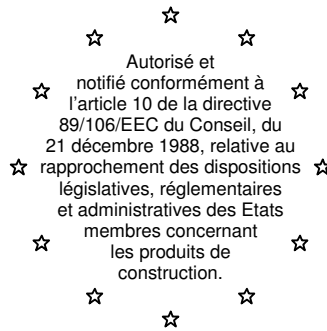


# Centre Scientifique et Technique du Bâtiment

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**CSTB**  
le futur en construction

**MEMBRE DE L'EOTA**

## European Technical Approval

## ETA-05/0112

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

Nom commercial :

**Trade name:**

**SPIT EPOMAX A4**

Titulaire :

**Holder of approval:**

**Société SPIT**

**Route de Lyon**

**F-26501 BOURG-LES-VALENCE**

**France**

Type générique et utilisation prévue du produit de construction :

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 et M16, en acier inoxydable pour fixation dans le béton non fissuré.

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

**Bonded injection type anchor with anchor rod sizes M8, M10, M12, M16, M20, M24 and M30 or internal sleeve sizes M8, M10, M12 and M16, made of stainless 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:**

21 pages incluant 11 annexes faisant partie intégrante du document.

**21 pages including 11 annexes which form an integral part of the document.**

This European Technical Approval replaces ETA-05/0112 with validity from 01/06/2005 au 31/05/2010

Cet Agrément Technique Européen remplace l'Agrément ETA-05/0112 valide du 01/06/2005 au 31/05/2010



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 products<sup>1</sup>, modified by the Council Directive 93/68/EEC of 22 July 1993<sup>2</sup>;
- Décret n° 92-647 du 8 juillet 1992<sup>3</sup> 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<sup>4</sup>;
- 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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<sup>1</sup> Official Journal of the European Communities n° L 40, 11.2.1989, p. 12

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

<sup>3</sup> Journal officiel de la République française du 14 juillet 1992

<sup>4</sup> 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 A4 with anchor rod or internal sleeve is a bonded anchor (injection type) made of stainless 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 threaded rod or internally threaded sleeve is inserted into the resin with a slow and slight twisting motion. The threaded rod is available for all diameters either with a one side 45° chamfer or with a two sides 45° chamfer. The internal sleeve is available in the diameter M8 to M16. The threaded rod are either delivered with the mortar cartridges or commercial standard threaded rods purchased separately (A4/70 for M8 to M24 and A4/50 for M30). 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 be used in concrete subject to dry internal conditions and also in concrete 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 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<sup>5</sup> of this European Technical Approval. The characteristic anchor values for the design of anchorages are given in Annexes 8 to 11.

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. The threaded rod are either delivered with the mortar cartridges or commercial standard threaded rods purchased separately (A4/70 for M8 to M24 and A4/50 for M30). 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 3506-1
- 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 SPIT 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

<sup>5</sup>

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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.

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.*

### **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<sup>6</sup>. 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:

<sup>6</sup>

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.

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.
- 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 :  $N_{Rk,c}^0$  according to Table 7a Annex 9

$s_{cr,n}$  and  $c_{cr,n}$  according to Table 7c Annex 10

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

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

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

$s_{cr,n} = 3 h_{ef}$  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 :  $N_{Rk,c}^0$  according to Table 7a Annex 9

$s_{cr,sp}$  and  $c_{cr,sp}$  according to Table 7c Annex 10

$\psi_{ucr,N} = 1,0$  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  $\frac{1}{2}$  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.**

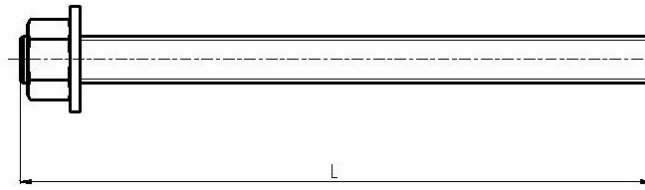
The mortar cartridges shall be protected against sun radiation and shall be stored according to the manufacturer's installation instructions in dry conditions at temperatures of at least 0°C to not more than +35°C.

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

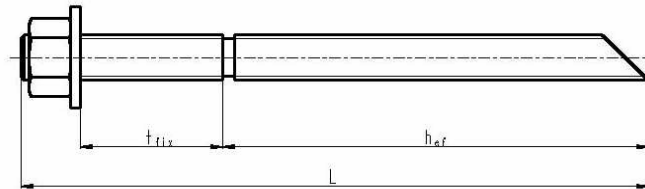
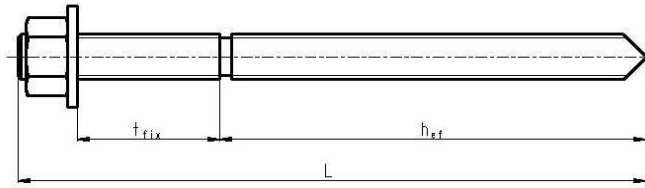
**The original French version is signed by**

**Le Directeur Technique  
H. BERRIER**

**Assembled anchor and schema of the anchor in use :**



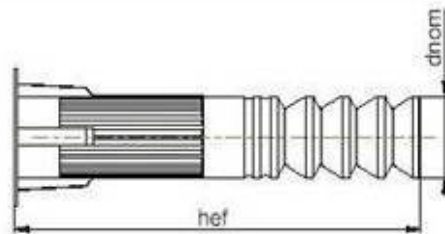
Commercial standard threaded rods with identifying mark of the producer and embedment depth :  
 A4/70 for M8 to M24  
 A4/50 for M30



**threaded rod**

One side and two sides 45° chamfer

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

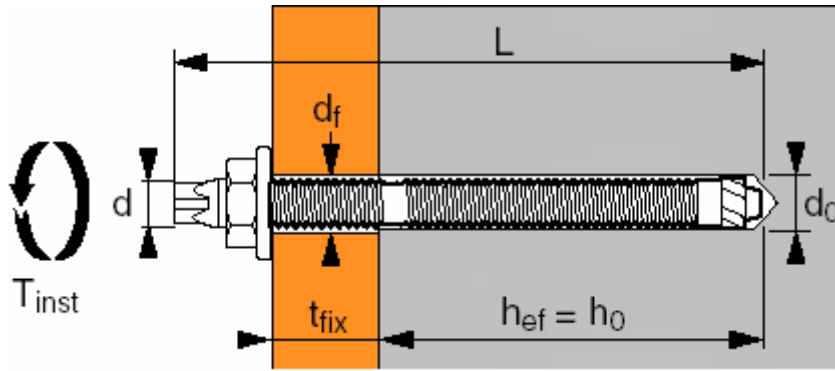


**ATP internal sleeve**

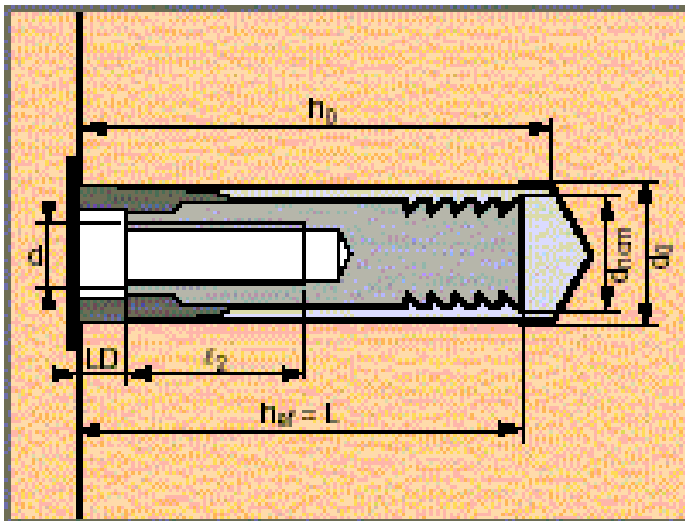
Marking on the internal threaded sleeve: letter S, bolt diameter + grey plastic cap:  
 Ex: S M12

<p><b>SPIT EPOMAX A4</b></p>	<p><b>Annex 1                  of European Technical Approval                  ETA-05/0112</b></p>
<p><b>Product and intended use</b></p>	

**Threaded rod: Schema of the anchor in use**



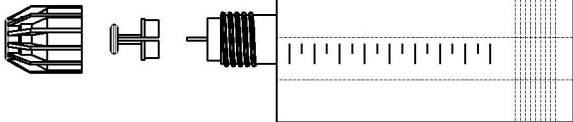
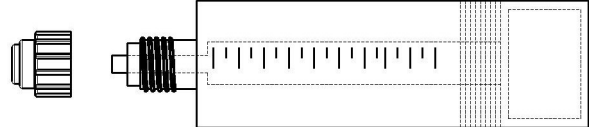
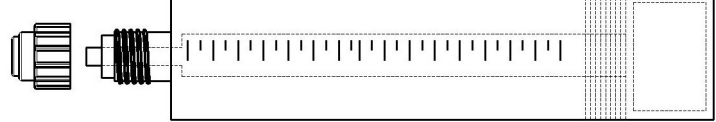
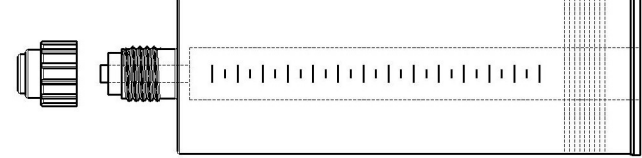
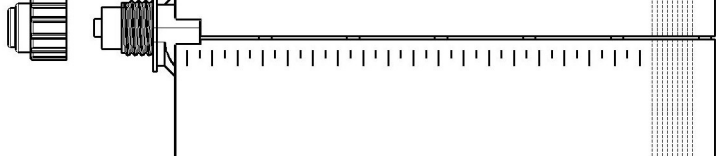
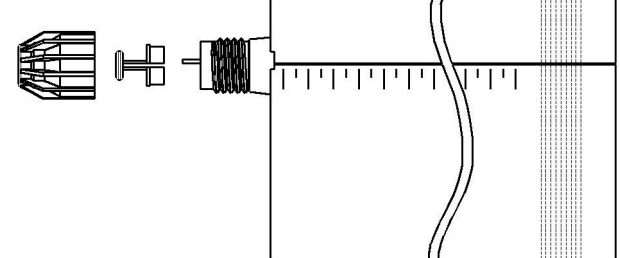
**ATP internal sleeves: Schema of the anchor in use**



SPIT EPOMAX A4

Product and intended use

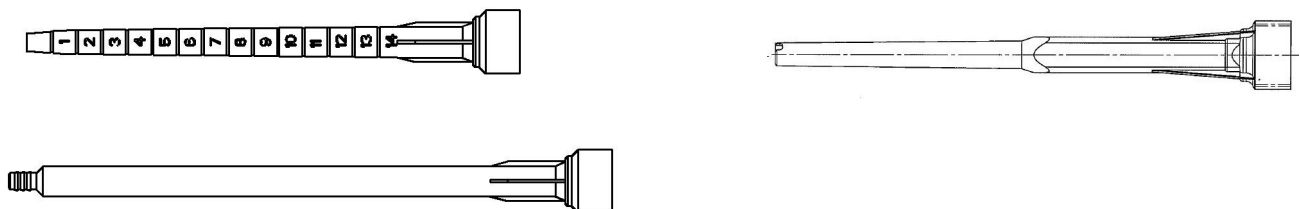
Annex 2  
of European Technical Approval  
ETA-05/0112

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**



<b>SPIT EPOMAX</b>	<b>Annex 3 of European Technical Approval ETA-05/0112</b>
<b>Mortar cartridges</b>	

**Table 1: Materials**

	Size	Material and EN/ISO reference
Injection mortar with styrenefree vinylester resin, hardener and inorganic agents		
Threaded rod	M8 to M30	X2CrNiMo 17.12.2 1.4404 EN 10088-3
ATP Internal Sleeves	M8 to M16	Stainless steel A4-80 EN 20898-2
Nut	-	Stainless steel A4-80 EN 20898-2
Washer	-	Stainless steel A4 EN 20898-2

**SPIT EPOMAX A4****Material**
**Annex 4  
of European Technical Approval  
ETA-05/0112**

**Table 2 : Cleaning method and minimum curing time**

	<b>Standard cleaning</b>	<b>Premium cleaning</b>
Nominal diameter	All diameters	All diameters
Cleaning method	<p>4 blows+ 4 brushing operation + 4 blows</p> <p><b>Blowing operation:</b> using a hand pump, blow 4 times.</p> <p><b>Brushing operation:</b> 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.</p>	<p>2 blows+ 2 brushing operation + 2 blows</p> <p><b>Blowing operation:</b> using oil free compressed air (mini 6 bars), starting from the bottom of the hole, move upward until no dust is evacuated.</p> <p><b>Brushing operation:</b> 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)</p>

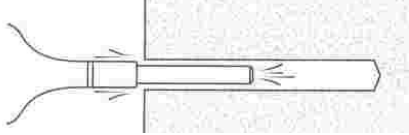
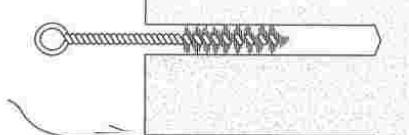
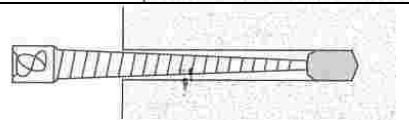
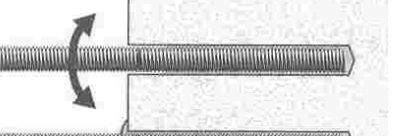

	Threaded rods							ATP internal sleeves			
Anchor size	M8	M10	M12	M16	M20	M24	M30	M8	M10	M12	M16
Brush diameter [mm]	11	13	15	20	26	30	37	15	22	26	30

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

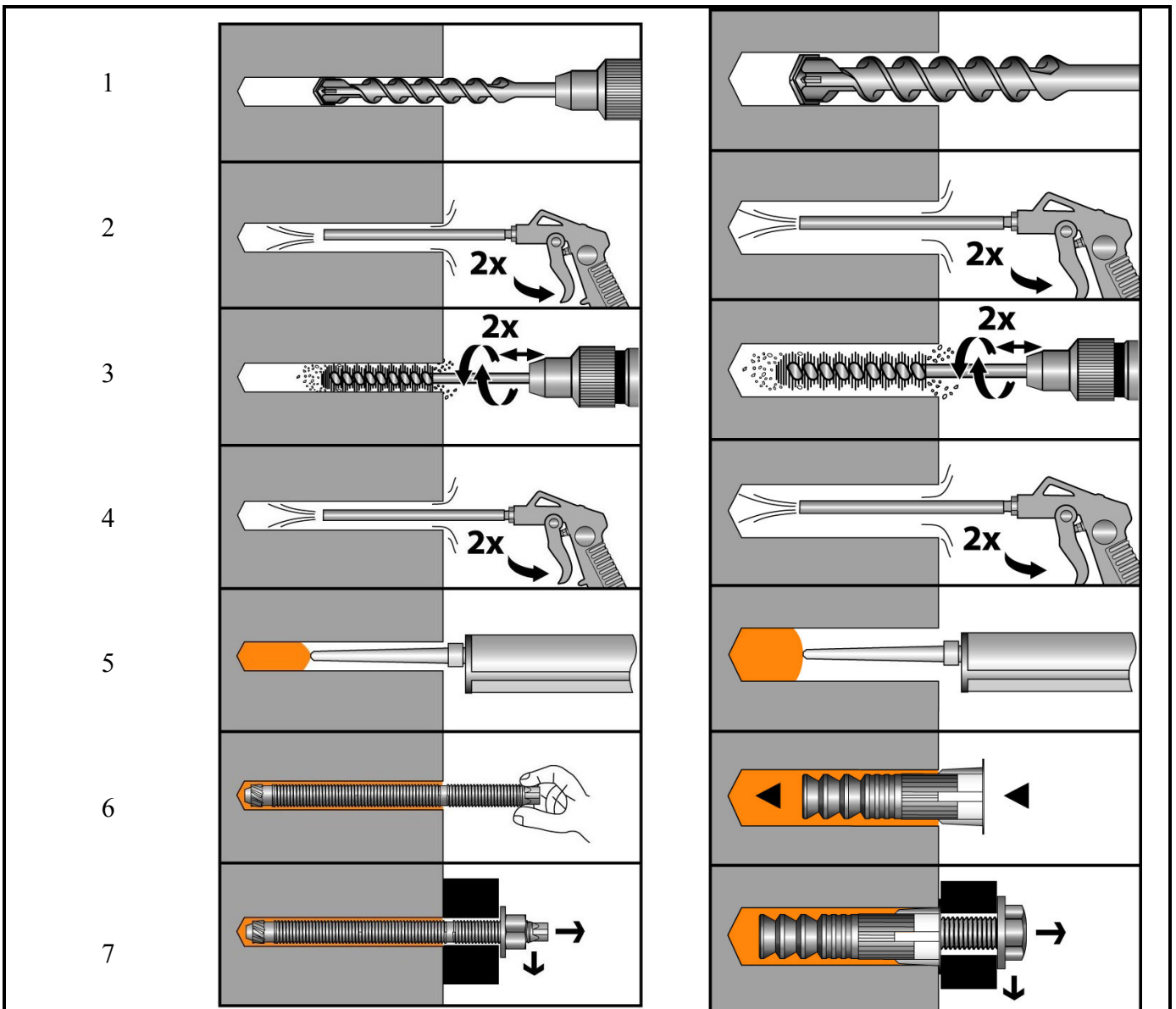
**Brush for cleaning the drill hole**



<b>SPIT EPOMAX A4</b>	<b>Annex 5 of European Technical Approval ETA-05/0112</b>
<b>Cleaning methods</b>	

	<p>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 pump. For the hole diameter 10mm a reduction <math>\phi</math> 6mm must be clamped on the air pump nozzle.</p>
	<p>Using the specified brush, brush out 4 times mechanically</p>
	<p>Starting from the drill hole base, blow out at least 4 times with the hand pump</p>
	<p>Dispense the first part to waste until an even colour is achieved (<math>\approx</math> 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%.</p>
	<p>Immediately insert the fixing, slowly and with a slight twisting motion. Remove excess resin from around the mouth of the hole before it sets</p>
	<p>Leaver the fixing undisturbed until the cure time has elapse. Attach the fixture and tighten the nut at the required torque.</p>
<p><b>SPIT EPOMAX A4</b></p>	
<p><b>Instruction For Use: Standard cleaning</b></p>	<p><b>Annex 6 of European Technical Approval ETA-05/0112</b></p>





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 ( $\approx 20\text{cm}$ ). 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 A4**

**Instruction For Use: Premium cleaning**

**Annex 7  
of European Technical Approval  
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**Table 3: Dimensions for threaded rods**

M	D	Embedment depth		
		$h_{ef, std}$	$h_{ef, min}$	$h_{ef, max}$
<b>M8</b>	8	80	64	95
<b>M10</b>	10	90	80	120
<b>M12</b>	12	110	96	144
<b>M16</b>	16	125	128	192
<b>M20</b>	20	170	160	220
<b>M24</b>	24	210	192	280
<b>M30</b>	30	280	240	330

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

Nominal diameter	$\varnothing d_0$ 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]				[N.m]		
<b>M8</b>	10	9	80	64	95	80	64	95	10	110	100	125
<b>M10</b>	12	12	90	80	120	90	80	120	20	120	110	150
<b>M12</b>	14	14	110	96	144	110	96	144	30	140	125	175
<b>M16</b>	18	18	125	128	192	125	128	192	60	160	165	230
<b>M20</b>	25	22	170	160	220	170	160	220	120	220	210	270
<b>M24</b>	28	26	210	192	280	210	192	280	200	265	250	335
<b>M30</b>	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

**Table 6 : Minimum spacing and edge distances**

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

**SPIT EPOMAX A4**

Installation data

**Annex 8**  
**of European Technical Approval**  
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**Table 7A: Characteristic values of resistance to tension loads of design method A In case of steel failure, pull-out failure and concrete cone failure**

			M8	M10	M12	M16	M20	M24	M30
<b>Steel failure with anchor rod A4-70</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	23	37	54	102	159	229	261
Partial safety factor	$\gamma_{Ms}$	-	1.86						2.86
<b>Steel failure with ATP internal sleeve + screw grade A4-70</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	23	37	54	102	-	-	-
Partial safety factor	$\gamma_{Ms}$	-	1.86						-
<b>Pullout and concrete cone failure in non-cracked concrete C20/25</b>									
<b>Threaded rods <math>h_{ef}</math> min</b>		[mm]	64	80	96	128	160	192	240
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	16	25	40	50	60	95	115
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	12	20	30	40	50	75	95
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	9	16	25	35	40	60	75
<b>Threaded rods <math>h_{ef}</math> std</b>		[mm]	80	90	110	125	170	210	280
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	20	30	40	50	75	95	140
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	16	25	35	40	60	75	115
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	12	20	25	30	45	60	75
<b>Threaded rods <math>h_{ef}</math> max</b>		[mm]	95	120	144	192	220	280	330
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	25	40	60	75	95	140	170
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	20	30	40	50	75	115	140
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	16	25	35	50	60	75	95
<b>ATP internal sleeves</b>		[mm]	60	65	75	125	-	-	-
Characteristic resistance T = - 40°C to + 40°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	16	20	30	60	-	-	-
Characteristic resistance T = - 40°C to + 80°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	12	16	25	50	-	-	-
Characteristic resistance T = - 40°C to + 120°C	$N_{Rk,p} = N_{Rk,c}^0$	[kN]	9	12	20	35	-	-	-
<b>Increasing and partial safety factors</b>									
Increasing factor	C30/37	$\psi_c$	-	1,14					
Increasing factor	C40/50			1,26					
Increasing factor	C50/60			1,34					

**Table 7B: 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

**SPIT EPOMAX A4****Characteristic resistance under tension loads – Design method A****Annex 9****of European Technical Approval  
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**Table 7C: Spacing and edges distances for design method A**

				Threaded rods						ATP internal sleeves					
				M8	M10	M12	M16	M20	M24	M30	M8	M10	M12	M16	
Effective anchorage depth		$h_{ef}$ min	[mm]	64	80	96	128	160	192	240	60	65	75	125	
		$h_{ef}$ std	[mm]	80	90	110	125	170	210	280					
		$h_{ef}$ max	[mm]	95	120	144	192	220	280	330					
Spacing	min	std	$s_{cr,N}$	[mm]	130	160	190	260	320	380	120	130	150	250	
					160	180	220	250	340	420					560
					190	240	290	380	440	560					660
	max	std	$s_{cr,sp}$	[mm]	190	240	290	380	480	580	180	200	230	380	
					240	270	330	380	510	630					840
					280	360	430	580	660	840					990
Edge distance	min	std	$c_{cr,N}$	[mm]	65	80	95	130	160	190	60	65	75	125	
					80	90	110	125	170	210					280
					95	120	145	190	220	280					330
	max	std	$c_{cr,sp}$	[mm]	95	120	145	190	240	290	90	100	115	190	
					120	135	165	190	255	315					420
					140	180	215	290	330	420					495

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

		M8	M10	M12	M16	M20	M24	M30	
<b>Steel failure without lever arm with threaded anchor rod A4-70</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	11,4	18,5	27,0	51	80	114	131
Partial safety factor	$\gamma_{Ms}$	-	1.56					2.38	
<b>Steel failure without lever arm with ATP internal sleeve + Screw grade A4-70</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	11,4	18,5	27,0	51	-	-	-
Partial safety factor	$\gamma_{Ms}$	-	1.56			-	-	-	
<b>Steel failure with lever arm with threaded rod A4-70</b>									
Characteristic resistance	$M_{Rk,s}$	[N.m]	22	45	80	207	405	700	1012
Partial safety factor	$\gamma_{Ms}$	-	1.56					2.38	
<b>Steel failure with lever arm with ATP internal sleeve + Screw grade A4-70</b>									
Characteristic resistance	$M_{Rk,s}$	[N.m]	22	45	80	207	-	-	-
Partial safety factor	$\gamma_{Ms}$	-	1.56			-	-	-	

**SPIT EPOMAX A4****Characteristic resistance under tension loads – Design method A****Annex 10  
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**Table 8B: Characteristic values of resistance to shear loads of design method A**

				M8	M10	M12	M16	M20	M24	M30
<b>Pry out failure</b>										
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		$\gamma_{Mp}$	-	1,50	1,50	1,50	1,50	1,50	1,50	1,50

<b>Concrete edge failure</b>										
Threaded rods	Effective length of anchor under shear loading	l <sub>f</sub>	[mm]	80	90	110	125	170	210	280
	Outside diameter of anchor	d <sub>nom</sub>	[mm]	10	12	14	18	25	28	35
ATP internal sleeves	Effective length of anchor under shear loading	l <sub>f</sub>	[mm]	60	65	75	125	-	-	-
	Outside diameter of anchor	d <sub>nom</sub>	[mm]	12	16	20	22	-	-	-
Partial safety factor		$\gamma_{Mc}$	-	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
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
$\delta_{N0}$ 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
$\delta_{N\infty}$ 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

**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
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
$\delta_{N0}$ 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
$\delta_{N\infty}$ 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

**SPIT EPOMAX A4****Characteristic displacement under tension and shear loads****Annex 11  
of European Technical Approval  
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