Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-18/0366 of 15 June 2018

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	Nailed-in anchor CNplus 8
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	Knauf Gips KG Am Bahnhof 7 97346 Iphofen DEUTSCHLAND
Manufacturing plant	Knauf Gips KG
This European Technical Assessment contains	17 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 CNplus 8 consists of an anchor sleeve with an enlarged shaft made of polypropylene (virgin material), an insulation plate made of glass fibre reinforced polyamide (virgin material) and a special compound nail consisting of two parts, one made of glass fibre reinforced polyamide for the shaft element and the other part made of galvanised steel.

The serrated expanding part of the anchor sleeve is slotted.

The anchor may in addition be combined with the anchor plates DT 90, DT 110 and DT 140.

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
Edge distances and spacing	See Annex B 2
Displacements	See Annex C 3

3.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	See Annex C 2

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.

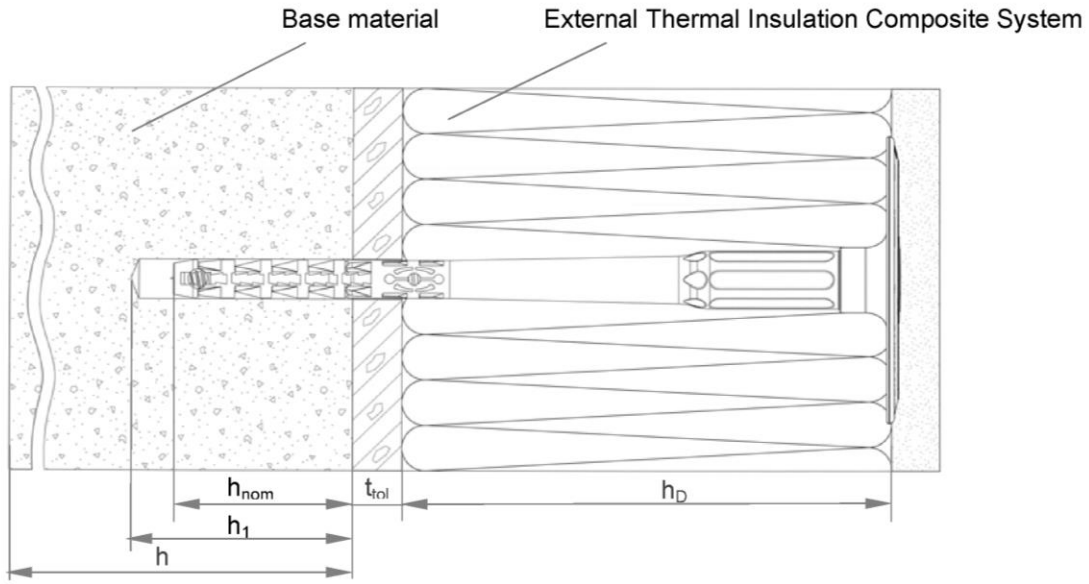
Issued in Berlin on 15 June 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

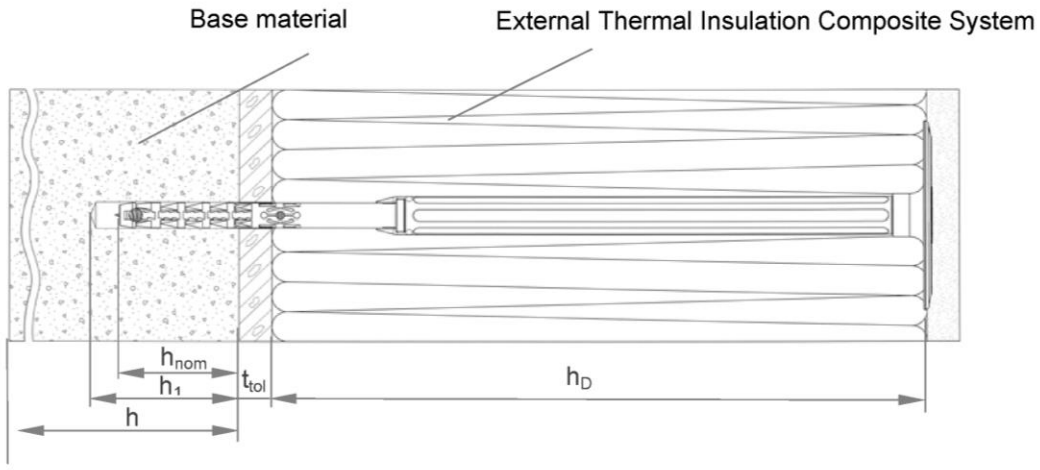
beglaubigt:
E. Aksünger

Deutsches Institut für Bautechnik DIBt

Nailed-in anchor CNplus 8 / 110 – 230 – flush mounted



Nailed-in anchor CNplus 8 / 250-390 – flush mounted



Legend

h_{nom} = Overall plastic anchor embedment depth in the base material
h_1 = Depth of drilled hole to deepest point
h = Thickness of member (wall)
h_D = Thickness of insulation material
t_{tol} = Thickness of equalizing layer or non–load bearing coating

Nailed-in anchor CNplus 8	**Annex A1**
Product description Installed anchor – flush-mounted	

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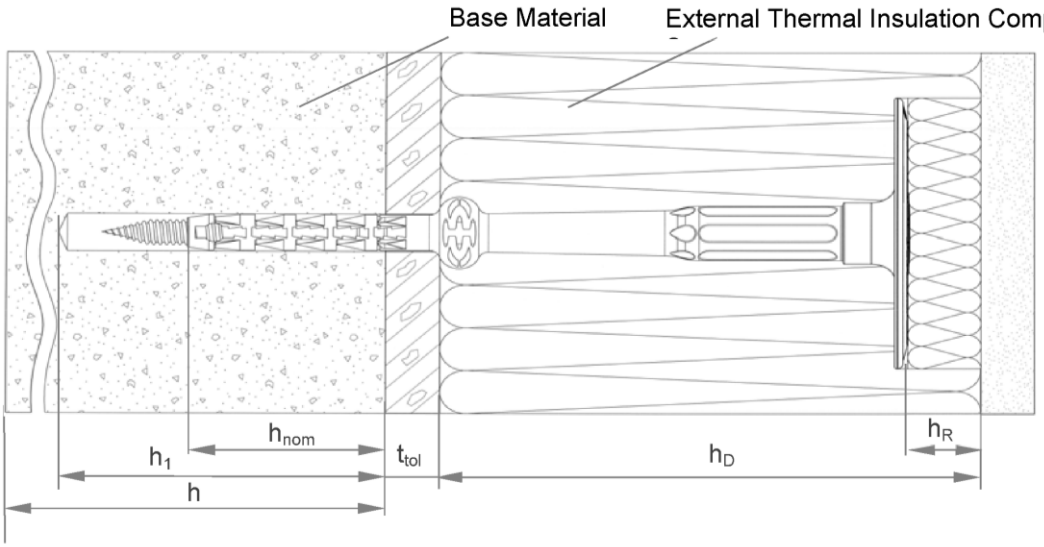
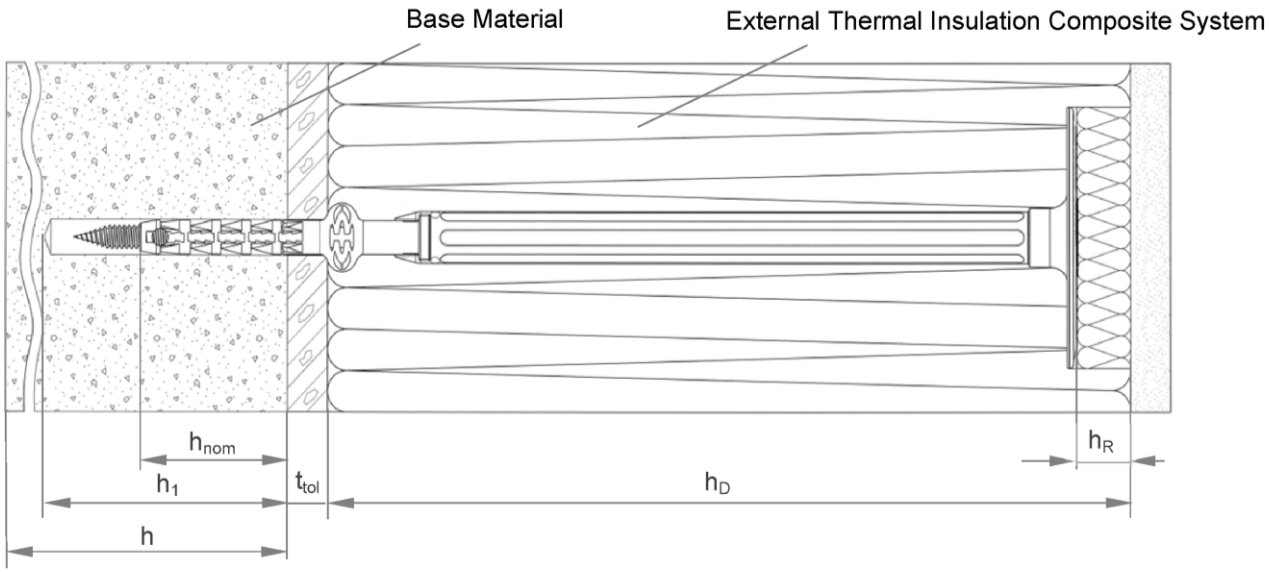
Nailed-in anchor CNplus 8 / 110 – 230 – countersunk mounted



Nailed-in anchor CNplus 8 / 250 – 390 – countersunk mounted

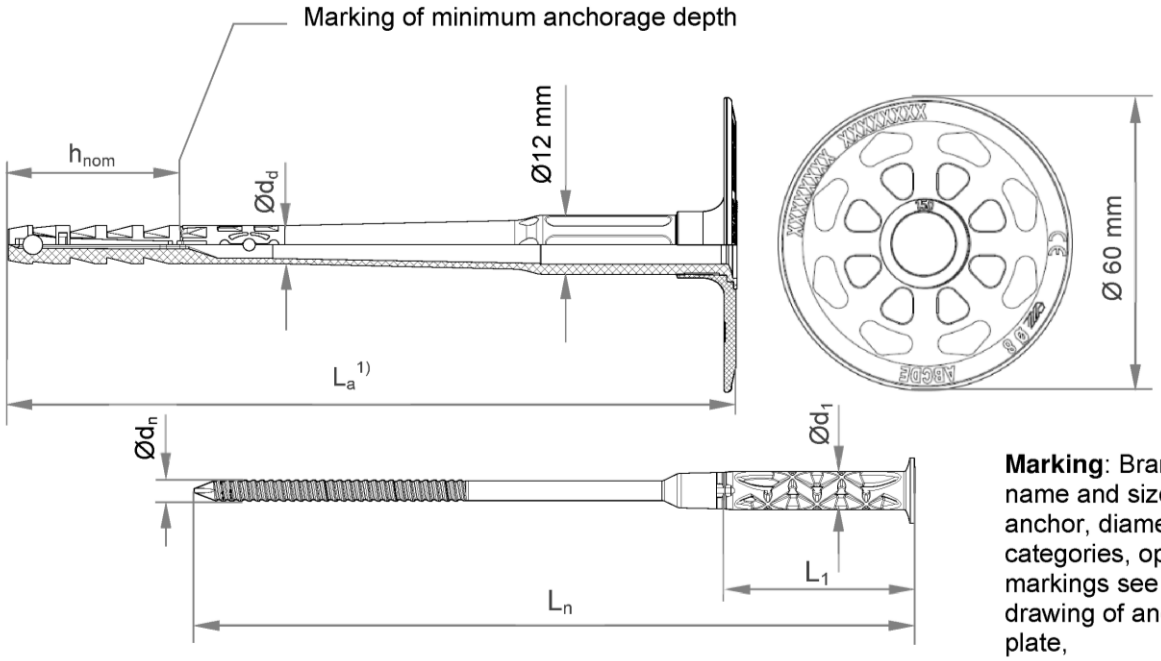


Legend

h_{nom}	=	Overall plastic anchor embedment depth in the base material
h_1	=	Depth of drilled hole to deepest point
h	=	Thickness of member (wall)
h_D	=	Thickness of insulation material
h_R	=	Thickness of insulation cap
t_{tol}	=	Thickness of equalizing layer or non–load bearing coating

Nailed-in anchor CNplus 8	**Annex A2**
Product description Installed anchor – countersunk mounted	

Nailed-in anchor CNplus 8 / 110–230



Marking: Brand, name and size of anchor, diameter, categories, optional markings see drawing of anchor plate, example e.g. Schlagdübel CNplus 8 ABCDE

[1)] Various lengths of the anchors are possible:

e.g. for Nailed-in anchor CNplus 8 / 110 – 230: $110\ mm \geq L_a \leq 230\ mm$

$L_a = L_n + 1{,}5\ mm$

Determination of maximum thickness of insulation: $h_D = L_a - h_{nom} - t_{tol}$

e.g. for Nailed-in anchor CNplus 8x150: $L_a = 148\ mm$, $h_{nom} = 35\ mm$, $t_{tol} = 10\ mm$

$h_D = 148 - 35 - 10 \approx 100$

Table A3.1: Dimensions Nailed-in anchor CNplus 8 / 110–230

Anchor type	Anchor sleeve		Specific compound nail			
	Ø d_d [mm]	**h_{nom}** [mm]	**Ø d_n** [mm]	**L_n** [mm]	**L_1** [mm]	**Ø d_1** [mm]
Nailed-in anchor CNplus 8 / 110-230	8	35/55[1)]	4,3	L_a – 1,5	40	8

[1)] Only for use cat. D & E

Nailed-in anchor CNplus 8	**Annex A3**
Product description Dimensions Nailed-in anchor CNplus 8 / 110-230	

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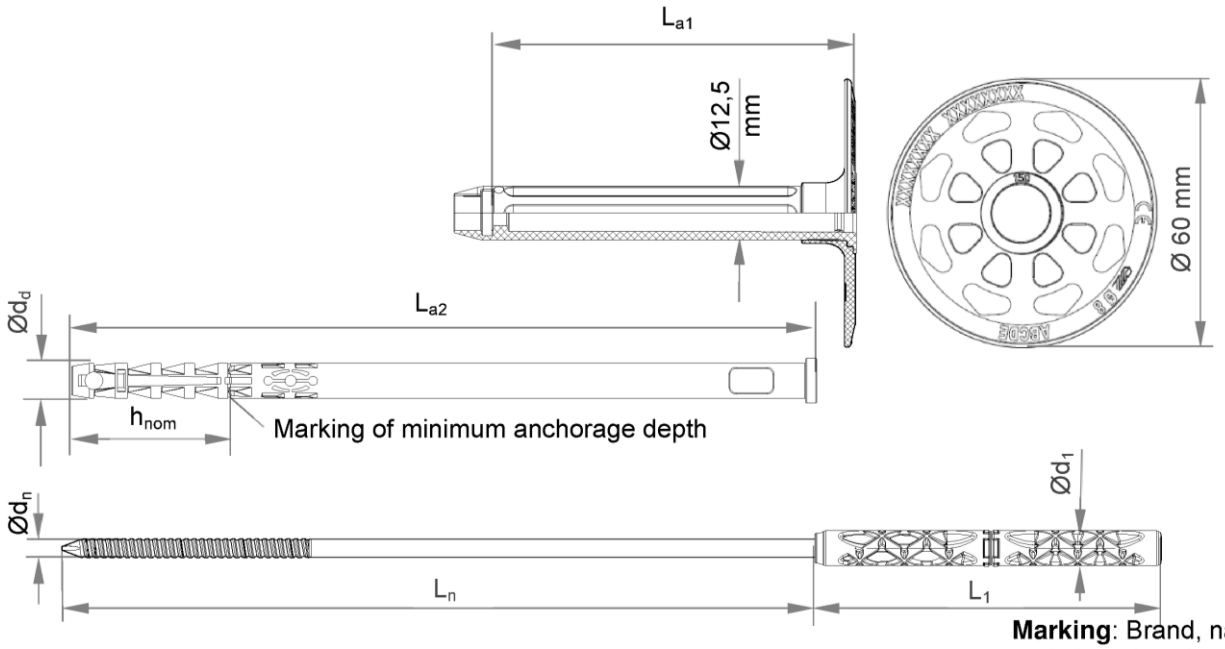
Nailed-in anchor CNplus 8 / 250–310



Marking: Brand, name and size of anchor, diameter, categories, optional markings see drawing of anchor plate, example e.g. Schlagdübel CNplus 8 ABCDE

Various lengths of the anchors are possible:

e.g. for Nailed-in anchor CN plus 8 / 250 – 310:
250 mm ≥ L_{a1} + L_{a2} ≤ 310 mm
L_a = L_{a1} + L_{a2} = L_n + 79,5 mm

Determination of maximum thickness of insulation: $h_D = L_a - h_{nom} - t_{tol}$

e.g. for Nailed-in anchor CNplus 8 8 x 250: L_a = 248 mm, h_{nom} = 35 mm, t_{tol} = 10 mm

h_D = 248 – 35 – 10 ≈ 200 mm

Table A4.1: Dimensions Nailed-in anchor CNplus 8 / 250 – 310

Anchor type	Shaft	Anchor sleeve			Specific compound nail			
	L_{a1} [mm]	Ø d_d [mm]	h_{nom} [mm]	L_{a2} [mm]	Ø d_n [mm]	L_n [mm]	L_1 [mm]	Ø d_1 [mm]
Nailed-in anchor CNplus 8 / 250 – 310	81	8	35/55[1)]	167 - 247	4,3	(L_{a1}+L_{a2}) – 79,5	77,5	8

[1)] Only for use cat. D & E

Nailed-in anchor CNplus 8	**Annex A4**
Product description Dimensions Nailed-in anchor CNplus 8 / 250-310	

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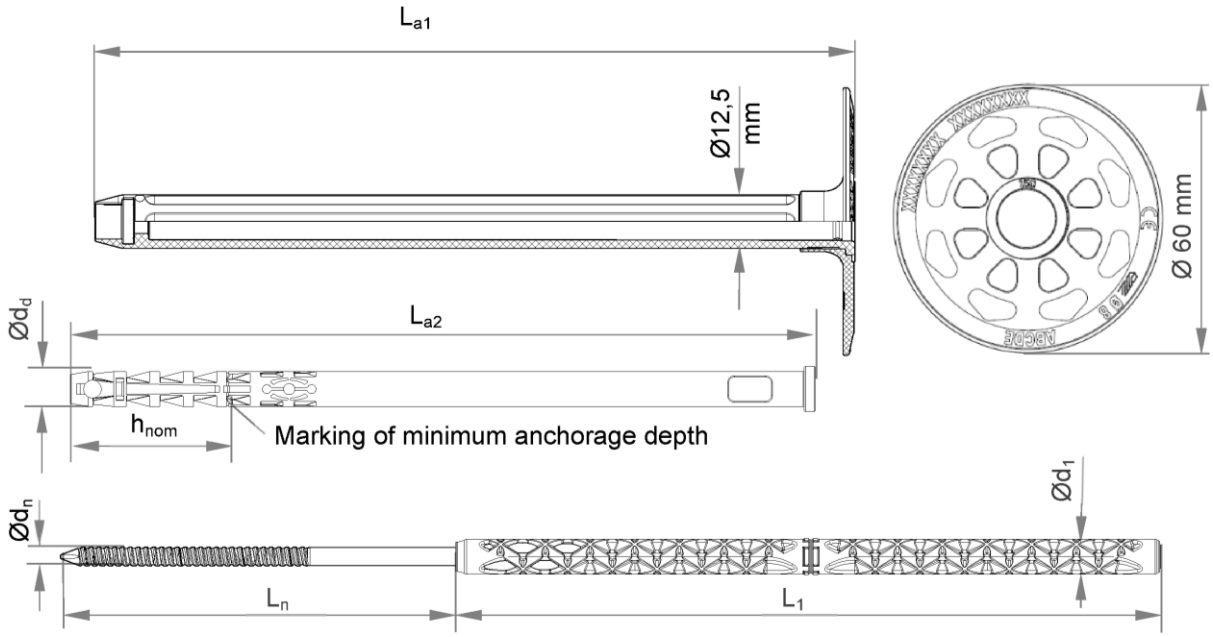
Nailed-in anchor CNplus 8 / 330–390



Marking: Brand, name and size of anchor, diameter, categories, optional markings see drawing of anchor plate, example e.g. Schlagdübel CNplus 8 ABCDE

Various lengths of the anchors are possible:

e.g. for Nailed-in anchor CNplus 8 / 330 – 390:
330 mm ≥ L_{a1} + L_{a2} ≤ 390 mm
L_a = L_{a1} + L_{a2} = L_n + 159,5 mm

Determination of maximum thickness of insulation: $h_D = L_a - h_{nom} - t_{tol}$

e.g. for Nailed-in anchor CNplus 8 x 330: L_a = 328 mm, h_{nom} = 35 mm, t_{tol} = 10 mm

h_D = 328 – 35 – 10 ≈ 280 mm

Table A5.1: Dimensions Nailed-in anchor CNplus 8 / 330 – 390

Anchor type	Shaft	Anchor sleeve			Specific compound nail			
	L_{a1} [mm]	Ø d_d [mm]	h_{nom} [mm]	L_{a2} [mm]	Ø d_n [mm]	L_n [mm]	L_1 [mm]	Ø d_1 [mm]
Nailed-in anchor CNplus 8/ 330 – 390	161	8	35/55[1)]	167 - 247	4,3	(L_{a1}+L_{a2}) – 159,5	157,5	8

[1)] Only for use cat. D & E

Nailed-in anchor CNplus 8	**Annex A5**
Product description Dimensions Nailed-in anchor CNplus 8 / 330-390	

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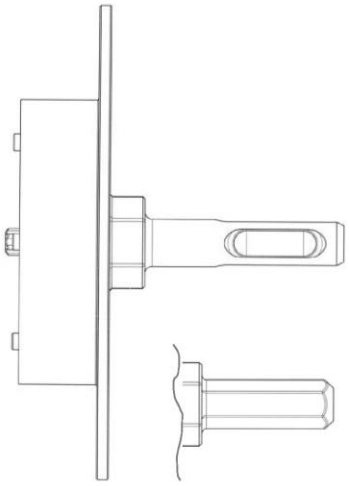
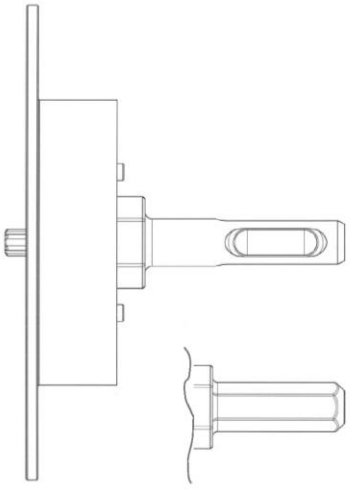
Setting tool with SDS adapter or hexagonal adapter available

Nailed-in anchor CNplus 8

Countersunk setting [1)]

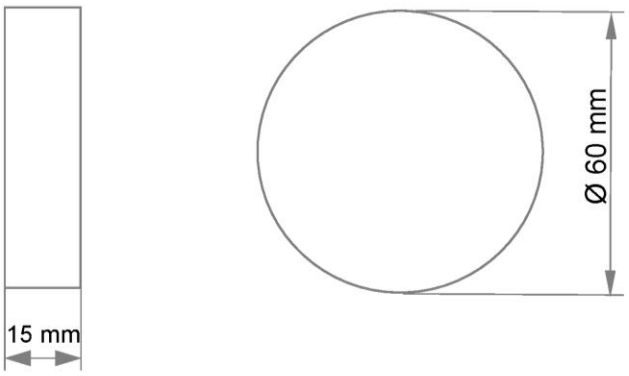


optional plain surface setting



[1)] Alternatively, it is possible to mill the insulation material with a standard, market-available milling tool.

Polystyrene or mineral wool cap



Nailed-in anchor CNplus 8	**Annex A6**
Product description Setting tool for Nailed-in anchor CNplus 8	

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Table A7.1: Material

Designation	Material
Anchor sleeve	PP (virgin material), colour: grey
CNplus 8 / 250 - 390	PA6 (virgin material)GF, colour: grey
CNplus 8 / 110 – 230 or CNplus 8 / 250 - 390	PA6 GF (plastic part of compound nail) Steel gal Zn A2G or A2F according to EN ISO 4042 : 1999
Anchor plate	PA6 (virgin material) GF colour: grey and blue
Slip-on plate	PA6 (virgin material) GF colour: grey and blue

Drawing of the slip-on plates

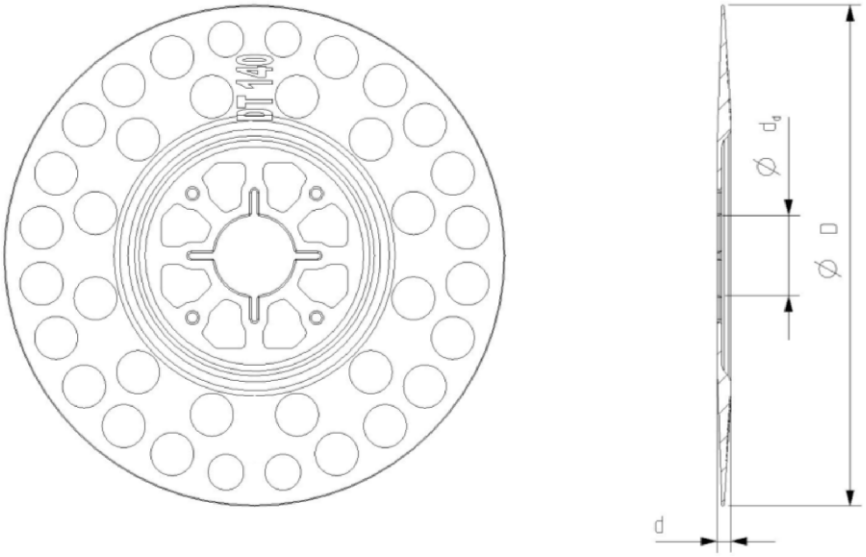

Table A7.2: Slip-on plate, diameters and material

Slip-on plate	Ø D [mm]	Ø d_d [mm]	d [mm]	Material
DT 90 / 110 / 140	90 / 110 / 140	22,5	3,9	PA6 GF

Nailed-in anchor CNplus 8	**Annex A7**
Product description Material Slip-on plates combined with Nailed-in anchor CNplus 8	

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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 external thermal insulation composite system (ETICS).

Base materials:

- Normal weight concrete (use category A), according to Annex C1 and C2.
- Solid masonry (use category B), according to Annex C1 and C2.
- Hollow or perforated masonry (use category C), according to Annex C1 and C2.
- Lightweight aggregate concrete (use category D), according to Annex C1 and C2.
- Autoclaved aerated concrete (use category E), according to Annex C1 and C2.
- For other base materials of the use categories A, B, C, D and E the characteristic resistance of the anchor may be determined by job site tests acc. 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 in absence of other national regulations.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchors is indicated on the design drawings.
- Fasteners are only to be used for multiple fixings of ETICS.

Installation:

- Hole drilling by the drill modes according to Annex C1 and C2.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on 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.

Nailed-in anchor CNplus 8	**Annex B1**
Intended use Specification	

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Table B2.1: Installation parameters / flush mounted

Anchor type				Nailed-in anchor CNplus 8
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]	45/55[1]/65[2]
Overall plastic anchor embedment depth in the base material	h_{nom}	≥	[mm]	35/45[1]/55[2]

[1] Only CNplus 8: for weather shell (thin concrete slabs) : 35 mm ≤ h_{nom} ≤ 45 mm
[2] Nailed-in anchor CNplus 8: Only for use cat. "D" & "E"

Table B2.2: Installation parameters / countersunk mounted

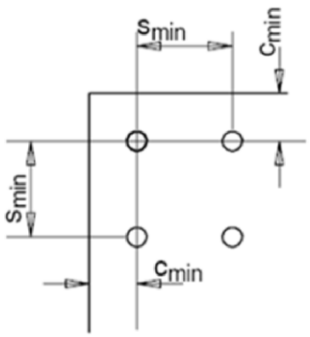
Anchor type				Nailed-in anchor CNplus 8
Drill hole diameter	d_0	=	[mm]	8
Cutting diameter of drill bit	d_{cut}	≤	[mm]	8,45
Depth of drilled hole to deepest point	h_1	≥	[mm]	60/70[1]/80[2]
Overall plastic anchor embedment depth in the base material	h_{nom}	≥	[mm]	35/45[1]/55[2]

[1] valid for weather shell (thin concrete slabs): 35 mm ≤ h_{nom} ≤ 45 mm
[2] Only for use cat. "D" & "E"

Table B2.3: Minimum distances and spacing

				Nailed-in anchor CNplus 8
Minimum thickness of member	h_{min}	=	[mm]	100
Minimum spacing	s_{min}	=	[mm]	100
Minimum edge distance	c_{min}	=	[mm]	100

Scheme of distance and spacing



Nailed-in anchor CNplus 8	**Annex B2**
Intended use Installation parameters Minimum distances and spacing	

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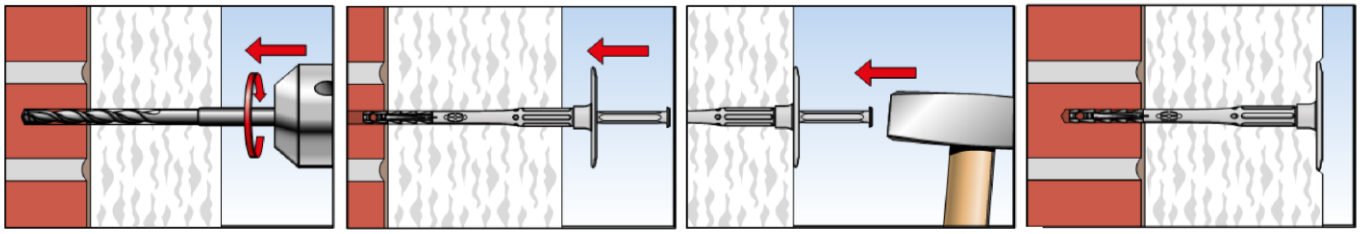
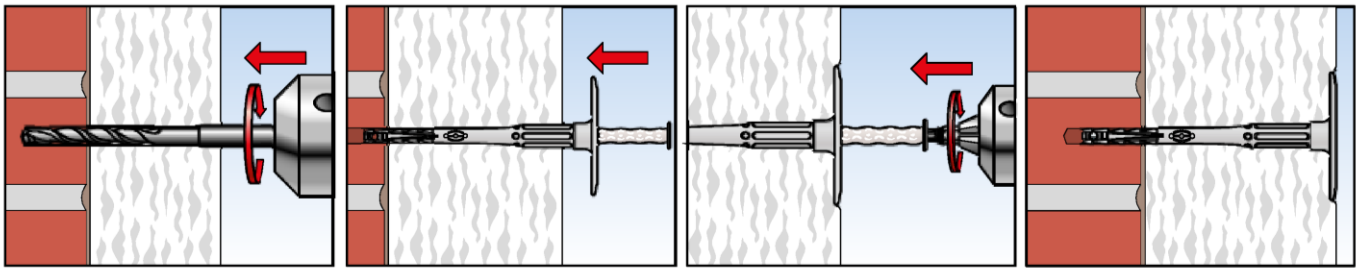
Installation instructions

Setting of anchor (flush mounted) by hammer / Nailed-in anchor CNplus 8



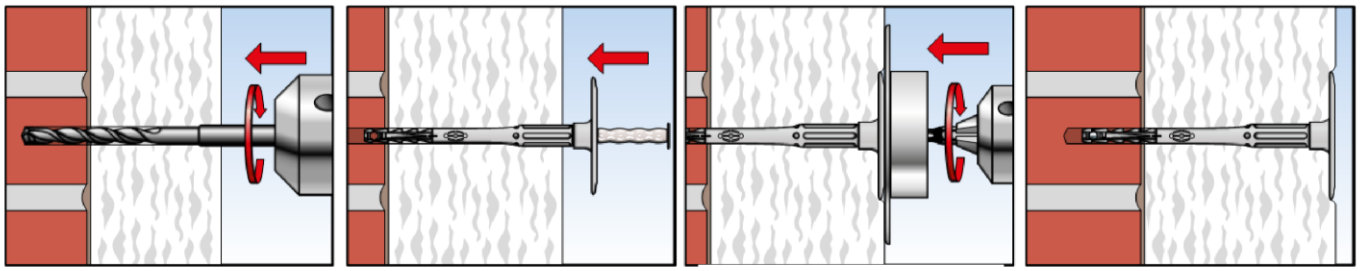
1.Drill hole by corresponding drilling method | 2.Insert anchor manually | 3.Set anchor by hammerblows | 4.Correctly installed anchor

Setting of anchor (flush mounted) by machine / Nailed-in anchor CNplus 8



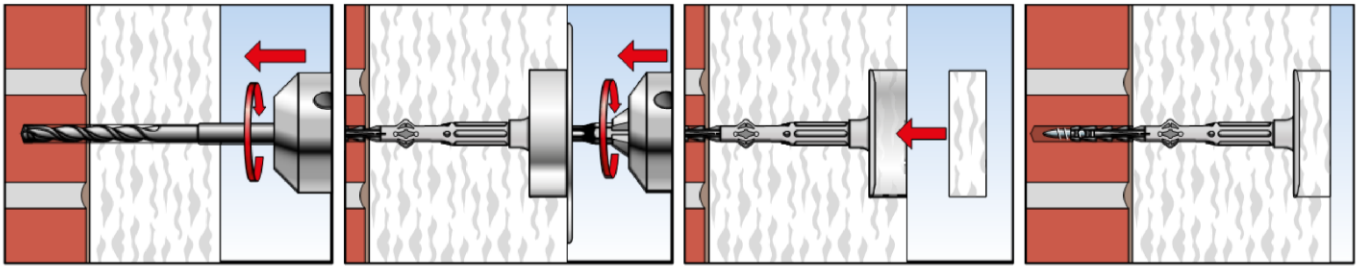
1.Drill hole by corresponding drilling method | 2.Insert anchor manually | 3.Set anchor by machine. | 4.Correctly installed anchor

Setting of anchor (flush mounted) by setting tool \ Nailed-in anchor CNplus 8



1.Drill hole by corresponding drilling method | 2.Insert anchor manually | 3.Set anchor by setting tool. | 4.Correctly installed anchor

Setting of anchor (countersunk mounted) by setting tool / Nailed-in anchor CNplus 8



1.Drill hole by corresponding drilling method | 2.Insert anchor and set anchor by setting tool. | 3.Put on polystyrene or mineral wool cap | 4.Correctly installed anchor

Nailed-in anchor CNplus 8	**Annex B3**
Intended use Installation instruction	

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Table C1.1: Characteristic resistance N_{Rk} in [kN] to tension loads for single anchor

Base material	Use cat.[1]	Min. compressive strength f_b [N/mm²]	Bulk density ρ [kg/dm³]	Remarks	Drill method[2]	Characteristic resistance N_{Rk} [kN] **Nailed-in anchor CNplus 8**
Concrete ≥ C12/15 - C50/60 EN 206-1:2000	A	-	-	-	H	**0,9**
Weather resistant concrete shell ≥ C20/25 EN 206-1:2000	A	-	-	h ≥ 42 mm ; t_{fix} ≥ 35mm	H	**0,9**
Solid clay bricks **Mz** acc. to EN 771-1:2011	B	20	≥ 1,8	Cross section reduced up to 15% by perforation vertically to the resting area	H	**0,9**
Calcium silicate solid bricks **KS** acc. to EN 771-2:2011	B	20	≥ 1,8		H	**0,9**
Solid concrete blocks **Vbn** acc. to EN 771-3:2011	B	20	≥ 2,0		H	**0,9**
Lightweight concrete blocks **Vbl** acc. to EN 771-3:2011	B	10	≥ 1,6		H	**0,75**
Vertically perforated clay bricks **Hlz** acc. to EN 771-1:2011	C	48	≥ 1,6	Cross section reduced between 15% and 50% by perforation vertically to the resting area. Exterior web thickness ≥ 17 mm	R	**0,75**
		12	≥ 1,0	Cross section reduced between 15% and 50% by perforation vertically to the resting area. Exterior web thickness ≥ 15 mm		**0,5**
Hollow calcium silicate brick **KSL** acc. to EN 771-2:2011	C	16	≥ 1,4	Cross section reduced between 15% and 50% by perforation vertically to the resting area. Exterior web thickness ≥ 16 mm	H	**0,5**
Lightweight concrete hollow blocks **Hbl**, acc. to EN 771-3:2011	C	10	≥ 1,2	Cross section reduced between 15% and 50% by perforation vertically to the resting area. Exterior web thickness ≥ 38 mm	H	**0,6**
Lightweight aggregate concrete **LAC**, acc. to EN 1520:2011, EN 771-3:2011	D	6	≥ 0,9	-	H	**0,4[3]**
Autoclaved aerated concrete blocks, **AAC** acc. to EN 771-4:2011	E	4	> 0,4	-	R	**0,3[3]**

[1] See Annex B1
[2] R = Rotary drilling | H = Hammer drilling
[3] Only valid for h_{nom} ≥ 55 mm

Nailed-in anchor CNplus 8

Performance
Characteristic resistance Nailed-in anchor CNplus 8

Annex C1

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Table C2.1: Point thermal transmittance acc. to EOTA Technical Report TR 025 : 2016 – 05
Nailed-in anchor CNplus 8 - flush mounted

Thickness of insulation material h_D [mm]	Point thermal transmittance χ [W/K]				
	cat. A	cat. B	cat. C	cat. D	cat. E
60	0,001	0,001	0,001	0,001	0
80					0,001
100	0,002	0,002			
120			0,002	0,002	
140					
160					
180				0,001	
200			0,001		
220					
240					
260				0	0
280	0,001	0,001			
300				0,001	
320					
340				-	-

Table C2.2: Point thermal transmittance acc. to EOTA Technical Report TR 025 : 2016 – 05
Nailed-in anchor CNplus 8 - countersunk mounted

Thickness of insulation material h_D [mm]	Point thermal transmittance χ [W/K]				
	cat. A	cat. B	cat. C	cat. D	cat. E
80	0,001	0	0	0	0
100		0,001	0,001	0,001	0,001
120					
140					
160	0,002				
180		0,002			
200	0,001	0,001			
220					
240					
260				0	0
280	0	0	0		
300	0,001	0,001			
320			0,001		
340				-	-

Table C2.3: Plate stiffness acc. to EOTA Technical Report TR 026 : 2016 – 05

Anchor type	Size of the anchor plate [mm]	Load resistance of the anchor plate [kN]	Plate stiffness [kN/mm]
termoz CN plus	60	1,7	0,6

Nailed-in anchor CNplus 8

Performance
Point thermal transmittance / Plate stiffness

Annex C2

Deutsches Institut für Bautechnik DIBt

Table C3.1: Displacements CNplus 8

Base material	Nailed-in anchor CNplus 8	
	Tension load **F** [kN]	Displacements δ [mm]
Concrete ≥ C12/15 – C50/60 (EN 206-1:2000)	0,30	< 0,1
Weather resistant concrete shell ≥ C20/25 (EN 206-1:2000)	0,30	< 0,1
Clay brick (EN 771-1:2011), Mz 20	0,30	< 0,2
Calcium silicate solid bricks (EN 771-2:2011), KS 20	0,30	< 0,2
Solid concrete blocks (EN 771-3:2011), Vbn 20	0,30	< 0,2
Lightweight concrete solid blocks (EN 771-3:2011), Vbl 10	0,25	< 0,1
Vertically perforated clay brick (EN 771-1:2011), Hlz 48	0,25	< 0,2
Vertically perforated clay brick (EN 771-1:2011), Hlz 12	0,17	< 0,1
Hollow calcium silicate brick (EN 771-2:2011), KSL 16	0,17	< 0,1
Hollow brick lightweight concrete (EN 771-3:2011), Hbl 10	0,20	< 0,1
Lightweight aggregate concrete (EN 1520:2011, EN 771-3:2011) LAC 6	0,13	< 0,2
Autoclaved aerated concrete blocks (EN 771-4:2011) AAC 4	0,10	< 0,1

Nailed-in anchor CNplus 8	**Annex C3**
Performance Displacements	