

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

**ETA-13/0371
of 2 October 2018**

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

Apolo MEA Drop-in anchor SA plus

Fasteners for use in concrete for redundant non-structural
applications

Apolo MEA Befestigungssysteme GmbH
Industriestraße 6
86551 Aichach
DEUTSCHLAND

Plant 8
Plant 13

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

EAD 330747-00-0601

ETA-13/0371 issued on 9 May 2014

European Technical Assessment

ETA-13/0371

English translation prepared by DIBt

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

The Apolo MEA Drop-In Anchor SA plus in sizes M6, M8, M8-25, M10 and M10-25 is an anchor made of zinc-plated steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

The description of the product is given in Annex A.

2 Specification of the intended use in accordance with the applicable EAD

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 C2

3.2 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance for all load directions and modes of failure for simplified design	See Annex C1

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

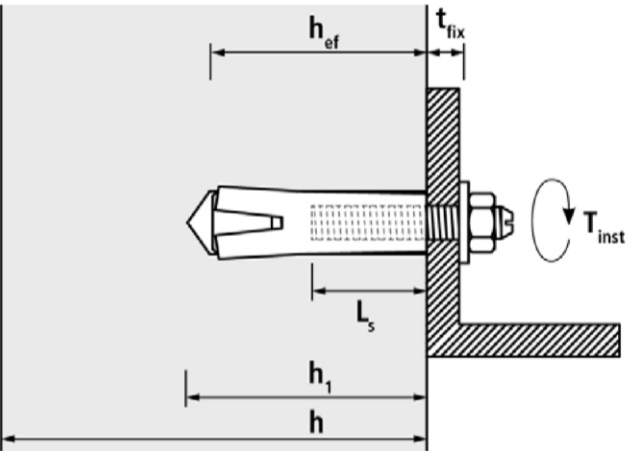
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 2 October 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

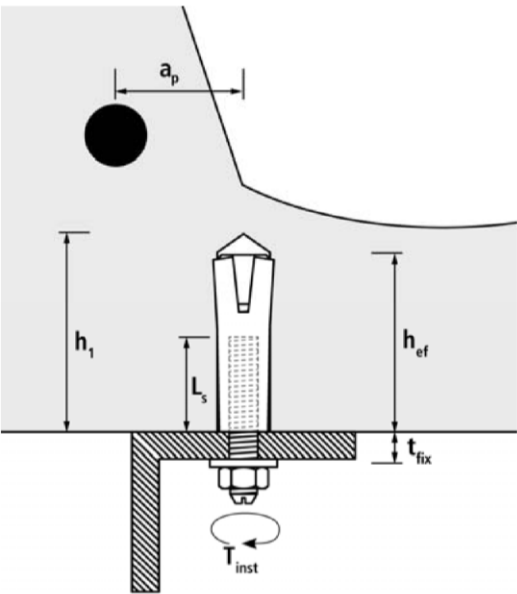
beglaubigt:
Tempel

SA plus - intended use in concrete C20/25 to C50/60

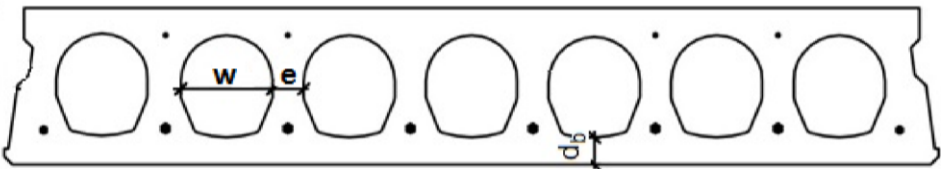


- h = thickness of member
 h_1 = depth of drill hole
 h_{ef} = effective anchorage depth
 t_{fix} = thickness of fixture
 L_s = length of thread inside of the anchor
 T_{inst} = max. installation torque

**SA plus - intended use in precast prestressed hollow core slabs ($w/e \leq 4,2$)
with flange thickness ≥ 35 mm and concrete C45/55 to C50/60**



- h_1 = depth of drill hole
 h_{ef} = effective anchorage depth
 t_{fix} = thickness of fixture
 L_s = length of thread inside of the anchor
 T_{inst} = max. installation torque
 a_p = distance between plug and reinforcement



- w = core width
 e = web thickness
 d_b = bottom flange thickness

Apolo MEA Drop in anchor SA plus


Product description
Installed condition

Annex A1

Apolo MEA Drop in anchor SA plus



marking: brand marking type size Logo or company name
SA plus
M ... (i.e. M10)

Example:  SA plus M10

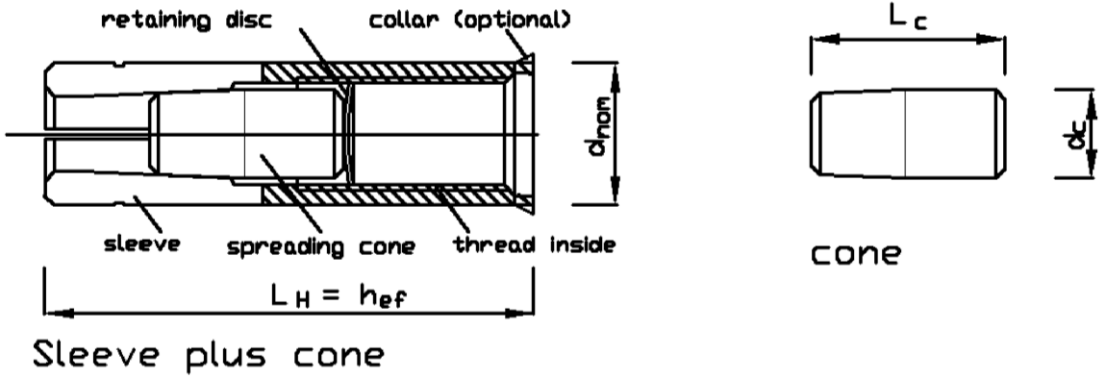


Table A2: Dimensions

Anchor		Sleeve		Cone	
	thread inside	length	outer-Ø sleeve	length	outer-Ø cone
type		L _H	d _{nom}	L _C	d _C
SA plus		[mm]	[mm]	[mm]	[mm]
M 6	M6	25	8	10	4,5
M 8 - 25	M8	25	10	8,3	6,3
M 8	M8	30	10	12	6.0
M 10 - 25	M10	25	12	8,3	8,0
M 10	M10	40	12	16	7,5

Apolo MEA Drop in anchor SA plus

Product description
Parts, marking and dimensions

Annex A2

Table A3.1: Designation and materials

Designation	Material
sleeve M6 M8 M8-25 M10-25	steel for cold forming C1008-C1012 or EN 10277:2008
sleeve M10	steel for cold forming C1015 or EN 10277:2008
spreading cone	steel for cold forming C1006-C1008
retaining disc	paper or plastics

all parts zinc plated and blue passivated $\geq 5 \mu\text{m}$ acc. EN ISO 4042:1999

Table A3.2: Material strength of sleeve

Apolo MEA Drop in anchor SA plus			Size		
			M6	M8 / M8-25	M10 / M10-25
Nominal characteristic steel ultimate strength	f_{uk}	[N/mm ²]	535	535	535
Nominal characteristic steel yield strength	f_{yk}	[N/mm ²]	485	485	485

Apolo MEA Drop in anchor SA plus

Product description
Materials

Annex A3

Handsetting tool

Optional: setting tool with marking and/or rubber grip possible

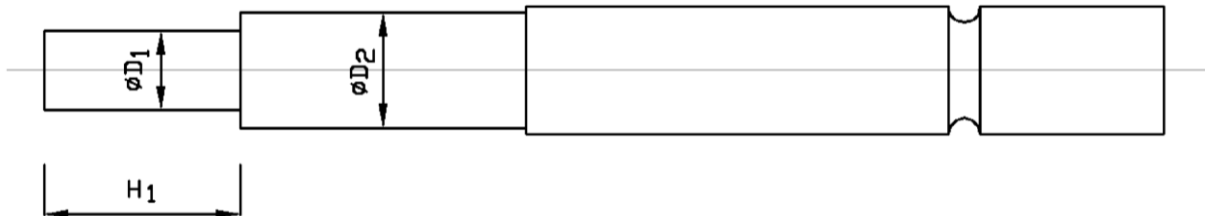


Table A4.1: Geometry of the setting tool

Setting tool	Setting pin		
steel HRc 38-42	dimension		
Type	D ₁	D ₂	H ₁
	[mm]	[mm]	[mm]
ESW 6	5	7,5	15
ESW 8-25	6,6	9,5	17,5
ESW 8	6,6	9,5	17,5
ESW 10-25	8,3	12	17,0
ESW 10	8,3	12	23,5

Apolo MEA Drop in anchor SA plus

Product description
Setting tool

Annex A4

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads,
- Used only for use in concrete for redundant non-structural systems,
- Used for anchorage in prestressed hollow core slabs (only sizes M8-25 and M10-25),
- Under fire exposure (not for using in 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):

- 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 and quasi-static actions and under fire exposure are designed in accordance with FprEN 1992-4:2017 and EOTA Technical Report TR 055, design method B,

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Positioning of the drill holes without damaging the reinforcement,
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application

Apolo MEA Drop in anchor SA plus

Intended use
Specifications

Annex B1

Table B2.1: Installation data

Fixing screws or anchor rods:

It can be used the strength categories 4.6, 5.6, 5.8 or 8.8 acc. EN ISO 898-1.

Minimal screwing depth:

The length of the fixing screw depends on the thickness t_{fix} on the fixed part, permissible tolerances and usable thread length $L_{s,max}$ as well as on the minimal screwing depth $L_{s,min}$.

Apolo MEA Drop in anchor SA plus			Size				
			M6	M8-25	M8	M10-25	M10
nominal driller diameter	d_0	[mm]	8	10	10	12	12
Cutting diameter of drillbit	$d_{cut} \leq$	[mm]	8,45	10,45	10,45	12,50	12,50
diameter of thread inside	M	[mm]	6	8	8	10	10
depth of drill hole (deepest point)	$h_1 \geq$	[mm]	27	27	32	27	43
Distance between plug position and prestressing steel ¹⁾	$a_p \geq$	[mm]	-	50	-	50	-
effective anchorage depth	h_{ef}	[mm]	25	25	30	25	40
Maximum screwing depth	$L_{s,max}$	[mm]	11	12	13	12	16
Minimum screwing depth	$L_{s,min}$	[mm]	6	8	8	10	10
diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	9	12	12
Maximum installation torque moment	$\max T_{inst}$	[Nm]	4	8	8	15	15

1) Only for hollow core slabs

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

Apolo MEA Drop in anchor SA plus			Size				
			M6	M8-25	M8	M10-25	M10
minimum thickness of member	h_{min}	[mm]	100	100	100	100	100
minimum spacing	s_{min}	[mm]	70	120	105	130	105
minimum edge distance	c_{min}	[mm]	105	110	105	140	140

Table B2.3: Minimum thickness, spacing and edge distance of precast prestressed hollow core slabs

Apolo MEA Drop in anchor SA plus			Size	
			M8-25	M10-25
minimum thickness of member	h_{min}	[mm]	200	200
minimum spacing	s_{min}	[mm]	180	180
minimum edge distance	c_{min}	[mm]	150	150

Apolo MEA Drop in anchor SA plus

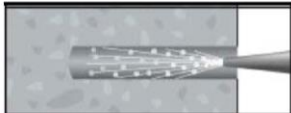
Intended use
Installation data

Annex B2

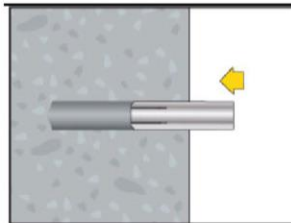
Installation instruction:



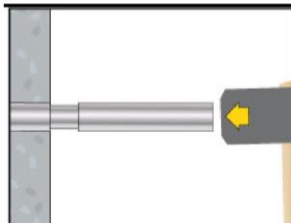
1. Drill the hole with a hammer drill



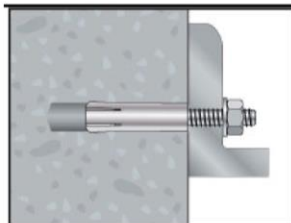
2. Clean the borehole



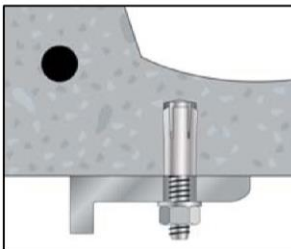
3. To set the anchor by hand or by hammer blows, anchor should be flush to the concrete edge



4. To spread the anchor with the setting tool. The anchor is installed correctly, if the setting pin is completely inside



5. To fix the fixture, not allowed to pass over the max. installation torque T_{inst}



5. Installed SA in precast prestressed hollow core slab

Apolo MEA Drop in anchor SA plus

Intended use
Installation instruction

Annex B3

Table C1.1: Design method B - Characteristic values of resistance

Apolo MEA Drop in anchor SA plus				Size				
Any load direction				M6	M8-25	M8	M10-25	M10
Characteristic resistance in concrete C20/25 - C50/60	F_{Rk}^0	[kN]	≥ Steel 4.6	1,5	2,5	3,0	2,5	7,5
Installation safety factor	γ_{inst}	[-]		1,4	1,2	1,2	1,2	1,2
Characteristic spacing	s_{cr}	[mm]		80	220	120	220	240
Characteristic edge distance	c_{cr}	[mm]		40	110	60	110	120
Steel failure with lever arm								
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	Steel 4.6	6,1	15,0	15,0	29,9	29,9
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	Steel 5.6	7,6	18,7	18,7	37,4	37,4
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	Steel 5.8	7,6	18,7	18,7	37,4	37,4
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	Steel 8.8	12,2	30,0	30,0	59,8	59,8

Table C1.2: Characteristic resistance for use in precast prestressed hollow core slabs with bottom flange thickness ≥ 35 mm

Apolo MEA Drop in anchor SA plus				
Precast prestressed hollow core slabs, C45/55 to C50/60			Size	
Any load direction			M8-25	M10-25
Characteristic resistance	F_{Rk}	[kN]	3,0	4,0
Installation safety factor	γ_{inst}	[-]	1,2	1,2
Spacing	$s_{cr} = s_{min}$	[mm]	180	180
Edge distance	$c_{cr} = c_{min}$	[mm]	150	150

Apolo MEA Drop in anchor SA plus

Performances
Characteristic values of resistance

Annex C1

**Table C2: Characteristic values of resistance under fire exposure in any load direction
for use in concrete C20/25 to C50/60 (not for using in prestressed hollow core slabs)**

Apolo MEA Drop in anchor SA plus					Size		
Fire resistance class					M6	M8	M10
R30	Characteristic resistance	$F_{Rk,fi}$	[kN]	$\geq \text{Steel 4.6}$	0,2	0,3	0,6
R60	Characteristic resistance	$F_{Rk,fi}$	[kN]	$\geq \text{Steel 4.6}$	0,2	0,3	0,5
R90	Characteristic resistance	$F_{Rk,fi}$	[kN]	$\geq \text{Steel 4.6}$	0,2	0,2	0,4
R120	Characteristic resistance	$F_{Rk,fi}$	[kN]	$\geq \text{Steel 4.6}$	0,1	0,2	0,3
Spacing and edge distance under fire exposure							
Spacing distance for R30 – R120		$s_{cr,fi}$	[mm]		100	120	160
Edge distance for R30 – R120		$c_{cr,fi}$	[mm]		50	60	80

The edge distance shall be ≥ 300 mm, in case of fire attack from more than one side.

Apolo MEA Drop in anchor SA plus

Performances

Characteristic values of resistance under fire exposure

Annex C2