

SUPPLEMENTAL SPECIFICATION 522 - LUMBER AND TIMBER

SECTION 522 - LUMBER AND TIMBER, delete the present section and insert the following:

SECTION 522 - LUMBER AND TIMBER

522.01, DESCRIPTION. This work shall consist of detailing, furnishing, fabricating, transporting, framing, and placing or erecting lumber, structural timber, or structural glued laminated timber; installing hardware; and applying preservative treatment.

522.02, MATERIALS. Materials shall meet the requirements of the following Subsections:

Joint Sealer, Hot Poured	707.04 (a)
Coatings for Wood	708.05
Structural Lumber and Timber	709.01
Miscellaneous Hardware	709.01 (h)
Nonstructural Lumber	709.02
Structural Glued Laminated Timber	709.03
Timber Preservative	726.01
Copper Naphthenate Solution	726.04
Waterproofing Pitch	726.05

Material furnished under this Section shall conform to the requirements of AASHTO M 168.

Unless otherwise specified, all metal parts and hardware shall be galvanized in accordance with AASHTO M 111M/M 111 or AASHTO M 232M/M 232.

522.03, GENERAL FABRICATION REQUIREMENTS. Glued laminated timber furnished under this Section shall be fabricated by an AITC licensed laminator and shall comply with ANSI/AITC A190.1. In addition to being a licensed laminator, the fabricator must demonstrate the capability to fabricate the end products specified.

Unless otherwise specified, all material shall be fabricated prior to preservative treatment.

Dimensions and bolt hole locations of prefabricated material shall be within a tolerance of 2 mm (1/16 inch) of the details specified.

522.04, DRAWINGS. Unless otherwise specified, as soon as practical after award of the Contract, the Contractor shall prepare fabrication or construction drawings necessary for performance of the work in accordance with Subsection 105.03 and applicable requirements of Subsection 506.04 (a).

522.05, STORAGE. Timber, lumber, and glued laminated materials stored on the site shall be kept in orderly piles, open stacked, and on supports that provide at least 300 mm (12 inches) of ground clearance. For outside storage, the ground area in the vicinity of the material shall be cleared of grass, weeds, and rubbish. Free circulation of air shall be provided between the tiers, courses, and the ground.

Timber, lumber and glued laminated timber (treated or untreated) shall be stored under cover. The covering shall adequately protect it from direct and blowing rain or snow and yet provide full circulation of air.

Fabricated material shall be stored in a manner that will prevent dimensional changes in the members prior to assembly.

522.06 QUALITY OF WORK. Quality of work shall be first-class throughout. All framing shall be true and exact. Nails and spikes shall be driven with the heads set flush with the surface of the wood. Wood surfaces shall be free from deep or frequent hammer marks.

522.07 HANDLING. Material shall be carefully handled to avoid damaging the edges or surface and to keep it clean.

Materials shall be picked up or moved with slings or other devices that will not damage or mar the surface. Peavies, cant hooks, timber dogs, or other pointed tools will not be permitted.

522.08 FRAMING. Timber, lumber and glued laminated timber shall be accurately cut and framed to a close fit in such a manner that the joints will have full and even bearing over the entire contact surface. Mortises shall be true to size for their full depth, and tenons shall fit snugly. Except as indicated by Contract Documents, shimming will not be permitted in making joints, and open joints will not be accepted.

When permitted by the Engineer, forms or temporary braces may be attached to treated material. Upon removal, any holes, cuts or abrasions shall be treated in accordance with Subsection 522.14.

522.09 CONNECTIONS.

- (a) Holes for Bolts, Dowels, Rods, and Lag Screws. Holes for metal round drift-bolts or dowels shall be bored with a bit 2 mm (1/16 inch) less in diameter than the drift-bolt or dowel to be used. The diameter of holes for metal square drift-bolts or dowels shall be equal to the least dimension of the drift-bolt or dowel.

Except as required for timber connectors (see below) holes for machine bolts shall be bored with a bit the same diameter as the bolt.

Holes for round wood dowels shall be bored with a bit the same diameter as the dowel.

Holes for rods shall be bored with a bit 2 mm (1/16 inch) greater in diameter than the rod.

Lead holes for lag screws, wood screws and spikes shall conform to requirements specified within the latest edition of the AITC Timber Construction Manual.

- (b) Countersinking. Countersinking shall be done wherever smooth faces are required. All recesses in treated lumber and timber formed for countersinking shall be painted with copper naphthenate solution. Recesses likely to collect injurious materials shall be filled with a hot-poured joint sealer or other material, as directed by the Engineer.
- (c) Bolts and Washers. A washer of the size and type specified shall be used under all bolt heads and nuts, which would otherwise come in contact with wood.

All nuts shall be effectively locked after they have been finally tightened.

- (d) Timber Connectors. In addition to wood dowels, bolts and rods, timber (wood member) connectors may be the split ring, shear plate, or spike grid type. The split ring and shear plate types shall be installed in precut grooves of dimensions as recommended by the manufacturer. The spike grid type shall be forced into the contact surfaces of the wood members joined by means of pressure equipment. All connectors of this type at any given joint shall be embedded simultaneously and uniformly.

Bolt holes shall be perpendicular to the face of the material and 2 mm (1/16 inch) larger in diameter than the bolt.

- (e) Framed Bents. Framed bents shall be constructed in accordance with Division II, Section 16 of the AASHTO Standard Specifications for Highway Bridges and interim specifications in effect on the date of the Contract.

522.10, TRUSSES. Trusses, when completed, shall show no irregularities of line. Chords shall be straight and true from end to end in horizontal projection and, in vertical projection, shall show a smooth curve through panel points conforming to the correct camber. All bearing surfaces shall fit accurately. Uneven or rough cuts at the points of bearing shall be cause for rejection of the piece containing the defect.

522.11, TRUSS HOUSING. The carpentry on truss housings shall be equal in all respects to the best house carpentry. The finished appearance of the housing is considered of primary importance and special care shall be taken to secure a high quality of work and finish on this portion of the structure.

Unless otherwise directed by the Engineer, housing and railings shall be built after the removal of the falsework and the adjustment of the trusses to correct alignment and camber.

522.12, DECKING.

- (a) Plank Flooring. Plank material shall be of dimension lumber of the grade specified.

Unless otherwise specified, all material shall be surfaced four sides (S4S).

Single layer plank floors shall consist of a single thickness of dimension lumber planks supported by stringers or floor beams. The planks shall be laid heart side down, with 6 mm (1/4 inch) openings between them. Each plank shall be securely spiked to each supporting member. The planks shall be carefully graded as to thickness and so laid that no two adjacent planks shall vary in thickness by more than 2 mm (1/16 inch). Unless otherwise specified, the lengths of transverse planks on stringers shall be full width of the designed cross-section.

Two-ply plank floors shall consist of two layers of dimension lumber planks supported on stringers or floor beams. Each plank of the top course shall be securely fastened to the lower course. At the ends of the bridge, if required, the decking shall be beveled to match the approach surfaces. For stringer supports, the top course of planks may be laid either diagonal or parallel to the centerline of roadway. Joints in the top layer shall be staggered at least 1 m (3 feet) and care shall be taken to securely fasten the ends of each plank. For floor beam supports, unless otherwise specified, the lengths of transverse top course planks shall be full width of the designed cross-section.

- (b) Nail Laminated Decking. Nail laminate deck material shall be furnished and installed in accordance with the Contract or as ordered by the Engineer. Deck material shall be of the grade specified. Unless otherwise specified, in transverse applications the lengths of planks shall be full width of the designed cross-section. Each plank shall be spiked to the preceding plank at each end and at intervals of approximately 450 mm (18 inches) with the spikes driven alternately near the top and bottom edges. The spikes shall be of sufficient length to pass through two planks and at least halfway through a third plank.

When timber nailing strips are used, every other plank shall be toe-nailed to every other nailing strip. The size of the spikes shall be as shown on the Plans or as directed by the Engineer.

When shown on the Plans or authorized by the Engineer, the laminated decking may be attached to steel supports by the use of approved galvanized metal clips. Care shall be taken to have each strip vertical and tight against the preceding one and bearing evenly on all supports.

- (c) Glued Laminated Decking. Glued laminated decking material shall be furnished and installed in accordance with the Contract, approved shop drawings, or as directed by the Engineer.

522.13, SAWN LUMBER STRINGERS. Stringers shall be sized at bearings and shall be placed in position so that knots near edges will be in the compression portions of the stringers.

Outside stringers may have butt joints with the ends cut on a taper, but interior stringers shall be lapped to take bearing over the full width of the floor beam or cap at each end. The lapped ends of untreated stringers shall be separated at least 15 mm (1/2 inch) for the circulation of air and shall be securely fastened by drift-bolting where specified. When stringers are two panels in length, the joints shall be staggered.

Cross-bridging between stringers shall be neatly and accurately framed and securely toe-nailed with at least two nails in each end. All cross-bridging members shall have full bearing at each end against the sides of stringers. Unless otherwise specified, cross-bridging shall be placed at the center of each span.

522.14, PRESERVATIVE TREATMENT.

- (a) Pressure Treatment. Timber, lumber and glued laminated timber shall be pressure treated with the type of preservative specified in the Contract. When a specific type or options are not specified, Type II preservative shall be used. Prior to handling or erecting pressure treated timber, lumber or glued laminated timber the Contractor shall read and provide a copy of any Material Safety Data Sheets (or Consumer Information Sheets required for the material) to the Resident Engineer. The Contractor shall also provide the Resident Engineer with a plan detailing clean-up, storage and disposal procedures for pressure treated sawdust and cutoffs.
- (1) Treatment of Cuts, Abrasions and Holes. Cuts, abrasions, and holes bored after treatment shall be treated with two coats of copper naphthenate solution. Cuts and abrasions shall be carefully trimmed prior to treatment. Holes left unfilled shall be filled with wooden plugs treated with copper naphthenate solution.
- (2) Temporary Attachments. Holes remaining after the removal of nails and spikes used to attach temporary forms or bracing to treated material shall be filled by driving galvanized nails or spikes flush with the surface or plugging the holes with wooden plugs treated with copper naphthenate solution.
- (b) Untreated Timber, Lumber and Glued Laminated Timber. For untreated timber, lumber and glued laminated timber: cuts, notches, bore holes, contact surfaces and other areas specified by the Contract shall be treated with two coats of copper naphthenate solution.
- (c) Field Treatment. When field applications of preservative are specified, the materials shall be furnished, prepared and applied in accordance with AWPAs Standard M4.

522.15, PAINTING. The surface of any material to be painted or stained shall be dry and free of dirt, dust, oil, or other foreign materials. Unless otherwise specified, all surfaces shall be coated with a prime coat and one finish coat.

Paint or stain shall be applied in accordance with Section 513.

522.16, METHOD OF MEASUREMENT. The quantity of Structural Lumber and Timber and of Nonstructural Lumber to be measured for payment will be the number of cubic meters (thousand feet board measure - MFBM) incorporated into the complete and accepted work, as computed from the nominal cross-section sizes and the actual in-place lengths of members. Final accepted in-place length of any member will be determined as the maximum length of a member as projected along one edge-line, measured to the next 0.25 m (1 foot) increment. Further measurement shall not be made for cutoffs or actual stock lengths.

If round timbers and English units are specified, the number of board feet will be computed by the Vermont Log Rule: Board Feet = $(D \times R \times L) / 12$; where D = diameter in inches, measured under the bark at the small end; R = D/2; and L = length in feet.

The quantity of Structural Glued Laminated Timber to be measured for payment will be on a lump sum basis for each structure or each structural unit in the complete and accepted work.

522.17, BASIS OF PAYMENT. The accepted quantities of Structural Lumber and Timber and of Nonstructural Lumber will be paid for at the Contract unit prices per cubic meter (thousand feet board measure - MFBM). Payment for each quantity will be full compensation for detailing, furnishing, transporting, handling, placing or erecting, and painting or treating the material specified, including all hardware; for providing all falsework, forms, bracing, sheeting, or other timber used for erection purposes; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Structural Glued Laminated Timber will be paid for at the Contract lump sum price. Partial payments will be made as follows:

- (a) The first payment of 50% of the lump sum price will be made upon the original delivery of the timbers to the project, provided the materials are acceptable and certified.
- (b) The remaining 50% will be paid when the installation is complete and the work accepted.

Payments for the quantity of Structural Glued Laminated Timber will be full compensation for detailing, furnishing, transporting, handling, placing or erecting, and painting or treating the material specified, including all hardware; for providing all falsework, forms, bracing, sheeting, or other timber used for erection purposes; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
522.20 Structural Lumber and Timber - Untreated	Cubic Meter (MFBM)
522.25 Structural Lumber and Timber - Treated	Cubic Meter (MFBM)
522.30 Nonstructural Lumber - Untreated	Cubic Meter (MFBM)
522.35 Nonstructural Lumber - Treated	Cubic Meter (MFBM)
522.40 Structural Glued Laminated Timber	Lump Sum