

## Declaration of performance

Through anchor

valid for  
MÜPRO Trough anchor

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

DoP No.: MP Steckanker 20180508

#### 1. Unique identification code of the product-type:

Through 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-05/0162, 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:

<b>generic type</b>	torque controlled expansion anchor (bolt type)
<b>for use in</b>	non-cracked concrete C20/25 - C50/60 (EN 206)
<b>option</b>	7
<b>loading</b>	static or quasi-static
<b>material</b>	<p><u>zinc plated steel:</u> dry internal conditions only covered sizes: M6, M8, M10, M12, M16, M20</p> <p><u>hot-dip galvanised steel:</u> dry internal conditions only covered sizes: M8, M10, M12, M16, M20</p> <p><u>stainless steel (marking A4):</u> internal and external use without particular aggressive conditions covered sizes: M6, M8, M10, M12, M16, M20</p> <p><u>highly corrosion resistant steel (marking HCR):</u> internal and external use with particular aggressive conditions covered sizes: M6, M8, M10, M12, M16, M20</p>
<b>temperature range (if applicable)</b>	--

#### 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-05/0162

on the basis of

EAD 330232-00-0601

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 552-4

### 9. Declared performance:

Essential Characteristics	Design Method	Performance		Harmonized Technical Specification
		Zinc plated	A4 / HCR	
characteristic resistance for tension	FprEN 1992-4 and TR 055	Annex C1	Annex C2	EAD 330232-00-0601
characteristic resistance for shear	FprEN 1992-4 and TR 055	Annex C3	Annex C3	
Displacement for serviceability limit state	FprEN 1992-4 and TR 055	Annex C4	Annex C4	

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, 08.05.2018

i.V. Stefan Podszus,

Quality Manager

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

Anchor size			M6	M8	M10	M12	M16	M20	
Installation safety factor	$\gamma_{inst}$	[-]	1,0						
<b>Steel failure</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	8,7	15,3	26	35	65	107	
Partial safety factor	$\gamma_{Ms}$	[-]	1,5				1,6		
<b>Pull-out</b>									
<b>Standard anchorage depth <math>h_{ef}</math></b>									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	9	12	16	1)	1)	1)	
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 <sup>2)</sup>	1) 2)	1)	1)	1)	1)	
Increasing factor for $N_{Rk,p}$	$\psi_C$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$						
<b>Splitting</b>									
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	min [ $N_{Rk,p}$ ; $N^0_{Rk,c}$ ]						
<b>Standard anchorage depth <math>h_{ef}</math></b>									
Spacing	$S_{cr,sp}$	[mm]	160	220	240	330	410	500	
Edge distance	$C_{cr,sp}$	[mm]	80	110	120	165	205	250	
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>									
Spacing	$S_{cr,sp}$	[mm]	180	210	230	240	320	400	
Edge distance	$C_{cr,sp}$	[mm]	90	105	115	120	160	200	
<b>Concrete cone failure</b>									
<b>Standard anchorage depth <math>h_{ef}</math></b>									
Effective anchorage depth	$h_{ef} \geq$	[mm]	40	44	48	65	82	100	
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$						
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$						
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>									
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30 <sup>2)</sup>	35 <sup>2)</sup>	42	50	64	78	
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef,red}$						
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef,red}$						
Factor for $k_1$	$k_{Ucr,N}$	[-]	11,0						

1) Pullout failure is not decisive

2) Use restricted to anchorages of indeterminate structural components

**MÜPRO Through Anchor**

**Performance**  
Characteristic values for **tension loads, steel zinc plated**

**Annex C1**

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

Anchor size			M6	M8	M10	M12	M16	M20	
Installation safety factor	$\gamma_{inst}$	[-]	1,0						
<b>Steel failure</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	10	18	30	44	88	134	
Partial safety factor	$\gamma_{Ms}$	[-]	1,50						1,68
<b>Pull-out</b>									
<b>Standard anchorage depth <math>h_{ef}</math></b>									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	7,5	12	16	25	1)	1)	
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>									
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 <sup>2)</sup>	9 <sup>2)</sup>	12	1)	1)	1)	
<b>Splitting</b>									
<b>Standard anchorage depth <math>h_{ef}</math></b>									
The higher one of the decisive resistances of Case 1 and Case 2 is applicable.									
Case 1									
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6	9	12	20	30	40	
Spacing	$S_{cr,sp}$	[mm]	3 $h_{ef}$						
Edge distance	$C_{cr,sp}$	[mm]	1,5 $h_{ef}$						
Case 2									
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	7,5	12	16	25	1)	1)	
Spacing	$S_{cr,sp}$	[mm]	160	220	240	340	410	560	
Edge distance	$C_{cr,sp}$	[mm]	80	110	120	170	205	280	
<b>Reduced anchorage depth <math>h_{ef,red}</math></b>									
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6 <sup>2)</sup>	9 <sup>2)</sup>	12	1)	1)	1)	
Spacing	$S_{cr,sp}$	[mm]	180	210	230	300	320	400	
Edge distance	$C_{cr,sp}$	[mm]	90	105	115	150	160	200	
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	$\psi_C$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$						
<b>Concrete cone failure</b>									
<b>Standard anchorage depth</b>									
Effective anchorage depth	$h_{ef}$	[mm]	40	44	48	65	80	100	
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$						
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$						
<b>Reduced anchorage depth</b>									
Effective anchorage depth	$h_{ef,red}$	[mm]	30 <sup>2)</sup>	35 <sup>2)</sup>	42	50	64	78	
Spacing	$S_{cr,N}$	[mm]	3 $h_{ef}$						
Edge distance	$C_{cr,N}$	[mm]	1,5 $h_{ef}$						
Factor for $k_1$	$k_{ucr,N}$	[-]	11,0						

<sup>1)</sup> Pullout failure is not decisive.

<sup>2)</sup> Use restricted to anchorages of indeterminate structural components.

**MÜPRO Through Anchor**

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

**Annex C2**

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

Anchor size			M6	M8	M10	M12	M16	M20	
Installation safety factor	$\gamma_{inst}$	[-]	1,0						
<b>Steel failure without lever arm</b>									
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5	11	17	25	44	69	
Factor for ductility	$k_7$	[-]	1,0						
<b>Steel failure with lever arm</b>									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	9	23	45	78	186	363	
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	$\gamma_{Ms}$	[-]	1,25				1,33		
<b>Concrete pry-out failure</b>									
Factor for $h_{ef}$	$k_8$	[-]	1,0	1,0	1,0	2,0	2,0	2,0	
Factor for $h_{ef,red}$	$k_8$	[-]	1,0 <sup>1)</sup>	1,0 <sup>1)</sup>	1,0	1,0	2,0	2,0	
<b>Concrete edge failure</b>									
Effective length of anchor in shear loading for $h_{ef}$	$l_f$	[mm]	40	44	48	65	82	100	
Effective length of anchor in shear loading for $h_{ef,red}$	$l_{f,red}$	[mm]	30 <sup>1)</sup>	35 <sup>1)</sup>	42	50	64	78	
Outside diameter of anchor	$d_{nom}$	[mm]	6	8	10	12	16	20	

<sup>1)</sup> Use restricted to anchorages of indeterminate structural components

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

Anchor Size			M6	M8	M10	M12	M16	M20	
Installation safety factor	$\gamma_{inst}$	[-]	1,0						
<b>Steel failure without lever arm</b>									
Characteristic shear resistance	$V_{Rk,s}$	[kN]	7	12	19	27	50	86	
Factor for ductility	$k_7$	[-]	1,0						
<b>Steel failure with lever arm</b>									
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	10	24	49	85	199	454	
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	$\gamma_{Ms}$	[-]	1,25				1,4		
<b>Concrete pry-out failure</b>									
Factor for $h_{ef}$	$k_8$	[-]	1,0	1,0	1,0	2,0	2,0	2,0	
Factor for $h_{ef,red}$	$k_8$	[-]	1,0 <sup>1)</sup>	1,0 <sup>1)</sup>	1,0	1,0	2,0	2,0	
<b>Concrete edge failure</b>									
Effective length of anchor in shear loading with $h_{ef}$	$l_f$	[mm]	40	44	48	65	80	100	
Effective length of anchor in shear loading with $h_{ef,red}$	$l_{f,red}$	[mm]	30 <sup>1)</sup>	35 <sup>1)</sup>	42	50	64	78	
Outside diameter of anchor	$d_{nom}$	[mm]	6	8	10	12	16	20	

<sup>1)</sup> Use restricted to anchorages of indeterminate structural components

**MÜPRO Through Anchor**

**Performance**  
Characteristic values for **shear loads**

**Annex C3**

**Table C5: Displacements under tension loads, steel zinc plated**

Anchor size			M6	M8	M10	M12	M16	M20
<b>Standard anchorage depth</b>								
Tension load	N	[kN]	4,3	5,8	7,6	11,9	16,7	23,8
Displacement	$\delta_{N0}$	[mm]	0,4	0,5				
	$\delta_{N\infty}$	[mm]	0,7	2,3				
<b>Reduced anchorage depth</b>								
Tension load	N	[kN]	2,9	5,0	6,5	8,5	12,3	16,6
Displacement	$\delta_{N0}$	[mm]	0,3	0,4				
	$\delta_{N\infty}$	[mm]	0,6	1,8				

**Table C6: Displacements under tension loads, stainless steel A4/HCR**

Anchor size			M6	M8	M10	M12	M16	M20
<b>Standard anchorage depth</b>								
Tension load	N	[kN]	3,6	5,7	7,6	11,9	17,2	24,0
Displacement	$\delta_{N0}$	[mm]	0,7	0,9	0,5	0,6	0,9	2,1
	$\delta_{N\infty}$	[mm]	1,8					4,2
<b>Reduced anchorage depth</b>								
Tension load	N	[kN]	2,9	4,3	5,7	8,5	12,3	16,6
Displacement	$\delta_{N0}$	[mm]	0,4	0,7	0,4	0,4	0,6	1,5
	$\delta_{N\infty}$	[mm]	1,3					2,9

**Table C7: Displacements under shear loads, steel zinc plated**

Anchor size			M6	M8	M10	M12	M16	M20
Shear load	V	[kN]	2,9	6,3	9,7	14,3	23,6	37,0
Displacement	$\delta_{V0}$	[mm]	1,2	1,5	1,6	2,6	3,1	4,4
	$\delta_{V\infty}$	[mm]	2,4	2,2	2,4	3,9	4,6	6,6

**Table C8: Displacements under shear loads, stainless steel A4/HCR**

Anchor Size			M6	M8	M10	M12	M16	M20
Shear load	V	[kN]	4,0	6,9	10,9	15,4	28,6	43,7
Displacement	$\delta_{V0}$	[mm]	1,1	2,0	1,2	2,0	2,2	2,1
	$\delta_{V\infty}$	[mm]	1,7	3,0	1,8	3,0	3,3	3,2

**MÜPRO Through Anchor**Performance  
Displacements**Annex C4**