Declaration of Performance

2323-CPR-0058

1. Unique identification code of the product-type: Mungo metal Anchor MEA for multiple use for non-structural applications in concrete

2. Manufacturer: Mungo Befestigungstechnik AG, Bornfeldstrasse 2, CH-4600 Olten/Switzerland

3. System/s of AVCP: System 2+

4. Intended use or use/es:

Product	Intended use
Anchor for multiple use for non-structural application in non-cracked and cracked concrete	The anchor is to be used for static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 to C50/60 according to EN 206-1

5. European Assessment Document: ETAG 001 Part 6, April 2013, used as EAD
European Technical Assessment: ETA-18/0269 of 03.04.2018
Technical Assessment Body: ETA-Denmark A/S
Notified body/ies: No 305/2011 (Construction Product Regulation)

6. Declared performance:
Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for all load directions	See appendix, especially Annex C1 to C3
Edge distances and spacing	See appendix, especially Annex B2

Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	See appendix, especially Annex C5
Resistance to fire	See appendix, especially Annex C4

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Singed for and on behalf of the manufacturer by:

Robert Klemencic Dipl.-Ing.
Head of Engineering

ppa

Olten, 18.11.2019

This DoP Has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.
The Appendix includes voluntary and complementary information in English language exceeding the (language as neutrally specified) legal requirements.

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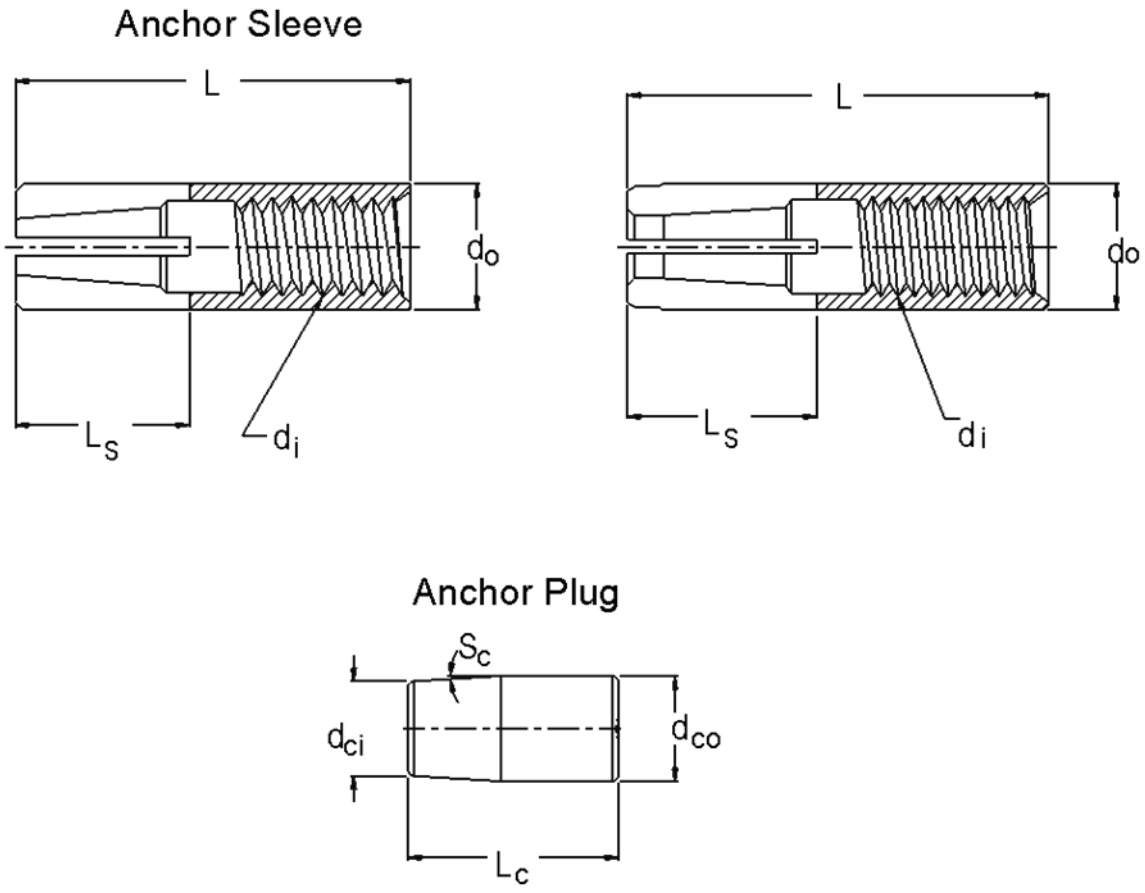
Figure A1 – anchor



MEA DROP-IN ANCHOR	**Annex A1** of European Technical Assessment ETA-18/0269
Product description Characteristics of the product	

Table A1. Dimensions of the anchor

Diameter inside d_i [mm]	Length L [mm]	Length of spread L_s [mm]	Diameter outside d_o [mm]	Length of cone L_c [mm]	Diameter cone outside d_{co} [mm]	Diameter cone inside d_{ci} [mm]	square s_c [°]
M6	24.90 ± 0.30	11.60 ± 0.60	7.94 ± 0.07	10.00 ± 0.20	5.05 ± 0.05	3.95 ± 0.05	5.00 ± 0.50
M8	29.90 ± 0.30	13.80 ± 0.60	9.94 ± 0.07	11.90 ± 0.30	6.25 ± 0.25	4.50 ± 0.25	6.00 ± 2.00
M10	39.60 ± 0.40	18.35 ± 0.75	11.94 ± 0.07	15.70 ± 0.30	7.85 ± 0.25	6.30 ± 0.30	6.00 ± 2.00
M12	50.50 ± 0.50	22.75 ± 0.75	14.94 ± 0.07	20.70 ± 0.30	10.05 ± 0.25	8.50 ± 0.30	4.00 ± 2.00
M16	65.00 ± 0.50	29.35 ± 0.75	19.80 ± 0.20	28.10 ± 0.30	13.85 ± 0.25	11.70 ± 0.30	3.50 ± 2.00

Diameter inside d_i [mm]	Length L [mm]	Length of spread L_s [mm]	Diameter outside d_o [mm]	Length of cone L_c [mm]	Diameter cone outside d_{co} [mm]	Diameter cone inside d_{ci} [mm]	square s_c [°]
M8x25	24.90 ± 0.30	11.15 ± 0.60	10.00 - 0.13	8.15 ± 0.20	6.40 ± 0.05	5.40 ± 0.05	4.5 ± 0.5
M10x25	24.60 ± 0.40	11.60 ± 0.60	12.00 - 0.13	8.80 ± 0.20	8.30 ± 0.05	7.50 ± 0.05	3.5 ± 0.5
M10x30	29.60 ± 0.40	15.00 ± 0.60	12.00 - 0.13	13.60 ± 0.20	7.85 ± 0.05	6.70 ± 0.05	3.5 ± 0.5
M12x25	24.60 ± 0.40	11.20 ± 0.60	15.00 - 0.13	10.45 ± 0.20	9.80 ± 0.05	8.60 ± 0.05	7.0 ± 0.5

Table A2. Materials

Member	Material
Sleeve	Coldformed steel grade C8C in accordance with table 2 in EN 10263-2 or coldformed steel grade 1008 in accordance with table 3 in ASTM A510. Galvanized
Plug	Coldformed steel grade C8C in accordance with table 2 in EN 10263-2 or coldformed steel grade 1008 in accordance with table 3 in ASTM A510. Galvanized

MEA DROP-IN ANCHOR	**Annex A2** of European Technical Assessment ETA-18/0269
Product description Materials	

Figure A2 - Hand setting tool

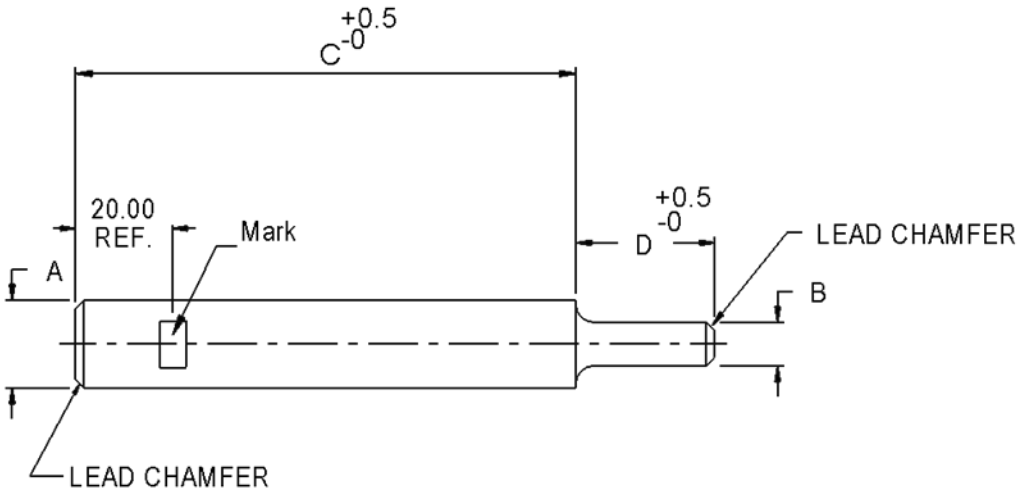


Table A3 – Dimensions of hand setting tool

Size	A [mm]	B (REF) [mm]	C [mm]	D [mm]
M6	Ø 10.0	Ø 4.7	114.5	15.0
M8	Ø 10.0	Ø 6.35	94.5	17.9
M10	Ø 13.0	Ø 7.9	100.5	23.8
M12	Ø 16.0	Ø 9.8	107.5	29.7
M16	Ø 22.0	Ø 13.5	114.5	36.8

Size	A [mm]	B (REF) [mm]	C [mm]	D [mm]
M8x25	Ø 10.0	Ø 6.35	95.65	16.75
M10x25	Ø 13.0	Ø 7.9	108.5	15.8
M10x30	Ø 13.0	Ø 7.9	108.3	16.0
M12x25	Ø 16.0	Ø 9.8	123.05	14.15

Figure A3 - Mechanical setting tool

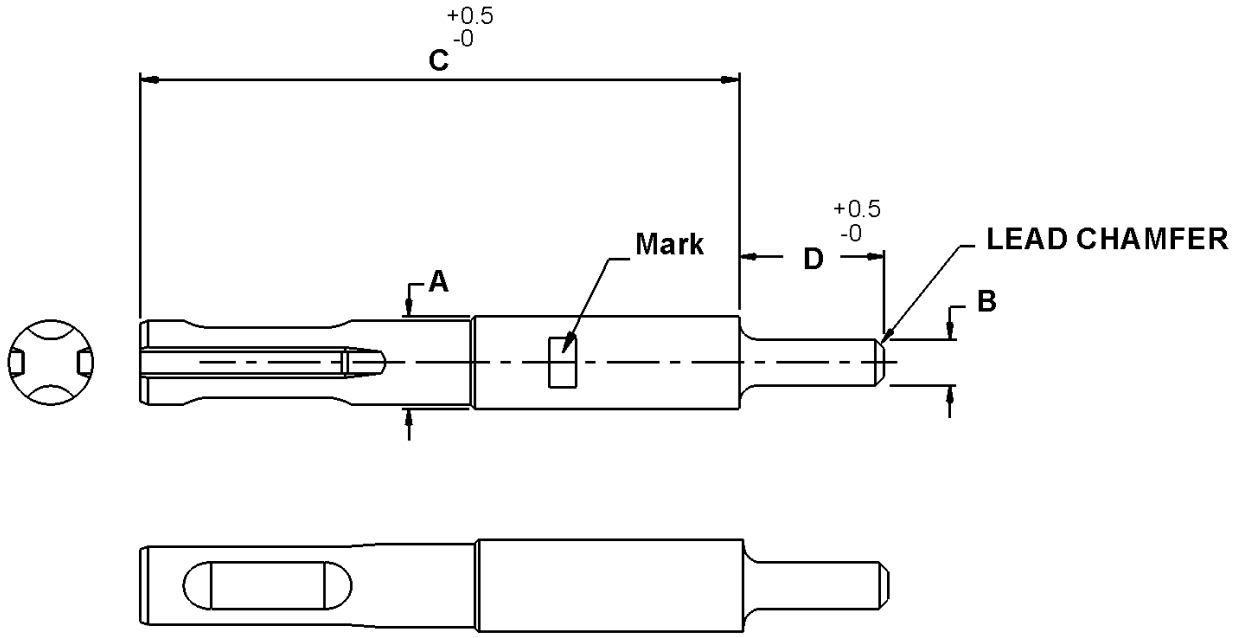


Table A4 – Dimensions of mechanical setting tool

Size	A [mm]	B (REF) [mm]	C [mm]	D [mm]
M6	Ø 10.0	Ø 4.7	114.5	15.0
M8	Ø 10.0	Ø 6.35	94.5	17.9
M10	Ø 13.0	Ø 7.9	100.5	23.8
M12	Ø 16.0	Ø 9.8	107.5	29.7
M16	Ø 22.0	Ø 13.5	114.5	36.8

Size	A [mm]	B (REF) [mm]	C [mm]	D [mm]
M8x25	Ø 10.0	Ø 6.35	95.65	16.75
M10x25	Ø 13.0	Ø 7.9	108.5	15.8
M10x30	Ø 13.0	Ø 7.9	108.3	16.0
M12x25	Ø 16.0	Ø 9.8	123.05	14.15

Use:
The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 of Regulation 305/2011 (EU) shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences.

Anchors subject to:
- Multiple use for non-structural applications.
- Static and quasi-static loads.

Base materials:
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1.
- Cracked and non-cracked concrete

Use conditions (Environmental conditions):
- Internal dry conditions

Installation:
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Check before placing the anchor to ensure that the strength class of the concrete, in which the anchor is to be placed, is identical with the values which the characteristic loads apply.
- Check of concrete being well compacted, e.g. without significant voids.
- Edge distances and spacings not less than the specified values without minus tolerances.
- Positioning of the drill holes without damaging the reinforcement.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of load application.
- Hole shall be clear.
- Anchor installation such that the effective anchorage depth is complied with; the compliance is ensured if the thickness of the fixture is not larger than the maximum values given in Annex B2.
- Anchor expansion by impact on the wedge of the anchor; the anchor is properly set if the wedge is fully dropped in.

Proposed design methods:
- 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 transmitted. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static and quasi-static loads are designed in accordance with EN 1992-4.
- Fasteners are only to be used for multiple use for non-structural applications acc. to ETAG 001, Part 6, Edition August 2010.

MEA DROP-IN ANCHOR	**Annex B1** of European Technical Assessment ETA-18/0269
Intended use – Specification	

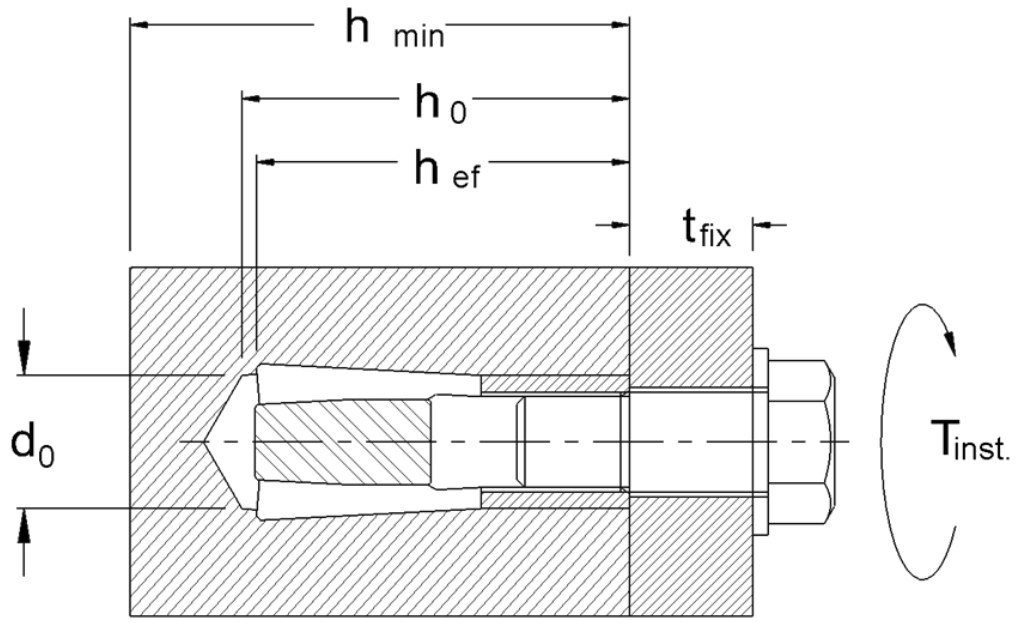


Table B1. Installation parameters

Installation parameters				**M6**	**M8**	**M10**	**M12**	**M16**
Nom. drill hole diameter	Ø d_0	[mm]	=	8	10	12	15	20
Max. Cutting diameter of drill bit	Ø d_{cut}	[mm]	≤	8,45	10,45	12,45	15,50	20,50
Depth of drill hole	h_1	[mm]	≥	25	30	40	50	65
Effective anchorage depth	h_{ef}	[mm]	≥	25	30	40	50	65
Installation moment	T_{inst}	[Nm]	=	4	8	15	35	60

Installation parameters				**M8x25**	**M10x25**	**M10x30**	**M12x25**
Nom. drill hole diameter	Ø d_0	[mm]	=	10	12	12	15
Max. Cutting diameter of drill bit	Ø d_{cut}	[mm]	≤	10,45	12,45	12,45	15,50
Depth of drill hole	h_1	[mm]	≥	25	25	30	25
Effective anchorage depth	h_{ef}	[mm]	≥	25	25	30	25
Installation moment	T_{inst}	[Nm]	≤	8	15	15	35

		M6	**M8**	**M10**	**M12**	**M16**
Minimum thickness of member	h_{min} [mm] =	100	100	120	140	160
Minimum edge distance	c_{min} [mm] =	110	140	90	140	125
Minimum spacing	s_{min} [mm] =	120	130	120	130	140

		M8x25	**M10x25**	**M10x30**	**M12x25**
Minimum thickness of member	h_{min} [mm] =	100	100	100	100
Minimum edge distance	c_{min} [mm] =	50	55	60	100
Minimum spacing	s_{min} [mm] =	100	110	150	200

MEA DROP-IN ANCHOR	**Annex B2** of European Technical Assessment ETA-18/0269
Intended use – installation parameters	

Table C1: Design method C, characteristic tension load values

			M6	M8	M10	M12	M16
Steel failure							
Resistance to steel failure	$N_{Rk,s}$	[kN]	9,92	14,62	15,24	30,92	49,90
Partial safety factor under tension load	γ_{Ms}	[-]	1,40	1,40	1,40	1,40	1,40
Pull-out failure							
Resistance to pull-out failure in cracked concrete C20/25	$N_{Rk,cr}$	[kN]	2,0	2,0	4,0	3,5	6,0
Increase factors for non-cracked concrete	Ψ_c	[-]	1,35	1,25	1,47	1,55	1,55
Concrete cone failure							
Effective embedment depth	h_{ef}	[mm]	25	30	40	50	65
Edge distance	$c_{cr,N}$	[mm]	$1,5xh_{ef}$	$1,5xh_{ef}$	$1,5xh_{ef}$	$1,5xh_{ef}$	$1,5xh_{ef}$
Spacing	$s_{cr,N}$	[mm]	$3xh_{ef}$	$3xh_{ef}$	$3xh_{ef}$	$3xh_{ef}$	$3xh_{ef}$
Robustness							
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,4	1,0
Minimum edge distance and spacing							
Minimum edge distance	c_{min}	[mm]	110	140	90	140	125
Minimum spacing distance	s_{min}	[mm]	120	130	120	130	140
Min. thickness of the concrete member	h_{min}	[mm]	100	100	120	140	160
Edge distance to prevent splitting under load							
	$N^0_{Rk,sp}$	[kN]	2,0	2,0	4,0	3,5	6,0
Appropriate edge distance	$c_{cr,sp}$	[mm]	110	140	90	140	125
Displacements under static and quasi-static loading							
Short time tension displacement	δ_{N0}	**[mm]**	0,10	0,35	0,09	0,08	0,32
Long-time tension displacement	$\delta_{N\infty}$	**[mm]**	-	-	0,09	-	-

Table C1A: Design method C, characteristic tension load values

			M8x25	M10x25	M10x30	M12x25
Steel failure						
Resistance to steel failure	$N_{Rk,s}$	[kN]	14,13	15,24	15,24	30,92
Partial safety factor under tension load	γ_{Ms}	[-]	1,40	1,40	1,40	1,40
Pull-out failure						
Resistance to pull-out failure in cracked concrete C20/25	$N_{Rk,cr}$	[kN]	0.9	1.5	3.0	2.0
Increase factors for non-cracked concrete	Ψ_c	[-]	1.34	1.45	1.19	1.45
Concrete cone failure						
Effective embedment depth	h_{ef}	[mm]	25	25	30	25
Edge distance	$c_{cr,N}$	[mm]	$1,5xh_{ef}$	$1,5xh_{ef}$	$1,5xh_{ef}$	$1,5xh_{ef}$
Spacing	$s_{cr,N}$	[mm]	$3xh_{ef}$	$3xh_{ef}$	$3xh_{ef}$	$3xh_{ef}$
Robustness						
Installation safety factor	γ_{inst}	[-]	1.4	1.2	1.4	1.4
Minimum edge distance and spacing						
Minimum edge distance	c_{min}	[mm]	50	55	60	100
Minimum spacing distance	s_{min}	[mm]	100	110	150	200
Min. thickness of the concrete member	h_{min}	[mm]	100	100	100	100
Edge distance to prevent splitting under load						
	$N^0_{Rk,sp}$	[kN]	0.9	1.5	2.0	2.0
Appropriate edge distance	$c_{cr,sp}$	[mm]	60	75	90	100
Displacements under static and quasi-static loading						
Short time tension displacement	δ_{N0}	**[mm]**	0.10	0.14	0.28	0.31
Long-time tension displacement	$\delta_{N\infty}$	**[mm]**	-	-	0.40	-

Table C2: Design method C, Characteristic shear load values

			M6	M8	M10	M12	M16
Resistance to steel failure under shear load							
Resistance to shear load without lever arm	$V^0_{Rk,s}$	[kN]	2,5	5,0	6,0	7,5	16,0
Resistance to shear load with lever arm	$M^0_{Rk,s}$	[Nm]	18,5	33,4	46,5	114	245
Displacements under static and quasi-static loading							
Short time shear displacement	δ_{V0}	**[mm]**	0,51	0,61	0,45	0,23	0,38
Long-time shear displacement	$\delta_{V\infty}$	**[mm]**	0,77	0,92	0,68	0,35	0,57

			M8x25	M10x25	M10x30	M12x25
Resistance to steel failure under shear load						
Resistance to shear load without lever arm	$V^0_{Rk,s}$	[kN]	4.0	7,0	6.5	5.0
Resistance to shear load with lever arm	$M^0_{Rk,s}$	[Nm]	34.7	46.5	46.5	114.0
Displacements under static and quasi-static loading						
Short time shear displacement	δ_{V0}	**[mm]**	0.33	0.76	1.37	0.05
Long-time shear displacement	$\delta_{V\infty}$	**[mm]**	0.50	1.14	2.06	0.08

Table C3: Resistance to fire

Characteristic values for tension load under fire exposure in accordance to EOTA TR020											
Steel failure				**M6x25**	**M8x30**	**M8x40**	**M10x25**	**M10x30**	**M10x40**	**M12x50**	**M16x65**
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	0,21	0,27	0,27	0,50	0,50	0,50	1,24	2,14
	R60			0,19	0,25	0,25	0,43	0,43	0,43	0,93	1,60
	R90			0,15	0,19	0,19	0,33	0,33	0,33	0,81	1,39
	R120			0,11	0,14	0,14	0,27	0,27	0,27	0,62	1,07
Pullout failure											
Characteristic resistance in concrete ≥ C20/25	R30	$N_{Rk,p,fi}$	[kN]	1,25	0,88	1,50	0,38	1,38	1,75	2,50	3,00
	R60										
	R90			1,00	0,70	1,20	0,30	1,10	1,40	2,00	2,40
	R120										
Concrete cone failure											
Characteristic resistance in concrete ≥ C20/25	R30	$N^{0}_{Rk,c,fi}$	[kN]	0,56	0,89	1,82	0,56	0,89	1,82	3,18	6,13
	R60										
	R90			0,45	0,71	1,46	0,45	0,71	1,46	2,55	4,91
	R120										
Spacing		$s_{cr,fi}$	[mm]	$4*h_{ef}$							
		s_{min}		100	90	120	110	150	160	200	260
Edge distance		$c_{cr,fi}$	[mm]	$2*h_{ef}$							
		c_{min}		Fire attack from one side: $2*h_{ef}$ Fire attack from more than 1 side: ≥ 300							
Characteristic values for shear load under fire exposure in accordance to EOTA TR020											
Steel failure without lever arm				**M6x25**	**M8x30**	**M8x40**	**M10x25**	**M10x30**	**M10x40**	**M12x50**	**M16x65**
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,21	0,27	0,27	0,50	0,50	0,50	1,24	2,14
	R60			0,19	0,25	0,25	0,43	0,43	0,43	0,93	1,60
	R90			0,15	0,19	0,19	0,33	0,33	0,33	0,81	1,39
	R120			0,11	0,14	0,14	0,27	0,27	0,27	0,62	1,07
Steel failure with lever arm											
Characteristic resistance	R30	$M^{0}_{Rk,s,fi}$	[Nm]	0,40	0,67	0,67	1,53	1,53	1,53	4,59	10,49
	R60			0,36	0,60	0,60	1,32	1,32	1,32	3,44	7,87
	R90			0,28	0,47	0,47	1,02	1,02	1,02	2,98	6,82
	R120			0,20	0,34	0,34	0,81	0,81	0,81	2,29	5,25
Pryout failure											
k-factor		$k=k_3$	[-]	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00
Characteristic resistance in concrete ≥ C20/25	R30	$V^{0}_{Rk,cp,fi}$	[kN]	0,56	0,89	1,82	0,56	0,89	1,82	3,18	12,26
	R60										
	R90										
	R120			0,45	0,71	1,46	0,45	0,71	1,46	2,55	9,81
Concrete edge failure											
The initial value $V^{0}_{Rk,c,fi}$ of the characteristic resistance in concrete C20/25 to C50/60 under fire exposure may be determined by: $V^{0}_{Rk,c,fi} = 0,25 \times V^{0}_{Rk,c}$ (≤ R90) $V^{0}_{Rk,c,fi} = 0,20 \times V^{0}_{Rk,c}$ (≤ R120)											

MEA DROP-IN ANCHOR	**Annex C4** of European Technical Assessment ETA-18/0269
Performance for exposure to fire	

Table C4: Reaction to fire

HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 1 PARAGRAPH 5.2.1	
ESSENTIAL CHARACTERISTICS	**PERFORMANCE**
Reaction to fire	In the final application, the thickness of the mortar layer is about 1 to 2 mm and most of the mortar is material classified class A1 according to EC Decision 96/603/EC. Therefore, it may be assumed that the bonding material (synthetic mortar or a mixture of synthetic mortar and cementitious mortar) in connection with the metal anchor in the end use application do not contribute to fire growth or to the fully developed fire and they have no influence to the smoke hazard.