



EUROPEAN ASSESSMENT DOCUMENT

EAD 220006-00-0402

June 2016

ROOFING SLATES MADE OF POLYPROPYLENE, LIMESTONE AND FILLERS

The reference title and language for this EAD is English. The applicable rules of copyright refer to the document elaborated in and published by EOTA.

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

1	Scope of the EAD.....	4
1.1	Description of the construction product	4
1.2	Information on the intended use(s) of the construction product	4
1.2.1	Intended use.....	4
1.2.2	Working life/Durability.....	5
2	Essential characteristics and relevant assessment methods and criteria.....	6
2.1	Essential characteristics of the product	6
2.2	Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product	7
2.2.1	Bending moment	7
2.2.2	Reaction to fire	7
2.2.3	External fire performance of roofs.....	7
2.2.4	Dimensions.....	7
2.2.5	Density.....	7
2.2.6	Water absorption	7
2.2.7	Dimensional stability.....	8
2.2.8	Warm water immersion at ambient temperature	8
2.2.9	Warm water immersion at elevated temperature	8
2.2.10	Dry heat at elevated temperature	8
2.2.11	Freeze/thaw cycling.....	9
2.2.12	UV exposure.....	9
2.2.13	Heat/Rain Cycling.....	9
3	Assessment and verification of constancy of performance	10
3.1	System(s) of assessment and verification of constancy of performance to be applied	10
3.2	Tasks of the manufacturer	10
3.3	Tasks of the notified body	10
4	Reference documents	12

1 SCOPE OF THE EAD

1.1 Description of the construction product

Compression-moulded slates made from a recyclable blend of polypropylene, limestone, fillers including fire retardants and pigments.

Ridge-caps made to the same formulation are also available for use with the slates.

The slates have the nominal characteristics of:

Dimensions (mm)	445 x 305
Nominal thickness (mm)	top edge 7, bottom edge 3.5
Average density (kg.m ⁻³)	1323
Installed weight (kg.m ⁻²)	13.5
Colours	A range of colours are available.
Finishes	A range of finishes are available.

Slight colour variations may exist between batches and the product should be randomised on site to achieve a consistent appearance when installed.

The slates are marked with blind holes for installation.

The product is not fully covered by a harmonised European standard (hEN), but generally in accordance with EN 492 which covers fibre-cement products only. However, the assessment methods are applicable with exceptions for the conditioning and the period of conditioning of the samples.

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

The slates are for use as a weatherproof finish to pitched roofs. The image below shows the product installed on a pitched 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 roofing slate for the intended use of 25 years when installed in the works (provided that the roofing slate 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 works¹.

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 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 roofing slates is assessed in relation to the essential characteristics.

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

No	Essential characteristic	Assessment method	Type of expression of product performance <i>(level, class, description)</i>
Basic Works Requirement 1: Mechanical resistance and stability			
1	Bending moment	See paragraph 2.2.1	value
Basic Works Requirement 2: Safety in case of fire			
2	Reaction to fire	See paragraph 2.2.2	Class
3	External fire performance of roofs	See paragraph 2.2.3	Class according to EN13501-5
Basic Works Requirement 4: Safety and accessibility in use			
4	Dimensions	See paragraph 2.2.4	value
5	Density	See paragraph 2.2.5	value
6	Water absorption	See paragraph 2.2.6	value
7	Dimensional stability	See paragraph 2.2.7	value
8	Warm water immersion at ambient temperature	See paragraph 2.2.8	value
9	Warm water immersion at elevated temperature	See paragraph 2.2.9	value
10	Dry Heat at elevated temperature	See paragraph 2.2.10	value
11	Freeze/thaw cycling	See paragraph 2.2.11	value
12	UV exposure	See paragraph 2.2.12	Level
13	Heat-rain cycling	See paragraph 2.2.13	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 identification of construction product by means of bending moment, dimensions, density and water absorption, clauses 2.2.1, 2.2.5, 2.2.6 and 2.2.7 refer respectively.

The level to be stated and the classification respectively for each characteristic has to be representative for the range.

2.2.1 Bending moment

Bending moment of the product shall be determined in accordance with EN 492, 7.3.2.2

The average, minimum or maximum Bending moment shall be stated in the ETA.

2.2.2 Reaction to fire

The product shall be tested using the test method(s) according to 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.

2.2.3 External fire performance of roofs

The roof (including the complete roof covering) in which the slates are intended to be incorporated, installed or 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.

The slates to be tested shall be installed, in addition to the general provisions given in ENV 1187, in a manner representative of their intended use in accordance with the manufacturer's specifications.

The product is classified in accordance with EN 13510-5 and designated in the ETA.

2.2.4 Dimensions

The dimensions; length, width and thickness shall be determined in accordance with EN 492, 7.2

The measured values and tolerances shall be stated in the ETA.

2.2.5 Density

The density shall be determined in accordance with EN 492, 7.3.1 and average value stated in the ETA.

2.2.6 Water absorption

Five specimens of size, 50mm by 50mm shall cut from a sample of the slate. The thickness of the specimens must not vary by more than $\pm 10\%$ of the nominal specimen thickness, or $\pm 1\text{mm}$, whichever is less. They must also have a volume of at least 25 cm^3 . Loose particles if dust must be removed using an air blast.

Mass of the specimen must be measured to an accuracy of $\pm 0.05\text{g}$.

The specimens must be immersed in water at $20 \pm 2^\circ\text{C}$ for not less than 24 hrs. Specimens must be kept immersed until successive immersed mass determinations of individual specimens at intervals of 2 hours show an increase of less than 0.5%.

The specimens are removed from the water and the surface dried with a towel to remove surface moisture. The saturated mass (M_c) of each specimen must be determined.

Specimens must be dried in an oven at $105 \pm 5^\circ\text{C}$ until successive mass determinations at intervals of 2 hours show a decrease of less than 0.5%. After removal from the oven, the specimen should be placed in a desiccator and allowed to cool to ambient temperature. The dry mass (M_a) of the specimen is then determined.

The water absorption is given by the formula:

$$W_a = \frac{M_c - M_a}{M_a} \times 100\%$$

Where M_a and M_c are the dry and saturated masses respectively as defined above.

The average water absorption shall be stated in the ETA.

2.2.7 Dimensional stability

The slates shall be tested as follows

Demec points are glued with a suitable adhesive on all sides of each of three full-size slates. The slates are left for 24 hours at ambient temperature to allow the adhesive to fully set.

Measurements using a Demec gauge with a 200 mm gauge length are made for each specimen.

The slates are then placed in an oven and subjected to 6 hours at $80^\circ \pm 5^\circ\text{C}$. The slates are removed from the oven and left to cool for 24 hours at ambient temperature prior to taking measurements.

The % change in length and width of the slates is recorded and the dimensional change in both directions shall be stated in the ETA.

2.2.8 Warm water immersion at ambient temperature

A bending test shall be performed in accordance with EN 492: 7.3.2.2 on control and conditioned samples with the following exceptions:

Samples are conditioned for 28 days and 56 days water immersion at ambient temperature (23 ± 2) $^\circ\text{C}$. All specimens shall be tested with the weather side in tension. The test shall be carried out in the longitudinal direction only.

The average bending moment at rupture of the control and conditioned samples is recorded and stated in the ETA.

2.2.9 Warm water immersion at elevated temperature

A bending test shall be performed in accordance with EN 492: 7.3.2.2 on control and conditioned samples with the following exceptions:

Samples are conditioned for 28 days and 56 days water immersion at (40 ± 2) $^\circ\text{C}$. All specimens shall be tested with the weather side in tension. The test shall be carried out in the longitudinal direction only.

2.2.10 Dry heat at elevated temperature

A bending test shall be performed in accordance with EN 492: 7.3.2.2 on control and conditioned samples with the following exceptions:

Samples are conditioned in a ventilated oven controlled at (80 ± 2) °C for 28 and 56 days. All specimens shall be tested with the weather side in tension. The test shall be carried out in the longitudinal direction only.

2.2.11 Freeze/thaw cycling

A bending test shall be performed in accordance with EN 492: 7.3.2.2 on samples after subjecting them to Freeze-thaw cycling for 100 cycles.

The average bending moment at rupture of the control and conditioned samples is recorded and stated in the ETA.

2.2.12 UV exposure

A bending test shall be performed in accordance with EN 492: 7.3.2.2 on samples after subjecting them to either of following conditions:

UV aged – In accordance with EN ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent lamps*. UVB 313 lamps (wavelength 250 -400 nm) cycling 4 hours UV at 50°C followed by 4 hours condensation at 50°C for 1000 and 2000 hours.

Or

UV aged- In accordance with EN ISO 4892-2 *Plastics –Methods of exposure to laboratory light sources*. Part 2: *Xenon Arc lamps* for a duration of 3150 hours with an energetic exposure of 60 Wm^{-2} (wave length 300 to 400nm). The energy received by the sample will therefore be equal to 0.68 GJm^{-2} (wave length from 300 to 400 nm) or 10 GJm^{-2} (wave length from 300 to 2500 nm).

The average bending moment at rupture of the control and conditioned samples is recorded following Level 1: 1000 hours, Level 2: 2000 hours and Level 3: 3000 hours

2.2.13 Heat/Rain Cycling

The test is performed in accordance with EN 492.:7.4.2

The results of visual examination shall be 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 1998/436/EC

The system is: 1.

In addition, with regard to e.g. reaction to fire for products covered by this EAD the applicable European legal act is: Decision 1998/436/EC

The systems are: 1, 3 and 4

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 (refer to 2.2 or 3.4)	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]*					
1	Control of the raw materials	According to manufacturer's specifications			Each batch
2	Visual inspection of the final product	Visual	Identical with the reference body	5	Continuous
3	Mechanical properties of the final product: -Dimensions (length, width and thickness -Density -Bending moment	Clause 2.2.4 Clause 2.2.5 Clause 2.2.1		5 5 5	Once per shift

3.3 Tasks of the notified body

The intervention of the notified body under AVCP system 1 is only necessary for reaction to fire for 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).

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.

Table 3: Tasks for the notified body;

Subject/type of control (<i>product, raw/constituent material, component - indicating characteristic concerned</i>)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control				
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardants.	As defined in clause 2.2.2 of the EAD	As defined in clause 2.2.2 of the EAD	As defined in clause 2.2.2 of the EAD	When starting the production
Continuous surveillance, assessment and evaluation of factory production control				
Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardants.	As defined in clause 2.2.2 of the EAD	As defined in clause 2.2.2 of the EAD	As defined in clause 2.2.2 of the EAD	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.

- EN 492 *Fibre-cement slates and fitting- Product Specifications and test methods.*
- EN 13501-5 *Fire classification of construction products and building elements, Part 5 Classification using data from external fire exposure to roofs tests*
- ENV 1187 *Test methods for external fire exposure to roofs*
- EN ISO 4892-3 *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent lamps*
- EN ISO 4892-2 *Plastics –Methods of exposure to laboratory light sources. Part 2: Xenon Arc lamps f*