



# **ENGINEERED TIMBER PRODUCTS**

## **- Specification and Use -**

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# This Presentation

- Some Basics
- Durability
- Treatment
- Installation
- Other



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# Timber – Don't you just love it!

- Anisotropic
- Non-homogeneous
- Hygroscopic
- Moisture, temperature and time dependant
- Bio-degradable and
- Highly variable



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# Engineered Timber Products

You can 'engineer out' some of the undesirable characteristics, but the durability of ETP's still needs to be considered in specification and use.



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# Durability of ETP's

Combination of:-

- Suitability of adhesive for exposure conditions
- The timber durability (and treatment)
- Resistance to weathering

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# Adhesives and exposure conditions

Adhesive Type	Exposure conditions	Typical Adhesives used
Type I	Full weather exposure Temp.>50°C	Resorcinol, phenol-resorcinol and polyurethane
Type II	Protected from weather Temp.<50°C RH<85% @20°C	Melamine urea formaldehyde, polyurethane

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# Adhesives

## Adhesives commonly used in manufacture of ETP's

EWP type	Manufacturing standard	Adhesives Commonly used for manufacture
Glued-laminated timber	AS/NZS 1328.1	Type I (usually) Type II (permitted)
Laminated veneer lumber (LVL)	AS/NZS 4357 <sup>1</sup>	Type I
Plywood	AS/NZS 2269 <sup>1</sup>	Type I
Oriented-strand board (OSB)	Overseas standards e.g. EN300	Type II
Particleboard	AS/NZS 1860.1	Type II
I-beams	Proprietary	Depends upon components

Note:

1. Indicates Type I (Type A bond) is mandatory under the manufacturing standard.
2. "Proprietary" indicates information may be obtained from the manufacturer.

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# Adhesives and exposure conditions

**Service Class 1** :- moisture content corresponding to a temperature of 20°C and RH of the surrounding air only exceeding 65% for a few weeks per year.

NOTE: In Service Class 1, average EMC in most softwoods will not exceed 12%.

**Service Class 2** :- moisture content corresponding to a temperature of 20°C and RH of the surrounding air only exceeding 85% for a few weeks per year.

NOTE: In Service Class 2, average EMC in most softwoods will not exceed 20%.

**Service Class 3** :- climatic conditions leading to higher moisture contents than Service Class 2, or where timber is **directly exposed to sun and/or rain**.

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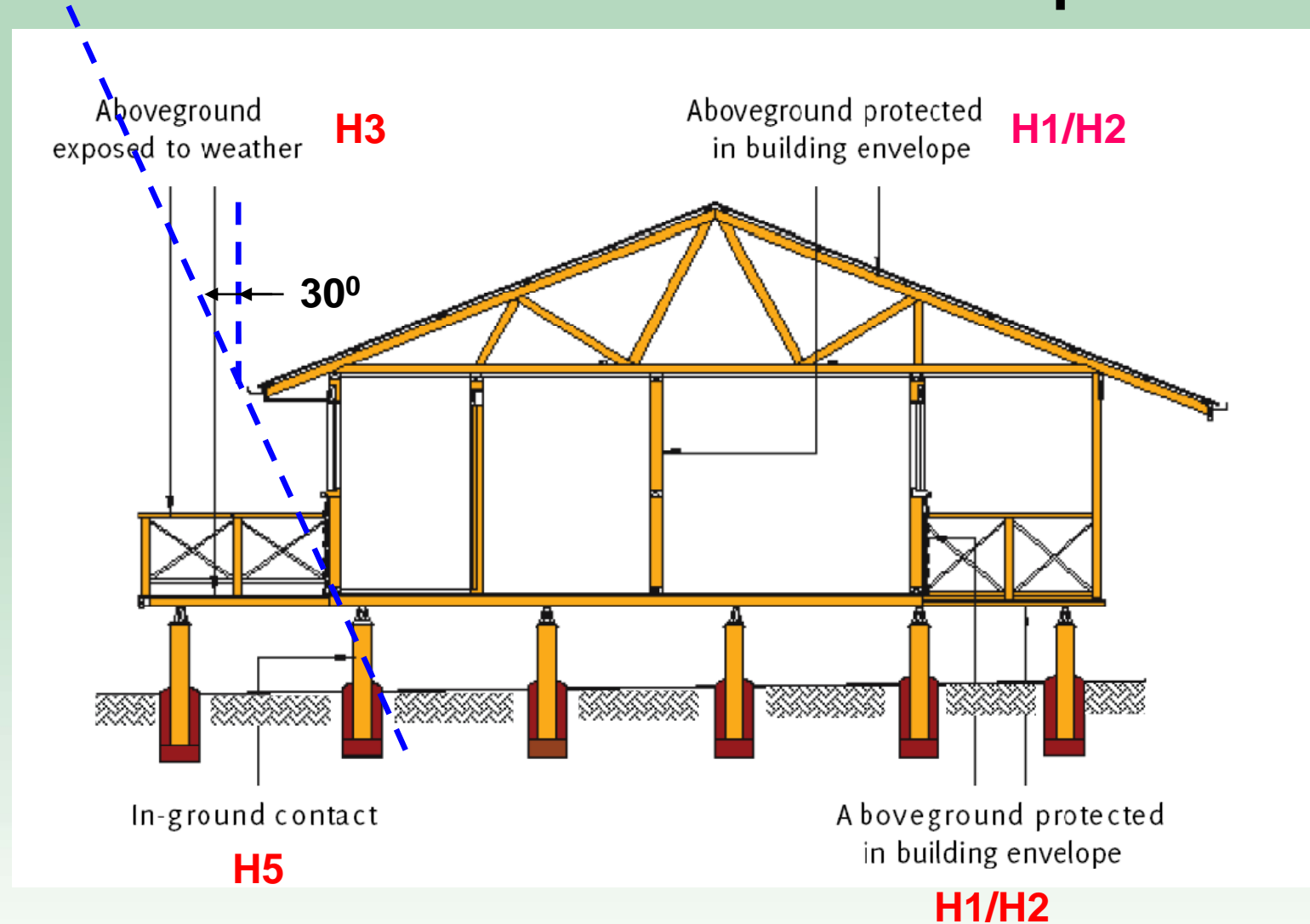


# Hazard Levels

Hazard Class	Exposure	Service Conditions	Biological Hazard	Adhesive Type
H1	Inside above ground	Fully Protected Well ventilated	Borers Only	Type I or II
H2	Inside above ground	Protected from Wetting nil leaching	Borers and Termites	Type I or II
H3	Outside above ground	Moderate wetting and leaching	Decay borers & termites	Type I
H4	Outside in ground	Severe wetting & leaching	Severe decay, borers & termites	Type I
H5	Outside in ground	Extreme wetting, leaching &/or critical use	Very severe decay, borers and termites	Type I
H6	Marine waters Nth & Sth	Prolonged immersion in sea water	Marine wood borers and decay	Type I
H6SW	Marine waters Sth only	Prolonged immersion in sea water	Marine wood borers and decay	Type I

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# Hazard Levels and Exposure



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# Durability

Durability Class	Durability Rating	Expected Service Life (yrs)	
		In Ground	Outside Above Ground
1	High	25	>40
2	Reasonably High	15 - 25	15 - 40
3	Moderate	5 - 15	7 - 15
4	Low	<5	<7

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# Durability

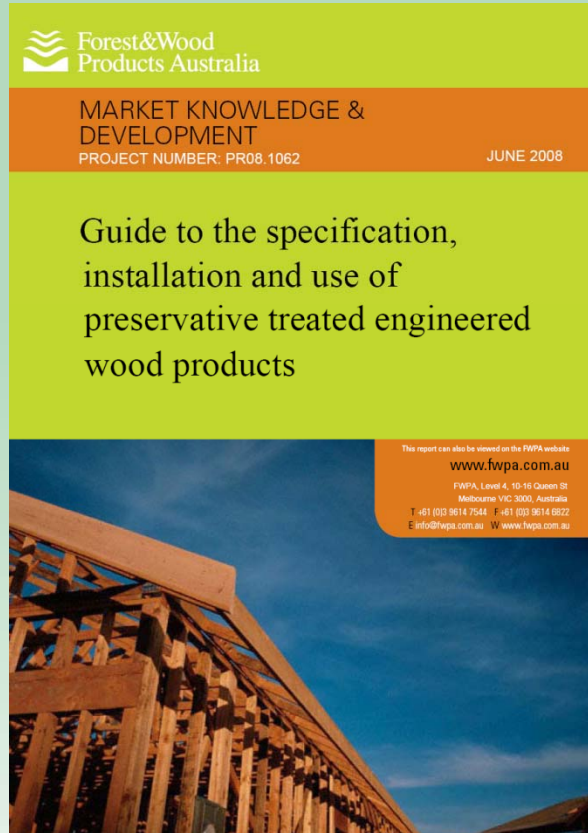
Durability Class	Species or Species Group	
<p><b><i>There is a common misunderstanding that the higher the stress grade, the higher the durability. This is NOT the case. There is no direct relationship between stress grade and durability (e.g. certain low durability hardwoods such as Vic Ash, Tasmanian Oak and some imports can have relatively high stress grades – i.e. F17, F27 but are Durability Class 4).</i></b></p>		
Class 4	Douglas fir (Oregon), Vic ash, Tas oak, Red balau, Radiata, Slash, Meranti	Douglas fir (Oregon), Vic ash, Tas oak, Red balau, Radiata, Slash, Meranti



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# Durability BCA/CTIQ etc



For Guide: [www.ewp.asn.au](http://www.ewp.asn.au)

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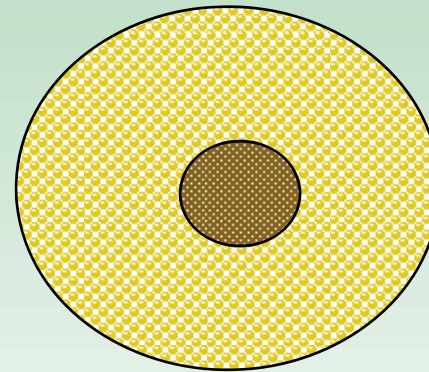




# Preservative Treatment

- Fungi
- Termites/Borers
- Weathering
- Fire
- Marine
- Chemical

**HAZARD/TREATMENT  
LEVELS (H) APPLY TO  
THESE 3 AGENTS**



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# What fungi need!

- Moisture > 20%
- Oxygen
- Temperature > 25° to 40° < ideal
- Food (treatment removes food source)

Remove any of these four key elements  
and growth stops or is retarded

# Treatment Standards

<b>AS 1604</b>	<b>Specification for preservative treatment</b>
<b>AS 1604.1</b>	Part 1: Sawn and round timber
<b>AS/NZS 1604.2</b>	Part 2: Reconstituted wood-based products
<b>AS/NZS 1604.3</b>	Part 3: Plywood
<b>AS/NZS 1604.4</b>	Part 4: Laminated veneer lumber (LVL)
<b>AS/NZS 1604.5</b>	Part 5: Glued-laminated timber products

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# Treatment Types

TYPE		HAZARD LEVEL					
		H1	H2	H3	H4	H5	H6
Envelope	Water/oil		☺				
Water	Boron	☺	?				
	CCA	☺	☺	☺	☺	☺	☺ ?
	Copper Azole	☺	☺	☺	☺	☺	
	ACQ	☺	☺	☺	☺	☺	
Solvent	LOSP	☺	☺	☺			
Double	CCA + Creosote						☺

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# Treatment methods

## Treatment Methods

Code	Penetration Pattern Type
P	Fibre particles have been treated
V	Veneer treatment
E	Envelope treatment of the finished product
G	Gluelines have been dosed with biocide
G/F	Gluelines have been dosed plus the face layers/veneers have received treatment
T	Solid timber laminates have been treated before fabrication

## Treatment Designations

EWP type	Treatment designation					
	H1	H2	H3	H4	H5	H6
OSB, particleboard	P	P, E, G, G/F	P, E	-	-	-
Plywood	V, G	E, V, G, G/F	E, V	E, V	E, V	V
LVL	V, G	E, V, G, G/F	E, V	E, V	E, V	-
Glulam	T	T, E	T, E	T, E	-	-

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# Weather exposed applications



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# Manufacturers Recommendations



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# Typical manufacturers recommendations

- 'I' Beams not suitable for weather exposed app's
- H3 treated pine (LVL and glulam) or Durable hardwood (glulam) OK
- No moisture traps
- HDG or stainless fasteners
- Before erection – prime all round with oil-based primer
- Two coats of solid, light coloured, oil or acrylic
- Sun exposed faces to be sheeted
- Malthoid or similar to tops of joists/beams
- End caps to exposed end grain

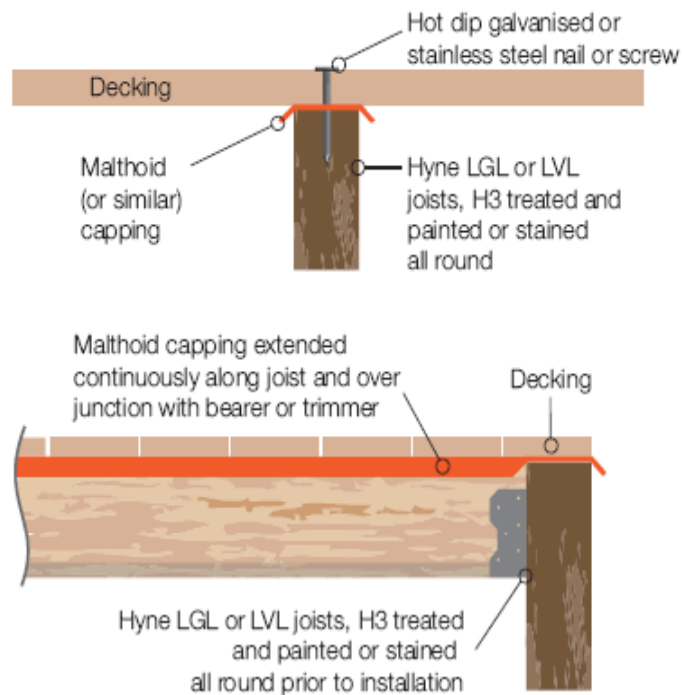
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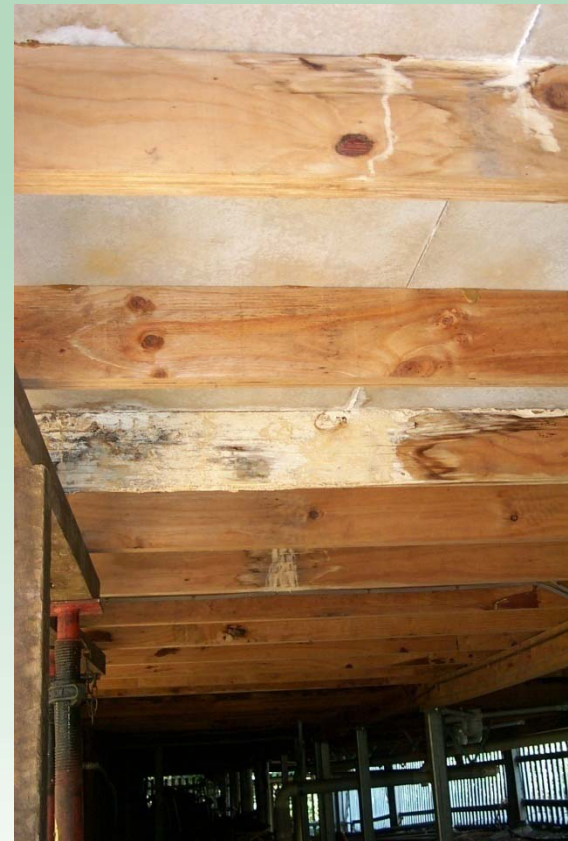
# Typical manufacturers recommendations

**DIAGRAM 3 BEARER AND JOIST IN WEATHER EXPOSED DECK**



# Other Considerations

- “Waterproof” decks – are they?



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# Trusting 'sealants'?



Support Point for Bearer



Water through deck to supports below

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# Other Considerations

- Nail plate connectors should not be used on external decks or in any location where they are exposed to the effects of weather. Plate withdrawal will occur due to cyclic wetting and drying.



Deck joists, Mt Coolum,  
6 years old

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# Weathering and Finishing



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# Weathering and Finishing



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# Other Considerations

- ETP's must be of suitable durability if exposed or partly exposed to the weather



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# Other Considerations



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# ETP's and future developments



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THANK YOU

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