MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

Área Anardi 5,
E-20730 Azpeitia
Gipuzkoa-Spain
Tel: +34 946 430 850
Lab_services@tecnalia.com
www.tecnalia.com

Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 25/0122 of 26/03/2025

General Part

Technical Assessment Body issuing the ETA:	**TECNALIA RESEARCH & INNOVATION**
Trade name of the construction product	**TNC SHORT ANCHOR BOLT**
Product family to which the construction product belongs.	Cast-in anchor bolts of ribbed reinforcing steel.
Manufacturer	**NOXIFER S.L.** Carretera de Sarral a Barberá, parcela 21 43424 Sarral Tarragona (Spain)
Manufacturing plant	Incasol- Pont de la Barquera road, 8 43420 Santa Coloma de Queralt Tarragona (Spain) Carretera de Sarral a Barberá, parcela 21 43424 Sarral Tarragona (Spain)
This European Technical Assessment contains	14 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 330924-01-0601

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Table of contents

Specific part.

1. Technical description of the product.

The TNC short anchor bolt consists of ribbed reinforcing steel B500B or B500C of the diameters 20, 25, 32 and 40 mm, two hexagon nuts and two washers. One of the ends of the bolt is provided with an anchor head and the other end with a metric thread of the sizes M20, M24, M30, M36 and M39.

The anchor bolt is imbedded in concrete up to the threaded length.

The product description is given in Annex A.

2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD).

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. Mechanical resistance and stability (BWR1)

Essential characteristic	Performance
Characteristic resistance under static and quasi-static tension load	See Annex C1
Characteristic resistance under static and quasi-static shear load	See Annex C1
Characteristic resistance under static and quasi-static tension and/ or shear load	See Annex C1
Displacement under static and quasi-static tension or shear	No performance assessed

3.2. Safety in case of fire (BWR 2)

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

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

In accordance with EAD No. 330924-01-0106, the applicable European legal act is Commission Decision 1996/582/EC.

The system to be applied is: 1.

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 Assessment and Verification of Constancy of Performance (AVCP) system are laid down in the control plan deposited at Tecnalia Research & Innovation.

The Control Plan is a confidential part of the ETA and is only handed over to the notified body involved in the assessment and verification of constancy of performance.

Issued in Azpeitia, on 26/03/2025

TECNALIA LAB_SERVICES

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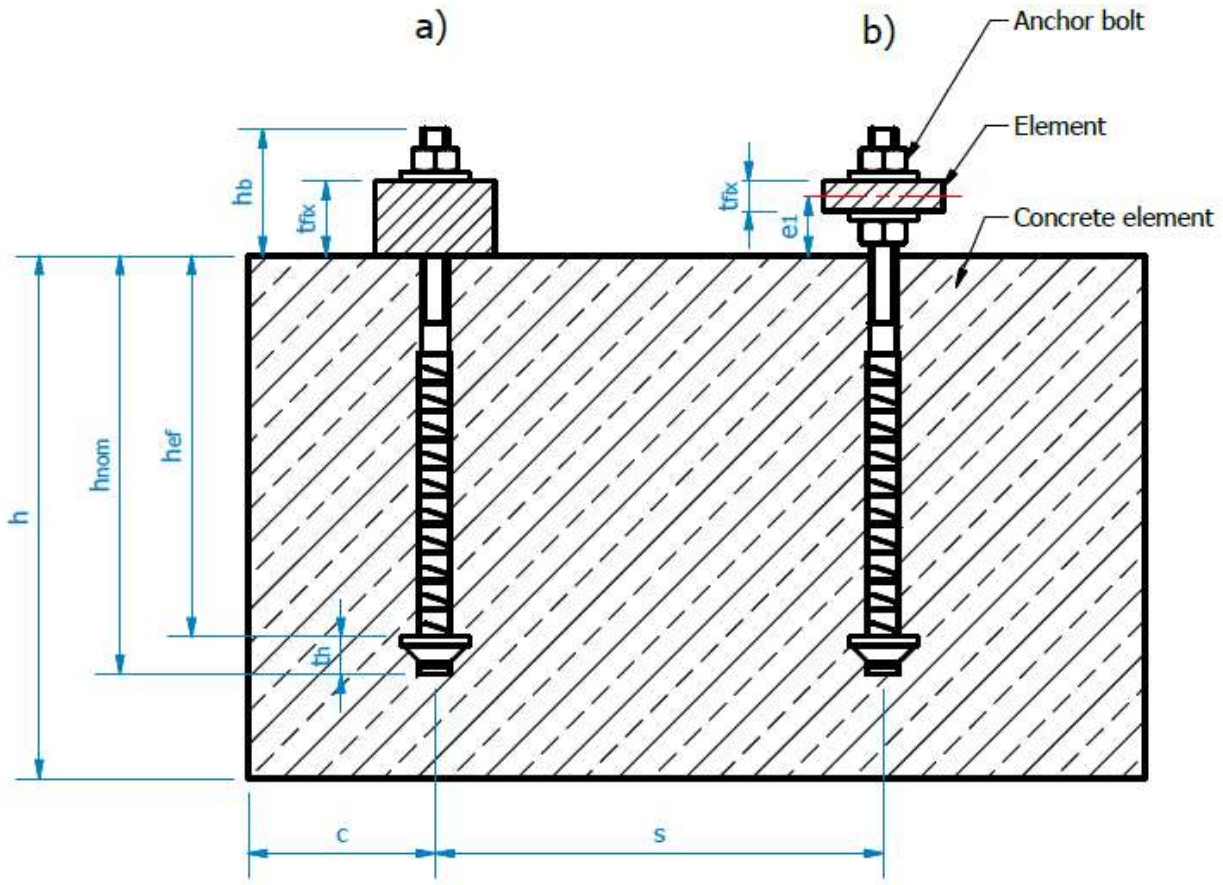
Miguel Mateos

Innovation and Conformity Assessment Point

Tecnalia Research & Innovation



a) General b) Steel to steel contact

h = Thickness of the concrete element
hnom = Total length of the threaded anchor in the concrete
hef = Effective length
hb = Threaded length outside of the concrete
th = Thickness of the head
c = Edge distance
s = Separation
tfix = Thickness of the element
e1 = Distance between the shear load and the concrete surface

PRODUCT DESCRIPTION Installation conditions	**Annex A1**

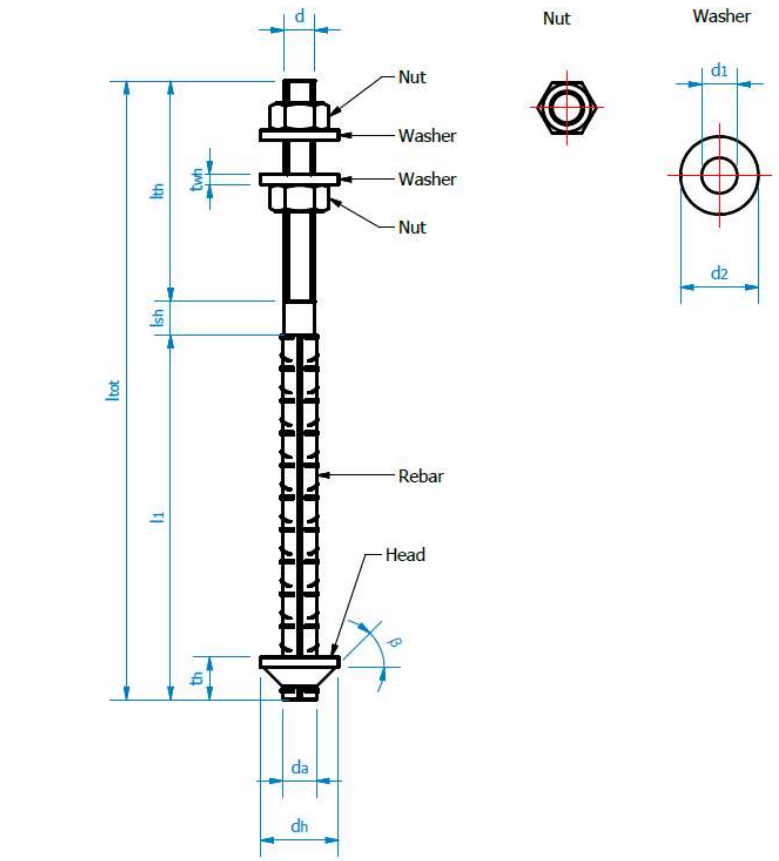


Figure A.1: Dimensions of TNC short anchor bolts

	Anchor bar							Washer			Nut
Anchor bolt	$l_{tot\ min}$ (mm)	$l_{th\ min}$ (mm)	$l_{1\ min}$ (mm)	**d** (mm)	$t_{h,min}$ (mm)	$d_{h,\ min}$ (mm)	D_a (mm)	$t_{hw,\ min}$ (mm)	d_1 (mm)	d_2 (mm)	(-)*
TN20C	227	40	167	20	12	46	20	6	23	46	M20
TN24C	279	46	208	24	13	56	25	6	28	56	M24
TN30C	370	55	275	30	15	70	32	8	35	70	M30
TN36C	473	65	368	36	18	90	40	10	38	85	M36
TN39C	528	75	413	39	18	90	40	10	46	90	M39

*Dimensions acc. to EN ISO 4032:2012- Hexagon regular nuts.

Table A.1: Dimensions of TNC short anchor bolts

PRODUCT DESCRIPTION Components and dimensions	**Annex A2**

Part	Material	Mechanical properties
Anchor bar	Reinforcing steel B500B o B500C acc.to EN 1992-1-1:2004 Annex C	f_{yk}≥ 500 MPa; f_{uk}≥ 550 MPa acc.to EN 1992-1-1:2004 Annex C
Nut	Acc.to EN ISO 4032:2012	Class 8 acc.to EN ISO 898-2:2022
Washer	Steel S275JR/J0/J2 o S355JR/J0/J2 acc.to EN 10025-2:2019	Acc.to EN 10025-2:2019

Table A.2: Materials of TNC short anchor bolts

Specifications of intended use

Loading of anchor bolts subject to:

- Static and quasi-static tension, shear or combination of tension and shear loads.

Base materials.

- Reinforced compacted normal weight concrete without fibres acc. to EN 206:2013+A2:2021.
- Strength classes C20/25 to C90/105 acc. to EN 206:2013+A2:2021.
- Cracked or uncracked concrete.

User conditions (environmental conditions).

- Anchor bars made of steel or ribbed reinforcing steel, washer and hexagonal nut are made of steel: Anchor bolts for use in structures subject to dry internal conditions.
- Anchor bars made of steel or ribbed reinforcing steel, washer and hexagonal nut are made of steel with concrete cover acc. to EN 1992-1-1:2004+A1:2014: Anchor bolts for use in structures subject appropriate exposition relating to the concrete cover.

Design

- Anchor bolts are designed under the responsibility of an engineer experienced in connections (anchor bolts, etc.) as well as in design of structures (concrete, steel, etc.).
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of anchor bolts, number of them and reinforcement (if needed) shall be indicated on the design drawings.
- For static and quasi-static loading, the anchor bolts are designed according to EN 1992-4:2018.
- The occurring splitting forces are resisted by the reinforcement. The required cross section of the minimum reinforcement is determined acc. to EN 1992-4:2018, section 7.2.1.7.

INTENDED USE Specifications	**Annex B1**

Installation

- The installation of anchor bolts is carried out by appropriately qualified personnel under the supervision of the person responsible for the technical matters on site.
- Use the product only as supplied by the manufacturer without any manipulation or exchanging of components.
- Installation in accordance with the manufacturers product installation instructions given in Annex B3 and Annex B4.
- The anchor bolts are fixed to the formwork, reinforcement, or auxiliary construction such that no movement of the product will occur during the time of laying the reinforcement and of placing and compacting the concrete.
- The concrete under the head of the anchors is properly compacted.
- The installation torque according to Table B.1 must not be exceeded.

	Installation parameters						
	h_{ef}	**$h_{ef\ min}$ (mm)**	**S_{min} (mm)**	**c_{min} (mm)**	**h_{min} (mm)**	**Max. T_{inst} case (a) (Nm)**	**Max. T_{inst} case (b) (Nm)**
TN20C	l_{tot}-l_{th}-t_h	175	120	65	h_{ef}+t_h+c_{nom}*	30	160
TN24C		220	145	75		50	280
TN30C		300	180	95		90	570
TN36C		390	220	115		160	1000
TN39C		435	235	125		190	1300

Table B.1: Installation parameters of TNC short anchor bolts

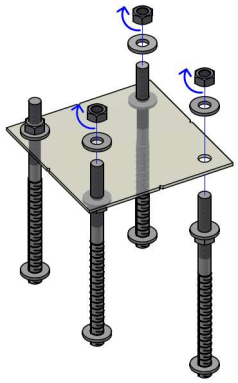
*Required concrete cover according to EN 1992-1-1:2004+AC:2010 and national rules

INTENDED USE Specifications and installation parameters	**Annex B2**

Installation instructions.

Identification of the anchor bolt model and verification that it is the correct one according to the project plan.

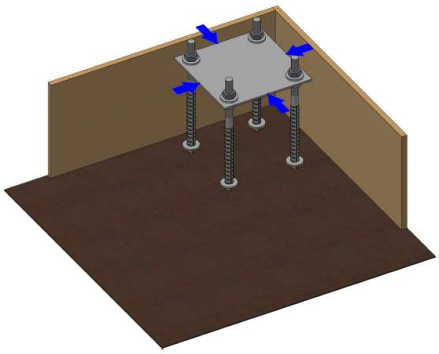
- Short (TNC) or long (TNL) type.
- Bolt capacity or bolt metric (20, 24, 30, 36 or 39).



Placement of the anchor bolts along with the correct template.

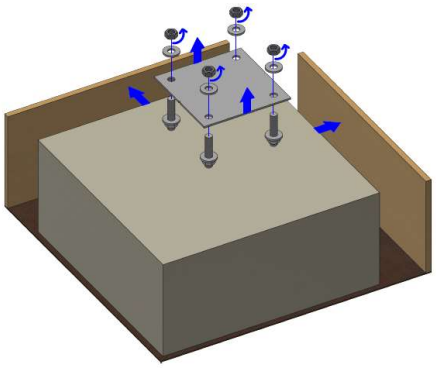
Fixing the bolts to the template using washers and nuts.

Template design and number of bolts according to the project plans.



Placement of the template and the anchor bolts in the correct position, according to the project plan.

The assembly must be securely fixed to the reinforcement or the formwork to prevent displacement during concrete pouring.

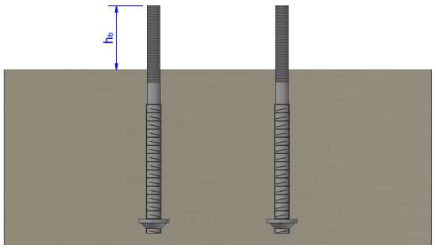


Once the concrete has hardened, remove the template for reuse.

It is important to reattach the washer and nut to each anchor bolt to prevent them from being lost.

INTENDED USE Installation instructions	**Annex B3**

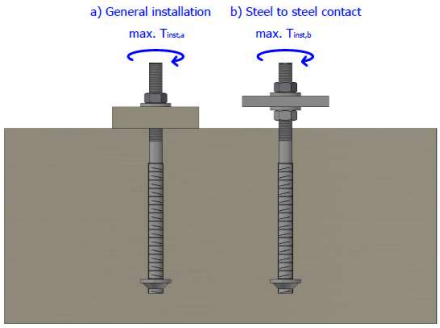
Installation instructions.



Before the assembly, check that the anchor bolt height is correct according to the project plan.

Verify that the threaded part of the anchor bolt has not suffered any type of damage (broken head, loss of verticality…).

If everything is correct, proceed with the assembly of the structure.



Depending on the type of installation (general or steel to steel contact), maximum torques are defined which must not be exceeded during the assembly of the structure.

This maximum torques are defined in Annex C1

INTENDED USE Installation instructions	**Annex B4**

Basic Works Requirement 1: Mechanical resistance and stability

Table C1: Characteristic resistance under static and quasi-static tension load

Short anchor bolts TNC			TN20C	TN24C	TN30C	TN36C	TN39C
Steel failure							
Characteristic resistance	$N_{Rk,s}$	(kN)	134,72	193,99	308,5	449,44	536,93
Partial safety factor (1)	γ_{Ms}	(-)	1,4				
Pull-out failure							
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	(kN)	283,03	414,15	639,28	1072,07	1072,07
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	(kN)	202,16	295,82	456,63	765,76	765,76
Partial safety factor (1)	γ_{Mp}	(-)	1,5				
Concrete cone failure							
Effective embedment depth	h_{ef}	(mm)	$h_{ef} = l_{tot} - l_{th} - t_h$				
	$h_{ef,min}$	(mm)	175	220	300	390	435
Factor for the influence of the load transfer mechanism	$k_{ucr,N}$	(-)	12,7				
	$k_{cr,N}$	(-)	8,9				
Characteristic edge distance	$c_{cr,N}$	(mm)	1,5 h_{ef}				
Characteristic spacing	$s_{cr,N}$	(mm)	3 h_{ef}				
Partial safety factor (1)	γ_{Mc}	(-)	1,5				
Concrete splitting							
Reinforcement must be used in order to resist splitting forces and limit the crack width to wk≤ 0,3 mm. See EN 1992-4:2018. Section 7.2.1.7.							
Minimum edge distance, spacing and thickness of concrete member							
Minimum allowable edge distance	C_{min}	(mm)	65	75	95	115	125
Minimum allowable spacing	S_{min}	(mm)	120	145	180	220	235
Minimum allowable thickness of concrete member	h_{min}	(mm)	$h_{ef}+t_h+c_{nom}$*				
Maximum installation torque							
Maximum recommended installation torque general case	T_{inst} (general)	(Nm)	30	50	90	160	190
Maximum recommended installation torque steel to steel case	T_{inst} (steel to steel)	(Nm)	160	280	570	1000	1300

(1) In absence of other national regulations.

PERFORMANCE
Characteristic resistances under tension load
Characteristic resistances under shear load
Combined tension and shear load

Annex C1

Table C2: Characteristic resistance under static and quasi-static shear load

Short anchor bolts TNC			TN20C	TN24C	TN30C	TN36C	TN39C
Steel failure under shear load							
Characteristic resistance without level arm	$V^0_{Rk,s}$	(kN)	67,36	96,99	154,25	224,72	268,47
Factor according to EN 1992-4:2018 sec. 7.2.2.3.1	k_7	(-)	1				
Characteristic resistance with lever arm	$M^0_{Rk,s}$	(Nm)	356,88	616,64	1236,66	2174,58	2839,51
Partial safety factor (2)	γ_{Ms}	(-)	1,5				
Concrete edge failure without supplementary reinforcement							
Effective length of the anchor bolt	l_f	(mm)	160	192	240	288	312
Effective outer diameter	$d_{nom} = d$	(mm)	20	24	30	36	39
Partial safety factor (2)	γ_{Mc}	(-)	1,5				
Concrete pry-out failure							
Factor according to EN 1992-4:2018 sec. 7.2.2.4	k_8 (1)	(-)	2				
Partial safety factor (2)	γ_{Mcp}	(-)	1,5				

(1) If supplementary reinforcement is present, the factor k_8 has to be multiplied by 0,75.
(2) In absence of other national regulations.

Table C3: Characteristic resistance under static and quasi-static tension and/or shear load

Short anchor bolts TNC			TN20C	TN24C	TN30C	TN36C	TN39C
Combined tension and shear load							
Factor according to EN 1992-4:2018 sec. 7.2.3.2	k_{11}	(-)	2/3				

PERFORMANCE
Characteristic resistances under tension load
Characteristic resistances under shear load
Combined tension and shear load

Annex C2

Basic Works Requirement 2: Safety in case of fire

Table C4: Reaction and resistance to fire

Short anchor bolts TNC			TN20C	TN24C	TN30C	TN36C	TN39C
Reaction to fire							
Anchorages satisfy requirements for Class A1							
Resistance to fire							
Fire resistance to steel failure (tension load)							
Characteristic resistance (30 min fire exposure)	$N_{Rk,s,fi\ 30}$	(kN)	4,90	7,05	11,22	16,34	19,52
Characteristic resistance (60 min fire exposure)	$N_{Rk,s,fi\ 60}$	(kN)	3,67	5,29	8,41	12,26	14,64
Characteristic resistance (90 min fire exposure)	$N_{Rk,s,fi\ 90}$	(kN)	3,18	4,59	7,29	10,62	12,69
Characteristic resistance (120 min fire exposure)	$N_{Rk,s,fi\ 120}$	(kN)	2,45	3,53	5,61	8,17	9,76
Fire resistance to pull-out failure (tension load)							
Characteristic resistance (90 min fire exposure) in uncracked concrete	$N_{Rk,p,fi\ 90\ uncracked}$	(kN)	70,76	103,54	159,82	268,02	268,02
Characteristic resistance (120 min fire exposure) in uncracked concrete	$N_{Rk,p,fi\ 120\ uncracked}$	(kN)	56,61	82,83	127,86	214,41	214,41
Characteristic resistance (90 min fire exposure) in cracked concrete	$N_{Rk,p,fi\ 90\ cracked}$	(kN)	50,54	73,96	114,16	191,44	191,44
Characteristic resistance (120 min fire exposure) in cracked concrete	$N_{Rk,p,fi\ 120\ cracked}$	(kN)	40,43	59,16	91,33	153,15	153,15
Fire resistance to steel failure (shear load without lever arm)							
Characteristic resistance (30 min fire exposure)	$V_{Rk,s,fi\ 30}$	(kN)	4,90	7,05	11,22	16,34	19,52
Characteristic resistance (60 min fire exposure)	$V_{Rk,s,fi\ 60}$	(kN)	3,67	5,29	8,41	12,26	14,64
Characteristic resistance (90 min fire exposure)	$V_{Rk,s,fi\ 90}$	(kN)	3,18	4,59	7,29	10,62	12,69
Characteristic resistance (120 min fire exposure)	$V_{Rk,s,fi\ 120}$	(kN)	2,45	3,53	5,61	8,17	9,76
Fire resistance to steel failure (shear load with lever arm)							
Characteristic resistance (30 min fire exposure)	$M^0_{Rk,s,fi\ 30}$	(Nm)	12,98	22,42	44,97	79,08	103,25
Characteristic resistance (60 min fire exposure)	$M^0_{Rk,s,fi\ 60}$	(Nm)	9,73	16,82	33,73	59,31	77,44
Characteristic resistance (90 min fire exposure)	$M^0_{Rk,s,fi\ 90}$	(Nm)	8,44	14,58	29,23	51,40	67,12
Characteristic resistance (120 min fire exposure)	$M^0_{Rk,s,fi\ 120}$	(Nm)	6,49	11,21	22,48	39,54	51,63

PERFORMANCE
Reaction to fire
Resistance to fire

Annex C3