

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-11/0163
of 22 May 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

K-A-L-M Drop-In Anchor SAK

Product family
to which the construction product belongs

Deformation-controlled expansion anchors
for use in non-cracked concrete

Manufacturer

KALM
Befestigungssysteme GmbH
Marie-Curie-Straße 5
67661 Kaiserslautern
DEUTSCHLAND

Manufacturing plant

Kalm Befestigungssysteme GmbH, Kaiserslautern

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

European Assessment Document (EAD)
330232-00-0601

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Specific Part

1 Technical description of the product

The K-A-L-M Drop-in anchor SAK in the sizes M8, M10, M12 and M16 is an anchor made of zinc-plated steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

The 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)

Essential characteristic	Performance
Characteristic resistance under static and quasi-static loading	See Annex C 1 and C 2
Displacements under tension and shear loads	See Annex C 3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Safety in use (BWR 4)

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

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

In accordance with European Assessment Documents EAD No. 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

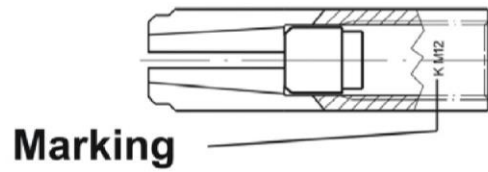
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 22 May 2017 by Deutsches Institut für Bautechnik

Andreas Kummerow
Head of Department

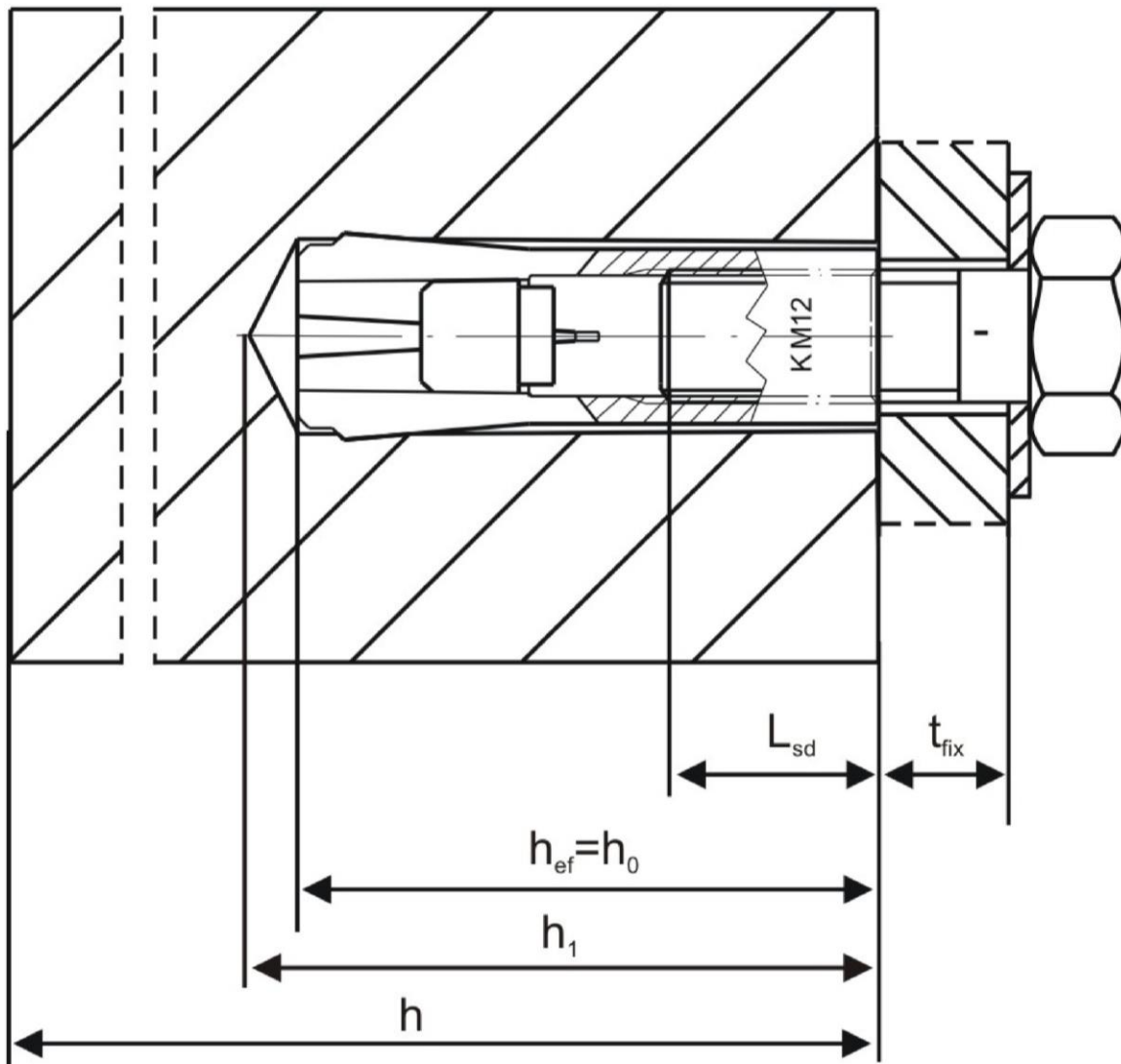
beglaubigt:
Baderschneider

Drop-In anchor



Identifying mark of manufacturing plant K
Size of thread M...
Example: Km12
or SAK M...

Intended Use



K-A-L-M Drop-In Anchor SAK

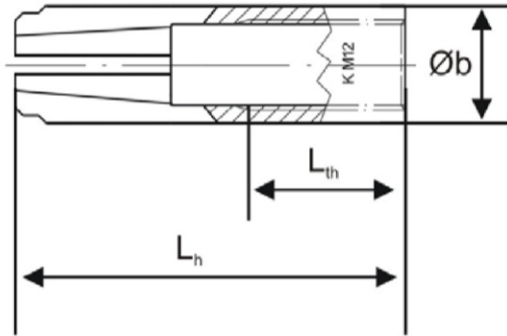
Product Description

Installation conditions of the anchor

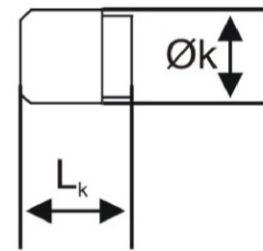
Annex A 1

Description

Sleeve



Cone



Setting tool

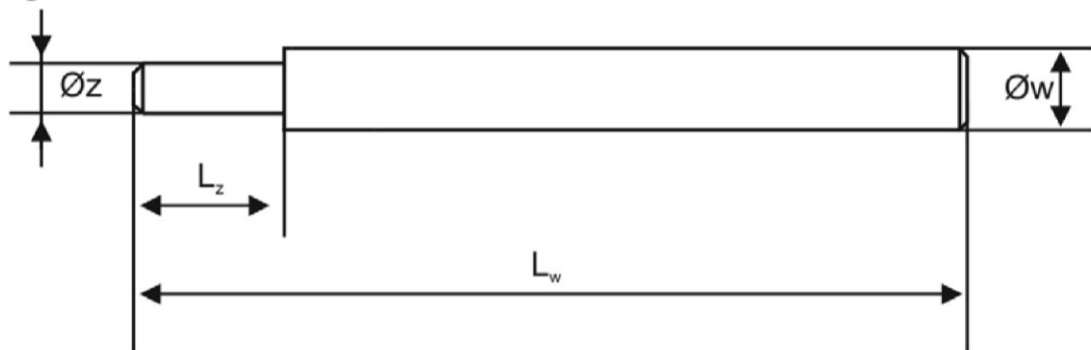


Table A1: Anchor Dimensions

	Drop-In Anchor			Cone		Setting Tool			
	L_h	L_{th}	$\varnothing b$	L_k	$\varnothing k$	L_w	L_z	$\varnothing w$	$\varnothing z$
M 8	30	13	10	11	6,5	170	17	10	6
M 10	40	15	12	14	8,1	170	23	12	8
M 12	50	18	15	18	10,0	170	26	15	10
M 16	65	23	20	25	13,8	170	40	20	13

All Values in Millimetres (mm)

K-A-L-M Drop-In Anchor SAK

Product Description
Sleeve / Cone / Setting Tool

Annex A 2

Table A2: Material

Part	Description	Steel, galvanised, ≥ 5 µm according to DIN EN ISO 4042
1	Sleeve	Steel according to EN 10087:1998 or EN 10263:2001, Strength class 5.8 according to EN 1993-1-8:2005
2	Cone	Steel according to EN 10087:1998 or EN 10263:2001, Strength class 5.8 according to EN 1993-1-8:2005
3	Setting tool	Steel according to EN 10087:1998 or EN 10263:2001, Strength class 5.8 according to EN 1993-1-8:2005

Requirements of the fastening screw or the threaded rod acc. to the engineering documents:

- Minimum property class 5.6 acc. to EN ISO 898-1
- Minimum screwing depth $L_{sd,min}$ acc. to Table B1
- The length of the screw shall be determined depending on thickness of the fixture t_{fix} available thread length L_{th} and minimum screwing depth $L_{sd,min}$

Blow-out pump ABK



K-A-L-M Drop-In Anchor SAK

Product Description
Material / Cleaning

Annex A 3

Specification of intended use

Anchorage subject to:

- Static und quasi-static loads: M8 to M16.

Base material:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000.
- Non-cracked 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.
- Anchorages under static or quasi-static actions are designed in accordance with EN 1992-4:2017.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervisions of the person responsible for the technical matters.
- Use category: dry base material (ground).
- Size: M8 to M16.
- Hole drilling by Hammer drilling.

K-A-L-M Drop-In Anchor SAK

Intended Use
Specifications

Annex B 1

Table B1: Installation Parameter

Anchor Size			M8	M10	M12	M 16
Nominal drill hole diameter	d_0	[mm]	10	12	15	20
Cutting drill diameter	$d_{cut} \leq$	[mm]	10,45	12,50	15,50	20,55
Depth of drill hole	h_1	[mm]	33	44	54	71
Effective anchoring depth	$h_0=h_{ef}$	[mm]	30	40	50	65
Length of Threat	L_{th}	[mm]	16	18	20	27
Minimum reach of the screw	$L_{sd,min}$	[mm]	9	11	13	17
Recommended torque moment	$T_{inst} \leq$	[Nm]	8	15	35	60
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	11	13	18
Minimum thickness of member	h_{min}	[mm]	100	120	130	160
Minimum edge distance	c_{min}	[mm]	95	135	165	200
Minimum spacing	s_{min}	[mm]	60	100	120	150

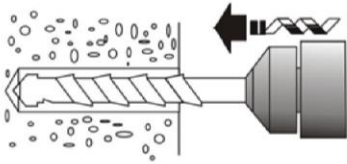
K-A-L-M Drop-In Anchor SAK

Intended Use
Installation Parameters

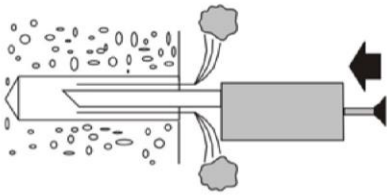
Annex B 2

Installation Instruction

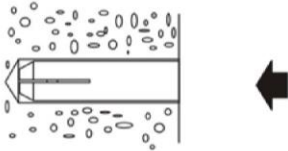
Installation instructions



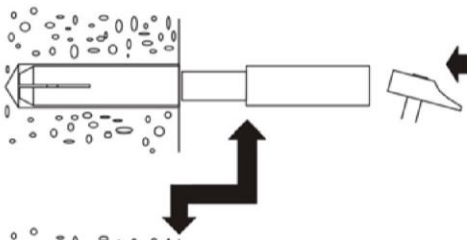
Drill the hole.



Clean the drill hole.



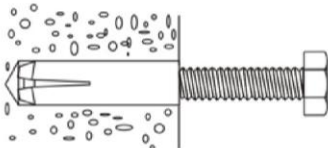
Drive in Anchor SAK.



Set the Anchor SAK by using the setting tool.



Shoulder of setting tool must fit on anchor rim.



Apply installation torque T_{inst} by using torque wrench.

K-A-L-M Drop-In Anchor SAK

Intended Use
Installation Instruction

Annex B 3

Table C1: Characteristic values of resistance to tension load

Anchor Size			M 8	M 10	M 12	M 16
Steel Failure Screw 5.6						
Characteristic resistance	$N_{Rk,s}$	[kN]	18	28	42	78
Partial Safety Factor	γ_{Ms}	[-]	2,0			
Pull-Out						
Characteristic resistance	$N_{Rk,p}$	[kN]	7,5	9	12	20
Partial Safety Factor	γ_{Mc}	[-]	2,1			1,8
Installation Safety Factor	γ_{inst}	[-]	1,4			1,2
Increasing Factors for $N_{Rk,p}$	ψ_c	C30/37	1,09			
		C40/50	1,13			
		C50/60	1,17			
Concrete Cone Failure and splitting failure						
Effective anchoring depth	h_{ef}	[mm]	30	40	50	65
Faktor k_1	$k_{Ucr,N}$	[-]	11,0			
Concrete cone failure	Edge Distance	$c_{cr,N}$	$1,5 h_{ef}$			
	Spacing	$s_{cr,N}$	$3,0 h_{ef}$			
Splitting failure	Edge Distance	$c_{cr,sp}$	95	135	165	200
	Spacing	$s_{cr,sp}$	190	270	320	400
Partial Safety Factor	γ_{Mc}	[-]	2,1			1,8
Installation Safety Factor	γ_{inst}	[-]	1,4			1,2

K-A-L-M Drop-In Anchor SAK

Performance

Characteristic values for tension load

Annex C 1

Table C2: Characteristic values for shear load

Anchor Size			M 8	M 10	M 12	M 16
Steel Failure without lever arm screw 5.6						
Characteristic resistance	$V_{Rk,S}$	[kN]	7	9	19	37
Ductility factor	k_7	[-]	0,8			
Partial Safety Factor	γ_{MS}	[-]	1,67			
Steel Failure with lever arm screw 5.6						
Characteristic resistance	$M^0_{Rk,S}$	[Nm]	19	37	65	166
Partial Safety Factor	γ_{MS}	[-]	1,67			
Concrete Pryout Failure						
Factor	k_8	[-]	1,0			2,0
Partial Safety Factor	γ_{Mc}	[-]	1,5			
Installation Safety Factor	γ_{inst}	[-]	1,0			
Concrete Edge Failure						
Effective Length in Shear Loading	l_f	[mm]	30	40	50	65
Outside Diameter of the Anchor	d_{nom}	[mm]	10	12	15	20
Partial Safety Factor	γ_{Mc}	[-]	1,5			

K-A-L-M Drop-In Anchor SAK

Performances
Characteristic values for shear load

Annex C 2

Table C3: Displacement under tension load

Anchor Size			M 8	M 10	M 12	M 16
Load in non-cracked concrete	N	[kN]	3,6	4,3	4,1	7,9
Displacement	δ_{N0}	[mm]	0,2			
	$\delta_{N\infty}$	[mm]	0,3			

Table C4: Displacement under shear load

Anchor Size			M 8	M 10	M 12	M 16
Load in non-cracked concrete	V	[kN]	3,0	3,8	8,1	15,8
Displacement	δ_{V0}	[mm]	1,3	1,0	1,7	2,7
	$\delta_{V\infty}$	[mm]	1,9	1,5	2,5	4,0

K-A-L-M Drop-In Anchor SAK

Performances
Characteristic values for Displacement

Annex C 3