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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-15/0784
of 22 December 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

MULTI-MONTI-plus

Product family to which the construction product belongs

Mechanical fasteners for use in concrete

Manufacturer

HECO-Schrauben GmbH & Co. KG
Dr.-Kurt-Steim-Straße 28
78713 Schramberg
DEUTSCHLAND

Manufacturing plant

HECO-Plant 1, HECO-Plant 2

This European Technical Assessment contains

20 pages including 3 annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

EAD 330232-02-0601

This version replaces

ETA-15/0784 issued on 2 June 2021

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Specific Part

1 Technical description of the product

The MULTI-MONTI-plus is an anchor in size 6, 7.5, 10, 12, 16 and 20 mm made of galvanized steel and stainless steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

Product and product description are given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex B2 and B3, Annex C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C1 and C2
Displacements (static and quasi-static loading)	See Annex C6 and C7
Stiffness	No performance assessed
Characteristic resistances and displacements for seismic performance categories C1 and C2	See Annex C3 and C4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C5

3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	Performance
Durability	See Annex B1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with European Assessment Document EAD No. 330232-02-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

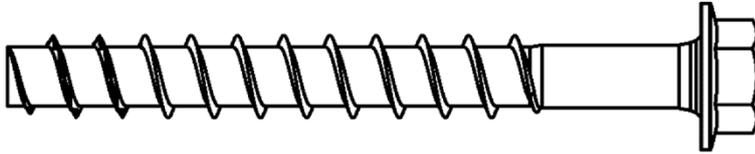
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 22 December 2025 by Deutsches Institut für Bautechnik

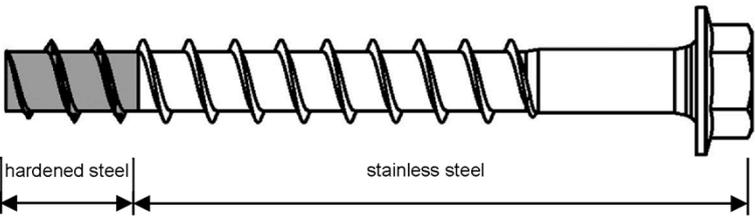
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Tempel

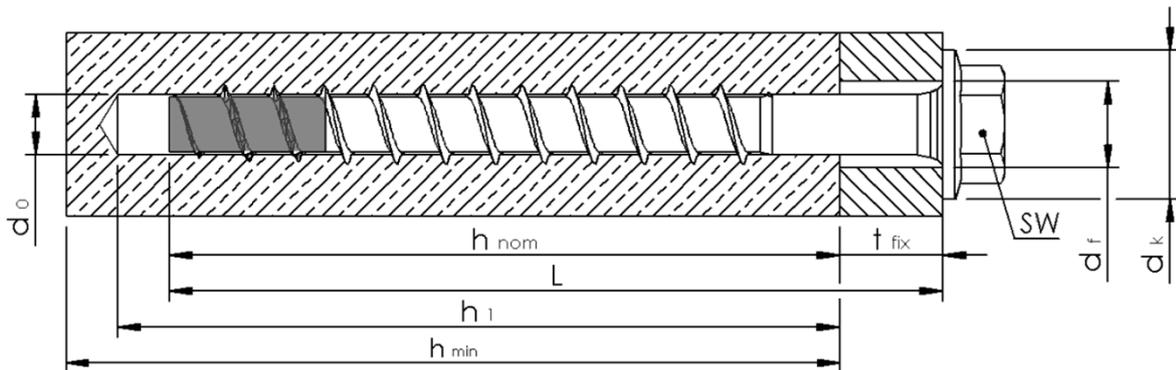
Installed condition



MMS-plus / carbon steel



MMS-plus / stainless steel



e.g. MMS-plus A4 SS stainless steel with hexagon head and washer

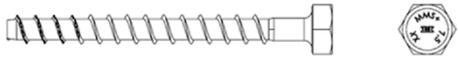
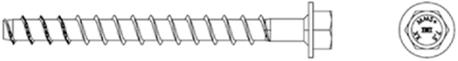
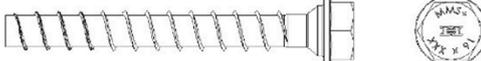
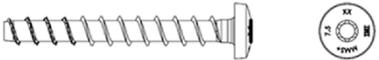
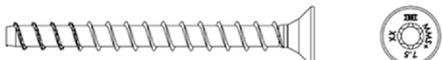
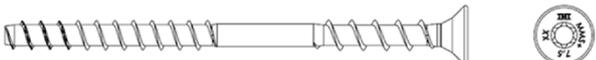
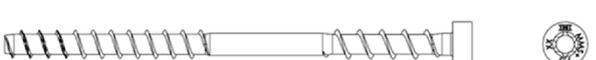
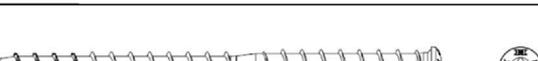
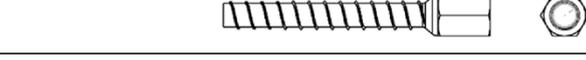
- d_0 = nominal borehole diameter
- h_{nom} = nominal anchorage depth (embedment depth)
- h_1 = borehole depth
- h_{min} = minimum thickness of concrete member
- t_{fix} = thickness of fixture
- d_f = diameter of clearance hole in the fixture

MULTI-MONTI-plus

Product description
Product in the installed state

Annex A 1

Table A1: Screw types

Head types	Marking
	1) Hexagon Head with and without washer (alternative design with cone under the head) (S)
	2) Hexagon Head and washer (SS)
	3) Hexagon Head and washer (alternative design with cone under the head) (SSK)
	4) PanHead, with small Pan Head (P)
	5) Mounting bar-anchor, with large Pan Head (MS)
	6) Countersunk head (F)
	7) Countersunk head with under head thread and single- or multi-start thread (FT)
	8) Cylinder Head with under head thread and single- or multi-start thread (ZT, SST & PT)
	9) Anchor with metric stud (ST)
	10) Anchor with metric stud for mounting of nuts (pre-assembled with sleeve) (I)
	11) Anchor with metric stud (V)
	12) Pan Head with under head thread and single- or multi-start thread, different diameters compared to the concrete thread (others expression possible) (DWC)
	13) Countersunk Head with under head thread, different diameters compared to the concrete thread (TC)
	14) Anchor with coarse internal thread (GGI)
	15) Anchor with coarse thread (GGA)
	16) Anchor with metric internal thread (SI)
	17) PanHead with under head thread (support thread), single- or multi-start thread (PSG)

MULTI-MONTI-plus

Product description
Dimensions and screw types

Annex A 2

Table A2: Dimensions, materials and head markings

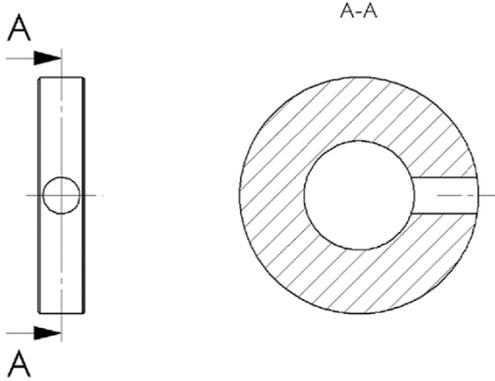
carbon steel ¹⁾			Ø					
			6	7,5	10	12	16	20
Thread diameter	d _s	[mm]	6,65	7,75	10,5	12,6	16,7	21,2
Core diameter	d _k	[mm]	4,3	5,45	7,3	9,05	13,3	17,4
Length	L ≥	[mm]	35	35	50	75	100	140
	L ≤	[mm]	500	500	500	600	800	800
Rupture elongation	A ₅	[%]	≤ 8					
1) galvanized steel EN 10263-4:2001 (multi-layered coating systems are possible)								
stainless steel ²⁾			Ø					
			7,5	10	12			
Thread diameter	d _s	[mm]	7,65	10,5	12,6			
Core diameter	d _k	[mm]	5,45	7,3	9,25			
Length	L ≥	[mm]	35	60	90			
	L ≤	[mm]	500	500	500			
Rupture elongation	A ₅	[%]	> 8					
2) stainless steel 1.4401, 1.4462, 1.4578, 1.4529 and 1.4571 according EN 10088-1:2005								
Identification								
				Marking		Attribute		
				H		Factory sign		
				MMS+		Anchor type		
				e.g. 7,5		Anchor size		
e.g. 75		Anchor length						
A4 + A5		additional marking for stainless steel and CRC III						
FA		additional marking for stainless steel and CRC IV						
KK		additional marking for high corrosion resistance steel and CRC V						
Materials				Marking				
carbon steel				MMS+				
1.4401 / 1.4578				MMS+ A4				
1.4462				MMS+ FA				
1.4571				MMS+ A5				
1.4529				MMS+ KK				

MULTI-MONTI-plus

Product description
Dimensions and head marking

Annex A 3

Table A3: Option annual gap filling

Filling washer	Injection mortar (with ETA)
	<p>Mortar compressive strength $\geq 50 \text{ N/mm}^2$</p> <p>For example: HECO HEP-1000</p> 

Option annual gap filling

- Usable head types
 - 1) Hexagon Head with and without washer (alternative design with cone under the head) **(S)**
 - 2) Hexagon Head and washer **(SS)**
 - 3) Hexagon Head and washer (alternative design with cone under the head) **(SSK)**
 - 4) PanHead, with small Pan Head **(P)**
 - 5) Mounting bar-anchor, with large Pan Head **(MS)**
- Working and curing time according to product data sheet
- Additional installation instruction for annual gap filling, see Annex B5

MULTI-MONTI-plus

Product description
Option Seismic-Kit, annular gap filling

Annex A 4

Specifications of intended use

Table B1: Use of the anchoring

Size MMS-plus			6	7,5	10	12	16	20
Embedment depth	h_{nom}	[mm]	all					
Head types			all					
Static and quasi-static loads in cracked and non-cracked concrete			ok					
Fire exposure			ok					
Size MMS-plus			10	12		16	20	
Embedment depth	h_{nom}	[mm]	65	75	90	115	140	
Head types			1 – 17		1 – 17		1 – 17	
Seismic actions ^{1) 2)}		C1	ok		ok		ok	
		C2	No performance assessed				ok	

¹⁾ Only carbon steel (A4-/HCR-Steel not assessed)

²⁾ With head types 9, 10, 14 & 16 and use of connecting thread only axial seismic actions are allowed

Base Materials:

- Compacted reinforced or non-reinforced normal weight concrete without fibres according to EN 206:2013 + A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016
- Cracked and uncracked concrete

Conditions of use (Environmental conditions):

- Structures subject to dry internal conditions
- For all other conditions according to EN 1993-1-4:2015, table A.1 corresponding to corrosion resistance classes:
 - CRC III: screws with head marking MMS+ A4, MMS+ A5
 - CRC IV: screws with head marking MMS+ FA
 - CRC V: screws with head marking MMS+ KK

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 designs of the anchoring under static or quasi-static actions and fire exposure have to be carried out in accordance with EN 1992-4:2018 and EOTA Technical Report TR 055
- The design under shear load according to EN 1992-4:2018, section 6.2.2 applies to all in annex B2, table B2 and annex B3, table B3 specified diameter d_f the diameter of clearance hole in the fixture

Installation:

- Hole drilling by hammer drilling.
- 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, and the required embedment depth is reached.

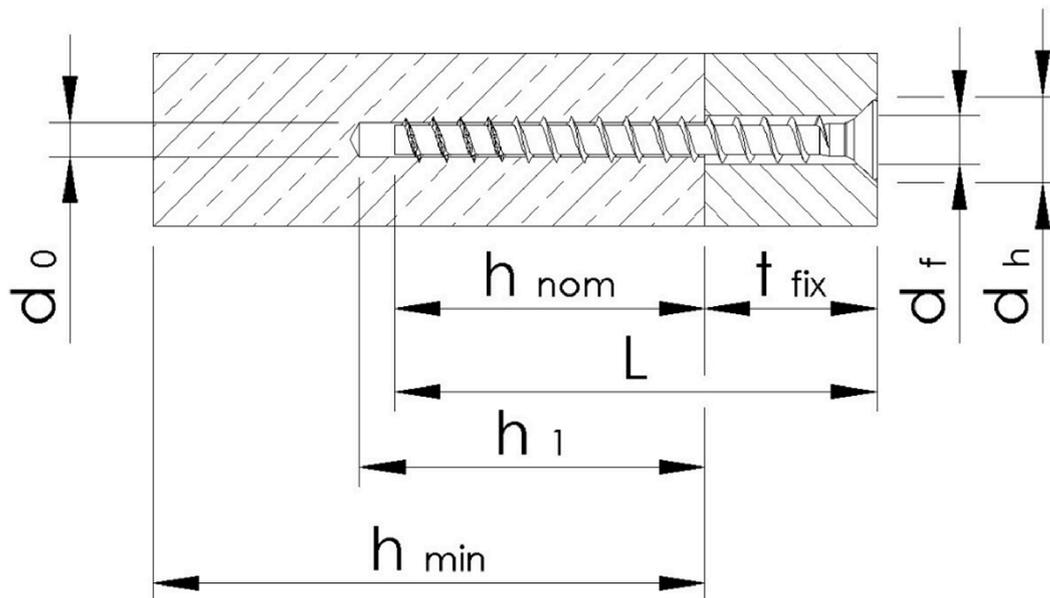
MULTI-MONTI-plus

Intended use
Specification

Annex B 1

Table B2: Installation parameters MMS-plus carbon steel

Size MMS-plus			6		7,5		10		12		16		20	
Embedment depth	h_{nom}	[mm]	35	45	35	55	50	65	75	90	100	115	140	
Nominal 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 with cleaning	$h_1 \geq$	[mm]	40	50	40	65	60	75	85	100	115	130	155	
Diameter of clearance hole	$d_f \leq$	[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	minimum spacing	s_{min}	30		35		35		40		60		80	
	min. edge distance	c_{min}	30		30		35		40		60		80	
Recommended installation tool		[Nm]	Impact screw driver, max. power output T_{max} according to 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	



MULTI-MONTI-plus

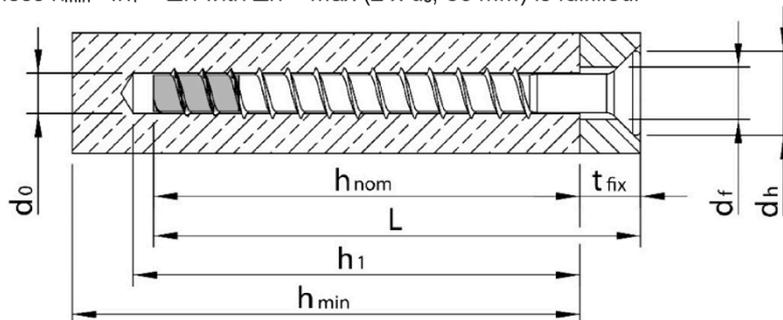
Intended use
Installation parameters

Annex B 2

Table B3: Installation parameters MMS-plus stainless steel

Size MMS-plus A4			7,5			10		12	
Nominal drill diameter	d_0	[mm]	6			8		10	
Drill bit cutting-Ø	$d_{cut} \leq$	[mm]	6,40			8,45		10,45	
Embedment depth $h_{nom,standard}$	h_{nom}	[mm]	40	55	75	70	85	100	115
Borehole depth with cleaning	$h_1 \geq$	[mm]	45	60	85	80	95	110	125
Borehole depth without cleaning ¹⁾	$h_1 \geq$	[mm]	$h_{nom} + 2 \times d_0$						
Borehole depth with adjustment ¹⁾	$h_{1,adj} \geq$	[mm]	-	$h_{nom,adj,0} + 10 \text{ mm}$					
Borehole depth with adjustment and without cleaning ¹⁾	$h_{1,adj} \geq$	[mm]	-	$h_{nom,adj,0} + 2 \times d_0$					
Embedment depth $h_{nom,reduced}$	h_{nom}	[mm]	35	50	65	60	75	90	105
Borehole depth with cleaning	$h_1 \geq$	[mm]	40	55	75	70	85	100	115
Borehole depth without cleaning ¹⁾	$h_1 \geq$	[mm]	$h_{nom} + 2 \times d_0$						
Borehole depth with adjustment ¹⁾	$h_{1,adj} \geq$	[mm]	-	$h_{nom,adj,0} + 10 \text{ mm}$					
Borehole depth with adjustment and without cleaning ¹⁾	$h_{1,adj} \geq$	[mm]	-	$h_{nom,adj,0} + 2 \times d_0$					
Diameter of clearance hole	$d_f \leq$	[mm]	9,0			12,5		14,5	
Diameter countersunk	d_h	[mm]	13,6			17		21	
Min. thickness of the concrete member	h_{min}	[mm]	100			115	125	150	
Cracked and uncracked concrete	min. spacing	s_{min}	35			35		40	
	min. edge distance	c_{min}	30			35		40	
Recommended installation tool		[Nm]	Impact screw driver, max. power output T_{max} according to manufacturer information						
			185	200	450	600			

¹⁾ It should be ensured that the requirement for the minimum component thickness $h_{min} \geq h_1 + \Delta h$ with $\Delta h = \max(2 \times d_0; 30 \text{ mm})$ is fulfilled.



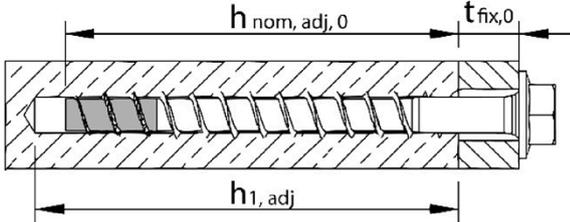
MULTI-MONTI-plus

Intended use
Installation parameters

Annex B 3

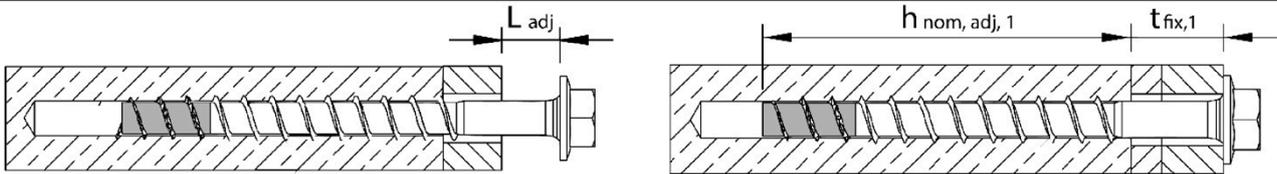
Adjustment MMS-plus stainless steel

Borehole depth for adjustment

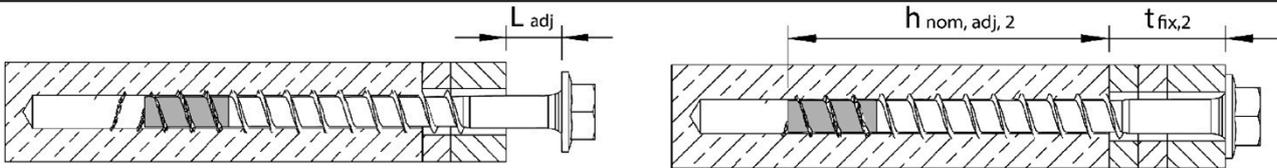


Adjustment

1. Step



2. Step



Controlling of adjustment and mounting

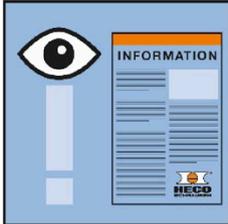
A screw can be adjusted maximum two times. The screw may be loosened up to a maximum $L_{adj} = 10$ mm from the surface of the attachment. The borehole depth for adjustment should be minimum $h_{1,adj}$ (see table B3, annex B3). The total allowed thickness of the shims added during the adjustment process is 10mm. The required embedment depth h_{nom} must also be maintained after the adjustment process ($h_{nom,adj,1} \geq h_{nom}$ and $h_{nom,adj,2} \geq h_{nom}$).

MULTI-MONTI-plus

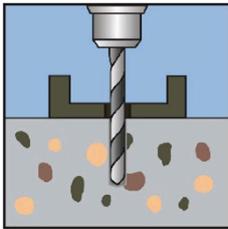
Intended use
Installation parameters

Annex B 4

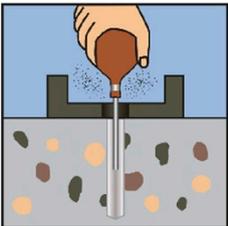
Installation instructions



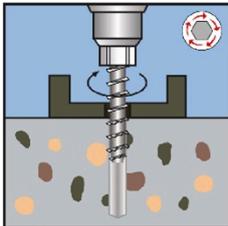
Note the information of the approval!



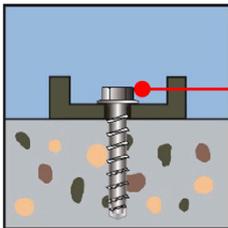
Creation of the borehole using hammer drilling to the required embedment depth.



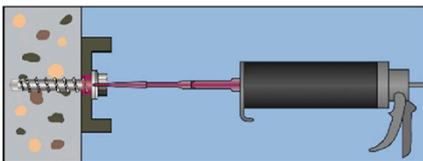
Clean borehole, e.g. with blowing out.



Install the screw anchor with an impact wrench or by hand.



Check: The anchor head is fully supported on the fixture and not damaged.



Option annual gap filling

For application with annual gap filling in seismic performance categories C1 and C2, the gap between the screws shaft and the attachment must be filled with mortar, mortar compressive strength $\geq 50 \text{ N/mm}^2$ (e.g. HECO HEP1000). The HECO filling washers from the HECO Seismic-Kit are recommended as an aid for annual gap filling.

MULTI-MONTI-plus

Intended use
Installation instruction

Annex B 5

**Table C1: Characteristic values for static and quasi-static loading
MMS-plus carbon steel**

Size MMS-plus			6		7,5		10		12		16		20	
Embedment depth	h_{nom}	[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	$\gamma_{Ms,N}$	[-]	1,50											
Characteristic resistance	$V^0_{Rk,s}$	[kN]	4,1		6,1		13,7		24,1		50,2		85,3	
Partial safety factor	$\gamma_{Ms,V}$	[-]	1,25											
Ductility factor	k_7	[-]	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	$\geq N^0_{Rk,c}$								
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 $N_{Rk,p} = N_{Rk,p(C20/25)} * \psi_c$ of compressive strength classes C20/25 to C50/60	ψ_c	[-]	$(f_{ck}/20)^{0,50}$											
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	$k_{urc,N}$	11,0											
Concrete cone	edge distance	$c_{cr,N}$	$1,5 h_{ef}$											
	spacing	$s_{cr,N}$	$3 h_{ef}$											
Splitting	Characteristic resistance	$N^0_{Rk,sp}$	1	1,5	2	4	6	9	12	16	20	30	44	
	edge distance	$c_{cr,sp}$	$1,5 h_{ef}$											
	spacing	$s_{cr,sp}$	$3 h_{ef}$											
Installation 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

MULTI-MONTI-plus

Performance
Characteristic values for static and quasi-static loading

Annex C 1

**Table C2: Characteristic values for static and quasi-static loading
MMS-plus stainless steel**

Size MMS-plus			7,5			10			12		
Steel failure for tension- and shear load											
Characteristic resistance	$N_{RK,s}$	[kN]	16			29			45		
Partial safety factor	$\gamma_{Ms,N}$	[-]	1,4								
Characteristic resistance	$V^0_{RK,s}$	[kN]	2	11	14	18	28	23	27		
Partial safety factor	$\gamma_{Ms,V}$	[-]	1,4								
Ductility factor	k_7	[-]	1,0								
Characteristic resistance	$M^0_{RK,s}$	[Nm]	13,3			32,1			61,1		
Pullout											
Embedment depth $h_{nom,standard}$	h_{nom}	[mm]	40	55	75	70	85	100	115		
Characteristic resistance in uncracked concrete C20/25	$N_{RK,p}$	[kN]	5,5	4,5	13	12	20	20	32		
Characteristic resistance in cracked concrete C20/25	$N_{RK,p}$	[kN]	3,5	2	4	6	9	12	16		
Embedment depth $h_{nom,reduced}$	h_{nom}	[mm]	35 ¹⁾	50	65	60	75	90	105		
Characteristic resistance in uncracked concrete C20/25	$N_{RK,p}$	[kN]	4	4	10	10	17	16	26		
Characteristic resistance in cracked concrete C20/25	$N_{RK,p}$	[kN]	2,5	1,5	3	5	7	9,5	13		
Increasing factor for $N_{RK,p}$											
Increasing factor for $N_{RK,p} = N_{RK,p(C20/25)} * \psi_c$ of compressive strength classes C20/25 to C50/60	ψ_c	[-]	$(f_{ck}/20)^{0,50}$								
Concrete cone failure and splitting failure											
Effective anchorage depth	$h_{ef,standard}$	[mm]	23	36	49	44	56	65	77		
	$h_{ef,reduced}$		19	32	40	35	48	56	69		
Factor for	cracked	$k_{cr,N}$	7,7								
	uncracked	$k_{urc,N}$	11,0								
Concrete cone	edge distance	$c_{cr,N}$	1,5 h_{ef}								
	spacing	$s_{cr,N}$	3 h_{ef}								
Splitting	Chararct. resistance	$N^0_{RK,sp}$	$N^0_{RK,sp} = N_{RK,p}^{2)}$								
	edge distance	$c_{cr,sp}$	1,5 h_{ef}								
	spacing	$s_{cr,sp}$	3 h_{ef}								
Installation factor	γ_{inst}	[-]	1,2			1,0					
Concrete pryout failure											
k-factor for $h_{ef,standard}$	k_8	[-]	1,0			2,0					
k-factor for $h_{ef,reduced}$	k_8	[-]	1,0			2,0					
Concrete edge failure											
Effective length of the anchor	l_f	[mm]	$l_f = \text{corresponding } h_{ef}$								
Effective diameter of the anchor	d_{nom}	[mm]	6			8			10		

¹⁾ Only for non-structural applications, only under dry internal conditions

²⁾ For $N_{RK,p}$ the value in cracked concrete is decisive

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Performance

Characteristic values for static and quasi-static loading

Annex C 2

Table C3.1: Characteristic values for seismic actions C1 MMS-plus carbon steel

Size MMS-plus			10	12	16	20	
Embedment depth	h_{nom}	[mm]	65	75	90	115	140
Steel failure for tension- and shear load							
Characteristic resistance and partial safety factor	$N_{Rk,s,c1}$	[kN]	24,1	37,4	100,0	142,7	
	$\gamma_{Ms,N}$	[-]	1,5				
	$V_{Rk,s,c1}$	[kN]	9,6	16,9	45,2	91,0	
	$\gamma_{Ms,V}$	[-]	1,25				
without annular gap filling	α_{gap}	[-]	0,5				
with annular gap filling ¹⁾	α_{gap}	[-]	1,0				
Pullout							
Characteristic resistance in cracked concrete	$N_{Rk,p,c1}$	[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 edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}				
	$s_{cr,N}$	[mm]	3 h_{ef}				
Installation factor	γ_{inst}	[-]	1,0				
Concrete pryout failure							
k-factor	k_8	[-]	2,0				
Concrete edge failure							
Effective length of the anchor	$l_f = h_{ef}$	[mm]	50	57	70	90	114
Effective diameter of the anchor	d_{nom}	[mm]	8	10	14	18	

¹⁾ annual gap filling according to annex A4 and B5

MULTI-MONTI-plus

Performance
Characteristic value for seismic actions C1

Annex C 3

Table C3.2: Characteristic values for seismic actions C2 MMS-plus carbon steel ¹⁾

Size MMS-plus			16	20
Embedment depth	h_{nom}	[mm]	115	140
Steel failure for tension- and shear load				
Characteristic resistance and partial safety factor	$N_{Rk,s,c2}$	[kN]	100,0	142,7
	$\gamma_{Ms,N}$		1,5	
	$V_{Rk,s,c2}$	[kN]	26,1	57,7
	$\gamma_{Ms,V}$		1,25	
without annular gap filling	α_{gap}	[-]	0,5	
with annular gap filling ²⁾	α_{gap}	[-]	1,0	
Pullout				
Characteristic resistance in cracked concrete	$N_{Rk,p,c2}$	[kN]	14,0	18,1
Concrete cone failure				
Effective anchorage depth	h_{ef}	[mm]	90	114
Concrete edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}	
cone spacing	$s_{cr,N}$	[mm]	3 h_{ef}	
Installation factor	γ_{inst}	[-]	1,0	
Concrete pryout failure				
k-factor	k_8	[-]	2,0	
Concrete edge failure				
Effective length of the anchor	$l_f = h_{ef}$	[mm]	90	114
Effective diameter of the anchor	d_{nom}	[mm]	14	18

¹⁾ displacements $\delta_{N,c2}$ und $\delta_{V,c2}$ are not assessed

²⁾ annular gap filling according to annex A4 and B5

MULTI-MONTI-plus

Performance
Characteristic value for seismic actions C2

Annex C 4

Table C4: Characteristic values under fire exposure MMS-plus carbon steel

Size MMS-plus			6		7,5		10		12		16		20	
Embedment depth		h_{nom}	[mm]	35	45	35	55	50	65	75	90	100	115	140
Characteristic resistance for tension and shear / $F_{Rk,fi} = N_{Rk,s,fi} = N_{Rk,p,fi} = V_{Rk,s,fi}$														
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 to R120		$C_{cr,fi}$	[mm]	2 h_{ef}										
Spacing														
R30 to R120		$S_{cr,fi}$	[mm]	2 $C_{cr,fi}$										

Table C5: Characteristic values under fire exposure MMS-plus stainless steel

Size MMS-plus			7,5			10		12	
Embedment depth $h_{nom,standard}$		[mm]	40	55	75	70	85	100	115
Embedment depth $h_{nom,reduced}$		[mm]	35	50	65	60	75	90	105
Characteristic resistance for tension and shear / $F_{Rk,fi} = N_{Rk,s,fi} = N_{Rk,p,fi} = V_{Rk,s,fi}$									
Characteristic resistance	R30	$F_{Rk,fi}$	[kN]	0,5	1,1	1,4	2,3	3,0	3,9
	R60	$F_{Rk,fi}$	[kN]	0,5	0,8	1,4	1,4	2,1	2,1
	R90	$F_{Rk,fi}$	[kN]	0,5	0,5	1,0	1,0	1,5	1,5
	R120	$F_{Rk,fi}$	[kN]	0,4	0,4	0,8	0,8	1,2	1,2
	R30	$M^0_{Rk,s,fi}$	[Nm]	1,1		2,7		5,3	
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,6		1,5		2,8	
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,4		1,1		2,0	
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,3		0,9		1,6	
Edge distance									
R30 to R120		$C_{cr,fi}$	[mm]	2 h_{ef}					
Spacing									
R30 to R120		$S_{cr,fi}$	[mm]	2 $C_{cr,fi}$					

MULTI-MONTI-plus

Performance
Characteristic values under fire exposure

Annex C 5

Table C6: Displacements under tension loads MMS-plus carbon steel

Size MMS-plus			6		7,5		10		12		16		20
Embedment depth	h_{nom}	[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	$\bar{\delta}_{N0}$	[mm]	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1
	$\bar{\delta}_{N\infty}$	[mm]	0,3	0,3	0,4	1,1	0,8	0,7	0,7	0,6	0,1	0,1	0,1
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	20,9
Displacement	$\bar{\delta}_{N0}$	[mm]	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
	$\bar{\delta}_{N\infty}$	[mm]	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	1,4	1,4	0,7

Table C7: Displacements under tension loads MMS-plus stainless steel

Size MMS-plus			7,5			10		12	
Embedment depth $h_{nom,standard}$		[mm]	40	55	75	70	85	100	115
Embedment depth $h_{nom,reduced}$		[mm]	35	50	65	60	75	90	105
Tension load uncracked concrete	N	[kN]	2,4	2,1	6,2	5,7	9,5	9,5	14,3
Displacement	$\bar{\delta}_{N0}$	[mm]	1,4	1,3	2,5	2,3	2,7	10,3	3,7
	$\bar{\delta}_{N\infty}$	[mm]	2,1	1,9	3,8	3,5	4,0	15,9	5,5
Tension load cracked concrete	N	[kN]	1,4	0,7	1,9	2,9	4,3	5,7	7,6
Displacement	$\bar{\delta}_{N0}$	[mm]	1,3	0,2	0,3	0,6	0,5	1,3	1,4
	$\bar{\delta}_{N\infty}$	[mm]	1,9	0,3	0,5	0,9	0,8	1,9	2,2

MULTI-MONTI-plus

Performance
Displacements under tension loads

Annex C 6

Table C8: Displacements under shear loads MMS-plus carbon steel

Size MMS-plus			6		7,5		10		12		16		20
Embedment depth	h_{nom}	[mm]	35	45	35	55	50	65	75	90	100	115	140
Shear load uncracked and cracked concrete	V	[kN]	2,0		4,0		8,0		12,0		22,6		42,8
Displacement	$\bar{\delta}_{v0}$	[mm]	0,1	0,1	0,1	0,1	0,2	0,1	0,2		2,9		3,4
	$\bar{\delta}_{v\infty}$	[mm]	0,2	0,2	0,1	0,2	0,2	0,2	0,3		4,4		5,1

Table C9: Displacements under shear loads MMS-plus stainless steel

Size MMS-plus			7,5			10		12	
Embedment depth $h_{nom,standard}$		[mm]	40	55	75	70	85	100	115
Embedment depth $h_{nom,reduced}$		[mm]	35	50	65	60	75	90	105
Shear load uncracked and cracked concrete	V	[kN]	3,9	4,8	6,2	8,1	12,9	10,5	12,4
Displacement	$\bar{\delta}_{v0}$	[mm]	2,7	3,5	3,1	2,7	3,3	3,2	3,3
	$\bar{\delta}_{v\infty}$	[mm]	4,0	5,3	4,6	4,1	4,9	4,8	5,0

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Performance
Displacements under shear loads

Annex C 7