

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-15/0356
of 16 June 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

CELO Forced expansion anchor ZA

Product family
to which the construction product belongs

Mechanical fasteners for use in concrete

Manufacturer

CELO Befestigungssysteme GmbH
Industriestraße 6
86551 Aichach
DEUTSCHLAND

Manufacturing plant

Werk 11

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-15/0356 issued on 8 July 2015

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Specific Part

1 Technical description of the product

The CELO Forced expansion anchor ZA 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 B2 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
Durability	See Annex B 1
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

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 Document 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 in the applicable European Assessment Document

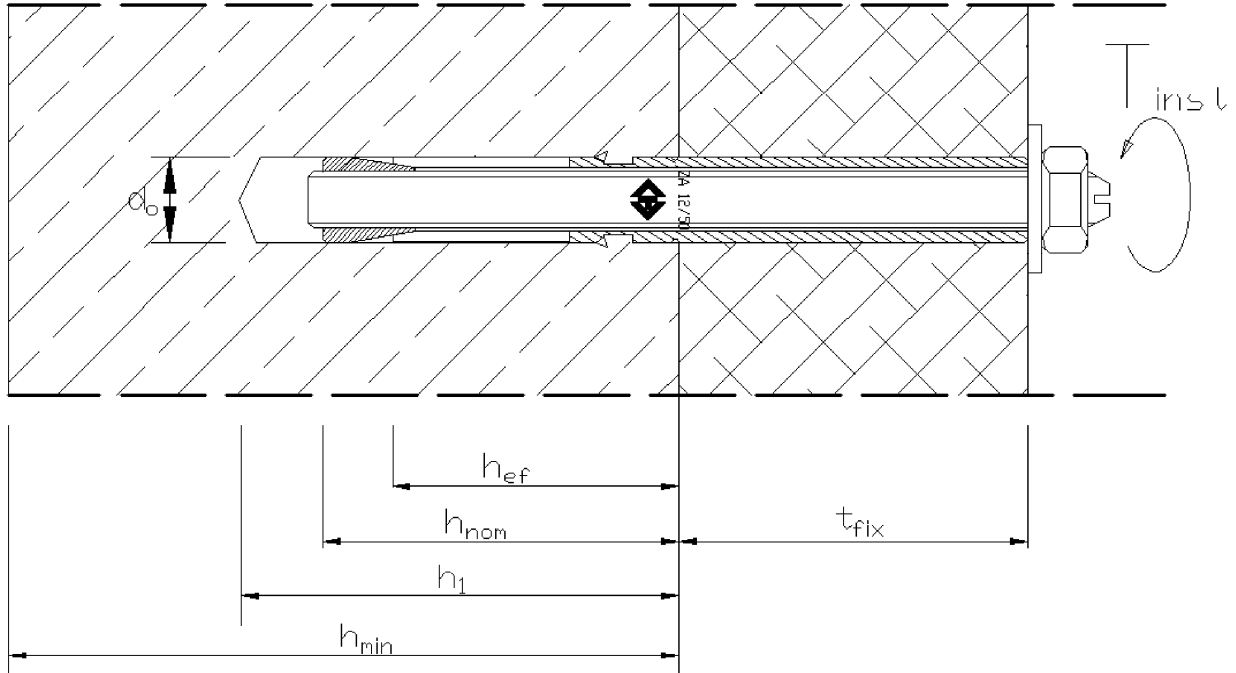
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 16 June 2021 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

CELO forced expansion anchor ZA 12 (after installation in concrete)



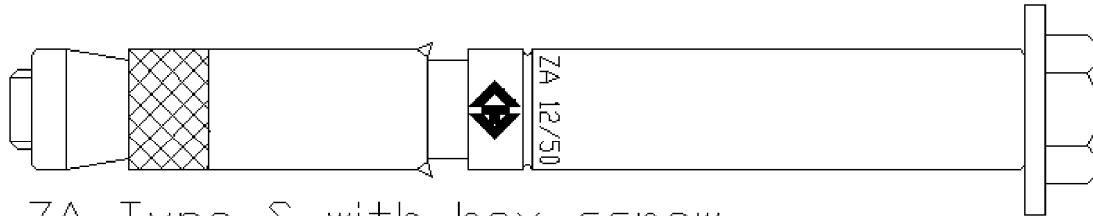
- h_{nom} = Setting depth
- h_1 = Depth of the drill hole (deepest point)
- h_{min} = Min. thickness of concrete member
- t_{fix} = Thickness of fixture
- h_{ef} = Effective anchorage depth
- d_o = Drill hole diameter
- T_{inst} = Installation torque

CELO forced expansion anchor ZA

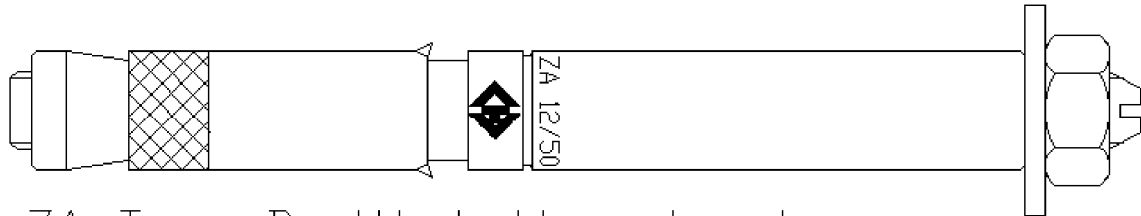
Product description
Installed conditions

Annex A 1

CELO forced expansion anchor ZA 12 (assembled)



ZA Type S with hex screw



ZA Type B with bolt and nut

Marking:

brand marking
Type
Size
Max. clamping size

Logo or company name
ZA
12 (= outer diameter)
i.e. /50

Example:

◀▶ **ZA 12/50**

Marking optional with anchor length:

Anchor length

i.e. -100

Example:

◀▶ **ZA 12-100/50**

CELO forced expansion anchor ZA

Annex A 2

Product description
Anchor types and marking

Table 1: Anchor parts

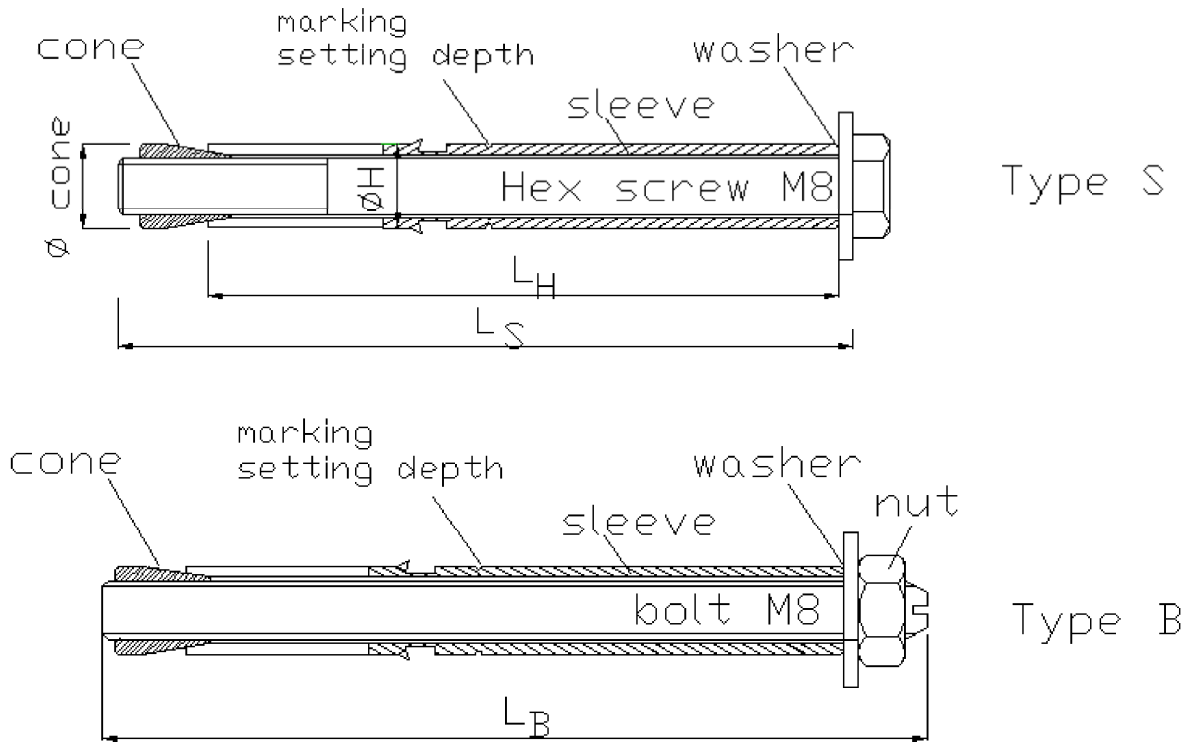


Table 2: Material

All parts are zinc plated and blue passivated $\geq 5\mu\text{m}$ acc. EN ISO 4042:2018

Designation	Material
Hex Screw	Carbon steel quality 8.8, EN ISO 898-1:2013
Anchor stud (Bolt)	Carbon steel, DIN EN ISO 898-1, $f_{uk} \geq 800 \text{ N/mm}^2$, $f_{yk} \geq 640 \text{ N/mm}^2$
Nut	Carbon steel, quality class 8, EN ISO 898-2:2012
Washer	Carbon steel, EN 10025-2:2019, HV10 = 140 - 250
Cone	Carbon steel, HRC = 42 – 52 or HV10 = 420-550, lubricated
Sleeve	Carbon steel pipe, Hv10 ≥ 128

Table 3: Dimension

Anchor	Ø H sleeve	Ø cone	Ø screw	Ø bolt	sleeve length L_H	screw length L_S	bolt length L_B	SW
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ZA 12	12	12	M8	M8	≥ 45	≥ 53	≥ 65	13

CELO forced expansion anchor ZA

Product description
Materials and dimensions

Annex A 3

Specifications of intended use

Anchorage 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 to C50/60 according to EN 206:2013+A1:2016.
- Uncracked 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.).
- Anchorages under static or quasi-static actions are designed in accordance with
- EN 1992-4:2018 and EOTA Technical Report TR 055, Edition 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.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Hammer drilling only.
- Positioning of the drill holes without damaging the reinforcement.

CELO forced expansion anchor ZA

Intended use
Specifications

Annex B 1

Table 4: Installation data

CELO Forced expansion anchor ZA			Size
			ZA 12 (M8)
Nominal drill hole diameter	d_o	[mm]	12
Max. cutting diameter of drill bit	$d_{cut,max}$	[mm]	12,50
Depth of drill hole	$h_1 \geq$	[mm]	55
Effective anchorage depth	$h_{ef} \geq$	[mm]	40
Setting depth	$h_{nom} \geq$	[mm]	49
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	14
Thickness of fixture	t_{fix}	[mm]	0...250
Wrench size	SW	[mm]	13
Required installation torque moment	T_{inst}	[Nm]	20

Table 5: Minimum thickness of concrete member, spacing and edge distance

CELO Forced expansion anchor ZA			Size
			ZA 12 (M8)
Minimum thickness of member	h_{min}	[mm]	120
Minimum spacing	s_{min}	[mm]	90
Minimum edge distance	c_{min}	[mm]	60

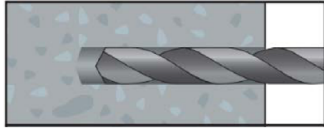
CELO forced expansion anchor ZA

Intended use

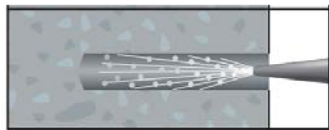
Installation data, minimum thickness spacing and edge distance

Annex B 2

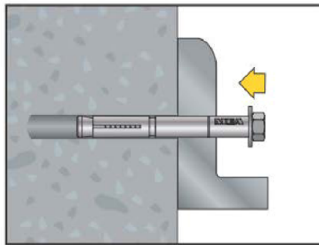
Installation instruction



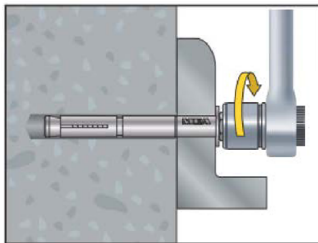
1. Drill the hole with a hammer drill



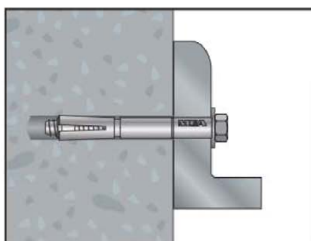
2. Clean the borehole



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



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



5. After installation

CELO forced expansion anchor ZA

Intended use
Installation instruction

Annex B 3

Table 6: Characteristic values under tension load

CELO Forced expansion anchor ZA			Size
			ZA 12 (M8)
Steel failure class 8.8 (bolt or screw)			
Characteristic resistance	$N_{Rk,s}$	[kN]	29,3
Pull out failure			
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	12
increasing factors for $N_{Rk,p}$	Ψ_c	C25/30	1,1
		C30/37	1,22
		C40/50	1,41
		C50/60	1,55
Installation factor	γ_{inst}	[-]	1,0
Concrete cone			
Effective anchorage depth	h_{ef}	[mm]	40
factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0
factor for cracked concrete	$k_{cr,N}$	[-]	No performance assessed
Spacing	$s_{cr,N}$	[mm]	120
Edge distance	$c_{cr,N}$	[mm]	60
Splitting failure			
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}; N^0_{Rk,c})$
Spacing (splitting)	$s_{cr,sp}$	[mm]	160
Edge distance (splitting)	$c_{cr,sp}$	[mm]	80
Installation factor	γ_{inst}	[-]	1,0

Table 7: Displacements under tension load

Forced expansion anchor ZA			Size
			ZA 12 (M8)
Tension load	N	[kN]	6,4
Displacements	δ_{N_0}	[mm]	1,4
Displacements	δ_{N_∞}	[mm]	1,7

CELO forced expansion anchor ZA

Annex C 1

Performances

Characteristic values and displacements under tension load

Table 8: Characteristic values under shear load

CELO Forced expansion anchor ZA			Size
			ZA 12 (M8)
Steel failure without lever arm (screw or bolt)			
Characteristic resistance	$V_{Rk,s}^0$	[kN]	14,6
Steel failure with lever arm (screw or bolt)			
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	30,0
Factor	k_7	[-]	1,0
Concrete pryout failure			
Factor for pry out failure	k_8	[-]	1,0
Installation factor	γ_{inst}	[-]	1,0
Concrete edge failure			
Effective length of anchor under shear load	l_f	[mm]	40
effective external diameter of anchor	d_{nom}	[mm]	8
Installation factor	γ_{inst}	[-]	1,0

Table 9: Displacements under shear load

CELO Forced expansion anchor ZA			Size
			ZA 12 (M8)
Shear load	V	[kN]	10,6
Displacements	δ_{v_0}	[mm]	1,4
Displacements	δ_{v_∞}	[mm]	2,0

CELO forced expansion anchor ZA

Performances

Characteristic values and displacements under shear load

Annex C 2