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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-05/0070
of 13 November 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

MUNGO Throughbolt m2 and m2r

Product family to which the construction product belongs

Mechanical fastener for use in concrete

Manufacturer

MUNGO Befestigungstechnik AG
Webereiweg 6
4802 Strengelbach
SCHWEIZ

Manufacturing plant

MUNGO Plants

This European Technical Assessment contains

19 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 330232-01-0601, Edition 05/2021

This version replaces

ETA-05/0070 issued on 11 April 2017

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Specific Part

1 Technical description of the product

The MUNGO throughbolt m2 and m2r is an anchor made of galvanised steel or stainless steel which is placed into a drilled hole and anchored by torque-controlled expansion. According to the size of washer the anchor versions are designated as m2 or m2r, m2-C or m2r-C and m2-CG.

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 fastener 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 fastener 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 and C 2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 3 and C 4
Characteristic resistance for seismic performance category C1 and C2	No performance assessed
Displacements	See Annex C 5 and C 6

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

3.3 Aspects of durability

Essential characteristic	Performance
Durability	See Annex B 1

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 330232-01-0601 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

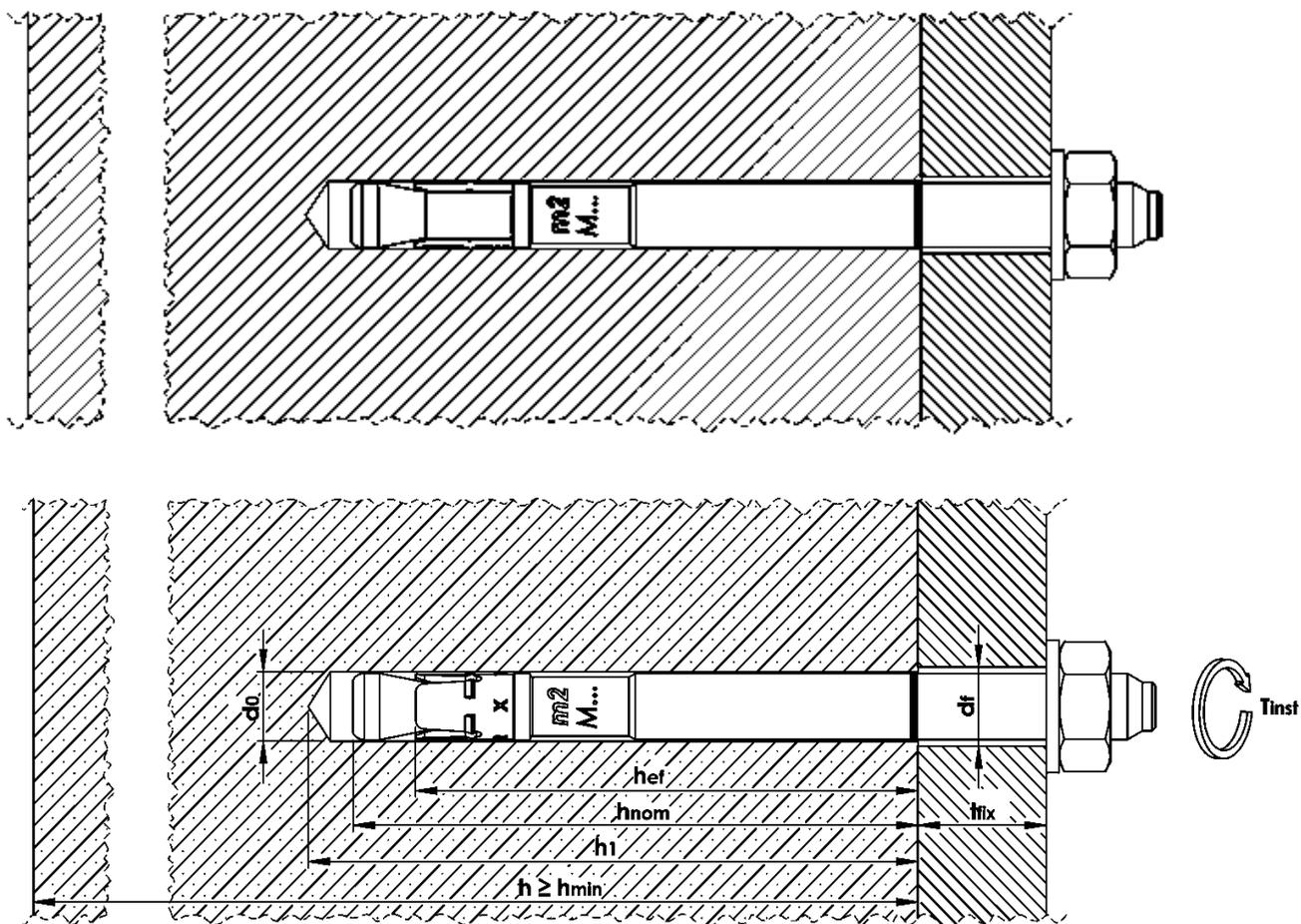
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 13 November 2025 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

Installation condition for m2 Throughbolt



Installation condition exemplary m2 Throughbolt

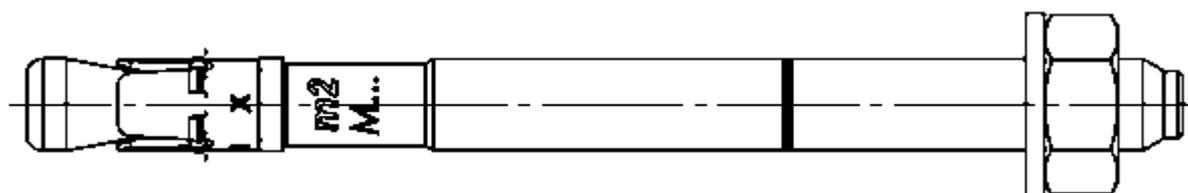
- Legend:**
- h_{ef} = effective anchorage depth
 - h_{nom} = overall fastener embedment depth in the concrete
 - h_1 = depth of drill hole
 - h = thickness of concrete member
 - h_{min} = minimum thickness of concrete member
 - d_0 = nominal diameter of drill bit
 - d_f = clearance hole diameter in the fixture
 - t_{fix} = thickness of fixture
 - T_{inst} = installation torque

MUNGO Throughbolt m2 and m2r

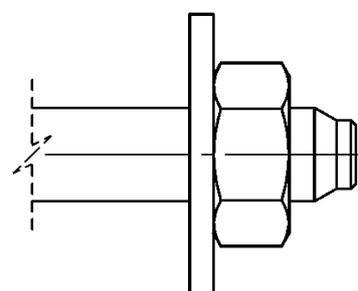
Product description
Installation condition

Annex A 1

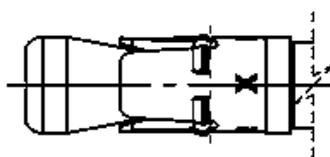
Designation and design of the Expansion Sleeves (Clips)



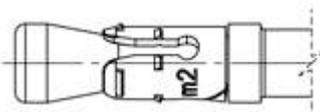
Exemplary m2 Throughbolt



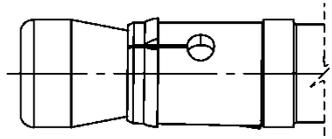
Exemplary m2-C Throughbolt



Expansion Sleeve Geometry for:
m2 & m2r M8, M10 and M12



Expansion Sleeve Geometry for:
m2 & m2r M6 and m2 M20



Expansion Sleeve Geometry for:
m2 & m2r M16

Types of Throughbolts:

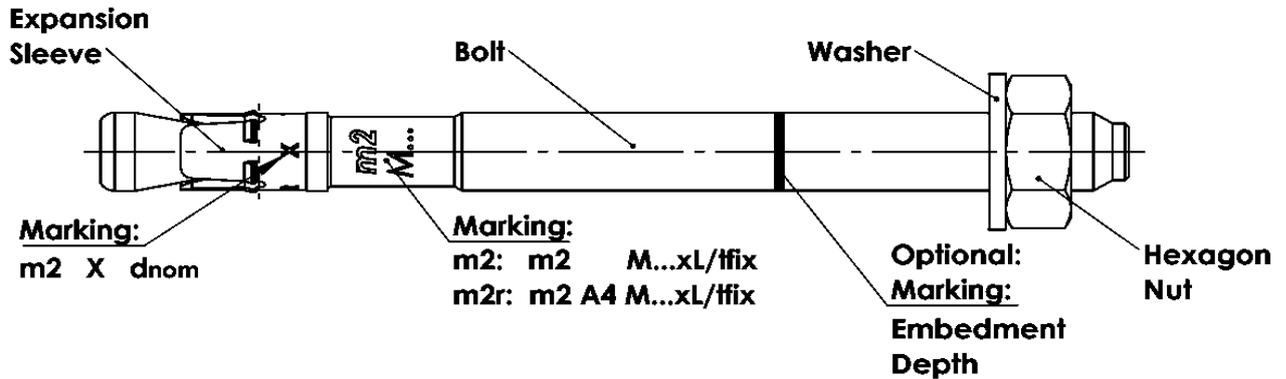
m2 and m2r	with washer EN ISO 7089 and hexagon nut
m2-C and m2r-C	with washer EN ISO 7093-1 and hexagon nut
m2-CG	with washer EN ISO 7094 and hexagon nut

MUNGO Throughbolt m2 and m2r

Product description
Designation and design of expansion sleeves (clips)

Annex A 2

Throughbolt Marking and Designation



Marking on Body:

Product Marking, Example: m2 A4

M10 x 125/45

Product Designation

For Stainless Steel additionally A4

On the Marking Surface of the Bolt

m2 Version: Steel, ZnNi coated (**GreenTec®**)

m2r Version: Stainless Steel

Diameter x Total Length /

max. Usable Length (t_{fix})

On the Marking Surface of the Bolt

Marking on Expansion Sleeve:

Product Marking, Example: m2 X 10

Product Designation with Diameter

placed on the Expansion Sleeve

m2 Version: Steel, coated

m2r Version: Stainless Steel

Tip Marking

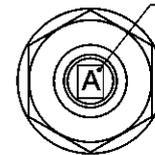


Table A1: Length Identification

Length Identification			A	C/D*	E	G	H	J	K
Usable Length	max t_{fix}	[mm]	5	10	15	25	30	40	45

*M16 with D for t_{fix} = 65mm

Length Identification			L	N	P	R	S	T	U
Usable Length	max t_{fix}	[mm]	50	60	70	80	90	100	95

MUNGO Throughbolt m2 and m2r

Product description
Marking, Designation and Length Identification

Annex A 3

Table A2: Materials

Part	Designation		Material	
			m2 & m2-C	m2r & m2r-C
	Steel Grade		Steel	Stainless Steel (A4) according to EN 10088:2014
			ZnNi plated (GreenTec®) ≥ 5 µm	Corrosion Resistance Class CRC III according to EN 1993-1-4:2006+A1:2015
1	Expansion Sleeve	L ≤ 185mm	Cold Strip, EN 10139:2016+A1:2020, plated ≥ 5 µm	Cold Strip, Stainless Steel EN 10088:2014
		L > 185mm ¹⁾	Cold Strip, Stainless Steel EN 10088:2014	-
2	Bolt	L ≤ 185mm	Cold Form Steel	Stainless Steel EN 10088:2014
		L > 185mm	Free-Cutting Steel	-
3	Washer		Cold Strip, EN 10139:2016+A1:2020	Stainless Steel EN 10088:2014
4	Hexagon Nut		Steel, Strength Class min. 8 according to ISO 898-2:2022	Stainless Steel EN 10088:2014, Material Class min. 70, EN ISO 3506-2:2020

¹⁾ valid for sizes M12 and M16, valid for size M20 regardless of length

MUNGO Throughbolt m2 and m2r

Product description
Materials

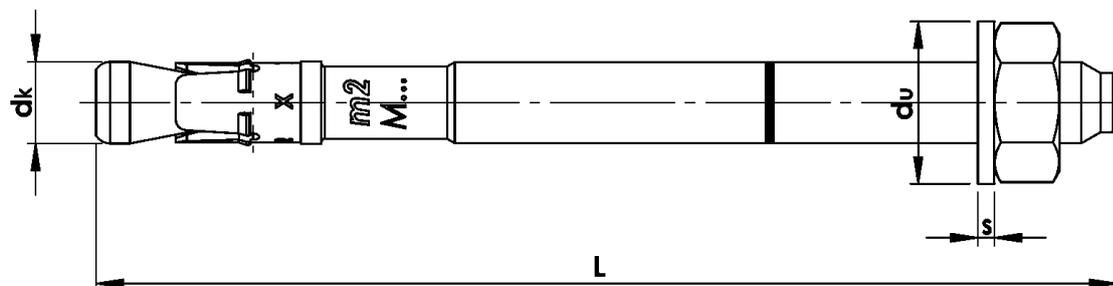
Annex A 4

Table A3: Dimensions for m2, m2-C and m2-CG

Through Bolt			m2, m2-C, m2-CG						
Part	Designation	Size	M6	M8	M10	M12	M16	M20	
2	Bolt	d_k [mm]	6	8	10	12	16	20	
		L_{min} [mm]	50	80	60	80	90	130	
		L_{max} [mm]	95	165	180	360	440	270	
3	Washer	EN ISO 7089	d_u [mm]	12	16	20	24	30	37
			s [mm]	1,6	1,6	2	2,5	3	3
		EN ISO 7093-1	d_u [mm]	18	24	30	37	50	60
			s [mm]	1,6	2	2,5	3	3	4
		EN ISO 7094	d_u [mm]	22	28	34	44	56	72
			s [mm]	2	3	3	4	5	6
4	Hexagon Nut	SW [mm]	10	13	17	19	24	30	

Table A4: Dimensions for m2r and m2r-C

Through Bolt			m2r, m2r-C					
Part	Designation	Size	M6	M8	M10	M12	M16	
2	Bolt	d_k [mm]	6	8	10	12	16	
		L_{min} [mm]	65	80	95	110	130	
		L_{max} [mm]	95	165	180	185	180	
3	Washer	EN ISO 7089	d_u [mm]	12	16	20	24	30
			s [mm]	1,6	1,6	2	2,5	3
		EN ISO 7093-1	d_u [mm]	18	24	30	37	50
			s [mm]	1,6	2	2,5	3	3
4	Hexagon Nut	SW [mm]	10	13	17	19	24	



MUNGO Throughbolt m2 and m2r

Product description
Dimensions

Annex A 5

Specifications of Intended Use

Anchors subject to:

Through Bolt	m2, m2-C, m2-CG					
Size	M6	M8	M10	M12	M16	M20
Hammer Drilling (HD)				✓		
Uncracked Concrete				✓		
Static and Quasi-Static Loads				✓		

Through Bolt	m2r, m2r-C				
Size	M6	M8	M10	M12	M16
Hammer Drilling (HD)			✓		
Uncracked Concrete			✓		
Static and Quasi-Static Loads			✓		

Base Materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres of strength class C20/25 to C50/60 according to EN 206:2013 + A1:2016.
- Uncracked concrete.

Use Conditions (Environmental Conditions):

- Structures subject to dry internal conditions (all versions).
- For all other environmental conditions according to EN 1993-1-4:2006+A1:2015 in accordance with Corrosion Resistance Class CRC according to Annex A 4, Table A2.

Design:

- The design of the anchors shall be done under the responsibility of an engineer experienced in the field of anchorages and concrete work.
- Verifiable calculations and construction drawings shall be prepared, taking into account the loads to be anchored. The location of the anchors (e.g. location of the anchor in relation to the reinforcement or the supports, etc.) must be indicated on the design drawings.
- The anchors shall be designed in accordance with: EN 1992-4:2018.

Installation:

- Hole drilling by hammer drilling (HD).
- Anchor installation in accordance with the manufacturer's specifications using the appropriate tools carried out by appropriately qualified personnel.
- Cleaning of the drill hole of debris and drilling dust.
- The anchor may only be set once.

MUNGO Throughbolt m2 and m2r

Intended use
Specifications

Annex B 1

Table B1: Installation Parameters for m2, m2-C and m2-CG

Throughbolt			m2, m2-C, m2-CG						
Size			M6	M8	M10 _{hnom1}	M10 _{hnom2}	M12	M16	M20
Nominal drill hole diameter	d_0	[mm]	6	8	10	12	16	20	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40	8,45	10,45	12,50	16,50	20,55	
Drill hole depth	$h_1 \geq$	[mm]	60	70	50	80	90	130	
Effective embedment depth	h_{ef}	[mm]	40	50	33	58	68	100	
Clearance hole diameter in fixture	d_f	[mm]	7	9	12	14	18	22	
Installation torque moment	T_{inst}	[Nm]	5	15	30	50	100	200	
Torque wrench socket size	SW	[mm]	10	13	17	19	24	30	

Table B2: Installation Parameters for m2r and m2r-C

Throughbolt			m2r, m2r-C				
Size			M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0	[mm]	6	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40	8,45	10,45	12,50	16,50
Drill hole depth	$h_1 \geq$	[mm]	60	65	80	90	110
Effective embedment depth	h_{ef}	[mm]	40	50	58	68	80
Clearance hole diameter in fixture	d_f	[mm]	7	9	12	14	18
Installation torque moment	T_{inst}	[Nm]	6,5	15	30	50	140
Torque wrench socket size	SW	[mm]	10	13	17	19	24

MUNGO Throughbolt m2 and m2r

Intended use
Installation parameters

Annex B 2

Table B3: Minimum Thickness of Concrete, Minimum Edge and Spacing Distances for m2, m2-C and m2-CG

Throughbolt		m2, m2-C, m2-CG							
Size		M6	M8	M10	M12		M16		M20
Length	L [mm]				≤ 185	> 185	≤ 185	> 185	
Minimum thickness of concrete member	h_{min} [mm]	100	100	120	140		160		200
Minimum edge distance for spacing	c_{min} [mm]	40	-	-	-	150	130	240	300
	s [mm]	80				210	190	240	350
Minimal spacing for edge distance	s_{min} [mm]	40	45	50	75	110	100	120	200
	c [mm]	70	45	50	80	200	190	320	400

Table B4: Minimum Thickness of Concrete, Minimum Edge and Spacing Distances for m2r and m2r-C

Throughbolt		m2r, m2r-C				
Size		M6	M8	M10	M12	M16
Length	L [mm]				≤ 185	≤ 185
Minimum thickness of concrete member	h_{min} [mm]	100	100	120	140	160
Minimum edge distance for spacing	c_{min} [mm]	40	-	-	-	130
	s [mm]	80				190
Minimal spacing for edge distance	s_{min} [mm]	40	45	55	75	100
	c [mm]	70	45	55	75	190

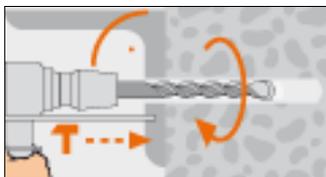
MUNGO Throughbolt m2 and m2r

Intended use

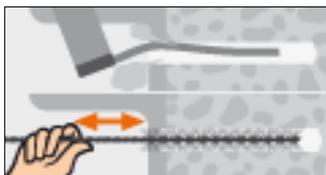
Minimum thickness of concrete member, minimum edge distance and spacing

Annex B 3

Installation Instructions



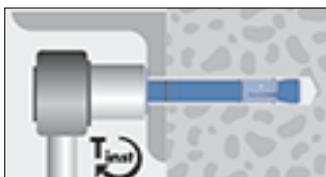
Hammer Drilling (HD): Drill a hole perpendicular to the surface of the anchoring base.



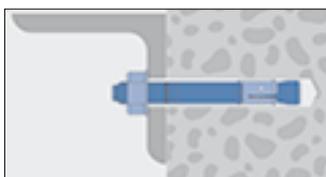
Cleaning the bore hole.



Drive in Throughbolt.



Tightening with torque wrench to predetermined value of installation torque moment T_{inst} .



Installed Throughbolt.

MUNGO Throughbolt m2 and m2r

Intended use
Installation instructions

Annex B 4

Table C1: Characteristic resistance under tension load for m2, m2-C and m2-CG

Throughbolt			m2, m2-C, m2-CG						
Size			M6	M8	M10 _{hnom1²⁾}	M10 _{hnom2}	M12	M16	M20
Length	L	[mm]	≤ 185			≤ 185	> 185	≤ 185	
Tension load									
Steel failure									
Characteristic Resistance	$N_{Rk,s}$	[kN]	10	19	33		43	77	124
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,4						
Pullout failure									
Characteristic Resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	7,5	12	$N_{Rk,c}^{0,3)}$	16	24	30	50
Increasing factors for $N_{Rk,p,ucr}$ in 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		
	$\Psi_{c,25/30}$	[-]	1,08		1,10		1,08		
	$\Psi_{c,30/37}$	[-]	1,17		1,22		1,17		
	$\Psi_{c,35/45}$	[-]	1,27		1,34		1,27		
	$\Psi_{c,40/50}$	[-]	1,32		1,41		1,32		
	$\Psi_{c,45/55}$	[-]	1,37		1,48		1,37		
	$\Psi_{c,50/60}$	[-]	1,42		1,55		1,42		
Installation factor	γ_{inst}	[-]	1,0				1,2		
Concrete cone and splitting failure									
Effective embedment depth	h_{ef}	[mm]	40	50	33	58	68	80	100
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0						
Edge distance (concrete cone)	$c_{cr,N}$	[mm]	60	75	50	87	102	120	150
Spacing (concrete cone)	$s_{cr,N}$	[mm]	120	150	100	175	205	240	300
Characteristic splitting resistance for concrete C20/25	$N_{Rk,sp}^0$	[kN]	$\min(N_{Rk,p}; N_{Rk,c}^{0,3)})$						
Characteristic edge distance for splitting failure	$c_{cr,sp}$	[mm]	100	125	82,5	145	170	200	250
Characteristic spacing for splitting failure	$s_{cr,sp}$	[mm]	200	250	165	290	340	400	500

¹⁾ in absence of other national regulations

²⁾ only for application with statically indeterminate structural components subject to dry internal conditions

³⁾ $N_{Rk,c}^0$ according to EN 1992-4:2018

MUNGO Throughbolt m2 and m2r

Performances

Characteristic resistance under tension load for m2, m2-C and m2-CG

Annex C 1

Table C2: Characteristic resistance under tension load for m2r and m2r-C

Throughbolt			m2r, m2r-C				
Size			M6	M8	M10	M12	M16
Length	L	[mm]	≤ 185				
Tension load							
Steel failure							
Characteristic Resistance	$N_{Rk,s}$	[kN]	10	19	33	46	82
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,6				
Pullout failure							
Characteristic Resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	7,5	12	16	25	30
Increasing factor for $N_{Rk,p,ucr}$ in uncracked concrete $N_{Rk,p,ucr} = \Psi_c \cdot N_{Rk,p,ucr}$ (C20/25)	$\Psi_{c,20/25}$	[-]	1,00				
	$\Psi_{c,25/30}$	[-]	1,08				
	$\Psi_{c,30/37}$	[-]	1,17				
	$\Psi_{c,35/45}$	[-]	1,27				
	$\Psi_{c,40/50}$	[-]	1,32				
	$\Psi_{c,45/55}$	[-]	1,37				
	$\Psi_{c,50/60}$	[-]	1,42				
Installation factor	γ_{inst}	[-]	1,0				
Concrete cone and splitting failure							
Effective embedment depth	h_{ef}	[mm]	40	50	58	68	80
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0				
Edge distance (concrete cone)	$c_{cr,N}$	[mm]	60	75	87	102	120
Spacing (concrete cone)	$s_{cr,N}$	[mm]	120	150	174	204	240
Characteristic splitting resistance for concrete C20/25	$N^0_{Rk,sp}$	[kN]	min ($N_{Rk,p}$; $N^0_{Rk,c}^{2)}$)				
Characteristic edge distance for splitting failure	$c_{cr,sp}$	[mm]	120	150	174	170	200
Characteristic spacing for splitting failure	$s_{cr,sp}$	[mm]	240	300	348	340	400

¹⁾ in absence of other national regulations

²⁾ $N^0_{Rk,c}$ according to EN 1992-4:2018

MUNGO Throughbolt m2 and m2r

Performances

Characteristic resistance under tension load for m2r and m2r-C

Annex C 2

Table C3: Characteristic resistance under shear load for m2, m2-C and m2-CG

Throughbolt			m2, m2-C, m2-CG						
Size			M6	M8	M10 _{hnom1} ²⁾	M10 _{hnom2}	M12	M16	M20
Length	L	[mm]	≤ 185			≤ 185	> 185	≤ 185	
Shear load									
Steel failure									
Characteristic Resistance without lever arm	V ⁰ _{Rk,s}	[kN]	4,5	11	18	24	28	33	51
Ductility factor	k ₇	[-]	1,0						
Characteristic Resistance with lever arm	M ⁰ _{Rk,s}	[Nm]	12	27	56,8	91,6	104,7	249	486,2
Partial safety factor	γ _{Ms} ¹⁾	[-]	1,50	1,29	1,27	1,25	1,33	1,50	
Pry-out failure									
Pry-out factor	k ₈	[-]	1,0			2,0			
Concrete edge failure									
Outside diameter of the fastener relevant for shear loading	d _{nom}	[mm]	6	8	10		12	16	20
Effective length of fastener under shear loading	l _f	[mm]	40	50	33	58	68	80	100

¹⁾ in absence of other national regulations

²⁾ only for application with statically indeterminate structural components subject to dry internal conditions

MUNGO Throughbolt m2 and m2r

Performances

Characteristic resistance under shear load for m2, m2-C and m2-CG

Annex C 3

Table C4: Characteristic resistance under shear load for m2r and m2r-C

Throughbolt			m2r, m2r-C				
Size			M6	M8	M10	M12	M16
Length	L	[mm]	≤ 185				
Shear load							
Steel failure							
Characteristic Resistance without lever arm	$V^0_{Rk,s}$	[kN]	7	13	21	30	56
Ductility factor	k_7	[-]	1,0				
Characteristic Resistance with lever arm	$M^0_{Rk,s}$	[Nm]	12	30	60	105	266
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,33				
Pry-out failure							
Pry-out factor	k_8	[-]	1,0	2,0			
Concrete edge failure							
Outside diameter of the fastener relevant for shear loading	d_{nom}	[mm]	6	8	10	12	16
Effective length of fastener under shear loading	l_f	[mm]	40	50	58	68	80

¹⁾ in absence of other national regulations

MUNGO Throughbolt m2 and m2r

Performances

Characteristic resistance under shear load for m2r and m2r-C

Annex C 4

Table C5: Displacements under tension load for m2, m2-C and m2-CG

Throughbolt		m2, m2-C, m2-CG						
Size		M6	M8	M10 _{hnom1}	M10 _{hnom2}	M12	M16	M20
Displacements under static and quasi-static load								
Tension load	N [kN]	3,6	5,7	4,6	7,6	9,9	11,9	19,8
Displacement	δ_{N0} [mm]	0,3		0,14	0,3			
	$\delta_{N\infty}$ [mm]	1,3						

Table C6: Displacements under tension load for m2r and m2r-C

Throughbolt		m2r, m2r-C				
Size		M6	M8	M10	M12	M16
Displacements under static and quasi-static load						
Tension load	N [kN]	3,6	5,7	7,6	9,9	11,9
Displacement	δ_{N0} [mm]	0,3				
	$\delta_{N\infty}$ [mm]	1,3				

MUNGO Throughbolt m2 and m2r

Performances
Displacements under tension load

Annex C 5

Table C7: Displacements under shear load for m2, m2-C and m2-CG

Throughbolt		m2, m2-C, m2-CG						
Size		M6	M8	M10 _{hnom1}	M10 _{hnom2}	M12	M16	M20
Displacements under static and quasi-static load								
Shear load	V [kN]	1,9	3,5	4,6	5,5	7,5	14	21,9
Displacement	δ_{v0} [mm]	1,6	2,2	2,1	2,4	2,7	3,3	3,8
	$\delta_{v\infty}$ [mm]	2,4	3,2	3,2	3,6	4,1	4,9	5,7

Table C8: Displacements under shear load for m2r and m2r-C

Throughbolt		m2r, m2r-C				
Size		M6	M8	M10	M12	M16
Displacements under static and quasi-static load						
Shear load	V [kN]	3,9	7,1	11,2	16,3	30,3
Displacement	δ_{v0} [mm]	1,5	1,9	2,3	3,1	3,9
	$\delta_{v\infty}$ [mm]	2,3	2,9	3,5	4,7	5,9

MUNGO Throughbolt m2 and m2r

Performances
Displacements under shear load

Annex C 6