

DECLARATION of PERFORMANCE

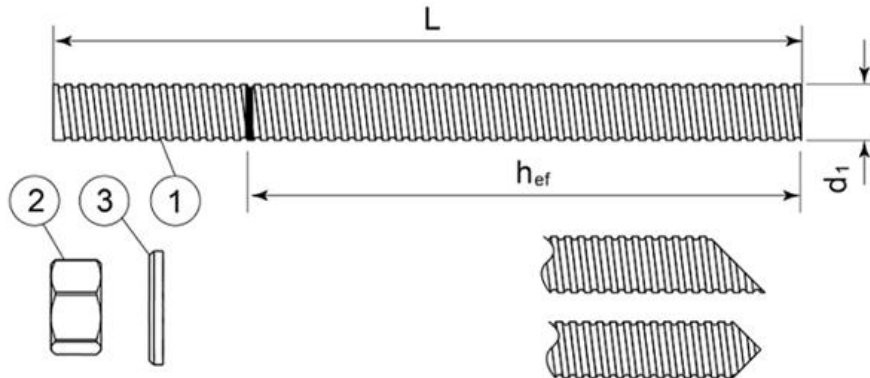
No 01/MKP/0876/2020



1. *Unique identification code of the product-type:* **MKP**
2. *Intended use:* for fixing in uncracked concrete as a injection mortal together with threaded rods from diameter:8 to 12mm.
3. *Name, registered trade name or registered trade mark and contact address of the manufacturer:* **Marcopol Sp. z o.o. Producer of Bolts str. Oliwska 100, 80-209 Chwaszczyno Poland manufacturing plant 1**
4. *System of assessment verification of constancy of performance of the construction product:* **System "1" of assessment**
5. *European Technical Assessment:* **ETA 20/0876 issued 19.11.2020**
Technical Assessment Body: **Technical and Test Institute for Construction Prague**
Notified Body: **Number: 1020 - Technical and Test Institute for Construction Prague**
Certificate number: **1020-CPR-090-050583**
6. *Declared performance:*

	Essential characteristics	Performance	Technical specification
3.1 BWR 1: Mechanical resistance and stability			
3.1.1.	Resistance to steel failure (tension)	see Annex C1 below	ETA 20/0876
3.1.2.	Resistance to combined pull-out and concrete failure	see Annex C1 below	ETA 20/0876
3.1.3	Resistance to concrete cone failure	see Annex C1 below	ETA 20/0876
3.1.4	Edge distance to prevent splitting under load	see Annex C1 below	ETA 20/0876
3.1.5	Robustness	see Annex C1 below	ETA 20/0876
3.1.6	Maximum setting torque moment	see Annex B4 below	ETA 20/0876
3.1.7	Minimum edge distance and spacing	see Annex B4 below	ETA 20/0876
3.1.8	Resistance to steel failure (shear)	see Annex C2 below	ETA 20/0876
3.1.9	Resistance to pry-out failure	see Annex C2 below	ETA 20/0876
3.1.10	Resistance to concrete edge failure	see Annex C2 below	ETA 20/0876
3.1.11	Displacements under short term and long term loading	see Annex C2 below	ETA 20/0876
3.1.12	Durability	see Annex A3 below	
3.3 BWR 3: Hygiene, health and the environment			
3.3.1.	Content, emission and/or release of dangerous substances	NPD	EU Regulation REACH 1907/2006

Threaded rod KGFIX M8, M10, M12, M16, M20, M24



Standard commercial threaded rod with marked embedment depth

Part	Designation	Material
Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 or Steel, Hot-dip galvanized $\geq 40 \mu\text{m}$ acc. to EN ISO 1461 and EN ISO 10684 or Steel, zinc diffusion coating $\geq 15 \mu\text{m}$ acc. to EN 13811		
1	Anchor rod	Steel, EN 10087 or EN 10263 Property class 4.6, 5.8, 8.8, 10.9* EN ISO 898-1
2	Hexagon nut EN ISO 4032	According to threaded rod, EN 20898-2
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
Stainless steel		
1	Anchor rod	Material: A2-70, A4-70, A4-80, EN ISO 3506
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
High corrosion resistant steel		
1	Anchor rod	Material: 1.4529, 1.4565, EN 10088-1
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

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Product description

Threaded rod and materials

Annex A3

Table B1: Installation parameter

Size			M8	M10	M12	M16	M20	M24
Nominal drill hole diameter	$\varnothing d_0$	[mm]	10	12	14	18	22	26
Diameter of cleaning brush	d_b	[mm]	14	14	20	20	29	29
Torque moment	max T_{fix}	[Nm]	10	20	40	80	120	160
Depth of drill hole for $h_{ef,min}$	h_{ef}	[mm]	64	80	96	128	160	192
Depth of drill hole for $h_{ef,max}$	h_{ef}	[mm]	96	120	144	192	240	288
Depth of drill hole	h_0	[mm]	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$	$h_{ef}+5$
Minimum edge distance	c_{min}	[mm]	40	40	40	60	80	95
Minimum spacing	s_{min}	[mm]	40	40	40	60	80	95
Minimum thickness of member	h_{min}	[mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$		

Table B2: Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

Table B3: Minimum curing time

Resin cartridge temperature [°C]	T Work [mins]	Base material Temperature [°C]	T Load [mins]
min +5	18	min +5	145
+5 to +10	10	+5 to +10	
+10 to +20	6	+10 to +20	85
+20 to +25	5	+20 to +25	50
+25 to +30	4	+25 to +30	40
+30		+30	35

T work is typical gel time at highest temperature

T load is set at the lowest temperature

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Intended use

Installation parameters

Curing time

Annex B4

Table C1: Design method EN 1992-4

Characteristic values of resistance to tension load

Steel failure – Characteristic resistance				M8	M10	M12	M16	M20	M24
Size									
Steel grade 4.6	$N_{Rk,s}$	[kN]		15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]		2,0					
Steel grade 5.8	$N_{Rk,s}$	[kN]		18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]		1,5					
Steel grade 8.8	$N_{Rk,s}$	[kN]		29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]		1,5					
Steel grade 10.9	$N_{Rk,s}$	[kN]		37	58	84	157	245	353
Partial safety factor	γ_{Ms}	[-]		1,4					
Stainless steel grade A2-70, A4-70	$N_{Rk,s}$	[kN]		26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]		1,9					
Stainless steel grade A4-80	$N_{Rk,s}$	[kN]		29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]		1,6					
Stainless steel grade 1.4529	$N_{Rk,s}$	[kN]		26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]		1,5					
Stainless steel grade 1.4565	$N_{Rk,s}$	[kN]		26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]		1,9					

Combined pullout and concrete cone failure in uncracked concrete C20/25									
Size				M8	M10	M12	M16	M20	M24
Characteristic bond resistance in uncracked concrete									
Temperature range: -40°C to +80°C	$\tau_{Rk,ucr}$	[N/mm ²]		6	6	5	5	4	4
Dry/wet concrete and flooded hole									
Installation safety factor	γ_{inst}	[-]		1,2					
Factor for concrete	C25/30	ψ_c	[-]	1,04					
	C30/37			1,08					
	C35/45			1,12					
	C40/50			1,15					
	C45/55			1,17					
	C50/60			1,19					

Concrete cone failure			
Factor for concrete cone failure	$k_{ucr,N}$	[-]	11
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure								
Size			M8	M10	M12	M16	M20	M24
Edge distance	$c_{cr,sp}$	[mm]	$2 \cdot h_{ef}$					
Spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$					

MKP	Annex C1
Performances	
Characteristic resistance for tension loads	

Table C2: Design method EN 1992-4
Characteristic values of resistance to shear load

Steel failure without lever arm									
Size			M8	M10	M12	M16	M20	M24	
Steel grade 4.6	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	
Partial safety factor	γ_{Ms}	[-]	1,67						
Steel grade 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	
Partial safety factor	γ_{Ms}	[-]	1,25						
Steel grade 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	
Partial safety factor	γ_{Ms}	[-]	1,25						
Steel grade 10.9	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	
Partial safety factor	γ_{Ms}	[-]	1,5						
Stainless steel grade A2-70, A4-70	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	
Partial safety factor	γ_{Ms}	[-]	1,56						
Stainless steel grade A4-80	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	
Partial safety factor	γ_{Ms}	[-]	1,33						
Stainless steel grade 1.4529	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	
Partial safety factor	γ_{Ms}	[-]	1,25						
Stainless steel grade 1.4565	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	
Partial safety factor	γ_{Ms}	[-]	1,56						
Characteristic resistance of group of fasteners									
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$									
Steel failure with lever arm									
Size			M8	M10	M12	M16	M20	M24	
Steel grade 4.6	$M^o_{Rk,s}$	[N.m]	15	30	52	133	260	449	
Partial safety factor	γ_{Ms}	[-]	1,67						
Steel grade 5.8	$M^o_{Rk,s}$	[N.m]	19	37	66	166	325	561	
Partial safety factor	γ_{Ms}	[-]	1,25						
Steel grade 8.8	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	
Partial safety factor	γ_{Ms}	[-]	1,25						
Steel grade 10.9	$M^o_{Rk,s}$	[N.m]	37	75	131	333	649	1123	
Partial safety factor	γ_{Ms}	[-]	1,50						
Stainless steel grade A2-70, A4-70	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	
Partial safety factor	γ_{Ms}	[-]	1,56						
Stainless steel grade A4-80	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	
Partial safety factor	γ_{Ms}	[-]	1,33						
Stainless steel grade 1.4529	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	
Partial safety factor	γ_{Ms}	[-]	1,25						
Stainless steel grade 1.4565	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	
Partial safety factor	γ_{Ms}	[-]	1,56						
Concrete pry-out failure									
Factor for resistance to pry-out failure	k_8	[-]	2						
Concrete edge failure									
Size			M8	M10	M12	M16	M20	M24	
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24	
Effective length of fastener	ℓ_f	[mm]	min ($h_{ef}, 8 d_{nom}$)						

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Performances

Characteristic resistance for shear loads

Annex C2

Table C3: Displacement under tension and shear load

Size	M8	M10	M12	M16	M20	M24
Tension load						
δ_{N0} [mm/kN]	0,03	0,03	0,03	0,02	0,01	0,02
$\delta_{N\infty}$ [mm/kN]	0,13	0,08	0,05	0,03	0,03	0,02
Shear load						
δ_{V0} [mm/kN]	0,71	0,45	0,31	0,17	0,11	0,07
$\delta_{V\infty}$ [mm/kN]	1,06	0,67	0,46	0,25	0,16	0,11

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Performances

Displacement

Annex C3

7. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 6

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 3.

Chwaszczyno, 05.02.2021

Signed by:

R&D Director

Janusz Kabała