

SECTION 06 18 00 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
  - 1. Structural glued-laminated timber wales.

1.3 COORDINATION

- A. Coordinate openings, profiles and anchorage with work in other Sections.
- B. Coordinate application of shop and field applied finishes and coatings with manufacturer requirements.

1.4 DEFINITIONS

- A. Structural Glued-Laminated Timber: An engineered, stress-rated product of a timber laminating plant, composed of assemblies of specially selected and prepared wood laminations in which the grain of all laminations is approximately parallel longitudinally and the laminations are bonded with adhesives.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Coatings and finishes, including application instructions.
  - 2. Adhesives.
  - 3. Lumber.
  - 4. Fabrication.
  - 5. Protection.
- B. Shop Drawings: Submit prior to fabrication.
  - 1. General Requirements:
    - a. The mass timber detailer shall generate all Shop Drawing fabrication and installation details from the Contract Documents and the Specifications.
    - b. The use of reproductions or photocopies of the Drawings is not permitted.

- c. Shop Drawings shall contain sufficient detail and information for complete fabrication and erection without reference to the Drawings either in fabrication or in erection on-site.
  - d. Where CAD, REVIT, or other digital files are provided, it is the responsibility of the detailer to remove all information not directly relevant to the creation of Shop Drawings including the removal all references to files sources.
  - e. Resubmittals: Clearly identify all revisions to previous submittals.
    - 1) Draw clouded outlines (revision clouds) around revised items or areas of individual sheets.
    - 2) Information outside of revision clouds will not be reviewed.
2. Show layout of structural glued-laminated timber system and fully dimensioned piece mark drawing of each member. Indicate location of each member by same designation mark placed on member. Place mark on surfaces that will not be exposed in the completed Work. For each member include:
- a. Species, stress grade, combination symbol, appearance grade, corner treatments, camber, and all dimensions.
3. Include large-scale details of connections. For custom designed steel connectors include:
- a. Dimensions for all steel components, material and bolt ASTM designations and grades, assembly finish, and indicate welds by standard AWS symbols showing size, length, and weld type.
4. Include relationship of members to affecting or affected adjacent construction.
- C. Quality Assurance Submittals:
- 1. Manufacturer's qualifications. Provide factory-glued structural units produced by an ANSI- or APA-licensed firm.
- D. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements of current version of ANSI A190.1.
- E. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.
- F. Statement of Responsibility for Weather Protection: Submit document assuming responsibility for timber during shipping and erection, including:
- 1. Protection of timber from excessive moisture and sun staining.
  - 2. Replacing or repairing any damaged components.
  - 3. Cleaning of stained surfaces exposed to view.

4. Strategies for limiting surface checking.

## 1.6 QUALITY ASSURANCE

### A. Manufacturer Qualifications:

1. Manufacturer shall be an AITC or APA-EWS-licensed firm.
2. Glulam timber shall comply with latest edition of ANSI A190.1.

### B. Installer Qualifications: The installer shall have at least two years' experience in similar type and size of project.

### C. Inspections & Testing Agency: Owner will engage a qualified independent testing and inspection agency to perform special inspections as indicated in the Drawings.

## 1.7 DELIVERY, STORAGE, AND HANDLING

### A. General: Comply with provisions in AITC 111.

### B. Members shall be marked on a non-visible face in accordance with ANSI A190.1.

### C. Individually wrap members using plastic-coated paper covering with water-resistant seams.

## PART 2 - PRODUCTS

### 2.1 STRUCTURAL GLUED-LAMINATED TIMBER

#### A. General: Provide structural glued-laminated timber that complies with:

1. North American sourced glulam timber: ANSI A190.1 and ANSI 117

#### B. Species and Grades for Structural Glued-Laminated Timber:

1. Glulam timber: Douglas Fir-Larch in grades and lay-up that comply with the structural properties and beam stress classification indicated in the Structural Drawings.

#### C. Appearance Grade:

1. Appearance grade shall be as indicated on structural drawings and defined by ANSI A190.1.
2. All visible glue-laminated construction in Project shall have matching appearance in fabrication quality.

#### D. Adhesives: Provide adhesive products in compliance with ANSI A190.1 and ANSI 405 for wet-use.

1. Color: Clear or Brown.

2. Use adhesive that contains no urea-formaldehyde resins.
- E. Members 10  $\frac{3}{4}$  wide and less shall be assembled with single piece lamination. Members wider than 10  $\frac{3}{4}$ " may be block-glued or assembled with a split-lamination layup pattern. Split-lamination layups shall be edge bonded meeting the requirements of ANSI A190.1
- F. Cross sectional dimensions for supplied members shall be as shown on drawings. No further reduction in size for planing or finishing is permitted.
- G. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- H. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
- I. Preservative Treatment after Fabrication: Pressure treat after fabrication according to AWPA U1.
  1. Use ammoniacal copper zinc arsenate (ACZA) to a retention of 0.6 pounds per cubic foot.
  2. Comply with the current Best Management Practices (BMPs) for the use of treated woods in aquatic environments, published by the Western Wood Preservers Institute (WWPI).
  3. Cut to length and drill holes prior to preservative treatment to the extent possible.

## 2.2 TIMBER CONNECTORS

- A. Custom steel connections:
  1. Materials: Unless otherwise indicated, fabricate from the following materials:
    - a. Structural-steel shapes, plates, and flat bars as indicated on Structural Drawings.
    - b. Round steel bars complying with ASTM A575, Grade M 1020.
    - c. Hot rolled steel sheet complying with ASTM A1011, Structural Steel, Type SS, Grade 33
- B. Bolts, complying with ASTM A307, Grade A; nuts complying with ASTM A563; and, where indicated, flat washers. All bolts shall be full diameter with cut threads.
- C. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123 or ASTM A153.

## 2.3 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes. Exposed glue-laminated construction shall be CNC cut.
  1. Dress exposed surfaces as needed to remove planing and surfacing marks.

2. Fabricate glue laminated structural members in accordance with finish grade requirements listed above.
  3. Welding: Perform welding in accordance with AWS D1.1.
  4. Cut and fit members accurately to length to achieve tight joint fit.
  5. Do not splice or join members in locations other than those indicated without permission.
  6. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
- B. Camber: None.
- C. Tolerances shall conform to latest edition of ANSI A190.1.
- D. End-Cut Sealing: Immediately after end cutting each member to final length, and after preservative treatment, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- E. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application or that may stain or damage surfaces to be exposed.

#### 3.3 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place. The erector shall have the sole responsibility for determining the means and methods used to properly and adequately brace the frame during erection.
  1. Lift with padded slings and protect corners with wood blocking.
  2. Install timber connectors as indicated.
  3. Install structural glued-laminated timber to comply with Shop Drawings.

- B. Cutting: Avoid cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication. Confirm field-cutting where required with Structural Engineer of Record prior to any modifications. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
  - a. Use copper naphthenate treatment.

#### 3.4 ERECTION TOLERANCES

- A. Connections used may require tighter tolerances as specified below. Supplier and installer responsible to coordinate during shop drawing process.
- B. Wales:
  - 1. Elevation: +/- 1/4 inch from theoretical
  - 2. Position: +/- 1/8 inch from theoretical

#### 3.5 ADJUSTING AND CLEANING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Engineer.

#### 3.6 PROTECTION

- A. The erector shall protect the glued-laminated timber from damage, water exposure, sun staining, and other environmental damaging effects during construction.
  - 1. Do not remove wrappings on individually wrapped members until they no longer serve a useful protection purpose.
  - 2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION