

Declaration of performance

Steel anchor

valid for MÜPRO Steel anchor

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Declaration of performance acc. Regulation (EU) 305/2011

DoP No.: MP Stahldübel 20160202

1. Unique identification code of the product-type:

Steel anchor

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

ETA-05/0160, Annex 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	deformation-controlled expansion anchor
for use in	non-cracked concrete C20/25 - C50/60 (EN 206)
option	7
loading	static or quasi-static
material	<p><u>zinc-plated steel:</u> dry internal conditions only covered sizes: M6x30, M8x30, M8x40, M10x30², M10x40, M12x50, M12x80, M16x65, M16x80, M20x80¹⁾</p> <p>¹⁾ Without shoulder ²⁾ With skoulder</p> <p><u>stainless steel (marking A4):</u> internal and external use without particular aggressive conditions covered sizes: M6x30, M8x30, M8x40, M10x40, M12x50, M12x80, M16x65, M16x80, M20x80¹⁾</p> <p>¹⁾ Without shoulder</p> <p><u>highly corrosion resistant steel (marking HCR):</u> internal and external use with particular aggressive conditions covered sizes: M6x30, M8x30, M8x40, M10x40, M12x50, M12x80, M16x65, M16x80, M20x80¹⁾</p> <p>¹⁾ Without shoulder</p>
temperature range if applicable	--

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

MÜPRO Services GmbH
Hessenstrasse 11
65719 Hofheim-Wallau

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

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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:

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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-05/0160

on the basis of

ETAG 001-4

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-M552-2

9. Declared performance:

Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
characteristic resistance for tension	ETAG 001, Annex C	ETA-05/0160, Annex C1-C2	ETAG 001
	CEN/TS 1992-4		
characteristic resistance for shear	ETAG 001, Annex C	ETA-05/0160, Annex C3-C4	
	CEN/TS 1992-4		
displacement for serviceability limit state	ETAG 001, Annex C	ETA-05/0160, Annex C5	
	CEN/TS 1992-4		

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:



Hofheim-Wallau, 02.02.2016

i.V. Stefan Podszus,

Quality Manager

Table C1: Characteristic values for tension loads, zinc plated steel

Anchor size			M6x30 ¹⁾	M8x30 ¹⁾	M8x40	M10x30 ¹⁾	M10x40	M12x50	M12x80	M16x65 M16x80	M20x80
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,2								
Steel failure											
Characteristic resistance Steel 4.6	$N_{Rk,s}$	[kN]	8,0	14,6		23,2		33,7		62,8	98,0
Partial safety factor	γ_{Ms}	[-]	2,0								
Characteristic resistance Steel 5.6	$N_{Rk,s}$	[kN]	10,0	18,3		18,0	20,2	42,1		78,3	122,4
Partial safety factor	γ_{Ms}	[-]	2,0			1,5		2,0			
Characteristic resistance Steel 5.8	$N_{Rk,s}$	[kN]	10,0	17,6	18,3	18,0	20,2	40,2	42,1	67,1	106,4
Partial safety factor	γ_{Ms}	[-]	1,5						1,6		
Characteristic resistance Steel 8.8	$N_{Rk,s}$	[kN]	15,0	17,6	19,9	18,0	20,2	40,2	43,0	67,1	106,4
Partial safety factor	γ_{Ms}	[-]	1,5						1,6		
Pull-out failure											
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	2)	2)	9	2)	2)	2)	2)	2)	2)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,3}$								
Concrete cone failure and splitting											
Effective anchorage depth	h_{ef}	[mm]	30	30	40	30	40	50	65	80	
Spacing (edge distance)	$s_{cr,N} (= 2 C_{cr,N})$	[mm]	3 h_{ef}								
	$s_{cr,sp} (= 2 C_{cr,sp})$	[mm]	190	190	190	230	270	330	400	520	
Factor acc. to CEN/TS 1992-4	k_{ucr}	[-]	10,1								

¹⁾ Use restricted to anchoring of structural components statically indeterminate

²⁾ Pull-out is not decisive

MÜPRO steel anchor, zinc plated, A4, HCR

Performance
Characteristic values for tension loads, zinc plated steel

Annex C1

Table C2: Characteristic values for tension loads, stainless steel A4, HCR

Anchor size			M6x30 ¹⁾	M8x30 ¹⁾	M8x40	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0						
Steel failure									
Characteristic resistance (property class 70)	$N_{Rk,s}$	[kN]	14,1	23,3	29,4	50,2	83,8	133,0	
Characteristic resistance (property class 80)	$N_{Rk,s}$	[kN]	17,5	23,3	29,4	50,2	83,8	133,0	
Partial safety factor	γ_{Ms}	[-]	1,87						
Pull-out failure									
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	2)	2)	9	2)	2)	2)	2)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$						
Concrete cone failure and splitting									
Effective anchorage depth	h_{ef}	[mm]	30 ³⁾	30	40	40	50	65	80
Spacing (edge distance)	$s_{cr,N} (= 2 c_{cr,N})$	[mm]	3 h_{ef}						
	$s_{cr,sp} (= 2 c_{cr,sp})$	[mm]	160	190	190	270	330	400	520
Factor acc. to CEN/TS 1992-4	k_{ucr}	[-]	10,1						

¹⁾ Use restricted to anchoring of structural components statically indeterminate

²⁾ Pull-out is not decisive.

³⁾ For proof against concrete cone failure as per ETAG 001, annex C or CEN/TS 1992-4-4, $N_{Rk,c}$ must be multiplied by the factor $(25/f_{ck,cube})^{0,2}$.

MÜPRO steel anchor, zinc plated, A4, HCR

Performance
Characteristic values for tension loads, stainless steel A4, HCR

Annex C2

Table C3: Characteristic values for shear loads, zinc plated steel

Anchor size		M6x30 ¹⁾	M8x30 ¹⁾	M8x40	M10x30 ¹⁾	M10x40	M12x50	M12x80	M16x65 M16x80	M20x80
Steel failure without lever arm										
Characteristic resistance Steel 4.6	$V_{Rk,s}$ [kN]	4,0	7,3		11,6	9,6		16,8	31,3	49,0
Partial safety factor	γ_{Ms} [-]	1,67								
Characteristic resistance Steel 5.6	$V_{Rk,s}$ [kN]	5,0	9,1		10,1	9,6		21,1	39,2	61,2
Partial safety factor	γ_{Ms} [-]	1,67			1,25	1,67				
Characteristic resistance Steel 5.8	$V_{Rk,s}$ [kN]	5,0	6,9		10,1	7,2	19,4	21,1	33,5	53,2
Partial safety factor	γ_{Ms} [-]	1,25						1,33		
Characteristic resistance Steel 8.8	$V_{Rk,s}$ [kN]	5,0	6,9		10,1	7,2	19,4	21,5	33,5	53,2
Partial safety factor	γ_{Ms} [-]	1,25						1,33		
Factor of ductility	k_2 [-]	1,0								
Steel failure with lever arm										
Characteristic resistance Steel 4.6	$M^0_{Rk,s}$ [Nm]	6,1	15		30	30		52	133	259
Partial safety factor	γ_{Ms} [-]	1,67								
Characteristic resistance Steel 5.6	$M^0_{Rk,s}$ [Nm]	7,6	19		37	37		65	166	324
Partial safety factor	γ_{Ms} [-]	1,67								
Characteristic resistance Steel 5.8	$M^0_{Rk,s}$ [Nm]	7,6	19		37	37		65	166	324
Partial safety factor	γ_{Ms} [-]	1,25								
Characteristic resistance Steel 8.8	$M^0_{Rk,s}$ [Nm]	12	30		59	60		105	266	519
Partial safety factor	γ_{Ms} [-]	1,25								
Factor of ductility	k_2 [-]	1,0								
Concrete pry-out failure										
Factor k acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS	$k_{(3)}$ [-]	1,0					1,5		2,0	
Concrete edge failure										
Effective length of anchor under shear loading	l_f [mm]	30	30	40	30	40		50	65	80
Outside diameter of anchor	d_{nom} [mm]	8	10	10	12	12		15	20	25

¹⁾ Use restricted to anchoring of structural components statically indeterminate

MÜPRO steel anchor, zinc plated, A4, HCR

Performance
Characteristic values for shear loads, zinc plated steel

Annex C3

Table C4: Characteristic values for shear loads, stainless steel A4, HCR

Anchor size		M6x30 ¹⁾	M8x30 ¹⁾	M8x40	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Steel failure without lever arm								
Characteristic resistance (property class 70)	$V_{Rk,s}$ [kN]	7,0	10,6		13,4	25,1	41,9	66,5
Characteristic resistance (property class 80)	$V_{Rk,s}$ [kN]	8,7	10,6		13,4	25,1	41,9	66,5
Partial safety factor	γ_{Ms} [-]	1,56						
Factor of ductility	k_2 [-]	1,0						
Steel failure with lever arm								
Characteristic resistance (property class 70)	$M^0_{Rk,s}$ [Nm]	11	26		52	92	233	454
Partial safety factor	γ_{Ms} [-]	1,56						
Characteristic resistance (property class 80)	$M^0_{Rk,s}$ [Nm]	12	30		60	105	266	519
Partial safety factor	γ_{Ms} [-]	1,33						
Factor of ductility	k_2 [-]	1,0						
Concrete pry-out failure								
Factor k acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS	$k_{(3)}$ [-]	1,0	1,7		1,7		2,0	
Concrete edge failure								
Effective length of anchor under shear loading	l_f [mm]	30	30	40	40	50	65	80
Outside diameter of anchor	d_{nom} [mm]	8	10	10	12	15	20	25

¹⁾ Use restricted to anchoring of structural components statically indeterminate

MÜPRO steel anchor, zinc plated, A4, HCR

Performance
Characteristic values for shear loads, stainless steel A4, HCR

Annex C4

Table C5: Displacements under tension loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Steel zinc plated										
Tension load in non-cracked concrete	N	[kN]	3	3	3,6	3,3	4,8	6,4	10	14,8
Displacement	δ_{N0}	[mm]	0,24							
	$\delta_{N\infty}$	[mm]	0,36							
Stainless steel A4 / HCR										
Tension load in non-cracked concrete	N	[kN]	4	4	4,3	-	6,1	8,5	12,6	17,2
Displacement	δ_{N0}	[mm]	0,12							
	$\delta_{N\infty}$	[mm]	0,24							

Table C6: Displacements under shear loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Steel zinc plated										
Shear load in non-cracked concrete	V	[kN]	2	4	4	5,7	4,0	11,3	18,8	32,2
Displacement	δ_{V0}	[mm]	0,9	0,9	1,0	1,5	0,6	1,2	1,2	1,6
	$\delta_{V\infty}$	[mm]	1,3	1,3	1,5	2,3	0,9	1,9	1,9	2,4
Stainless steel A4 / HCR										
Shear load in non-cracked concrete	V	[kN]	3,5	5,2	5,2	-	6,5	11,5	19,2	30,4
Displacement	δ_{V0}	[mm]	1,9	1,1	0,7	-	1,0	1,7	2,4	2,6
	$\delta_{V\infty}$	[mm]	2,8	1,6	1,0	-	1,5	2,6	3,6	3,8

MÜPRO steel anchor, zinc plated, A4, HCR

Performance
Displacements

Annex C5