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European Technical Assessment ETA 20/1272 of 30/12/2020

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General Part

Technical Assessment Body issuing the ETA designated according to Art. 29 of Regulation (EU) 305/2011:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product:	**Anchor B-SLPT, anchor B-SLPC**
Product family to which the construction product belongs:	Torque controlled expansion anchor made of galvanized steel of sizes M6, M8, M10, M12, M16 and M20 for use in concrete.
Manufacturer:	**Bilontec Industrial S.L.** Bizkargi 6 Poligono Industrial Sarrikola 48195 Larrabetzu (Bizkaia) Spain
Manufacturing plants:	Bilontec plant 2
This European Technical Assessment contains:	11 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 Technical Assessment EAD 330232-00-0601 “Mechanical Fasteners for use in concrete”, ed. October 2016

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This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to article 25 (3) of Regulation (EU) No 305/2011.

SPECIFIC PART

1. Technical description of the product

The Bilontec B-SLPT heavy duty anchor in the range of M6, M8, M10, M12, M16 and M20 is an anchor made of galvanised steel. B-SLPT anchor comes with hexagonal head and B-SLPC anchor comes with countersunk head. The anchor is installed into a predrilled cylindrical hole and anchored by torque-controlled expansion. The anchorage is characterised by friction between the expansion tube and the concrete.

Product and installation descriptions are given in annexes A1 and A2.

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 mean to 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 loads	See annex C2
Characteristic resistance to shear loads	See annex C3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for class A1 according to EN 13501-1
Resistance to fire	See annex C4

4. Assessment and Verification of Constancy of Performances (hereinafter AVCP) system applied, with reference to its legal base

The applicable European legal act for the system of Assessment and Verification of Constancy of Performances (see annex V to Regulation (EU) No 305/2011) 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.

The technical details necessary for the implementation of the AVCP system are laid down in the quality plan deposited at Instituto de Ciencias de la Construcción Eduardo Torroja.

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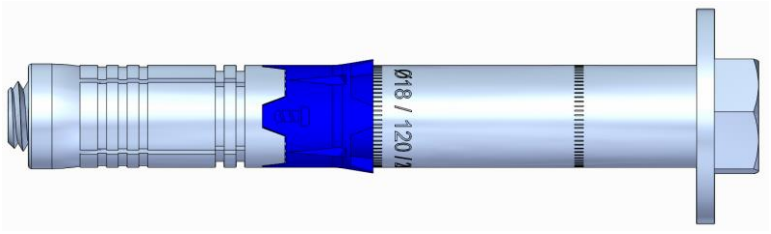
On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 30th of December 2020

Firmado por CASTILLO TALAVERA ANGEL - DNI 52507605P
Fecha: 24/01/2021 20:17:18 CET

Director IETcc-CSIC

Product and installed condition

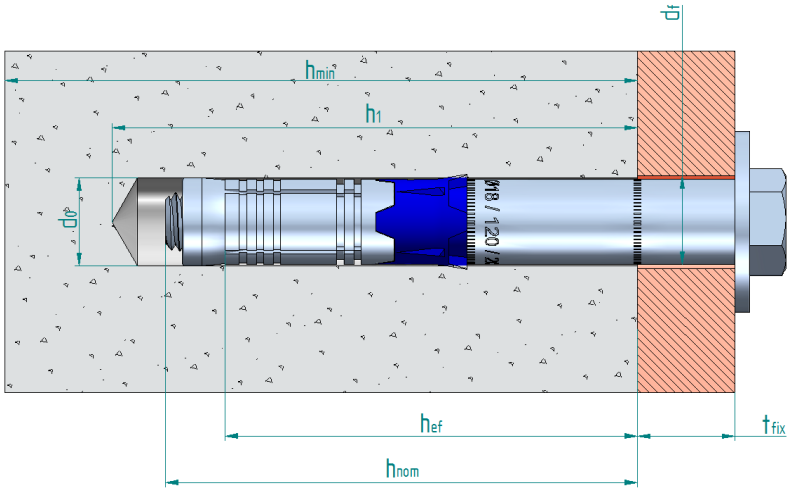
B-SLPT anchor



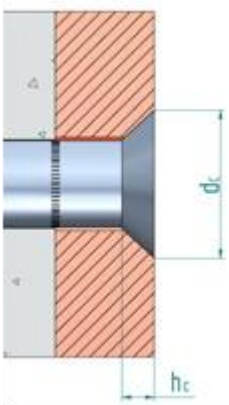
B-SLPC anchor

Identification on anchor:

- Sleeve: “T” (bolt version) “C” (countersunk version) Outer diameter / Total length / Maximum fixture to be fixed.
- Plastic ring: anchor name “SLP”, company logo



d_0: Nominal diameter of drill bit
d_f: Fixture clearance hole diameter
h_{ef}: Effective anchorage depth
h_1: Depth of drilled hole
h_{nom}: Overall anchor embedment depth in the concrete
h_{min}: Minimum thickness of concrete member
t_{fix}: Fixture thickness



B-SLPT anchor	
Product description Installed condition	**Annex A1**

Table A1: Materials

Item	Designation	Material for B-SLPT	Material for B-SLPC
1	Bolt	DIN 931 ISO 898-1 class 8.8. Galvanized ≥ 5 µm ISO 4042 A2	DIN 7991 ISO 898-1 class 10.9. Galvanized ≥ 5 µm ISO 4042 A2
2	Washer	DIN 9021. Galvanized ≥ 5 µm ISO 4042 A2	Special conical washer. Galvanized ≥ 5 µm ISO 4042 A2
3	Sleeve	Carbon steel. Galvanized ≥ 5 µm ISO 4042 A2	
4	Plastic ring	POM	
5	Expansion tube	Carbon steel. Galvanized ≥ 5 µm ISO 4042 A2	
6	Cone	Hardened carbon steel. Galvanized ≥ 5 µm ISO 4042 A2	

Specifications of intended use

Anchorages subjected to:

- Static or quasi static loads
- Resistance to fire exposure up to 120 minutes

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2008
- Strength classes C20/25 to C50/60 according to EN 206-1:2008
- Cracked or uncracked concrete

Use conditions (environmental conditions):

- Anchorages subjected to dry internal conditions.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete.
- Verifiable calculation rules and drawings are prepared taking into 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.).
- Anchorages under static or quasi-static actions are designed for design method A in accordance with EN 1992-4:2018
- Anchorages under fire exposure are designed in accordance with EN-1992-4:2018. It must be ensured that local spalling of the concrete cover does not occur.

Installation:

- Hole drilling by rotary plus hammer mode.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

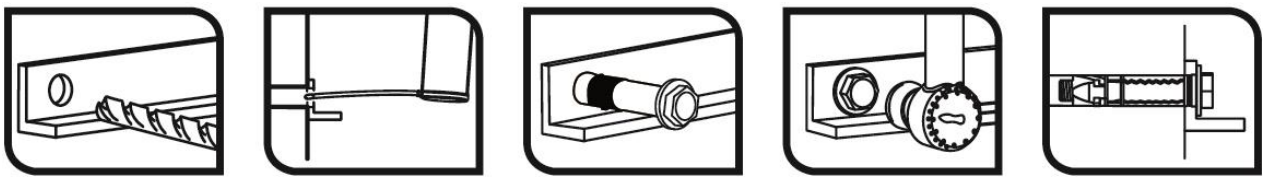
B-SLPT anchor	**Annex B1**
Intended use Specifications	

Table C1: Installation parameters

Installation parameters			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
d_0	Nominal diameter of drill bit:	[mm]	10	12	16	18	24	28
d_f	Fixture clearance hole diameter ≤	[mm]	12	14	18	20	26	31
T_{inst}	Nominal installation torque:	[Nm]	15	30	50	80	160	240
h_{min}	Minimum thickness of concrete member:	[mm]	100	120	140	170	200	250
h_1	Depth of drilled hole ≥	[mm]	70	85	95	110	130	160
h_{nom}	Overall anchor embedment depth in the concrete:	[mm]	59	72	83	97	117	146
h_{ef}	Effective anchorage depth:	[mm]	50	60	70	85	100	125
t_{fix}	Thickness of fixture[1)] ≤	[mm]	L - 60	L - 75	L - 85	L - 100	L - 120	L - 150
s_{min}	Minimum allowable spacing:	[mm]	100	120	175	200	220	320
c_{min}	Minimum allowable edge distance:	[mm]	50	60	70	80	100	160
d_c	Diameter of countersunk head in the fixture:	[mm]	16.4	20.6	26.8	30.8	38.8	44.8
h_c	Height of countersunk head in the fixture:	[mm]	3.2	4.3	5.4	6.4	7.4	8.4
SW	B-SLPT socket size:	[--]	10	13	17	19	24	30
SW	B-SLPC countersunk key:	[--]	4	5	6	8	10	12

[1)] L = total anchor length

Installation process



B-SLPT anchor	**Annex C1**
Performances Installation parameters and installation procedure	

Table C2: Characteristic values to tension loads of design method A according to EN 1992-4

Characteristic values of resistance to tension loads of design according to design method A				Performances					
				M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Tension loads: steel failure									
$N_{Rk,s}$	Characteristic resistance:		[kN]	16.1	29.3	46.4	67.4	126.0	196.0
γ_{Ms}	Partial safety factor:		[-]	1.5					
Tension loads: pull-out failure in concrete									
$N_{Rk,p,ucr}$	Characteristic resistance in C20/25 uncracked concrete:		[kN]	--[1)]	--[1)]	--[1)]	--[1)]	--[1)]	--[1)]
$N_{Rk,p,cr}$	Characteristic resistance in C20/25 cracked concrete:		[kN]	--[1)]	--[1)]	--[1)]	--[1)]	--[1)]	--[1)]
γ_{ins}	Installation safety factor:		[-]	1.0	1.0	1.0	1.0	1.2	1.2
ψ_c	Increasing factor for $N^0_{Rk,p}$:	C30/37	[-]	1.22	1.22	1.22	1.22	1.08	1.08
		C40/50	[-]	1.41	1.41	1.41	1.41	1.15	1.15
		C50/60	[-]	1.58	1.58	1.58	1.58	1.20	1.20
Tension loads: concrete cone and splitting failure									
h_{ef}	Effective embedment depth:		[mm]	50	60	70	85	100	125
$k_{ucr,N}$	Factor for uncracked concrete:		[-]	11.0					
$k_{cr,N}$	Factor for cracked concrete:		[-]	7.7					
γ_{ins}	Installation safety factor:		[-]	1.0	1.0	1.0	1.0	1.2	1.2
$s_{cr,N}$	Concrete cone failure:		[mm]	3 x h_{ef}					
$c_{cr,N}$			[mm]	1.5 x h_{ef}					
$s_{cr,sp}$	Splitting failure:		[mm]	205	245	285	345	410	510
$c_{cr,sp}$			[mm]	105	125	145	175	205	255

[1)] The pull out failure mode is not decisive

Table C3: Displacements under tension load

Displacements under tension loads			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
N	Service tension load in uncracked concrete C20/25 to C50/60:	[kN]	7,67	10,90	13,71	18,38	19,52	27,30
δ_{N0}	Short term displacement:	[mm]	1,18	2,02	1,79	1,15	2,46	2,12
$\delta_{N\infty}$	Long term displacement:	[mm]	2,68	2,68	2,68	2,68	2,68	2,68
N	Service tension load in cracked concrete C20/25 to C50/60:	[kN]	5,81	7,62	9,62	12,86	13,65	19,09
δ_{N0}	Short term displacement:	[mm]	1,75	2,69	2,57	3,53	1,76	2,41
$\delta_{N\infty}$	Long term displacement:	[mm]	3,75	4,69	4,57	5,53	3,76	4,41

Table C4: Characteristic values to shear loads of design method A according to EN 1992-4

Characteristic values of resistance to shear loads of design according to design method A			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Shear loads: steel failure without lever arm								
$V_{Rk,s}$	Characteristic resistance:	[kN]	20.2	33.0	62.2	75.1	111.2	141.7
k_7	Ductility factor:	[-]	1.0					
γ_{Ms}	Partial safety factor:	[-]	1.25					
Shear loads: steel failure with lever arm								
$M^0_{Rk,s}$	Characteristic bending moment:	[Nm]	12.2	30.0	59.8	104.8	266.4	519.3
γ_{Ms}	Partial safety factor:	[-]	1.25					
Shear loads: concrete pryout failure								
k_8	Pryout factor:	[-]	1.0	2.0	2.0	2.0	2.0	2.0
γ_{ins}	Installation safety factor:	[-]	1.0					
Shear loads: concrete edge failure								
l_f	Effective length of anchor under shear loads:	[mm]	50	60	70	85	100	125
d_{nom}	Outside anchor diameter:	[mm]	10	12	16	18	24	28
γ_{ins}	Installation safety factor:	[-]	1.0					

Table C5: Displacements under shear load

Displacements under shear loads			Performances					
			M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
V	Service shear load in uncracked and cracked concrete C20/25 to C50/60:	[kN]	9,62	15,71	29,62	35,76	44,13	56,23
δ_{V0}	Short term displacement:	[mm]	2,15	1,22	1,31	1,72	1,41	1,96
$\delta_{V\infty}$	Long term displacement:	[mm]	3,23	1,83	1,96	2,58	2,11	2,93

Table C8: Characteristic values for resistance under fire exposure

Characteristic values for resistance to fire				Performances					
				M6 Ø10	M8 Ø12	M10 Ø16	M12 Ø18	M16 Ø24	M20 Ø28
Steel failure									
$N_{Rk,s,fi}$	Characteristic tension resistance:	R30	[kN]	0,2	0,4	0,9	1,7	3,1	4,9
		R60	[kN]	0,2	0,3	0,8	1,3	2,4	3,7
		R90	[kN]	0,1	0,3	0,6	1,1	2,0	3,2
		R120	[kN]	0,1	0,2	0,5	0,8	1,6	2,5
$V_{Rk,s,fi}$	Characteristic shear resistance:	R30	[kN]	0,2	0,4	0,9	1,7	3,1	4,9
		R60	[kN]	0,2	0,3	0,8	1,3	2,4	3,7
		R90	[kN]	0,1	0,3	0,6	1,1	2,0	3,2
		R120	[kN]	0,1	0,2	0,5	0,8	1,6	2,5
$M^0_{Rk,s,fi}$	Characteristic bending resistance:	R30	[kN]	0,2	0,4	1,1	2,6	6,7	13,0
		R60	[kN]	0,1	0,3	1,0	2,0	5,0	9,7
		R90	[kN]	0,1	0,3	0,7	1,7	4,3	8,4
		R120	[kN]	0,1	0,2	0,6	1,3	3,3	6,5
Pull out failure									
$N_{Rk,p,fi}$	Characteristic resistance:	R30 to R120	[kN]	--[1)]					
Concrete cone failure									
$N_{Rk,p,fi}$	Characteristic resistance:	R30 R60 R90	[kN]	3,0	4,8	7,1	11,5	17,2	30,1
		R120	[kN]	2,4	3,8	5,6	9,2	13,8	24,1
$s_{cr.N,fi}$	Critical spacing:	R30 to R120	[mm]	$4 \times h_{ef}$					
$c_{cr.N,fi}$	Critical edge distance:	R30 to R120	[mm]	$2 \times h_{ef}$					
$s_{min,fi}$	Minimum spacing:	R30 to R120	[mm]	100	120	175	200	220	320
$c_{min,fi}$	Minimum edge distance:	R30 to R120	[mm]	$c_{min} = 2 \times h_{ef}$; if fire attack comes from more than one side, the edge distance of the anchor has to be ≥ 300 mm and ≥ $2 \times h_{ef}$					
Concrete pryout failure									
k_8	Pryout factor:	R30 to R120	[-]	1.0	2.0	2.0	2.0	2.0	2.0

1) The pull out failure mode is not decisive
2) As a rule, splitting failure can be neglected since cracked concrete and reinforcement is assumed.
3) In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{m,fi} = 1,0$ is recommended