Deutsches Institut für Bautechnik

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-22/0550 of 24 October 2022

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 Concrete screw BTS in stainless steel
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 16
This European Technical Assessment contains	19 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 330232-01-0601, Edition 05/2021

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Specific Part

1 Technical description of the product

The "CELO Concrete screw BTS in stainless steel" is an anchor in size 6, 8 and 10 mm made of stainless steel. 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.

Product and product description are 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 concrete screw 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 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex B4, C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C1 and C2
Displacements (static and quasi-static loading)	See Annex C5
Characteristic resistance and displacements for seismic performance categorie C1	See Annex C3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C4

3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	Performance
Durability	See Annex B1

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. 330232-01-0601 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 24 October 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

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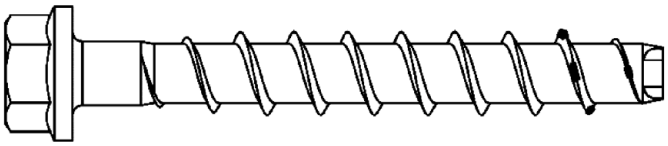
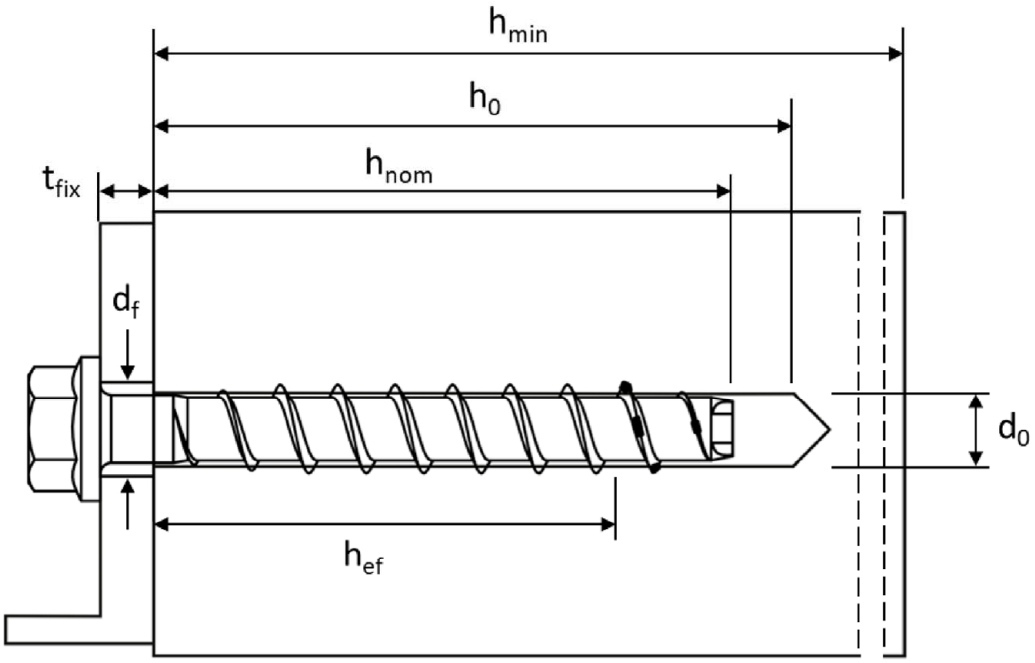
Product in installed condition

CELO concrete screw BTS in stainless steel

- stainless steel A4
- high corrosion resistant steel HCR



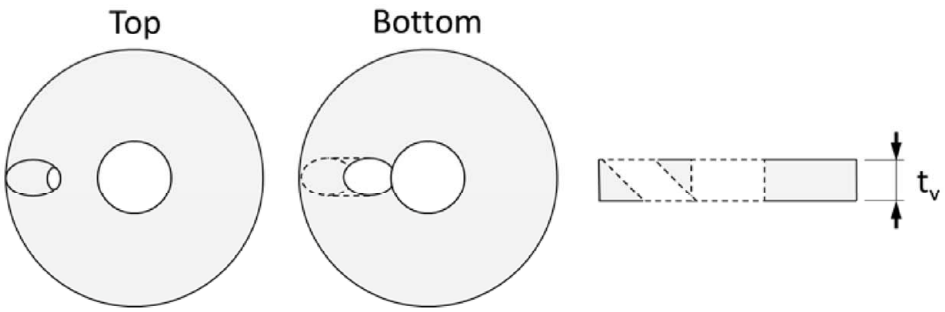
e.g. BTS concrete screw with hexagon head and fixture



d_0 = nominal diameter of drill hole
t_{fix} = thickness of fixture
d_f = diameter of clearance hole

h_{min} = minimum thickness of member
h_{nom} = nominal embedment depth
h_0 = depth of drill hole
h_{ef} = effective embedment depth

Filling washer (optional) to fill annular gap



CELO concrete screw BTS in stainless steel	Annex A1
Product description Product in installed condition	

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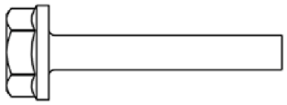
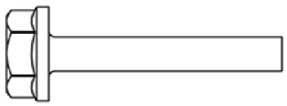
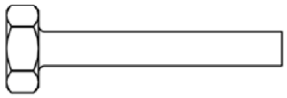
Version with metric connection thread
and hexagon drive e.g. BTS 8x105 M10 SW7




Version with washer and hexagon head
e.g. BTS B 8x80 SW13

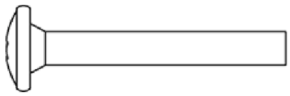



Version with washer, hexagon head and
TORX drive e.g. BTS B 8x80 SW13 TX40

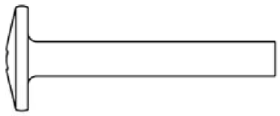



Version with hexagon head
e.g. BTS K 8x80 SW13

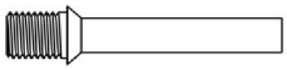

Version with countersunk head and TORX drive
e.g. BTS 8x80 TX40



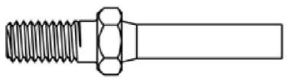

Version with pan head and TORX drive
e.g. BTS PT 8x80 TX40



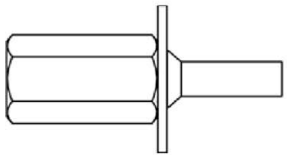
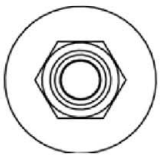

Version with large pan head and TORX drive
e.g. BTS PTL 8x80 TX40




Version with countersunk head and
connection thread e.g. BTS E 6x55 M8




Version with hexagon drive and
connection thread e.g. BTS E 6x55 M8 SW10

Version with internal thread and
hexagon drive e.g. BTS H 6x55 M8/10

CELO concrete screw BTS in stainless steel	
Product description Screw types	**Annex A2**

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Table 1: Material

Part	Product name	Material
all types	CELO BTS A4	1.4401; 1.4404; 1.4571; 1.4578
	CELO BTS HCR	1.4529

Part	Product name	Nominal characteristic steel		Rupture elongation A_5 [%]
		Yield strength f_{yk} [N/mm²]	Ultimate strength f_{uk} [N/mm²]	
all types	CELO BTS A4	560	700	≤ 8
	CELO BTS HCR			

Table 2: Dimensions

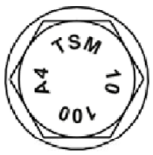
Anchor size			6			8			10		
Nominal embedment depth		h_{nom}	1[1)]	2	3	1	2	3	1	2	3
		[mm]	35	45	55	45	55	65	55	75	85
Screw length	≤ L	[mm]	500								
Core diameter	d_K	[mm]	5,1			7,2			9,2		
Thread outer diameter	d_s	[mm]	7,6			10,5			12,5		
Thickness of filling washer	t_v	[mm]	5			5			5		

1) only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

Marking:

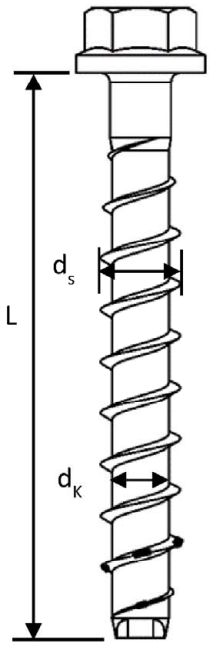
BTS A4

Screw type:	BTS
Screw size:	10
Screw length:	100
Material:	A4



BTS HCR

Screw type:	BTS
Screw size:	10
Screw length:	100
Material:	HCR



CELO concrete screw BTS in stainless steel

Product description
Material, dimensions and markings

Annex A3

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Specification of Intended use

Table 3: Anchorages subject to

BTS concrete screw size		6			8			10		
Nominal embedment depth	h_{nom}	h_{nom1} [1)]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
	[mm]	35	45	55	45	55	65	55	75	85
Static and quasi-static loads		All sizes and all embedment depths								
Fire exposure										
C1 category - seismic		2)	ok	ok	ok	2)	ok	ok	2)	ok

1) only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

2) no performance assessed

Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206:2013.
- Cracked and uncracked concrete.

Use conditions (Environmental conditions):

- Concrete screws subject to dry internal conditions: all screw types.
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2006 + A1:2015
  - Stainless steel according to Annex A3, screw with marking A4: CRC III
  - High corrosion resistant steel according to Annex A3, screw with marking HCR: CRC V

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Specification of Intended use - continuation

Design:

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are to be 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 are designed according to EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.

  The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters d_f of clearance hole in the fixture in Annex B3, Table 4.

Installation:

- Hammer drilling or hollow drilling. Hollow drilling only for size 6-10.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer, if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The head of the anchor is supported in the fixture and is not damaged.
- The borehole may be filled with injection mortar CF-T 300V or ATA 2004C.
- Adjustability according to Annex B6 for sizes 6-10.
- Cleaning of borehole is not necessary, if using a hollow drill.

CELO concrete screw BTS in stainless steel	Annex B2
Intended use Specification continuation	

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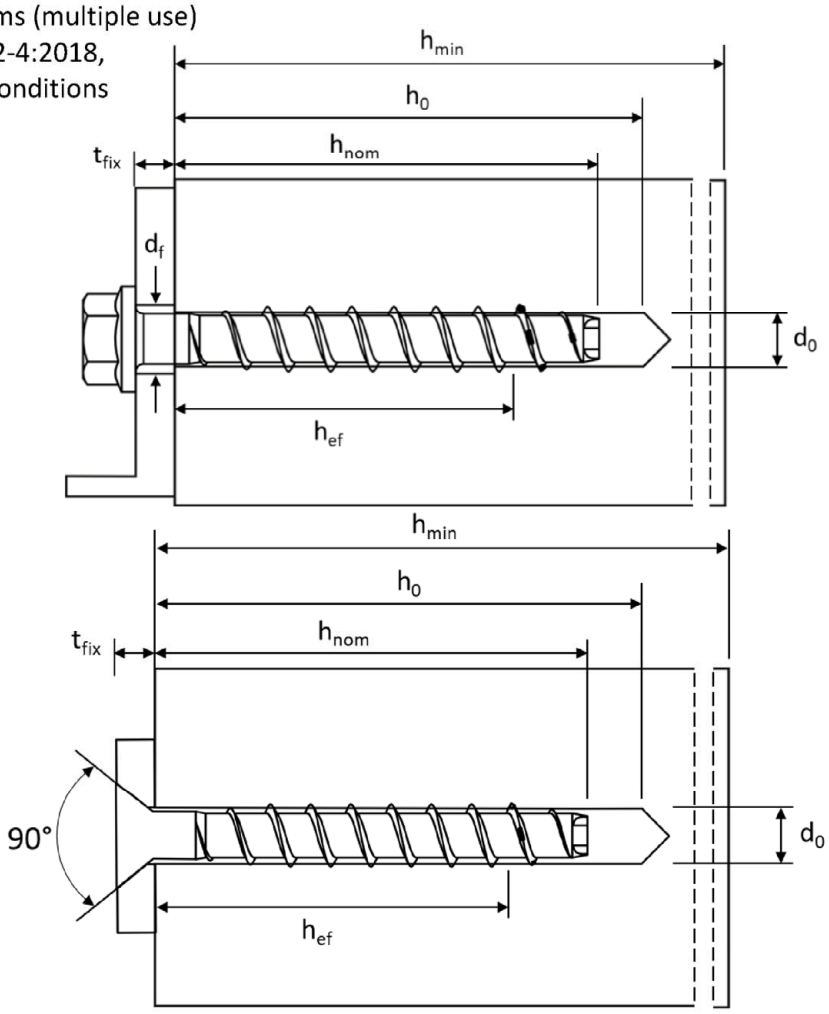
Table 4: Installation parameters

BTS concrete screw size			6			8			10		
Nominal embedment depth		h_{nom}	h_{nom1} [1)]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	35	45	55	45	55	65	55	75	85
Nominal drill hole diameter	d_0	[mm]	6			8			10		
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40			8,45			10,45		
Depth of drill hole	$h_0 \geq$	[mm]	40	50	60	55	65	75	65	85	95
Clearance hole diameter	$d_f \leq$	[mm]	8			12			14		
Installation torque (version with connection thread)	T_{inst}	[Nm]	10			20			40		
Torque impact screw driver		[-]	Max. torque according to manufacturer's instructions								
			160			300			450		

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions



CELO concrete screw BTS in stainless steel	**Annex B3**
Intended use Installation parameters	

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

BTS concrete screw size			6			8			10		
Nominal embedment depth		h_{nom}	h_{nom1} [1)]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	35	45	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	80	80	100	80	100	120	100	130	130
Minimum edge distance	c_{min}	[mm]	35	35	35	35	35	35	40	40	40
Minimum spacing	s_{min}	[mm]	35	35	35	35	35	35	40	40	40

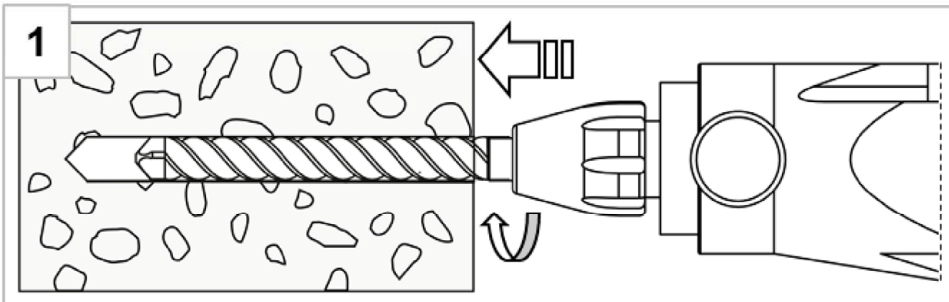
[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

CELO concrete screw BTS in stainless steel	Annex B4
Intended use Minimum thickness of member, minimum edge distance and minimum spacing	

Deutsches Institut für Bautechnik DIBt

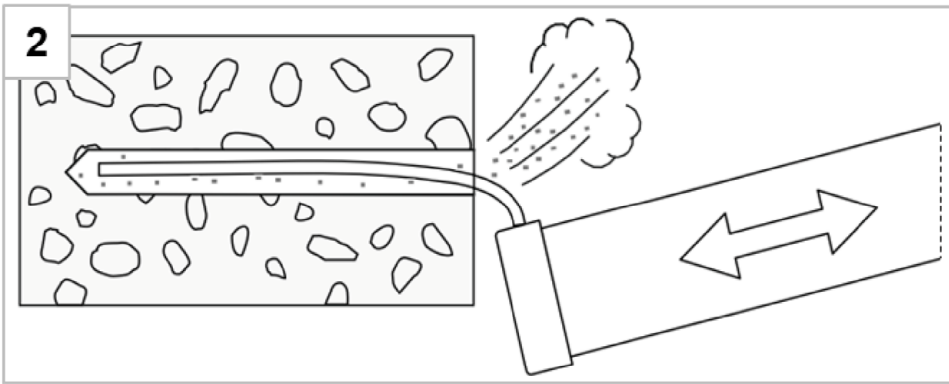
Installation Instructions

1



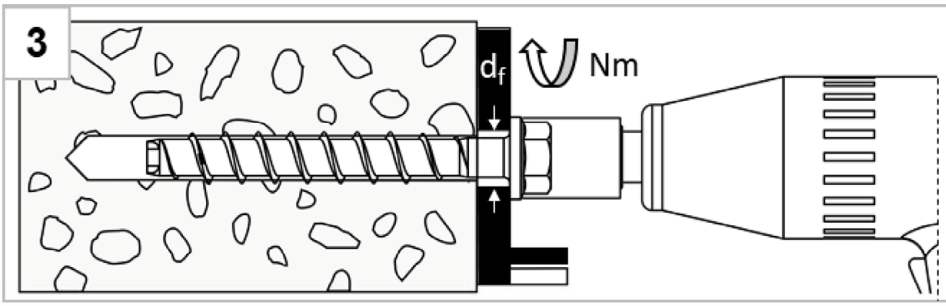
Create hammer drilled or hollow drilled borehole

2



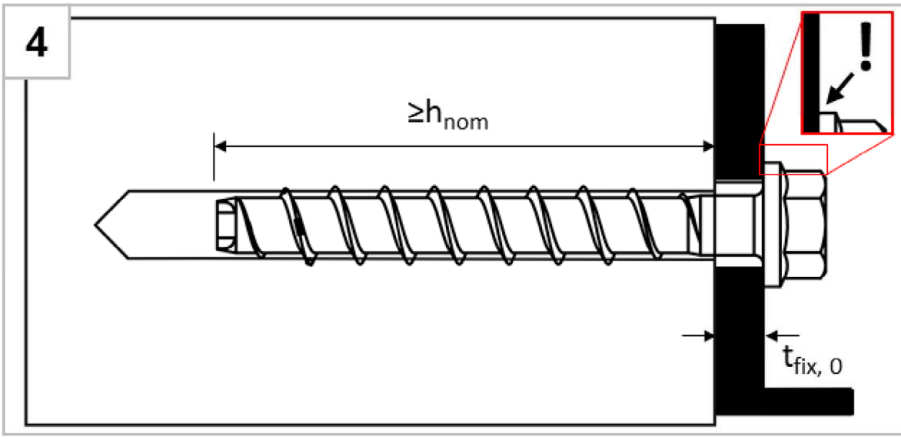
Remove drill dust by vacuuming or blowing of

3



Install with torque impact screw driver or torque wrench

4



The head must be undamaged and in contact with the fixture

For screw size 6 with h_{nom} = 35mm, installation only with impact screw drivers.

CELO concrete screw BTS in stainless steel	
Intended use Installation instructions	**Annex B5**

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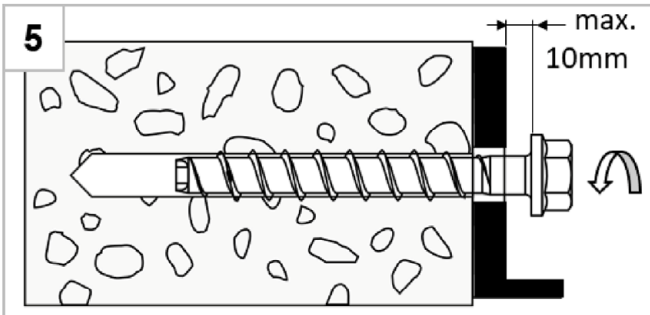
Installation Instructions – Adjustment

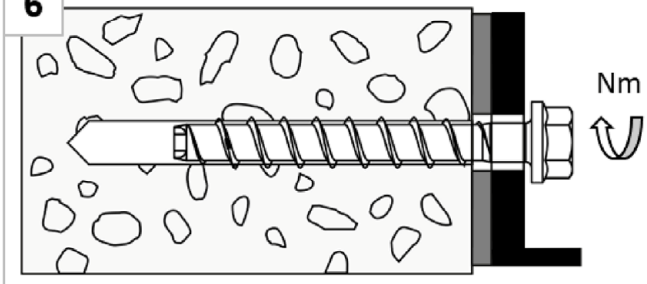
1. Adjustment

5



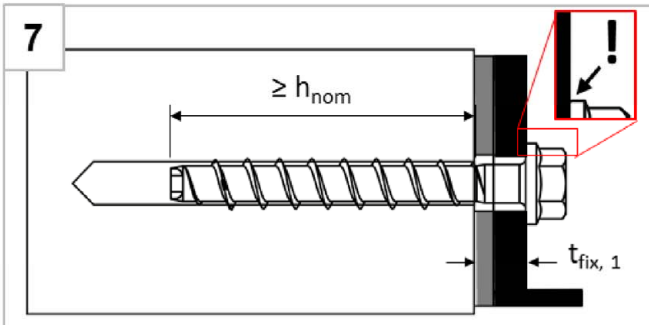
Screw may be untightened maximum 10mm

6



After adjustment, tighten the screw again

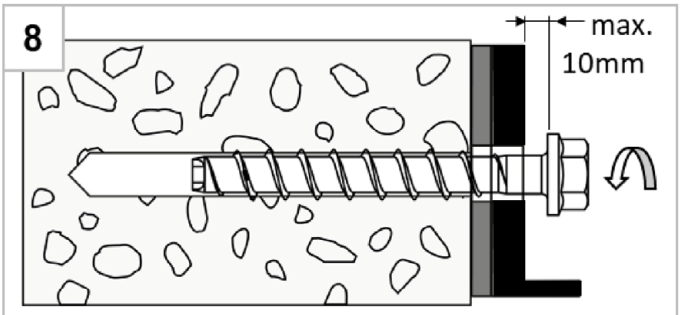
7



The head must be undamaged and in contact with the fixture

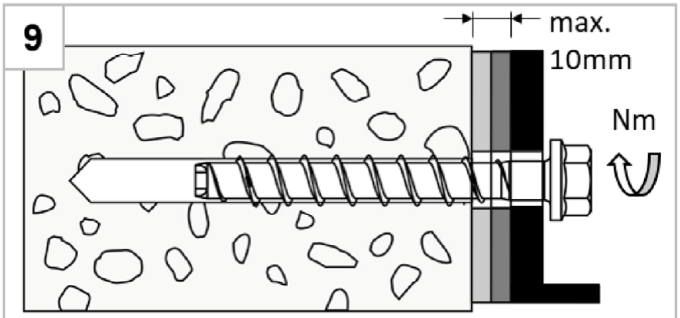
2. Adjustment

8



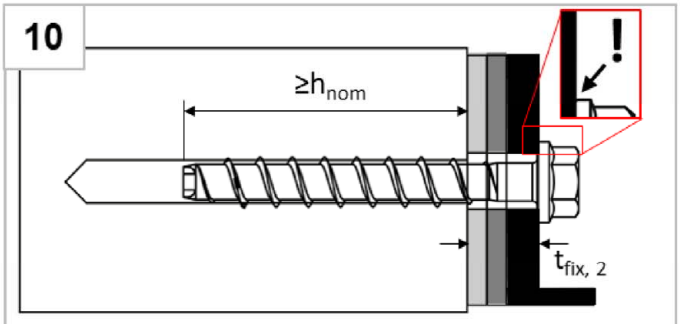
Screw may be untightened maximum 10mm

9



After adjustment, tighten the screw again

10



The head must be undamaged and in contact with the fixture

Note:
The fastener can be adjusted maximum two times. The total allowed thickness of shims added during the adjustment process is 10mm. The final embedment depth after adjustment process must be larger or equal than h_{nom}.

CELO concrete screw BTS in stainless steel	
Intended use Installation instructions - Adjustment	**Annex B6**

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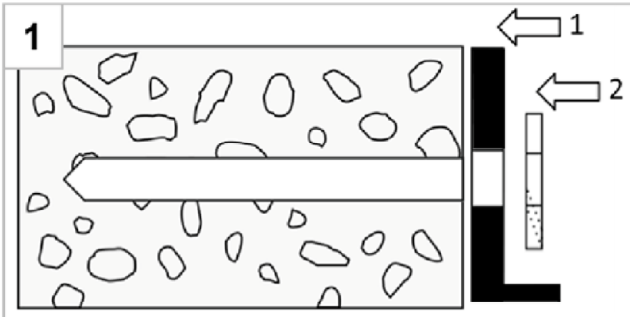
Installation Instructions – Filling annular gap

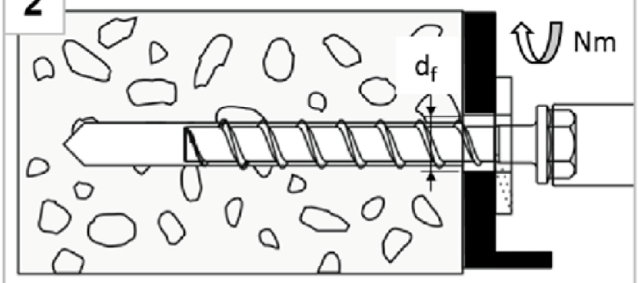
Positioning of fixture and filling washer

1



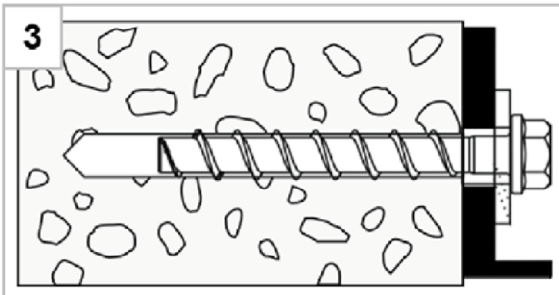
After preparing borehole (Annex B5, figure 1+2), position first fixture (1), than filling washer (2)

2



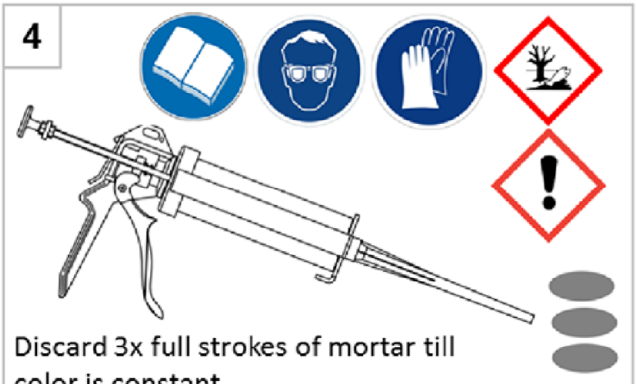
Install with torque impact screw driver or torque wrench

3



Installed condition without injected mortar in the filling washer

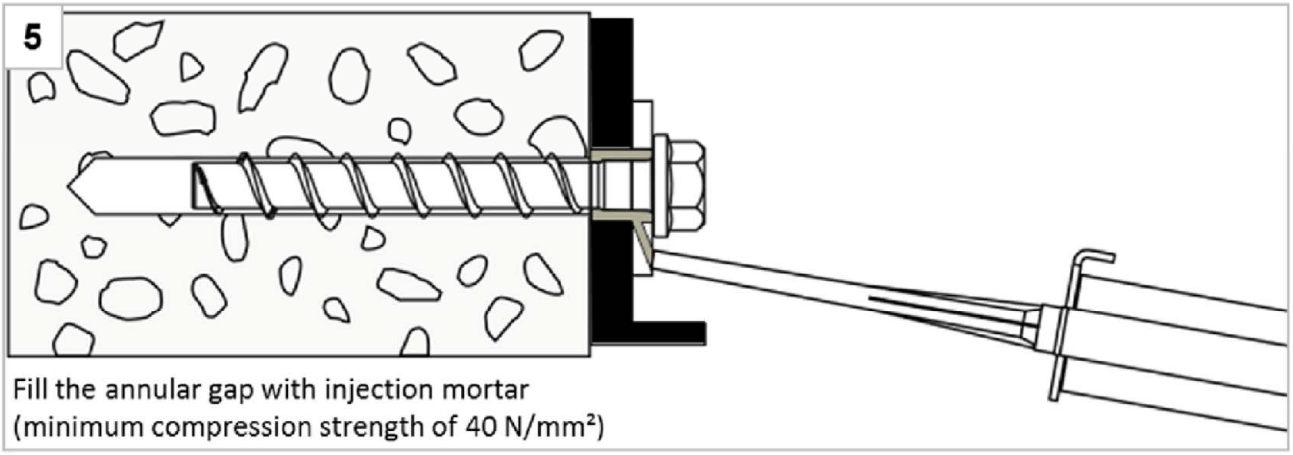
4



Discard 3x full strokes of mortar till color is constant

Filling the annular gap

5



Fill the annular gap with injection mortar (minimum compression strength of 40 N/mm²)

Note:
For seismic loading the installation with filled and without filled annular gap is approved. Differences in performance can be found in Annex C3.

CELO concrete screw BTS in stainless steel	
Intended use Installation instructions – Filling annular gap	**Annex B7**

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Table 6: Characteristic values for static and quasi-static loading

BTS concrete screw size				6			8			10		
Nominal embedment depth		h_{nom}	h_{nom1} [1)]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
		[mm]	35	45	55	45	55	65	55	75	85
Steel failure for tension and shear loading											
Characteristic tension load		$N_{Rk,s}$	[kN]	14,0			27,0			45,0	
Partial factor		$\gamma_{Ms,N}$	[-]	1,5							
Characteristic shear load		$V^0_{Rk,s}$	[kN]	7,0			13,5		17,0	22,5	34,0
Partial factor		$\gamma_{Ms,V}$	[-]	1,25							
Ductility factor		k_7	[-]	0,8							
Characteristic bending load		$M^0_{Rk,s}$	[Nm]	10,9			26,0			56,0	
Pull-out failure in uncracked concrete											
Characteristic tension load C20/25		$N_{Rk,p}$	[kN]	3,5 [1)]	4,0	8,5	9,0	12,0	17,0	11,0	19,0	25,0
Increasing factor for $N_{Rk,p}$ = $= N_{Rk,p\,(C20/25)} \cdot \psi_c$ with $\psi_c = \left(\frac{f_{ck}}{20}\right)^m$	C25/30	m	[-]	0,35	0,50	0,38	0,50		0,30	0,50		
	C30/37			0,35	0,50	0,38	0,50		0,30	0,50		
	C40/50			0,35	0,50	0,38	0,50		0,30	0,50		
	C50/60			0,35	0,50	0,38	0,50		0,30	0,50		
Pull-out failure in cracked concrete											
Characteristic tension load C20/25		$N_{Rk,p}$	[kN]	2,5 [1)]	1,5	3,0	3,0	5,5	8,0	6,0	13,0	17,0
Increasing factor for $N_{Rk,p}$ = $= N_{Rk,p\,(C20/25)} \cdot \psi_c$ with $\psi_c = \left(\frac{f_{ck}}{20}\right)^m$	C25/30	m	[-]	0,41	0,35	0,50				0,39		
	C30/37			0,41	0,35	0,50				0,39		
	C40/50			0,41	0,35	0,50				0,39		
	C50/60			0,41	0,35	0,50				0,39		

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

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Table 7: Characteristic values for static and quasi-static loading continuation

BTS concrete screw size				6			8			10		
Nominal embedment depth			h_{nom}	h_{nom1} [1)]	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	35	45	55	45	55	65	55	75	85
Concrete failure: concrete cone failure and splitting failure												
Effective embedment depth		h_{ef}	[mm]	25	34	42	32	41	49	40	57	65
k-factor	cracked	k_{cr}	[-]	7,7								
	uncracked	k_{ucr}	[-]	11,0								
Concrete cone failure	spacing	$s_{cr,N}$	[mm]	3 x h_{ef}								
	edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}								
Splitting failure case 1	resistance	$N^0_{Rk,sp}$	[kN]	3,5	4,0	8,5	9,0	12,0	17,0	11,0	19,0	25,0
	spacing	$s_{cr,sp}$	[mm]	120	160	240	200	240	290	230	280	320
	edge distance	$c_{cr,sp}$	[mm]	60	80	120	100	120	145	115	140	160
Splitting failure case 2	resistance	$N^0_{Rk,sp}$	[kN]	[2)]	2,5	5,5	5,5	8,0	11,0	7,0	15,0	20,0
	spacing	$s_{cr,sp}$	[mm]	[2)]	116	168	128	164	196	160	224	260
	edge distance	$c_{cr,sp}$	[mm]	[2)]	58	84	64	82	98	80	114	130
Pry-out failure												
Factor for pry-out failure		k_8	[-]	1,0	1,6		2,1	2,8		2,5		
Installation factor		γ_{inst}	[-]	1,0								
Concrete edge failure												
Effective length in concrete		l_f	[mm]	35	45	55	45	55	65	55	75	85
Nominal outer diameter of screw		d_{nom}	[mm]	6			8			10		

1) only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

2) no performance assessed

CELO concrete screw BTS in stainless steel

Performances
Characteristic values for static and quasi-static loading continuation

Annex C2

Deutsches Institut für Bautechnik DIBt

Table 8: Seismic category C1 – Characteristic load values (only BTS B, BTS K, BTS ST, BTS, BTS E[1)], BTS PT/PTL und BTS H[1)])

BTS concrete screw size			6		8		10	
Nominal embedment depth		h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom3}	h_{nom1}	h_{nom3}
		[mm]	45	55	45	65	55	85
Steel failure for tension and shear load (version **BTS B, BTS K, BTS ST, BTS, BTS E[1)], BTS PT/PTL, BTS H[1)]**)								
Characteristic tension load	$N_{Rk,s,C1}$	[kN]	14,0		27,0		45,0	
Partial factor	$\gamma_{Ms,N}$	[-]	1,5					
Characteristic shear load **BTS B, BTS K, BTS, BTS PT/PTL**	$V_{Rk,s,C1}$	[kN]	3,5	4,0	8,0	10,0	14,0	16,0
Characteristic shear load **Type ST**	$V_{Rk,s,C1}$	[kN]	2,5	[2)]	4,5	7,0	14,0	10,0
Partial factor	$\gamma_{Ms,V}$	[-]	1,25					
Without filling of the annular gap [3)]	α_{gap}	[-]	0,5					
With filling of the annular gap [4)]	α_{gap}	[-]	1,0					
Pull-out failure (version **BTS B, BTS K, BTS ST, BTS, BTS E[1)], BTS PT/PTL, BTS H[1)]**)								
Characteristic tension load in cracked concrete C20/25	$N_{Rk,p,C1}$	[kN]	1,5	3,0	3,0	8,5	6,0	17,0
Concrete cone failure (version **BTS B, BTS K, BTS ST, BTS, BTS E[1)], BTS PT/PTL, BTS H[1)]**)								
Effective embedment depth	h_{ef}	[mm]	34	42	32	49	40	65
Edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$					
Spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$					
Installation safety factor	γ_{inst}	[-]	1,0					
Concrete pry-out failure (version **BTS B, BTS K, BTS ST, BTS E, BTS PT/PTL**)								
Factor for pry-out failure	k_8	[-]	1,6		2,1	2,8	2,5	
Concrete edge failure (version **BTS B, BTS K, BTS ST, BTS E, BTS PT/PTL**)								
Effective length in concrete	l_f	[mm]	45	55	45	65	55	85
Nominal outer diameter of screw	d_{nom}	[mm]	6		8		10	

[1)] only tension load
[2)] no performance assessed
[3)] without filling of the annular gap according to annex B5
[4)] with filling of the annular gap according to annex B7

CELO concrete screw BTS in stainless steel

Performances
Seismic category C1 – Characteristic load values

Annex C3

Deutsches Institut für Bautechnik DIBt

Table 9: Fire exposure – characteristic values of resistance

BTS concrete screw size				6			8			10		
Nominal embedment depth		h_{nom}		1[1)]	2	3	1	2	3	1	2	3
			[mm]	35	45	55	45	55	65	55	75	85
Steel failure for tension and shear load												
characteristic Resistance	R30	$N_{Rk,s,fi30}$	[kN]	0,9			2,4			4,4		
	R60	$N_{Rk,s,fi60}$	[kN]	0,8			1,7			3,3		
	R90	$N_{Rk,s,fi90}$	[kN]	0,6			1,1			2,3		
	R120	$N_{Rk,s,fi120}$	[kN]	0,4			0,7			1,7		
	R30	$V_{Rk,s,fi30}$	[kN]	0,9			2,4			4,4		
	R60	$V_{Rk,s,fi60}$	[kN]	0,8			1,7			3,3		
	R90	$V_{Rk,s,fi90}$	[kN]	0,6			1,1			2,3		
	R120	$V_{Rk,s,fi120}$	[kN]	0,4			0,7			1,7		
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,7			2,4			5,9		
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,6			1,8			4,5		
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,5			1,2			3,0		
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,3			0,9			2,3		
Pull-out failure												
characteristic Resistance	R30-90	$N_{Rk,p,fi}$	[kN]	0,6	0,4	0,8	0,8	1,4	2,0	1,5	3,3	4,3
	R120	$N_{Rk,p,fi}$	[kN]	0,5	0,3	0,6	0,6	1,1	1,6	1,2	2,6	3,4
Concrete cone failure												
characteristic Resistance	R30-90	$N^0_{Rk,c,fi}$	[kN]	0,5	1,2	2,0	1,0	1,9	2,9	1,7	4,2	5,9
	R120	$N^0_{Rk,c,fi}$	[kN]	0,4	0,9	1,6	0,8	1,5	2,3	1,4	3,4	4,7
Edge distance												
R30 - R120		$c_{cr,fi}$	[mm]	$2 \times h_{ef}$								
In case of fire attack from more than one side, the minimum edge distance shall be ≥300mm.												
Spacing												
R30 bis R120		$s_{cr,fi}$	[mm]	$4 \times h_{ef}$								
Pry-out failure												
R30 bis R120		k_8	[-]	1,0	1,6		2,1	2,8		2,5		
The anchorage depth has to be increased for wet concrete by at least 30 mm compared to the given value.												

[1)] only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, only in dry internal conditions

CELO concrete screw BTS in stainless steel

Performances
Fire exposure – characteristic values of resistance

Annex C4

Deutsches Institut für Bautechnik DIBt

Table 10: Displacements under static and quasi-static tension load

BTS concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	45	55	45	55	65	55	75	85
Cracked concrete	tension load	N	[kN]	0,72	1,45	1,63	2,74	4,06	3,04	6,22	8,46
	displacement	δ_{N0}	[mm]	0,19	0,27	0,27	0,53	0,45	0,26	0,58	0,61
		$\delta_{N\infty}$	[mm]	0,55	0,84	0,49	0,66	0,61	0,69	0,92	1,1
Uncracked concrete	tension load	N	[kN]	2,11	4,07	4,24	5,97	8,03	5,42	9,17	12,28
	displacement	δ_{N0}	[mm]	0,42	0,43	0,33	0,49	0,58	0,84	0,62	0,79
		$\delta_{N\infty}$	[mm]	0,42	0,43	0,58			0,79		

Table 11: Displacements under static and quasi-static shear load

BTS concrete screw size				6		8			10		
Nominal embedment depth			h_{nom}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			[mm]	45	55	45	55	65	55	75	85
Cracked and uncracked concrete	shear load	V	[kN]	3,3		8,6			16,2		
	displacement	δ_{V0}	[mm]	1,55		2,7			2,7		
		$\delta_{V\infty}$	[mm]	3,1		4,1			4,3		

CELO concrete screw BTS in stainless steel

Performances
Displacements under static and quasi-static loads

Annex C5