Declaration of Performance n° 17/0952

Mechanical Torque Controlled anchors VSA

Intended use of the construction product according to EAD 330232-00-0601	
Generic type	Torque controlled expansion anchor
Base material	Non cracked and cracked concrete C20/25 a C50/60 – EN 206-1:2003
Material	Zincplated steel
Durability	Internal dry condition
Loads	Static, quasi-static / Seismic action category C1
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 17/0952 issued by (issued 11-01-2018)	ETA Danmark A/S Goteborg Plads 1 DK-2150 Nordhavn
On the basis of	EAD 330232-00-0601 / 10/2016
Certificate of conformity **1220-CPR-1803** Issued by	ITeC Institut de Tecnologia de la Construccio de Catalunya Wellington 19 – ES08018 Barcelona
Under system	1

Declared performance according to EAD 330232-00-0601							
Essential Characteristic			**Performance**				
				M8	**M10**	**M12**	**M16**
Installation parameters VSA V / VSA B							
d_0	Nominal diameter of drill bit	[mm]		12	15	18	24
h_{ef}	Effective anchorage depth	[mm]		59	67	88	99
h_{min}	Minimum thickness of the concrete member	[mm]		125	135	190	220
h_1	Depth of drilled hole	[mm]		85	95	120	130
d_f	Diameter of hole in the fixture	[mm]		14	17	20	26
T_{inst}	Setting torque	[Nm]		25	50	80	150
t_{fix}	Fixture thickness	[mm]		10-20-50	10-20-50	10-25 50-100	25-50
Installation parameters VSA S							
d_0	Nominal diameter of drill bit	[mm]		12	15	18	
h_{ef}	Effective anchorage depth	[mm]		59	67	88	
h_{min}	Minimum thickness of the concrete member	[mm]		125	135	190	
h_1	Depth of drilled hole	[mm]		85	95	120	
d_f	Diameter of hole in the fixture	[mm]		14	17	20	
T_{inst}	Setting torque	[Nm]		25	50	80	
t_{fix}	Fixture thickness	[mm]		16-26-56	15-25-55	18-33-58	

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Tension – Steel failure							
$N_{Rk,s}$	Tension steel characteristic failure	[kN]		20	49	64	126
$\gamma_{m,sN}$	Partial safety factor	[-]		1.5			
Pull-out failure							
$N_{Rk,p,ucr}$	Tension characteristic load in non-cracked concrete C20/25	[kN]		12	16	25	40
$N_{Rk,p,cr}$	Tension characteristic load in cracked concrete C20/25	[kN]		7	10	18	28
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	[-]		1.55			
γ_2	Partial safety factor	[-]		1.2			
Concrete cone failure							
$K_1=K_{ucr}$	Factor for determination of the resistance to concrete cone failure on non cracked concrete	[-]		10.1			
$K_1=K_{cr}$	Factor for determination of the resistance to concrete cone failure on cracked concrete	[-]		7.2			
$s_{cr,N}$	Critical spacing	[mm]		3 h_{ef}			
$c_{cr,N}$	Critical edge distance	[mm]		1.5 h_{ef}			
γ_2	Partial safety factor	[-]		1.2			
Splitting failure							
$s_{cr,sp}$	Critical spacing (splitting)	[mm]		250	290	390	420
$c_{cr,sp}$	Critical edge distance (splitting)	[mm]		200	220	260	280
γ_2	Partial safety factor	[-]		1.2			
Displacement on Tension load							
N_{ucr}	Service tension load in non-cracked concrete C20/25	[kN]		4.0	5.3	9.9	13.2
$\delta_{N0,ucr}$	Short term displacement under tension load	[mm]		0.07	0.11	0.17	0.23
$\delta_{N\infty,ucr}$	Long term displacement under tension load	[mm]		-	1.47	-	-
N_{cr}	Service tension load in cracked concrete C20/25	[kN]		3.3	4.8	8.6	13.3
$\delta_{N0,cr}$	Short term displacement under tension load	[mm]		0.56	0.47	0.78	0.92
$\delta_{N\infty,cr}$	Long term displacement under tension load	[mm]		1.69	0.77	1.33	1.42
Shear – Steel failure							
$V_{Rk,s}$	Shear characteristic failure	[kN]		16.8	25	33.7	62.8
$\gamma_{m,sV}$	Partial safety factor	[-]		1.25			
$M^0_{Rk,s}$	Bending moment characteristic failure	[Nm]		30	60	105	266
$\gamma_{m,sV}$	Partial safety factor	[-]		1.25			
Shear – Concrete pry out							
$K=K_3=K_8$	Factor for pry out failure	[-]		1	2		
γ_2	Partial safety factor	[-]		1.2			
Shear – Concrete edge failure							
l_{ef}	Effective anchorage length	[mm]		59	67	88	99
γ_2	Partial safety factor	[-]		1.2			
Displacement on shear load							
V	Service shear load in cracked and non-cracked concrete	[kN]		9.6	14.3	19.3	35.9
δ_{V0}	Short term displacement under shear load	[mm]		3.7	3.8	4.0	4.1
$\delta_{V\infty}$	Long term displacement under shear load	[mm]		5.6	5.7	6.0	6.2
Characteristic tension resistance in cracked and non-cracked concrete under Fire Exposure TR 020							
Steel failure – Characteristic resistance							
$N_{Rk,s,fi}$	R30	[kN]		0.4	0.9	1.7	3.1
$N_{Rk,s,fi}$	R60	[kN]		0.3	0.8	1.3	2.4
$N_{Rk,s,fi}$	R90	[kN]		0.3	0.6	1.1	2.0
$N_{Rk,s,fi}$	R120	[kN]		0.2	0.5	0.8	1.6

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Pull-out failure – Characteristic resistance in concrete ≥ C20/25							
$N_{Rk,p,fi}$	R30	[kN]		1.8	2.5	4.5	7.0
$N_{Rk,p,fi}$	R60	[kN]					
$N_{Rk,p,fi}$	R90	[kN]					
$N_{Rk,p,fi}$	R120	[kN]		1.4	2.0	3.6	5.6
Concrete cone and splitting failure – Characteristic resistance in concrete ≥ C20/25							
$N^0_{Rk,c,fi}$	R30	[kN]		4.8	6.6	13.1	17.6
$N^0_{Rk,c,fi}$	R60	[kN]					
$N^0_{Rk,c,fi}$	R90	[kN]					
$N^0_{Rk,c,fi}$	R120	[kN]		3.9	5.3	10.5	14.0
$s_{cr,N,fi}$	Characteristic spacing	[mm]		4 h_{ef}			
$s_{min,N,fi}$	Minimum spacing	[mm]		120	140	180	240
$c_{cr,N,fi}$	Characteristic edge distance	[mm]		2 h_{ef}			
$c_{min,N,fi}$	Minimum edge distance	[mm]		Fire attack from one side: 2 h_{ef} Fire attack from more than one side: ≥300			
Characteristic shear resistance in cracked and non-cracked concrete under Fire Exposure TR 020							
Steel failure without lever arm – Characteristic resistance							
$V_{Rk,s,fi}$	R30	[kN]		0.4	0.9	1.8	3.3
$V_{Rk,s,fi}$	R60	[kN]		0.4	0.8	1.4	2.5
$V_{Rk,s,fi}$	R90	[kN]		0.3	0.6	1.2	2.2
$V_{Rk,s,fi}$	R120	[kN]		0.2	0.5	0.9	1.7
Steel failure with lever arm – Characteristic resistance							
$M^0_{Rk,s,fi}$	R30	[Nm]		0.4	1.1	2.6	6.7
$M^0_{Rk,s,fi}$	R60	[Nm]		0.3	1.0	2.0	5.0
$M^0_{Rk,s,fi}$	R90	[Nm]		0.3	0.7	1.7	4.3
$M^0_{Rk,s,fi}$	R120	[Nm]		0.2	0.6	1.3	3.3
Concrete pryout – Characteristic resistance							
$V_{Rk,cp,fi}$	R30	[kN]		4.8	13.2	26.2	35.1
$V_{Rk,cp,fi}$	R60	[kN]					
$V_{Rk,cp,fi}$	R90	[kN]					
$V_{Rk,cp,fi}$	R120	[kN]		3.9	10.6	20.9	28.1
$K = K_3$	Factor for pry-out	[-]		1.0	2.0	2.0	2.0
Concrete edge failure							
The initial value $V^0_{RK,c,fi}$ of the characteristic resistance in concrete C20/25 to C50/60 under fire exposure may be determined by: $V^0_{RK,c,fi} = 0.25 \times V^0_{RK,c}$ (≤R90) $V^0_{RK,c,fi} = 0.20 \times V^0_{RK,c}$ (≤R120) With $V^0_{RK,c}$ initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature.							
Characteristic values for tension and shear for seismic category C1							
Tension – Steel failure							
$N_{Rk,s,seis}$	Characteristic resistance	[kN]		20	49	64	-
$\gamma_{M,\ seis}$	Partial safety factor	[-]		1.5			
Pull out failure							
$N_{Rk,p,seis}$	Characteristic resistance	[kN]		5.6	10	14.4	-
$\gamma_{M,\ seis}$	Partial safety factor	[-]		1.8			
Shear – Steel failure without lever arm							
$V_{Rk,s,seis}$	Characteristic resistance	[kN]		13.4	25.0	33.7	-
$\gamma_{M,\ seis}$	Partial safety factor	[-]		1.25			

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The above performance apply for the following article numbers:

Code	d [mm]	Type VSA V
10880	12	12/10-80
10881		12/20-90
10882		12/50-120
10883	15	15/10-90
10884		15/20-100
10885		15/50-130
10886	18	18/10-110
10887		18/25-125
10888		18/50-150
10889		18/100-200
10890	24	24/25-140
10891		24/50-165

Code	d [mm]	Type VSA B
10900	12	12/10-80
10901		12/20-90
10902		12/50-120
10903	15	15/10-90
10904		15/20-100
10905		15/50-130
10906	18	18/10-110
10907		18/25-125
10908		18/50-150
10909		18/100-200
10910	24	24/25-140
10911		24/50-165

Code	d [mm]	Type VSA S
10920	12	12/10-86
10921		12/20-96
10922		12/50-126
10923	15	15/10-95
10924		15/20-105
10925		15/50-135
10926	18	18/10-120
10927		18/25-135
10928		18/50-160

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, 19/12/2017