HECO SCHRAUBEN

European Technical Assessment – Option 1 for cracked concrete

ETA-05/0011

MULTI-MONTI®

European Technical Assessment ETA-05/0011

Concrete screw made of stainless steel
for use in concrete

Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-05/0011 of 4 September 2018

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	HECO MULTI-MONTI MMS A4
Product family to which the construction product belongs	Concrete screw for use in concrete
Manufacturer	HECO-Schrauben GmbH & Co. KG Dr.-Kurt-Steim-Straße 28 78713 Schramberg
Manufacturing plant	HECO-Schrauben GmbH & Co. KG Dr.-Kurt-Steim-Straße 28 78713 Schramberg
This European Technical Assessment contains	11 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 330232-00-0601
This version replaces	ETA-05/0011 issued on 21 January 2015

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Specific Part

1 Technical description of the product

The Concrete Screw HECO MULTI MONTI MMS A4 is an anchor in sizes 7.5, 10 and 12 mm made of 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.

The product description is 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 C 1
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 2
Displacements (static and quasi-static loading)	See Annex C 1 and C 2
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C 3

3.3 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

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

In accordance with the European Assessment Document EAD 330232-00-0601 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 4 September 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Tempel

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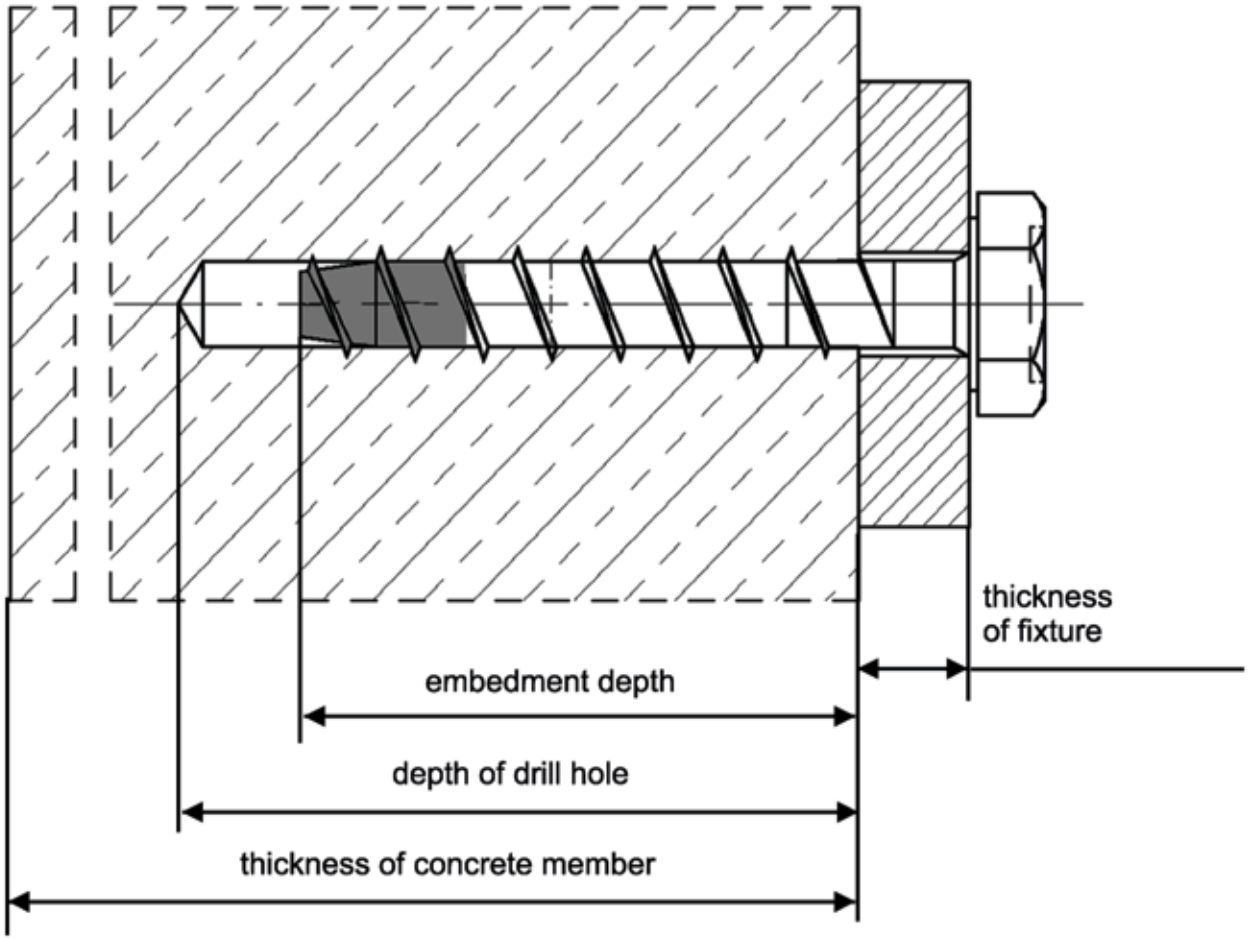
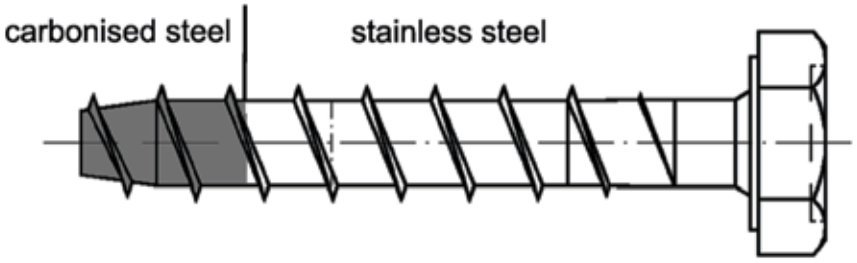
Installed condition

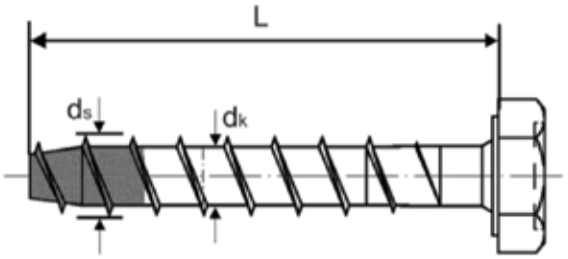




HECO MULTI-MONTI MMS A4

Product description
Product,
Installed condition

Annex A 1



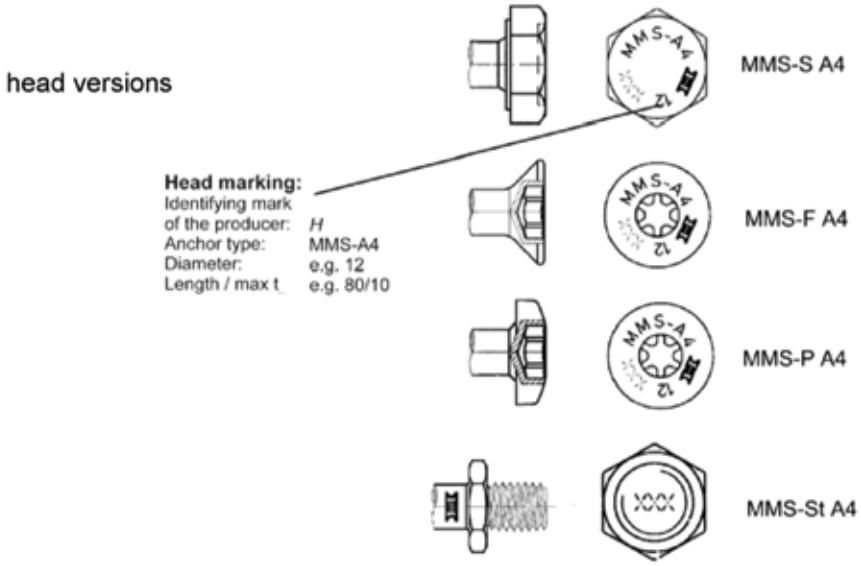


Table A1: Dimensions and Materials

Anchor sizes			MMS-7,5 A4	MMS-10 A4	MMS-12 A4
Length	L ≥	[mm]	65	75	90
Length	L ≤	[mm]	500	500	500
Bolt diameter	d_k	[mm]	5,7	7,6	9,6
Thread diameter	d_s	[mm]	7,5	10,1	12,4
Material			stainless steel 1.4401, 1.4462, 1.4529 and 1.4571		
Material of the tip			steel acc. to EN 10263-4		

Table A2: Materials and head marking

Material	head-marking
Stahl, gvz	MMS
1.4401	MMS-A4
1.4462	MMS-FA
1.4571	MMS-A5
1.4529	MMS-KK

HECO MULTI-MONTI MMS A4

Product description
Head Versions,
dimensions and materials

Annex A 2

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads: all sizes.
- Fire exposure: all sizes.

Base Materials:

- Reinforced or unreinforced 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: all sizes.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: all screw-types
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal conditions where no particular aggressive conditions exist: all screw-types
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal conditions where particular aggressive conditions exist: screw-types with head-marking KK

  Note: Such particular aggressive conditions are e.g. permanent or alternate immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulfurization plants or road tunnels where de-icing materials are used)

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.
- The head of the anchor is attached to the fixture and is not damaged; respectively the required embedment depth h_{nom} is reached.
- MMS-St: The required setting depth has to be achieved and the anchor has to be secured against further turning.

HECO MULTI-MONTI MMS A4	**Annex B 1**
Intended Use Specifications	

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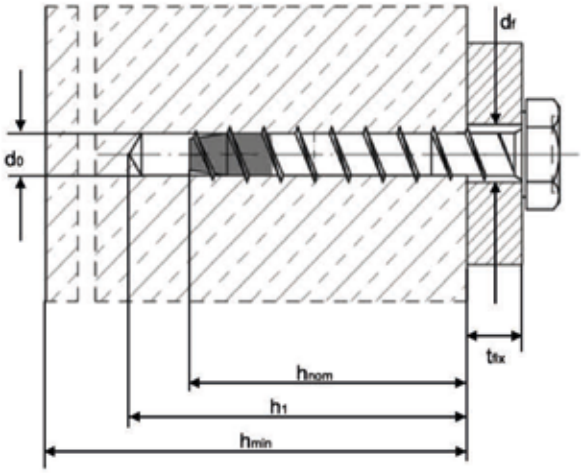
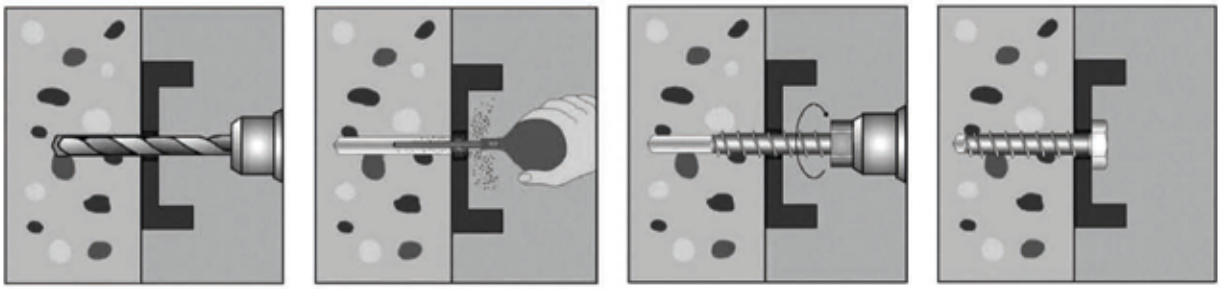
Table B1: Installation Parameters

Anchor sizes			MMS-7,5 A4	MMS-10 A4	MMS-12 A4
Nominal drill diameter	d_0	[mm]	6,0	8,0	10,0
Cutting diameter of the drill bit	$d_{cut} \leq$	[mm]	6,4	8,45	10,45
Depth of drill hole	$h_1 \geq$	[mm]	75	90	100
Embedment depth	$h_{nom} \geq$	[mm]	65	75	90
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9,0	12,0	14,0
Recommended installation tool			Impact screw driver, max. power output T_{max} according to manufacturer information		
			100 Nm	250 Nm	250 Nm



Installation Instruction



Drilling
Drill diameter d_0 and drilling depth h_1 have to be met

Removal of drill dust
e.g. blowing

Installation
e.g. by hand or with impact screw driver

Complete
verification: head supported to fixture and embedment depth h_{nom}

Table B2: Minimum thickness of concrete member, minimum spacing and minimum edge distances of anchor

Anchor sizes			MMS-7,5 A4	MMS-10 A4	MMS-12 A4
min. thickness of concrete member	h_{min}	[mm]	105	130	140
cracked and uncracked concrete					
min. spacing	s_{min}	[mm]	40	50	60
min. edge distance	c_{min}	[mm]	40	50	60

HECO MULTI-MONTI MMS A4

Intended Use
Installation Parameters, installation instruction, minimum thickness of concrete member, minimum spacing and minimum edge distance

Annex B 2

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Table C1: Performance under tension loads

Anchor sizes				**MMS-7,5 A4**	**MMS-10 A4**	**MMS-12 A4**
Steel failure						
Characteristic resistance		$N_{Rk,s}$	[kN]	23	16	25
Partial safety factor		γ_{Ms}	[-]	1,4		
Pullout						
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	5	9	12
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	7,5	12	16
Increasing factor for $N_{Rk,p}$ in cracked and uncracked concrete		ψ_c	C30/37	1,22		
			C40/50	1,41		
			C50/60	1,58		
Installation safety factor		γ_{inst}	[-]	1,4	1,2	
Concrete cone failure, splitting failure						
Effective anchorage depth		h_{ef}	[mm]	40	47,5	54,5
Factor for	cracked concrete	$k_{cr,N}$	[-]	7,7		
	uncracked concrete	$k_{urc,N}$	[-]	11,0		
Spacing		$s_{cr,N} = s_{cr}$	[mm]	3 x h_{ef}		
Edge distance		$c_{cr,N} = c_{cr}$	[mm]	1,5 x h_{ef}		
Installation safety factor		γ_{inst}	[-]	1,4	1,2	

Table C2: Displacements under tension loads

Anchor sizes			**MMS-7,5 A4**	**MMS-10 A4**	**MMS-12 A4**
Tension load in cracked concrete	N	[kN]	1,7	3,0	4,0
Displacements	δ_{N0}	[mm]	0,1	0,1	0,2
	$\delta_{N\infty}$	[mm]	0,2	0,2	0,6
Tension load in uncracked concrete	N	[kN]	2,6	4,0	5,3
Displacements	δ_{N0}	[mm]	0,1	0,1	0,2
	$\delta_{N\infty}$	[mm]	0,2	0,2	0,6

HECO MULTI-MONTI MMS A4

Performance
Characteristic values under tension loads
Displacements under tension loads

Annex C 1

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Table C3: Performance under shear loads

Anchor sizes			**MMS-7,5 A4**	**MMS-10 A4**	**MMS-12 A4**
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s}$	[kN]	12,3	20	33
Factor	k_7		0,8		
Partial safety factor	γ_{Ms}	[-]	1,5		
Steel failure with lever arm					
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	22	45	93
Partial safety factor	γ_{Ms}	[-]	1,5		
Concrete pryout failure					
k-factor	k_8	[-]	1,0	2,0	
Installation safety factor	γ_{inst}	[-]	1,0		
Concrete edge failure					
Effective length of the anchor	l_f	[mm]	40	47,5	54,5
Effective diameter of the anchor	d_{nom}	[mm]	6	8	10
Installation safety factor	γ_{inst}	[-]	1,0		

Table C4: Displacements under shear loads

Anchor sizes			**MMS-7,5 A4**	**MMS-10 A4**	**MMS-12 A4**
Shear load in cracked and uncracked concrete	V	[kN]	5,9	9,7	15,7
Displacements	δ_{V0}	[mm]	1,7	3,0	3,2
	$\delta_{V\infty}$	[mm]	2,6	4,5	4,8

HECO MULTI-MONTI MMS A4

Performance
Characteristic values under shear loads
Displacements under shear loads

Annex C 2

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Table C5: Performance under tension loads under fire exposure

Anchor sizes			**MMS-7,5 A4**				**MMS-10 A4**				**MMS-12 A4**			
Fire resistance duration	R	[min]	30	60	90	120	30	60	90	120	30	60	90	120
Steel failure														
Characteristic resistance	$N_{Rk,s,fi}$	[kN]	1,7	1,2	0,8	0,6	3,4	2,5	1,7	1,2	5,9	4,4	3,0	2,2
Characteristic resistance for MMS-St with metric stud	$N_{Rk,s,fi}$	[kN]	1,7	1,2	0,8	0,6	1,8	1,5	1,1	1,0	-	-	-	-
Pullout														
Characteristic resistance in concrete C20/25 to C50/60	$N_{Rk,p,fi}$	[kN]	1,3			1,0	2,3			1,8	3,0			2,4
Concrete cone failure														
Characteristic resistance in concrete C20/25 to C50/60	$N_{Rk,c,fi}$	[kN]	1,8			1,5	2,8			2,2	3,9			3,2
Spacing	$s_{cr,fi}$	[mm]	$4 \times h_{ef}$											
Edge distance	$c_{cr,fi}$	[mm]	$2 \times h_{ef}$											

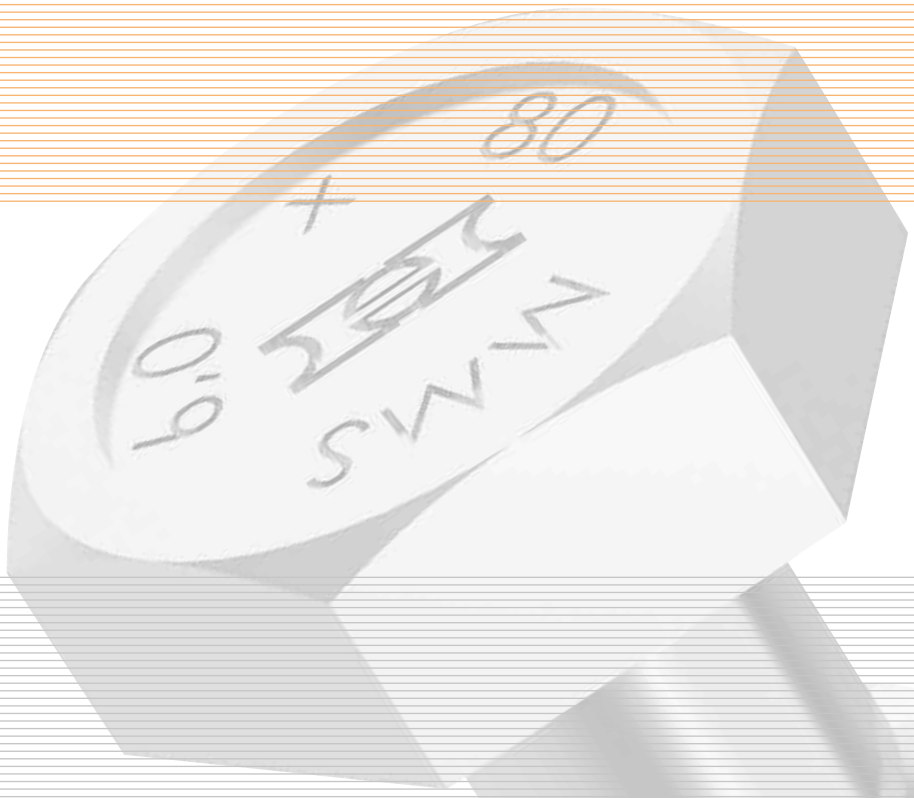
Table C6: Performance under shear loads under fire exposure

Anchor sizes			**MMS-7,5 A4**				**MMS-10 A4**				**MMS-12 A4**			
Fire resistance duration	R	[min]	30	60	90	120	30	60	90	120	30	60	90	120
Steel failure without lever arm														
Characteristic resistance	$V_{Rk,s,fi}$	[kN]	1,7	1,2	0,8	0,6	3,4	2,5	1,7	1,2	5,9	4,4	3,0	2,2
Steel failure with lever arm														
Characteristic resistance	$M^0_{Rk,s,fi}$	[Nm]	1,5	1,1	0,7	0,5	4,0	3,0	2,0	1,5	8,8	6,6	4,4	3,3

HECO MULTI-MONTI MMS A4

Performance
Characteristic values of tension and shear load resistance under fire exposure

Annex C 3



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41465-10/2018