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## European Technical Assessment

**ETA 18/0697**  
of 08/10/2018

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*

### **Chapa Térmica IsoTec27** **Telha Térmica IsoTecCoppo**

Factory made self-supporting composite PUR foam insulated metal sheets for roofing, external cladding and internal lining

*Chapas compósitas prefabricadas autoportantes com isolamento de espuma rígida de PUR, para coberturas, paredes e revestimentos interiores*

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

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

European Assessment Document (EAD) No. 210020-00-0402 – Factory made self-supporting composite PUR/PIR foam insulated metal sheet for roofing, external cladding and internal lining

*Documento de Avaliação Europeu (EAD) n.º 210020-00-0402 – Chapas compósitas prefabricadas autoportantes com isolamento de espuma rígida de PUR/PIR, para coberturas, paredes e revestimentos interiores*

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## 1. Technical description of the product

This European Technical Assessment (ETA) applies to two products for roofing, external claddings and internal linings under the trade designations *Chapa Térmica IsoTec27* and *Telha Térmica IsoTecCoppo*, consisting of factory made self-supporting composite lightweight profiled steel sheets covered in the internal side with a thin layer of PUR foam, either not faced or faced with an adherent embossed aluminum foil.

This ETA applies to products (hereafter referred to as composite steel sheets or products) comprising constituent materials produced by the manufacturer or by suppliers. The ETA holder is ultimately responsible for the composite steel sheets specified in this ETA.

This ETA applies to the composite steel sheets *Chapa Térmica IsoTec27* and *Telha Térmica IsoTecCoppo*. Ancillary products, such as fixings, associated accessories (e.g. ridges, junctions, end caps and flashings) and optional joint sealants are not covered by the ETA and therefore they cannot be CE-marked on the basis of it.

Relevant manufacturer's stipulations on these ancillary products and fixings shall be considered.

The composite steel sheets are produced in standardised dimensions in factory conditions, using a semi-automated production line. *Chapa Térmica IsoTec27* has a trapezoidal profiled cross section and *Telha Térmica IsoTecCoppo* is a tile profiled composite sheet (see Annex).

The main constituents of the composite steel sheets are:

- a profiled sheet of steel grade S250GD+Z100 (EN 508-1 and EN 10346), with 0.45 mm nominal thickness and an external 25 µm polyester pre-painted coat (available in different colours);
- a PUR (polyurethane rigid foam) layer with nominal density of 55 kg/m<sup>3</sup>, dispensed and moulded during manufacture;
- an optional embossed aluminium lacquered (2.5 µm) foil facing, 50 µm thick, adhered to the PUR layer.

The composite steel sheets have the following general dimensions:

Nominal length.....2.0 m to 13.5 m

*Chapa Térmica IsoTec27*

Nominal total thickness .....11 mm

Nominal cover width.....905 mm

Nominal maximum free span .....1.50 m

*Telha Térmica IsoTecCoppo*

Nominal total thickness .....23 mm (crown and valley)

.....18 mm (web)

Nominal cover width.....985 mm

Nominal maximum free span .....1.40 m

Detailed information about geometrical and other relevant characteristics of the products is presented in Table 1 of section 3.

The composite steel sheets are intended to be fixed to a series of transverse steel (or wood or concrete) linear support elements by means of self-drilling screws driven through the composite steel sheets at specified discrete locations. Both supports and fixings are not covered by the ETA.

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 products 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 composite steel sheets *Chapa Térmica IsoTec27* and *Telha Térmica IsoTecCoppo* are intended to be used for roofing (pitched roofs), external claddings and internal linings.

The products may be used in new and renovated agricultural, industrial, services and residential buildings

The composite metal sheets are not intended for structural purposes nor have influence on the racking resistance of the works. They are self-supporting, resisting the self-weight and any variable actions applied directly to their surface.

Roof surfaces are accessible for installation and maintenance only, always with protection and security assessment.

The composite steel sheets should not be used in structures exposed to aggressive, corrosive and maritime environments.

The relevant national regulations shall be observed, namely concerning energy efficiency, fire safety and structural performance. Additional layers and complementary solutions may be required depending on the type of building and location where the composite steel sheets are intended to be used.

This European Technical Assessment, based on the provisions, test and assessment methods specified in EAD 210020-00-0402, have been written based upon the assumed intended working life of the composite steel sheets for the intended use of 15 years, provided that the products are subjected to appropriate installation, use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the ETA holder or by the Technical Assessment Body, but are to be regarded as a means for choosing the appropriate product in relation to the expected economically reasonable working life of the works<sup>1</sup>.

#### Design

Verification of stability of the works is not subject to the ETA and should be carried out according to the national regulations applicable.

The following condition shall be observed:

- Design of the application of the composite steel sheets is carried under the responsibility of an engineer experienced in these elements.

#### Installation

- The composite steel sheets shall be installed according to the ETA holder's instructions.
- Installation of the composite steel sheets shall be carried out by qualified personnel with specific training for this type of work according to the ETA holder's instructions and the rules of the applicable regulations in place.
- The substructure must be clean, without irregularities and deviations from the required position.
- During and after installation the composite steel sheets shall show no permanent deformation.

#### Use, maintenance and repair

- The assessment of the products is based on the assumption that maintenance is not required during the assumed intended working life.
- Should repair prove necessary this is treated on an individual basis relative to the specific application and/or damage.
- It is the responsibility of the ETA holder to ensure that the information on these provisions is given to those who are concerned.

### 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 these products according to the Basic Requirements were carried out in compliance with EAD No. 210020-00-0402.

Table 1 presents the relevant performance of the products and the corresponding methods used in their assessment and is complemented with Table 2, that concerns specifically their bending resistance under wind and snow loads.

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

For the products covered by this EAD the applicable European legal act is: Decision 98/436/EC as amended by Decision 2001/596/EC.

The system to be applied is 4.

In addition, with regard to reaction to fire for products covered by this ETA, the applicable is system 3.

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

TABLE 1

Performance of the products and methods used for their assessment

Basic requirement	Composite steel sheet	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)	
BWR 2 Safety in case of fire	<i>Chapa Térmica IsoTec27</i>	Reaction to fire	EN 13501-1 CDR 2016/364 (classification) EN ISO 11925-2 EN 13823 EAD, Annex A	External fire: Class B-s2,d0 (with aluminium foil facing) Internal fire: Class E (without aluminium foil facing) Internal fire: Class B-s2,d0 (with aluminium foil facing)	
	<i>Telha Térmica IsoTecCoppo</i>			External fire: Class D-s3,d0 (with aluminium foil facing) Internal fire: Class E (with aluminium foil facing)	
	<i>Chapa Térmica IsoTec27</i>  <i>Telha Térmica IsoTecCoppo</i>	External fire performance	Commission Decision 2001/671/EC as amended by Commission Decision 2005/823/EC	Performance not assessed	
BWR 3 Hygiene, health and the environment	<i>Chapa Térmica IsoTec27</i>  <i>Telha Térmica IsoTecCoppo</i>	Water permeability	EN 14782  Visual inspection	Visual inspection: no holes as defects	
	<i>Chapa Térmica IsoTec27</i>	Dimensional tolerances (geometrical properties)* - Width - Length - Squareness (deviation) - Design (cover) width - Deviation of side laps - Thickness of external metal sheet - Thickness of internal aluminium foil facing - Thickness of PUR layer - Pitch - Depth of profile - Width of crown and valley	EN 14782	Geometrical properties 1035 mm ≤ 3000 mm > 3000 mm 2.5 mm 905 mm > 1.5 mm 0.45 mm 50 µm 10 mm 113 26 mm 36 mm	Tolerances + 10 mm / – 5 mm + 20 mm / – 5 mm ≤ 4.5 mm ± 4.5 mm ± 2.0 mm ± 0.06 mm ± 5 µm ± 1.0 mm ± 2.0 mm ± 1.0 mm + 2.0 mm / – 1.0 mm

TABLE 1

Performance of the products and methods used for their assessment (*continued*)

Basic requirement	Composite steel sheet	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)	
BWR 3 Hygiene, health and the environment ( <i>continued</i> )	<i>Telha Térmica IsoTecCoppo</i>	Dimensional tolerances (geometrical properties)*	EN 14782	Geometrical properties	Tolerances
		- Width		1063 mm	
		- Length			± 2.0 mm individual tile ± 6.0 mm total
		- Squareness (deviation)		2.0 m to 13.5 m	± 6.0 mm
		- Design (cover) width		2.5 mm	± 5.0 mm
		- Deviation of side laps		985 mm	± 2.0 mm
		- Thickness of external metal sheet		> 1.5 mm	± 0.06 mm
		- Thickness of internal aluminium foil facing		0.45 mm	± 5 µm
		- Thickness of PUR layer		50 µm	± 3.0 mm ± 2.0 mm
		- Pitch		23 mm (crown and valley) 18 mm (web)	± 3.0 mm
- Depth of profile	25 mm	± 1.5 mm			
- Width of crown and valley	201 mm	± 2.0 mm			
			36 mm	± 1.0 mm	
	<i>Chapa Térmica IsoTec27</i>	Water absorption of PUR foam (short term, partial immersion)	EN 1609, method A	$W_{sp} = 0 \text{ kg/m}^2$	
	<i>Telha Térmica IsoTecCoppo</i>				
	<i>Chapa Térmica IsoTec27</i>	Water vapour permeability	EN 12086	PUR layer: $\mu = 186.3$	
	<i>Telha Térmica IsoTecCoppo</i>			Aluminium foil faced PUR layer: $Z = 11.5 \text{ (m}^2 \cdot \text{h} \cdot \text{Pa)/mg}$	
	<i>Chapa Térmica IsoTec27</i>	Biological resistance (growth of mould fungus)	EN ISO 846	Performance not assessed	
	<i>Telha Térmica IsoTecCoppo</i>				
BWR 4 Safety and accessibility in use	<i>Chapa Térmica IsoTec27</i>	Mechanical resistance (bending under wind and snow loads)	EAD, clause 2.2.8	Characteristic values of serviceability state (conventional deflection values) and ultimate loads (see Table 2)	
	<i>Telha Térmica IsoTecCoppo</i>				

TABLE 1

Performance of the products and methods used for their assessment (*continued*)

Basic requirement	Composite steel sheet	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
BWR 4 Safety and accessibility in use ( <i>continued</i> )	<i>Chapa Térmica IsoTec27</i>	Point load resistance (roofs)	EN 14782, Annex B (1.2 kN)	Pass Elastic deformation: 9.8 mm ( <i>L/153</i> ) Ultimate load: 2.15 kN
	<i>Telha Térmica IsoTecCoppo</i>			Pass Elastic deformation: 13.8 mm ( <i>L/101</i> ) Ultimate load: 1.64 kN
	<i>Chapa Térmica IsoTec27</i>	Impact resistance (hard body)	EOTA TR 001 (5 Nm and 10 Nm)	5 Nm / 10 Nm Depth of indentation: 1.5 mm / 1.5 mm Diameter of indentation: 17 mm / 19 mm The impactor has not penetrated the face of the test specimen No projections, cracking, bumps or sharp cutting edges
	<i>Telha Térmica IsoTecCoppo</i>			5 Nm / 10 Nm Depth of indentation: 2.5 mm / 2.5 mm Diameter of indentation: 28 mm / 36 mm The impactor has not penetrated the face of the test specimen No projections, cracking, bumps or sharp cutting edges
	<i>Chapa Térmica IsoTec27</i>	Impact resistance (soft body)	EOTA TR 001 (300 Nm and 700 Nm)	300 Nm / 700 Nm Maximum deformation: 19 mm / 105 mm Diameter of indentation: 17 mm / 19 mm No collapse: localized residual deformation at midspan (impact zone) No penetration No projections, cracking, bumps or sharp cutting edges

TABLE 1

Performance of the products and methods used for their assessment (*continued*)

Basic requirement	Composite steel sheet	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
BWR 4 Safety and accessibility in use ( <i>continued</i> )	<i>Telha Térmica IsoTecCoppo</i>	Impact resistance (soft body)	EOTA TR 001 (300 Nm and 700 Nm)	300 Nm / 700 Nm  Maximum deformation: 105 mm / –  Collapse by deformation of the composite sheet and residual deformation at midspan; tensile break of the PUR layer and the aluminium facing  No penetration  No projections, cracking, bumps or sharp cutting edges
	<i>Chapa Térmica IsoTec27</i>	Corrosion resistance**	EN 14782	Steel sheet S250GD+Z100, external 25 µm polyester pre-painted coating
	<i>Telha Térmica IsoTecCoppo</i>			Aluminium foil facing (50 µm), optional internal lacquer (2.5 µm)
BWR 6 Energy economy and heat retention	<i>Chapa Térmica IsoTec27</i>	Thermal conductivity (PUR foam), aged value ( $\lambda_{a,90/90}$ )	EN 12667	$\lambda_{a,90/90} = 0.034 \text{ W}/(\text{m}^2 \cdot \text{K})$
	<i>Telha Térmica IsoTecCoppo</i>		EN 13165	
	<i>Chapa Térmica IsoTec27</i>	Air permeability	EN 14782	Visual inspection: no holes as defects
	<i>Telha Térmica IsoTecCoppo</i>		ISO 10456	
	<i>Chapa Térmica IsoTec27</i>	Insulation (PUR foam) thickness ( $d_{PUR}$ )	EN 823, Annex B	$d_{PUR} = 10 \pm 1 \text{ mm}$
	<i>Telha Térmica IsoTecCoppo</i>	Insulation (PUR foam) thickness ( $d_{PUR}$ )	EN 823, Annex B	Tile crown and valley: $d_{PUR} = 23 \pm 3 \text{ mm}$  Tile web: $d_{PUR} = 18 \pm 2 \text{ mm}$
	<i>Chapa Térmica IsoTec27</i>	Insulation (PUR foam) density ( $\rho_{PUR}$ )	EN 14320-2, Annex C	$\rho_{PUR} = 55 \text{ kg}/\text{m}^3 (\pm 10\%)$
<i>Telha Térmica IsoTecCoppo</i>				

\* These characteristics also relate to identification of the products, safety in use and thermal performance.

\*\* Not adequate for chemically corrosive, aggressive and maritime environments. Member States of use may require nominal metallic masses and/or organic coating thicknesses greater than the values indicated.

TABLE 2

Composite steel sheets: Mechanical resistance (bending under wind and snow loads)\*

Composite steel sheet	Number of spans	Free span length (L) (m)	Action corresponding to the deflection value of				Ultimate load (collapse) (kN/m <sup>2</sup> )	
			1/150 of span (kN/m <sup>2</sup> )	1/200 of span (kN/m <sup>2</sup> )	1/250 of span (kN/m <sup>2</sup> )	1/300 of span (kN/m <sup>2</sup> )		
Uniformly distributed positive (descending) actions								
<i>Chapa Térmica IsoTec27</i>	1	1.50	1.41	0.98	0.77	0.62	4.81	
	2		2.02	1.56	1.19	0.97	5.66	
	Uniformly distributed negative (ascending) actions							
	1	1.50	1.45	1.10	0.90	0.72	3.71	
2	2.03		1.46	1.28	1.00	5.04		
Uniformly distributed positive (descending) actions								
<i>Telha Térmica IsoTecCoppo</i>	1	1.40	0.91	0.72	0.60	0.50	1.94	
	2		1.51	1.16	0.91	0.75	2.89	
	Uniformly distributed negative (ascending) actions							
	1	1.40	0.73	0.51	0.38	0.31	1.52	
2	2.00		1.50	1.30	1.06	3.88		

\* The tabulated characteristic values of the mechanical bending resistance are based on experimental results and were calculated according to ISO 12491 for  $p = 95\%$  (5% lower fractile), with a confidence level of 75 %.

## 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 composite steel sheets, to their production or to their 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>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.



#### Other tasks for the manufacturer

For assessing the composite steel sheets 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(s) of performance of the products to be drawn up by the manufacturer following the issuing of this ETA shall include its reference number and issuing date.

Changes to the products, their production or their 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(s) of performance issued and inform LNEC without delay.

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

As the products fall under systems 3 and 4 (see clause 4), there is no involvement of a notified body after the ETA has been issued.

Issued in Lisbon on 08/10/2018

By

Laboratório Nacional de Engenharia Civil (LNEC)

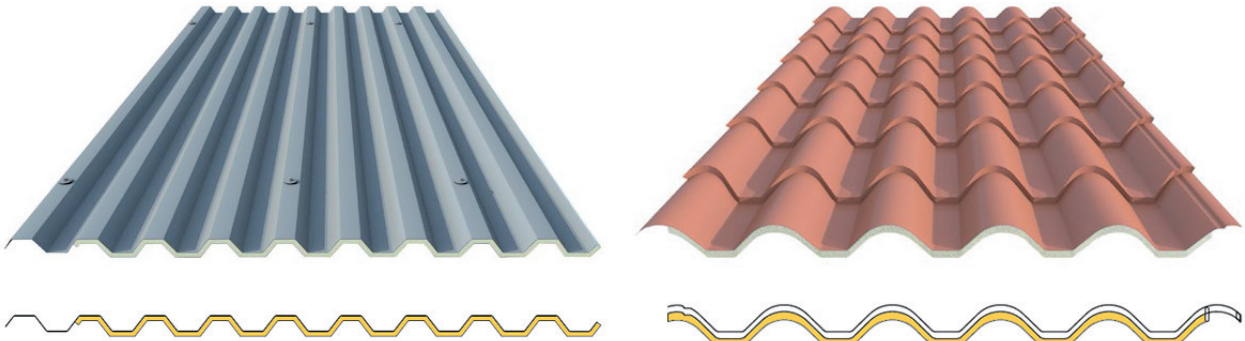
The Board of Directors

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

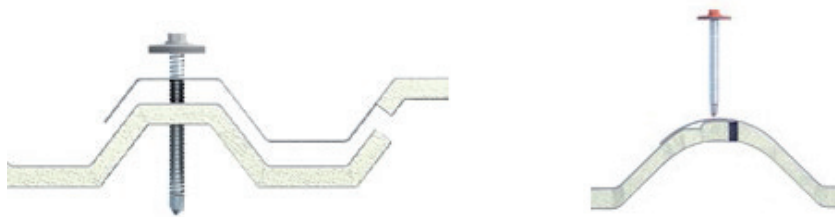
Carlos Pina  
President

## Annex

### Composite steel sheets *Chapa Térmica IsoTec27* and *Telha Térmica IsoTecCoppo*



General view of *Chapa Térmica IsoTec27* (left) and *Telha Térmica IsoTecCoppo* (right) composite steel sheets and respective cross sections



Longitudinal overlapping details of *Chapa Térmica IsoTec27* (left) and *Telha Térmica IsoTecCoppo* (right) composite steel sheets



Examples (not covered by the ETA) of screws and EPDM washer for fixing the composite steel sheets to metallic supports

CDU	693.6:691.15-415:699.86	Descriptors:	Roof cladding / Buildings roof / Wall cladding / External wall / Internal wall / Thermal insulation / / Composite sheet / Europe
ISSN	2183-3362	Descritores:	Revestimento de coberturas / Cobertura de edifícios / Revestimento de paredes / Parede exterior / Parede interior / Isolamento térmico / Chapa compósita / Europa

I S N 2 1 8 3 - 3 3 6 2



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