EUROPEAN TECHNICAL ASSESSMENT

BETABOLT

EUROPEAN TECHNICAL ASSESSMENT
OPTION 1
13/0934

CONCRETE
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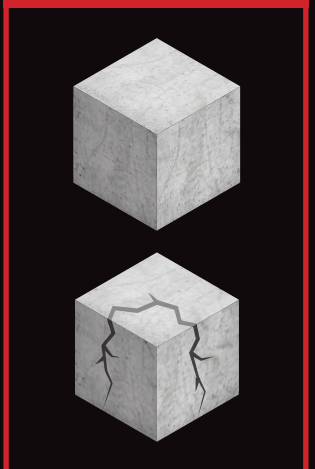

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European Technical Assessment

ETA-13/0934 of 20/04/2021

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	BETABOLT
Product family to which the construction product belongs	Concrete screw made of zinc plated steel of sizes 8, 10, 12, 14 and 16 for use in concrete
Manufacturer	Scell-it 28, Rue Paul Dubrulle 59810 Lesquin France
Manufacturing plant	SCELL-IT Plant 6
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	European Assessment Document EAD 330232-00-0601 “Mechanical fasteners for use in concrete”
This version replaces	ETA-13/0934 issued on 12/10/2015

Specific Part

1 Technical description of the product

The concrete screw BETABOLT of the sizes 8, 10, 12, 14 and 16 is made of heat treated and zinc plated steel (electroplated or mechanically plated). The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the fastener cuts an internal thread into a concrete member while setting. The anchorage is characterized by mechanical interlock in the special thread.

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 anchors are used in compliance with the specifications and conditions given in Annex B.

The performances given in this European Technical Assessment are based on an assumed working life of the anchor of 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristics	Performances
Characteristic resistance under static and quasi-static loading	See Annex C1 and C2
Displacements	See Annex C3

3.1.2 Safety in case of fire (BWR 2)

Essential characteristics	Performances
Reaction to fire	Anchors satisfy requirements for Class A1
Resistance to fire	See Annex C4 and C5

3.2 Methods used for the assessment

The assessment of the products has been made in accordance with the EAD 330232-00-0601 “Mechanical fasteners for use in concrete”.

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

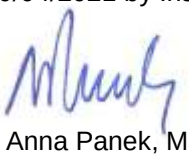
According to Decision 96/582/EC of the European Commission the system 1 of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) applies.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at 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 20/04/2021 by Instytut Techniki Budowlanej



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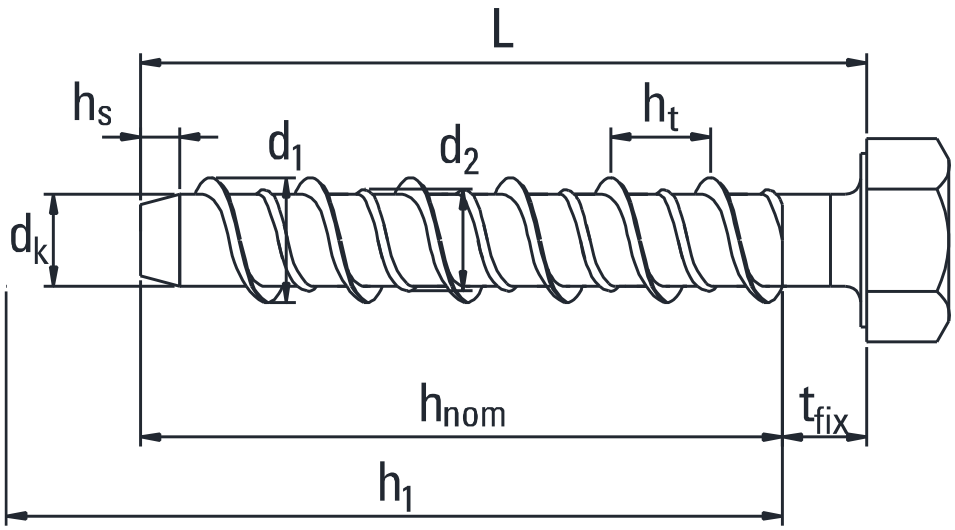
Deputy Director of ITB

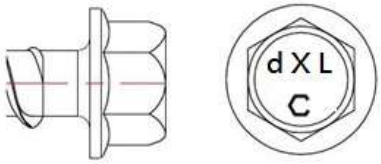
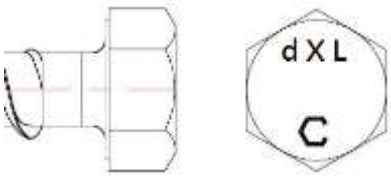


BETABOLT	**Annex A1** of European Technical Assessment ETA-13/0934
Product description Characteristic of the product	

Table A1: Dimensions and materials

Anchor size			**8**	**10**	**12**	**14**	**16**
Length of anchor L	L_{min}	mm	50	55	55	65	65
	L_{max}	mm	250	350	350	350	350
Bolt diameter	$Ød_k$	mm	7,50	9,37	11,35	13,20	15,30
Higher thread diameter	$Ød_1$	mm	9,85	11,95	14,08	16,23	18,65
Lower thread diameter	$Ød_2$	mm	8,13	10,25	12,15	14,18	16,03
Thread pitch	h_t	mm	10	12	12	17	19
Tip chamfer	h_s	mm	5	5	5	5	7
Material: steel	f_{uk}	N/mm^2	1000				
	f_{yk}	N/mm^2	900				
Coating			Zinc coating (≥ 5 µm); electroplated acc. to EN ISO 4042 or mechanically deposited acc. to EN ISO 12683				

Table A2: Head types with marking

Hex Flange Head	**Hex Head**
	
Marking: Identifying mark of the producer: C d X L where: d = anchor size [mm] e.g. 8 L = length of anchor [mm] e.g. 100	**Marking:** Identifying mark of the producer: C d X L where: d = anchor size [mm] e.g. 12 L = length of anchor [mm] e.g. 130

BETABOLT	**Annex A2** of European Technical Assessment ETA-13/0934
Product description Dimensions, materials and head types	

Specification of intended use

Anchorages subject to:

- Static and quasi-static loads: sizes from 8 to 16.
- Anchorages with requirements related to resistance to fire: sizes from 8 to 16.

Base material:

- Reinforced or unreinforced normal weight concrete with strength class C20/25 to C50/60 according to EN 206.
- Uncracked and cracked concrete: sizes from 8 to 16.

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 and under fire exposure are designed in accordance with EN 1992-4.

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.
- 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.
- Check of concrete being well compacted, e.g. without significant voids.
- Positioning of the drill holes without damaging the reinforcement.
- Anchor installation such that the effective anchorage depth is complied with.

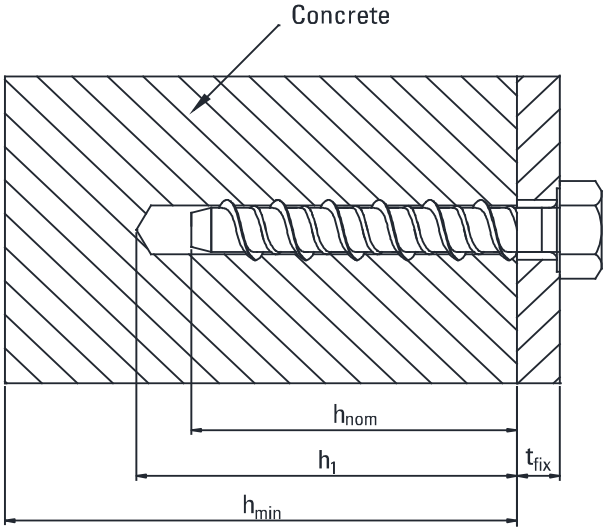
BETABOLT	**Annex B1** of European Technical Assessment ETA-13/0934
Intended use Specification	

Table B1: Installation parameters

Anchor size			**8**			**10**			**12**			**14**			**16**		
Nominal drill bit diameter	d_0	mm	8			10			12			14			16		
Cutting diameter of drill bit	$d_{cut} \leq$	mm	8,45			10,45			12,50			14,50			16,50		
Depth of drill hole	$h_1 \geq$	mm	55	60	75	60	70	85	60	70	105	70	80	125	70	80	125
Nominal anchorage depth	h_{nom}	mm	45	50	65	50	60	75	50	60	95	60	70	115	60	70	115
Effective embedment depth	h_{ef}	mm	30	34	47	33	42	54	33	42	71	40	48	86	40	49	86
Clearance hole in the fixture	d_f	mm	12			14			16			18			20		
Thickness of fixture	t_{fix}	mm	$L - h_{nom}$														

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

Anchor size			**8**	**10**	**12**	**14**	**16**
Minimum thickness of member	h_{min}	mm	110	110	130	150	150
Minimum edge distance	c_{min}	mm	60	70	80	90	100
Minimum spacing	s_{min}	mm	60	70	80	90	100



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Intended use
Installation parameters

Annex B2

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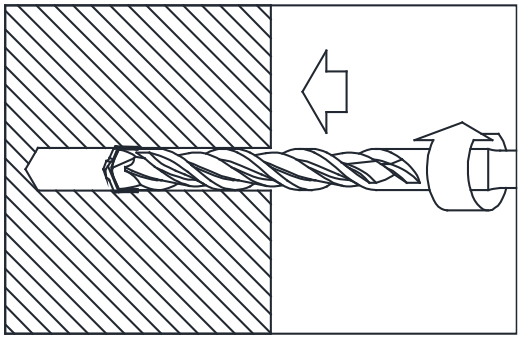
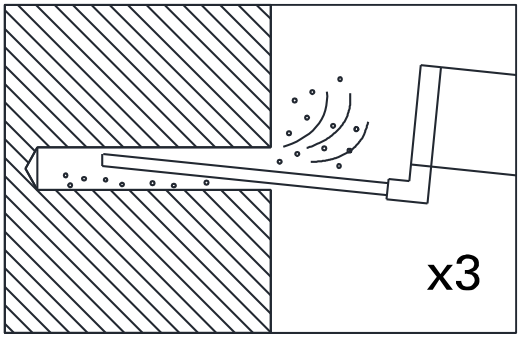
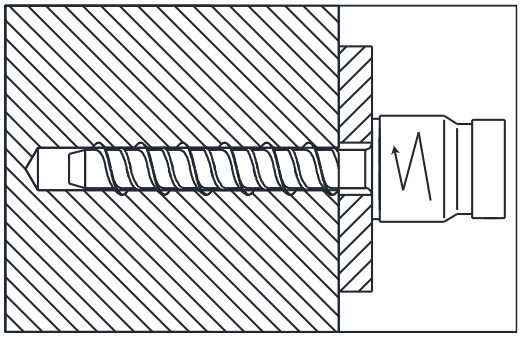


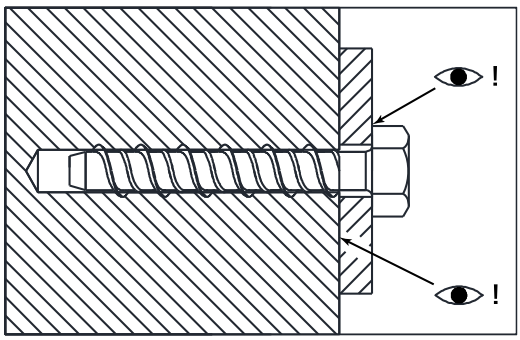
Drill hole with rotary percussive machine. Drill to a required depth.



Blow out dust at least 3 times with a hand pump.



Screw the anchor with suitable impact screw driver (BOSCH GDS 18 E [1)]) or other tools without a mentioned torque moment (e.g. rachet spanner).



The fixture shall be fully pressed on the concrete surface without intermediate layers. Further turning of the anchor is not possible. The head of the anchor has to be fully supported on the fixture and is not damaged.

[1)] installation with other impact screw driver of equivalent power and performance is possible

BETABOLT	**Annex B3** of European Technical Assessment ETA-13/0934
Intended use Installation instruction	

Table C1: Characteristic resistance for tension loads in cracked and non-cracked concrete C20/25 to C50/60, design method A

Anchor size				**8**			**10**			**12**			**14**			**16**		
Nominal embedment depth	h_{nom}	[mm]	45	50	65	50	60	75	50	60	95	60	70	115	60	70	115
Steel failure																		
Characteristic resistance	$N_{Rk,s}$	[kN]	42,4			67,2			99,4			134,0			201,0		
Partial safety factor	γ_{Ms} [1)]	[-]	1,4														
Pullout failure																		
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6	6	12	6	9	16	6	9	25	9	12	35	12	17	40
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	3	4	7,5	4	6	9	4	6	16	5	7,5	20	9	12	25
Installation safety factor	γ_{inst} [1)]	[-]	1,2														
Increasing factor: concrete C30/37	Ψ_c	[-]	1,17														
Increasing factor: concrete C40/50	Ψ_c	[-]	1,32														
Increasing factor: concrete C50/60	Ψ_c	[-]	1,42														
Concrete cone and splitting failure																		
Effective embedment depth	h_{ef}	[mm]	30	34	47	33	42	54	33	42	71	40	48	86	40	49	86
Factor for non-cracked concrete	$k_{ucr,N}$	[-]	11,0														
Factor for cracked concrete	$k_{cr,N}$	[-]	7,7														
Installation safety factor	γ_{inst}	[-]	1,2														
Increasing factor: concrete C30/37	Ψ_c	[-]	1,17														
Increasing factor: concrete C40/50	Ψ_c	[-]	1,32														
Increasing factor: concrete C50/60	Ψ_c	[-]	1,42														
Characteristic resistance for splitting in non-cracked concrete	$N^0_{Rk,p}$	[kN]	6	6	12	6	9	16	6	9	25	9	12	35	12	17	40
Characteristic resistance for splitting in cracked concrete	$N^0_{Rk,p}$	[kN]	3	4	7,5	4	6	9	4	6	16	5	7,5	20	9	12	25
Characteristic spacing: concrete cone failure	$s_{cr,N}$	[mm]	120	120	142	140	140	162	160	160	214	180	180	260	200	200	260
Characteristic spacing: splitting failure	$s_{cr,sp}$	[mm]	120	120	142	140	140	162	160	160	214	180	180	260	200	200	310
Edge distance: concrete cone failure	$c_{cr,N}$	[mm]	60	60	71	70	70	81	80	80	107	90	90	130	100	100	130
Edge distance: splitting failure	$c_{cr,sp}$	[mm]	60	60	71	70	70	81	80	80	107	90	90	130	100	100	155

[1)] in the absence of other national regulations

BETABOLT

Annex C1

of European Technical Assessment ETA-13/0934

Performances
Characteristic resistance for tension loads

Table C2: Characteristic resistance for shear loads in cracked and non-cracked concrete C20/25 to C50/60, design method A

Anchor size			**8**			**10**			**12**			**14**			**16**		
Nominal embedment depth	h_{nom}	[mm]	45	50	65	50	60	75	50	60	95	60	70	115	60	70	115
Steel failure without lever arm																	
Characteristic resistance	$V_{Rk,s}$	[kN]	17,0			26,9			39,8			53,5			100,0		
Factor considering ductility	k_7	[-]	0,8														
Partial safety factor	γ_{Ms} [1)]	[-]	1,5														
Steel failure with lever arm																	
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	46,8			93,2			167,7			261,8			482,3		
Partial safety factor	γ_{Ms} [1)]	[-]	1,5														
Concrete pry-out failure																	
Factor	k_8	[-]	1,0	1,0	2,0	1,0	2,0	2,0	1,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Partial safety factor	γ_{Mc} [1)]	[-]	1,5												1,8		
Concrete edge failure																	
Outside diameter of anchor	d_{nom}	[mm]	8			10			12			14			16		
Effective length of anchor under shear loads	l_f	[mm]	30	34	47	33	42	54	33	42	71	40	48	86	40	49	86
Partial safety factor	γ_{Mc} [1)]	[-]	1,5												1,8		
Minimum thickness of member	h_{min}	[mm]	100	100	100	100	100	110	100	100	145	100	100	150	100	100	150

[1)] in the absence of other national regulations

Table C3: Displacements

Displacements							
Tension load in non-cracked concrete C20/25 to C50/60							
Tension load	N	[kN]	5,8	8,5	12,6	15,6	15,8
Short term tension displacement	δ_{NO}	[mm]	0,3	0,4	0,4	0,6	0,5
Long term tension displacement	$\delta_{N\infty}$	[mm]	1,4	1,5	1,8	1,9	0,6`
Tension load in cracked concrete C20/25 to C50/60							
Tension load	N	[kN]	3,2	4,0	6,9	9,6	9,9
Short term tension displacement	δ_{N0}	[mm]	0,4	0,5	0,5	0,6	0,4
Long term tension displacement	$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0
Shear load in non-cracked and cracked concrete C20/25 to C50/60							
Shear load	V	[kN]	7	11	16	21	32
Short term shear displacement	δ_{V0}	[mm]	1,5	1,7	2,0	2,7	3
Long term shear displacement	$\delta_{V\infty}$	[mm]	2,3	2,6	3,0	4,1	4,5

Table C4: Characteristic resistance for tension loads under fire exposure in cracked and non-cracked concrete C20/25 to C50/60

Anchor size				**8**	**10**	**12**	**14**	**16**
Nominal embedment depth		h_{nom}	[mm]	65	75	95	115	115
Steel failure								
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,64	1,34	1,99	2,68	4,02
	R60	$N_{Rk,s,fi}$	[kN]	0,55	1,01	1,49	2,01	3,02
	R90	$N_{Rk,s,fi}$	[kN]	0,42	0,87	1,29	1,74	2,61
	R120	$N_{Rk,s,fi}$	[kN]	0,34	0,67	0,99	1,34	2,01
Pullout failure								
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	1,9	2,2	4,0	5,0	6,25
	R60	$N_{Rk,p,fi}$	[kN]	1,9	2,2	4,0	5,0	6,25
	R90	$N_{Rk,p,fi}$	[kN]	1,9	2,2	4,0	5,0	6,25
	R120	$N_{Rk,p,fi}$	[kN]	1,5	1,8	3,2	4,0	5,00
Concrete cone failure								
Characteristic resistance	R30	$N_{Rk,c,fi}$	[kN]	2,7	3,9	7,6	12,3	12,3
	R60	$N_{Rk,c,fi}$	[kN]	2,7	3,9	7,6	12,3	12,3
	R90	$N_{Rk,c,fi}$	[kN]	2,7	3,9	7,6	12,3	12,3
	R120	$N_{Rk,c,fi}$	[kN]	2,2	3,1	6,1	9,9	9,9
Edge distance								
	R30	$c_{cr,N,fi}$	[mm]	$2 \cdot h_{ef}$				
	R60	$c_{cr,N,fi}$	[mm]					
	R90	$c_{cr,N,fi}$	[mm]					
	R120	$c_{cr,N,fi}$	[mm]					
In case of fire attack from more than one side minimum edge distance shall be ≥ 300 mm								
Spacing								
	R30	$s_{cr,N,fi}$	[mm]	$4 \cdot h_{ef}$				
	R60	$s_{cr,N,fi}$	[mm]					
	R90	$s_{cr,N,fi}$	[mm]					
	R120	$s_{cr,N,fi}$	[mm]					

Table C5: Characteristic resistance for shear loads under fire exposure in cracked and non-cracked concrete C20/25 to C50/60

Anchor size				**8**	**10**	**12**	**14**	**16**
Nominal embedment depth		h_{nom}	[mm]	65	75	95	115	115
Steel failure without lever arm								
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,64	1,34	1,99	2,68	4,02
	R60	$V_{Rk,s,fi}$	[kN]	0,55	1,01	1,49	2,01	3,02
	R90	$V_{Rk,s,fi}$	[kN]	0,42	0,87	1,29	1,74	2,61
	R120	$V_{Rk,s,fi}$	[kN]	0,34	0,67	0,99	1,34	2,01
Steel failure with lever arm								
Characteristic bending resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,70	1,86	3,36	5,24	9,65
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,61	1,40	2,52	3,93	7,23
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,47	1,21	2,18	3,40	6,27
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,37	0,93	1,68	2,62	4,82
Concrete pry-out failure								
R30 to R120		k	[-]	1	1	2	2	2
Concrete edge failure								
	R30	$V^0_{Rk,c,fi}$	[kN]	$0,25 \cdot V^0_{Rk,c}$ [1)]				
	R60	$V^0_{Rk,c,fi}$	[kN]					
	R90	$V^0_{Rk,c,fi}$	[kN]					
	R120	$V^0_{Rk,c,fi}$	[kN]	$0,20 \cdot V^0_{Rk,c}$ [1)]				

[1)] $V^0_{Rk,c}$ - initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature