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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 2: SPECIFIC STIPULATIONS FOR KITS BASED ON POLYMER MODIFIED BITUMEN EMULSIONS AND SOLUTIONS

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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 2 "Specific stipulations for kits based on polymer modified bitumen emulsions and solutions" shall be used in conjunction with Part 1 - "General".

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

Normative references

This ETA-Guideline Part 2 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 1107-1	Flexible sheets for waterproofing – Determination of dimensional stability – Part 1:Bitumen sheets for roof waterproofing.
EN 1107-2	Flexible sheets for waterproofing – Determination of dimensional stability – Part 2:Plastic and rubber sheets for roof waterproofing.
EN 1109	Flexible sheets for waterproofing – Bitumen sheets for roof waterproofing – Determination of flexibility at low temperature.
EN 1426	Bitumen and bituminous binders – Determination of needle penetration.
EN 1427	Bitumen and bituminous binders – Determination of softening temperature – Ring and ball method.
EN 1428	Bitumen and bituminous binders – Determination of water content in bitumen emulsions – Azeotropic distillation.
EN ISO 2431 (+ C1 and 2)	Paints and varnishes – Determination of flow time by use of flow cups.
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 2592	Determination of flash and fire points – Cleveland open cup method.
EN ISO 2719	Determination of flash points – Pensky-Martens closed cup method.
EN ISO 3251	Paints, varnishes and plastics – Determination of non-volatile matter content.
ISO 976	Rubber and plastics – Polymer dispersions and rubber lattices – Determination of pH.
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.
ISO 13736	Petroleum products and other liquids – Determination of flash point – Abel closed cup.
BS 2000-223	Method of test for petroleum and its products – Determination of ash of petroleum products containing mineral matter.
ETAG 005 – Part 1	Liquid applied water proofing kits : Part 1 - General
EOTA TR – 006	Determination of the resistance to dynamic indentation.
EOTA TR – 007	Determination of the resistance to static 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.

The ETA-Guideline 005 – Part 2, edition March 2000, has been 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 2 shall be used in conjunction with ETAG 005 – Part 1.

This Complementary Part (ETAG 005 – Part 2) "Specific stipulations for kits based on polymer modified bitumen emulsions and solutions" specifies the 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 waterproofing kits based on polymer modified bitumen emulsions and solutions, in-situ applied by brushing, spraying or spreading, with or without a supporting layer, an internal layer and/or a protective finish of mineral granules, chips or solar reflective coating.

The nature of the modification shall be specified for each (group of) kit(s).

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 2, the following definitions apply:

3.2.1 **bitumen**: A viscous semi-solid or solid, consisting essentially of a complex mixture of hydrocarbons and their derivatives, soluble in carbon disulphide; it is substantially non-volatile and softens gradually when heated. It is black in colour and possesses waterproofing and adhesive properties. It is obtained by refinery processes from petroleum and is also found as a natural deposit or as a component of naturally occurring asphalt where it is associated with mineral matter.

3.2.2 **bitumen adhesive (cold):** A high viscosity homogeneous blend of bitumen or polymer modified bitumen and volatile organic solvent(s) which may incorporate fillers and/or fibres.
Can be used as a cold applied adhesive for bonding bituminous roofing sheets used as a supporting layer.

3.2.3 **bitumen adhesive (hot):** A solid bitumen gradually softening when heated. It can be used as a hot-applied adhesive for bonding bituminous roofing sheets used as a supporting layer. The bitumen can be either oxidised or polymer modified.

3.2.4 **bitumen emulsion**: A substantial amount of bitumen, finely dispersed in an aqueous medium by one or more suitable emulsifying agents. The emulsion may also incorporate inert fillers and/or fibres. A liquid or paste of brushing, spraying or spreading consistency that, when dried, provides a film forming part of the assembled system

3.2.5 **bitumen primer:** A low viscosity bitumen emulsion or solution for the purpose of improving adhesion, sealing and preparing surfaces prior to the application of the kit (LARWK).

3.2.6 **bitumen solution:** A blend of bitumen dissolved in volatile organic solvent(s) which may contain inert fillers and/or fibres. A viscous liquid or paste of brushing, spraying or spreading consistency that, when dried, provides a film forming part of the assembled system.

3.2.7 **catalyst:** A destabilising salt solution, added to certain bitumen emulsion systems in order to break or destabilise the emulsion and initiate the curing process.

3.2.8. **modified** (bitumen): changed, with respect to one or more characteristics (of the used bitumen), depending on the type of modifier used to bring about the specific change(s).

3.2.9 **polymer/copolymer (modifier):** A polymer/copolymer in solid, viscous liquid or liquid emulsion (latex) form, suitable for blending with bitumen to improve properties such as durability, flexibility and elasticity within the dried film.
Examples are:
- acrylics
- atactic polypropylene (APP)
- polychloroprene (CR)
- ethylene methyl acetate (EMA)
- ethylene vinyl acetate (EVA)
- polyisoprene (IR)
- natural rubber (NR)
- polybutylene (PB)
- styrene butadiene rubber (SBR)
- styrene butadiene styrene (SBS).

3.2.10 **polymer modified bitumen**: A homogeneous blend of bitumen and suitable polymer/copolymer in such proportions as to obtain a desired level of performance. A solid material softening when heated.

3.2.11 **polymer modified bitumen emulsion:** A substantial amount of polymer modified bitumen, finely dispersed in an aqueous medium by one or more suitable emulsifying agents.

The polymer is usually added during the manufacture in the form of a polymer emulsion (latex). The emulsion may also contain inert fillers and/or fibres. Applied by brush, spray or by spreading it provides, when dried, a film that forms part of the assembled system.

3.2.12 **polymer modified bitumen solution:** A blend of polymer modified bitumen in volatile organic solvent(s) which may incorporate inert fillers or fibres. A viscous liquid or paste of brushing, spraying or spreading consistency that, when dried, provides a film that forms part of the assembled system.

3.2.13 **solar reflective coating:** A liquid coating, sufficiently light in colour, used for the purpose of protection against solar degradation, in particular reducing heat gain of the roof surface and associated thermal movement. The coating can be of bitumen base containing metal flake or of polymer base containing pigments and inert fillers and/or fibres. The coating can be in an aqueous or volatile organic solvent(s) medium and is applied as a finish layer to the assembled system.

3.3 Particular abbreviations

For the purpose of this ETA-Guideline - Part 2 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 **polymer modified bitumen emulsions and solutions**, 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** The following additional requirements (working life and durability aspects)	
4.3.1	**Effects of low and high surface temperatures**	
4.3.1.1	Low temperature flexibility {ref. ETAG 005 – Part 1 clause 5.3.3.4.1 (ii)}	- additional specific requirements in 6.3.1.1
4.3.2	**Resistance to ageing media**	
4.3.2.1	Heat ageing	- specific ageing conditions in 5.3.2.1
4.3.2.2	Low temperature flexibility after UV ageing {ref. ETAG 005 – Part 1 clause 5.3.3.5.2 (ii)}	- additional specific requirements in 6.3.2.1
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**

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 variations in kit components and site practices**	
4.7.1.1	Dynamic indentation	- additional requirements in 6.7.1
4.7.1.2	Static indentation	- additional requirements in 6.7.1

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.

For testing procedures the samples shall be sufficiently dry {maximum moisture content 4% (m/m)}. After spraying the material for sampling purposes this can be achieved by:

- natural drying at ambient temperature to constant weight;
- forced drying at 40º C maximum air temperature to constant weight.

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**

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

5.3.1	**Effects of low and high surface temperatures**	
5.3.1.1	with reference to clause 5.3.3.4.1 (ii) of ETAG 005 – Part 1:	- Additional testing of low temperature flexibility shall be performed in accordance with EN 1109
5.3.2	**Resistance to ageing media**	
5.3.2.1	Heat ageing with reference to clause 5.3.3.5.1 (i) of ETAG 005 – Part 1:	- Depending on the nature of modification, heat ageing conditions of 70 ± 2 ºC at a doubled exposure period (Table 10 of ETAG 005 – Part 1) is permitted.
5.3.2.2	UV ageing with reference to clause 5.3.3.5.2 (ii) of ETAG 005 – Part 1	
5.3.2.2.1	Following the UV ageing period	- Additional comparative testing of the low temperature flexibility shall be performed on new and aged samples in accordance with EN 1109
5.4	**ER4: Safety in use**	No specific method of verfication
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 under the defined conditions:

5.7.1.1	Comparative testing of: Resistance to dynamic indentation	According to EOTA TR-006
5.7.1.2	Comparative testing of: Resistance to static indentation	According to EOTA TR-007

5.8 **Identification of components**

5.8.0 **General**

It is necessary to verify that components comply with the Applicant's specification (including tolerances). 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 **Bitumen primer**

5.8.1.1	- nature	by declaration
5.8.1.2	- flash point	method: EN ISO 2592 or EN ISO 2719
5.8.1.3	- viscosity	method: EN ISO 2431
5.8.1.4	- % non-volatiles	method: EN ISO 3251

5.8.2 **Polymer modified bitumen emulsion and bitumen emulsion**

5.8.2.1	- type of bitumen	by declaration
5.8.2.2	- type of modifier	by declaration (where applicable)
5.8.2.3	- % of modifier	by declaration (where applicable)
5.8.2.4	- viscosity	method: EN ISO 2431 or EN ISO 2555 (Brookfield)
5.8.2.5	- % non-volatiles	method: EN 1428
5.8.2.6	- pH-value	method: ISO 976

5.8.3 **Polymer modified bitumen solution and bitumen solution**

5.8.3.1	- type of bitumen	by declaration
5.8.3.2	- type of modifier	by declaration (where applicable)
5.8.3.3	- % of modifier	by declaration (where applicable)
5.8.3.4	- flash point	method: ISO 13736 (Abel closed cup) or EN ISO 2592 (Cleveland open cup)
5.8.3.5	- viscosity	method: EN ISO 2431 or EN ISO 2555 (Brookfield)
5.8.3.6	- % non-volatiles	method: EN ISO 3251

5.8.4 **Internal layer**

5.8.4.1	- nature	by declaration
5.8.4.2	- mass per unit area	method: appropriate to nature of the material (ISO 3374)(ISO 9073-1)
5.8.4.3	- tensile strength	method: appropriate to nature of the material (ISO 3342)(ISO 9073-3)
5.8.4.4	- tensile elongation	method: appropriate to nature of the material (ISO 3342)(ISO 9073-3)

5.8.5 **Supporting layer**

5.8.5.1	- nature	by declaration
5.8.5.2	- type specification	by declaration
5.8.5.3	- dimensional stability	method: EN 1107-1 (bitumen roofing sheets) or EN 1107-2 (plastics and rubber roofing sheets)

5.8.6 **Mineral finish**

5.8.6.1	- nature	by declaration

5.8.6.2 - particle size method: EN 933-1

5.8.7 **Solar reflective coating (liquid)**
5.8.7.1 - nature by declaration
5.8.7.2 - % non-volatiles method: EN ISO 3251
5.8.7.3 - % ash content method: e.g. BS 2000 - 223

5.8.8 **Catalyst**
5.8.8.1 - nature by declaration

5.8.9 **Bitumen adhesive (cold)**
5.8.9.1 - nature by declaration
5.8.9.2 - flash point method: EN ISO 2592 or EN ISO 2719
5.8.9.3 - viscosity method: EN ISO 2431 or EN ISO 2555 (Brookfield)
5.8.9.4 - % non-volatiles method: EN ISO 3251

5.8.10 **Bitumen adhesive (hot)**
5.8.10.1 - nature by declaration
5.8.10.2 - softening point method: EN 1427 (ring and ball method)
5.8.10.3 - penetration method: EN 1426

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 2).

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 **Effects of low and high temperatures**

6.3.1.1 Low temperature flexibility — The test results shall meet the temperature set by the TL-categorisation applied for. (see Table 6a of ETAG 005 – Part 1).

6.3.2 **Resistance to ageing media**

6.3.2.1 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 5.3.2.2.1, 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 **Effects of variations in kit components and site practices**

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

6.8 **Identification of components**

When verified in accordance with clause 5.8 of this document 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.

6.8.1 **Supporting layer**

The free shrinkage of sheet material used as a supporting layer shall be less than 0,7 %

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 of ETAG 005 – Part 1shall be elaborated in the Manufacturer's Technical Dossier (MTD) taking into account the following particular points:

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. EVALUATION AND ATTESTATION 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 2) 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 thickness of the applied film and corrective measures, if necessary;
- verification of breaking time for emulsions 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 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

9. THE ETA CONTENT

9.1 **Exceptions**

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

Annex I
(informative)

BIBLIOGRAPHY

The following document has served as reference in the preparation of this ETAG 005 – Part 2 of the ETA Guideline “Liquid Applied Roof Waterproofing Kits (LARWK's).

BS 2000 - Part 223 (1993)	Methods of test for petroleum and its products - Determination of ash of petroleum products containing mineral matter.