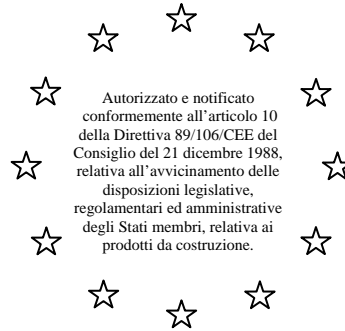


**Istituto per le Tecnologie  
della Costruzione  
Consiglio Nazionale delle Ricerche**

Via Lombardia 49 - 20098 San Giuliano Milanese – Italy  
tel: +39-02-9806.1 – Telefax: +39-02-98280088

e-mail: info@itc.cnr.it



**Membro EOTA**

**European Technical Approval**

**ETA 11/0081**

(English language translation; the original version is in Italian)

Nome commerciale <b>Trade name</b>	<b>“BOEROTHERM”</b>
Beneficiario <b>Holder of approval</b>	<b>BOERO BARTOLOMEO S.p.A. via Macaggi, 19 - 16121 GENOVA</b>
Tipologia del prodotto da costruzione ed utilizzo  <b>Generic type and use of construction product</b>	Sistema Composito di Isolamento Termico Esterno di facciata con Intonaco destinato all'isolamento termico esterno delle murature degli edifici <b>External Thermal Insulation Composite System with renderings for the use as external insulation to the walls of buildings</b>
Validità da/a <b>Validity from/to</b>	<b>10.06.2013/09.06.2018</b>
Indirizzo stabilimenti di produzione <b>Manufacturing plants</b>	<b>BOERO BARTOLOMEO S.p.A. via Savonesa 11/1 15054 Rivalta Scrivia (AL) - Italy</b>
Questo BTE contiene: <b>This ETA contains:</b>	15 pagine <b>15 pages</b>



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

## I LEGAL BASIS AND GENERAL CONDITIONS

1. This European Technical Approval is issued by Istituto per le Tecnologie della Costruzione - Consiglio Nazionale delle Ricerche (called ITC-CNR in the following text) 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> and by Regulation EC n. 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - DPR 246 of 21/04/93<sup>4</sup> and DPR 499 of 10/12/97<sup>5</sup>, concerning the implementation of Council Directive 89/106/EEC;
  - Common Procedural Rules for Requesting, Preparing and Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC<sup>6</sup>;
  - Guideline for European Technical Approval of “External Thermal Insulation Composite Systems with rendering” Edition March 2000 (called ETAG 004 Edition March 2000 in the following text).
2. ITC-CNR is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to this European Technical Approval and for their fitness for the intended use remains with the Holder of the European Technical Approval.
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<sup>1</sup> Official Journal of the European Communities N° L 40, 11.02.1989, p.12

<sup>2</sup> Official Journal of the European Communities N° L 220, 30.08.1993, p.1

<sup>3</sup> Official Journal of the European Union N° 1 L 220, 30.10.2003, p.1

<sup>4</sup> Gazzetta Ufficiale della Repubblica Italiana n. 170 of 22.07.1993

<sup>5</sup> Gazzetta Ufficiale della Repubblica Italiana n. 21 of 10/12/1998

<sup>6</sup> Official Journal of the European Communities N° L 17, 20.01.1994, p.34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 DEFINITION OF PRODUCT AND INTENDED USE

The kit “BOEROTHERM” is designed and installed in accordance with the ETA Holder design and installation instructions, deposited at ITC-CNR.

According to categories envisaged by § 2.2 of ETAG 004 Edition March 2000, the kit “BOEROTHERM” is a bonded system (required bonded surface: at least 40%) with supplementary mechanical fixings (the fixings are used to provide stability until the adhesive has dried and act as a temporary connection); it comprises the components described in the following Table 1 which are factory-made by the ETA Holder or by his suppliers. The ETA Holder is ultimately responsible for the kit.

#### 1.1 Components of the kit “BOEROTHERM”

The components of the kit are specified by the ETA Holder as follows:

<b>Component</b>	<b>Trade name</b>	<b>Installation information</b>	
		<b>Coverage kg/m<sup>2</sup></b>	<b>Thickness (mm)</b>
<b>Adhesive 1</b> (cement <sup>7</sup> based powder paste requiring addition of 20 –22% of water) particle size: 1.5 mm	“GB831” <sup>8</sup>	2.5 - 4.0	//
<b>Adhesive 2</b> (cement <sup>9</sup> based powder + fillers requiring addition of 20 –22% of water) particle size: 1.5 mm	“GB831 Light” <sup>10</sup>	2.0 - 3.0	//
<b>Insulation product 1</b> (expanded polystyrene panels) (see further description at § 2.3.1)	“PORON B 100” <sup>11</sup>	//	30 -100
<b>Insulation product 2</b> (mineral wool panels) (see further description at § 2.3.2)	“Frontrock Max E” <sup>12</sup>	//	40 -240
<b>Base coat 1</b> (cement <sup>13</sup> based powder paste requiring addition of 20 –22% of water) particle size: 1.5 mm	“GB831” <sup>14</sup>	4.0 - 6.0	3 - 5 (dry)
<b>Base coat 2</b> (cement <sup>15</sup> based powder paste + fillers requiring addition of 20 –22% of water) particle size: 1.5 mm	“GB831 Light” <sup>16</sup>	5.0 - 5.0	4 - 5 (dry)

<sup>7</sup> CEM II/A - LL 42,5 R

<sup>8</sup> Manufacturer: Rofix, Prevalle (Bs) – Comabbio (VA) Italy

<sup>9</sup> CEM II/A - LL 42,5 R

<sup>10</sup> Manufacturer: Rofix, Prevalle (Bs) – Comabbio (VA) Italy

<sup>11</sup> Manufacturer: Poron Italiana Sud Srl

<sup>12</sup> Manufacturer: Rockwool S.p.A.

<sup>13</sup> CEM II/A - LL 42,5 R

<sup>14</sup> Manufacturer: Rofix, Prevalle (Bs) – Comabbio (VA) Italy

<sup>15</sup> CEM II/A - LL 42,5 R

<sup>16</sup> Manufacturer: Rofix, Prevalle (Bs) – Comabbio (VA) Italy

<b>Reinforcement</b> (glass fibre mesh) mesh size: 4.00 x 4.5mm	“RET01-1160” <sup>17</sup>	//	//
<b>Key coat</b> (Emulsione acrilica)	“Fondo P 378” <sup>18</sup>	0.10 – 0.20	//
<b>Finishing coat 1</b> (ready to use paste based on acrylic polymer) particle size: 1.0 mm	“Biquarz Acrilsilossanico” <sup>19</sup>	2.0 (± 10%) (prepared product)	1.0 -1.5
<b>Finishing coat 2</b> (ready to use paste based on silicate) particle size: 1.0 mm	“Silnovo Intonaco” <sup>20</sup>	2.0 (± 10%) (prepared product)	1.0 -1.5
<b>Ancillary materials: profiles and anchors</b>			
Base profiles in aluminium: L profiles length 250 cm different sections	“ZIN 32” <sup>21</sup>	//	//
Corner profiles in PVC: L-Profiles length 250 cm thickness: 0.5 mm	“ZIN 33box” <sup>22</sup>	//	//
Anchors in plastic: (one-piece plastic anchors) different lengths in relation with thickness of insulation	“TER 11 N” <sup>23</sup>	~ 2	Ø of the nail: 8 mm Ø of the collar: 60 mm
Anchors in plastic: (with steel nail) different lengths in relation with thickness of insulation	“TER 11 A” <sup>24</sup>	~ 2	Ø of the nail: 8 mm Ø of the collar: 60 mm

Tab. 1 : Components of the kit

## 1.2 Intended use

The kit “BOEROTHERM” is intended for use as external thermal insulation composite system of buildings’ walls and in particular for new and existing buildings whose facades can be made of masonry (bricks, concrete, stones, ...), in concrete cast on site or in prefabricated panels, and that can be rendered and coated or uncoated; the substrate may need preparation as described in § 7.2.1 of ETAG 004 Edition March 2000.

The kit can be used on vertical walls. It can also be used on horizontal or inclined surfaces which are not exposed to precipitation. It is made of non load-bearing construction elements and the installed system does not contribute directly to the stability of the wall on which it is installed, but it can contribute to durability by providing enhanced protection from the effects of weathering. The installed system is not intended to ensure the air tightness of the building structure. For what concerns the impact resistance, the kit result in Use Category II (see § 2.2.5 of this ETA).

The provisions made in this ETA are based on an assumed intended working life of at least 25 years, provided that the installed system is subjected to an appropriate use and maintenance; the indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or by the Approval Body, but should only be regarded as a mean

<sup>17</sup> Manufacturer: Saint Gobain Vertex – Litomyšl; Czech Republic

<sup>18</sup> Manufacturer: Boero S.p.A., Italy

<sup>19</sup> Manufacturer: Boero S.p.A., Italy

<sup>20</sup> Manufacturer: KABE FARBEN, Swiss

<sup>21</sup> Manufacturer: Dakota S.p.A.

<sup>22</sup> Manufacturer: Dakota S.p.A.

<sup>23</sup> Manufacturer: Dakota S.p.A.

<sup>24</sup> Manufacturer: Dakota S.p.A..

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

## 2. CHARACTERISTICS OF PRODUCT AND METHODS OF VERIFICATION

### 2.1 General

The identification tests and the assessment of fitness for use of the kit “BOEROTHERM” were carried out in compliance with ETAG 004 Edition March 2000 and ITC-CNR has carried out all the identification tests in full conformity with what envisaged in Annex C of ETAG 004 Edition March 2000.

This ETA is issued for the kit on the basis of admitted information/data, deposited at ITC-CNR, which identify the kit that was assessed and judged. Changes to the production process of the components or to the components of the kit which could result in deposited information/data being incorrect, shall be notified to ITC-CNR before they are introduced and ITC-CNR will assess whether or not such changes affect the ETA and, if so, whether further assessment and/or alteration to the ETA shall be necessary<sup>25</sup>.

The characteristics of the components and of the system not mentioned in this ETA nor in the annexes shall correspond to the respective values laid down in the Technical Documentation of this ETA, checked by ITC-CNR.

### 2.2 Characteristics of the system “BOEROTHERM”

#### 2.2.1 Reaction to fire of “BOEROTHERM”

The reaction to fire has been determined according with § 5.1.2.1 of ETAG 004 Edition March 2000. The system, as defined under clause 1.1, reached the following classification: Euroclass according to EN 13501-1:

	Organic content of the rendering system (%)	Flame retardant content of the rendering system (%)	Maximum thickness (mm)	Class
“BOEROTHERM” with EPS	9.5%	0	100	B – s1, d0

Tab. 2: Reaction to fire

#### **Mounting and fixing**

(for all end use applications given in 1.2 of this ETA)

The assessment of reaction to fire is based on tests with a maximum insulation layer thickness of SBI/100 mm, EN 11925-2/60 mm and a maximum insulation material (EPS) density of 20.00 kg/m<sup>3</sup>, as well as a rendering system with a maximum organic content of 9.5% and a thickness of 4.0 mm. For the SBI test the system was mounted directly to a calcium silicate substrate (A2-s1, d0) with a minimum density of 815 kg/m<sup>3</sup>.

The mounting of the specimen was carried out at ITC-CNR Laboratory by the Manufacturer following the specifications given in his ETA Technical Dossier and in his Recommendations, using a single layer of the glass fibre mesh all over the specimen (without overlapping the mesh). The specimen didn't include any joints nor anchors (anchors have no influence on the test results); the panel edges were rendered, excluding the bottom edge and the top of the specimen.

#### **Extended application**

The test results cover arrangements with insulation materials (EPS) of a lower thickness and density, as well as with rendering systems (binder types) with a lower organic content.

<sup>25</sup> The ETA Holder could change, under his own responsibility, some of the suppliers of a component, but only provided that the characteristics and the performances of the new components and the final performances of the system do not change at all. These changes must be fully recorded within the Factory Production Control documents in order to grant full traceability.

2.2.2 Water absorption (capillarity test)

The water absorption has been determined in accordance with § 5.1.3.1 of ETAG 004 Edition March 2000.

Water absorption	after 1 hour		after 24 hours	
	< 1.0 kg/m <sup>2</sup>	≥ 1.0 kg/m <sup>2</sup>	< 0.5 kg/m <sup>2</sup>	≥ 0.5 kg/m <sup>2</sup>
Base coat GB831 on EPS	X	not applicable	X	
Base coat GB831 on MW	X	not applicable	X	
Base coat GB831 Light on EPS	X	not applicable		X
Base coat GB831 Light on MW	X	not applicable		X
Rendering system made of: - base coat GB831 on EPS - key coat - finishing coat Biquarz Acrilsilossanico	X	not applicable	X	
Rendering system made of: - base coat GB831 on EPS - key coat - finishing coat Silnovo Intonaco	X	not applicable	X	
Rendering system made of: - base coat GB831 on MW - key coat - finishing coat Biquarz Acrilsilossanico	X	not applicable	X	
Rendering system made of: - base coat GB831 on MW - key coat - finishing coat Silnovo Intonaco	X	not applicable	X	
Rendering system made of: - base coat GB831 Light on EPS - key coat - finishing coat Biquarz Acrilsilossanico	X	not applicable	X	
Rendering system made of: - base coat GB831 Light on EPS - key coat - finishing coat Silnovo Intonaco	X	not applicable		X
Rendering system made of: - base coat GB831 Light on MW - key coat - finishing coat Biquarz Acrilsilossanico	X	not applicable	X	
Rendering system made of: - base coat GB831 Light on MW - key coat - finishing coat Silnovo Intonaco	X	not applicable		X

Tab.3: Water absorption

2.2.3 Hygrothermal behaviour (heat-rain and heat-cold cycles)

In accordance with the method envisaged in 5.1.3.2.1 ETAG 004 Edition March 2000, the kit has been applied on 2 rigs and the hygrothermal behaviour of the 8 alternatives has been assessed.

None of the following defects occurred:

- blistering or peeling of any paint finishing,
- failure or cracking associated with joints between insulation products boards or profiles fitted with the system,
- detachment of the render,
- cracking allowing water penetration to the insulation layer.

Assessment: the system “BOEROTHERM” is resistant to hygrothermal cycles.

2.2.4 Freeze thaw behaviour

As shown in Table 3 of this ETA, the water absorptions of the base coat “GB831 Light” and of the rendering systems which includes the finishing coat “Silnovo Intonaco” are more than 0.5 kg/m<sup>2</sup> after 24 hours. Therefore the so the alternatives with these components were subjected to freeze-thaw cycle as envisaged in § 5.1.3.2.2 of ETAG 004 Edition March 2000. The samples were subjected to 30 freeze-thaw cycles. At a period of every three cycles during the freeze-thaw cycles observations related to changes in characteristics of the surface or of the entire system, were made. No changes, no distortions at the edges were observed. So the configuration of the system “Boerotherm” is assessed as freeze-thaw resistant.

2.2.5 Impact resistance

The tests have been performed on the rig on the 8 alternatives after the hygrothermal cycles, in accordance with § 5.1.3.3 of ETAG 004 Edition March 2000. The alternatives were made with one single standard mesh. The resistance of the systems to hard body impacts (3 Joules and 10 Joules) and to perforation (Perfotest) leads to the following use category:

“BOEROTHERM” with Single standard mesh	Use Category II
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Tab. 4: Category of impact resistance of BOEROTHERM”

2.2.6 Water vapour permeability (Resistance to water vapour diffusion)

The water vapour permeability has been determined in accordance with § 5.1.3.4 of ETAG 004 Edition March 2000.

Water vapour permeability	Acceptance criteria	Equivalent air thickness (m)	Pass
Rendering system made of - base coat GB831 - key coat - finishing coat Biquarz Acrilsilossanico	≤ 2 m	0.34	X
Rendering system made of: - base coat GB831 Light - key coat - finishing coat Silnovo Intonaco	≤ 2 m	0.13	X
Rendering system made of - base coat GB831 - key coat - finishing coat Biquarz Acrilsilossanico	≤ 2 m	0.42	X

Rendering system made of: - base coat GB831 Light - key coat - finishing coat Silnovo Intonaco	≤ 2 m	0.23	X
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Tab. 5: Water vapour permeability

### 2.2.7 Release of dangerous substances

The external thermal insulation composite system complies with the provisions of Guidance Paper H (“A harmonized approach relating to Dangerous substances under the construction products directive”, edition 2002) about dangerous substances.

A written declaration of conformity in this respect was made by the manufacturer. 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 EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

### 2.2.8 Safety in use

#### 2.2.8.1 Bond strength

The bond strength has been determined in accordance with § 5.1.4.1 of ETAG 004 Edition March 2000.

Bond strength between:	Acceptance criteria	Pass
base coat GB831 and insulation product in EPS (§ 5.1.4.1.1): - under dry conditions	≥ 0.08 MPa	X
base coat GB831 Light and insulation product in EPS (§ 5.1.4.1.1): - under dry conditions		X
base coat GB831 and insulation product in MW (§ 5.1.4.1.1): - under dry conditions	≥ 0.08 MPa or 100% break into insulation	X
base coat GB831 Light and insulation product in MW (§ 5.1.4.1.1): - under dry conditions		X
adhesive GB831 and insulation product in EPS (§ 5.1.4.1.3): - under dry conditions - 2 days of water immersion + 2 hours drying - 2 days of water immersion + 7 days drying	≥ 0.08 Mpa ≥ 0.03 Mpa ≥ 0.08 MPa	X X X
adhesive GB831 and insulation product in MW (§ 5.1.4.1.3): - under dry conditions - 2 days of water immersion + 2 hours drying - 2 days of water immersion + 7 days drying	≥ 0.08 Mpa ≥ 0.03 Mpa ≥ 0.08 MPa	or 100% break into insulation X X X
adhesive GB831 Light and insulation product in EPS (§ 5.1.4.1.3): - under dry conditions - 2 days of water immersion + 2 hours drying - 2 days of water immersion + 7 days drying	≥ 0.08 Mpa ≥ 0.03 Mpa ≥ 0.08 MPa	X X X



adhesive GB831 Light and insulation product in MW (§ 5.1.4.1.3):			
- under dry conditions	≥ 0.08 Mpa	or 100% break into insulation	X
- 2 days of water immersion + 2 hours drying	≥ 0.03 Mpa		X
- 2 days of water immersion + 7 days drying	≥ 0.08 MPa		X

Tab. 6: Bond strength

### 2.2.8.2 Fixing strength

In accordance with what envisaged in Table 3 and in § 5.1.4.2 of ETAG 004 Edition March 2000, being “BOEROTHERM” a bonded system, the Fixing strength (Displacement test) and Wind load resistance performances were not determined.

### 2.2.9 Thermal resistance

The thermal transmittance of the substrate wall covered by the ETICS is calculated in accordance with the standard EN ISO 6946:

$$U = U_c + \chi_p \cdot n$$

Where:  $\chi_p \cdot n$  has only to be taken into account if it is greater than 0,04 W/(m<sup>2</sup>.K)

U: global thermal transmittance of the covered wall (W/ (m<sup>2</sup>.K))

n: number of anchors (through insulation product) per m<sup>2</sup>

$\chi_p$ : local influence of thermal bridge caused by an anchor. The value listed below can be taken into account if not specified in the eventual anchor's ETA

= 0.002 W/K for anchors with a stainless steel screw with the head covered by a plastic material and for anchors with an air gap at the head of the screw ( $\chi_p \cdot n$  negligible for n < 20)

= 0.004 W/K for anchors with a galvanized steel screw with the head covered by a plastic material ( $\chi_p \cdot n$  negligible for n < 10)

= negligible for anchors with plastic nails (reinforced or not with glass fibres ...)

U<sub>c</sub>: thermal transmittance of the current part of the covered wall (excluding thermal bridges) (W/ (m<sup>2</sup>.K)) determined as follows:

$$U_c = \frac{1}{R_i + R_{render} + R_{substrate} + R_{se} + R_{si}}$$

Where: R<sub>i</sub>: thermal resistance of the insulation product

R<sub>render</sub>: thermal resistance of the render (about 0.02 (m<sup>2</sup>.K)/W)

R<sub>substrate</sub>: thermal resistance of the substrate of the building (concrete, brick ...) ((m<sup>2</sup>.K)/W)

R<sub>se</sub>: external superficial thermal resistance ((m<sup>2</sup>.K)/W)

R<sub>si</sub>: internal superficial thermal resistance ((m<sup>2</sup>.K)/W)

### 2.2.10 Aspects of durability: Bond strength after ageing

The bond strength of the system after ageing has been determined following the method envisaged in § 5.1.7.1.1 of ETAG 004 Edition March 2000.

Bond strength after ageing	Acceptance criteria	Pass
between base coat GB831 + key coat + finishing coat “Biquarz Acrilsilossanico” and EPS insulation	≥ 0.08	X
between base coat GB831 + key coat + finishing coat “Silnovo Intonaco” and EPS insulation	≥ 0.08	X

between base coat GB831 + key coat + finishing coat "Biquarz Acrilsilossanico" and MW insulation	$\geq 0.08$ or 100% break into insulation	X
between base coat GB831 + key coat + finishing coat "Silnovo Intonaco" and MW insulation	$\geq 0.08$ or 100% break into insulation	X
between base coat GB831 Light + key coat + finishing coat "Biquarz Acrilsilossanico" and EPS insulation	$\geq 0.08$	X
between base coat GB831 Light + key coat + finishing coat "Silnovo Intonaco" and EPS insulation	$\geq 0.08$	X
between base coat GB831 Light + key coat + finishing coat "Biquarz Acrilsilossanico" and MW insulation	$\geq 0.08$ or 100% break into insulation	X
between base coat GB831 Light + key coat + finishing coat "Silnovo Intonaco" and MW insulation	$\geq 0.08$ or 100% break into insulation	X

Tab. 7: Bond strength of system after ageing

#### 2.2.11 Aspects of durability: Bond strength after freeze-thaw cycles

The bond strength of the system after freeze-thaw cycles has been determined following the method envisaged in § 5.1.7.1.1 of ETAG 004 Edition March 2000.

	Acceptance criteria	Pass
Bond strength after freeze-thaw cycles	$\geq 0.08$ or 100% break into insulation	X

Tab. 8: Bond strength of system after freeze-thaw cycles

### 2.3 Component's characteristics and parameters

The tests on components have been carried out in accordance with § 5.2 and with Annex C of ETAG 004 Edition March 2000 in order to verify the declared values or with the acceptance values of ETAG 004 Edition March 2000, where present. The results were positive.

#### 2.3.1 Insulation product in EPS

Expanded polystyrene panels with right edges. Their characteristics are given in the following table.

<i>Characteristic (test method)</i>	<i>Declared value (classification, standards, references)</i>	<i>Minimum/maximum value (when envisaged from ETAG 004 Edition March 2000)</i>	<i>Pass/fail or statement of the value (when envisaged from ETAG 004 Edition March 2000)</i>
Reaction to fire (EN 13501-1) thickness: 30 – 100 mm density: 20 kg/m <sup>3</sup>	Euroclass E	-	-
Water absorption by partial immersion (EN 1609) thickness: 40 mm density: 20 kg/m <sup>3</sup>	0.5 kg/m <sup>2</sup>	$\leq 1 \text{ kg/m}^2$	pass

Water vapour permeability ( $\mu$ ) (EN 12086) thickness: 40 mm	-	-	28.5
Tensile strength (EN 1607)	200 KPa	-	282 KPa
Shear strength (EN 12090)	-	$\geq 0.02 \text{ N/mm}^2$	pass
Shear modulus of elasticity (EN 12090)	-	$\geq 1.00 \text{ N/mm}^2$	pass
Conductivity ( $\lambda$ ) (EN 12667)	-	-	0.035 W/mK
Thermal resistance for the minimum thickness (30 mm) (EN 12667)	-	-	0.85 m <sup>2</sup> K/W
Thickness (EN 823)	T2 (EN 13163)	-	-
Length (EN 822)	L2 (EN 13163)	-	-
Width (EN 822)	W2 (EN 13163)	-	-
Squareness (EN 824)	S2 (EN 13163)	-	-
Flatness (EN 825)	P4 (EN 13163)	-	-
Density (EN 1602)	20 kg/m <sup>3</sup> ( $\pm 6$ )	-	-
Dimensional stability (23° $\pm$ 2°C, 50 $\pm$ 5% RH) (EN 1603)	$\leq 0.2 \%$	$\leq 0.2 \%$	-
Dimensional stability (70° $\pm$ 2° C for 7 days) (EN 1604)	$\leq 0.5 \%$	$\leq 0.5 \%$	-

Tab. 9: Insulation characteristics

### 2.3.2 Insulation product in MW

Mineral wool panels with right edges. Their characteristics are given in the following table.

<i>Characteristic (test method)</i>	<i>Declared value (classification, standards, references)</i>	<i>Minimum/maximum value (when envisaged from ETAG 004 Edition March 2000)</i>	<i>Pass/fail or statement of the value (when envisaged from ETAG 004 Edition March 2000)</i>
Reaction to fire (EN 13501-1) thickness: 40 – 240 mm density: 90 kg/m <sup>3</sup>	Euroclass A 1	-	-
Water absorption by partial immersion (EN 1609) thickness: 40 mm density: 90 kg/m <sup>3</sup>	//	$\leq 1 \text{ kg/m}^2$	pass
Water vapour permeability ( $\mu$ ) (EN 12086) thickness: 40 mm	-	-	1.85

Tensile strength (EN 1607)	$\geq 7.5$ (thickness up to 60 mm) $\geq 10$ (other thicknesses)	-	15.8
Shear strength (EN 12090)	-	$\geq 0.02 \text{ N/mm}^2$	pass
Shear modulus of elasticity (EN 12090)	-	$\geq 1.00 \text{ N/mm}^2$	pass
Resistance to compression (KPa) (EN 826)	$\geq 20$		pass
Conductivity ( $\lambda$ ) (EN 12667)	-	-	0.037 W/mK
Thermal resistance for the minimum thickness (40 mm) (EN 12667)	-	-	1.08 m <sup>2</sup> K/W
Thickness (EN 823)	-	-	1000 $\pm$ 2
Length (EN 822)	-	-	600 $\pm$ 2
Width (EN 822)	-	-	40 $\pm$ 2
Squareness (EN 824)	-	-	$\leq 2$
Flatness (EN 825)	-	-	$\leq 1$
Density kg/m <sup>3</sup> (EN 1602)	$\geq 90$	-	-
Dimensional stability (23° $\pm$ 2°C, 50 $\pm$ 5% RH) (EN 1603)	$\leq 0.2 \%$	$\leq 0.2 \%$	-
Dimensional stability (70° $\pm$ 2° C for 7 days) (EN 1604)	$\leq 0.5 \%$	$\leq 0.5 \%$	-

Tab. 10: Insulation characteristics

### 2.3.3 Rendering system (base coat GB831 + reinforcement)

#### 2.3.3.1 Rendering system strip tensile test

The test has been carried out in accordance with § 5.5.4.1 of ETAG 004 Edition March 2000.

Rendering system strain value	mean value of cracks in warp direction (mm)	mean value of cracks in weft direction (mm)
0.3 %	$0.10 < w \leq 0.15$	$0.05 < w \leq 0.10$
0.5 %	$0.15 < w \leq 0.20$	$0.10 < w \leq 0.15$
0.8 %	$0.15 < w \leq 0.20$	$0.10 < w \leq 0.15$
1.0 %	$0.15 < w \leq 0.20$	$0.15 < w \leq 0.20$
1.5 %	$0.15 < w \leq 0.20$	$0.15 < w \leq 0.20$
2.0 %	//	$0.20 < w \leq 0.25$
n° of cracks	37 (mean value )	50 (mean value )

Tab. 11: Rendering system strip tensile test results (w = crack's width)

### 2.3.4 Rendering system (base coat GB831 Light + reinforcement)

#### 2.3.4.1 Rendering system strip tensile test

The test has been carried out in accordance with § 5.5.4.1 of ETAG 004 Edition March 2000.

Rendering system strain value	mean value of cracks in warp direction (mm)	mean value of cracks in weft direction (mm)
0.3 %	//	//
0.5 %	$0.10 < w \leq 0.15$	$0.10 < w \leq 0.15$
0.8 %	$0.15 < w \leq 0.20$	$0.15 < w \leq 0.20$
1.0 %	$0.15 < w \leq 0.20$	$0.20 < w \leq 0.25$
1.5 %	$0.20 < w \leq 0.25$	$0.20 < w \leq 0.25$
n° of cracks	9 (mean value )	9 (mean value )

Tab. 12: Rendering system strip tensile test results (w = crack's width)

### 2.3.5 Reinforcement (glass fibre mesh)

The reinforcement is a glass fibre mesh and its characteristics have been verified through the Identification methods envisaged in Annex C of ETAG 004 Edition March 2000.

#### 2.3.5.1 Residual strength of reinforcement after ageing

	Results	Acceptance criteria
Residual strength after ageing - Weft direction - Warp direction	30.02 N/mm 27.62 N/mm	$\geq 20$ N/mm
Relative residual resistance (% after ageing) of strength in the as delivered state - Weft direction - Warp direction	76 % 65 %	$\geq 50$ % of the value at as delivered state

Tab. 13: Residual strength after ageing

## 3 EVALUATION OF CONFORMITY AND CE MARKING

### 3.1 **Attestation of conformity system**

Considering the Euroclass B for the reaction to fire and that no stage in production process has been identified that corresponds to an improvement of the reaction to fire classification, the system of Attestation of Conformity specified by the European Commission is System 2+ described in the Council Directive 89/106/EEC Annex III, 2 (i), First possibility and described as follows:

Declaration of Conformity of an ETICS by the manufacturer on the basis of:

#### a) Tasks of the manufacturers:

1. Initial type testing of the ETICS and the components
2. Factory Production Control, including testing of samples taken at the factory in accordance with a control plan<sup>26</sup>.

#### b) Tasks of the Notified Body:

3. Certification of 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.

<sup>26</sup> The control plan has been deposited at ITC-CNR and is only made available to the Notified Bodies involved in the conformity attestation procedure.

## **3.2 Responsibilities**

### **3.2.1 Tasks of the manufacturer**

#### **3.2.1.1 Initial Type testing (system 2+)**

For Initial Type Testing, the results of the test performed as part of the assessment for this European Technical Approval shall be used unless there are changes in the production line or plant. In such cases, the necessary new initial type testing has to be agreed between ITC-CNR and the Manufacturer. These tests could be taken over by the Manufacturer for Declaration of Conformity.

#### **3.2.1.2 Factory production control**

The ETA Holder has a Factory Production Control system in his plants (manufacturing the finishing coats and the key coat) and exercises permanent internal control of production, including testing samples in accordance with his control plan.

For the components of the system, which the ETA Holder does not manufacture by himself, he makes sure that a proper Factory Production Control carried out by the other manufacturers gives the guaranty of the components compliance with the European Technical Approval. In this aim:

- he relies on national certification bodies,
- and
- has specified through contracts with his suppliers the awaiting characteristics, the needed controls and the frequencies,
- and
- he carries out by himself controls on these components.

The control plan and the provisions taken by the ETA Holder for components not produced by himself have been agreed with the Approval Body and deposited with ITC-CNR where it is only made available to the Notified Body involved in the Conformity attestation procedure. This control plan will be given to the Notified Body chosen by the ETA Holder to perform the foreseen tasks on attestation of conformity.

The manufacturer only uses raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written processes and procedures. This production control system ensures that the system and its components are in conformity with this European Technical Approval.

The results of Factory Production Control are recorded and evaluated. The records include, among the others, the following information:

- designation of the product, raw material and components;
- type of control or testing;
- date of the product's manufacture and date of testing of the product or raw materials and components;
- results of controls 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 ITC-CNR.

Details of the extent, nature and frequency of testing and controls to be performed within the Factory Production Control shall correspond to the control plan which is part of the technical documentation of this European Technical Approval.

### **3.2.2. Tasks of the Notified Bodies**

#### **3.2.2.1 Initial inspection of factory and Factory Production Control**

The Notified Body shall ascertain that, in accordance with the control plan, the factory (in particular the employees and the equipment) and the Factory Production Control are suitable to ensure continuous and orderly manufacturing of the components according to the specifications mentioned in clause 2 of this ETA.

### 3.2.2.2 Continuous surveillance, assessment and approval of factory production control

The Notified Body should visit the factories at least once a year for surveillance. It has to be verified that the system of Factory Production Control and the specified manufacturing process are maintained taking into account the deposited control plan. Continuous surveillance and assessment of Factory Production Control have to be performed in accordance with the control plan.

During each visit, the Notified Body shall utilize an ad-hoc check list and shall examine, among the others:

- the control register of raw materials, products in course of manufacture and finished products,
- the document attesting the respect of the control frequencies,
- the conformity of the products subjected to this ETA.

In cases where the provisions of the European Technical Approval and the control plan are no longer fulfilled, the conformity certificate should be withdrawn.

### 3.3. **CE Marking**

The CE Marking shall be affixed on the packaging or on transport documents (DDT) accompanying the components of the kit when they are intended to be used in the kit. The symbol « CE » shall be followed by identification number of the Notified Body involved and shall be accompanied by the following information:

- name or identifying mark of the ETA Holder and name of the his manufacturing plants,
- legal address of the ETA Holder,
- the last two digits of the year in which the CE-marking was affixed,
- number of the EC certificate of conformity of Factory Production Control,
- number of this European Technical Approval,
- "BOEROTHERM",
- ETAG 004 – Edition March 2000.

## 4 **ASSUMPTIONS UNDER WHICH THE FITNESS OF THE PRODUCT FOR THE INTENDED USE WAS FAVOURABLY ASSESSED**

### 4.1 **Manufacturing**

The components of the system shall correspond, as far as their composition and manufacturing process is concerned, to the products subject to the approval tests. Manufacturing process scheme is deposited with ITC-CNR.

### 4.2 **Installation**

#### 4.2.1. General

It is the responsibility of the ETA Holder to guarantee that the information about design and installation of the system, are effectively communicated to the concerned people. These information can be given using reproductions of the respective parts of this European Technical Approval. Besides, all the data concerning the execution shall be clearly indicated on the packaging and/or the enclosed instruction sheets using one or several illustrations.

In any case, it is suitable to comply with national regulations and particularly concerning fire.

Only the components described in clause 1.1 with characteristics in accordance with clause 2 of this ETA can be used for the system.

The requirements given in ETAG 004 Edition March 2000, chapter 7, have to be considered.

#### 4.2.2. Design

To bond the system, the minimal bonded surface area and the method of bonding shall comply with characteristics of the system as well as the national regulations. In any case, the minimal bonded surface shall be at least 40%.

#### 4.2.3. Execution

The recognition and preparation of the substrate as well as the generalities about the execution of the system, which are fully described in the current version of the ETA Holder Catalogue, shall be carried out in compliance with:

- chapter 7 of the ETAG 004 Edition March 2000,
- national regulations in effect, if any.

The particularities in execution linked to the method of bonding and the application of the rendering system shall be handled in accordance with ETA Holder prescriptions. In particular it is suitable to comply with the quantities of rendering applied, the thickness regularity and the drying period between 2 layers.

## 5 RECOMMENDATIONS

### 5.1 **Packaging, transport and storage**

Packaging of the components has to be such that the products are protected from moisture during transport and storage, unless other measures are foreseen by the manufacturer for this purpose and, in case, by ETA Holder specifications  
The components have to be protected against damage.

### 5.2 **Maintenance and repair of the works**

It is accepted that the finishing coat shall normally be maintained in order to fully preserve the system's performances.

Maintenance, which is clearly described in the current version of the ETA Holder Catalogue, includes:

- the repairing of localised damaged areas due to accidents,
- the application of various products or paints, possibly after washing or *ad hoc* preparation.

Necessary repairs should be done rapidly.

It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance.

**The original version is signed by  
arch. Roberto Vinci  
(ITC Director)**