

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 1 November 2018**

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

Apolo MEA concrete screw BTS6

Product family  
to which the construction product belongs

Fasteners for use in concrete for redundant  
non-structural systems

Manufacturer

Apolo MEA Befestigungssysteme GmbH  
Industriestraße 6  
86551 Aichach  
DEUTSCHLAND

Manufacturing plant

Plant 15

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 330747-00-0601

This version replaces

ETA-16/0848 issued on 25 April 2017

**European Technical Assessment**

**ETA-16/0848**

English translation prepared by DIBt

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## Specific Part

### 1 Technical description of the product

The Apolo MEA 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.

Product and 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 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**

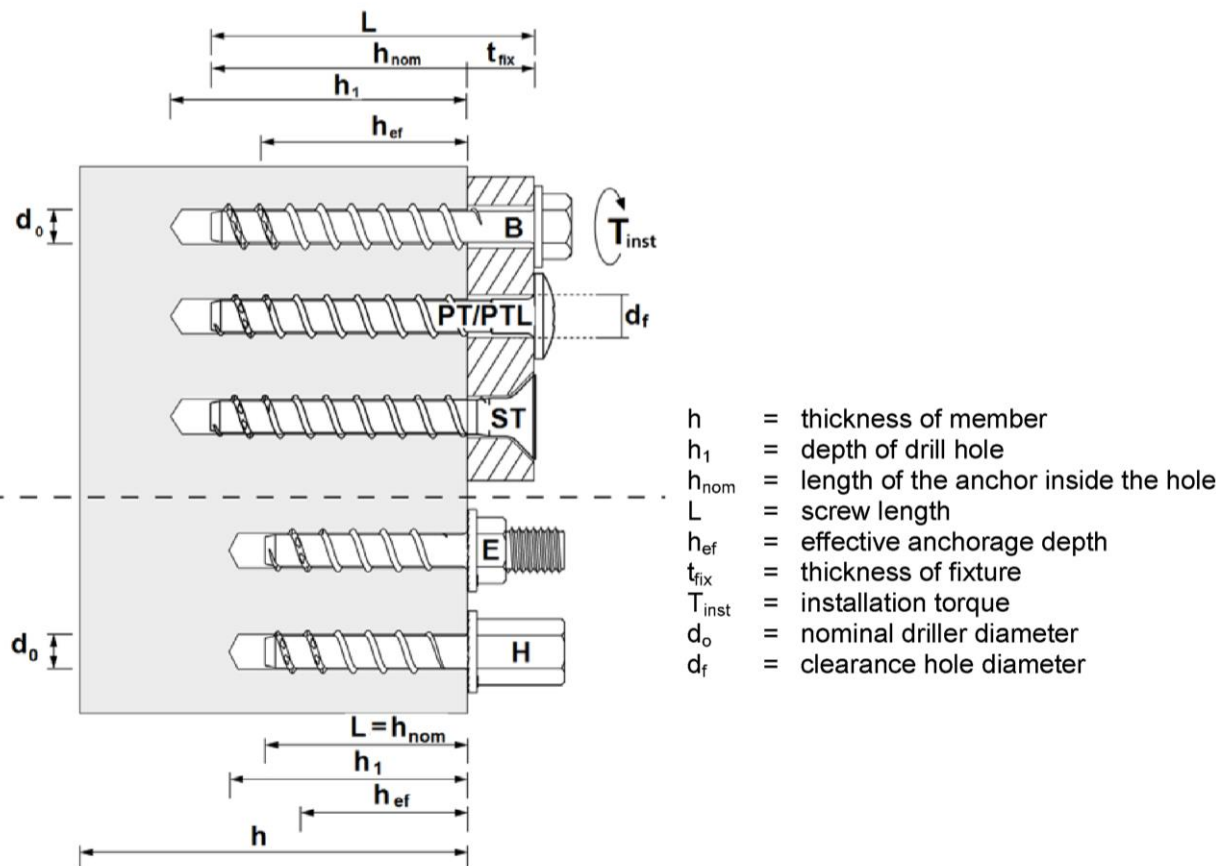
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 1 November 2018 by Deutsches Institut für Bautechnik

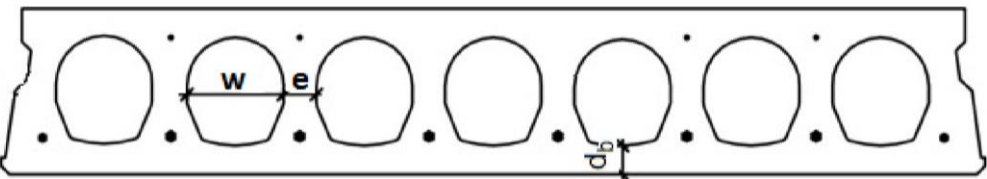
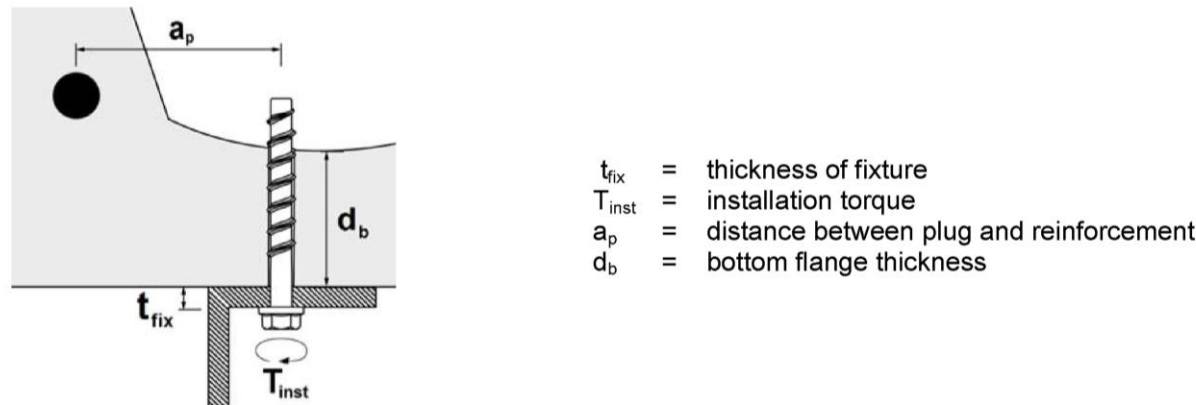
Dr.-Ing. Lars Eckfeldt  
p. p. Head of Department

*beglaubigt:*  
Tempel

**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  $\geq 35$  mm**



$W$  = core width  
 $e$  = web thickness

Apolo MEA concrete screw BTS6

**Product description**  
Installed condition

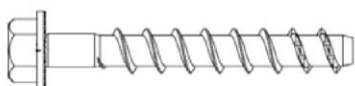
**Annex A1**

**Table A2.1: Material and screw types**

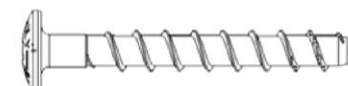
Apolo MEA concrete screw BTS6			6
Nominal characteristic yield strength	$f_{yk}$	[N/mm <sup>2</sup> ]	867
Nom. characteristic ultimate strength	$f_{uk}$	[N/mm <sup>2</sup> ]	930
Elongation at rupture	$A_5$	[%]	≤ 8

All parts carbon steel.

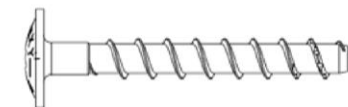
Coating: Grey Zn-Al flake coated or zinc plated and blue passivated ≥ 5 µm acc. EN ISO 4042



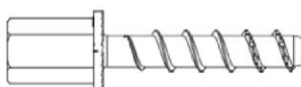
1- BTS-B: Hexagonal head



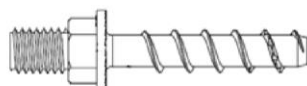
2- BTS-PT: Pan head



3- BTS-PTL: Pan head large



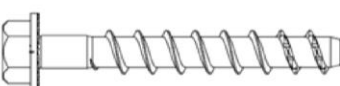
4- BTS-H: Internal thread M6, M8 and M10 or 1/4" and 3/8"



5- BTS-E: External thread 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**

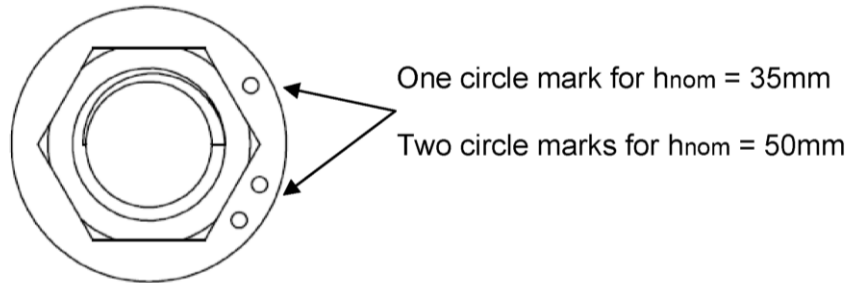
Apolo MEA concrete screw BTS6

**Production description**

Material, screw types, marking

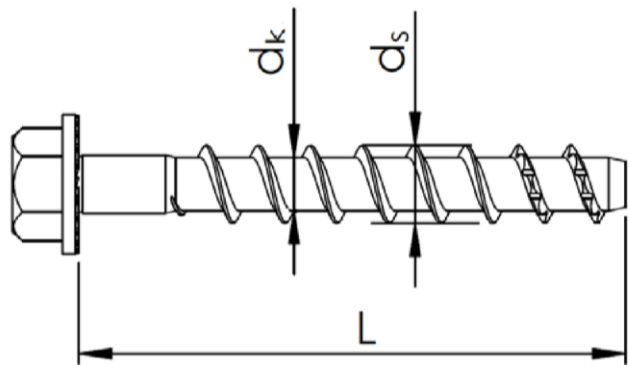
**Annex A2**

In models BTS-E and BTS-H:



**Table A3.1: Dimensions**

Apolo MEA concrete screw BTS6			6	
Nominal embedment depth		[mm]	$h_{nom}$ 35	$h_{nom}$ 50
Length	$L \leq$	[mm]	150	
Thread outer diameter	$d_s$	[mm]	7,75	
Core diameter	$d_k$	[mm]	5,40	



Apolo MEA 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:

- Reinforced or unreinforced normal weight concrete without fibres 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):

- 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 FprEN 1992-4: 2017 and EOTA Technical Report TR 055.
- The design under shear load according to FprEN 1992-4:2017, 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.

Apolo MEA concrete screw BTS6

**Intended use**  
Specifications of intended use

**Annex B1**



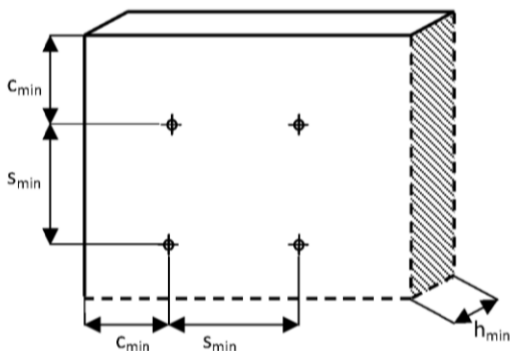
**Table B2.1: Installation data**

Apolo MEA concrete screw BTS6			6	
Nominal anchorage depth	$h_{nom}$	[mm]	35	50
Nominal drill 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 <sup>1)</sup>	
TX recess			TX 30	
Max. thickness of fixture	$t_{fix}$	[mm]	115	100

<sup>1)</sup> SW10 or SW13 for all types with HEX head

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

Apolo MEA 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	



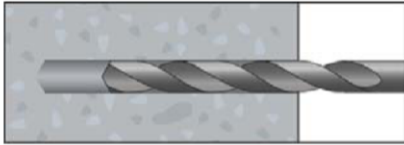
Apolo MEA concrete screw BTS6

**Intended use**

Installation data, minimum thickness, spacing and edge distance

**Annex B2**

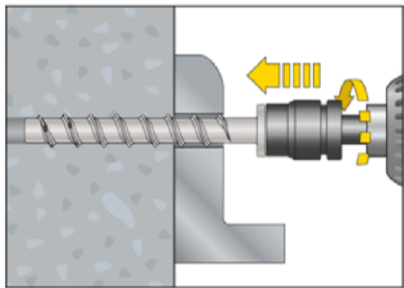
### Installation instruction BTS6 in concrete and precast prestressed hollow core slabs



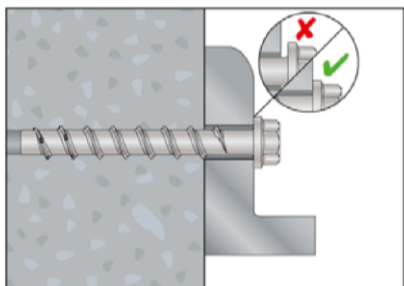
1. Drill the hole with a hammer drill



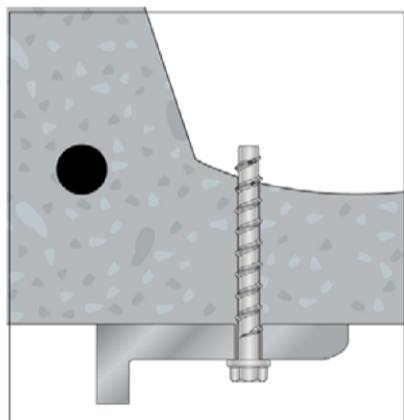
2. Clean the borehole



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.

Apolo MEA concrete screw BTS6

**Intended use**  
Installation instruction

**Annex B3**

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

Apolo MEA concrete screw BTS6			6	
Nominal anchor depth	$h_{nom} \geq$	[mm]	35	50
All load directions				
Characteristic resistance in concrete C20/25	$F^0_{Rk}$	[kN]	2,5	4
Installation factor	$\gamma_{inst}$	[ - ]	1,4	1,0
Increasing factors for $F^0_{Rk}$	$\Psi_c$	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	$M^0_{Rk,s}$	[Nm]	12	
Partial safety 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**

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

Apolo MEA 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)**

Apolo MEA 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.				

Apolo MEA concrete screw BTS6

**Performances**

Characteristic loads under fire exposure

**Annex C2**