

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 April 2017

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

Concrete screw size 6 mm for multiple use for non-
structural applications in concrete

Manufacturer

Apolo MEA Befestigungssysteme GmbH
Industriestraße 6
86551 Aichach
DEUTSCHLAND

Manufacturing plant

Werk 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

Guideline for European technical approval of "Metal
anchors for use in concrete", ETAG 001 Part 6: "Anchors
for multiple use for non-structural applications",
August 2010,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

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Specific Part**1 Technical description of the product**

The Apolo MEA concrete screw BTS6 in size 6 mm is an anchor 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 Mechanical resistance and stability (BWR 1)**

The essential characteristics regarding mechanical resistance and stability are included under the Basic Works Requirement Safety in use.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C 2

3.3 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance in concrete	See Annex C 1
Edge distances and spacing	See Annex C 1

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

In accordance with guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 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

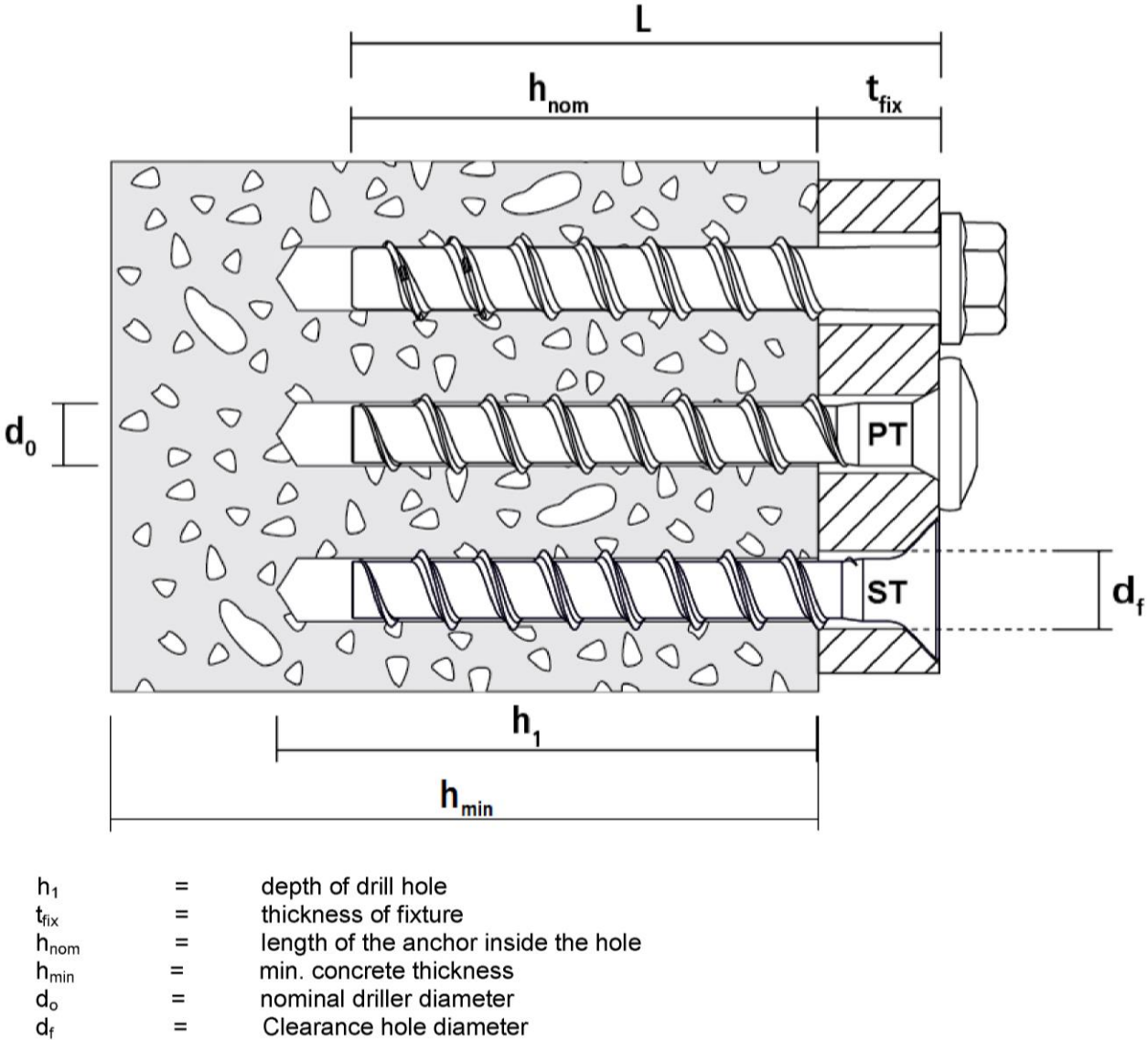
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 25 April 2017 by Deutsches Institut für Bautechnik

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Tempel

BTS6 after installation in concrete



Apolo MEA concrete screw BTS6

Product description
Installed condition

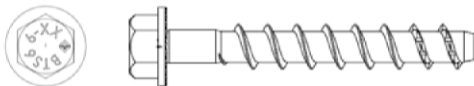
Annex A1

Table A1: Material and screw types

Apolo MEA 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.

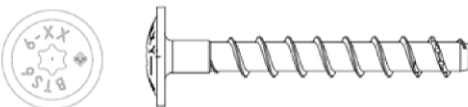
Coating: Grey Zn-Al flake coated or zinc plated and blue passivated ≥ 5 µm acc. EN ISO 4042



1- BTS-B: Hexagonal head



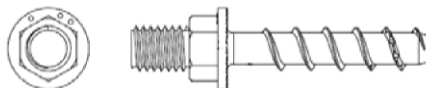
2- BTS-PT: Pan head



3- BTS-LT: Button head



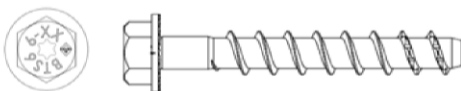
4- BTS-H: Internal thread M6, M8 and M10 or 1/4" and 3/8"



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**

Apolo MEA concrete screw BTS6

Production description
Screw types, marking

Annex A2

In models BTS-E and BTS-H:

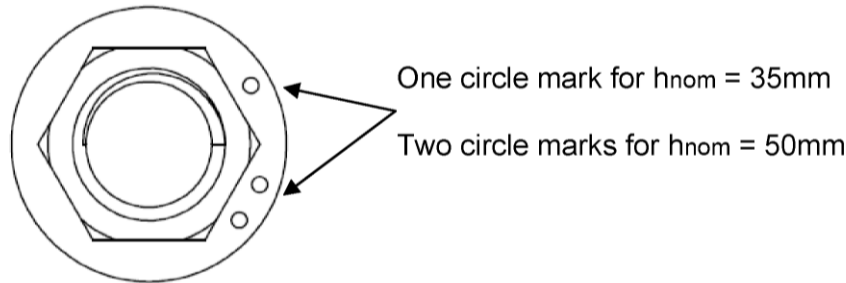
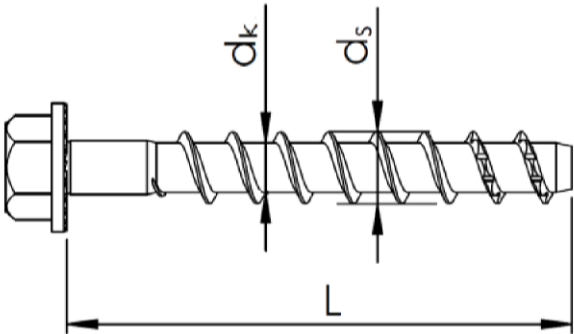


Table A2: Dimensions

Apolo MEA concrete screw BTS6			6	
Nominal embedment depth		[mm]	h_{nom} 35	h_{nom} 50
Length	$L \leq$	[mm]	150	
Threaded 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 to be used for multiple use for non-structural applications, according to ETAG 001, Part 6
- fire exposure: Only for concrete C20/25 to C50/60

Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000
- strength classes C20/25 to C50/60 according to EN 206-1:2000
- 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.)
- Anchorages under static or quasi-static actions are designed in accordance with:
 - ETAG 001, Annex C, design method B, Edition August 2010 or
 - CEN/TS 1992-4:2009, design method B
- Anchorages under fire exposure are designed in accordance with
 - EOTA Technical Report TR 020, Edition May 2004
 - CEN/TS 1992-4:2009, Annex D
- The design method according to ETAG 001, Annex C, section 4.2.2 also applies for the specified diameter d_f of clearance hole in the fixture in Annex B2, Table B1.
- In CEN/TS 1992-4-1, section 5.2.3.1 the 3. indent will be replaced as follow: only the most unfavorable anchors of an anchor group take up shear loads, if diameter of the clearance hole d_f is larger than given CEN/TS 1992-4-1, Table 1.
- The condition according to CEN / TS 1992-4-1, Section 5.2.3.3, no. 3) are also fulfilled for the specified diameter d_f of clearance hole in the fixture in Annex B2, Table B1.

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.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.
- 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

Specification of intended use

Annex B1

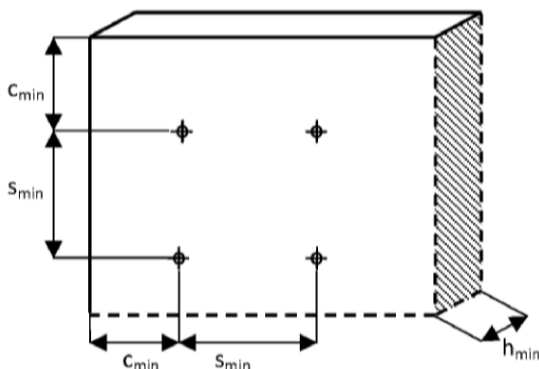
Table B1: Installation data

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	[mm]	9	
Depth of drill hole	$h_1 \geq$	[mm]	$h_{nom} + 5 \text{ mm}$	
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-E (M10 and 3/8) and BTS-H (M10 and 3/8)

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

Apolo MEA concrete screw BTS6			6	
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	



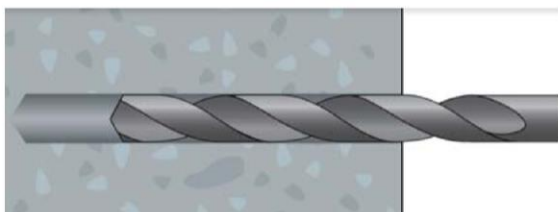
Apolo MEA concrete screw BTS6

Intended use

Installation data, min. thickness, spacing and edge distance

Annex B2

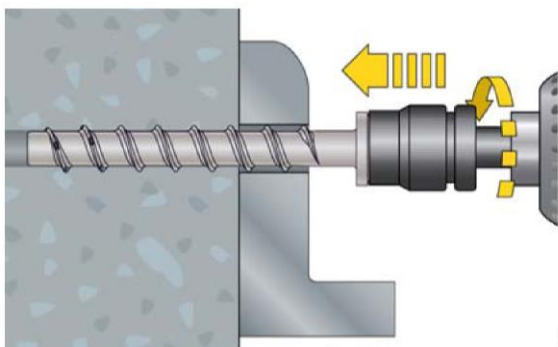
Installation instruction BTS6 in concrete



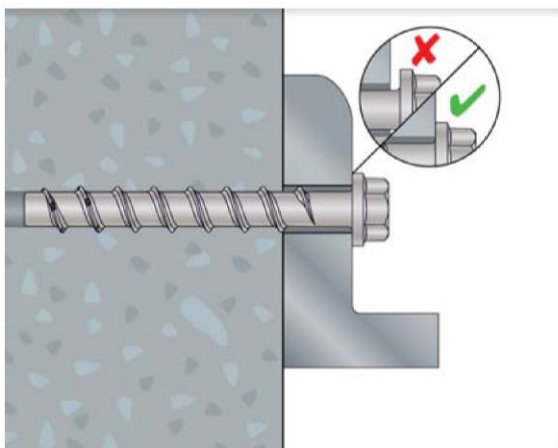
1. Drill the hole with a hammer drill



2. Clean the borehole



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



4. After installation

Apolo MEA concrete screw BTS6

Intended use
Installation instruction

Annex B3

Table C1: Design method B - Characteristic load values

Apolo MEA concrete screw BTS6			6	
Nominal anchor depth	$h_{nom} \geq$	[mm]	35	50
Any load directions				
Characteristic resistance in concrete C20/25	F^0_{Rk}	[kN]	2,5	4
Installation safety factor	$\gamma_2^{1)} = \gamma_{inst}^{2)}$	[-]	1,4	1,0
Increasing factors for F^0_{Rk}	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	$M^0_{Rk,s}$	[Nm]	12	
Partial safety factor	$\gamma_{Ms,V}$	[-]	1,5	

1) acc. to ETAG 001, Annex C

2) acc. to CEN/TS 1992-4:2009

Apolo MEA concrete screw BTS6

Performances

Design method B, characteristic loads

Annex C1

**Table C2: Characteristic resistance under fire exposure in any load direction
for use in concrete C20/25 – C50/60**

Apolo MEA concrete screw BTS6				6
	Fire resistance class			$h_{nom} \geq 50 \text{ mm}$
Characteristic 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