Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

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European Technical Assessment

ETA-20/0683 of 3 September 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 SNA
Product family to which the construction product belongs	Fasteners for use in concrete for redundant non-structural systems
Manufacturer	RAPTOR A/S Skanderborgvej 277 8260 VIBY J DÄNEMARK
Manufacturing plant	RAPTOR A/S
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

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Specific Part

1 Technical description of the product

The Nail anchor SNA is an anchor made of galvanised (SNA) or stainless steel (SNA R) or high corrosion resistant steel (SNA HCR). The anchor is pushed into a predrilled cylindrical drill 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 in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance to tension and shear load (static and quasi-static loading)	See Annex B 2 and 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 3 September 2021 by Deutsches Institut für Bautechnik

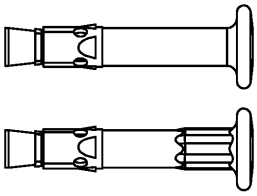
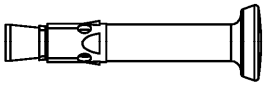
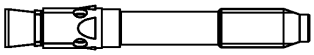
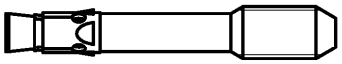
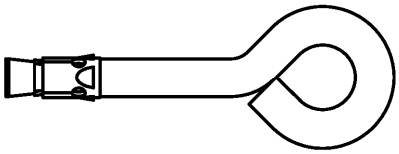
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

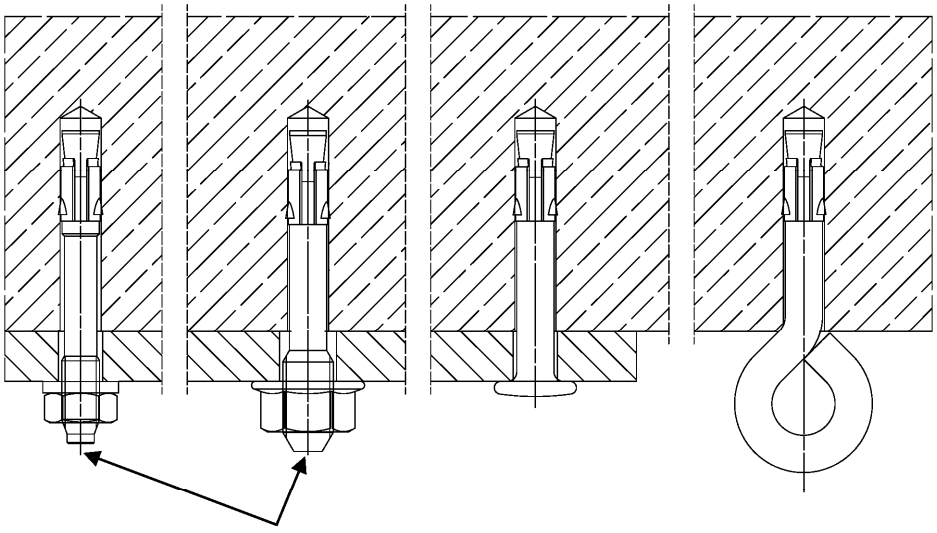
Deutsches Institut für Bautechnik DIBt

Only for use for for redundant non-structural systems according to EN 1992-4:2018

Design types:

Nail head		SNA 6x25/.. SNA 6x30/..
Nail head RB		SNA 6x25/.. RB SNA 6x30/.. RB
Threaded bolt with ISO standard metric thread M6		SNA 6x25 M6/.. SNA 6x30 M6/..
Threaded bolt with ISO standard metric thread M8		SNA 6x25 M8/.. SNA 6x30 M8/..
SNA OE with eye		SNA 6x25 OE SNA 6x30 OE

Intended use:



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

(Fig. not to scale)

Nail anchor SNA	**Annex A 1**
Product description Product and intended use	

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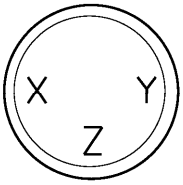
Marking:

Nail head



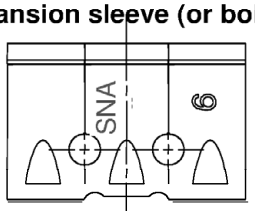
Marking at **X**: "O" for h_{ef} = 25 mm
and "I" for h_{ef} = 30 mm;

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

Marking at **Z**: "R" or "HCR" (stainless steel)

Expansion sleeve (or bolt)

e.g.:



For stainless steel additional marking "R" or "HCR"

Marking-Codes for **Y**:

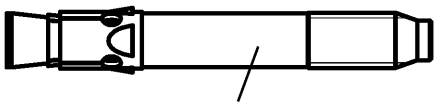
	A	Q	T	N	P	B	L	H	U
t_{fix}	5	10	15	20	25	30	35	40	45

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

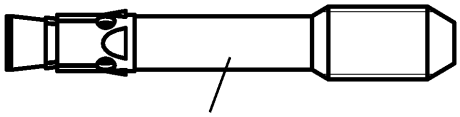
	(A)	F	(B)	(D)	(E)	G	J
t_{fix}	95	100	105	110	115	120	125

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

Shaft (threaded bolt)



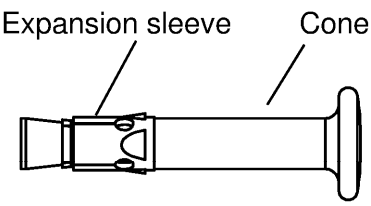
Marking e.g.: 6/10
thread size/thickness of the fixture



Marking e.g.: 8/10
thread size /thickness of the fixture
Exception: 8/5 no marking

Table A2.1: Materials SNA

Part	Designation	Material		
		SNA	SNA R	SNA HCR
	Steel grade	Steel	Stainless steel R	High corrosion resistant steel HCR
		Zinc plated ≥ 5 µm, EN ISO 4042:2018	Acc. to EN 10088:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2015	Acc. to EN 10088:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2015
1	Expansion sleeve	Cold strip, EN 10139:2016 or stainless steel EN 10088:2014	Stainless steel EN 10088:2014	Stainless steel EN 10088:2014
2	Cone bolt	Cold form steel or free cutting steel		High corrosion resistant steel EN 10088:2014



(Fig. not to scale)

Nail anchor SNA

Product description
Marking and materials

Annex A 2

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Specifications of intended use

Fastenings subject to:

Size	SNA, SNA R, SNA HCR
Hammer drilling with standard drill bit	All types
Static and quasi-static loads	✓
Cracked and uncracked concrete	
Fire exposure	

Base materials:

- Compacted reinforced and unreinforced normal weight concrete without fibres (cracked and uncracked) according to EN 206:2013+A1:2016
- Strength classes C12/15 to C50/60 according to EN 206:2013+A1:2016

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (SNA, SNA R, SNA HCR) with $h_{ef} \geq 25$ mm
- For all other conditions according to EN 1993-1-4:2006 + A1:2015 corresponding to corrosion resistance class
  - CRC III: for SNA R with $h_{ef} \geq 30$ mm
  - CRC V: for SNA HCR with $h_{ef} \geq 30$ mm

Design:

- Fastenings are to be designed under the responsibility of an engineer experienced in fastenings and concrete work
- Verifiable calculation notes and drawings have to be prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.)
- Only for use for for redundant non-structural systems according to EN 1992-4:2018, Chapter 7.3
- Simplified design method C according to EN 1992-4:2018 Annex G

Installation:

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener
- Checking before placing the fastener to ensure that the strength class of the concrete in which the fastener is to be placed, is in the range given and is not lower than that of the concrete to which the characteristic loads apply
- Check of concrete being well compacted, e.g. without significant voids
- Drill hole created perpendicular +/- 5° to concrete surface, positioning without damaging the reinforcement
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill hole or smaller distance if the aborted drill hole is filled with high strength mortar (e.g. FIS HB, FIS SB, FIS EM Plus, FIS V Plus) and if under shear or oblique tension load it is not in the direction of load application

Nail anchor SNA	**Annex B 1**
Intended Use Specifications	

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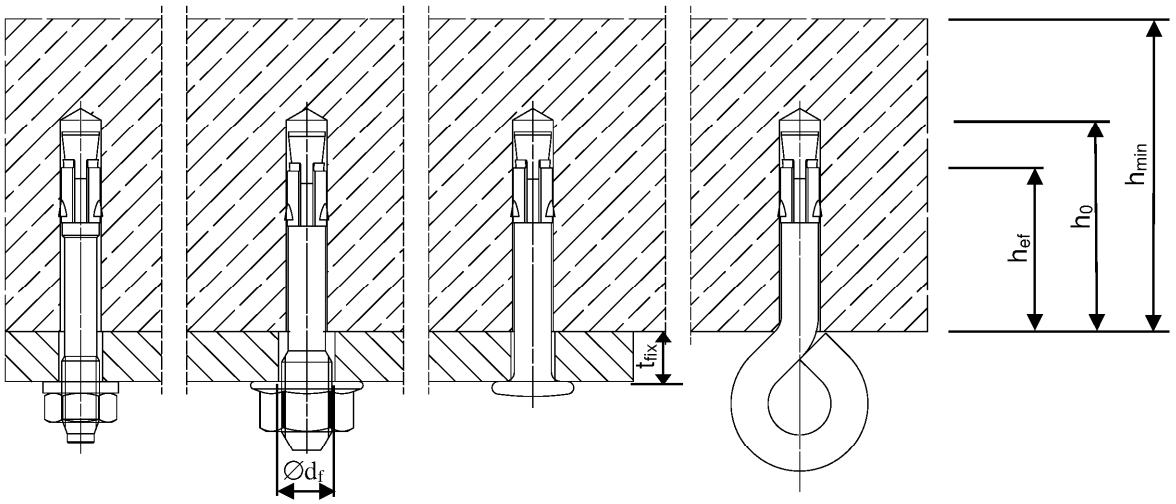
Table B2.1: Installation parameters

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



(Fig. not to scale)

Nail anchor SNA

Intended Use
Installation parameters

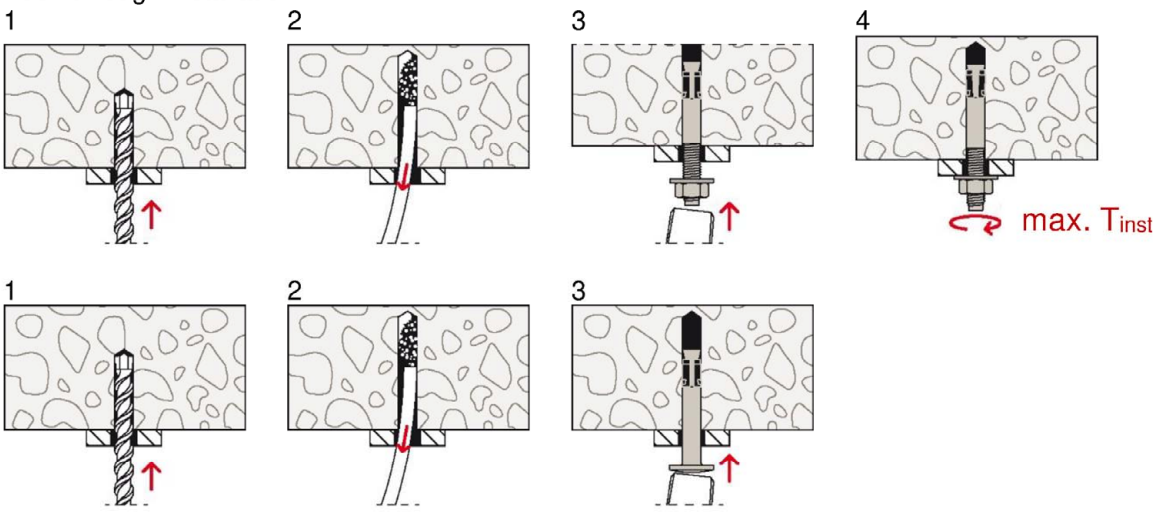
Annex B 2

Deutsches Institut für Bautechnik DIBt

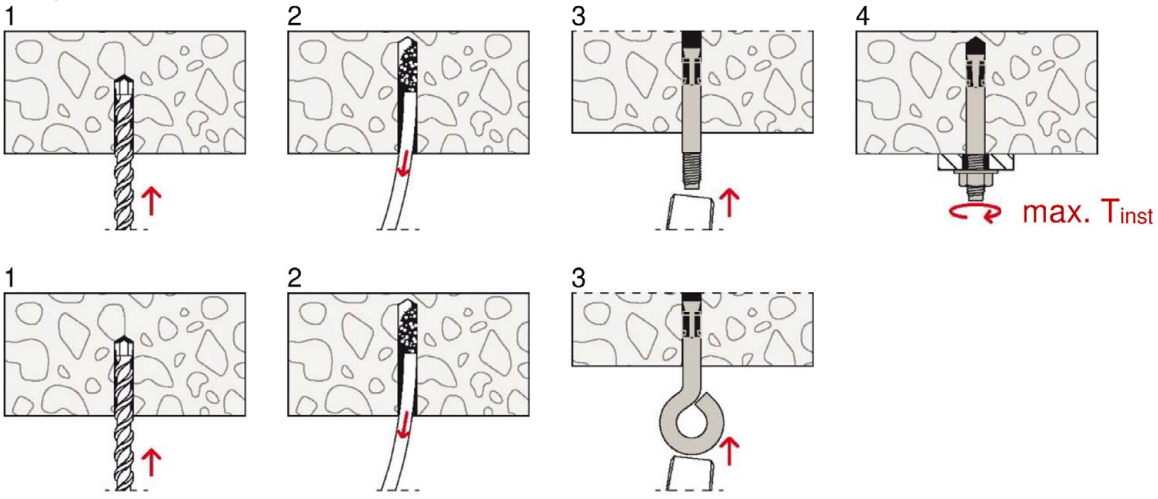
Installation instruction:

Drill the hole | **Clean the hole** | **Set the fastener** | **Apply max. T_{inst}**

Push through installation



Pre-positioned installation



(Fig. not to scale)

Nail anchor SNA

Intended Use
Installation instruction

Annex B 3

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Table C1.1: Characteristic resistance of a fixing point[1)] for all load directions

Type of anchor			SNA 6x25/..	SNA 6x25 M6/.. SNA 6x25 M8/..	SNA 6x25 OE	SNA 6x30 OE	SNA 6x30/..	SNA 6x30 M6/.. SNA 6x30 M8/..
Material			SNA			SNA, SNA R, SNA HCR		
Effective anchorage depth	$h_{ef} \geq$	[mm]	25			30		
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 and corresponding spacing - and edge distances								
Characteristic spacing **between** fixing points[1)]	$a_1 = a_2 \geq$	[mm]	200					
Minimum spacing **within** a fixing point[1)]	$s_{cr} =$		50					
Characteristic resistance F_{Rk} C20/25 to C50/60 (C12/15)	c_{cr}[2)] ≥ 100 mm	[kN]	3,0 (2,5)		1,5		5,0 (4,0)	
	c_{cr}[2)] ≥ 50 mm		2,35 (1,9)				2,35 (1,9)	
Partial factor	γ_M	[-]	1,5					
Reduced loads for reduced spacing - and corresponding edge distances								
Characteristic spacing **between** fixing points[1)]	$a_1 = a_2 \geq$	[mm]	100					
Minimum spacing **within** a fixing point[1)]	$s_{cr} =$		50					
Characteristic resistance F_{Rk} C20/25 to C50/60 (C12/15)	c_{cr}[2)] ≥ 200 mm	[kN]	3,0 (2,5)		1,5		5,0 (4,0)	
	c_{cr}[2)] ≥ 50 mm		1,7 (1,2)		1,5 (1,2)		1,7 (1,2)	
Partial factor	γ_M	[-]	1,5					
Reduced loads for minimum spacing - and edge distance								
Characteristic spacing **between** fixing points[1)]	$a_1 = a_2 \geq$	[mm]	100					
Minimum spacing **within** a fixing point[1)]	$s_{cr} =$		40					
Characteristic resistance F_{Rk} C20/25 to C50/60 (C12/15)	$c_{cr} \geq 40$ mm	[kN]	1,30 (0,85)					
Partial factor	γ_M	[-]	1,5					

[1)] See EN 1992-4:2018, Picture 3.4
[2)] Intermediate values for c may be calculated by linear interpolation

Nail anchor SNA

Performances
Characteristic resistance

Annex C 1

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Table C2.1: Characteristic resistance of a fixing point[2] under fire exposure in concrete C20/25 to C50/60

Characteristic resistance under fire exposure for all load directions for h_{ef} = 25 mm

Type of anchor	Spacing	Edge distance	Effective anchorage depth	Characteristic resistance $F_{Rk,fi}$ [kN]			
	$s_{cr,fi} \geq$ [mm]	$c_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
SNA 6x25/..	100	50	25	0,6	0,6	0,5	0,3
SNA 6x25 M6/.. SNA 6x25 M8/..					0,35	0,3	
SNA 6x25 OE				0,3	0,2		0,1

Characteristic resistance under fire exposure for all load directions for h_{ef} = 30 mm

Type of anchor	Spacing	Edge distance	Effective anchorage depth	Characteristic resistance $F_{Rk,fi}$ [kN]			
	$s_{cr,fi} \geq$ [mm]	$c_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
SNA 6x30/..	120	60	30	0,9	0,8	0,5	0,3
	100	50		0,6	0,6		
SNA 6x30 M6/.. SNA 6x30 M8/..	120	60			0,35	0,3	
	100	50					
SNA 6x30/..R/HCR	120	60		0,9			0,7
	100	50		0,6			0,5
SNA 6x30 M6/.. R/HCR	120	60		0,9			0,7
SNA 6x30 M8/.. R/HCR	100	50		0,6			0,5
SNA 6x30 OE R/HCR	100	50		0,3	0,2		0,1

Characteristic resistance under fire exposure 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]			
	$s_{cr,fi} \geq$ [mm]	$c_{cr,fi} \geq$ [mm]	$h_{ef} \geq$ [mm]	R 30	R 60	R 90	R 120
SNA 6x30/.. R/HCR SNA 6x30 M6/.. R/HCR SNA 6x30 M8/.. R/HCR	140	70	30+5[1]	1,3		1,0	0,7
	100	50		0,7			0,6

Characteristic resistance under fire exposure for shear load without level arm

Type of anchor	Characteristic resistance $M^0_{Rk,s,fi}$ [Nm]			
	R 30	R 60	R 90	R 120
SNA 6x25 OE/..	0,2	0,1	0,08	0,07
SNA 6x25..; SNA 6x25 .. RB; /..	0,9	0,7	0,4	0,3
SNA 6x25 M6..; SNA 6x25 M8.. / ..	0,3	0,2	0,2	0,2
SNA 6x30..; SNA 6x30 .. RB; /.. R/HCR	4,4	2,0	1,2	0,8
SNA 6x30 M6..; SNA 6x30 M8.. /.. R/HCR	2,8	1,3	0,8	0,5

[1] The effective anchorage depth h_{ef} = 30 + 5 mm is reached by setting the anchor SNA 6x30/… 5 mm deeper with an anchor that is 5 mm longer than required for the actual thickness of the fixture.

[2] A fixing point is defined as a single anchor or a group of 2 or 4 anchors

In case of fire attack from more than one side, the edge distance shall be $c_{fi,min} \geq$ 300 mm

Nail anchor SNA

Performances
Characteristic resistance under fire exposure

Annex C 2