



European Technical Approval

ETA-04/0003

Handelsbezeichnung

Trade name

fischer Schwerlastanker TA M, TA M S, TA M T

fischer-Heavy-duty anchor TA M, TA M S, TA M T

Zulassungsinhaber

Holder of approval

fischerwerke

Artur Fischer GmbH & Co. KG

Weinhalde 14-18

72178 Waldachtal

DEUTSCHLAND

Zulassungsgegenstand und Verwendungszweck

Kraftkontrolliert spreizender Dübel aus galvanisch
verzinktem Stahl in den Größen M 6, M 8, M 10 und M 12
zur Verankerung im ungerissenen Beton

*Generic type and use
of construction product*

*Torque controlled expansion anchor made of galvanised steel of sizes
M 6, M 8, M 10 and M 12 for use in non-cracked concrete*

Geltungsdauer vom

*Validity from
bis
to*

13. Januar 2004

13. Januar 2009

Herstellwerk

Manufacturing plant

fischerwerke, Herstellwerk 1, Italien

Diese europäische
technische Zulassung umfasst
*This European Technical Approval
contains*

14 Seiten einschließlich 7 Anhänge
14 pages including 7 annexes

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 products¹, amended by the Council Directive 93/68/EEC of 22 July 1993²;
 - *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 1998³;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁴;
 - 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 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.
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- 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.

¹ Official Journal of the European Communities N° L 40, 11.02.1989, p. 12

² Official Journal of the European Communities N° L 220, 30.08.1993, p. 1

³ *Bundesgesetzblatt I*, p. 812, zuletzt geändert durch Gesetz ('last amended by law on') vom 15.12.2001, *Bundesgesetzblatt I*, p. 3762

⁴ Official Journal of the European Communities N° L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The fischer Heavy-duty anchor TA M, TA M S and TA M T in the range of M 6, M 8, M 10 and M 12 is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion with the hexagon head bolt.

The hexagon head bolt and the washer for anchor type TA M shall be purchased by the user. For the different types of the installed anchors 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 C20/25 at minimum and C50/60 at most according to EN 206-1: 2000-12. It may be anchored non-cracked concrete only.

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 corresponds to the drawings and provisions given in Annex 3. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annex 3 shall correspond to the respective values laid down in the technical documentation⁵ of this European Technical Approval.

The hexagon head bolt and the washer for anchor type TA M shall correspond to the specifications given in Annex 5, Table 4 and 5.

The characteristic anchor values for the design of anchorages are given in Annexes 4 to 7.

Each anchor is marked with the identifying mark of the producer included the commercial name, the drill hole diameter and the thread size according to Annex 2.

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

⁵ The technical documentation for 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 7.

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 plan⁶. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of materials such as cone-nut, washers 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:
 - cone-nut (diameter, length, angle of the cone, thread);
 - expansion sleeve and spacing sleeve (length, thickness);
 - hexagon head bolt (TA M S and TA M T only, well running, wrench size across flats);
 - washer (TA M S and TA M T only, diameter, thickness).
- Material properties:
 - cone-nut (tensile strength, hardness, coating);
 - expansion sleeve (tensile strength, yield limit);
 - hexagon head bolt (TA M S and TA M T only, strength test);
 - washer (TA M S and TA M T only, hardness)
- Thickness of the zinc plate
- Visual control of correct assemblage and of completeness of the anchor.

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.

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 plan⁶ 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.

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;

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.

- 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 7);
- 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).

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 compliance is ensured, if the expansion sleeve does not exceed the concrete surface.
- The hexagon head bolt and the washer for anchor type TA M correspond to the specifications given in Annex 5.
- 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 4 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.

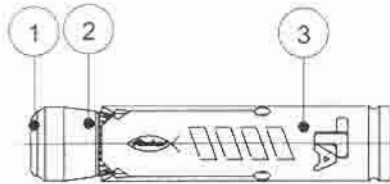
Prof. Dr.-Ing. Bossenmayer

Beglaubigt
Lange

Pre-positioned installation:

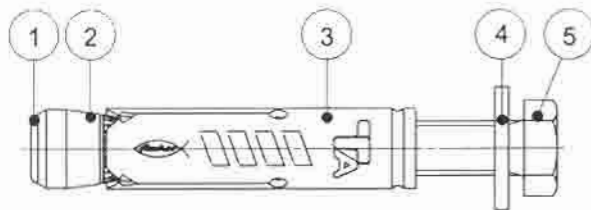
TA M

The hexagon head bolt and the washer according to table 4 and 5 must be purchased by the user



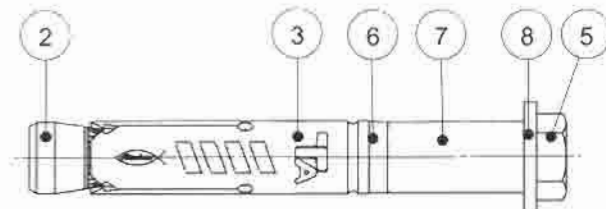
TA M S

The hexagon head bolt is provided by the manufacturer (fischer) together with the anchor

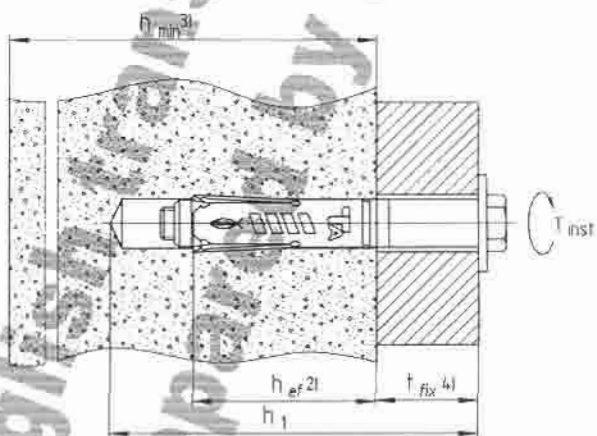
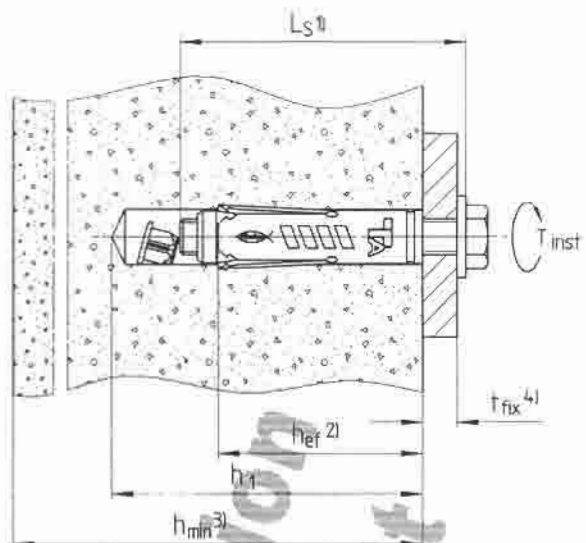


In-place installation:

TA M T

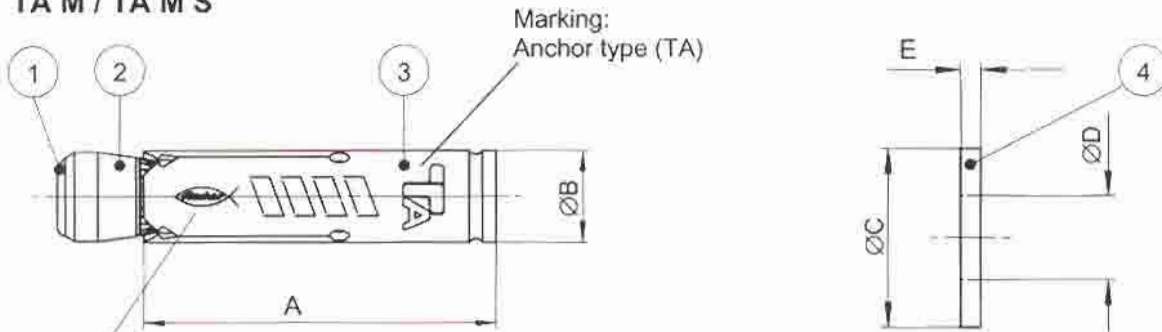


- ① Plastic cap (optional)
- ② Cone-nut
- ③ Expansion sleeve
- ④ Washer (TA M / TA M S)
- ⑤ Hexagon head bolt
- ⑥ Distance ring
- ⑦ Spacing sleeve
- ⑧ Washer (TA M T)



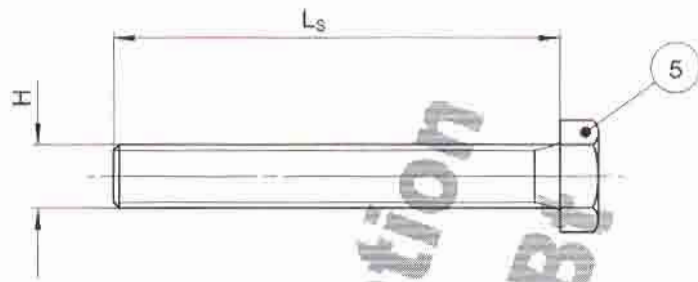
- ¹⁾ Length of hexagon head bolt L_s
- ²⁾ Effective anchorage depth h_{ef}
- ³⁾ Minimum thickness of concrete member h_{min}
- ⁴⁾ Thickness of fixture t_{fix}

TA M / TA M S

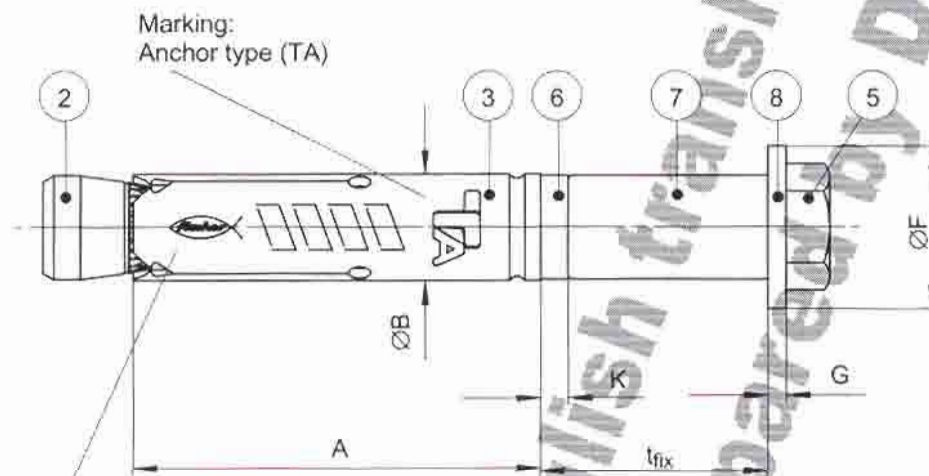


Marking:

- Producer ()
- Drill hole diameter (e.g. Ø 12)
- Thread size (e.g. M 8)



TA M T



Marking:

- Producer ()
- Drill hole diameter (e.g. Ø 12)
- Thread size (e.g. M 8)

Table 1: Anchor dimensions [mm]

Part	Designation	Type of anchor	Dimension	M6	M8	M10	M12
3	Expansion sleeve	TA M / TA M S / TA M T	A =	40	45	55	70
			Ø B =	9,6	11,8	14,5	17,5
4	Washer ¹⁾	TA M S	Ø C ≥	11,0	15,0	19,0	23,0
			E ≥	1,4	1,4	1,8	2,3
8	Washer	TA M T	Ø F ≥	17,0	21,0	25,0	30,0
			G ≥	1,4	1,8	2,3	2,7
5	Hexagon head bolt ²⁾	TA M S / TA M T	L _s ≥	t _{fix} +50	t _{fix} +55	t _{fix} +70	t _{fix} +85
			H	M6	M8	M10	M12
6	Distance ring	TA M T	K =	3,0	3,0	3,0	3,0

¹⁾ For specification - summary of washer for TA M see table 5

²⁾ For specification - summary of hexagon head bolt for TA M see table 4

Table 2: Materials

Part	Designation	Type of anchor	Materials	Treatment
1	Plastic cap ¹⁾	TA M / TA M S	Polyamid	
2	Cone-nut	TA M / TA M S / TA M T	Steel, EN 10 277	Zinc plated according to EN ISO 4042, min 5 µm, additional functional coating
3	Expansion sleeve	TA M / TA M S / TA M T	Cold-rolled steel EN 10139	Zinc plated according to EN ISO 4042, min 5 µm
4	Washer ²⁾	TA M S	Steel, min 140 HV	
8	Washer	TA M T		
5	Hexagon head bolt ³⁾	TA M S / TA M T	Steel, property class 8.8	
6	Distance ring	TA M T	Polyethylen	
7	Spacing sleeve	TA M T	Cold-rolled steel EN 10 139 / Steel EN10 277	Zinc plated according to EN ISO 4042, min 5 µm

¹⁾ Optional

²⁾ For specification - summary of washer for TA M see table 5

³⁾ For specification - summary of hexagon head bolt for TA M see table 4

fischer Heavy-duty anchor TA M / TA M S / TA M T

Anchor dimensions and materials

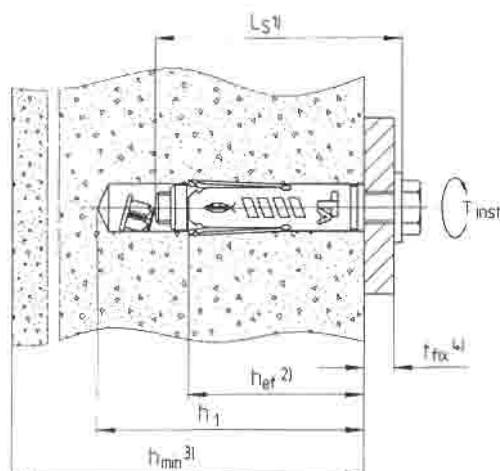
Annex 3

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Table 3: Installation parameters for TA M / TA M S / TA M T

Anchor size		M6	M8	M10	M12
Nominal drill hole diameter	$d_0 = [\text{mm}]$	10	12	15	18
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$	10,45	12,50	15,50	18,50
Length of hexagon head bolt	$L_s \geq [\text{mm}]$	$t_{\text{fix}} + 50$	$t_{\text{fix}} + 55$	$t_{\text{fix}} + 70$	$t_{\text{fix}} + 85$
Depth of drill hole (TA M / TA M S)	$h_1 \geq [\text{mm}]$	$L_s - t_{\text{fix}} + 15$	$L_s - t_{\text{fix}} + 15$	$L_s - t_{\text{fix}} + 20$	$L_s - t_{\text{fix}} + 20$
Depth of drill hole (TA M T)	$h_1 \geq [\text{mm}]$	$L_s + 10$			
Diameter of clearance hole in the fixture (TA M / TA M S)	$d_i \leq [\text{mm}]$	7	9	12	14
Diameter of clearance hole in the fixture (TA M T)	$d_i \leq [\text{mm}]$	12	14	18	20
Required torque moment	$T_{\text{inst}} = [\text{Nm}]$	10	20	40	75
Thickness of fixture - min	$t_{\text{fix,min}} \geq [\text{mm}]$	1	1	1	1
Thickness of fixture - max	$t_{\text{fix,max}} \leq [\text{mm}]$	150	200	250	300

TA M / TA M S:

- 1) Length of hexagon head bolt L_s
 2) Effective anchorage depth h_{ef}
 3) Minimum thickness of concrete member h_{min}
 4) Thickness of fixture t_{fix}

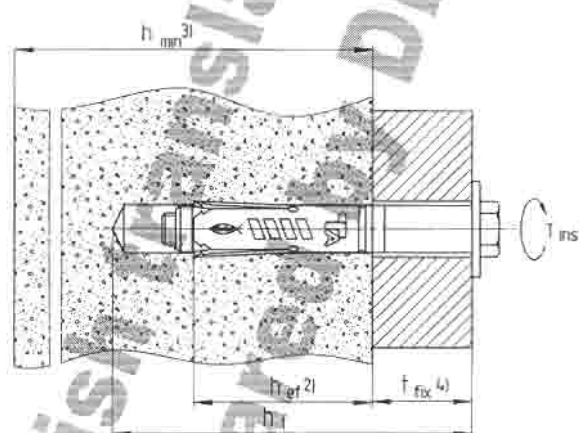
TA M T:

Table 4: Selection criteria for the hexagon head bolt (TA M)

Description	TA M6	TA M8	TA M10	TA M12
Length of hexagon head bolt L_s [mm]	$\geq t_{fix} + 50$	$\geq t_{fix} + 55$	$\geq t_{fix} + 70$	$\geq t_{fix} + 85$
Thread size	M6	M8	M10	M12
Standardisation	ISO 4014 / ISO 4017 or DIN 931 / DIN 933			
Material	Steel, property class 8.8			
Treatment	Zinc plated according to EN ISO 4042, min 5 μm			

Table 5: Selection criteria for the washer (TA M)

Description	TA M6	TA M8	TA M10	TA M12
Hole diameter D [mm]	min	6,0	8,0	10,0
	max	6,6	8,6	10,8
External diameter C [mm]	$\geq 11,0$	$\geq 15,0$	$\geq 19,0$	$\geq 23,0$
Thickness E [mm]	min	1,4	1,8	2,3
	max	3,0	4,0	5,0
Material	Steel, hardness class min 140 HV			
Treatment	Zinc plated according to EN ISO 4042, min 5 μm			

Table 6: Minimum thickness of concrete member, minimum spacings and minimum edge distances

Anchor size		M6	M8	M10	M12
Minimum thickness of concrete member	h_{min} [mm]	100	100	110	140
Minimum spacing	s_{min} [mm]	80	90	110	160
Minimum edge distance	c_{min} [mm]	50	60	70	120

fischer Heavy-duty anchor TA M / TA M S / TA M T

Selection criteria for hexagon head bolt and washer TA M,
minimum spacings and edge distances**Annex 5**of European
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Table 7: Characteristic values of resistance to tension loads of design method A

Anchor size			M6	M8	M10	M12
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	16,1	29,3	46,4	67,4
Partial safety factor	γ_{Ms}		1,5			
Pull-out failure						
Characteristic resistance in non-cracked concrete	$N_{Rk,p}$	C20/25 [kN]	7,5	12	20	25
Increasing factors for $N_{Rk,p}$ in non-cracked concrete	ψ_c	C30/37	1,22			
		C40/50	1,41			
		C50/60	1,55			
Partial safety factor	γ_{Mp}		1,8 ¹⁾			
Concrete cone failure and splitting failure						
Effective anchorage depth	h_{ef}	[mm]	40	45	55	70
Spacing (concrete failure)	$s_{cr,N}$	[mm]	120	135	220	210
Edge distance (concrete failure)	$c_{cr,N}$	[mm]	60	68	110	105
Spacing (splitting)	$s_{cr,sp}$	[mm]	120	180	330	420
Edge distance (splitting)	$c_{cr,sp}$	[mm]	60	90	165	210
Partial safety factor	γ_{Mo}		1,8 ¹⁾			

¹⁾ the partial safety factor $\gamma_2 = 1,0$ is included

Table 8: Displacements due to tension loads

Anchor size			M6	M8	M10	M12
Tension load in non-cracked concrete		[kN]	3,0	4,8	7,9	9,9
Displacements	δ_{N0}	[mm]	0,7	0,7	1,2	1,2
	$\delta_{N_{90}}$	[mm]	1,0	1,0	1,8	1,8

Table 9: Characteristic values of resistance to shear loads of design method A

Anchor size			M6	M8	M10	M12
Shear load without lever arm						
Characteristic resistance	$V_{Rk,s}$	[kN]	5,8	11,7	19,2	29,8
Partial safety factor	γ_{Ms}		1,25			
Shear load with lever arm						
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	12	30	60	105
Partial safety factor	γ_{Ms}		1,25			
Concrete pryout failure						
Factor in equation (5.6) of ETAG Annex C, 5.2.3.3	k		1,1	1,8	1,8	2,0
Partial safety factor	$\gamma_{Mc,p}$		1,8 ¹⁾			
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	40	45	55	70
Effective external diameter of anchor	d_{nom}	[mm]	10	12	15	18
Partial safety factor	γ_{Mc}		1,8 ¹⁾			

¹⁾ the partial safety factor $\gamma_2 = 1,0$ is included

Table 10: Displacements due to shear loads

Anchor size			M6	M8	M10	M12
Shear load in non-cracked concrete		[kN]	3,3	6,7	11,0	17,0
Displacements	δ_{V0}	[mm]	2,1	1,9	3,1	3,3
	$\delta_{V\infty}$	[mm]	3,1	2,8	4,6	4,9