Declaration of Performance n° 14/0027

Concrete screws CSB

Intended use of the construction product according to EAD 330232-00-0601	
Generic type	Metallic anchor for use in concrete
Base material	Reinforced or unreinforced concrete C20/25 to C50/60 EN 206-1
Material	Coated steel
Durability	Anchorages subject to dry internal conditions. The verifications and assessment methods on which this ETA is based lead the assumption of 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 means for choosing the right products in relation to the expected economically reasonable working life of the works
Loads	- Static and quasi-static loads: size Ø8 to Ø16 - Seismic action for performance category C1: size Ø10 - Seismic action for performance category C1 C2: size Ø12 and Ø16
Manufacturer information	
VORPA s.r.l. Vial San Leo, 5 – 47838 – Riccione (RN) – ITALY Tel. +39 0541/607111 vorpa@vorpa.com – www.vorpa.com	
Certificate information	
ETA 14/0027 issued by	Deutsches Institut für Bautechnik Anstalt des öffentlichen Rechts Kolonnenstr. 30 L 10829 Berlin Germany
On the basis of	EAD 330232-00-0601
Certificate of conformity **1020-CPR-010-041025** Issued by	ZUS - Technical and Test Institute for Construction Prague Prosecká 811/76a 190 00 Praha 9 Proseck (CZ)
Under system	1

Declared performance according to EAD 330232-00-0601							
Essential Characteristics			**Prestazioni**				
			Ø8/6	**Ø10/8**	**Ø12/10**	**Ø16/14**	
Installation parameters							
d_0	Nominal diameter of drill bit	[mm]	6	8	10	14	
d_{nom}	Outside diameter of anchor	[mm]	8	10	12	16	
h_{ef}	Effective anchorage depth	[mm]	48	56	64	85	
h_1	Depth of drill hole	[mm]	75	85	100	140	
h_{nom}	Overall anchor embedment depth	[mm]	60	70	80	110	
h_{min}	Minimum thickness of concrete memeber	[mm]	100	110	130	170	
d_f	Diameter of clearance in the fixture	[mm]	9	12	14	18	
t_{fix}	Minimum thickness of fixture	[mm]	≥5	≥5	≥5	≥5	
s_{min}	Minimum spacing	[mm]	45	50	60	80	
c_{min}	Minimum edge distance	[mm]	45	50	60	80	
T_{inst}	Setting torque (requires an impact wrench)	[Nm]	20	50	80	160	

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Tension – Steel faiulure							
$N_{Rk,s}$	Tension steel characteristic failure	[kN]	20	35	50	95	
γ_{Ms}	Partial safety factor	[-]	1.5				
Pull-out failure							
$N_{Rk,p}$	Characteristic resistance in uncracked concrete C20/25	[kN]	16	20	25	40	
	Characteristic resistance in cracked concrete C20/25	[kN]	4	7.5	9	16	
$N_{Rk,p,eq}$	Characteristic resistance in seisimic perferomance category C1	[kN]	-	6	6.3	16	
$N_{Rk,p,eq}$	Characteristic resistance in seisimic perferomance category C2	[kN]	-	-	2.7	7.2	
ψ_c C30/37	Increasing factor for concrete C30/37	[-]	1.22				
ψ_c C40/50	Increasing factor for concrete C40/50	[-]	1.41				
ψ_c C50/60	Increasing factor for concrete C50/60	[-]	1.58				
γ_{inst}	Partial safety factor	[-]	1.4	1.2	1.4		
Concrete cone failure and splitting failure and splitting failure							
h_{ef}	Effective anchorage depth	[mm]	48	56	64	85	
k_1	Factor K_1 – uncracked concrete	[mm]	11				
k_1	Factor K_1 – cracked concrete	[mm]	7.7				
$s_{cr,N}$	Critical spacing	[mm]	3 x h_{ef}				
$c_{cr,N}$	Critical edge distance	[mm]	1.5 x h_{ef}				
$s_{cr,sp}$	Critical spacing (splitting)	[mm]	160	175	195	255	
$c_{cr,sp}$	Critical edge distance (splitting)	[mm]	80	85	95	130	
γ_{inst}	Partial safety factor for installation	[-]	1.4	1.2	1.4		
Spostamenti per carico a trazione							
N_{ucr}	Service tension load in non-cracked concrete C20/25	[kN]	7.62	8.89	11.9	13.61	
$\delta_{N0,ucr}$	Short term displacement under tension load	[mm]	0.76	0.74	0.63	0.74	
$\delta_{N\infty,ucr}$	Long term displacement under tension load	[mm]	0.29	0.34	0.23	0.41	
N_{cr}	Service tension load in cracked concrete C20/25	[kN]	1.9	4.17	4.29	5.44	
$\delta_{N0,cr}$	Short term displacement under tension load	[mm]	0.27	0.39	0.45	0.79	
$\delta_{N\infty,cr}$	Long term displacement under tension load	[mm]	0.53	0.77	0.97	1.05	
Shear – Steel failure							
$V_{Rk,s}$	Shear characteristic failure	[kN]	9.4	20.1	32.4	56.9	
$V_{Rk,s,eq}$	Characteristic resistance for seismic action in performance category C1	[kN]	-	12.1	19.1	39.8	
$V_{Rk,s,eq}$	Characteristic resistance for seismic action in performance category C2	[kN]	-	-	17.7	39.8	
γ_{Ms}	Partial safety factor	[-]	1.5				
$M^0_{Rk,s}$	Bending moment characteristic failure	[Nm]	19	44	83	216	
K_7	Ductility factor	[-]	0.8				
γ_{Ms}	Partial safety factor	[-]	1.5				
Shear – Concrete edge failure							
l_{ef}	Effective anchorage length	[mm]	39.5	44.5	51.5	63	
Displacement on shear load							
V	Service shear load in cracked and non-cracked concrete C20/25	[kN]	4.5	9.6	15.4	27.1	
δ_{V0}	Short term displacement under shear load	[mm]	0.94	1.47	1.87	3	
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	1.41	2.20	2.81	4.5	

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Performance under fire exposure in concrete C20/25 to C50/60 (tension)							
Duration of fire resistance = 30 min							
$N_{Rk,s,fi,30}$	Characteristic resistance – steel failure	[KN]	0.28	0.73	1.51	2.85	
$N_{Rk,p,fi,30}$	Characteristic resistance – pull-out failure	[KN]	1	1.87	2.25	4	
$N_{Rk,c,fi,30}$	Characteristic resistance – concrete cone failure	[KN]	2.87	4.23	5.9	12	
Duration of fire resistance = 60 min							
$N_{Rk,s,fi,60}$	Characteristic resistance – steel failure	[KN]	0.25	0.64	1.13	2.14	
$N_{Rk,p,fi,60}$	Characteristic resistance – pull-out failure	[KN]	1	1.87	2.25	4	
$N_{Rk,c,fi,60}$	Characteristic resistance – concrete cone failure	[KN]	2.87	4.22	5.9	12	
Duration of fire resistance = 90 min							
$N_{Rk,s,fi,90}$	Characteristic resistance – steel failure	[KN]	0.19	0.49	0.98	1.85	
$N_{Rk,p,fi,90}$	Characteristic resistance – pull-out failure	[KN]	1	1.87	2.25	4	
$N_{Rk,c,fi,90}$	Characteristic resistance – concrete cone failure	[KN]	2.87	4.22	5.9	12	
Duration of fire resistance = 120 min							
$N_{Rk,s,fi,120}$	Characteristic resistance – steel failure	[KN]	0.14	0.39	0.75	1.43	
$N_{Rk,p,fi,120}$	Characteristic resistance – pull-out failure	[KN]	0.8	1.5	1.8	3.2	
$N_{Rk,c,fi,120}$	Characteristic resistance – concrete cone failure	[KN]	2.3	3.38	4.72	9.59	
Interassi e distanze dal bordo							
$s_{cr,N}$	Critical spacing	[mm]	$4 \times h_{ef}$				
s_{min}	Minimum spacing	[mm]	45	50	60	80	
$c_{cr,N}$	Critical edge distance	[mm]	$2 \times h_{ef}$				
c_{min}	Minimum edge distance	[mm]	$c_{min}=2 \times h_{ef}$; if fire attack comes from more than one side, the edge distance has to be ≥300mm o ≥2 x h_{ef}				
Performance under fire exposure in concrete C20/25 to C50/60 (shear)							
Duration of fire resistance = 30 min							
$V_{Rk,s,fi,30}$	Characeteristic shear resistance	[KN]	0.28	0.73	1.51	2.85	
$M_{Rk,s,fi,30}$	Characeteristic bending resistance	[Nm]	0.24	0.87	2.22	5.76	
Duration of fire resistance = 60 min							
$V_{Rk,s,fi,60}$	Characeteristic shear resistance	[KN]	0.25	0.64	1.13	2.14	
$M_{Rk,s,fi,60}$	Characeteristic bending resistance	[Nm]	0.22	0.75	1.66	4.32	
Duration of fire resistance = 90 min							
$V_{Rk,s,fi,90}$	Characeteristic shear resistance	[KN]	0.19	0.49	0.98	1.85	
$M_{Rk,s,fi,90}$	Characeteristic bending resistance	[Nm]	0.17	0.58	1.44	3.74	
Duration of fire resistance = 120 min							
$V_{Rk,s,fi,120}$	Characeteristic shear resistance	[KN]	0.14	0.39	0.75	1.43	
$M_{Rk,s,fi,120}$	Characeteristic bending resistance	[Nm]	0.12	0.46	1.11	2.88	
Concrete edge failure							
$V_{Rk,cp,fi,RI}$	The characteristic resistance in concrete C20/25 to C50/60 is determined by $V^0_{Rk,c,fi,(90)} = 0.25 \times V^0_{Rk,c}$ (R30, R60, R90) and $V^0_{Rk,c,fi,(120)} = 0.20 \times V^0_{Rk,c}$ (R120) with $V^0_{Rk,c}$ as initial value of the characteristic resistance of a single anchor in cracked concrete C20/25						

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The above performance apply for the following article numbers

CSB CE			
Code	d [mm]	d0 [mm]	$t_{fix\ max}$ [mm]
93672	8	6	20
93673			40
93674			60
93676	10	8	10
93677			30
93678			50
93679			70
93680			90
93681	12	10	10
93682			30
93683			50
93684			70
93685			110
93686			130
93687			170
93688			210
93689	16	14	20
93690			40
93691			70

CSB E CE			
Code	d [mm]	d0 [mm]	$t_{fix\ max}$ [mm]
93710	8	6	10
93711			40
93713	10	8	10
93725			30
93726			100
93727	12	10	10
93728			30

CSB S CE			
Code	d [mm]	d0 [mm]	$t_{fix\ max}$ [mm]
93700	8	6	10
93701			40
93702			80
93703	10	8	10
93704			30
93705			90
93706	12	10	20
93707			40

The performances of the product identified by above identification code are in conformity with the declared performances.
This declaration of performance is issued on the basis of the European regulation (EU) N. 305/2011, under the sole responsibility of the indicated Manufacturer.

Signed for and in behalf of the manufacturer by:

Name and function	Place and date	Signature
Roberto Vorabbi Legale Rappresentante	Riccione, 28/11/2017