Declaration of Performance

DoP-17/0184-R-HPTII-ZF

1. Unique identification code of the product-type:

R-HPTII-ZF

The photo depicts an example of a product of the given type of goods

2. Intended use/es:

general type	Anchors
to be applied in	Torque-controlled M6, M8, M10, M12, M16, M20 expansion anchors for both non-cracked and cracked concrete
option / category	
Loading	static, quasi-static and seismic
material	The Rawl R-HPTII-ZF Anchors are through-fixing torque controlled expansion anchors in sizes of M8, M10, M12, M16 and M20. Each type comprises special bolt with a taper, an expansion sleeve, a hexagonal nut and a washer. The anchors are made from carbon steel finished in zinc/aluminium coating.

3. Manufacturer:

Rawlplug S.A.
ul. Kwidzyńska 6, 51-416 Wrocław, PL
www.rawlplug.com

4. System/s of AVCP:

System 1

5. European Assessment Document:

EAD-330232-00-0601 Mechanical anchors for use in concrete.
Utilization category:

6. European Technical Assessment:

ETA-17/0184 edition of 2018-08-14

7. Technical Assessment Body:

Technicky a zkusebni ustav stavebni Praha

8. Notified body/ies:

1488 on the basis of:

- an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product
- initial inspection of the manufacturing plant and of factory production control
- continuing surveillance, assessment and evaluation of factory production control

issued a certificate **1488-CPR-0629/W**

9. Declared performance/s:

Essential Characteristics:

Technical Specification	**Basic requirements according to CPR**		**Remarks:**
ETA-17/0184	[1]	Mechanical resistance and stability	Declared values on the page 2
	[4]	Operational safety	Such criteria as those significant for [1]

Table C1 – Characteristic resistance under tension load

Steel failure												
Size			M8		M10		M12		M16		M20	
			Reduced[1]	Standard	Reduced[1]	Standard	Reduced[1]	Standard	Reduced[1]	Standard	Reduced[1]	Standard
Characteristic resistance	$N_{Rk,s}$	[kN]	11,0		17,5		25,8		45,8		70,0	
Partial safety factor	γ_{Ms}	[-]	1,4		1,4		1,4		1,4		1,4	
Pull-out failure												
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	3,0	5,0	6,0	9,0	9,0	12,0	16,0	20,0	-[5]	30,0
Characteristic resistance in non cracked concrete C20/25	$N_{Rk,p}$	[kN]	7,5	9,0	9,0	12,0	12,0	20,0	-[5]	35,0	-[5]	-[5]
Installation safety factor	γ_2[2] = γ_{inst}[3][4]	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Increasing factor												
Cracked and non cracked concrete	C30/37	[-]	1,20	1,12	1,16	1,22	1,22	1,00	1,11	1,14	1,12	1,07
	C40/50 ψ_c		1,40	1,22	1,33	1,44	1,44	1,00	1,22	1,28	1,26	1,14
	C50/60		1,60	1,33	1,50	1,67	1,67	1,00	1,33	1,43	1,39	1,21
Concrete cone failure												
Factor for cracked concrete	k_1[2] = k_{ucr}[3]	[-]	7,2									
	$k_{ucr,N}$[4]	[-]	7,7									
Factor for non cracked concrete	k_1[2] = k_{ucr}[3]	[-]	10,1									
	$k_{ucr,N}$[4]	[-]	11,0									
Installation safety factor	γ_2[2] = γ_{inst}[3][4]	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Effective anchorage depth	h_{ef}	[mm]	32	47	39	59	48	68	65	85	80	99
Spacing	$s_{cr,N}$	[mm]	96	141	117	177	144	204	195	255	240	297
Edge distance	$c_{cr,N}$	[mm]	48	71	59	89	72	102	98	128	120	149
Splitting failure												
Spacing	$s_{cr,sp}$	[mm]	170	220	200	300	250	340	320	430	410	530
Edge distance	$c_{cr,sp}$	[mm]	85	110	100	150	125	170	160	215	205	265
Installation safety factor	γ_2[2] = γ_{inst}[3][4]	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0

[1] Use restricted to anchoring statically indeterminate structural components
[2] parameter for design according to EOTA ETAG 001 Annex C
[3] parameter for design according to CEN/TS 1992-4-4:2009
[4] parameter for design according to FprEN 1992-4:2016
[5] Pull-out failure mode is not decisive

Table C2 – Displacement under tension load

Size			M8		M10		M12		M16		M20	
			Reduced[1)]	Standard	Reduced[1)]	Standard	Reduced[1)]	Standard	Reduced[1)]	Standard	Reduced[1)]	Standard
Tension load in cracked concrete	N	[kN]	1,2	2,0	2,4	4,3	4,3	5,7	7,6	9,5	12,3	14,3
Displacement	δ_{N0}	[mm]	0,6	0,8	0,3	1,0	0,5	0,7	0,3	0,4	0,4	0,4
	$\delta_{N\infty}$	[mm]	1,0	0,9	1,1	1,4	1,0	0,9	0,8	1,1	1,3	0,7
Tension load in uncracked concrete	N	[kN]	3,0	3,6	3,6	5,7	5,7	9,5	12,6	16,7	17,2	23,6
Displacement	δ_{N0}	[mm]	0,1	0,3	0,3	0,3	0,1	0,6	0,5	0,2	0,1	0,6
	$\delta_{N\infty}$	[mm]	1,0	0,9	1,1	1,4	1,0	0,9	0,8	1,1	1,3	0,7

[1)] Use restricted to anchoring statically indeterminate structural components

Table C3 – Characteristic resistance under shear load

Steel failure without lever arm												
Size			M8		M10		M12		M16		M20	
			Reduced[1]	Standard	Reduced[1]	Standard	Reduced[1)]	Standard	Reduced[1)]	Standard	Reduced[1)]	Standard
Characteristic resistance	$V^0_{Rk,s}$	[kN]	9,1		15,7		23,7		47,1		60,6	
Ductility factor	k_7	[-]	0,8		0,8		0,8		0,8		0,8	
Partial safety factor	γ_{Ms}	[-]	1,25		1,25		1,25		1,25		1,25	
Steel failure with lever arm												
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	22		45		79		200		389	
Partial safety factor	γ_{Ms}	[-]	1,25		1,25		1,25		1,25		1,25	
Concrete pry-out failure												
Factor	k_8	[-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Installation safety factor	γ_2[2)]= γ_{inst}[3)4)]	[-]	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Concrete edge failure												
Effective length of anchor	ℓ_f	[mm]	32	47	39	59	48	68	65	85	80	99
Anchor diameter	d_{nom}	[mm]	8		10		12		16		20	
Installation safety factor	γ_2[2)]= γ_{inst}[3)4)]	[-]	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0

[1)] Use restricted to anchoring statically indeterminate structural components
[2)] parameter for design according to EOTA ETAG 001 Annex C
[3)] parameter for design according to CEN/TS 1992-4-4:2009
[4)] parameter for design according to FprEN 1992-4:2016

Table C4 – Displacement under shear load

Size			M8		M10		M12		M16		M20	
			Reduced[2)]	Standard	Reduced[2)]	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
Shear load in cracked and non cracked concrete	V	[kN]	5,8	5,8	9,2	9,2	13,3	13,3	24,5	24,5	38,5	38,5
Displacement	δ_{V0}	[mm]	1,2	1,2	1,5	1,5	2,0	2,0	2,4	2,4	2,6	2,6
	$\delta_{V\infty}$	[mm]	1,8	1,8	2,3	2,3	3,0	3,0	3,6	3,6	3,9	3,9

[1)] Use restricted to anchoring statically indeterminate structural components

Table C5 – Characteristic values of resistance to tension load under fire exposure[1)]

Size			M8		M10		M12		M16		M20	
			Reduced[2)]	Standard	Reduced[2)]	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
Characteristic fire resistance duration at 30 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,4		0,9		1,7		3,1		4,9	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 60 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,3		0,8		1,3		2,4		3,7	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 90 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,3		0,6		1,1		2,0		3,2	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 120 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,2		0,5		0,8		1,6		2,5	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,6	1,0	1,2	1,8	1,8	2,4	3,2	4,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	0,8	2,2	1,4	3,9	2,3	5,5	4,9	9,6	8,2	14,0
Spacing	$s_{cr,N}$	[mm]	$4 \times h_{ef}$									
	s_{min}	[mm]	55	50	75	70	150	90	190	160	300	180
Edge distance	$c_{cr,N}$	[mm]	$2 \times h_{ef}$									
	c_{min}	[mm]	$c_{min} = 2 \times h_{ef}$ however if the fire attack is from more than one side, the edge distance of the anchor has to be ≥ 300 mm and ≥ $2 \times h_{ef}$									

[1)] In absence of other national regulations the partial safety factor for resistance under fire exposure. $\gamma_{M,fi} = 1,0$ is recommended

[2)] Use restricted to anchoring statically indeterminate structural components

Table C6 – Characteristic values of resistance to shear load under fire exposure

Size			M8		M10		M12		M16		M20	
			Reduced[1)]	Standard	Reduced[1)]	Standard	Reduced	Standard	Reduced	Standard	Reduced	Standard
Characteristic fire resistance duration at 30 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	0,4		0,9		1,7		3,1		4,9	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	0,4		1,1		2,6		6,7		13,0	
Characteristic fire resistance duration at 60 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	0,3		0,8		1,3		2,4		3,7	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	0,3		1,0		2,0		5,0		9,7	
Characteristic fire resistance duration at 90 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	0,3		0,6		1,1		2,0		3,2	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	0,3		0,7		1,7		4,3		8,4	
Characteristic fire resistance duration at 120 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	0,2		0,5		0,8		1,6		2,5	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	0,2		0,6		1,3		3,3		6,5	
Concrete pry-out failure												
Factor[2)]	k_8	[-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Concrete edge failure			The characteristic resistance $V^0_{Rk,c,fi}$ in concrete C20/25 to C50/60 is determined by: $V^0_{Rk,c,fi} = 0,25 \times V^0_{Rk,c(\leq 90)}$ and $V^0_{Rk,c,fi} = 0,20 \times V^0_{Rk,c(\leq 120)}$ with the initial value of the characteristic resistance $V^0_{Rk,c}$ in cracked concrete C20/25 under normal temperature									

[1)] Use restricted to anchoring statically indeterminate structural components

[2)] The values of factor k_8 and relevant values of $N_{Rk,c,fi}$ given in the Table C5 have to be considered in the design

Table C7 – Characteristic values of resistance under seismic action category C2

Size			M10	M12	M16
			Standard		
Tension load					
Steel failure					
Characteristic resistance	$N_{Rk,s,eq,C2}$	[kN]	17,5	25,8	45,8
Partial safety factor	$\gamma_{Ms,eq}$	[-]	1,4	1,4	1,4
Pull-out failure					
Characteristic resistance in concrete C20/25	$N_{Rk,p,eq,C2}$	[kN]	3,4	7,0	10,9
Installation safety factor	$\gamma_{2,eq} = \gamma_{inst,eq}$	[-]	1,0	1,0	1,0
Shear load					
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s,eq,C2}$	[kN]	9,2	11,1	28,2
Partial safety factor	$\gamma_{Ms,eq}$	[-]	1,25	1,25	1,25
Factor for annular gap	α_{gap}	[-]		0,5	

Table C8 – Displacement under tensile and shear load - seismic category C2

Size		M10	M12	M16
$\delta_{N,eq(DLS)}$	[mm]	2,8	3,0	4,2
$\delta_{N,eq(ULS)}$	[mm]	9,3	12,2	13,0
$\delta_{V,eq(DLS)}$	[mm]	4,5	4,3	5,8
$\delta_{V,eq(ULS)}$	[mm]	7,0	7,0	10,2

The performance of the product identified above is in conformity with the set of declared performance/s. 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 manufacturer:

Sławomir Jagła
Proxy of the Quality Management System
Wrocław, 19.09.2018.

PEŁNOMOCNIK SYSTEMU
ZARZĄDZANIA JAKOŚCIĄ
mgr Sławomir Jagła