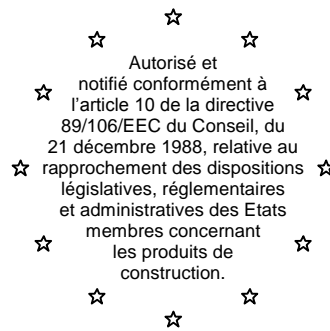


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CSTB
le futur en construction

MEMBRE DE L'EOTA

European Technical Approval

ETA-11/0487

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

Nom commercial :

Trade name:

SORMAT LYT

Titulaire :

Holder of approval:

SORMAT OY

Harjutie 5

FIN-21290 Rusko

Finlande

Type générique et utilisation prévue du produit de construction :

Generic type and use of construction product:

Cheville à clou pour fixation de système composite d'isolation thermique extérieure dans le béton et la maçonnerie

Nailed-in anchor for fixing of external thermal insulation composite systems with rendering in concrete and masonry

Validité du :

au :

Validity from / to:

12/12/2011

12/12/2016

Usine de fabrication :

Manufacturing plant:

SORMAT Plant 1

Le présent Agrément technique européen contient :

This European Technical Approval contains:

13 pages incluant 5 annexes faisant partie intégrante du document.

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



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

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by the Council Directive 93/68/EEC of 22 July 1993²;
 - Décret n° 92-647 du 8 juillet 1992³ concernant l'aptitude à l'usage des produits de construction;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁴;
 - Guideline for European Technical Approval of « Plastic anchors for fixing of external thermal insulation composite systems with rendering » ETAG 014, edition January 2002.
2. The Centre Scientifique et Technique du Bâtiment is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
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¹ Official Journal of the European Communities n° L 40, 11.2.1989, p. 12

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

³ Journal officiel de la République française du 14 juillet 1992

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

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1. Definition of product

The SORMAT LYT anchor consists of a plastic expansion sleeve with a collar for fixing the profiles for thermal insulation systems and a metallic nail as expansion element. The anchor sleeve is made of polyamide 6 (PA6) and the nail is made of steel, with bright passivated coating, or made of stainless steel. The collar exists in two different shapes (countersunk or pansunk head). The plastic sleeve is expanded by hammering in the expansion element which presses the sleeve against the wall of the drilled hole.

The installed anchor is shown in Annex 1.

1.2. Intended use

The anchor is intended to be used for anchorages for which requirements for safety in use in the sense of the Essential Requirement 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would cause low risk to human life. The anchor is to be used only as multiple fixing for the anchorage of profiles for bonded thermal insulation composite system (ETICS) according to ETAG 014 in concrete and masonry. The base material shall consist of reinforced or unreinforced normal weight concrete of strength class C 12/15 at least to C50/60 at most according to EN 206-1 or of masonry walls according to Table 4 of Annex 4 (categories A and B).

The anchor may only be used for transmission of wind suction loads and shall not be used for the transmission of dead loads of the thermal insulation composite system. The dead loads have to be transmitted by the adhesion of the thermal insulation composite system. The anchor with the passivated coating steel nail shall be used with a thermal insulation cover of at least 50 mm.

The provisions made in this European Technical Approval are based on an assumed intended working life of the anchor of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

2.1. Characteristics of product

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

Each plastic expansion sleeve is marked with the diameter and length of the anchor (same length as the nail): e.g. 8/100.

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

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 safety in use in the sense of the Essential Requirement 4 has been made in accordance with the « Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Insulation Composite Systems with rendering » based on the use categories A and B.

3 Evaluation of Conformity and CE marking

3.1. Attestation of conformity system

The system of attestation of conformity 2 (ii) (referred to as system 2+) according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

a) tasks for the manufacturer:

1. initial type testing of the product,
2. factory production control,
3. testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.

b) tasks for the approved body:

4. certification of the factory production control on the basis of ,
 - initial inspection of the factory and of factory production control,
 - continuous surveillance, assessment and approval of factory production control.

3.2. Responsibilities

3.2.1. Tasks of the manufacturer, factory production control

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan⁶. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of incoming materials shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying the dimensions and determining the material properties.

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

- Nail:
 - Mechanical properties (yield and ultimate tensile strength, ultimate elongation)
- Expansion sleeve:
 - Physical properties (diameter, length, density);
 - Mechanical properties (yield and ultimate tensile strength, ultimate elongation);
 - Thermal properties (Melting flow index, DSC curves)
- Visual control of both parts of the anchor (nail and expansion sleeve).
- Adjusting data of injection moulding machine.

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.

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 inspection of the factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed tests plan, the factory, in particular the staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the anchor with the specifications mentioned in 2.1 as well as in the Annexes to the European technical Approval.

3.2.2.2. Continuous surveillance

The approved body shall visit the factory at least once a year for surveillance. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the prescribed test plan.

Continuous surveillance and assessment of factory production control have to be performed according to the prescribed test plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to the 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 CE marking consists of the letters "CE" followed by the identification number of the inspection body. The CE-marking shall be accompanied by:

- 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 European Technical Approval;
- use categories A and B.

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

4.2.1.1 General

The ETA only applies to the manufacture and use of the anchor. Verification of stability of the external thermal insulation composite system including application of loads on the anchor are not subject of this European Technical Approval.

Fitness of the anchor for the intended use is given under the following provisions:

The design is carried out in compliance with ETAG 014 "Guideline for European Technical Approval of plastic anchors for fixing of External Thermal Insulation Composite Systems with rendering" under the responsibility of an engineer experienced in anchorages.

Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials, the thickness of the insulation and the dimensions of the anchorage members as well of the relevant tolerances.

Proof of direct local application of load on the base material has been delivered.

The anchor shall only be used for the transmission of wind suction loads. All other loads such as dead load and restraints shall be transmitted by the adhesion of the relevant external thermal insulation composite system.

4.2.1.2 Resistance

The characteristic values of the tension resistance of the anchor are given in Table 5, Annex 5. If there is a difference in the characteristic values of the base material or if a similar base material of category B is supposed to be used, job-site tests according to 4.2.3 shall be carried out in order to determine the specific characteristic tension resistance.

4.2.1.3 Characteristic values, spacing and dimensions of anchorage member

The minimum spacing and dimensions of anchorage member according to Annex 5 shall be observed.

4.2.1.4 Displacement behavior

When loaded to the design value of resistance in normal weight concrete or in clay bricks a displacement up to approximately 0,3 mm in the load direction is expected.

4.2.2 Installation of anchor

The fitness for use of the anchor can only be assumed if the following conditions of installation are met:

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on the site;

- use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor;
- anchor installation in accordance with the manufacturer's specifications and drawings prepared for that purpose and using the appropriate tools;
- checks before placing the anchor to ensure that the characteristic values of the base material in which the anchor is to be placed is identical with the values which the characteristic loads apply for;
- observation of the drilling method : in the case of base materials covered in this Approval, the drilled hole is carried out using hammer or impact drilling;
- placing drilled holes without damaging the reinforcement;
- temperature during the installation of the anchor $\geq 0^{\circ}\text{C}$;
- exposure to UV due to solar radiation of the anchor not protected by rendering ≤ 6 weeks.

4.2.3 Job site tests

The characteristic tension resistance of the anchor may be determined by means of job site pull-out tests carried out on the material actually used if a characteristic resistance of the base material does not exist.

The characteristic resistance of the anchor shall be determined by carrying out at least 15 centric tension load pull-out tests on the site. These tests are also possible under the same conditions in laboratory.

Execution and evaluation of the tests as well as the issuing of the test report and the determination of the characteristic resistance should be under the responsibility of approved testing laboratories or the supervision of the person responsible for the execution of the works on site.

Number and position of the anchors to be tested shall be adapted to the relevant special conditions of the site and, for example, to be increased in the case of hidden and larger areas, such that reliable information about the characteristic resistance of the anchor in the base material in question can be derived. The tests shall take into account the most unfavourable conditions of the practical execution.

4.2.3.1 Assembly

The anchor to be tested shall be installed (e.g. preparation of drilled hole, drilling tool to be used, drill bit) and the spacing and the edge distances shall be in the same way as planned for the fixing of the external thermal insulation composite system.

4.2.3.2 Execution of tests

The test rig used for the pull-out tests shall provide a continuous slow increase of the load, controlled by a calibrated load cell. The load shall apply perpendicular to the surface of the base material and shall be transmitted to the anchor via an hinge. The reaction forces shall be transmitted into the base material at a distance of at least 15 cm from the anchor. The load shall be increased continuously in a way that the ultimate load is reached after about 1 minute. The load is measured when the ultimate load (N_1) is achieved.

4.2.3.3 Test report

The test report shall include all information necessary to assess the resistance of the tested anchor. It shall be included in the construction dossier.

The minimum data required are:

- Construction site, building owner, date and location of the tests, air temperature, type of structure to be fixed (ETICS or VETURE kits);
- Masonry type (type of brick, strength class, dimensions, mortar group);
- Plastic anchor and nail used for the tests; Effective cutting diameter of drill bit;
- Test rig; Results of tests with ultimate value N_1 ;
- Test carried out or supervised by; signature;

4.2.3.4 Evaluation of tests results

The characteristic resistance NRk1 is obtained from the measured values N1 as follows:

$$N_{Rk1} = 0,6 \cdot N_1 \leq 1,5 \text{ kN}$$

with N₁ the mean value of the five smallest measured values at the ultimate load.

4.2.4. Responsibility of the manufacturer

It is the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to in 4.2.1, 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 packaging and/or on an enclosed instruction sheet, preferably using illustrations.

The minimum data required are:

- base material for the intended use;
- drill bit diameter;
- maximum thickness of the ETICS;
- minimum effective anchorage depth;
- minimum hole depth;
- information on the installation procedure;
- identification of the manufacturing batch

All data shall be presented in a clear and explicit form.

5 Recommendations on packaging, transport and storage.

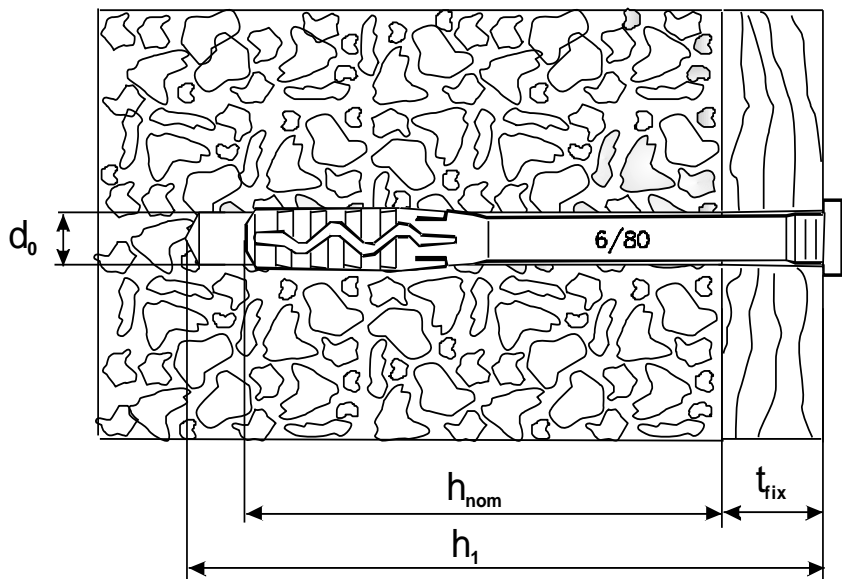
The anchor shall be supplied as a complete unit.

The anchor shall be stored under normal climatic condition in its original packaging. Before installation, it shall not be extremely dried or frozen.

**The original French version is
signed by**

**Le Directeur Technique
C. BALOCHE**

Scheme of the SORMAT LYT anchor in use



Intended use : anchorage of profiles for ETICS in concrete and masonry.

L : total length of the plastic sleeve

h_{ef} : effective anchorage depth

d_0 : drilled hole diameter

h_0 : depth of drilled hole

t_{fix} : thickness of fixture

D : diameter of the collar

t_{fix} , thickness of fixture corresponds to the thickness of the equalizing layer or non loadbearing coating in addition to the thickness of the profile itself.

Table 1 : Materials

Part	Designation	Material	
1	Plastic expansion sleeve	Polyamide	
2	Nail	Zinc electroplated steel $\geq 5 \mu\text{m acc. EN ISO 4042}$	EN ISO 898-1: grade 5.8
		Stainless steel A2	EN 10088: grade 50
		Stainless steel A4	

SORMAT LYT

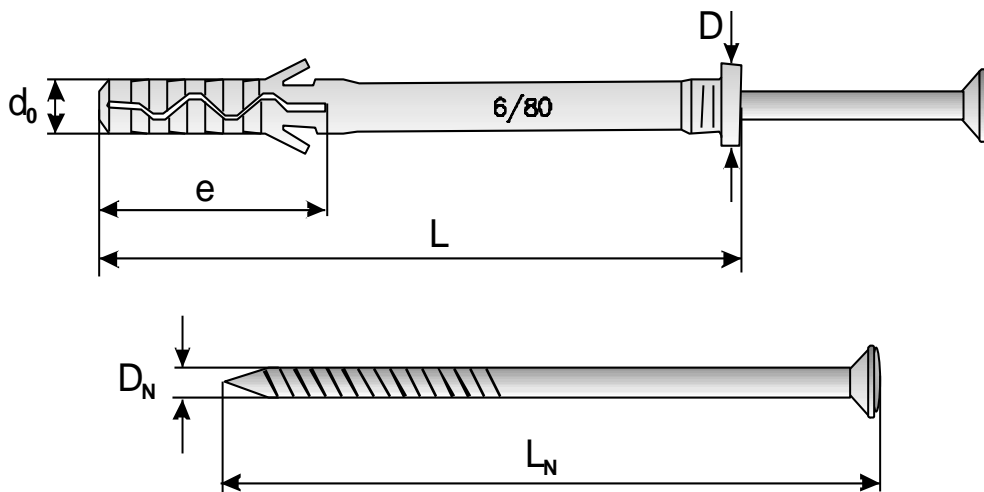
Annex 1

Intended use and materials

of European
Technical Approval
ETA-11/ 0487



SORMAT LYT : PLASTIC SLEEVE AND STEEL NAIL / MARKING ON PLASTIC SLEEVE



Designation of the anchor : anchor name, anchor diameter, length of the expansion sleeve, collar shape (UK or LK) and type of coating (SP or KP, bright coating). *For example: LYT 6/80 UK KP.*
Marking : the expansion sleeve displays anchor diameter (d_0) / length of the expansion sleeve (L).

Table 2: Different sizes and combinations of plastic sleeves and steel nails

Ø5 Pansunk	LYT 5/L LK	
Ø5 Countersunk	LYT 5/L UK	
Ø6 Pansunk	LYT 6/L LK	
Ø6 Countersunk	LYT 6/L UK	
Ø8 Pansunk	LYT 8/L LK	
Ø8 Countersunk	LYT 8/L UK	

SORMAT LYT

**Different components of the anchor:
sleeves and nails**

Annex 2

of European
Technical Approval
ETA-11/ 0487

Table 3 : Dimensions of components and installation data


SORMAT LYT Anchor type (Diameter / Length)	Maximum thickness of fixture	Diameter of the expansion sleeve and drilled hole	Length of the expansion part	Diameter of the collar	Diameter of the nail	Emb. depth	Depth of the drilled hole	Length of the nail
	t_{fix}	d_{nom} and d_0	e	D	d_N	h_{ef}	h_0	L_N
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
5/30	0	5	22	8.3	3,3	30	40	30
5/40	10							40
5/50	20							50
6/40	10	6	28	9.0	3.7			40
6/60	30							60
6/80	50							80
8/60	20	8	35	12.0	4.8	40	50	60
8/80	40							80
8/100	60							100
8/120	80							120

Installation

- The anchor shall be set at a temperature of at least 0°C.
- The drilled hole is realized for concrete and masonry made of clay brick, by means of a hammer drill by impact.
- The expansion sleeve is set into the drilled hole with a hand hammer by way of slight hammering.
- The nail is then hammered into the expansion sleeve, until the head of the nail rests on the plate.

SORMAT LYT**Dimensions and installation data****Annex 3**of European
Technical Approval
ETA-11/0487

Table 4 : Base materials

Base material	Dimensions L x l x H [mm]	References	Compressive strength [MPa]
Concrete C20/25	2500x1500x400	EN 206-1	25.0
Concrete C50/60	2500x1500x400	EN 206-1	60.0
Clay brick	 220 x 110 x 55	NF EN 771-1	4.7 (bending test)

SORMAT LYT

Base materials

Annex 4

of European
Technical Approval
ETA-11/0487

Table 5 : Characteristic resistance to tension loads N_{Rk} in concrete and masonry for a single anchor in kN

Base material	SORMAT LYT Characteristic resistance to tension loads N_{Rk} [kN]		
	Ø5	Ø6	Ø8
Concrete C15/20	0.20	0.40	0.75
Concrete C20/25 to C50/60	0.30	0.60	0.90
Clay brick	0.20	0.60	0.75

Table 6 : Minimum spacing and edge distances, dimension of members

Minimum spacing	$S_{min} \geq 100 \text{ mm}$
Minimum edge distance	$C_{min} \geq 100 \text{ mm}$
Minimum thickness of member	$h \geq 100 \text{ mm}$

SORMAT LYT	Annex 5 of European Technical Approval ETA-11/ 0487
Characteristic resistance to tension loads N_{Rk} Minimum spacing and edge distances	