... eine starke Verbindung

DECLARATION OF PERFORMANCE

DoP Nr.: **MKT-1.2-301**_en

- ✧ **Unique identification code of product-type:** **Nail Anchor N**
- ✧ **Intended use/es:** Fastener for use in concrete for redundant non-structural systems, see Annex B
- ✧ **Manufacturer:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
  Auf dem Immel 2
  67685 Weilerbach
- ✧ **System or systems of assessment and verification of constancy of performance:** 2+
- ✧ **European Assessment Document:** **EAD 330747-00-0601**
  European Technical Assessment: **ETA-11/0240, 21.12.2021**
  Technical Assessment Body: DIBt, Berlin
  Notified body/ies: NB 2873 – Technische Universität Darmstadt
- ✧ **Declared performance/s:**

Essential Characteristics	Performance
Safety in case of fire (BWR 2)	
Reaction to fire	Class A1
Resistance to fire	Annex C2
Safety in use (BWR 4)	
Characteristic resistance for all load directions and modes of failure for simplified design	Annex B2, C1
Durability	Annex B1

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Stefan Weustenhagen
(General manager)
Weilerbach, 21.12.2021

p.p.
Dipl.-Ing. Detlef Bigalke
(Head of product development)

The original of this declaration of performance was written in German. In the event of deviations in the translation, the German version shall be valid.

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**
• Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel)	h_{ef} ≥ 30mm and $h_{ef,red}$ ≥ 25mm
• Structures subject to permanently damp internal conditions, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel)	h_{ef} ≥ 30mm and $h_{ef,red}$ ≥ 25mm
• 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} ≥ 30mm
• Structures subject to external atmospheric exposure and to permanently damp internal conditions, if other particular aggressive conditions exist (high corrosion resistant steel)	h_{ef} ≥ 30mm

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.

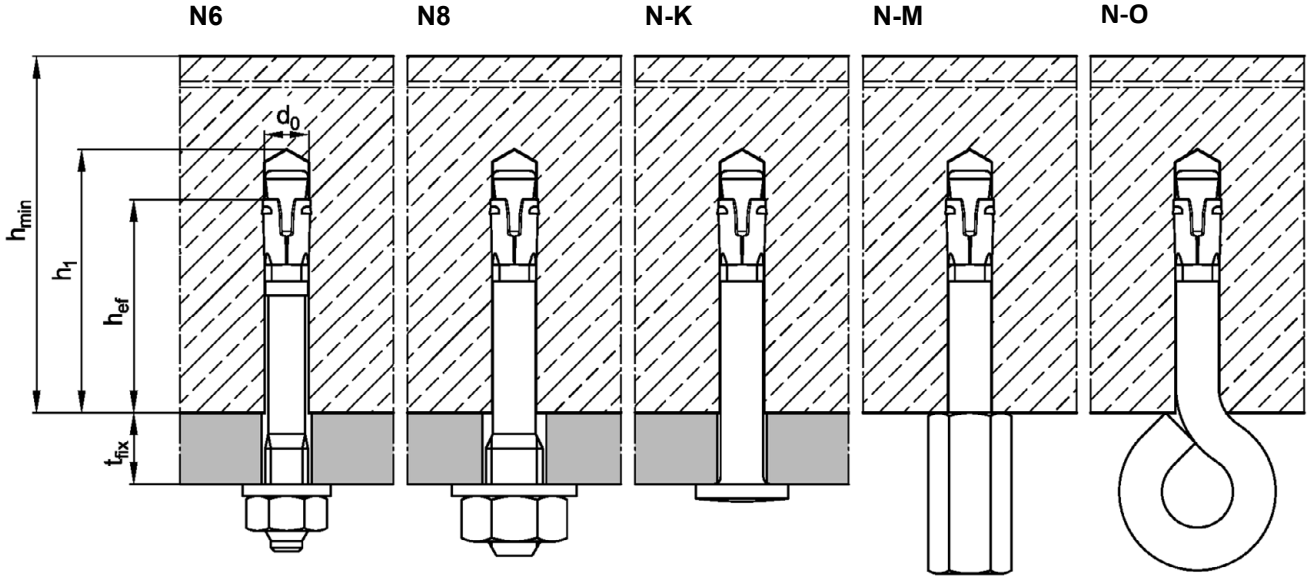
Installation:

- 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.

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

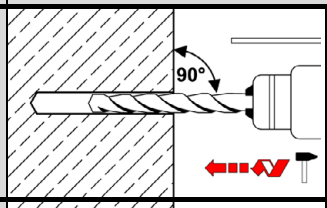
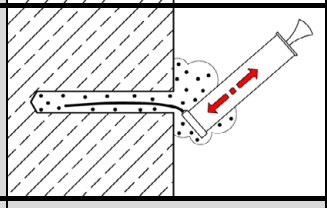
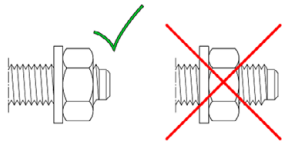
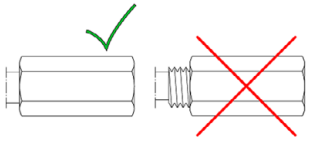
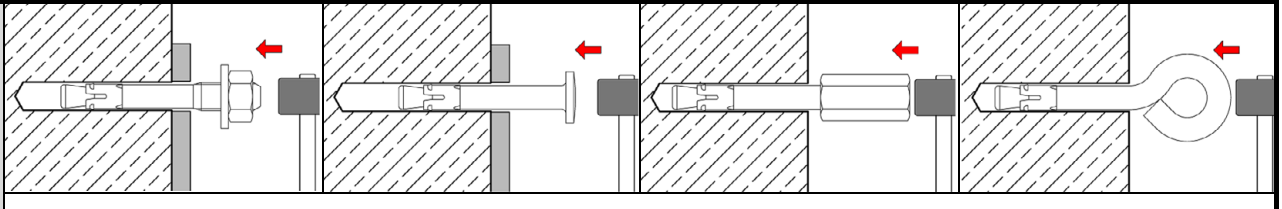
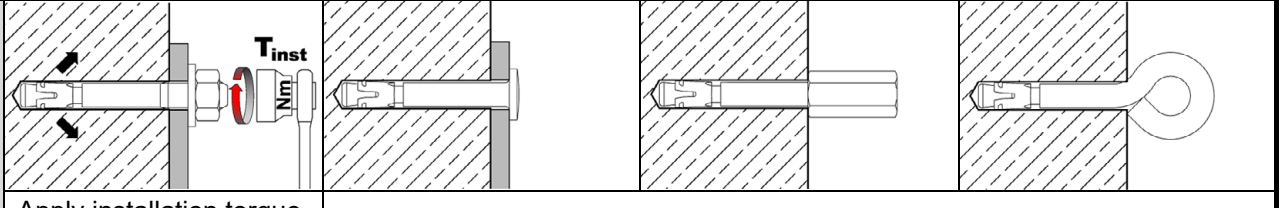
	All fastener types			
1		Drill hole perpendicular to the concrete surface by hammer drilling or vacuum drilling.		
2		Blow out dust. Alternatively, vacuum clean down to the bottom of the hole.		
	N6 / N8 Thread M6 / M8	**N-K** Nail head	**N-M** Coupling nut	**N-O** Loop
3		-		-
	Check position of nut.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

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
Characteristic resistance **C20/25** to **C50/60**	F_{Rk}	[kN]	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
Characteristic resistance **C20/25** to **C50/60**	F_{Rk}	[kN]	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**	$M^0_{Rk,s}$	[Nm]	9,2	12,7	[3)]	9,2	12,7	[3)]
Characteristic bending resistance, **stainless steel A4 / HCR**	$M^0_{Rk,s}$	[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 mm ≤ 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.

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 mm ≤ 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.