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European Technical Assessment

**ETA 10/0448
of 06/03/2017**

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) Nº305/2011:

Instituto de Ciencias de la Construcción
Eduardo Torroja (IETcc)

Trade name of the construction product

Tezno T.4 GRANDES LUCES

Product family to which the construction product belongs

Self-supporting composite lightweight panels
for use in roofs

Manufacturer

Tezno Cuber Composites S.L.
Majuelo, 2. Polígono Cantabria 1-C.
26006 Logroño (La Rioja) – Spain
<http://www.grupotezno.com>

Manufacturing plant(s)

Tezno Cuber Composites S.L.
Majuelo, 2. Polígono Cantabria 1-C.
26006 Logroño (La Rioja) – Spain.

This European Technical Assessment contains

11 pages including 4 Annexes which form an integral part of this assessment. Annex 4 contains confidential information and is not included in the ETA when is publicly available

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

Guideline for European Technical Assessment (ETAG) nº 016 ed. November 2003, part 1 and 2 used as European Assessment Document (EAD)

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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SPECIFIC PART

1. Technical description of the product

This ETA covers self-supporting composite lightweight panels Teznocuber[®] T.4, GRANDES LUCES for use as sheathing system in roofs.

This product is assessed according to the ETAG 016 *Self-supporting Composite Lightweight Panels – Part 1: General and Part 2: Specific aspects relating to Self-supporting Composite Lightweight Panels for use in roofs*, edition November 2003 used as European Assessment Document (EAD).

The use categories (A1 – A4 as defined in ETAG 016 part 2) depend on the different Teznocuber[®] board types described in 1.1.

1.1 Definition of the product components

The panel is made of non-metallic covering layers and expanded polystyrene thermal insulating core EPS of different thicknesses bonded by means of polyurethane glue.

The covering layers used on manufacturing of Teznocuber[®] T. 4 GRANDES LUCES panels¹ are always fir wood, for inner and outer faces, with a thickness of 27 mm.

The trade name, for example TEZNO TIPO 4 – GRANDES LUCES - YY indicates:

TEZNO: Trade mark

TIPO 4 – panel type

GRANDES LUCES: it refers to the use of these panels, “great spans”.

YY- Core thickness (mm)

Teznocuber[®] T.4 GRANDES LUCES panels present tongue-and-groove joints at the core level on the longitudinal sides.

The panels are fixed with mechanical fixings (screws) and joints are waterproofed from outside. Both auxiliary components are not part of the assessment of this ETA.

1.2 Auxiliary elements

1.2.1 Fixing elements

Wood support: Metal self-threading screws, stainless steel or coated steel (galvanized, zinc plated, bichromate etc.).

Metal support: Metal self-drilling screws, stainless steel or coated steel (galvanized, zinc plated, bichromate etc.).

Concrete support: Carbon steel self-threading screws with anti-corrosion treatment or screws with expandable plug specific for concrete.

The characteristics of the fixing elements are included in Table 1.

	WOODEN SUPPORT	METAL SUPPORT	CONCRET SUPPORT
Fixing elements description:	Metal self-threading screws	metal self-drilling screws	Metal self-threading screws or Screws with expandable plug
Head fixing diameter (mm)	≥ 10	≥ 10	≥ 10
Fixing diameter (mm)	≥ 6	≥ 6,3	≥ 6
Length of the fixing element beyond the panel thickness (mm)	≥ 40	≥ 30	≥ 40

¹ Physical features and heat transmittance of the panel in annex 1 and physical and mechanical properties in annex 2.

² The fixings used must be resistant or protected against corrosion. See Eurocode 5 (EN 1995-1-1: 2015), Table 4.1: Example of minimum specifications for material protection against corrosion for fasteners (related to ISO 2081).

1.2.2 Sealing products

The following products are suitable to be used with Teznocuber® T.4 GRANDES LUCES panels for joints:

- Auto-adhesive strips
- PUR putty
- Other similar

2. Specification of the intended use in accordance with the applicable EAD

2.1 Intended use

The Teznocuber® T.4 GRANDES LUCES panels are used as insulating self-supporting roof sheeting in roofs. The system does not have structural functions nor does it have significant influence on the racking resistance of the works.

Teznocuber® T.4 GRANDES LUCES panels are adequate to use indoor or in normal humidity conditions³ and always require external finishing layers to provide waterproofing and protection performances.

2.2 Relevant general conditions for the use of the product

The provisions made in this European Technical Assessment according to the ETAG 016, Parts 1 and 2, used as EAD, are based on an assumed working life of 25 years, as long as conditions lay down for installation, packaging and storage as well as appropriate use, maintenance and repair, are fulfilled. 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 products in relation to the expected economically reasonable working life of the works.

2.3 Design of the product

The ETA holder is responsible for guaranteeing the information about design and installation of these panels are easily accessible to the concerned people. This information can be supplied by means of reproduction of this ETA.

The designer using the system object of this ETA shall in any case comply all the National Regulations and in particular those referring to behaviour in the face of fire and wind resistance. Only the panels described in section 1.1 of this ETA should be used in this system.

The support on which the system will be executed must be rigid and stable. Its rigidity must be appropriate to ensure the system will not be exposed to deformations which might damage it.

Execution tasks must be planned (including details such as confluences with walls, chimneys, ridgepoles, ceilings, walls, breaks, etc.) to prevent water penetrating the system. The laying of the panels shall follow the same national regulations, which proceed as set forth in section 2.4 of this ETA and manufacturer's instructions.

2.4 Installation

Layout and preparation of support likewise the generalities of the system execution shall be pursuant to chapter 7 of the ETAG 016, Parts 1, likewise the corresponding national dispositions.

Panels shall be placed so that their greater sides are perpendicular to the supports, the panel lesser sides resting on them. Panels should rest on 3 or 2 supports provided that the maximum span is 6000 mm. The joint among panels will be through a tongue-and-groove joint at the core level, in the greater sides of the panel.

Panels will be secured with screws, 2 per support, following the manufacturer's instructions and considering:

- The design wind loads according to the national regulations.
- The characteristic resistance of the fixing devices into the considered substrate.
- Safety in use of the panels

³ For example, it may be considered the conditions required in Eurocode 5 (EN 1995-1-1:2015) for service class 1 which is characterised by a moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 85% for a few weeks for year.

The panels must be finished with external layer(s) for waterproofing and protection purposes. All traditional roofing materials can be laid over these panels following the common guidelines thereof regarding slopes, overlapping, fixings, etc. In addition, joints between the panels will be sealed or will be installed a waterproofing system to prevent water infiltration due to roof problems.

Teznocuber® T. 4 GRANDES LUCES panels should not be exposed to temperatures above 75°C, which may damage the EPS core. Thus panels must be protected from high temperature focus on the roof, e.g. chimneys, lamps, etc.

2.5 Use, maintenance and repair

To preserve Teznocuber® system performances, roof waterproofing will be efficiently maintained and regularly checked for possible water filtration at specific points, likewise presence of the same due to condensation.

Maintenance will include repair of damaged areas to be done as soon as possible.
The manufacturer will provide customers with this information.

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

The assessment of the fitness of Teznocuber® T. 4 GRANDES LUCES panels for the intended use according to the Basic Requirements was carried out in compliance with the ETAG 016 used as an EAD. Values of features (both components and the system) not specified in this document or its annexes must correspond with those recorded in the technical documentation verified by the IETcc.

3.1 Mechanical resistance and stability (BWR 1)

Teznocuber® T. 4 GRANDES LUCES panels are non-loadbearing part of the works because they do not contribute to the structural resistance of the roof structure, nor it does claim any claim rigidity or stability function. The self-supporting mechanical resistance is considered under BWR4 Safety in use (see 3.4).

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire

Declared performances, obtained from tests of reaction to fire, are included below.

The reaction to fire test, carried out by *Gaiker ik-4 Research Alliance*, according to UNE-EN 13823:2002, UNE-EN ISO 11925-2:2002, with a test report, according to CEN/TS 15117:2005 y UNE-EN 13501-1:2002, has done this classification:

T.4 GRANDES LUCES: **B – s1, d0**

3.2.2 Resistance to fire

No performance assessed.

3.2.3 External fire performance

No performance assessed, Teznocuber® T.4 GRANDES LUCES panels are never used as external finishing layer.

3.3 Hygiene, health and the environment (BWR 3)

3.3.1 Water permeability

No performance assessed.

3.3.2 Vapour permeability

The μ values of the materials that constitute the different types of Teznocuber® T. 4 GRANDES LUCES panels are declared in table 2.

TABLE 2: WATER VAPOUR DIFFUSION RESISTANCE FACTOR (μ)/ MATERIAL		
MATERIAL	FACTOR(μ)	
	Dry	Wet
fir wood	50	20
Expanded polystyrene (EPS)	80	80

3.3.3 Release of dangerous substances

According to the manufacturer's declaration the boards that composed the panel are classified as formaldehyde class E1 to EN 13986.

The manufacturer declares that the wood-base boards that composed Teznocuber[®] T.4 GRANDES LUCES panels covered by this ETA are non-treated wood-based boards. They do not contain either wood preservatives or fire protection agents or other dangerous substances.

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the product falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive 89/106/CEE, these requirements need also to be complied with, when and where they apply.

3.3.4 Dimensional variations

No performance assessed.

3.4 Safety in use (BWR 4)

3.4.1 Mechanical resistance

3.4.1.1 Mechanical resistance of panels subject to positive loads

Tests performed in Wooden Structures Laboratory INIA-AITIM on two supports Teznocuber[®] T. 4 GRANDES LUCES panels, according to ETAG 016, and manufacturer specifications, has done the results appearing in table 3.

TABLE 3: MECHANICAL RESISTANCE OF PANELS ON TWO SUPPORTS SUBJECT TO POSITIVE LOADS			
TYPE OF PANEL	SPAN (mm)	ULTIMATE LOAD (kN/m ²)	LOAD L/200 (kN/m ²)
TEZNO T4-120 GRANDES LUCES	3000	19,07	7,53
TEZNO T4-120 GRANDES LUCES	3500	14,884	6,62
TEZNO T4-120 GRANDES LUCES	4000	11,5	4,94
TEZNO T4-150 GRANDES LUCES	3500	18,339	8,72
TEZNO T4-150 GRANDES LUCES	4000	13,837	4,51
TEZNO T4-150 GRANDES LUCES	4500	10,543	4,11
TEZNO T4-200 GRANDES LUCES	2400	38,372	17,12
TEZNO T4-200 GRANDES LUCES	3200	24,709	9,54
TEZNO T4-200 GRANDES LUCES	4800	11,628	7,12

Tests performed in Wooden Structures Laboratory INIA-AITIM on three supports Teznocuber[®] T. 4 GRANDES LUCES panels, according to ETAG 016 and manufacturer specifications, has done the results appearing in table 4.

TABLE 6: MECHANICAL RESISTANCE OF PANELS ON THREE SUPPORTS SUBJECT TO POSITIVE LOADS				
TYPE OF PANEL	SPAN (mm)	NUMBER OF SPANS	ULTIMATE LOAD (kN/m ²)	LOAD L/200 (kN/m ²)
TEZNO T4-120 GRANDES LUCES	1200	x2	40,32	28,68
TEZNO T4-150 GRANDES LUCES	1600	x2	41,62	35,31
TEZNO T4-200 GRANDES LUCES	2400	x2	42,98	14,16

The values, declared in this ETA, are characteristic values (5% fractile with a probability of 75% for unknown standard deviation, according with the EUROCODE).

The width for all the supports has to be greater than 4 cm, although the supports where rest two panels in a row have to have a minimum width of 8 cm.

3.4.1.2 Mechanical resistance of panels subjected to negative loads

Tests performed in INIA-AITIM laboratory on two and three supported Teznocuber® T. 4 GRANDES LUCES panels, according to Guide 016 EOTA and manufacturer specifications, always resulted in punch breakage of top panel layer by the screw head. The fixing elements comprised ø6mm metal screws with countersunk head. This fastening system fail on some of the two supports of the panel at an average value of 2,42 kN/fixing support.

The manufacturer advises the convenience of using 2 fixings per support (fixings specification in table 1).

3.4.1.3 Thermal effect

No performance assessed.

3.4.2 Impact resistance

Hard and soft body impact resistance and walkability test results enable Teznocuber® T. 4 GRANDES LUCES panel classification in the use category appearing in table 5 according to ETAG 016, part 2.

TABLE 5: USE CATEGORY OF PANELS	
TYPE OF PANEL	USE CATEGORY ⁴
TEZNO T. 4- GRANDES LUCES- 120	A4

3.4.3 Resistance to fixings

3.4.3.1 Resistance of the panel at fixing devices and joints

The behaviour of the panel has been assessed in 3.4.1.2. The failure mode has been always Type B: Pull through (should not cause moisture ingress).

3.4.3.2 Resistance to eccentric load resistance due to objects fixed to panel

Panel resistance as support to suspend lightweight decoration or lighting elements (100 N) is satisfactory in view of test results.

3.4.4 Walkability

Tests performed on panels, under the most unfavourable configurations produced no damage. Use categories classification of Teznocuber® T. 4 Grandes Lucas panels is included in table 5.

3.5 Protection against noise (BWR 5)

3.5.1 Direct airborne sound insulation

The sound reduction index R_w has been determined by testing in *Labein Tecnalía* according to EN-ISO 140-3: 1995 on different Teznocuber® T.4 GRANDES LUCES panel types (most unfavourable) assembled according to manufacturer's instructions.

Results, according to UNE-EN ISO 717, appearing in table 6.

TABLE 6: SOUND REDUCTION INDEX		
TYPE OF PANEL	RA (dBA)	R_w (dBA)
TEZNO T.4 GRANDES LUCES	28,5	$R_w (C; C_{tr}) = 29(-1; -3)$

⁴ ETAG 016, part 2, 6.4.6 Impact resistance, table 2.

CATEGORÍA DE USO	NIVEL DE ACCESIBILIDAD
A1	Not accessible roofs, not even for installation
A2	Roofs, accessible for installation and maintenance only, always with protective measures
A3	Accessible roofs with protective measures
A4	Accessible roofs without protective measures

3.5.2 Sound absorption

No performance assessed.

3.6 Energy economy and heat retention (BWR 6)

3.6.1 Thermal insulation properties

Declared thermal transmittance (U) for different Teznocuber® T. 4 GRANDES LUCES panels, calculated in accordance with EN ISO 6946, appears in Annex 1.

On the cases where supporting structure is metallic, thermal bridges should be taken into account.

3.6.2 Air permeability

Teznocuber® T. 4 GRANDES LUCES system requires all the joins between the panels to be sealed.

The air permeability of Teznocuber T. 4 GRANDES LUCES panel has been tested according to EN 12114:2000 and the positive and negative pressure conditions for applied pressure from 0 to 500 Pa. In all the cases the air flux obtained has been 0 m³/h.

3.7 Aspects of durability serviceability and identification of the products

3.7.1 Durability

3.7.1.1 Creep

Test was performed on a two supports Teznocuber® T.4 GRANDES LUCES panel (the most onerous composition) following ETAG 16 Part 2. The results are included in table 7.

LOAD TIME (h)	CREEP FACTOR ϕ
	SPAN 1
0	0
500	0,1802
1000	0,2703
2000	0,3514

3.7.1.2 Thermal agents

3.7.1.2.1 Climate cycles

No performance assessed.

Teznocuber® T. 4 GRANDES LUCES panels require placement of a finishing covering systems that provides waterproofing on the outer face, so the panels will not be in contact with water. For this reason climatic testing cycles are considered as not relevant.

3.7.1.2.2 Thermal shock

The most unfavourable type of Teznocuber® T. 4 GRANDES LUCES panels has been subjected to 15 cycles of thermal shock following ETAG 16 Part 2. The tests were carried out with panels finished with an external covering layer in accordance with the defined intended use described in 2.1.

The mechanical bending strength of the panels was not affected by thermal shocks.

With this evidence together with the experience of IETcc on the assessment of this product in several national Technical Assessments, the declared working life of the panels is 25 years.

3.7.1.3 Biological agents

Teznocuber® T.4 GRANDES LUCES panel durability from the biological viewpoint depends on the wooden boards comprising the same and susceptible to said attack. This is included in the specifications for the EC marking of said boards included in EN 13986.

Should the designer consider there is a possibility of biological attack (due to geographical location, high risk of insects, proximity or contact with wood which has suffered xylophages attacks, etc.), it might be necessary to apply exclusive treatment against these risks to panel components. The panels described in this ETA are exempt from protection against these attacks.

3.7.2 Serviceability

3.7.2.1 Resistance to impact from hard body

Test performed on panels with the 120mm thickness for the core.
Use categories are included in table 5.

3.7.2.2 Resistance to impact from soft body

Test performed on panels with the 120mm thickness for the core.
Use categories are included in table 5.

3.7.3 Identification of products

The identification of Teznocuber[®] T. 4 GRANDES LUCES panels is included in 1.1.

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

4.1 System of attestation of conformity

According to the decision 2003/640/EC of the European Commission⁵ the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) N° 305/2011) for Teznocuber[®] T.4 GRANDES LUCES panels is:

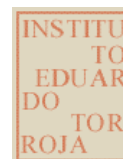
System 1

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

Technical details necessary for the implementation of the AVCP system are laid down in the quality plan deposited at Instituto de Ciencias de la Construcción Eduardo Torroja.



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On behalf of the Eduardo Torroja Construction Science Unit
Madrid, 6th March 2017

Marta Mª Castellote Armero
Director

⁵ Official Journal of the European Communities L226/21 of 10.09.2003.

ANNEX 1: Table of panel types. Dimensions, weights and heat transmittance.

Dimensional tolerances: Length ± 10 mm Thickness ± 3 mm
 Width ± 5 mm Deviation for squareness $\pm 1, 5$ mm

TYPE	INNER FACE (mm)	CORE (mm)	OUTER FACE (mm)	DIMENSIONS (mm)			WEIGHT (Kg/m ²)	HEAT TRANSMITTANCE EPS U (W/m ² .°C)	HEAT TRANSMITTANCE EPS-GRAFITO U (W/m ² .°C)
				THICKNESS	LENGTH	WIDTH			
TEZNO T.4 G L	Solid fir 27	100	Solid fir 27	154	12000	200-210	28	0,296	0,267
TEZNO T.4 G L	Solid fir 27	120	Solid fir 27	174	12000	200-210	29,1	0,253	0,227
TEZNO T.4 G L	Solid fir 27	150	Solid fir 27	204	12000	200-210	30,5	0,208	0,186
TEZNO T.4 G L	Solid fir 27	200	Solid fir 27	254	12000	200-210	32,4	0,160	0,143

ANNEX 2: Characteristics of the components

EPS GRAFITO - EPS

PROPERTIES	UNITS	VALUE	TOLERANCES	REGULATIONS
Density	kg/cm ³	≥ 20	Typical value	UNE EN 1602
Thermal conductivity	W/m °K	0,031-0.035	Minimum value	EN 13164
Compressive stress	MPa	0,10	Minimum value	EN 826
Bending stress	MPa	0,15	Minimum value	UNE EN 12090

SOLID FIR BOARD

PROPERTIES	UNITS	VALUES	TOLERANCES	REGULATIONS
Density	kg/m ³	420	+/- 10 %	EN 323
Bending strength	MPa	62-90	Minimum value	EN 319
Shear stress	MPa	4.9-7.5	Minimum value	UNE EN 12090
Modulus of Elasticity	MPa	11000	Minimum value	EN 310
Swelling (24 h)	% vol.	12	Minimum value	EN 317

ANNEX 3: Details.

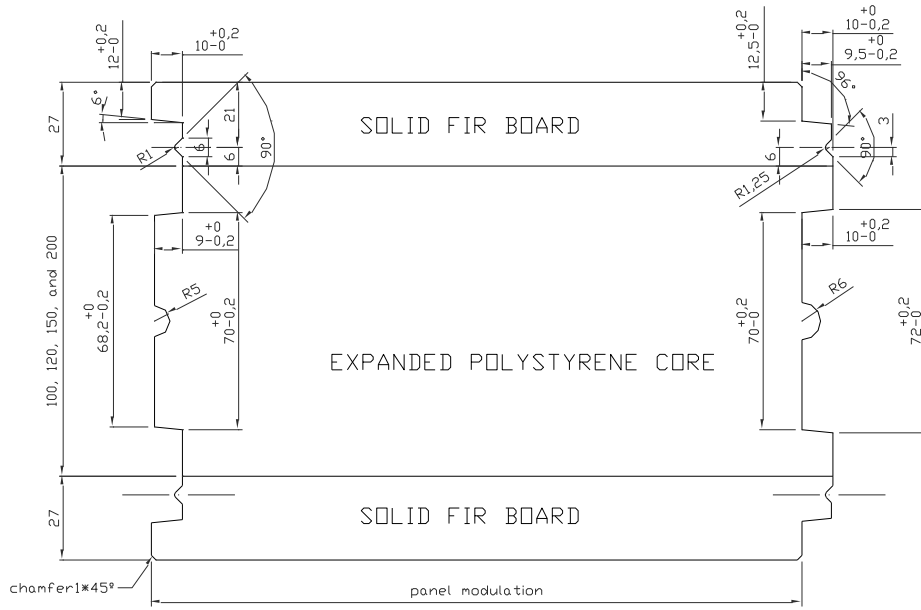


Figure 1: Panel composition

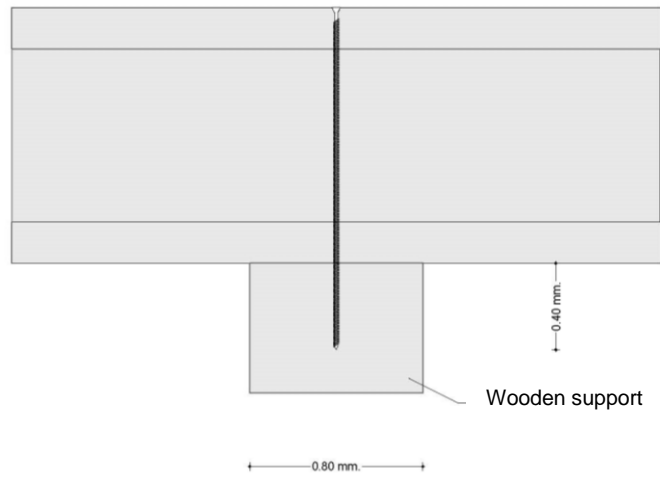


Figure 2: Metallic screw disposition for wooden supports

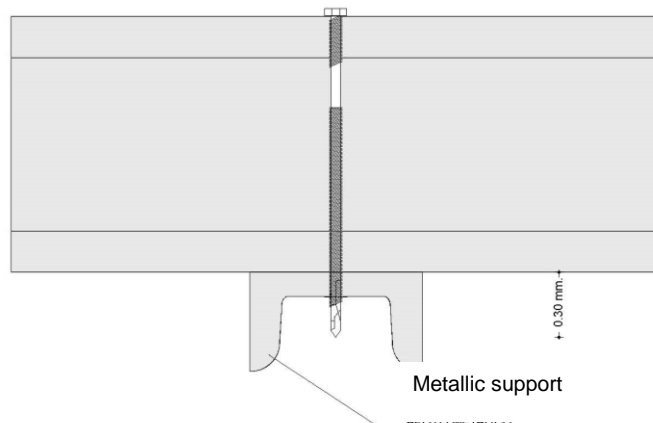


Figure 3: Metallic screw disposition for metallic supports