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Autorisé et notifié conformément à l'article 10 de la directive 89/106/EEC du Conseil, du 21 décembre 1988, relative au rapprochement des dispositions législatives, réglementaires et administratives des Etats membres concernant les produits de construction.

CSTB le futur en construction

MEMBRE DE L'EOTA

European Technical Approval ETA-05/0111

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

Nom commercial : **Trade name:**	**SPIT EPOMAX**
Titulaire : **Holder of approval:**	**Société SPIT** **Route de Lyon** **F-26501 BOURG-LES-VALENCE** **France**
Type générique et utilisation prévue du produit de construction : **Generic type and use of construction product:**	Cheville à scellement de type "à injection" avec tige d'ancrage diamètres M8, M10, M12, M16, M20, M24 et M30 ou douille taraudée diamètres M8, M10, M12, M16, M20, en acier galvanisé pour fixation dans le béton non fissuré. **Bonded injection type anchor with anchor rod sizes M8, M10, M12, M16, M20, M24 and M30 or internal sleeve sizes M8, M10, M12, M16 and M20, made of galvanised steel for use in non cracked concrete.**
Validité du : au : **Validity from / to:**	**05/06/2007** **05/06/2012**
Usine de fabrication : **Manufacturing plant:**	**Société SPIT** **Route de Lyon** **F-26501 BOURG-LES-VALENCE** **France**
Le présent Agrément technique européen contient : **This European Technical Approval contains:**	23 pages incluant 13 annexes faisant partie intégrante du document. **23 pages including 13 annexes which form an integral part of the document.**

This European Technical Approval replaces ETA-05/0111 with validity from 01/06/2005 au 31/05/2010

Cet Agrément Technique Européen remplace l'Agrément ETA-05/0111 valide du 01/06/2005 au 31/05/2010

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 products[1], modified by the Council Directive 93/68/EEC of 22 July 1993[2];

– Décret n° 92-647 du 8 juillet 1992[3] 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/EC[4];

– Guideline for European Technical Approval of « Metal Anchors for use in Concrete » ETAG 001, edition 1997, Part 1 « Anchors in general » and Part 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.

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

4. This European Technical Approval may be withdrawn by the Centre Scientifique et Technique du Bâtiment pursuant to Article 5 (1) of the Council Directive 89/106/EEC.

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

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

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1 Official Journal of the European Communities n° L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities n° L 220, 30.8.1993, p. 1
3 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 SPIT EPOMAX with anchor rod or internal sleeve is a bonded anchor (injection type) made of galvanised steel, which is placed into a drilled hole previously injected with a two components injection mortar using an applicator gun equipped with a special mixing nozzle. The anchor rod, or internally threaded sleeve is inserted into the resin with a slow and slight twisting motion. The anchor rod is available with a helical end (M8 to M16), with a one side 45° chamfer (M8 to M30) and with a two sides 45° chamfer (M8 to M30). The internal sleeve is available in the diameter M8 to M20. The mortar cartridges are available in different sizes (150 ml to 825 ml) and system (coaxial or side by side). The anchor rod is intended to be used with embedment depth from 8 diameters to 12 diameters.

For the installed anchor see Figure given in Annex 2.

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 only be used in concrete subject to dry internal conditions.

The anchor may be installed in dry or wet concrete or in flooded holes excepting sea water (use category 2) for all diameters.

Installation	Substrate		
	Dry concrete	Wet concrete	Flooded hole
All diameters	Yes	Yes	Yes

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 +40°C (max short term temperature +40°C and max long term temperature +24°C)

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 rods in the sizes of M8 to M30, the internal sleeves and the mortar cartridges correspond 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 4 to 7 shall correspond to the respective values laid down in the technical documentation[5] of this European Technical Approval. The characteristic anchor values for the design of anchorages are given in Annexes 8 to 13.

Each mortar cartridge is marked with the identifying mark of the producer, the trade name, the charge code, storage life, curing and processing time. Each internal sleeve is marked on the cap with the letter S (company label) and the nominal diameter. Each anchor rod with helical end is marked with the letter S (company label), the nominal diameter of the threaded part of the rod and thickness of the fixture according to the description given in annex 1. Alternatively, commercial standard threaded rods can be used. If the threaded rods are supplied separately by another party than the approval holder, then it shall be ensured:

- Mechanical properties according to EN ISO 898-1

- Quality affirmation of the mechanical properties with an inspection document according to EN 10204

- Marking of the threaded rod with the identifying mark of the producer of the rod and the envisage embedment depth.

The two components of the SPIT injection mortar EPOMAX could be delivered in unmixed condition in mortar cartridges in a size of 150 ml, 200 ml, 300 ml and 380 ml in case of coaxial cartridges, 345 ml and 825 ml in case of side by side cartridges according to Annex 3.

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 7.

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.

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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.

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. 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 plan[6]. 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), resin (fill quantity, fill weight), hardener (fill quantity, fill weight) nuts (diameter, good functioning).

- Material properties: Threaded rod (yielding and ultimate tensile strength), nuts (proof load), resin (composition, viscosity), hardener (composition, viscosity).

- Thickness of the electroplated treatment of the elements.

- Visual control of completeness of the anchor.

[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.

– Visual control of the aspect of cartridges

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.

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 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 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 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 : $N^0_{Rk,c}$ according to Table 7b Annex 10

$s_{cr,N}$ and $c_{cr,N}$ according to Table 7d Annex 11

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

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

where : $N^0_{Rk,c} = 0,75 \times 15,5 \times h_{ef}^{1,5} \times f_{ck,cube}^{0,5}$

$s_{cr,n} = 3\ h_{ef}$ 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 : $N^0_{Rk,c}$ according to Table 7b Annex 10

$s_{cr,sp}$ and $c_{cr,sp}$ according to Table 7d Annex 11

$\psi_{ucr,N} = 1,0$ 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 using the tools indicated in the technical documentation of this European Technical Approval;

– 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;

– keeping the effective anchorage depth;

– 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 drill hole: the drill hole shall be filled with mortar;

– Cleaning of the hole: Standard cleaning

– cleaning the hole of drilling dust : the hole shall be cleaned by at least four blowing operations with hand pump, by at least four manual brushing operations followed again by at least four blowing operations; before brushing cleaning the brush and checking whether the brush diameter according to Annex 5 Table 2 is sufficient;

– Cleaning of the hole: Premium cleaning

– cleaning the hole of drilling dust : the hole shall be cleaned by at least two blowing operations with compressed air & an air pistol, by at least two mechanical brushing operations followed again by at two blowing operations; before brushing cleaning the brush and checking whether the brush diameter according to Annex 5 Table 2 is sufficient;

– anchor installation ensuring the specified embedment depth, that is the appropriate depth marking of the anchor not exceeding the concrete surface;

– mortar injection by using the equipment including the special mixing nozzle shown in Annex 3; discarding the first swings of mortar of each new cartridge until an homogeneous colour is achieved; taking from the manufacturer instruction the admissible processing time (open time) of a cartridge as a function of the ambient temperature of the concrete; filling the drill hole uniformly from the drill hole bottom, in order to avoid entrapment of air; removing the special mixing nozzle slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to ½ of the drill hole; inserting immediately the anchor rod or threaded rod, slowly and with a slight twisting motion, removing excess of injection mortar around the rod; observing the curing time according to Annex 5 table 2 until the rod may be loaded; during curing of the injection mortar the temperature of the concrete must not fall below 0°C;

– application of the torque moment given in Annex 8 Tables 4 and 5 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.

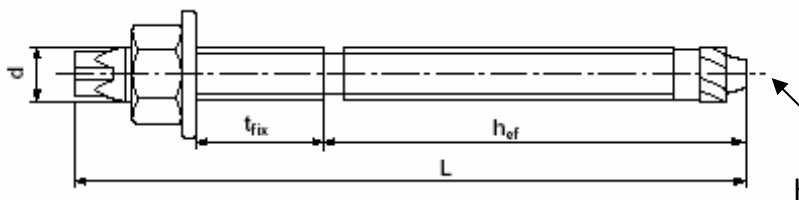
The mortar cartridges shall be protected against sun radiation and shall be stored according to the manufacturer's installation instructions in dry conditions at temperatures of at least 0°C to not more than +35°C.

Mortar cartridges with expired shelf life must no longer be used.

The original French version is signed by

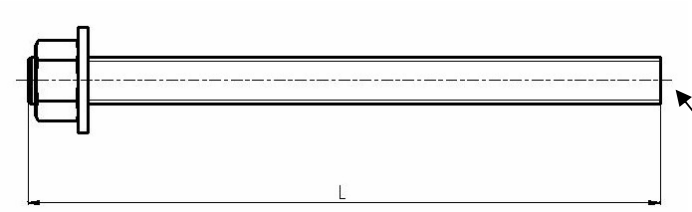
Le Directeur Technique
H. BERRIER

Assembled anchor:

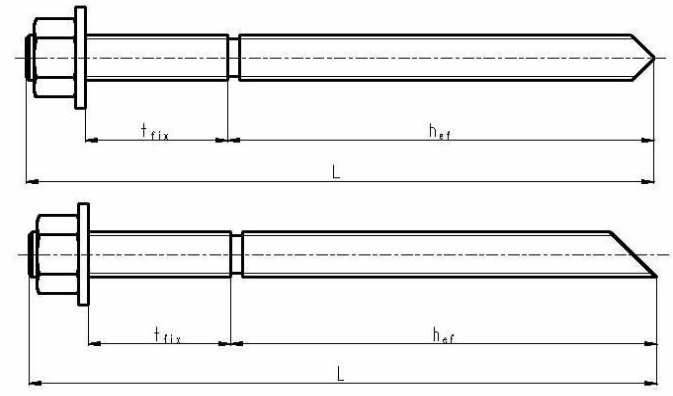


Helical end

"S"anchor rod



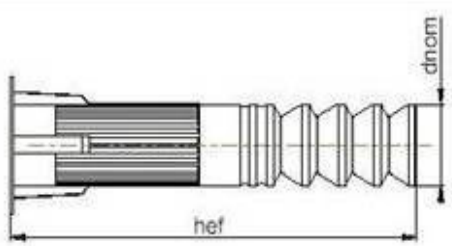
Commercial standard threaded rods with identifying mark of the producer and embedment depth :
Galvanised carbon steel grade 5.8 to 10.9



One side and two sides 45° chamfer

threaded rod

Marking on the anchor rod: letter S, bolt diameter and maximum thickness of the fixture :
Ex: S M10 / 20

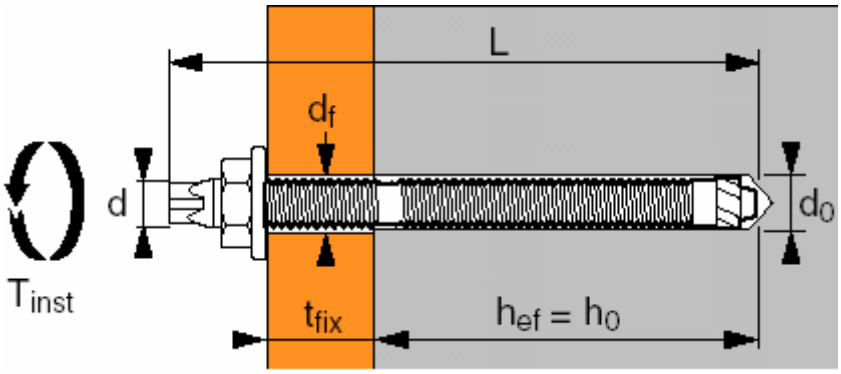


ATP internal sleeve

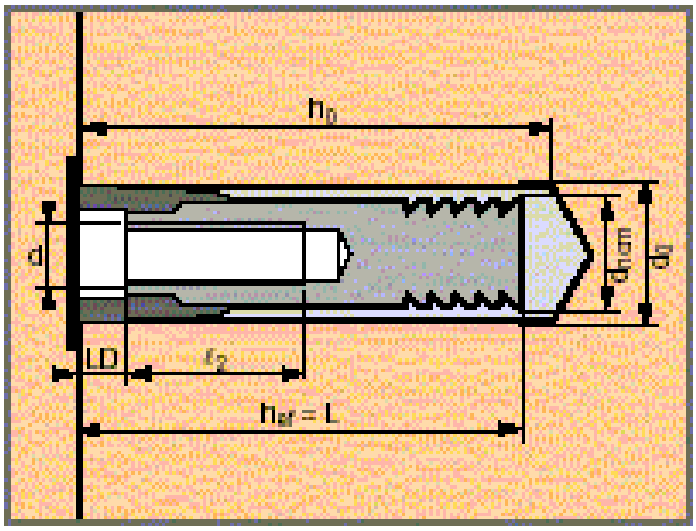
Marking on the internal threaded sleeve: letter S, bolt diameter + White plastic cap:
Ex: S M12

SPIT EPOMAX	**Annex 1** **of European Technical Approval** **ETA-05/0111**
Product and intended use	

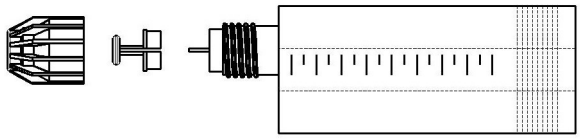
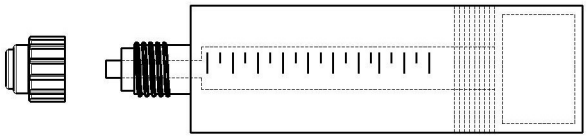
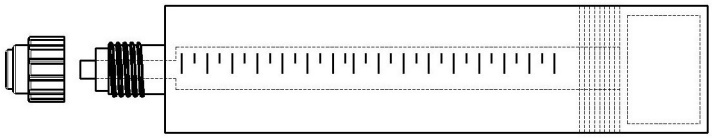
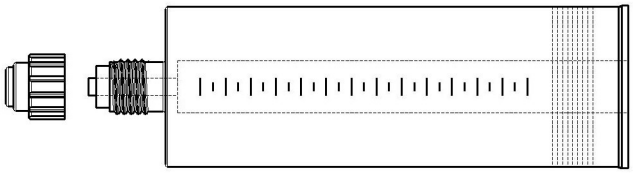
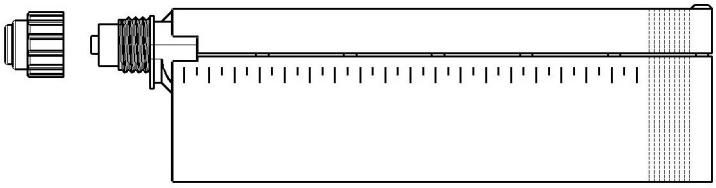
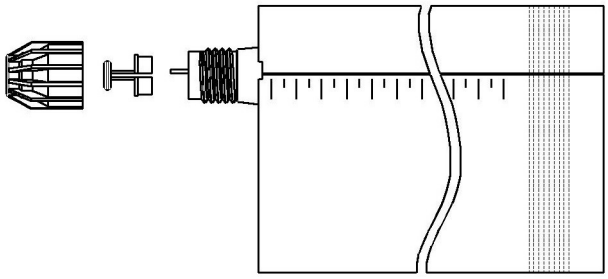
Threaded rod: Schema of the anchor in use



ATP internal sleeves: Schema of the anchor in use



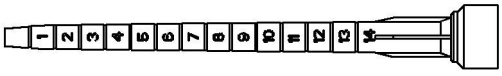
SPIT EPOMAX	**Annex 2** **of European Technical Approval** **ETA-05/0111**
Product and intended use	

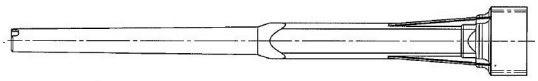
150ml coaxial cartridge	
200ml coaxial cartridge	
300ml coaxial cartridge	
380ml coaxial cartridge	
345 ml side by side cartridge	
825 ml side by side cartridge	

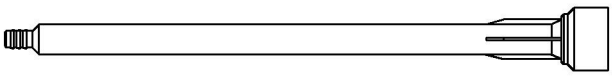
Marking of the mortar cartridges :

- Identifying mark of the producer
- Trade name
- Charge code number
- Storage life
- Curing and processing time

Special mixing nozzles







SPIT EPOMAX	**Annex 3** **of European Technical Approval** **ETA-05/0111**
Mortar cartridges	

Table 1: Materials

	Size	Material and EN/ISO reference	Coating
Injection mortar with styrenefree vinylester resin, hardener and inorganic agents			
Threaded rod	M8 to M30 (standard commercial rods)	Carbon steel grade 5.8; 8.8 and 10.9 according to ISO 898	Zinc coating 5µm min. NF E25-009
	M8 to M16 (produced by the manufacturer)	M8 : DIN 1654 part 2 or 4, cold formed steel or NFA 35053, cold formed steel. M10 to M16 : NFA 35053 cold formed steel	
	M20 to M30 (produced by the manufacturer)	11SMnPb37 : NF A35-561	
ATP Internal Sleeves	M8 to M20	Carbon steel 11SMnPb30	
Nut	-	Steel, EN 20898-2 Grade 6 or 8	
Washer	-	Steel DIN 513	

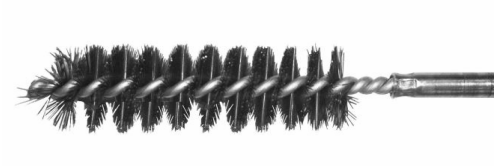
Table 2 : Cleaning method and minimum curing time

	Standard cleaning	**Premium cleaning**
Nominal diameter	All diameters	All diameters
Cleaning method	4 blows+ 4 brushing operation + 4 blows **Blowing operation:** using a hand pomp, blow 4 times. **Brushing operation:** using the relevant brush, starting from the top of the hole, move downward to the bottom of the hole then move upward to the top of the hole.	2 blows+ 2 brushing operation + 2 blows **Blowing operation:** using oil free compressed air (mini 6 bars), starting from the bottom of the hole, move upward until no dust is evacuated. **Brushing operation:** using the relevant brush fitted on a SPIT drilling machine, starting from the top of the hole, move downward to the bottom of the hole (duration 5s) then move upward to the top of the hole (duration 5s)

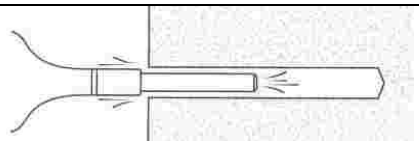
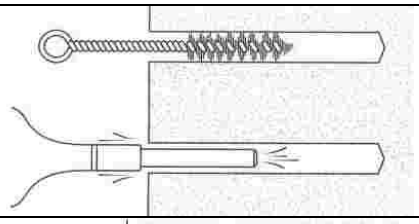
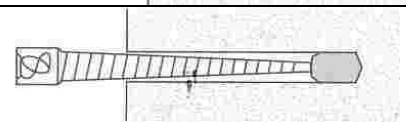
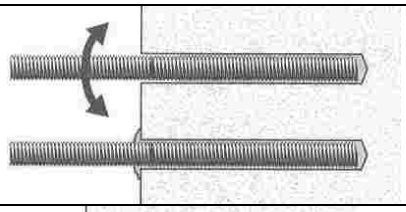
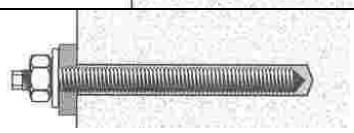
	Threaded rods							ATP internal sleeves				
Anchor size	M8	M10	M12	M16	M20	M24	M30	M8	M10	M12	M16	M20
Brush diameter [mm]	11	13	15	20	26	30	37	15	22	26	30	37

Ambient temperature	0°C	5°C	10°C	20°C	30°C	40°C
Processing time	22mn	17mn	11mn	6mn	3mn	1mn
Curing time in dry concrete	210mn	120mn	60mn	40mn	35mn	30mn
Curing time in wet concrete	420mn	240mn	120mn	80mn	70mn	60mn

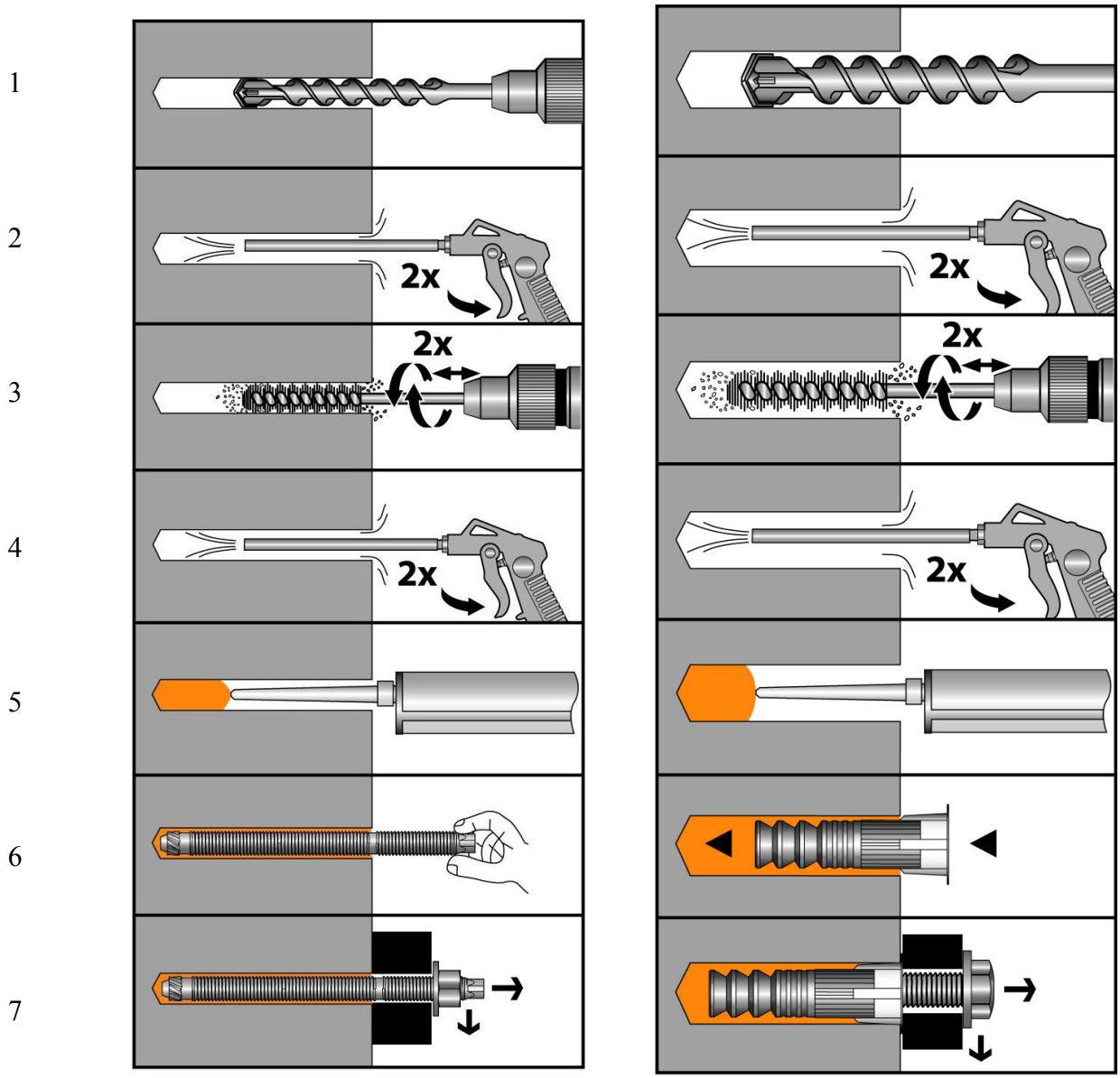
Brush for cleaning the drill hole



SPIT EPOMAX	**Annex 5** **of European Technical Approval** **ETA-05/0111**
Cleaning methods	

	Drill a hole to the correct diameter and depth using a rotary percussive machine. Starting from the drill hole base blow out at least 4 times with the SPIT hand pomp. For the hole diameter 10mm a reduction ϕ 6mm must be clamped on the air pump nozzle.
	Using the specified brush, brush out 4 times mechanically Starting from the drill hole base, blow out at least 4 times with the hand pomp
	Dispense the first part to waste until an even colour is achieved (≈ 20cm). Insert the nozzle to the far end of the hole, and inject the resin, withdrawing the nozzle as the hole fills. Fill the hole at 50%.
	Immediately insert the fixing, slowly and with a slight twisting motion. Remove excess resin from around the mouth of the hole before it sets
	Leaver the fixing undisturbed until the cure time has elapse. Attach the fixture and tighten the nut at the required torque.

SPIT EPOMAX	**Annex 6** **of European Technical Approval** **ETA-05/0111**
Instruction For Use: Standard cleaning	



1. Drill a hole to the correct diameter and depth using a rotary percussive machine.
2. Starting from the drill hole base blow out at least 2 times using oil free compressed air.
3. using the relevant brush fitted on a SPIT drilling machine, starting from the top of the hole, move downward to the bottom of the hole (duration 5s) then move upward to the top of the hole (duration 5s)
4. Starting from the drill hole base blow out at least 2 times using oil free compressed air.
5. Dispense the first part to waste until an even colour is achieved (≈ 20cm). Insert the nozzle to the far end of the hole, and inject the resin, withdrawing the nozzle as the hole fills. Fill the hole at 50%.
6. Immediately insert the fixing, slowly and with a slight twisting motion. Remove excess resin from around the mouth of the hole before it sets
7. Leave the fixing undisturbed until the cure time has elapse. Attach the fixture and tighten the nut at the required torque.

SPIT EPOMAX	**Annex 7** **of European Technical Approval** **ETA-05/0111**
Instruction For Use: Premium cleaning	

Table 3: Dimensions for threaded rods

M	D	L	Standard		Minimum		Maximum	
			$h_{ef,std}$	$t_{fix\ max}$*	$h_{ef,min}$	$t_{fix\ max}$*	$h_{ef,max}$	$t_{fix\ max}$*
M8	8	110	80	15	64	30	95	-
M10	10	130	90	20	80	30	120	-
M12	12	160	110	25	96	40	144	-
M16	16	190	125	35	128	32	192	-
M20	20	260	170	65	160	75	220	-
M24	24	300	210	63	192	80	280	-
M30	30	380	280	70	240	110	330	-

* maximum thickness of the fixture only in the case of the specific "S" anchor rod with helical end.

Table 4: Installation data with standard, minimum and maximum embedment depth for threaded rods

Nominal diameter	Ø d_0 Nominal diameter of the drill bit	d_f Clearance hole in the fixture	h_0 depth of the hole			h_{ef} effective anchoring depth			T_{inst} Tightening torque	h_{min} minimum thickness of the concrete slab		
			std	min	max	std	min	max		std	min	max
	[mm]	[mm]	[mm]			[mm]			[N.m]	[mm]		
M8	10	9	80	64	95	80	64	95	10	110	100	125
M10	12	12	90	80	120	90	80	120	20	120	110	150
M12	14	14	110	96	144	110	96	144	30	140	125	175
M16	18	18	125	128	192	125	128	192	60	160	165	230
M20	25	22	170	160	220	170	160	220	120	220	210	270
M24	28	26	210	192	280	210	192	280	200	265	250	335
M30	35	33	280	240	330	280	240	330	400	350	310	400

Table 5: Installation data with standard for ATP internal sleeves

Designation	Diameter anchor mm	Length of the thread mm	Length of the anchor mm	Drilling diameter mm	Depth of the hole mm	Minimum thickness of the concrete slab mm	Torque moment N.m
ATP M8X60	12	25	60	14	65	100	15
ATP M10X65	16	32	65	20	70	100	30
ATP M12X75	20	38	75	24	80	125	70
ATP M16X125	22	50	125	28	130	180	120
ATP M20X170	28	63	170	35	175	240	200

Table 6 : Minimum spacing and edge distances

			Threaded rods							ATP internal sleeves				
			M8	M10	M12	M16	M20	M24	M30	M8	M10	M12	M16	M20
Minimum spacing	s_{min}	mm	40	45	55	65	85	105	140	40	45	55	65	85
Minimum edge distance	c_{min}	mm	40	45	55	65	85	105	140	40	45	55	65	85

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Installation data

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Table 7A: Characteristic values of resistance to tension loads of design method A In case of steel failure

			M8	M10	M12	M16	M20	M24	M30
Steel failure with "S" anchor rod									
Characteristic resistance	$N_{Rk,s}$	[kN]	22	35	51	94	118	170	272
Partial safety factor	γ_{Ms}	-	1,71				1,49		
Steel failure with standard threaded rod grade 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18	29	42	78	122	177	280
Partial safety factor	γ_{Ms}	-	1,50						
Steel failure with standard threaded rod grade 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	449
Partial safety factor	γ_{Ms}	-	1,50						
Steel failure with standard threaded rod grade 10.9									
Characteristic resistance	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	561
Partial safety factor	γ_{Ms}	-	1,40						
Steel failure with ATP internal sleeve + screw grade 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18	29	42	78	122	-	-
Partial safety factor	γ_{Ms}	-	1.50					-	-
Steel failure with ATP internal sleeve + screw grade 6.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	22	35	51	94	147	-	-
Partial safety factor	γ_{Ms}	-	1.50					-	-
Steel failure with ATP internal sleeve + screw grade 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	110	183	-	-
Partial safety factor	γ_{Ms}	-	1.50					-	-

SPIT EPOMAX	**Annex 9 of European Technical Approval ETA-05/0111**
Characteristic resistance under tension loads – Design method A	

Table 7B: Characteristic values of resistance to tension loads of design method A In case of pull-out failure and concrete cone failure

Pullout and concrete cone failure in non-cracked concrete C20/25									
Threaded rod h_{ef} min		*[mm]*	*64*	*80*	*96*	*128*	*160*	*192*	*240*
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	16	25	40	50	60	95	115
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	12	20	30	40	50	75	95
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	9	16	25	35	40	60	75
Threaded rod h_{ef} std*		*[mm]*	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	20	30	40	50	75	95	140
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	16	25	35	40	60	75	115
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	12	20	25	30	45	60	75
Threaded rod h_{ef} max		*[mm]*	*95*	*120*	*144*	*192*	*220*	*280*	*330*
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	25	40	60	75	95	140	170
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	20	30	40	50	75	115	140
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	16	25	35	50	60	75	95
ATP internal sleeves		*[mm]*	*60*	*65*	*75*	*125*	*170*	-	-
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	16	20	30	60	95	-	-
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	12	16	25	50	75	-	-
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	9	12	20	35	60	-	-
Increasing and partial safety factors									
Increasing factor	C30/37	ψ_c	-	1,14					
Increasing factor	C40/50			1,26					
Increasing factor	C50/60			1,34					

Table 7C: Partial safety factors

Type of element	**Partial safety factor**	**Standard cleaning**	**Premium cleaning**
Threaded rods	Category 1 Dry concrete and wet concrete	$\gamma_{Mp} = \gamma_{Mc}$= 1.8 for all sizes	$\gamma_{Mp} = \gamma_{Mc}$= 1.5 for all sizes
	Category 2 Dry and Wet concrete or flooded holes		$\gamma_{Mp} = \gamma_{Mc}$= 1.8 for M8 and M10 $\gamma_{Mp} = \gamma_{Mc}$= 1.5 for M12 to M30
ATP internal sleeves	Category 2 Dry and Wet concrete or flooded holes	$\gamma_{Mp} = \gamma_{Mc}$= 1.8 for all sizes	$\gamma_{Mp} = \gamma_{Mc}$= 1.5 for all sizes

* "S" anchor rods

SPIT EPOMAX	**Annex 10 of European Technical Approval ETA-05/0111**
Characteristic resistance under tension loads – Design method A	

Table 7D: Spacing and edges distances for design method A

				Threaded rods							ATP internal sleeves				
				M8	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**	**M8**	**M10**	**M12**	**M16**	**M20**
Effective anchorage depth		h_{ef} min	[mm]	64	80	96	128	160	192	240	60	65	75	125	170
		h_{ef} std	[mm]	80	90	110	125	170	210	280					
		h_{ef} max	[mm]	95	120	144	192	220	280	330					
Spacing	min	$s_{cr,N}$	[mm]	130	160	190	260	320	380	480	120	130	150	250	340
	std			160	180	220	250	340	420	560					
	max			190	240	290	380	440	560	660					
	min	$s_{cr,sp}$	[mm]	190	240	290	380	480	580	720	180	195	225	375	510
	std			240	270	330	380	510	630	840					
	max			280	360	430	580	660	840	990					
Edge distance	min	$c_{cr,N}$	[mm]	65	80	95	130	160	190	240	60	65	75	125	170
	std			80	90	110	125	170	210	280					
	max			95	120	145	190	220	280	330					
	min	$c_{cr,sp}$	[mm]	95	120	145	190	240	290	360	90	98	113	188	255
	std			120	135	165	190	255	315	420					
	max			140	180	215	290	330	420	495					

SPIT EPOMAX	**Annex 11 of European Technical Approval ETA-05/0111**
Characteristic resistance under tension loads – Design method A	

Table 8A: Characteristic values of resistance to shear loads of design method A

			M8	M10	M12	M16	M20	M24	M30
Steel failure without lever arm with "S" anchor rod									
Characteristic resistance	$V_{Rk,s}$	[kN]	11,0	17,4	25,3	47	59	85	136
Partial safety factor	γ_{Ms}	-	1,43				1,50		
Steel failure without lever arm with standard threaded rod grade 5.8									
Characteristic resistance	$V_{Rk,s}$	[kN]	9,2	14,5	21,1	39	61	88	140
Partial safety factor	γ_{Ms}	-	1,25						
Steel failure without lever arm with standard threaded rod grade 8.8									
Characteristic resistance	$V_{Rk,s}$	[kN]	14,6	23,2	33,7	63	98	141	224
Partial safety factor	γ_{Ms}	-	1,25						
Steel failure without lever arm with standard threaded rod grade 10.9									
Characteristic resistance	$V_{Rk,s}$	[kN]	18,3	29,0	42,2	78	122	176	280
Partial safety factor	γ_{Ms}	-	1,50						
Steel failure without lever arm with ATP internal sleeve + Screw grade 5.8									
Characteristic resistance	$V_{Rk,s}$	[kN]	9.2	14.5	21.1	39	61	**-**	**-**
Partial safety factor	γ_{Ms}	-	1.25					**-**	**-**
Steel failure without lever arm with ATP internal sleeve + Screw grade 6.8									
Characteristic resistance	$V_{Rk,s}$	[kN]	11.0	17.4	25.3	47	73	**-**	**-**
Partial safety factor	γ_{Ms}	-	1.25					**-**	**-**
Steel failure without lever arm with ATP internal sleeve + Screw grade 8.8									
Characteristic resistance	$V_{Rk,s}$	[kN]	14.6	23.2	33.7	55	91	**-**	**-**
Partial safety factor	γ_{Ms}	-	1.25			1.50		-	-

Steel failure with lever arm with "S" anchor rod									
Characteristic resistance	$M_{Rk,s}$	[N.m]	22	45	78	200	301	520	1052
Partial safety factor	γ_{Ms}	-	1,43				1,50		
Steel failure with lever arm with standard threaded rod grade 5.8									
Characteristic resistance	$M_{Rk,s}$	[N.m]	19	37	65	166	324	561	1124
Partial safety factor	γ_{Ms}	-	1,25						
Steel failure with lever arm with standard threaded rod grade 8.8									
Characteristic resistance	$M_{Rk,s}$	[N.m]	30	60	105	266	519	898	1799
Partial safety factor	γ_{Ms}	-	1,25						
Steel failure with lever arm with standard threaded rod grade 10.9									
Characteristic resistance	$M_{Rk,s}$	[N.m]	37	75	131	333	649	1123	2249
Partial safety factor	γ_{Ms}	-	1,50						
Steel failure with lever arm with ATP internal sleeve + Screw grade 5.8									
Characteristic resistance	$M_{Rk,s}$	[N.m]	19	37	65	166	324	-	**-**
Partial safety factor	γ_{Ms}	-	1.25					-	**-**
Steel failure with lever arm with ATP internal sleeve + Screw grade 6.8									
Characteristic resistance	$M_{Rk,s}$	[N.m]	22	45	79	200	389	-	**-**
Partial safety factor	γ_{Ms}	-	1.25					-	**-**
Steel failure with lever arm with ATP internal sleeve + Screw grade 8.8									
Characteristic resistance	$M_{Rk,s}$	[N.m]	30	60	105	266	519	-	**-**
Partial safety factor	γ_{Ms}	-	1.25			1.50		-	-

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Characteristic resistance under shear loads – Design method A

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Table 8B: Characteristic values of resistance to shear loads of design method A

				M8	M10	M12	M16	M20	M24	M30
Pry out failure										
Factor in equation (5.6)	Threaded rods	k	-	2	2	2	2	2	2	2
	ATP internal sleeves	k	-	2	2	2	2	2	-	-
Partial safety factor		γ_{Mp}	-	1,50	1,50	1,50	1,50	1,50	1,50	1,50

Concrete edge failure											
Threaded rods	Effective length of anchor under shear loading	lf	[mm]	80	90	110	125	170	210	280
	Outside diameter of anchor	d_{nom}	[mm]	10	12	14	18	25	28	35
ATP internal sleeves	Effective length of anchor under shear loading	lf	[mm]	60	65	75	125	170	-	-
	Outside diameter of anchor	d_{nom}	[mm]	12	16	20	22	28	-	-
Partial safety factor		γ_{Mc}	-	1,50	1,50	1,50	1,50	1,50	1,50	1,50

Table 9: Characteristic displacements under axial tension loads

Characteristic displacement in non-cracked C 20/25 to C50/60 concrete		**Threaded rods**							**ATP internal sleeves**				
		M8	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**	**M8**	**M10**	**M12**	**M16**	**M20**
Admissible service load :N	[kN]	8,7	12,2	17,9	19,9	28,4	42,1	50,3	4.3	5.7	9.5	19.0	35.7
δ_{N0} short term	[mm]	0,1	0,1	0,1	0,1	0,2	0,3	0,4	0.1	0.1	0.1	0.2	0.3
$\delta_{N\infty}$ long term	[mm]	0,2	0,2	0,2	0,2	0,2	0,3	0,4	0.2	0.2	0.2	0.2	0.3

Table 10: Characteristic displacements under shear loads

Characteristic displacement in non-cracked C 20/25 to C50/60 concrete		**Threaded rods**							**ATP internal sleeves**				
		M8	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**	**M8**	**M10**	**M12**	**M16**	**M20**
Admissible service load : V	[kN]	5,9	9,3	13,5	25,2	36,4	52,4	62,2	4.3	5.7	9.5	19.0	35.7
δ_{N0} short term	[mm]	2,0	2,0	2,0	3,5	3,5	3,5	3,5	0.1	0.1	0.1	0.2	0.3
$\delta_{N\infty}$ long term	[mm]	3,0	3,0	3,0	5,2	5,2	5,2	5,2	0.2	0.2	0.2	0.2	0.3

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Characteristic displacement under tension and shear loads

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