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ETAG 005

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GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL
OF

LIQUID APPLIED ROOF WATERPROOFING KITS

Revision March 2004

Part 3: SPECIFIC STIPULATIONS FOR KITS BASED ON GLASS REINFORCED RESILIENT UNSATURATED POLYESTER RESIN

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FOREWORD

General

This ETA-Guideline has been established by the EOTA WG 4.02/01 dealing with liquid applied roof waterproofing kits (LARWK).

This ETA-Guideline - Part 3 "Specific stipulations for kits based on glass reinforced resilient unsaturated polyester resins" shall be used in conjunction with ETAG 005 – Part 1.

This Complementary Part expands and/or modifies the requirements given in ETAG 005 – Part 1 taking into account the specific family of products referred to.

Normative references

This ETA-Guideline Part 3 incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to, or revisions of these publications, apply to this ETA-Guideline only when incorporated in it by amendment or revision. For undated references the latest dated revision of the publication referred to, applies.

EN 933-1	Tests for geometrical properties of aggregates – Part 1:Determination of particle size distribution – Sieving method.
EN ISO 527-3	Plastics – Determination of tensile properties – Part 3:Test conditions for films and sheets.
EN ISO 527-4	Plastics – Determination of tensile properties – Part 4:Test conditions for isotropic and orthotropic plastic fibre-reinforced composites.
EN ISO 527-5	Plastics – Determination of tensile properties – Part 5 : Test conditions for unidirectional fibre-reinforced plastics composites.
EN ISO 1172	Textile-glass-reinforced plastics – Prepregs, moulding compounds and laminates – Determination of textile-glass and mineral-filler content – Calcination methods.
EN ISO 2535	Plastics – Unsaturated polyester resins – Measurement of gel time at ambient temperature.
EN ISO 3219	Plastics – Polymers/resins in the liquid state or as emulsions or dispersions – Determination of viscosity using a rotational viscometer with define shear rate.
EN ISO 3251	Paints, varnishes and plastics – Determination of non-volatile matter content.
EN ISO 3521(+C1)	Plastics – Unsaturated polyester and epoxy resins – Determination of overall volume shrinkage.
ISO 3374	Reinforcement products – Mats and Fabrics – Determination of mass per unit area.
ETAG 005 – Part 1	Liquid applied water proofing kits : Part 1 – General.

EOTA TR – 004 Determination of the resistance to delamination.

EOTA TR – 014 Exposure procedure for accelerated ageing by two-hour water boil.

SECTION ONE

INTRODUCTION

1. PRELIMINARIES

1.1 Legal basis

The legal basis of the ETA-Guidelines is given in clause 1.1 of ETAG 005 – Part 1.

No existing ETA-Guideline is superseded.

1.2 Status of ETA-Guidelines

The Status of the ETA-Guidelines is given in clause 1.2 of ETAG 005 – Part 1.

2. SCOPE

This Part 3 shall be used in conjunction with ETAG 005 – Part 1.

This Complementary Part (ETAG 005 – Part 3) - "Specific stipulations for kits based on glass reinforced resilient unsaturated polyester resins" specifies the terminology and definitions, methods of verification for the construction products and for the identification of its component characteristics.

It also gives guidance for the assessment of the specific installation instructions and for the Attestation of Conformity for such kits for use in roof waterproofing.

It is applicable to waterproofing kits based on glass reinforced resilient unsaturated polyester resins, in-situ applied to defined timber based substrates by spreading by hand (ie hand lay-up). The incorporation of a pigmented flow coat as an aesthetic and protective finish is assumed.

3. TERMINOLOGY

3.1 Definitions and abbreviations

For the purpose of this Complementary Part of the ETA-Guideline the particular definitions and abbreviations as stated in clause 3 of ETAG 005 – Part 1 and the Common Terminology adopted by the Technical Board (see Annex II of ETAG 005 – Part 1) applies.

3.2 Particular definitions

For the purpose of this ETAG 005 – Part 3 the following definitions apply:

3.2.1 **additives (accelerator / inhibitor):** a chemical compound which, when added to a polyester resin, controls the reaction and, in conjunction with a catalyst, facilitates curing without the application of heat. Accelerators / inhibitors may be added during mixing, or may be supplied ready mixed with the polyester resin (pre-accelerated resin).

3.2.2 **anti-skid additives:** a mineral aggregate, applied to or mixed with the flow coat, to impart non-skid properties to the assembled system.

3.2.3 **base coat:** a resilient polyester, applied as a first layer of an assembled system into which the glass fibre reinforcement is embedded and consolidated.

3.2.4 **catalyst:** a chemical compound, added to a polyester resin to initiate the curing process. Catalysts may be supplied as paste, as liquid dispersion in a plasticiser, or as powder in an inert filler.

3.2.5 **day joint:** a joint necessitated by a temporary termination in the liquid applied roof waterproofing layer, due to a suspensions of work (e.g. end of the working day).

3.2.6 **flow coat:** a pigmented resilient polyester, applied as an unreinforced finish layer of an assembled system, to provide a sealed and coloured surface.

3.2.6 **internal layer:** a non-woven, resin bonded chopped strand mat of glass fibres.

3.2.7 **resilient polyester:** an unsaturated polyester resin which, when reinforced with an internal layer of glass fibre, meets the requirements given in 6.7.1 "tensile properties".

3.3 Particular abbreviations

For the purpose of this ETAG 005 – Part 3 no particular abbreviations apply.

SECTION TWO:

GUIDANCE FOR THE ASSESSMENT OF THE FITNESS FOR USE

4. REQUIREMENTS

4.0 **General**

The performance requirements, establishing the fitness for use of LARWK(s) based on **glass reinforced resilient unsaturated polyester resins,** shall be in accordance with chapter 4 of ETAG 005 – Part 1and with the following specific stipulations for this family of products.

4.1	**ER 1: Mechanical resistance and stability**	No requirements
4.2	**ER 2: Safety in case of fire**	
4.2.1	**External fire performance**	Specific requirements in 6.2.1
4.2.2	**Reaction to fire**	Specific requirements in 6.2.2
4.3	**ER 3: Hygiene, health and the environment** (Working life and durability aspects)	The following additional requirements
4.3.1	**Resistance to fatigue movement**	- specific substrate in 5.3.1.1
4.3.2	**Effects of low and high surface temperatures**	
4.3.2.1	high surface temperatures	- limited requirements in 5.3.2.1
4.3.3	**Resistance to ageing media**	
4.3.3.1	water ageing	- additional requirements in 5.3.3.3
4.4	**ER 4: Safety in use**	No specific requirements
4.5	**ER 5: Protection against noise**	No requirements
4.6	**ER 6: Energy economy and heat retention**	No requirements
4.7	**Related aspects of serviceability**	Additional requirements

4.7.1 **Tensile properties**

To fall within the scope of this Complementary Part (ETAG 005 – Part 3) the resin used in the kit shall meet the requirements of a resilient polyester given in clause 6.7.1

4.7.2	**Effects of day joints**.	
4.7.2.1	Delamination strength	- additional requirements in 5.7.2

5. SPECIFIC METHODS OF VERIFICATION

5.0 **General**

The methods of verification given in chapter 5 of ETAG 005 – Part 1 5 shall be applied, except where identified below.

5.1 **ER 1: Mechanical resistance and stability** Not applicable

5.2 **ER2: Safety in case of fire**

5.2.1 **External fire performance** Method of verification according to clause 5.2.1 of ETAG 005 – Part 1.

5.2.2 **Reaction to fire** Method of verification for the reaction to fire according clause 5.2.2 of ETAG 005 – Part 1.

5.3 **ER 3: Hygiene, health and the environment** Specific methods of verification

The following specific methods of verification apply and relate to working life and durability aspects.

5.3.1 **Resistance to fatigue movement**

5.3.1.1 ETAG 005 – Part 1 clause 5.3.3.3 Due the stiffness of the glass reinforced resilent unsaturated polyester resin, it is unlikely to be affected by fatigue movement. Consequently determination of the fatigue movement as defined in clause 5.3.3.3 of ETAG 005 – Part 1 will be omitted.

5.3.2 **Effects of low and high surface temperatures**

5.3.2.1 ETAG 005 – Part 1 clause 5.3.3.4.3 (i, ii, iii) Since the resilient polyester resin is thermo-setting, it is unlikely to be affected by elevated surface temperatures. It will not flow or soften at the high temperatures envisaged in service. Consequently the determination of the effects of elevated temperatures as defined in ETAG 005 – Part 1 will be omitted.

5.3.3 **Resistance to ageing media**

5.3.3.1 Heat ageing {ETAG 005 – Part 1, clause 5.3.3.5.1 (i)} There are no specific heat ageing conditions in relation to the defined methods of verification for this family of products.

5.3.3.2 UV ageing {ETAG 005 – Part 1, clause 5.3.3.5.2 (ii)} Following UV ageing in the presence of moisture, determination of the flexural properties according EN ISO 527-3 or EN ISO 527-4 is required.

5.3.3.3 Water ageing {ETAG 005 – Part 1,

clause 5.3.3.5.3}	There are no specific conditions for ageing by water in relation to the methods of verification defined in ETAG 005 – Part 1.
5.3.3.3.1 Following water ageing	The determination of the delamination strength in accordance with EOTA TR-004 is not required for this family of products.
5.3.3.3.2 Specific two-hour water boil test	For this family of products the effects of water ageing is additionally verified by subjecting 3 test pieces to a two-hour water boil test in accordance with EOTA TR-014.
5.3.3.3.3 Following the two-hour water boil test	Additional comparative testing of tensile properties shall be performed according EN ISO 527-3 or EN ISO 527-4 on boiled and unboiled samples; test piece type III; testing speed 2 mm/min.

5.4	**ER4: Safety in use**	No specific method of verification
5.5	**ER 5: Protection against noise**	Not applicable
5.6	**ER 6: Energy economy and heat retention**	Not applicable
5.7	**Related aspects of serviceability**	Additional methods of verification

5.7.1 **Tensile properties**

Additional measurement of elongation at break in accordance with EN ISO 527-3 or EN ISO 527-4, using a testing speed of 2 mm/min. on test pieces type III from samples:

a. - prepared at extremes of the quoted application temperature range
and,

b. - prepared at the maximum application temperature and subjected to a 2 hour water boil in accordance with EOTA TR-014.

5.7.2 **Effects of day joints**

To check the compatibility of the assembled system, freshly applied to the dried assembled system:

Delamination strength	The delamination test shall be performed according to EOTA TR-004. - the substrate is the assembled system bonded on the most suitable substrate for adherence (generally concrete) and dried for the period given by the Applicant at normal conditions. - the test specimen is the fresh kit applied on that substrate.

5.7.3 **Effects of variations in kit components and site practices**

To check that a satisfactory assembled system can be achieved over the whole range of permitted weather conditions and variations in proportions of constituent parts quoted by the Applicant, the following tests shall be performed comparatively on free films prepared under the defined conditions:

5.7.3.1 Determination of elongation at break in accordance with EN ISO 527-3 or EN ISO 527-4.

5.7.3.2 Determination of elongation at break after two-hour water boil.

5.8 Identification of components

5.8.0 General

It is necessary to verify that components comply with the specification (including tolerances) of the Applicant. This is achieved by measuring relevant characteristics, preferably by using EN or ISO Standards. Where no appropriate EN or ISO Standard is available the use of an approved national standard is permitted.

5.8.1 Internal layer

5.8.1.1	- nature	glass chopped strand mat
5.8.1.2	- binder content (%)	by declaration
5.8.1.3	- mass per unit area	method: ISO 3374

5.8.2 Resilient polyester (base coat) resin

5.8.2.1	- nature	by declaration
5.8.2.2	- viscosity	method: EN ISO 3219
5.8.2.3	- gel time	method: EN ISO 2535
5.8.2.4	- volatile content	method: EN ISO 3251

5.8.3 Resilient polyester (flow coat) resin

5.8.3.1	- nature	by declaration
5.8.3.2	- viscosity	method: EN ISO 3219
5.8.3.3	- gel time	method: EN ISO 2535
5.8.3.4	- volatile content	method: EN ISO 3251

5.8.4 Additives (e.g. catalyst, accelerator, inhibitor)

5.8.4.1	- nature	by declaration

5.8.5 Pigments

5.8.5.1	- nature	by declaration
5.8.5.2	- dispersion	by declaration

5.8.6 Anti-skid additives (grit)

5.8.6.1	nature	by declaration

5.8.7 Pre-formed accessories (edge details, upstands) and cured laminate

5.8.7.1	- tensile strength/elongation	method: EN ISO 527-3 or EN ISO 527-4 (test speed: 2 mm / min)
5.8.7.2	- glass / resin ratio	method: EN ISO 1172

6. ASSESSING AND JUDGING THE FITNESS OF PRODUCTS FOR INTENDED USE.

6.0 **General**

The requirements given in chapter 6 of ETAG 005 – Part 1 shall be applied, except where identified below, or where the test has been identified as being not required in chapter 5 of this Complementary Part (ETAG 005 – Part 3).

6.1	**ER 1: Mechanical resistance and stability**	Not applicable
6.2	**ER2: Safety in case of fire**	
6.2.1	**External fire performance**	Classification in accordance with the provisions given in clause 6.2.1 of ETAG 005 – Part 1
6.2.2	**Reaction to fire**	Classification in accordance with the provisions given in clause 6.2.2 of ETAG 005 – Part 1
6.3	**ER3: Hygiene, health and the environment** (working life and durability aspects)	Additional assessment

In addition to or contrary to the requirements given in chapter 6 of ETAG 005 – Part 1, the following specific requirements shall be taken into account for the assessment of the fitness for use.

6.3.1	**Resistance to fatigue movement**	No assessment
6.3.2	**Effects of low and high surface temperatures**	
6.3.2.1	Effects of high surface temperatures	No assessment
6.3.3	**Resistance to ageing media**	
6.3.3.1	UV ageing When aged by UV and tested	The Approval Body shall satisfy itself that the expected working life, based on the data gathered in accordance with 5.3.3.2, is consistent with the defined working life categories.
6.3.3.2	Effects of two-hour water boil test.	After comparative testing the Approval Body shall satisfy itself that the expected working life, based on the data gathered in accordance with 5.3.3.3.3, is consistent with the defined working life categories.
6.4	**ER 4: Safety in use**	No specific assessment

6.5 **ER 5: Protection against noise** Not applicable

6.6 **ER 6: Energy economy and heat retention** Not applicable

6.7 **Related aspects of serviceability**

6.7.1 **Tensile properties**
When tested in accordance with 5.7.1 (a) and 5.7.1 (b) the elongation at break shall be at least 1,5 %.

6.7.2 **Effects of variations in kit components and site practices**
The variations mentioned in clause 5.7.2 of this document shall be within the accepted limits quoted by the Applicant and shall not affect the kits fitness for the intended use.

6.7.2.1 Elongation at break
When tested, on samples prepared at the extremes of the quoted temperature range, the variation in the property measured shall be less than 20%.

6.7.2.3 Elongation at break after 2 hour water boil.
When tested, on a sample prepared at the quoted maximum application temperature, the measured property shall not be reduced by more than 15%.

6.8 **Identification of components**
When verified in accordance with chapter 5.8 of this document (ETAG 005 – Part 3) the characteristics of the components shall fall within the limits declared by the Applicant.

The Approval Body shall assess the possible effects on the performances of the assembled system due to the declared tolerancies.

7. PRECONDITIONS CONCERNING THE INCORPORATION OF PRODUCTS IN THE WORKS

7.1 **Application methods and design rules** (installation instructions)
All the information required, as indicated in clause 7 ETAG 005 – Part 1, shall be elaborated in the Manufacturer's Technical Dossier (MTD) taking into account the following specific provisions:

7.1.1 **Transport and storage**
There are no specific requirements.

7.1.2 **Influence of weather conditions**
There are no specific requirements.

7.1.3 **Application of components**
The Applicant's installation instructions shall give precise information on the required minimum thickness of the various layers as well as on the preparation of the timber surface, which shall include fixing requirements necessary to limit movement at joints etc. A definition of an acceptable timber surface must be given

7.1.4 **Details**

Generally details are achieved by the use of pre-formed factory manufactured elements. Precise details of the availability and use of these shall be given.

7.1.5 **Auxiliaries**
There are no specific requirements.

7.1.6 **Product waste**
There are no specific requirements.

7.1.7 **Special measures**
There are no specific requirments

7.1.8 **Safety measures**
There are no specific requirments.

7.2 **Maintenance and repair**
There are no specific requirements.

SECTION THREE

ATTESTATION OF CONFORMITY

8. ATTESTATION AND EVALUATION OF CONFORMITY

8.1 **EC-decisions**

The decision as given in clause 8.1 of ETAG 005 – Part 1.

8.2 **AC-procedures**

This Complementary Part (ETAG 005 – Part 3) has no procedures contrary to those stated in clauses 8.1 and 8.2 of ETAG 005 – Part 1.

Because incorporation in the works implies the manufacturing of the final product, the installation instructions should also contain one or more practical parameters to verify some aspects which are indicative for **the designed quality of that final product.**

Consequently the installation instructions should not only give guidance on the on-site process control as indicated in clause 7.1.3 ("application of components") of ETAG 005 – Part 1, but should also contain instructions on the following, which are to be considered as on-site **quality** control:

- verification of adhesion to the substrate
- verification of thickness of the applied system and corrective measures, if necessary
- recommendations for the preparation of free film site samples to enable this on-site verification
- directions for the registration of results of this on-site verification in a completion report.

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8.3 CE-marking and information

This Complementary Part of the ETA-Guideline gives no additional or different information and/or requirements for CE-marking as detailed in clause 8.4 of ETAG 005 – Part 1.

SECTION FOUR

THE ETA CONTENT

9. THE ETA CONTENT

9.1 **Exceptions**

There are no exceptions to the conditions mentioned in clause 9 of ETAG 005 – Part 1.