# Brisbane City Council

# Reference Specifications for Engineering Work

# S220 Woodwork

## Amendment Register

|  |  |  |  |
| --- | --- | --- | --- |
| Ed/Rev Number | Section Number | Description | Date |
| 1.0 |  | Original Issue | Apr 2014 |
| 2.0 | General | External References Updated and Corrected | May 2016 |
| 1.3 | Reference list expanded to show all referenced documents |
| 3.0 | General | Document name changed from ‘Reference Specifications for Civil Engineering Work’ to ‘Reference Specifications for Engineering Work’ | Mar 2021 |
| 3.1 | Updates to references in *Identification* and *Recognised product certification programs* |

(Page Left Intentionally Blank)

## TABLE OF CONTENTS

1.0 GENERAL 1

1.1 Section Content 1

1.2 Standards 1

1.3 References 1

1.4 Interpretation 1

2.0 QUALITY 2

2.1 Inspection 2

2.2 Contractor’s Submissions 2

3.0 materials and components 3

3.1 Timber General 3

3.2 Structural Timber 4

3.3 Marine Structural Timber 4

3.4 Heavy Decking Timber 5

3.5 Glue Laminated Structural Timber 5

3.6 Fasteners 5

4.0 execution 5

4.1 Pole Structures 5

4.2 Outdoor Structures 6

4.3 Workmanship 6

4.4 Completion 6

(Page Left Intentionally Blank)

## GENERAL

### Section Content

Specified in this section: Timber supply and construction.

### Standards

|  |  |  |
| --- | --- | --- |
| Australian/New Zealand Standard | AS/NZS 1080.1 | Timber – Meth0ods of test – Moisture contentt |
| Australian/New Zealand Standard | AS/NZS 1328.1 | Glued laminated structural timber - Performance requirements and minimum production requirements |
| Australian/New Zealand Standard | AS/NZS 1328.2 | Glued laminated structural timber - Guidelines for AS/NZS 1328: Part 1 for the selection, production and installation of glued laminated structural timber |
| Australian Standard | AS 1604.1 | Specification for preservative treatment – Sawn and round timber |
| Australian/New Zealand Standard | AS/NZS 1604.2 | Specification for preservative treatment – Reconstituted wood-based products |
| Australian/New Zealand Standard | AS/NZS 1604.3 | Specification for preservative treatment – Plywood |
| Australian/New Zealand Standard | AS/NZS 1604.4 | Specification for preservative treatment - Laminated veneer lumber (LVL) |
| Australian Standard | AS 1720.1 | Timber structures – Design methods |
| Australian/New Zealand Standard | AS/NZS 1748 | Timber – Solid – Stress-graded for structural purposes – General requirements |
| Australian/New Zealand Standard | AS/NZS 1748.2 | Timber – Solid – Stress-graded for structural purposes – Qualification of grading method |
| Australian Standard | AS 2082 | Timber – Hardwood – Visually stress-graded for structural purposes |
| Australian Standard | AS 2209 | Timber – Poles for overhead lines |
| Australian/New Zealand Standard | AS/NZS 2269 | Plywood – Structural |
| Australian/New Zealand Standard | AS/NZS 2272 | Plywood – Marine |
| Australian Standard | AS 2543 | Nomenclature of Australian timbers |
| Australian Standard | AS 2858 | Timber – Softwood – Visually stress-graded for structural purposes |
| Australian Standard | AS 3519 | Timber – Machine proof grading |

### References

Refer to the following other Reference Specifications for Engineering Work:

|  |  |
| --- | --- |
| S110 | General Requirements |
| S200 | Concrete Work |

### Interpretation

Definitions

Pole: A full length preservative treated round timber pole used as a column and extending to roof level or used as a pier or post extending to the underside of the floor frame.

Pole strut: A pole used as a horizontal or diagonal bracing member.

Pole footing: An in situ concrete pier formed in a bored pier hole as a footing for a pole, including the concrete encasing of embedded poles.

## QUALITY

### Inspection

Witness points

*Refer annexure*. Give sufficient notice so that inspection may be made at the following stages:

* Prefabricated items before priming or water repellent treatment.
* Structural woodwork after erection but before it is covered.
* Bolts after final tightening.

### Contractor’s Submissions

Materials

Rainforest species: Submit source certification.

Identification

Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification.

Inspection: Submit the authority’s certificate verifying that the timber complies with the specification.

Moisture content: Submit evidence of moisture content.

Pressure preservative treatment: For timber requiring pressure treatment, submit a certificate or other satisfactory evidence showing that the timber has been treated.

Subcontractors

Timber portal frames: Submit name and contact details of proposed prefabricator.

Shop drawings

General requirement: For items designed by the Contractor, submit shop drawings certified by a structural engineer to *AS 1720.1* for the span, spacing, and loading. Show the following information.

* Arrangement of members.
* Location of the members in the building.
* Loading parameters and bracing lengths assumed in the design.
* Species, stress grade, strength group and joint group of timber.
* Size of each member.
* Tolerances on member sizes.
* Joint details including connector plates.
* Lifting points.
* Method of fixing and bracing.
* Preservative treatment, if any.
* Long term deflection.
* Moisture content at time of manufacture.
* Method of fabrication.

Timber portal frame: Show the following additional information.

* Size and specification of gussets.
* Gusset fastenings (nail size and arrangement).
* Base plate details.
* Fixings for purlins, girts and bracing.
* Method of handling and erection, including temporary bracing required, if any.

Glue laminated timber: Show the following additional information

* Design stresses.
* Appearance grade.
* Service class.
* Strength grade.
* Precamber.

## MATERIALS AND COMPONENTS

### Timber General

General

Rainforest species: Do not use rainforest timber species unless plantation grown.

Lyctus susceptible timbers: Do not use timbers containing Lyctus susceptible sapwood.

**Identification**

Method: Identify timber using branding, certification or both.

Branding structural timber: Brand under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges that will be concealed in the works. Include data such as stress grade, method of grading, "seasoned" or "s", certification mark of the product certification program, and the applicable standard.

Branding plywood: Brand to identify the plywood type and the appropriate Australian Standard, face and back veneer grades, glue bond, stress grade, manufacturer, and the mark of a recognised *Engineered Wood Products Association of Australasia* *EWPAA-JAS-ANZ Product Certification Scheme*.

Inspection: If neither branding nor certification is adopted, inspect the timber by an independent inspecting authority.

Recognised product certification programs

Pine framing: *National Construction Code – Building Code of Australia (BCA) Quality Control Scheme*.

Glued laminated timber: *Glued Laminated Timber Association of Australia (GLTAA) Product Certification System*.

Laminated veneer lumber: *Engineered Wood Products Association of Australasia (EWPAA),* *Quality Control and Product Certification Scheme*.

Finger jointed structural timber: *National Construction Code – Building Code of Australia (BCA) Quality Control Scheme*.

Durability

General: Use timbers having natural durability appropriate to the conditions of use, or preservative treated timber of equivalent durability.

Natural durability rating: To *AS/NZS 1604*.

Class 1 rating: Timbers in contact with ground.

Class 2 rating: Timbers above ground, not in continuous contact with moisture, well ventilated, protected from moisture but exposed to the weather.

Class 3 rating: Timbers above ground, not in continuous contact with moisture, well ventilated, protected with a finish, and well maintained.

Class 4 rating: Timbers fully protected from moisture, indoor, above ground, and well ventilated.

Preservative treatment

General: Use preservative-treated timber appropriate to the conditions of use in accordance with *AS/NZS 1604*.

Hazard classification: To *AS/NZS 1604*.

Moisture content

Tolerance: Make milled and dressed products from timbers seasoned to 10 - 15% moisture content, and within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use, and with no more than 3% difference between any 2 pieces in any one group.

Testing: To *AS/NZS 1080.1*.

Protection: Protect timber and timber products stored on site from moisture and weather. For milled, prefinished, prefabricated and similar elements that are protected in the final structure, provide temporary weather protection until the permanent covering is in place.

Finished sizes

General: Provide milled timbers with actual dimensions which are at least the stated dimensions, except for dimensions qualified by a term such as "nominal" or "out of" to which industry standards for finished sizes apply.

Surface class (minimum)

Visible sawn timbers (seasoned): No. 4 sawn surface (fine).

Visible sawn timbers (unseasoned): No. 3 sawn surface (medium).

Visible dressed timbers: No. 4 dressed surface (fine).

Joinery and dressed timbers (including veneers visible internally) – gloss paint finish: No. 2 abraded surface (smooth).

Joinery and dressed timbers (including veneers visible internally) – polished, clear and tinted finishes: No. 3 abraded surface (very smooth).

### Structural Timber

General: Provide specific details on the drawings or in the annexure*. Refer annexure*.

Visual grading: To *AS 2082* for hardwood and *AS 2858* for softwood.

Mechanical stress grading: To *AS/NZS 1748*.

Machine proof-grading: To *AS 3519*.

Grade selection: Appearance grade if exposed to view in the finished work. Otherwise stud grade or lintel grade, as appropriate. *Refer annexure*.

Natural durability classification to *AS/NZS 1604* (minimum): Durability Class 2, or preservative treated timber of equivalent durability.

### Marine Structural Timber

General: Provide specific details on the drawings or in the annexure*. Refer annexure*.

Sawn hardwood: Species of durability minimum Class 2 and Strength Group S3.

Sawn softwood: Radiata pine, slash pine, hoop pine or Caribbean pine. Preservative treatment to H6 level.

Grading: Structural Grade No. 2 to *AS 2082* or *AS 2858*, as appropriate. The following variations to the grading standard apply.

* No loose gum and resin veins, unsound knots, shakes, or splits.
* Sapwood only if preservative treated.
* No gum or resin pockets on the upper surfaces of decking, kerbs or other horizontal members fully exposed to the weather.
* Hardwood may have sound heart in the central one third cross-section of members with a least dimension greater than 175 mm.
* Heartwood in softwoods limited to 20% of the cross-section and 50% of the surface width.

### Heavy Decking Timber

General: Provide specific details on the drawings or in the annexure*. Refer annexure*.

Variations to grading standard: No loose or unsound knots, knot holes, loose gum veins, gum pockets, shakes or termite galleries in the upper surface of decking timbers.

Durability class (minimum): Durability Class 2, or preservative treated timber of equivalent durability.

Seasoned timber: Decking up to 30 mm thick.

Unseasoned timber: Decking over 30 mm thick.

### Glue Laminated Structural Timber

General: Provide specific details on the drawings or in the annexure*. Refer annexure*.

Standard: To *AS/NZS 1328*.

End joints: Scarf or finger joints generally.

Butt joints: Permitted in timbers where the stress grade can be reduced.

Orientation: Install cambered members with the camber up.

Protection from weather: Provide temporary protection for timber members until permanent covering is in place.

### Fasteners

Bolts: Provide thread length at least four times the bolt diameter. Drill bolt holes 2 mm larger than the bolt diameter.

## EXECUTION

### Pole Structures

Standard: To *AS 2209.*

Barrel checks and end splits for pole as delivered to site: Not exceeding rating 1 for softwood and rating 2 for hardwood, and width not exceeding 3 mm.

Pole taper: Maximum 1 in 120.

Mechanical damage: Indentations up to 12 mm deep may be dressed out before or after preservative treatment provided that such dressing does not adversely affect the treatment.

Docking: Notwithstanding the specified end split restrictions, allow for docking a minimum of 200 mm from the tops of poles before fabricating pole tops to detail.

Protection: Protect pole tops exposed to weather with metal caps or bands.

Site preservative treatment: Before erection or concealment, apply a saturated coating of preservative to untreated wood exposed by docking, checking or dressing.

Erecting poles: Erect poles plumb and true within the limits of deviation from verticality set by the allowed sweep in the poles.

Setting out: Centre the poles on the framing grids at ground level and roof level. Align the allowable sweep parallel to the roof beams. Compensate for sweep at floor beam level by appropriate offsets from the framing grid. Tolerance to be within ±10 mm from grid location at ground level.

Temporary bracing: Provide temporary bracing to maintain poles in correct position until structural framing is complete.

Pole footings: Ensure holes are dry and clear of loose material before placing concrete footings.

Curing: Allow 10 days after placing concrete encasing before loading or carrying out fabrication work.

Beam connection: Form flat bearing surfaces by checking or notching into the pole to a depth just sufficient to achieve the required width of bearing.

### Outdoor Structures

Sealing: Seal the ends of members with wax emulsion or petroleum jelly immediately after sawing.

Anti splitting plates: Plate the ends of members 250 mm x 75 mm or larger with pressed or hammer-on galvanised nail plates equal to 50% of the cross-sectional area.

Bolt holes: Treat bolt holes with creosote or copper naphthenate emulsion before inserting the bolt.

Coating: After completion of fabrication, notching and machining; coat joints, holes and notches with a 6 mm layer of copper naphthenate emulsion.

Heart: Place the heart side of bracing members on the inside of joints. Place the heart side of other members on the downside wherever possible.

Bolt protection: Coat bolts with a bituminous coating before insertion in the bolt hole.

Recessed fixing: For fixings punched or sunk below the surface, fill the recess with a suitable wood filler or mastic.

### Workmanship

Joints: Use timber in single lengths whenever possible. If joints are necessary, make them over the supports unless otherwise shown on the drawings.

Fixings: Where fixings are likely to cause splitting, adopt the following practices.

* Predrilling to 80% of the diameter of the fixing for nail and screw fixings.
* Stagger adjacent nails and screws.
* Install adjacent nails and screws at slightly opposing angles.

Timber movement: Make necessary allowance for shrinkage or swelling of timber.

Unseasoned timber: If unseasoned timber is used, or if variations in moisture are likely, allow for shrinkage, swelling and differential movement.

Treated timber: Coat metal fixings in contact with CCA treated timber with a heavy bodied grease or bituminous coating.

Painting edges: Chamfer edges of work to receive paint or similar coatings.

Priming: For woodwork to be painted, prime hidden surfaces before assembly.

### Completion

Tightening: Tighten bolts, screws and other fixings so that joints and anchorages are secure at practical completion.