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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

MEMBER OF EOTA

European Technical Assessment ETA-20/0295 of 2024/07/25

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	MUNGO Through Bolt m1 powerGrip (m1, m1-C, m1r and m1r-C)
Product family to which the above construction product belongs:	Mechanical fasteners for use in concrete
Manufacturer:	MUNGO Befestigungstechnik AG Webereiweg 6 4802 Strengelbach Switzerland Internet www.mungo.swiss
Manufacturing plant:	MUNGO Herstellwerke MUNGO Plants
This European Technical Assessment contains:	18 pages including 13 annexes which form an integralpart of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330232-01-0601, “Mechanical fasteners for use in concrete”
This version replaces:	The ETA with the same number issued on 2024-07-01

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

Technical description of the product

MUNGO m1 powerGrip is a torque controlled expansion anchor made of galvanized steel (m1) or stainless steel(m1r). The anchor is installed in a drilled hole and anchored by torque-controlled expansion.

An illustration of the product is given in Annex A.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex B, Table B1. The intended use specifications of the product are detailed in the Annex B1.

2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

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 provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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 Characteristics of product

Mechanical resistance and stability (BWR 1):
The essential characteristics are detailed in Annex C1, C2 and C3.

Safety in case of fire (BWR 2):
The essential characteristics are detailed in Annex C4.

Safety in use (BWR4):
For basic requirement Safety in use the same criteria are valid for Basic Requirement Mechanical resistance and stability (BWR1).

Sustainable use of natural resources (BWR7)
No performance assessed.

Other Basic Requirements are not relevant.

3.2 Methods of assessment

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 has been made in accordance with EAD 330232-01-0601; Mechanical fasteners for use in concrete and EOTA Technical Report 049 Post-installed fasteners in concrete under seismic action.

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

4.1 AVCP system

According to the decision 1996/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

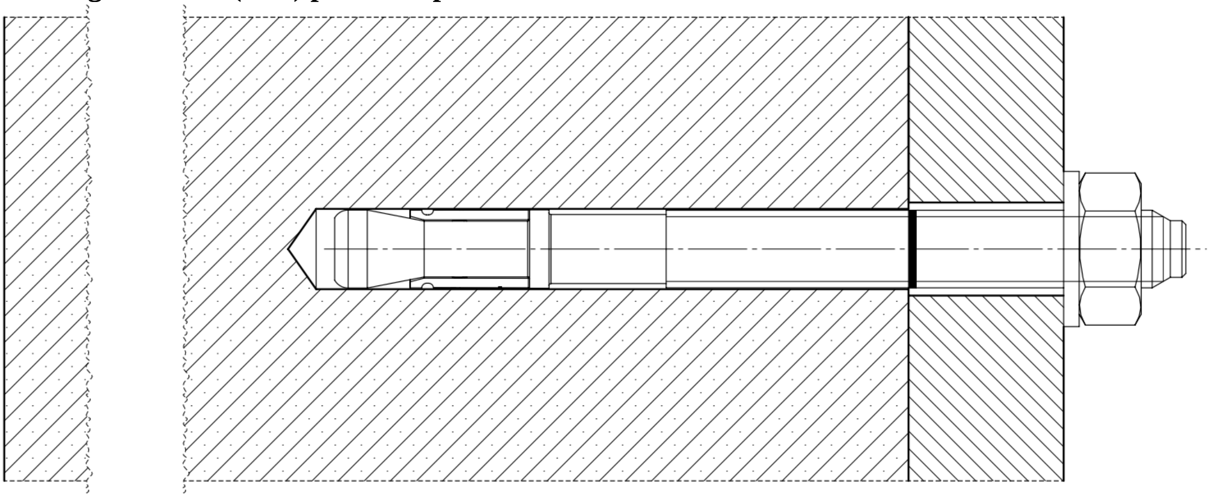
Technical details necessary for the implementation ofthe AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2024-07-25 by

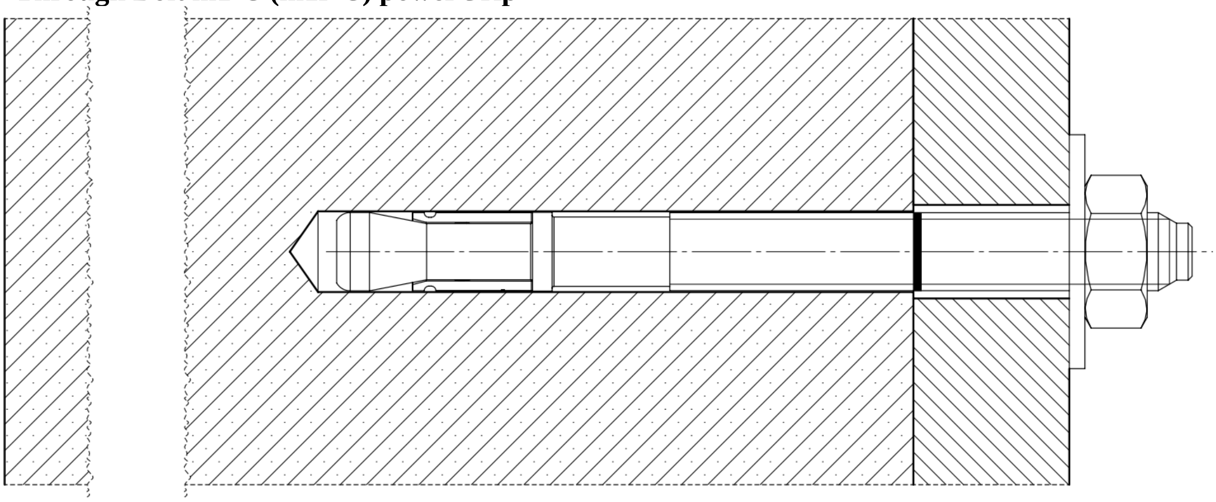
Thomas Bruun
Managing Director, ETA-Danmark

Installation condition for m1 powerGrip

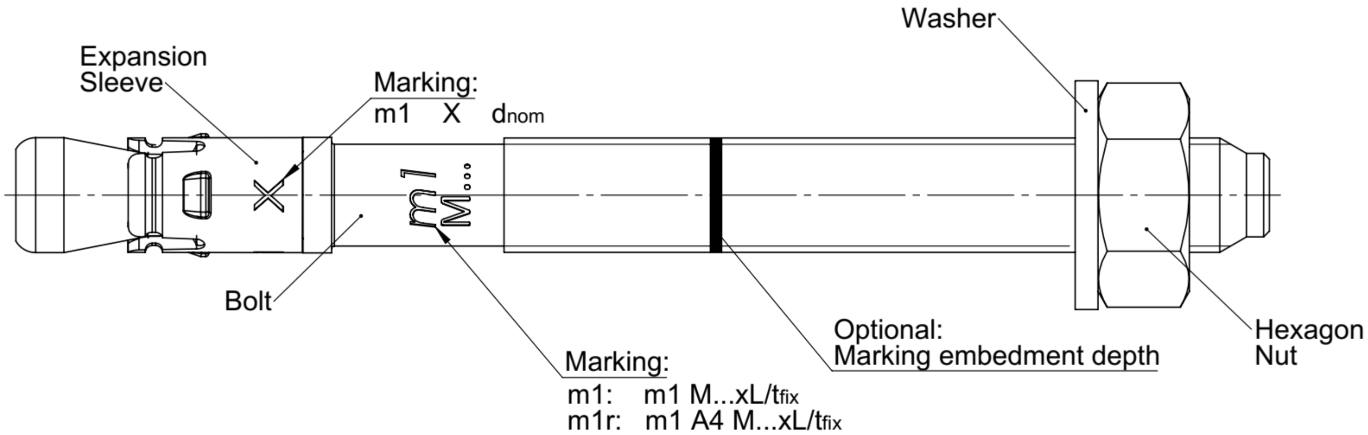
Through Bolt m1 (m1r) powerGrip



Through Bolt m1-C (m1r-C) powerGrip



Marking and description



Marking on body

Product marking, example: *m*1 A4 M10 x 125/45

Product designation
for stainless steel additional A4
placed on marking area at body

Thread size x total length / max. thickness fixture (t_{fix})
placed on marking area at body

m1: carbon steel, zinc plated (GreenTec®)
m1 A4: stainless steel

Marking on sleeve

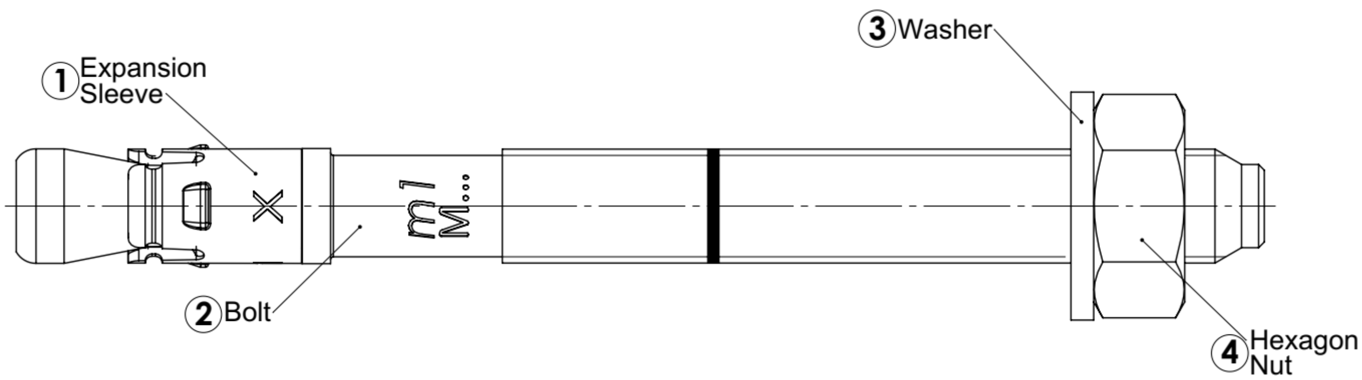
Product marking, example: *m*1 X 10

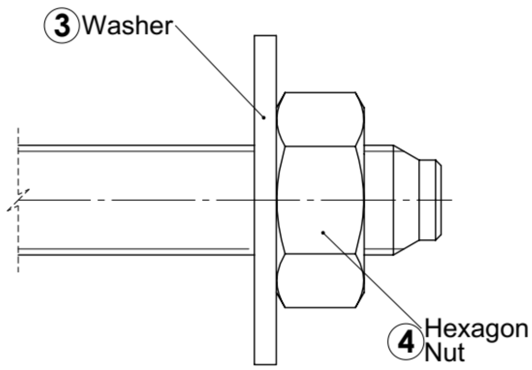
Product designation
with nominal diameter
placed on marking area at expansion sleeve

m1: stainless steel (expansion sleeve always stainless steel)

Table A1: Materials

Part	Designation	Material	
		m1 & m1-C	m1r & m1r-C
	Steel grade	Steel	Stainless steel (A4) according to EN 10088:2014
		Zinc plated (GreenTec®) ≥ 5 µm	Corrosion resistance class **CRC III** according to EN 1993-1-4:2016+A1:2015
1	Expansion sleeve	Cold strip with surface finish 2B, stainless steel EN 10088:2014	
2	Bolt	Cold form steel	Stainless steel EN 10088:2014
3	Washer	Cold strip, EN 10139:2016	Stainless steel EN 10088:2014
4	Hexagon nut	Steel, property class min. 8, EN ISO 898-2:2023-02	Stainless steel EN 10088:2014, property class min. 70, EN ISO 3506-2:2020





MUNGO m1 powerGrip	Annex A3 of European Technical Assessment ETA-20/0295
Product description Materials	

Specifications of intended use

Anchors subject to:

Through Bolt		**m1, m1-C, m1r, m1r-C**			
Size		**M8**	**M10**[2]	**M12**	**M16**
Hammer drilling with standard drill bit (HD)		✓			
Hammer drilling with hollow drill bit with automatic cleaning (HDB)		✓			
Cracked and uncracked concrete		✓			
Static and quasi-static loads		✓			
Seismic performance category	C1	✓			
	C2	–[1]	✓		
Fire exposure		✓ (R30, R60, R90, R120)			

[1] No performance assessed

[2] Reduced setting depth is limited in use

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

Use conditions (Environmental conditions):
- Anchors may be used in structures subject to dry internal conditions
- For all other conditions according EN 1993-1-4 + A1, corresponding to corrosion resistance classes CRC according to Annex A3, Table A1

Installation:
- The anchors may be installed in:
  - Dry concrete: sizes M8, M10, M12 and M16.
- 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.
- Cleaning of the hole of drilling dust.
- 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:

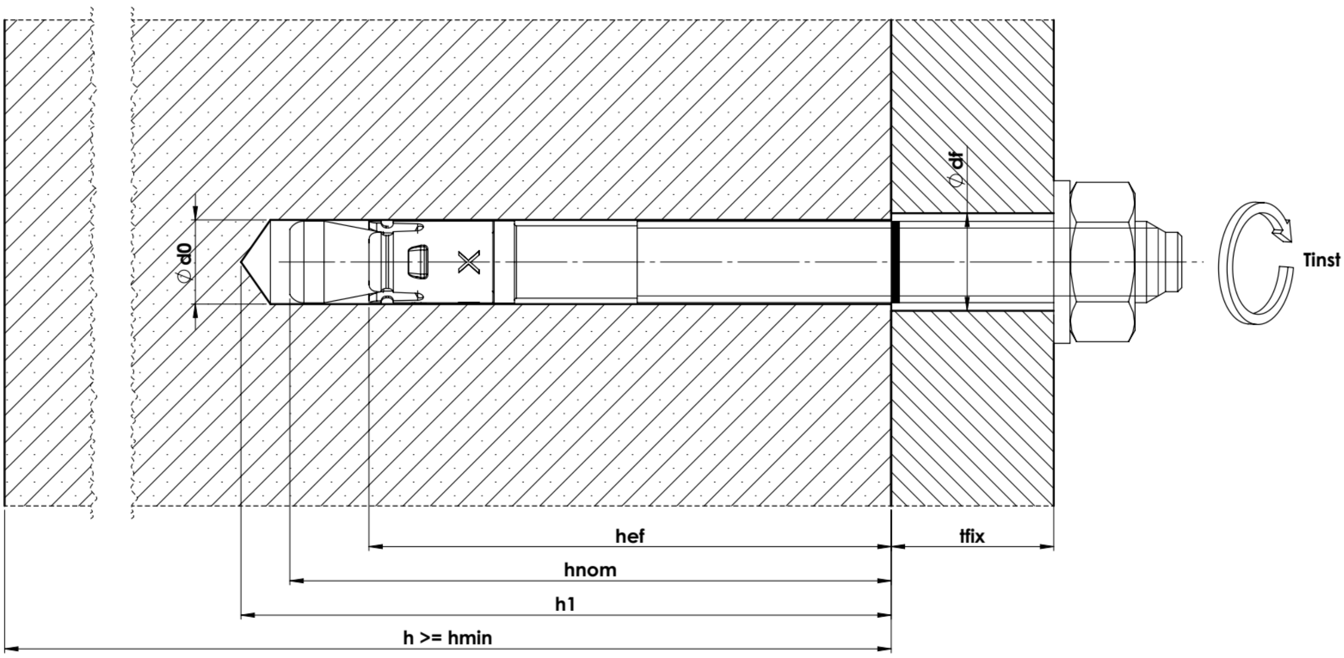
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be transmitted. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static and quasi-static loads are designed in accordance EN 1992-4

Table B1: Installation parameters

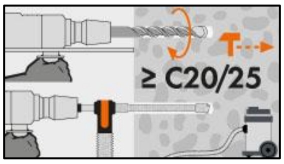
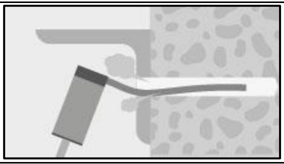
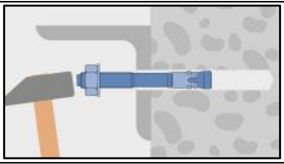
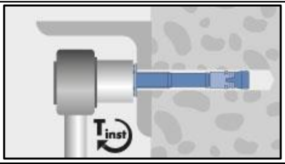
Through Bolt			m1, m1-C, m1r, m1r-C				
Size			**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**
Nominal drill hole diameter	d_0	[mm]	8	10	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	10,45	12,50	16,50
Drill hole depth	$h_1 \geq$	[mm]	65	60	80	90	110
Nominal embedment depth	$h_{nom} \geq$	[mm]	55	50	70	81	98
Effective embedment depth	h_{ef}	[mm]	48	40	60	70	80
Clearance hole diameter in fixture	d_f	[mm]	9	12	12	14	18
Installation torque moment	T_{inst}	[Nm]	20	45	45	60	80
Torque wrench socket size	SW	[mm]	13	17	17	19	24

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

Through Bolt			m1, m1-C				m1r, m1r-C			
Size			**M8**	**$M10_{hnom1}$ $M10_{hnom2}$**	**M12**	**M16**	**M8**	**$M10_{hnom1}$ $M10_{hnom2}$**	**M12**	**M16**
Minimum thickness of concrete member	h_{min}	[mm]	110	120	140	160	100	120	140	160
Minimum edge distance	c_{min}	[mm]	70	55	60	90	50	65	60	70
Minimum spacing	s_{min}	[mm]	60	80	110	130	50	80	100	120



Installation instructions

1a or **1b**		1a. Hammer drilling (HD): Drill a hole perpendicular to the surface of the anchoring base. 1b. Hammer drilling with hollow drill bit (HDB): Drill a hole perpendicular to the surface of the anchoring base. Continue with step 3.
2		Blow out dust. Alternatively vacuum clean down to the bottom of the drill hole. Cleaning not required for HDB.
3		Drive in Through Bolt.
4		Apply installation torque T_{inst}.

MUNGO m1 powerGrip	**Annex B4** of European Technical Assessment ETA-20/0295
Intended use – installation parameters	

Table C1: Characteristic resistance to tension load (static and quasi-static loading) for m1 / m1-C (Galvanized steel) according to EN 1992-4

Through Bolt			m1, m1-C				
Size			**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**
Tension load							
Steel failure							
Characteristic Resistance	$N_{Rk,s}$	[kN]	17	30	30	44	77
Partial safety factor for steel resistance	γ_{Ms} 1)	[-]	1,40				
Pullout failure							
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	9	7,5	15	18	26
Increasing factor for $N_{Rk,p,ucr}$ for uncracked concrete $N_{Rk,p,ucr} = \Psi_c \cdot N_{Rk,p,ucr}$ (C20/25)	$\Psi_{c,20/25}$	[-]	1,00	1,00	1,00	1,00	1,00
	$\Psi_{c,25/30}$	[-]	1,06	1,09	1,12	1,10	1,09
	$\Psi_{c,30/37}$	[-]	1,12	1,18	1,22	1,20	1,17
	$\Psi_{c,35/45}$	[-]	1,16	1,25	1,32	1,28	1,24
	$\Psi_{c,40/50}$	[-]	1,21	1,32	1,41	1,36	1,31
	$\Psi_{c,45/55}$	[-]	1,25	1,39	1,50	1,44	1,37
	$\Psi_{c,50/60}$	[-]	1,28	1,45	1,58	1,51	1,42
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	4	5,5	7,5	16	20
Increasing factor for $N_{Rk,p,cr}$ for cracked concrete $N_{Rk,p,cr} = \Psi_c \cdot N_{Rk,p,cr}$ (C20/25)	$\Psi_{c,20/25}$	[-]	1,00	1,00	1.00	1,00	1,00
	$\Psi_{c,25/30}$	[-]	1,11	1,02	1,09	1,12	1,10
	$\Psi_{c,30/37}$	[-]	1,21	1,03	1,17	1,22	1,19
	$\Psi_{c,35/45}$	[-]	1,30	1,05	1,24	1,32	1,26
	$\Psi_{c,40/50}$	[-]	1,38	1,06	1,30	1,41	1,34
	$\Psi_{c,45/55}$	[-]	1,46	1,07	1,37	1,49	1,40
	$\Psi_{c,50/60}$	[-]	1,54	1,08	1,42	1,57	1,47
Installation safety factor	γ_{inst}	[-]	1,0				
Concrete cone failure and splitting failure under load							
Effective embedment depth	h_{ef}	[mm]	48	40	60	70	80
Factor for uncracked concrete	k_{ucr}	[-]	11,0				
Factor for cracked concrete	k_{cr}	[-]	7,7				
Edge distance	$c_{cr,N}$	[mm]	$1{,}5 \cdot h_{ef}$				
Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$				
Characteristic edge distance for splitting failure	$c_{cr,sp}$	[mm]	96	120	120	140	140
Characteristic spacing for splitting failure	$s_{cr,sp}$	[mm]	192	240	240	280	280

MUNGO m1 powerGrip	**Annex C1** of European Technical Assessment ETA-20/0295
Performance for static and quasi-static loads: Resistances	

Table C2: Characteristic resistance to tension load (static and quasi-static loading) for m1r / m1r-C (Stainless steel) according to EN 1992-4

Through Bolt			m1r, m1r-C				
Size			**M8**	**M10$_{hnom1}$**	**M10$_{hnom2}$**	**M12**	**M16**
Tension load							
Steel failure							
Characteristic Resistance	$N_{Rk,s}$	[kN]	17	30	30	44	77
Partial safety factor for steel resistance	γ_{Ms} [1)]	[-]	1,60				
Pullout failure							
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	12	7,5	20	24	26
Increasing factor for $N_{Rk,p,ucr}$ for uncracked concrete $N_{Rk,p,ucr} = \Psi_c \cdot N_{Rk,p,ucr}$ (C20/25)	$\Psi_{c,20/25}$	[-]	1,00	1,00	1,00	1,00	1,00
	$\Psi_{c,25/30}$	[-]	1,06	1,10	1,09	1,11	1,12
	$\Psi_{c,30/37}$	[-]	1,11	1,18	1,16	1,21	1,22
	$\Psi_{c,35/45}$	[-]	1,16	1,26	1,23	1,30	1,32
	$\Psi_{c,40/50}$	[-]	1,20	1,34	1,29	1,39	1,41
	$\Psi_{c,45/55}$	[-]	1,23	1,40	1,35	1,47	1,50
	$\Psi_{c,50/60}$	[-]	1,27	1,47	1,40	1,54	1,58
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	4	4,5	9	16	20
Increasing factor for $N_{Rk,p,cr}$ for cracked concrete $N_{Rk,p,cr} = \Psi_c \cdot N_{Rk,p,cr}$ (C20/25)	$\Psi_{c,20/25}$	[-]	1,00	1,00	1,00	1,00	1,00
	$\Psi_{c,25/30}$	[-]	1,12	1,12	1,12	1,11	1,10
	$\Psi_{c,30/37}$	[-]	1,22	1,22	1,22	1,21	1,19
	$\Psi_{c,35/45}$	[-]	1,32	1,32	1,32	1,30	1,27
	$\Psi_{c,40/50}$	[-]	1,41	1,41	1,41	1,38	1,35
	$\Psi_{c,45/55}$	[-]	1,50	1,50	1,50	1,46	1,42
	$\Psi_{c,50/60}$	[-]	1,58	1,58	1,58	1,54	1,48
Installation safety factor	γ_{inst}	[-]	1,0				
Concrete cone failure and splitting failure under load							
Effective embedment depth	h_{ef}	[mm]	48	40	60	70	80
Factor for uncracked concrete	k_{ucr}	[-]	11,0				
Factor for cracked concrete	k_{cr}	[-]	7,7				
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$				
Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$				
Characteristic edge distance for splitting failure	$c_{cr,sp}$	[mm]	96	120	120	140	200
Characteristic spacing for splitting failure	$s_{cr,sp}$	[mm]	192	240	240	280	400

Table C3: Characteristic resistance to shear load (static and quasi-static loading) according to EN 1992-4

Through Bolt			**m1, m1-C**					**m1r, m1r-C**				
Size			**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**	**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**
Shear load												
Steel failure												
Characteristic Resistance without lever arm	$V^0_{Rk,s}$	[kN]	13,4	21,3	21,3	33	47,3	14,6	23,2	23,2	33,7	62,8
Characteristic Resistance with lever arm	$M^0_{Rk,s}$	[Nm]	48,3	94,2	94,2	162,9	386	48,3	94,2	94,2	162,9	386
Partial safety factor for steel resistance	γ_{Ms} [1)]	[-]	1,50					1,33				
Pry-out failure												
Factor for pryout failure	k_8	[-]	1,0	1,0	2,0	2,0	2,0	1,0	1,0	2,0	2,0	2,0
Concrete edge failure												
Outside diameter of the fastener relevant for shear load	d_{nom}	[mm]	8	10	10	12	16	8	10	10	12	16
Effective length of the fastener for transfer of shear load	l_f	[mm]	48	40	60	70	80	48	40	60	70	80

[1)] In absence of other national regulations

Table C3: Characteristic resistance to seismic performance category C1

Through Bolt			m1, m1-C				m1r, m1r-C			
Size			**M8**	**M10**	**M12**	**M16**	**M8**	**M10**	**M12**	**M16**
Effective embedment depth	h_{ef}	[mm]	48	60	70	80	48	60	70	80
Tension load										
Steel failure										
Characteristic Resistance	$N_{Rk,s,C1}$	[kN]	15,7	27,8	42,1	71,2	17,7	29,9	35,9	70,5
Partial safety factor for steel resistance	$\gamma_{MsN,seis}$ [1)	[-]	1,4				1,6			
Pullout failure										
Characteristic resistance	$N_{Rk,p,C1}$	[kN]	3,6	7	15,2	18,4	4	9	13	18,2
Installation safety factor	$\gamma_{Mp,seis}$ [1)	[-]	1,5				1,5			
Shear load										
Steel failure without lever arm										
Characteristic Resistance	$V_{Rk,s,C1}$	[kN]	13,4	21,3	33	47,3	14,6	23,2	33,7	62,8
Partial safety factor for steel resistance	$\gamma_{MsV,seis}$ [1)	[-]	1,5				1,33			

1) The recommended partial safety factors under seismic action ($\gamma_{M,seis}$) are the same as for static loading

Table C4: Characteristic resistance to seismic performance category C2

Through Bolt			m1, m1-C			m1r, m1r-C		
Size			**M10**	**M12**	**M16**	**M10**	**M12**	**M16**
Effective embedment depth	h_{ef}	[mm]	60	70	80	60	70	80
Tension load								
Steel failure								
Characteristic Resistance	$N_{Rk,s,C2}$	[kN]	10,3	23	54,2	10,3	23	54,2
Partial safety factor for steel resistance	$\gamma_{MsN,seis}$ [1)	[-]	1,4			1,6		
Pullout failure								
Characteristic resistance	$N_{Rk,p,C2}$	[kN]	2,6	8,3	14	3,1	8,3	14
Installation safety factor	$\gamma_{Mp,seis}$ [1)	[-]	1,5			1,5		
Shear load								
Steel failure without lever arm								
Characteristic Resistance	$V_{Rk,s,C2}$	[kN]	15,3	26,4	37,9	15,3	26,4	37,9
Partial safety factor for steel resistance	$\gamma_{MsV,seis}$ [1)	[-]	1,5			1,33		

1) The recommended partial safety factors under seismic action ($\gamma_{M,seis}$) are the same as for static loading

Table C5: Resistance to fire

Through Bolt				m1, m1-C				m1r, m1r-C			
Size				**M8**	**M10**	**M12**	**M16**	**M8**	**M10**	**M12**	**M16**
Effective embedment depth		$h_{ef} \geq$	[mm]	48	60	70	80	48	60	70	80
Tension load											
Steel failure											
Characteristic resistance	R30	$N_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	1,01	1,96	3,39	6,03
	R60	$N_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	0,80	1,57	2,83	5,03
	R90	$N_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	0,60	1,26	2,26	4,02
	R120	$N_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	0,50	1,10	1,81	3,22
Shear load											
Steel failure without lever arm											
Characteristic resistance	R30	$V_{Rk,s,fi(30)}$	[kN]	0,50	1,18	2,26	4,02	1,01	1,96	3,39	6,03
	R60	$V_{Rk,s,fi(60)}$	[kN]	0,45	1,02	1,70	3,02	0,80	1,57	2,83	5,03
	R90	$V_{Rk,s,fi(90)}$	[kN]	0,35	0,79	1,47	2,61	0,60	1,26	2,26	4,02
	R120	$V_{Rk,s,fi(120)}$	[kN]	0,25	0,63	1,13	2,01	0,50	1,10	1,81	3,22
Steel failure with lever arm											
Characteristic resistance	R30	$M^0_{Rk,s,fi(30)}$	[Nm]	0,50	1,18	2,26	4,02	1,01	1,96	3,39	6,03
	R60	$M^0_{Rk,s,fi(60)}$	[Nm]	0,45	1,02	1,70	3,02	0,80	1,57	2,83	5,03
	R90	$M^0_{Rk,s,fi(90)}$	[Nm]	0,35	0,79	1,47	2,61	0,60	1,26	2,26	4,02
	R120	$M^0_{Rk,s,fi(120)}$	[Nm]	0,25	0,63	1,13	2,01	0,50	1,10	1,81	3,22

$N_{Rk,p,fi}$ and $N_{Rk,c,fi}$ according EN 1992-4

The recommended partial safety factors under fire are $\gamma_{M,fi}$ = 1,0 and γ_{inst} = 1,0

Table C5: Reaction to fire

The anchors are made from steel and is classified as reaction to fire Class A1 as provided for in the Delegated Regulation 2016/364/EC and EN 13501-1

Table C6: Displacements

Through Bolt			m1, m1-C					m1r, m1r-C				
Size			**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**	**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**
Displacements under static and quasi-static load												
Tension load	**N**	[kN]	1,91	2,62	3,57	7,62	9,52	1,90	2,14	4,29	7,62	9,52
Short-time tension displacement	δ_{N0}	[mm]	0,01	0,09	0,01	0,30	0,78	0,09	0,08	0,21	0,42	0,20
Long-time tension displacement	$\delta_{N\infty}$	[mm]	0,83	0,48	1,03	1,15	1,49	1,01	0,41	1,63	1,39	1,39

Through Bolt			m1, m1-C					m1r, m1r-C				
Size			**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**	**M8**	**$M10_{hnom1}$**	**$M10_{hnom2}$**	**M12**	**M16**
Displacements under static and quasi-static load												
Shear load	**V**	[kN]	6,36	6,1	10,14	15,72	22,54	7,86	8,15	12,46	18,11	33,73
Short-time tension displacement	δ_{V0}	[mm]	1,30	1,20	2,01	2,73	2,45	2,16	2,67	1,26	2,61	3,42
Long-time tension displacement	$\delta_{V\infty}$	[mm]	1,94	1,80	3,01	4,09	3,68	3,23	4,01	1,90	3,90	5,12