

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:

Deutsches Institut für Bautechnik

Trade name of the construction product

Apolo MEA Drop-in anchor SA plus

Product family
to which the construction product belongs

Fasteners for use in concrete for redundant non-structural
applications

Manufacturer

Apolo MEA Befestigungssysteme GmbH
Industriestraße 6
86551 Aichach
DEUTSCHLAND

Manufacturing plant

Plant 8
Plant 13

This European Technical Assessment
contains

13 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-13/0371 issued on 9 May 2014

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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

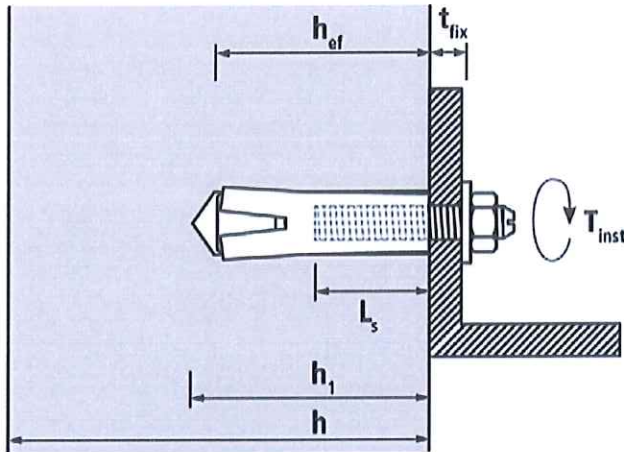
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

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

BD Dipl.-Ing. Andreas Kummerow
Head of Department

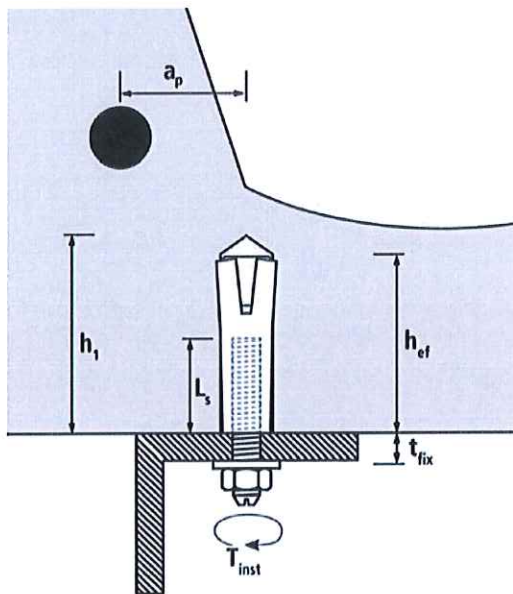
beglaubigt:
Tempel

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

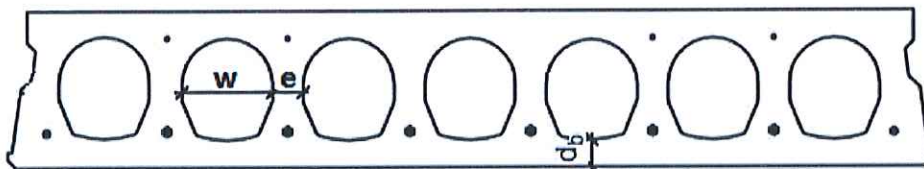


- h = thickness of member
- h_1 = depth of drill hole
- h_{ef} = effective anchorage depth
- t_{fix} = thickness of fixture
- L_s = length of thread inside of the anchor
- T_{inst} = max. installation torque

**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

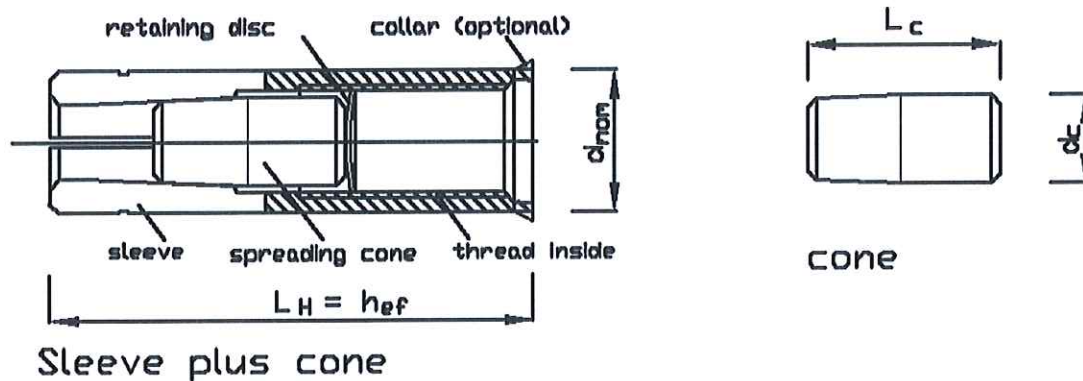


Table A2: Dimensions

| 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

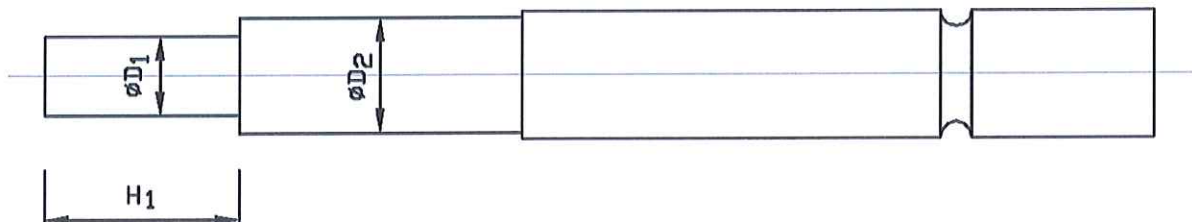


Table A4.1: Geometry of the setting tool

| 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

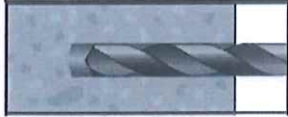
| Apolo MEA Drop in anchor SA plus | | | Size | |
|----------------------------------|-----------|------|-------|--------|
| | | | M8-25 | M10-25 |
| minimum thickness of member | h_{min} | [mm] | 200 | 200 |
| minimum spacing | s_{min} | [mm] | 180 | 180 |
| minimum edge distance | c_{min} | [mm] |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

Apolo MEA Drop in anchor SA plus

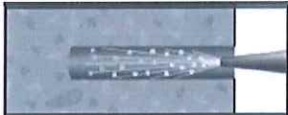
Intended use
Installation data

Annex B2

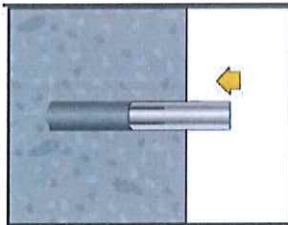
Installation instruction:



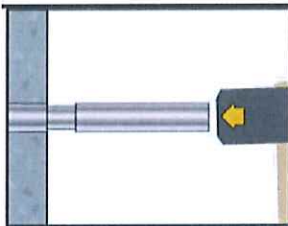
1. Drill the hole with a hammer drill



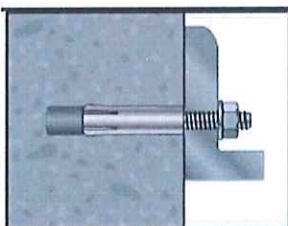
2. Clean the borehole



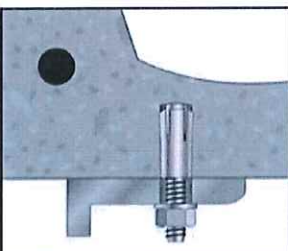
3. To set the anchor by hand or by hammer blows, anchor should be flush to the concrete edge



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 Steel 4.6 | 0,2 | 0,3 | 0,6 |
| R60 | Characteristic resistance | $F_{Rk,fi}$ | [kN] | \geq Steel 4.6 | 0,2 | 0,3 | 0,5 |
| R90 | Characteristic resistance | $F_{Rk,fi}$ | [kN] | \geq Steel 4.6 | 0,2 | 0,2 | 0,4 |
| R120 | Characteristic resistance | $F_{Rk,fi}$ | [kN] | \geq 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