

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-09/0158**  
**of 11 May 2022**

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

BTI drop-in anchor BE

Product family  
to which the construction product belongs

Mechanical fasteners for use in concrete

Manufacturer

BTI Befestigungstechnik GmbH & Co. KG  
Salzstraße 51  
74653 Ingelfingen  
DEUTSCHLAND

Manufacturing plant

BTI Herstellwerk 1

This European Technical Assessment  
contains

14 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 330232-01-0601, Edition 05/2021

This version replaces

ETA-09/0158 issued on 25 April 2017

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

**Specific Part**

**1 Technical description of the product**

The BTI drop-in anchor BE is an anchor made of galvanized or stainless steel which is placed into a drilled hole and anchored by deformation-controlled expansion.  
 The fixture shall be anchored with a fastening screw or threaded rod.  
 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)**

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi static action) Method A	See Annex B2 and C1
Characteristic resistance to shear load (static and quasi static action)	See Annex C2
Displacements	See Annex C3
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

**3.3 Aspects of durability linked with the Basic Works Requirements**

Essential characteristic	Performance
Durability	See Annex B1

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

In accordance with the European Assessment Document EAD 330232-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

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

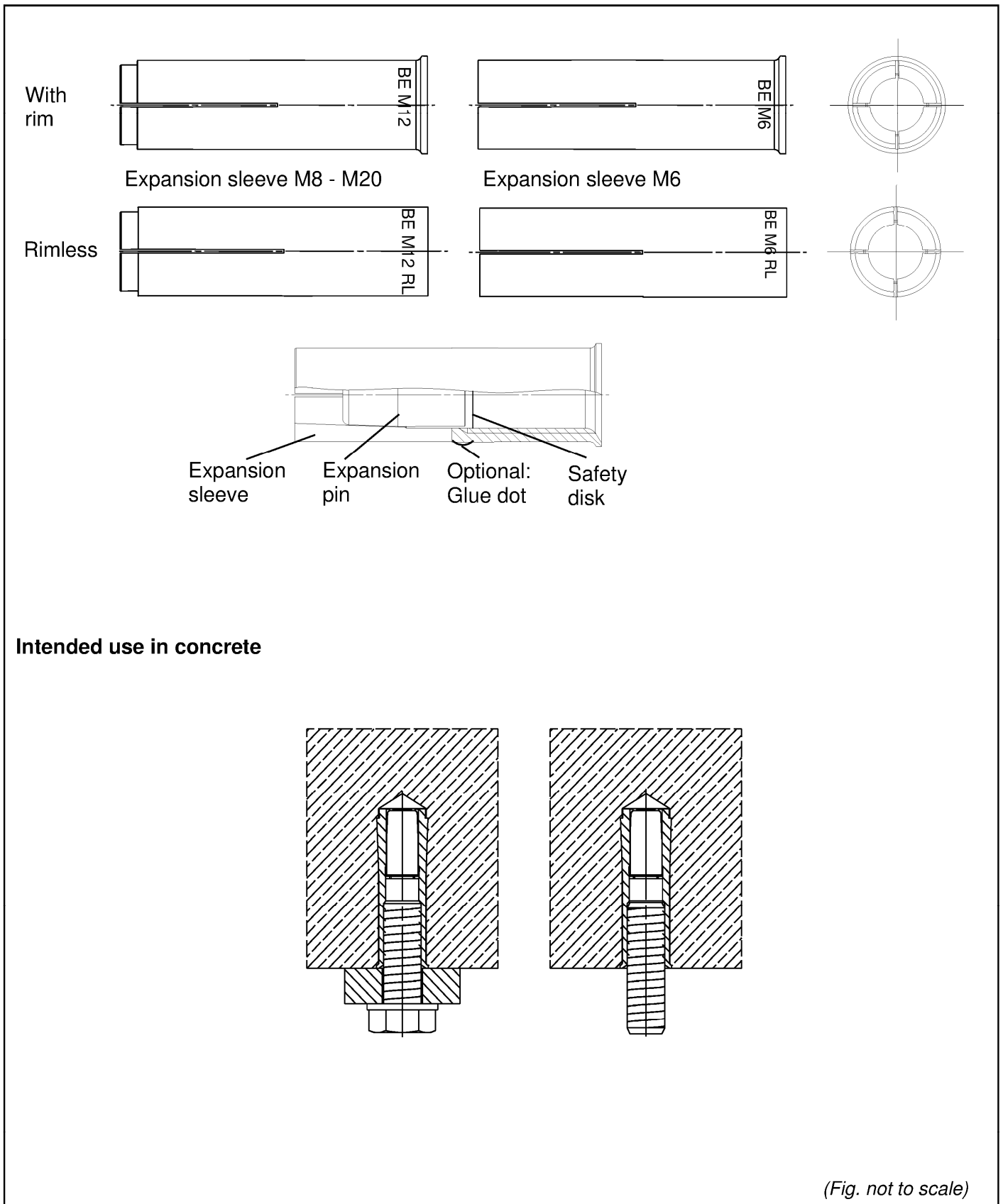
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 11 May 2022 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Baderschneider

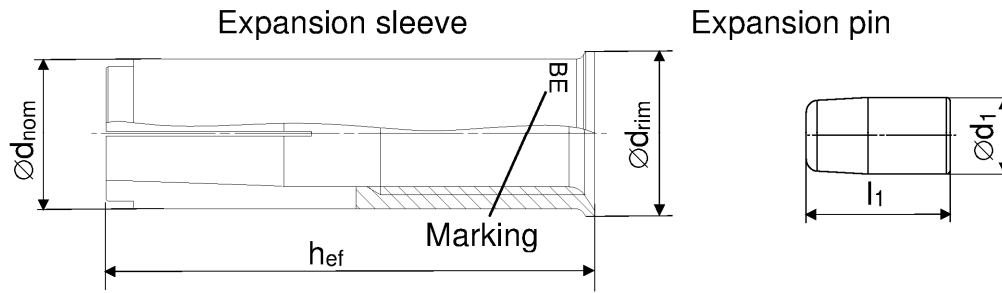
English translation prepared by DIBt



BTI drop-in anchor BE

**Product description**  
Anchor types  
Installed condition

**Annex A 1**



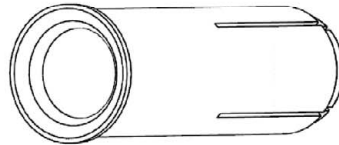
**Table A2.1: Anchor size**

Anchor size BE [mm]	M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M12x50 D	M16x65	M20x80
$h_{ef}$	30	30	40	30	40	50		65	80
$\varnothing d_{nom}$	8	10		12		15	16	20	25
$\varnothing d_{rim}$ (not applicable for BE RL)	9,5	11,5		13,5		16,5	17,5	21,5	27,0
$\varnothing d_1$	5	6,5		8		10		13,5	17,5
$l_1$	14	13,5		13	18	18		25	26

**Distinctive feature**

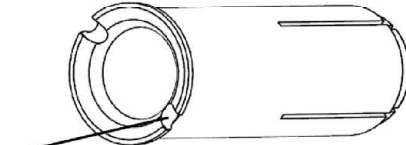
No groove for:

- BE M6x30..
- BE M8x30..
- BE M10x40..
- BE M12x50..
- BE M16x65..
- BE M20x80..



2 grooves for:

- BE M8x40..
- BE M10x30..



**Table A2.2: Marking on anchor body**

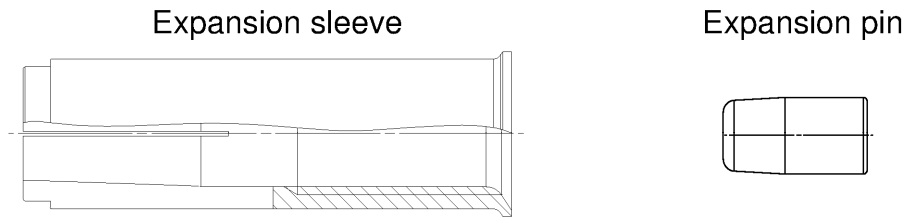
galvanised steel (gvz)		stainless steel (R)	
with rim	rimless	with rim	rimless
BE M6x30	BE M6x30 RL	BE M6x30 R	BE M6x30 RL R
BE M8x30	BE M8x30 RL	BE M8x30 R	BE M8x30 RL R
BE M8x40	BE M8x40 RL	BE M8x40 R	BE M8x40 RL R
BE M10x30	BE M10x30 RL	BE M10x30 R	BE M10x30 RL R
BE M10x40	BE M10x40 RL	BE M10x40 R	BE M10x40 RL R
BE M12x50	BE M12x50 RL	BE M12x50 R	BE M12x50 RL R
BE M12x50 D	BE M12x50 RL D	BE M12x50 D R	BE M12x50 RL D R
BE M16x65	BE M16x65 RL	BE M16x65 R	BE M16x65 RL R
BE M20x80	BE M20x80 RL	BE M20x80 R	BE M20x80 RL R

(Fig. not to scale)

BTI drop-in anchor BE

Product description  
Anchor types

**Annex A 2**



**Table A3.1: Materials**

Designation	Material	
	galvanised steel ( $\geq 5 \mu\text{m}$ )	stainless steel (R)
Expansion sleeve	EN 10277:2018 or EN 10084:2008 or EN 10111:2008 or EN 10263:2018 or EN 10087:1999 or ASTM A29/A29M	EN 10088:2014
Expansion pin		
Fastening screw or threaded rod	steel, property class 4.6, 5.6, 5.8 or 8.8 according to EN ISO 898-1:2013	property class 50, 70 or 80 according to EN ISO 3506:2020

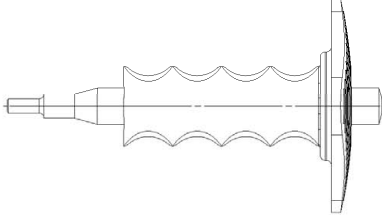
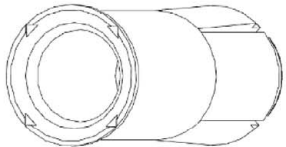
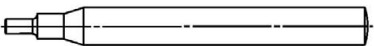
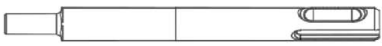
(Fig. not to scale)

BTI drop-in anchor BE

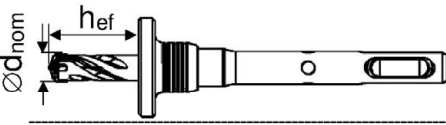
**Product description**  
Material

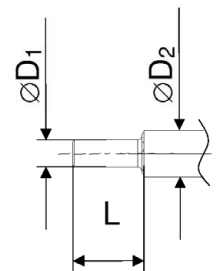
**Annex A 3**

### Setting & drilling tools

Setting tools	Marking	Description	Marking on BE with rim and rimless
	EHS Plus M..x hef	Manual setting tool with hand guard	
	EHS M..x hef	Manual setting tool basic format	
	EMS M..x hef	Machine setting tool with SDS Plus	No marking

### Drilling tools

	EBB $\varnothing d_{nom} \times h_{ef}$	Stop drill
Or other usual drillers		



**Table A4.1: Corresponding drill bits and parameters of setting tools**

Manual setting tool	Machine setting tool	Stop drill	For anchor size BE	$\varnothing D1$ [mm]	$\varnothing D2$ [mm]	L [mm]
EHS (Plus) M6x25/30	EMS M6x25/30	EBB 8x30	BE M6x30	4,8	9,0	17,0
EHS (Plus) M8x25/30	EMS M8x25/30	EBB 10x30	BE M8x30			6,4
EHS (Plus) M8x40	EMS M8x40	EBB 10x40	BE M8x40	7,9	13,0	
EHS (Plus) M10x25/30	EMS M10x25/30	EBB 12x30	BE M10x30			10,2
EHS (Plus) M10x40	EMS M10x40	EBB 12x40	BE M10x40	13,5	22	
EHS (Plus) M12x50	EMS M12x50	EBB 15x50	BE M12x50			16,4
EHS (Plus) M12x50	EMS M12x50	EBB 16x50	BE M12x50 D	13,5	22	
EHS (Plus) M16x65	EMS M16x65	EBB 20x65	BE M16x65			16,4
EHS (Plus) M20x80	EMS M20x80	EBB 25x80	BE M20x80			



(Fig. not to scale)

BTI drop-in anchor BE

**Intended Use**  
Setting & Drilling tools

**Annex A 4**

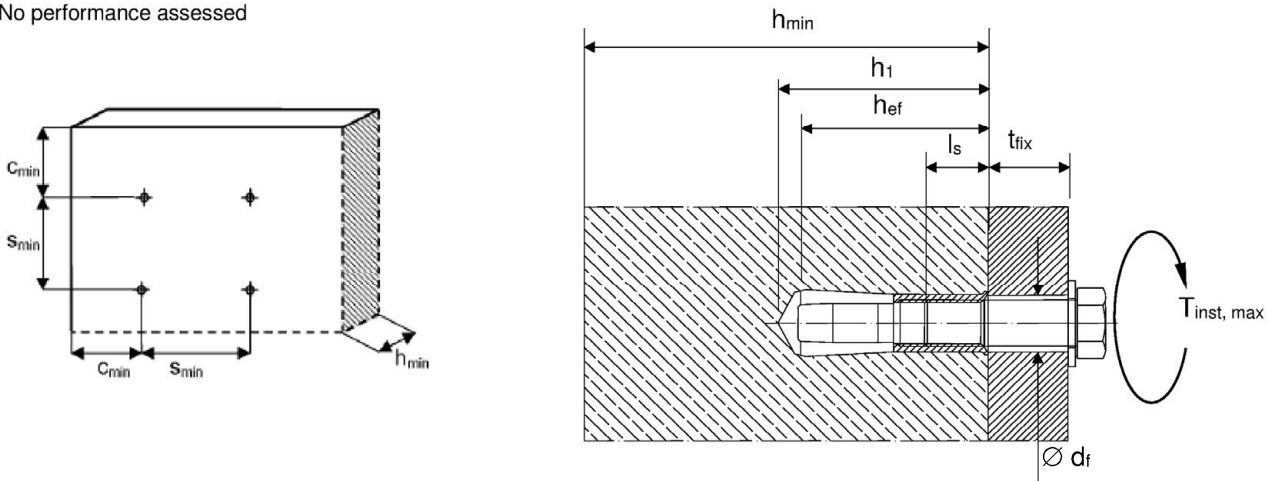


<b>Specifications of intended use</b>						
<b>Anchorage subject to:</b>						
BTI drop-in anchor BE (all versions)	M6	M8	M10	M12	M16	M20
Hammer drilling with standard drill bit 	All types					
Hammer drilling with hollow drill bit with automatic cleaning 						
Material	Steel	Zinc plated	✓			
	Stainless	R	✓			
Static and quasi-static loads	✓					
Uncracked concrete	✓					
<p><b>Base materials:</b></p> <ul style="list-style-type: none"> <li>Reinforced or unreinforced normal concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016</li> </ul> <p><b>Use conditions (Environmental conditions):</b></p> <ul style="list-style-type: none"> <li>Structures subject to dry internal conditions: <b>BE, BE R</b></li> <li>For all other conditions according to EN 1993-1-4:2006 + A1:2015 corresponding to corrosion resistance class CRC III <b>BE R</b> Anchor types M6x30 R, M8x30 R and M10x30 R only for dry internal exposure</li> </ul> <p><b>Design:</b></p> <ul style="list-style-type: none"> <li>Anchorage is to be designed under the responsibility of an engineer experienced in anchorages and concrete work</li> <li>Verifiable calculation notes and drawings are 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.)</li> <li>Design of fastenings according to EN 1992-4:2018 and Technical Report TR 055, Edition February 2018</li> <li>Anchor sizes M6x30, M8x30 and M10x30 for statically indeterminate structural components only, when in case of failure, the load can be distributed to other fasteners.</li> </ul> <p><b>Installation:</b></p> <ul style="list-style-type: none"> <li>Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site</li> <li>Create drill hole with hammer drill or with hollow drill and vacuum cleaner</li> <li>The anchor may only be used once</li> <li>In case of aborted hole: New hole must be drilled at a minimum distance of twice the depth of the aborted hole or closer, if the hole is filled with a high strength mortar (e.g. UVT-TOP Z or UVT TOP) and only if the hole is not in the direction of the oblique tensile or shear load</li> <li>Anchor expansion by impact using the setting tools given in Annex A 4. The anchor is properly set if the stop of the setting tool reaches the expansion sleeve. The manual setting tool with installation control leaves a visible mark on the sleeve, as illustrated in Annex A 4 and B 3</li> </ul>						
<b>BTI drop-in anchor BE</b>					<b>Annex B 1</b>	
<b>Intended Use Specifications</b>						

**Table B2.1: Installation parameters for concrete C20/25 to C50/60**

Anchor size (all versions)			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M12x50 D	M16x65	M20x80
			Nominal drill hole diameter	$d_0$	8	10		12		15	16
Cutting diameter of drill bit	$d_{cut}$	[mm]	8,45	10,45		12,50		15,50	16,50	20,55	25,55
Effective anchorage depth	$h_{ef}$		30	30	40	30	40	50		65	80
Maximum installation torque	$T_{inst,max}$	[Nm]	4	8		15		35	60	120	
Minimum drill hole depth	$h_1$		32	33	43	33	43	54	70	85	
Minimum screw-in depth	$l_{s,min}$	[mm]	6	8		10		12	16	20	
Maximum screw-in depth	$l_{s,max}$		14	14		15	17	22	28	34	
Clearance of hole diameter	$\varnothing d_f \leq$		7	9		12		14	18	22	
<b><math>h_{min} = 80 \text{ mm}</math></b>											
Minimum spacing	$S_{min}$	[mm]	70	110	200	200		-1)			
Minimum edge distance	$C_{min}$		150	150		150		-1)			
<b><math>h_{min} = 100 \text{ mm}</math></b>											
Minimum spacing	$S_{min}$	[mm]	65	70	90	150	200		-1)		
Minimum edge distance	$C_{min}$		115	115		160	180	-1)			
<b><math>h_{min} = 120 \text{ mm}</math></b>											
Minimum spacing	$S_{min}$	[mm]	65	70	85	95	145	-1)			
Minimum edge distance	$C_{min}$		115	115		140	150	200	-1)		
<b><math>h_{min} = 160 \text{ mm}</math></b>											
Minimum spacing	$S_{min}$	[mm]	65	70	85	95	145	180	-1)		
Minimum edge distance	$C_{min}$		115	115		140	150	200	240	-1)	
<b><math>h_{min} = 200 \text{ mm}</math></b>											
Minimum spacing	$S_{min}$	[mm]	65	70	85	95	145	180	190	-1)	
Minimum edge distance	$C_{min}$		115	115		140	150	200	240	280	

<sup>1)</sup> No performance assessed



Fastening screw or threaded rod:

- Minimum property class and materials according to table A3.1
- The length of the fastening screw or threaded rod shall be determined depending on thickness of fixture  $t_{fix}$ , admissible tolerances and maximum screw-in depth  $l_{s,max}$  as well as minimum screw-in depth  $l_{s,min}$

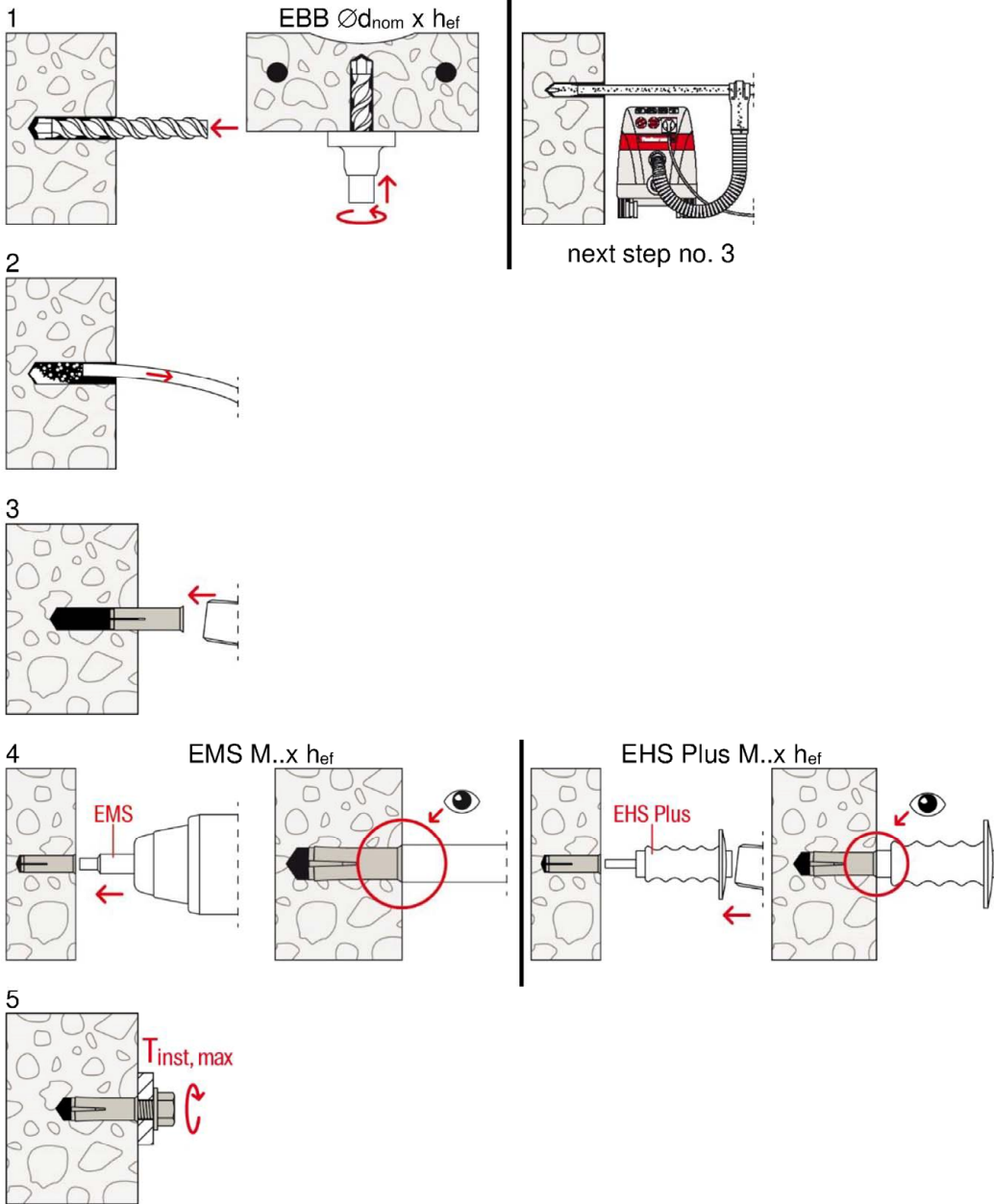
(Fig. not to scale)

BTI drop-in anchor BE

Intended Use  
Installation parameters

**Annex B 2**

## Installation instructions



No.	Description
1	Create drill hole with hammer drill or stop drill or with hollow drill and vacuum cleaner
2	Clean from drill-dust
3	Set anchor till anchor is flush with surface of concrete
4	Expand the sleeve by driving the pin with the corresponding setting tool into the sleeve and control the correct setting
5	Fixation of fixture. Maximum installation torque $T_{\text{inst, max}}$ must not be exceeded

BTI drop-in anchor BE

Intended Use  
Installation instructions

Annex B 3

**Table C1.1:** Characteristic values for tension loads under static and quasi-static action

BE	property class of the fastening screw or threaded rod	M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x30 <sup>1)</sup>	M10x40	M12x50	M12x50 D	M16x65	M20x80
<b>Steel failure</b>										
Installation factor	$\gamma_{inst}$ [-]	1,0								
Characteristic resistance	$N_{Rk,s}$ [kN] A4-50	10,1	18,3	29,0		42,1		78,3	122,4	
Partial factor	$\gamma_{Ms}^{4)}$ [-]	2,86								
Characteristic resistance	$N_{Rk,s}$ [kN] A4-70	14,1	19,6	24,9		45,1	59,0		73,8	117,2
Partial factor	$\gamma_{Ms}^{4)}$ [-]	1,87	1,5				1,87		1,5	
Characteristic resistance	$N_{Rk,s}$ [kN] A4-80	16,1	19,6	24,9		45,1	59,0		73,8	117,2
Partial factor	$\gamma_{Ms}^{4)}$ [-]	1,6	1,5							
Characteristic resistance	$N_{Rk,s}$ [kN] steel 4.6	8,0	14,6	23,2		33,7		62,7	97,9	
Partial factor	$\gamma_{Ms}^{4)}$ [-]	2,0								
Characteristic resistance	$N_{Rk,s}$ [kN] steel 5.6	10,1	18,3	29,0		42,1		78,3	122,4	
Partial factor	$\gamma_{Ms}^{4)}$ [-]	2,0								
Characteristic resistance	$N_{Rk,s}$ [kN] steel 5.8	10,1	17,2	21,8		39,6	42,1	64,7	102,8	
Partial factor	$\gamma_{Ms}^{4)}$ [-]	1,5								
Characteristic resistance	$N_{Rk,s}$ [kN] steel 8.8	13,5	17,2	21,8		39,6	53,3	64,7	102,8	
Partial factor	$\gamma_{Ms}^{4)}$ [-]	1,5								
<b>Pullout failure</b>										
Characteristic resistance C20/25	$N_{Rk,p}$ [kN]	8,1	12,5	8,1	12,5	17,4		25,8	35,2	
Increasing Factors for $N_{Rk,p}$ $N_{Rk,p} = \psi_c \cdot N_{Rk,p}$ (C20/25)	$\psi_c$	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 and splitting failure</b>										
Effective anchorage depth	$h_{ef}$ [mm]	30	40	30	40	50		65	80	
Factor for uncracked concrete	$k_{ucr,N}$ [-]	11,0 <sup>2)</sup>								
Factor for cracked concrete	$k_{cr,N}$ [-]	No performance assessed								
Spacing	$s_{cr,N}$ [mm]	90	120	90	120	150		195	240	
Edge distance	$c_{cr,N}$ [mm]	45	60	45	60	75		97	120	
Spacing (splitting failure)	$s_{cr,sp}$ [mm]	210	280	210	320	350		455	560	
Edge distance (splitting failure)	$c_{cr,sp}$ [mm]	105	140	105	160	175		227	280	
Characteristic resistance to splitting	$N^0_{Rk,sp}$ [kN]	$\min \{N^0_{Rk,c}, N_{Rk,p}\}^{3)}$								
<sup>1)</sup> Use restricted to anchoring of structural components which are statically indeterminate <sup>2)</sup> Based on concrete strength as cylinder strength <sup>3)</sup> $N^0_{Rk,c}$ according to EN 1992-4:2018 <sup>4)</sup> In absence of other national regulations										
<b>BTI drop-in anchor BE</b>								<b>Annex C 1</b>		
<b>Performances</b> Characteristic resistance to tension loads under static and quasi-static action										

<b>Table C2.1: Characteristic values for shear loads under static and quasi-static action</b>										
BE	property class of the fastening screw or threaded rod	M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x30 <sup>1)</sup>	M10x40	M12x50	M12x50 D	M16x65	M20x80
		Factor for ductility	$k_7$ [-]	1,0						
Installation factor	$\gamma_{inst}$ [-]	1,0								
<b>Steel failure without lever arm</b>										
Characteristic resistance	$V_{Rk,s}^0$ [kN]	A4-50	5,0	9,2	14,5	21,1	39,2	61,2		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	2,38								
Characteristic resistance	$V_{Rk,s}^0$ [kN]	A4-70	7,0	9,8	12,4	22,6	29,5	37	59	
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,56	1,25				1,56	1,25		
Characteristic resistance	$V_{Rk,s}^0$ [kN]	A4-80	8,0	9,8	12,4	22,6	30,4	36,9	58,6	
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,33	1,25							
Characteristic resistance	$V_{Rk,s}^0$ [kN]	steel 4.6	4,0	7,3	11,6	16,9	31	49		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,67								
Characteristic resistance	$V_{Rk,s}^0$ [kN]	steel 5.6	5,0	9,2	14,5	21,1	39	61		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,67								
Characteristic resistance	$V_{Rk,s}^0$ [kN]	steel 5.8	5,0	8,6	10,9	19,8	21,1	32	51	
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,25								
Characteristic resistance	$V_{Rk,s}^0$ [kN]	steel 8.8	6,8	8,6	10,9	19,8	27	32	51	
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,25								
<b>Steel failure with lever arm</b>										
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	A4-50	8	19	37	66	166	324		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	2,38								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	A4-70	11	26	52	92	232	454		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,56								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	A4-80	12	30	60	105	266	519		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,33								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	steel 4.6	6,1	15	30	52	133	259		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,67								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	steel 5.6	7,6	19	37	66	166	324		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,67								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	steel 5.8	7,6	19	37	66	166	324		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,25								
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	steel 8.8	12	30	60	105	266	517		
Partial factor	$\gamma_{Ms}^{(2)}$ [-]	1,25								
<b>Concrete pryout failure</b>										
Factor for pryout failure	$k_8$ [-]	1,74	1,9	1,74	1,9	2,0				
<b>Concrete edge failure</b>										
Effective length of anchor	$l_f$ [mm]	30	40	30	40	50	65	80		
Effective diameter of anchor	$d_{nom}$ [mm]	8	10	12	15	16	20	25		
<sup>1)</sup> Use restricted to anchoring of structural components which are statically indeterminate <sup>2)</sup> In absence of other national regulations										
<b>BTI drop-in anchor BE</b>							<b>Annex C 2</b>			
<b>Performances</b> Characteristic resistance to shear loads under static and quasi-static action										

**Table C3.1: Displacements under tension and shear loads for BE in galvanised steel**

BE		M6x30		M8x30		M8x40		M10x30		M10x40		M12x50		M12x50 D		M16x65		M20x80	
Tension load in C20/25 to C50/60	N	[kN]		4,0		6,1		4,0		6,1		8,5		12,6		17,2			
Displacement	$\delta_{N_0}$	[mm]		0,1															
	$\delta_{N_\infty}$	[mm]		0,2															
Shear load in C20/25 to C50/60	V	[kN]		3,9		4,9		6,2		11,3		15,2		18,5		29,4			
Displacement	$\delta_{V_0}$	[mm]		0,95		1,00		1,05		1,10		1,40		1,80					
	$\delta_{V_\infty}$	[mm]		1,40		1,50		1,60		1,70		2,10		2,70					

**Table C3.2: Displacements under tension and shear loads for BE in stainless steel**

BE R		M6x30		M8x30		M8x40		M10x30		M10x40		M12x50		M12x50 D		M16x65		M20x80	
Tension load in C20/25 to C50/60	N	[kN]		4,0		6,1		4,0		6,1		8,5		12,6		17,2			
Displacement	$\delta_{N_0}$	[mm]		0,1															
	$\delta_{N_\infty}$	[mm]		0,2															
Shear load in C20/25 to C50/60	V	[kN]		3,2		5,6		7,1		12,9		13,5		21,1		33,5			
Displacement	$\delta_{V_0}$	[mm]		0,95		1,00		1,05		1,10		1,40		1,80					
	$\delta_{V_\infty}$	[mm]		1,40		1,50		1,60		1,70		2,10		2,70					

BTI drop-in anchor BE

Performances  
Displacements

Annex C 3