DECLARATION OF PERFORMANCE

HECO-DoP_ETA_15/0784_MMS-plus_1804_GB

1. Unique identification code of the product-type:
MULTI-MONTI-plus (MMS-plus)

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):
Identification acc. ETA-15/0784 annex A2, A3
Batch number: see packaging of product

3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:
ETA-15/0784 annex B1

Anchor type	Screw anchor
For use in	Concrete C20/25 - C50/60 (EN 206) - uncracked: Ø6, Ø7.5, Ø10, Ø12, Ø16 and Ø20 - cracked: Ø6, Ø7.5, Ø10, Ø12, Ø16 and Ø20
Option/Category	Option 1 Seismic: category C1 and C2
Stress	Static and quasi-static loads (all Ø), seismic (Ø10, Ø12, Ø16 and Ø20), fire exposure (all Ø)
Material/Versions	Galvanized steel: - for structures to dry internal conditions - different head versions

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):
HECO-Schrauben GmbH & Co. KG
Dr.-Kurt-Steim-Str. 28
78713 Schramberg (Germany)

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:
-

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

- Technical Assessment Body: Deutsches Institut für Bautechnik (DIBt)
- Notified Body: Materialprüfungsanstalt Universität Stuttgart, ID number 0672
- European Assessment Document: EAD 330232-00-0601
- Certificate of Conformity: 0672-CPR-0635

9. Declared performance

Essential characteristics	**Performance**
Installation parameters	see annex: especially annex B2
Characteristic values for static and quasi-static load	see annex: especially annex C1
Characteristic values for seismic C1 and C2	see annex: especially annex C2
Fire resistance	see annex: especially annex C3
Displacement for serviceability limit state	see annex: especially annex C3

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:
Schramberg, 28.08.2018

i.V.
Andreas Heck
Head of PM/Fastening technology

i.V.
Andreas Hettich
Head of PM/Marketing

Specifications of intended use

Use of the anchoring:

- Static and quasi static loads: all sizes
- Seismic category C1:

  MMS-plus all Versions, size 10 with maximum embedment depth (h_{nom}), size 12 with both embedment depth (h_{nom}) and size 16 and 20 with maximum embedment depth (h_{nom})
- Seismic category C2:

  MMS-plus all Versions, size 16 and 20 with maximum embedment depth (h_{nom})
- Fire exposure: all sizes

Base Materials:

- Reinforced or non-reinforced normal weight concrete according to EN 206-1:2000
- Strength classes C20/25 to C50/60 according to EN 206-1:2000
- Cracked and uncracked concrete

Conditions of use (Environmental conditions):

- Structures subject to dry internal conditions

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.)
- The design of the anchoring under static or quasi-static actions and fire exposure have to be carried out in accordance with FprEN 1992-4:2017 and EOTA Technical Report TR055
- The design under shear load according to FprEN 1992-4:2017, section 6.2.2 applies to all in appendix B2, table B1 specified diameter d_f the diameter of clearance hole in the fixture

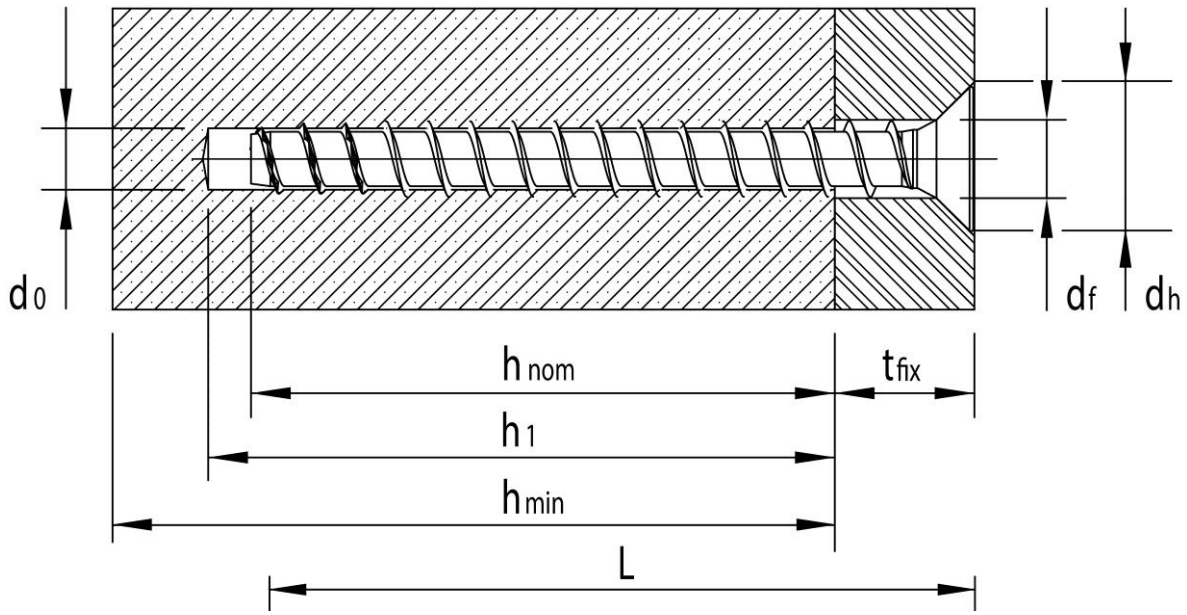
Installation:

- Hole drilling by hammer-drilling only
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- After installation further turning of the anchor must not be possible
- The head of the anchor is attached to the fixture and is not damaged, respectively the required embedment depth is reached.

Annex B1

Table B1: Installation parameters MMS-plus

Size MMS-plus			**6**		**7,5**		**10**		**12**		**16**		**20**
			h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}
Embedment depth in concrete		[mm]	35	45	35	55	50	65	75	90	100	115	140
Norminal drill diameter	d_0	[mm]	5		6		8		10		14		18
Drill bit cutting-Ø	$d_{cut} \leq$	[mm]	5,40		6,40		8,45		10,45		14,50		18,50
Borehole depth	$h_1 \geq$	[mm]	40	50	40	65	60	75	85	100	115	130	160
Diameter of clearhole in the fixure	$d_f \leq$	[mm]	7		9		12,5		14,5		19		23
Diameter Countersunk	d_h	[mm]	11,5		15,5		19,5		24		-		-
Min. thickness of the concrete member	h_{min}	[mm]	100		100		100	115	125	150	150		180
cracked and uncracked concrete — min. spacing	s_{min}	[mm]	30		35		35		40		60		80
cracked and uncracked concrete — min. edge distance	c_{min}	[mm]	30		30		35		40		60		80
Recommended installation tool		[Nm]	Impact screw driver, max. power output T_{max} according manufacturer information										
			75	100	120		250		250		600		800
Torque moment for threaded version (MMS-plus V)	T_{inst}	[Nm]	-		15		20		30		55	70	140



Annex B2

Table C1: Characteristic values for static and quasi-static tension MMS-plus

Size MMS-plus				**6**		**7,5**		**10**		**12**		**16**		**20**
				h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}
Embedment depth in concrete			[mm]	35[1]	45	35[1]	55	50	65	75	90	100	115	140
Steel failure for tension- and shear load														
Characteristic resistance		$N_{Rk,s}$	[kN]	10,8		17,6		32,1		49,9		111,1		190,2
Partial safety factor		γ_{Ms}	-	1,50										
Characteristic resistance		$V_{Rk,s}$	[kN]	4,1		6,1		13,7		24,1		50,2		85,3
Partial safety factor		γ_{Ms}	-	1,25										
		k_7 [2]	-	0,8										
Characteristic resistance		$M^0_{Rk,s}$	[Nm]	6,7		14,1		34,5		66,8		207,6		464,3
Pullout														
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	5,5	8	4	- [2]	- [2]		- [2]		- [2]		- [2]
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	1	1,5	2	4	6	9	12	16	20	30	44
Increasing factor for concrete	C30/37	Ψ_c	-	1,22										
	C40/50			1,41										
	C50/60			1,58										
Concrete cone failure and splitting failure														
Effective anchorage depth		h_{ef}	[mm]	26	35	26	43	36	50	57	70	77	90	114
Factor for	cracked	$k_{cr,N}$	-	7,7										
	uncracked	$k_{ucr,N}$	-	11,0										
Concrete cone	edge distance	$c_{cr,N}$	[mm]	1.5 h_{ef}										
	spacing	$s_{cr,N}$	[mm]	3 h_{ef}										
Splitting	edge distance	$c_{cr,sp}$	[mm]	1.5 h_{ef}										
	spacing	$s_{cr,sp}$	[mm]	3 h_{ef}										
Installation safety factor		γ_{inst}	-	1,0										
Concrete pryout failure														
k-Factor		k_8	-	1,0							2,0			
Concrete edge failure														
Effective length of the anchor		$l_f = h_{ef}$	[mm]	26	35	26	43	36	50	57	70	77	90	114
Effective diameter of the anchor		d_{nom}	[mm]	5		6		8		10		14		18

[1] only for non-structural applications
[2] Pullout is not decisive

Annex C1

Table C2: Characteristic values for seismic actions C1

Size MMS-plus			**10**	**12**		**16**	**20**
			h_{nom}	h_{nom}	h_{nom}	h_{nom}	h_{nom}
Embedment depth in concrete		[mm]	65	75	90	115	140
Steel failure for tension- and shear load							
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	24,1	37,4		100,0	142,7
	$V_{Rk,s,eq}$	[kN]	9,6	16,9		45,2	81,0
Pullout							
Characteristic resistance in cracked concrete	$N_{Rk,p,eq}$	[kN]	6,8	9,0	12,0	21,0	33,0
Concrete cone failure							
Effective anchorage depth	h_{ef}	[mm]	50	57	70	90	114
concrete cone edge distance	$c_{cr,N}$	[mm]	1.5 h_{ef}				
concrete cone spacing	$s_{cr,N}$	[mm]	3 h_{ef}				
Installation safety factor	γ_2	-	1,0				
Concrete pryout failure							
k-Factor	k	-	1,0		2,0		
Concrete edge failure							
Effective length of the anchor under shear loading	$l_f = h_{ef}$	[mm]	50	57	70	90	114
Effective diameter-Ø	d_{nom}	[mm]	8	10		14	18

Table C2.2 Characteristic values for seismic actions C2

Size MMS-plus			**16**	**20**
			h_{nom}	h_{nom}
Embedment depth in concrete		[mm]	115	140
Steel failure for tension- and shear load				
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	100,0	142,7
	$V_{Rk,s,eq}$	[kN]	27,6	57,2
Pullout				
Characteristic resistance in cracked concrete	$N_{Rk,p,eq}$	[kN]	14,0	18,1
Concrete cone failure				
Effective anchorage depth	h_{ef}	[mm]	90	114
concrete cone edge distance	$c_{cr,N}$	[mm]	1.5 h_{ef}	
concrete cone spacing	$s_{cr,N}$	[mm]	3 h_{ef}	
Installation safety factor	γ_2	-	1,0	
Concrete pryout failure				
k-Factor	k	-	2,0	
Concrete edge failure				
Effective length of the anchor under shear loading	$l_f = h_{ef}$	[mm]	90	114
Effective diameter-Ø	d_{nom}	[mm]	14	18

Annex C2

Table C3 Characteristic values under fire exposure

Size MMS-plus				6		7,5		10		12		16		20
				h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}
Embedment depth in concrete			[mm]	35	45	35	55	50	65	75	90	100	115	140
Characteristic resistance for tension and shear														
Characteristic resistance	R30	$F_{Rk,fi}$	[kN]	0,3	0,4	0,5	1,1	1,4	2,3	3,0	3,9	5,0	7,5	11,0
	R60	$F_{Rk,fi}$	[kN]	0,3	0,4	0,5	0,8	1,4	1,4	2,1	2,1	4,5	4,5	7,7
	R90	$F_{Rk,fi}$	[kN]	0,3	0,4	0,5	0,5	1,0	1,0	1,5	1,5	3,3	3,3	5,6
	R120	$F_{Rk,fi}$	[kN]	0,2	0,3	0,4	0,4	0,8	0,8	1,2	1,2	2,6	2,6	4,5
	R30	$M^0_{Rk,s,fi}$	[Nm]	0,5		1,1		2,7		5,3		16,4		36,6
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,3		0,6		1,5		2,8		8,9		19,8
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,2		0,4		1,1		2,0		6,4		14,2
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,2		0,3		0,9		1,6		5,1		11,4
Edge distance														
	R30 bis R120	$c_{cr,fi}$	[mm]	$2\ h_{ef}$										
Spacing														
	R30 bis R120	$s_{cr,fi}$	[mm]	$2\ c_{cr,fi}$										

Table C4 Displacements under tension loads

Size MMS-plus				6		7,5		10		12		16		20
				h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}
Embedment depth in concrete			[mm]	35	45	35	55	50	65	75	90	100	115	140
Tension load uncracked concrete	N		[kN]	1,9	3,0	1,9	5,3	5,7	7,9	10,7	12,8	16,2	20,1	29,3
Displacement	δ_{N0}		[mm]	0,11	0,11	0,06	0,12	0,06	0,07	0,05	0,19	0,09	0,09	0,09
	$\delta_{N\infty}$		[mm]	0,30	0,28	0,38	1,03	0,75	0,72	0,74	0,60	0,13	0,13	0,13
Tension load cracked concrete	N		[kN]	0,5	0,7	0,9	2,0	2,9	4,3	5,7	6,4	9,5	14,2	20,95
Displacement	δ_{N0}		[mm]	0,01	0,02	0,03	0,04	0,03	0,09	0,05	0,02	0,09	0,09	0,09
	$\delta_{N\infty}$		[mm]	0,14	0,09	0,12	0,11	0,08	0,09	0,07	0,22	1,38	1,38	0,69

Tabelle C5 Displacements under shear loads

Size MMS-plus				6		7,5		10		12		16		20
				h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}		h_{nom}
Embedment depth in concrete			[mm]	35	45	35	55	50	65	75	90	100	115	140
Shear load uncracked concrete	V		[kN]	2,0		4,0		8,0		12,0		22,6		42,8
Displacement	δ_{V0}		[mm]	0,14	0,13	0,09	0,11	0,18	0,13	0,18		2,9		3,4
	$\delta_{V\infty}$		[mm]	0,20	0,19	0,13	0,16	0,27	0,20	0,27		4,4		5,1

Annex C3