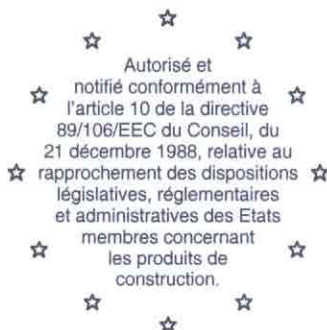


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European Technical Approval

ETA-02/0040

(English language translation, the original version is in French language)

Nom commercial :

Trade name:

Titulaire :

Holder of approval:

Type générique et utilisation prévue du
produit de construction :

**Generic type and use of
construction product:**

Validité du :
au :

Validity from / to:

Usine de fabrication :

Manufacturing plant:

Le présent Agrément technique européen
contient :

**This European Technical Approval
contains:**

fischer Eurobond with anchor rod A4

fischerwerke.

Artur Fischer GmbH & Co.KG

Otto-Hahn-Str. 15

D-79211 DENZLINGEN

DEUTSCHLAND

Cheville à scellement en acier inoxydable, pour fixation dans le béton
non fissuré : diamètres M8, M10, M12, M16, M20, M24, M27 et M30.

**Bonded anchor made of stainless steel for use in non
cracked concrete: sizes M8, M10, M12, M16, M20, M24, M27
and M30.**

01/10/2002

01/10/2007

fischerwerke, plant 1, Germany

fischerwerke, plant 2, Germany

14 pages incluant 5 annexes faisant partie intégrante du document.

**14 pages including 5 annexes which form an integral part of
the document.**



Organisation pour l'Agrément Technique Européen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment 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, modified by the Council Directive 93/68/EEC of 22 July 1993²;
 - Décret n° 92-647 du 8 juillet 1992³ concernant l'aptitude à l'usage des produits de construction;
 - 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 5 « Bonded anchors».
2. The Centre Scientifique et Technique du Bâtiment is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with 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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¹ Official Journal of the European Communities n° L 40, 11.2.1989, p. 12

² Official Journal of the European Communities n° L 220, 30.8.1993, p. 1

³ Journal officiel de la République française du 14 juillet 1992

⁴ Official Journal of the European Communities n° L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1. Definition of product

The fischer Eurobond with anchor rod A4 in the sizes M8 to M30 is a bonded anchor versions made of stainless steel, which is placed into a drilled hole previously filled with a capsule of resin, hardener and quartz sand or corundum. The threaded rod is driven into the capsule with a drilling machine. The rotation of the threaded rod allows the mixing of the different capsule elements.

For the installed anchor see Figure given in Annex 1.

1.2. Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences. Safety in case of fire (Essential Requirement 2) is not covered in this ETA. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C 20/25 at least to C50/60 at most according to ENV 206: 2000-12. It may be anchored in non-cracked concrete only.

The anchor may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The anchor may be installed in dry or wet concrete or in a flooded hole excepting sea water (use category 2) for diameters from M8 to M27, and only in dry or wet concrete for diameter M30 (use category 1).

Installation	Substrate		
	Dry concrete	Wet concrete	Flooded hole
M8 to M27	Yes	Yes	Yes
M30	Yes	Yes	No

All the diameters (i.e. from M8 to M30) may be used overhead.

The anchor may be used in the following temperature ranges :

Temperature range : -40°C to +80°C (max short term temperature +80°C and
max long term temperature +50°C)

Temperature range : -40°C to +120°C (max short term temperature +120°C and
max long term temperature +72°C)

The provisions made in this European Technical Approval are based on an assumed intended working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for

choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

2.1. Characteristics of product

The anchor in the sizes of M8 to M30 corresponds to the drawings and provisions given in Annexes 1 to 3. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 2 and 3 shall correspond to the respective values laid down in the technical documentation⁵ of this European Technical Approval. The characteristic anchor values for the design of anchorages are given in Annexes 4 and 5.

Each anchor is marked with the company label, the nominal diameter of the threaded part of the rod and the embedment depth according to the description given in annex 1. Each capsule is marked with the company label, the commercial name and the nominal diameter of the threaded rod.

The anchor shall only be packaged and supplied as a complete unit, capsules being packed separately from threaded rods, washers and nuts.

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 5 « Bonded anchors », on the basis of Option 8.

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 UE Construction Products Directive, these requirements need also to be complied with, when and where they apply.

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.

⁵ The technical documentation of this European Technical Approval is deposited at the Centre Scientifique et Technique du Bâtiment 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.

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. This 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 incoming materials such as nuts, washers, threaded rods, resin, hardeners... shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimension and determining material properties, e.g. tensile strength, surface finish.

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

- Dimensions of components:
Threaded rod (total length, nominal diameter, marking), washer (diameter, thickness), capsules (diameter, length, wall thickness, marking), nuts (diameter, good functioning).
- Material properties: Threaded rod (yielding and ultimate tensile strength), nuts (proof load), resin (composition, viscosity), hardener (composition, viscosity).
- Mass of materials included within the capsule.
- Thickness of the electroplated treatment of the elements if any.
- Visual control of completeness of the anchor.
- Visual control of the aspect of capsules.

The frequency of controls and tests conducted during production 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.

⁶ The prescribed test plan has been deposited at the Centre Scientifique et Technique du Bâtiment and is only made available to the approved bodies involved in the conformity attestation procedure.

The records shall be presented to the inspection body during the continuous surveillance. On request, they shall be presented to the Centre Scientifique et Technique du Bâtiment.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan 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 Centre Scientifique et Technique du Bâtiment 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 and the factory production control are suitable to ensure continuous and orderly manufacturing of the anchor according to the specifications mentioned in 2.1. as well as to the Annexes to the European Technical Approval.

3.2.2.3. Continuous surveillance

The approved body shall visit the factory at least once a year for regular inspection. 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 Centre Scientifique et Technique du Bâtiment. 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 the producer and manufacturing plant;
- the last two digits of the year in which the CE-marking was affixed;
- number of the EC certificate of conformity;
- number of the European Technical Approval;
- use category (ETAG 001-1 Option 8);
- 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 during inspection of the plant by the Centre Scientifique et Technique du Bâtiment and the approved body and laid down in the technical documentation.

4.2. Installation

4.2.1. Design of anchorages

The fitness of the anchors 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 bonded expansion anchors under the responsibility of an engineer experienced in anchorages and concrete work.

For the verifications given below according to annex C the following shall be observed :

- For the verification “concrete cone failure” (clause 5.2.2.4, Annex C of the ETAG, $N_{Rk,c}$ shall be determined according to (1) and (2) : the smaller of the values according to (1) and (2) is decisive.

(1) $N_{Rk,c}$ according to equation (5.2), annex C of the ETAG

where : $N_{Rk,c}^0$ according to Table 5 Annex 4

$s_{cr,N}$ and $c_{cr,N}$ according to Table 5 Annex 4

$\psi_{ucr,N} = 1,0$

(2) $N_{Rk,c} = 0,75 \times 15,5 \times h_{ef}^{1,5} \times f_{ck,cube}^{0,5}$

where : $N_{Rk,c}^0$ according to Table 5 Annex 4

$s_{cr,n} = 3 h_{ef}$ and $c_{cr,n} = 1,5 h_{ef}$

$\psi_{ucr,N} = 1,0$

- For the verification “splitting failure due to loading” (clause 5.2.2.6, Annex C of the ETAG), $N_{Rk,sp}$ shall be determined according to (3).

(3) $N_{Rk,sp}$ according to equation (5.3), Annex C of the ETAG

where : $N_{Rk,c}^0$ according to Table 5 Annex 4

$s_{cr,N}$ and $c_{cr,N}$ according to Table 5 Annex 4

$\psi_{ucr,N} = 1,0$ and $\psi_{h,sp} = 1,0$

- For the verification “concrete pryout failure” (clause 5.2.3.3, Annex C of the ETAG), $N_{Rk,c}$ for equation (5.6), Annex C of the ETAG shall be determined according to (1).

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 support, etc.).

4.2.2. Installation of anchors

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

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on 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 prepared for that purpose 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;
- check of concrete being well compacted, e.g. without significant voids;
- clearing the hole of drilling dust : the hole shall be cleaned by at least four blowing operations;
- anchor installation ensuring the specified embedment depth, that is the appropriate depth marking of the anchor not exceeding the concrete surface or embedment depth control;
- 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, at a smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not to the anchor in the direction of load application;
- capsule insertion into the drilled hole; connection of the anchor rod with the percussion drill and driving of the anchor rod into the drilled hole with appropriate percussion/rotary action of the drill, using some pressure until the marked line of the anchor rod is reached; during curing time, the temperature of concrete must not fall below -5°C.
- application of the torque moment given in Annex 3 using a calibrated torque wrench.

4.2.3. Responsibility of the manufacturer

It is the manufacturer's responsibility to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to in 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 installation depth,
- required torque moment,
- admissible service temperature range,
- curing time of the bonding material depending on the installation temperature,
- 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.

5 Recommendations concerning packaging, transport and storage.

The packaging of capsules in corrugated cardboards is intended to prevent them from knocking against one another and breaking in case of light impacts due normal handling.

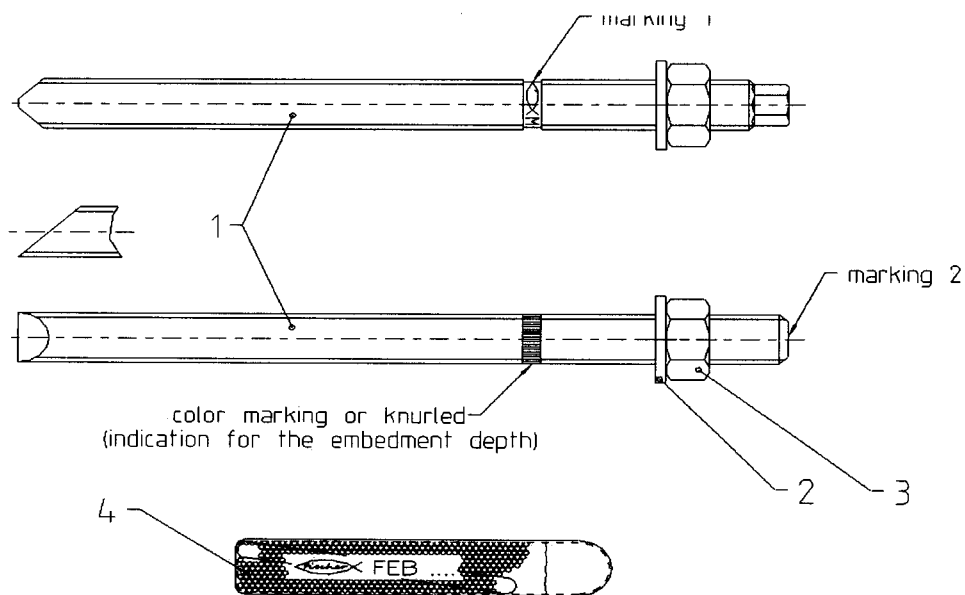
To preserve the product characteristics, capsules shall be stocked sheltered from the UV light and within a range of temperatures between +5°C and +25°C. All the data concerning storage shall appear clearly on the packaging.

The installation data appearing on the capsules packaging shall indicate that the capsules can be used only with the corresponding threaded rods of the manufacturer and vice versa.

The original French version is signed by

**Le Directeur Technique
J.-D. MERLET**

Assembled anchor and schema of the anchor in use :



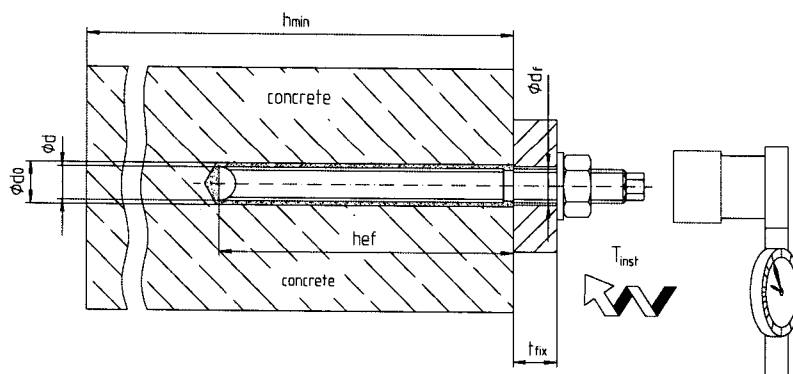
1) threaded rod 2) washer 3) hexagonal nut 4) capsule

Marking 1
or 2 :

 { M16 E A4 (stainless steel)

Nominal diameter

extra dimension



fischer Eurobond with anchor rod A4

Product and intended use

Annex 1

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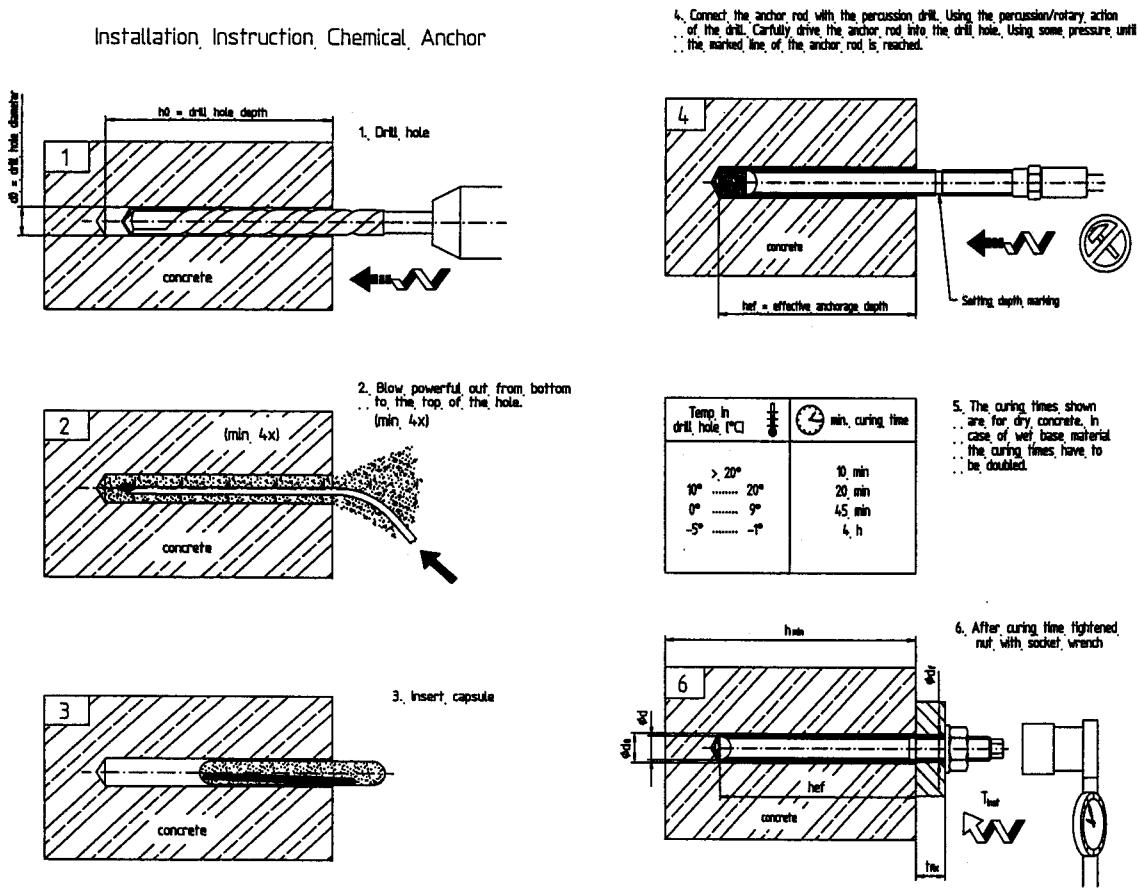
Table 1 : Materials

	Size	Production	Material and EN/ISO reference
Threaded rod	M8, M10, M12, M16, M20, M24, M27, M30	Cold formed or machined	1.4401 / 1.4571 DIN EN ISO 3506 Class 70
Nut	-	-	Steel, DIN EN ISO 3506 Class A4-70
Washer	-	-	Steel DIN EN 10088

In all versions, capsule with vinylester resin (without styrene), hardener and quartz sand.

Version M8 : capsule with vinylester resin (without styrene), hardener and corundum.

Installation Instruction Chemical Anchor



fischer Eurobond with anchor rod A4

Materials and setting process

Annex 2

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Table 2: Dimensions

Size	Threaded rod			Capsule	
	Ød [mm]	t (1) [mm]	minL (2) * [mm]	Ød _c (3) [mm]	L _c (4) [mm]
M8	8	80	90	9	85
M10	10	90	100	10,5	90
M12	12	110	130	12,5	97
M16	16	125	150	16,5	95
M16E	16	190	215	16,5	120
M20	20	170	195	23	160
M20E	20	240	290	23	215
M24	24	210	240	23	190
M24E	24	290	320	23	255
M27	27	250	280	27,5	210
M30	30	280	315	27,5	260

* different lengths are possible

(1) embedment depth (2) minimum length of the threaded rod (3) nominal diameter (4) capsule length

Table 3: Installation data

Threaded steel	Ød ₀ nominal diameter of the drill bit [mm]	h ₀ depth of the hole [mm]	h _{ef} effective anchoring depth [mm]	T _{inst} Tightening torque [Nm]	h _{min} minimum thickness of the concrete slab [mm]	d _f clearance hole in the fixture [mm]
M8	10	80	80	10	110	9
M10	12	90	90	20	120	12
M12	14	110	110	40	150	14
M16	18	125	125	60	160	18
M16E	18	190	190	60	250	18
M20	25	170	170	120	220	22
M20E	25	240	240	120	300	22
M24	28	210	210	150	300	26
M24E	28	290	290	150	350	26
M27	32	250	250	200	350	30
M30	35	280	280	300	350	33

Table 4 : Minimum spacing and edge distances

			M8	M10	M12	M16	M16 E	M20	M20 E	M24	M24 E	M27	M30
Minimum spacing	S _{min}	mm	40	45	55	65	95	85	120	105	145	125	140
Minimum edge distance	C _{min}	mm	40	45	55	65	95	85	120	105	145	125	140

fischer Eurobond with anchor rod A4

Installation data

Annex 3

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

			M8	M10	M12	M16	M16 E	M20	M20 E	M24	M24 E	M27	M30
Steel failure													
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	59	110	110	171	171	247	247	321	393
Partial safety factor	γ_{Ms}	-	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87
Bond failure in non-cracked concrete C20/25 to C50/60													
Characteristic resistance* T = - 40°C to + 80°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	16	20	30	50	75	75	95	95	140	140	170
Characteristic resistance* T = - 40°C to + 120°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	12	20	30	40	60	60	95	95	115	115	140
Partial safety factor	γ_{Mp}	-	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16
Concrete cone failure and splitting failure													
Effective anchorage depth	h_{ef}	[mm]	80	90	110	125	190	170	240	210	290	250	280
Partial safety factor	$\gamma_{Mc} = \gamma_{M,sp}$	-	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16	2,16
Spacing	$s_{cr,N}$	[mm]	160	180	220	250	380	340	480	420	580	500	560
	$s_{cr,sp}$	[mm]	180	200	240	280	420	370	530	460	640	550	620
Edge distance	$c_{cr,N}$	[mm]	80	90	110	125	190	170	240	210	290	250	280
	$c_{cr,sp}$	[mm]	90	100	120	140	210	185	265	230	320	275	310

* according to equation (6.19) ETAG 001 part 5

Table 6: Characteristic displacements under axial tension loads

Characteristic displacement in non-cracked C 20/25 concrete		M8	M10	M12	M16	M16 E	M20	M20 E	M24	M24 E	M27	M30
Admissible service load :N	[kN]	4	6,6	9,9	16,5	24,8	24,8	31,4	31,4	46,3	46,3	56,2
δ_{N0} short term	[mm]	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,4	0,3	0,4
$\delta_{N\infty}$ long term	[mm]	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,4	0,4	0,4

fischer Eurobond with anchor rod A4**Characteristic resistance and displacements under tension loads – design method A****Annex 4**of European
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Table 7: Characteristic values of resistance to shear loads of design method A

			M8	M10	M12	M16	M16 E	M20	M20 E	M24	M24 E	M27	M30
Steel failure													
Characteristic resistance	$V_{Rk,s}$	[kN]	12,8	20,3	29,5	55,0	55,0	85,8	85,8	123	123	160	196
Partial safety factor	γ_{Ms}	-	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56
Steel failure with lever arm													
Characteristic resistance	$M_{Rk,s}$	[N.m]	26	52	92	233	233	454	454	786	786	1165	1574
Partial safety factor	γ_{Ms}	-	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56	1,56
Pry out failure :													
Factor in equation (5.6)	k	-	2	2	2	2	2	2	2	2	2	2	2
Partial safety factor	γ_{Mp}	-	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
Concrete edge failure :													
Effective length of anchor under shear loading	l _f	[mm]	80	90	110	125	190	170	240	210	290	250	280
Outside diameter of anchor	d _{nom}	[mm]	10	12	14	18	18	25	25	28	28	32	35
Partial safety factor	γ_{Mc}	-	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80

Table 8: Characteristic displacements under shear loads

Characteristic displacement in non-cracked C 20/25 concrete		M8	M10	M12	M16	M16 E	M20	M20 E	M24	M24 E	M27	M30
Admissible service load : V	[kN]	3,5	7,1	9,0	19,2	19,2	28,3	28,3	37,7	37,7	51,0	69,5
δ_{N0} short term	[mm]	1,6	1,6	1,7	1,7	1,7	1,9	1,9	2,0	2,0	2,1	2,2
$\delta_{N\infty}$ long term	[mm]	2,4	2,4	2,5	2,6	2,6	2,8	2,8	3,0	3,0	3,2	3,3

fischer Eurobond with anchor rod A4

Characteristic resistances and displacements
under shear loads – design method A

Annex 5

of European
Technical Approval
ETA-02/0040