

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-10/0474  
of 12 June 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

Berner Heavy-duty anchor BTA M, BTA M S, BTA M T

Product family  
to which the construction product belongs

Mechanical fasteners for use in concrete

Manufacturer

Berner Trading Holding GmbH  
Bernerstraße 6  
74653 Künzelsau  
DEUTSCHLAND

Manufacturing plant

Berner Herstellwerk 6  
Berner manufacturing plant 6

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 330232-00-0601

**European Technical Assessment**  
**ETA-10/0474**

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**Specific Part**

**1 Technical description of the product**

The Berner Heavy-duty anchor BTA M, BTA M S and BTA M T in the range of M6, M8, M10 and M12 is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion with the hexagon head bolt.

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 concrete screw 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 the assumption of working life of the concrete screw 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 to tension load (static and quasi-static loading)	see Annex C 1
Characteristic resistance to shear load (static and quasi-static loading)	see Annex C 2
Displacements (static and quasi-static loading)	see Annex C 2
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

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

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

**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

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**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 12 June 2018 by Deutsches Institut für Bautechnik

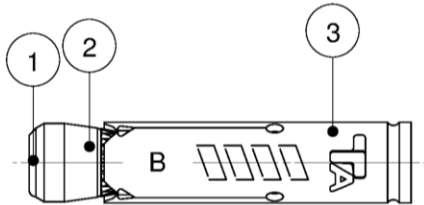
BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Baderschneider

**Pre-positioned installation:**

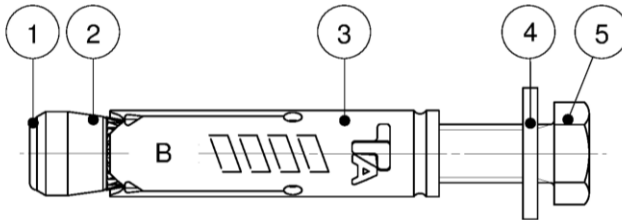
**BTA M**

The hexagon head screw and the washer according to table A4.1 and A4.2 must be provided by the user



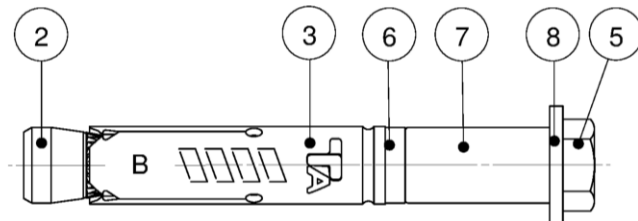
**BTA M S**

The hexagon head screw is provided by the manufacturer (Berner) together with the anchor



**In-place installation:**

**BTA M T**



- |                            |                      |
|----------------------------|----------------------|
| 1 Plastic cap (optional)   | 5 Hexagon head screw |
| 2 Cone-nut                 | 6 Distance ring      |
| 3 Expansion sleeve         | 7 Spacing sleeve     |
| 4 Washer (BTA M / BTA M S) | 8 Washer (BTA M T)   |

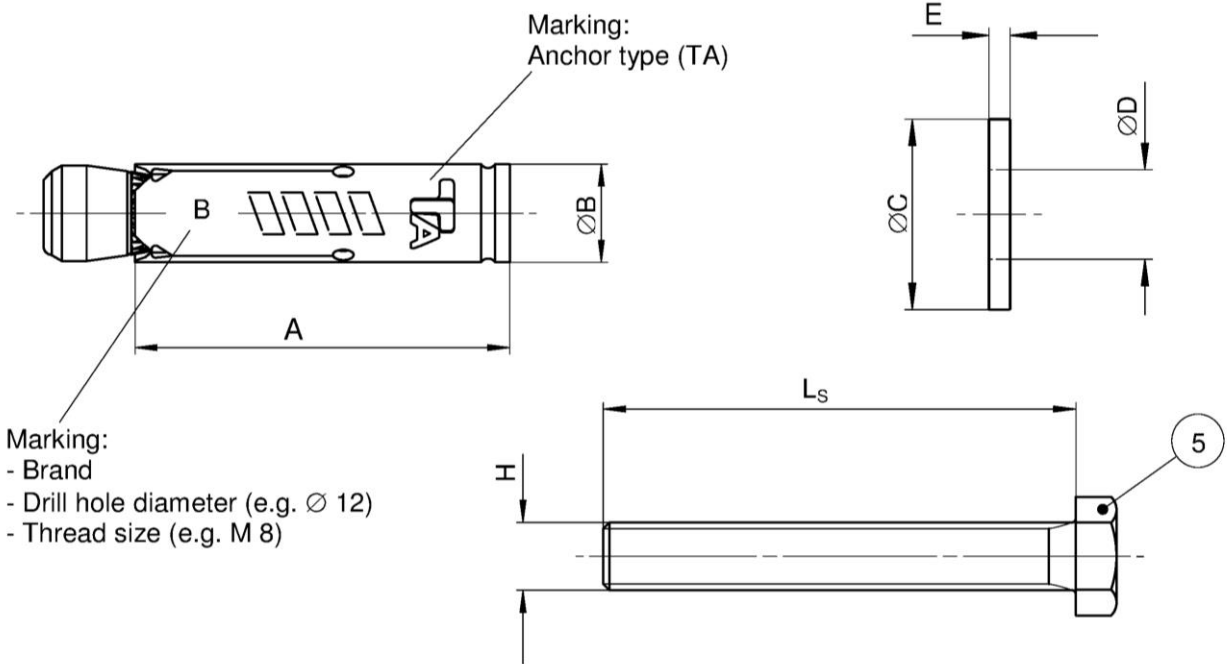
(Fig. not to scale)

**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

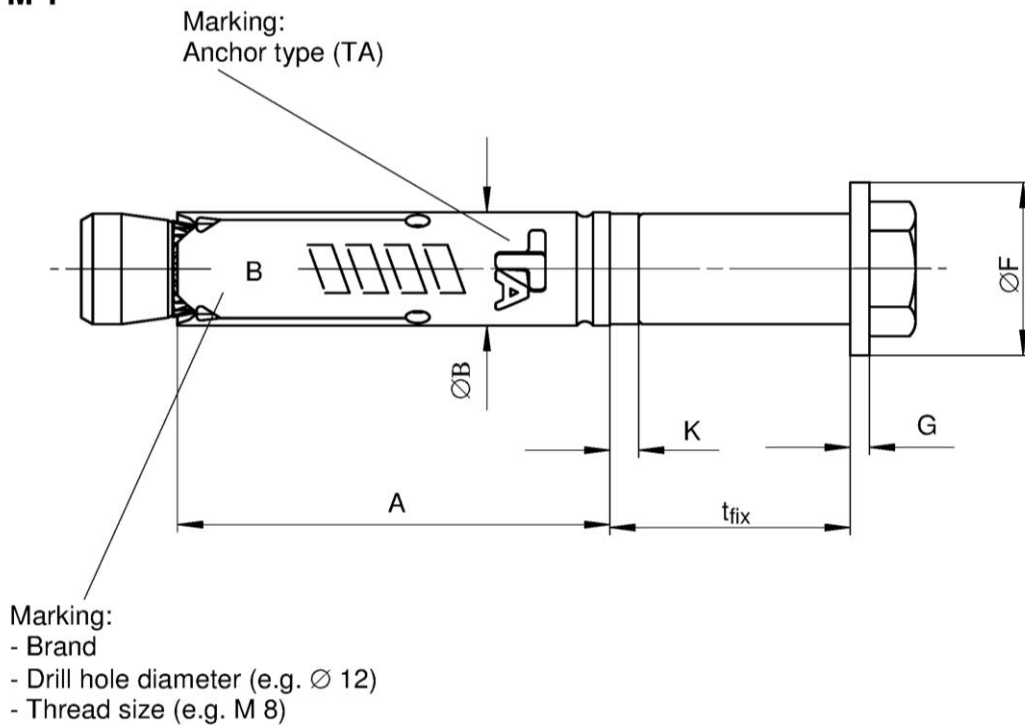
**Product description**  
Anchor types

**Annex A 1**

**BTA M / BTA M S**



**BTA M T**



(Fig. not to scale)

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**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

**Product description**  
Anchor components

**Annex A 2**

**Table A3.1: Anchor dimensions [mm]**

Part	Designation	Type of anchor		M6	M8	M10	M12
3	Expansion sleeve	BTA M / BTA M S / BTA M T	A	40,0	45,0	55,0	70,0
			∅ B	9,6	11,8	14,5	17,5
4	Washer <sup>1)</sup>	BTA M S	∅ C ≥	11,0	15,0	19,0	23,0
			E ≥	1,4	1,4	1,8	2,3
8	Washer	BTA M T	∅ F ≥	17,0	21,0	25,0	30,0
			G ≥	1,4	1,8	2,3	2,7
5	Hexagon head screw <sup>2)</sup>	BTA M S / BTA M T	L <sub>s</sub> ≥	t <sub>fix</sub> + 50	t <sub>fix</sub> + 55	t <sub>fix</sub> + 70	t <sub>fix</sub> + 85
			H	M6	M8	M10	M12
6	Distance ring	BTA M T	K =	3,0	3,0	3,0	3,0

<sup>1)</sup> For specification - summary of washer for BTA M see table A4.2

<sup>2)</sup> For specification - summary of hexagon head screw for BTA M see table A4.1

**Table A3.2: Materials**

Part	Designation	Type of anchor	Materials	Treatment
1	Plastic cap <sup>1)</sup>	BTA M / BTA M S	Polyamide	-
2	Cone-nut	BTA M / BTA M S / BTA M T	Steel, EN 10277:2008	Zinc plated according to EN ISO 4042:2017, min 5 µm, additional functional coating
3	Expansion sleeve	BTA M / BTA M S / BTA M T	Cold-rolled steel EN 10139:2016	Zinc plated according to EN ISO 4042:2017, min 5 µm
4	Washer <sup>2)</sup>	BTA M S	Steel, min 140 HV	
8	Washer	BTA M T		
5	Hexagon head screw <sup>3)</sup>	BTA M S / BTA M T	Steel, property class 8.8	
6	Distance ring	BTA M T	Polyethylen	-
7	Distance sleeve	BTA M T	Cold-rolled steel EN 10139:2016/ Steel EN 10 277:2008	Zinc plated according to EN ISO 4042:2017, min 5 µm

<sup>1)</sup> Optional

<sup>2)</sup> For specification - summary of washer for BTA M see table A4.2

<sup>3)</sup> For specification - summary of hexagon head screw for BTA M see table A4.1

**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

**Product description**  
Anchor dimensions  
Materials

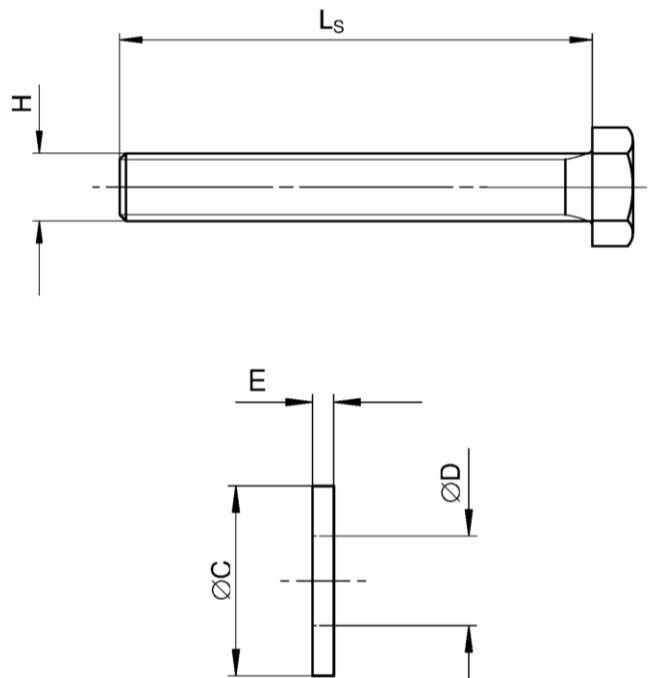
**Annex A 3**

**Table A4.1:** Selection criteria for the hexagon head screw (BTA M)

Description		BTA M6	BTA M8	BTA M10	BTA M12
Length of hexagon head screw	$L_S$ [mm]	$\geq t_{fix} + 50$	$\geq t_{fix} + 55$	$\geq t_{fix} + 70$	$\geq t_{fix} + 85$
Thread size	H [-]	M6	M8	M10	M12
Standardisation		ISO 4014:2017 / ISO 4017:2014 or DIN 931:1987 / DIN 933:1987			
Material		Steel, property class 8.8			
Treatment		Zinc plated according to EN ISO 4042:2017, min 5 $\mu$ m			

**Table A4.2:** Selection criteria for the washer (BTA M)

Description		BTA M6	BTA M8	BTA M10	BTA M12	
Hole diameter	D	min max	6,0	8,0	10,0	12,0
			6,6	8,6	10,8	13,3
External diameter	C [mm]	$\geq 11,0$	$\geq 15,0$	$\geq 19,0$	$\geq 23,0$	
Thickness	E	min max	1,4	1,4	1,8	2,3
			3,0	3,0	4,0	5,0
Material		Steel, hardness class min 140 HV				
Treatment		Zinc plated according to EN ISO 4042:2017, min 5 $\mu$ m				



(Fig. not to scale)

**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

**Product description**  
Dimensions  
Materials

**Annex A 4**



### Specifications of intended use

fischer Heavy-duty anchor	BTA M6	BTA M8	BTA M10	BTA M12
Steel, zinc plated			✓	
Static and quasi-static loads			✓	
Uncracked concrete			✓	

**Base materials:**

- Compacted 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

**Use conditions (Environmental conditions):**

- Structures subject to dry internal conditions

**Design:**

- Anchorages have to be designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings have to be 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.)
- Design of fastenings according to FprEN 1992-4: 2016 and EOTA Technical Report TR 055

**Installation:**

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Hammer or hollow drilling according to Annex B3
- Drill hole created perpendicular +/- 5° to concrete surface, positioning without damaging the reinforcement
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill 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

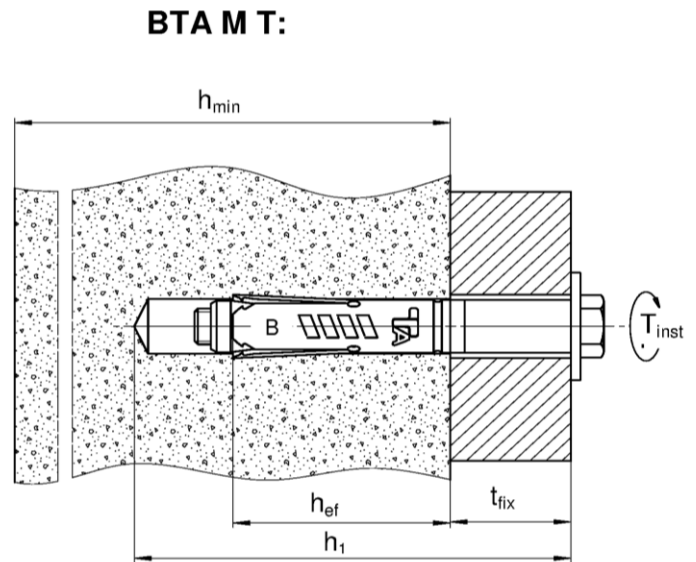
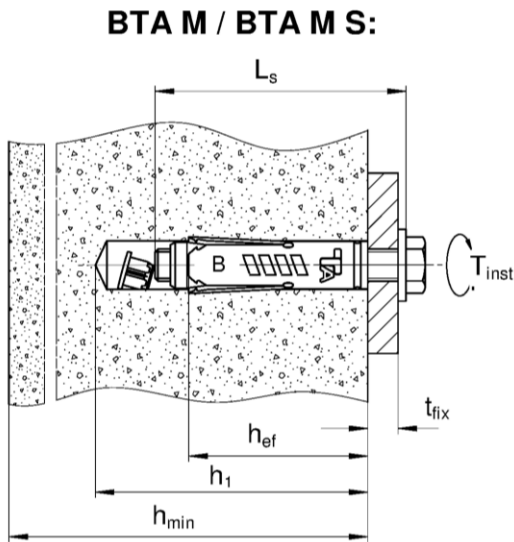
**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

**Intended use**  
Specifications

**Annex B 1**

**Table B2.1:** Installation parameters for BTA M / BTA M S / BTA M T

Anchor size		BTA M6	BTA M8	BTA M10	BTA M12
Nominal drill hole diameter	$d_0$	10	12	15	18
Maximum drill bit diameter	$d_{cut} \leq$	10,45	12,50	15,50	18,50
Length of hexagon head screw	$L_s \geq$	$t_{fix} + 50$	$t_{fix} + 55$	$t_{fix} + 70$	$t_{fix} + 85$
Depth of drill hole (BTA M / BTA M S)	$h_1 \geq$	$L_s - t_{fix} + 15$		$L_s - t_{fix} + 20$	
Depth of drill hole (BTA M T)	$h_1 \geq$	$L_s + 10$			
Diameter of clearance hole in the fixture (BTA M / BTA M S)	$d_f \leq$	7	9	12	14
Diameter of clearance hole in the fixture (BTA M T)	$d_f \leq$	12	14	18	20
Thickness of fixture	$t_{fix, min}$	1			
	$t_{fix, max}$	150	200	250	300
Required torque moment	$T_{inst}$ [Nm]	10	20	40	75



$L_s$  = Length of hexagon head screw  
 $h_{ef}$  = Effective embedment depth  
 $t_{fix}$  = Thickness of the fixture

$h_{min}$  = Minimum thickness of concrete member  
 $h_1$  = Depth of drill hole to deepest point  
 $T_{inst}$  = Required setting torque

**Table B2.2:** Minimum thickness of concrete member, minimum spacing and minimum edge distances

Anchor size		BTA M6	BTA M8	BTA M10	BTA M12
Minimum thickness of concrete member	$h_{min}$	100	100	110	140
Minimum spacing	$s_{min}$ [mm]	80	90	110	160
Minimum edge distance	$c_{min}$	50	60	70	120

(Fig. not to scale)

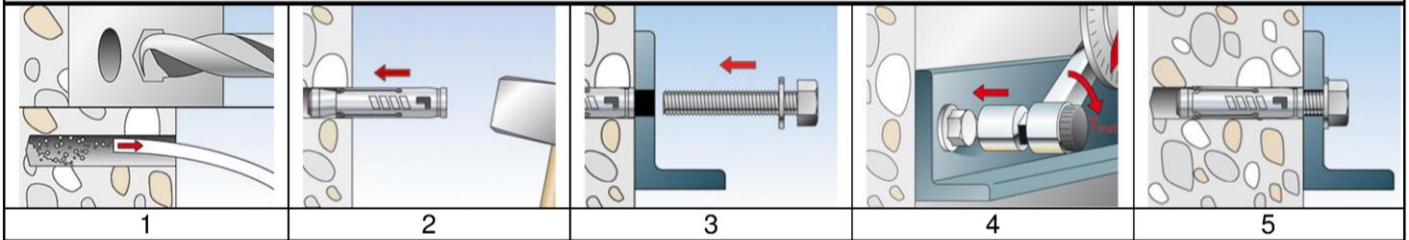
**Berner Heavy-duty anchor BTA M, BTA M S, BTA M T**

**Intended Use**  
 Installation instructions  
 Minimum thickness of concrete member, minimum spacing and minimum edge distance

**Annex B 2**

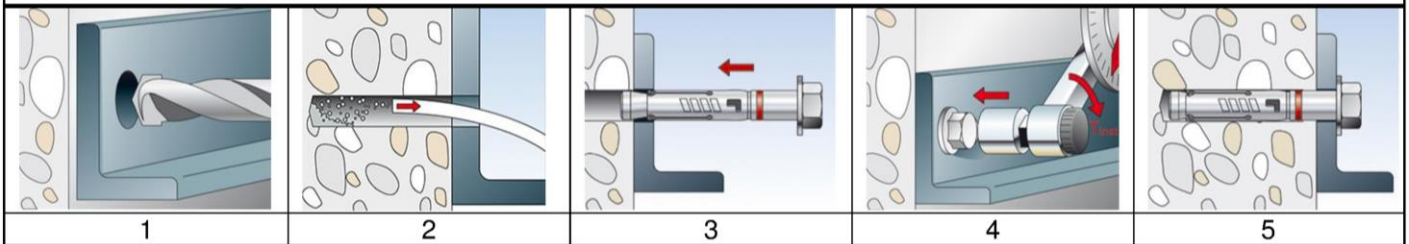
### Installation instruction

#### Pre-positioned installation BTA M / BTA M S



No.	Description	
1	Create drill hole with hammer drill, clean bore hole	Create drill hole with hollow drill and vacuum cleaner
2	Set the fastener	
3	Attach the fixture and turn the screw in	
4	Apply required torque moment $T_{inst}$	
5	Installed fastener	

#### Push-through installation BTA M T



No.	Description	
1	Create drill hole with hammer drill	Create drill hole with hollow drill and vacuum cleaner
2	Clean bore hole	-
3	Set the fastener	
4	Apply required torque moment $T_{inst}$	
5	Installed fastener	

#### Types of drills

Hammer drill



Hollow drill



#### Berner Heavy-duty anchor BTA M, BTA M S, BTA M T

Intended use  
Installation instruction

Annex B 3

**Table C 1.1:** Characteristic **tension** resistance under static and quasi-static loads

Anchor size		BTA M6	BTA M8	BTA M10	BTA M12
<b>Steel failure</b>					
Characteristic resistance property class 8.8	$N_{Rk,s}$ [kN]	16,1	29,3	46,4	67,4
Partial factor	$\gamma_{Ms}$ <sup>1)</sup> [-]	1,5			
<b>Pull-out failure</b>					
Characteristic resistance in uncracked concrete	$N_{Rk,p}$ [kN] C20/25	7,5	12	20	25
Increasing factors for $N_{Rk,p}$ for uncracked concrete	$\psi_c$	C25/30	1,12		
		C30/37	1,22		
		C35/45	1,32		
		C40/50	1,41		
		C45/55	1,50		
	C50/60	1,58			
Installation factor	$\gamma_{inst}$ [-]	1,0			
<b>Concrete cone failure and splitting failure</b>					
Effective embedment depth	$h_{ef}$ [mm]	40	45	55	70
Factor for uncracked concrete	$k_1$ [-]	11,0 <sup>2)</sup>			
Spacing (concrete cone failure)	$s_{cr,N}$	120	135	220	210
Edge distance (concrete cone failure)	$c_{cr,N}$	60	68	110	105
Spacing (splitting)	$s_{cr,sp}$	120	180	330	420
Edge distance (splitting)	$c_{cr,sp}$	60	90	165	210
<sup>1)</sup> In absence of other national regulations <sup>2)</sup> Based on concrete strength as cylinder strength					
<b>Berner Heavy-duty anchor BTA M, BTA M S, BTA M T</b>					<b>Annex C 1</b>
<b>Performances</b> Characteristic <b>tension</b> resistance under static and quasi-static loads					

<b>Table C2.1:</b> Characteristic values of <b>shear</b> resistance under static and quasi-static loads					
Anchor size		<b>BTA M6</b>	<b>BTA M8</b>	<b>BTA M10</b>	<b>BTA M12</b>
<b>Shear load without lever arm</b>					
Characteristic resistance property class 8.8	$V_{Rk,s}^0$ [kN]	5,8	11,7	19,2	29,8
Partial factor	$\gamma_{Ms}^{1)}$ [-]	1,25			
Factor for ductility	$k_7$ [-]	1,0			
<b>Shear load with lever arm</b>					
Characteristic bending moment property class 8.8	$M_{Rk,s}^0$ [Nm]	12	30	60	105
Partial factor	$\gamma_{Ms}^{1)}$ [-]	1,25			
<b>Concrete pryout failure</b>					
Factor for ductility	$k_7$ [-]	1,0			
Factor for pryout failure	$k_8$ [-]	1,1	1,8	1,8	2,0
<b>Concrete edge failure</b>					
Effective embedment depth for calculation	$l_f$ [mm]	40	45	55	70
Outside diameter of fastener	$d_{nom}$ [mm]	10	12	15	18
<sup>1)</sup> In absence of other national regulations					
<b>Table C2.2:</b> Displacements under static and quasi static <b>tension</b> loads					
Anchor size		<b>BTA M6</b>	<b>BTA M8</b>	<b>BTA M10</b>	<b>BTA M12</b>
Tension load in uncracked concrete	[kN]	3,0	4,8	7,9	9,9
Displacements	$\frac{\delta_{N0}}{\delta_{N\infty}}$ [mm]	0,7	0,7	1,2	1,2
		1,0	1,0	1,8	1,8
<b>Table C2.3:</b> Displacements under static and quasi static <b>shear</b> loads					
Anchor size		<b>BTA M6</b>	<b>BTA M8</b>	<b>BTA M10</b>	<b>BTA M12</b>
Shear load in uncracked concrete	[kN]	3,3	6,7	11,0	17,0
Displacements	$\frac{\delta_{V0}}{\delta_{V\infty}}$ [mm]	2,1	1,9	3,1	3,3
		3,1	2,8	4,6	4,9
<b>Berner Heavy-duty anchor BTA M, BTA M S, BTA M T</b>					<b>Annex C 2</b>
<b>Performances</b>					
Characteristic <b>shear</b> resistance under static and quasi-static loads Displacements under tension and shear loads					