

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-14/0269
of 13 October 2014

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

KALM Wedge Anchor KDK-F

Product family
to which the construction product belongs

Torque controlled expansion anchor of sizes M8, M10,
M12 and M16 for use in non-cracked concrete

Manufacturer

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

Manufacturing plant

KALM
Befestigungssysteme GmbH
Marie-Curie-Straße 5
67661 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

Guideline for European technical approval of "Metal
anchors for use in concrete", ETAG 001 Part 2: "Torque
controlled expansion anchors", Edition April 2013,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

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Specific Part

1 Technical description of the product

The KALM Wedge Anchor KDK-F in the sizes M8, M10, M12 and M16 is an anchor made of hot-dip galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

Product and product description 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 provisions made in this European technical assessment are based on an assumed working life of the anchor of 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 for tension loads	See Annex C 1
Edge distances and spacing	See Annex C 1
Characteristic resistance for shear loads	See Annex C 2
Displacements under shear and tension 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 determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European technical assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.4 Safety and accessibility (BWR 4)

For Basic requirement Safety and accessibility in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not applicable

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision 96/582/EC of the Commission of 24 June 1996 (Official Journal of the European Communities L 254 of 08.10.1996, p. 62–65) the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use(s)	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

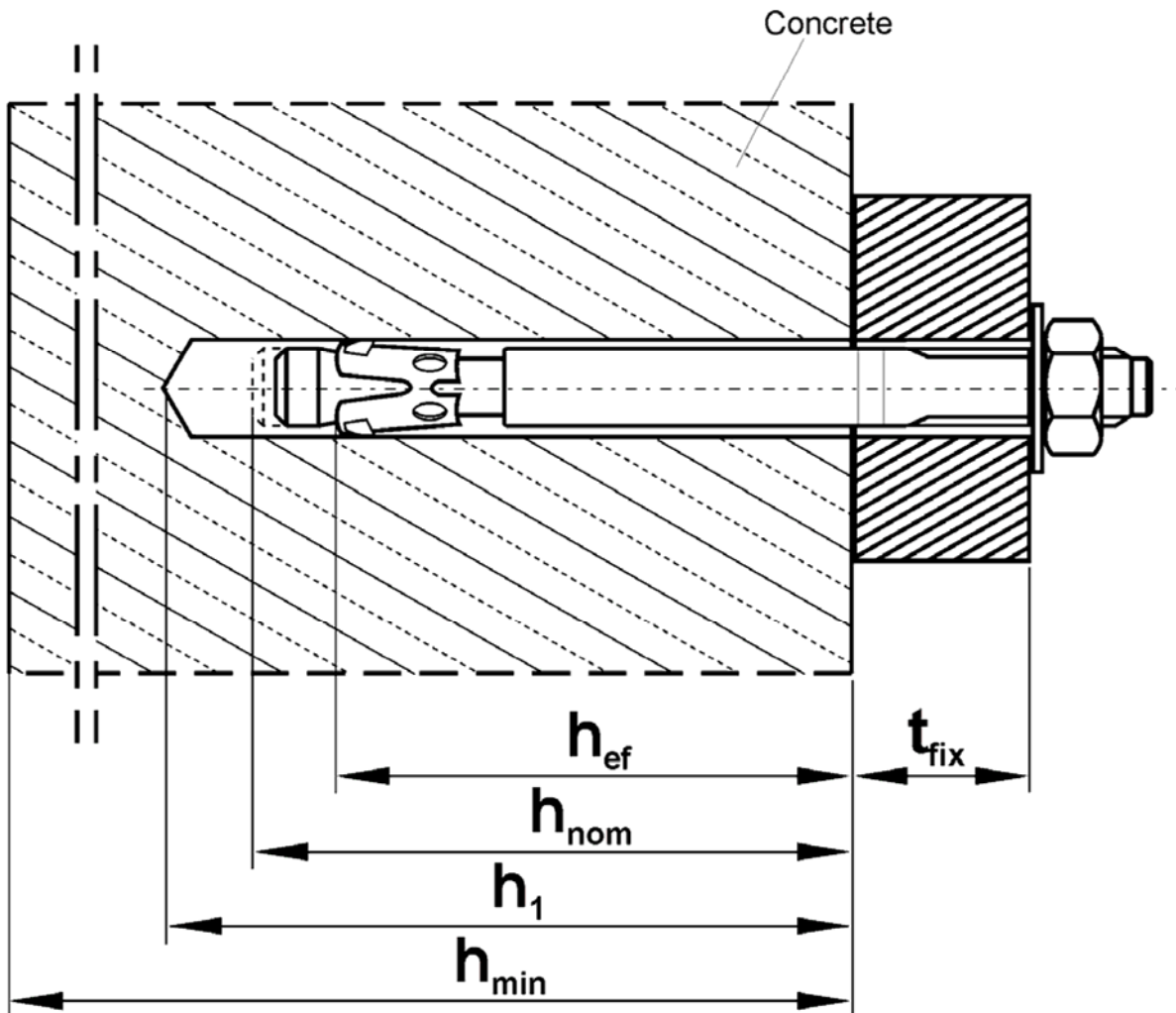
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 13 October 2014 by Deutsches Institut für Bautechnik

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Tempel

Installation of anchor

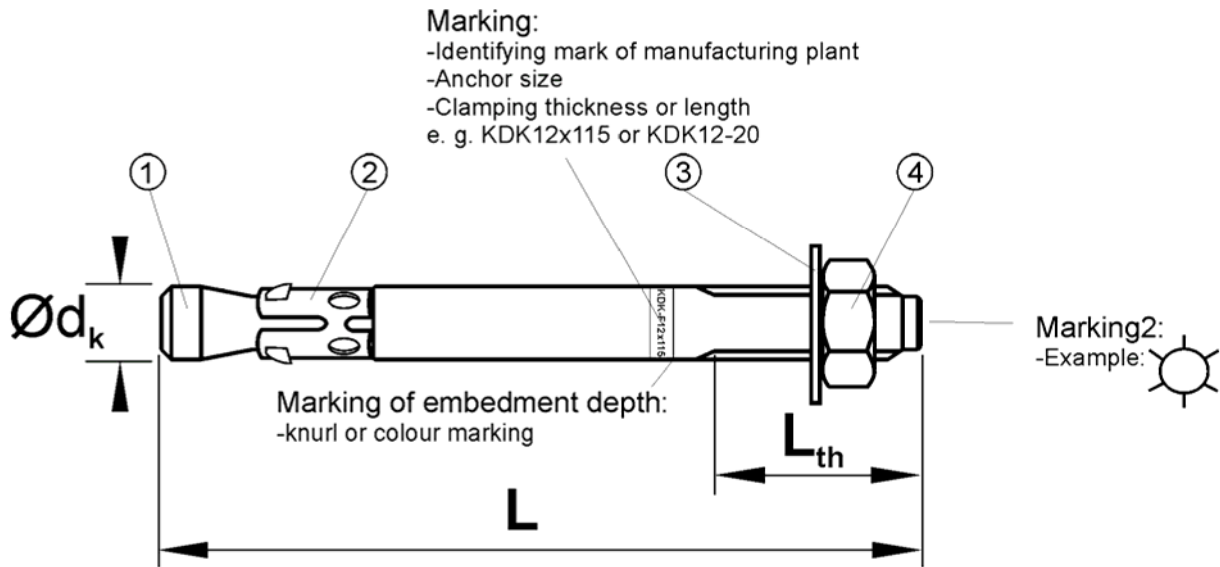


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K-A-L-M Wedge Anchor KDK-F

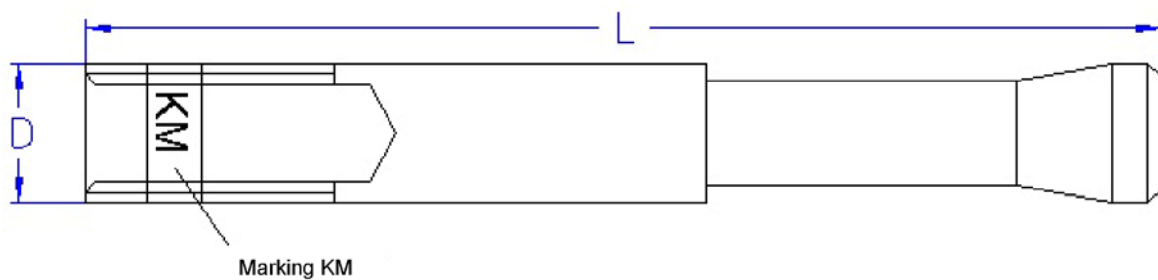
Product description
Installed condition

Annex A 1



Dimensions

Anchor size	L [mm]		Thread		Ø dk
	min.	max.	Size	L _{th}	
M8	65	350	M8	25-120	8
M10	70	410	M10	30-120	10
M12	95	555	M12	35-120	12
M16	115	515	M16	40-120	16



Anchor size	Ø dk	L [mm]
M8	10	50
M10	12	60
M12	16	75

K-A-L-M Wedge Anchor KDK-F

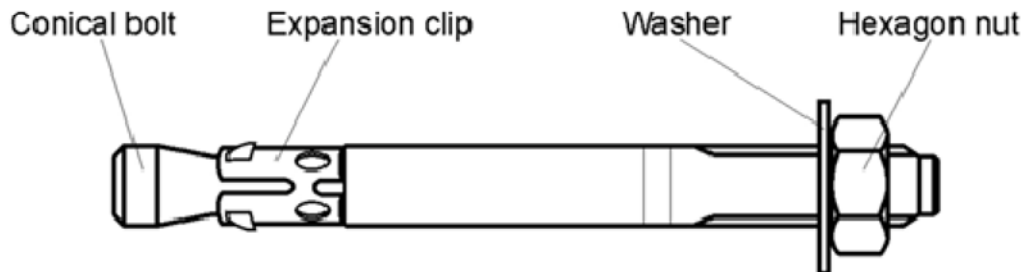
Product description

Description and dimensions of anchor

Annex A 2

Materials

Part	Designation	Material
Version KDK-F – steel hot-dip galvanized $\geq 40\mu\text{m}$		
1	Conical bolt	Steel, Property class 5.8, 8.8
2	Expansion clip	steel EN 10149-2
3	washer	steel EN 10025-2
4	nut	strength class 8 EN 20 898-2



Type of anchor / size			M8	M10	M12	M16
Nominal characteristic steel ultimate strength	f_{uk}	[N/mm ²]	620	620	570	570
Nominal characteristic steel yield strength	f_{yk}	[N/mm ²]	740	740	690	690

K-A-L-M Wedge Anchor KDK-F

Product description
Materials

Annex A 3

Specifications of intended use

Anchorage subject to

- Static and quasi-static loads

Base Materials

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000-12
- Strength classes C20/25 to C50/60 according to EN 206-1:2000-12
- Non-cracked concrete

Use conditions (Environmental conditions)

- Structures subject to dry internal conditions

Design Installation

- 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 are designed in accordance with ETAG 001, Annex C, design method A, Edition August 2010

Installation

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Check of concrete being well compacted, e.g. without significant voids,
- 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.

K-A-L-M Wedge Anchor KDK-F

Intended Use
Specifications of intended use

Annex B 1

Installation parameters

Anchor size			M8	M10	M12	M16
Nominal drill hole diameter	$d_0 =$	mm	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	mm	8,45	10,45	12,5	16,5
Depth of drill hole	$h_1 \geq$	mm	65	70	90	110
Anchor embedment depth	h_{nom}	mm	55	60	80	100
Effective anchorage depth	h_{ef}	mm	45	50	65	80
Thickness of the fixture	t_{fix}	mm	1-64	1-80	1-96	1-128
Diameter of clearance hole in the fixture	$d_f \leq$	mm	9	12	14	18
Torque moment for non-cracked concrete	$T_{inst} =$	Nm	12	20	30	90

Minimum thickness of concrete member, minimum spacing and minimum edge distances

Anchor size			M8	M10	M12	M16
Non-cracked concrete						
Minimum member thickness	h_{min}	mm	100	100	120	160
Minimum spacing	s_{min}	mm	60	70	120	120
Minimum edge distance	c_{min}	mm	75	120	180	160

K-A-L-M Wedge Anchor KDK-F

Intended Use
Installation parameters

Annex B 2

Installation instructions

- Drill the hole
- Clean the drill hole.
- Set KDK through the fixture and hit it into the drill hole.
- Tight the nut with a torque moment wrench



Blow Pump ABK (Standard Cleaning)



K-A-L-M Wedge Anchor KDK-F

Intended Use
Installation instructions, cleaning tool

Annex B 3

Characteristic values for tension load in non-cracked concrete (design according to ETAG 001, Annex C, design method A)

Anchor size			M8	M10	M12	M16
Steel failure						
Characteristic resistance	$N_{Rk,S}$	[kN]	18	29	39	73
Pullout failure						
Characteristic resistance in $N_{Rk,p}$ in non-cracked concrete	C 20/25	[kN]	7,5	12	16	20
Installation safety factor	γ_2	[-]	1,2			
Increasing factors for $N_{Rk,p}$ for Cracked and non-cracked concrete	ψ_c	[-]	1,22			
	C30/37		1,41			
	C40/50		1,55			
C50/60						
Concrete cone and splitting failure						
Effective anchorage depth	h_{ef}	[mm]	45	50	65	80
Spacing	$s_{cr,N}$	[mm]	3 x h_{ef}			
	$s_{cr,sp}$	[mm]	220	240	320	400
Edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}			
	$c_{cr,sp}$	[mm]	110	120	160	200
Installation safety factor	γ_2	[-]	1,2			

K-A-L-M Wedge Anchor KDK-F

Performances

Characteristic values for tension load in non-cracked concrete (ETAG 001, Annex C, design method A)

Annex C 1

Characteristic values for shear load in non-cracked concrete (design according to ETAG 001, Annex C, design method A)

Anchor size			M8	M10	M12	M16
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}$	[kN]	7	15	20	36
Steel failure with lever arm						
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	28	55	90	229
Concrete pryout failure						
Factor k	k	[-]	1,0		2,0	
Installation safety factor	γ_2	[-]	1,0			
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	45	50	65	80
Effective outside diameter of anchor	d_{nom}	[mm]	8	10	12	16
Installation safety factor	γ_2	[-]	1,0			

K-A-L-M Wedge Anchor KDK-F

Performances

Characteristic values for shear load in non-cracked concrete (ETAG 001, Annex C, design method A)

Annex C 2

Displacements under tension loads

Anchor size			M8	M10	M12	M16
Tension load in non-cracked concrete	N	[kN]	3,0	4,8	6,3	7,9
Displacements	δ_{N0}	[mm]	0,4	0,2	0,3	0,3
	$\delta_{N\infty}$	[mm]	0,5	1,0	1,5	1,4

Displacements under shear loads

Anchor size			M8	M10	M12	M16
Shear load in non-cracked concrete	V	[kN]	3,2	7,0	9,3	17,4
Displacement	δ_{V0}	[mm]	0,8	1,3	1,5	3,1
	$\delta_{V\infty}$	[mm]	1,2	2,0	2,3	4,7