

**SECTION 06 10 00**  
**ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

Section specifies wood blocking, framing, sheathing, furring, nailers, sub-flooring, rough hardware, and light wood construction.

**1.2 RELATED WORK:**

A. Gypsum sheathing: Section 09 29 00, GYPSUM BOARD.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings showing framing connection details, fasteners, connections and dimensions.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Protect lumber and other products from dampness both during and after delivery at site.
- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least 150 mm (6 inches) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

**1.5 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Forest and Paper Association (AFPA):  
National Design Specification for Wood Construction  
NDS-05.....Conventional Wood Frame Construction
- C. American Institute of Timber Construction (AITC):  
A190.1-07.....Structural Glued Laminated Timber
- D. American Society of Mechanical Engineers (ASME):  
B18.2.1-96(R2005).....Square and Hex Bolts and Screws  
B18.2.2-87.....Square and Hex Nuts  
B18.6.1-97.....Wood Screws  
B18.6.4-98(R2005).....Thread Forming and Thread Cutting Tapping Screws  
and Metallic Drive Screws

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E. American Plywood Association (APA):

E30-07.....Engineered Wood Construction Guide

F. American Society for Testing And Materials (ASTM):

A47-99(R2009).....Ferritic Malleable Iron Castings

A48-03(R2008).....Gray Iron Castings

A653/A653M-10.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy Coated (Galvannealed) by the Hot Dip  
Process

C954-10.....Steel Drill Screws for the Application of Gypsum  
Board or Metal Plaster Bases to Steel Studs from  
0.033 inch (2.24 mm) to 0.112-inch (2.84 mm) in  
thickness

C1002-07.....Steel Self-Piercing Tapping Screws for the  
Application of Gypsum Panel Products or Metal  
Plaster Bases to Wood Studs or Metal Studs

D143-09.....Small Clear Specimens of Timber, Method of  
Testing

D1760-01.....Pressure Treatment of Timber Products

D2559-10.....Adhesives for Structural Laminated Wood Products  
for Use Under Exterior (Wet Use) Exposure  
Conditions

D3498-11.....Adhesives for Field-Gluing Plywood to Lumber  
Framing for Floor Systems

F844-07.....Washers, Steel, Plan (Flat) Unhardened for  
General Use

F1667-08.....Nails, Spikes, and Staples

G. Federal Specifications (Fed. Spec.):

MM-L-736C.....Lumber; Hardwood

H. Commercial Item Description (CID):

A-A-55615.....Shield, Expansion (Wood Screw and Lag Bolt Self  
Threading Anchors)

I. Military Specification (Mil. Spec.):

MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

J. Truss Plate Institute (TPI):

TPI-85.....Metal Plate Connected Wood Trusses

K. U.S. Department of Commerce Product Standard (PS)

PS 1-95.....Construction and Industrial Plywood

PS 20-05.....American Softwood Lumber Standard

## **PART 2 - PRODUCTS**

### **2.1 LUMBER:**

- A. Unless otherwise specified, each piece of lumber bear grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.
  - 1. Identifying marks in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
  - 2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Structural Members: Species and grade as listed in the AFPA, National Design Specification for Wood Construction having design stresses as shown.
- C. Lumber Other Than Structural:
  - 1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
  - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100.
  - 3. Furring, blocking, nailers and similar items 100 mm (4 inches) and narrower Standard Grade; and, members 150 mm (6 inches) and wider, Number 2 Grade.
- D. Sizes:
  - 1. Conforming to Prod. Std., PS20.
  - 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- E. Moisture Content:
  - 1. At time of delivery and maintained at the site.
  - 2. Boards and lumber 50 mm (2 inches) and less in thickness: 19 percent or less.
  - 3. Lumber over 50 mm (2 inches) thick: 25 percent or less.
- F. Fire Retardant Treatment:
  - 1. Mil Spec. MIL-L-19140 with piece of treated material bearing identification of testing agency and showing performance rating.
  - 2. Treatment and performance inspection, by an independent and qualified testing agency that establishes performance ratings.
- G. Preservative Treatment:
  - 1. Do not treat Heart Redwood and Western Red Cedar.

2. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 600 mm (24 inches) from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
3. Treat other members specified as preservative treated (PT).
4. Preservative treat by the pressure method complying with ASTM D1760, except any process involving the use of Chromated Copper arsenate (CCA) for pressure treating wood is not permitted.

## **2.2 PLYWOOD**

- A. Comply with Prod. Std., PS 1.
- B. Bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.
- C. Sheathing:
  1. APA rated Exposure 1 or Exterior; panel grade CD or better.
  2. Wall sheathing:
    - a. Minimum 9 mm (11/32 inch) thick with supports 400 mm (16 inches) on center and 12 mm (15/32 inch) thick with supports 600 mm (24 inches) on center unless specified otherwise.
    - b. Minimum 1200 mm (48 inches) wide at corners without corner bracing of framing.
- D. Underlayment:
  1. APA rated Exposure 1 or Exterior, panel grade C-C Plugged.
  2. Minimum 6 mm (1/4 inch) thick or greater over plywood subflooring unless otherwise shown.

## **2.3 ROUGH HARDWARE AND ADHESIVES:**

- A. Anchor Bolts:
  1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2 inch) unless shown otherwise.
  2. Extend at least 200 mm (8 inches) into masonry or concrete with ends bent 50 mm (2 inches).
- B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2 inches) into masonry or concrete. Use 13 mm (1/2 inch) bolt unless shown otherwise.
- C. Washers
  1. ASTM F844.

2. Use zinc or cadmium coated steel or cast iron for washers exposed to weather.

D. Screws:

1. Wood to Wood: ANSI B18.6.1 or ASTM C1002.
2. Wood to Steel: ASTM C954, or ASTM C1002.

E. Nails:

1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
2. ASTM F1667:
  - a. Common: Type I, Style 10.
  - b. Concrete: Type I, Style 11.
  - c. Barbed: Type I, Style 26.
  - d. Underlayment: Type I, Style 25.
  - e. Masonry: Type I, Style 27.
  - f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4 inches) long, 8d and deformed or annular ring shank.

F. Framing and Timber Connectors:

1. Fabricate of ASTM A446, Grade A; steel sheet not less than 1.3 mm (0.052 inch) thick unless specified otherwise. Apply standard plating to steel timber connectors after punching, forming and assembly of parts.
2. Framing Angles: Angle designed with bendable legs to provide three way anchors.
3. Straps:
  - a. Designed to provide wind and seismic ties with sizes as shown or specified.
  - b. Strap ties not less than 32 mm (1-1/4 inches) wide.
  - c. Punched for fastener.
4. Wall Anchors for Joists and Rafters:
  - a. Mild steel strap, 5 by 32 mm (3/16 by 1-1/4 inch) with wall ends bent 50 mm (2 inches), or provide 9 by 130 mm (3/8 by 5 inch) pin through strap end built into masonry.
  - b. Strap long enough to extend onto three joists or rafters, and punched for spiking at each bearing.
  - c. Strap not less than 100 mm (4 inches) embedded end.
5. Joint Plates:

- a. Steel plate punched for nails.
  - b. Steel plates formed with teeth or prongs for mechanically clamping plates to wood.
  - c. Size for axial eccentricity, and fastener loads.
- G. Adhesives:
- 1. For field-gluing plywood to lumber framing floor or roof systems: ASTM D3498.
  - 2. For structural laminated Wood: ASTM D2559.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:**

- A. Conform to applicable requirements of the following:
- 1. AFPA National Design Specification for Wood Construction for timber connectors.
  - 2. AITC Timber Construction Manual for heavy timber construction.
  - 3. AFPA WCD-number 1, Manual for House Framing for nailing and framing unless specified otherwise.
  - 4. APA for installation of plywood or structural use panels.
  - 5. ASTM F 499 for wood underlayment.
  - 6. TPI for metal plate connected wood trusses.
- B. Fasteners:
- 1. Nails.
    - a. Nail in accordance with the Recommended Nailing Schedule as specified in AFPA Manual for House Framing where detailed nailing requirements are not specified in nailing schedule. Select nail size and nail spacing sufficient to develop adequate strength for the connection without splitting the members.
    - b. Use special nails with framing connectors.
    - c. For sheathing and subflooring, select length of nails sufficient to extend 25 mm (1 inch) into supports.
    - d. Use eight penny or larger nails for nailing through 25 mm (1 inch) thick lumber and for toe nailing 50 mm (2 inch) thick lumber.
    - e. Use 16 penny or larger nails for nailing through 50 mm (2 inch) thick lumber.
    - f. Select the size and number of nails in accordance with the Nailing Schedule except for special nails with framing anchors.
    - g. Nailing Schedule; Using Common Nails:
      - 1) Joist bearing on sill or girder, toe nail three-8d or framing anchor
      - 2) Bridging to joist, toe nail each end two-8d

- 3) Ledger strip to beam or girder three-16d under each joint.
- 4) Sole plate to joist or blocking, through sub floor face nail 20d nails, 400 mm (16 inches) on center.
- 5) Top plate to stud, end nail two-16d.
- 6) Stud to sole plate, toe nail or framing anchor. Four-8d
- 7) Doubled studs, face nail 16d at 600 mm (24 inches) on center.
- 8) Built-up corner studs 16d at 600 mm (24 inches) (24 inches) on center.
- 9) Doubled top plates, face nails 16d at 400 mm (16 inches) on center.
- 10) Top plates, laps, and intersections, face nail two-16d.
- 11) Continuous header, two pieces 16d at 400 mm (16 inches) on center along each edge.

2. Bolts:

- a. Fit bolt heads and nuts bearing on wood with washers.
- b. Countersink bolt heads flush with the surface of nailers.
- c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
- d. Use toggle bolts to hollow masonry or sheet metal.
- e. Use bolts to steel over 2.84 mm (0.112 inch, 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.

3. Drill Screws to steel less than 2.84 mm (0.112 inch) thick.

- a. ASTM C1002 for steel less than 0.84 mm (0.033 inch) thick.
- b. ASTM C 954 for steel over 0.84 mm (0.033 inch) thick.

4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.

5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.

6. Screws to Join Wood:

- a. Where shown or option to nails.
- b. ASTM C1002, sized to provide not less than 25 mm (1 inch) penetration into anchorage member.
- c. Spaced same as nails.

C. Cut notch, or bore in accordance with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.

D. Blocking Nailers, and Furring:

1. Install furring, blocking, nailers, and grounds where shown.
2. Use longest lengths practicable.
3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
4. Layers of Blocking or Plates:
  - a. Stagger end joints between upper and lower pieces.
  - b. Nail at ends and not over 600 mm (24 inches) between ends.
  - c. Stagger nails from side to side of wood member over 125 mm (5 inches) in width.

E. Framing:

1. Set with crown edge up.
2. Keep framing at least 50 mm (2 inches) away from chimneys.
3. Bear on not less than 100 mm (4 inches) on concrete and masonry, and 38 mm (1-1/2 inches) on wood and metal unless shown otherwise.
4. Support joist, trimmer joists, headers, and beams framing into carrying members at same relative levels on joist hangers unless shown otherwise.
5. Lap and spike wood joists together at bearing, or butt end-to-end with scab ties at joint and spike to plates. Scab tie lengths not less than 200 mm (8 inches) lap on joist ends. Install wood I beam joists as shown.
6. Frame openings with headers and trimmer joist. Double headers carrying more than two tail joists and trimmer joists supporting headers carrying more than one tail joist unless otherwise shown.
7. Drive nails through headers into joists using two nails for 50 mm by 150 mm (2 inch by 6 inch); three nails for 50 mm by 200 mm (2 inch by 8 inch) and four nails for 50 mm by 250 mm (2 inch by 10 inch) and over in size.
8. Install nearest joist to double headers and spike joist to both header members before trimmer joist is installed and secured together.
9. Nonbearing partitions running parallel with ceiling joists, install solid 50 mm (2 inch) thick bridging same depth as ceiling joists cut to fit snug between joists for securing top plate of partitions. Securely spike bridging to joists. Space 1200 mm (4 feet) on center.

F. Bridging:

1. Use 25 mm by 75 mm (1 inch by 3 inch) lumber with ends beveled for slope. Option: Metal bridging may be used for wood bridging.



2. Install one row of bridging for joist spans over 2400 mm (8 feet), but less than 4800 mm (16 feet) long; install two rows for spans over 4800 mm (16 feet) long.
3. Install an extra row of bridging between trimmer and next two joists if header is more than 600 mm (2 feet) from end of trimmer or from regular row of bridging.
4. Secure with two nails at ends.
5. Leave bottom ends loose until after subflooring or roof sheathing is installed.
6. Install single row of bridging at centerline of span and two rows at the third points of span unless otherwise shown.

G. Partition and Wall Framing:

1. Use 50 mm by 100 mm (2 inch by 4 inch) studs spaced 400 mm (16 inches) on centers; unless shown otherwise.
2. Install double studs at openings and triple studs at corners.
3. Installation of sole plate:
  - a. Anchor plates of walls or partitions resting on concrete floors in place with expansion bolts, one near ends of piece and at intermediate intervals of not more than 1200 mm (4 feet) or with power actuated drive pins with threaded ends of suitable type and size, spaced 600 mm (2 feet) on center unless shown otherwise.
  - b. Nail plates to wood framing through subfloor as specified in nailing schedule.
4. Headers or Lintels:
  - a. Make headers for openings of two pieces of 50 mm (2 inch) thick lumber of size shown with plywood filler to finish flush with face of studs or solid lumber of equivalent size.
  - b. Support ends of headers on top of stud cut for height of opening. Spike cut stud to adjacent stud. Spike adjacent stud to header.
5. Use double top plates, with members lapped at least 610 mm (2-feet) spiked together.
6. Install intermediate cut studs over headers and under sills to maintain uniformity of stud spacing.
7. Use single sill plates at bottom of opening unless shown otherwise. Toe nail to end stud, face nail to intermediate studs.
8. Install 50 mm (2 inch) blocking for firestopping so that maximum dimension of any concealed space is not over 2400mm (8 feet) in accordance with NFPA Manual for House Framing.
9. Install corner bracing when plywood or structured use panel sheathing is not used.

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- a. Let corner bracing into exterior surfaces of studs at an angle of approximately 45 degrees, extended completely over walls plates, and secured at bearing with two nails.
- b. Use 25 mm by 100 mm (1 inch by 4 inch) corner bracing.

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