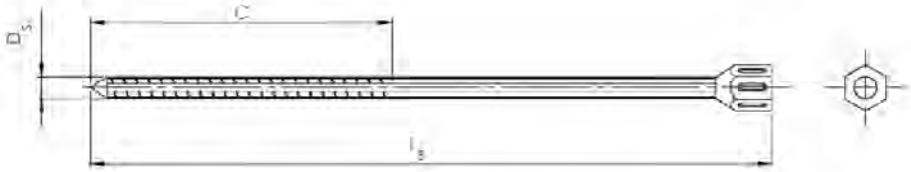
$h_d = 80$

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 3**
Product description FIX-M - marking and dimension of the anchor sleeve FIX Expansion element M	

FIX-PA



Marking:
Anchor sleeve - FIX
Anchor size - 10xL_s



Accompanying specific nail PA

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]
FIX-PA	60	10	70	100 420	5,5	65	105 425

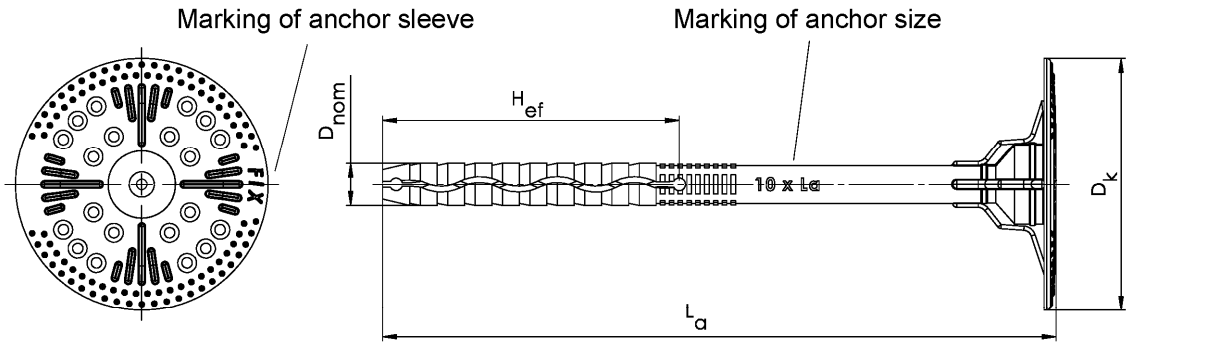
Determination of maximum thickness of insulation h_d [mm] for FIX-PA:

$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

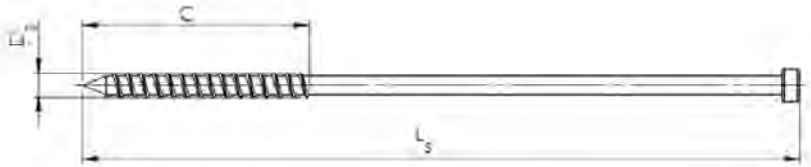
e.g. $h_d = 160 - 10 - 70$

$h_d = 80$

FIX-S



Marking:
Anchor sleeve - FIX
Anchor size - 10xL_a



Accompanying specific nail S

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]
FIX-S	60	10	70	100 420	4,4	50	103 423

Determination of maximum thickness of insulation h_d [mm] for FIX-S:

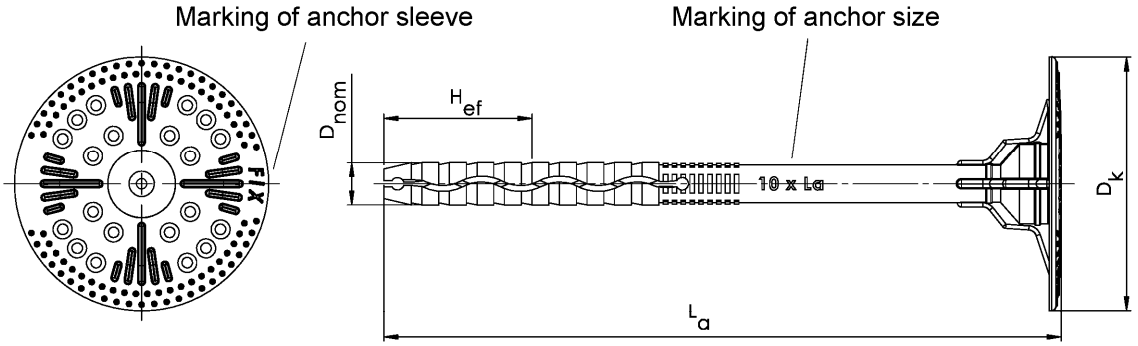
$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

e.g. $h_d = 160 - 10 - 70$

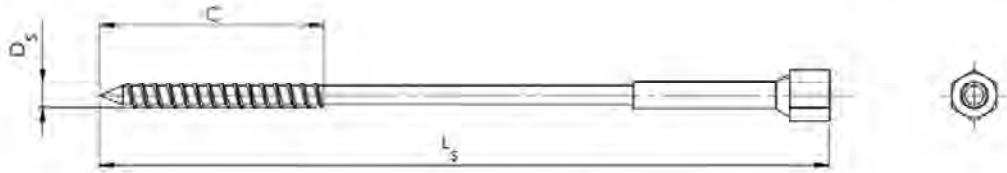
$h_d = 80$

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 5**
Product description FIX-S - marking and dimension of the anchor sleeve FIX Expansion element S	

FIX-M-K



Marking:
Anchor sleeve - FIX
Anchor size - 10xL_a



Accompanying specific nail M

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]	C [mm]	min L_s max L_s [mm]
FIX-M-K	60	10	35	100 420	4,4	50	105 425

Determination of maximum thickness of insulation h_d [mm] for FIX-M-K:

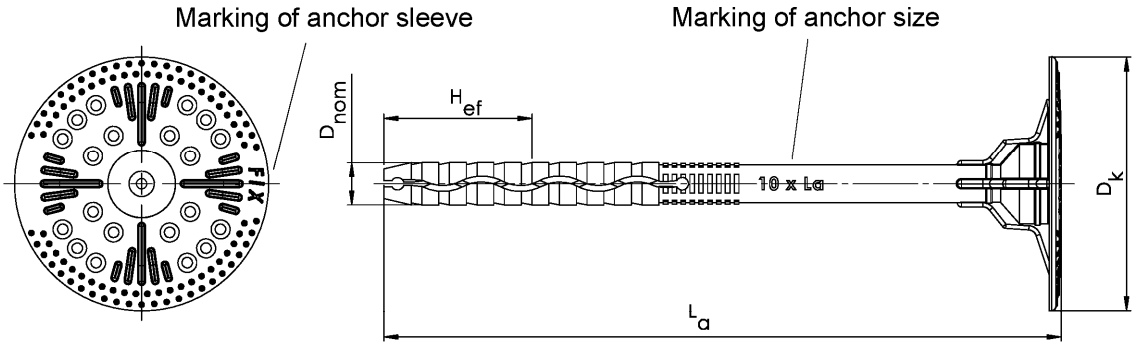
$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

e.g. $h_d = 160 - 10 - 35$

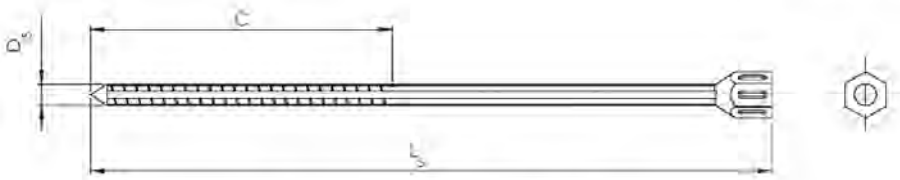
$h_d = 115$

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 6**
Product description FIX-M-K - marking and dimension of the anchor sleeve FIX -K Expansion element M	

FIX-PA-K



Marking:
Anchor sleeve - FIX
Anchor size - 10xL_a



Accompanying specific nail PA

Table A5: 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]
FIX-PA-K	60	10	35	100 420	5,5	65	105 425

Determination of maximum thickness of insulation h_d [mm] for FIX-PA-K:

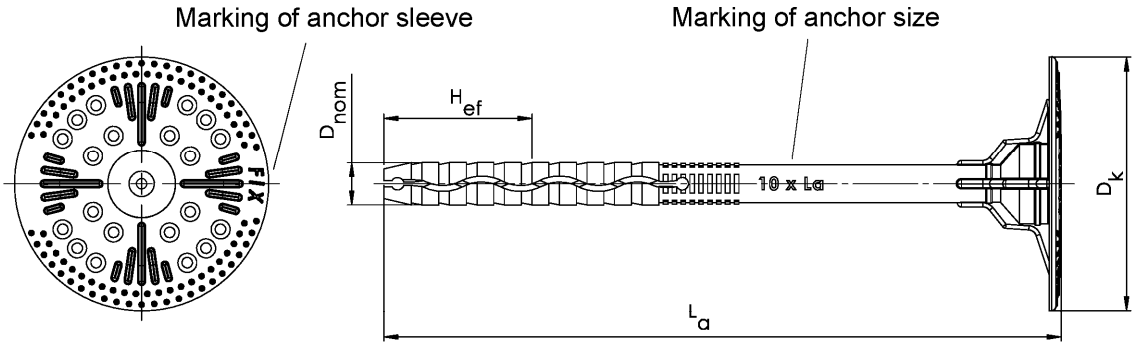
$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

e.g. $h_d = 160 - 10 - 35$

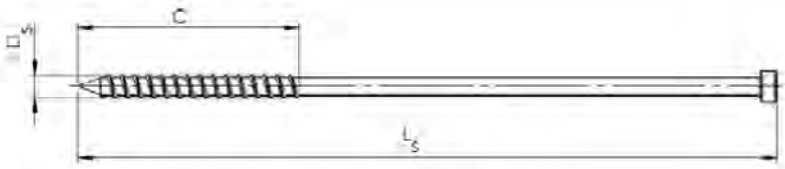
$h_d = 115$

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 7**
Product description FIX-PA-K - marking and dimension of the anchor sleeve FIX -K Expansion element PA	

FIX-S-K



Marking:
Anchor sleeve - FIX
Anchor size - 10xL_a



Accompanying specific nail S

Table A6: 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]
FIX-S-K	60	10	35	100 420	4,4	50	103 423

Determination of maximum thickness of insulation h_d [mm] for FIX-S-K:

$h_d = L_a - t_{tol} - H_{ef}$ (L_a = e.g. 160; t_{tol} = 10)

e.g. $h_d = 160 - 10 - 35$

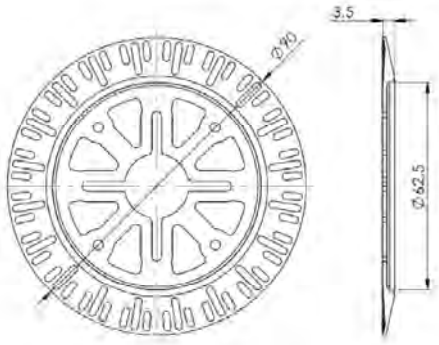
$h_d = 115$

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 8**
Product description FIX-S-K - marking and dimension of the anchor sleeve FIX -K Expansion element S	

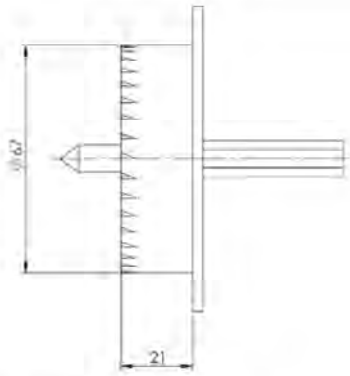
Table A7: Materials	
Name	Materials
Anchor sleeve	virgin Polypropylene, colour: natural
Specific nail M	Carbon steel, electro galvanized ≥ 5 µm in accordance with EN ISO 4042:2018, white passivated
Specific nail PA	virgin Polyamide + GF, colour: black
Specific nail S	Carbon steel, electro galvanized ≥ 5 µm in accordance with EN ISO 4042:2018, white passivated
Insulation cover	Polystyrene, colour: white or gray

Table A8: Insulation discs, diameters and material

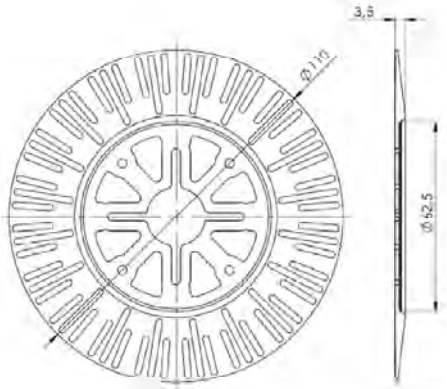
Plate type	Ø D [mm]	Material
TDW 90	90	PP, PA
TDW 110	110	PP, PA
TDW 130	130	PP, PA



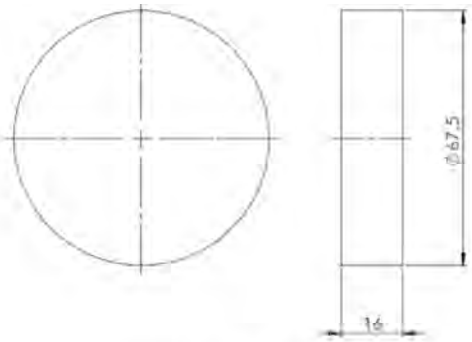
TDW 90



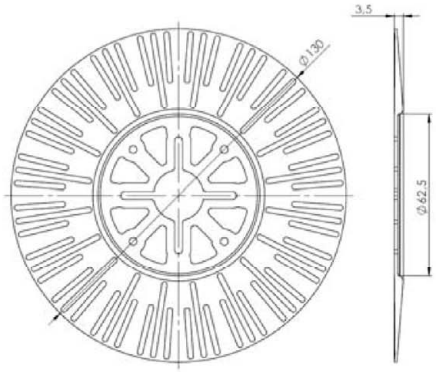
Drill tool ZP-FS for immerged installation



TDW 110



Insulation cover



TDW 130

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex A 10**
Product description Slip on plates with Product FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K Drill tool for immerged installation	

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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
- Solid masonry (base material group B), according to Annex C 1
- Hollow or perforated masonry (base material group C), according to Annex C 1
- Lightweight aggregate concrete (base material group D), according to Annex C 1
- Autoclaved aerated concrete (base material group E), according to Annex C 1
- 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.

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

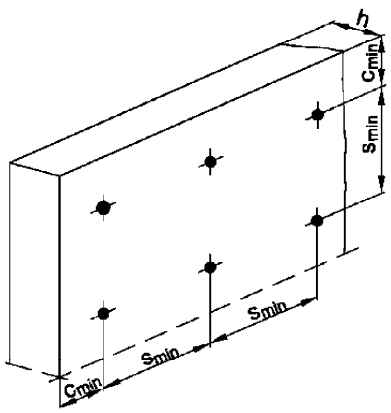
FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex B 1**
Intended use Specifications	

Table B1: Installation parameters for FIX-M / FIX-PA / FIX-S			
Anchor type		Product FIX-M / FIX-PA / FIX-S	
		A B C	D and 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 B2: Installation parameters for FIX-M-K / FIX-PA-K / FIX-S-K			
Anchor type		Product FIX-M-K / FIX-PA-K / FIX-S-K	
		A B C	D and 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] ≥	40	40
Effective anchorage depth	h_{ef} [mm] ≥	35	35

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



FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex B 2**
Intended use Installations parameters, Edge distances and spacing	

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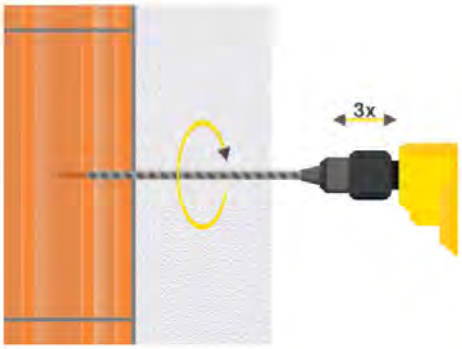
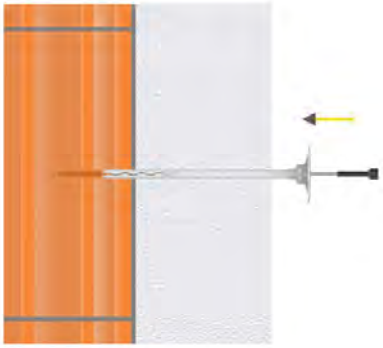
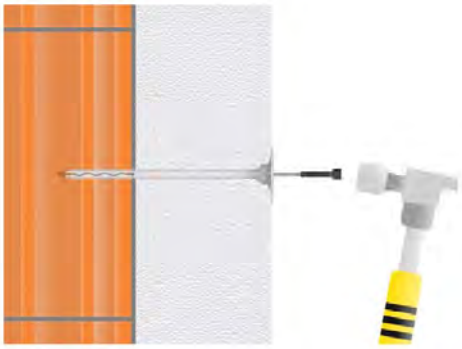
Installation instructions



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



Place the anchor into the drill hole. The bottom side of the plate must be flush with the ETICS.



Drive in the specific nail with the hammer.

Installed condition.

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex B 3**
Intended use Installation instructions – surface mount	

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Installation instructions

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

Drill the recess for immerged installation with the tool ZP-FS.

Place the anchor into the drill hole. The bottom side of the plate must be flush with the ETICS.

Drive in the specific nail with the hammer.

Insert the insulation cover.

Installed condition.

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	Annex B 4
Intended use Installation instructions – immerged mount	

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

Anchor type					FIX-PA	FIX-PA-K
Base materials	Bulk density ρ [kg/dm³]	Compres-sive strength f_b [N/mm²]	General remarks	Drill method	N_{Rk} [kN]	N_{Rk} [kN]
Concrete C12/15 EN 206-1:2000	≥ 2,25	≥ 15		hammer	-	0,70
Concrete C16/20 ÷ C50/60 EN 206-1:2000	≥ 2,30	≥ 25		hammer	-	1,00
Clay bricks, Mz e.g. according to EN 771-1:2011	≥ 2,00	≥ 20		hammer	0,60	0,50
Calcium silicate bricks, KS e.g. according to EN 771-2:2011	≥ 2,00	≥ 20		hammer	0,60	0,50
Calcium silicate perforated bricks, KSL e.g. according to EN 771-2:2011	≥ 1,60	≥ 12	Vertically perforation more than 15 %, outer web thickness ≥ 20 mm	hammer	0,60	0,50
Vertically perforated clay bricks, HLZ e.g. according to EN 771-1:2011	≥ 1,20	≥ 12	Vertically perforation more than 15 % and less than 50 %, outer web thickness ≥ 12 mm	rotary	0,25	0,50
Vertical perforated clay bricks, Porotherm 25 e.g. according to EN 771-1:2011	≥ 0,80	≥ 10	Vertically perforation more than 15 % and less than 50 %, outer web thickness ≥ 12 mm	rotary	0,20	0,20
Autoclaved aerated concrete, AAC 2 – AAC 7 e.g. according to EN 771-4:2011	≥ 0,35	≥ 2		rotary	0,50	0,45
Lightweight aggregate concrete, LAC e.g. according to EN 1520:2011 / EN 771-3:2011	≥ 0,88	≥ 5		rotary	-	1,00

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

Anchor type					FIX-M and FIX-S	FIX-M-K and FIX-S-K
Base materials	Bulk density ρ [kg/dm³]	Compressive strength f_b [N/mm²]	General remarks	Drill method	N_{Rk} [kN]	N_{Rk} [kN]
Concrete C12/15 EN 206-1:2000	≥ 2,25	≥ 15		hammer	0,50	0,40
Concrete C16/20 ÷ C50/60 EN 206-1:2000	≥ 2,30	≥ 25		hammer	0,70	0,55
Clay bricks, Mz e.g. according to EN 771-1:2011	≥ 2,00	≥ 20		hammer	0,45	0,45
Calcium silicate bricks, KS e.g. according to EN 771-2:2011	≥ 2,00	≥ 20		hammer	0,45	0,45
Calcium silicate perforated bricks, KSL e.g. according to EN 771-2:2011	≥ 1,60	≥ 12	Vertically perforation more than 15 %, outer web thickness ≥ 20 mm	hammer	0,45	0,45
Vertically perforated clay bricks, HLz e.g. according to EN 771-1:2011	≥ 1,20	≥ 12	Vertically perforation more than 15 % and less than 50 %, outer web thickness ≥ 12 mm	rotary	0,25	0,25
Vertical perforated clay bricks, Porotherm 25 e.g. according to EN 771-1:2011	≥ 0,80	≥ 10	Vertically perforation more than 15 % and less than 50 %, outer web thickness ≥ 12 mm	rotary	0,10	0,10
Autoclaved aerated concrete, AAC 2 – AAC 7 e.g. according to EN 771-4:2011	≥ 0,35	≥ 2		rotary	0,35	0,20
Lightweight aggregate concrete, LAC e.g. according to EN 1520:2011 / EN 771-3:2011	≥ 0,88	≥ 5		rotary	0,70	0,55

Table C3: 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]
FIX-PA, FIX-PA-K FIX-M, FIX-M-K, FIX-S, FIX-S-K	60	1,50	0,3

Table C4: Displacements FIX-PA		
Base materials	Tension load N [kN]	Displacements $\delta_{(N)}$ [mm]
Clay bricks, Mz 20 (EN 771-1:2011)	0,20	0,33
Calcium silicate bricks KS 20 (EN 771-2:2011)	0,20	0,30
Calcium silicate hollow block KSL 12 (EN 771-1:2011)	0,20	0,26
Vertically perforated clay bricks, HLZ 12 (EN 771-1:2011)	0,10	0,43
Vertically perforated clay bricks, Porotherm 25 (EN 771-2:2011)	0,07	0,48
Autoclaved aerated concrete, AAC 2 – AAC 7 (EN 771-4:2011)	0,17	0,28
Lightweight aggregate concrete, LAC 5 (EN 1520:2011 / EN 771-3:2011)	-	-

Table C5: Displacements FIX-PA-K		
Base materials	Tension load N [kN]	Displacements $\delta_{(N)}$ [mm]
Concrete C12/15 (EN 206-1:2000)	0,23	0,15
Concrete C16/20 – C50/60 (EN 206-1:2000)	0,30	0,22
Clay bricks, Mz 20 (EN 771-1:2011)	0,17	0,15
Calcium silicate bricks KS 20 (EN 771-2:2011)	0,17	0,15
Calcium silicate hollow block KSL 12 (EN 771-1:2011)	0,17	0,15
Vertically perforated clay bricks, HLZ 12 (EN 771-1:2011)	0,17	0,15
Vertically perforated clay bricks, Porotherm 25 (EN 771-2:2011)	0,07	0,11
Autoclaved aerated concrete, AAC 2 – AAC 7 (EN 771-4:2011)	0,15	0,12
Lightweight aggregate concrete, LAC 5 (EN 1520:2011 / EN 771-3:2011)	0,30	0,22

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex C 3**
Performances Plate stiffness, displacements FIX-PA, FIX-PA-K	

Table C6: Displacements FIX-M / FIX-S		
Base materials	Tension load N [kN]	Displacements $\delta_{(N)}$ [mm]
Concrete C12/15 (EN 206-1:2000)	0,17	0,22
Concrete C16/20 – C50/60 (EN 206-1:2000)	0,23	0,31
Clay bricks, Mz 20 (EN 771-1:2011)	0,15	0,33
Calcium silicate bricks KS 20 (EN 771-2:2011)	0,15	0,33
Calcium silicate hollow block KSL 12 (EN 771-1:2011)	0,15	0,23
Vertically perforated clay bricks, HLZ 12 (EN 771-1:2011)	0,08	0,44
Vertically perforated clay bricks, Porotherm 25 (EN 771-2:2011)	0,03	0,27
Autoclaved aerated concrete, AAC 2 – AAC 7 (EN 771-4:2011)	0,12	0,12
Lightweight aggregate concrete, LAC 5 (EN 1520:2011 / EN 771-3:2011)	0,23	0,25

Table C7: Displacements FIX-M-K / FIX-S-K		
Base materials	Tension load N [kN]	Displacements $\delta_{(N)}$ [mm]
Concrete C12/15 (EN 206-1:2000)	0,13	0,22
Concrete C16/20 – C50/60 (EN 206-1:2000)	0,18	0,30
Clay bricks, Mz 20 (EN 771-1:2011)	0,15	0,28
Calcium silicate bricks KS 20 (EN 771-2:2011)	0,15	0,28
Calcium silicate hollow block KSL 12 (EN 771-1:2011)	0,15	0,37
Vertically perforated clay bricks, HLZ 12 (EN 771-1:2011)	0,08	0,21
Vertically perforated clay bricks, Porotherm 25 (EN 771-2:2011)	0,03	0,12
Autoclaved aerated concrete, AAC 2 – AAC 7 (EN 771-4:2011)	0,07	0,33
Lightweight aggregate concrete, LAC 5 (EN 1520:2011 / EN 771-3:2011)	0,18	0,24

FIX-M / FIX-PA / FIX-S / FIX-M-K / FIX-PA-K / FIX-S-K	**Annex C 4**
Performances Displacements FIX-M, FIX-S, FIX-M-K, FIX-S-K	

Table C8: Point thermal transmittance according EOTA Technical Report TR 025:2016-05			
Anchor type	Installed condition	Insulation thickness h_D [mm]	Point thermal transmittance χ [W/K]
FIX-M / FIX-M-K	surface mount	20	0,003
		150	0,003
		375	0,002
	immerged mount	40	0,001
		150	0,002
		395	0,002
FIX-PA / FIX-PA-K	surface mount	20	0,001
		150	0
		375	0
	immerged mount	40	0
		150	0
		395	0
FIX-S / FIX-S-K	surface mount	20	0,002
		150	0,003
		375	0,002
	immerged mount	40	0,001
		150	0,002
		395	0,002