sistemi di fissaggio BOSSONG®

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FASTENING SYSTEMS SYSTEMES DE FIXATION BEFESTIGUNGSSYSTEME SISTEMAS DE FIJACIÒN

CE

DECLARATION OF PERFORMANCE
In accordance with Construction Products Regulation n° 305/2011

DoP No. 09/0140

1. Unique identification code of the product-type:

BCR V PLUS / BCR V PLUS-W / BCR V PLUS-T

2. Type, batch, series number or any other element allowing identification of the construction product in accordance with Article 11(4):

BCR + content in ml + V PLUS. Example BCR 400 V PLUS

3. Intended use or uses of the construction product, in accordance with the relevant harmonized technical specification, as intended by the manufacturer:

Intended use		Chemical anchor for anchoring threaded rods.							
Measures		M8	M10	M12	M16	M20	M24	M27	M30
hef [mm]	**min**	60	70	80	100	120	145	145	145
	max	160	200	240	320	400	480	540	600

Intended use		Chemical anchor for anchoring bars with improved adhesion								
Measures		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
hef [mm]	**min**	60	70	80	80	100	120	150	180	200
	max	160	200	240	280	320	400	500	560	640

Support type and resistance	Reinforced or non-reinforced concrete of normal weight, resistance class from C20/25 minimum to C50/60 maximum in accordance with EN 206-1.
Condition of the base material	Uncracked from M8 to M30 and from Ø8 to Ø32, cracked from M10 to M20. Seismic category C1 from M12 to M20 and seismic category C2 for M12 and M16.
Metallic material of the anchor and related environmental exposure condition	Threaded rods: X1) structures subject to dry internal conditions: elements made of galvanized steel (galvanized or hot galvanized) and a2, A4 stainless steel or high corrosion resistance steel (HCR). X2) structures subject to external atmospheric exposure (including industrial and marine environment) and permanently humid internal conditions, if there are no particular aggressive conditions: elements made of a4 stainless steel or high resistance steel (HCR). X3) Structures subject to external atmospheric exposure (including industrial and marine environments) and permanently humid internal conditions, if other particular aggressive conditions exist. Such particularly aggressive conditions are e.g. permanent, alternating immersion in sea water or in the sea water spray zone, chloride atmosphere of swimming pools or indoor environments with chemical pollution (e.g. in desulphurisation plants or road tunnels where anti-icing materials are used): Elements made of corrosion resistant steel (HCR) Bars with improved adhesion class B or C in accordance with EN 1992-1-1

Cap.Soc. € 520.000
S.V. € 260.000
P.IVA IT 00227840162
R.E.A. BG n.98000
Iscr.Reg.Impr. BG n. 00227840162

BPU – Banca Popolare di Bergamo
Agenzia di Longuelo Via Mattioli, 69
ABI 5428 CAB 11103 C/C 220
IBAN:
IT70 C054 2811 1030 0000 0000 220

Deutsche Bank S.p.A.
Sede Bergamo Via Camozzi,82
ABI 3104 CAB 11100 C/C13030
IBAN:
IT 76 J 03104 11100 000000013030

ASSOCIATO MEMBER OF ECAP assorestauro

Numero Verde 800121962

Type of load	Static load, quasi-static and seismic load category C1 and C2. Fire resistant. 100 years service life
Service temperatures	a) from -40°C to +40°C (max. short-term temperature +40°C and max. long-term continuous temperature +24°C). b) from -40°C to +80°C (max. short-term temperature +80°C and max. long-term continuous temperature +50°C). c) from -40°C to +120°C (max. short-term temperature +120°C and max. long-term continuous temperature +72°C).
Usage category	Category I1 and I2: dry, wet concrete and flooded hole. Overhead installation permitted. Drilling with standard drill or with vacuum bits.

4. Name, registered trade name or registered trade mark and address of the manufacturer in accordance with Article 11(5):

Bossong SpA - via Enrico Fermi 49/51 - 24050 Grassobbio (Bg) – Italy – www.bossong.com

5. Where appropriate, name and address of the authorized representative whose mandate covers the tasks referred to in Article 12(2):

Not applicable

6. System or systems for evaluating and verifying the constancy of performance of the construction product referred to in Annex V:

System 1

7. In the case of a declaration of performance relating to a construction product that falls within the scope of a harmonized standard:

Not applicable

8. In the case of a declaration of performance relating to a construction product for which a European technical assessment has been issued:

ITB issued ETA-09/0140 based on EAD 330499-02-0601
ITB (n°1488) carried out:
determination of the product-type based on type tests (including sampling), type calculations, values taken from tables or descriptive documentation of the product; initial inspection of the manufacturing plant and factory production control; continuous surveillance, evaluation and verification of factory production control, with attestation system 1 and has issued the certificate of conformity n° 1488-CPR-0119/W.

9. Declared performance:

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601								
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**							
Installation parameters	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
d [mm]	8	10	12	16	20	22-24	27	30
d_0 [mm]	10	12	14	18	24	28	30	35
d_{fix} [mm]	9	12	14	18	22	26	30	33
h_1 [mm]	h_{ef} + 5 mm							
h_{min} [mm]	MAX { h_{ef} + 30 mm; ≥ 100 mm; h_{ef} + 2d_0 }							
T_{Fix} [Nm]	10	20	40	80	130	200	250	280
S_{min} [mm]	40	50	60	75	90	115	120	140
C_{min} [mm]	35	40	45	50	55	60	75	80
γ_{inst} [-] Category I1	1.00							
γ_{inst} [-] Category I2	1.20							
Resistance for tensile loads Characteristic resistance on the steel side	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel class 4.8 $N_{Rk,s}$ [kN]	15	23	34	63	98	141	183	224
Steel class 5.8 $N_{Rk,s}$ [kN]	18	29	42	78	122	176	229	280
Steel class 8.8 $N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449
Steel class 10.9 $N_{Rk,s}$ [kN]	37	58	84	157	245	353	459	561
Stainless steel A2, A4, HCR class 50 $N_{Rk,s}$ [kN]	18	29	42	78	122	176	229	280
Stainless steel A2, A4, HCR class 70 $N_{Rk,s}$ [kN]	26	41	59	110	171	247	321	392
A4 stainless steel, HCR class 80 $N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601								
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**							
Resistance for shear loads Characteristic resistance on the steel side without lever arm	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel class 4.8 $V^0_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Steel class 5.8 $V^0_{Rk,s}$ [kN]	9	14	21	39	61	88	115	140
Steel class 8.8 $V^0_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Steel class 10.9 $V^0_{Rk,s}$ [kN]	18	29	42	78	122	176	230	280
Stainless steel A2, A4, HCR class 50 $V^0_{Rk,s}$ [kN]	9	14	21	39	61	88	115	140
Stainless steel A2, A4, HCR class 70 $V^0_{Rk,s}$ [kN]	13	20	29	55	86	124	160	196
A4 stainless steel, HCR class 80 $V^0_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
k_7	1.0							
Resistance for shear loads resistance on steel side with lever arm	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel class 4.8 $M^0_{Rk,s}$ [Nm]	15	30	52	133	260	449	666	900
Steel class 5.8 $M^0_{Rk,s}$ [Nm]	19	37	66	166	324	561	832	1125
Steel class 8.8 $M^0_{Rk,s}$ [Nm]	30	60	105	266	519	898	1331	1799
Steel class 10.9 $M^0_{Rk,s}$ [Nm]	37	75	131	333	649	1123	1664	2249
Stainless steel A2, A4, HCR class 50 $M^0_{Rk,s}$ [Nm]	19	37	66	166	324	561	832	1125
Stainless steel A2, A4, HCR class 70 $M^0_{Rk,s}$ [Nm]	26	52	92	233	454	786	1165	1574
A4 stainless steel, HCR class 80 $M^0_{Rk,s}$ [Nm]	30	60	105	266	519	898	1331	1799
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance for 50 and 100 years	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$\tau_{Rk,ucr}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)	16.0	12.0	12.0	12.0	9.5	9.5	8.0	8.0
$\tau_{Rk,ucr}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)	11.0	8.5	8.5	8.5	7.0	7.0	6.0	6.0
$\tau_{Rk,ucr}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)	6.0	4.5	4.5	4.5	4.0	4.0	3.0	3.0
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance for 50 years	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)	-	9.0	9.0	9.0	6.5	-	-	-
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)	-	6.5	6.5	6.5	4.5	-	-	-
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)	-	3.5	3.5	3.5	2.5	-	-	-
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance for 100 years	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)		8.5	8.5	8.0	5.5			
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)		6.0	6.0	5.5	4.0			
$\tau_{Rk,cr}$ [N/mm ^{2}] cracked concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)		3.0	3.0	3.0	2.0			
$\psi_{c,uc\,/\,ucr}$ [-]	$(\frac{f_{ck}}{20})^{0.3}$							
Sustained load factor for temperature range -40°C / +40°C	ψ^0_{subs} / $\psi^0_{sus,100}$ [-]	0.72						
Sustained load factor for temperature range -40°C / +80°C		0.74						
Sustained load factor for temperature range -40°C / +120°C		0.75						
Resistance for tensile loads Characteristic resistance for concrete cone	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$k_{ucr,N}$	11.0							
$k_{cr,N}$	7.7							
$C_{cr,N}$	1.5 hours $_{ef}$							
$S_{cr,N}$	3.0 h $_{ef}$							

Resistance for tensile loads Characteristic resistance for splitting (concrete cracking)		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$C_{cr,sp}$ [mm]	if $h = h_{min}$	2.5 hours $_{ef}$		2.0 h_{ef}		1.5 hours $_{ef}$			
	if $h_{min} < h < 2\ h_{min}$	interpolated value							
	if $h \geq 2\ h_{min}$	$C_{cr,Np}$							
$S_{cr,sp}$ [mm]		2.0 $C_{cr,sp}$							
Resistance for shear loads Characteristic resistance for dislodging from concrete		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
k_8 [-]		2.0							
Resistance for shear loads Characteristic resistance to concrete edge failure		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
l_f [mm]		$l_f = h_{ef}$ and ≤ 12 dn $_{om}$						$l_f = h_{ef}$ and $\leq$max (8 d $_{nom}$;, 300mm)	
Movements under conditions of service Tensile loads		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
F_{unc} [kN] for concrete from C20/25 to C50/60		9.6	10.8	14.3	23.8	29.6	42.4	40.4	44.4
$\delta_{0,unc}$ [mm]		0,30	0,30	0,35	0,35	0,35	0,40	0,40	0,45
$\delta_{\infty,unc}$ [mm]		0,85							
F_{cr} [kN] per concrete da C20/25 a C50/60		-	9,5	14,3	21,4	23,8	-	-	-
$\delta_{0,cr}$ [mm]		-	0,50	0,50	0,70	0.60	-	-	-
$\delta_{\infty,cr}$ [mm]		-		0.85		-			
Movements under conditions of service Shear loads		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
$F_{unc/cr}$ [kN] for concrete from C20/25 to C50/60		3.7	5.8	8.4	15.7	24.5	35.3	45.5	55.6
$\delta_{0.unc/cr}$ [mm]		2.00							
$\delta_{\infty,unc/cr}$ [mm]		3.00							

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601										
ESSENTIAL FEATURES		**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**								
Installation parameters		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
d [mm]		8	10	12	14	16	20	25	28	32
d_0 [mm]		10*-12	12*-14	14*-16	18	20	25	30	35	40
h_1 [mm]		h_{ef} + 5 mm								
h_{min} [mm]		MAX { h_{ef} + 30 mm; ≥ 100 mm; h_{ef} + 2d_0 }								
S_{min} [mm]		40	50	60	75	75	90	115	120	140
C_{min} [mm]		35	40	45	50	50	55	60	75	80
γ_{inst} [-] Category I1		1.00								
γ_{inst} [-] Category I2		1.20								
Resistance for tensile loads Characteristic resistance steel side		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$N_{Rk,s}$ [kN]		A_s x f_{uk}								
A_s [mm^2]		50	79	113	154	201	314	491	616	804
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance for 50 and 100 years		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$\tau_{Rk,ucr}$ [N/mm^2] concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)		14.0	13.0	13.0	12.0	10.0	9.5	9.5	8.5	7.5
$\tau_{Rk,ucr}$ [N/mm^2] concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)		10.0	9.5	9.0	9.0	7.5	7.0	7.0	6.0	5.5
$\tau_{Rk,ucr}$ [N/mm^2] concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)		5.5	5.0	5.0	5.0	4.0	4.0	4.0	3.5	3.0
$\psi_{c,uc\,/\,ucr}$ [-]		$(\frac{f_{ck}}{20})^{0.3}$								
Sustained load factor for temperature range -40°C / +40°C	ψ^0_{sus-} $\psi^0_{sus,100}$ [-]	0.72								
Sustained load factor for temperature range -40°C / +80°C		0.74								
Sustained load factor for temperature range -40°C / +120°C		0.75								
Resistance for tensile loads Characteristic resistance for concrete cone		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$k_{ucr,N}$		11.0								
$C_{cr,N}$		1.5 hours $_{ef}$								
$S_{cr,N}$		3.0 h_{ef}								
Resistance for tensile loads Characteristic resistance for splitting (concrete cracking)		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$C_{cr,sp}$ [mm]	if h = h_{min}	2.5 hours $_{ef}$		2.0 h_{ef}			1.5 hours $_{ef}$			
	if h_{min} < h < 2 h_{min}	interpolated value								
	if h ≥ 2 h_{min}	$C_{cr,Np}$								
$S_{cr,sp}$ [mm]		2.0 $C_{cr,sp}$								
Resistance for shear loads Characteristic resistance on the steel side without lever arm		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$V_{Rk,s}$ [kN]		0.5x A_s x f_{uk}								
k_7		1.0								
Resistance for shear loads resistance on steel side with lever arm		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
Characteristic bending moment $M^0_{Rk,s}$ [Nm]		1.2 x Wel x fuk								
Elastic resistance modulus W_{el} [mm^3]		50	98	170	269	402	785	1534	2155	3217
Resistance for shear loads resistance for dislodging from concrete		**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
k_8 [-]		2.0								

Resistance for shear loads Characteristic resistance to concrete edge failure	**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
l_f [mm]	$l_f = h_{ef}$ and $\leq 12\ d_{nom}$						$l_f = h_{ef}$ and $\leq$max (8 d_{nom} ;, 300mm)		

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601									
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**								
Movements under conditions of service Tensile loads	**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
F_{unc} [kN] for concrete from C20/25 to C50/60	10.1	13.6	17.2	20.1	23.9	41.2	53.3	64.1	67.3
$\delta_{0,unc}$ [mm]	0.33	0.33	0.40	0.41	0.42	0.45	0.45	0.47	0.48
$\delta_{\infty, unc}$ [mm]	0.85								
Movements under conditions of service Shear loads	**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
$F_{unc / cr}$ [kN] for concrete from C20/25 to C50/60	13.2	20.6	29.6	40.3	52.7	82.3	128.6	161.3	210.6
$\delta_{0.unc / cr}$ [mm]	2.00								
$\delta_{\infty, unc / cr}$ [mm]	3.00								

*Perforation with reduced diameter

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601 QUALIFICATION FOR SEISMIC ACTIONS CATEGORY C1			
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**		
Resistance for tensile loads Characteristic resistance on the steel side (class 10.9 threaded rods are not qualified for seismic category C1)	**M12**	**M16**	**M20**
$N_{Rk,s,C1}$ [kN]	1.0 x $N_{Rk,s}$		
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance	**M12**	**M16**	**M20**
$\tau_{Rk,C\,1}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)	4.2	3.7	3.7
$\tau_{Rk,C\,1}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)	3.0	2.7	2.7
$\tau_{Rk,C\,1}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)	1.6	1.4	1.4
$\psi_{c,cr}$ C30/37 [-]	1.00		
$\psi_{c,cr}$ C40/50 [-]	1.00		
$\psi_{c,cr}$ C50/60 [-]	1.00		
γ_{inst} [-] Category I1	1.0		
γ_{inst} [-] Category I2	1,2		
Resistance for shear loads Characteristic resistance on the steel side without lever arm (class 10.9 threaded rods are not qualified for seismic category C1)	**M12**	**M16**	**M20**
$V_{Rk,s,C1}$ [kN]	0.7 x $V^0_{Rk,s}$		
Hole fill factor	**M12**	**M16**	**M20**
α_{gap} [-]	0.5 (1.0) [2)]		

[2)] Value in brackets is valid for the case in which there is no hole-bolt clearance

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601 QUALIFICATION FOR SEISMIC ACTIONS CATEGORY C2		
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**	
Resistance for tensile loads Characteristic resistance on the steel side (class 10.9 threaded rods are not qualified for seismic category C2)	**M12**	**M16**
$N_{Rk,s,C2}$ [kN]	1.0 x $N_{Rk,s}$	
Resistance for tensile loads Characteristic combined pull-out and concrete cone resistance for 50 and 100 years	**M12**	**M16**
$\tau_{Rk,C2}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+40°C (T_{mlp} = 24°C)	1.6	1.7
$\tau_{Rk,C2}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+80°C (T_{mlp} = 50°C)	1,2	1,2
$\tau_{Rk,C2}$ [N/mm ^{2}] concrete C20/25 Temperature range -40°C/+120°C (T_{mlp} = 72°C)	0.6	0.7
$\psi_{c,cr}$ C30/37 [-]	1.00	
$\psi_{c,cr}$ C40/50 [-]	1.00	
$\psi_{c,cr}$ C50/60 [-]	1.00	
γ_{inst} [-] Category I1	1.0	
γ_{inst} [-] Category I2	1,2	
Resistance for shear loads Characteristic resistance on the steel side without lever arm (class 10.9 threaded rods are not qualified for seismic category C2)	**M12**	**M16**
$V_{Rk,s,C2}$ [kN]	0.53 x $V^0_{Rk,s}$	0.46 x $V^0_{Rk,s}$
A_{t5}	>19%	
Hole fill factor	**M12**	**M16**
α_{gap} [-]	0.5 (1.0) [2]	

[2] Value in brackets is valid for the case in which there is no hole-bolt clearance

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601 QUALIFICATION FOR SEISMIC ACTIONS CATEGORY C2		
ESSENTIAL FEATURES	**PERFORMANCE IN ACCORDANCE WITH ETA-09/0140**	
Tensile and shear displacements for seismic category C2	**M12**	**M16**
Movements under conditions of service Tensile loads $\delta_{N,seis\ (DLS)}$ [mm]	0.20	0.23
Movements under ultimate conditions Tensile loads $\delta_{N,seis\ (ULS)}$ [mm]	0.33	1.04
Movements under condition of service Shear load $\delta_{V,seis\ (DLS)}$ [mm]	2.01	0.70
Movements under ultimate conditions Shear load $\delta_{V,seis\ (ULS)}$ [mm]	4.68	2.12

HARMONIZED TECHNICAL SPECIFICATION : : EAD 330499-02-0601	
ESSENTIAL FEATURES	**PERFORMANCE**
Reaction to fire	In the final application the layer thicknesses of product are approximately 1 ÷ 2 mm and most of these products are classified in class A1 according to decision THERE IS 96/603/EC . Therefore one can assume that the material binder (resin synthetic or a mixture of synthetic resin and cementitious) in connection with the metal anchor, in use final application, Not makes any contribution to the development of fire or to a fire fully developed and it hasn't no influence on the risk of smoke development .

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601	
ESSENTIAL FEATURES	**PERFORMANCE**
Fire resistant	See graph and tables below

Characteristic bond strength of a single fastener $\tau_{Rk,fi,p(\theta)}$ for concrete strength classes from C20/25 to C50/60 with all drilling methods under fire conditions for 50 and 100 years
The characteristic bond strength of a single fastener under fire conditions $\tau_{Rk,fi,p}$ for a given temperature (θ) must be calculated using the following equations

$$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) * \tau_{Rk,cr,C20/25}$$

$$\tau_{Rk,fi,p}(\theta) = k_{fi,p}(\theta) * \tau_{Rk,cr,100,C20/25}$$

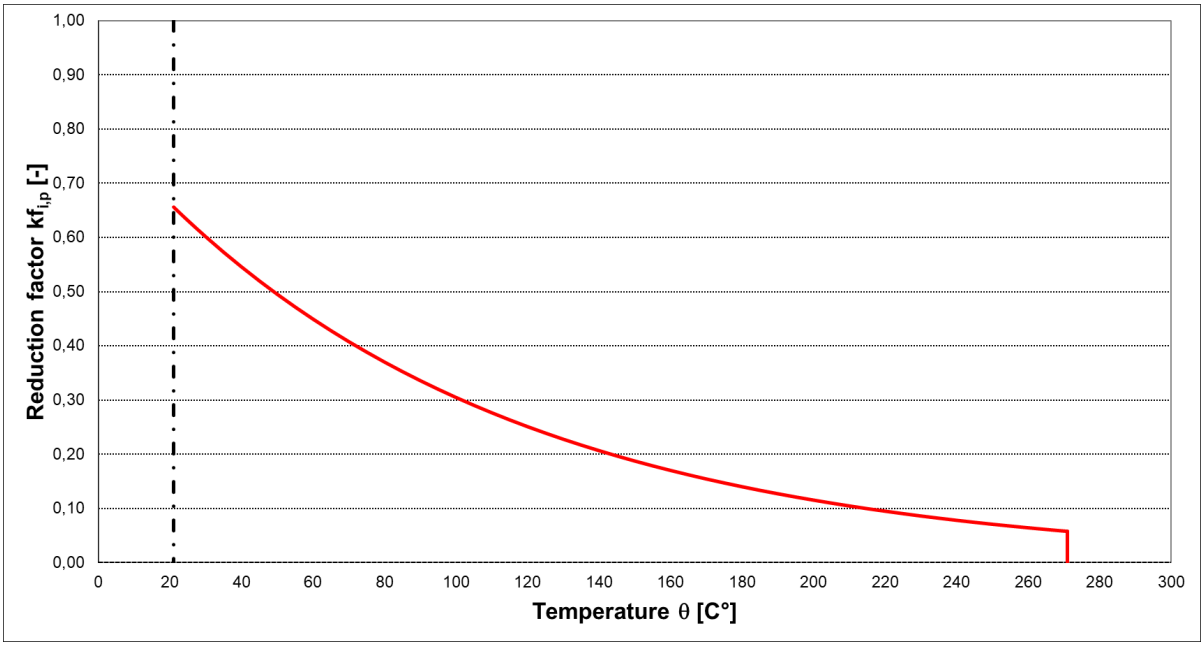
Where

$$if\ \theta \leq \theta_{max} \quad k_{fi,p}(\theta) = k_{fi,p}(\theta) = 0{,}8049 \cdot e^{-0{,}0097 \cdot \theta} \leq 1{,}0$$

$$if\ \theta > \theta_{max} \quad k_{fi,p}(\theta) = k_{fi,p}(\theta) = 0$$

$\theta_{max} = 271°C$

$\tau_{Rk,fi,p}$ = characteristic bond strength for cracked concrete exposed to fire for a given temperature (θ)
$k_{fi,p(\theta)}$ = reduction factor for bond strength in case of exposure to fire
$\tau_{Rk,cr,C\,20/25}$ = characteristic bond strength for cracked concrete for concrete strength class C20/25 for a service life of 50 years given in Table C3.
$\tau_{Rk,cr,100,C\,20/25}$ = characteristic bond strength for cracked concrete for concrete strength class C20/25 for a service life of 100 years given in table C3.



Characteristic resistance under tensile load in case of steel failure in fire conditions – threaded rod

Diameter			M10	M12	M16	M20
Breakage on the steel side						
Steel class 5.8 - 8.8	$N_{Rk,s,fi(30)}$	[kN]	0.87	1.70	3.14	4.90
	$N_{Rk,s,fi(60)}$	[kN]	0.75	1.28	2.36	3.68
	$N_{Rk,s,fi(90)}$	[kN]	0.58	1.11	2.04	3.19
	$N_{Rk,s,fi(120)}$	[kN]	0.46	0.85	1.57	2.45
Stainless steel A4	$N_{Rk,s,fi(30)}$	[kN]	1.45	2.55	4.71	7.35
	$N_{Rk,s,fi(60)}$	[kN]	1.16	2.13	3.93	6.13
	$N_{Rk,s,fi(90)}$	[kN]	0.93	1.70	3.14	4.90
	$N_{Rk,s,fi(120)}$	[kN]	0.81	1.36	2.51	3.92

Characteristic resistance under shear load with and without lever arm in case of steel failure in fire conditions – threaded rod

Diameter			M10	M12	M16	M20
Breakage on the steel side						
Steel class 5.8 - 8.8	$V_{Rk,s,fi(30)}$	[kN]	0.87	1.70	3.14	4.90
	$V_{Rk,s,fi(60)}$	[kN]	0.75	1.28	2.36	3.68
	$V_{Rk,s,fi(90)}$	[kN]	0.58	1.11	2.04	3.19
	$V_{Rk,s,fi(120)}$	[kN]	0.46	0.85	1.57	2.45
A4 stainless steel	$V_{Rk,s,fi(30)}$	[kN]	1.45	2.55	4.71	7.35
	$V_{Rk,s,fi(60)}$	[kN]	1.16	2.13	3.93	6.13
	$V_{Rk,s,fi(90)}$	[kN]	0.93	1.70	3.14	4.90
	$V_{Rk,s,fi(120)}$	[kN]	0.81	1.36	2.51	3.92
Steel class 5.8 - 8.8	$M_{Rk,s,fi(30)}$	[Nm]	1,1	2,7	6,7	13.0
	$M_{Rk,s,fi(60)}$	[Nm]	1.0	2.0	5.0	9,7
	$M_{Rk,s,fi(90)}$	[Nm]	0.7	1,7	4,3	8,4
	$M_{Rk,s,fi(120)}$	[Nm]	0.6	1.3	3.3	6.5
A4 stainless steel	$M_{Rk,s,fi(30)}$	[Nm]	1.9	4.0	10.0	19.5
	$M_{Rk,s,fi(60)}$	[Nm]	1.5	3.3	8.3	16.2
	$M_{Rk,s,fi(90)}$	[Nm]	1,2	2.7	6.7	13.0
	$M_{Rk,s,fi(120)}$	[Nm]	1.0	2.1	5.3	10.4

Characteristic resistance under tensile load in case of concrete cone failure and splitting in fire conditions – threaded rod

Diameter			M10	M12	M16	M20
Concrete cone failure						
Steel class 5.8 - 8.8 A4 stainless steel	$N_{0\ Rk,c\ ,fi\ (30)}$	[kN]	$\frac{h_{ef}}{200} * N^0_{Rk,c} \leq N^0_{Rk,c}$			
	$N_{0\ Rk,c\ ,fi\ (60)}$	[kN]				
	$N_{0\ Rk,c\ ,fi\ (90)}$	[kN]				
	$N_{0\ Rk,c\ ,fi\ (120)}$	[kN]	$0{,}8 * \frac{h_{ef}}{200} * N^0_{Rk,c} \leq N^0_{Rk,c}$			
Characteristic wheelbase	$s_{cr,N\ ,fi}$	[mm]	4hef			
Characteristic distance from the edge	$c_{cr,N\ ,fi}$	[mm]	2hef			

Characteristic resistance under shear load in case of breakthrough failure in fire conditions – threaded rod

Diameter			M10	M12	M16	M20
Pryout failure						
Steel class 5.8 - 8.8 A4 stainless steel	$V_{Rk,cp\ ,fi\ (30)}$	[kN]	k8 x $N_{Rk,c\ ,fi\ (90)}$			
	$V_{Rk,cp\ ,fi\ (60)}$	[kN]				
	$V_{Rk,cp\ ,fi\ (90)}$	[kN]				
	$V_{Rk,cp\ ,fi\ (120)}$	[kN]	k8 x $N_{Rk,c\ ,fi\ (120)}$			

Characteristic resistance under shear load in case of concrete edge failure in fire conditions – threaded rod

Diameter			M10	M12	M16	M20
Concrete edge failure						
Steel class 5.8 - 8.8 A4 stainless steel	$V_{Rk,c\ ,fi\ (30)}$	[Nm]	0.25 $V_{0\ Rk,c}$			
	$V_{Rk,c\ ,fi\ (60)}$	[Nm]				
	$V_{Rk,c\ ,fi\ (90)}$	[Nm]				
	$V_{Rk,c\ ,fi\ (120)}$	[Nm]	0.20 $V_{0\ Rk,c}$			

LEGEND OF SYMBOLS	
d	Diameter of the bolt or threaded part
d_0	Hole diameter
d_{fix}	Diameter of the hole in the object to be fixed
h_{ef}	Effective anchoring depth
h_1	Hole depth
h_{min}	Minimum thickness of the concrete support
TFix	Tightening torque
t_{fix}	Fixable thickness
S_{min}	Minimum wheelbase
C_{min}	Minimum distance from the edges
$N_{Rk,s}$	Characteristic tensile strength on the steel side in case of static load
$N_{Rk,s,C1}$	Characteristic tensile strength on the steel side for seismic category C1
$N_{Rk,s,C2}$	Characteristic tensile strength on the steel side for seismic category C2
$V_{Rk,s}$	Characteristic shear resistance on the steel side in case of static load
$V_{Rk,s,C1}$	Characteristic shear resistance on the steel side for seismic category C1
$V_{Rk,s,C2}$	Characteristic shear resistance on the steel side for seismic category C2
$\tau P\kappa$	Characteristic adhesion in non-cracked (uncr), cracked (cr) concrete, seismic category C1 and C2
On the $_{left}$	Cross-sectional area
At_5	Fracture elongation
$M^0_{Rk,s}$	Characteristic bending moment
W_{el}	Elastic resistance modulus
α_{gap}	Hole fill factor
k_7	Ductility factor
k_8	Coefficient for concrete undermining
N_{Rk}	Characteristic resistance for pull-out and concrete cone formation for single anchorage
γ_{inst}	Partial safety coefficient relating to the installation of the anchor
$S_{cr,Np}$	Center distance to ensure the transmission of the characteristic pull-out load for a single anchorage
$C_{cr,Np}$	Distance from the edge to ensure transmission of the characteristic pull-out load for a single anchor
$k_{uncr,N}$	Coefficient for non-cracked concrete
$k_{cr,N}$	Coefficient for cracked concrete
$S_{cr,N}$	Center distance to ensure the transmission of the characteristic load for the formation of the concrete cone for a single anchorage
$C_{cr,N}$	Distance from the edge to ensure the transmission of the characteristic load for the formation of the concrete cone for a single anchorage
$S_{cr,sp}$	Center distance to ensure the transmission of the characteristic load for concrete splitting for a single anchorage
$C_{cr,sp}$	Distance from the edge to ensure the transmission of the characteristic load for concrete splitting for a single anchorage
$\psi_{c,ucr}$	Increase factor for non-cracked concrete classes
$\psi_{c,cr}$	Increase factor for cracked concrete classes
l_f	Effective length
F	Service load in uncracked concrete (ucr) or cracked concrete (cr)
δ_0	Short-term displacement under service load in uncracked concrete (uncr) or cracked concrete (cr)
δ_∞	Long-term displacement under service load in uncracked concrete (uncr) or cracked concrete (cr)
NPA	Performance not declared

REACH Regulation n°1907/2006

Esteemed customer,
We inform you that our company within the REACH regulation supply chain is classified as a downstream user of substances and preparations.
Regarding the product defined in point 1, we want to confirm that it does not currently contain substances considered SVHC based on the list published at:
http://echa.europa.eu/chem_data/candidate_list_table_en.asp .
The product safety data sheet can be requested from our technical office: tek@bossong.com or tek3@bossong.com and can be downloaded from our website www.bossong.com .

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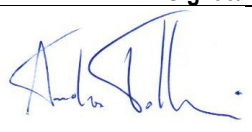
10. The performance of the product referred to in points 1 and 2 is in conformity with the declared performance referred to in point 9.
This declaration of performance is issued under the exclusive responsibility of the manufacturer referred to in point 4.
Signed for and on behalf of:

Name and function	Place and date of release	Signature
Andrea Taddei **Director General**	**Grassobbio (Bg) - Italy** **27.05.2024**	

Note: This DoP replaces the previous version dated 05.23.2019.