

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-04/0026  
of 25 April 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

Kunkel anchor K6, K6+, K6L and K8

Product family  
to which the construction product belongs

Deformation-controlled expansion anchor  
for multiple use for non-structural  
applications in concrete

Manufacturer

Kunkel GmbH  
Befestigungssysteme  
Jakobstraße 24  
66115 Saarbrücken  
DEUTSCHLAND

Manufacturing plant

Kunkel GmbH Befestigungssysteme

This European Technical Assessment  
contains

16 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

ETAG 001 Part 6: "Anchors for multiple use for non-  
structural applications", Januar 2011,  
used as 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 Kunkel anchor K6, K6+, K6L and K8 is an anchor made of galvanised steel, stainless or high corrosion resistant 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)**

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

**3.2 Safety in case of fire (BWR 2)**

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C 3

**3.3 Safety in use (BWR 4)**

Essential characteristic	Performance
Characteristic resistance for all load directions	See Annex C 1 und C 2

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

In accordance with guideline for European technical approval ETAG 001, January 2011, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, the applicable European legal act is: [97/161/EC].

The system to be applied is: 2+

English translation prepared by DIBt

**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 with Deutsches Institut für Bautechnik.

Issued in Berlin on 25 April 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Baderschneider

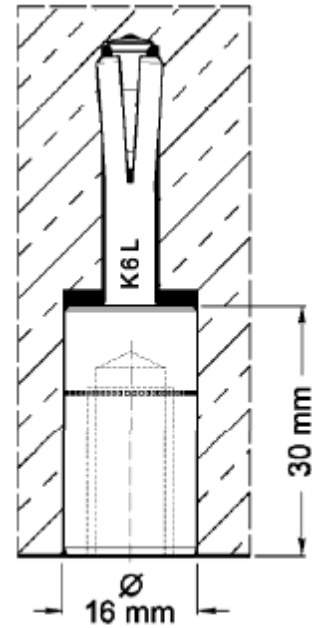
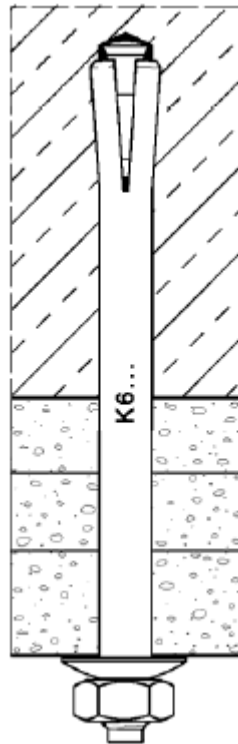
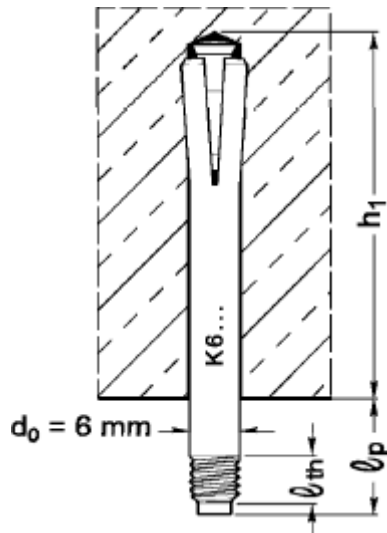
**Multiple use for non-structural applications only**

**Different Installations with different head forms of the anchor**

**Pre-positioned Installation**

**In-place Installation**

**Counter-sunk Installation**



$l_{th}$  – Length of connection thread  
 $l_p$  – Length of protrusion

**Kunkel anchor K6, K6+, K6L and K8**

**Product description**  
Installation condition

**Annex A1**

**Table A1: Materials**

Material	Anchor type / Marking			
	K6	K6+	K6L	K8
Steel galvanized according to EN ISO 4042	K6	K6+	K6L	K8
Stainless steel 1.4401 according to EN 10088	K6E	K6+E	K6LE	K8E
Stainless steel 1.4404 according to EN 10088	K6E	K6+E	K6LE	K8E
Stainless steel 1.4571 according to EN 10088	K6X	K6+X	K6LX	K8X
High corrosion resistant steel 1.4529 acc. to EN 10088	K6C	K6+C	K6LC	K8C
High corrosion resistant steel 1.4565 acc. to EN 10088	K6C	K6+C	K6LC	K8C
Drill hole depth $h_1$	32 mm	37 mm	42 mm	43 mm
Effective embedment depth $h_{ef}$	26 mm	31 mm	36 mm	36 mm

Concrete

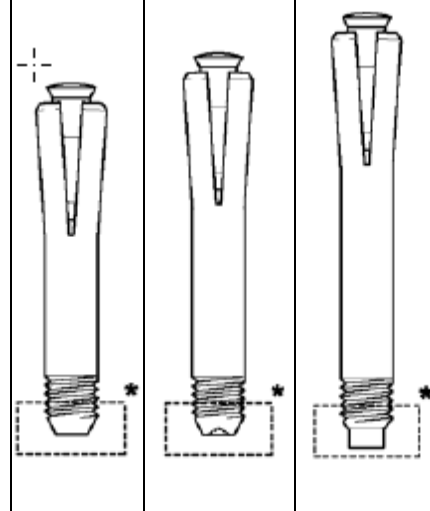
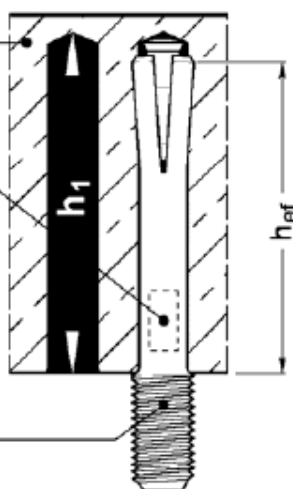
C20/25 to C50/60

Marking:

e.g. K6L

either on the shaft or  
outside the internal  
threaded sleeve

Different head forms and  
thread sizes are  
admissible



\* Length  
Indicator

The anchor may only be set with appropriate  
stop drills and setting tools.

Kunkel anchor K6, K6+, K6L and K8

Product description  
Materials and anchor types

Annex A2

## Specifications of intended use

### Anchorage subject to:

- Static and quasi-static loads
- Only to be used for multiple use for non-structural application
- Fire exposure

### Base material:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000
- Strength class C20/25 to C50/60 according to EN 206-1:2000
- Cracked and non-cracked concrete

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) or exposure to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions. (high corrosion resistant steel).  
Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used.)

### 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.).
- The strength class and the length of the fastening screw or threaded rod shall be defined by the designing engineer
- Anchorages under static or quasi-static actions for multiple use for non-structural applications are designed in accordance with:
  - ETAG 001, Annex C, design method C, Edition August 2010 or
  - CEN/TS 1992-4:2009, design method C
- Anchorages under fire exposure are designed in accordance with:
  - ETAG 001, Annex C, design method C, Edition August 2010 and EOTA Technical Report TR 020, Edition May 2004 or
  - CEN/TS 1992-4:2009, Annex D
  - It must be ensured that local spalling of the concrete cover does not occur.

### Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools,
- Drill hole by hammer drilling only,
- Positioning of the drill holes without damaging the reinforcement.
- The anchor with external thread for pre-set installation or anchor internal thread is properly expanded if the setting tool rests on the concrete surface. The anchor for through-set installation is properly expanded if the setting tool rests on the surface of the fixture.
- The screw-in depth of fastening screw or threaded rod for anchors with internal thread must be at least the nominal thread size.

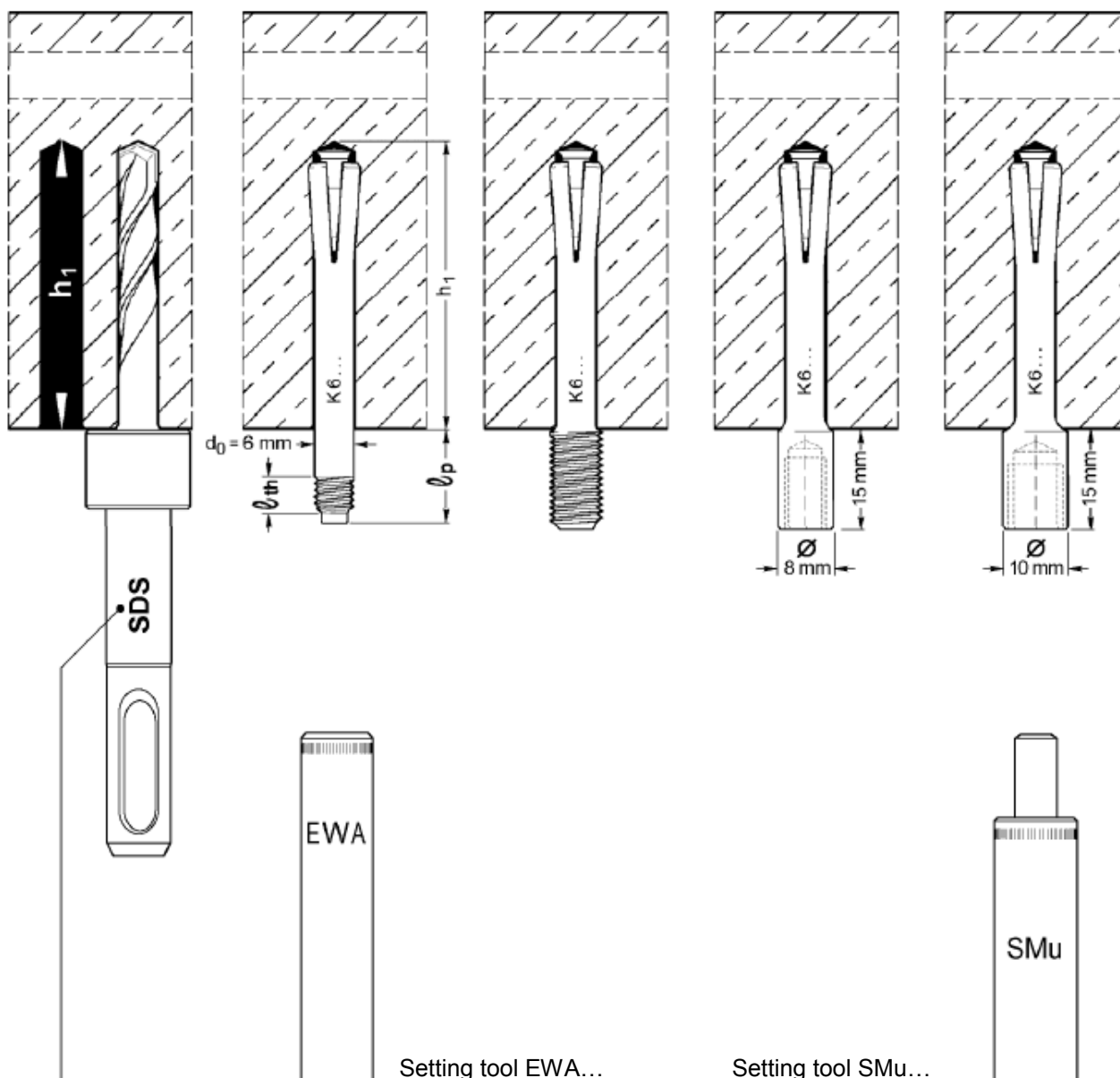
**Kunkel anchor K6, K6+, K6L and K8**

**Intended Use  
Specifications**

**Annex B1**

**Table B1: Information's for pre-positioned installation (K6, K6+, K6L (...E, ...X, ...C))**

Anchor type		K6 x lp	K6-8 x lp	KMu 6	KMu 8
Thread size		External thread M6	External thread M8	Internal thread M6	Internal thread M8
Setting tool		EWA 6 x lp	EWA 8 x lp	SMu 6	SMu 8
Length of thread $l_{th}$	[mm]	$5 \leq l_{th} \leq 50$		-	-
Length of protrusion $l_p$	[mm]	$5 \leq l_p \leq 300$		-	-
Screw-in depth		-		6 bis 12	8 bis 12



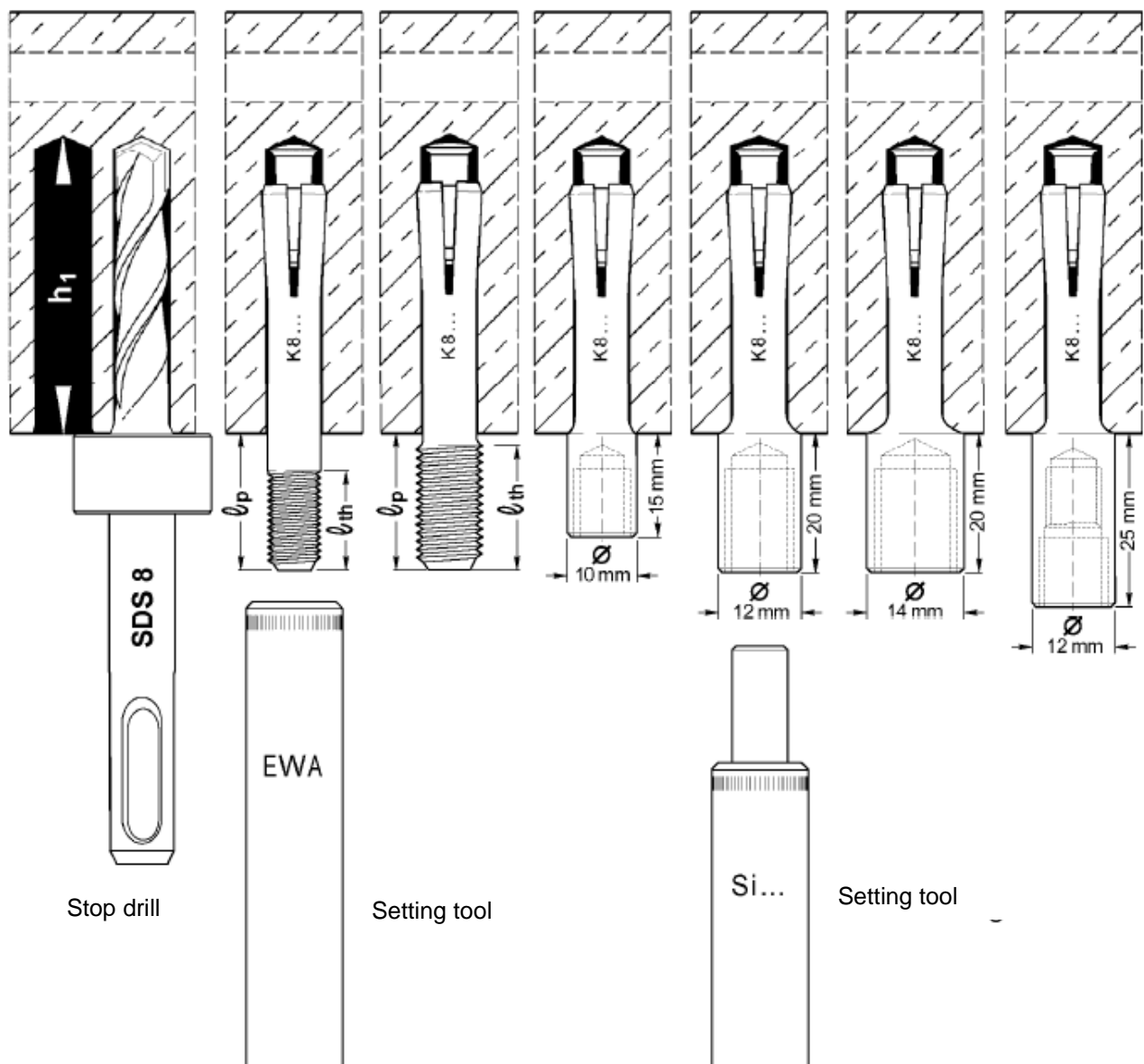
Anchor type	K6	K6+	K6L
Appropriate stop drill	SDS 1	SDS +	SDS 2

Kunkel anchor K6, K6+, K6L and K8	<b>Annex B2</b>
<b>Intended Use</b> Information's for pre-positioned installation K6, K6+ and K6L	



**Table B2: Information's for pre-positioned installation (K8 (...E, ...X, ...C))**

Anchor type	K8 x $l_p$	K8 - 10 x $l_p$	K8 - M8i	K8 - M10i	K8 - M12i	K8-M8i/M10i
Thread size	External thread M8	External thread M10	Internal thread M8	Internal thread M10	Internal thread M12	Internal thread M8/M10
Setting tool	EWA 8 x $l_p$	EWA 10 x $l_p$	Si 8 - SM	Si 10 - SM	Si 12 - SM	Si 8 - SM
Length of thread $l_{th}$ [mm]	$5 \leq l_{th} \leq 50$	$5 \leq l_{th} \leq 50$	-			
Length of protrusion $l_p$ [mm]	$5 \leq l_p \leq 300$	$5 \leq l_p \leq 300$	-			
Screw-in depth [mm]	-	-	8 to 10	10 to 15	12 to 15	M8: 8 to 10
Stop drill	SDS 8 x 43					



Kunkel anchor K6, K6+, K6L and K8

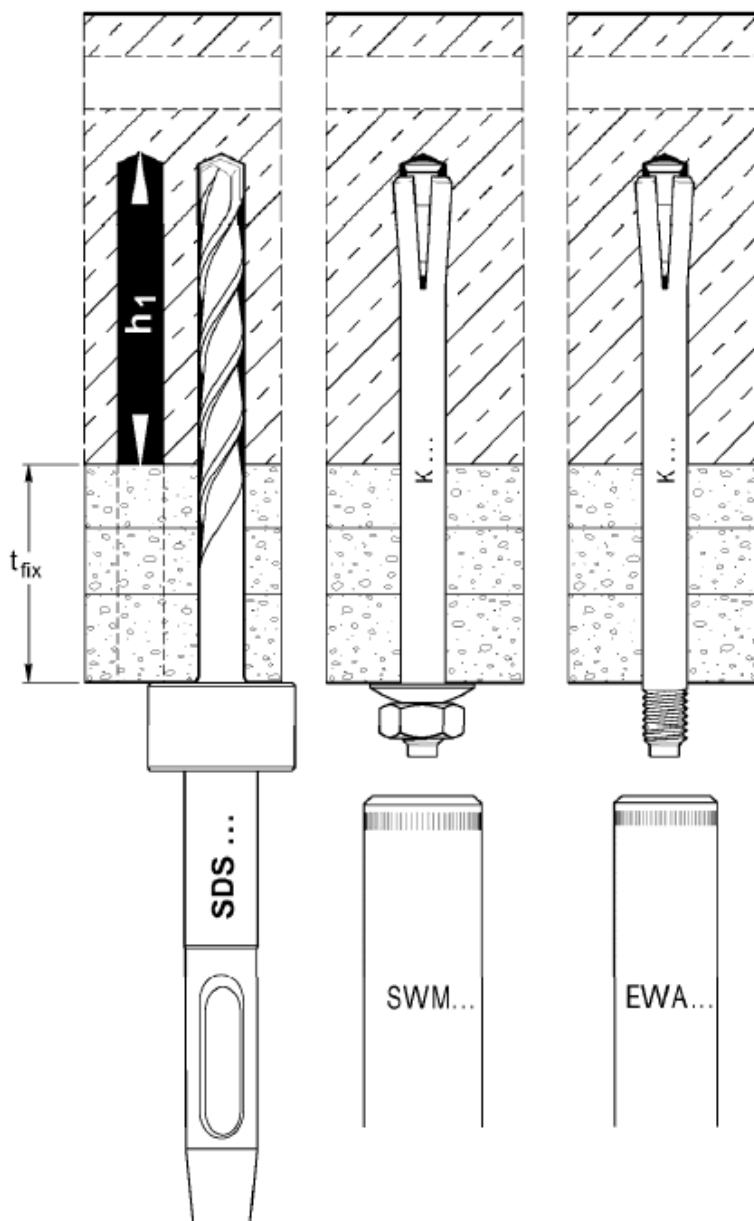
**Intended Use**  
Information's for pre-positioned installation  
K8

**Annex B3**

**Table B3: Information's for in-place installation (K6, K6+, K6L, K8 (...E, ...X, ...C))**

Anchor type		KDM 6 x t <sub>fix</sub> / ...N KDM 8 x t <sub>fix</sub> / ...N with washer and hexagon nut	K 6 x t <sub>fix</sub> / ...N K 8 x t <sub>fix</sub> / ...N
Thread size		M6 / M8	M6 / M8
Setting tool		SWM ...	EWA ...
Length of thread $l_{th}$	[mm]	-	≥ 5
Thickness of the fixture $t_{fix}$	[mm]	≤ 300	
Stop drill		SDS ...	

The type of stop drill depends on the required thickness of the fixture  $t_{fix}$



Kunkel anchor K6, K6+, K6L and K8

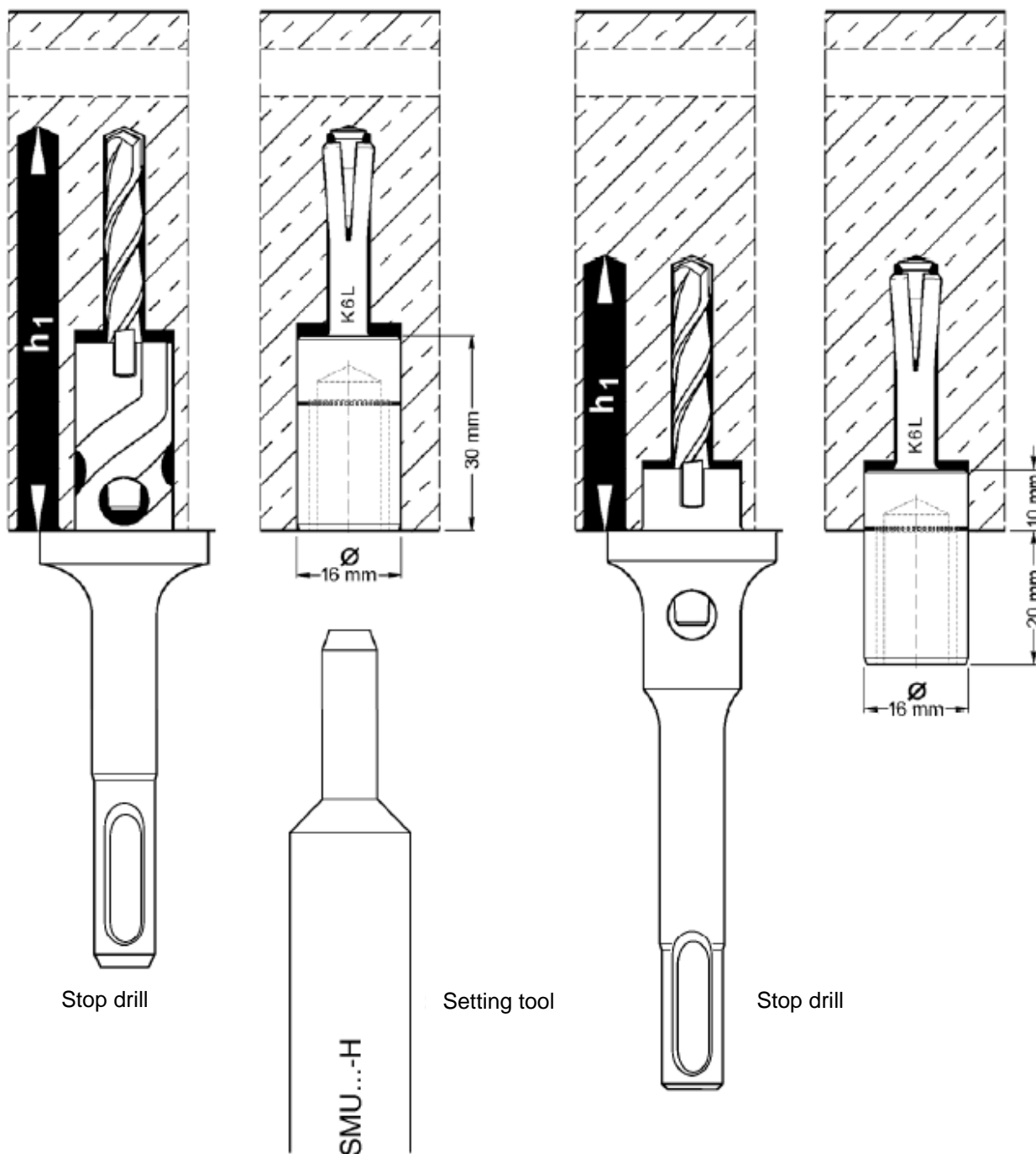
**Intended Use**

Information's for in-place installation  
K6, K6+, K6L and K8

**Annex B4**

**Table B4: Informations for counter-sunk installation (K6L)**

Anchor type		KMu F 10	KMu F 12
Thread size		M 10	M 12
Setting tool		SMu 10 H	SMu 12 H
Scre-in depth	[mm]	10 bis 18	12 bis 18
Stop drill		SDS DUO HV ...	
Material		Galvanised steel $\geq 5\mu\text{m}$ acc. to EN ISO 4042	



**Kunkel anchor K6, K6+, K6L and K8**

**Intended Use**  
Information's for counter-sunk installation  
K6L

**Annex B5**

**Table B5: Installation Parameters for anchors made of galvanized steel**

Anchor type		K6	K6+	K6L		K8
Diameter off drill hole	$d_0$ [mm]	6	6	6		8
Depth of drill hole	$h_1 \geq$ [mm]	32	37	42	62	43
Minimum thickness of fixture	$h_{min}$ [mm]	80	80	80	100	80
Effective anchorage depth	$h_{ef} \geq$ [mm]	26	31	36	56	36
Maximum torque moment	$T_{inst}$ [mm]	5	5	5	5	10
Spacing	$s_{cr} \geq$ [mm]	200				
Edge distance	$c_{cr} \geq$ [mm]	150				

**Table B6: Installation Parameters for anchors made of stainless and high corrosion resistant steel**

Anchor type		K6 E,X,C	K6+ E,X,C	K6L E,X,C	K8 E,X,C
Diameter off drill hole	$d_0$ [mm]	6	6	6	ì
Depth of drill hole	$h_1 \geq$ [mm]	32	37	42	I H
Minimum thickness of fixture	$h_{min}$ [mm]	80			
Effective anchorage depth	$h_{ef} \geq$ [mm]	26	31	36	36
Maximum torque moment	$T_{inst}$ [mm]	5	5	5	10
Spacing	$s_{cr} \geq$ [mm]	200			
Edge distance	$c_{cr} \geq$ [mm]	150			

Kunkel anchor K6, K6+, K6L and K8

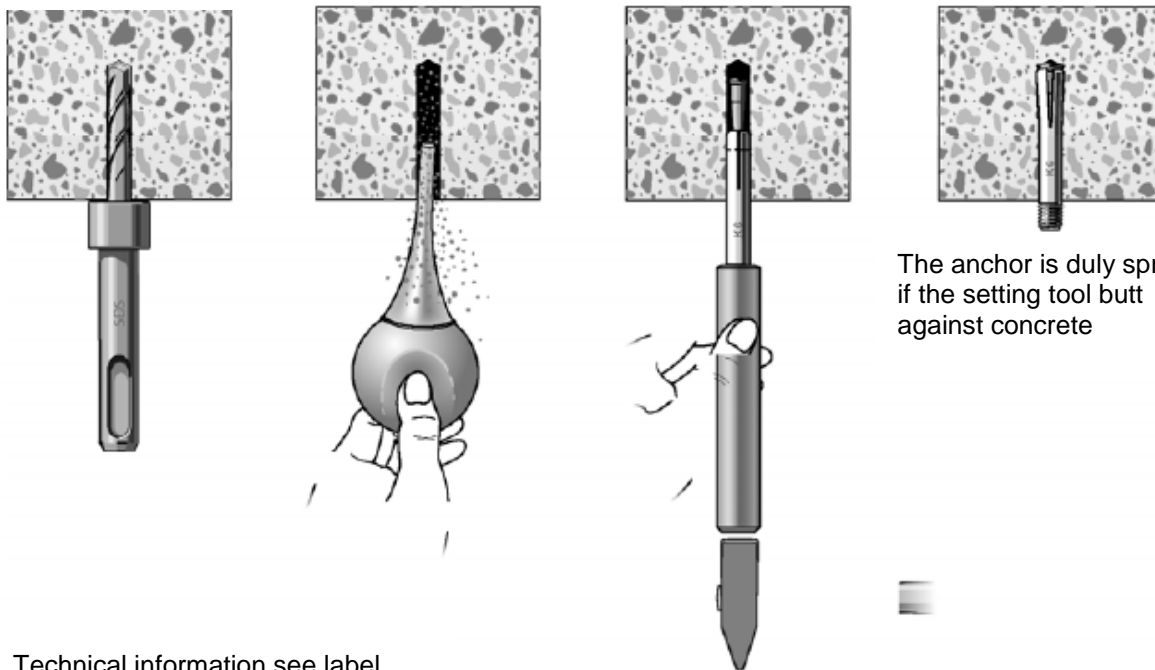
**Intended Use**  
Installation Parameters

**Annex B6**

### Installation Instructions (examples)

#### External thread anchor K6, K6L und K8

Hand setting tool

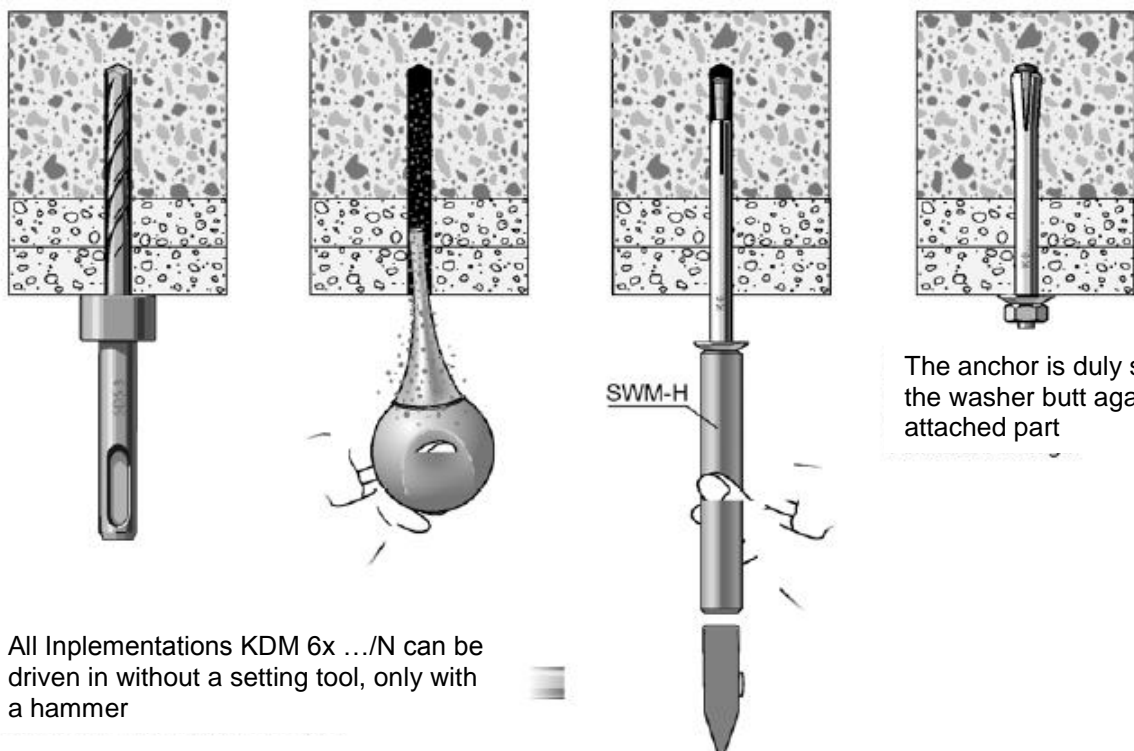


The anchor is duly spread if the setting tool butt against concrete

Technical information see label

#### Fire protection anchor KDM 6 x ... /N

Hand setting tool for all KDM 6 x ... /N



The anchor is duly spread, if the washer butt against attached part

All Implementations KDM 6x .../N can be driven in without a setting tool, only with a hammer

**Kunkel anchor K6, K6+, K6L and K8**

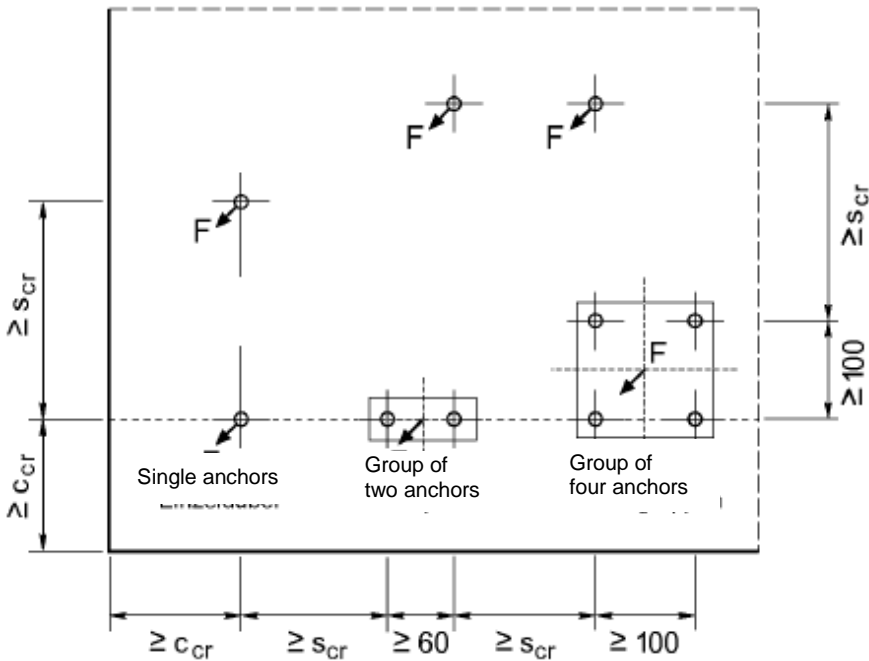
**Intended Use**  
Installation instructions

**Annex B7**

**Table C1: Characteristic values of resistance for all load directions for anchors made of galvanised steel**

Anchor type		K6	K6+	K6L	K8
<b>Any load direction</b>					
Characteristic resistance in C20/25 to C50/60	$F_{Rk}^0$ [kN]	2	2,5	5	5
Partial safety factor <sup>2)</sup>	$\gamma_m$ [-]	1,5	1,5	2,1	2,1
<b>Shear load with lever arm</b>					
Characteristic bending moment	$M_{Rk,s}^0$ <sup>1)</sup> [Nm]	3,6	7,7	18	
Partial safety factor	$\gamma_{ms}$ [-]	1,25			

1) Characteristic bending moment  $M_{Rk,s}^0$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4  
2) The Installation safety factor  $\gamma_2$  is included



The values given in table C1 are valid for one fixing point.

Fixing points can be:

- **Single anchors,**
- **Groups of two anchors** with  $s_1 \geq 60\text{mm}$  or
- **Groups of four anchors** with  $s_1 = s_2 \geq 100\text{mm}$

**Kunkel anchor K6, K6+, K6L and K8**

**Performance**

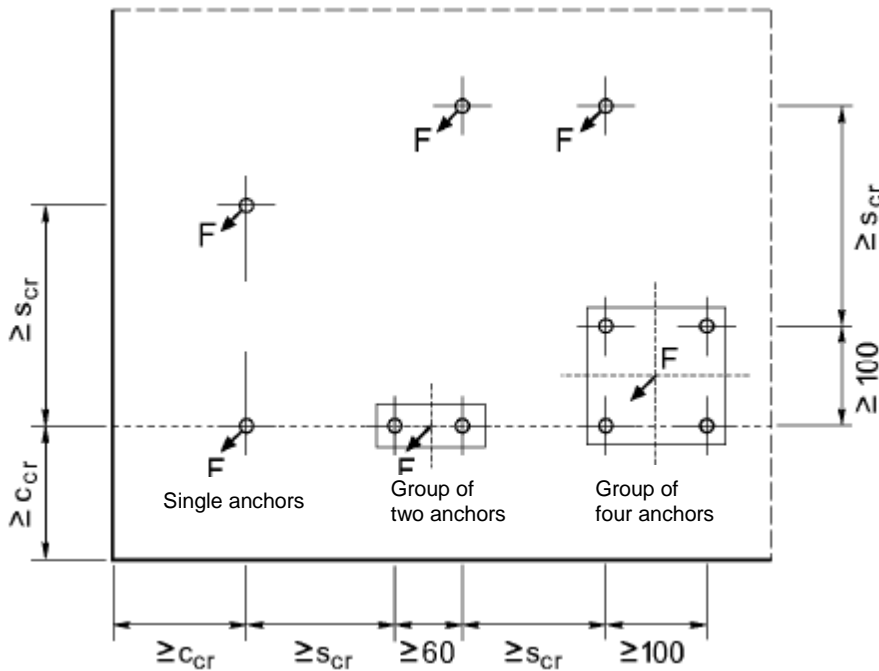
Characteristic values of resistance for all load directions for anchors made of galvanised steel

**Annex C1**

**Table C2: Characteristic values of resistance for all load directions for anchors made of stainless and high corrosion resistant steel**

Anchor type		K6	K6+	K6L	K8
		E,X,C	E,X,C	E,X,C	E,X,C
<b>Any load direction</b>					
Characteristic resistance in C20/25 to C50/60	$F_{Rk}^0$ [kN]	1,5	2,5	3	5
Partial safety factor	$\gamma_m$ [-]	2,1	1,8	2,1	1,8
<b>Shear load with lever arm</b>					
Characteristic bending moment	$M_{Rk,s}^0$ <sup>1)</sup> [Nm]	4,0	8,4	20,6	
Partial safety factor	$\gamma_{ms}$ [-]	1,5			

- 1) Characteristic bending moment  $M_{Rk,s}^0$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4  
 2) The Installation safety factor  $\gamma_2$  is included



The values given in table C2 are valid for one fixing point.

Fixing points can be:

- **Single anchors,**
- **Groups of two anchors** with  $s_1 \geq 60$ mm or
- **Groups of four anchors** with  $s_1 = s_2 \geq 100$ mm
- 

**Kunkel anchor K6, K6+, K6L and K8**

**Performance**

Characteristic values of resistance for all load directions for anchors made of stainless and high corrosion resistant steel

**Annex C2**

**Table C3: Characteristic values under fire exposure in all load directions in concrete C20/25 to C50/60**

Fire resistance class	Anchor type			K6 (..E,..X,..C)	K6+, K6L (..E,..X,..C)	K8 (..E,..X,..C)
R30	Characteristic resistance	$F_{Rk,s(30)}$	[kN]	0,3	0,6	1,2
R60	Characteristic resistance	$F_{Rk,s(60)}$	[kN]	0,3	0,5	1,0
R90	Characteristic resistance	$F_{Rk,s(90)}$	[kN]	0,3	0,3	0,6
R120	Characteristic resistance	$F_{Rk,s(120)}$	[kN]	0,2	0,2	0,4
R30 to R120	Spacing	$s_{cr} = s_{min}$	[mm]	200	200	200
	Edge distance for fire attack from one side only	$c_{cr} = c_{min}$	[mm]	150	150	150
	Edge distance for fire attack from more than one side	$c_{cr} = c_{min}$	[mm]	300	300	300

**Kunkel anchor K6, K6+, K6L and K8**

**Performance**

Characteristic values under fire exposure in all load directions in concrete C20/25 to C50/60

**Annex C3**