

European technical assessment

MKT Nailanchor N
for use in concrete

valid for

Nail anchor

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Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-11/0240
of 21 December 2021

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

Nail Anchor N

Product family
to which the construction product belongs

Fastener for use in concrete for redundant non-structural
systems

Manufacturer

MKT
Metall-Kunststoff-Technik GmbH & Co. KG
Auf dem Immel 2
67685 Weilerbach
DEUTSCHLAND

Manufacturing plant

MKT
Metall-Kunststoff-Technik GmbH & Co. KG
Auf dem Immel 2
67685 Weilerbach
DEUTSCHLAND

This European Technical Assessment
contains

11 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 330747-00-0601 Edition 06/2018

This version replaces

ETA-11/0240 issued on 7 May 2015

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Specific Part

1 Technical description of the product

The Nail Anchor N is a fastener made of galvanized or stainless steel which is placed into a drilled hole and expanded by loading.

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 verifications 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 50 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 in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C2

3.2 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for all load directions and modes of failure for simplified design	See Annex B2 and C1
Durability	See Annex B1

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

In accordance with European Assessment Document EAD No. 330747-00-0601, the applicable European legal act is: [97/161/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 European Assessment Document

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 21 December 2021 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Lange

Nail Anchor N

Installation condition and fastener versions

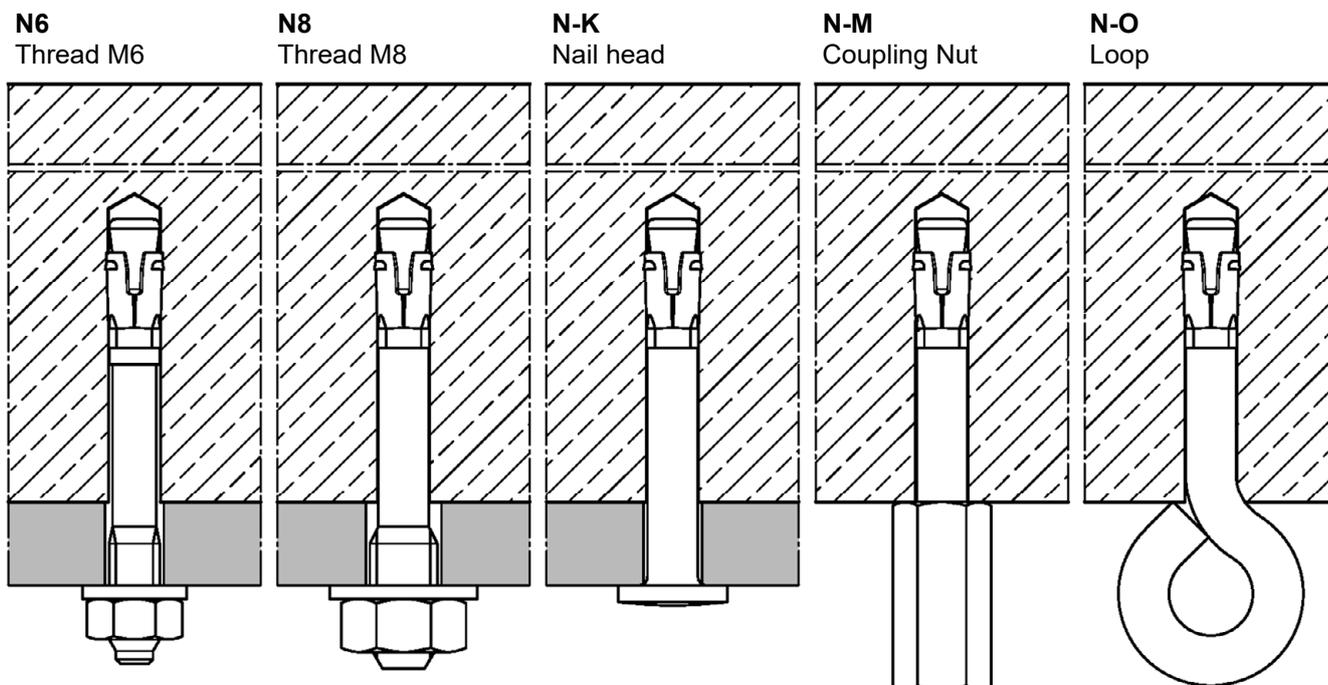


Table A1: Materials

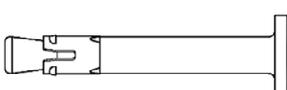
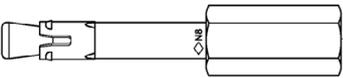
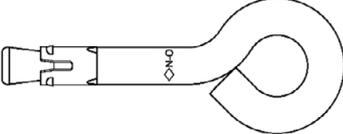
Designation	Steel zinc plated	Stainless steel CRC III	High corrosion resistant steel CRC V
Conical bolt	Steel, galvanized ≥ 5 µm, fracture elongation A ₅ ≥ 8 %	Stainless steel, coated fracture elongation A ₅ ≥ 8 %	High corrosion resistant steel, coated fracture elongation A ₅ ≥ 8 %
Expansion sleeve	Stainless steel	Stainless steel	Stainless steel
Washer	Steel, galvanized ≥ 5 µm	Stainless steel	High corrosion resistant steel
Hexagon nut			
Coupling nut	Steel galvanized ≥ 5 µm	Stainless steel	High corrosion resistant steel

Nail Anchor N

Product description
Installation conditions and fastener versions / Materials

Annex A1

Marking

Version		Marking (examples)	Explanation
N6 Thread M6 N8 ¹⁾ Thread M8	 Marking of length see Table A2	◇ N6 5/10 ◇ N6 5 A4 ◇ N8 5/10 ◇ N8 5 A4	◇ manufacturer identification N6 fastener identity with thread size M6 or M8 N8
N-K ¹⁾ Nail head			5 max. thickness of fixture for h _{ef} = 30 mm 10 max. thickness of fixture for h _{ef} = 25 mm
N-M ¹⁾ Coupling Nut M8/M10 M8/M12	 Marking of length (embossing on the top) see Table A2	◇ N8 5/10 ◇ N8 5 A4	additional markings: A4 stainless steel HCR high corrosion resistant steel
N-O Loop		◇ N-O	-O fastener version: Loop

¹⁾ optional with torsion protection

Table A2: Length identification

Fastener identifier	Marking		Thickness of fixture	
	all materials	steel, zinc plated	at h _{ef} =	
			30 mm	25 mm ¹⁾
A	0 / 5		0	5
B	5 / 10		5	10
C	10 / 15		10	15
D	15 / 20		15	20
E	20 / 25		20	25
F	25 / 30		25	30
G	30 / 35		30	35
H	35 / 40		35	40
I	40 / 45		40	45
J	45 / 50		45	50
K	50 / 55		50	55
L	55 / 60		55	60
M	60 / 65		60	65

Ausführung identifier	Marking		Thickness of fixture	
	all materials	steel, zinc plated	at h _{ef} =	
			30 mm	25 mm ¹⁾
N	65 / 70		65	70
O	70 / 75		70	75
P	75 / 80		75	80
Q	80 / 85		80	85
R	85 / 90		85	90
S	90 / 95		90	95
T	95 / 100		95	100
U	100 / 105		100	105
V	105 / 110		105	110
W	110 / 115		110	115
X	115 / 120		115	120
Y	120 / 125		120	125
Z	125 / 130		125	130

¹⁾ for internal use only

Nail Anchor N

Product description
Marking / Length identification

Annex A2

Specifications of intended use

Nail Anchor	N6 Thread M6	N8 Thread M6	N-K Nail head	N-M Coupling nut	N-O Loop
Static or quasi-static action	✓				
Fire exposure	R30 / R60 / R90 / R120				
Cracked or uncracked concrete	✓				
Strength classes C12/15 to C50/60 according to EN 206:2013 + A1:2016	✓				
Compacted, reinforced or unreinforced normal weight concrete, without fibres according to EN 206:2013 + A1:2016	✓				

Use conditions (environmental conditions):	Effective anchorage depth
<ul style="list-style-type: none"> Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel) 	$h_{ef} \geq 30\text{mm}$ and $h_{ef,red} \geq 25\text{mm}$
<ul style="list-style-type: none"> Structures subject to permanently damp internal conditions, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel) 	$h_{ef} \geq 30\text{mm}$ and $h_{ef,red} \geq 25\text{mm}$
<ul style="list-style-type: none"> Structures subject to external atmospheric exposure including industrial and marine environment, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel) 	$h_{ef} \geq 30\text{mm}$
<ul style="list-style-type: none"> Structures subject to external atmospheric exposure and to permanently damp internal conditions, if other particular aggressive conditions exist (high corrosion resistant steel) 	$h_{ef} \geq 30\text{mm}$

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used.)

Design:

- Fastenings are designed under the responsibility of an engineer experienced in fastenings and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be fastened. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Design of fastenings according to EN 1992-4:2018, simplified design method C
- Fasteners are only to be used for redundant non-structural systems.

Installation:

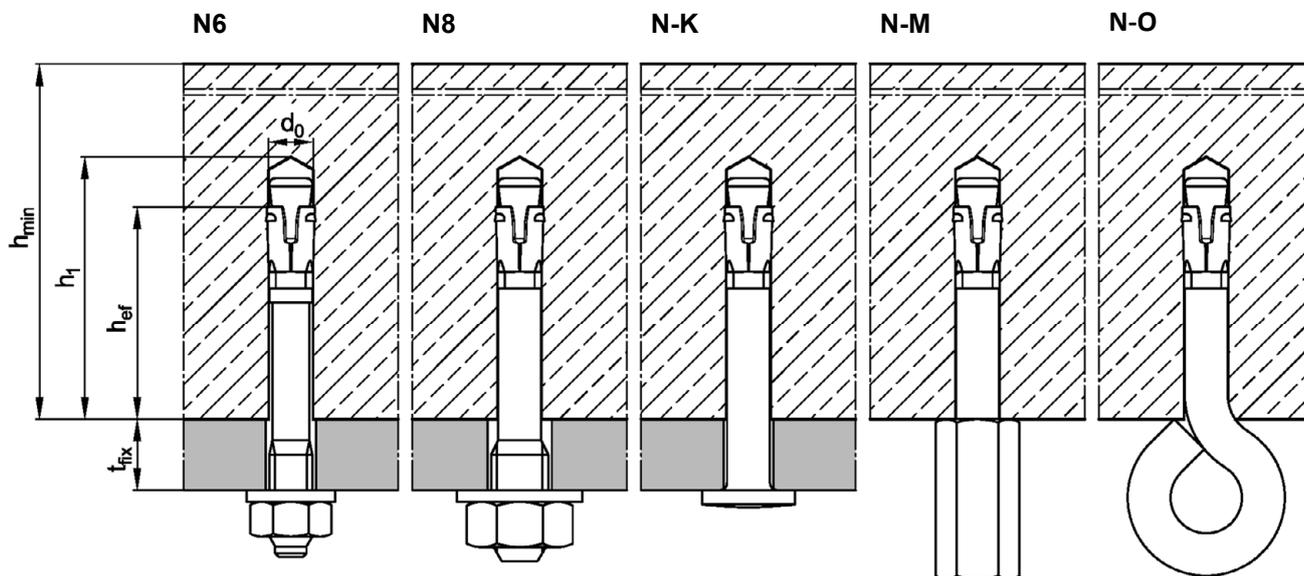
- Drill hole by hammer drilling or vacuum drilling.
- Installation only as supplied by the manufacturer, without replacement of individual parts.
- Fastener installation such that the effective setting depth is complied with. This compliance is ensured, if the admissible thickness of fixture is kept or the loop of Nail Anchor N-O rests on the concrete surface.

Nail Anchor N	Annex B1
Intended Use Specifications	

Table B1: Installation parameters

Fastener type			N6 N-K N-O	N8 N-M	N6 N-K N-O	N8 N-M
Effective anchorage depth	$h_{ef} \geq$	[mm]	25 ¹⁾		30	
Nominal drill hole diameter	d_0	[mm]	6		6	
Cutting diameter to drill bit	$d_{cut} \leq$	[mm]	6,40		6,40	
Depth of drill hole	$h_1 \geq$	[mm]	35		40	
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	7	9
Maximum tightening torque (N 6 and N 8)	$T_{inst} \leq$	[Nm]	4		4	
Minimum member thickness	h_{min}	[mm]	80		80	

¹⁾ Internal use only

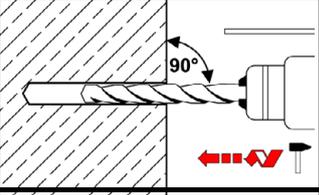
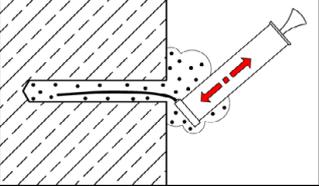
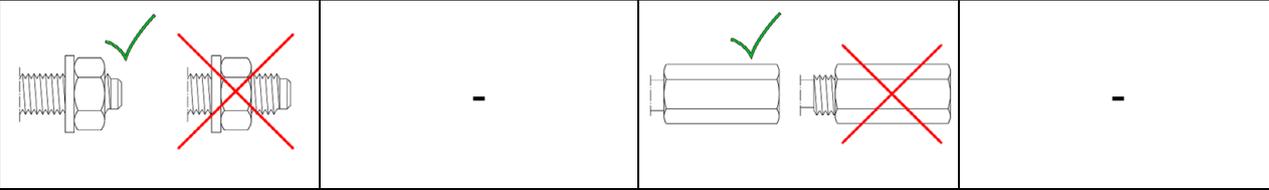
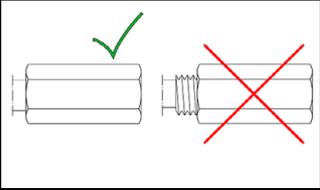
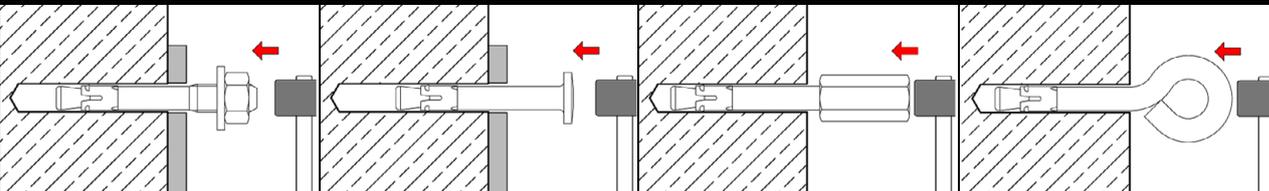
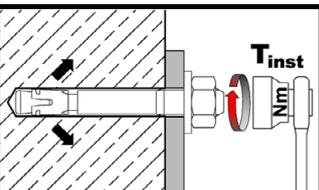
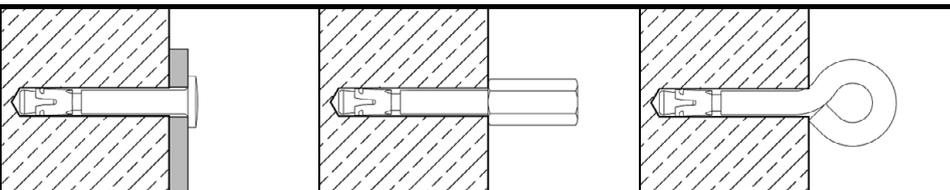


Nail Anchor N

Intended Use
Installation parameters

Annex B2

Installation instructions

All fastener types				
1		Drill hole perpendicular to the concrete surface by hammer drilling or vacuum drilling.		
2		Blow out dust. Alternatively, vacuum clean down to the bottom of the hole.		
	N6 / N8 Thread M6 / M8	N-K Nail head	N-M Coupling nut	N-O Loop
3		-		-
Check position of nut.				
4		Drive in fastener.		
5				
Apply installation torque $T_{inst} \leq 4 \text{ Nm}$.		Installation condition		

Nail Anchor N

Intended Use
Installation instructions

Annex B3

Table C1: Characteristic resistance for a fixing point ¹⁾, all directions, design method C

Fastener type			N6	N8 N-K N-M	N-O	N6	N8 N-K N-M	N-O
Effective anchorage depth		h_{ef} [mm]	25			30		
Optimized for maximum load								
Characteristic resistance	C12/15	F_{Rk} [kN]	3,0	3,0	1,5	4,0	4,0	1,5
	C20/25 to C50/60		4,5	4,5	1,5	5,9	5,9	1,5
Respective spacing between fixing points ^{1) 2)}		s_{cr} [mm]	100					
		for $c_{cr} \geq$ [mm]	200					
Respective edge distance ²⁾		c_{cr} [mm]	100					
		for $s_{cr} \geq$ [mm]	200					
Partial factor		γ_M	1,5					
Optimized for minimum edge distance								
Characteristic resistance	C12/15	F_{Rk} [kN]	1,5	1,5	1,5	2,0	2,0	1,5
	C20/25 to C50/60		2,0	2,0	1,5	2,5	2,5	1,5
Respective spacing between fixing points ^{1) 2)}		c_{cr} [mm]	50					
		for $s_{cr} \geq$ [mm]	100					
Partial factor		γ_M	1,5					
Shear load with lever arm								
Characteristic bending resistance, steel, zinc plated		$M_{Rk,s}^0$ [Nm]	9,2	12,7	³⁾	9,2	12,7	³⁾
Characteristic bending resistance, stainless steel A4 / HCR		$M_{Rk,s}^0$ [Nm]	9,2	13,5	³⁾	9,2	13,5	³⁾
Partial factor		γ_{Ms}	1,25					

¹⁾ A fixing point is defined as:

- Single fastener
- Fastener group with a minimum spacing s of $50 \text{ mm} \leq s < s_{cr}$

If the spacing in a fixing point is greater than or equal to the respective spacing in this table, the characteristic resistances apply to every single fastener.

²⁾ Intermediate values can be linearly interpolated

³⁾ No performance assessed.

Nail Anchor N

Performances
Characteristic resistance

Annex C1

Table C2: Characteristic resistance for a fixing point ¹⁾ under fire exposure in concrete C20/25 to C50/60, design method C

Fire resistance class			Fastener type							
			N6 N8	N-K	N-M ³⁾	N-O	N6 N8	N-K	N-M ³⁾	N-O
Effective anchorage depth		h_{ef} [mm]	25				30			
Load in any direction										
R 30	Characteristic resistance, steel zinc plated	$F_{Rk,fi}$ [kN]	0,6	0,6	0,6	0,2	0,9	0,9	0,8	-
R 60			0,6	0,6	0,6	0,2	0,7	0,8	0,7	-
R 90			0,5	0,6	0,6	0,1	0,5	0,6	0,6	-
R 120			0,4	0,5	0,5	0,1	0,4	0,5	0,6	-
R 30	Characteristic resistance, stainless steel A4 / HCR	$F_{Rk,fi}$ [kN]	0,6	0,6	0,6	0,2	0,9	0,9	0,8	0,2
R 60			0,6	0,6	0,6	0,2	0,9	0,9	0,7	0,2
R 90			0,5	0,6	0,6	0,1	0,9	0,9	0,6	0,1
R 120			0,4	0,5	0,5	0,1	0,7	0,7	0,6	0,1
R 30 - R 120	Edge distance	$c_{cr,fi}$ [mm]	50				50			
	Spacing	$s_{cr,fi}$ [mm]	100				100			
Shear load with lever arm										
R 30	Characteristic resistance, steel zinc plated	$M^0_{Rk,fi}$ [Nm]	0,7	1,0	0,7	²⁾	0,7	1,0	0,7	²⁾
R 60			0,5	0,8	0,7	²⁾	0,5	0,8	0,7	²⁾
R 90			0,4	0,5	0,6	²⁾	0,4	0,5	0,6	²⁾
R 120			0,3	0,4	0,5	²⁾	0,3	0,4	0,5	²⁾
R 30	Characteristic resistance, stainless steel A4 / HCR	$M^0_{Rk,fi}$ [Nm]	1,4	2,1	0,7	²⁾	1,4	2,1	0,7	²⁾
R 60			1,1	1,5	0,7	²⁾	1,1	1,5	0,7	²⁾
R 90			0,7	1,0	0,6	²⁾	0,7	1,0	0,6	²⁾
R 120			0,5	0,7	0,5	²⁾	0,5	0,7	0,5	²⁾
If the fire attack is from more than one side, the edge distance shall be ≥ 300 mm										

¹⁾ A fixing point is defined as:

- Single fastener,
- Fastener group with a minimum spacing s of $50 \text{ mm} \leq s < s_{cr}$

If the spacing in a fixing point is greater than or equal to the respective spacing in this table, the characteristic resistances apply to every single fastener

²⁾ No performance assessed

³⁾ Only in connection with threaded rods M8, M10 or M12 minimum strength class 5.8.

Nail Anchor N

Performances
Characteristic resistance under fire exposure

Annex C2