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-23/0136 of 13 April 2023

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	TX m2r
Product family to which the construction product belongs	Torque-controlled expansion anchor for use in uncracked concrete
Manufacturer	AS System d.o.o. Obrtniska ulica 14 3240 SMARJE PRI JELSAH SLOWENIEN
Manufacturing plant	AS System d.o.o. Obrtniska ulica 14 3240 SMARJE PRI JELSAH SLOVENIA
This European Technical Assessment contains	12 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

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Specific Part

1 Technical description of the product

The TX m2r 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 to tension load (static and quasi static action) Method A	See Annex B 2 and C 1
Characteristic resistance to shear load (static and quasi static action)	See Annex C 2
Displacements	See Annex C 1 and C 2
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed
Durability	See Annex B 1

3.2 Safety in case of fire (BWR 2)

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

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 EAD

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

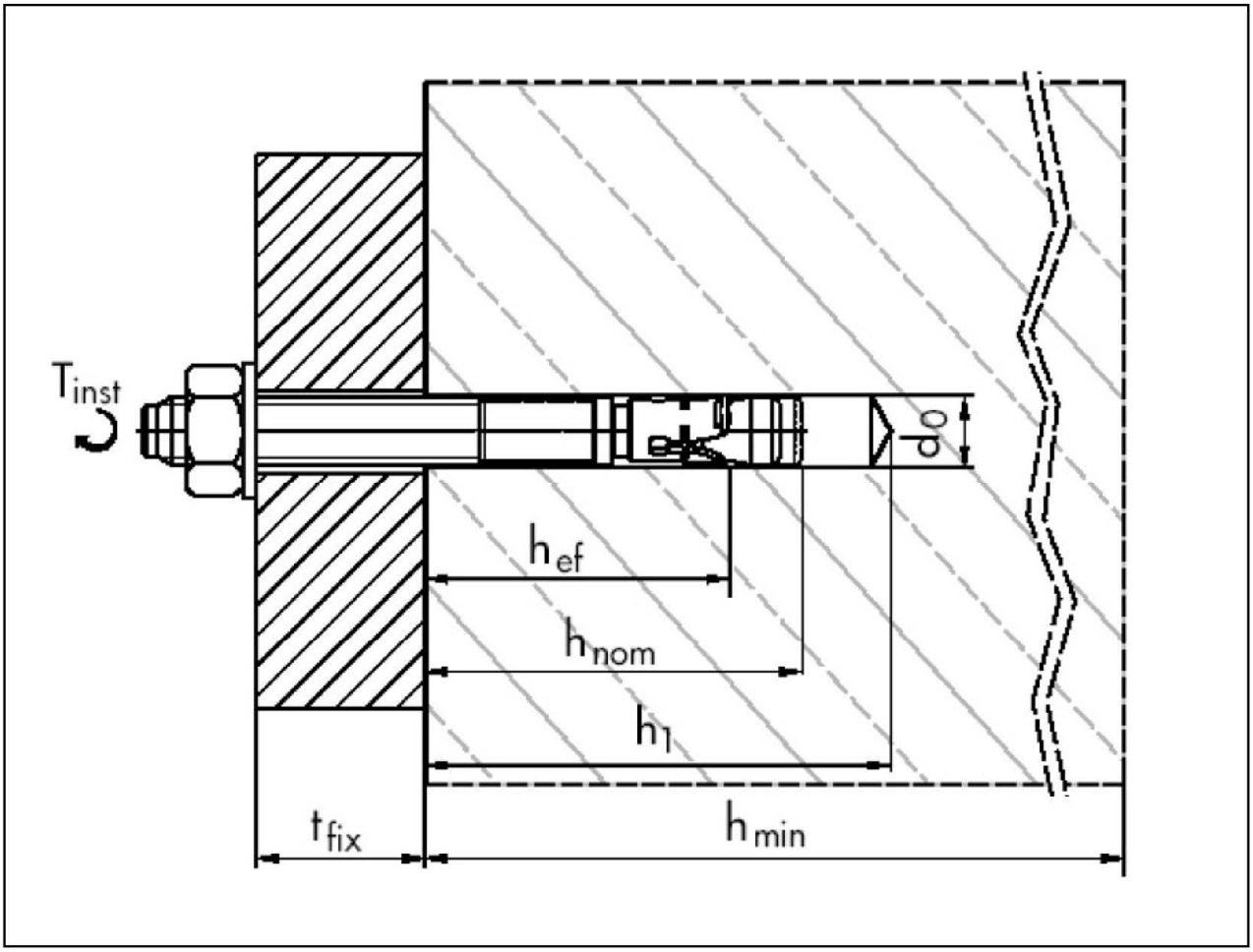
Issued in Berlin on 13 April 2023 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

Deutsches Institut für Bautechnik DIBt

Installed condition



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

TX m2r	**Annex A 1**
Product description Installed condition	

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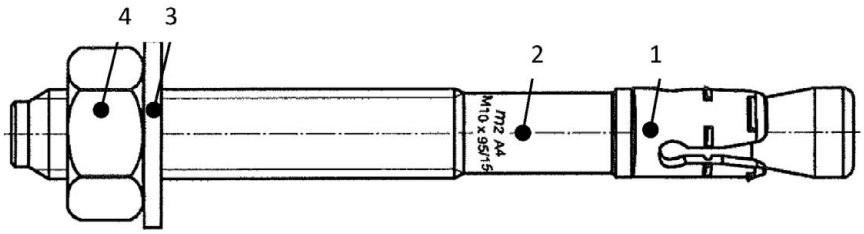
Anchor type

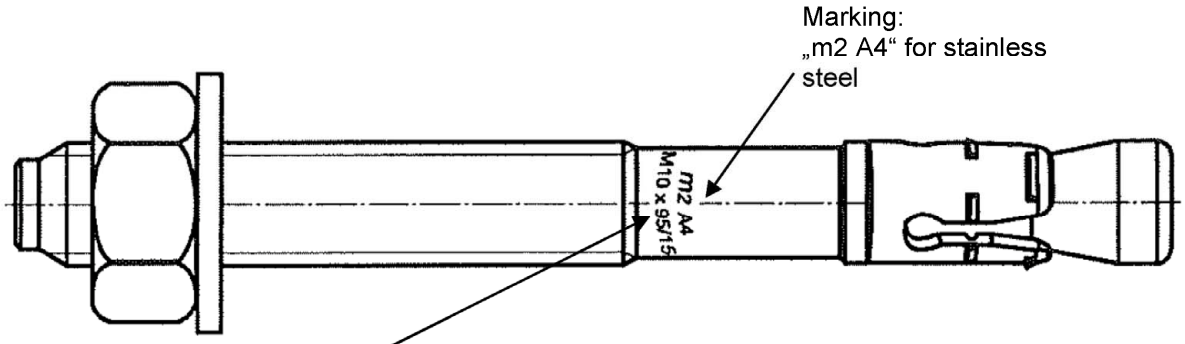


1 expansion element
2 bolt
3 washer
4 hexagonal nut

Design of expansion elements

TX m2r M6
TX m2r M16

TX m2r M8
TX m2r M10
TX m2r M12



Reading:
Nominal diameter (e.g. M10) x anchor length (e.g. 95) x max. member thickness (e.g.15)

Anchor types:

TX m2r bolt m2r with washer EN ISO 7089:2000 and hexagonal nut EN ISO 4032:2012

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

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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

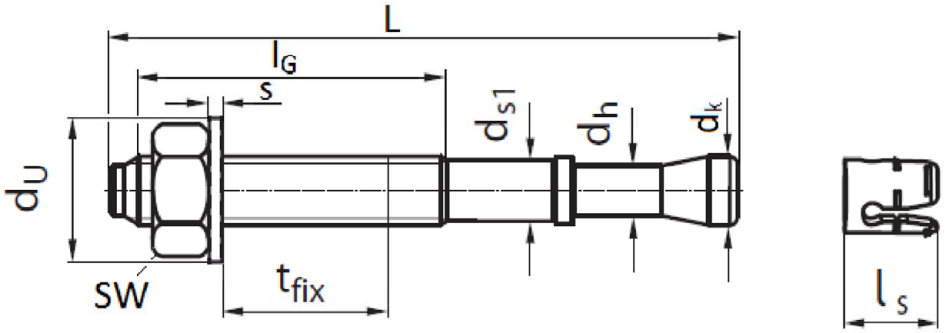

Table A2: Materials

Part	Designation	Material
1	Bolt	Stainless steel A4 according to EN 10088-1:2014
2	Expansion element	Stainless steel A4 according to EN 10088-1:2014
3	Washer	Stainless steel A4 according to EN 10088-1:2014
4	Hexagonal nut	Stainless steel A4 according to EN ISO 3506-1:2010, EN 10088-1:2014

TX m2r

Product description
Dimensions and materials

Annex A 3

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Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads

Base materials:
- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206-1:2013 + A1:2016.
- Strength classes C20/25 to C50/60 according to EN 206-1:2013 + A1:2016.
- Uncracked concrete

Use conditions:
- Structures subject to dry internal conditions
- For all other conditions according EN 1993-1-4:2006 + A1:2015 corresponding to corrosion resistance classes Annex A 3, Table A2 (stainless steels).

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 are designed in accordance with:
  EN 1992-4:2018 and EOTA Technical Report TR 055, 12/2016

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 under the supervision of the person responsible for technical matters of the site.
- Cleaning the holes
- The anchor may only be set once.

TX m2r	**Annex B 1**
Intended use Specifications	

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Table B1: Installation parameters

Size			M6	M8	M10	M12	M16
Nominal drill hole diameter	d_0	[mm]	6	8	10	12	16
Effective embedment 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

TX m2r

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

Annex B 2

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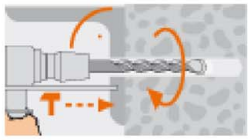
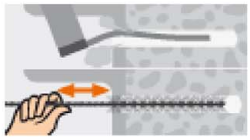
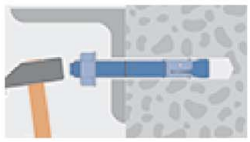
Installation instructions



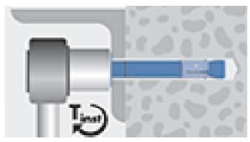
Drilling the hole



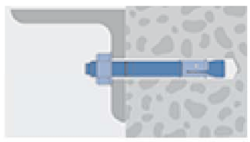
Cleaning the hole



Fixing plug and building material



Tightening with torque wrench and predetermined value of T_{inst} (see Table B1)



Tightened fixation
Check of correct effective embedment depth:
The marking of embedment depth should not be visible above the concrete surface

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

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

Size			**M6**	**M8**	**M10**	**M12**	**M16**
Installation safety factor	γ_{inst}	[-]	1,0				
Steel failure							
Characteristic tension resistance	$N_{Rk,s}$	[kN]	10	19	33	46	82
Partial safety factor	γ_{Ms} [1)]	[-]	1,6				
Pull-out failure							
Characteristic tension 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 embedment depth	h_{ef}	[mm]	40	50	58	68	80
Factor uncracked concrete	$k_{ucr,N}$	[-]	11,0				
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}				
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}				
Concrete splitting failure							
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	Min ($N_{Rk,p}$; $N^0_{Rk,c}$ [2)])				
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.
2) $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C2: Displacements under tension load

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				

TX m2r

Performances
Design method A, characteristic values under tension load
Displacements under tension load

Annex C 1

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

Size			**M6**	**M8**	**M10**	**M12**	**M16**
Steel failure without lever arm							
Characteristic resistance	$V^0_{Rk,s}$	[kN]	7	13	21	30	56
Partial safety factor	γ_{Ms} [1)]	[-]	1,33				
Ductility factor	k_7		1,0				
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							
Pryout-Factor	k_8	[-]	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

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

TX m2r

Performances
Design method A, characteristic values under shear load
Displacements under shear load

Annex C 2