

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-16/0848
of 25 May 2021

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

CELO Concrete screw BTS6

Fasteners for use in concrete for
redundant non-structural systems

CELO Befestigungssysteme GmbH
Industriestraße 6
86551 Aichach
DEUTSCHLAND

Werk 15
Plant 15

12 pages including 3 annexes which form an integral part
of this assessment

EAD 330747-00-0601, Edition 06/2018

ETA-16/0848 issued on 1 November 2018

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Specific Part

1 Technical description of the product

The CELO concrete screw BTS6 is an anchor of size 6 mm made of galvanised steel respectively steel with zinc flake coating. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

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 concrete screw 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

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

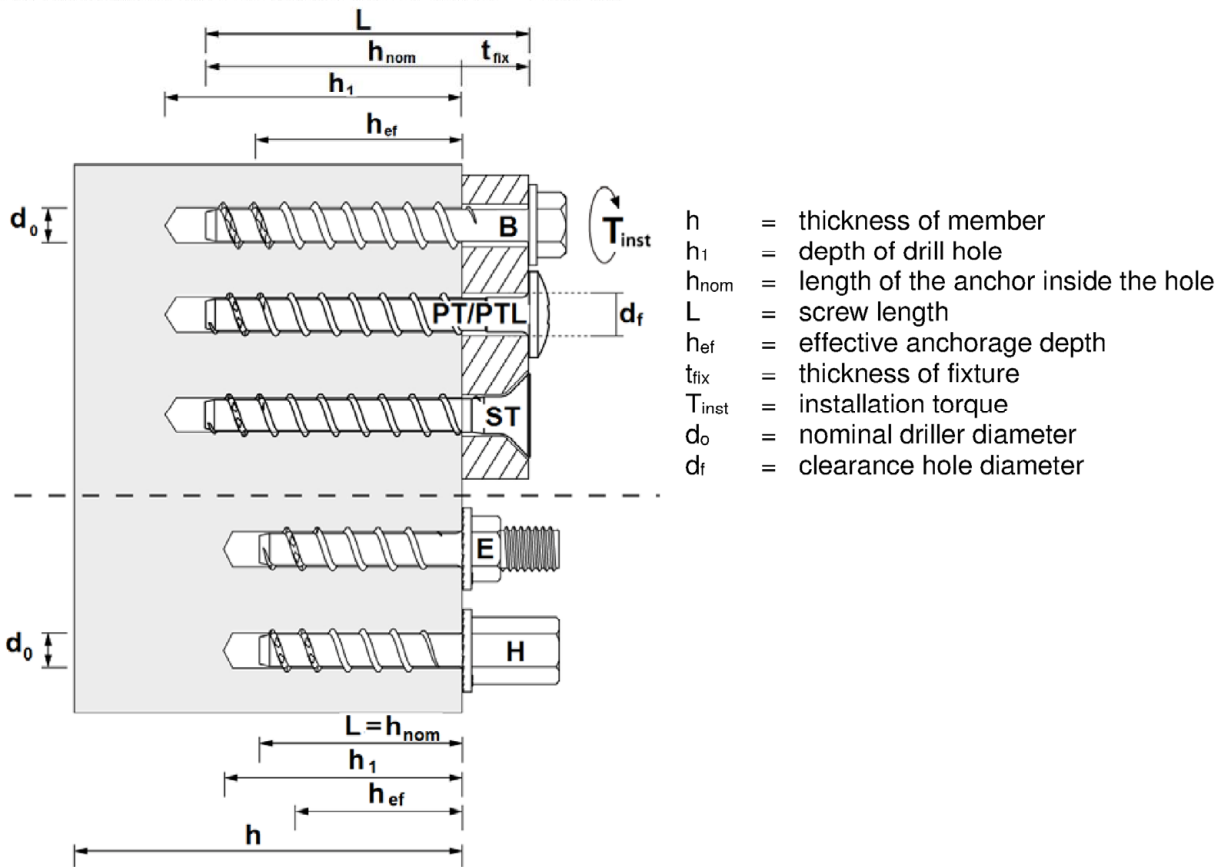
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 25 May 2021 by Deutsches Institut für Bautechnik

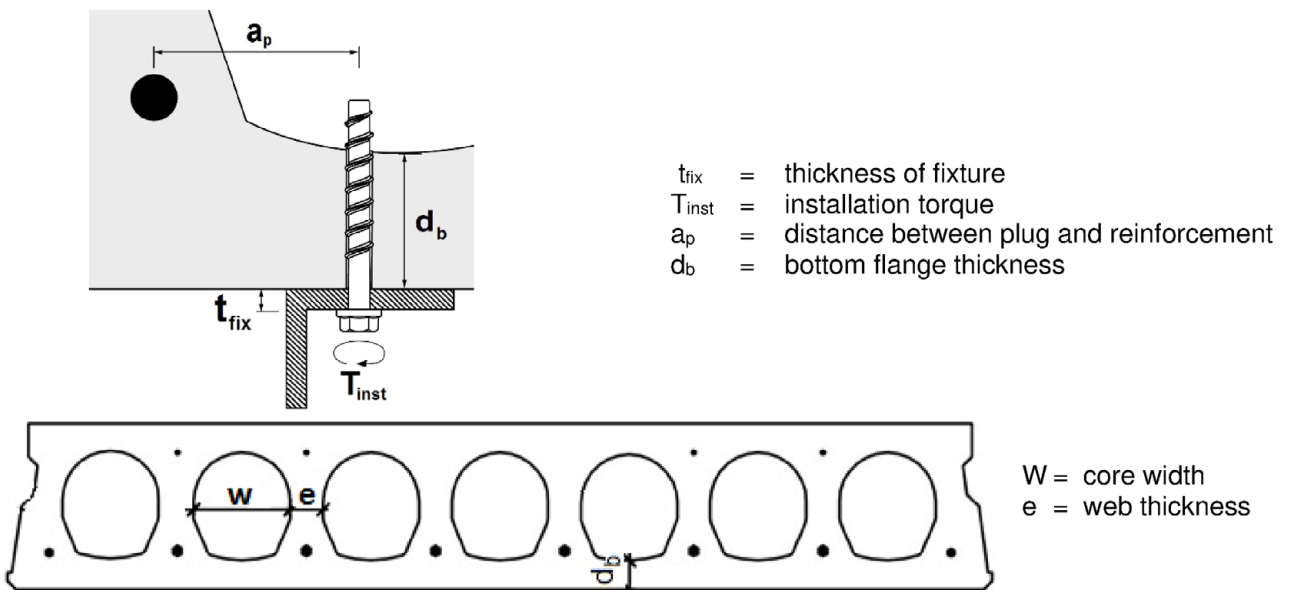
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

BTS6 intended use in concrete C20/25 – C50/60



BTS6 - intended use in precast prestressed hollow core slabs ($w/e \leq 4,2$) with flange thickness ≥ 35 mm



CELO concrete screw BTS6

Product description
Installed condition

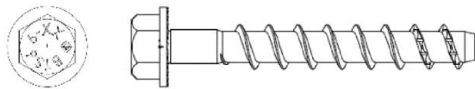
Annex A1

Table A2.1: Material and screw types

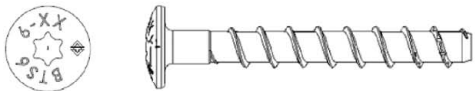
CELO concrete screw BTS6			6
Nominal characteristic yield strength	f_{yk}	[N/mm ²]	867
Nom. characteristic ultimate strength	f_{uk}	[N/mm ²]	930
Elongation at rupture	A_5	[%]	≤ 8

All parts carbon steel.

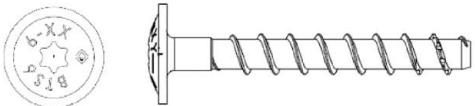
Coating: Grey Zn-Al flake coated or zinc plated and blue passivated ≥ 5 µm acc. EN ISO 4042:2018



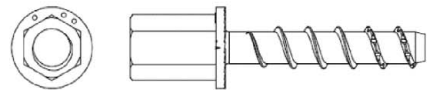
1- **BTS-B: Hexagonal head**



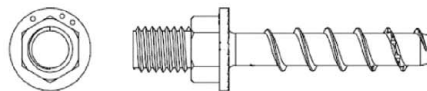
2- **BTS-PT: Pan head**



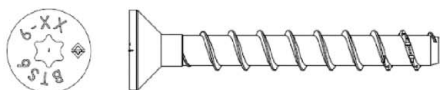
3- **BTS-PTL: Pan head large**



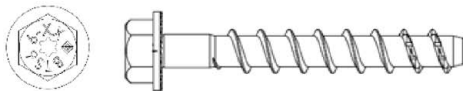
4- **BTS-H: Internal thread M6, M8 and M10 or 1/4" and 3/8"**




5- **BTS-E: External head M6, M8 and M10 or 1/4", 5/16" and 3/8"**



6- **BTS-ST: Countersunk head**



7- **BTS-BT: Hexagonal head with TX recess**

marking: company name or logo (optional) 
 anchor name BTS or BTS6
 type (optional) e.g. -B
 diameter 6
 length e.g. -55

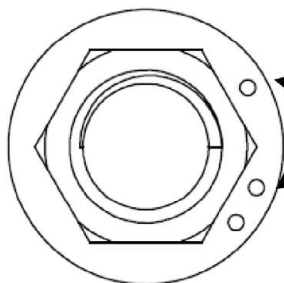
Example: **BTS6-B 6-55**

CELO concrete screw BTS6

Production description
Material, screw types, marking

Annex A2

In types BTS-E and BTS-H:

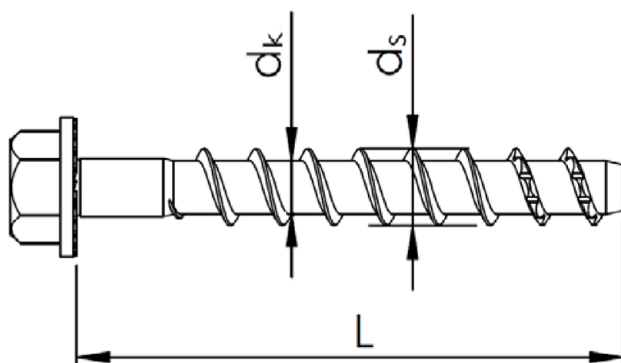


One circle mark for $h_{nom} = 35\text{mm}$

Two circle marks for $h_{nom} = 50\text{mm}$

Table A3.1: Dimensions

CELO concrete screw BTS6			6	
Nominal embedment depth		[mm]	h_{nom} 35	h_{nom} 50
Length	$L \leq$	[mm]	300	
Thread outer diameter	d_s	[mm]	7,75	
Core diameter	d_k	[mm]	5,40	



CELO concrete screw BTS6

Production description
Dimensions

Annex A3

Specifications of Intended use

Anchorage subject to:

- static and quasi-static loads,
- only for use in concrete for redundant non-structural systems,
- used for anchorage in prestressed hollow core slabs,
- used for anchorages with requirements related to resistance to fire (does not apply for precast prestressed hollow core slabs).

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,
- cracked and uncracked concrete.

Use conditions (Environmental conditions):

- The anchor may only be used in 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.).
- Design of fastenings according to EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.
- The design under shear load according to EN 1992-4:2018, Section 6.2.2 applies to all specified diameter d_f of clearance hole in the fixture in Annex B2, Table B2.1.

Installation:

- 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.
- After installation further turning of the anchor is not possible.
- The head of the anchor is supported on the fixture and is not damaged.

CELO concrete screw BTS6

Intended use
Specifications

Annex B1

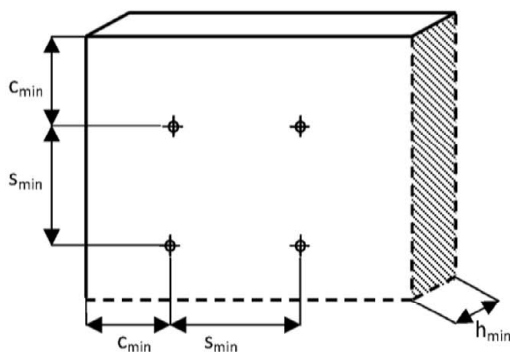
Table B2.1: Installation data

CELO concrete screw BTS6			6	
Nominal anchorage depth	h_{nom}	[mm]	35	50
Nominal driller diameter	d_o	[mm]	6	
Cutting diameter of drillbit	$d_{cut} \leq$	[mm]	6,40	
Clearance hole diameter	$d_f \leq$	[mm]	9	
Depth of drill hole	$h_1 \geq$	[mm]	$h_{nom} + 5 \text{ mm}$	
Distance between plug position and prestressing steel	$a_p \geq$	[mm]	50	
Effective anchorage depth	h_{ef}	[mm]	26	39
Maximum installation torque	$\max T_{inst}$	[Nm]	15	
Max. nominal torque for installation with an impact screw driver	$T_{imp,max}$	[Nm]	150	
Wrench size (for Hex head)	SW	[mm]	10/13 ¹⁾	
TX recess			TX 30	
Max. thickness of fixture	t_{fix}	[mm]	115	100

¹⁾ SW13 only for BTS-S (M10 und 3/8") and BTS-H (M10 and 3/8")

Table B2.2: Minimum thickness, spacing and edge distance in concrete

CELO concrete screw BTS6			concrete	
Nominal anchorage depth	$h_{nom} \geq$	[mm]	35	50
Minimum thickness of member	h_{min}	[mm]	100	
Minimum spacing	s_{min}	[mm]	40	
Minimum edge distance	c_{min}	[mm]	40	



CELO concrete screw BTS6

Intended use

Installation data, minimum thickness, spacing and edge distance

Annex B2

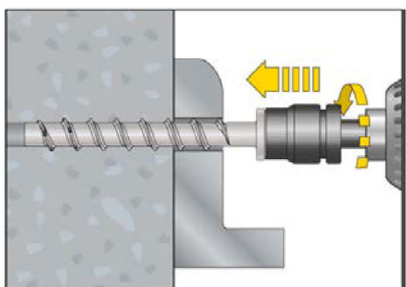
Installation instruction BTS6 in concrete and precast prestressed hollow core slabs



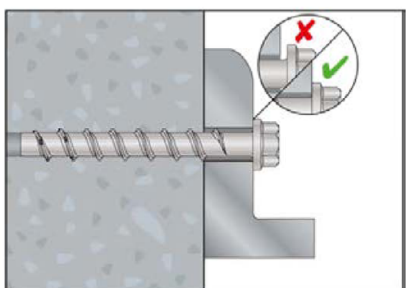
1. Drill the hole with a hammer drill



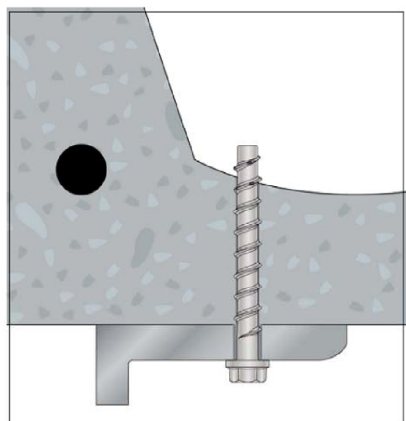
2. Clean the borehole



3. Install the anchor with a torque wrench or an Impact Screw Driver using some pressure.



4a. After installation



4b. Installation in precast prestressed hollow core slab.
Further turning of the anchor is not possible.

CELO concrete screw BTS6

Intended use
Installation instruction

Annex B3

Table C1.1: Design method B - Characteristic load values

CELO concrete screw BTS6			6	
Nominal anchor depth	$h_{nom} \geq$	[mm]	35	50
All load directions				
Characteristic resistance in concrete C20/25	F_{Rk}^0	[kN]	2,5	4
Installation factor	γ_{inst}	[-]	1,4	1,0
Increasing factors for F_{Rk}^0	ψ_C	C30/37	1,15	1,08
		C40/50	1,30	1,17
		C50/60	1,45	1,25
Effective anchorage depth	h_{ef}	[mm]	26	39
Characteristic spacing	s_{cr}	[mm]	160	
Characteristic edge distance	c_{cr}	[mm]	80	
Shear load with lever arm				
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	12	
Partial factor	$\gamma_{Ms,V}$	[-]	1,5	

Table C1.2: Characteristic resistance for use in precast prestressed hollow core slabs ($w/e \leq 4,2$) with bottom flange thickness $d_b \geq 35$ mm

CELO concrete screw BTS6			
Precast prestressed hollow core slabs, concrete \geq C45/55			
All load directions			
Characteristic resistance	F_{Rk}^0	[kN]	3,0
Installation factor	γ_{inst}	[-]	1,4
Edge distance	$c_{cr} = c_{min}$	[mm]	150
spacing	$s_{cr} = s_{min}$	[mm]	200

CELO concrete screw BTS6

Performances
Design method B, characteristic load values

Annex C1

**Table C2: Characteristic load resistance under fire exposure in any load direction
for use in concrete C20/25 – C50/60
(does not apply for precast pre-stressed hollow core slabs)**

CELO concrete screw BTS6				6
	Fire resistance class			$h_{nom} \geq 50 \text{ mm}$
Characteristic load resistance	R 30	$F_{Rk,fi}$	[kN]	0,2
	R 60	$F_{Rk,fi}$	[kN]	0,2
	R 90	$F_{Rk,fi}$	[kN]	0,1
	R 120	$F_{Rk,fi}$	[kN]	0,1
Spacing and edge distance under fire exposure				
Spacing distance for R 30 – R 120		$S_{cr,fi}$	[mm]	160
Edge distance for R 30 – R 120		$C_{cr,fi}$	[mm]	80
The edge distance shall be $\geq 300 \text{ mm}$, in case of fire attack from more than one side.				

CELO concrete screw BTS6

Performances
Characteristic loads under fire exposure

Annex C2