Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-05/0199 of 15 February 2016

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 Througbolt m2r
Product family to which the construction product belongs	Torque-controlled expansion anchor made of stainless steel for use in non-cracked concrete
Manufacturer	Mungo Befestigungstechnik AG Bornfeldstrasse 2 4603 OLTEN SCHWEIZ
Manufacturing plant	Mungo Werk Olten
This European Technical Assessment contains	12 pages including 3 annexes
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval of "Metal anchors for use in concrete", ETAG 001 Part 2: "Torque controlled expansion anchors", April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

The mungo Throughbolt m2r in the range of M6, M8, M10, M12 and M16 is an anchor made of stainless steel which is placed into a drilled hole and anchored by torque-controlled expansion.

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 tension and shear loads, Displacements	See Annex C 1 to C 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

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 guideline for European technical approval ETAG 001, April 2013 used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011 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 EAD

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

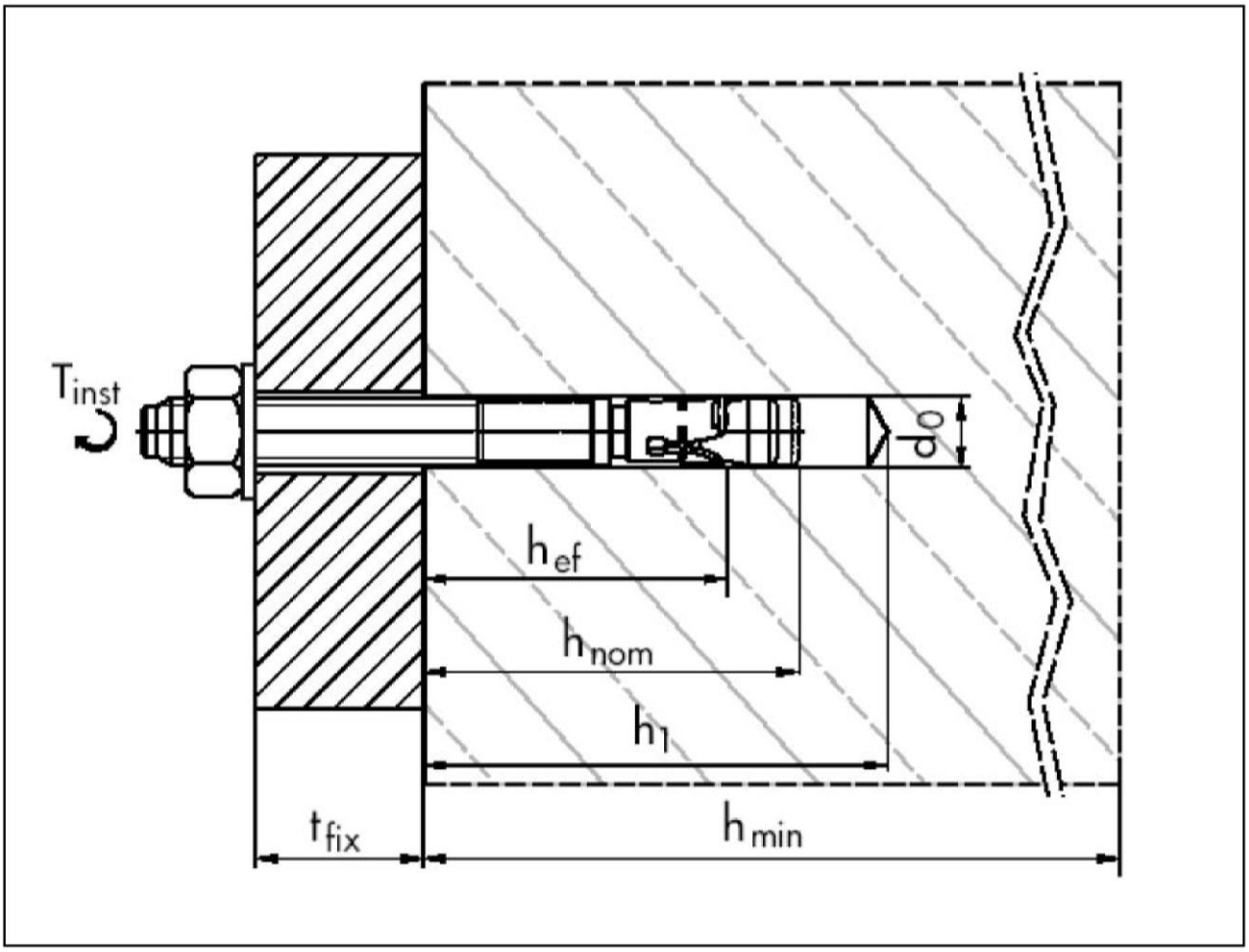
Issued in Berlin on 15 February 2016 by Deutsches Institut für Bautechnik

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Lange

Deutsches Institut für Bautechnik DIBt

Installed anchor



Legend:

h_{ef}	=	effective anchorage depth
h_{nom}	=	embedment depth
h_1	=	depth of drill hole
h_{min}	=	minimum thickness of concrete member
d_0	=	nominal diameter of drill bit
t_{fix}	=	thickness of fixture
T_{inst}	=	installation torque

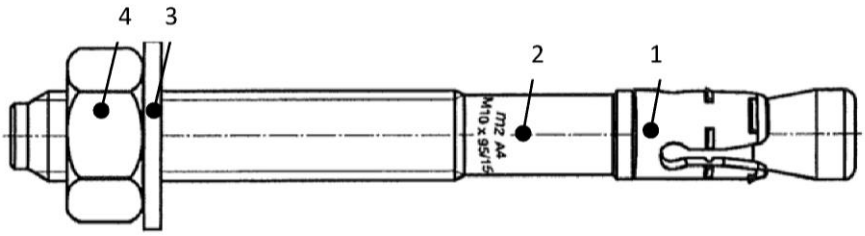
m2r

Product description
Installed condition

Annex A 1

Deutsches Institut für Bautechnik DIBt

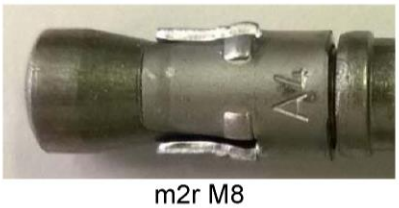
Anchor type



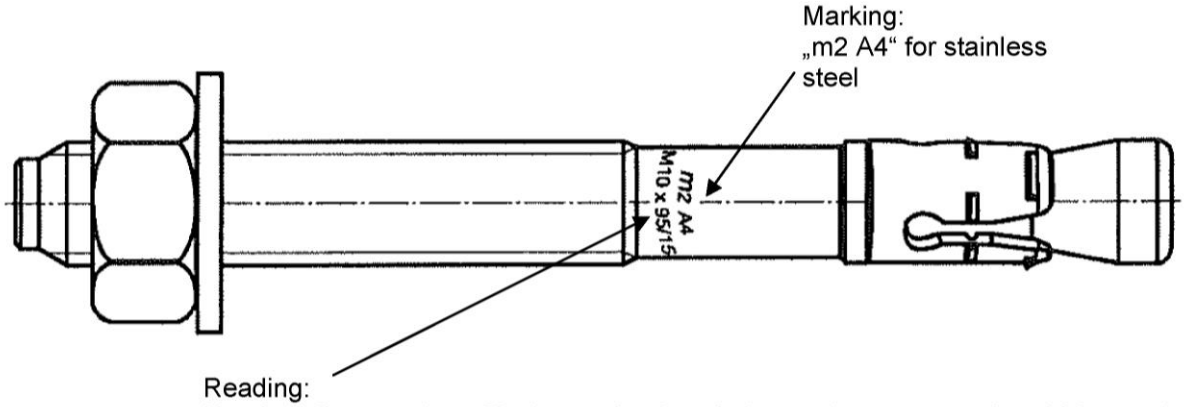
1 expansion element
2 bolt
3 washer
4 hexagonal nut

Design of expansion elements

m2r M6
m2r M16



m2r M8
m2r M10
m2r M12



Anchor types:

m2r bolt m2 with washer EN ISO 7089:2000 and hexagonal nut DIN 934:1987-10

m2r	
Product description Marking and denomination	**Annex A 2**

Deutsches Institut für Bautechnik DIBt

Table A1: Dimensions

Part	Designation				M6	M8	M10	M12	M16
1	Bolt		d_k	[mm]	6	8	10	12	16
			d_h	[mm]	4	5,6	7,2	8,5	11,5
			d_{s1}	[mm]	5,25	7,05	8,9	10,7	14,5
			min l_G	[mm]	32	43	52	62	73
			max l_G	[mm]	62	120	120	120	120
			min L	[mm]	65	80	95	110	130
			max L	[mm]	95	165	180	185	180
2	Expansion element - length		l_s	[mm]	9,5	13,2	15,2	17,5	19,3
3	Washer	EN ISO 7089:2000	d_u	[mm]	12	16	20	24	30
			s	[mm]	1,6	1,6	2	2,5	3
4	Hexagonal nut		SW	[mm]	10	13	17	19	24

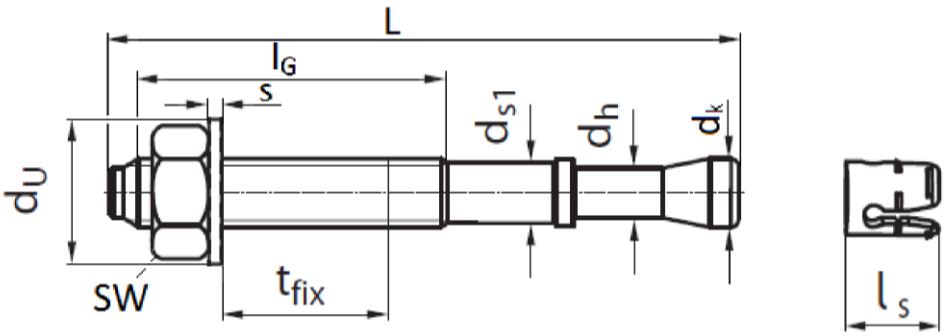


Table A2: Materials

Part	Designation	Material
1	Bolt	Stainless steel according to EN 10088
2	Expansion element	Stainless steel according to EN 10088
3	Washer	Stainless steel according to EN 10088
4	Hexagonal nut	Stainless steel A4 ISO3506, EN 10088

m2r

Product description
Dimensions and materials

Annex A 3

Deutsches Institut für Bautechnik DIBt

Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads

Base materials:
- Reinforced or unreinforced normal weight concrete according to EN 206:2013
- Strength classes C20/25 to C50/60 according to EN 206:2013
- Non-cracked concrete

Use conditions:
- Structures subject to dry internal conditions
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist.

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.).
- Anchorages under static or quasi-static actions are designed in accordance with ETAG 001, Annex C, design method A, Edition August 2010
- It must be ensured that local spalling of the concrete cover does not occur.

Installation:
- Hole drilling by hammer drilling only
- Anchor installation in accordance with the manufacturer's specifications using the appropriate tools carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor
- Check concrete strength before placing the anchor to ensure that the strength class of the concrete is covered by the product's assessment
- Positioning the drill holes without damaging the reinforcement
- Cleaning the holes
- Edge distances and spacing not less than the specified values without minus tolerances
- Anchor installation such that the effective embedment depth is complied with. This compliance is ensured if the anchor's embedment mark doesn't exceed the concrete surface.
- The anchor may only be set once.
- In case of aborted holes: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it isn't in the direction of load application.
- Using a calibrated torque wrench for installation.

m2r	Annex B 1
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Anchor size			M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0	[mm]	6	8	10	12	16
Effective anchorage depth	h_{ef}	[mm]	40	50	58	68	80
Installation torque	T_{inst}	[Nm]	6,5	15	30	50	140
Cutting diameter at the upper tolerance limit (maximum diameter bit)	$d_{cut} \leq$	[mm]	6,4	8,45	10,45	12,5	16,5
Depth of drill hole	$h_1 \geq$	[mm]	60	65	80	90	110
Diameter of clearance hole in fixture	$d_f \leq$	[mm]	7	9	12	14	18
Minimum fixture thickness	$t_{fix,min}$	[mm]	1	1	1	1	1
Maximum fixture thickness	$t_{fix,max}$	[mm]	10	45	100	90	65

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

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

m2r

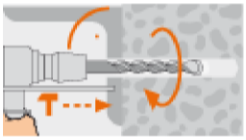
Intended use
Installation parameters
Minimum thickness of concrete member, minimum spacing and edge distances

Annex B 2

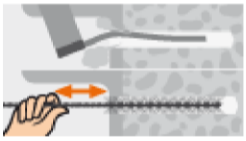
Deutsches Institut für Bautechnik

DIBt

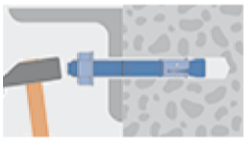
Installation instructions



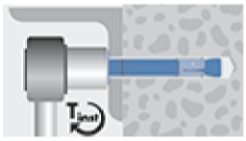
Drilling the hole



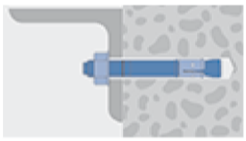
Cleaning the hole



Fixing plug and building material



Tightening with torque wrench and predetermined value of T_{inst} (see Table B2)



Tightened fixation

m2r	
Intended use Installation instructions	**Annex B 3**

Deutsches Institut für Bautechnik DIBt

Table C1: Design method A, characteristic values under tension load

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**
Installation safety factor	γ_2	[-]	1,0				
Steel failure							
Characteristic resistance	$N_{Rk,s}$	[kN]	10	19	33	46	82
Partial safety factor	γ_{Ms} [1)]	[-]	1,6				
Pull-out failure							
Characteristic resistance	$N_{Rk,p}$	[kN]	7,5	12,0	16,0	25,0	30,0
Increasing factor for $N_{Rk,p}$	ψ_C	C30/37	1,17				
		C40/50	1,32				
		C50/60	1,42				
Concrete cone failure							
Effective anchorage depth	h_{ef}	[mm]	40	50	58	68	80
Spacing	$s_{cr,N}$	[mm]	$3\ h_{ef}$				
Edge distance	$c_{cr,N}$	[mm]	$1{,}5\ h_{ef}$				
Concrete splitting failure							
Spacing	$s_{cr,sp}$	[mm]	$6\ h_{ef}$			$5\ h_{ef}$	
Edge distance	$c_{cr,sp}$	[mm]	$3\ h_{ef}$			$2{,}5\ h_{ef}$	

1) In absence of other national regulations.

Table C2: Displacements under tension load

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**
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				

Deutsches Institut für Bautechnik DIBt

Table C3: Design method A, characteristic values under shear load

Anchor size			M6	M8	M10	M12	M16
Steel failure without lever arm							
Characteristic resistance	$V_{Rk,s}$	[kN]	7	13	21	30	56
Partial safety factor	γ_{Ms} [1)]	[-]	1,33				
Steel failure with lever arm							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	12	30	60	105	266
Partial safety factor	γ_{Ms} [1)]	[-]	1,33				
Concrete pryout failure							
Factor in equation (5.6) of ETAG Annex C 5.2.3.3	k	[-]	1,0		2,0		
Concrete edge failure							
Effective anchor length under shear load	l_f	[mm]	40	50	58	68	80
external anchor diameter	d_{nom}	[mm]	6	8	10	12	16

[1)] In absence of other national regulations.

Table C4: Displacements under shear load

Anchor size			M6	M8	M10	M12	M16
Shear load		[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