



INSTYTUT TECHNIKI BUDOWLANEJ



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## European Technical Assessment

**ETA-25/0815**  
**of 29/08/2025**



### General Part

**Technical Assessment Body issuing the European Technical Assessment**

Instytut Techniki Budowlanej

**Trade name of the construction product**

ETA Ankerbolt and ETA Socket Bolt

**Product family to which the construction product belongs**

Concrete screws for use in concrete

**Manufacturer**

Hexstone Ltd Trading  
as JCP Construction Products  
Opal Way, Stone Business Park  
Stone, Staffordshire, ST15 0SW  
Great Britain

**Manufacturing plant**

JCP Plant 58

**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)  
330232-01-0601 "Mechanical fasteners for use in concrete"

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## Specific Part

### 1 Technical description of the product

ETA Ankerbolt and ETA Socket Bolt are concrete screws of sizes: 6, 8, 10, 12, 14 and 16 mm, made of zinc coated, hardened steel.

The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into a concrete member while setting. The anchorage is characterized by mechanical interlock in the special thread.

The description of the product is given in Annex A.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document (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 given in this European Technical Assessment are based on an assumed working life of the fastener of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, 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 Performance of the product

##### 3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension and shear loads (static and quasi-static loading)	Annex C1 and C2
Displacements under static and quasi-static loading	Annex C2

##### 3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchors satisfy requirements for Class A1
Resistance to fire	Annex C3

#### 3.2 Methods used for the assessment

The assessment has been made in accordance with EAD 330232-01-0601.

### 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 European Commission the system 1 of assessment and verification of constancy of performance applies (see Annex V to regulation (EU) No 305/2011).

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 29/08/2025 by Instytut Techniki Budowlanej

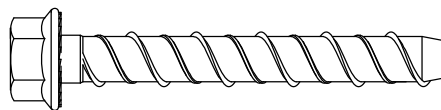
A handwritten signature in blue ink, appearing to read 'Anna Panek'.

Anna Panek, MSc  
Deputy Director of ITB

**ETA Ankerbolt F**

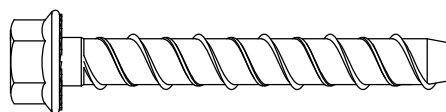
Hexagon flange head

Sizes: 6, 8, 10, 12, 14 and 16


**ETA Ankerbolt FX**

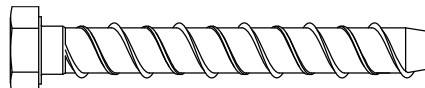
Hexagon flange head with Torx

Sizes: 6, 8 and 10


**ETA Ankerbolt H**

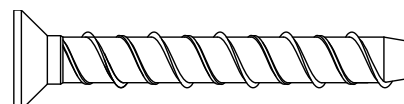
Hexagon head

Sizes: 8, 10, 12, 14 and 16


**ETA Ankerbolt C**

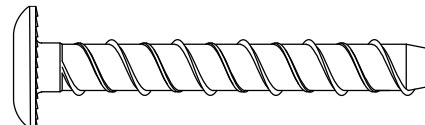
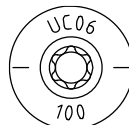
Countersunk head

Sizes: 6, 8 and 10


**ETA Ankerbolt PM**

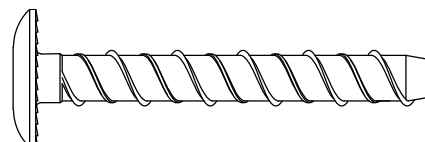
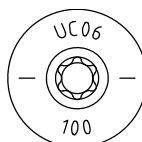
Pan head Ø16 mm

Size: 6


**ETA Ankerbolt P**

Pan head Ø18 mm

Size: 6


**ETA Socket Bolt M10**
**ETA Socket Bolt M8**
**ETA Socket Bolt M3/8**

Socket head

M10 internal thread for M10

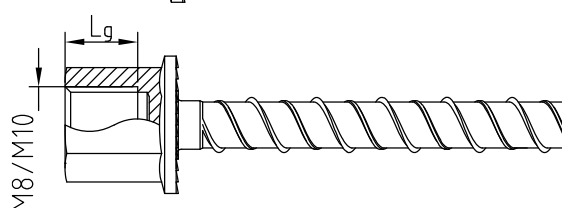
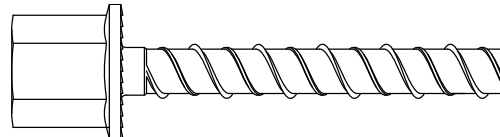
M8 internal thread for M8

3/8 UNC int. thread for M3/8

Size: 6

 $L_g = 9 \text{ mm}$ ,  $D = \text{M10}$  for M10

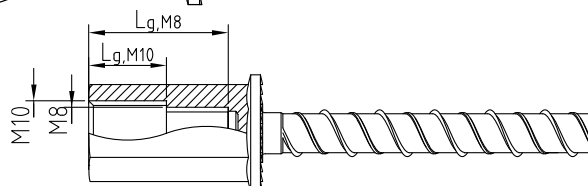
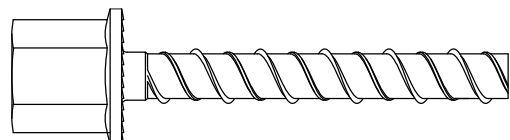
 $L_g = 7 \text{ mm}$ ,  $D = \text{M8}$  for M8

 $L_g = 9 \text{ mm}$ ,  $D = 3/8 \text{ UNC}$  for M3/8

**ETA Socket Bolt Dual**

Dual Socket head

M10 and M8 dual internal thread

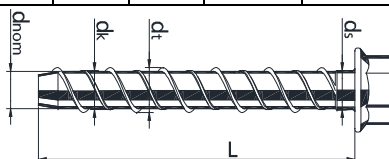
Size: 6

 $L_{g,M8} = 7 \text{ mm}$ 
 $L_{g,M10} = 9 \text{ mm}$ 

**ETA Ankerbolt and ETA Socket Bolt**
**Product description**  
Screw types

**Annex A1**  
of European  
Technical Assessment  
ETA-25/0815

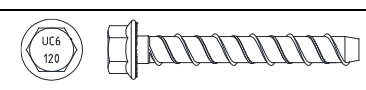
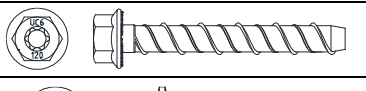
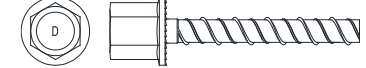
**Table A1:** Head screw characteristic

Head screw characteristic				6	8	10	12	14	16
ETA Ankerbolt F	Wrench size	SW	Mm	10	13	15	16	18	21
	Flange diameter	$\varnothing d_h$	Mm	14,0	18,0	22,3	26,6	30,5	35,0
ETA Ankerbolt FX	Wrench size	SW	Mm	10	13	15	-	-	-
	Flange diameter	$\varnothing d_h$	Mm	14,0	18,0	22,3	-	-	-
	Torx size	-	-	T30	T40	T50	-	-	-
ETA Ankerbolt H	Wrench size	SW	Mm	-	15	17	19	24	27
ETA Ankerbolt C	Head diameter	$\varnothing d_h$	Mm	13,0	19,5	21	-	-	-
	Torx size	-	-	T30	T40	T50	-	-	-
ETA Ankerbolt PM	Head diameter	$\varnothing d_h$	Mm	16	-	-	-	-	-
	Torx size	-	-	T30	-	-	-	-	-
ETA Ankerbolt P	Head diameter	$\varnothing d_h$	Mm	18	-	-	-	-	-
	Torx size	-	-	T30	-	-	-	-	-
ETA Socket Bolt M10	Wrench size	SW	Mm	13	-	-	-	-	-
ETA Socket Bolt M8	Wrench size	SW	Mm	13	-	-	-	-	-
ETA Socket Bolt M3/8	Wrench size	SW	Mm	13	-	-	-	-	-
ETA Socket Bolt Dual	Wrench size	SW	Mm	13	-	-	-	-	-

**Table A2:** Dimensions and material

Anchor size			6	8	10	12	14	16
Length of anchor	$L_{min}$	mm	44	50	55	65	85	100
	$L_{max}$	mm	150	150	200	200	200	200
Nominal hole diameter	$d_0$	mm	6,00	8,00	10,00	12,00	14,00	16,00
Nominal core diameter	$d_{nom}$	mm	5,35	7,35	9,35	11,35	13,35	15,35
Shaft diameter	$d_s$	mm	5,72	7,50	9,72	11,90	13,70	15,95
Higher thread diameter	$d_t$	mm	7,70	10,00	12,00	14,20	16,40	18,60
Lower thread diameter	$d_k$	mm	6,00	8,00	10,00	12,00	14,00	16,00
Thread pitch	$h_t$	mm	7,50	11,00	14,00	17,00	20,00	23,00
Tip chamfer for M10, M8, M3/8 and Dual	$h_s$	mm	-	-	-	-	-	-
Tip chamfer for other anchors	$h_s$	mm	4,00	4,00	5,00	5,00	5,00	5,00
Material			Hardened carbon steel, $A_5 \leq 8\%$					
Coating			Zinc coating ( $\geq 5 \mu m$ ); electroplated acc. to EN ISO 4042 or mechanically deposited acc. to EN ISO 12683					

**Marking:**

	ETA Ankerbolt and Socket Bolt	Designations
	F, C, H, PM, P	UC Product identification 6 / 06 Screw size 120 Screw length L, mm
	FX	UC Product identification 6 / 06 Screw size 120 Screw length L, mm
	M10, M8, M3/8, Dual	D Length of anchor, mm L = 55

<b>ETA Ankerbolt and ETA Socket Bolt</b>	<b>Annex A2</b> of European Technical Assessment ETA-25/0815
<b>Product description</b> Head screw characteristic, dimensions, materials and marking	

**Specification of intended use****Anchorage subject to:**

- Static and quasi-static loads: all sizes and all embedment depth.
- Anchorages with requirements related to resistance to fire: all sizes and all embedment depths.

**Base material:**

- Reinforced or unreinforced normal weight concrete with strength class C20/25 to C50/60 according to EN 206.
- Uncracked and cracked concrete: all sizes.

**Use conditions (environmental conditions):**

- Structures subject to dry internal conditions.

**Design:**

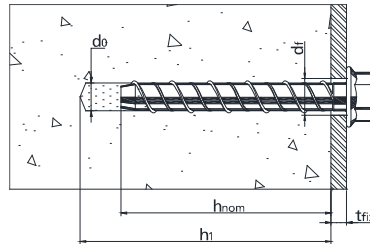
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be transmitted. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static and quasi-static loads are designed in accordance with EN 1992-4:2018.

**Installation:**

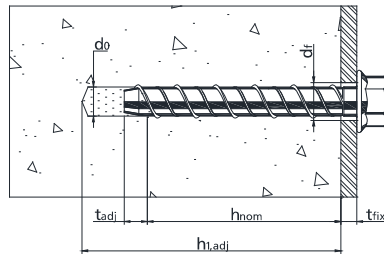
- Hammer drilling only: all sizes and all embedment depths.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- 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.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.
- Adjustment according to Annex B2, B4 and Table C1.

**ETA Ankerbolt and ETA Socket Bolt****Intended use  
Specification****Annex B1****of European  
Technical Assessment  
ETA-25/0815**

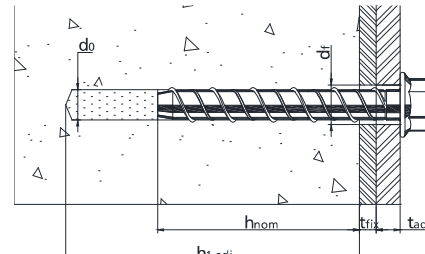
### Installation parameters without adjustment



### Installation parameters with adjustment



before adjustment



after adjustment

**Table B1:** Installation parameters

Anchor size			6		8		10			12			14			16	
Nominal embedment depth	h <sub>nom</sub>	[mm]	h <sub>nom2</sub>	h <sub>nom1</sub>	h <sub>nom2</sub>	h <sub>nom1</sub>	h <sub>nom3</sub>	h <sub>nom2</sub>	h <sub>nom1</sub>	h <sub>nom3</sub>	h <sub>nom2</sub>	h <sub>nom1</sub>	h <sub>nom3</sub>	h <sub>nom2</sub>	h <sub>nom1</sub>	h <sub>nom2</sub>	h <sub>nom1</sub>
			44	55	50	65	55	65	85	65	85	100	85	100	115	100	120
Nominal drill hole diameter	d <sub>0</sub>	[mm]	6		8		10			12			14			16	
Nominal core diameter	d <sub>nom</sub>	[mm]	5,35		7,35		9,35			11,35			13,35			15,35	
Cutting diameter of drill bit	d <sub>cut</sub> ≤	[mm]	6,40		8,45		10,45			12,45			14,50			16,50	
Clearance hole diameter	d <sub>r</sub> ≤	[mm]	8		11		13			15			17			19	
Effective embedment depth	h <sub>ef</sub>	[mm]	30	41	34	47	37	45	62	44	61	73	60	72	85	71	88
Installation torque	T <sub>inst</sub>	[Nm]	10		20		30			50			60			80	
Maximum torque impact screw driver		[Nm]	250				350										
Setting tool (impact screw driver)	-	[-]	BOSCH GDS 18E or equivalent														
For vertically downwards, vertically upwards and horizontally installation in concrete with cleaning and for vertically upwards installation in concrete with no cleaning																	
Depth of drill hole	h <sub>1</sub> ≥	[mm]	50	65	60	75	65	75	95	75	95	110	95	110	125	115	135
For horizontally and vertically downwards installation in concrete with no cleaning (h <sub>1uc</sub> = h <sub>1</sub> + 3 d <sub>0</sub> )																	
Depth of drill hole	h <sub>1uc</sub> ≥	[mm]	68	83	84	99	95	105	125	111	131	146	137	152	167	163	183
For vertically downwards, vertically upwards and horizontally installation in concrete with cleaning and for vertically upwards installation in concrete with no cleaning, with adjustment t <sub>adj</sub> = 10 mm (h <sub>1,adj</sub> = h <sub>1</sub> + t <sub>adj</sub> )																	
Depth of drill hole	h <sub>1,adj</sub> ≥	[mm]	-	75	-	85	-	-	105	-	-	120	-	-	135	-	145
For horizontally and vertically downwards installation in concrete with no cleaning, with adjustment t <sub>adj</sub> = 10 mm (h <sub>1uc,adj</sub> = h <sub>1</sub> + 3 d <sub>0</sub> + t <sub>adj</sub> )																	
Depth of drill hole	h <sub>1uc,adj</sub> ≥	[mm]	-	85	-	109	-	-	135	-	-	156	-	-	177	-	193
Minimum thickness of member	h <sub>min</sub>	[mm]	80	80	80	80	80	90	120	100	120	150	120	150	150	150	150
Minimum spacing	s <sub>min</sub>	[mm]	35	35	35	35	40	40	40	50	50	50	60	60	60	70	70
Minimum edge distance	c <sub>min</sub>	[mm]	35	35	35	35	40	40	40	50	50	50	60	60	60	70	70

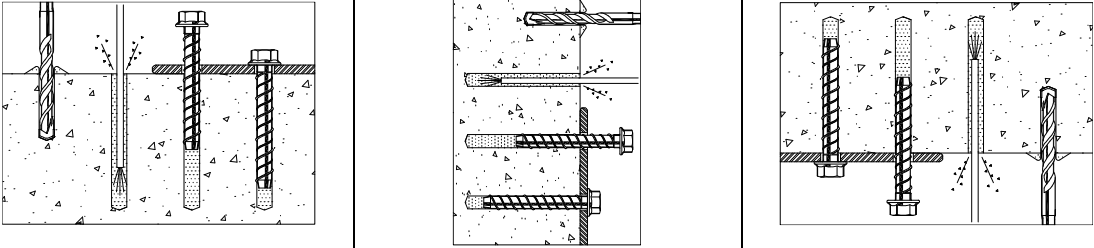
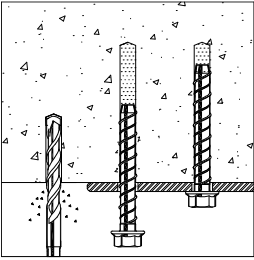
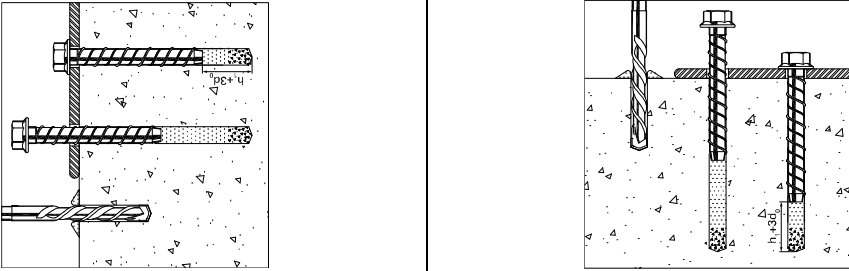
**ETA Ankerbolt and ETA Socket Bolt**

**Intended use**  
Installation parameters

**Annex B2**

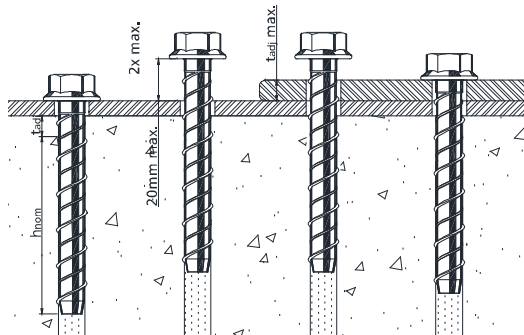
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Vertically downwards, vertically upwards and horizontally installation in concrete with cleaning	
	
<b>Drilling</b>	Make drilling depth $h_1$ .
<b>Cleaning</b>	Cleaning 3 times needed in downward and horizontal installation direction with drill hole depth.
<b>Setting</b>	Setting by specified by manufacturer impact screw driver (impact wrench tool) or torque wrench up to $T_{inst}$ only (according to Table B1).
<b>Checking</b>	After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and undamaged.
Vertically upwards installation in concrete with no cleaning	
	
<b>Drilling</b>	Make drilling depth $h_1$ .
<b>Cleaning</b>	No cleaning needed.
<b>Setting</b>	Setting by specified by manufacturer impact screw driver (impact wrench tool) or torque wrench up to $T_{inst}$ only (according to Table B1).
<b>Checking</b>	After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and undamaged.
Horizontally and vertically downwards installation in concrete with no cleaning	
	
<b>Drilling</b>	Make drilling depth: $h_{1uc} = h_1 + 3 \cdot d_0$
<b>Cleaning</b>	No cleaning needed.
<b>Setting</b>	Setting by specified by manufacturer impact screw driver (impact wrench tool) or torque wrench up to $T_{inst}$ only (according to Table B1).
<b>Checking</b>	After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and undamaged.
<div>ETA Ankerbolt and ETA Socket Bolt</div> <div>Intended use Installation instruction and tools <b>without adjustment</b></div>	
<div>Annex B3</div> <div>of European Technical Assessment ETA-25/0815</div>	

**Vertically downwards, vertically upwards and horizontally installation in concrete with cleaning or without cleaning, with adjustment**

<b>Installation</b>	Installation according to Annex B3 but with $h_{1,adj} = h_1 + t_{adj}$ (for installation without cleaning) or $h_{1uc,adj} = h_{1uc} + t_{adj}$ (for installation with cleaning). Install the screw with: $h_{nom,adj} = h_{nom} + t_{adj}$
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<b>Unscrewing</b>	The screw may be untightened to a maximum of $L_{adj} = 20$ mm off the surface of the initial fixture, It is permissible to adjust the screw twice.
<b>Shimming</b>	The total permissible thickness of shims added during the adjustment process is $t_{adj} \leq 10$ mm
<b>Setting</b>	Setting by specified by manufacturer impact screw driver (impact wrench tool) or torque wrench up to $T_{inst}$ only (according to Table B1). The final embedment depth after adjustment process must be $\geq h_{nom,1}$
<b>Checking</b>	After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture and undamaged.

**ETA Ankerbolt and ETA Socket Bolt**

**Intended use**  
 Installation instruction and tools **with adjustment**

**Annex B4**

of European  
 Technical Assessment  
 ETA-25/0815

**Table C1:** Characteristic resistance to tension load in cracked and uncracked concrete C20/25 to C50/60, design method A

Anchor size			6			8			10			12			14			16		
Nominal embedment depth		$h_{nom}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$			
		[mm]	44	55	50	65	55	65	85	65	85	100	85	100	115	100	120			
Adjustment																				
Total max. thickness of adjustment layers		$t_{adj}$	[mm]	-	10	-	10	-	-	10	-	-	10	-	-	10	-	10		
Max. number of adjustments		$n_a$	-	-	2	-	2	-	-	2	-	-	2	-	-	2	-	2		
Steel failure																				
Characteristic resistance		$N_{Rk,s}$	[kN]	20,2		38,2		61,8			80,9			112,0			148,1			
Partial safety factor		$\gamma_{Ms}^{1)}$	[-]	1,50		1,50		1,50			1,50			1,50			1,50			
Pull-out failure																				
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	1	7,5	7,5	11	9	11	20	10	15	20	19	28	28	28	36		
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	- <sup>2)</sup>	4	2,5	8,5	4,5	9	13	7	11	15	14	21	24	15	24		
Installation safety factor		$\gamma_{inst}$	[-]	1,4	1,2	1,4	1,2	1,4	1,2	1,2	1,4	1,2	1,2	1,2	1,2	1,2	1,2	1,2		
Increasing factor		C30/37	[-]	1,09	1,10	1,06	1,09	1,06	1,07	1,08	1,06	1,08	1,06	1,07	1,07	1,07	1,08	1,09		
		C40/45	[-]	1,16	1,18	1,11	1,17	1,11	1,13	1,13	1,11	1,14	1,10	1,11	1,11	1,12	1,14	1,16		
		C50/60	[-]	1,21	1,25	1,15	1,23	1,14	1,18	1,18	1,15	1,18	1,13	1,15	1,15	1,16	1,19	1,22		
Concrete cone failure and splitting failure																				
Effective embedment depth		$h_{ef}$	[mm]	30	41	34	47	37	45	62	44	61	73	60	72	85	71	88		
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0																
Factor for cracked concrete		$k_{cr,N}$	[-]	7,7																
Installation safety factor		$\gamma_{inst}$	[-]	1,4	1,2	1,4	1,2	1,4	1,2	1,2	1,4	1,2	1,2	1,2	1,2	1,2	1,2	1,2		
Concrete cone failure	Spacing	$S_{cr,N}$	[mm]	3 x $h_{ef}$																
	Edge distance	$C_{cr,N}$	[mm]	1,5 x $h_{ef}$																
Splitting failure	Spacing	$S_{cr,sp}$	[mm]	80	110	110	130	110	130	180	130	180	200	180	200	240	210	260		
	Edge distance	$C_{cr,sp}$	[mm]	40	55	55	65	55	65	90	65	90	100	90	100	120	105	130		
<sup>1)</sup> In the absence of other national regulations																				
<sup>2)</sup> not applicable																				

ETA Ankerbolt and ETA Socket Bolt

### Performances

Characteristic resistance to tension load (static and quasi-static loading)

### Annex C1

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**Table C2:** Characteristic resistance to shear load (static and quasi-static loading) in cracked and uncracked concrete C20/25 to C50/60

Anchor size			6			8		10			12			14			16	
Nominal embedment depth	$h_{nom}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$		
	[mm]	44	55	50	65	55	65	85	65	85	100	85	100	115	100	120		
Steel failure without lever arm																		
Characteristic resistance	$V_{Rk,s}^0$	[kN]	9,3	12,6	16,3	20,3	27,6	31,2	31,2	34,5	40,4	40,4	56,0	56,0	56,0	71,5	73,4	
Factor considering ductility	$k_7$	[-]	1,0															
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5															
Steel failure with lever arm																		
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	16,2		42,1		86,7			137,8			224,2			340,9		
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5															
Concrete pry-out failure																		
Factor	$k_8$	[-]	1,0		1,0		1,0		2,0	1,0	2,0		2,0			2,0		
Installation safety factor	$\gamma_{inst}$	[-]	1,4	1,2	1,4	1,2	1,4	1,2		1,4	1,2		1,2			1,2		
Concrete edge failure																		
Effective length of anchor under shear loads	$l_f$	[mm]	30	41	34	47	37	45	62	44	61	73	60	72	85	71	88	
Outside anchor diameter	$d_{nom}$	[mm]	6		8		10			12			14			16		
Installation safety factor	$\gamma_{inst}$	[-]	1,4	1,2	1,4	1,2	1,4	1,2	1,2	1,4	1,2	1,2	1,2	1,2	1,2	1,2	1,2	
Minimum member thickness	$h_{min}$	[mm]	80	80	80	80	80	90	120	100	120	150	120	150	150	150	150	
1) In the absence of other national regulations																		

<sup>1)</sup> In the absence of other national regulations

**Table C3.** Displacements under static and quasi-static loading

Anchor size				6		8		10			12			14			16	
Nominal embedment depth	$h_{nom}$	[mm]	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	
			44	55	50	65	55	65	85	65	85	100	85	100	115	100	120	
Displacements under tension loads																		
Uncracked concrete C20/25 to C50/60	Tension load	N	[kN]	1,4	3,1	2,8	4,7	3,2	4,7	8,0	3,5	6,1	8,4	7,7	11,2	11,8	11,6	14,8
	Displacement	$\delta_{N0}$	[mm]	0,15	0,20	0,20	0,30	0,30	0,30	0,35	0,30	0,33	0,38	0,35	0,42	0,43	0,40	0,45
		$\delta_{N\infty}$	[mm]	0,40	0,40	0,50	0,50	0,50	0,50	0,50	0,55	0,55	0,55	0,60	0,60	0,60	0,60	0,65
Cracked concrete C20/25 to C50/60	Tension load	N	[kN]	-	1,6	0,9	3,5	1,6	3,7	5,4	2,5	4,7	6,2	5,8	8,5	9,1	6,2	10,0
	Displacement	$\delta_{N0}$	[mm]	-	0,10	0,10	0,20	0,20	0,20	0,25	0,21	0,24	0,26	0,24	0,25	0,28	0,30	0,30
		$\delta_{N\infty}$	[mm]	-	1,07	1,30	1,20	1,60	1,45	1,40	1,70	1,50	1,50	1,80	1,56	1,50	1,80	1,60
Displacements under shear loads																		
Uncracked concrete C20/25 to C50/60	Shear load	V	[kN]	2,8	5,1	3,3	6,3	3,8	5,9	14,9	4,9	18,6	19,2	18,2	23,9	26,7	23,3	32,2
	Displacement	$\delta_{V0}$	[mm]	1,19	1,76	1,34	1,78	1,45	1,22	1,86	1,46	1,30	1,85	1,55	1,65	1,85	1,63	1,92
		$\delta_{V\infty}$	[mm]	1,79	2,64	2,01	2,67	2,18	1,83	2,79	2,19	1,65	2,78	2,33	2,48	2,78	2,45	2,88
Cracked concrete C20/25 to C50/60	Shear load	V	[kN]	-	3,6	2,3	4,4	2,7	4,1	13,3	3,4	18,6	17,1	12,7	16,7	21,4	16,3	22,5
	Displacement	$\delta_{V0}$	[mm]	-	1,54	1,05	1,60	1,22	1,15	1,64	1,30	1,20	1,66	1,36	1,57	1,70	1,42	1,74
		$\delta_{V\infty}$	[mm]	-	2,31	1,58	2,40	1,83	1,73	2,46	1,95	1,80	2,49	2,04	2,36	2,55	2,13	2,61

**ETA Ankerbolt and ETA Socket Bolt****Performances**

Characteristic resistance to shear load (static and quasi-static loading).  
Displacements under static and quasi-static loading

**Annex C2**

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**Table C4: Characteristic resistance under fire exposure in cracked and uncracked concrete C20/25 to C50/60**

Anchor size			6		8		10			12			14			16		
Nominal embedment depth			$h_{nom}$	$h_{nom2}$	$h_{nom1}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$	$h_{nom3}$	$h_{nom2}$	$h_{nom1}$		
			[mm]	44	55	50	65	55	65	85	65	85	100	85	100	115	100	120
Steel failure for tension and shear load $F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$																		
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	0,22	0,22	0,42	0,42	1,03	1,03	1,03	2,02	2,02	2,02	2,80	2,80	2,80	3,70	3,70
	R60	$F_{Rk,s,fi}$	[kN]	0,20	0,20	0,38	0,38	0,89	0,89	0,89	1,52	1,52	1,52	2,10	2,10	2,10	2,78	2,78
	R90	$F_{Rk,s,fi}$	[kN]	0,16	0,16	0,30	0,30	0,69	0,69	0,69	1,32	1,32	1,32	1,82	1,82	1,82	2,41	2,41
	R120	$F_{Rk,s,fi}$	[kN]	0,11	0,11	0,21	0,21	0,55	0,55	0,55	1,01	1,01	1,01	1,40	1,40	1,40	1,85	1,85
	R30	$M^0_{Rk,s,fi}$	[Nm]	0,18	0,18	0,47	0,47	1,44	1,44	1,44	3,45	3,45	3,45	5,61	5,61	5,61	8,52	8,52
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,16	0,16	0,42	0,42	1,25	1,25	1,25	2,58	2,58	2,58	4,20	4,20	4,20	6,39	6,39
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,13	0,13	0,33	0,33	0,96	0,96	0,96	2,24	2,24	2,24	3,64	3,64	3,64	5,54	5,54
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,09	0,09	0,23	0,23	0,77	0,77	0,77	1,72	1,72	1,72	2,80	2,80	2,80	4,26	4,26
Concrete cone failure																		
Characteristic resistance	R30	$N_{Rk,c,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	5,21	2,21	5,00	7,84	4,80	7,57	11,47	7,31	12,51
	R60	$N_{Rk,c,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	5,21	2,21	5,00	7,84	4,80	7,57	11,47	7,31	12,51
	R90	$N_{Rk,c,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	5,21	2,21	5,00	7,84	4,80	7,57	11,47	7,31	12,51
	R120	$N_{Rk,c,fi}$	[kN]	-	1,48	0,93	2,09	1,15	1,87	4,17	1,77	4,00	6,27	3,84	6,06	9,18	5,85	10,01
Pull-out failure																		
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	-	1,00	0,63	2,13	1,13	2,25	3,25	1,75	2,75	3,75	3,50	5,25	6,00	3,75	6,00
	R60	$N_{Rk,p,fi}$	[kN]	-	1,00	0,63	2,13	1,13	2,25	3,25	1,75	2,75	3,75	3,50	5,25	6,00	3,75	6,00
	R90	$N_{Rk,p,fi}$	[kN]	-	1,00	0,63	2,13	1,13	2,25	3,25	1,75	2,75	3,75	3,50	5,25	6,00	3,75	6,00
	R120	$N_{Rk,p,fi}$	[kN]	-	0,80	0,50	1,70	0,90	1,80	2,60	1,40	2,20	3,00	2,80	4,20	4,80	3,00	4,80
Concrete pry-out failure																		
Characteristic resistance	R30	$V_{Rk,cp,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	10,42	2,21	10,01	15,68	9,60	15,15	22,94	14,63	25,02
	R60	$V_{Rk,cp,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	10,42	2,21	10,01	15,68	9,60	15,15	22,94	14,63	25,02
	R90	$V_{Rk,cp,fi}$	[kN]	-	1,85	1,16	2,61	1,43	2,34	10,42	2,21	10,01	15,68	9,60	15,15	22,94	14,63	25,02
	R120	$V_{Rk,cp,fi}$	[kN]	-	1,48	0,93	2,09	1,15	1,87	8,34	1,77	8,01	12,54	7,68	12,12	18,35	11,70	20,01
Concrete edge failure																		
Characteristic resistance	R30	$V^0_{Rk,cp,fi}$	[kN]	0,58	0,61	0,62	0,66	0,78	0,81	0,86	1,12	1,19	1,24	1,55	1,61	1,67	2,01	2,10
	R60	$V^0_{Rk,cp,fi}$	[kN]	0,58	0,61	0,62	0,66	0,78	0,81	0,86	1,12	1,19	1,24	1,55	1,61	1,67	2,01	2,10
	R90	$V^0_{Rk,cp,fi}$	[kN]	0,58	0,61	0,62	0,66	0,78	0,81	0,86	1,12	1,19	1,24	1,55	1,61	1,67	2,01	2,10
	R120	$V^0_{Rk,cp,fi}$	[kN]	0,46	0,49	0,50	0,53	0,62	0,65	0,69	0,89	0,95	0,99	1,24	1,29	1,34	1,61	1,68
Edge distance																		
R30 to R120			$c_{cr,fi}$	[mm]		$2 \cdot h_{ef}$												
In case of fire attack from more than one side, the minimum edge distance shall be $\geq 300$ mm																		
Anchor spacing																		
R30 to R120			$s_{cr,fi}$	[mm]		$4 \cdot h_{ef}$												
Factor			$k_8$	[-]		1,0	1,0	1,0	1,0	1,0	2,0	1,0	2,0	2,0	2,0	2,0	2,0	2,0

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**Performances**  
Characteristic resistance under fire exposure

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