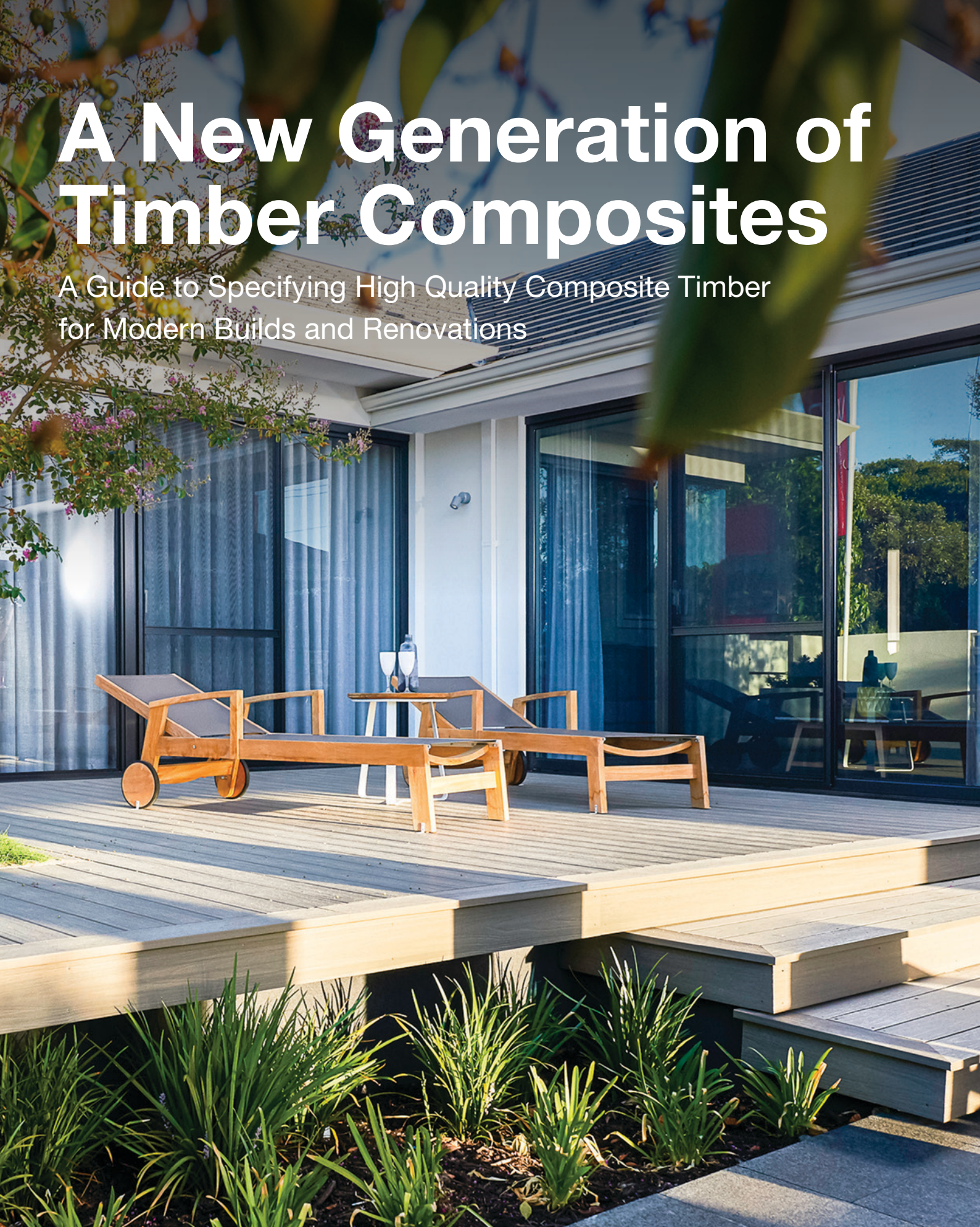


A New Generation of Timber Composites

A Guide to Specifying High Quality Composite Timber for Modern Builds and Renovations



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Getting up to date with composite timber technology?

Composite timber first emerged in the 1990s as an alternative to real timber for applications such as decking. As the name suggests, composite timber is made of a mixture of materials – typically, wood fibres (sawdust), plastic and different binding agents. These ingredients are combined to form a new type of wood-plastic material with performance properties and characteristics superior to wood alone. Composite timber's specific construction gives it the look and workability of wood, but with increased strength, water resistance and durability. Depending on specifications, composite timber can be engineered to be lightweight for easier handling. These materials can also be moulded with or without simulated wood grain details.

Despite these advancements, today the potential of wood-plastic composites as an alternative to natural timber is hampered by a perception issue. Early iterations of composite technology suffered from quality and performance issues due to the proliferation of “uncapped” composites. A “capped” composite product refers to one which has a protective layer applied on its surface whereas an “uncapped” product has no protection around the core. Without this protective layer, the wooden fibres in a composite timber product are susceptible to damage and degradation when exposed to the elements.

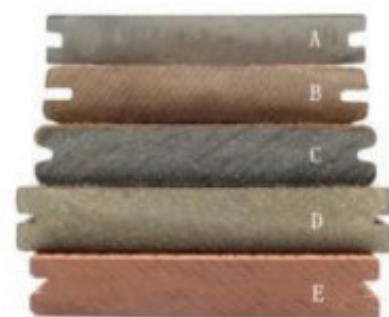
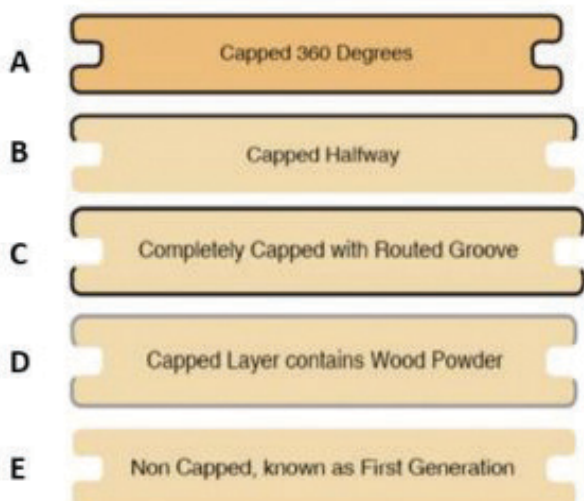
Early-stage manufacturers offered low quality, non-capped wood-plastic composites that suffered from crumbling, colour fading, moulding, cracking and staining. As these issues manifested over time in older composite products, some of which are still on the market, the material gained a reputation for being inferior

to natural timber in terms of both performance and aesthetics – a perception that still persists among many in the architecture and design community.

Flash forward to today – advancements in capped composite technology have overcome many of these shortcomings. Leading manufacturers now offer a range of composites that are capped using special engineering-grade polymers and additives. This protective layer is applied either during or after the extrusion process, resulting in a superior new material whose surface can better withstand impacts and moisture, as well as provides increased stability.

The polymer used to cap modern timber composites offers an extremely low water absorption rate, eliminating issues with moisture-related degradation, mould growth and decay. The protective layer is also more resistant to fading, staining and scratching, which increases the product's overall service life. New methods are being employed to improve the aesthetic of this new generation of composites – a range of high-definition grains, colours, shades and textures can be applied to the product to create natural-looking wood hues that are popular in modern design trends.

The environmental credentials of composite timber have also improved. Leading manufacturers use a mixture of recycled soft and hard wood and recycled plastic to reduce the lifecycle environmental impact of the composite manufacturing process. Several composite products are also environmentally certified, making them viable solutions in achieving credits or points under recognised green building rating systems.



A true alternative to harvested timber

The latest in capped composite technology has resulted in more natural looking yet highly durable composite materials. Due to these enhanced properties, composite timber can be reliably specified in place of natural timber without any sacrifice in looks or performance. Increased durability and water resistance offer architectural advantages in Australia's harsh climate, allowing timber composite to be specified for applications in which natural timber would not be suitable. There are also timber-look options with a high Bushfire Attack Level rating, which is critical for builds in bushfire-prone areas around Australia.

Timber composites are a good choice for the environmentally conscious. By specifying composites in place of natural wood, you are reducing pressure on rainforests thus saving natural habitats, maintaining carbon sinks that mitigate climate change and protecting the world's biodiversity. Choosing timber composites that are made using recycled plastic also supports the minimisation of plastic waste and diverts plastic from landfills and oceans. For example, leading timber composite manufacturer, NewTechWood, saves over 26,000 tonnes of plastic from being buried in landfills every year and requires not one single tree to be cut down for its timber composite boards.

For architects and designers, composite timber offers a versatile, easy-to-use solution that can be used for a variety of interior and exterior applications – from decking and cladding to screening and fencing. It can be cut, drilled, screwed and routed with standard woodworking tools, so specialised labour is not required. In addition, a wide range of finishes, grains and textures allow designers to achieve their creative vision unconstrained. Importantly, specifying the new generation of capped timber composites gives architects and designers confidence that they are delivering a longlasting solution that is fit-for-purpose for most conditions.

With capped timber composites, owners can achieve an authentic timber look in even the most challenging conditions and save on costs over time. Although some timber composite profiles cost more than timber upfront, an analysis of the lifetime costs of ongoing maintenance indicates that composites present a highly attractive value proposition. Advanced timber composites are vastly easier to maintain than real timber and have virtually no maintenance requirements – they do not need to be sanded, oiled, resealed or painted.



Opportunities with low carbon composites: Green building certification

Not all timber composites are the same. To fully reap the material's numerous benefits, one must be able to choose the best composite timber for the chosen application out of a wide range of products on the market. Below are some design considerations relevant to this process.

Budget

The price of the initial material supply is not always a good indicator of value. The ease and availability of different types of installation methods available for different composite profiles may make a specific product or brand a more cost-effective option overall. Some manufacturers offer easy-to-use hidden fixing systems that can reduce installation costs.

It is also important to consider the reputation of the manufacturer, the length and scope of any warranties that come with the product, and whether extensive technical support is available. Some manufacturers offer a 25-year warranty for residential applications.

Composition

The mixture of ingredients in different composite timber products varies greatly. It is important to consider the type of plastic and the type of timber used as well as the ratio of hard to soft wood fibres and the ratio of timber to plastic. These factors can impact quality, performance and longevity.

Capped vs uncapped

The timber composite market can be divided into capped and non-capped composite wood categories. Within these categories, there are five types of composite wood:

- **Capped 360 degrees.** A protective layer is applied to all sides of the timber composite providing maximum protection from the elements.
- **Half-capped composite.** The underside and grooves of the board are exposed to the elements, which can result in dry and wet effects between the top and bottom of the board. This can lead to bowing, cupping or cracking due to the effects of uneven moisture absorption across the board.
- **Groove cut out and not capped.** An uncapped groove in a timber composite board allows moisture to be absorbed into the core, throughout the length of the board. This can cause the board to swell, cup and/or crack.
- **Cap layer contains wood powder.** If the cap layer includes wood powder, there is wood that is exposed to the elements thus making the board susceptible to degradation.
- **"First generation" uncapped.** As mentioned earlier, uncapped timber composites offer little or no protection to the core. Without a protective capped layer, wood fibres are exposed to the surface and can be damaged

by harsh weather conditions, ultraviolet (UV), moisture, bacteria, fungus and mould. Not only will the colour of the board fade, but the structure and composition of the board will degrade substantially.

Performance and testing

Manufacturers claim that composite timber products are highly durable, low maintenance and can withstand the elements. But how can this be quantified and compared between products? It is important to ensure that the composite product has undergone testing in accordance with the relevant industry standards. Composite products can vary greatly in key performance areas such as UV resistance, stain resistance, scratch resistance, abrasion resistance, stability and so on.

Appearance

The surface finish, appearance and texture of composites can vary widely. Leading manufacturers offer a range of timber-like finishes that emulate the natural look of timber, complete with realistic high-definition grains and textures. Furthermore, some manufacturers offer different composite profiles to help architects and designers achieve unique design features, such as borders, dividers and staggered butt joints, and optimise material utilisation.

Environmental credentials

Composite timbers that contain recycled material content are more environmentally friendly. It is pertinent to consider how much recycled content and reclaimed wood fibres are used in the product, the percentage amount in the product and where they are sourced from. As a rule of thumb, any manufacturer or supplier that claims an "average" amount of recycled content in each product as opposed to a "minimum" amount should be treated with caution. Manufacturers should be able to show that their recycled content claims have been independently verified.

It is also prudent to check whether the product has an official Environmental Product Declaration (EPDs). An EPD is a transparent report that provides a review of a product's environmental performance and communicates what a product is made of and its carbon footprint throughout its entire lifecycle. A company can reduce its carbon footprint through waste reduction, energy conservation, and by utilising optimal manufacturing processes.

Other environmental certifications, reports and eco-labels should also be considered, including LEED (Leadership in Energy and Environmental Design) compliance statements, Global GreenTag's GreenRate and Good Environmental Choice Australia.

The cutting edge in composite timber

NewTechWood

Since 2004, NewTechWood has been at the forefront of the design and manufacture of wood-plastic composite products to enhance outdoor living. They have solved the problems experienced in the early days of development and come up with a product that is not only extremely hard wearing, but has a natural timber look.

NewTechWood uses sophisticated technology to provide the most advanced capped composite product on the market. This advanced capped composite material has a strong and durable polymer shield which fully caps the core. The core is made of 60% recycled dense wood fibre mixed with 35% high-grade recycled plastics (HDPE), with only 5% virgin material. The shield is made of special engineering-grade polymer and additives with extremely low water penetration.

Using a co-extrusion process, the shield is heat pressed onto the core creating an impermeable protective barrier against moisture, UV, insects and bacteria. Moreover, the extremely durable shield will give maximum protection, with stain resistance, fade resistance and no requirements for oiling or painting. Backed by a 25-year warranty, this system provides a more durable and longer lasting product, which will provide years of enjoyment with less maintenance over the life span of your deck, screening or wall cladding.

NewTechWood has recently boosted its sustainability credentials by gaining two new environmental awards: LEED and EPD. A leading green building award, the LEED rating system, developed by the US Green Building Council, is a major international standard for sustainability. NewTechWood has achieved an LEED compliance statement in the field of materials and resources. That means NewTechWood decking, cladding and screening can be used for any building project seeking LEED certification.

NewTechWood is also EPD verified. The EPD program is essential for the building industry, as it makes it possible to compare the environmental impacts of different materials and products – and therefore select the most sustainable option. A verified EPD contributes to the product's credits for LEED v4, BREEM and other leading green building rating systems.



NewTechWood



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All information provided correct as of October 2021

