

General Properties of ModWood

Compliance with International Standards

A range of ModWood products has been exhaustively tested to the US Standard ICC-ES™ AC174 and found to be suitable for all US applications without restriction, provided installation guidelines are followed.

Moisture absorption (full submersion)

| Duration | Solid boards |
|----------|--------------|
| 24 hours | <1% |
| 7 days | <1% |
| 3 months | 5 - 7% |

Note: While ModWood may be exposed to weather without concern – it is not suitable for continuous immersion in water or damp soil.

Thermal expansion 0.000015 mm/mm/deg C

A 5400mm board will expand and contract approximately 3mm in a 40 degree temperature variation. Therefore ModWood should not be fixed at or near its maximum temperature (and expansion) for the geographical area where it is installed. On hot days, store ModWood in the shade until fixing - or fix in the cooler morning or evening. Warm ModWood expands to the same degree in length and width, unlike timber which expands more across grain than along grain. The recommended end gaps must be observed when installing ModWood.

Termite resistance ModWood has been tested by CSIRO and found to have a high degree of resistance to attack by two of Australia's most important species of subterranean termites, *Mastotermes darwiniensis* and *Coptotermes acinaciformis*. Compared with untreated hardwoods and softwoods, ModWood is dramatically more resistant against termite attack.

Density 1.15 kg/litre approximately

Board Weights

| Product | Dimensions (mm x mm) | Weight per LM (kg/LM) | Standard Length* (m) | Board Weight (kg) |
|-------------------------|----------------------|-----------------------|----------------------|-------------------|
| Mini Board (solid) | 68 x 17 | 1.3 | 4.8 | 6.4 |
| Deck Board (solid) | 88 x 23 | 2.3 | 5.4 | 12.6 |
| Wide Deck Board (solid) | 137 x 23 | 3.6 | 5.4 | 19.6 |
| Marina Board (solid) | 137 x 32 | 5.1 | 4.2 | 21.2 |
| Super Marina (solid) | 137 x 35 | 5.5 | 3.6 | 19.8 |

*Note: Longer or shorter boards are available to special order. Handling arrangements onsite need to be appropriate to the heavier boards.

Surface hardness 95 (Shore D)

This hardness score is better than softwoods and is typical of Wood Plastic Composites. To avoid scratching ModWood with products such as outdoor furniture, soft feet on furniture should always be used.

Slip resistance

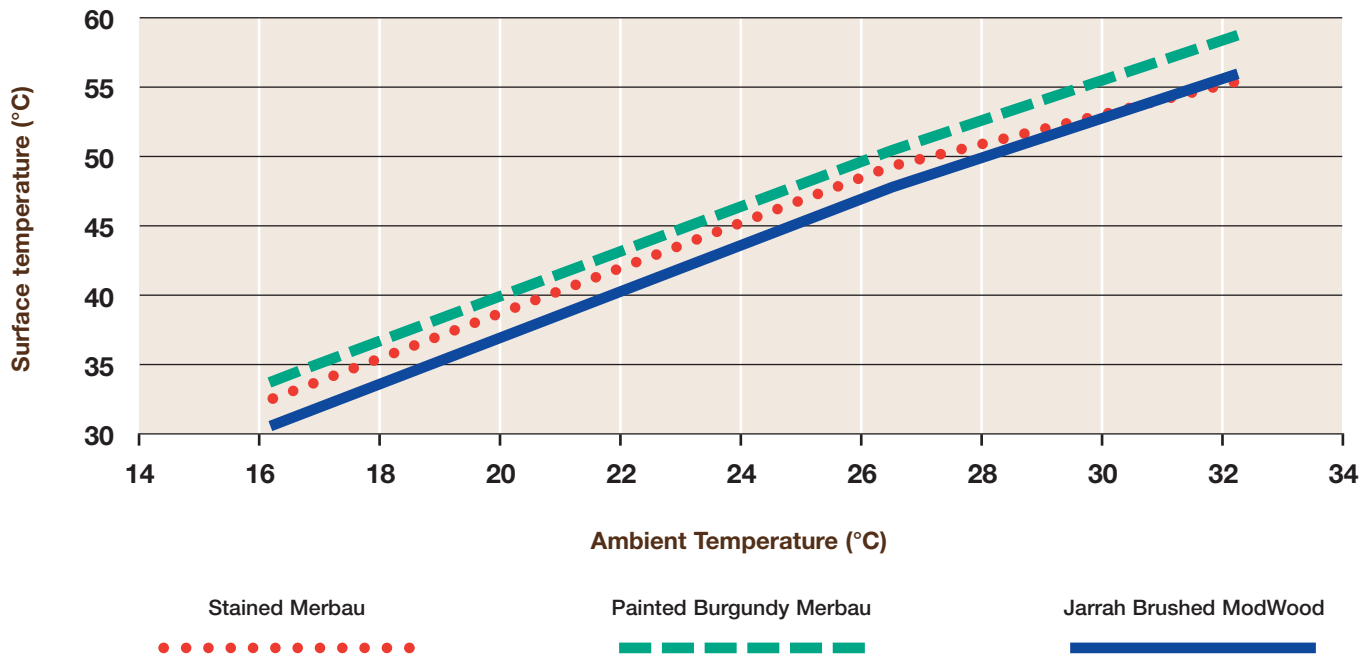
Slip resistance testing by CSIRO Tested to AS/NZS 4586:2004

| No. | Sample | Wet Pendulum Class | Oil-Wet Ramp Class |
|-----|-------------------------|--------------------|--------------------|
| 1 | ModWood Deck | Y | R10 |
| 2 | ModWood Wide and Marina | Y | R11 |
| 3 | Oiled Timber | Y | R10 |
| 4 | Painted Timber | Y | R10 |

Note: Sample 3 was coated with natural decking oil, merbau tint with a brush.

Sample 4 was coated with decking paint, applied with a mini roller.

Surface Temperature Comparison - ModWood versus stained and painted Merbau in full sun.



Burning Characteristics and Bushfire Resistance

Burning Characteristics - tested by AWTA AS/NZS 1530.3 - 1999

| | Flame Shield® |
|-----------------------|---------------|
| Ignitability Index | 13 |
| Spread of flame Index | 5 |
| Smoke developed Index | 4 |
| Heat evolved Index | 4 |

Bushfire Resistance - tested by Exova Warringtonfire AUS to AS 1530.8.1

| | |
|-------------|----------------|
| AS 1530.8.1 | BAL-A40 Rating |
|-------------|----------------|

ModWood Flame Shield® is rated to BAL-40 and, when installed as per Installation Instructions, is a system complying to AS1530.8.1 for AS3959-2009 Section 8: Construction for Bushfire Attack Level 40 (BAL-40).

Properties of ModWood Boards

(Warning: This data is specific to the ModWood range of products and must not be used for designing with competitor WPC or ‘plastic lumber’ products - these usually show significantly inferior mechanical properties).

The Table shows averages based on Laboratory Test results (at 23°C) from routine manufacturing quality assurance:

| Dimensions | Unit | Mini Board | Deck Board | Wide Deck | Wide Deck Flame Shield® | Marina Board | Super Marina Board |
|-----------------|------|------------|------------|-----------|-------------------------|--------------|--------------------|
| Width | mm | 68 | 88.3 | 137 | 137 | 137 | 137 |
| Thickness | mm | 17 | 23 | 23 | 23 | 32 | 35 |
| Standard Length | mm | 4800 | 5400 | 5400 | 5400 | 4200 | 3600 |
| Board Weight | kg | 6.4 | 12.6 | 19.6 | 19.6 | 21.2 | 19.8 |

Mechanical Properties

| Test Method (Instron Extensometer) | | ASTM D790a | ASTM D6109 | ASTM D6109 | ASTM D6109 | ASTM D6109 | ASTM D6109 |
|------------------------------------|-----|--------------|--------------|--------------|--------------|--------------|--------------|
| Sample simply supported | | 3-Point Bend | 4-Point Bend | 4-Point Bend | 4-Point Bend | 4-Point Bend | 4-Point Bend |
| Test Span (l) | mm | 280 | 450 | 450 | 450 | 600 | 600 |
| MOR | MPa | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| MOE (Youngs Modulus) | MPa | 4500 | 5430 | 5150 | 5150 | 5500 | 5500 |

Designing with ModWood

As a manufactured product, ModWood is much less variable than timber, being free of knots, cracks, grain and other sources of variation. It is also far more durable than untreated timber.

Unlike timber – which in engineering terms is a fibre-reinforced foam - ModWood is a solid product. It therefore requires pre-drilling to take nailing or screwing and is more sensitive to crush damage near edges and ends. Please follow the installation advice when using ModWood. Compared with natural timber, ModWood is strong in shear and shear-failure mechanisms that often limit design in natural timber do not apply to ModWood.

ModWood is highly durable and mechanical properties were found to be 90% retained in severe accelerated weathering tests that destroyed both hardwood and softwood natural timber product samples.

The failure mechanisms of interest to the designer are:

- Overload in bending – the long-term Failure Bending Moment can be estimated to be 90% of that obtained in the Test Results above. A Factor Safety of 4 is recommended.
- Acceptable deflection under load is a question for the designer. As a guide, Deflection should not exceed Span/150.
- Tear out from fixings – decking and screening boards are subject to expansion & contraction - it is critical to follow the fixing instructions.

Overhangs

The cantilevered or ‘overhung’ section of a ModWood board should never exceed 50% of the width of the board. This avoids the load-to-failure on the overhung section falling below the load-to-failure on the supported span. Some overhang may be useful to achieve other design objectives and to avoid additional supports in stairs and walkways.

Creep Factor 4.0

This factor has been measured by long-term loading tests in our Laboratory and is similar to reported data for other WPC products and green timber. A factor of 4.0 means that the long-term deflection from a significant point load (Concentrated Action) can be up to 4 times the short-term deflection. If you would like to have heavy items on your deck – such as planter boxes – then the loads are best located over the joists and sub-structure rather than applied mid-span to the boards.

Durability

ModWood product has been tested for over 7000 hours in an accelerated Weatherometer laboratory machine, with a cycle of intense UV radiation and high humidity, simulating over 15 years of outdoor weathering. Mechanical strength and stiffness properties were 90% retained – a far better performance than treated softwood and hardwood decking samples under the same test – these cracked and broke up to such an extent that mechanical properties could not be tested.

Workability

ModWood is kind to tools being easy-cutting. Keep tools sharp and use light cuts with minimal force to achieve a good finish.