

	DECLARATION OF PERFORMANCE According to Construction Product Regulation n° 305/2011
	DoP N°22/0469

1. Unique identification code of the product-type:
BCR E-PLUS

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):
BCR + content in ml + E-PLUS. Example BCR 585 E-PLUS

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:
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Generic type and use		Bonded anchor for anchorage of threaded rod.							
Size covered		M8	M10	M12	M16	M20	M24	M27	M30
hef [mm]	min	60	60	70	80	90	96	110	120
	max	160	200	240	320	400	480	540	600

Generic type and use		Bonded anchor for anchorage of rebars with improved adhesion											
Size covered		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
hef [mm]	min	60	60	70	70	80	90	90	100	120	120	130	200
	max	160	200	240	280	320	400	440	500	560	600	640	800

Base material and strength class	Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1.
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Base material condition	Non cracked from M8 to M30 and from Ø8 a Ø40, cracked from M12 to M30 and from Ø8 to Ø40 Seismic category C1 from Ø10 a Ø32 Seismic category C2 from M12 to M24.
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Anchor metal material and corresponding environmental exposure	Threaded rod: X1) Structures subject to dry internal conditions: elements made of galvanized steel (galvanized or hot galvanized) and stainless steel A2, A4 or high corrosion resistance steel (HCR). X2) Structures subject to external atmospheric exposure (including industrial and marine environment) and permanently wet internal conditions, if there are no particular aggressive conditions: Elements made of A4 stainless steel or high corrosion resistance steel (HCR). X3) Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently wet internal conditions, if other particular aggressive conditions exist. Such particularly aggressive conditions are eg. permanent immersion, alternating in sea water or in the sea water spray area, chloride atmosphere of swimming pools or indoor environments with chemical pollution (eg in desulphurisation plants or road tunnels where de-icing materials are used): Elements made of corrosion-resistant steel (HCR) Bars with improved adhesion class B or C according to EN 1992-1-1
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Type of loading	Static or quasi-static loading and seismic category C1 and C2. Qualification for 50 and 100 years of service life
Service temperature range	a) -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C), b) -40°C to +55°C (max. short term temperature +43°C and max. long term temperature +43°C), c) -40°C to +80°C (max. short term temperature +50°C and max. long term temperature +50°C).
Use category	Category 1 and 2: dry and wet concrete and flooded hole. Overhead installation is allowed. Perforation with hammer drilling machine, hollow drill bit and diamond drilling machine

4 Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

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

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

Not applicable

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:

System 1

7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:

Not applicable

8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

ETA-Denmark A/S issued ETA-22/0469 on the basis of EAD 330499-02-0601

TZUS (n°1020) performed:

the determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; the initial inspection of the factory and of the factory production control; the continuous surveillance; assessment and approval of the factory production control; under system 1 and issue the certificate of conformity n° 1020-CPR- 090-056638.

9. Declared performance:

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601

ESSENTIAL CHARACTERISTICS	PERFORMANCE ACCORDING TO A ETA-22/0469							
Installation parameters	M8	M10	M12	M16	M20	M24	M27	M30
d [mm]	8	10	12	16	20	24	27	30
d ₀ [mm]	10	12	14	18	22-24	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	270	300
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 load	M8	M10	M12	M16	M20	M24	M27	M30
Characteristic steel resistance								
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
Stainless steel A4, HCR class 80 N _{Rk,s} [kN]	29	46	67	126	196	282	367	449

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601								
ESSENTIAL CHARACTERISTICS		PERFORMANCE ACCORDING TO ETA-22/0469						
Resistance for shear load								
Characteristic steel resistance without lever arm	M8	M10	M12	M16	M20	M24	M27	M30
Steel class 4.8 $V_{0Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Steel class 5.8 $V_{0Rk,s}$ [kN]	9	14	21	39	61	88	115	140
Steel class 8.8 $V_{0Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Steel class 10.9 $V_{0Rk,s}$ [kN]	18	29	42	78	122	176	230	280
Stainless steel A2, A4, HCR class 50 $V_{0Rk,s}$ [kN]	9	14	21	39	61	88	115	140
Stainless steel A2, A4, HCR class 70 $V_{0Rk,s}$ [kN]	13	20	29	55	86	124	160	196
Stainless steel A4, HCR class 80 $V_{0Rk,s}$ [kN]	15	23	34	63	98	141	184	224
k_7	1,0							
Resistance for shear load								
Characteristic steel resistance with lever arm	M8	M10	M12	M16	M20	M24	M27	M30
Steel class 4.8 $M_{0Rk,s}$ [Nm]	15	30	52	133	260	449	666	900
Steel class 5.8 $M_{0Rk,s}$ [Nm]	19	37	66	166	324	561	832	1125
Steel class 8.8 $M_{0Rk,s}$ [Nm]	30	60	105	266	519	898	1331	1799
Steel class 10.9 $M_{0Rk,s}$ [Nm]	37	75	131	333	649	1123	1664	2249
Stainless steel A2, A4, HCR class 50 $M_{0Rk,s}$ [Nm]	19	37	66	166	324	561	832	1125
Stainless steel A2, A4, HCR class 70 $M_{0Rk,s}$ [Nm]	26	52	92	233	454	786	1165	1574
Stainless steel A4, HCR class 80 $M_{0Rk,s}$ [Nm]	30	60	105	266	519	898	1331	1799
Resistance for tensile load								
Characteristic resistance for combined pullout and concrete cone failure	M8	M10	M12	M16	M20	M24	M27	M30
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+40°C ($T_{mip} = 24^\circ\text{C}$)	16,0	16,0	16,0	16,0	16,0	16,0	15,0	14,0
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+55°C ($T_{mip} = 43^\circ\text{C}$)	15,0	15,0	15,0	15,0	15,0	15,0	14,0	14,0
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+80°C ($T_{mip} = 50^\circ\text{C}$)	11,0	11,0	11,0	10,0	10,0	10,0	10,0	10,0
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+40°C ($T_{mip} = 24^\circ\text{C}$)	-	-	7,0	7,5	7,0	8,0	-	-
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+55°C ($T_{mip} = 43^\circ\text{C}$)	-	-	7,0	7,5	7,0	8,0	-	-
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+80°C ($T_{mip} = 50^\circ\text{C}$)	-	-	5,5	5,5	5,5	5,5	-	-
Resistance for tensile load								
Characteristic resistance for combined pullout and concrete cone failure – Diamond drilling machine	M8	M10	M12	M16	M20	M24	M27	M30
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+40°C ($T_{mip} = 24^\circ\text{C}$)	-	-	-	14,0	14,0	14,0	13,0	13,0
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+55°C ($T_{mip} = 43^\circ\text{C}$)	-	-	-	13,0	13,0	13,0	12,0	12,0
$\tau_{Rk,ucr}$ [N/mm ²] concreteC20/25 Temperature range -40°C/+80°C ($T_{mip} = 50^\circ\text{C}$)	-	-	-	10,0	10,0	10,0	9,0	9,0
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+40°C ($T_{mip} = 24^\circ\text{C}$)	-	-	-	7,5	7,0	7,0	7,0	6,5
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+55°C ($T_{mip} = 43^\circ\text{C}$)	-	-	-	7,5	7,0	7,0	7,0	6,5
$\tau_{Rk,cr}$ [N/mm ²] cracked concreteC20/25 Temperature range -40°C/+80°C ($T_{mip} = 50^\circ\text{C}$)	-	-	-	5,5	5,0	5,0	5,0	4,5
Resistance for tensile load								
Characteristic resistance for combined pullout and concrete cone failure – Sustained load and concrete coefficient	M8	M10	M12	M16	M20	M24	M27	M30
$\psi_{c,ucr}$	$\left(\frac{f_{ck}}{20}\right)^{0,2}$							
$\psi_{c,cr}$	1,0							
ψ_{sus}^0	0,73							

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601										
ESSENTIAL CHARACTERISTICS			PERFORMANCE ACCORDING TO ETA-22/0469							
Resistance for tensile load Characteristic resistance for concrete cone failure			M8	M10	M12	M16	M20	M24	M27	M30
$k_{ucr,N}$			11,0							
$k_{cr,N}$			7,7							
$C_{cr,N}$			1,5 h_{ef}							
$S_{cr,N}$			3,0 h_{ef}							
Resistance for tensile load Characteristic resistance for splitting failure			M8	M10	M12	M16	M20	M24	M27	M30
$S_{cr,sp}$ [mm]			se $h = h_{min}$ - $S_{cr,sp} = 4 h_{ef}$ se $h_{min} \leq h < 2 h_{ef}$ - $S_{cr,sp}$ = interpolated value se $h \geq 2 h_{ef}$ - $S_{cr,sp} = 2 h_{ef}$							
$C_{cr,sp}$ [mm]			0,50 $S_{cr,sp}$							
Resistance for shear load Characteristic resistance for concrete pry-out failure			M8	M10	M12	M16	M20	M24	M27	M30
k_s [-]			2,0							
Resistance for shear load Characteristic resistance for edge failure			M8	M10	M12	M16	M20	M24	M27	M30
l_f [mm]			$l_f = h_{ef}$ and $\leq 12 d_{nom}$							$l_f = h_{ef}$ and $\leq \max(8d_{nom}; 300mm)$
Characteristic displacement in non-cracked concrete Tensile load – hammer drilling			M8	M10	M12	M16	M20	M24	M27	M30
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	0,01	0,02	0,03	0,03	0,03	0,03	0,04	0,05
	$\delta_{N\infty}$	[mm/(N/mm ²)]	0,04	0,04	0,04	0,04	0,04	0,04	0,05	0,05
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	0,01	0,02	0,03	0,03	0,03	0,03	0,04	0,05
	$\delta_{N\infty}$	[mm/(N/mm ²)]	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	0,02	0,03	0,04	0,04	0,04	0,05	0,06	0,07
	$\delta_{N\infty}$	[mm/(N/mm ²)]	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,07
Characteristic displacement in cracked concrete Tensile load – hammer drilling			M8	M10	M12	M16	M20	M24	M27	M30
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	-	-	0,06	0,06	0,06	0,07	-	-
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	0,26	0,24	0,26	0,23	-	-
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	-	-	0,06	0,06	0,06	0,07	-	-
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	0,26	0,24	0,26	0,23	-	-
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	-	-	0,07	0,08	0,08	0,09	-	-
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	0,33	0,33	0,33	0,33	-	-
Characteristic displacement in non-cracked concrete Tensile load – diamond drilling			M8	M10	M12	M16	M20	M24	M27	M30
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,02	0,03	0,03	0,03	0,04
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,05	0,05	0,05	0,05	0,05
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,02	0,03	0,03	0,04	0,04
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,05	0,05	0,05	0,06	0,06
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,03	0,04	0,04	0,05	0,05
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,07	0,07	0,07	0,08	0,08
Characteristic displacement in cracked concrete Tensile load – diamond drilling			M8	M10	M12	M16	M20	M24	M27	M30
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,05	0,05	0,07	0,07	0,08
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,25	0,26	0,26	0,26	0,28
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,05	0,05	0,07	0,07	0,08
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,25	0,26	0,26	0,26	0,28
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	-	-	-	0,07	0,08	0,09	0,10	0,11
	$\delta_{N\infty}$	[mm/(N/mm ²)]	-	-	-	0,34	0,37	0,37	0,37	0,41
Characteristic displacement - Shear load			M8	M10	M12	M16	M20	M24	M27	M30
All temperature range	δ_{V0} factor	[mm/kN]	0,024	0,020	0,019	0,011	0,007	0,006	0,005	0,005
	$\delta_{V\infty}$ factor	[mm/kN]	0,036	0,030	0,030	0,017	0,011	0,009	0,007	0,008

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601												
ESSENTIAL CHARACTERISTICS	PERFORMANCE ACCORDING TO ETA-22/0469											
Installation parameters	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
d [mm]	8	10	12	14	16	20	22	25	28	30	32	40
d ₀ [mm]	10*-12	12*-14	14*-16	18	20	25	26	30-32	35	35	40	50-52
h _f [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	70	80	100	105	125	140	150	160	160
C _{min} [mm]	40	45	45	50	50	65	65	70	75	80	80	100
γ _{inst} [-] Category I1	1,00											
γ _{inst} [-] Category I2	1,20											
Resistance for tensile load Characteristic steel resistance	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
N _{Rk,s} [kN]	A _s x f _{uk}											
A _s [mm ²]	50	79	113	154	201	314	380	491	616	707	804	1256
Resistance for tensile load Characteristic resistance for combined pull-out and concrete cone failure	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
τ _{Rk,ucr} [N/mm ²] concrete C20/25 Temperature range -40°C/+40°C (T _{mip} = 24°C)	15,0	15,0	15,0	14,0	14,0	13,0	13,0	12,0	12,0	12,0	11,0	11,0
τ _{Rk,ucr} [N/mm ²] concrete C20/25 Temperature range -40°C/+55°C (T _{mip} = 43°C)	15,0	15,0	15,0	14,0	14,0	13,0	13,0	12,0	12,0	12,0	11,0	11,0
τ _{Rk,ucr} [N/mm ²] concrete C20/25 Temperature range -40°C/+80°C (T _{mip} = 50°C)	10,0	10,0	10,0	10,0	10,0	9,5	9,0	9,0	9,0	9,0	7,5	7,5
τ _{Rk,cr} [N/mm ²] cracked concrete C20/25 Temperature range -40°C/+40°C (T _{mip} = 24°C)	8,5	8,0	8,0	8,0	8,0	7,5	7,5	7,5	7,5	7,0	7,0	6,5
τ _{Rk,cr} [N/mm ²] cracked concrete C20/25 Temperature range -40°C/+55°C (T _{mip} = 43°C)	8,5	8,0	8,0	8,0	8,0	7,5	7,5	7,5	7,5	7,0	7,0	6,5
τ _{Rk,cr} [N/mm ²] cracked concrete C20/25 Temperature range -40°C/+80°C (T _{mip} = 50°C)	6,0	5,5	5,5	5,5	5,5	5,0	5,5	5,0	5,0	5,0	5,0	4,5
ψ _{c,ucr}	$\left(\frac{f_{ck}}{20}\right)^{0.2}$											
ψ _{sus} ⁰	0,73											
Resistance for tensile load Characteristic resistance for concrete cone failure	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
K _{ucr,N}	11,0											
K _{cr,N}	7,7											
C _{cr,N}	1,5 h _{ef}											
S _{cr,N}	3,0 h _{ef}											

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601														
ESSENTIAL CHARACTERISTICS			PERFORMANCE ACCORDING TO ETA-22/0469											
Resistance for tensile load Characteristic resistance for splitting failure			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
$S_{cr,sp}$ [mm]			se $h = h_{min}$ - $S_{cr,sp} = 4 h_{ef}$ se $h_{min} \leq h < 2 h_{ef}$ - $S_{cr,sp}$ = interpolated value se $h \geq 2 h_{ef}$ - $S_{cr,sp} = 2 h_{ef}$											
$C_{cr,sp}$ [mm]			$0,50 S_{cr,sp}$											
Resistance for shear load Characteristic steel resistance without lever arm			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
$V_{Rk,s}$ [kN]			$0,5x A_s \times f_{uk}$											
k_7			1,0											
Resistance for shear load Characteristic steel resistance with lever arm			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
Characteristic bending moment $M^0_{Rk,s}$ [Nm]			$1,2 \times W_{el} \times f_{uk}$											
Elastic section modulus W_{el} [mm ³]			50	98	170	269	402	785	1045	1534	2155	2650	3217	6283
Resistance for shear load Characteristic resistance for concrete pry-out failure			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
k_8 [-]			2,0											
Resistance for shear load Characteristic resistance for edge failure			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
l_f [mm]			$l_f = h_{ef} \text{ and } \leq 12 d_{nom}$						$l_f = h_{ef} \text{ and } \leq \max(8d_{nom}, 300\text{mm})$					
Characteristic displacement in non-cracked concrete Tensile load			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	0,02	0,02	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,07	0,07
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,06	0,06	0,06
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	0,02	0,02	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,07	0,07
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,06	0,06	0,06
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	0,03	0,00	0,04	0,04	0,04	0,06	0,06	0,06	0,08	0,09	0,09	0,09
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,09	0,09	0,09	0,09
Characteristic displacement in cracked concrete Tensile load			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
Temperature range -40°C / +40°C	δ_{N0}	[mm/(N/mm ²)]	0,03	0,04	0,05	0,06	0,06	0,08	0,07	0,08	0,08	0,11	0,11	0,13
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,18	0,24	0,20	0,24	0,25	0,27	0,25	0,27	0,28	0,30	0,28	0,34
Temperature range -40°C / +55°C	δ_{N0}	[mm/(N/mm ²)]	0,03	0,04	0,05	0,06	0,06	0,08	0,07	0,08	0,08	0,11	0,11	0,13
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,18	0,24	0,20	0,24	0,25	0,27	0,25	0,27	0,28	0,30	0,28	0,34
Temperature range -40°C / +80°C	δ_{N0}	[mm/(N/mm ²)]	0,04	0,06	0,07	0,08	0,08	0,11	0,10	0,11	0,12	0,15	0,15	0,18
	$\delta_{N_{50}}$	[mm/(N/mm ²)]	0,25	0,34	0,28	0,33	0,35	0,38	0,35	0,38	0,39	0,42	0,39	0,47
Characteristic displacement in non-cracked concrete - Shear load			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32	Ø40
All temperature range	δ_{V0} factor	[mm/kN]	0,018	0,014	0,013	0,009	0,008	0,006	0,005	0,004	0,004	0,004	0,003	0,003
	$\delta_{V_{50}}$ factor	[mm/kN]	0,027	0,022	0,019	0,014	0,012	0,009	0,008	0,006	0,006	0,005	0,005	0,005

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601 SEISMIC CATEGORY C1										
ESSENTIAL CHARACTERISTICS	PERFORMANCE ACCORDING TO ETA-22/0469									
Resistance for tensile load Characteristic steel resistance	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32
N _{Rk,s} [kN]	A _s x f _{uk}									
A _s [mm ²]	79	113	154	201	314	380	491	616	707	804
γ _{Ms,N}	1,4									
Resistance for tensile load Characteristic resistance for combined pull-out and concrete cone failure	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32
τ _{Rk,C1} [N/mm ²] concrete C20/25 Temperature range -40°C/+40°C (T _{mlp} = 24°C)	4,0	6,0	5,7	5,7	4,6	4,6	4,6	4,6	4,6	4,6
τ _{Rk,C1} [N/mm ²] concrete C20/25 Temperature range -40°C/+55°C (T _{mlp} = 43°C)	4,0	6,0	5,7	5,7	4,6	4,6	4,6	4,6	4,6	4,6
τ _{Rk,C1} [N/mm ²] concrete C20/25 Temperature range -40°C/+80°C (T _{mlp} = 50°C)	2,9	4,3	4,1	4,1	3,3	3,3	3,3	3,3	3,3	3,3
ψ _{c,ucr}	1,0									
Resistance for shear load Characteristic steel resistance without level arm	Ø10	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø28	Ø30	Ø32
V _{Rk,s,C1} [kN]	0,64 x V ⁰ _{Rks}			0,70 x V ⁰ _{Rks}			0,62 x V ⁰ _{Rks}			
γ _{Ms,V}	1,5									

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601 SEISMIC CATEGORY C2				
ESSENTIAL CHARACTERISTICS	PERFORMANCE ACCORDING TO ETA-22/0469			
Resistance for tensile load Characteristic steel resistance (threaded rods class 10.9 are not qualified for the C2 seismic category)	M12	M16	M20	M24
$N_{Rk,s,C2}$ [kN]	1,0 x $N_{Rk,s}$			
Resistance for tensile load Characteristic resistance for combined pull-out and concrete cone failure	M12	M16	M20	M24
$\tau_{Rk,C2}$ [N/mm ²] concrete C20/25 Temperature range -40°C/+40°C ($T_{mlp} = 24^\circ\text{C}$)	5,4	5,3	5,5	5,4
$\tau_{Rk,C2}$ [N/mm ²] concrete C20/25 Temperature range -40°C/+55°C ($T_{mlp} = 43^\circ\text{C}$)	5,4	5,2	5,5	5,4
$\tau_{Rk,C2}$ [N/mm ²] concrete C20/25 Temperature range -40°C/+80°C ($T_{mlp} = 50^\circ\text{C}$)	3,9	3,8	3,9	3,9
$\psi_{c,cr}$ [-]	1,00			
γ_{inst} [-] Category I1	1,0			
γ_{inst} [-] Category I2	1,2			
Resistance for shear load Characteristic steel resistance without level arm (threaded rods class 10.9 are not qualified for the C2 seismic category)	M12	M16	M20	M24
$V_{Rk,s,C2}$ [kN]	0,54 x $V^0_{Rk,s}$	0,55 x $V^0_{Rk,s}$	0,68 x $V^0_{Rk,s}$	0,59 x $V^0_{Rk,s}$
A_5	>12%			
Filling factor of the hole	M12	M16	M20	M24
α_{gap} [-]	0,5 (1,0) ²⁾			
Displacements for tensile and shear load for seismic category C2	M12	M16	M20	M24
Displacement in tensile at Damage limit state $\delta_{N,seis}(DLS)$ [mm]	0,22	0,27	0,92	0,54
Displacement in tensile at Ultimate limit state $\delta_{N,seis}(ULS)$ [mm]	0,28	0,66	1,70	0,93
Displacement in shear at Damage limit state $\delta_{V,seis}(DLS)$ [mm]	1,64	0,81	2,39	2,21
Displacement in shear at Ultimate limit state $\delta_{V,seis}(ULS)$ [mm]	3,96	4,29	7,29	7,42

2) Value in brackets valid for filled annular gap between anchor and clearance in the fixture.

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601	
ESSENTIAL CHARACTERISTICS	PERFORMANCE
Fire reaction	In the final application the thickness of the mortar layer is about 1 to 2 mm and most of the mortar is material classified class A1 according to EC Decision 96/603/EC. Therefore it may be assumed that the bonding material (synthetic mortar or a mixture of synthetic mortar and cementitious mortar) in connection with the metal anchor in the end use application do not make any contribution to fire growth or to the fully developed fire and they have no influence to the smoke hazard.

HARMONIZED TECHNICAL SPECIFICATION: EAD 330499-02-0601	
ESSENTIAL CHARACTERISTICS	PERFORMANCE
Fire resistance	NPA

TERMINOLOGY AND SYMBOLS	
d	Diameter of anchor bolt or thread diameter
d ₀	Drill hole diameter
d _{fix}	Diameter of clearance hole in the fixture
h _{ef}	Effective anchorage depth
h ₁	Depth of the drilling hole
h _{min}	Minimum thickness of concrete member
T _{Fix}	Torque moment to installation
t _{fix}	Thickness to be fixed
S _{min}	Minimum allowable spacing
C _{min}	Minimum allowable edge distance
N _{Rk,s}	Characteristic steel- tensile resistance for static load
N _{Rk,s,C2}	Characteristic steel- tensile resistance for C2 seismic category
V _{Rk,s}	Characteristic steel- shear resistance for static load
V _{Rk,s,C2}	Characteristic steel- shear resistance for C2 seismic category
f _{Rk}	Characteristic adhesion in non-cracked concrete (uncr), cracked (cr), seismic category C1 and C2
A _s	Transversal section area
A ₅	Fracture elongation
α _{gap}	Annular gap factor
M ⁰ _{Rk,s}	Characteristic bending moment
W _{el}	Elastic section modulus
k ₇	Ductility factor
k ₈	Pryout factor
N _{Rk}	Characteristic resistance for pull-out and concrete cone for single anchor
γ _{inst}	Partial safety factors for installation
S _{cr,Np}	Spacing for ensuring the transmission of the characteristic resistance of a single anchor without spacing and edge effects in case of pullout failure
C _{cr,Np}	Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of pullout failure
k _{uncr,N}	Un-Cracked coefficient
k _{cr,N}	Cracked coefficient
S _{cr,N}	Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure
C _{cr,N}	Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure
S _{cr,sp}	Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure
C _{cr,sp}	Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure
ψ _{c,ucr}	Increasing factor for un-cracked concrete
ψ _{c,cr}	Increasing factor for cracked concrete
l _f	Effective length
F	Service load in un-cracked (ucr) or cracked concrete (cr)
δ ₀	Short term displacement under service load in un-cracked (uncr) or cracked concrete (cr)
δ _∞	Long term displacement under service load in un-cracked (uncr) or cracked concrete (cr)
NPA	No declared performance

Regulation REACH n°1907/2006

Estimate customer,

We inform you that in the REACH supply chain our company is classified as DU: Downstream-user.

About the product detailed in the point 1 we confirm you that we don't use in our production substances classified as SVHC according to the Candidate List published on ECHA site web:

http://echa.europa.eu/chem_data/candidate_list_table_en.asp.

You can require the safety data sheet of the product to our technical department: tek@bossong.com or you can download the document from our web site www.bossong.com

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

Name and function	Name and function	Firma
Andrea Taddei General Manager	Grassobbio (Bg) - Italia 04.04.2025	