Deutsches Institut für Bautechnik DIBt

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-15/0508 of 15 December 2020

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	CELO Sleeve anchor DNBOLT
Product family to which the construction product belongs	Mechanical fastener for use in concrete
Manufacturer	CELO Befestigungssysteme GmbH Industriestraße 6 86551 Aichach DEUTSCHLAND
Manufacturing plant	Plant 11 Plant 13
This European Technical Assessment contains	12 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 330232-00-0601, Edition 10/2016
This version replaces	ETA-15/0508 issued on 23 September 2015

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Specific Part

1 Technical description of the product

The CELO sleeve anchor DNBOLT is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

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 Mechanical resistance and stability (BWR 1)

Essential characteristic	**Performance**
Characteristic resistance to tension load (static and quasi-static loading)	see Annex B 2 and C 1
Characteristic resistance to shear load (static and quasi-static loading)	see Annex C 2
Displacements (static and quasi-static loading)	see Annex C 1 and C 2
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed
Durability	See Annex B 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	**Performance**
Reaction to fire	Class A1
Resistance to fire	No performance assessed

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

In accordance with European Assessment Documents EAD No. 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for the applicable European Assessment Document

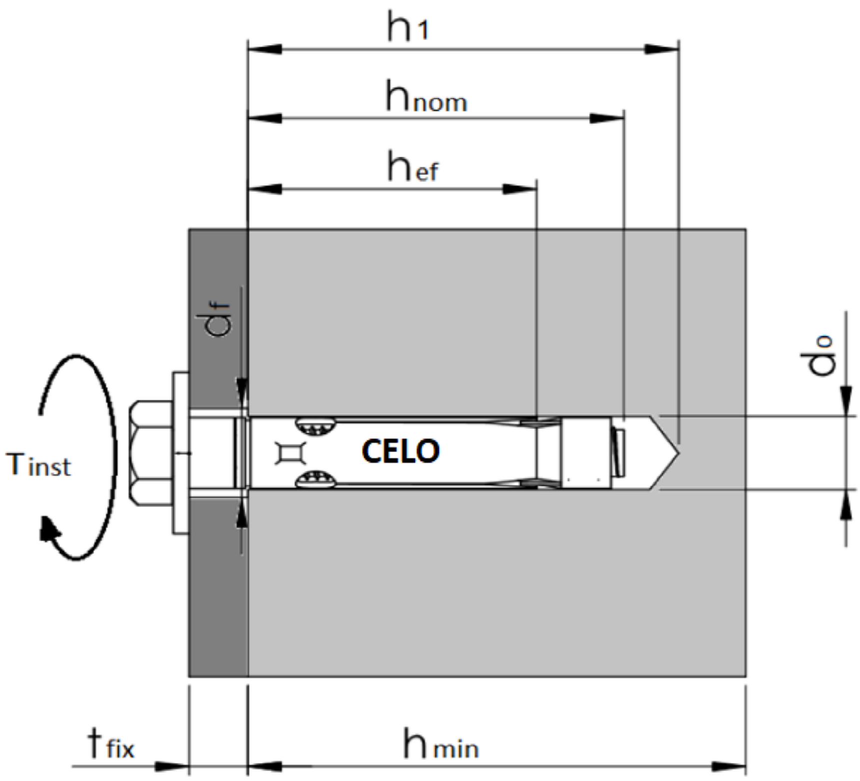
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 15 December 2020 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

CELO sleeve anchor DNBOLT (after installation)



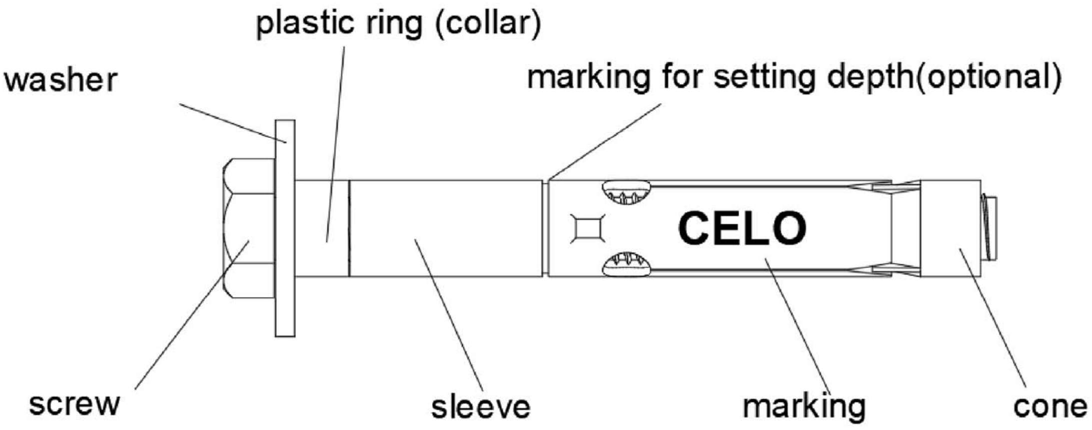
h_{nom}	=	Setting depth
h_1	=	Depth of the drill hole (deepest point)
h_{min}	=	Min. thickness of concrete member
t_{fix}	=	Thickness of fixture
h_{ef}	=	Effective embedment depth
d_0	=	Drill hole diameter
d_f	=	Diameter of clearance hole in the fixture
T_{inst}	=	Installation torque moment

CELO sleeve anchor DNBOLT

Product description
Installation conditions

Annex A 1

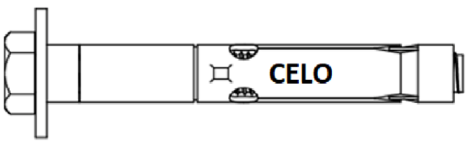
CELO sleeve anchor DNBOLT (assembled)



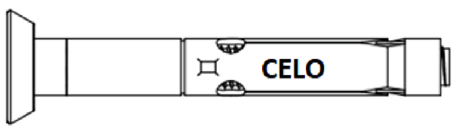
Marking: company name (CELO) or Logo, name of the anchor, diameter – length (optional) / clamping size

Example for marking: CELO Dnbolt 10-80/30 or 10/30

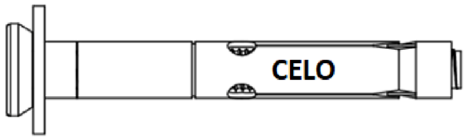
Anchor types:



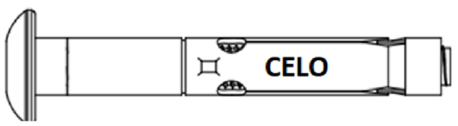
Type DT - screw according to DIN 933:1987-09 or EN ISO 4017:204 and washer



Type DV - Countersunk screw



Type ARPHO - Countersunk screw and washer



Type DB - Button screw

CELO sleeve anchor DNBOLT

Product description
Assembling, marking, anchor types

Annex A 2

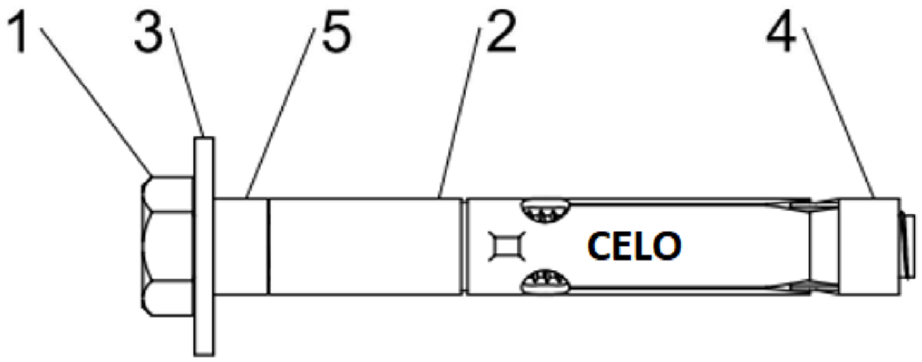


Table A1: Components and materials

Item	Designation	Material
1	Screw	Steel, according EN ISO 898-1:2012, class 6.8 or 8.8
2	Sleeve	Carbon steel, hardness 90-150 Hv
3	Washer	Carbon steel, hardness > 90 Hv
4	Cone	Carbon steel, hardness > 150 Hv
5	Collar	Plastic

All steel parts are zinc plated and blue passivated ≥5µm acc. EN ISO 4042:2018

Table A2: Dimensions

Anchor	d_o	Collar length	Washer	Ø screw	Sleeve length	Screw length	SW
	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
DNBOLT 8	8	4,5	DIN 9021:1990-03 or EN ISO 7093:2000	M6	≥30,5	≥45	10
DNBOLT 10	10	5,5	DIN 9021:1990-03 or EN ISO 7093:2000	M8	≥40,5	≥60	13
DNBOLT 12	12	6,5	DIN 9021:1990-03 or EN ISO 7093:2000	M10	≥47	≥70	17

CELO sleeve anchor DNBOLT

Product description
Components, materials and dimensions

Annex A 3

Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads.

Base materials:
- Compacted, reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 + A1:2016.
- Strength classes C20/25 - C50/60 according to EN 206:2013 + A1:2016
- Non-cracked concrete.

Use conditions (Environmental conditions):
- Structures subject to dry internal conditions.

Design:
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are 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.).
- The anchorages are designed in accordance to EN 1992-4:2018 and Technical Report TR 055, Edition February 2018
- For effective embedment depth hef < 40 mm only statically indeterminate fixings (e.g. light-weight suspended ceilings with internal exposure) are covered by the ETA

Installation:
- Hole drilling by hammer drilling only
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- Positioning of the drill holes without damaging the reinforcement.

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Table B1: Installation parameters

CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Nominal drill hole diameter	d_o	[mm]	8	10	12
Max. cutting diameter of drill bit	$d_{cut,max}$	[mm]	8,45	10,45	12,50
Depth of drill hole	$h_1 \geq$	[mm]	45	55	65
Effective embedment depth	$h_{ef} \geq$	[mm]	30	37	43
Setting depth	$h_{nom} \geq$	[mm]	40	50	60
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14
Thickness of fixture	t_{fix}	[mm]	5...250	5...300	10...300
Wrench size	SW	[mm]	10	13	17
Installation torque moment	T_{inst}	[Nm]	10	15	30

Table B2: Minimum thickness of concrete member, spacing and edge distance

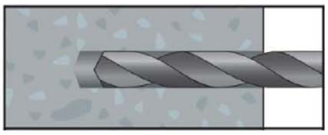
CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Minimum thickness of member	h_{min}	[mm]	100	100	110
Minimum spacing	s_{min}	[mm]	40	50	60
Minimum edge distance	c_{min}	[mm]	40	50	60

CELO sleeve anchor DNBOLT

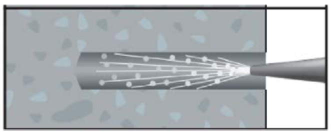
Intended use
Installation parameters, minimum thickness, min. spacing and edge distance

Annex B 2

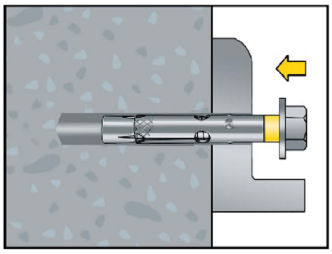
Installation instructions



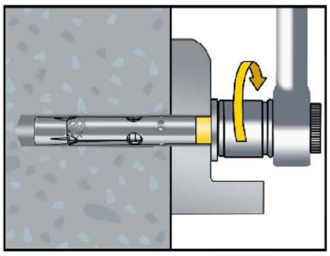
1. Drill the hole with a hammer drill



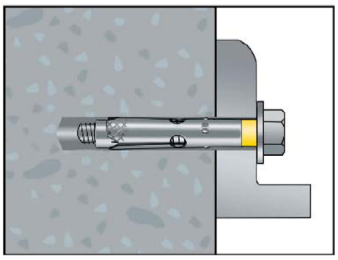
2. Clean the borehole



3. Hammer in the anchor (pay attention to the defined setting depth)



4. Apply the installation torque moment T_{inst} by using a torque wrench



5. After installation

CELO sleeve anchor DNBOLT	**Annex B 3**
Intended use Installation instruction	

Table C1: Characteristic values under tension loads

CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Steel failure class 6.8					
Characteristic resistance	$N_{Rk,s}$	[kN]	12,1	22,0	34,8
Partial factor	$\gamma_{Ms,N}$	[-]	1,5		
Steel failure class 8.8					
Characteristic resistance	$N_{Rk,s}$	[kN]	16,1	29,3	46,4
Partial factor	$\gamma_{Ms,N}$	[-]	1,5		
Pull out failure					
Characteristic resistance in non-cracked concrete ≥ C20/25	$N_{Rk,p}$	[kN]	6,0	7,5	12,0
Increasing factor for concrete	ψ_c	[-]	1,0		
Installation factor	γ_{inst}	[-]	1,0	1,0	1,2
Concrete cone failure					
Factor for cracked concrete	k_{cr}	[-]	No performance assessed		
Factor for uncracked concrete	k_{ucr}	[-]	11,0		
Effective anchorage depth	h_{ef}	[mm]	30	37	43
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}		
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}		
Splitting failure					
Characteristic resistance	$N^0_{Rk,sp}$	[kN]	$N^0_{Rk,sp}$ = min ($N_{Rk,p}$; $N^0_{Rk,c}$ [1)])		
Spacing (splitting)	$s_{cr,sp}$	[mm]	180	200	240
Edge distance (splitting)	$c_{cr,sp}$	[mm]	90	100	120
Installation factor	γ_{inst}	[-]	1,0	1,0	1,2

[1)] $N^0_{Rk,c}$ according to EN 1998-4:2018

Table C2: Displacement under tension loads

CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Tension load	N	[kN]	2,5	3,3	5,7
Displacements	δ_{N0}	[mm]	0,35	0,33	0,39
Displacements	$\delta_{N\infty}$	[mm]	2,15		

CELO sleeve anchor DNBOLT

Performances
Characteristic values under tension load
Displacement under tension load

Annex C 1

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Table C3: Characteristic values under shear loads

CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Steel failure without lever arm class 6.8					
Characteristic resistance	$V^0_{Rk,s}$	[kN]	6,0	11,0	17,4
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Steel failure without lever arm class 8.8					
Characteristic resistance	$V^0_{Rk,s}$	[kN]	8,0	14,6	23,2
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Steel failure with lever arm class 6.8					
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	9,2	22,5	44,9
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Steel failure with lever arm class 8.8					
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	12,2	30,0	59,8
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Ductility factor	k_7	[-]	0,8		
Concrete pryout failure					
k-Factor	k_8	[-]	1,0	1,0	1,0
Installation factor	γ_{inst}	[-]	1,0		
Concrete edge failure					
Effective length of anchor under shear load	l_f	[mm]	30	37	43
Diameter	d_{nom}	[mm]	6	8	10
Installation factor	γ_{inst}	[-]	1,0		

The plastic ring may not be used for the load transmission.

Table C4: Displacement under shear loads

CELO sleeve anchor DNBOLT			Size		
			DNBOLT 8	DNBOLT 10	DNBOLT 12
Shear load	V	[kN]	2,9	5,2	6,9
Displacements	δ_{V0}	[mm]	0,17	0,56	0,53
Displacements	$\delta_{V\infty}$	[mm]	0,26	0,84	0,80

CELO sleeve anchor DNBOLT

Performances
Characteristic values under shear load
Displacement under shear load

Annex C 2