Centre Scientifique et Technique du Bâtiment
84 avenue Jean Jaurès
CHAMPS-SUR-MARNE
F-77447 Marne-la-Vallée Cedex 2
Tél. : (33) 01 64 68 82 82
Fax : (33) 01 60 05 70 37

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.

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MEMBRE DE L'EOTA

European Technical Approval ETA-12/0099

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

Nom commercial : **Trade name:**	**SPIT EPOMAX PLUS bonded anchor**
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" pour fixation dans le béton non fissuré M8, M10, M12, M16, M20 et M24. **Bonded injection type anchor for use in non cracked concrete: sizes M8, M10, M12, M16, M20 and M24.**
Validité du : au : **Validity from / to:**	**07/02/2012** **25/07/2013**
Usine de fabrication : **Manufacturing plant:**	**Société SPIT Plant 2**
Le présent Agrément technique européen contient : **This European Technical Approval contains:**	19 pages incluant 10 annexes faisant partie intégrante du document. **19 pages including 10 annexes which form an integral part of the document.**

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 PLUS adhesive system with standard threaded rod (galvanized steel / stainless steel / high corrosion resistant stainless steel) is a bonded anchor system (injection type) consisting of an adhesive cartridge with SPIT injection adhesive EPOMAX PLUS and a threaded rod with hexagon nut and washer in sizes M8 to M24. The standard threaded rod is placed into a rotary percussive hammer drilled hole previously injected with a two components injection adhesive using an applicator dispenser equipped with a special static mixing nozzle. The standard threaded rod is inserted into the adhesive resin with a slow and slight twisting motion . The threaded rod may be used with a flat tip end, a one side 45° chamfer or with a two sides 45° chamfer. The adhesive cartridges are available in different sizes (150 ml to 825 ml) and system (coaxial, side by side or two components capsules in one cartridge). The anchor is intended to be used with embedment depth from 8 diameters to 12 diameters.

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 with galvanized steel threaded rod may only be used in concrete subject to dry internal conditions ***(Characteristic values in Annexes 5, 7 and 9)***

The anchors with threaded rod grade A4-70 and A4-80 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). ***(Characteristic values in Annexes 6, 8 and 9)***

The anchor with high corrosion resistant stainless steel threaded rod may be used in concrete subject to dry internal conditions and also in concrete subject to external atmospheric exposure, in permanently damp internal conditions or in other particular aggressive conditions. Such particular conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used). ***(Characteristic values in Annexes 6, 8 and 9).***

The anchor may only be used in concrete subject to dry internal conditions.

The anchor may be installed in dry or wet concrete (use category 1) for all diameters.

Installation	Substrate		
	Dry concrete	Wet concrete	Flooded hole
All diameters	Yes	Yes	No

All the diameters (i.e. from M8 to M24) may be used overhead.

The anchor may be used in the following temperature range :

Temperature range : -40°C to +80°C (max short term temperature +80°C and max long term temperature +50°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 M24 and the mortar cartridges correspond to the drawings and provisions given in Annexes 1 and 2. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 3 and 4 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 5 to 9.

Each mortar cartridge is marked with the identifying mark of the producer, the trade name, the charge code, storage life, curing and processing time. The SPIT EPOMAX PLUS bonded anchor is intended to be used with commercial standard threaded rods according to appendixes 1 & 3. Threaded rods shall be supplied with:

- Mechanical properties according to Annexe 3, Table 1.
- Quality affirmation of the mechanical properties with an inspection document according to EN 10204.
- Marking of the threaded rod with the embedment depth.

The two components of the SPIT EPOMAX PLUS injection mortar could be delivered in unmixed condition in mortar cartridges in a size of 150 ml, 330 ml, 380 ml, 400 ml, 410 ml in case of coaxial cartridges (C-CN), 345 ml, 825ml in case of side by side cartridges (S-CN), 150ml, 300 ml, 380 ml and 550 ml in case of two part foil capsules within a single component cartridge (CIC) and 280 ml in case of two part foil capsules (PLR) according to Annex 2.

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.

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.

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 resin and hardener shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying appropriate properties.

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

- Physical properties: Resin (fill quantity, fill weight), hardener (fill quantity, fill weight);
- Mechanical properties: Resin (composition, viscosity), hardener (composition, viscosity);
- 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.

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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 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 5 Annex 5 or Table 6 Annex 6
$s_{cr,N}$ and $c_{cr,N}$ according to Table 5 Annex 5 or Table 6 Annex 6
$\psi_{ucr,N} = 1,0$

(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 5 Annex 5 or Table 6 Annex 6
$s_{cr,sp}$ and $c_{cr,sp}$ according to Table 5 Annex 5 or Table 6 Annex 6
$\psi_{ucr,N} = 1,0$ 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;
- clearing the hole of drilling dust : the hole shall be cleaned by at least two blowing operations + two brushing operations + two blowing operations + two brushing operations + two blowing operations; before brushing cleaning the brush and checking whether the brush diameter according to Annex 3 Table 2 is sufficient. The brush shall produce natural resistance as it enters the anchor hole. If this is not the case a new brush or a brush with a larger diameter must be used;
- 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 2; discarding the first portion 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 threaded rod, slowly and with a slight twisting motion, removing excess of injection mortar around the rod; observing the curing time according to Annex 3 table 2 until the rod may be loaded; during curing of the injection mortar the temperature of the concrete must not fall below - 5°C;
- After curing time elapsed, application of the torque moment given in Annex 4 Tables 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 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 5°C to not more than +20°C.

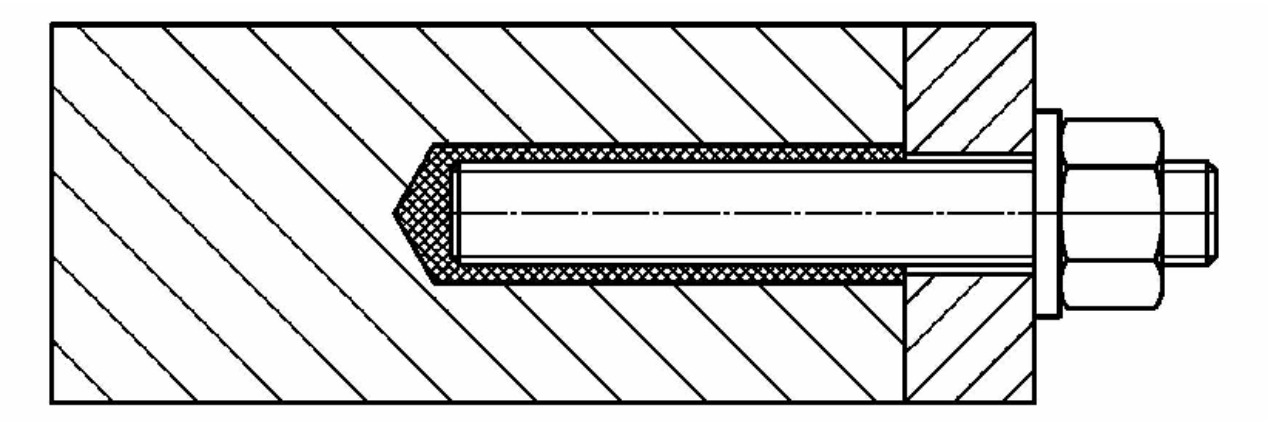
Mortar cartridges with expired shelf life must no longer be used.

The original French version is signed by

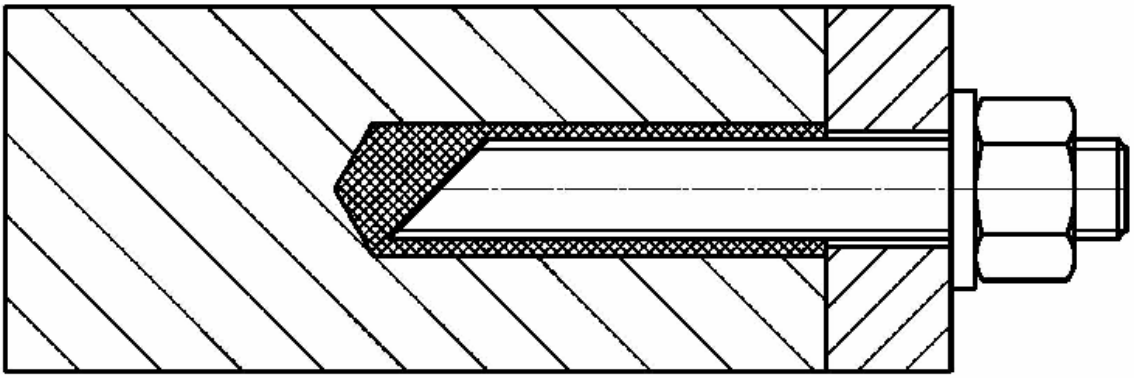
Le Directeur Technique
C. BALOCHE

Assembled anchor and schema of the anchor in use :

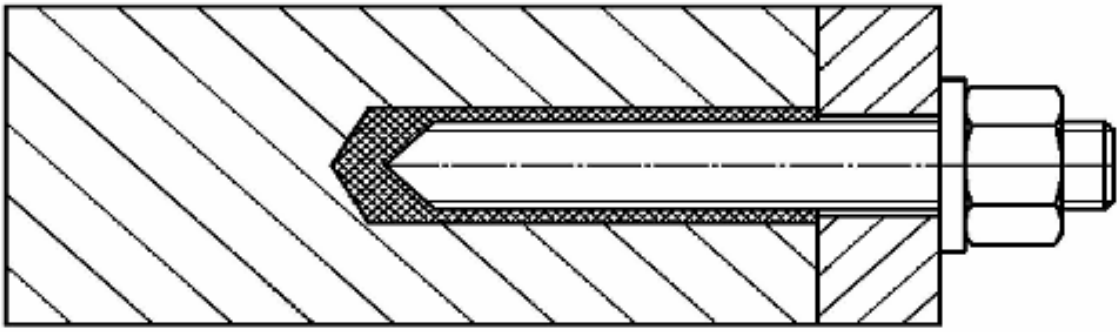
Commercial standard threaded rods with identifying mark of the producer and embedment depth :



Standard threaded rod with flat tip end



Standard threaded rod with one side 45° chamfer



Standard threaded rod with two sides 45° chamfer

Intended used:

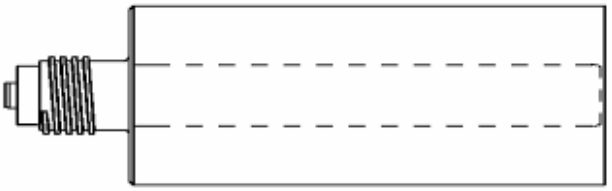
- Dry and wet concrete
- Overhead installation is permitted
- Temperature range -40°C to +80°C

SPIT EPOMAX PLUS bonded anchor	**Annex 1**
Product and intended use	of European Technical Approval **ETA-12/0099**

Mortar cartridges:

coaxial cartridge:

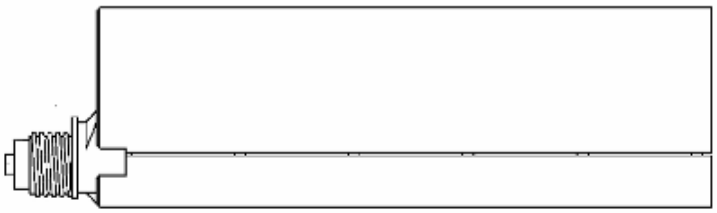
C-CN/150-10/EPOMAX PLUS
C-CN/330-10/EPOMAX PLUS
C-CN/380-10/EPOMAX PLUS
C-CN/400-10/EPOMAX PLUS
C-CN/410-10/EPOMAX PLUS
(150 ml / 330 ml / 380 m / 400 ml / 410 ml)



side by side cartridge

S-CN/345-10/EPOMAX PLUS
S-CN/825-10/EPOMAX PLUS

(345 ml / 825ml)



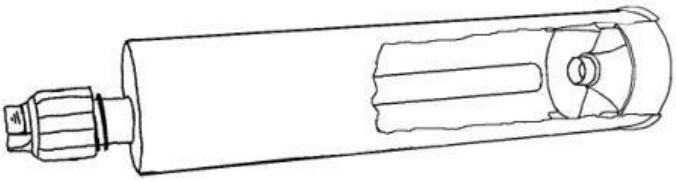
two part foil capsules within a single component cartridge :

CIC/150/EPOMAX PLUS
CIC/300/EPOMAX PLUS
CIC/380/EPOMAX PLUS
CIC/550/EPOMAX PLUS

(150ml / 300 ml / 380 ml / 550 ml)

PLR/280-10/EPOMAX PLUS

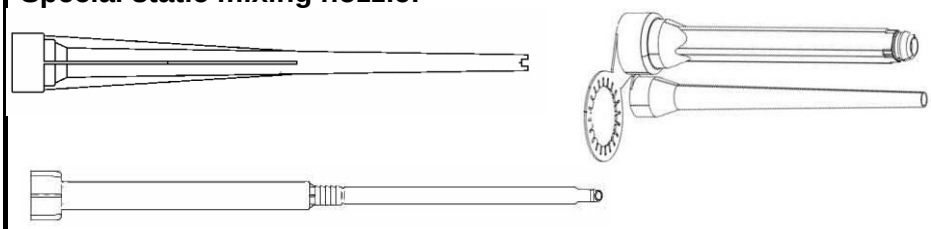
(280 ml)



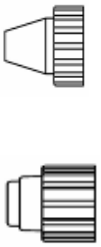
Marking of the mortar cartridges :

– Identifying mark of the producer, trade name, Charge code number, Storage life, curing and processing time

Special static mixing nozzle:



Different screw caps:



Threaded rods:

- Material and mechanical properties according to Annex 3, Table 1;
- Confirmation of material and mechanical properties by inspection certificate according to EN 10204:2004;
- Marking of the threaded rod with the identifying mark of the producer of the rod and the envisaged embedment depth.

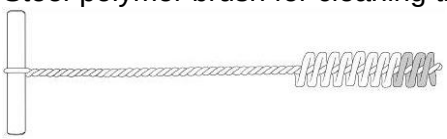
SPIT EPOMAX PLUS bonded anchor	**Annex 2**
Materials, cleaning method and curing times	of European Technical Approval **ETA-12/0099**

Table 1 : Materials

	Size	Material and EN/ISO reference	Coating
Threaded rod	M8 to M24 (standard commercial rods)	**Carbon steel** according to ISO 898-1, grade 5.8, 8.8 and 10.9 **Stainless steel** 1.4401, 1.4404 or 1.4571 according to EN 10088, grade A4-70 or A4-80 according to EN-ISO 3506-1 **High corrosion resistant stainless Steel** 1.4529, 1.4565 according to EN 10088 grade 70 according to EN-ISO 3506-1	Zinc coating 5µm min. NF E25-009
Nut	-	EN-ISO 4032, Steel acc. to threaded rod **Carbon steel** grade 6 to 10 according to ISO 898-2 **Stainless steel** grade A4-70 or A4-80 according to EN-ISO 3506-2 **High corrosion resistant stainless Steel** grade 70 according to EN-ISO 3506-2	
Washer	-	EN ISO 887 or EN-ISO 7089 up to EN-ISO 7094 Steel according to threaded rod	

Injection mortar with styrenefree epoxy acrylate resin, hardener and inorganic agents

Table 2 : Cleaning method and minimum curing time

Nominal diameter	All diameters	Steel-polymer brush for cleaning the drill hole 
Cleaning method	2 blows+ 2 brushing operations + 2 blows + 2 brushing operations + 2 blows	

Anchor size		M8	M10	M12	M16	M20	M24
Steel brush head diameter	[mm]	14		20		29	
Steel brush head length	[mm]	80		80		80	
Min. overall brush length	[mm]	110	130	160	210	250	300

Ambient temperature	- 5°C < T ≤ 0°C	0°C < T ≤ 5°C	5°C < T ≤ 10°C	10°C < T ≤ 20°C	20°C < T ≤ 35°C
Processing time	Minimum cartridge temperature = 5°C		8 mn	4 mn	1 mn

Base Material temperature	- 5°C < T ≤ 0°C	0°C < T ≤ 5°C	5°C < T ≤ 10°C	10°C < T ≤ 20°C	20°C < T ≤ 35°C
Curing time	24 h	180 mn	100 mn	70 mn	40 mn

SPIT EPOMAX PLUS bonded anchor	**Annex 3**
Materials, cleaning method and curing times	of European Technical Approval **ETA-12/0099**

Table 3: Installation data for minimum and maximum embedment depths

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	
hef	-	-	« 8d »	« 12d »	« 8d »	« 12d »	-	« 8d »	« 12d »
M8	10	9	64	96	64	96	10	100	125
M10	12	12	80	120	80	120	20	110	150
M12	14	14	96	144	96	144	40	125	175
M16	18	18	128	192	128	192	80	160	225
M20	22	22	160	240	160	240	150	200	280
M24	26	26	192	288	192	288	200	240	335

Table 4 : Minimum spacing and edge distances

h_{ef} = 8d			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Minimum spacing	s_{min}	mm	35	40	50	65	80	95
Minimum edge distance	c_{min}	mm	35	40	50	65	80	95

h_{ef} = 12d			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Minimum spacing	s_{min}	mm	48	60	70	95	120	145
Minimum edge distance	c_{min}	mm	48	60	70	95	120	145

Drilling techniques :
Rotary hammer drilling (electric drilling machine or driven by compressed air).

Use category :
Installation in dry concrete or wet concrete for all diameters.

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

Installation direction :
All diameters may be used overhead.

Table 5: Characteristic values of resistance to tension loads of design method A in case of steel failure, pullout and concrete cone failure with CARBON STEEL threaded rods

			M8	M10	M12	M16	M20	M24
Steel failure with standard threaded rod grade 5.8								
Characteristic resistance	$N_{Rk,s}$	[kN]	19	30	44	82	127	184
Partial safety factor	γ_{Ms}	-	1,5					
Steel failure with standard threaded rod grade 8.8								
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	-	1,5					
Steel failure with standard threaded rod grade 10.9								
Characteristic resistance	$N_{Rk,s}$	[kN]	38	60	88	163	255	367
Partial safety factor	γ_{Ms}	-	1,4					

Pullout and concrete cone failure in non-cracked concrete C20/25								
h_{ef} = 8d		*[mm]*	*64*	*80*	*96*	*128*	*160*	*192*
Characteristic bond resistance C20/25 – h_{ef} = 8d T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	**16**	**25**	**40**	**60**	**75**	**115**
h_{ef} = 12d		*[mm]*	*96*	*120*	*144*	*192*	*240*	*288*
Characteristic bond resistance C20/25 – h_{ef} = 12d T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	**25**	**40**	**60**	**95**	**115**	**170**
Increasing factor and Partial safety factor								
Increasing factor C30/37	ψ_c	-	1,04					
Increasing factor C40/50			1,07					
Increasing factor C50/60			1,09					
Partial safety factor	$\gamma_{Mp} = \gamma_{Mc}$	-	1,8 [1)]					

[1)] The partial safety factor γ_2 =1.2 is included

Splitting failure				M8	M10	M12	M16	M20	M24
Effective anchorage depth		h_{ef} « 8d »	[mm]	64	80	96	128	160	192
		h_{ef} « 12d »	[mm]	96	120	144	192	240	288
Partial safety factor		$\gamma_{M,sp}$	-	1,8	1,8	1,8	1,8	1,8	1,8
Spacing	8d 12d	$s_{cr,N}$	[mm]	128 192	160 240	192 288	256 384	320 480	384 576
	8d 12d	$s_{cr,sp}$	[mm]	192 288	240 360	288 432	384 576	480 720	576 864
Edge distance	8d 12d	$c_{cr,N}$	[mm]	64 96	80 120	96 144	128 192	160 240	192 288
	8d 12d	$c_{cr,sp}$	[mm]	96 144	120 180	144 216	192 288	240 360	288 432

SPIT EPOMAX PLUS bonded anchor	**Annex 5**
Characteristic resistance under tension loads – design method A	of European Technical Approval **ETA-12/0099**

Table 6: Characteristic values of resistance to tension loads of design method A in case of steel failure, pullout and concrete cone failure with STAINLESS STEEL and HIGH CORROSION RESISTANT STAINLESS STEEL threaded rods

			M8	M10	M12	M16	M20	M24
Steel failure with standard threaded rod A4-70								
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	59	110	171	247
Partial safety factor	γ_{Ms}	-	1,9					
Steel failure with standard threaded rod A4-80								
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	-	1,6					
Steel failure with standard threaded rod high corrosion resistant 1.4529 or 1.4565 Grade 70 [1]								
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	-	1.5					

Pullout and concrete cone failure in non-cracked concrete C20/25								
h_{ef} = 8d		*[mm]*	*64*	*80*	*96*	*128*	*160*	*192*
Characteristic bond resistance C20/25 – h_{ef} = 8d T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	**16**	**25**	**40**	**60**	**75**	**115**
h_{ef} = 12d		*[mm]*	*96*	*120*	*144*	*192*	*240*	*288*
Characteristic bond resistance C20/25 – h_{ef} = 12d T = - 40°C to + 80°C	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	**25**	**40**	**60**	**95**	**115**	**170**
Increasing factor and Partial safety factor								
Increasing factor C30/37	ψ_c	-	1,04					
Increasing factor C40/50			1,07					
Increasing factor C50/60			1,09					
Partial safety factor	$\gamma_{Mp} = \gamma_{Mc}$	-	1,8 [2]					

[1] f_{uk}=700 N/mm² and f_{yk}= 560 N/mm²

[2] The partial safety factor γ_2 =1.2 is included

Splitting failure				M8	M10	M12	M16	M20	M24
Effective anchorage depth		h_{ef} « 8d »	[mm]	64	80	96	128	160	192
		h_{ef} « 12d »	[mm]	96	120	144	192	240	288
Partial safety factor		$\gamma_{M,sp}$	-	1,8	1,8	1,8	1,8	1,8	1,8
Spacing	8d 12d	$s_{cr,N}$	[mm]	128 192	160 240	192 288	256 384	320 480	384 576
	8d 12d	$s_{cr,sp}$	[mm]	192 288	240 360	288 432	384 576	480 720	576 864
Edge distance	8d 12d	$c_{cr,N}$	[mm]	64 96	80 120	96 144	128 192	160 240	192 288
	8d 12d	$c_{cr,sp}$	[mm]	96 144	120 180	144 216	192 288	240 360	288 432

SPIT EPOMAX PLUS bonded anchor	**Annex 6**
Characteristic resistance under tension loads – design method A	of European Technical Approval **ETA- 12/0099**

Table 7: Characteristic values of resistance to shear loads of design method A with CARBON STEEL threaded rods

			M8	M10	M12	M16	M20	M24
Steel failure without lever arm with standard threaded rod grade 5.8								
Characteristic resistance	$V_{Rk,s}$	[kN]	9,5	15,1	21,9	40,8	63,7	91,8
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	62,8	98,0	141,2
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]	19,0	30,2	43,8	81,6	127,4	183,6
Partial safety factor	γ_{Ms}	-	1,50					
Steel failure with lever arm with standard threaded rod grade 5.8								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	19	39	68	173	337	584
Partial safety factor	γ_{Ms}	-	1,25					
Steel failure with lever arm with standard threaded rod grade 8.8								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	-	1,25					
Steel failure with lever arm with standard threaded rod grade 10.9								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	39	78	136	346	675	1167
Partial safety factor	γ_{Ms}	-	1,50					

Table 8: Characteristic values of resistance to shear loads of design method A with STAINLESS STEEL and HIGH CORROSION RESISTANT STAINLESS STEEL threaded rods

			M8	M10	M12	M16	M20	M24
Steel failure without lever arm with standard stainless steel threaded rod A4-70								
Characteristic resistance	$V_{Rk,s}$	[kN]	12,8	20,3	29,5	55,0	85,8	123,6
Partial safety factor	γ_{Ms}	-	1,56					
Steel failure without lever arm with standard stainless steel threaded rod A4-80								
Characteristic resistance	$V_{Rk,s}$	[kN]	14,6	23,2	33,7	62,8	98,0	141,2
Partial safety factor	γ_{Ms}	-	1,25					
Steel failure without lever arm with standard threaded rod high corrosion resistant 1.4529 or 1.4565 / Grade 70								
Characteristic resistance	$V_{Rk,s}$	[kN]	12.8	20.3	29.5	55.0	85.8	123.6
Partial safety factor	γ_{Ms}	-	1.25					

Steel failure with lever arm with standard stainless steel threaded rod grade A4-70								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	-	1,56					
Steel failure with lever arm with standard stainless steel threaded rod grade A4-80								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	-	1,25					
Steel failure with lever arm with standard threaded rod high corrosion resistant 1.4529 or 1.4565 / Grade 70								
Characteristic resistance	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	-	1.25					

SPIT EPOMAX PLUS bonded anchor	**Annex 8**
Characteristic resistance under shear loads – design method A	of European Technical Approval **ETA- 12/0099**

Table 9: Characteristic values for pryout failure under shear loads

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

Table 10: Characteristic values for concrete edge failure under shear loads

Concrete edge failure			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Effective length of anchor under shear loading	lf (8d)	[mm]	64	80	96	128	160	192
	lf (12d)		96	120	144	192	240	288
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24
Partial safety factor	γ_{Mc}	-	1,50					

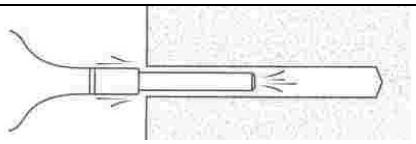
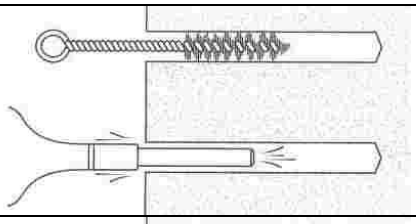
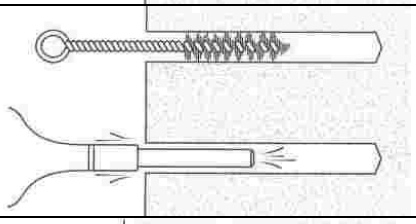
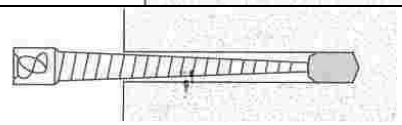
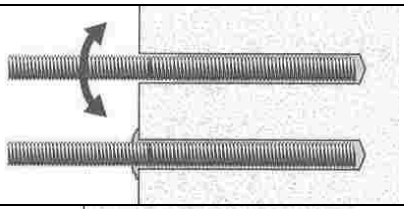
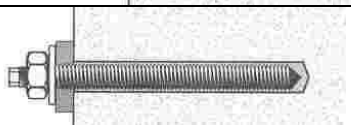
Table 11: Characteristic displacements under axial tension loads

Characteristic displacement in non-cracked C 20/25 to C50/60 concrete		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Admissible service load :N	[kN]	7,2	11,3	16,2	28,9	35,5	51,1
δ_{N0} short term	[mm]	0,2	0,2	0,2	0,2	0,2	0,4
$\delta_{N\infty}$ long term	[mm]	0,4	0,4	0,4	0,4	0,4	0,4

Table 12: Characteristic displacements under shear loads

Characteristic displacement in non-cracked C 20/25 to C50/60 concrete		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Admissible service load : V	[kN]	5,4	8,6	12,5	23,3	36,4	52,4
δ_{N0} short term	[mm]	2,0	2,0	2,0	2,0	2,0	4,0
$\delta_{N\infty}$ long term	[mm]	4,0	4,0	4,0	4,0	4,0	4,0

Installation instruction

	Drill a hole to the correct diameter and depth using a rotary percussive machine. Starting from the drill hole base blow out at least 2 times with the SPIT hand pump. For the hole diameter 10mm a reduction ϕ 6mm must be clamped on the air pump nozzle.
	Using the specified brush, brush out 2 times mechanically Starting from the drill hole base, blow out at least 2 times with the hand pump
	Using the specified brush, brush out 2 times mechanically Starting from the drill hole base, blow out at least 2 times with the hand pump
	Dispense the first part to waste until an even colour is achieved (≈ 20ml). Insert the nozzle to the far end of the hole, and inject the resin, withdrawing the nozzle as the hole fills. Fill the hole to at least 60%of its depth.
	Immediately insert the fixing, slowly and with a slight twisting motion. Remove excess resin from around the mouth of the hole before it sets
	Leave the fixing undisturbed until the cure time has elapsed. Attach the fixture and tighten the nut to the required torque.