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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 6: SPECIFIC STIPULATIONS FOR KITS BASED ON POLYURETHANE

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FOREWORD

General

This ETAG 005 – Part 6 has been established by the EOTA WG 4.02/01 dealing with liquid applied roof waterproofing kits (LARWK).

This ETAG 005 – Part 6 "Specific stipulations for kits based on polyurethane" shall be used in conjunction with ETAG 005 – Part 1 - "General".

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

Normative references

This ETA-Guideline Part 6 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 527-1 (+ C1)	Plastics – Determination of tensile properties – Part 1:General Principles.
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 1675	Plastics – Liquid resins – Determination of density by the pyknometer method.
EN ISO 2555	Plastics – resins in the liquid state or as emulsions or dispersions – Determination of apparent viscosity by the Brookfield Test method.
EN ISO 3451-1	Plastics – Determination of ash – Part 1:General methods.
ISO 3342	Textile glass – Mats – Determination of tensile breaking force.
ISO 3374	Reinforcement products – Mats and Fabrics – Determination of mass per unit area.

ISO 9073-1	Textiles – Test methods for nonwovens – Part 1:Determination of mass per unit area.
ISO 9073-3	Textiles – Test methods for nonwovens – Part 3:Determination of tensile strength and elongation.
ETAG 005 Part 1	Liquid applied water proofing kits : Part 1 – General.
EOTA TR – 004	Determination of the resistance to delamination.
EOTA TR – 006	Determination of the resistance to dynamic indentation.

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

This Complementary Part (ETAG 005 – Part 6) - "Specific stipulations for kits based on polyurethane" specifies terminology and definitions, the specific 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 roof waterproofing kits based on polyurethane, in-situ applied by spraying or spreading, with or without a supporting layer, an internal layer and/or a protection layer.

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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 6 the following definitions apply:

3.2.1 **anti-skid additives:** A mineral aggregate applied to or mixed with the polyurethane based finish layer to impart non-skid properties to the assembled system.

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

3.2.3 **polyurethane:** Polyurethane is made by polyaddition of either di- or polyfunctional hydroxyl or amino group containing compounds and of di- or polyisocyanates or di- or polyfunctional prepolymers.

3.2.4 **polyurethane based finish layer:** A finish layer based on polyurethane, which is liquid applied on the assembled system and may have several functions; eg protection of the waterproofing assembled system against UV-light or chemicals or as an aesthetic coloured finish.

3.2.5 **primer:** A primer is a one- or two-component solvent- or water-borne or solventless penetrating first coat, based on materials such as polyurethane, polyacrylate, polyester or polyepoxide, to improve adhesion on the base layer and to seal the substrate.

3.3 **Particular abbreviations**

For the purpose of this ETA-Guideline - Part 6 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 **polyurethane**, shall be in accordance with chapter 4 of ETAG 005 – Part 1, and 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 wind loads**	
	Delamination strength	- additional requirements in 6.3.1.
4.3.2	**Effects of low and high surface temperatures**	
4.3.2.1	Effects of low surface temperatures	- no specific requirements.
4.3.2.2	Effects of high surface temperatures	- limited requirements in 6.3.2.1 and 6.3.2.2.
4.3.3	**Resistance to ageing media**	
4.3.3.1	Heat ageing	- specific heat ageing conditions in 5.3.3.1.
4.3.3.2	Tensile properties after heat ageing period	- additional requirements in 6.3.3.1.
4.3.3.3	Tensile properties after UV ageing	- additional requirements in 6.3.3.2.
4.3.3.4	Delamination strength after water ageing	- additional requirements in 6.3.3.3.
4.4	**ER 4: Safety in use**	Specific requirements in 6.3.3.3.
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** The following additional requirements

To fall within the scope of this Complemantary Part the final product shall meet the additional requirements related to the following aspects.

4.7.1 **Effects of weather conditions**

Tensile strength and elongation at break - additional requirements in 6.7.1.

4.7.2 **Effects of day joints**

Delamination strength - additional requirements in 6.7.2.

5. SPECIFIC METHODS OF VERIFICATION

5.0 **General**

The methods of verification given in chapter 5 of ETAG 005 – Part 1 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 according to 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 related to working life and durability aspects.

5.3.1 **Resistance to wind loads**

Delamination strength No specific method of verification.

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

5.3.2.1 Effects of low surface temperatures {ETAG 005 – Part 1, clause 5.3.3.4.1 (ii)} No additional testing of low temperature flexibility required.

5.3.2.2 Effects of high surface temperature Polyurethane 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)}: Specific ageing conditions of (70 ± 2) ºC at a doubled exposure period (see Table 10 of ETAG –5 – Part 1) for testing this family of products are permitted.

5.3.3.1.1 Following the heat ageing period

{ETAG 005 – Part 1, clause 5.3.3.5.1 (iii)} Additional comparative testing of tensile properties shall be performed on new and aged samples at 23 °C in accordance with EN ISO 527-1 and –3 (unreinforced), or –4 (reinforced); test piece shape 1B; testing speed 200 mm/min.

5.3.3.2 UV ageing

{ETAG 005 – Part 1, clause 5.3.3.5.2 (ii)}

5.3.3.2.1 Following the UV ageing period Additional comparative testing of tensile properties shall be performed on new and aged samples at 23 °C in accordance with EN ISO 527-1 and –3 (unreinforced), or –4 (reinforced); test piece shape 1B; testing speed 200 mm/min.

5.3.3.3 Water ageing

(ETAG 005 – Part 1, clause 5.3.3.5.3): No specific conditions for ageing by water

5.3.3.3.1 Following the water ageing period

{ETAG 005 – Part 1,clause 5.3.3.5.3 (ii)} Determination of the resistance to delamination in accordance with EOTA TR – 004 is required.

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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 **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 from the

same batch under the defined conditions defined by the Applicant:

5.7.1.1 Comparative testing of:
Tensile strength and elongation at break — according to EN ISO 527-1 and -3 or –4.

5.7.1.2 Comparative testing of
Dynamic indentation — according to EOTA TR-006.

5.7.2 **Effects 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.

5.8 **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 **Polyurethane base resin** (including primer / first layer)

5.8.1.1 - nature — method: infrared analysis must be put for by the Applicant.
5.8.1.2 - viscosity — method: EN ISO 2555 (Brookfield).
5.8.1.3 - density — method: EN ISO 1675.
5.8.1.4 - ash content — method: EN ISO 3451-1.
5.8.1.5 - relevant characteristics such as:
curing time
skin formation — and the relevant methods of verification.
shall be declared by the Applicant, depending on the nature of the base resin.

5.8.2 **Primers** (other than polyurethane)

5.8.2.1 - nature — by declaration.
5.8.2.2 - relevant characteristics such as:
curing time,
non-volatile contents,
viscosity — and the relevant methods of verification
shall be declared by the Applicant, depending on the nature of the primer.

5.8.3 **Internal layer**

5.8.3.1	- nature	by declaration
5.8.3.2	- mass per unit area	method: ISO 9073-1 or ISO 3374.
5.8.3.3	- tensile strength	method: ISO 9073-3 or ISO 3342.
5.8.3.4	- tensile elongation	method: ISO 9073-3 or ISO 3342.

5.8.4 **Finish layer**

5.8.4.1	- nature	by declaration.
5.8.4.2	- relevant characteristics such as: curing time, non-volatile contents, viscosity	and the relevant methods of verification shall be declared by the Applicant, depending on the nature of the finish layer.

5.8.5 **Anti-skid additives**

5.8.5.1	- nature	by declaration.
5.8.5.2	- particle size	method: EN 933-1.

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 6).

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** Additional assessment (working life and durability aspects)

In addition 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 wind loads**

{ETAG 005 – Part 1,clause 6.3.3.2 (ii)}	The delamination strength for bonded assembled systems determined in accordance with clause 5.3.3.1 (ii) of ETAG 005 – Part 1 shall be equal to or exceed the values declared by the Applicant for the proposed substrate(s) and shall be not less than 50 kPa.

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

6.3.2.1 Effects of high surface temperatures	No assessment of the delamination strength at a temperature of + 40 °C.
6.3.2.2 Effects of high surface temperatures	No assessment of sliding.

6.3.3 **Resistance to ageing media**

6.3.3.1 Heat ageing When aged by heat and tested	- the Approval Body shall satisfy itself that the expected working life, based on the data gathered in accordance with 5.3.3.1.1, is consistent with the defined working life categories.
6.3.3.2 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 5.3.3.2.1, is consistent with the defined working life categories.
6.3.3.3 Water ageing When aged by water and tested in accordance with clause 5.3.3.3.1	- the Approval Body shall satisfy itself that the value shall fall within the range declared by the Applicant and shall be not less than 50 kPa.

6.4	**ER 4: Safety in use**	Assessment (see requirements in 6.3.3.3).
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 **Effects of weather conditions**

As a result of comparative testing in accordance with clause 5.7.1.1 and 5.7.1.2 of this document (ETAG 005 – Part 6), the properties measured shall fall within the accepted limits declared by the Applicant and shall not affect the kits fitness for the intended use.

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6.7.2 **Effects of day joints**

The Approval Body shall satisfy itself that the expected working life, based on the data gathered in accordance with 5.7.2, is consistent with the defined working life categories.

6.8 **Identification of components**

When verified in accordance with clause 5.8 of this document (ETAG 005 – Part 6), 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 tolerances.

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 chapter 7 of 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**
There are no specific requirements.

7.1.4 **Details**
There are no specific requirements.

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 requirements.

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

7.2 **Maintenance and repair**

There are no specific requirements.

SECTION THREE
ATTESTATION OF CONFORMITY

8. ATTESTATION AND EVALUATION OF CONFORMITY

8.1 EC-decision

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

8.2 AC-procedures

This Complementary Part (ETAG 005 – Part 6) 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.**

As consequence 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 the water content in the substrate (when porous)
- verification of thickness of the applied film and corrective measures, if necessary;
- verification of adhesion to the substrate;
- 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,

8.3 CE-marking and information

This Complementary Part (ETAG 005 – Part 6) 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

9. THE ETA CONTENT

9.1 **Exceptions**

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