



## EUROPEAN ASSESSMENT DOCUMENT

EAD 230012-01-0105

November 2017

# ADDITIVES FOR ASPHALT PRODUCTION – ADDITIVE FROM BITUMEN GRANULES MADE FROM RECYCLED BITUMINOUS ROOFING FELT

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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).

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## 1 SCOPE OF THE EAD

### 1.1 Description of the construction product

The additive used as a constituent material for asphalt production consists of bitumen granules made from recycled bituminous roofing felt which is a mix of new\* and old roofing felt waste. The granules include on average bitumen (55% by mass) and aggregate, filler and fibres (in total on average 45% by mass). In the production, the roofing felt is shredded and nails are removed by a magnet. The bitumen granules are delivered to asphalt mixing plants and used as recycled bitumen in the asphalt production. The characteristics and durability of the final asphalt is the responsibility of the asphalt manufacturer under EN 13108 and is not covered by this EAD.

\* Note. By “new roofing felt waste” is meant bituminous roofing felt waste generated from roofing felt manufacturers.

#### **The raw material:**

The raw material is received as roofing felt waste. The roofing felt comes from roofing felt factories, roof building companies, demolition companies, and waste stations.

Delivery of roofing felt to the applicant takes place after stringent requirements. All suppliers will have a sorting guidance to be followed. The roofing felt shall not contain tar, asbestos, PVC, sheet metal flashings, metal parts, wood, insulation and cardboard.

Roofing nails and screws are accepted as part of the incoming roofing felt, and will be removed as part of the shredding process.

#### **Shredding of roofing felt waste:**

The received roofing felt waste is shredded through a patented production method through several processes. In the process roofing nails and other small metal parts are removed with magnets. When the shredding is completed, the product has a granulate size of 0-16 mm.

No materials or substances are added in the process. The final product consists of roofing felt, which is bitumen, aggregates and sand. Fibres and plastics from the back of the roofing felt and maybe paper from the wrapping of the rolls is also a part of the final product. The bitumen percent is on average 55%. Other materials constitute the remaining 45 % of the final product as described above.

To ensure a homogeneous bitumen percentage several batches of the finished product are mixed.

The bitumen granules are delivered newly shredded from factory so that the asphalt customer- the mix plant - receives a loose product.

The bitumen granules are characterized by the following characteristics; grading, particle size, source, type and properties, and homogeneity, which are defined in accordance with EN 13108-8. The granules will never include asbestos, as there are specific legislation regulating the handling of works containing asbestos.

The product is not covered by a harmonised European standards (hEN) EN 14023:2010 and 13108 series, since these standards do not cover additives derived from regenerated materials and it does not include bituminous materials from roof waste.

In comparison to EAD 230012-00-0105, the amendments included in this version of the EAD concerns the following aspects: clarification that the additive is a constituent material in the framework of EN 13108; and amendment of table 2 concerning frequencies and removal of control of asbestos in the final additive (as this will never be included into the manufacturing process). Additionally, table 3 has been updated to be consistent with the latest model clauses.

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)**

Additive in the form of bitumen granules used as a constituent material for the production of asphalt for roads.

The bitumen granules are added in the asphalt production as a partial substitute for virgin bitumen.

Note: Normally approx. 5% bitumen is required in AC asphalt mixes. 2% additive is recommended and the remaining 4 % can be a mix of virgin bitumen and bitumen from reclaimed asphalt.

### **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 asphalt incorporating the bitumen granules for the intended use of 25 years when installed in the works (provided that the additive is included within the EN 13108 mix design in accordance with EN 13108-20 by the asphalt manufacturer and subsequently installed in accordance with the asphalt manufacturers paving procedures. The durability of the final asphalt is the responsibility of the supplier of the asphalt (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.

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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 the assumed working life.

## 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

Table 1 shows how the performance of the bitumen granules is assessed in relation to the essential characteristics.

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

No	Essential characteristic	Method of verification and assessment	Type of expression of product performance (level, class, description)
Basic Works Requirement 3: Hygiene, health and the environment			
1	Content, emission and release of dangerous substances	2.2.1	Description
Basic Works Requirement 4: Safety and accessibility in use			
2	Softening point - Ring and Ball method	2.2.2	Level
3	Penetration	2.2.3	Level
4	Bitumen (binder) content	2.2.4	Level
5	Foreign matter	2.2.5	Description
6	Grading	2.2.6	Description

### 2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

Characterisation of products to be assessed shall be done in accordance with available specifications, notably grading, particle size, source, type and properties, and homogeneity.

#### 2.2.1 Content and/or release of dangerous substances

The performance of the product 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 using the methods and criteria described in EOTA TR 034, specifically concerning tar and polyaromatic hydrocarbons (PAH) and Benzo(a)pyrene (B(a)P).

The possible content of tar is detected by its smell, and in case of detection of tar, the batch will be removed and not used.

The content of PAH including B(a)P is determined in accordance with ISO 18287 (GC-MS). The content of PAH is stated in mg/kg and the content of B(a)P is stated in mg/kg in the ETA.

## **2.2.2 Softening point - Ring and Ball method**

The Bitumen (binder) recovery is determined in accordance with EN 12697-3 and is used to obtain samples of binder for the test as described below

The softening point - Ring and Ball method is determined in accordance with EN 1427 and the level is stated in the ETA.

## **2.2.3 Penetration**

The Bitumen (binder) recovery is determined in accordance with EN 12697-3 and is used to obtain samples of binder for the test as described below

The needle penetration is determined in accordance with EN 1426 and the level is stated in the ETA.

## **2.2.4 Bitumen (binder) content**

The bitumen (soluble binder) content of the bitumen granules is determined in accordance with EN 12697-1 and the level is stated in the ETA.

## **2.2.5 Foreign matter**

Foreign matter assessed in this EAD are in the form of rubber, wood, aluminium and EPS. The amount of foreign matter in the additive is determined in accordance with EN 933-11 and the proportion of each constituent is calculated in accordance with EN 933-11. The maximum percentage of total foreign matter is stated in the ETA.

## **2.2.6 Grading**

The particle size distribution after bitumen extraction shall be determined in accordance with EN 12697-2 and stated in the ETA.

### 3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

#### 3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 98/601/EC amended by Decision 2001/596/EC

The system is: **2+**

#### 3.2 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	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Tar in roofing felt waste	Visual (smelling)	No tar smell	As given in control plan	As given in control plan
2	Asbestos in roofing felt waste	Statement from supplier	None	As given in control plan	As given in control plan
3	Bitumen granules size	Mechanical sorting	0-16 mm	As given in control plan	As given in control plan
4	Spikes and metal parts removal	Mechanical by magnet	100%	As given in control plan	As given in control plan
5	Bitumen % in granules	2.2.4	Control plan	As given in control plan	As given in control plan

### 3.3 Tasks of the notified body

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

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 2+ are laid down in Table 3.

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

Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>				
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan
<b>Continuous surveillance, assessment and evaluation of factory production control</b>				
Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan

## 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.

- |             |   |
|-------------|---|
| EN 14023    | Bitumen and bituminous binders - Specification framework for polymer modified bitumens  |
| EN 13108-8  | Bituminous mixtures - Material specifications - Part 8: Reclaimed asphalt   |
| EN 1426     | Bitumen and bituminous binders - Determination of needle penetration  |
| EN 1427     | Bitumen and bituminous binders - Determination of the softening point - Ring and Ball method                                    |
| EN 12697-1  | Bituminous mixtures - Test methods for hot mix asphalt - Part 1: Soluble binder content   |
| EN 12697-3  | Bituminous mixtures - Test methods for hot mix asphalt - Part 3: Bitumen recovery: Rotary evaporator                            |
| EOTA TR 034 | General BWR3 Checklist for EADs/ETAs - Content and/or release of dangerous substances in construction products                  |
| EN 933-11   | Tests for geometrical properties of aggregates – Part 11: Classification test for the constituents of coarse recycled aggregate |
| EN 12697-2  | Bituminous mixtures - Test methods - Part 2: Determination of particle size distribution  |