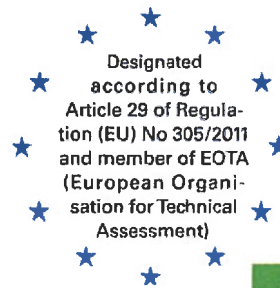


Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0001
of 3 April 2017

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

B+BTec CS, High Performance

Product family
to which the construction product belongs

Concrete screw of sizes 6, 8, 10, 12 and 14 mm for use in
concrete

Manufacturer

B+BTec International BV
Munterij 8
4762 AH ZEVENBERGEN
NIEDERLANDE

Manufacturing plant

B+BTec Zevenbergen, The Netherlands

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

European Assessment Document (EAD)
330232-00-0601 and 330011-00-0601

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This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No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 concrete screw B+BTec CS, High Performance is an anchor in size 6, 8, 10, 12 and 14 mm made of galvanised steel respectively steel with zinc flake coating, made of stainless or high corrosion resistant steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and 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
Product performance for static and quasi static action	See Annex C 1 and C 2
Product performance for seismic category C1	See Annex C 4
Displacements under tension and shear loads	See Annex C 3

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 5

3.3 Safety in use (BWR 4)

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

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 and EAD No. 330011-00-0601, 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 EAD

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 3 April 2017 by Deutsches Institut für Bautechnik

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Tempel

Product and installed condition

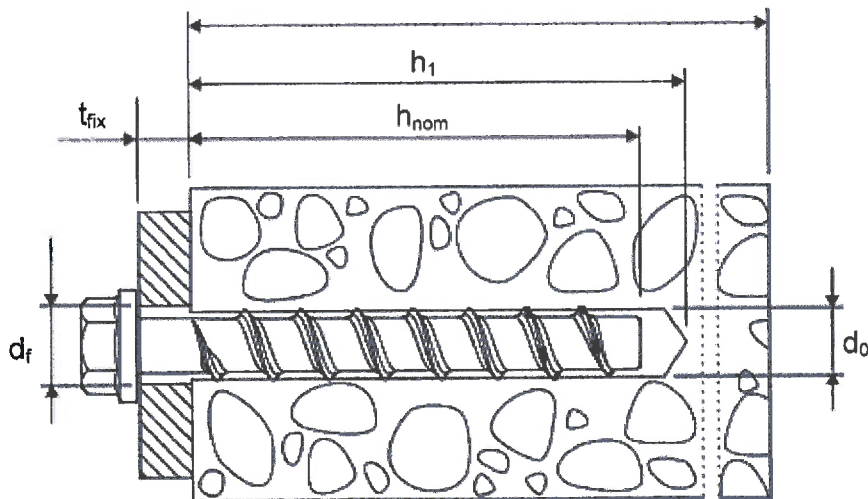
B+BTec CS Concrete Screw, High Performance



carbon steel



stainless steel A4 and HCR



- | | | |
|-----------|---|---|
| d_0 | = | nominal drill bit diameter |
| h_{nom} | = | nominal anchorage depth |
| h_1 | = | depth of the drill hole |
| h_{min} | = | minimum thickness of member |
| t_{fix} | = | thickness of fixture |
| d_f | = | diameter of clearance hole in the fixture |























B+BTec CS, High Performance

Product description

Installed condition

Annex A 1

Table A1: materials and variants

part	name	Material		
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Concrete screw	B+BTec CS, Galvanized	Steel EN 10263-4 galvanized acc. to EN ISO 4042 or zinc flake coating acc. to EN ISO 10683 ($\geq 5\mu\text{m}$)	
		B+BTec CS, A4	1.4401, 1.4404, 1.4571, 1.4578	
		B+BTec CS, HCR	1.4529	
				B+BTec CS, Galvanized B+BTec CS, A4 B+BTec CS, HCR
		nominal characteristic steel yield strength	f_{yk}	[N/mm ²] 560
		nominal characteristic steel ultimate strength	f_{uk}	[N/mm ²] 700
		elongation at rupture	A_5	[%] ≤ 8
		1)	Anchor version with connection thread and hexagon socket	
		2)	Anchor version with connection thread and hexagon drive	
		3)	Anchor version with washer, hexagon head and TORX	
		4)	Anchor version with washer and hexagon head	
		5)	Anchor version with washer, hexagon head and	
		6)	Anchor version with countersunk head	
		7)	Anchor version with pan head	
		8)	Anchor version with large pan head	
		9)	Anchor version with countersunk head and connection thread	
		10)	Anchor version with hexagon drive and connection thread	
		11)	Anchor version with internal thread and hexagon drive	

B+BTec CS, High Performance

Product descriptions

Materials und versions

Annex A 2

Table A2: dimensions and markings

Anchor size B+BTec CS		6		8			10			
Nominal embedment depth h_{nom} [mm]		h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	
		40	55	45	55	65	55	75	85	
Length of the anchor	$L \leq$ [mm]	500								
Diameter of shaft	d_k [mm]	5,1		7,1			9,1			
Diameter of thread	d_s [mm]	7,5		10,6			12,6			
Anchor size B+BTec CS		12			14					
Nominal embedment depth h_{nom} [mm]		h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}			
		65	85	100	75	100	115			
Length of the anchor	$L \leq$ [mm]	500								
Diameter of shaft	d_k [mm]	11,1			13,1					
Diameter of thread	d_s [mm]	14,6			16,6					



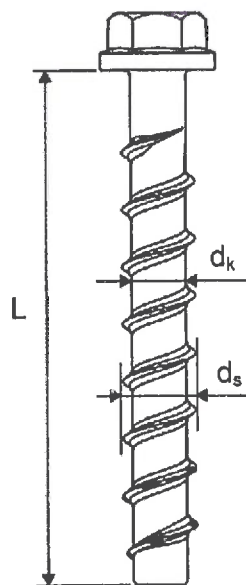
Marking:
B+BTec CS
Anchor type: CS
Anchor size: 10
Length of the anchor: 100



B+BTec CS A4
Anchor type: CS
Anchor size: 10
Length of the anchor: 100
Material: A4



B+BTec CS HCR
Anchor type: CS
Anchor size: 10
Length of the anchor: 100
Material: HCR



B+BTec CS, High Performance

Product descriptions
Dimensions and markings

Annex A 3

Intended use

Anchorage subject to:

- static and quasi-static loads, all sizes and all embedment depth,
- used for anchorages with requirements related to resistance of fire, all sizes and all embedment depth,
- used for anchorages with seismic actions category C1, sizes 8-14 for maximum embedment depth h_{nom3} .

Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000,
- strength classes C20/25 to C50/60 according to EN 206-1:2000,
- cracked and uncracked concrete.

Use conditions (Environmental conditions):

- The anchor may only be used in dry internal conditions: All screw types,
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exists: screw types made of stainless steel with marking A4,
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exists: screw types made of stainless steel with marking HCR.
- Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with 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,
- Anchorages under static or quasi-static actions, under seismic actions and under fire exposure are designed in accordance with EN 1992-4:2017,
- The design of anchorages under shear load according to EN 1992-4:2017, Section 6.2.2 applies for all specified diameters d_r of clearance hole in the fixture in Annex B2, Table B1.

Installation:

- Hammer drilling only.
- Fastener installation in accordance with the manufacturer's specifications using the appropriate tools carried out by appropriately qualified personnel.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.
- The drill hole can be used without or with injection mortar Chemofast CF-T 300 V.
- Adjustability according to Annex B4: sizes 8-14, all anchorage depths.

B+BTec CS, High Performance

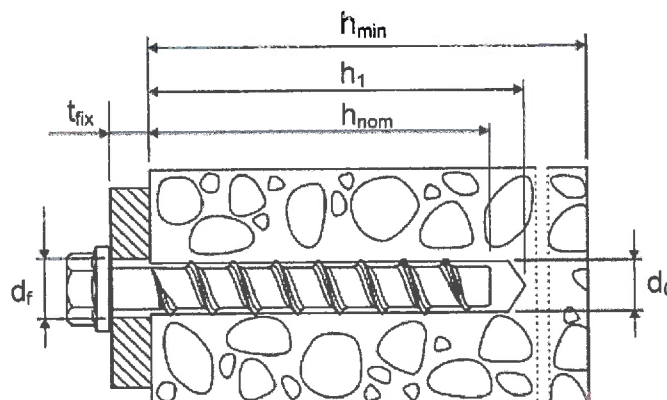
Intended use

Specifications

Annex B 1

Table B1: Installation parameters

Anchor size B+BTec CS			6		8			10			
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	
			40	55	45	55	65	55	75	85	
Nominal drill bit diameter	d_0	[mm]	6		8			10			
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40		8,45			10,45			
Depth of drill hole	$h_1 \geq$	[mm]	45	60	55	65	75	65	85	95	
Diameter of clearing hole in the fixture	$d_f \leq$	[mm]	8		12			14			
Installation torque for version with connection thread	T_{inst}	[Nm]	10		20			40			
Recommended impact screw driver		[Nm]	Max. torque according to manufacturer's instructions								
			160		300			400			
Anchor size B+BTec CS			12			14					
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}			
			65	85	100	75	100	115			
Nominal drill bit diameter	d_0	[mm]	12			14					
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	12,50			14,50					
Depth of drill hole	$h_1 \geq$	[mm]	75	95	110	85	110	125			
Diameter of clearing hole in the fixture	$d_f \leq$	[mm]	16			18					
Installation torque for version with connection thread metrical	T_{inst}	[Nm]	60			80					
Recommended impact screw driver			Max. torque according to manufacturer's instructions								
			650			650					



B+BTec CS, High Performance

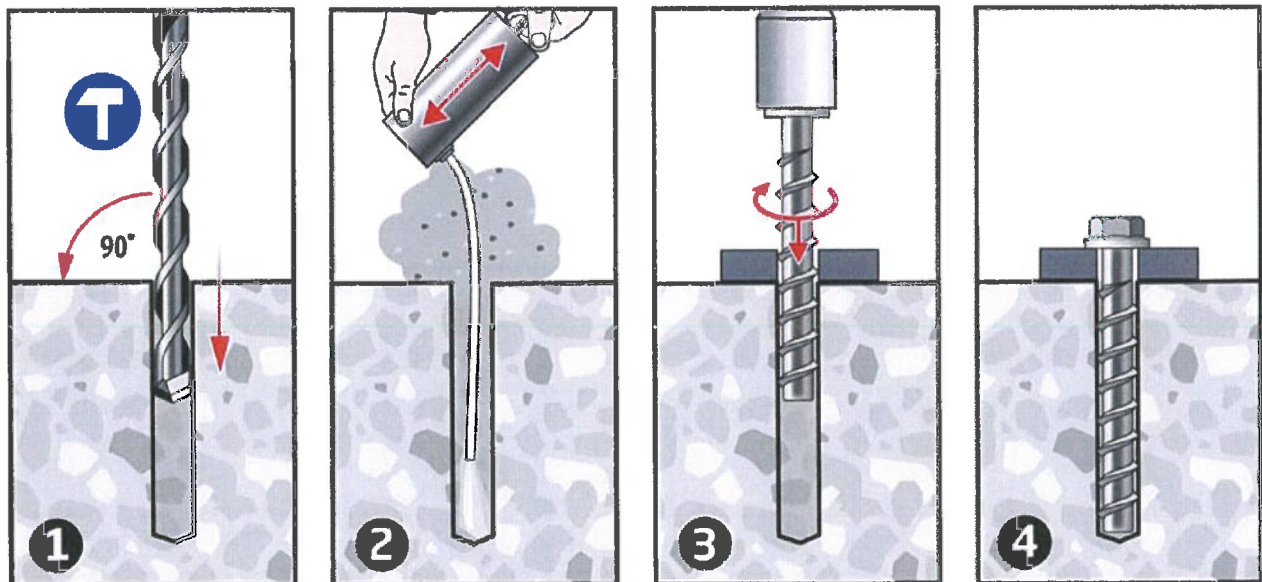
Intended use
Installation parameters

Annex B 2

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

Anchor size B+BTec CS			6		8			10		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			40	55	45	55	65	55	75	85
Minimum thickness of member	h_{min}	[mm]	100		100		120	100	130	130
Minimum edge distance	c_{min}	[mm]	40		40	50		50		
Minimum spacing	s_{min}	[mm]	40		40	50		50		
Anchor size B+BTec CS			12			14				
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}		
			65	85	100	75	100	115		
Minimum thickness of member	h_{min}	[mm]	120	130	150	130	150	170		
Minimum edge distance	c_{min}	[mm]	50		70	50		70		
Minimum spacing	s_{min}	[mm]	50		70	50		70		

Installation instructions



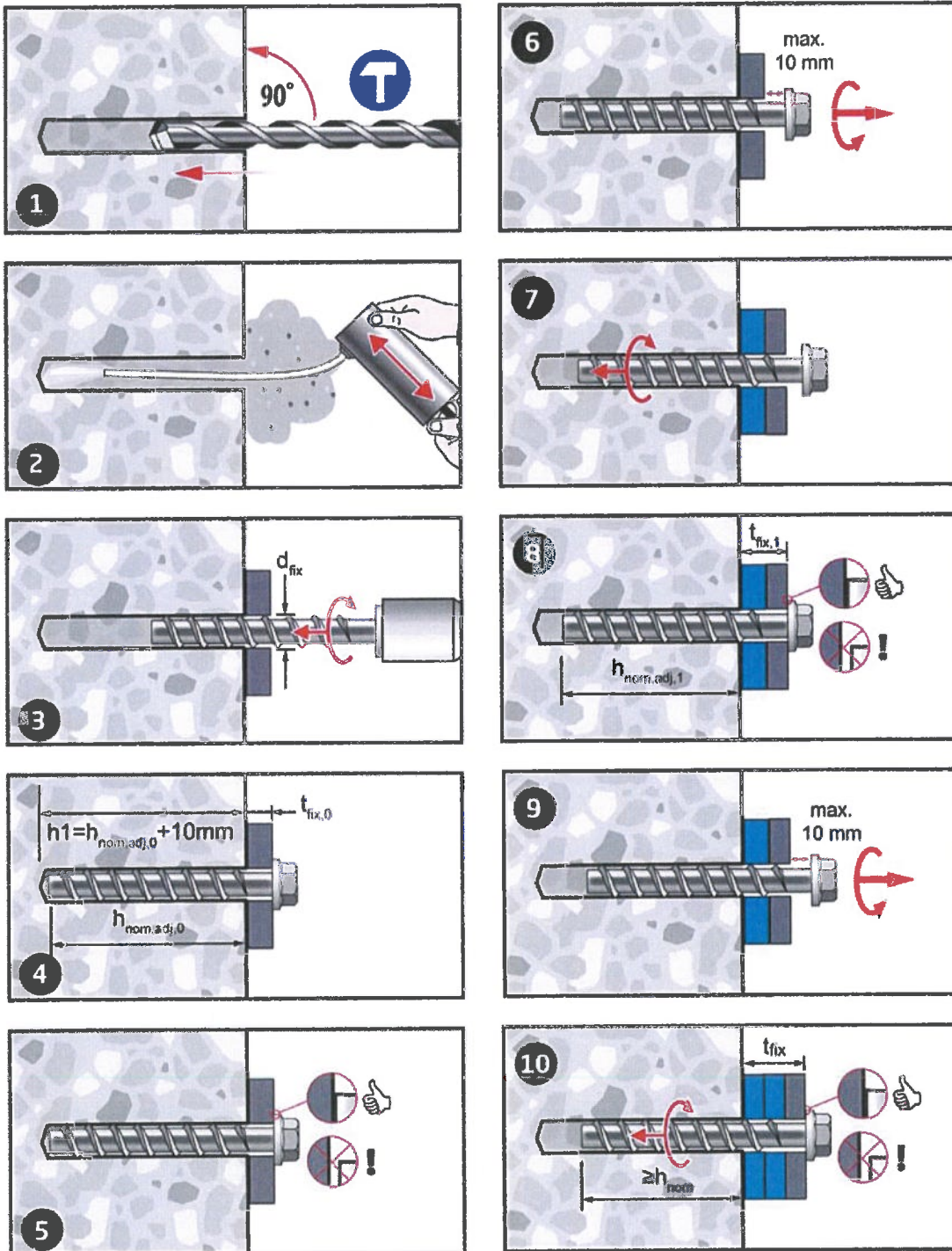
B+BTec CS, High Performance

Intended use

Minimum thickness of member, minimum spacing, minimum edge distance and installation instructions

Annex B 3

Installation instructions for adjustability



Installation instructions

The anchor may be adjusted maximum two times while the anchor may turn back at most 10 mm.
The total allowed thickness of shims added during the adjustment process is 10mm.
The final embedment depth after adjustment process must be equal or larger than h_{norm} .

B+BTec CS, High Performance

Intended use

Installation instruction for adjustability

Annex B 4

**Table C1: Characteristic values for design method A
for B+BTec CS 6, 8 and 10**

Anchor size B+BTec CS			6		8			10			
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}	
			40	55	45	55	65	55	75	85	
steel failure for tension- and shear load											
characteristic load	$N_{Rk,s}$	[kN]	14,0		27,0			45,0			
	$V_{Rk,s}$	[kN]	7,0	13,5			17,0	22,5	34,0		
	k_7	[-]	0,8	0,8			0,8				
	$M^0_{Rk,s}$	[Nm]	10,9	26,0			56,0				
pull-out failure											
characteristic tension load in cracked concrete C20/25	$N_{Rk,p}$	[kN]	2,0	4,0	5,0	9,0	12,0	9,0	Pull-out failure is not decisive		
characteristic tension load in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	4,0	9,0	7,5	12,0	16,0	12,0	20,0	26,0	
increasing factor for $N_{Rk,p}$	ψ_C	C30/37	1,22								
		C40/50	1,41								
		C50/60	1,58								
concrete cone and splitting failure											
effective anchorage depth	h_{ef}	[mm]	31	44	35	43	52	43	60	68	
factor k_1	cracked	$k_{cr,N}$	7,7								
	uncracked	$k_{ucr,N}$	11,0								
concrete cone failure	spacing	$s_{cr,N}$	$3 \times h_{ef}$								
	edge distance	$c_{cr,N}$	$1,5 \times h_{ef}$								
splitting failure	spacing	$s_{cr,Sp}$	120	160	120	140	150	140	180	210	
	edge distance	$c_{cr,Sp}$	60	80	60	70	75	70	90	105	
installation safety factor	γ_{inst}	[-]	1,0								
concrete pry out failure (pry-out)											
factor	k_8	[-]	1,0						2,0		
concrete edge failure											
effective length of anchor	$l_f = h_{ef}$	[mm]	31	44	35	43	52	43	60	68	
outside diameter of anchor	d_{nom}	[mm]	6		8			10			

B+BTec CS, High Performance

Performances

Characteristic values for B+BTec CS 6, 8 and 10

Annex C 1

**Table C2: Characteristic values for design method A
for B+BTec CS 12 and 14**

Anchor size B+BTec CS			12			14		
Nominal embedment depth h_{nom} [mm]			h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
			65	85	100	75	100	115
steel failure for tension- and shear load								
characteristic load	$N_{Rk,s}$	[kN]	67,0			94,0		
	$V_{Rk,s}$	[kN]	33,5	42,0		56,0		
	k_7	[-]	0,8			0,8		
	$M^0_{Rk,s}$	[Nm]	113,0			185,0		
pull-out failure								
characteristic tension load in cracked concrete C20/25	$N_{Rk,p}$	[kN]	12,0	Pull-out failure is not decisive		Pull-out failure is not decisive		
characteristic tension load in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	16,0					
increasing factor for $N_{Rk,p}$	ψ_C	C30/37	1,22					
		C40/50	1,41					
		C50/60	1,58					
concrete cone and splitting failure								
effective anchorage depth	h_{ef}	[mm]	50	67	80	58	79	92
factor k_1	cracked	$k_{cr,N}$	7,7					
	uncracked	$k_{ucr,N}$	11,0					
concrete cone failure	spacing	$s_{cr,N}$	$3 \times h_{ef}$					
	edge distance	$c_{cr,N}$	$1,5 \times h_{ef}$					
splitting failure	spacing	$s_{cr,Sp}$	150	210	240	180	240	280
	edge distance	$c_{cr,Sp}$	75	105	120	90	120	140
installation safety factor	γ_{inst}	[-]	1,0					
concrete pry out failure (pry-out)								
factor	k_8	[-]	1,0	2,0		1,0	2,0	
concrete edge failure								
effective length of anchor	$l_f = h_{ef}$	[mm]	50	67	80	58	79	92
outside diameter of anchor	d_{nom}	[mm]	12			14		

B+BTec CS, High Performance

Performances

Characteristic values for B+BTec CS 12 and 14

Annex C 2

Table C3: Displacements under tension load for B+BTec CS

Anchor size B+BTec CS				6		8			10		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				40	55	45	55	65	55	75	85
Cracked concrete	tension load	N	[kN]	0,95	1,9	2,4	4,3	5,7	4,3	7,9	9,6
	displacement	δ_{N0}	[mm]	0,3	0,6	0,6	0,7	0,8	0,6	0,5	0,9
		δ_{∞}	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2
un- cracked concrete	tension load	N	[kN]	1,9	4,3	3,6	5,7	7,6	5,7	9,5	11,9
	displacement	δ_{N0}	[mm]	0,4	0,6	0,7	0,9	0,5	0,7	1,1	1,0
		$\delta_{N\infty}$	[mm]	0,4	0,4	0,6	1,0	0,9	0,4	1,2	1,2
Anchor size B+BTec CS				12			14				
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}		
				65	85	100	75	100	115		
Cracked concrete	tension load	N	[kN]	5,7	9,4	12,3	7,6	12,0	15,1		
	displacement	δ_{N0}	[mm]	0,9	0,5	1,0	0,5	0,8	0,7		
		δ_{∞}	[mm]	1,0	1,2	1,2	0,9	1,2	1,0		
un- cracked concrete	tension load	N	[kN]	7,6	13,2	17,2	10,6	16,9	21,2		
	displacement	δ_{N0}	[mm]	1,0	1,1	1,2	0,9	1,2	0,8		
		$\delta_{N\infty}$	[mm]	1,0	1,2	1,2	0,9	1,2	1,0		

Table C4 : Displacements under shear load for B+BTec CS

Anchor size B+BTec CS				6		8			10		
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}
				40	55	45	55	65	55	75	85
shear load	V	[kN]		3,3		8,6			16,2		
displacement	δ_{V0}	[mm]		1,55		2,7			2,7		
	$\delta_{V\infty}$	[mm]		3,10		4,1			4,3		
Anchor size B+BTec CS				12			14				
Nominal embedment depth h_{nom} [mm]				h_{nom1}	h_{nom2}	h_{nom3}	h_{nom1}	h_{nom2}	h_{nom3}		
				65	85	100	75	100	115		
shear load	V	[kN]		20,0			30,5				
displacement	δ_{V0}	[mm]		4,0			3,1				
	$\delta_{V\infty}$	[mm]		6,0			4,7				

B+BTec CS, High Performance

Performances

Displacements under tension and shear loads

Annex C 3

Table C5: Characteristic values for seismic category C1

Anchor size B+BTec CS			8	10	12	14
Nominal embedment depth h_{nom} [mm]			h_{nom3}			
			65	85	100	115
steel failure for tension- and shear load						
characteristic load	$N_{Rk,s,eq}$	[kN]	27,0	45,0	67,0	94,0
	$V_{Rk,s,eq}$	[kN]	8,5	15,3	21,0	22,4
pull-out failure						
characteristic tension load in cracked concrete C20/25	$N_{Rk,p,eq}$	[kN]	12,0	Pull-out failure is not decisive		
concrete cone failure						
effective anchorage depth	h_{ef}	[mm]	52	68	80	92
concrete spacing	$s_{cr,N}$	[mm]	3 x h_{ef}			
cone failure edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}			
installation safety factor	γ_{inst}	[-]	1,0			
concrete pry out failure (pry-out)						
factor	k_B	[-]	1,0	2,0		
concrete edge failure						
effective length of anchor	$l_f = h_{ef}$	[mm]	52	68	80	92
outside diameter of anchor	d_{nom}	[mm]	8	10	12	14

B+BTec CS, High Performance

Performances

Characteristic values for seismic category C1

Annex C 4

Table C6: Characteristic values of resistance to fire exposure for B+BTec CS

Anchor size B+BTec CS				6		8			10			12			14		
Nominal embedment depth	h_{nom}			1	2	1	2	3	1	2	3	1	2	3	1	2	3
	[mm]			40	55	45	55	65	55	75	85	65	85	100	75	100	115
steel failure for tension- and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)																	
Fire resistance class																	
R30	Characteristic Resistance	$F_{Rk,s,fi30}$	[kN]	0,9	2,4	4,4	7,4	10,3									
R60		$F_{Rk,s,fi60}$	[kN]	0,8	1,7	3,3	5,8	8,2									
R90		$F_{Rk,s,fi90}$	[kN]	0,6	1,1	2,3	4,2	5,9									
R120		$F_{Rk,s,fi120}$	[kN]	0,4	0,7	1,7	3,4	4,8									
R30		$M^0_{Rks,fi30}$	[Nm]	0,7	2,4	5,9	12,3	20,4									
R60		$M^0_{Rk,s,fi60}$	[Nm]	0,6	1,8	4,5	9,7	15,9									
R90		$M^0_{Rk,s,fi90}$	[Nm]	0,5	1,2	3,0	7,0	11,6									
R120		$M^0_{Rks,fi120}$	[Nm]	0,3	0,9	2,3	5,7	9,4									
edge distance																	
R30 bis R120	$c_{cr, fi}$		[mm]	$2 \times h_{ef}$													
spacing																	
R30 bis R120	$s_{cr, fi}$		[mm]	$4 \times h_{ef}$													

The characteristic resistance to fire exposure for pull-out failure, concrete cone failure, concrete pry-out failure and concrete edge failure shall be calculated according to EN 1992-4. If no value for $N_{Rk,p}$ is given, in the equation D.4 and D.5 the value of $N^0_{Rk,c}$ shall be inserted instead of $N_{Rk,p}$.

B+BTec CS, High Performance

Performances

Characteristic values of resistance to fire exposure

Annex C 5