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Declaration of Performance

No. **DPGEB1035** v1.1

1. Unique identification code of the product-type: **BETA Acciaio CE**

2. Intended uses:

Intended use of the construction product according to ETA-20/0883	
Generic type:	Deformation-controlled expansion anchor
Anchorages subject to:	Multiple use for non-structural application Static and quasi-static loads Anchorages with requirements related to resistance to fire M6 (8x25), M8 (10x30), M10H (12x30), M10 (12x40), M12 (15x50), M12D (16x50)
Base materials:	- Reinforced or unreinforced normal weight concrete, of strength class C20/25 to C50/60 according to EN 206:2013+A1:2016 - Non-cracked and cracked concrete
Environmental conditions:	Structures subject to dry internal conditions
Reaction to fire:	Anchors satisfy requirements for Class A1
Resistance to fire:	Resistance to fire exposure up to 120 minutes
Installation:	Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
Design:	Anchorages designed under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings prepared taking account of the loads to be transmitted. The position of the anchor indicated on the design drawings. Anchorages under static and quasi-static loads and under fire exposure designed in accordance with EN 1992-4:2018, Simplified method B Fasteners only to be used for multiple use for non-structural applications acc. to EAD 330747-00-0601.

Intended use of the construction product according to ETA-17/0176	
Generic type:	Deformation-controlled expansion anchor
Anchorages subject to:	Static and quasi-static loads M8 (10x30), M10 (12x40), M12 (15x50), M12D (16x50), M16 (20x65), M20 (25x80)
Base materials:	- Reinforced or unreinforced normal weight concrete, of strength class C20/25 to C50/60 according to EN 206 - Non-cracked concrete
Environmental conditions:	Structures subject to dry internal conditions
Reaction to fire:	Anchors satisfy requirements for Class A1
Installation:	Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
Design:	Anchorages designed under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings prepared taking account of the loads to be transmitted. The position of the anchor indicated on the design drawings. Anchorages under static and quasi-static loads and under fire exposure designed in accordance with EOTA Technical Report TR 055

3. Manufacturer: **G&B Fissaggi S.r.l.** C.so Savona 22, Villastellone (TO), Italia

5. System of AVCP: 1

6b.
European Assessment Document: EAD 330747-00-0601 “Fasteners for use in concrete for redundant non-structural systems”
European Technical Assessment: ETA-20/0883
Technical Assessment Body: Instytut Techniki Budowlanej
Notified Body: 1488 INSTYTUT TECHNIKI BUDOWLANEJ (ITB)

European Assessment Document: EAD 330232-00-0601 “Mechanical fasteners for use in concrete”
European Technical Assessment: ETA-17/0176
Technical Assessment Body: Instytut Techniki Budowlanej
Notified Body: 1488 INSTYTUT TECHNIKI BUDOWLANEJ (ITB)

7. Declared performances:

Declared performances according to EAD 330747-00-0601, ETA-20/0883

Thread diameter			**M6**	**M8**	**M10H**	**M10**	**M12**	**M12D**
Essential characteristics			**Performance**					
Installation parameters								
d_0	Hole diameter	[mm]	8	10	12	12	15	16
h_{ef}	Effective anchorage depth	[mm]	25	30	30	40	50	50
h_{nom}	Installation depth	[mm]	25	30	30	40	50	50
h_1	Minimum depth of the drilling hole	[mm]	28	33	33	43	54	54
h_{min}	Minimum thickness of the concrete member	[mm]	80	80	80	80	100	100
$s_{min} = s_{cr}$	Minimum and critical spacing	[mm]	200	200	200	200	200	200
$c_{min} = c_{cr}$	Minimum and critical edge distance	[mm]	150	150	150	150	150	150
d_f	Diameter of clearance hole in the fixture	[mm]	7	9	12	12	14	14
$L_{s,min}$	Minimum screwing depth	[mm]	6	8	8	10	12	12
$L_{s,max}$	Maximum screwing depth	[mm]	11	13	12	17	21	21
T_{inst}	Maximum installation torque	[Nm]	4	8	15	15	35	35
Resistance in all load directions, with screw or threaded rod property class ≥ 4.6								
F_{Rk}	Characteristic resistance in concrete C20/25 to C50/60	[kN]	1.5	2.0	3.0	3.0	4.0	5.0
γ_{inst}	Installation safety factor	[-]	1.4					
Steel failure with lever arm								
$M^0_{Rk,s}$	Steel characteristic bending resistance, screw class 4.6	[Nm]	6.1	15.0	29.9	29.9	52.4	52.4
$M^0_{Rk,s}$	Steel characteristic bending resistance, screw class 4.8	[Nm]	6.1	15.0	29.9	29.9	52.4	52.4
$M^0_{Rk,s}$	Steel characteristic bending resistance, screw class 5.8	[Nm]	7.6	18.8	37.4	37.4	65.6	65.6
$M^0_{Rk,s}$	Steel characteristic bending resistance, screw class 6.8	[Nm]	9.2	22.5	44.9	44.9	78.7	78.7
$M^0_{Rk,s}$	Steel characteristic bending resistance, screw class 8.8	[Nm]	12.2	30.0	59.9	59.9	104.9	104.9
Fire Resistance - Resistance in all load directions, with screw or threaded rod property class ≥ 4.6								
$F_{Rk,fi,30}$	Characteristic resistance in concrete C20/25 to C50/60 – 30 minuti	[kN]	0.2	0.5	0.8	0.8	1.0	1.3
$F_{Rk,fi,60}$	Characteristic resistance in concrete C20/25 to C50/60 – 60 minuti	[kN]	0.2	0.5	0.8	0.8	1.0	1.3
$F_{Rk,fi,90}$	Characteristic resistance in concrete C20/25 to C50/60 – 90 minuti	[kN]	0.1	0.4	0.8	0.8	1.0	1.1

Thread diameter			**M6**	**M8**	**M10H**	**M10**	**M12**	**M12D**
Essential characteristics			**Performance**					
$F_{Rk,fi,120}$	Characteristic resistance in concrete C20/25 to C50/60 – 120 minuti	[kN]	0.1	0.3	0.6	0.6	0.8	0.8
$s_{cr,fi}$	Spacing	[mm]	$4 \cdot h_{ef}$					
$c_{cr,fi}$	Edge distance (fire from one side)	[mm]	$2 \cdot h_{ef}$					
$c_{cr,fi}$	Edge distance (fire from more than one side)	[mm]	max (300, $2 \cdot h_{ef}$)					

Declared performances according to EAD 330232-00-0601, ETA-17/0176

Thread diameter			**M8**	**M10**	**M12**	**M12D**	**M16**	**M20**
Essential characteristics			**Performance**					
Installation parameters								
d_0	Hole diameter	[mm]	10	12	15	16	20	25
h_{ef}	Effective anchorage depth	[mm]	30	40	50	50	65	80
h_{nom}	Installation depth	[mm]	30	40	50	50	65	80
h_1	Minimum depth of the drilling hole	[mm]	33	43	54	54	70	85
h_{min}	Minimum thickness of the concrete member	[mm]	100	100	100	100	130	160
s_{min}	Minimum spacing	[mm]	41	54	68	68	88	108
c_{min}	Minimum edge distance	[mm]	41	54	68	68	88	108
d_f	Diameter of clearance hole in the fixture	[mm]	9	12	14	14	18	22
$L_{s,min}$	Minimum screwing depth	[mm]	8	10	12	12	16	20
$L_{s,max}$	Maximum screwing depth	[mm]	13	17	21	21	30	30
T_{inst}	Maximum installation torque	[Nm]	8	15	35	35	60	120
Tension steel failure mode								
$N_{Rk,s}$	Characteristic tension resistance of steel class 4.6	[kN]	14.6	23.2	33.7	33.7	62.8	98.0
γ_{Ms}	Partial safety factor, class 4.6	[-]	2.0					
$N_{Rk,s}$	Characteristic tension resistance of steel class 4.8	[kN]	14.6	23.2	33.7	33.7	62.8	98.0
γ_{Ms}	Partial safety factor, class 4.8	[-]	1.5					
$N_{Rk,s}$	Characteristic tension resistance of steel class 5.8	[kN]	18.3	29.0	42.2	42.2	78.5	122.5
γ_{Ms}	Partial safety factor, class 5.8	[-]	1.5					
$N_{Rk,s}$	Characteristic tension resistance of steel class 6.8	[kN]	22.0	34.8	50.6	50.6	94.2	147.0
γ_{Ms}	Partial safety factor, class 6.8	[-]	1.5					
$N_{Rk,s}$	Characteristic tension resistance of steel class 8.8	[kN]	29.3	46.4	67.4	67.4	125.6	196.0
γ_{Ms}	Partial safety factor, class 8.8	[-]	1.5					
Pull-out failure mode								
$N_{Rk,p}$	Pull-out characteristic resistance in non-cracked concrete C20/25	[kN]	n.d.[1]	n.d.[1]	n.d.[1]	n.d.[1]	25	30
$\psi_{c,C30/37}$	Increasing factor for concrete C30/37	[-]	1.22					
$\psi_{c,C40/50}$	Increasing factor for concrete C40/50	[-]	1.41					
$\psi_{c,C50/60}$	Increasing factor for concrete C50/60	[-]	1.55					

Thread diameter			**M8**	**M10**	**M12**	**M12D**	**M16**	**M20**
Essential characteristics			**Performance**					
$\gamma_2 = \gamma_{inst}$	Installation safety factor	[-]	1.2	1.2	1.4	1.2	1.2	1.2
Concrete cone failure mode								
$k_1 = k_{ucr}$	Factor in in non-cracked concrete, design according to ETAG 001 Annex C or CEN/TS 1992-4-4:2009	[-]	10.1					
$k_1 = k_{ucr,N}$	Factor in in non-cracked concrete, design according to EN 1992-4	[-]	11.0					
$s_{cr,N}$	Critical spacing	[mm]	90	120	150	150	195	240
$c_{cr,N}$	Critical edge distance	[mm]	45	60	75	75	97	120
$\gamma_2 = \gamma_{inst}$	Installation safety factor	[-]	1.2	1.2	1.4	1.2	1.2	1.2
Splitting failure mode								
$N^0_{Rk,sp}$	Splitting characteristic resistance	[kN]	n.d.[1]	n.d.[1]	n.d.[1]	n.d.[1]	25	30
$\psi_{c,C30/37}$	Increasing factor for concrete C30/37	[-]	1,22					
$\psi_{c,C40/50}$	Increasing factor for concrete C40/50	[-]	1,41					
$\psi_{c,C50/60}$	Increasing factor for concrete C50/60	[-]	1,55					
$s_{cr,sp}$	Critical spacing	[mm]	210	280	350	350	455	560
$c_{cr,sp}$	Critical edge distance	[mm]	105	140	175	175	227	280
$\gamma_2 = \gamma_{inst}$	Installation safety factor	[-]	1.2	1.2	1.4	1.2	1.2	1.2
Steel failure mode without lever arm								
$V_{Rk,s} = V^0_{Rk,s}$	Characteristic shear resistance of steel class 4.6	[kN]	7.3	11.3	16.9	16.9	31.4	49.0
γ_{Ms}	Partial safety factor, class 4.6	[-]	1.67					
$V_{Rk,s} = V^0_{Rk,s}$	Characteristic shear resistance of steel class 4.8	[kN]	7.3	11.3	16.9	16.9	31.4	49.0
γ_{Ms}	Partial safety factor, class 4.8	[-]	1.25					
$V_{Rk,s} = V^0_{Rk,s}$	Characteristic shear resistance of steel class 5.8	[kN]	9.2	14.5	21.1	21.1	39.3	61.3
γ_{Ms}	Partial safety factor, class 5.8	[-]	1.25					
$V_{Rk,s} = V^0_{Rk,s}$	Characteristic shear resistance of steel class 6.8	[kN]	11.0	17.4	25.3	25.3	47.1	73.5
γ_{Ms}	Partial safety factor, class 6.8	[-]	1.25					
$V_{Rk,s} = V^0_{Rk,s}$	Characteristic shear resistance of steel class 8.8	[kN]	14.6	23.2	33.7	33.7	62.8	98.0
γ_{Ms}	Partial safety factor, class 8.8	[-]	1.25					
$k = k_2 = k_7$	Ductility factor	[-]	0.8					
Steel failure mode with lever arm								
$M^0_{Rk,s}$	Characteristic bending resistance of steel class 4.6	[Nm]	15.0	29.9	52.4	52.4	133.3	259.8
γ_{Ms}	Partial safety factor, class 4.6	[-]	1.67					
$M^0_{Rk,s}$	Characteristic bending resistance of steel class 4.8	[Nm]	15.0	29.9	52.4	52.4	133.3	259.8
γ_{Ms}	Partial safety factor, class 4.8	[-]	1.25					
$M^0_{Rk,s}$	Characteristic bending resistance of steel class 5.8	[Nm]	18.8	37.4	65.6	65.6	166.3	324.8
γ_{Ms}	Partial safety factor, class 5.8	[-]	1.25					

Thread diameter			**M8**	**M10**	**M12**	**M12D**	**M16**	**M20**
Essential characteristics			**Performance**					
$M^0_{Rk,s}$	Characteristic bending resistance of steel class 6.8	[Nm]	22.5	44.9	78.7	78.7	199.9	389.7
γ_{Ms}	Partial safety factor, class 6.8	[-]	1.25					
$M^0_{Rk,s}$	Characteristic bending resistance of steel class 8.8	[Nm]	30.0	59.9	104.9	104.9	266.6	519.7
γ_{Ms}	Partial safety factor, class 8.8	[-]	1.25					
Concrete pry-out failure mode								
$k = k_3 = k_8$	Factor for concrete pry-out	[-]	1.0				2.0	
γ_{Mc}	Partial safety factor	[-]	1.5					
Concrete edge failure mode								
l_{ef}	Effective length of anchor under shear load	[mm]	30	40	50	50	65	80
d_{nom}	Outside diameter of anchor	[mm]	10	12	15	16	20	25
γ_{Mc}	Partial safety factor	[-]	1.5					
Displacements under static and quasi-static loading, in non-cracked concrete C20/25 to C50/60								
N = V	Tension and shear service load	[kN]	4.44	6.91	6.40	9.92	11.46	23.86
δ_{N0}	Short term displacement under tension load	[mm]	0.98	3.54	3.06	2.73	1.15	4.26
$\delta_{N\infty}$	Long term displacement under tension load	[mm]	0.50	0.50	0.38	0.50	0.50	0.50
δ_{V0}	Short term displacement under shear load	[mm]	0.98	3.54	3.06	2.73	1.15	4.26
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	0.50	0.50	0.38	0.50	0.50	0.50

[1] pull-out failure is not decisive

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Andrea Maggioni, General manager

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Villastellone, 9 February 2021