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## European Technical Assessment

**ETA 17/0141**  
of 06/02/2018

English translation prepared by LNEC; original version in Portuguese language

ISSN 2183-3362

Trade name of the construction product

*Designação comercial do produto de construção*

Product family to which the construction product belongs

*Família de produtos a que o produto de construção pertence*

Manufacturer

*Fabricante*

Manufacturing plant(s)

*Instalações de fabrico*

This European Technical Assessment contains

*A presente Avaliação Técnica Europeia contém*

This European Technical Assessment is issued in accordance with Regulation (EU) No. 305/2011, on the basis of

*A presente Avaliação Técnica Europeia é emitida ao abrigo do Regulamento (UE) n.º 305/2011, com base no*

### PLUS <sup>2F</sup>

Thermal insulation products for buildings with radiant heat reflective components

*Produtos de isolamento térmico com faces refletantes para edifícios*

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6 pages, including 1 annex which forms an integral part of this assessment

*6 páginas, incluindo 1 anexo que faz parte desta avaliação*

European Assessment Document (EAD) No. 040007-00-1201: Thermal insulation products for buildings with radiant heat reflective components, edition December 2015

*Documento de Avaliação Europeu (EAD) n.º 040007-00-1201: Produtos de isolamento térmico com elementos refletantes para edifícios, edição de dezembro de 2015*

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## 1. Technical description of the product

This European Technical Assessment (ETA) applies to a product for thermal and/or acoustic protection under the trade designation PLUS<sup>2F</sup>, consisting of a flexible foam core made of extruded expanded polyethylene (PEF) coated on both sides by an aluminum foil. The aluminum foil is layered by a polyethylene terephthalate (PET) film and thermo-coupled to the core by means of a low density polyethylene (LDPE) film. The ETA holder is ultimately responsible for the product specified in this ETA.

The product is marketed with nominal thicknesses of 3, 5 and 10 mm in the form of a roll having a width of 1200 mm.

The features of the PLUS 2F product are as follows:

**Core:** Flexible non-crosslinked extruded expanded polyethylene foam sheet (PEF) with nominal density of 21 kg/m<sup>3</sup>;

**Exterior coatings:** Low density polyethylene film (LDPE); aluminum foil with a nominal thickness of 8 µm; polyethylene terephthalate (PET) film with a nominal thickness of 12 µm.

A self-adhesive tape of metallized polyester is used to perform the overlapping of the reflective product sheets during application.

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with Laboratório Nacional de Engenharia Civil, which identifies the product that has been assessed and judged. The European Technical Assessment applies only to products satisfying the requirements of the mentioned agreed data/information.

## 2. Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The intended use of the reflective product PLUS<sup>2F</sup> is as complement of thermal insulation when it is incorporated in construction systems.

The product is used for walls, floors or roofs, for which air voids are designed and executed (minimum recommended air space thickness 20 mm) in order to create non-ventilated spaces in contact with the product. Examples of application of the product in the building envelope are given in the figure included in annex. The thermal properties of the product are mainly related to the surface low emissivity of the metalized foil in contact with air spaces.

The reflective product should not be used in structures exposed to precipitation or weathering and for construction elements with contact to water and soil.

Apart from meeting specific insulation requirements also requirements and regulations concerning components and materials to be used in combination with the reflective product as well as the entire solution buildup are necessary for the successful use of the insulation in the intended uses. Evaluation of the thermal insulation takes account of the end-use conditions.

Concerning the application of the reflective product, the respective national regulations shall be observed.

The thermal resistance shall be laid down according to relevant national provisions.

This European Technical Assessment, based on the provisions, test and assessment methods in EAD 040007-00-1201, has been written based upon the assumed intended working life of the thermal and/or acoustic protection solution for the intended use of 25 years, provided that the product is subjected to appropriate use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

### 3. Performance of the product and references to the methods used for its assessment

Sampling, conditioning, testing and the assessment for the intended use of this product of thermal protection according to the Essential Requirements were carried out in compliance with the EAD 040007-00-1201.

Table 1 presents the relevant performance of the product and the corresponding methods used in its assessment.

### 4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to Decision 1999/91/EC<sup>1</sup> of the European Commission the system of assessment and verification of constancy of performance 3 applies.

### 5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

#### 5.1 General

It is the manufacturer's responsibility to make sure that all those who use the product are appropriately informed of the specific conditions laid down in this ETA.

Changes to the reflective product or its production, and application process should be notified to LNEC before the changes are introduced. LNEC will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

#### 5.2 Tasks for the manufacturer

##### Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed.

This production control system shall ensure that the product is in conformity with this ETA.

The manufacturer may only use components stated in the technical documentation of this ETA. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

The factory production control shall be in accordance with the Control Plan<sup>2</sup>, which is part of the Technical Documentation of this ETA. The control plan has been agreed between the manufacturer and the LNEC and is laid down in the context of the factory production control system operated by the manufacturer and deposited within LNEC. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

<sup>1</sup> Official Journal of the European Communities L29/44 of 25.01.1999.

<sup>2</sup> The Control Plan is a confidential part of this European Technical Assessment and is only handed over to the notified body or bodies involved in the procedure of assessment and verification of constancy of performance. See section 5.3.

TABLE 1

Performance of the product and methods used for its assessment

Basic requirement	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)		
<b>BWR 2</b> Safety in case of fire	Reaction to fire	EN 13501-1 CDR 2016/364 EN ISO 11925-2 EN ISO 9239-1	Roofs and walls: Class F Floors: Class B <sub>FL-s1</sub>		
<b>BWR 5</b> Protection against noise	Impact sound reduction, $\Delta L_w$ (dB)	EN ISO 10140-1 EN ISO 10140-3 EN ISO 717-2	16		
	Compressibility, $c$ (mm) [5 mm]	EN 12431 EN 13171	1.4 ( $d = 10$ mm)		
<b>BWR 6</b> Energy economy and heat retention	Thermal core resistance, $R_{90/90}$ (m <sup>2</sup> .K/W)	EN 16012+A1 EN 12667 ISO 10456	0.08 ( $d = 3$ mm) 0.24 ( $d = 10$ mm)		
	Emissivity, $\varepsilon$	EN 16012+A1	0.39		
	Water vapour diffusion resistance, $\mu$	EN ISO 12572 (condition C)	175 - 10168 ( $d = 3$ mm)* 2101 - 5367 ( $d = 10$ mm)		
	Geometry	Length**, $l$ (m) [-2%; +5%]	EN 822 EN 16012+A1	30 and 60 ( $d = 3$ mm) 50 and 100 ( $d = 5$ mm) 21 and 42 ( $d = 10$ mm)	
		Width, $b$ (mm) [ $\pm 2\%$ ]		1200	
		Thickness, $d$ (mm) [-2%; +10%]		3 5 10	
		Mass per unit area (g/m <sup>2</sup> ) [ $\pm 10\%$ ]	EN 1602	220 ( $d = 3$ mm) 390 ( $d = 10$ mm)	
	Dimensional stability (%)	Length, $\Delta E_l$	EN 1604	0.0 ( $d = 3$ mm) -0.3 ( $d = 10$ mm)	
		Width, $\Delta E_b$		-0.2 ( $d = 3$ mm) -0.1 ( $d = 10$ mm)	
		Thickness, $\Delta E_d$		-9.9 ( $d = 3$ mm) -11.2 ( $d = 10$ mm)	
	Tensile strength parallel to faces, $\sigma_t$ (kPa)	EN 1608	Longitudinal Transversal	1.8 x 10 <sup>3</sup> ( $d = 3$ mm) 5.5 x 10 <sup>2</sup> ( $d = 10$ mm) 1.5 x 10 <sup>3</sup> ( $d = 3$ mm) 4.8 x 10 <sup>2</sup> ( $d = 10$ mm)	
	Tensile strength perpendicular to faces, $\sigma_{mt}$ (kPa)	EN 1607		95 ( $d = 3$ mm) 100 ( $d = 10$ mm)	
	Resistance to tearing (N)	Before ageing	NP EN 12310-1	Longitudinal Transversal	25 ( $d = 3$ mm) 40 ( $d = 10$ mm) 40 ( $d = 3$ mm) 95 ( $d = 10$ mm)
		After ageing		Longitudinal Transversal	30 ( $d = 3$ mm) 75 ( $d = 10$ mm) 45 ( $d = 3$ mm) 125 ( $d = 10$ mm)
		Mechanical resistance of the tape [N/50 mm]	Before ageing	EN ISO 11339	9.4
			After ageing		8.9
		Compressive creep, $X_t$ (mm) / $\varepsilon_t$ (%)***	EN 1606	0.7 mm / 21.6% ( $d = 3$ mm) 1.0 mm / 8.4% ( $d = 10$ mm)	

\* Influence of irregular micro-perforation of the material.

\*\* At customer's request the rolls can be supplied with other lengths.

\*\*\* Compressive stress value,  $\sigma_c$ , of 1,5 kPa.

#### Other tasks for the manufacturer

For assessing the reflective product the results of the tests performed as part of the assessment for the ETA shall be used unless there are changes in the production line or plant. In such cases the necessary testing has to be agreed with LNEC.

The declaration of performance of the product to be drawn up by the manufacturer following the issuing of this ETA shall include its reference number and issuing date.

Changes to the product, its production or its application process should be notified to LNEC before the changes are introduced. LNEC will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

In cases where the provisions of the ETA and its control plan are no longer fulfilled, the manufacturer shall withdraw the declaration of performance issued and inform LNEC without delay.

#### 5.3 Tasks for the notified body (bodies)

As the assessment and verification of constancy of performance for the product is system 3, there is no involvement of the notified body after the ETA has been issued.

Issued in Lisbon on 06/02/2018

By

Laboratório Nacional de Engenharia Civil (LNEC)

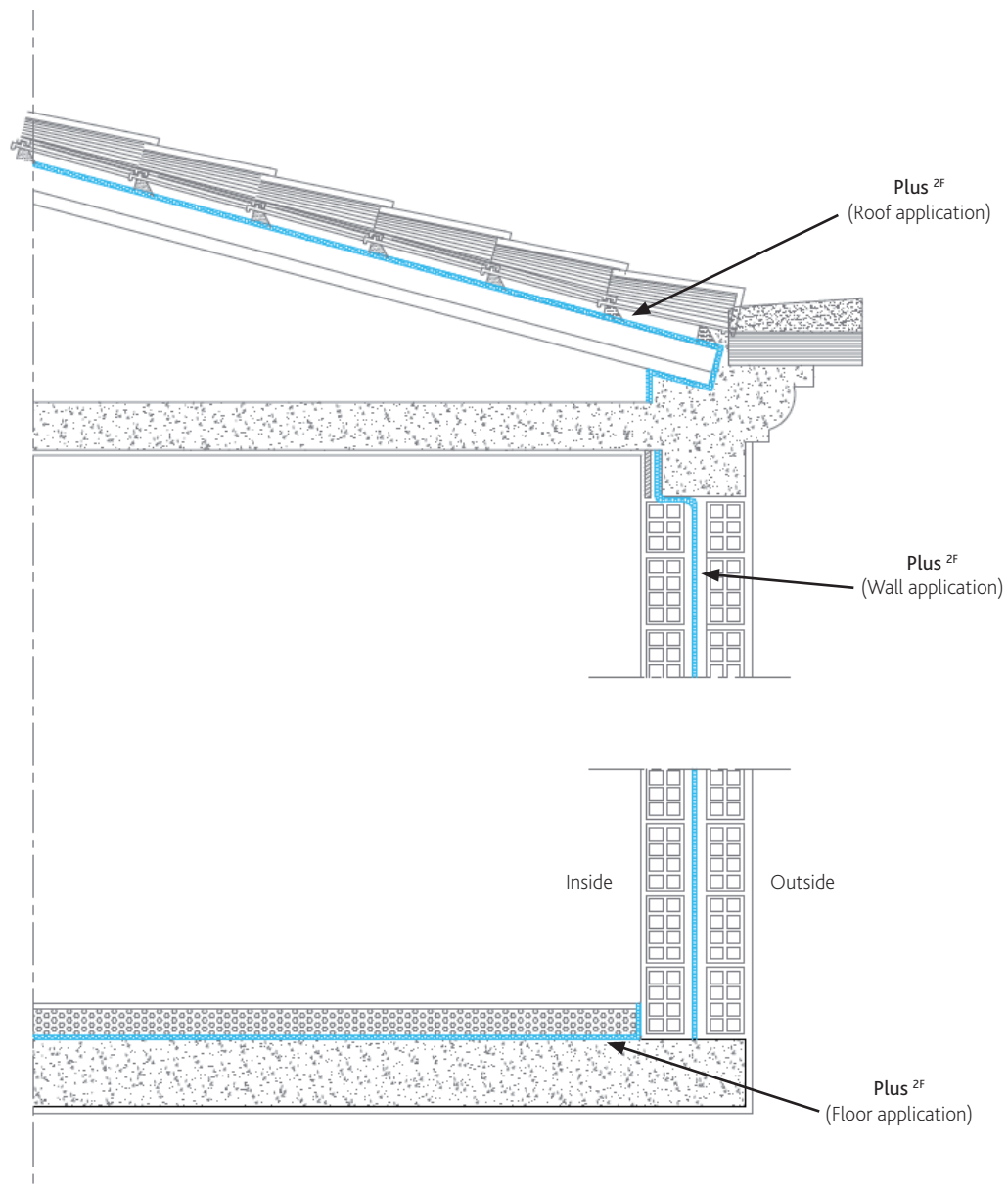
The Board of Directors

A handwritten signature in blue ink, appearing to read 'Carlos Pina', is written over a horizontal line.

Carlos Pina

President

## Annex



Examples of application of Plus 2F in building envelope

CDU	691.15:699.86(4)	Descriptors:	Thermal insulation / Acoustic insulation / Composite material / Building envelope / Reflective product / Europe
ISSN	691.15:699.844(4) 2183-3362	Descritores:	Isolamento térmico / Isolamento acústico / Material compósito / Envolvente de edifício / Produto refletante / Europa



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