Australian Native

A Specifier's Guide to Engineered Timber Flooring

BigRiver

IMAGES: Koonya Pavilion featuring ArmourFloor Spotted Gum 138

Introduction

Timber remains ubiquitous in the built environment. An especially popular choice for flooring, timber flooring represents a quarter of the flooring market.[1] Within this category, engineered timber flooring has emerged as a preferred choice due to its practical and performance advantages over solid timber flooring.

Engineered timber technology has improved greatly over recent decades. The result is a high performing flooring material boasting high levels of inherent stability and durability, and greater resistance to temperature and moisture than solid timber.[2] High quality products also offer a natural look that is almost indistinguishable from a solid plank floor.

With the growth of engineered timber products on the market, it is critical for architects, designers and specifiers to know what to look for when choosing the solution best suited to their intended application. Not all engineered timber flooring performs the same – product type, species, composition, installation method and the climatic conditions of the install environment all affect performance and stability. In today's market, sustainability and health requirements must also be considered.

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Engineered Timber vs. Solid Timber

Engineered timber is comprised of a decorative surface layer of timber (called a veneer or lamella) bonded over a timber substrate.[3] By comparison, solid timber floors consist of planks made out of solid pieces of wood and is the more traditional style for flooring. Solid timber typically comes as a raw product, requiring the installer to sand and polish the whole area. Engineered timber generally comes pre-finished and ready to install, although some products are available uncoated (designed to be sanded and finished after installation).

The processes of layering, compression and lamination used to manufacture engineered timber provide additional stability and durability to the end product. Every board is created by bonding together layers of wood, creating a solid core board. The core is then covered with a real wood top layer or lamella. This construction makes engineered timber less susceptible to warping and bowing while maintaining a high degree of structural integrity. For further protection from environmental conditions, some engineered boards use plywood in the core for extra stability and strength.

Engineered timber floors may be laid as floating floors, or glued to a subfloor as an overlay.[4] In some applications, it may be fixed as a structural floor on battens.[5] There are glueless jointing systems available on the market, which often make use of tongue and groove joints for assembly.

The Impact of the Install Environment

Knowing the details of the installation environment – namely the location, climatic conditions and the specifics of the interior space – is critical to successful timber flooring specification and installation. Timber flooring, including engineered timber floors, perform differently according to different environmental conditions. Heat, cold and humidity fluctuations may cause timber to shrink, expand and/or swell, causing the floorboards to move and warp. Solid timber flooring is more susceptible to movement than engineered timber, which is more resistant to climatic changes provided it is specified correctly.

Australia has a diverse range of climates across the country. Northern Queensland has hot and humid summers and drier winters, whereas Melbourne and Sydney enjoy more temperate yet still widely variable weather. Indoor environments should be controlled and stable, but temperature and humidity variations will still occur. Other factors such as heating and cooling systems, sunlight exposure and the thermal performance of the building itself can also impact timber flooring.

Specifiers will need to consider the average moisture content of the timber product, ensuring it is in line with the expected average in-service moisture content.[6] Drier products in seasonally moister environments tend to swell after installation.[7] Conversely, if the product has higher moisture content than what it will attain in service, seasonal shrinking should be expected.[8] Product performance will also be affected if in-service moisture content is different from conditions during installation, which is why some timber products need to be acclimatised to the install environment before installation.

The condition of the subfloor should also be taken into account, including the possibility of moisture that could affect the floor's performance. Subfloors should be clean and dry. If the floor is to be adhered to a concrete slab, the moisture content of the slab should be assessed for acceptability.[9] With floating floors, a moisture vapour retarding membrane is typically required.

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Specifying Engineered Timber Flooring
Design Considerations

Stability

Enhanced stability is a key advantage that engineered timber has over solid timber. However, not all engineered products perform the same in this regard. For example, three-ply and multi-ply products have different structural characteristics that will impact their suitability for an application. Three-ply boards are comprised of a lamella, core and base layer. Multi-ply boards feature a core that is made up with multiple layers of ply. A three-ply board is more susceptible to movement than a multi-ply board.

The composition and species used in a board should also be considered. Some engineered timber products have a core that is a different species to the face lamella. The face lamella may have a different density to the core. A core that is the same species as the face lamella results in a product that has superior balance and stability.

Durability

The durability of engineered timber products is influenced by several factors:

- **Surface finish.** The finish, whether it be polyurethane, oil or wax, provides protection to the floor's surface. The level of protection varies depending on the type of finish selected. Some types of coatings are better suited for high humidity and hot climates. Multiple coatings are required to protect the floor against daily wear and tear.
- **Thickness of top layer.** The thickness of the top layer contributes to durability and resistance to surface damage. Lamella thickness will also determine whether or not it will be possible to rejuvenate the floor by re-sanding or finishing.
- **Timber hardness.** Timber hardness is measured by the Janka rating. The harder the timber, the more resistant it is to denting.
- **Quality of installation and maintenance.** Careful installation and proper care and maintenance will contribute to a floor's longevity.

Quality of Lamella

The lamella can be made of any species of wood, so specifiers should assess its quality when specifying engineered timber flooring. Species and thickness of the lamella should be clearly marked. The supplier should also be able to describe how the lamella layer has been cut.

A stable lamella layer is essential for a high quality engineered timber floor. The main options for cutting the solid wood lamella layer are:

- **Dry, solid sawn.** The traditional process of cutting a log in a sawmill to its ideal thickness, width and length, resulting in a durable, thick layer of veneer. This is a lengthy process and results in some loss of material through sawdust.
- **Rotary cut or peel.** Wooden logs are placed in a conditioning tub and boiled, after which manufacturers peel long, thin layers from it using a blade. These layers are then pressed flat, producing a stable top layer with less material waste.
- **Sliced cut or peel.** The wooden logs are boiled and the flooring top layer is cut from the end of the log. As with rotary-peeled lamella, this method also produces a high amount of usable product from the wood.

Aesthetics

High quality engineered timber retains the aesthetic of real wood. Different species and manufacturing methods will result in different looks. Engineered timber flooring also tends to have more stylistic variations than solid timber flooring.

As a natural product, engineered timber is subject to some degree of colour variation. Samples may not perfectly match the actual floor once installed and there will be natural variations in knots, grain and sap marks.

Installation Method

Engineered timber flooring is installed using either the floating or glue-down installation method. Glue-down installation involves securing floor planks to the subfloor using a bonding agent or adhesive. Conversely, floating floors are not secured directly onto the floor but rather use a fixing system, such as a tongue and groove or click system, to fix the planks together while the weight of the floor itself holds it in position.

The choice between either method should be determined by the species of the flooring product, cost and time constraints. Some products are more suitable for either a floating or glue-down installation. Glue-down floors are inherently more time consuming to install than floating floors, the latter typically requiring no drying time.

The environmental conditions of the install environment are also a factor. The glue-down method is more suitable for concrete subfloors. The adhesive should be compatible with the substrate and flooring, non-staining and resistant to ageing, oxidation and ultraviolet light. In higher humidity environments, glue-down may perform better and offer greater stability than a floating floor.

For the installation of timber flooring over heated subfloors, engineered timber offers a better choice than other timber products due to its inherent dimensional stability which makes it more resistant to temperature fluctuations. While engineered timber floors can be floated over heated subfloors, there are some products that can be glued down. All installations should follow the manufacturer's specifications and guidelines.

Sustainability

Sustainable product certification and Chain of Custody (CoC) of forest products help specifiers identify timber products that are sourced and produced in a sustainable manner. The following certifications provide an indication as to the product's credentials in this area:

- Forest Stewardship Council (FSC® certified)
- Good Environmental Choice Australia (GECA – Australia's only independent, not-for-profit, multi-sector sustainability and environmental certification program)
- Program for the Endorsement of Forest Certification (PEFC™)
- Cradle-To-Cradle Certified

Buying local manufactured engineered timber products is more sustainable than importing products in the same category. The benefits of buying local include reduced energy consumption and materials from transportation, higher levels of quality assurance, and protection of local industries.

Engineered Timber Flooring with a Difference
Armourfloor® from Big River Group

Manufactured in Australia, Armourfloor is Australia and New Zealand's most stable timber floor. The product is manufactured using a five-layer, cross-ply construction. The bottom or base board is the same species as the face veneer providing superior balance and stability. This quality enables Armourfloor to perform to expectations in all geographical locations. No expansion is required through the floor unless the area exceeds 15 meters in length and width (but note that perimeter expansion gaps are still required).

The rotary-peeled lamella on Armourfloor opens the grain, giving a distinctive flowing appearance and is unique in appearance compared to conventional back sawn products. As a raw uncoated product, Armourfloor must be coated in-situ, enabling the use of different finishes to be applied to produce desired sheen levels. Finishes, such as polyurethanes, oils or wax, can be chosen based on the specifics of the application.

Armourfloor is manufactured to AS/NZS 2271:2004 "Plywood and blockboard for exterior use" and stress graded in accordance with AS/NZS 2269:2012. Being a F22 product in panel form (2,400x1,200), Armourfloor can form part of the flooring system. Faces are graded to AS/NZS 2271:2004. The material is laminated using exterior B-bond to AS/NZS 2271:2004. Available species include the following: Blackbutt, Flooded Gum, Spotted Gum, and Sydney Blue Gum.

Benefits

- Australian manufactured
- Excellent stability
- Suitable as a floating floor, or glued directly to existing floors.
- CoC-certified by Australian authorities
- Formaldehyde emission certified to Super E0, the lowest rating available
- Excellent performance on underfoot heating
- Square edge provides a seamless look

About Big River Group

Big River Group is recognised as a leading manufacturer and distributor of a variety of premium timber products including decorative timber panel products, structural plywood and engineered timber flooring. Big River also provides a broad range of formwork and building products primarily to the commercial, residential, and infrastructure construction market segments. The company's wide network of sales and distribution outlets and manufacturing facilities provides customers with full support and technical expertise at every stage of the product lifecycle. This is the guarantee of quality and service that Big River has based its 110 years of success on.

References

1 Australian Timber Flooring Association. “The Australian Timber Flooring Association.” ATFA. https://www.atfa.com.au (accessed 8 June 2021).

2 Pugel, Anton. “Seeing the benefits of engineered wood.” The Construction Specifier. https://www.constructionspecifier.com/specifiers-guide-benefits-engineered-wood (accessed 8 June 2021).

3 Australian Timber Flooring Association. “Timber Flooring Applications.” ATFA. https://www.atfa.com.au/wp-content/uploads/2018/02/Timber-Flooring-Applications-Bro-v09.pdf (accessed 8 June 2021).

4 Ibid.

5 Ibid.

6 Ibid.

7 Ibid.

8 Ibid.

9 Ibid.

All information provided correct as of June 2021.

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