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Ermächtigt und notifiziert gemäß Artikel 10 der Richtlinie des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte (89/106/EWG)

DIBt

Mitglied der EOTA

Europäische Technische Zulassung ETA-01/0006

Handelsbezeichnung *Trade name*	**Mungo - Stahlbolzendübel M3**
Zulassungsinhaber *Holder of approval*	**Mungo-Befestigungstechnik AG Bornfeldstraße 2 CH-4603 Olten**
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	**Kraftkontrolliert spreizender Dübel aus beschichtetem Stahl in den Größen M 8, M 10, und M 12 zur Verankerung im Beton** *Torque controlled expansion anchor made of coated steel of sizes M 8, M 10, and M 12 for use in concrete*
Geltungsdauer von *Validity from* bis *to*	**14. 02. 2001** **14. 02. 2006**
Herstellwerk *Manufacturing plant*	**Mungo Herstellwerk 1, Deutschland**
Diese europäische technische Zulassung umfaßt *This European Technical Approval contains*	12 Seiten einschließlich 5 Anhängen *12 pages including 5 annexes*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European Technical Approval is issued by the Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by the Council Directive 93/68/EEC of 22 July 1993[2];

- *Gesetz über das Inverkehrbringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 1. April 1998* [3],

- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[4];

- Guideline for European Technical Approval of "Metal Anchors for Use in Concrete" ETAG 001, edition 1997, Part 1 "Anchors in general" and Part 2 "Torque-controlled expansion anchors".

2 The Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by the Deutsches Institut für Bautechnik, in particular after information by the Commission on the basis of Article 5 (1) of Council Directive 89/106/EEC.

5 Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of the Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6 The European Technical Approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

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1 Official Journal of the European Communities N° L 40, 11.2.1989, p 12
2 Official Journal of the European Communities N° L 220, 30.8.1993, p.1
3 Bundesgesetzblatt, Teil I, Nr. 25 vom 8.5.1998, S. 812
4 Official Journal of the European Communities N° L 17, 20.1.1994, p 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The Mungo-Stahlbolzendübel M3 in the range of M 8, M 10 and M12 is an anchor made of coated steel which is placed into a drilled hole and anchored by torque-controlled expansion.

For the installed anchor see Figure given in Annex 1.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C 20/25 at minimum and C 50/60 at most according to ENV 206: 1990-03. It may be anchored in cracked and non-cracked concrete.

The anchor may only be used in structures subject to dry internal conditions.

The provisions made in this European Technical Approval 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, 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The anchor in the range of M 8, M 10 and M12 corresponds to the drawings and provisions given in Annexes 2 and 3. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 2 and 3 shall correspond to the respective values laid down in the technical documentation[5] of this European Technical Approval.

The characteristic anchor values for the design of anchorages are given in Annexes 4 and 5.

Each anchor is marked with the identifying mark of the producer included the commercial name, the thread size, and the maximum thickness of fixture

The anchor shall only be packaged and supplied as a complete unit.

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5 The technical documentation of this European Technical Approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

2.2 Methods of verification

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 Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European Technical Approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 2 "Torque-controlled expansion anchors" on the basis of Option 1.

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity 2(i) (referred to as System 1)according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

a) tasks for the manufacturer:

(1) factory production control,

(2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.

b) tasks for the approved body:

(3) initial type-testing of the product,

(4) initial inspection of factory and of factory production control,

(5) continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer; factory production control

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan[6]. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of materials such as nuts, washers, wire for bolts and metal band for expansion sleeves shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimensions and determining material properties, e.g. tensile strength, hardness, surface finish

The manufactured components of the anchor shall be subjected to the following tests:

- Dimensions of component parts:
  conical bolt (diameter, length, angle of the cone, thread);
  expansion sleeves (length, thickness);
  hexagon nut (well running, wrench size across flats);
  washer (diameter, thickness).

[6] The prescribed test plan has been deposited at the Deutsches Institut für Bautechnik and is handed over only to the approved bodies involved in the conformity attestation procedure.

- Material properties:
  conical bolt (tensile strength, yield limit, hardness);
  expansion sleeves (tensile strength, yield limit);
  Hexagon nut (strength test);
  Washer (hardness)
- Control of the coatings
- Visual control of correct assemblage and of completeness of the anchor.

The frequency of controls and tests conducted during production and on the assembled anchor is laid down in the prescribed test plan taking account of the automated manufacturing process of the anchor.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- designation of the product, basic material and components;
- type of control or testing;
- date of manufacture of the product and date of testing of the product or basic material and components;
- result of control and testing and, if appropriate, comparison with requirements;
- signature of person responsible for factory production control.

The records shall be presented to the inspection body involved in the continuous surveillance. On request they shall be presented to the Deutsches Institut für Bautechnik.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan[6] which is part of the technical documentation of this European Technical Approval.

3.2.2 Tasks of approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary initial type-testing has to be agreed between the Deutsches Institut für Bautechnik and the approved bodies involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular the staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the anchor with the specifications mentioned in 2.1 as well as in the Annexes to the European Technical Approval, in accordance with the prescribed test plan.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least once a year for surveillance. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the prescribed test plan.

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6 The prescribed test plan has been deposited at the Deutsches Institut für Bautechnik and is handed over only to the approved bodies involved in the conformity attestation procedure.

Continuous surveillance and assessment of factory production control have to be performed according to the prescribed test plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to the Deutsches Institut für Bautechnik.

In cases where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled the conformity certificate shall be withdrawn.

3.3 CE marking

The CE marking shall be affixed on each packaging of anchors. The symbol "CE" shall be accompanied by the following information:

- identification number of the certification body;
- name or identifying mark of producer and manufacturing plant;
- the last two digits of the year in which the CE marking was affixed;
- number of the EC certificate of conformity;
- number of the European Technical Approval;
- use category (ETAG 001-1 Option 1);
- size.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The anchor is manufactured in accordance with the provisions of the European Technical Approval using the automated manufacturing process as identified in the inspection of the plant by the Deutsches Institut für Bautechnik and the approved body and laid down in the technical documentation.

4.2 Installation

4.2.1 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the "Guideline for European Technical Approval of Metal Anchors for Use in Concrete", Annex C, Method A, for torque controlled expansion anchors 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, in cracked or non-cracked concrete, etc.).

4.2.2 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- Anchor installation 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.

- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools;
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply.
- Check of concrete being well compacted, e.g. without significant voids.
- Clearing of the hole of drilling dust.
- Anchor installation such that the effective anchorage depth is complied with. This compli-ance is ensured, if the exist thickness of fixture is not greater than the maximum thickness of fixture marked on the anchor.
- Keeping of the edge distance and spacing to 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 in the direction of load application.
- Application of the torque moment given in Annex 3 using a calibrated torque wrench.

4.2.3 Responsibility of the manufacturer

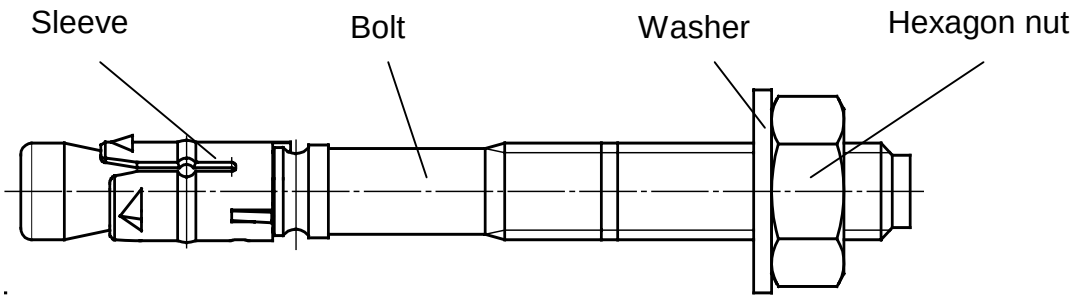
It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to and 4.2.1 and 4.2.2 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

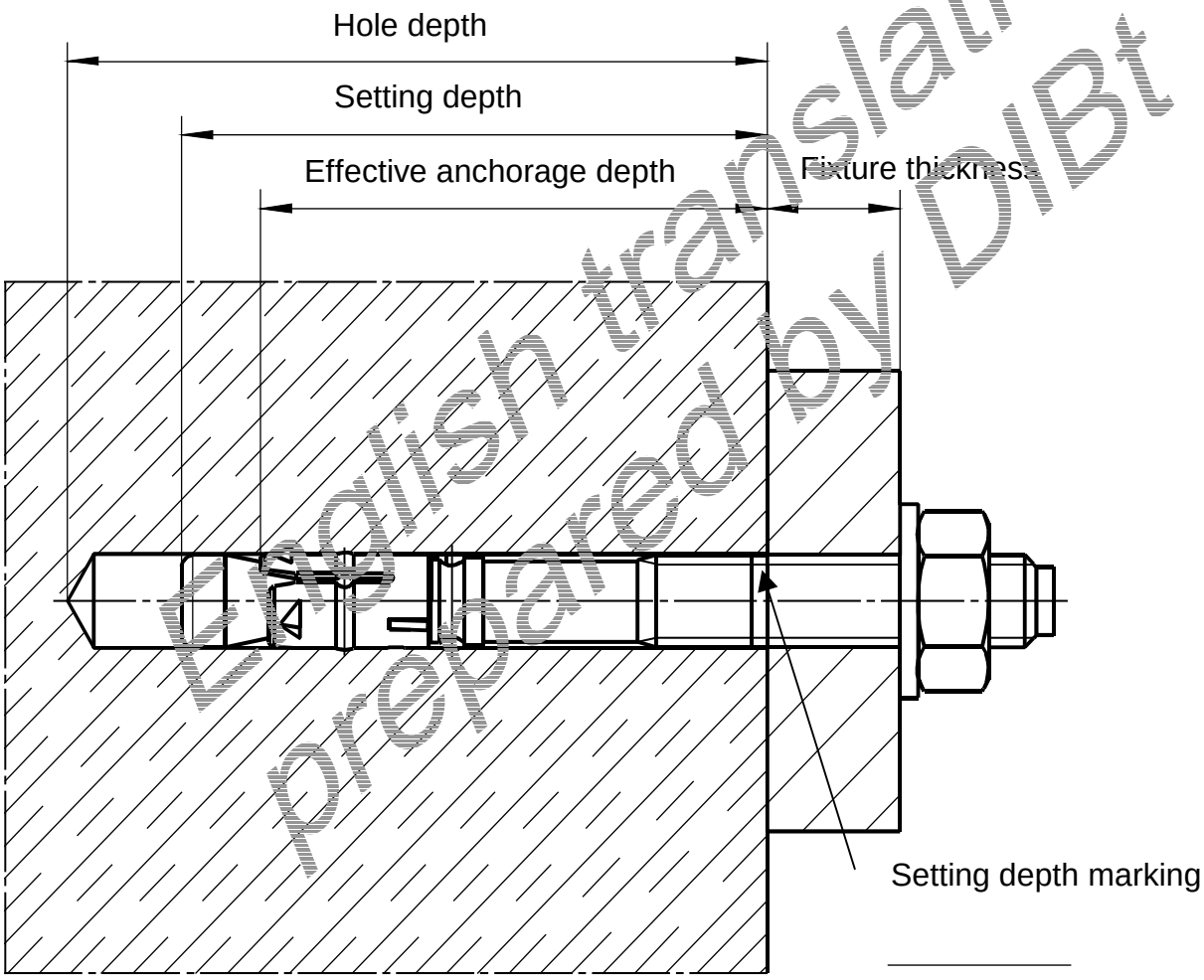
The minimum data required are:

- drill bit diameter,
- thread diameter,
- maximum thickness of the fixture,
- minimum effective anchorage depth,
- minimum hole depth,
- torque moment,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

In Vertretung *Beglaubigt*
Dipl.-Ing. Seyfert Feistel





Mungo – Stahlbolzendübel M3	**Annex 1** **of European Technical Approval** ETA-01/0006
Product and intended use	

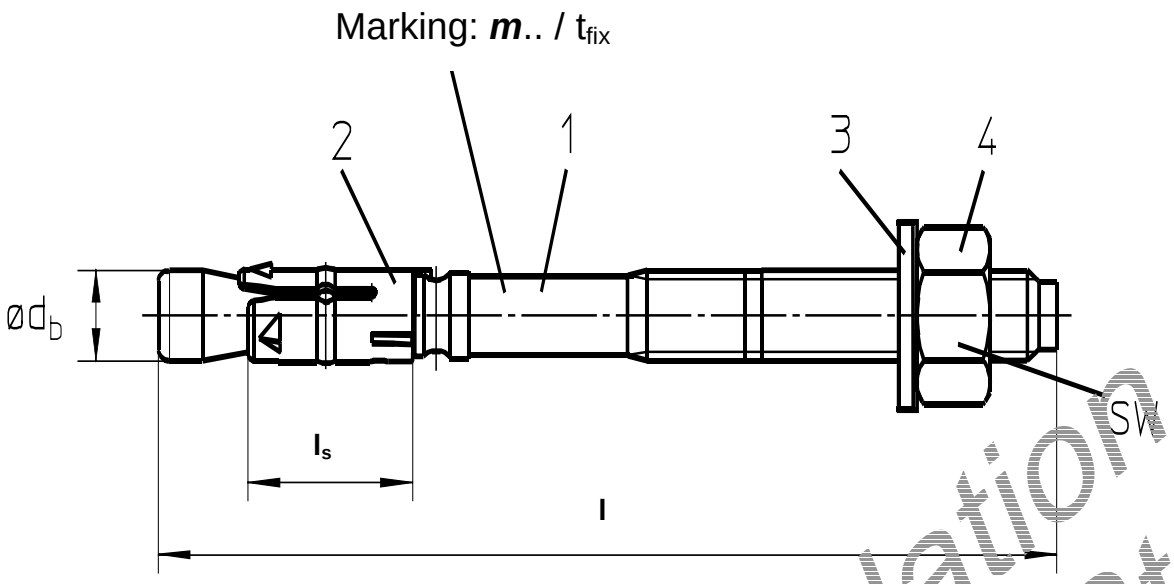


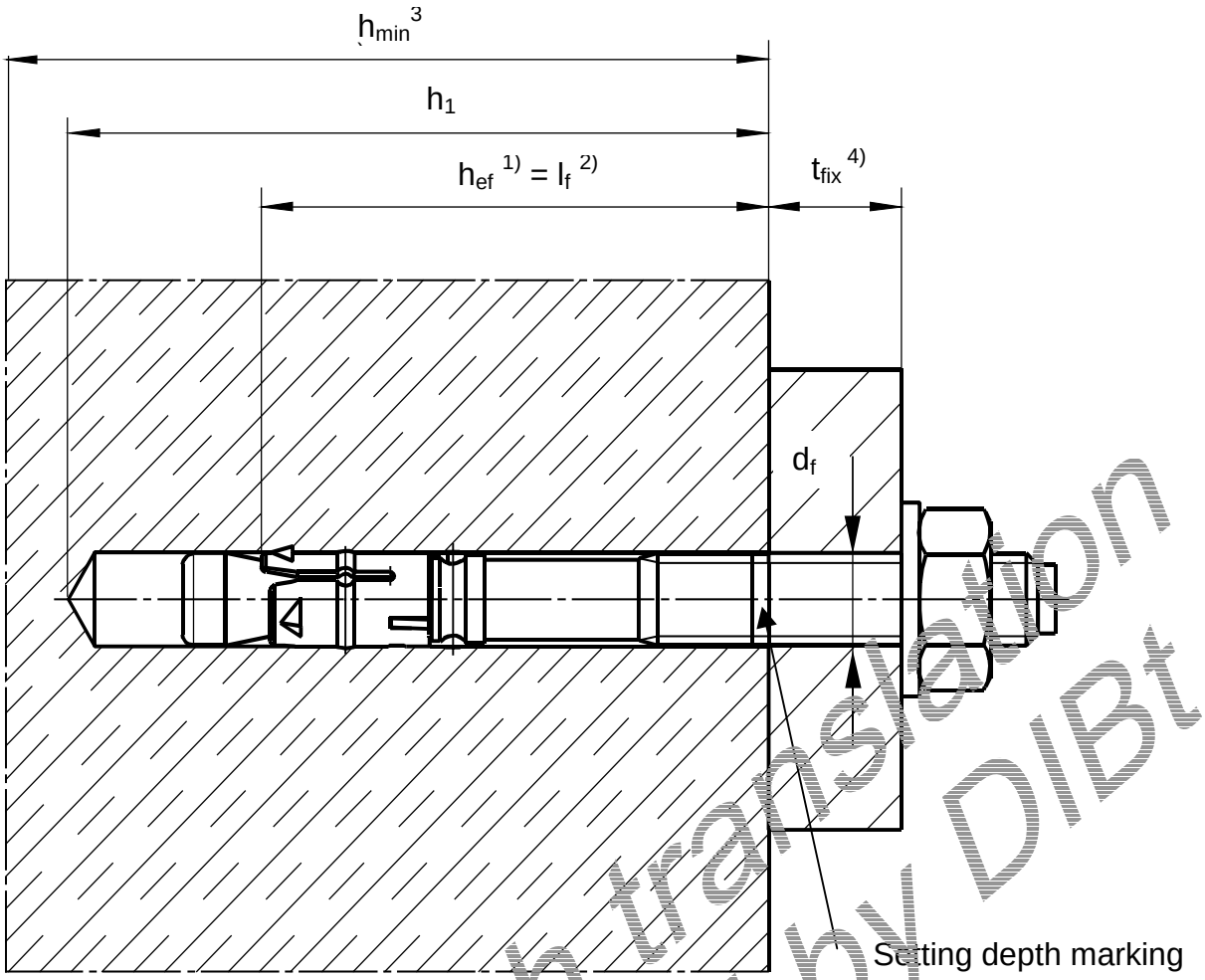
Table 1: Materials

Part	Designation	Materials
1	Bolt	1.5523, DIN 1654, coated
2	Sleeve	DIN 1.4016
3	Washer	Steel galvanized DIN 125 A
4	Hexagon nut	Steel galvanized DIN 934-8, DIN 267-4, glide coated

Table 2: Dimensions

Anchor type	t_{fix} [mm]		l [mm]		l_s [mm]	SW [mm]	d_b [mm]
	min.	max.	min.	max.			
M3 M8	15	100	80	163	16	13	8
M3 M10	10	150	90	230	19	17	10
M3 M12	20	200	113	293	22	19	12

Mungo – Stahlbolzendübel M3	**Annex 2** **of European Technical Approval** ETA-01/0006
Materials **Dimensions of anchors**	



1) Effective anchorage depth h_{ef}, see annex 4
2) Effective length of anchor under shear loading, see annex 5
3) Minimum thickness of concrete member h_{min}, see table 4
4) Thickness of fixture t_{fix}, see annex 2

Table 3: Installation parameters

Anchor type				**M8 / t_{fix}**	**M10 / t_{fix}**	**M12 / t_{fix}**
Nominal diameter of drill bit			[mm]	8	10	12
Cutting diameter of drill bit	d_{cut}	≤	[mm]	8,45	10,45	12,50
Depth of drill hole	h_1	≥	[mm]	60	75	85
Diameter of clearance hole in the fixture	d_f	≤	[mm]	9	12	14
Torque moment	T_{inst}			25	45	60

Table 4: Minimum thickness of concrete member, minimum spacings and minimum edge distances of anchors

			M8	**M10**	**M12**
Minimum thickness of concrete member	h_{min}	[mm]	100	120	140
Minimum edge distance	c_{min}	[mm]	110	150	170
Minimum spacing	s_{min}	[mm]	90	120	140

Mungo – Stahlbolzendübel M3	**Annex 3** **of European Technical Approval** ETA-01/0006
Installation parameters **Minimum thickness of concrete member, minimum spacings and minimum edge distance of anchors**	

Table 5: Characteristic values of resistance to tension loads of design method A

				M8	M10	M12
Steel failure						
Characteristic resistance	$N_{Rk,s}$		[kN]	22	37	51
Partial safety factor	γ_{Ms}			1,50		
Pullout failure						
Characteristic resistance in cracked concrete	$N_{Rk,p}$	C20/25	[kN]	5,0	7,5	9,0
Characteristic resistance in non-cracked concrete	$N_{Rk,p}$	C20/25	[kN]	6,0	9,0	12,0
Increasing factors for $N_{RK,p}$ in cracked and non-cracked concrete	Ψc			1,22		
		C40/50		1,41		
		C50/60		1,55		
Partial safety factor	γ_{Mp}			2,52 [1]	2,52 [1]	2,16 [2]
Concrete cone failure						
Effective anchorage depth	h_{ef}		[mm]	46	58	68
Spacing	$s_{cr,N}$		[mm]		$3\ h_{ef}$	
Edge distance	$c_{cr,N}$		[mm]		$1,5\ h_{ef}$	
Partial safety factor	γ_{Mc}			2,52 [1]	2,52 [1]	2,16 [2]
Splitting failure						
Spacing	$s_{cr,sp}$		[mm]		$5\ h_{ef}$	
Edge distance	$c_{cr,sp}$		[mm]		$2,5\ h_{ef}$	
Partial safety factor	$\gamma_{M,sp}$			2,52 [1]	2,52 [1]	2,16 [2]

[1] The partial safety factor γ_2 =1,4 is included
[2] The partial safety factor γ_2 =1,2 is included

Table 6: Displacements under tension loads

			M8	M10	M12
Tension load in cracked concrete		[kN]	1,4	2,1	4,0
Displacements	δ_{N0}	[mm]		0,3	
	$\delta_{N\infty}$	[mm]	0,8	0,5	0,3
Tension load in non-cracked concrete		[kN]	1,7	2,6	4,0
Displacements	δ_{N0}	[mm]		0,2	
	$\delta_{N\infty}$	[mm]		0,3	

Mungo – Stahlbolzendübel M3	**Annex 4** **of European Technical Approval** ETA-01/0006
Design method A, characteristic values of resistance to tension loads; displacements	

Table 7: Characteristic values of resistance to shear loads of design method A

			M8	M10	M12
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s}$	[kN]	11	18	19
Partial safety factor	γ_{Ms}		1,5		
Steel failure with lever arm					
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	34	67	118
Partial safety factor	γ_{Ms}		1,5		
Concrete pryout failure					
Factor in equation (5.6) of ETAG annex C, 5.2.3.3	k		1,5	2,0	2.0
Partial safety factor			1,8 [1)]		
Concrete edge failure					
Effective length of anchor in shear loading	l_f	[mm]	46	58	68
Diameter of anchor	d_{nom}	[mm]	8	10	12
Partial safety factor	γ_{Ms}		1,8 [1)]		

[1)] The partial safety factor γ_2 =1,0 is included

Table 8: Displacements under shear loads

			M8	M10	M12
Shear loads in cracked and non-cracked concrete		[kN]	5,5	8,7	9,0
Displacements	δ_{v0}	[mm]	1,5	1,7	1,7
	$\delta_{v\infty}$	[mm]	2,3	2,5	2,5

Mungo – Stahlbolzendübel M3	**Annex 5 of European Technical Approval** ETA-01/0006
Design method A, characteristic values of resistance to shear loads; displacements	