DECLARATION OF PERFORMANCE

Nr DoP-23/0934-R-KF2

1. Unique identification code of the product type: **R-KF2**
2. Intended use: **Bonded anchor R-KF2, R-KF2-S, R-KF2-W, with threaded rod for use in non-cracked concrete.**
3. Producer: **RAWLPLUG S.A., ul. Kwidzyńska 6, 51-416 Wrocław, Polska**
4. System(s) of assessment and verification of constancy of performance: **System 1**
5. European Assessment Document: **EAD 330499-02-0601; September 2022**
6. European Technical Assessment: **ETA-23/0934; 2025-04-08**
   Technical Assessment Unit: **Technical and Test Institute for Construction Prague**
   Notified body or bodies: **1020**
   Certificate number and type: **1020-CPR-090-064445**
7. Declared performance characteristics:

Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load and shear load static and quasi static loading.	See Tabele C1 to C8; ETA-23/0934
Displacements under short term and long term loading	See Tabele C9 to C11; ETA-23/0934

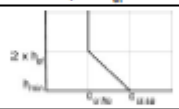
Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

Hygiene, health and environment (BWR 3)

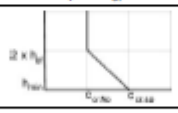
Essential characteristic	Performance
No performance assessed	

Table C1: Characteristic values under tension load for threaded rod in uncracked concrete

Size				M8	M10	M12	M16	M20	M24	M27	M30
Steel failure											
Steel, property class 4.8											
Characteristic resistance		$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor[1]		γ_{Ms}	[-]	1,50							
Steel, property class 5.8											
Characteristic resistance		$N_{Rk,s}$	[kN]	18	29	42	78	122	176	230	280
Partial safety factor[1]		γ_{Ms}	[-]	1,50							
Steel, property class 8.8											
Characteristic resistance		$N_{Rk,s}$	[kN]	29	46	67	125	196	282	367	448
Partial safety factor[1]		γ_{Ms}	[-]	1,50							
Steel, property class 10.9											
Characteristic resistance		$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor[1]		γ_{Ms}	[-]	1,40							
Steel, property class 12.9											
Characteristic resistance		$N_{Rk,s}$	[kN]	44	70	101	188	294	424	551	673
Partial safety factor[1]		γ_{Ms}	[-]	1,40							
Stainless steel, property class A2/A4/HCR-50											
Characteristic resistance		$N_{Rk,s}$	[kN]	18	29	42	78	122	176	230	280
Partial safety factor[1]		γ_{Ms}	[-]	2,86							
Stainless steel, property class A2/A4/HCR-70											
Characteristic resistance		$N_{Rk,s}$	[kN]	25	40	59	109	171	247	321	392
Partial safety factor[1]		γ_{Ms}	[-]	1,87							
Stainless steel, property class A2/A4/HCR-80											
Characteristic resistance		$N_{Rk,s}$	[kN]	29	46	67	125	196	282	367	448
Partial safety factor[1]		γ_{Ms}	[-]	1,60							
Combined pull-out and concrete cone failure in uncracked concrete C20/25 for a working life of 50 and 100 years											
Characteristic bond resistance temperature range -40°C / +40°C [2]		$\tau_{Rk,ucr}$	[N/mm²]	10,9	10,7	10,8	10,0	9,4	8,4	7,9	7,5
Characteristic bond resistance temperature range -40°C / +80°C [2]		$\tau_{Rk,ucr}$	[N/mm²]	10,3	10,1	10,1	9,4	8,9	7,8	7,4	7,0
Increasing factor for C 25/30		ψ_c	[-]	1,02							
Increasing factor for C 30/37				1,04							
Increasing factor for C 35/45				1,06							
Increasing factor for C 40/50				1,07							
Increasing factor for C 45/55				1,08							
Increasing factor for C 50/60				1,09							
Factor for influence of sustained load for a working life of 50 years	temperature range -40°C / +40°C [3]	ψ^0_{sus}	[-]	0,78							
	temperature range -40°C / +80°C [3]			0,78							
Factor for influence of sustained load for a working life of 100 years	temperature range -40°C / +40°C [3]			0,74							
	temperature range -40°C / +80°C [3]			0,73							
Concrete cone failure in uncracked concrete											
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0							
Edge distance		$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$							
Spacing		$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$							
Splitting failure											
Edge distance	$c_{cr,sp}$ for h_{min}		[mm]	$2,0 \cdot h_{ef}$							
	$c_{cr,sp}$ for $h_{min} < h^{3)} < 2 \cdot h_{ef}$ ($c_{cr,sp}$ from linear interpolation)										
	$c_{cr,sp}$ for $h^{3)} \geq 2 \cdot h_{ef}$			$c_{cr,N}$							
Spacing	$s_{cr,sp}$		[mm]	$2,0 \cdot c_{cr,sp}$							
Installation sensitivity factors for combined pull-out, concrete cone and splitting failure for hammer drilling											
Installation sensitivity factor for use in category I1 and I2[1]		γ_{inst}	[-]	1,4			1,2				
Installation sensitivity factors for combined pull-out, concrete cone and splitting failure for dustless drilling											
Installation sensitivity factor for use in category I1 and I2[1]		γ_{inst}	[-]	1,2							

[1] In the absence of other national regulation.
[2] See: Annex B1.
[3] h = concrete member thickness

Table C2: Characteristic values under tension load for rebar in uncracked concrete

Size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Steel failure											
Characteristic resistance		$N_{Rk,s}$	[kN]	A_s [4] · f_{uk}							
Partial safety factor [1]		γ_{Ms}	[-]	1,4							
Combined pull-out and concrete cone failure in uncracked concrete C20/25 for a working life of 50 and 100 years											
Characteristic bond resistance temperature range -40°C / +40°C [2]		$\tau_{Rk,ucr}$	[N/mm²]	9,5	8,7	8,9	8,6	7,6	6,9	6,3	5,8
Characteristic bond resistance temperature range -40°C / +80°C [2]		$\tau_{Rk,ucr}$	[N/mm²]	8,9	8,1	8,3	8,1	7,1	6,5	5,9	5,4
Increasing factor for C 25/30		Ψ_c	[-]	1,02							
Increasing factor for C 30/37				1,04							
Increasing factor for C 35/45				1,06							
Increasing factor for C 40/50				1,07							
Increasing factor for C 45/55				1,08							
Increasing factor for C 50/60				1,09							
Factor for influence of sustained load for a working life of 50 years	temperature range -40°C / +40°C [2]	Ψ^0_{sus}	[-]	0,78							
	temperature range -40°C / +80°C [2]			0,78							
Factor for influence of sustained load for a working life of 100 years	temperature range -40°C / +40°C [2]			0,74							
	temperature range -40°C / +80°C [2]			0,73							
Concrete cone failure in uncracked concrete											
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0							
Edge distance		$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$							
Spacing		$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$							
Splitting failure											
Edge distance	$c_{cr,sp}$ for h_{min}		[mm]	$2,0 \cdot h_{ef}$							
	$c_{cr,sp}$ for $h_{min} < h$ [3] $< 2 \cdot h_{ef}$ ($c_{cr,sp}$ from linear interpolation)										
	$c_{cr,sp}$ for h [3] $\geq 2 \cdot h_{ef}$			$c_{cr,N}$							
Spacing	$s_{cr,sp}$		[mm]	$2,0 \cdot c_{cr,sp}$							
Installation sensitivity factors for combined pull-out, concrete cone and splitting failure for hammer drilling											
Installation sensitivity factor pro použití v kategorii I1 and I2 [1]		γ_{inst}	[-]	1,4		1,2					
Installation sensitivity factors for combined pull-out, concrete cone and splitting failure for dustless drilling											
Installation sensitivity factor pro použití v kategorii I1 and I2 [1]		γ_{inst}	[-]	1,2							

[1] In the absence of other national regulation.
[2] See: Annex B1.
[3] h = concrete member thickness
[4] Stressed cross section of the steel element

Table C3: Characteristic values under shear loads for threaded rod steel failure without and with lever arm

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel, property class 4.8										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	9	14	20	38	59	85	110	135
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	15	30	52	133	260	449	666	900
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,25							
Steel, property class 5.8										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	11	17	25	47	73	106	138	168
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	561	832	1124
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,25							
Steel, property class 8.8										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898	1332	1799
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,25							
Steel, property class 10.9										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	37	75	131	333	649	1123	1664	2249
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,50							
Steel, property class 12.9										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	22	35	51	94	147	212	275	337
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	45	90	157	400	779	1347	1997	2699
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,50							
Stainless steel, property class A2/A4/HCR-50										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	561	832	1124
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	2,38							
Stainless steel, property class A2/A4/HCR-70										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	13	20	29	55	86	124	161	196
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	26	52	92	233	454	786	1165	1574
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,56							
Stainless steel, property class A2/A4/HCR-80										
Steel failure without lever arm	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Steel failure with lever arm	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898	1332	1799
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,33							

Table C4: Characteristic values under shear loads – pry out and concrete edge failure for threaded rod

Size			M8	M10	M12	M16	M20	M24	M27	M30
Pry out failure										
Factor	k_8	[-]	2							
Concrete edge failure										
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Effective length of anchor under shear loading	l_f	[mm]	min (h_{ef}; $8d_{nom}$)							

[1] In the absence of other national regulation.

Table C6: Characteristic values under shear loads for rebar – steel failure without lever arm

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Rebar										
Characteristic resistance	$V^0_{Rk,s}$	[kN]	$0,5 \cdot A_s$[2] $\cdot f_{uk}$							
Factor considering ductility	k_7	[-]	1							
Partial safety factor [1]	γ_{Ms}	[-]	1,5							

Table C7: Characteristic values under shear loads for rebar – steel failure with lever arm

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Rebar										
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	$1,2 \cdot W_{el}$[3] $\cdot f_{uk}$							
Partial safety factor [1]	γ_{Ms}	[-]	1,5							

Table C8: Characteristic values under shear loads – pry out and concrete edge failure for rebar

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Pry out failure										
Factor	k_8	[-]	2							
Concrete edge failure										
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	25	28	32
Effective length of anchor under shear loading	l_f	[mm]	min (h_{ef}; $12d_{nom}$)					min (h_{ef}; $8d_{nom}$)		

[1] In the absence of other national regulation
[2] Stressed cross section of the steel element
[3] Elastic section modulus calculated from the stressed cross section of steel element

Table C9: Displacement under tension loads – threaded rod

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic displacement in uncracked concrete C20/25 to C50/60 under tension loads										
Displacement	δ_{N0}	[mm/kN]	0,015	0,013	0,011	0,009	0,007	0,007	0,006	0,005
	$\delta_{N\infty}$	[mm/kN]	0,100	0,081	0,057	0,041	0,031	0,027	0,023	0,019

Table C10: Displacement under tension loads – rebar

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Characteristic displacement in uncracked concrete C20/25 to C50/60 under tension loads										
Displacement	δ_{N0}	[mm/kN]	0,049	0,046	0,037	0,027	0,023	0,023	0,020	0,018
	$\delta_{N\infty}$	[mm/kN]	0,114	0,102	0,073	0,048	0,039	0,033	0,029	0,025

Table C11: Displacement under shear loads – threaded rod

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic displacement in concrete C20/25 to C50/60 under shear loads										
Displacement	δ_{V0}	[mm]	0,036	0,028	0,021	0,013	0,009	0,006	0,005	0,004
	$\delta_{V\infty}$	[mm]	0,054	0,041	0,032	0,019	0,013	0,009	0,008	0,007

Table C11: Displacement under shear loads – rebar

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Characteristic displacement in concrete C20/25 to C50/60 under shear loads										
Displacement	δ_{V0}	[mm]	0,029	0,021	0,015	0,010	0,007	0,005	0,004	0,003
	$\delta_{V\infty}$	[mm]	0,004	0,031	0,023	0,015	0,010	0,007	0,005	0,005

The performance of the product identified above is in conformity with the set of declared performance characteristics. This declaration of performance is issued in accordance with Regulation (EU) No 305/2011 under the sole responsibility of the manufacturer identified above.

Tomasz Walczak
Wrocław, 2025-06-26

DYREKTOR ADMINISTRACYJNY
Tomasz Walczak