

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-13/0441**  
**of 11 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

Sormat Drop in anchor LA+ and LAL+

Product family  
to which the construction product belongs

Fasteners for use in concrete for redundant non-structural  
applications

Manufacturer

Sormat Oy  
Harjutie 5  
21290 RUSKO  
FINNLAND

Manufacturing plant

Sormat Plant 7

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-13/0441 issued on 14 July 2014

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English translation prepared by DIBt

**Specific Part**

**1 Technical description of the product**

The Sormat Drop in anchor LA+ and LAL+ 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**

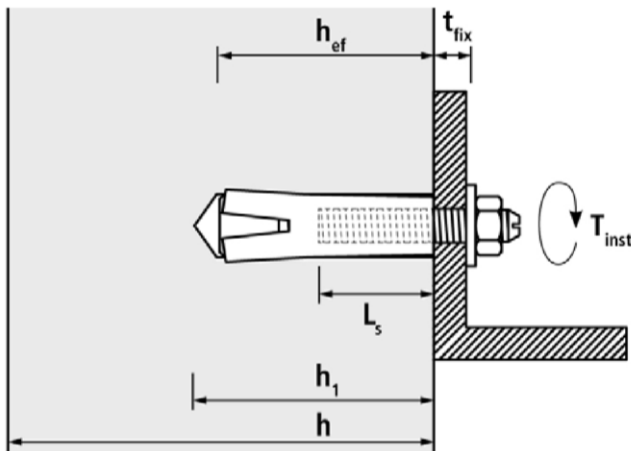
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 11 October 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

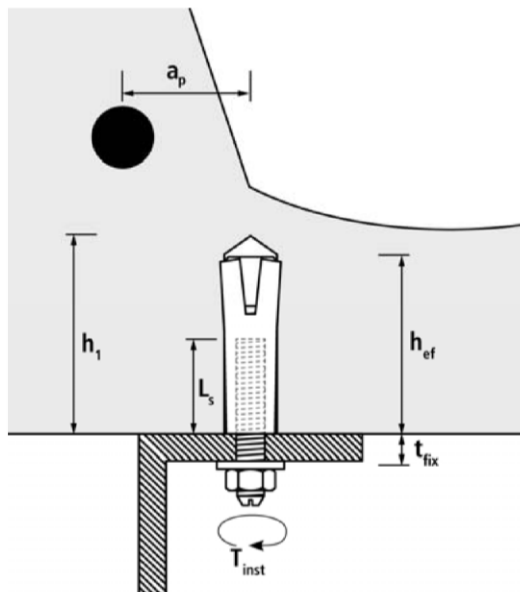
*beglaubigt:*  
Tempel

**LA+ and LAL+ - intended use in concrete C20/25 to C50/60**

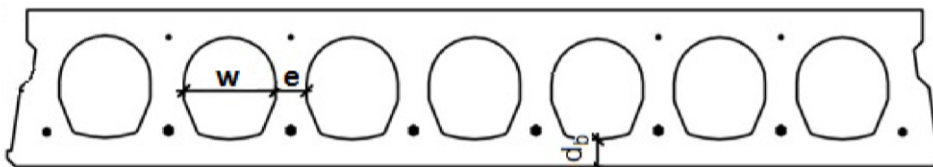


- $h$  = thickness of member
- $h_1$  = depth of drill hole
- $h_{ef}$  = effective anchorage depth
- $t_{fix}$  = thickness of fixture
- $L_s$  = length of thread inside of the anchor
- $T_{inst}$  = max. installation torque

**LA+ and LAL+ - intended use in precast prestressed hollow core slabs ( $w/e \leq 4,2$ )  
with flange thickness  $\geq 35$  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



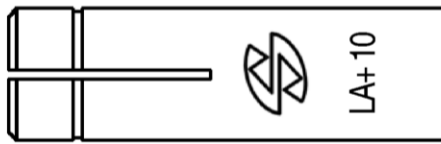
- $w$  = core width
- $e$  = web thickness
- $d_b$  = bottom flange thickness

**Sormat Drop in anchors LA+ and LAL+**

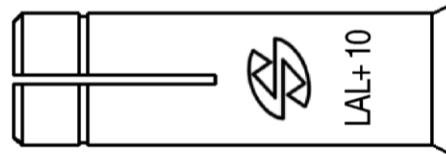
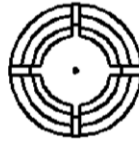
**Product description**  
Installed condition

**Annex A1**

**Sormat Drop in anchor LA+ and LAL+**



LA+ without collar



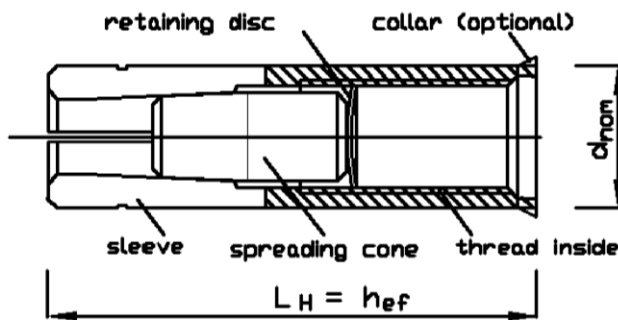
LAL+ with collar

marking:

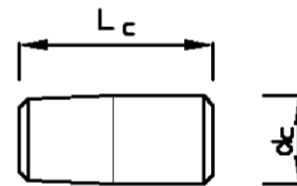
brand marking  
type  
size

Logo or company name  
LA+ / LAL+  
e.g. 10

Example:



Sleeve plus cone



cone

**Table A2: Dimensions**

Anchor	Sleeve		Cone		
	thread inside	length	outer-Ø sleeve	length	outer-Ø cone
type		$L_H$	$d_{nom}$	$L_c$	$d_c$
LA(L)+		[mm]	[mm]	[mm]	[mm]
6	M6	25	8	10	4,5
8 x 25	M8	25	10	8,3	6,3
8	M8	30	10	12	6,0
10 x 25	M10	25	12	8,3	8,0
10	M10	40	12	16	7,5

**Sormat Drop in anchors LA+ and LAL+**

**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**

Sormat Drop in anchor LA+ and LAL+			Size		
			M6	M8 / M8-25	M10 / M10-25
Nominal characteristic steel ultimate strength	$f_{uk}$	[N/mm <sup>2</sup> ]	535	535	535
Nominal characteristic steel yield strength	$f_{yk}$	[N/mm <sup>2</sup> ]	485	485	485

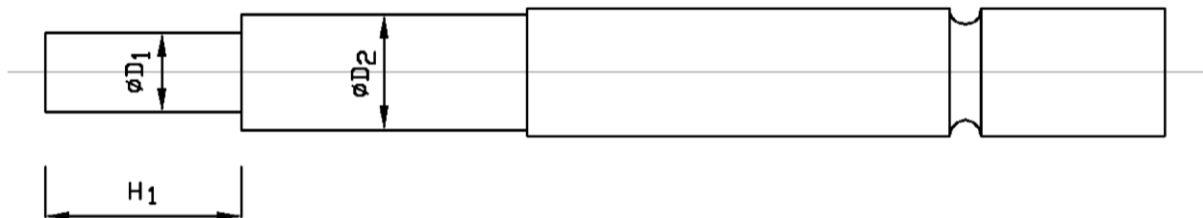
**Sormat Drop in anchors LA+ and LAL+**

**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 <sub>1</sub>	D <sub>2</sub>	H <sub>1</sub>
	[mm]	[mm]	[mm]
LT+ 6 (PRO)	5	7,5	15
LT+ 8 (PRO)	6,6	9,5	17,5
LT+ 10x25 (PRO)	8,3	12	17,0
LT+ 10 (PRO)	8,3	12	23,5

Sormat Drop in anchors LA+ and LAL+

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.

**Sormat Drop in anchors LA+ and LAL+**

**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  $L_{s,min}$ .

Sormat Drop in anchor LA+ and LAL+			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 <sup>1)</sup>	$a_p \geq$	[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**

Sormat Drop in anchor LA+ and LAL+			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**

Sormat Drop in anchor LA+ and LAL+			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

**Sormat Drop in anchor LA+ and LAL+**

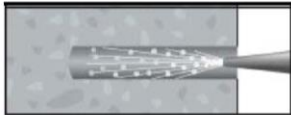
**Intended use**  
Installation data

**Annex B2**

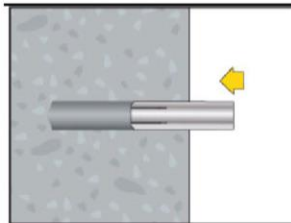
**Installation instruction:**



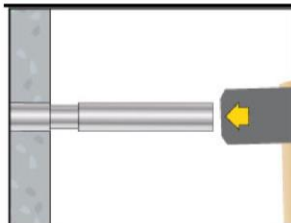
1. Drill the hole with a hammer drill



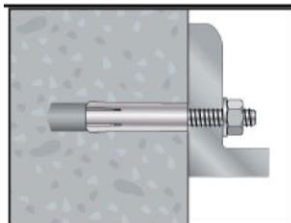
2. Clean the borehole



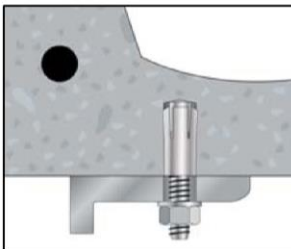
3. To set the anchor by hand or by hammer blows, anchor should be flush to the concrete edge



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 LA+/LAL+ in precast prestressed hollow core slab

**Sormat Drop in anchor LA+ and LAL+**

**Intended use**  
Installation instruction

**Annex B3**

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

Sormat Drop in anchor LA+ and LAL+				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	$\gamma_{inst}$	[ - ]		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
<b>Steel failure with lever arm</b>								
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  $\geq 35$  mm**

Sormat Drop in anchor LA+ and LAL+				
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	$\gamma_{inst}$	[ - ]	1,2	1,2
Spacing	$s_{cr} = s_{min}$	[mm]	180	180
Edge distance	$c_{cr} = c_{min}$	[mm]	150	150

**Sormat Drop in anchor LA+ and LAL+**

**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)**

Sormat Drop in anchor LA+ and LAL+					Size		
Fire resistance class					M6	M8	M10
R30	Characteristic resistance	$F_{Rk,fi}$	[kN]	≥Steel 4.6	0,2	0,3	0,6
R60	Characteristic resistance	$F_{Rk,fi}$	[kN]	≥Steel 4.6	0,2	0,3	0,5
R90	Characteristic resistance	$F_{Rk,fi}$	[kN]	≥Steel 4.6	0,2	0,2	0,4
R120	Characteristic resistance	$F_{Rk,fi}$	[kN]	≥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  $\geq 300$  mm, in case of fire attack from more than one side.

**Sormat Drop in anchor LA+ and LAL+**

**Performances**

Characteristic values of resistance under fire exposure

**Annex C2**