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Członek EOTA

European Technical Approval

ETA-13/0424

English translation – the original version is in Polish language

Nazwa handlowa

Trade name

LS-TECH-RC M-M i LS-TECH-RC M-O
LS-TECH-RC M-M and LS-TECH-RC M-O

Właściciel aprobaty

Holder of approval

LS-TECH-HOMES S.A.
ul. K. Korna 7/4
PL 43-300 Bielsko-Biała

Rodzaj i przeznaczenie wyrobu

*Generic type and use
of construction products*

**Kompozytowe płyty warstwowe do stosowania w
przekryciach dachowych i sufitach**
*Self-supporting composite panels for use in roofs and
ceilings*

Termin ważności

Valid

**od
from
do
to**

28.06.2013

28.06.2018

Zakład produkcyjny

Manufacturing plant

LS-TECH-HOMES S.A.
ul. Junacka 31
PL 43-502 Czechowice Dziedzice

Niniejsza Europejska Aprobata Techniczna zawiera

*This European Technical
Approval contains*

12 stron, w tym 2 Załączniki

12 pages including 2 Annexes



Europejska Organizacja ds. Aprobatach Technicznych
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by Instytut Techniki Budowlanej in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by the Council Directive 93/68/EEC² and Regulation (EC) no. 1882/2003 of the European Parliament and of the Council³;
 - ustawa z dnia 16 kwietnia 2004 r. o wyrobach budowlanych (law on construction products of 16 April 2004)⁴;
 - rozporządzenie Ministra Infrastruktury z dnia 14 października 2004 r. w sprawie europejskich aprobat technicznych oraz polskich jednostek organizacyjnych upoważnionych do ich wydawania (ordinance of Ministry of Infrastructure of 14 October 2004 on the European Technical Approvals and Polish bodies entitled to issue them)⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European Technical Approval ETAG 016, edition November 2003, Part 1: *General*, Part 2: *Specific aspects relating to self-supporting composite lightweight panels for use in roofs*, Part 4: *Specific aspects relating to self-supporting composite lightweight panels for use in internal walls and ceilings*.
2. Instytut Techniki Budowlanej is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
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¹ Official Journal of the European Communities no. L 40, 11.2.1989, p. 12

² Official Journal of the European Communities no. L 220, 30.8.1993, p. 1

³ Official Journal of the European Union no. L 284, 31.10.2003, p.1

⁴ Official Journal of the Polish Republic no. 92/2004, pos. 881

⁵ Official Journal of the Polish Republic no. 237/2004, pos. 2375

⁶ Official Journal of the European Communities no. L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

LS-TECH-RC M-M and LS-TECH-RC M-O are self-supporting composite lightweight panels consisting of covering layers made of magnesium oxide or OSB/3 board and EPS thermal insulating core, bonded by means of a polyurethane glue.

LS-TECH-RC M-M and LS-TECH-RC M-O panels have three layers:

- an inner layer made of magnesium oxide board MgO Green-LS-TECH of 11 mm thickness (symbol M),
- an EPS core of 230 mm thickness,
- an upper layer made of magnesium oxide board MgO Green-LS-TECH of 11 mm thickness (symbol M) or OSB/3 particle board of 12 mm thickness (symbol O).

Technical properties of the LS-TECH-RC M-M and LS-TECH-RC M-O panels are presented in Annexes 1 and 2.

The thickness of panels is: 252 mm in case of LS-TECH-RC M-M or 253 mm in case of LS-TECH-RC M-O panel, with tolerance ± 4 mm. The width of panels is 1000 or 1220 mm, with tolerance ± 5 mm. The maximum length of panels is 6000 ± 5 mm.

The joints between LS-TECH-RC M-M and LS-TECH-RC M-O panels are made using spline made of the OSB/3 particle board elements with dimensions 135 x 12 mm (see Annex 1, fig. 3) and screws. The panel is mechanically fixed to the support by means of at least 3 screws in case of 1000 mm width and 4 in case of 1220 mm of panel width.

This ETA applies to LS-TECH-RC M-M and LS-TECH-RC M-O panels and the spline. All other ancillary components of the roof or ceiling, which are necessary to fix panels and seal joints, are not part of the product covered by this ETA.

1.2 Intended use

The LS-TECH-RC M-M and LS-TECH-RC M-O panels are intended to be used as insulating self-supporting roofs and ceilings. The panels do not have structural function. Panels always require external finishing layers to provide waterproofing.

The provisions made in this European Technical Approval are based on an assumed working life of the product of 25 years, provided that the product is subjected to appropriate installation, use and maintenance. The indications given on the working life cannot be interpreted as a guarantee given by the producer or approval body, 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 Characteristics of product and methods of verification

2.1 Characteristics of product

The components of panels correspond to the drawings and information given in Annexes 1 and 2.

The dimensions and tolerances of the elements not indicated in Annexes 1 and 2 are given in the technical documentation of this ETA⁷.

The properties of MgO Green-LS-TECH board are presented in Annex 2.

The core of panels is made of 230 mm thickness EPS-EN 13163 T1-L1-W1-S1-P3-BS125-CS(10)80-DS(N)S-DS(70,-)2-DLT(1)5-TR150 in accordance with EN 13163 and class E reaction to fire in accordance with EN 13501-1. The density of core is 15 to 20 kg/m³ in accordance with EN 1602. Tensile modulus is at least 7,0 MPa and λ_{decl} (10°C) is at least 0,037 W/(m·K). The OSB/3 particle board is in accordance with EN 13986.

2.2 Methods of verification

2.2.1 General

The assessment of the LS-TECH-RC M-M and LS-TECH-RC M-O panels for the intended use was performed following the Guideline for European Technical Approval of Guideline's name ETAG 016, edition November 2003, Part 1: *General*, Part 2: *Specific aspects relating to self-supporting composite lightweight panels for use in roofs*, Part 4: *Specific aspects relating to self-supporting composite lightweight panels for use in internal walls and ceilings*.

2.2.2 Essential Requirement 1 – Mechanical resistance and stability

The LS-TECH-RC M-M and LS-TECH-RC M-O panels are no load - bearing parts of works. Mechanical resistance is considered under ER4 Safety in use (clause 2.1.4).

2.2.3 Essential Requirement 2 – Safety in case of fire

2.2.3.1. Reaction to fire

The LS-TECH-RC M-M panels for ceiling applications are classified as class B-s1, d0 of reaction to fire in accordance with EN 13501-1.

Reaction to fire for LS-TECH-RC M-O panels has not been determined (NPD).

2.2.3.2. Resistance to fire

No performance determined (NPD).

2.2.3.3. External fire performance

The LS-TECH-RC M-M and LS-TECH-RC M-O panels are classified as B_{ROOF}(t_i) in accordance with EN 13501-5.

⁷ The technical documentation of this European Technical Approval is deposited at Instytut Techniki Budowlanej and, as far as relevant for the tasks of the approved body involved in the attestation of conformity procedure, may be handed over only to the approved body involved.

2.2.4 Essential Requirement 3 – Hygiene, health and the environment

2.2.4.1. Water permeability

The water permeability of LS-TECH-RC M-M and LS-TECH-RC M-O panels has not been determined (NPD), since they do not have waterproofing function. The panels need a suitable waterproofing system over them.

2.2.4.2. Vapour permeability

No performance determined (NPD).

2.2.4.3. Content and/or release of dangerous substances

According to the manufacturer's declaration the LS-TECH-RC M-M and LS-TECH-RC M-O panels do not contain dangerous substances according to Directive 67/548/EEC and Regulation (EC) No 1272/2008. In accordance with EN 300, the OSB/3 board meet the requirements of Class E1 with regard to extractable formaldehyde content according to EN 300.

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. transported 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.

2.2.4.4. Dimensional variations

The dimensional behaviour of LS-TECH-RC M-M and LS-TECH-RC M-O panels has not been determined (NPD), since panels are never the outer layer.

2.2.5 Essential Requirement 4 – Safety in use

2.2.5.1. Mechanical resistance

2.2.5.2. Mechanical resistance of panels subjected to positive loads

Bending tests of two span configuration of LS-TECH-RC M-M and LS-TECH-RC M-O panels were performed in accordance with ETAG 016. The ultimate load using 1,5 m span in two span configuration is equal 11,0 kN/m² for both panels.

2.2.5.3. Mechanical resistance of panels subjected to negative loads

The resistance of the panel on its supports, subjected to negative loads (wind suction loads) is limited by the pull through resistance of the panel, i.e. the local resistance of the panel around the fixings. The mechanical resistance of panels subjected to negative loads were performed in accordance with ETAG 016. The fixing elements 300 x 5,4 mm were placed in half of the span, spaced at least 35 cm. The ultimate load per fixing point is 0,5 kN in case of LS-TECH-RC M-M panels and 1,3 kN in case of LS-TECH-RC M-O panels. The number of fixing points per support for LS-TECH-RC M-M and LS-TECH-RC M-O panels must be at least 3. There are no damages of panels and the head of screw does not break the layer of the panel.

2.2.5.4. Thermal effect

Thermal effect of LS-TECH-RC M-M and LS-TECH-RC M-O panels has not been determined (NPD), since panels are never the outer layer.

2.2.5.5. Impact resistance

Hard and soft body impact resistance and walkability test results enable LS-TECH-RC M-M and LS-TECH-RC M-O panels classification according to ETAG 016, are given below.

Level of accessibility	Impact resistance		Walkability	Use category
	Hard body impact	Soft body impact		
Roofs accessible without protective measures	1 x 10 J	1 x 1200 J	pass	A4

Category A4 means: If no protective measures are foreseen, the roof panels should be favourably assessed with reference to walkability. However, access on roof panels should always be limited to a single person, taking due care.

2.2.5.6. Resistance to fixings

The resistance of the panels as a base to suspend lightweight elements is satisfactory. The sheathing supports without any damages the 3 x 100 N load fixed on the panels through fixing with 65 x 5,2 fasteners.

2.2.5.7. Walkability

For the walkability, the panel withstands 1,2 kN point load applied (10 x 10 cm) with no permanent visible damages.

According to the test results the walkability resistance the LS-TECH-RC M-M and LS-TECH-RC M-O panels are classified as A4 use category.

2.2.6 Essential Requirement 5 – Protection against noise

2.2.6.1. Direct airborne sound insulation

No performance determined (NPD).

2.2.6.2. Sound absorption

No performance determined (NPD).

2.2.7 Essential Requirement 6 – Energy economy and heat retention

2.2.7.1. Thermal insulation

Thermal resistance for LS-TECH-RC M-M and LS-TECH-RC M-O panels, calculated in accordance with EN ISO 6946, using values $\lambda_{calc} = 0,155 \text{ W/(m}\cdot\text{K)}$ for MgO Green-LS-TECH board, $\lambda_{calc} = 0,037 \text{ W/(m}\cdot\text{K)}$ for EPS core and $\lambda_{calc} = 0,13 \text{ W/(m}\cdot\text{K)}$ for OSB/3 board, are given below.

	Thickness of the core, mm	Thermal resistance, $\text{m}^2\cdot\text{K/W}$
LS-TECH-RC M-O panel	230	6,52
LS-TECH-RC M-M panel	230	6,50

2.2.7.2. Air permeability

No performance determined (NPD).

2.2.8 Aspects of durability, serviceability and identification

2.2.8.1. Durability

2.2.8.1.1. Creep

The results are given below (for 3,0 m span).

Type of panel	creep coefficient φ_t	deflection of panel, mm
LS-TECH-RC25 M-M panel after:		
– 500 h	$\leq 0,4$	$\leq 1,4$
– 1000 h	$\leq 0,5$	$\leq 1,8$
– 2000 h	$\leq 0,7$	$\leq 2,6$
LS-TECH RC25 M-O panel after:		
– 500 h	$\leq 0,5$	$\leq 2,8$
– 1000 h	$\leq 0,5$	$\leq 2,9$
– 2000 h	$\leq 0,7$	$\leq 3,5$

2.2.8.1.2. Thermal agents

2.2.8.1.2.1. Climate cycles

The LS-TECH-RC M-M and LS-TECH-RC M-O 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.

2.2.8.1.2.2. Thermal shock

The LS-TECH-RC M-M and LS-TECH-RC M-O panels have been submitted to 15 cycles of thermal shock following ETAG 016. The mechanical bending strenght of the panels after thermal shock do not decrease more than 10 %.

2.2.8.1.3. Biological agents

Due to a possibility of biological attack (for example 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.

2.2.8.2. Serviceability

2.2.8.2.1. Resistance to hard body impact

The resistance to hard body impact of LS-TECH-RC M-M and LS-TECH-RC M-O panels has been tested and it is in both cases satisfactory, damages have not occurred (no cracks, no indentation, etc).

2.2.8.2.2. Resistance to soft body impact

The resistance to soft body impact of LS-TECH-RC M-M and LS-TECH-RC M-O panels has been tested and it is in both cases satisfactory, damages have not occurred (no cracks, no indentation, etc).

2.2.8.3. Identification of products

The description of LS-TECH-RC M-M and LS-TECH-RC M-O panels and its components are given in chapters 1.1, 2.1 and Annex 1 and 2 of this ETA.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 1998/213/EC of the European Commission for self-supporting panels for use in roofs and ceilings the system 3 attestation of conformity applies.

The system 3 of attestation of conformity provides:

Declaration of conformity of the product by the manufacturer on the basis of:

a) Tasks of the manufacturer:

(1) factory production control.

b) Tasks of the notified body:

(2) initial type-testing of the product.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1. 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 products are in conformity with this European Technical Approval.

The manufacturer shall only use raw materials stated in the technical documentation of this ETA. The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan⁸⁾. Check of incoming materials shall include control of inspection documents presented by the manufacturers of those materials.

The factory production control shall be in accordance with the control plan⁸⁾ which is a part of the technical documentation of this ETA. The control plan has been agreed between the manufacturer and Instytut Techniki Budowlanej and is laid down in the context of the factory production control system operated by the manufacturer and deposited with Instytut Techniki Budowlanej.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan⁸⁾.

The manufacturer shall make a declaration of conformity, stating that the LS-TECH-RC M-M and LS-TECH-RC M-O panels are in conformity with the provisions of the ETA-13/0424.

⁸⁾ The control plan has been deposited with Instytut Techniki Budowlanej and may be handed over only to the notified body involved in the procedure of attestation of conformity.

3.2.2 Tasks of the notified body

The notified body shall perform the initial type-testing of the product.

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusion drawn in written report.

3.3 CE marking

The CE marking shall be affixed on the product itself, the attached label, or the accompanying commercial documents. The letters „CE” shall be followed by the following additional information:

- the name and address of the ETA-holder,
- the last two digits of the year in which the CE marking was affixed,
- the number of the ETA,
- the trade name of the product,
- reaction to fire class,
- number of ETAG indicating the intended use.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The ETA is issued on the basis of agreed data/information, deposited with Instytut Techniki Budowlanej, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Instytut Techniki Budowlanej before the changes are introduced. Instytut Techniki Budowlanej will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Design and installation

The self-supporting panels for use in roofs and ceilings design shall comply with characteristics of the LS-TECH-RC M-M and LS-TECH-RC M-O panels as well as the national regulations.

The manufacturer shall ensure that the information about design and installation of the LS-TECH-RC M-M and LS-TECH-RC M-O panels are made known to those involved in design and execution of construction works. The information can be given using reproductions of the respective parts of this European Technical Approval. Besides, all the data concerning the execution shall be indicated clearly on the packaging and/or on the enclosed instruction sheets, preferably using illustrations. Installation details are given in the Manufacturer's Installation Guide.

Only the components defined in clause 1.1 of this ETA can be used for the LS-TECH-RC M-M and LS-TECH-RC M-O panels.

4.3 Recommendations on packaging, transport and storage

Packaging, transport and storage of the components has to be such that the products are protected from damage during transport and storage, unless other measures are foreseen by the manufacturer for this purpose.

The components have to be well identified as part of the LS-TECH-RC M-M and LS-TECH-RC M-O panels.

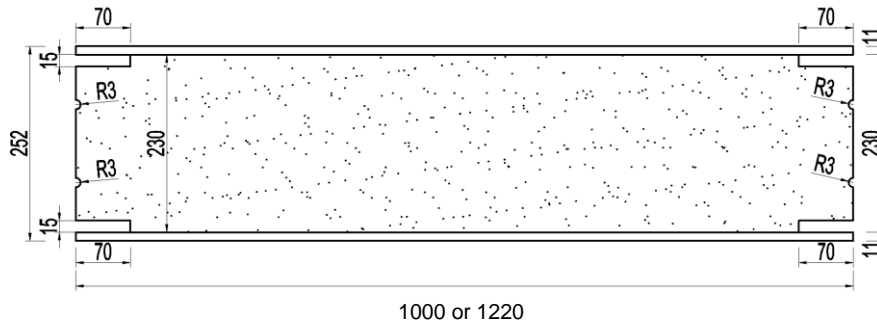
4.4 Use, maintenance and repair

To the indication on use, maintenance and repair the manufacturer's installation instruction applies.

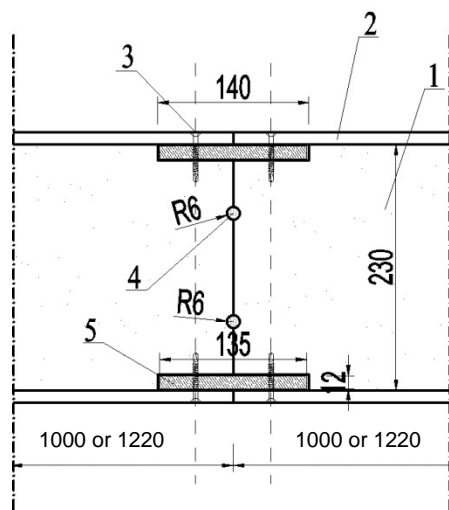
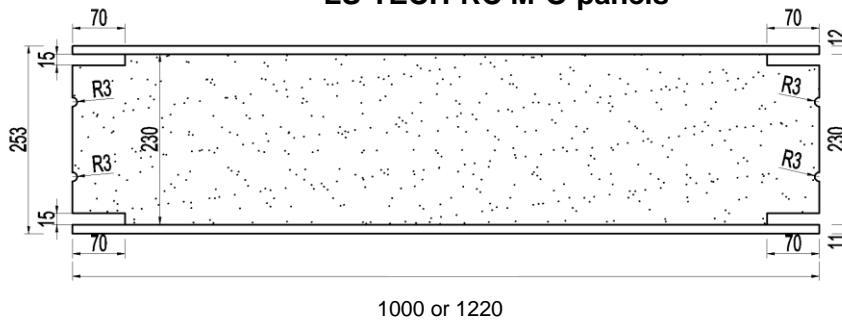
On behalf of Instytut Techniki Budowlanej

Jan Bobrowicz
Director of ITB

LS-TECH-RC M-M panels



LS-TECH-RC M-O panels



„Spline” joint
 1 – EPS core, 2 – magnesium oxide or OSB/3 board, 3 – self-drilling fastener \varnothing 3,5 mm x 35 mm, 4 – sealing element, 5 – „spline” fastener (OSB/3 board)

LS-TECH-RC M-M and LS-TECH-RC M-O panels

Sections of panels and “spline” joint

Annex 1
 of European
 Technical Approval
 ETA-13/0424

Table 1. Properties of the panels

Tensile strength perpendicular to faces of panels, MPa	≥ 0,15	ETAG 016 Part 1
Tensile modulus, MPa	≥ 9,0	
Tensile strength of panels after climatic tests – C2 cycle (temp. +65°C, humidity 98%), MPa:		
– after 7 days	≥ 0,20	
– after 28 days	≥ 0,09	

Table 2. Properties of MgO Green-LS-TECH board

Density, g/cm ³	0,9 ± 0,1	EN 12467
Flexural strength, MPa	≥ 8	
Dimensional stability (temp. +70°C and -20°C, 90% humidity)		EN 1604
- length and width	≤ 0,02	
- thickness	≤ 1	
Coefficient of thermal conductivity, λ _D , W/(m·K)	0,155	EN 12664, EN ISO 10456
Class of reaction to fire	A2-s1, d0	EN 13501-1

LS-TECH-RC M-M and LS-TECH-RC M-O panels

The properties of panels

Annex 2
of European
Technical Approval
ETA-13/0424