

## **European Technical Approval ETA-13/0401**

Handelsbezeichnung <i>Trade name</i>	DEMU Bolzenanker DEMU Bolt anchor
Zulassungsinhaber Holder of approval	Halfen GmbH Liebigstraße 14 40764 Langenfeld DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck	Einbetonierter Anker mit Innengewindehülse
Generic type and use of construction product	Cast-in anchor with internal threaded socket
Geltungsdauer: vom Validity: from	13 June 2013
bis to	13 June 2018
Herstellwerk Manufacturing plant	Werk Utrecht Atoomweg 1 3542 Utrecht Niederlande

English translation prepared by DIBt - Original version in German language

Diese Zulassung umfasst This Approval contains



Europäische Organisation für Technische Zulassungen European Organisation for Technical Approvals

20 Seiten einschließlich 13 Anhänge

20 pages including 13 annexes

8.06.01-351/12



Page 2 of 20 | 13 June 2013

#### I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by 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<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - Gesetz über das In-Verkehr-Bringen 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 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 2 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 Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to 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 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 fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12

<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25

<sup>5</sup> Bundesgesetzblatt Teil I 2011, p. 2178

Official Journal of the European Communities L 220, 30 August 1993, p. 1

Bundesgesetzblatt Teil I 1998, p. 812

Official Journal of the European Communities L 17, 20 January 1994, p. 34



Page 3 of 20 | 13 June 2013

### II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

#### 1 Definition of product and intended use

#### **1.1 Definition of the construction product**

The DEMU bolt anchor in the size of M12, M16, M20, M24, M30, M36 and M42 as type 1985 and 1988 is an anchor consisting of a bolt and an internal threaded socket screwed and pressed on the thread of the bolt.

The socket is made of electroplated steel, hot-dipped galvanised steel or stainless steel.

The anchor may be imbedded surface-flush or sunk in the concrete.

An illustration of the product and intended use is 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 C20/25 at minimum to C50/60 at most according to EN 206-1:2000-12. The anchor may be anchored in cracked and non-cracked concrete.

The anchor may be used for transmission of tensile loads, shear loads or a combination of tensile and shear loads.

The intended use of the anchor (anchor, washer, screw) concerning corrosion is given in Annex 5, Table 5 depending on the chosen material.

The anchor made of electroplated steel and hot-dipped galvanised steel and the anchor made of stainless steel without sealing of the bottom of the sleeve may only be used if the inner area of the socket is protected against water.

The provisions made in this European technical approval are based on an assumed 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 the product and methods of verification

#### 2.1 Characteristics of the product

The anchor corresponds to the drawings and information given in Annex 2 to 4. The characteristic material values, dimensions and tolerances of the anchor not indicated in the Annexes shall correspond to respective values laid down in the technical documentation<sup>7</sup> of this European technical approval.

7

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



#### Page 4 of 20 | 13 June 2013

Regarding the requirements concerning safety in case of fire it is assumed that the anchor meets the requirements of class A1 in relation to reaction to fire in accordance with the stipulations of the Commission decision 96/603/EC, amended by 2000/605/EC.

The characteristic values for the design of the anchorages are given in Annexes 7 to 11.

The anchor shall be marked with the identifying mark of the producer, the name of the anchor, the size and the material, e.g. "DEMU 1988 M16x140 GV" according to Annex 4.

#### 2.2 Method of verification

#### 2.2.1 General

The assessment of the fitness of the anchor for the intended use with regard to the requirements of mechanical resistance and stability as well as safety in use in the sense of the Essential Requirements 1 and 4 was performed based on the following verifications:

#### Verifications for tension loads for

1.	Steel failure	N <sub>Rk,s</sub>
2.	Steel failure - transfer of setting torque into prestressing force	T <sub>inst</sub>
3.	Concrete failure - pullout	N <sub>Rk,p</sub>
4.	Concrete failure - concrete cone	N <sub>Rk,c</sub>
5.	Concrete failure - splitting due to installation	c <sub>min</sub> , s <sub>min</sub> , h <sub>min</sub>
6.	Concrete failure - splitting due to loading	N <sub>Rk,sp</sub>
7.	Displacement under tension loads	$\delta_N$
Ve	rifications for shear loads for	
1.	Steel failure without lever arm	V <sub>Rk,s</sub>
2.	Steel failure with lever arm	М <sup>0</sup> <sub>Rk,s</sub>
3.	Concrete failure - pry-out	V <sub>Rk,cp</sub>
4.	Concrete failure - concrete edge	V <sub>Rk,c</sub>
5.	Displacement under shear loads	δ <sub>V</sub>

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

#### Evaluation and attestation of conformity and CE marking 3

#### 3.1 System of attestation of conformity

According to the Decision 96/582/EC of the European Commission<sup>8</sup> system 2(i) (referred to as system 1) of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
  - factory production control; (1)

8



#### Page 5 of 20 | 13 June 2013

- (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.

Note: Approved bodies are also referred to as "notified bodies".

#### 3.2 Responsibilities

#### 3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial/raw/constituent material stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

#### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

9

The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.



#### Page 6 of 20 | 13 June 2013

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

#### 3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- size.

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

#### 4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

#### 4.2 Design of anchorages

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

The design of the anchorage is based on the CEN/TS 1992-4:2009 "Design of fastenings for use in concrete", part 1 and 2 under the responsibility of an engineer experienced in anchorages and concrete work.

The screw is chosen with corresponding screw-in depth acc. Annex 6, Table 6 and strength grade acc. Annex 8, 10 and 11 subject to the required steel resistance.

The member thickness is not less than  $h_{min}$ . The edge distance of the anchors is not less than  $c_{min}$ . The spacing of the anchors is not less than  $s_{min}$ . All these values are indicated in Annex 7, Table 7 subject to the size of the anchor.

Taking into account the loads to be anchored verifiable calculation notes and drawings are generated.

The position, the name, the size of the anchor, if applicable the supplementary reinforcement and the size, the screw-in depth and the strength grade of the screw are indicated on the design drawings. The material of the anchor and the screw shall be given additionally on the drawings.



Page 7 of 20 | 13 June 2013

#### European technical approval ETA-13/0401 English translation prepared by DIBt

#### 4.3 Installation of the anchor

The fitness for use of the anchor can only be assumed, if the following installation conditions are observed:

- Installation by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- Use of the anchor only as supplied by the manufacturer without any manipulation or exchanging the components.
- Installation in accordance with the manufacturer's specifications given in Annex 12 and 13 and the design drawings.
- The anchors are fixed on the formwork so that no movement of the anchors will occur during the time of laying the reinforcement and of placing and compacting the concrete.
- The concrete among the anchor and especially under the head of the foot-mounted anchor is properly compacted.
- The sockets are protected from penetration of concrete, for sockets made of electroplated steel and hot-dipped galvanised steel and sockets made of stainless steel without sealing from penetration of water into the internal space of the sockets.
- Size, material and strength grade of screws corresponding to the design drawings.
- Observation of the prescribed values (e.g. T<sub>inst</sub> according Annex 6) of installation.
- The setting torques given in Annex 6 must not be exceeded.

#### 5 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 and 4.3 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).

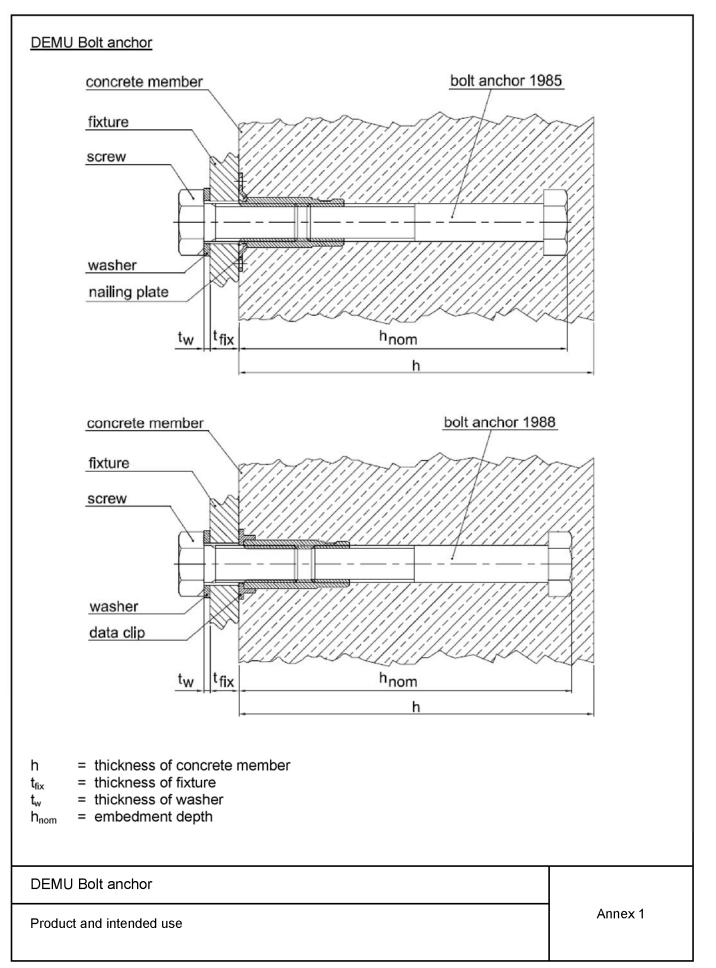
The minimum data required are:

- Dimensions of the anchor,
- Material of the socket,
- Mentioning the matching screw,
- Details on the installation procedure, preferably by using illustrations,
- Maximum setting torque,
- Identification of the manufacturing batch.

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

Andreas Kummerow p. p. Head of Department *beglaubigt:* Müller English translation prepared by DIBt

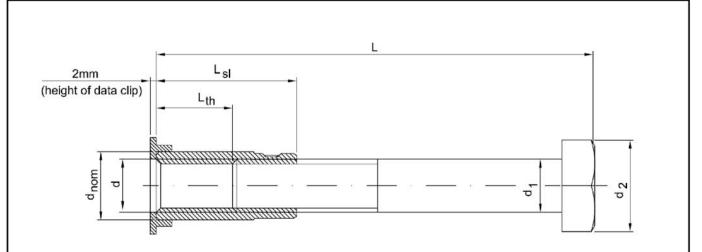




#### Page 9 of European technical approval ETA-13/0401 of 13 June 2013

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There are 4 different materials available for the DEMU Bolt anchor 1988:

Material 1: Sleeve electroplated

Material 2: Sleeve hot-dipped galvanised

Material 3: Sleeve in stainless steel A4-50

Material 4: Sleeve in stainless steel A4-80

Table 1: Dimensions of DEMU Bolt anchor 1988 with sleeves made of material 1 or 2

d	d <sub>nom</sub>	L <sub>sl</sub>	L <sub>th</sub>	d <sub>1</sub>	d <sub>2</sub>	L
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M12	15.5	35.0	23.0 - 25.4	12.0	18.0	55 / 100 / 150
M16	21.0	45.0	29.0 - 32.2	16.0	24.0	75 / 140 / 220
M20	26.0	55.0	35.0 - 39.0	20.0	30.0	90 / 150 / 180 / 270
M24	32.0	70.0	46.0 - 50.8	24.0	36.0	110 / 200 / 320
M30	40.0	90.0	60.0 - 66.0	30.0	46.0	160 / 240 / 380
M36	47.5	110.0	74.0 - 81.2	36.0	55.0	300 <sup>1)</sup> / 420
M42	54.0	110.0	68.0 - 76.4	42.0	65.0	300 <sup>1)</sup> / 460 <sup>1)</sup>

<sup>1)</sup> only available with sleeve made of material 1

Table 2: Dimensions of DEMU Bolt anchor 1988 with sleeves made of material 3 or 4

d	d <sub>nom</sub>	L <sub>si</sub>	L <sub>th</sub>	d <sub>1</sub>	d <sub>2</sub>	L
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M12	15.5 / 16.0 <sup>2)</sup>	35.0	23.0 - 25.4	12.0	18.0	100 / 150
M16	21.0 / 21.3 <sup>2)</sup>	45.0	29.0 - 32.2	16.0	24.0	140 / 220
M20	26.0	55.0	35.0 - 39.0	20.0	30.0	150 / 180 / 270
M24	32.0	70.0	46.0 - 50.8	24.0	36.0	200 <sup>3)</sup>
M30	40.0	90.0	60.0 - 66.0	30.0	46.0	240 <sup>3)</sup>

d	d <sub>nom</sub>	L <sub>sl</sub>	L <sub>th</sub>	d1	d <sub>2</sub>	L
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M12	15.5 / 16.0 <sup>2)</sup>	35.0	23.0 - 25.4	12.0	18.0	100 / 150
M16	21.0 / 21.3 2)	45.0	29.0 - 32.2	16.0	24.0	140 / 220
M20	26.0	55.0	35.0 - 39.0	20.0	30.0	150 / 180 / 270
M24	32.0	70.0	46.0 - 50.8	24.0	36.0	200 <sup>3)</sup>
M30	40.0	90.0	60.0 - 66.0	30.0	46.0	240 <sup>3)</sup>

**Dimensions type 1988** 

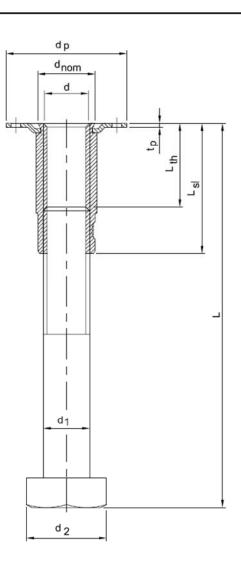
Annex 2

Electronic copy of the ETA by DIBt: ETA-13/0401

## Page 10 of European technical approval ETA-13/0401 of 13 June 2013

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The bolt anchor 1985 is available with a sleeve made of the following material:

Material 1: Sleeve electroplated

Table 3: Dimensions of DEMU Bolt anchor 1985 with sleeve / nailing plate made of material 1

d	d <sub>nom</sub>	L <sub>sl</sub>	L <sub>th</sub>	d <sub>1</sub>	d <sub>2</sub>	L	d <sub>p</sub>	t <sub>p</sub>
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M12	15.5	35.0	23.0 - 25.4	12.0	18.0	150	40.0	1.0
M16	21.0	45.0	29.0 - 32.2	16.0	24.0	140	44.0	1.5
M20	26.0	55.0	35.0 - 39.0	20.0	30.0	180	48.2	1.5
M24	32.0	70.0	46.0 - 50.8	24.0	36.0	200	57.0	1.5

**DEMU Bolt anchor** 

Dimensions type 1985

## Page 11 of European technical approval ETA-13/0401 of 13 June 2013

#### English translation prepared by DIBt



bolt anchor 1988	Marking:
(1) DEMU 1988 M (2)	e.g.: DEMU 1988 M16x140 GV
	DEMU: identifying mark of the producer
	1988: name of the anchor
bottom of sleeve sealed, applies only for sleeves	M16x140: size
applies only for sleeves made of stainless steel (material 3 + 4)	GV: material
	Material:
bolt anchor 1985	GV: sleeve electroplated
	FV: sleeve hot-dipped
(4) (1) ( <u>DEMU 1985 M</u> (2)	galvanised
	A4-50: sleeve made of
	stainless steel A4-50
	A4-80: sleeve made of
8	stainless steel A4-80

lectroplated steel (GV) E355 +N (1.0580), 7), acc. EN 10305-1, s acc. DIN 931 respect. hexagor material 1+2: HDPE / 1.0330), acc. EN 10130, Material 3 stainless steel A4-50 01 / 1.4404 / 1.4571 / 1.4362.	Sleeve in hot-dipped g Mecaval 147M +N, E355 + 20MnV6 +N (1.5217), acc. hot-dipped galvanised <sup>2)</sup> n head screws with thread u / RAL 7035 / (light-) grey  Mater Sleeve in stainle	N (1.0580), EN 10305-1, p to the head acc. DIN
7), acc. EN 10305-1, s acc. DIN 931 respect. hexagor material 1+2: HDPE / 1.0330), acc. EN 10130, Material 3 stainless steel A4-50	20MnV6 +N (1.5217), acc. hot-dipped galvanised <sup>2)</sup> n head screws with thread u / RAL 7035 / (light-) grey  Mater	EN 10305-1, p to the head acc. DIN
material 1+2: HDPE / 1.0330), acc. EN 10130, Material 3 stainless steel A4-50	/ RAL 7035 / (light-) grey  Mater	ial 4
1.0330), acc. EN 10130, Material 3 stainless steel A4-50	 Mater	
Material 3 stainless steel A4-50		
stainless steel A4-50		
		ISS STEEL A4-NU
aled $^{3)}$	Stainless steel 1.4401 / 1.4 acc. EN 10216-5, bottom of sleeve sealed <sup>3)</sup>	
s acc. DIN 931 respect. hexagoi hot-dipped galvanised <sup>4)</sup>		p to the head acc. DIN
	/ RAL 9003 / (signal-) white / RAL 9005 / (jet-) black	
EN ISO 4042 b. EN ISO 1461 bolt against corrosion; for corrosi Table 5, the sealing may be omitt b. EN ISO 10684		ccording to
C	c. EN ISO 10684	c. EN ISO 10684

### Page 12 of European technical approval ETA-13/0401 of 13 June 2013

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				Intended use						
		1	2		3					
		Dry internal rooms, Insignificant corrosion exposure	Low corrosion exposure	Medium corrosion exposure						
			Bolt anchors may also be used in structures in	atmospheric exposure (including i or exposure in permanently damp aggressive conditions (e. g. per seawate	internal conditions, if no particular nanent, alternating immersion in er) exist.					
1	Specification	Bolt anchors may only be	unheated / uninsulated buildings where	3a	3b					
		used in structures subject	condensation may occur (e.	Moderate level	Increased level					
		to dry internal conditions (e. g. accomodations, bureaus, schools, hospitals, shops).	g. warehouses, sport halls), as well as in structures not exposed to rain in outside atmosphere with low level of pollution (mostly rural areas).	Medium exposure to chlorides, i. e. sufficient distance from the sea (> 1km) and offside from roads with road salt application (> 10m); with contact to low acidic substances (pH > 3); low exposure to sulfur, nitrogen (urban atmosphere).	medium exposure to sulfur, nitrogen (industrial area); non-					
				Materials						
2	Bolt anchor	Bolt anchor acc. Table 4, material 1 <sup>1)</sup>	Bolt anchor acc. Table 4, material 2 <sup>1)</sup>	Bolt anchor acc. Table 4, material 3 and 4, without sealing of the bottom of the sleeve <sup>1)</sup>	Bolt anchor acc. Table 4, material 3 and 4, with special sealing of the bottom of the sleeve					
3	Washer acc. EN ISO 7089/7093-1	Steel acc. EN 10025, galvanised <sup>2)</sup>	Steel acc. EN 10025, hot- dipped galvanised <sup>3)</sup>	Stainless steel 1.4401 / 1.4404 /	/ 1.4571 / 1.4362 acc. EN 10088					
4	Screw	Steel acc. EN ISO 898-1, galv. <sup>2)</sup> , strength grade 4.6, 5.6 or 8.8	Steel acc. EN ISO 898-1, hot-dipped galv. <sup>3)</sup> , strength grade 4.6, 5.6 or 8.8		,					
5	Suppl. Reinforcement	B500A or B500B	B500A or B500B	Stainless reinforcement steel 1.4571 / 1.4362 / 1.4462 respect. B500A or B500B meeting the requirements for concrete cover c <sub>nom</sub> acc. EN 1992-1						

<sup>1)</sup> the inner area of the socket has to be protected against ingress of water, e. g. by using DEMU sealing cap or a srew acc. line 4

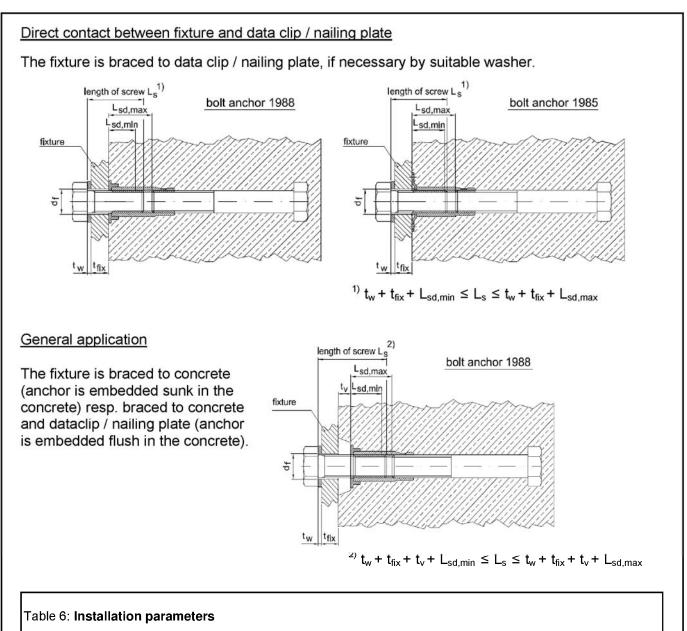
<sup>2)</sup> thickness of coating  $\ge$  5µm acc. EN ISO 4042

 $^{3)}$  thickness of coating  $\geq$  40  $\mu m$  acc. EN ISO 10684

1985  $\oplus$  $\oplus$ 1988 M18 ×140 DEMU M16 DEMU  $\oplus$  $\oplus$ Data clip: section, top view (with example Nailing plate: top view (with example for marking) and side view for marking) and section **DEMU Bolt anchor** Annex 5 Materials and intended use, marking

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Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Maximum torque moment	max. T <sub>inst</sub>	[Nm]	≤ 10	≤ 30	≤ 50	≤ 90	≤ 180	≤ 250	≤ 300
Minimum screw-in length - 1988	L <sub>sd,min</sub>	[mm]	16.4	21.2	26.0	30.8	38.0	45.2	52.4
Minimum screw-in length - 1985	$L_{sd,min}$	[mm]	18.0	24.0	30.0	36.0			
Maximum screw-in length - 1988	L <sub>sd,max</sub> <sup>1)</sup>	[mm]	25.0	31.0	37.0	48.0	62.0	76.0	70.0
Maximum screw-in length - 1985	L <sub>sd,max</sub>	[mm]	23.0	29.0	35.0	46.0			
Diameter of clearance hole in fixture	d <sub>f</sub>	[mm]	14.0	18.0	22.0	26.0	33.0	39.0	45.0

<sup>1)</sup> For bolt anchors with sealing on bottom of sleeve (material 3 + 4) the values have to be decreased by 3.0 mm.

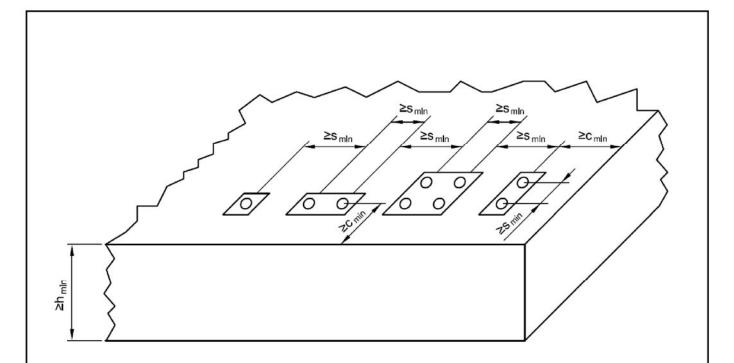
### DEMU Bolt anchor

Positions of the fixture Installation parameters

### Page 14 of European technical approval ETA-13/0401 of 13 June 2013

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The mentioned spacings, edge distances and member thicknesses apply also for anchors installed in the front edge.

### Table 7: Min. thickness of concrete member, min. edge distances and spacing

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Minimium spacing	S <sub>min</sub>	[mm]	100	100	120	150	180	220	260
Minimum edge distance	C <sub>min</sub>	[mm]	50	50	60	75	90	110	130
Minimum thickness of concrete	h <sub>min</sub>	[mm]			h.	<sub>om</sub> + c <sub>non</sub>	1)		

<sup>1)</sup>  $c_{nom}$  acc. EN 1992-1 with  $c_{nom} \ge 20$ 

**DEMU** Bolt anchor

Arrangement of anchors and member thickness

Z20936.13

### Page 15 of European technical approval ETA-13/0401 of 13 June 2013 English translation prepared by DIBt

	M42	(2	448.4		2)	560.5 4		ć	588.1 -/												0 770	041.0 A77 A	E-111E																
	M36	0.000	0.020		1001	408.5			490.5												5 0 FC	336.4	1.000																
	M30		224.4		1 000	280.5			335.0									448.8			169.0	100.9	1.007																
	M24	0	14 1.2	2.00	110 1	1/6.5	2.00		219.5	1.58								282.4	1.60		100 5	5.001 2.011	1 20	07.1	0.10	1.00	2.00	2.20	2.40	1.50									
	M20	galvanised steel	90.U	la sta la sta sta st		122.5		galvanised steel	139.6		-	110.3		16	110.3			180.1	1.48		8 09	03.0	1.15																
	M16	min. steel strength 4.6) made of electroplated / hot-dipped galvanised steel	0.20			/8.5		steel strength 8.8) made of electroplated / hot-dipped galvanised steel	93.1		ainless steel	81.0	3.09	A4-70, A4-80) made of stainless steel	81.0	3.09	ainless steel	125.6	1.60			44.7 67.5	0.20																
	M12	made of electrop	1.00	and to be a		42.2		made of electrop	45.8		w (min. steel strength A4-50) made of stainless steel	42.2	2.86	44-70, A4-80) mac	46.4		A4-80) made of stainless steel	59.0	1.48		7 40	35.7	3.00									acc. to Annex 4)							
	[mm]	ngth 4.6)	[NIN]	[-] [-]		[KN]	E	ngth 8.8)	[KN]		trength A	[kN]	[-]	trength A	[kN]	Ŀ	£ľ	[kN]	Ξ		0,617					Ē	ī	[-]	Ξ	[-]		tterial 1 a							
	q	steel stre	NRK,S	YMs 7		NRk,s	Y <sub>Ms</sub>	steel stre	NRk,s	Y <sub>Ms</sub>	n. steel s	N <sub>Rk,s</sub>	Y <sub>Ms</sub> <sup>1)</sup>	w (min. steel strength	N <sub>Rk,s</sub>	Y <sub>Ms</sub> <sup>1)</sup>	<u>w (min. steel s</u>		Y <sub>Ms</sub> 1)			Np.	d XX	°≁°	<sup>2</sup>	۰ ۲	°	Ψ <sub>c</sub>	۰ ۳	<sup>1)</sup> ۲ <sub>Mp</sub>		GV (m							
loads		$\sim$		`	-			uin.			and screw (mi						and screw (mi				0000	C20/22	C25/30	C30/37	C35/45		C40/50		C50/60			inly available in							
Table 8a: Characteristic values for tension loads	Thread size	Steel failure, bolt anchor (material 1 or 2) and screw		Partial safety factor		Characteristic resistance	Partial safety factor	Steel failure, bolt anchor (material 1 or 2) and screw	Characteristic resistance	zugehöriger Teilsicherheitsbeiwert	Steel failure, bolt anchor (material 3: A4-50) and scre	Characteristic resistance	Partial safety factor	Steel failure, bolt anchor (material 3: A4-50) and scre	Characteristic resistance	Partial safety factor	Steel failure, bolt anchor (material 4: A4-80) and screven	Characteristic resistance	Partial safety factor	:	Pull-out failure	Cliaract resistance in uncrecked contrate			I I I I I I I I I I I I I I I I I I I	Increasing factors for N <sub>Rk,p</sub> in cracked and	uncracked concrete			Partial safety factor	Ę	<sup>10</sup> in absence of other national regulations; <sup>23</sup> only available in GV (material 1 acc. to Annex 4)							
M	U	Bc	lt	ar	nc	hc	or																																-
nara	act	ori	sti	<u>с л</u>	/al	lue	25	fo	r te	<u>-</u> n	si	on	10	ac	ls																		1		А	nn	ex	8	



### DI

Characteristic values for tension loads Displacements under tension loads

Page 16 of European technical approval
ETA-13/0401 of 13 June 2013

English translation prepared by DIBt

Filleau size Concrete cone failure		Effective anchorage depth	Factor to take into account the influence of load transfer	mechanisms in cracked and uncracked concrete	Characteristic spacing	Characteristic edge distance	Partial safety factor	Splitting	Effective anchorage depth	Characteristic spacing	Characteristic edge distance	Partial safety factor	Table 9: Displacements under tension loads	Thread size	Displacements $\delta_{N0}$ to 0.7 mm for short term loading in cracked and uncracked concrete under following tension loads <sup>1)</sup>	$^{\eta)}$ for long term tension loading the displacements $\delta_{N^{\infty}}$ can	7 for long term tension loading t
<u>n</u>		n <sup>er</sup>	influence of load transfer kar	cracked concrete kuer	Scr,N	Ccr,N	YMC		h <sub>ef</sub> <sup>1)</sup>	Scr,sp	Ccrisp	Ymsp	tension loads	p	or short term loading in e under following tension N		
		[mm]	Ξ				2) [-]		<sup>1)</sup> [mm]	sp [mm]	sp [mm]	<sup>2)</sup> [-]		[mm]	[kN]	be increased to 1.8 mm	ncreased t
	M12x55: M12x100	M12x150:			<u> </u>	J.			M12x55: M12x100: M12x150: -	<u></u>	<u>ا</u>			n] M12	] 14.0	o 1.8 mm	0 1.8 mm
	49.0 M16x75: 67.0 N 94.0 M16x140: 132.0 N								M16x75: M16x140: M16x220:					M16	20.0		
	67.0 M20x90: 79.0 132.0 M20x150: 139.0								67.0 M20x90: 79.0 132.0 M20x150: 139.0 212.0 M20x180: 169.0 220x270: 259.0					M20	29.0		
1V124	79.0 M24×110: 97.0 139.0 M24×200: 187.0	M24x320:	8.5	11.9	3.0 • h <sub>ef</sub>	1.5 • h <sub>ef</sub>	1.50		M24x110: M24x200: M24x320:	4.0 • h <sub>ef</sub>	2.0 • h <sub>ef</sub>	1.50		M24	40.0		
201	97.0 M30x160: 143.0 187.0 M30x240: 223.0								97.0 M30x160: 143.0 187.0 M30x240: 223.0 307.0 M30x380: 363.0					M30	63.0		
DCINI	143.0 M36×300: 279.0 223.0 M36×420: 399.0								M36x300: M36x420: -					M36	83.0		
1442	279.0 M42x300: 276.0 399.0 M42x460: 436.0								279.0 M42x300: 276.0 399.0 M42x460: 436.0 					M42	113.0		



		Н						_		╞	_													ŀ				277.0 M4	0 M4		-							
		M36			163.4			204.3			245.2														2.0			141.0 M36×300: 277	221.0 M36X42U: 380		47.5							
		M30			112.2			140.3			167.5									224.4	1.33				2.0			M30×160: 141.0	185.0 M30X240: 221.0		40.0							
		M24	10		70.6	1.67		88.3	1.67		109.7	1.32								141.2	<u>+</u>				2.0	1.50		77.0 M24×110: 95.0	M24X200: 185.0	208.0 NIZ4X320. 230.0	32.0	1.50	13					
		M20		ed galvanised stee	49.0		ed galvanised stee	61.3		ed galvanised stee	69.8			55.1	58		00° I			90.0	1.23				2.0			M20×90: 77.0	130.0 M20X150: 137.0	M20x270: 208.0	26.0		applies for materia					
		M16		oplated / hot-dippe	31.4		oplated / hot-dippe	39.3		oplated / hot-dippe	46.5		stainless steel	40.5	2.58	ade of stainless st	40.0	8C.2	stainless steel	62.8	1.33				2.0			M16x75: 65.0	92.0 M16X140: 130.0		21.0/21.3 <sup>3)</sup>		); <sup>3)</sup> higher value a					
		M12		6) made of electro	16.9		<ol><li>made of electro</li></ol>	21.1		8) made of electro	22.9		A4-50) made of a	21.1	2.38	A4-70, A4-80) m	23.2		A4-80) made of :	29.5	1.23				M12X100: 2.0 M12X100: 2.0 M12X150: 2.0				M12X100: 92.0		15.5 / 16.0 <sup>3)</sup>		1 acc. to Annex 4					
		[mm]		ength 4	[kN]	Ξ	ength 5.	[kN]	Ŀ	ength 8.	ΣĮ		strength	Z.		strengtr	IN I		strength	[kN]	Ξ				 	$\Xi$			[mm]		[mm]	$\equiv$	atetrial					
		7	5	z steel str	V <sub>Rk,s</sub>	Y <sub>Ms</sub> <sup>1)</sup>	steel str	$V_{Rk,s}$	$\gamma_{Ms}$ <sup>1)</sup>	steel str	V <sub>Rk,s</sub>	Y <sub>Ms</sub> ''	in. steel	V <sub>Rk,s</sub>	Yms 7	In. steel	VRk,s 1)	Yms 7	in. steel	V <sub>Rk,s</sub>	Y <sub>Ms</sub> <sup>1)</sup>				<del>گ</del>	YMcp <sup>1)</sup>					d <sub>nom</sub>	YMce <sup>1)</sup>	in GV (m					
	Table 10a: Characteristic values for shear loads	Thread size d	Shear loads without lever arm Group factor (CEN/TS 1992-4-2 6 33 1)	) and screw (min			Steel failure, bolt anchor (material 1 or 2) and screw (min. steel strength 5.6) made of electroplated / hot-dipped galvanised steel	Characteristic resistance		(material 1 or 2) and screw (min	tance		r (material 3: A4-50) and screw (r	tance		(material 3: A4-50) and screw (n	lance	•	(material 4: A4-80) and screw (I	Characteristic resistance	Partial safety factor	ever arm: see Annex 10,Table 10b	Prv-out failure		Factor	Partial safety factor	Concrete edge failure (without suppl. reinforcement)		Effective length of fixing anchor (for shear loads)		Effective outside diameter	Partial safety factor	<sup>10</sup> in absence of other national regulations; <sup>20</sup> only available in GV (matetrial 1 acc. to Annex 4); <sup>30</sup> higher value applies for material 3					
[	DEM	U	Bo	lt a	n	cho	or																															
(	Chara	ict	eris	tic	Va	alu	es	fo	or s	she	ear	- Io	a	ls																				/	۹nr	iex	10	
~ ~	<u>^</u>																																					~-

# Page 17 of European technical approval ETA-13/0401 of 13 June 2013

224.2 <sup>2)</sup>

280.3 <sup>2)</sup>

294.1 <sup>2)</sup>

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M42



2/4. 432.

42x460:

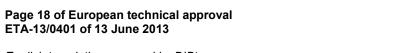
54.0

2.0

Annex 11
8.06.01-351/12

Characteristic values for shear loads Displacements under shear loads

Mark of the part of th	Image: of lectroplated / hot-dipped galvanised steel         Image: of lectroplated / hot-dipped galvanised steel         Image: of lectroplated / hot-dipped galvanised steel           Image: S0         52.4         13.2         258.6         157         Image: S0         157           ength: S0         65.5         1124.5         1124.5         1976.3         1976.3         1976.3           Image: S0         65.5         166.5         324.5         561.3         1124.5         1976.3         1           Image: S0         104.8         206.4         519.3         895.0         1799.2         3162.1         1           Image: S1         65.5         166.5         324.5         519.3         895.0         1799.2         3162.1         1           Image: S1         65.5         166.5         324.5         519.3         895.0         1799.2         3162.1         1           Image: S1         665.4         519.3         895.0         1799.2         3162.1         1           Image: S1         65.5         166.5         324.5         564.4         513.3         3162.1         1           Image: S1         103.8         55.0         3163.1         1.25         3162.1         1	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	and with hore man. $N_{\rm eff}$ $N_{\rm eff$	Structure and with lever arm Steel failure, bolt anchor (material 1 or Characteristic resistance Partial safety factor	2	[mm]	M12	M16	UCW	PCW	M30	M36	CPW					
Uure. Data bancher (material 1 or 2) and ser for (mit, steel strength 4.6) made of electroplated / hot-dipped galvanised steel       167       1691       17910       1791 <th cols<="" td=""><td><math display="block"> \begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td><td></td><td></td><td>Interformation of the control (matched) of the contr</td><td>Implicit of a matcher (material 1 or 2) and screek (mais sited streem)       45</td><td>Steel failure, bolt anchor (material 1 or Characteristic resistance Partial safety factor</td><td>5</td><td></td><td>7</td><td></td><td></td><td></td><td>000</td><td>000</td><td>7110</td></th>	<td><math display="block"> \begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td> <td></td> <td></td> <td>Interformation of the control (matched) of the contr</td> <td>Implicit of a matcher (material 1 or 2) and screek (mais sited streem)       45</td> <td>Steel failure, bolt anchor (material 1 or Characteristic resistance Partial safety factor</td> <td>5</td> <td></td> <td>7</td> <td></td> <td></td> <td></td> <td>000</td> <td>000</td> <td>7110</td>	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Interformation of the control (matched) of the contr	Implicit of a matcher (material 1 or 2) and screek (mais sited streem)       45	Steel failure, bolt anchor (material 1 or Characteristic resistance Partial safety factor	5		7				000	000	7110				
Inder controlMarkerNumber52.413.213.613.614.00899.6151.01Inter boltMarkerNumberNumberNumber13.713.7157.3 <td>reitlo resistance <math>W_{res}</math> [Wn] 5.2.4 (13.2) 2.9.6 (49.0) 099.6 (1591.0 (19.1) 10.1 (19.1) 10.1 (19.1) 11.1 (19.</td> <td><math display="block"> \begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td> <td><math display="block"> \begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td> <td><math display="block"> \begin{array}{                                    </math></td> <td>restations the function of th</td> <td>Characteristic resistance Partial safety factor</td> <td>2) and screw (min. stee</td> <td>strength 4.0</td> <td><ol><li>made of electr</li></ol></td> <td>oplated / hot-dipp</td> <td>ed galvanised stee</td> <td></td> <td></td> <td></td> <td></td>	reitlo resistance $W_{res}$ [Wn] 5.2.4 (13.2) 2.9.6 (49.0) 099.6 (1591.0 (19.1) 10.1 (19.1) 10.1 (19.1) 11.1 (19.	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{                                    $	restations the function of th	Characteristic resistance Partial safety factor	2) and screw (min. stee	strength 4.0	<ol><li>made of electr</li></ol>	oplated / hot-dipp	ed galvanised stee									
Interfact         Interfact <t< td=""><td>International control and control and control matrix       No.       No.</td><td><math display="block"> \begin{array}{                                    </math></td><td>Interfact of the control matter of</td><td>Interfact       Interfact       <thinterfact< th=""> <thinterfact< th=""> <thinterfact< th=""></thinterfact<></thinterfact<></thinterfact<></td><td>Interfact of the function of the funcing of the function of the function of th</td><td>Partial safety factor</td><td>M<sup>RK</sup></td><td>[Nm]</td><td>52.4</td><td>13.2</td><td>259.6</td><td></td><td>899.6</td><td>1581.0</td><td>2541.1</td></t<>	International control and control and control matrix       No.	$ \begin{array}{                                    $	Interfact of the control matter of	Interfact       Interfact <thinterfact< th=""> <thinterfact< th=""> <thinterfact< th=""></thinterfact<></thinterfact<></thinterfact<>	Interfact of the function of the funcing of the function of the function of th	Partial safety factor	M <sup>RK</sup>	[Nm]	52.4	13.2	259.6		899.6	1581.0	2541.1					
Interfactor         Market         Number         Set	Interferencial of the character of market of the character of market of the character of the character of market of the character of the charac	Implicit of the choose of th	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		Y <sub>Ms</sub> <sup>1)</sup>					1.67								
disk         Nmi         0         65.5         106.5         324.5         56.1.3         1124.5         1276.3         1           Ime. Dot and sector         me. Ni         1         1         1.67         1.66	Instruction         M <sup>m</sup> <sub>exc</sub> Nmm         65.5         166.5         166.5         1736.5         1337.7         1646.5         166.5         1236.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1337.7         126.5         1336.7         1337.7         126.5         <	relation $W_{exc}^{exc}$ $ Wn $ $6.5$ $106.5$ $106.5$ $107.5$ $107.5$ $107.6$	Instruction         Mm         Mm         Mm         Instruction	Relation constraint c	Retric restance $w^{v_{v_{v_{v_{v_{v_{v_{v_{v_{v_{v_{v_{v_{$	Steel failure, bolt anchor (material 1 or	2) and screw (min. stee	strength 5.	<ol> <li>made of electric</li> </ol>	oplated / hot-dipp	ed galvanised steel									
life	Lieb Hardner, The bott and correction for a fiel strength of the fighted gathemised steel ristic resistance167167167ristic resistance $m_{\rm Fis}$ Number of strength of the fighted gathemised steel1799.23162.13162.1ristic resistance $m_{\rm Fis}$ Number of the field strength of the fighted gathemised steel1799.23162.13162.1ristic resistance $m_{\rm Fis}$ Number of the field strength of the field strengt strength of the field strength of the field strength of the field strengt strength of the field strengt strength of the field strengt strength of the field strengt strength of the field strength strength	Interfact $ W_{en} $ $ V_{en} $ <	Include the function of the f	Interfact	Interfacient         Interfacient<	Characteristic resistance	M <sup>0</sup> Rk;	[Nm]	65.5	166.5	324.5		1124.5	1976.3	3176.3					
une. bolt anchor (material 1 or 2) and screw (min. Steel stength 8.8) made of eletroplated./ Inclupped galvanised steel         une. bolt anchor (material 2: A4-50) and screw (min. Steel stength A4-50) made of stainless steel         minit colspan="4">1.125         minit colspan="4">1.125         minit colspan="4">1.125         minit colspan="4">minit colspan="4">minit colspan="4"         minit colspan="4">minit colspan="4"         minit colspan="4" <th colsp<="" td=""><td></td><td>ume. bolt and softer, (mit street strength 8.8) made of eletropiated. I hold opped galomised street       1.25       3162.1         Idity factor       Num       1.25       3162.1       3162.1         Idity factor       Num       1.25       3162.1        <th 31<="" colspan="4" td=""><td>Implicit of a distribution of a distribu</td><td>Image of a discrete (min, steel strength 6.5) made of a dering dialet / hold/goed galvalised steel       179.2       316.1         Inter both androte (material 1 or 2) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both and colspan= of stantess steel       1.75       316.2.1         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.75       1.75         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       383.7       1.969.4         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       388.0       1.799.2         Inter both and screw (min, steel strength 4.4.60) made of</td><td><math display="block"> \begin{array}{                                    </math></td><td>Partial safety factor</td><td>YMs 1)</td><td></td><td></td><td></td><td></td><td>1.67</td><td></td><td></td><td></td></th></td></th>	<td></td> <td>ume. bolt and softer, (mit street strength 8.8) made of eletropiated. I hold opped galomised street       1.25       3162.1         Idity factor       Num       1.25       3162.1       3162.1         Idity factor       Num       1.25       3162.1        <th 31<="" colspan="4" td=""><td>Implicit of a distribution of a distribu</td><td>Image of a discrete (min, steel strength 6.5) made of a dering dialet / hold/goed galvalised steel       179.2       316.1         Inter both androte (material 1 or 2) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both and colspan= of stantess steel       1.75       316.2.1         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.75       1.75         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       383.7       1.969.4         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       388.0       1.799.2         Inter both and screw (min, steel strength 4.4.60) made of</td><td><math display="block"> \begin{array}{                                    </math></td><td>Partial safety factor</td><td>YMs 1)</td><td></td><td></td><td></td><td></td><td>1.67</td><td></td><td></td><td></td></th></td>		ume. bolt and softer, (mit street strength 8.8) made of eletropiated. I hold opped galomised street       1.25       3162.1         Idity factor       Num       1.25       3162.1       3162.1         Idity factor       Num       1.25       3162.1 <th 31<="" colspan="4" td=""><td>Implicit of a distribution of a distribu</td><td>Image of a discrete (min, steel strength 6.5) made of a dering dialet / hold/goed galvalised steel       179.2       316.1         Inter both androte (material 1 or 2) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both and colspan= of stantess steel       1.75       316.2.1         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.75       1.75         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       383.7       1.969.4         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       388.0       1.799.2         Inter both and screw (min, steel strength 4.4.60) made of</td><td><math display="block"> \begin{array}{                                    </math></td><td>Partial safety factor</td><td>YMs 1)</td><td></td><td></td><td></td><td></td><td>1.67</td><td></td><td></td><td></td></th>	<td>Implicit of a distribution of a distribu</td> <td>Image of a discrete (min, steel strength 6.5) made of a dering dialet / hold/goed galvalised steel       179.2       316.1         Inter both androte (material 1 or 2) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both and colspan= of stantess steel       1.75       316.2.1         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.75       1.75         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       383.7       1.969.4         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       388.0       1.799.2         Inter both and screw (min, steel strength 4.4.60) made of</td> <td><math display="block"> \begin{array}{                                    </math></td> <td>Partial safety factor</td> <td>YMs 1)</td> <td></td> <td></td> <td></td> <td></td> <td>1.67</td> <td></td> <td></td> <td></td>				Implicit of a distribution of a distribu	Image of a discrete (min, steel strength 6.5) made of a dering dialet / hold/goed galvalised steel       179.2       316.1         Inter both androte (material 1 or 2) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.50) made of stantess steel       1.25       316.2.1         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both androte (material 2: 44-50) and screw (min, steel strength 4.4.70) made of stantess steel       1.25       1.75         Inter both and colspan= of stantess steel       1.75       316.2.1         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.75       1.75         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       383.7       1.969.4         Inter both and screw (min, steel strength 4.4.60) made of stainless steel       1.153       1.799.2       388.0       1.799.2         Inter both and screw (min, steel strength 4.4.60) made of	$ \begin{array}{                                    $	Partial safety factor	YMs 1)					1.67			
riskic resistance         Inf**         Number         104.8         Number         104.8         Number         125         3162.1         3162.1         3162.1           Risky factor         Min.s.         Min.s.         Min.s         Min.s <t< td=""><td></td><td>Inside consistance         M<sup>va,v</sup>         Not         104         1048         1053         1253<!--</td--><td>Inder the interval of the int</td><td>cisical circal circa</td><td>Independent control         M<sup>64,6</sup>         Index         <thindex< th="">         Index         Index&lt;</thindex<></td><td>Steel failure, bolt anchor (material 1 or</td><td>2) and screw (min. stee</td><td>strength 8.</td><td><ol> <li>made of eletro</li> </ol></td><td>plated / hot-dippe</td><td>d galvanised steel</td><td></td><td></td><td></td><td></td></td></t<>		Inside consistance         M <sup>va,v</sup> Not         104         1048         1053         1253 </td <td>Inder the interval of the int</td> <td>cisical circal circa</td> <td>Independent control         M<sup>64,6</sup>         Index         <thindex< th="">         Index         Index&lt;</thindex<></td> <td>Steel failure, bolt anchor (material 1 or</td> <td>2) and screw (min. stee</td> <td>strength 8.</td> <td><ol> <li>made of eletro</li> </ol></td> <td>plated / hot-dippe</td> <td>d galvanised steel</td> <td></td> <td></td> <td></td> <td></td>	Inder the interval of the int	cisical circal circa	Independent control         M <sup>64,6</sup> Index         Index <thindex< th="">         Index         Index&lt;</thindex<>	Steel failure, bolt anchor (material 1 or	2) and screw (min. stee	strength 8.	<ol> <li>made of eletro</li> </ol>	plated / hot-dippe	d galvanised steel									
Itely factor $w_{w}^{b}$ $ \cdot $ $\cdots$ $1.25$ $1.25$ $1.25$ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $w_{w}^{b}$ $ \cdot $ Itely factor $ \cdot $ Itely factor $ \cdot $	If et y factor $y_{ev}$ $ -1 $ $(-1, 26)$ <t< td=""><td>Ieth reductIeth reduct1.251.25Ieth reductNuc.IIIIIIeth reductNuc.IIIIIIeth reductNuc.IIIIIIIeth reductNuc.IIIIIIIIeth reductNuc.IIIIIIIIIeth reductNuc.III</td><td>Ieth factor1.251.251.25Ieth factorNuc.Nuc.10.550.2450.55Ieth factorNuc.10.550.2450.55Ieth factorNuc.10.550.2450.55Ieth factorNuc.10.550.530.56Ieth factorNuc.11.560.3370.56Ieth factorNuc.Nuc.11.560.337Ieth factorNuc.Nuc.11.560.36Ieth factorNuc.Nuc.11.330.5100.50Ieth factorNuc.Nuc.11.330.501.7092Ieth factorNuc.11.300.501.7092<td< td=""><td>Ierb factorIerb</td></td<></td></t<> <td>If the function<math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><math>1.25</math><td>Characteristic resistance</td><td>M<sup>0</sup>Rk.</td><td>[Nm]</td><td>104.8</td><td>266.4</td><td>519.3</td><td>898.0</td><td>1799.2</td><td>3162.1</td><td>5082.1</td></td>	Ieth reductIeth reduct1.251.25Ieth reductNuc.IIIIIIeth reductNuc.IIIIIIeth reductNuc.IIIIIIIeth reductNuc.IIIIIIIIeth reductNuc.IIIIIIIIIeth reductNuc.III	Ieth factor1.251.251.25Ieth factorNuc.Nuc.10.550.2450.55Ieth factorNuc.10.550.2450.55Ieth factorNuc.10.550.2450.55Ieth factorNuc.10.550.530.56Ieth factorNuc.11.560.3370.56Ieth factorNuc.Nuc.11.560.337Ieth factorNuc.Nuc.11.560.36Ieth factorNuc.Nuc.11.330.5100.50Ieth factorNuc.Nuc.11.330.501.7092Ieth factorNuc.11.300.501.7092 <td< td=""><td>Ierb factorIerb</td></td<>	Ierb factorIerb	If the function $1.25$ <td>Characteristic resistance</td> <td>M<sup>0</sup>Rk.</td> <td>[Nm]</td> <td>104.8</td> <td>266.4</td> <td>519.3</td> <td>898.0</td> <td>1799.2</td> <td>3162.1</td> <td>5082.1</td>	Characteristic resistance	M <sup>0</sup> Rk.	[Nm]	104.8	266.4	519.3	898.0	1799.2	3162.1	5082.1					
Une bolt anchor (material 2: A4-50) and screw (min, steel strength A4-50) made of stainless steel         ristic resistance       M       M       No.       No. <t< td=""><td>une bolt anchor (material 2: A4-50) and screw (min, steel strength A4-50) made of stainless steel       24.5       Teles         Teles bolt anchor (material 2: A4-50) and screw (min, steel strength A4-70) made of stainless steel       Steel       Steel         Teles bolt anchor (material 2: A4-50) and screw (min, steel strength A4-70) made of stainless steel       Steel       Steel         More bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-50) and screw (min, steel strength A4-80) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-80) and screw (min steel strength A4-80) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-80) and screw (min steel strength A4-80) made of stainless steel</td><td>ure. bolt anchor (material 3: A4-50) and screw (rim, steel strength A4-50) made of statiless steel         insite restance       M<sup>m</sup><sub>ex.</sub>       INM       655.3       134.5       and screw (rim, steel strength A4-70) made of statiless steel         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       655.4       324.5         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       655.4       55.8         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       51.5       S         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       659.4       51.25.8         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       133.7       659.4       51.25.8         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       133.7       659.4       179.2         ristic restance       M<sup>m</sup><sub>ex.</sub>       INM       133.7       659.4       1799.2       I         ristic restance        <th <="" colspan="5" td="" th<=""><td>Image but anchor (material 3: At-30) and screw (min, steel strength At-30), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw 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(material 2: A4-50) and screw (min, steel strength A4-70) made of stainless steel       Steel       Steel         Teles bolt anchor (material 2: A4-50) and screw (min, steel strength A4-70) made of stainless steel       Steel       Steel         More bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt anchor (material 2: A4-50) and screw (min, steel strength A4-10) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-50) and screw (min, steel strength A4-80) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-80) and screw (min steel strength A4-80) made of stainless steel       Steel       Steel         Note bolt (material 2: A4-80) and screw (min steel strength A4-80) made of stainless steel	ure. bolt anchor (material 3: A4-50) and screw (rim, steel strength A4-50) made of statiless steel         insite restance       M <sup>m</sup> <sub>ex.</sub> INM       655.3       134.5       and screw (rim, steel strength A4-70) made of statiless steel         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       655.4       324.5         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       655.4       55.8         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       51.5       S         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       659.4       51.25.8         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       133.7       659.4       51.25.8         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       133.7       659.4       179.2         ristic restance       M <sup>m</sup> <sub>ex.</sub> INM       133.7       659.4       1799.2       I         ristic restance <th <="" colspan="5" td="" th<=""><td>Image but anchor (material 3: At-30) and screw (min, steel strength At-30), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-70), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 3: At-30) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) and screw (min, steel strength At-80), made of stantiess steel into (material 4: At-80) 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ture, bolt anchor (material 3: A4-50) and screw (min, steel Strength A4-70) made of Stainless steel         institue resistance       M <sup>*</sup> <sub>N-N</sub> [Nni)       91.7       383.7       659.4       East and the state of	une bolt anchor (material 2: 44-50) and screw (min. steel strength 44-70) made of staintess steel mich for the polar of the polar of staintess steel mich bolt anchor (material 2: 44-50) and screw (min. steel strength 44-80) made of staintess steel mich bolt anchor (material 2: 44-50) and screw (min. steel strength 44-80) made of staintess steel mich bolt anchor (material 2: 44-50) and screw (min. steel strength 44-80) made of staintess steel mich bolt anchor (material 2: 44-50) and screw (min. steel strength 44-80) made of staintess steel mich bolt anchor (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt anchor (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt anchor (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt and bolt (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt and bolt (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt and bolt (material 4: 44-80) and screw (min. steel strength 44-80) made of staintess steel mich consistance mich bolt and bol	Image of an anchor (material 2: A4-50) and screw (min, steel strength A4-70) made of staintees steel restance       Start bit is 059.4       Start bit is 059.4         ristic restance $w_w^w$	Image       Distance       Constrained       Minite       Distance       Minite       Distance       Di	Une both anchor (material 2: A4-50) and screw (min. steel strength A4-70) made of statitess steel relet alcost in the both anchor (material 2: A4-50) and screw (min. steel strength A4-80) made of statitess steel relet anchor (material 2: A4-50) and screw (min. steel strength A4-80) made of statitess steel relet anchor (material 2: A4-50) and screw (min. steel strength A4-80) made of statitess steel relet anchor (material 2: A4-50) and screw (min. steel strength A4-80) made of statitess steel relet and screw (min. steel strength A4-80) made of statitess steel relet and screw (min. steel strength A4-80) made of statitess steel relet and screw (min. steel strength A4-80) and screw (min. steel strength A4	Ure but anchor (material 3: 44-50) and screw (min. steel strength A4-70) made of statiness steel       istic restatince       istic restatince <t< td=""><td>Partial safety factor</td><td>(1 AMS</td><td></td><td></td><td>2.38</td><td></td><td></td><td></td><td></td><td></td></t<>	Partial safety factor	(1 AMS			2.38										
ristic resistance $ W_{R_{45}} $ $ Vm $ $91.7$ $383.7$ $659.4$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.52$ $1.56$ $1.53$ $1.56$ $1.53$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.52$ $1.56$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.56$ $1.53$ $1.56$ $1.53$ $1.56$ $1.52$ $1.56$ $1.56$ $1.53$ $1.52$ $1.56$ $1.56$ $1.52$ $1.56$ $1.56$ $1.52$ $1.56$ $1.56$ $1.52$ $1.56$ $1.52$ $1.56$ $1.52$ $1.56$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ $1.52$ <t< td=""><td><math display="block">\begin{tabular}{ c c c c c c c c c c c c c c c c c c c</math></td><td>ristic restance<math> W_{rs.c}^{rs.c} </math><math> V_{rs.c}^{rs} </math></td><td>right creditance in the contract of the contr</td><td>right creatistance<math>M_{\text{Fact.}}</math><math> Vm1]</math><math>91.7</math><math>38.3.7</math><math>659.4</math><math>1.560</math><math>1.560</math>right factor<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>1.560</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>1.799.2</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>1.04.8</math><math>1.04.8</math><math>3.05.16</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>2.66.4</math><math>1.33.2</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>2.61.4</math><math>3.03.16</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>2.66.4</math><math>1.33.2</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>2.66.4</math><math>1.33.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>104.8</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>1.33.2</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>1.33.2</math><math>1.799.2</math><math>1.799.2</math>right croic<math>N_{\text{Fact.}}</math><math>N_{\text{Fact.}}</math><math>104.8</math><math>104.8</math><math>1.799.2</math><math>1.799.2</math>right croic&lt;</td><td>richt restance fiel restance fiel <math>\frac{W_{res}}{W_{res}}</math> <math>\frac{Nm_{res}}{1}</math> <math>\frac{Nm_{res}}{1}</math></td><td>Steel failure. bolt anchor (material 3: A</td><td>(4-50) and screw (min. st</td><td>eel strength</td><td>A4-70) made of</td><td>stainless steel</td><td></td><td></td><td></td><td></td><td></td></t<>	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	ristic restance $ W_{rs.c}^{rs.c} $ $ V_{rs.c}^{rs} $	right creditance in the contract of the contr	right creatistance $M_{\text{Fact.}}$ $ Vm1]$ $91.7$ $38.3.7$ $659.4$ $1.560$ $1.560$ right factor $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $1.560$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $1.799.2$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $1.04.8$ $1.04.8$ $3.05.16$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $2.66.4$ $1.33.2$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $2.61.4$ $3.03.16$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $2.66.4$ $1.33.2$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $2.66.4$ $1.33.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $104.8$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $1.33.2$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $1.33.2$ $1.799.2$ $1.799.2$ right croic $N_{\text{Fact.}}$ $N_{\text{Fact.}}$ $104.8$ $104.8$ $1.799.2$ $1.799.2$ right croic<	richt restance fiel restance fiel $\frac{W_{res}}{W_{res}}$ $\frac{Nm_{res}}{1}$	Steel failure. bolt anchor (material 3: A	(4-50) and screw (min. st	eel strength	A4-70) made of	stainless steel										
Ifery factor         Mean         I-1         1.56         2.58         Instruction	If the factorIf the bold and the factor $1.56$ $2.58$ $2.58$ Inc. bold anchor (material 3: A4-50) and screw (min. steel strength A4-80) made of stainless steel $1.793$ $1.799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ Inc. bold anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel $1.33$ $388.0$ $1799.2$ 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1.30       1.30       1.30       1.30       1.30       1.30       1.30       1.30       1.30       1.30       36.0       35.0       82.0       1.30 </td <td>Itery factor       <math>w_{e^{3}}</math>       [-]       <math>1.33</math> <math>1.33</math>         Ince of other national regulations, <math>^{20}</math> only available in GV (material 1 acc. to Annex 4)       <math>1.33</math> <math>1.33</math>         Ince of other national regulations, <math>^{20}</math> only available in GV (material 1 acc. to Annex 4)       <math>1.33</math> <math>1.33</math>         Image of the national regulations, <math>^{20}</math> only available in GV (material 1 acc. to Annex 4)       <math>1.33</math> <math>1.33</math>         Image of the national regulation in and uncracked concrete under following shear       <math>1.33</math> <math>2.3.0</math> <math>36.0</math> <math>52.0</math> <math>82.0</math> <math>120.0</math>         Iterm shear loading the displacements <math>\delta_{fe}</math> can be increased to 2.0 mm       <math>1.30</math> <math>2.3.0</math> <math>36.0</math> <math>52.0</math> <math>82.0</math> <math>1.20.0</math></td> <td>ifety factor       w.e.<sup>10</sup>       [-]       1.33       1.33         rice of other national regulations: <math>2^{0}</math> only available in GV (material 1 acc. to Annex 4)       1.33       1.33         i: Displacements under shear load:       iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii</td> <td>If the factor       Nue.<sup>1</sup>       [-]       1.33       1.33         The of other national regulations: <sup>20</sup> only available in CV (material 1 acc. to Annex 4)       1.33       1.33         The of other national regulations: <sup>20</sup> only available in CV (material 1 acc. to Annex 4)       1.33       1.33         Explorements under shear loads       Imm       M12       M16       M24       M30       M36         Items 5<sub>0.6</sub> to 1.5 mm for short tem loading in the reaction of tem shear loading the displacements 5<sub>0.4</sub> cam be increased to 2.0 mm       13.0       36.0       52.0       82.0       120.0</td> <td>Characteristic resistance</td> <td>MRK</td> <td>- 1</td> <td>104.8</td> <td>266.4</td> <td>519.3</td> <td>898.0</td> <td>1/99.2</td> <td></td> <td></td>	Itery factor $w_{e^{3}}$ [-] $1.33$ $1.33$ Ince of other national regulations, $^{20}$ only available in GV (material 1 acc. to Annex 4) $1.33$ $1.33$ Ince of other national regulations, $^{20}$ only available in GV (material 1 acc. to Annex 4) $1.33$ $1.33$ Image of the national regulations, $^{20}$ only available in GV (material 1 acc. to Annex 4) $1.33$ $1.33$ Image of the national regulation in and uncracked concrete under following shear $1.33$ $2.3.0$ $36.0$ $52.0$ $82.0$ $120.0$ Iterm shear loading the displacements $\delta_{fe}$ can be increased to 2.0 mm $1.30$ $2.3.0$ $36.0$ $52.0$ $82.0$ $1.20.0$	ifety factor       w.e. <sup>10</sup> [-]       1.33       1.33         rice of other national regulations: $2^{0}$ only 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						<sup>1)</sup> for long term shear loading the displa		eased to 2.0	mm											





### Page 19 of European technical approval ETA-13/0401 of 13 June 2013

English translation prepared by DIBt

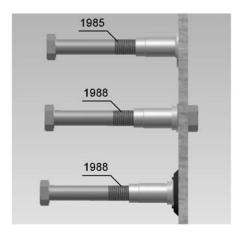


#### Installation instruction - part 1

1. Scope of delivery



2. Fixing of the anchor to the formwork



3. Pouring and compacting of concrete



- Selection of bolt anchor in accordance with the planning documents.
- 1a) DEMU Bolt anchor 1988 GV / FV / A4-50 / A4-80 or DEMU Bolt anchor 1985 GV
- 1b) Data clip for bolt anchor 1988 GV / FV, colour: grey;
  Data clip for bolt anchor 1988 A4-50, colour: white;
  Data clip for bolt anchor 1988 A4-80, colour: black.
  - 1) Attach data clip to the bolt anchor (this does not apply for type 1985).
  - Fix the anchor to the formwork with the help of DEMU assembly accessories (e. g. nailing plate) or alternatively by hexagon bolts.
    - → The inside of the threaded socket must be protected against ingress of dirt and water.
  - If necessary, supplementary reinforcement has to be placed according to the planning documents.
- 1) Pour concrete carefully, make sure the anchor stays in place!
- 2) Compact concrete carefully, avoid direct contact between compacting device and bolt anchor.
  - → The anchor must not be moved by force or damaged!

DEMU Bolt anchor

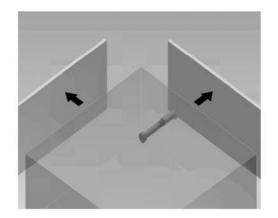
Installation instruction - part 1

English translation prepared by DIBt



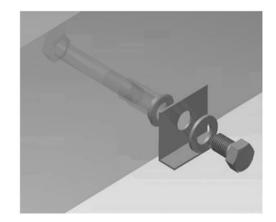
### Installation instruction - part 2

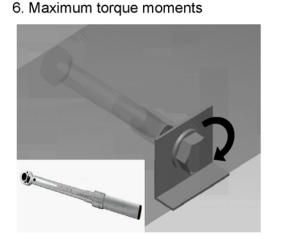
4. Hardening of the concrete, striking the formwork



- 1) Remove assembly accessories and formwork.
- Check if the inside of the threaded sleeve is free from dirt, otherwise clean it; further protection against ingress of water, dirt, etc. until required for use (e. g. by using DEMUsealing cap).

5. Mounting of fixture





- 1) Make sure that the concrete has reached its final strength.
- 2) Check the length of the required bolt.
  - → Maximum / minimum screw-in length according to Annex 6!
- 3) Mounting of the fixture

Γ

- → Use fixing components according to Annex 5, Table 5.
- → Maximum torque moments, see table below!
- → Take additionally care of assembly advices for the fixture.

Apply torque moment with the help of a torque wrench.  $T_{\text{inst}}$  must not be exceeded.

Maximum torque m	oment T <sub>in</sub>	st				
Thread	d	[mm]	M12	M16	M20	M24
Max. torque moment	max. T <sub>inst</sub>	[Nm]	≤ 10	≤ 30	≤ 50	≤ 90
Thread	d	[mm]	M30	M36	M42	
Max. torque moment	max. T <sub>inst</sub>	[Nm]	≤ 180	≤ 250	≤ 300	

#### DEMU Bolt anchor

Installation instruction - part 2