DECLARATION OF PERFORMANCE
DoP No. MKT- 450 - en

1. Unique identification code of the product-type: **MKT Injection System VM-EA**

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):

   ETA-16/0898, Annex A2 and A3
   Batch number: see packaging of the product.

3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:

generic type	bonded anchor
for use in	non-cracked concrete C20/25 - C50/60 (EN 206)
option	7
loading	static or quasi-static

material	hot-dip galvanized steel:
	    dry internal conditions only
	    covered sizes:
	         M8, M10, M12, M16, M20, M24
	
	 zinc-plated steel:
	    dry internal conditions only
	    covered sizes:
	         M8, M10, M12, M16, M20, M24
	
	 stainless steel (marking A4):
	    internal and external use without particular aggressive conditions
	    covered sizes:
	         M8, M10, M12, M16, M20, M24
	
	 high corrosion resistant steel (marking HCR):
	    internal and external use with particular aggressive conditions
	    covered sizes:
	         M8, M10, M12, M16, M20, M24

temperature range (if applicable)	Range I: -40 °C to +40 °C Range II -40 °C to +80 °C

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

   MKT Metall-Kunststoff-Technik GmbH & Co. KG
   Auf dem Immel 2
   D - 67685 Weilerbach

5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2): --

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V: **System 1**

7. In case of the declaration of performance concerning a construction product covered by a harmonised standard: --

22.11.2016

8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

Deutsches Institut für Bautechnik, Berlin

issued

ETA-16/0898

on the basis of

ETAG 001-5

The notified body 1343-CPR performed under system 1:

(i) determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product;

(ii) initial inspection of the manufacturing plant and of factory production control;

(iii) continuous surveillance, assessment and evaluation of factory production control.

and issued: Certificate of constancy of performance 1343-CPR-M 550-15/08.15
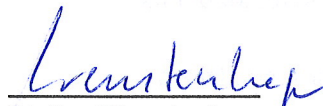
9. Declared performance:

Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
characteristic resistance for tension	TR 029, CEN/TS 1992-4	Annex C1	ETAG 001
characteristic resistance for shear	TR 029, CEN/TS 1992-4	Annex C2	
displacement for serviceability limit state	TR 029, CEN/TS 1992-4	Annex C3	

Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies: --
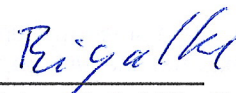
10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

Stefan Weustenhagen
(General Manager)
Weilerbach, 22.11.2016

i.V.
Dipl.-Ing. Detlef Bigalke
(Head of product development)

Table C1: Characteristic values under tension loads in non-cracked concrete

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24
Steel failure								
Characteristic tension resistance	$N_{Rk,s}$	[kN]	$A_s \times f_{uk}$					
Combined pull-out and concrete failure								
Characteristic bond resistance in non-cracked concrete C20/25								
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$ [N/mm²]	8,5	8,0	8,0	8,0	8,0	8,0
	flooded bore hole	$\tau_{Rk,ucr}$ [N/mm²]	8,5	8,0	8,0	8,0	8,0	8,0
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$ [N/mm²]	6,5	6,0	6,0	6,0	6,0	6,0
	flooded bore hole	$\tau_{Rk,ucr}$ [N/mm²]	6,5	6,0	6,0	6,0	6,0	6,0
Increasing factors for concrete ψ_c	C25/30		1,04					
	C30/37		1,08					
	C35/45		1,13					
	C40/50		1,15					
	C45/55		1,17					
	C50/60		1,19					
Factor according to CEN/TS 1992-4-5 Section 6.2.2.3	k_8	[-]	10,1					
Concrete cone failure								
Factor according to CEN/TS 1992-4-5 Section 6.2.3.1	k_{ucr}	[-]	10,1					
Edge distance	$c_{cr,N}$	[mm]	$1,5\ h_{ef}$					
Axial distance	$s_{cr,N}$	[mm]	$3,0\ h_{ef}$					
Splitting failure								
Edge distance	$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef} \le 2 \cdot h_{ef}\left(2,5 - \dfrac{h}{h_{ef}}\right) \le 2,4 \cdot h_{ef}$					
Axial distance	$s_{cr,sp}$	[mm]	$2\ c_{cr,sp}$					
Installation safety factor (dry and wet concrete)	$\gamma_2 = \gamma_{inst}$	[-]	1,2					
Installation safety factor (flooded bore hole)	$\gamma_2 = \gamma_{inst}$	[-]	1,2					

Injection System VM-EA, VM-EA express, VM-EA low speed for concrete	**Annex C 1**
Performances Characteristic values under tension loads in non-cracked concrete	

Table C2: Characteristic values under shear loads in non-cracked concrete

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24
Steel failure without lever arm								
Characteristic shear resistance,	$V_{Rk,s}$	[kN]	$0,5 \times A_s \times f_{uk}$					
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1	k_2	[-]	0,8					
Steel failure with lever arm								
Characteristic bending moment,	$M^0_{Rk,s}$	[Nm]	$1.2 \times W_{el} \times f_{uk}$					
Concrete pry-out failure								
Factor k_3 in equation (27) of CEN/TS 1992-4-5 Section 6.3.3 Factor k in equation (5.7) of Technical Report TR 029	$k_{(3)}$	[-]	2,0					
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Concrete edge failure								
Effective length of anchor	l_f	[mm]	$l_f = min(h_{ef}; 8\ d_{nom})$					
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					

Injection System VM-EA, VM-EA express, VM-EA low speed for concrete	**Annex C 2**
Performances Characteristic values under shear loads in non-cracked concrete	

Table C3:   Displacement under tension load[1]

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24
Non-cracked concrete C20/25								
Temperature range I: 40°C/24°C	δ_{N0}-factor	[mm/(N/mm²)]	0,03	0,04	0,05	0,07	0,08	0,10
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,07	0,08	0,08	0,08	0,08	0,10
Temperature range II: 80°C/50°C	δ_{N0}-factor	[mm/(N/mm²)]	0,02	0,03	0,03	0,04	0,04	0,05
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,15	0,17	0,17	0,17	0,17	0,17

[1] Calculation of the displacement
$\delta_{N0} = \delta_{N0}$-factor $\cdot \tau$;
$\delta_{N\infty} = \delta_{N\infty}$-factor $\cdot \tau$;

Table C4: Displacement under shear load[1]

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24
For non-cracked concrete C20/25								
All temperature ranges	δ_{V0}-factor	[mm/(kN)]	0,02	0,02	0,01	0,01	0,01	0,01
	$\delta_{V\infty}$-factor	[mm/(kN)]	0,03	0,02	0,02	0,01	0,01	0,01

[1] Calculation of the displacement
$\delta_{V0} = \delta_{V0}$-factor $\cdot V$;
$\delta_{V\infty} = \delta_{V\infty}$-factor $\cdot V$;

Injection System VM-EA, VM-EA express, VM-EA low speed for concrete	Annex C 3
Performances Displacement	