Deutsches Institut für Bautechnik

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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-12/0401 of 22 March 2016

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	TILCA Drop-In Anchor ED / ED-K
Product family to which the construction product belongs	Deformation-controlled expansion anchor for multiple use for non-structural applications in concrete
Manufacturer	Egli, Fischer & Co. AG Befestigungstechnik Gotthardstraße 6 8022 ZÜRICH SCHWEIZ
Manufacturing plant	Werk1, Deutschland
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 6: "Anchors for multiple use for non-structural applications", August 2010, 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 TILCA Drop-in anchor ED / ED-K in sizes M6×30, M8×30, M8×40, M10×30, M10×40, M12×50 and M16×65 is an anchor made of zinc-plated steel, of stainless steel 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	Anchorages satisfy requirements for Class A1
Resistance to fire	See Annex C 2

3.3 Safety in use (BWR 4)

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

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, August 2010, 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+

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 22 March 2016 by Deutsches Institut für Bautechnik

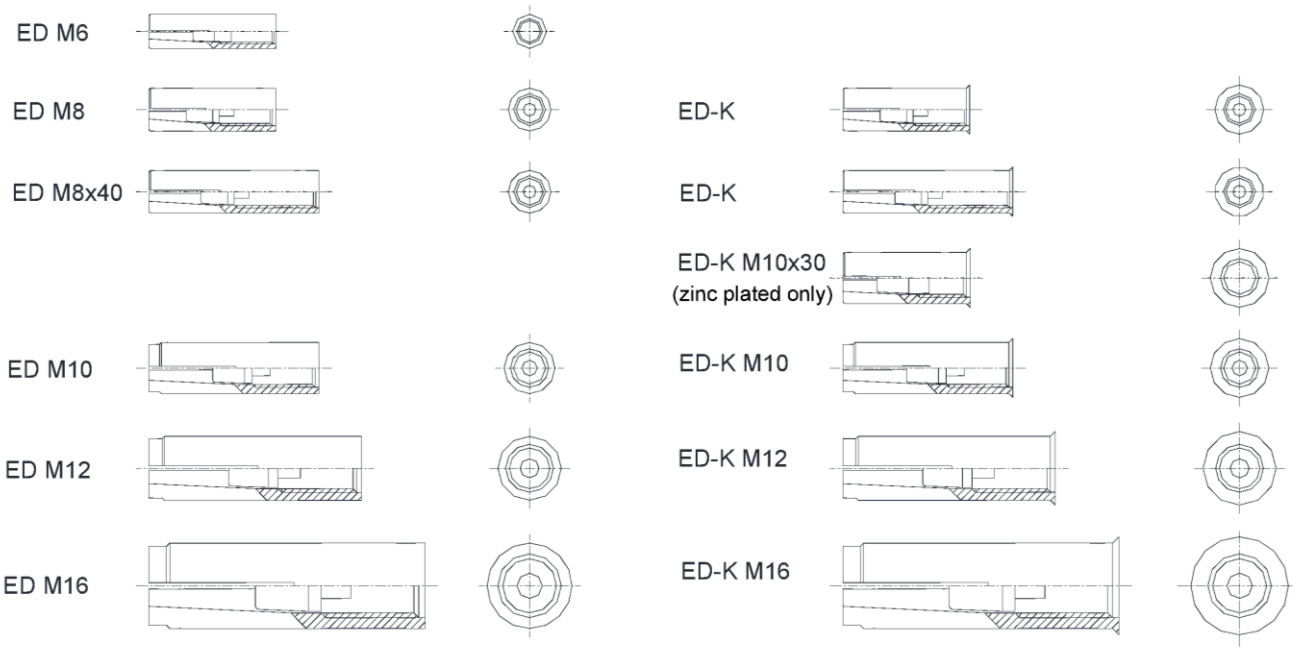
Uwe Bender
Head of Department

beglaubigt:
Baderschneider

Deutsches Institut für Bautechnik

Drop-in Anchor ED / ED-K

Anchor size



TILCA Drop-in Anchor ED / ED-K	Annex A1
Product description Anchor size	

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Installation situation

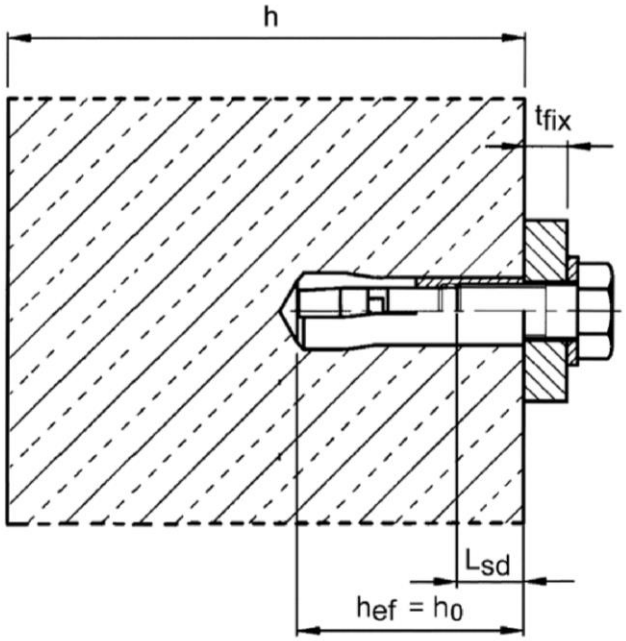

Tabelle A1: Designation and Material

Part	Designation	Steel, zinc plated	Stainless steel A4	High corrosion resistant steel HCR
1	Anchor sleeve	Cold formed or machining steel, zinc plated, EN ISO 4042:1999	Stainless steel, 1.4401, 1.4404, 1.4571, 1.4362, EN 10088:2005, Property class 70, EN ISO 3506:2010	Stainless steel, 1.4529, 1.4565, EN 10088:2005, Property class 70, EN ISO 3506:2010
2	Cone	Steel for cold forming acc. to EN 10263-2:2001	Stainless steel, 1.4401, 1.4404, 1.4571, 1.4362, EN 10088:2005	

TILCA Drop-in Anchor ED / ED-K	Annex A2
Product description Installation situation and material	

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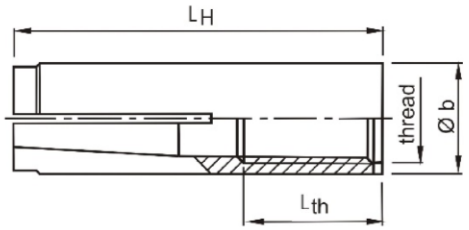
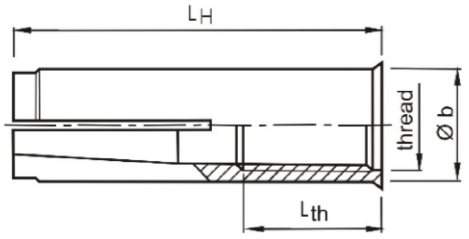
Anchor sleeve

Anchor version without shoulder (ED)



Anchor version with shoulder (ED-K)

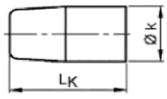


Marking: see Table A2

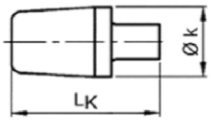
e.g.: ◇ E M8x40

◇	Identifying mark of manufacturing plant
E	Anchor identity (version without shoulder)
ES	Anchor identity (version with shoulder)
M8	Size of thread
40	Anchorage depth
A4	additional marking of stainless steel A4
HCR	additional marking of high corrosion resistant steel

Cone



Size M6 and M10x30



Size M8 – M16

Tabelle A2: Dimensions and marking

Anchor size	Anchor sleeve				Cone		Marking		
	thread	Ø b	L_H	L_{th}	Ø k	L_K	version ED	version ED-K	alternatively
M6	M6	8	30	13	5,0	13	◇ E M6x30	◇ ES M6x30	◇ E M6
M8	M8	10	30	13	6,5	12	◇ E M8x30	◇ ES M8x30	◇ E M8
M8x40	M8	10	40	20			◇ E M8x40	◇ ES M8x40	◇ E M8x40
M10x30	M10	12	30	12	8,2	12	-	◇ ES M10x30	◇ E M10x30
M10	M10	12	40	15	8,2	16	◇ E M10x40	◇ ES M10x40	◇ E M10
M12	M12	15	50	18	10,3	20	◇ E M12x50	◇ ES M12x50	◇ E M12
M16	M16	19,7	65	23	13,8	29	◇ E M16x65	◇ ES M16x65	◇ E M16

Dimensions in mm

TILCA Drop-in Anchor ED / ED-K

Product description
Dimensions and marking

Annex A3

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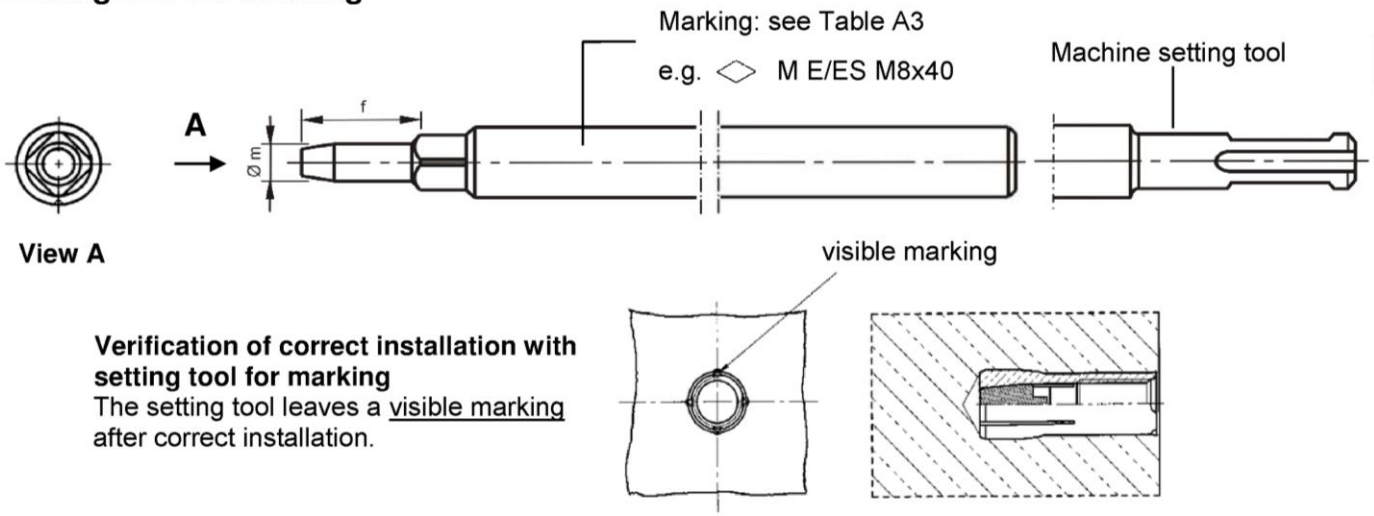
Setting tool for marking



Verification of correct installation with setting tool for marking
The setting tool leaves a visible marking after correct installation.

Setting tool

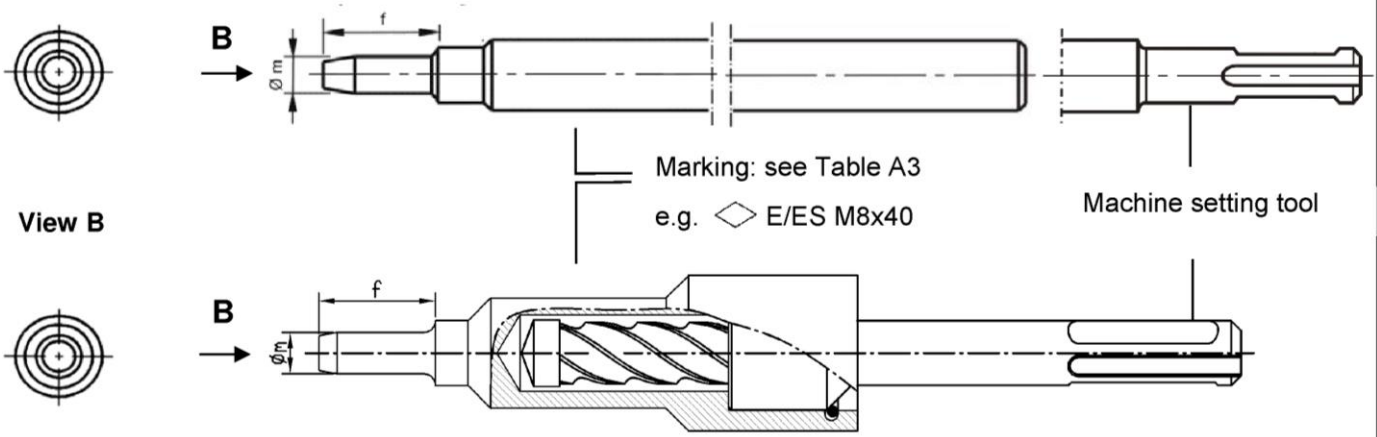


Tabelle A3: Dimensions and marking of setting tools

Anchor size	Ø m	f	Setting tool for marking		Setting tool	
			Marking	alternatively	**Marking**	alternatively
M6	4,9	17	◇ M E/ES M6x30	◇ M E M6	◇ E/ES M6x30	◇ E M6
M8	6,4	18	◇ M E/ES M8x30	◇ M E M8	◇ E/ES M8x30	◇ E M8
M8x40	6,4	28	◇ M E/ES M8x40	◇ M E M8x40	◇ E/ES M8x40	◇ E M8x40
M10x30	8,0	18	◇ M ES M10x30	◇ M E M10x30	◇ ES M10x30	◇ E M10x30
M10	8,0	24	◇ M E/ES M10x40	◇ M E M10	◇ E/ES M10x40	◇ E M10
M12	10,0	30	◇ M E/ES M12x50	◇ M E M12	◇ E/ES M12x50	◇ E M12
M16	13,5	36	◇ M E/ES M16x65	◇ M E M16	◇ E/ES M16x65	◇ E M16

Dimensions in mm

TILCA Drop-in Anchor ED / ED-K

Product description
Setting tools, dimensions and marking

Annex A4

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads

Base materials:

- 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
- cracked and non-cracked concrete

Use 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 are designed in accordance with:
  - ETAG 001, Annex C, design method B, Edition August 2010 or
  - CEN/TS 1992-4:2009, design method B
- Fasteners are only to be used for multiple use for non-structural applications, according to ETAG 001 Part 6, Edition 2010. Definition acc. to the member State is given in Annex 1 (informative)
- Anchorages under fire exposure are designed in accordance with:
  - 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.

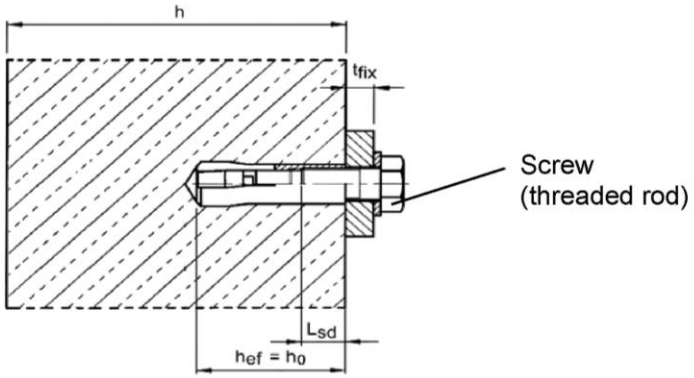
TILCA Drop-in Anchor ED / ED-K	Annex B1
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Anchor size			M6	M8	M8x40	M10x30	M10	M12	M16
Depth of drill hole	h_0 =	[mm]	30	30	40	30	40	50	65
Drill hole diameter	d_0 =	[mm]	8	10	10	12	12	15	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	10,45	12,5	12,5	15,5	20,55
max. recommended setting torque [1)]	$T_{inst} \leq$	[Nm]	4	8	8	15	15	35	60
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	9	12	12	14	18
Available thread length	L_{th}	[mm]	13	13	20	12	15	18	23
Minimum screwing depth	L_{sdmin}	[mm]	7	9	9	10	11	13	18
Spacing	s_{cr}	[mm]	130	180	210	230	170	170	400
Edge distance	c_{cr}	[mm]	65	90	105	115	85	85	200
Steel, zinc plated									
Minimum thickness of member	h_{min}	[mm]	100	100	100	120	120	130	160
Minimum spacing	s_{min}	[mm]	55	60	80	100	100	120	150
Minimum distance	c_{min}	[mm]	95	95	95	115	135	165	200
Stainless steel A4, HCR									
Minimum thickness of member	h_{min}	[mm]	100	100	100	-	130	140	160
Minimum spacing	s_{min}	[mm]	50	60	80	-	100	120	150
Minimum distance	c_{min}	[mm]	80	95	95	-	135	165	200

1) If the screw or threaded rod is otherwise secured against unscrewing, the torque can be omitted.



Requirements of the fastening screw or the threaded rod and nut according to the engineering documents:

- Minimum screw-in depth L_{sdmin} see Table B1
- The length of screw or the threaded rod shall be determined depending on the thickness of fixture t_{fix}, available thread length L_{th} (= maximum screw-in depth) and the minimum screw-in depth L_{sdmin}.
- A_5 > 8 % Ductility

Steel, zinc plated

- Property class 4.6 / 4.8 / 5.6 / 5.8 or 8.8 according to EN ISO 898-1:2013 or EN ISO 898-2:2012

Stainless steel A4

- Material 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088:2005
- Property class 70 or 80 according to EN ISO 3506:2010

High corrosion resistant steel (HCR)

- Material 1.4529; 1.4565, acc. to EN 10088:2005
- Property class 70 or 80 acc. to EN ISO 3506:2010

TILCA Drop-in Anchor ED / ED-K

Intended use
Installation parameters

Annex B2

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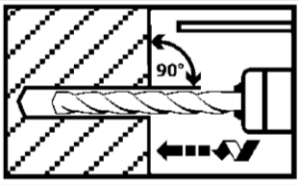
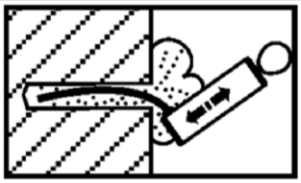
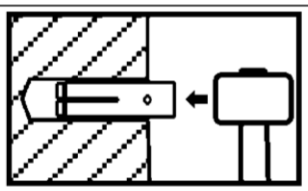
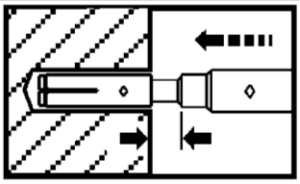
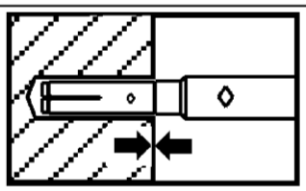
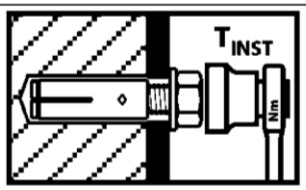
Installation instructions

1		Drill hole perpendicular to concrete surface.
2		Blow out dust.
3		Drive in anchor.
4		Drive in cone by using setting tool.
5		Shoulder of setting tool must fit on anchor rim.
6		Apply installation torque T_{inst} by using calibrated torque wrench.

TILCA Drop-in Anchor ED / ED-K

Intended use
Installation instructions

Annex B3

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic values for resistance (Design method B)

Anchor size			**M6**	**M8**	**M8x40**	**M10x30**	**M10**	**M12**	**M16**
Load in any direction									
Characteristic resistance in concrete C20/25 to C50/60	F^0_{Rk}	[kN]	3	5	6	6	6	6	16
Partial safety factor	γ_M	[-]	1,8	2,16		2,1	2,16	1,8	1,8
Shear load with lever arm, Steel zinc plated									
Characteristic resistance **(Steel 4.6)**	$M^0_{Rk,s}$ [1)]	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	γ_{Ms}	[-]	1,67						
Characteristic resistance **(Steel 4.8)**	$M^0_{Rk,s}$ [1)]	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	γ_{Ms}	[-]	1,25						
Characteristic resistance **(Steel 5.6)**	$M^0_{Rk,s}$ [1)]	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	γ_{Ms}	[-]	1,67						
Characteristic resistance **(Steel 5.8)**	$M^0_{Rk,s}$ [1)]	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	γ_{Ms}	[-]	1,25						
Characteristic resistance **(Steel 8.8)**	$M^0_{Rk,s}$ [1)]	[Nm]	12	30	30	59	60	105	266
Partial safety factor	γ_{Ms}	[-]	1,25						
Shear load with lever arm, Stainless steel A4 / HCR									
Characteristic resistance **(Property class 70)**	$M^0_{Rk,s}$ [1)]	[Nm]	11	26	26	-	52	92	233
Partial safety factor	γ_{Ms}	[-]	1,56						
Characteristic resistance **(Property class 80)**	$M^0_{Rk,s}$ [1)]	[Nm]	12	30	30	-	60	105	266
Partial safety factor	γ_{Ms}	[-]	1,33						

[1)] Characteristic bending moment $M^0_{Rk,s}$ for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

TILCA Drop-in Anchor ED / ED-K

Performance
Characteristic values for resistance

Annex C1

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Table C2: Characteristic values under **fire exposure** in concrete C20/25 to C50/60 (Design method B)

Anchor size					**M6**	**M8**	**M8x40**	**M10x30**	**M10**	**M12**	**M16**
Fire resistance class		**Fire resistance class**									
Steel 4.6	R 30	Characteristic resistance	$F^0_{Rk,fi}$	[kN]	0,2	0,4	0,4	0,9	0,9	1,5	3,1
	R 60			[kN]	0,2	0,3	0,3	0,8	0,8	1,3	2,4
	R 90			[kN]	0,1	0,3	0,3	0,6	0,6	1,1	2,0
	R 120			[kN]	0,1	0,2	0,2	0,5	0,5	0,8	1,6
Steel 4.8	R 30	Characteristic resistance	$F^0_{Rk,fi}$	[kN]	0,4	0,9	1,1	0,9	1,5	1,5	4,0
	R 60			[kN]	0,3	0,9	0,9	0,9	1,5	1,5	4,0
	R 90			[kN]	0,3	0,6	0,6	0,9	1,1	1,5	3,0
	R 120			[kN]	0,3	0,5	0,5	0,7	0,9	1,2	2,4
Steel ≥ 5.6	R 30	Characteristic resistance	$F^0_{Rk,fi}$	[kN]	0,8	0,9	1,5	0,9	1,5	1,5	4,0
	R 60			[kN]	0,8	0,9	1,5	0,9	1,5	1,5	4,0
	R 90			[kN]	0,4	0,9	0,9	0,9	1,5	1,5	3,7
	R 120			[kN]	0,3	0,5	0,5	0,7	1,0	1,2	2,4
A4 / HCR	R 30	Characteristic resistance	$F^0_{Rk,fi}$	[kN]	0,8	0,9	1,5	-	1,5	1,5	4,0
	R 60			[kN]	0,8	0,9	1,5	-	1,5	1,5	4,0
	R 90			[kN]	0,4	0,9	0,9	-	1,5	1,5	3,7
	R 120			[kN]	0,3	0,5	0,5	-	1,0	1,2	2,4
		Partial safety factor $\gamma_{M,fi}$		[-]	1,0						
Steel zinc plated											
R 30 to R 120		Spacing	$s_{cr,fi}$	[mm]	130	180	210	170	170	200	400
			s_{min}	[mm]	55	60	80	100	100	120	150
		Edge distance	$c_{cr,fi}$	[mm]	65	90	105	85	85	100	200
			c_{min}	[mm]	95	95	95	115	135	165	200
		If the fire attack is from more than one side, the edge distance shall be ≥ 300 mm.									
Stainless steel A4, HCR											
R 30 to R 120		Spacing	$s_{cr,fi}$	[mm]	130	180	210	-	170	200	400
			s_{min}	[mm]	50	60	80	-	100	120	150
		Edge distance	$c_{cr,fi}$	[mm]	65	90	105	-	85	100	200
			c_{min}	[mm]	80	95	95	-	135	165	200
		If the fire attack is from more than one side, the edge distance shall be ≥ 300 mm.									

TILCA Drop-in Anchor ED / ED-K

Performance
Characteristic values under **fire exposure**

Annex C2