LETObamboo technical data

LETObamboo panels and flooring products are manufactured from FSC accredited resources.

Data supplied according to US standards, not Australian standards. Results by direct comparison of the two standards are yet to be supplied.

Flammability

Rated by the U.S. National Fire Protection Agency (NFPA) life standards code, according to standards set by American Society for Testing Methods flooring (ASTM). The ASTM E648 is the Flooring Radiant Panel Test, i.e. Critical Radiant Flux.

There are only 2 ratings Watts per square centimeter W/cm^2

Class I - 0.45 W/cm^2 or greater

Class II – 0.22 W/cm^2 or greater

A Class I rating implies a more flame resistant system than Class II, hence deemed suitable for use in all classes of buildings.

LETO bamboo is rated as a Class I product.

Smoke Density

According to ASTM E622 a pass is deemed to be 450 or less for flaming mode & non-flaming mode

LETO bamboo rates at 269 flaming mode; 329 non-flaming mode

Abrasion Resistance LETObamboo pre-finished Flooring

Using ASTM C501 the abrasion resistance is measured by weight loss after testing and measures at

0.349 grams, which makes it one of the most abrasive-resistant available, where Treffert brand coatings have been applied.

Chemical and Stain Resistance LETObamboo pre-finished Flooring

The Treffert finish was unaffected when tested with the following chemical reagents: Acetic Acid (5%) Acetone Ammonium Hydroxide (10%) Toluene Detergent solution Ethyl Alcohol (50%) Hydrochloric Acid (10%) Turpentine heavy duty (.025%) Hydrogen peroxide (3%) Soap Solution (1%) sodium Hydroxide (1%).

Janka Hardness

Strand woven bamboo has been rated according to the ASTM 1037 between 2820 and 3625 psi using the Janka Hardness Scale. The Janka range is between 0 to 4000 psi - 0 being the softest; 4000 being the hardest. Brazilian Walnut, at 3680, is rated as the hardest timber.

Ranking scales are - Low: 540 – 1200; Medium: 1200 – 1800; High 1800 – 4000. Sydney Blue Gum has been rated at 2023, Spotted Gum at 2473, Tasmanian Oak at 1350.

Using the more common Australian rating tool of kN, **LETO brand strand woven bamboo has been rated at 16.1 kN,** compared to Sydney Blue Gum at 9.01, Spotted Gum at 11.0, Tasmanian Oak at 5.5.

Dimensional Stability

When tested according to standard methods for wood flooring, LETO bamboo strand woven products showed a dimensional change coefficient of .00144. According to one study, Jarrah rated at .00396; Merbau at .00158; Mesquite at .00129. At that rating, Mesquite was considered more stable and was given the highest rating; strand woven bamboo not having been included in this particular study.

Slip Resistance

This will very much depend on the finish and products used.

Compressive Strength

When tested according to ASTM D3501-86; Pressure applied parallel to Grain =7,549 PSI; Perpendicular to Grain =2,566 PSI; Flat-wise =16,925 PSI at 50% strain. (Load to compress to 1/2 thickness)

By comparison, Jarrah has been tested at 2,130 PSI Parallel to Grain.

Bending Strength

When tested according to ASTM D3043-87 result = 13,608 PSI.

Modulus of Elasticity (MOE)

Yet to be determined.

Strength

When tested according to BRITISH STANDARD # 373 result =parallel to grain 1,365 PSI.

Tensile Strength

When tested according to ASTM D3500-90 A result = parallel to grain 15, 290 PSI.

Moisture Content Range

8-12% at Port of Melbourne.

Density

Assessed at 0.72 g/cm3.

Impact resistance

97.1 KJ/M2 Hardness: 719kg/cm2, Grind ability: 110 rotations

Formaldehyde Emissions

CETEC Emission Testing at February 2009 used Test Method EN717-2 to determine Formaldehyde release by the Gas Analysis Method rated LETO Bamboo at 0.11 mg/m^2 /hr. This falls into the category of E1.

Glue: non-toxic for formaldehyde release: formaldehyde emission attained E1 standard requirement.

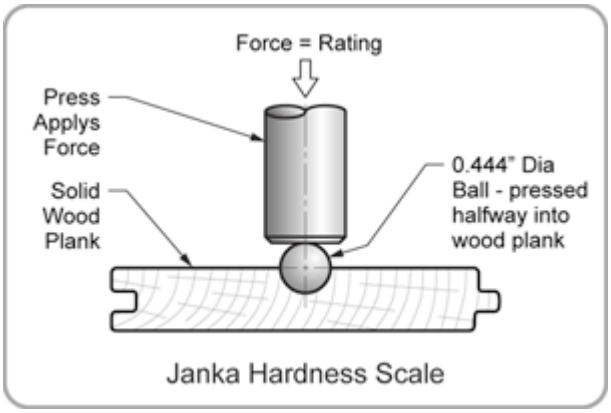
Volatile Organic Compounds (VOC)

CETEC Emission Testing using ASTM D5116 rated **LETO bamboo products at <0.05 mg/m^2/hr, and < 0.5 mg/m^3 (VOC).** According to GBCA Office Design V2 & V3 IEQ -13 a rating passes at <0.5 mg/m^2/hr (VOC). According to GBCA Office Interiors V1.1 IEQ-11 a rating passes at <0.5 mg/m^3/hr (VOC).

DEFINITIONS and ADDITIONAL INFORMATION

Introduction

Janka Hardness Scale



The Janka Hardness Scale measures the hardness of wood and is typically referred to in comparing the hardness of wood flooring types. Created in 1922, the first Janka rating results were given in units of pressure (Pa). It wasn't until the test was standardized in 1927 that the results were given in units of force (F).

The Janka test assesses the amount of force required to push a steel ball that is.444 inches in diameter (11.28 millimeters) halfway into the surface of a particular wood. The Janka scale ranges from 0-4000, with 0 being the softest wood and 4000 being the hardest.

Janka ratings are measured in pounds-force (lbf). This is true for Janka tests conducted in the United States but may not be true in other countries, as measurement units vary. For example, in Australia the Janka ratings are given in kilo Newtons (kN), whereas in Sweden they are measured in kilogram-force (kgf).

While the Janka Hardness Scale only helps to classify woods based upon hardness and density, it can be a good indication of how much wear and tear a particular wood can withstand. The woods in the upper portion of the Janka Scale, such as Ipe (3680) tend to resist denting more than softer woods like Chestnut (540). The Janka rating can also help determine how difficult a particular wood will be to saw or nail.

High Ranking (1800 – 4000)

Harder wood and bamboo types can be found in the upper portion of the Janka Scale and are generally recommended for high-traffic areas in homes and businesses. Woods that have a high ranking include Brazilian Cherry, Cumaru (Brazilian Teak), Mesquite, Jarrah, and **strand woven bamboo**.

Medium Ranking (1200 – 1800)

Medium density woods are good for most home applications, such as living rooms and dining rooms. Certain woods may not be recommended for kitchen use. Some common types are White Oak, American Beech, Red Oak, Bamboo and Maple.

Low Ranking (540 – 1200)

Wood and bamboo types on the lower end of the Janka Scale are best for low-traffic areas such as bedrooms and closets. Softer wood types include Douglas Fir, Southern Yellow Pine, Black Cherry, Teak, and Black Walnut.

http://knol.google.com/k/writers-at-findanyfloorcom/janka-hardness-scale/302oazusumhoz/19# 14 July 2009

Dimensional Stability

Study table - http://www.azdesertmesquite.com/properties.htm

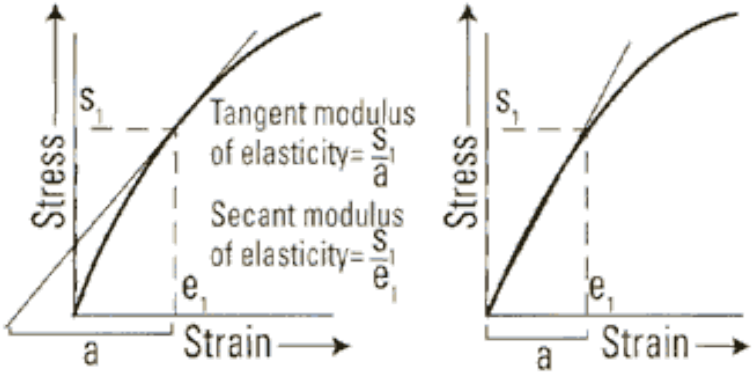
Modulus of Rupture

Ultimate strength determined in a flexure or torsion test. In a flexure test, modulus of rupture in bending is the maximum fiber stress at failure. In a torsion test, modulus of rupture in torsion is the maximum shear stress in the extreme fiber of a circular member at failure. Alternate terms are flexural strength and Torsional Strength.

http://www.instron.com.au/wa/resourcecenter/glossaryterm.aspx?ID=101

Modulus of Elasticity

Rate of change of strain as a function of stress. The slope of the straight line portion of a stress-strain diagram. Tangent modulus of elasticity is the slope of the stress-strain diagram at any point. Secant modulus of elasticity is stress divided by strain at any given value of stress or strain. It also is called stress-strain ratio.



Tangent and secant modulus of elasticity are equal, up to the proportional limit of a material. Depending on the type of loading represented by the stress-strain diagram, modulus of elasticity may be reported as: compressive modulus of elasticity (or modulus of elasticity in compression); flexural modulus of elasticity (or modulus of elasticity in flexure); shear modulus of elasticity (or modulus of elasticity in shear); tensile modulus of elasticity (or modulus of elasticity in tension); or torsional modulus of elasticity (or modulus of elasticity in torsion). Modulus of elasticity may be determined by dynamic testing, where it can be derived from complex modulus. Modulus used alone generally refers to tensile modulus of elasticity. Shear modulus is almost always equal to torsional modulus and both are called modulus of rigidity. Moduli of elasticity in tension and compression are approximately equal and are known as Young's Modulus. Modulus of rigidity is related to Young's Modulus by the equation: $E = 2G(r + 1)$ where E is Young's Modulus (psi), G is modulus of rigidity (psi) and r is Poisson's ratio. Modulus of elasticity also is called elastic modulus and coefficient of elasticity.

http://www.instron.com.au/wa/resourcecenter/glossaryterm.aspx?ID=99