Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

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

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

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.

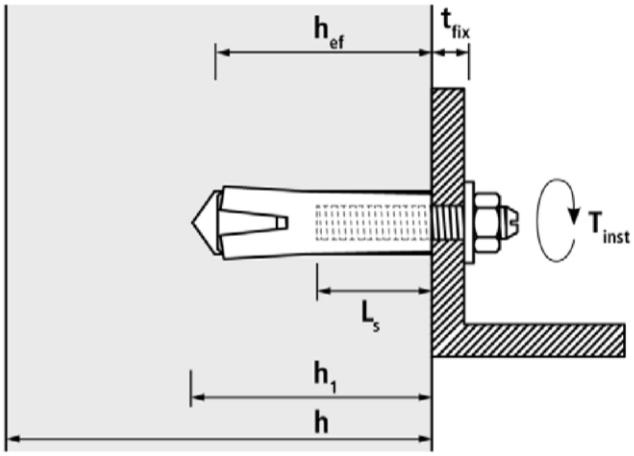
Issued in Berlin on 11 October 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Tempel

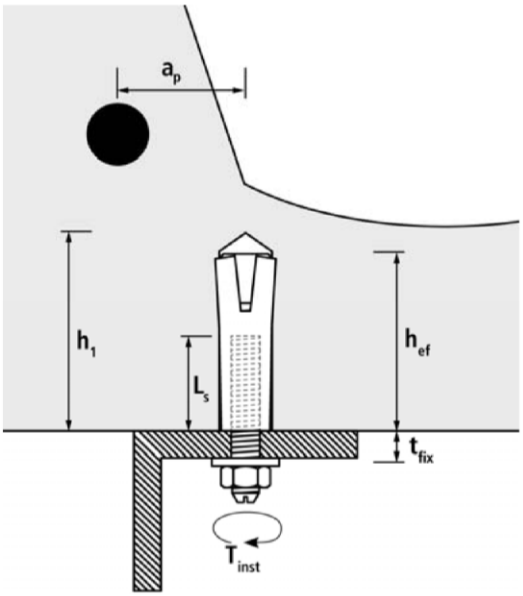
Deutsches Institut für Bautechnik

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

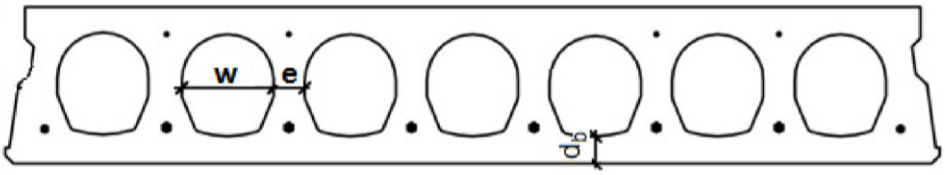


h = thickness of member
h_1 = depth of drill hole
h_{ef} = effective anchorage depth
t_{fix} = thickness of fixture
L_s = length of thread inside of the anchor
T_{inst} = max. installation torque

LA+ and LAL+ - intended use in precast prestressed hollow core slabs (w/e ≤ 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

Sormat Drop in anchors LA+ and LAL+	**Annex A1**
Product description Installed condition	

Deutsches Institut für Bautechnik DIBt

Sormat Drop in anchor LA+ and LAL+



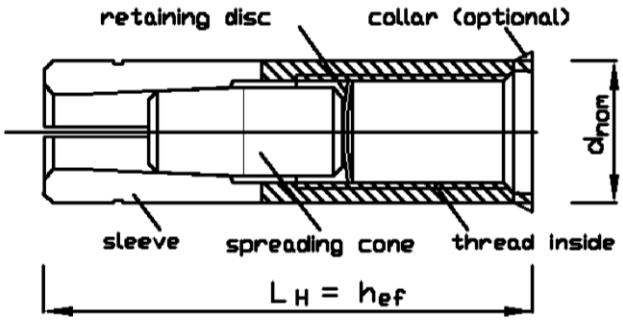
LA+ without collar

LAL+ with collar

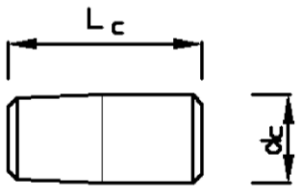
marking: brand marking type size

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

Example: **LA+ 10**, **LAL+ 10**



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+

Annex A2

Product description
Parts, marking and dimensions

Deutsches Institut für Bautechnik DIBt

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 ≥ 5 µm 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/mm²]	535	535	535
Nominal characteristic steel yield strength	f_{yk}	[N/mm²]	485	485	485

Sormat Drop in anchors LA+ and LAL+	**Annex A3**
Product description Materials	

Deutsches Institut für Bautechnik DIBt

Handsetting tool

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

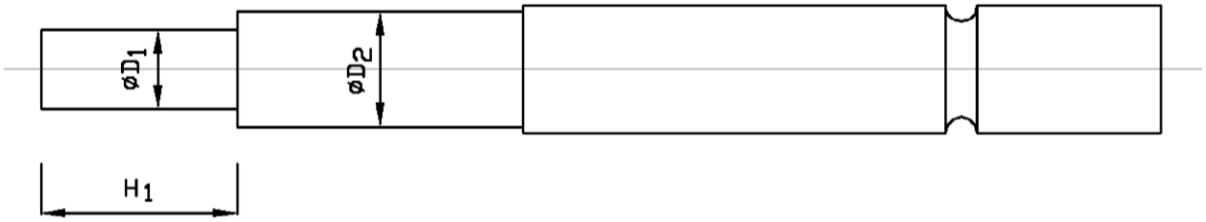


Table A4.1: Geometry of the setting tool

Setting tool	**Setting pin**		
steel HRc 38-42	dimension		
Type	D_1	D_2	H_1
	[mm]	[mm]	[mm]
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+	**Annex A4**
Product description Setting tool	

Deutsches Institut für Bautechnik DIBt

Specifications of intended use

Anchorages 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+	**Annex B1**
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

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 lenght 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 [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

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

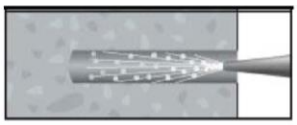
Sormat Drop in anchor LA+ and LAL+	**Annex B2**
Intended use Installation data	

Deutsches Institut für Bautechnik DIBt

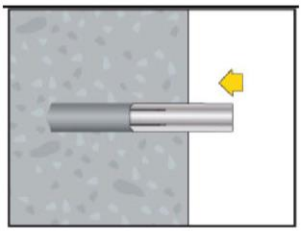
Installation instruction:



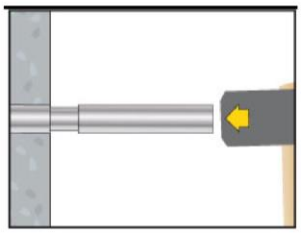
1. Drill the hole with a hammer drill



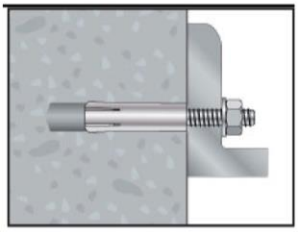
2. Clean the borehole



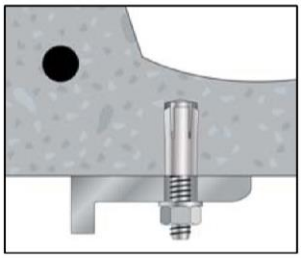
3. To set the anchor by hand or by hammer blows, anchor should be flush to the concrete edge



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+	**Annex B3**
Intended use Installation instruction	

Deutsches Institut für Bautechnik DIBt

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^0_{Rk}	[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	$M^0_{Rk,s}$	[Nm]	Steel 4.6	6,1	15,0	15,0	29,9	29,9
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	Steel 5.6	7,6	18,7	18,7	37,4	37,4
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	Steel 5.8	7,6	18,7	18,7	37,4	37,4
Characteristic bending moment	$M^0_{Rk,s}$	[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

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	γ_{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+	**Annex C1**
Performances Characteristic values of resistance	

Deutsches Institut für Bautechnik DIBt

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 ≥ 300 mm, in case of fire attack from more than one side.

Sormat Drop in anchor LA+ and LAL+	**Annex C2**
Performances Characteristic values of resistance under fire exposure	