



**HYNE ETP DESIGN FOR DURABILITY**

TDS9

When correctly designed, specified, detailed, installed and maintained Hyne Engineered Timber Products (ETP) timber structures and components will perform their intended function for the design life of that component. This Technical Data Sheet specifies requirements for the appropriate design and use of Hyne ETP.

**PRODUCTS**

Hyne Timber manufactures and distributes a range of engineered timber products including those listed as follows:

Product Name	Description	Manufacturing standard
Hyne LGL Hyne Beam 12 Hyne Beam 17 Hyne Beam 18 Hyne Beam 21	Structural glued-laminated timber. Timber laminate material is pine (LGL, 12, 17 grade), TasOak (18) or SEQld hardwood (21)	AS/NZS 1328.1
Hyne LVL, Hyne e-beam+	Structural laminated veneer lumber (LVL) manufactured from softwood veneer.	AS/NZS 4357.0
Hyne I-Beam	Structural composite wood I-Beam manufactured from solid finger-jointed pine flanges and OSB web panel.	Proprietary product

A more detailed description, properties, size range, treatment options and branding/identification is provided in current published literature and at [www.hyne.com.au](http://www.hyne.com.au).

**TERMS AND DEFINITIONS**

**Design Life**

Means the period for which a building, a building component element or sub-system is expected to fulfil its intended function.

**Note:** This is the "Design life" as defined by the ABCB Durability in Buildings Guideline for the Building Code of Australia (BCA). Design life is not interpreted as a guarantee. It is assumed that maintenance and inspection will be necessary for the achievement of the Design Life and that there are no unusual events (ABCB 2006).

**Maintenance**

Means the total set of activities performed during the design life to retain a building or its parts in a state in which it can fulfil its intended function (ABCB 2006).

**DESIGN**

Structural design of products is performed in accordance with the Building Code of Australia, and in particular in accordance with AS1720.1 *Timber structures Part 1: Design methods* or AS1684 *Residential timber-framed construction*. The total design, detailing and installation process requires due consideration of all relevant aspects of the system in which the product is used including structural, exposure hazards, moisture affects, durability, chemical and fire. In particular, with regard to durability, AS1720.1, states:

*"The structure and its structural elements (including timber, metal, adhesives and any other structural material) shall be designed. Any assumed maintenance program shall be specified in order to satisfy strength, stability and serviceability requirements, for the design life of the structure. Due consideration shall be given to environmental conditions, such as the thermal, physical, chemical, mechanical, and biological agents that may act on the structure to reduce its performance characteristics."*

Similar requirements are specified in AS1684, making designers and users of Hyne ETP responsible for how they are designed, specified and used. Informative Appendix B of AS1684 (Parts 2 and 3) provides good durability design guidance.

**DESIGN LIFE**

According to the Durability in Buildings Guideline (ABCB 2006):

*"The durability of a building and its components in their environment should be such that they remain fit for use during the design life, given appropriate maintenance"*.

The design life of components, or products, in a building is shown in Table 1 and is based on both ease of access and degree of economy to replace or repair.

**Table 1: BCA durability design life guideline.**

Design life of buildings - Years		Design life of components or sub-systems (years)		
Category	No. of years	Category		
		Readily accessible and economical to replace or repair	Moderate ease of access but difficult or costly to replace or repair	Not accessible or not economical to replace or repair
Normal	50	5	15	50

**Notes:**

- 1 Extracted from ABCB *Durability in Buildings*.
- 2 The design life of buildings should be taken as "Normal" for all building importance categories unless otherwise specified.

**EXPOSURE HAZARD**

Timber structures incorporating Hyne ETP may be subject to a range of potential hazards during their design life including:

- Weathering
- Above-ground decay
- Termite attack

Corrosion of fasteners and chemical attack has not been dealt with in this TDS and reference to the FWPA (2008) *Guide to the specification, installation and use of preservative treated engineered wood products* is recommended. Other hazards including fire are not covered in this TDS.

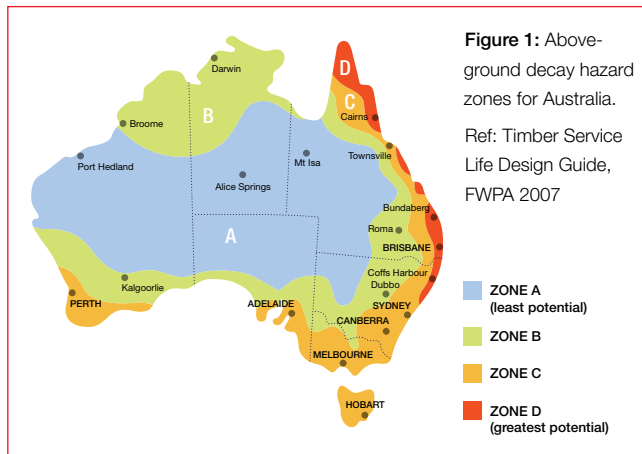
**Weathering**

Weathering of exposed Hyne ETP may result in wetting, drying, erosion, and changes. Surface discolouration can result due to bleaching, or the action of mould and mildew. Extremes of temperature may further result in checking and splitting of surfaces.

Cyclic wetting and drying by whatever means of Hyne ETP without protective sealing or shielding will generally result in mechanical damage to the wood surface in the form of checks, cracks, splits, raised grain or loose fibres.

**Above-ground decay**

Bio-deterioration of wood can result under favourable environmental conditions of moisture, oxygen, temperature and non-preservative treated wood as a food source. Decay risk will be minimised or eliminated by keeping the wood dry (<20%) and/or preservative treating the wood. Above-ground decay hazard zones for Australia are shown in Figure 1 demonstrating the variability of exposure environment by region.



**Termite attack**

Mitigation against termite attack may be achieved by any of the means given in AS3660.1 *Termite management Part 1: New building work*. The design may specify Hyne ETP preservative treated to H2 in accordance with AS1604. Alternatively, Naturally Termite Resistant timber products such as Hyne Beam 21 may be specified.

**PRESERVATIVE TREATMENT**

All products shall be preservative treated where necessary, appropriate to the Hazard Class for the specific product application in accordance with the Australian Standard series AS1604 *Specification for preservative treatment*. The relevant exposure hazard class for specific service conditions is given in AS1604 and in Table 2 following.

**Table 2: Description of Hazard Classes for exposure**

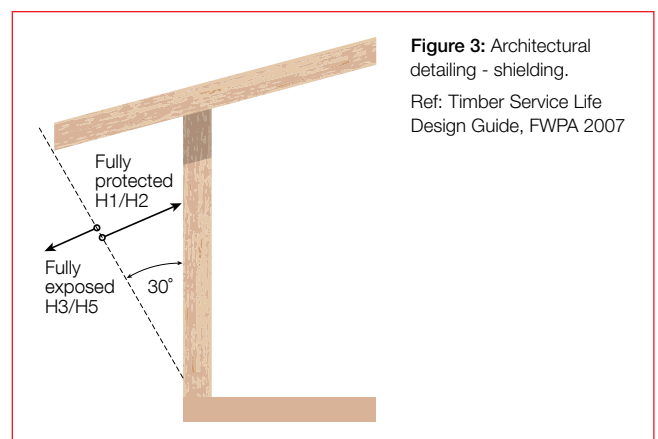
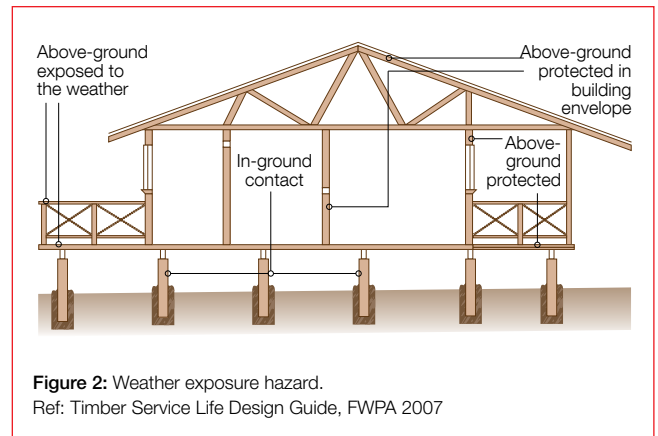
Hazard class	Exposure	Specific service conditions	Biological hazard
H1	Inside, above ground	Completely protected from the weather and well ventilated, and protected from termites	Lyctid borers
H2 <sup>2</sup>	Inside, above ground	Protected from wetting and with no leaching	Borers and termites
H3	Outside, above ground	Subject to periodic moderate wetting and some leaching	Moderate decay, borers and termites

**Notes:**

- 1 Extracted from AS1604 *Specification for preservative treated wood*.
- 2 H2-F is suitable for H2 applications south of the Tropic of Capricorn but is not suitable for H2 applications north of the Tropic of Capricorn.

The actual performance of any product, including Hyne ETP will be the result of a complex interaction between the selected product, its preservative treatment level, detailing employed and the exposure environment. It can generally be expected for Hazard Class H3 that supplementary detailing, finishing and maintenance will be necessary to achieve successful performance of products over the intended design life of the structure and component.

Figure 2 indicates the exposure of components in a typical structure. Figure 3 further shows the effect of architectural shielding on the exposure hazard class of building components.



**TREATMENT OF CUT SURFACES**

All newly exposed timber surfaces in Hyne ETP treated with H3 LOSP (light organic solvent preservative) resulting from cutting, rebating or drilling shall be resealed with a suitable site application of timber preservative. Suitable reseat timber preservative products include Tanalised® Ecoseal, Tanalised® Enseal Timber Protective or Osmose Protim-Solignum Reseal. All reseal products are to be used fully in accordance with the manufacturer’s recommendations.

**CONNECTION DESIGN**

Good design and detailing of Hyne ETP is essential at connections and must engage the following key elements:

- Shielding
- Isolation
- Drainage
- Ventilation

Joint detailing shall, wherever possible, comply with the following requirements:

- Keep horizontal contact areas to a minimum, in favour of self draining vertical surfaces.
- Ventilate joint surfaces by using spacers, wherever possible.
- Always use compatible fasteners which have adequate corrosion protection and do not cause splitting during installation eg. hot-dipped galvanic coatings or stainless steel.
- Ensure any moisture entering a joint is not trapped but can adequately drain away from the joint.
- Allow for thermal expansion/contraction in the joint design.

**PRODUCT PERFORMANCE**

With appropriate design, specification, detailing, installation and maintenance Hyne ETP may be expected to remain fit-for-purpose for the minimum design life of the component (product). Extensive durability design assistance for timber products is provided in FWPA published guideline documents *Timber service life design guide* and *Guide to the specification, installation and use of preservative treated engineered wood products*.



**DURABILITY DESIGN SOLUTIONS**

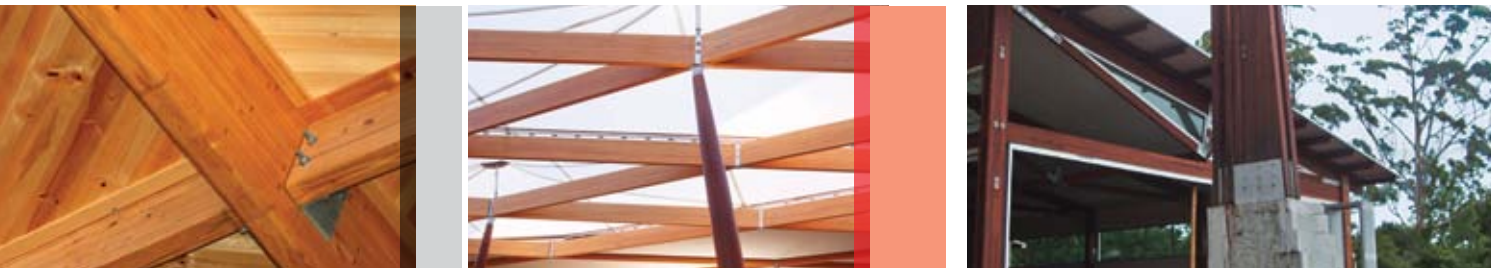
Requirements for achievement of the expected design life of Hyne ETP in a specific member or component application are given for a range of common scenarios in Table 3 for Zone D with minimum required preservative treatment, detailing at installation, and maintenance. With suitable consideration by the experienced designer, the requirements stated for detailing, painting and maintenance may be altered to provide an equivalent solution for the expected design life. The designer must determine the appropriate design life of the building and its components based on BCA requirements.

**Table 3: Typical durability design solutions for of Hyne ETP for exposure to hazard.**

Product	Member application	Hazard/Treatment level	Detailing protection	Maintenance regime <sup>8</sup>
Hyne LGL Hyne Beam 12 Hyne Beam 17 Hyne Beam 21 Hyne LVL Hyne e-beam+	Beam, bearer, rafter, lintel, etc	H1	Enclosed building envelope	Minimal
	Beam, bearer, rafter, lintel, etc	H2	Enclosed building envelope	Minimal
	Deck joist/ bearer with exposed face	H3	Top DPC, end flashing, free draining, well ventilated, paint or face flash	Regular repaint <sup>6</sup> , repair DPC <sup>8</sup> & flashing
	Deck joist/ bearer	H3	Top DPC, end flashing, free draining, well ventilated	Minimal
	Swimming pool enclosure purlins	H3	Top DPC, end flashing, free draining, well ventilated, paint or stain/seal.	Regular repaint <sup>6</sup> , repair DPC <sup>8</sup> & flashing
	Swimming pool enclosure beam/frame	H3	Profile/slope top surface, free draining, well ventilated, paint or stain/seal.	Regular repaint <sup>6</sup> , repair DPC <sup>8</sup> & flashing
	Pergola, exposed beam	H3	Profile/slope top surface, free draining, well ventilated, paint or stain/seal.	Regular repaint <sup>6</sup> and repair
Hyne I-Beam	Joist, rafter	H1	Enclosed building envelope	Minimal
	Joist, rafter	H2 <sup>4</sup>	Enclosed building envelope	Minimal
	Joist, rafter	H3 <sup>3</sup>	NOT SUITABLE	-
Hyne Beam 18	Beam, bearer, rafter, lintel, etc	H1	Enclosed building envelope	Minimal
	Beam, bearer, rafter, lintel, etc	H2, H3	NOT SUITABLE	-

**Notes:**

1. All paint to be good quality, light coloured and applied in accordance with manufacturer’s recommendations.
2. Any timber species susceptible to lyctid attack has been pretreated to H1 minimum.
3. Regardless of treatment level, Hyne I-Beam is not considered suitable for H3 hazard weather exposed applications- e.g external deck applications.
4. H2-F treatment is suitable for H2 applications south of the Tropic of Capricorn only.
5. Regular inspection of the structure and components is necessary at approximately yearly intervals as a minimum.
6. Repainting shall be carried out in accordance with the paint manufacturer’s recommendations. The scheduled time interval between paint reapplications may require adjustment in response to identified deterioration of the paint surface integrity.
7. The durability design solutions in this Table assume Above-ground decay hazard zone D (greatest potential hazard).
8. DPC means suitable Damp Proof Course



### DETAILING FOR WEATHER EXPOSED APPLICATIONS

Guidance on good practice design detailing for Hyne ETP to achieve the requirements of Table 3 is provided in Hyne Technical Data Sheet TDS 6: *Hyne ETP in weather exposed applications*. Hyne I-Beam and Hyne Beam 18 are not suitable for weather exposed applications.

### FINISHING

Finishing and surface coating of all Hyne ETP shall be carried out in accordance with Hyne Technical Data Sheet TDS 8: *Sealing, painting or varnishing Hyne ETP*.

### MAINTENANCE

Good maintenance is considered important to provide an extended design life for components. The designer/specifier should consider the likelihood that specified maintenance will be carried out. Maintenance intended to assist in Hyne ETP components achieving their designated design life shall be clearly specified at design stage. Relevant information about required maintenance shall be relayed to the builder and owner.

For all normal buildings and structures there is an underlying expectation that regular inspections are undertaken at 12 monthly intervals. Such inspections are the responsibility of the building owner. Inspections must involve evaluation of the condition of the structure and its components and instigate action on any necessary or prudent maintenance, repairs or component replacement. Where there may be any doubts raised by such inspections, the advice of an experienced building professional should be sought.

### STORAGE AND HANDLING

Storage and handling of all Hyne ETP shall be strictly in accordance Hyne Technical Data Sheet TDS 5 *Hyne ETP on-site handling and protection requirements*.

### FURTHER INFORMATION

Detailed product information including description, properties, size range, treatment options and branding/identification is available in current Hyne published literature and at [www.hyne.com.au](http://www.hyne.com.au).

For more detailed information about these Hyne Timber structural products, their design, applications, specification, use, storage & handling, installation and maintenance refer to the following list of references.

- Hyne Technical Data Sheet TDS 5: *Hyne ETP on-site handling and protection requirements*.
- Hyne Technical Data Sheet TDS 6: *Hyne ETP in weather exposed applications*.
- Hyne Technical Data Sheet TDS 8: *Sealing, painting or varnishing Hyne ETP*.
- ABCB. 2010. *Building Code of Australia – Volume 1 and 2. Australian Building Codes Board. Canberra.*

- ABCB. 2006. *Durability in Buildings. Guideline Document. Australian Building Codes Board. Canberra.*
- Bolden, S.A. and Greaves, H. (2008) *Guide to the specification, installation and use of preservative treated engineered wood products*. Market Knowledge & Development Project No. PR08.1062. Forest and Wood Products Australia Limited. Melbourne.
- MacKenzie, C.E., Wang, C-H, Leicester, R.H., Foliente, G.C., Nguyen, M.N. (2007) *Timber service life design guide*. Market Knowledge & Development Project No. PR07.1052. Forest and Wood Products Australia Limited. Melbourne.
- Standards Australia and Standards New Zealand, AS/NZS 1328.1 *Glued laminated structural timber – Part 1: Performance requirements and minimum production requirements*. SAI Global, Sydney.
- Standards Australia, AS 1604 Specification for preservative treatment. SAI Global, Sydney.
  - AS 1604.1 Part 1: *Sawn and round timber*
  - AS/NZS 1604.2 Part 2: *Reconstituted wood-based products*
  - AS/NZS 1604.4 Part 4: *Laminated veneer lumber (LVL)*
  - AS/NZS 1604.5 Part 5: *Glued laminated timber products*
- Standards Australia, AS 1684 Residential timber-framed construction. SAI Global, Sydney.
  - AS 1684.2 Part 2: *Non-cyclonic areas*.
  - AS 1684.3 Part 3: *Cyclonic areas*.
  - AS 1684.4 Part 4: *Simplified non-cyclonic areas*.
- Standards Australia, AS 1720.1 *Timber structures – Part 1: Design methods*. SAI Global, Sydney.
- Standards Australia, AS 3660.1 *Termite management Part 1: New building work*. SAI Global, Sydney.
- Standards Australia and Standards New Zealand, AS/NZS4357.0 *Structural laminated veneer lumber – Part 0: Specifications*. SAI Global, Sydney.

### Disclaimer

These Technical Data Sheets are based on current information and industry practices and have been produced in good faith for the general guidance of consumers and trades people. No warranty or assurance can be given that these requirements will suit every possible situation or particular circumstance. If in doubt Hyne recommends that users obtain independent expert advice.