

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-18/0541
of 27 June 2019

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

NIEDAX nail anchor NA and DAM

Product family
to which the construction product belongs

Fasteners for use in concrete for redundant
non-structural systems

Manufacturer

Niedax GmbH & Co. KG
Asbacher Straße 144
53545 Linz am Rhein
DEUTSCHLAND

Manufacturing plant

NIEDAX

This European Technical Assessment
contains

10 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

This version replaces

ETA-18/0541 issued on 12 December 2018

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Specific Part

1 Technical description of the product

The NIEDAX Nail Anchor NA and DAM is an anchor made of galvanised steel, stainless steel (marking "A4") or high corrosion resistant steel (marking "C") which is pushed 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 C 2

3.2 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for all load directions and modes of failure for simplified design	See Annex C 1
Durability	See Annex B 1

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

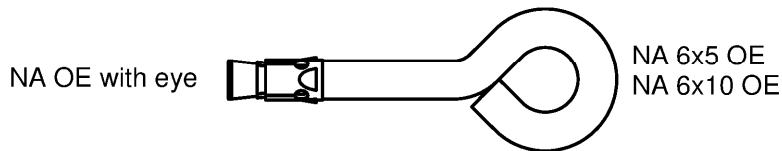
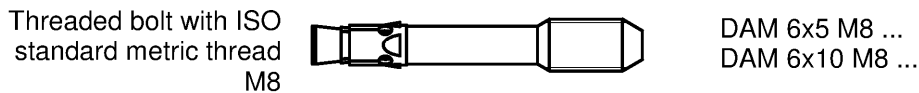
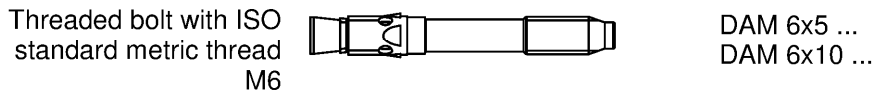
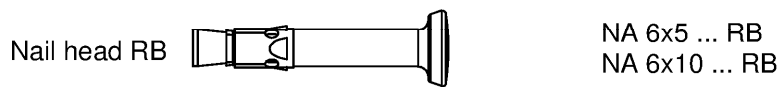
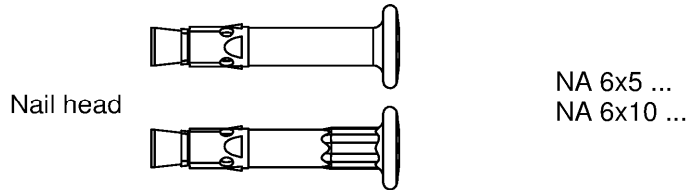
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 27 June 2019 by Deutsches Institut für Bautechnik

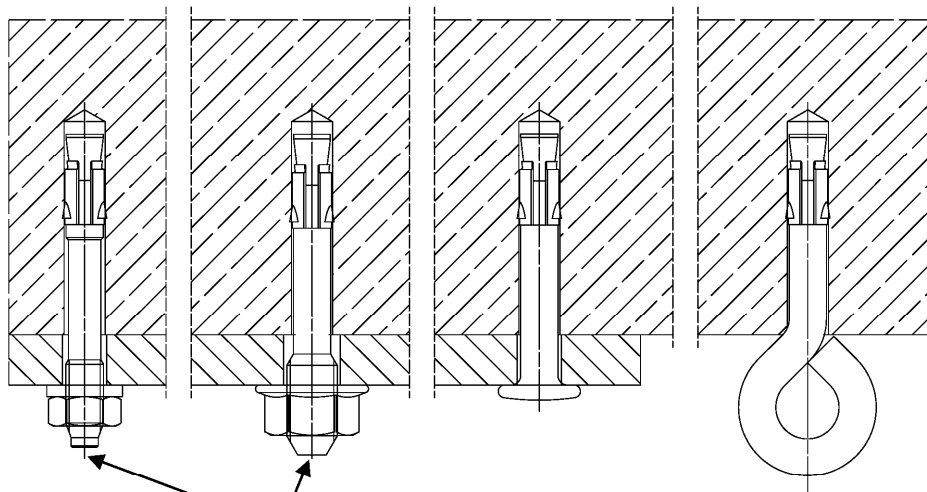
BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

Design types:



Intended use:



Additional marking only galvanised steel for $h_{ef} = 25$ mm (centring, bar or points)

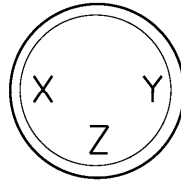
NIEDAX nail anchor NA and DAM

Product description
Product and intended use

Annex A 1

Marking:

Nail head



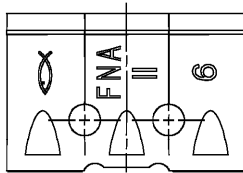
Marking at **X**: "O" for $h_{ef} = 25$ mm
and "I" for $h_{ef} = 30$ mm;

Marking at **Y**: t_{fix}

Marking at **Z**: "A4" or "C" (stainless steel)

Expansion sleeve (or bolt)

e.g.:



For stainless steel additional marking "A4" or "C"

Marking-Codes for Y:

	A	Q	T	N	P	B	L	H	U
t_{fix}	5	10	15	20	25	30	35	40	45

	D	V	S	W	X	E	M	Z	K
t_{fix}	50	55	60	65	70	75	80	85	90

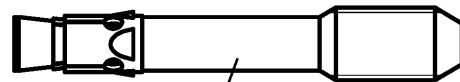
	(A)	F	(B)	(D)	(E)	G	J
t_{fix}	95	100	105	110	115	120	125

At $t_{fix} > 125$ mm the corresponding figure is marked.

Shaft (threaded bolt)



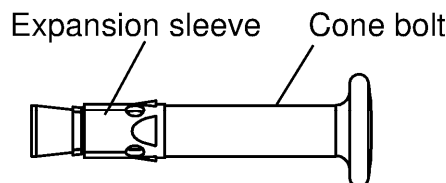
Marking e.g.: 6/10
thread size/thickness of the fixture



Marking e.g.: 8/10
thread size /thickness of the fixture
Exception: DAM 6x5 M8 and DAM 6x10 M8 no marking

Table A1: Materials

Designation	Material: Galvanized steel
Cone Bolt	Cold form steel or free cutting steel (zinc plated) Nominal steel tensile strength: $f_{uk} \leq 1000$ N/mm ²
Expansion sleeve	Cold strip, EN 10139:2013 (zinc plated)
Designation	Material: A4 (stainless steel), Type of Anchor "E5"
Cone Bolt	Stainless steel EN 100882: 2014 Nominal steel tensile strength: $f_{uk} \leq 1000$ N/mm ²
Expansion sleeve	Stainless steel EN 10088: 2014
Designation	Material: C (high corrosion resistant steel), Type of Anchor "C"
Cone Bolt	High corrosion resistant steel EN 10088: 2014 Nominal steel tensile strength: $f_{uk} \leq 1000$ N/mm ²
Expansion sleeve	Stainless steel EN 10088: 2014



NIEDAX nail anchor NA and DAM

Product description
Marking and materials

Annex A 2

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads: All types and all embedment depths
- Only for use in concrete for redundant non-structural systems
- Fire exposure: only for concrete C20/25 to C50/60

Base materials:

- Compacted reinforced and unreinforced normal weight concrete without fibers according to EN 206:2013
- Strength classes C12/15 to C50/60 according to EN 206:2013
- Uncracked and cracked concrete: All types and all embedment depths

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (gvz, A4, C) with $h_{ef} \geq 25$ mm
- Structures subject to external atmospheric exposure including industrial and marine environment, if no particular aggressive conditions exist (A4, C) with $h_{ef} \geq 30$ mm
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (C) with $h_{ef} \geq 30$ mm

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

Design:

- Anchorages have to be designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings have to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Design of fasteners according to EN 1992-4:2018, Design Method C and Technical Report TR 055, February 2018

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Create drill hole with hammer drill and clean the hole
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured, if the admissible thickness of the fixture is kept. For the anchor type NA 6 x h_{ef} OE the loop has to sit direct at the concrete surface.
- In case of aborted hole: New hole must be drilled at a minimum distance of twice the depth of the aborted hole or closer, if the hole is filled with a high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load

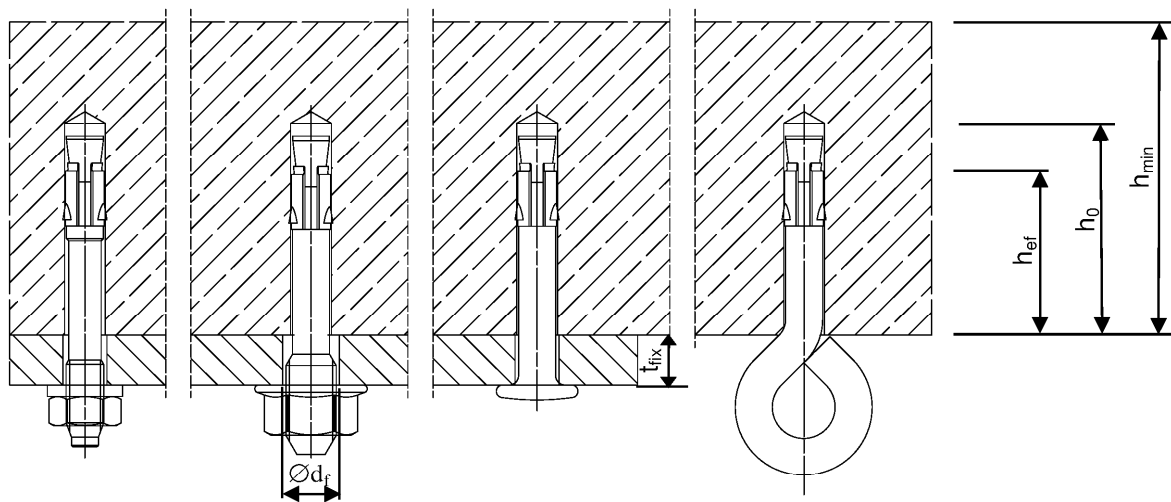
NIEDAX nail anchor NA and DAM

**Intended Use
Specifications**

Annex B 2

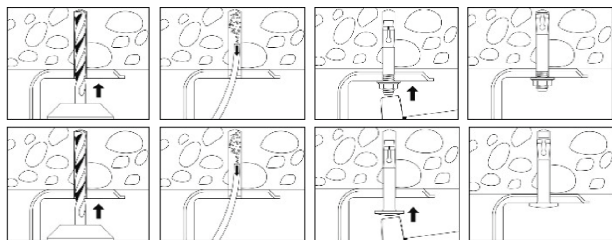
Table B1: Installation parameters

Effective embedment depth	$h_{ef} \geq$	[mm]	25	30
Nominal drill bit diameter	d_0	[mm]	6	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,4	
Depth of drill hole	$h_0 \geq$	[mm]	31	36
Diameter of clearance hole in the fixture for all NA and DAM except for M8 and OE	$d_i \leq$	[mm]	7	
Diameter of clearance hole in the fixture for M8	$d_i \leq$	[mm]	9	
Maximum torque moment (only threaded types)	max. T_{inst}	[Nm]	4	
Minimum thickness of member	h_{min}	[mm]	80	
Maximum thickness of fixture	max. t_{fix}	[mm]	400	

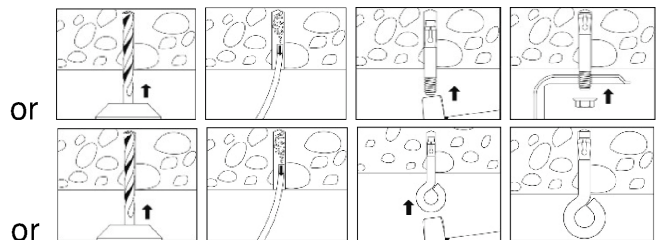


Installation instruction:

Push through installation



Pre-positioned installation



NIEDAX nail anchor NA and DAM

Intended Use
Installation parameters

Annex B 2

Table C1: Characteristic resistance of a fixing point¹⁾ for all load directions

Type of anchor			NA 6x5 ...	DAM 6x5 ... DAM 6x5 M8 ...	NA 6x5 OE	NA 6x10 OE	NA 6x10 ...	DAM 6x10 ... DAM 6x10 M8 ...
Material			galv.			galv., A4, C		
Effective anchorage depth	$h_{ef} \geq$ [mm]		25			30 ⁴⁾		
Installation factor	γ_{inst} [-]		1,0					
Characteristic bending moment	$M^0_{RK,s}$ [Nm]		10,7	9,2		13,2		9,2
Partial factor	γ_{Ms} [-]		1,25					
Maximum load for normal spacing - and edge distances								
Characteristic spacing between fixing points ¹⁾	$s_{cr} \geq$ [mm]		200					
Minimum spacing within a fixing point ¹⁾	$s_{min} \geq$ [mm]		50					
Characteristic resistance F^0_{RK} C20/25 to C50/60 (C12/15) ⁴⁾	$c_{cr}^{2)} \geq 100$	[kN]	3,0 (2,5)		1,5		5,0 (4,0)	
	$c_{cr}^{2)} \geq 50$		2,35 (1,9)				2,35 (1,9)	
Reduced loads for reduced spacing - and corresponding edge distances								
Characteristic spacing between fixing points ¹⁾	$s_{cr} \geq$ [mm]		100					
Minimum spacing within a fixing point ¹⁾	$s_{min} \geq$ [mm]		50					
Characteristic resistance F^0_{RK} C20/25 to C50/60 (C12/15) ⁴⁾	$c_{cr}^{2)} \geq 200$	[kN]	3,0 (2,5)		1,5		5,0 (4,0)	
	$c_{cr}^{2)} \geq 50$		1,7 (1,2)				1,5 (1,2)	
Reduced loads for minimum spacing - and edge distance								
Characteristic spacing between fixing points ¹⁾	$s_{cr} \geq$ [mm]		100					
Minimum spacing within a fixing point ¹⁾	$s_{min} \geq$ [mm]		40					
Characteristic resistance F^0_{RK} C20/25 to C50/60 (C12/15) ⁴⁾	$c_{cr} \geq 40$	[kN]	1,30 (0,85)					

¹⁾ A fixing point is defined as a single anchor or a group of 2 or 4 anchors

²⁾ Intermediate values for c may be calculated by linear interpolation

³⁾ Exception see B1 – use conditions – point 2

⁴⁾ Values in brackets for concrete strength class C12/15

NIEDAX nail anchor NA and DAM

Performances
Characteristic resistance

Annex C 1

Table C2: Characteristic resistance under fire exposure in concrete C20/25 to C50/60

Fire resistance class for all load directions for $h_{ef} = 25$ mm							
Type of anchor	Spacing	Edge distance	Effective anchorage depth	Characteristic resistance $F_{Rk,fi}$ [kN]			
				R 30	R 60	R 90	R 120
	$S_{cr,fi} \geq$ [mm]	$C_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
NA 6x5 (galv.)	100	50	25	0,6	0,6	0,5	0,3
DAM 6x5 (galv.) DAM 6x5 M8 (galv.)					0,35	0,3	
NA 6x5 OE (galv.)				0,3	0,2	0,1	

Fire resistance class for all load directions for $h_{ef} = 30$ mm							
Type of anchor	Spacing	Edge distance	Effective anchorage depth	Characteristic resistance $F_{Rk,fi}$ [kN]			
				R 30	R 60	R 90	R 120
	$S_{cr,fi} \geq$ [mm]	$C_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
NA 6x10 (galv.)	120	60	30	0,9	0,8	0,5	0,3
	100	50		0,6	0,6		
DAM 6x10 (galv.) DAM 6x10 M8 (galv.)	120	60			0,35	0,3	
	100	50		0,9		0,7	
NA 6x10 E5/C	120	60		0,6		0,5	
	100	50		0,9		0,7	
DAM 6x10 E5/C DAM 6x10 M8 E5/C	120	60		0,6		0,5	
	100	50		0,3	0,2	0,1	

Fire resistance class for all load directions for $h_{ef} = 30+5^{1)}$ mm							
Type of anchor	Spacing	Edge distance	Effective anchorage depth	Characteristic resistance $F_{Rk,fi}$ [kN]			
				R 30	R 60	R 90	R 120
	$S_{cr,fi} \geq$ [mm]	$C_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
NA 6x10 E5/C DAM 6x10 E5/C DAM 6x10 M8 E5/C	140	70	$30+5^{1)}$	1,3		1,0	0,7
	100	50		0,7		0,6	

¹⁾ The effective anchorage depth $h_{ef} = 30 + 5$ mm is reached by setting the anchor NA 6x10... 5 mm deeper with an anchor that is 5 mm longer than required for the actual thickness of the fixture.

In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm

NIEDAX nail anchor NA and DAM

Performances
Characteristic resistance under fire exposure

Annex C 2