

SECTION 06 18 00 - GLUED-LAMINATED CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- (A) GLUE LAMINATED WOOD BEAMS AND PURLINS.
- (B) PRESERVATIVE TREATMENT OF WOOD.
- (C) FIRE RETARDANT TREATMENT OF WOOD.
- (D) STEEL HARDWARE AND ATTACHMENT BRACKETS.

1.2 RELATED REQUIREMENTS

- (A) SECTION 09 91 00 - PAINTING - FIELD FINISHING

1.3 PRICE AND PAYMENT PROCEDURES

- (A) SEE SECTION 01 00 00 - GENERAL REQUIREMENTS, FOR ADDITIONAL UNIT PRICE REQUIREMENTS.
- (B) GLUE LAMINATED STRUCTURAL COLUMN MEMBERS: BY THE UNIT. INCLUDES UNIT MEMBER SHOP FINISHED, CONNECTORS AND BRACKETS, PLACED AND ANCHORED.
- (C) CONNECTIONS: BY THE POUND. INCLUDES FABRICATION, FINISHING, AND INSTALLATION.

1.4 REFERENCE STANDARDS

- (A) AITC 117 - STANDARD SPECIFICATIONS FOR STRUCTURAL GLUED LAMINATED TIMBER OF SOFTWOOD SPECIES; 2010.
- (B) AITC A190.1 - AMERICAN NATIONAL STANDARD FOR WOOD PRODUCTS - STRUCTURAL GLUED LAMINATED TIMBER; 2007.
- (C) ASTM A36/A36M - STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL; 2014.
- (D) ASTM A123/A123M - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS; 2017.
- (E) ASTM A153/A153M - STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE; 2016A.
- (F) ASTM A563 - STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS; 2015.
- (G) ASTM A563M - STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS (METRIC); 2007 (REAPPROVED 2013).
- (H) ASTM A666 - STANDARD SPECIFICATION FOR ANNEALED OR COLD-WORKED AUSTENITIC STAINLESS STEEL SHEET, STRIP, PLATE, AND FLAT BAR; 2015.

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- (I) ASTM D2559 - STANDARD SPECIFICATION FOR ADHESIVES FOR BONDED STRUCTURAL WOOD PRODUCTS FOR USE UNDER EXTERIOR EXPOSURE CONDITIONS; 2012A, WITH EDITORIAL REVISION (2016).
- (J) ASTM D2898 - STANDARD TEST METHODS FOR ACCELERATED WEATHERING OF FIRE-RETARDANT-TREATED WOOD FOR FIRE TESTING; 2010 (REAPPROVED 2017).
- (K) ASTM E84 - STANDARD TEST METHOD FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS; 2017.
- (L) ASTM F3125/F3125M - STANDARD SPECIFICATION FOR HIGH STRENGTH STRUCTURAL BOLTS, STEEL AND ALLOY STEEL, HEAT TREATED, 120 KSI (830 MPA) AND 150 KSI (1040 MPA) MINIMUM TENSILE STRENGTH, INCH AND METRIC DIMENSIONS; 2015A.
- (M) AWPA U1 - USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD; 2017.
- (N) AWS D1.1/D1.1M - STRUCTURAL WELDING CODE - STEEL; 2015 (WITH MARCH 2016 ERRATA).
- (O) FM (AG) - FM APPROVAL GUIDE; CURRENT EDITION.
- (P) ITS (DIR) - DIRECTORY OF LISTED PRODUCTS; CURRENT EDITION.
- (Q) RIS (GR) - STANDARD SPECIFICATIONS FOR GRADES OF CALIFORNIA REDWOOD LUMBER; 2000.
- (R) SPIB (GR) - GRADING RULES; 2014.
- (S) UL (DIR) - ONLINE CERTIFICATIONS DIRECTORY; CURRENT LISTINGS AT DATABASE.UL.COM.
- (T) UL (FRD) - FIRE RESISTANCE DIRECTORY; CURRENT EDITION.
- (U) WCLIB (GR) - STANDARD GRADING RULES FOR WEST COAST LUMBER NO. 17; 2004, AND SUPPLEMENTS.
- (V) WWPA G-5 - WESTERN LUMBER GRADING RULES; 2011.

1.5 SUBMITTALS

- (A) SEE SECTION 01 00 00 - GENERAL REQUIREMENTS, FOR SUBMITTAL PROCEDURES.
- (B) PRODUCT DATA: PROVIDE TECHNICAL DATA ON WOOD PRESERVATIVE MATERIALS, APPLICATION TECHNIQUE AND RESULTANT PERFORMANCE INFORMATION.
- (C) SHOP DRAWINGS: INDICATE FRAMING SYSTEM, SIZES AND SPACING OF MEMBERS, LOADS AND CAMBERS, BEARING AND ANCHOR DETAILS, BRIDGING AND BRACING FRAMED OPENINGS.
 - 1. SUBMIT DESIGN CALCULATIONS SIGNED AND SEALED BY DESIGN ENGINEER.
- (D) DESIGNER'S QUALIFICATION STATEMENT.
- (E) MANUFACTURER'S QUALIFICATION STATEMENT.
- (F) ERECTOR'S QUALIFICATION STATEMENT.

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1.6 QUALITY ASSURANCE

- (A) DESIGNER QUALIFICATIONS: DESIGN STRUCTURAL MEMBERS UNDER DIRECT SUPERVISION OF A PROFESSIONAL STRUCTURAL ENGINEER EXPERIENCED IN DESIGN OF THIS WORK AND LICENSED IN MONTANA.
- (B) MANUFACTURER/FABRICATOR QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURE OF GLUE LAMINATED STRUCTURAL UNITS WITH THREE YEARS OF DOCUMENTED EXPERIENCE, AND CERTIFIED BY AITC IN ACCORDANCE WITH AITC A190.1.
- (C) ERECTOR QUALIFICATIONS: COMPANY SPECIALIZING IN ERECTION OF PRODUCTS OF THE TYPE SPECIFIED WITH THREE YEARS DOCUMENTED EXPERIENCE, AND APPROVED BY MANUFACTURER.

1.7 DELIVERY, STORAGE, AND HANDLING

- (A) PROTECT MEMBERS TO AITC REQUIREMENTS FOR NOT WRAPPED.
- (B) LEAVE INDIVIDUAL WRAPPING IN PLACE UNTIL FINISHING OCCURS.
- (C) FIRE RETARDANT TREATED WOOD: PREVENT EXPOSURE TO PRECIPITATION DURING SHIPPING, STORAGE, OR INSTALLATION.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- (A) GLUED-LAMINATED STRUCTURAL UNITS:
 - 1. SENTINEL STRUCTURES, INC
 - 2. WESTERN WOOD STRUCTURES, INC
 - 3. SUBSTITUTIONS: OR APPROVED EQUAL
 - 4. SUBSTITUTIONS: SEE SECTION 01 00 00 - GENERAL REQUIREMENTS.

2.2 GLUED-LAMINATED UNITS

- (A) GLUED-LAMINATED UNITS: FABRICATE IN ACCORDANCE WITH AITC 117 INDUSTRIAL GRADE.
 - 1. VERIFY DIMENSIONS AND SITE CONDITIONS PRIOR TO FABRICATION.
 - 2. CUT AND FIT MEMBERS ACCURATELY TO LENGTH TO ACHIEVE TIGHT JOINT FIT.
 - 3. FABRICATE MEMBER WITH CAMBER BUILT IN.
 - 4. DO NOT SPLICE OR JOIN MEMBERS IN LOCATIONS OTHER THAN THOSE INDICATED WITHOUT PERMISSION.
 - 5. FABRICATE STEEL HARDWARE AND CONNECTIONS WITH JOINTS NEATLY FITTED, WELDED, AND GROUND SMOOTH.

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6. WELDING: PERFORM WELDING IN ACCORDANCE WITH AWS D1.1/D1.1M.
7. AFTER END TRIMMING, SEAL WITH PENETRATING SEALER IN ACCORDANCE WITH AITC REQUIREMENTS.

(B) PERFORMANCE CRITERIA:

1. COMPLY WITH APPLICABLE CODE FOR LOADS, SEISMIC ZONING, AND OTHER LOAD CRITERIA.
2. DESIGN ROOF LIVE AND DEAD LOAD: AS INDICATED ON DRAWINGS.

2.3 MATERIALS

- (A) LUMBER: SOFTWOOD LUMBER COMPLYING WITH RIS (GR) GRADING RULES WITH 12 PERCENT MAXIMUM MOISTURE CONTENT BEFORE FABRICATION. DESIGN FOR THE FOLLOWING VALUES:
1. BENDING (FB): 1,600 PSI
 2. COMPRESSION PARALLEL TO GRAIN (FC): 1,550 PSI
 3. MODULUS OF ELASTICITY (E): 1,400,000 PSI
 4. LUMBER FABRICATED FROM OLD GROWTH TIMBER IS NOT PERMITTED.
 5. PROVIDE SUSTAINABLY HARVESTED LUMBER, CERTIFIED OR LABELED AS SPECIFIED IN SECTION 01 60 00.
- (B) STEEL CONNECTIONS AND BRACKETS: ASTM A36/A36M WELDABLE QUALITY, GALVANIZE PER ASTM A123/A123M.
- (C) STEEL CONNECTIONS AND BRACKETS: ASTM A666, TYPE 304 STAINLESS STEEL.
- (D) ANCHOR BOLTS: ASTM F3125/F3125M, TYPE 1 HEAVY HEX HIGH STRENGTH BOLTS AND ASTM A563 (ASTM A563M) NUTS; HOT-DIP GALVANIZED TO MEET REQUIREMENTS OF ASTM A153/A153M, MATCHING WASHERS.
- (E) LAMINATING ADHESIVE: TESTED FOR WET/EXTERIOR SERVICE IN ACCORDANCE WITH ASTM D2559.
- (F) WOOD SEALER: MANUFACTURER'S STANDARD, FACTORY-APPLIED SEALER, TRANSPARENT WOOD SEALER.
- (G) BEARING PLATE ANCHORS: EXPANSION SHIELD AND LAG BOLT TYPE FOR ANCHORAGE TO SOLID MASONRY OR CONCRETE.
- (H) METAL PRIMER: MANUFACTURER'S STANDARD, FACTORY-APPLIED PRIMER.
- (I) SHELF, COUNTERTOP, AND WORKSTATION BRACKETS:
1. MATERIAL: STEEL.
 2. FINISH: MANUFACTURER'S STANDARD, FACTORY-APPLIED PRIMER.
 3. FINISH: MANUFACTURER'S STANDARD, FACTORY-APPLIED, TEXTURED POWDER COAT.

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4. FINISH: BRUSHED; WITH CLEAR, FACTORY-APPLIED COATING.
5. COLOR: SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD RANGE.
6. COLOR: BLACK.
7. PRODUCTS:
 - a. A&M HARDWARE, INC ; STANDARD BRACKETS:
HTTP://WWW.AANDMHARDWARE.COM/#SLE.
 - b. A&M HARDWARE, INC ; STAINLESS STEEL STANDARD BRACKETS:
HTTP://WWW.AANDMHARDWARE.COM/#SLE.
 - c. A&M HARDWARE, INC ; ALUMINUM STANDARD BRACKETS:
HTTP://WWW.AANDMHARDWARE.COM/#SLE.
 - d. SUBSTITUTIONS: OR APPROVED EQUAL
 - e. SUBSTITUTIONS: SEE SECTION 01 00 00 - GENERAL REQUIREMENTS.

2.4 WOOD TREATMENT

- (A) FACTORY-TREATED LUMBER: COMPLY WITH REQUIREMENTS OF AWPA U1 - USE CATEGORY SYSTEM FOR PRESSURE IMPREGNATED WOOD TREATMENTS DETERMINED BY USE CATEGORIES, EXPECTED SERVICE CONDITIONS, AND SPECIFIC APPLICATIONS.
- (B) PRESERVATIVE PRESSURE TREATMENT:
 1. FOR USE AT EXTERIOR APPLICATIONS.
 2. MANUFACTURERS:
 - a. LONZA GROUP: WWW.WOLMANIZEDWOOD.COM/#SLE.
 - b. OSMOSE UTILITIES SERVICES, INC: WWW.OSMOSE.COM/#SLE.
 - c. VIANCE, LLC: WWW.TREATEDWOOD.COM/#SLE.
 - d. SUBSTITUTIONS: OR APPROVED EQUAL
 - e. SUBSTITUTIONS: SEE SECTION 01 00 00 - GENERAL REQUIREMENTS.
 3. PRESERVATIVE PRESSURE TREATMENT OF GLUED-LAMINATED STRUCTURAL UNITS: AWPA U1, USE CATEGORY UC3B, COMMODITY SPECIFICATION F USING WATERBORNE PRESERVATIVE TO 0.25 LB/CU FT RETENTION.
 - a. KILN DRY LUMBER AFTER TREATMENT AND BEFORE LAMINATION TO MAXIMUM MOISTURE CONTENT OF 19 PERCENT.
 4. MARKING: MARKED EACH PIECE WITH STAMP OF AN ALSC-ACCREDITED TESTING AGENCY, CERTIFYING LEVEL AND TYPE OF TREATMENT IN ACCORDANCE WITH AWPA STANDARDS.

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(C) SHOP TREAT WOOD MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2.5 FABRICATION

- (A) FABRICATE GLUE LAMINATED STRUCTURAL MEMBERS IN ACCORDANCE WITH AITC INDUSTRIAL GRADE.
- (B) WELDING: PERFORM WELDING IN ACCORDANCE WITH AWS D1.1/D1.1M.
- (C) VERIFY DIMENSIONS AND SITE CONDITIONS PRIOR TO FABRICATION.
- (D) CUT AND FIT MEMBERS ACCURATELY TO LENGTH TO ACHIEVE TIGHT JOINT FIT.
- (E) FABRICATE MEMBER WITH CAMBER BUILT IN.
- (F) DO NOT SPLICE OR JOIN MEMBERS IN LOCATIONS OTHER THAN THOSE INDICATED WITHOUT PERMISSION.
- (G) FABRICATE STEEL HARDWARE AND CONNECTIONS WITH JOINTS NEATLY FITTED, WELDED, AND GROUND SMOOTH.
- (H) AFTER END TRIMMING, SEAL WITH PENETRATING SEALER IN ACCORDANCE WITH AITC REQUIREMENTS.
- (I) FIELD FINISHING OF MEMBERS: SPECIFIED IN SECTION 09 91 00.

PART 3 EXECUTION

3.1 EXAMINATION

- (A) VERIFY THAT SUPPORTS ARE READY TO RECEIVE UNITS.
- (B) VERIFY SUFFICIENT END BEARING AREA.

3.2 PREPARATION

- (A) COORDINATE PLACEMENT OF BEARING ITEMS.

3.3 ERECTION

- (A) LIFT MEMBERS USING PROTECTIVE STRAPS TO PREVENT VISIBLE DAMAGE.
- (B) SET STRUCTURAL MEMBERS LEVEL AND PLUMB, IN CORRECT POSITIONS OR SLOPED WHERE INDICATED.
- (C) PROVIDE TEMPORARY BRACING AND ANCHORAGE TO HOLD MEMBERS IN PLACE UNTIL PERMANENTLY SECURED.
- (D) FIT MEMBERS TOGETHER ACCURATELY WITHOUT TRIMMING, CUTTING, SPlicing, OR OTHER UNAUTHORIZED MODIFICATION.

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(E) SWAB AND SEAL THE INTERIOR WOOD SURFACES OF FIELD DRILLED HOLES IN MEMBERS WITH PRIMER.

(F) FIELD FINISHING: SPECIFIED IN SECTION 09 91 00.

3.4 TOLERANCES

(A) FRAMING MEMBERS: 1/2 INCH MAXIMUM FROM TRUE POSITION.

END OF SECTION

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