



## EUROPEAN ASSESSMENT DOCUMENT

EAD 030155-00-0402

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# ONE COMPONENT BITUMEN- POLYURETHANE RESIN FOR FLASHING APPLICATION

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

## Contents

<b>1</b>	<b>Scope of the EAD</b> .....	<b>4</b>
1.1	Description of the construction product	4
1.2	Information on the intended use(s) of the construction product	5
1.2.1	Intended use(s).....	5
1.2.2	Working life/Durability.....	5
1.3	Specific terms used in this EAD	5
<b>2</b>	<b>Essential characteristics and relevant assessment methods and criteria</b> .....	<b>6</b>
2.1	Essential characteristics of the product	6
2.2	Assessment methods and criteria for the performance of the product in relation to essential characteristics of the product	7
2.2.1	Characterisation of products to be assessed shall be done in accordance with following available specifications:Reaction to fire .....	7
2.2.2	External fire performance of roofs.....	7
2.2.3	Watertightness.....	7
2.2.4	Content, emission and/or release of dangerous substances .....	7
2.2.5	Resistance to wind load .....	8
2.2.6	Resistance to delamination on the support .....	8
2.2.7	Determination of tensile properties.....	9
2.2.8	Resistance to dynamic indentation.....	9
2.2.9	Resistance to differential movement of insulation.....	9
2.2.10	Resistance to differential movement on horizontal and vertical side .....	9
2.2.11	Compressibility test for insulation materials .....	10
2.2.12	Determination of the resistance of sliding .....	11
2.2.13	Compatibility with vertical substrate and bitumen sheets .....	11
2.2.14	Flexibility at low temperature.....	12
2.2.15	Resistance to plant root.....	12
2.2.16	Resistance to heat ageing.....	12
2.2.17	Resistance to UV ageing.....	12
2.2.18	Resistance to water ageing.....	12
<b>3</b>	<b>System(s) of assessment and verification of constancy of performance</b> .....	<b>13</b>
3.1	Tasks of the manufacturer	13
3.2	Tasks of the Notified Body	14
<b>4</b>	<b>Reference documents</b> .....	<b>15</b>

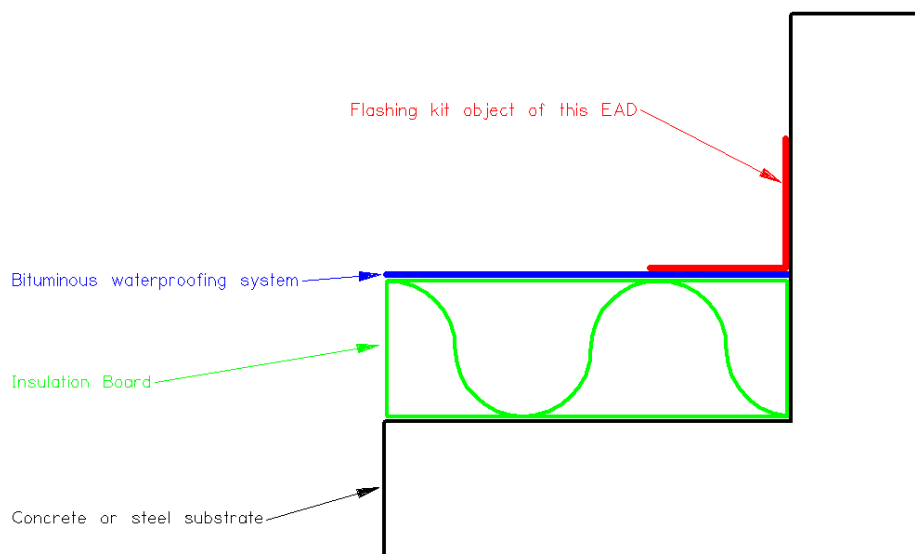
## 1 SCOPE OF THE EAD

### 1.1 Description of the construction product

The waterproofing membrane consists of one component bitumen-polyurethane resin for flashing application applied directly to bitumen waterproofing membrane used in the horizontal part of the roof.

The bitumen-polyurethane waterproofing membrane is composed of:

- 1 layer of one component bitumen-polyurethane resin
- 1 layer of reinforcement
- 1 layer of one component bitumen-polyurethane resin



The existing or new waterproofing system in horizontal parts of the roof can only be:

- Flexible bituminous sheets mechanically fastened.
- Partially or fully bonded bituminous sheets
- Loose laid flexible bituminous sheets

Admissible substrates are:

- For horizontal part :
  - bitumen sheet with mineral protection
  - bitumen sheet with metallic protection.
  - bitumen sheet with sand finishing
  - bitumen sheet burned film finishing (black sheet)
- For vertical part (acroterion, metallic roofcurb)
  - Concrete (all finish)
  - Steel

The product is not fully covered by ETAG 005 used as EAD.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

## **1.2 Information on the intended use(s) of the construction product**

### **1.2.1 Intended use(s)**

The waterproofing membrane consists of one component bitumen-polyurethane resin for flashing application applied directly to bitumen waterproofing membrane used in the horizontal part of the roof, and directly to the concrete or steel substrate on the vertical part of the roof.

### **1.2.2 Working life/Durability**

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the flashing resin for the intended use of 10 years when installed in the works (provided that the flashing kit is subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works<sup>1</sup>.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

## **1.3 Specific terms used in this EAD**

Flashing kit: waterproofing membrane defined in § 1.1

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<sup>1</sup> The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

## 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

Table 1 shows how the performance of the flashing kit is assessed in relation to the essential characteristics.

**Table 1** Essential characteristics of the product and assessment methods and criteria for the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
<b>Basic Works Requirement 2: Safety in case of fire</b>			
1	Reaction to fire	Clause 2.2.1	Class
2	External fire performance	Treated in the definition of current surface Clause 2.2.2	Class
<b>Basic Works Requirement 3: Hygiene, health and the environment</b>			
3	Watertightness	Clause 2.2.3	Pass / Fail
4	Release of dangerous substance	Clause 2.2.4	Description
<b>Basic Works Requirement 4: Safety and accessibility in use</b>			
5	Resistance to wind load	Treated in the definition of current surface Clause 2.2.5	/
6	Resistance to delamination on the support	Clause 2.2.6	Pass / Fail
7	Determination of tensile properties	Clause 2.2.7	Level
8	Resistance to dynamic indentation	Clause 2.2.8	Level
9	Resistance to differential movement of insulation	Clause 2.2.9	Pass / Fail
10	Resistance to differential movement on horizontal and vertical side	Clause 2.2.10	Pass / Fail
11	Compressibility test for insulation materials	Clause 2.2.11	Description
12	Resistance to sliding	Clause 2.2.12	Pass / Fail

No	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
13	Compatibility with vertical substrate and bitumen sheets	Clause 2.2.13	Description
14	Flexibility at low temperature	Clause 2.2.14	Level
15	Resistance to plant root	Clause 2.2.15	Pass / Fail
16	Resistance to heat ageing	Clause 2.2.16	Description
17	Resistance to UV ageing	Clause 2.2.17	Description
18	Resistance to water ageing	Clause 2.2.18	Description

## 2.2 Assessment methods and criteria for the performance of the product in relation to essential characteristics of the product

### 2.2.1 Characterisation of products to be assessed shall be done in accordance with following available specifications: Reaction to fire

The flashing kit shall be tested, using the test method(s) referred to in EN 13501-1 and relevant for the corresponding reaction to fire class. The product shall be classified according to Commission Delegated Regulation (EU) No 2016/364.

### 2.2.2 External fire performance of roofs

The external fire performance of roofs is treated in the definition of current surface.

If requested by the manufacturer, the roof (including the complete roof covering) in which the flashing kit is intended to be applied shall be tested using the test method relevant for the corresponding external fire performance roof class, in order to be classified according to EN 13501-5.

### 2.2.3 Watertightness

The watertightness of the product shall be determined, on a free film, by testing in accordance with the test method given in EOTA technical report TR-003 (2004).

The product must remain watertight.

### 2.2.4 Content, emission and/or release of dangerous substances

The performance of the product (components of the kit) related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer<sup>2</sup> after identifying the release scenarios (in accordance with EOTA TR 034) taking into

<sup>2</sup> The manufacturer may be asked to provide to the TAB the REACH related information which he must accompany the DoP with (cf. Article 6(5) of Regulation (EU) No 305/2011). The manufacturer is **not** obliged:

account the intended use of the product and the Member State where the manufacturer intends his product to be made available on the market.

The identified intended release scenarios for the product and intended use with respect to dangerous substances is S/W2: Product with indirect contact to soil, ground- and surface water.

**Leachable substances.** For the intended use covered by the release scenario S/W2 the performance of the product concerning leachable substances has to be assessed, if the product contains agents for root penetration. A leaching test with subsequent eluate analysis must take place, each in duplicate. Leaching tests of the membrane contained agents for root penetration are conducted according to CEN/TS 16637-2:2014. The leachate shall be pH-neutral demineralised water and the ratio of liquid volume to surface area must be  $20 \pm 5$  l/m<sup>2</sup>.

A sandblasted glass plates coated with the membrane (maximal thickness according to the technical data sheet) shall be prepared. The edges are not sealed. The cut edges of the membrane strip exposed to the eluent should be included in the calculation as a leachable area.

The eluates taken after 6 hours / 1 day / 2 days and 6 hours / 4 days / 9 days / 16 days / 36 days / 64 days shall be analysed for all environmentally relevant parameters, presumably at least the following:

- TOC according to EN 1484,
- pH-value according to EN ISO 10523,
- electrical conductivity according to EN 27888,
- agents for root penetration concentration [ $\mu\text{g/L}$ ], agents for root penetration release [ $\mu\text{g/m}^2$ ] and the cumulative agents for root penetration release [ $\text{g/m}^2$ ] according to appropriate test method

In eluates of "6 hours" and "64 days", the following biological tests shall be conducted:

- Acute toxicity test with *Daphnia magna* Straus according to EN ISO 6341
- Toxicity test with algae according to ISO 15799
- Luminescent bacteria test according to EN ISO 11348-1, EN ISO 11348-2 or EN ISO 11348-3

For each biological test, EC20-values shall be determined for dilution ratios 1:2, 1:4, 1:6, 1:8 and 1:16.

If the parameter TOC is higher than 10 mg/l, the following biological tests shall be conducted with the eluates of "6 hours" and "64 days" eluates Biological degradation according to OECD Test Guideline 301 part A, B or E.

Determined toxicity in biological tests must be expressed as EC20-values for each dilution ratio. Maximum determined biological degradability must be expressed as "...% within ...hours/days". The respective test methods for analysis must be specified.

### 2.2.5 Resistance to wind load

No performance determined: treated in the definition of current surface, for flashing area cf. §2.2.6. and §2.2.14

The current surface, and specially the perimeter and corner areas, has to be sized against wind's action according to national rules. The flashing kit is not involved in the resistance to the wind.

### 2.2.6 Resistance to delamination on the support

The delamination strength at  $(23 \pm 2)$  °C in accordance is measured with the test method given in EOTA technical report TR-004 (2004) on:

- concrete substrate with smooth finish (shuttered concrete)
- steel substrate
- bitumen sheet with mineral protection

- 
- to provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
  - to provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS.

Any information provided by the manufacturer regarding the chemical composition of the products may not be distributed to EOTA or to TABs.



- bitumen sheet with and metallic protection.
- bitumen sheet with sand finishing
- bitumen sheet burned film finishing (black sheet)

The product must have a delamination resistance over than 50 kPa.

### **2.2.7 Determination of tensile properties**

Comparative testing of tensile properties shall be performed on new and aged samples (cf. § 2.2.17) at 23°C. The tensile properties of a free film of the product shall be determined according to EN 527-1 and EN 527-3.

### **2.2.8 Resistance to dynamic indentation**

The resistance to dynamic indentation at  $(23 \pm 2)$  °C shall be determined in accordance with the test method given in EN 12691 – method B .

The test shall be done on samples of the product applied on one of these waterproofing sheets:

- bitumen sheet with mineral protection
- bitumen sheet with and metallic protection.
- bitumen sheet with sand finishing
- bitumen sheet burned film finishing (black sheet)

Waterproofing sheets must be selected in accordance with the lowest performances requested by the applicant (single layer sheets, lowest reinforcement, lowest thickness).

According to method B of EN 12691, the test substrate is EPS.

### **2.2.9 Resistance to differential movement of insulation**

A fully bonded assembled system shall be subjected to fatigue movements, in accordance with the method given in EOTA technical report TR-008 .

The system shall be tested with 500 cycles on new product and after 200 cycles on heat aged product (cf. §2.2.17). The test shall be done at  $(- 20 \pm 2)$  °C.

The roof waterproofing flashing system must remain watertight.

### **2.2.10 Resistance to differential movement on horizontal and vertical side**

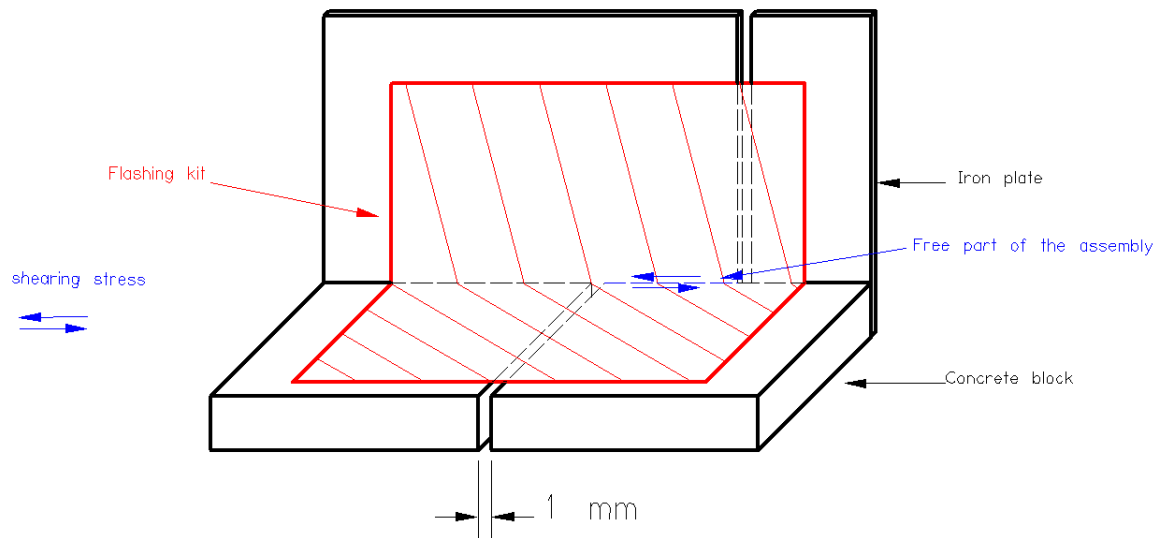
The differential movement on vertical and horizontal side is tested in accordance with the test method given in EOTA TR 008, on vertical and horizontal side.

The aim of this test is to simulate shearing stress that can occur on flashing, the type of shearing found typically on unstable insulation base.

The test consists in applying the waterproofing system (to be tested) on a purpose-built flashing.

The horizontal part is made up of 2 concrete blocks between which a 1 mm spacer is placed. 2 galvanized iron plates are fixed vertically to the concrete blocks. The metal plates are placed edge to edge and the joint is off-set from the horizontal joint (between the concrete blocks).

The waterproofing to be tested is applied on the flashing. The specified curing time must be respected.



The system is placed in a cold box set at a temperature of  $(-20 \pm 2) ^\circ\text{C}$ . The gap spacer is then removed and the system is subjected to 500 movement cycles in accordance to EOTA TR 008.

After 500 cycles, the spacer is placed again between the concrete blocks and the system is inspected. Should there be any doubt, waterproofing is checked with electric arc.

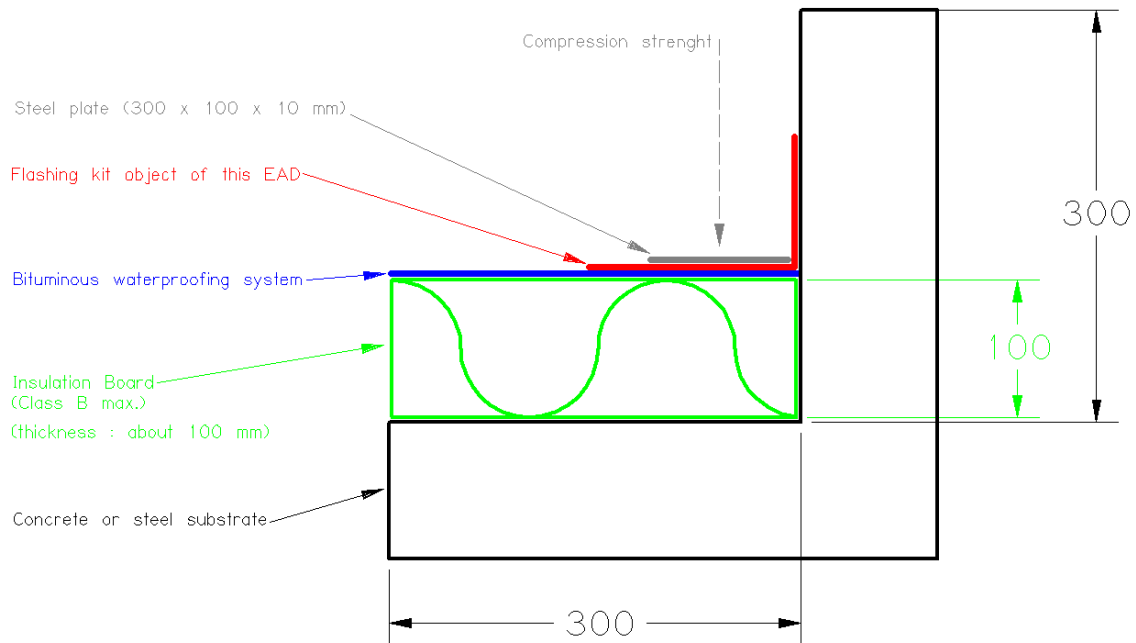
The roof waterproofing flashing system must remain watertight.

### 2.2.11 Compressibility test for insulation materials

It consists on a simulation of a walk near the flashing.

The compressibility test shall be done according to EN 826 with the following adaptation:

- The sample representing a model of a flashing, composed by :
  - A concrete or steel substrate (dimensions : 300 x 300 x 30 mm)
  - An insulation board (class B according to UEAtc Technical Guide for the assessment of waterproofing support insulation system for flat and inclined roof – February 1993).
  - A bitumen waterproofing system
  - The flashing kit



A charge of compression shall be applied with a steel plate (300 x 100 x 10 mm) until the ruin of the system (indicative value). Based on experience, the resistance to walking is given, if the measured values of compression strength for 10% relative deformation is over 60 kPa. Otherwise the resistance to walking cannot be verified on the basis of this EAD. Where relevant, a more exact test method for the resistance to walking of the kit would be need.

### 2.2.12 Determination of the resistance of sliding

The test method consists on the determination of the temperature of slippage according to EOTA TR009 with the following modifications:

- The test slope is 90°
- The test temperature is 90°C
- The test duration is 2 hours.

The sliding of the flashing kit shall be less than 2 mm.

### 2.2.13 Compatibility with vertical substrate and bitumen sheets

This test consists on peel resistance of the product applied on different substrates:

- Concrete with a smooth finish (shuttered concrete)
- Steel plate
- bitumen sheet with mineral protection
- bitumen sheet with and metallic protection.
- bitumen sheet with sand finishing
- bitumen sheet burned film finishing (black sheet)

Peel resistance test shall be performed in accordance to EN 12316-2 with the modification described in method A of §4.3.3 of UEAtc Technical Guide for the assessment Roof Waterproofing Systems made of Reinforced APP or SBS Polymers Modified Bitumen Sheets – December 2001.

Based on experience the compatibility with subtrates is given, if the measured values of peel resistance is over 25 N/50mm. Otherwise the compatibility with subtrates cannot be verified on the basis of this EAD. Where relevant, a more exact test method for the compatibility with subtrates would be need."

#### **2.2.14 Flexibility at low temperature**

The flexibility shall be determined according to EN 1109 on free film of the product.

#### **2.2.15 Resistance to plant root**

The resistance to plant root shall be assessed in accordance to EN 13948, if claimed by the manufacturer.

#### **2.2.16 Resistance to heat ageing**

The effects of heat ageing shall be assessed by subjecting an assembled system to heat ageing according to EOTA TR 011.

After heat ageing, followings performances shall by examined:

- After 84 days at 70°C : Determination of tensile properties (cf. 2.2.8)
- After 1 month at 80 °C : Resistance to differential movement of insulation ( 200 cycles) (cf. 2.2.9)
- After 1 month at 80 °C : Compatibility with vertical substrate and bitumen sheets (cf. 2.2.14)
- After 84 days at 70°C : Flexibility at low temperature (cf. 2.2.15)

Based on experience the durability is given, if the measured values after heat aging not deviate more than  $\pm 15\%$  at the state of delivery. Otherwise the durability cannot be verified on the basis of this EAD. Where relevant, a more exact test method for the durability would be need.

#### **2.2.17 Resistance to UV ageing**

The effects of UV ageing shall be assessed by subjecting an assembled system to heat ageing according to EOTA TR 010 during 1000 h at 60 °C.

After UV ageing, followings performances shall by verified:

- Determination of tensile properties (cf. 2.2.8)
- Flexibility at low temperature (cf. 2.2.15)

Based on experience the durability is given, if the measured values after UV aging not deviate more than  $\pm 20\%$  at the state of delivery. Otherwise the durability cannot be verified on the basis of this EAD. Where relevant, a more exact test method for the durability would be need

#### **2.2.18 Resistance to water ageing**

The effects of UV ageing shall be verified by subjecting an assembled system to heat ageing according to EOTA TR 012 during 30 days at 60 °C.

After water ageing, followings performances shall by verified:

- Resistance to dynamic indentation (cf.2.2.9)
- Compatibility with vertical substrate (cf. 2.2.14)

Based on experience the durability is given, if the measured values after water aging not deviate more than  $\pm 20\%$  at the state of delivery. Otherwise the durability cannot be verified on the basis of this EAD. Where relevant, a more exact test method for the durability of the coating would be need

### 3 SYSTEM(S) OF ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

For the products covered by this EAD the applicable European legal act is Decision 97/556/EC as amended by Decision 2001/596/EC.

The system to be applied is: 3

In addition, with regard to e.g. reaction to fire for products covered by this EAD the applicable European legal act is Decision 2001/596/EC

The system(s) to be applied is (are):

Product(s)	Intended use(s)	Level(s) or class(es)	AVCP system(s)
Flashing resin	For uses subject to regulation on reaction to fire	A1*,A2*,B,C*	1
		-----	-----
		A1**,A2**,B**,C**,D,E	3
		-----	-----
		(A1 to E)***,F	4

\* Products/ materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

\*\* Products/ materials not covered by footnote (\*).

\*\*\* Products/ materials that do not require to be tested for reaction to fire (eg. Products/materials of classes A1 according to Commission Decision 96/603/EC, as amended. This is not applicable for the liquid applied roof waterproofing kits because all the products are based on organic material and therefore not covered by the Commission Decision 96/603/EC and its amendment.

#### 3.1 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

**Table 2 Control plan for the manufacturer; cornerstones**

No	Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method (refer to 2.2 or 3.4)	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Brookfield viscosity	NF EN ISO 2555 § 2.2.17	/	1	Every batch
2	Density	NF EN ISO 1675 § 2.2.17	/	1	Every batch
3	Non-volatile-matter content	NF EN ISO 3251 § 2.2.17	/	1	Every batch at 160 °C
4	Determination of tensile properties	EN 527-1 and EN 527-3 § 2.2.4	/	5	Every 10 batches

### 3.2 Tasks of the Notified Body

The intervention of a notified body under AVCP system 1 is only necessary regarding reaction to fire and only if a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for LARWK are laid down in Table 3.

**Table 3. Control plan for the notified body; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of specimens	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	The notified body shall verify the ability of the manufacturer for a continuous and orderly control of the product according to the European Technical Assessment. In particular, the following items shall be appropriately considered <ul style="list-style-type: none"> <li>- personnel and equipment</li> <li>- the suitability of the factory production control established by the manufacturer</li> <li>- full implementation of the prescribed Control Plan</li> </ul>				---
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
1	The notified body shall verify that <ul style="list-style-type: none"> <li>- the manufacturing process of the kit components</li> <li>- the system of factory production control</li> <li>- the implementation of the prescribed Control Plan are maintained.</li> </ul>				Once per year

## 4 REFERENCE DOCUMENTS

As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance

<b>EN 13501-1</b>	Fire classification of construction products and building elements. Part 1: classification using test data from reaction to fire tests.
<b>EN 13501-5</b>	Fire classification of construction products and building elements Part 5: Classification using data from external fire exposure to roofs tests
<b>EOTA TR-003</b>	Determination of the watertightness.
<b>EOTA TR-004</b>	Determination of the resistance to delamination.
<b>EOTA TR-008</b>	Determination of the resistance to fatigue movement.
<b>EOTA TR-009</b>	Determination of the resistance to sliding.
<b>EOTA TR-010</b>	Exposure procedure for artificial weathering
<b>EOTA TR-011</b>	Exposure procedure for accelerated ageing by heat
<b>EOTA TR-012</b>	Exposure procedure for accelerated ageing by hot water
<b>EN 12691</b>	Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing. Determination of resistance to impact.
<b>EN 12316-2</b>	Flexible sheets for waterproofing — Determination of peel resistance of joints —  Part 2: Plastic and rubber sheets for roof waterproofing
<b>EN 1109</b>	Flexible sheets for waterproofing – Bitumen sheets for roof waterproofing – Determination of flexibility at low temperature.
<b>ETAG 005</b>	Guideline for European Technical Approval of liquid applied roof waterproofing kits.
<b>Commission Decision 98/599/EC of 12 October 1998</b>	On the procedure for attesting the conformity of construction products pursuant to Article 20(0) of Council Directive 89/106/EEC as regards liquid applied roof waterproofing kits.
<b>NF EN ISO 527-1 and -3</b>	Plastics – Determination of tensile properties. Part 1 : General principles and Part 3: Test conditions for films and sheets.
<b>EN 826</b>	Thermal insulating products for building applications. Determination of compression behaviour.
<b>EN 13948</b>	Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to root penetration.
<b>Guide UEAtc (2001)</b>	UEAtc Technical Guide for the assessment Roof Waterproofing Systems made of Reinforced APP or SBS Polymers Modified Bitumen Sheets – December 2001.
<b>Guide UEAtc (1993)</b>	UEAtc Technical Guide for the assessment of waterproofing support insulation system for flat and inclined roof – February 1993