




Terrapalha & Compalha Portugal NEWS

Portugal News

- Terrapalha started in 2008 for natural architecture.
- and to help spread the word.



- www.terrapalha.blogspot.com
- www.terrapalha.com

- **Most western**
- **Strawbale Builders**
- 
- **Located near Lisbon.**



Portugal News

- Compalha Association since 2014 for
- Portuguese Networking and SB development.



- **www.compalha.pt**
- Started during the participation of Catarina in Leonardo da Vinci STEP project to develop a professional SB Training Course.
- Compalha is organizing lectures, exhibitions and happenings to spread strawbale and natural ecological building.

Portugal News



SB Examples

← SBB in Tamera Community

SBB Nomad guest-house ↓



Portugal News

SB Examples



Portugal News

SB Examples



Portugal News

DURABALE – RICE STRAW BUILDING SYSTEMS THERMAL INSULATION PRODUCT

PARTNERSHIP BETWEEN TAMERA - ILOS
PEACE RESEARCH CENTER

<https://www.tamera.org/pt/>

AND TERRAPALHA

15.000€ GRANT FROM “Portugal 2020”

NATIONAL CIVIL ENGINEERING
LABORATORY - ITECONS

<https://www.itecons.uc.pt/>

Portugal News

European Technical Assessment

ETA **yy/xxxx**
of **xx/xx/201x**

English version prepared by Itecons

General Part

Technical Assessment Body issuing the ETA: Itecons - Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade

Trade name of the construction product **DuraBale – Rice straw building systems**

Product family to which the construction product belongs Thermal Insulation Product

Product area code: 4

Manufacturer **ILOS - Peace and Research Center, Lda.**
Monte Serro, Relíquias
7630-392 Relíquias
PORTUGAL

Manufacturing plant(s) Monte Serro, Relíquias
7630-392 Relíquias
PORTUGAL

This European Technical Assessment contains **7** pages

DURABALE – RICE STRAW BUILDING SYSTEMS THERMAL INSULATION PRODUCT

Specific parts

1. Technical description of the product

This European Technical Assessment (ETA) applies to a thermal insulation product DuraBale made from compressed rice straw bales without any additives. The raw material is collected from the rice fields while harvesting the rice grains, using a specific baling mechanism. In this process, rice straw is fixed by a cord to bales.

The product is not covered by a harmonised European standard (hEN).

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

Thermal insulation product used for buildings as insulation of walls, roofs and floors, between rafters and timber work.

The assessment of the thermal insulation product only applies if the dry product is used in structures where it will not be exposed to compression loads, precipitation, wetting or weathering and for construction elements with no contact to water and soil and if the risk of deleterious condensation and mould is precluded by a numerical simulation (see EN 15026:2007) considering the precise build-up and the climate conditions at the place of use.

DURABALE – RICE STRAW BUILDING SYSTEMS THERMAL INSULATION PRODUCT

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

The identification tests and the assessment for the intended use of this thermal insulation product made of straw bales were carried out in compliance with the EAD 040146-00-1201.

3.1 Mechanical resistance and stability (BWR 1)

Not relevant.

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to Fire

The reaction to fire was tested according to EN ISO 11925-2:2010 and to EN ISO 11925-2:2010/Cor1:2011 and classified according to EN 13501-1:2009.

The DuraBale meets the requirements of class E.

3.3 Hygiene, health and environment (BWR 3)

3.3.1 Biological resistance

The determination of the growth of mould fungus was carried out according to Annex A of the EAD 040146-00-1201.

The growth of mould fungus is 3, according to Table 4 of **EN ISO 846:1997**.

Portugal News

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

The identification tests and the assessment for the intended use of this thermal insulation product made of straw bales were carried out in compliance with the EAD 040146-00-1201.

3.1 Mechanical resistance and stability (BWR 1)

Not relevant.

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to Fire

The reaction to fire was tested according to EN ISO 11925-2:2010 and to EN ISO 11925-2:2010/Cor1:2011 and classified according to EN 13501-1:2009.

The DuraBale meets the requirements of class E.

3.3 Hygiene, health and environment (BWR 3)

3.3.1 Biological resistance

The determination of the growth of mould fungus was carried out according to Annex A of the EAD 040146-00-1201.

The growth of mould fungus is 3, according to Table 4 of **EN ISO 846:1997**.

Portugal News

3.6.2 Thermal conductivity

Lambda fractile at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$)

The determination of lambda fractile at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$), representing at least 90 % of the production with a confidence limit of 90 % was carried out in accordance with Annex B, clause 1 of the EAD 040146-00-1201 .

The thermal conductivity of the test specimens was measured according to EN 12667:2001 and lambda fractile at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$) was calculated using the principles as detailed in Annex A of the EN 13162:2012+A1:2015.

The lambda fractile at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$) is 0,0411 W/(m.K).

Mass-related moisture conversion coefficient ($f_{u,1}$)

The mass-related moisture conversion coefficient ($f_{u,1}$), for the conversion of $\lambda_{10,dry}$ to $\lambda_{23,50}$, was determined in accordance with Annex B, clause 2 of the EAD 040146-00-1201.

The thermal conductivity was measured according to EN 12667:2001 for the determination of lambda at 10 °C, at dry conditions ($\lambda_{10,dry}$) and lambda at 10 °C, at (23 ± 2)°C and (50 ± 5)% relative humidity conditions ($\lambda_{10,(23,50)}$).

The moisture content mass by mass at a moisture balance of 23 °C and 50% relative humidity ($u_{23,50}$) and mass-related moisture conversion coefficient ($f_{u,1}$) were calculated according to Annex B, clause 2 of the EAD 040146-00-1201.

The moisture content mass by mass at a moisture balance of 23 °C and 50% relative humidity ($u_{23,50}$) is 0,059 kg/kg and the mass-related moisture conversion coefficient ($f_{u,1}$) is 0,81.

Lambda declared at 23 °C and 50 % relative humidity $\lambda_{D(23,50)}$

The calculation of the lambda declared at 23 °C and 50 % relative humidity ($\lambda_{D(23,50)}$) was carried out in accordance with Annex B, clause 3 of the EAD 040146-00-1201.

The lambda declared at 23 °C and 50 % relative humidity ($\lambda_{D(23,50)}$) is 0,044 W/(m.K).

Portugal News

3.6.3 Water vapour diffusion resistance

The determination of the water vapour transmission was carried out according to EN 12086:2013. The test condition used were prepared according to set A conditions presented in the standard.

The water vapour diffusion resistance factor (μ) is 5.47.

3.6.7 Density

The determination of density was carried out on the basis of EN 1602:2013.

The density of the bales is $101 \text{ kg/m}^3 (\pm 6 \text{ kg/m}^3)$.

065142-001

tecnalia Inspiring Business

2:00:00

Portugal News

**DURABALE – RICE STRAW BUILDING SYSTEMS
THERMAL INSULATION PRODUCT**

FIRE TEST



IMG_3040.MOV

- In Portugal there are 30.000hec. of rice production
- 180.000 tons of rice per year, half of the portuguese consumption
- Usually it's a waste material that it is burnt
- More resistant than other fibers?? High Silica content

CHALLENGES

- Farmers don't use small balers anymore – create value for them to see it as by-product, prepare it and store it well
- Time of the year cycle, rice is harvested in September / October

terrapalha & compalha

Portugal News

- www.terrapalha.com
- www.compalha.com

- Email: catarinapinto@terrapalha.com
- Mobile: +351 933291112
- Catarina Pinto

Thank You!