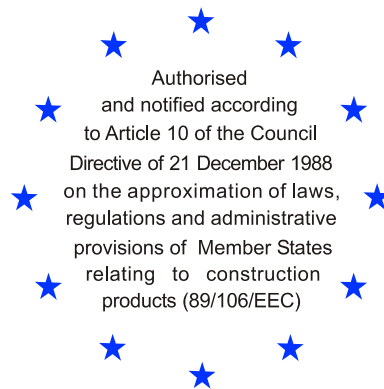


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DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-06/0252

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

KELYFOS Wärmeschutzsystem
KELYFOS Thermal Protection System

Zulassungsinhaber
Holder of approval

POLYKEM S.A.
Lefkis 111
14568 KRIONERI ATTIKIS
GRIECHENLAND

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Außenseitiges Wärmedämm-Verbundsystem mit Putzschicht
zur Wärmedämmung von Gebäuden
*External Thermal Insulation Composite System with rendering for the use as
external insulation of building walls*

Geltungsdauer:
Validity: vom
from
bis
to

8. Oktober 2011

Herstellwerk
Manufacturing plant

POLYKEM S.A.
Lefkis 111
14568 KRIONERI ATTIKIS
GRIECHENLAND

Diese Zulassung umfasst
This Approval contains

12 Seiten
12 pages

Diese Zulassung ersetzt
This Approval replaces

ETA-06/0252 mit Geltungsdauer vom 08.12.2006 bis 08.10.2011
ETA-06/0252 with validity from 08.12.2006 to 08.10.2011



Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik 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 Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, zuletzt geändert durch Gesetz vom 06.01.2004⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "External Thermal Insulation Composite Systems with Rendering", ETAG 004, edition March 2000.
- 2 Deutsches Institut für Bautechnik is authorized 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 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 manufacturers other than those indicated on page 1, or manufacturing plants other than those laid down in the context of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of 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 Deutsches Institut für Bautechnik. 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 fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities L 220, 30.8.1993, p. 1
3 Official Journal of the European Union L 284, 31.10.2003, p. 25
4 Bundesgesetzblatt I, p. 812
5 Bundesgesetzblatt I, p.2, 15
6 Official Journal of the European Communities L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of products and intended use

The External Thermal Insulation Composite System “KELYFOS Thermal Protection System” called ETICS in the following text, is designed and installed in accordance with the ETA-holder design and installation instructions, deposited with the Deutsches Institut für Bautechnik (DIBt). The ETICS comprises the following components, which are factory-produced by the ETA-holder or a supplier. It's made up on site from these. The ETA-holder is ultimately responsible for the ETICS.

1.1 Definition of the construction product

	Components (see clause 2.3 for further description, characteristics and performances)	Coverage [kg/m ²]	Thickness [mm]
Insulation material with associated method of fixing	Bonded ETICS: <ul style="list-style-type: none"> Insulation product factory-prefabricated extruded polystyrene foam (XPS) to EN 13164⁷ Adhesive (minimum bonded surface 40 %) Kelyfos Thermo (fibre reinforced cement based powder with additional resin requiring addition of 25 % of water) 	- 3 – 4 (prepared)	≤ 50 -
Base coat	Kelyfos Thermo Identical with the equally named adhesive given above.	About 6 (prepared)	About 4
Glass fibre mesh	Kelyfos Mesh Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 160 g/m ² and mesh size of about 3.5 mm x 4.0 mm	-	-
Key coat	Kelyfos Primer Ready to use pigmented acrylic dispersion liquid. For the compatibility with the finishing coats see below.	0.15	-
Finishing coat	Application without key coat: Thin layered cement based powder with additional resin requiring addition of 20 % of water: <ul style="list-style-type: none"> Kelyfos Fine (fine-grained, 0 to 1.3 mm) Kelyfos Decor (coarse-grained, 0 to 2.0 mm) 	About 4.0 (prepared) About 4.5 (prepared)	} About 3
	Application with key coat: Ready to use pastes – acrylic binder: <ul style="list-style-type: none"> Kelyfos Acryl Fine (particle size 1.5 mm) Kelyfos Acryl Decor (particle size 3.0 mm) 	About 2.7 About 3.5	
Ancillary material	Description in accordance with clause 3.2.2.5 of ETAG 004 and decorative coatings compatible with the ETICS to be applied to the finishing coat. Remain under the ETA-holder responsibilities.		

⁷ EN 13164:2001 Thermal insulation products for buildings - Factory made products of extruded polystyrene foam (XPS) - Specification

1.2 Intended use

This ETICS is intended to be used as external insulation to the walls of buildings made of masonry (bricks, blocks, stones ...) or concrete (cast on site or as prefabricated panels) with and without rendering (Class A1 or A2-s1, d0 according to EN 13501-1⁸). It shall be designed to give the wall to which it is applied satisfactory thermal insulation.

The ETICS is no load-bearing construction element. It 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 ETICS can be used on new or existing (retrofit) vertical walls.

The ETICS is not intended to ensure the air tightness of the building structure.

The provisions made in this European technical approval (ETA) based upon the assumed intended working life of the ETICS of at least 25 years, provided that the conditions laid down in clauses 4.2, 5.1 and 5.2 for the packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Approval Body, but should only be regarded as a means to choosing the appropriate products in relation to the expected, economically reasonable working life of the works.

2 Characteristics of products and methods of verification

2.1 General

The assessment of the fitness for use of the ETICS for the intended use according to the Essential Requirements was carried out in compliance with ETAG 004, "Guideline for European Technical Approval of External Thermal Insulation Composite Systems with rendering", edition March 2000 (called ETAG 004 in this ETA).

Characteristics (of the components as well as of the ETICS), not mentioned in this ETA shall correspond to the respective values laid down in the technical documentation of this ETA.

2.2 Characteristics of the ETICS

2.2.1 Reaction to fire

Rendering system: Base coat with finishing coat and compatible key coat indicated hereafter	Maximum declared organic content	Class according to EN 13501-1 ⁸
Kelyfos Fine	Base coat ≤ 3.6 % Finishing coat ≤ 1.2 %	B – s1, d0
Kelyfos Decor		
Kelyfos Acryl Fine with key coat "Kelyfos Primer"	Base coat ≤ 3.6 % Finishing coat ≤ 9.5 %	B – s2, d0
Kelyfos Acryl Decor with key coat "Kelyfos Primer"		

Mounting and fixing

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

The assessment of reaction to fire is based on tests with a maximum insulation layer thickness of 50 mm and a maximum insulation material (XPS) density of 32 kg/m³ as well as rendering systems with two different types of binder (cement based and organic based) each with the highest organic content and the lowest amount of flame retardant and additives.

⁸ EN 13501-1:2007 Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests

The manufacturer of the tested XPS is Dow Hellas A.E., Thorikon 19500 Lavrion, Greece. XPS with higher density than tested or with other chemical composition or of an other manufacturer, which fulfils the requirements of clause 2.3.1 and is deposited with the DIBt, can be used if it fulfils the requirements of Class E according to EN 13501-1⁸ by testing specimens with a thickness of 10 mm and with the highest possible density.

For rendering systems with organic based finishing coats the assessment of reaction to fire is based on tests with particle sizes of 3 mm (highest thickness).

For testing according to EN 13823⁹ – SBI-test – the ETICS was mounted directly to a calcium silicate substrate (class A2-s1, d0) according to EN 13238¹⁰ with a thickness of 11 mm.

For testing according to EN ISO 11925-2¹¹) the ETICS was mounted directly to a fibre cement substrate (class A2-s1, d0) with a thickness of 6 mm.

The installation of the ETICS was carried out by the approval holder following his design and installation instructions using the single mesh “Kelyfos Mesh” all over the test specimen.

The tests specimens were prefabricated and did not include any joints.

For the SBI-test the lateral edges were covered with the rendering system.

For testing according to EN ISO 11925-2¹¹ the edges were not covered with the rendering system (cut edges). The tests were performed with surface flaming of the front side and edge flaming turned by 90°.

Anchors were not included in the tested ETICS as they have no influence on the test result.

Note:

A European reference fire scenario for façades has not been laid down. In some Member States, the classification of ETICS according to EN 13501-1⁸ might not be sufficient for the use in facades. An additional assessment of ETICS according to national provisions (e.g. on the basis of a large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

2.2.2 Water absorption (capillarity test)

Base coat

- Water absorption after 1 h < 1 kg/m²
- Water absorption after 24 h > 0.5 kg/m²

Rendering system: Base coat with finishing coat indicated hereafter	Water absorption after 24 h	
	< 0.5 kg/m ²	≥ 0.5 kg/m ²
Kelyfos Fine	x	
Kelyfos Decor	x	
Kelyfos Acryl Fine with key coat "Kelyfos Primer"	x	
Kelyfos Acryl Decor with key coat "Kelyfos Primer"	x	

⁹ EN 13823:2002 Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item

¹⁰ EN 13238:2001 Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates

¹¹ EN ISO 11925-2:2002 Reaction to fire tests – Ignitability of building products subjected to direct impingement of flame

2.2.3 Hygrothermal behaviour

Hygrothermal cycles have been performed on a rig. None of the following defects occur during the testing:

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

The ETICS is so assessed resistant to hygrothermal cycles.

2.2.4 Freeze/thaw behaviour

The ETICS has been assessed as freeze/thaw resistant according to the simulated method.

2.2.5 Impact resistance

The verified resistance to hard body impact of the ETICS with all finishing coats results in category II.

The resistance to perforation has not to be verified, because of a total render thickness of not less than 6 mm.

2.2.6 Water vapour permeability

Rendering system: Base coat with finishing coat and compatible key coat indicated hereafter (evaluated without decorative coating)	Equivalent air thickness s_d
Kelyfos Fine	≤ 1.0 m (Test result obtained with "Kelyfos Fine", layer thickness 3 mm: 0.2 m)
Kelyfos Decor	
Kelyfos Acryl Fine with key coat "Kelyfos Primer"	≤ 1.0 m (Test result obtained with "Kelyfos Acryl Fine", layer thickness 2 mm: 0.3 m)
Kelyfos Acryl Decor with key coat "Kelyfos Primer"	

2.2.7 Emission of dangerous substances or radiation

The ETICS complies with the provisions of Guidance Paper H ("A harmonized approach related to dangerous substances under the construction product directives Revision August 2002").

In addition to the specific clauses relating to dangerous substances contained in this ETA, 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 Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.2.8 Safety in use / Bond strengths

Bond strength between base coat and insulation product (XPS)

Conditioning		
Initial state	After hygrothermal cycles on the rig	After freeze/thaw test
≥ 0.08 MPa	≥ 0.08 MPa	≥ 0.08 MPa

Bond strength between adhesive and substrate resp. insulation product (XPS)

	Conditioning		
	Initial state	2 d immersion in water + 2 h drying	2 d immersion in water + 7 d drying
Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
XPS	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa

2.2.9 Thermal resistance

The nominal value of the additional thermal resistance R provided by the ETICS to the substrate wall is calculated in accordance with EN ISO 6946¹² from the nominal value of the insulation product's thermal resistance R_D given accompanied to the CE marking and from the thermal resistance of the rendering system R_{render} which is about 0.02 m²K/W.

$$R = R_D + R_{render}$$

The thermal bridges caused by anchors used as supplementary mechanical fixings if applicable increase the thermal transmittance U. This influence had to take into account according to EN ISO 6946¹².

$$U_c = U + \chi_p \cdot n \quad \text{corrected thermal transmittance}$$

where: $\chi_p \cdot n$ influence of thermal bridges

n number of anchors per m²

χ_p local influence of thermal bridge caused by an anchor

2.2.10 Aspects of durability and serviceability

Bond strength after ageing

Rendering system: Base coat with finishing coat and compatible key coat indicated hereafter	Kelyfos Fine	≥ 0.08 MPa
	Kelyfos Decor	
	Kelyfos Acryl Fine with key coat "Kelyfos Primer"	
	Kelyfos Acryl Decor with key coat "Kelyfos Primer"	

2.3 Characteristics of the components

Detailed information on the chemical composition and other identifying characteristics of the components, following Annex C of ETAG 004 have been deposited with the DIBt.

Further information can be observed from the product data sheets, which are part of the technical documentation for this ETA.

2.3.1 Thermal insulation product

Factory-prefabricated, uncoated panels made of extruded polystyrene foam (XPS) to EN 13164⁷ with the following designation code and the other properties having the description in the Table below shall be used.

XPS – EN 13164 – T2 – CS(10\Y)250 – DS(TH) – WL(T)1.5

¹² EN ISO 6946:1996 Building components and building elements – Thermal resistance and thermal transmittance – Calculation method

Reaction to fire / EN 13501-1 ⁸	Class E
Thermal resistance [m ² K/W]	Defined in the CE marking in reference to EN 13164 ⁷
Water vapour diffusion resistance factor / EN 12086 ¹³	$\mu = 100 - 200$
Tensile strength perpendicular to the faces in dry conditions * [kPa] / EN 1607 ¹⁴	$\sigma_{mt} \geq 80$
Apparent density [kg/m ³] / EN 1602 ¹⁵	$\rho_a \leq 32$
Shear strength * [kPa] / EN 12090 ¹⁶	$20 \leq f_{tk} \leq 170$
Shear modulus [MPa] / EN 12090 ¹⁶	$G_m = 7$
Dimensional tolerances	
Length [mm] / EN 822 ¹⁷	± 6
Width [mm] / EN 822 ¹⁷	± 3
Squareness [mm/m] / EN 824 ¹⁸	$S_b = 5$
Flatness [mm] / EN 825 ¹⁹	$S_{max} = 6$
* Minimal value of all single values	

2.3.2 Render (base coat)

The average value of crack width of the base coat reinforced with the glass fibre mesh measured at a render strain value of 1% is about 0.2 mm.

2.3.3 Reinforcement (glass fibre mesh)

Characteristics (alkalis resistance): Pass

	Kelyfos Mesh	
	Warp	Weft
Residual strength after ageing [N/mm]	≥ 20	≥ 25
Relative residual resistance after ageing in % of the strength in the as-delivered state	≥ 50	≥ 50

13 EN 12086:1997 Thermal insulation products for building applications – Determination of water vapour transmission properties

14 EN 1607:1996 Thermal insulating products for building applications – Determination of tensile strength perpendicular to faces

15 EN 1602:1996 Thermal insulation products for building applications – Determination of the apparent density

16 EN 12090:1997 Thermal insulating products for building applications – Determination of shear behaviour

17 EN 822:1994 Thermal insulation products for building applications – Determination of length and width

18 EN 824:1994 Thermal insulation products for building applications – Determination of squareness

19 EN 825:1994 Thermal insulation products for building applications – Determination of flatness

3 Evaluation and attestation of conformity and CE-marking

3.1 System of attestation of conformity

According to the decision 97/556/EC of the European Commission²⁰ amended by 2001/596/EC²¹ system 1 or 2+ of the attestation of conformity applies depending on reaction to fire.

Considering Class B for reaction to fire of the ETICS, the systems of attestation of conformity are system 1 regarding reaction to fire characteristic and system 2+ regarding other characteristics than reaction to fire.

These systems of attestation of conformity are defined as follows:

System 1: Certification of the conformity of the product by a notified certification body on the basis of:

- (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 notified 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.

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
 - (1) initial type-testing of the product;
 - (2) factory production control;
 - (3) testing of samples taken at the factory in accordance with a prescribed test plan;
- (b) Tasks for the notified body:
 - (4) certification of factory production control on the basis of:
 - initial inspection of factory and of factory production control;
 - continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the ETICS and the components are in conformity with this ETA.

The manufacturer shall only use raw materials stated in the technical documentation of this ETA. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

²⁰ Official Journal of the European Communities/Union L 229/14 of 20.08.1997

²¹ Official Journal of the European Communities/Union L 209/33 of 2.8.2001

The factory production control shall be in accordance with the "Control plan"²² which is part of the technical documentation of this ETA. The "Control plan"²² has been agreed between the manufacturer and the DIBt and is laid down in the context of the factory production control system operated by the manufacturer and deposited with the DIBt.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the "Control plan"²². The records include at least the following information:

- designation of the product, the basic materials and components;
- type of control or testing;
- date of manufacture of the product and date of testing of the product or basic materials or 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 notified body involved in continuous surveillance. On request they shall be presented to the DIBt.

3.2.1.2 Other tasks for the manufacturer

For initial type-testing of the ETICS and the components regarding other characteristics than reaction to fire the results of the tests performed as part of the assessment for the ETA 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 with the DIBt.

The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in clause 3.1 in the field of ETICS in order to undertake the actions laid down in clause 3.2.2. For this purpose, the "Control plan"²² referred to in clauses 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the notified bodies involved.

The manufacturer shall make a declaration of conformity, stating that the ETICS is in conformity with the provisions of ETA-06/0252 issued on *(date)*.

3.2.2 Tasks for the notified bodies

The notified body shall perform the

- initial type-testing of the ETICS and the components regarding reaction to fire characteristic,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the "Control plan"²².

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue an EC certificate of conformity of the ETICS which includes the certification of factory production control stating the conformity with the provisions of this ETA.

In cases where the provisions of the ETA and its "Control plan"²² are no longer fulfilled the notified certification body shall withdraw the certificate of conformity and inform the DIBt without delay.

²² The "Control plan" is a confidential part of the European technical approval and only handed over to the notified body involved in the procedure of attestation of conformity. See section 3.2.2.

3.3 Marking

3.3.1 CE marking

The CE marking shall be affixed on the accompanying commercial document. The letters "CE" shall be followed by the identification number of the notified certification body and be accompanied by the following additional information:

- the name and address of the ETA-holder (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the ETICS
- the number of the ETA,
- the number of the ETAG,
- the ETICS trade name.

3.3.2 Additional marking

The respective trade name of the individual components of the ETICS shall be given on the packaging.

In addition to the trade name the following information shall be given in the accompanying commercial document and/or on the packaging of the thermal insulation product:

- minimum value of the tensile strength perpendicular to the faces of the insulation product,
- shear modulus of the insulation product.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The composition and manufacturing process used for the components of the ETICS shall comply with those on which the approval tests were based. Composition and manufacturing process are deposited at the DIBt.

The ETA is issued for the ETICS on the basis of agreed data/information, deposited with the DIBt, which identifies the ETICS that has been assessed and judged. Changes to the ETICS or the components or their production process, which could result in this deposited data/information being incorrect, should be notified to the DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation, design and execution

4.2.1 General

The wall on which the ETICS is applied shall be sufficiently stable and airtight. Its stiffness shall be large enough to ensure that the ETICS is not subjected to deformations, which could lead to damage.

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

4.2.2 Installation

The ETICS is installed on site. The approval holder is obliged to instruct all those entrusted with the design and execution of the ETICS about the specific conditions of this ETA and all other details necessary for perfect execution.

Only the components whose trade name is given in clause 1.1 and which have the characteristics according to clause 2.3 may be used for the ETICS.

4.2.3 Design

Requirements for the substrate

As to the requirements for the substrate and its preparation, ETAG 004, clause 7.2.1 applies.

4.2.4 Execution

The manufacturer's design and installation instructions, which are part of the technical documentation for this ETA, shall be observed with respect to the installation of the ETICS and drying times of rendering products.

5 Indications to the manufacturer

5.1 Packaging, transport and storage

Packaging of the components has to be such that they are protected against moisture during transport and storage, unless other measures are foreseen by the manufacturer for this purpose.

The components are to be protected against damage.

5.2 Use, maintenance, repair

To the indications on use, maintenance and repair ETAG 004, clause 7.3 applies.