

## **GYPSON BOARD ASSEMBLIES**

### **GENERAL INFORMATION**

- 1.1 Work Includes: shaft wall systems; screw-type steel framing and furring; ceiling suspension; screw-applied gypsum board panels; acoustical treatment and fibrous fire safing; sheet metal blocking for wall supported items; metal fabrications, accessories, and finishing necessary to complete installation.
- 1.2 The following standards relate to the work of this Section:
  - a. American Iron and Steel Institute (AISI): Specification for the Design of Cold-Formed Steel Structural Members, latest edition.
  - b. American Society for Testing and Materials (ASTM):
    1. A446/A446M Specification for Sheet Steel, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (physical) Quality.
    2. A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
    3. A641 Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
    4. C24 Test Method for Pyrometric Cone Equivalent (PCE) of Refractory Materials.
    5. C588 Specification for Gypsum Base for Veneer Plasters.
    6. C645 Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track) and Rigid Furring Channels for Screw-Application of Gypsum Board.
    7. C665 Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
    8. C754 Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
    9. C834 Specification for Latex Sealing Compounds.
    10. C840 Specification for Application and Finishing of Gypsum Board.

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11. E814 Fire Tests of Through-Penetration Firestops.
  - c. National Association of Architectural Metal Manufacturers (NAAMM): ML/SFA 540-87: Lightweight Steel Framing Systems Manual.
  - d. Underwriters Laboratory, Inc. (UL):
    1. UL 1479 Fire tests of Through-Penetration Firestops.
    2. Building Materials Directory
    3. Fire Resistance Directory
- 1.2 Performance Requirements: Shaftwall Systems
  - a. Deflection: L/180 (max.) at +/- 7.5 psi shaft pressure.
  - b. Air Infiltration: 0 at +/- 7.5 psi shaft pressure.
  - c. Fire Resistance Rating: As shown on Drawings, per ASTM E119.
- 1.3 Performance Requirements: Other Construction
  - a. Deflection of Vertical Construction: L/360 (max.) for tile-finished construction and L/240 (max.) for other construction, at 5 psi pressure applied normal to surfaces.
  - b. Deflection of Horizontal Construction: L/360 (max.) under its own dead load plus loads of built-in work supported by horizontal construction.
  - c. Air Infiltration: 0 at 5 psi air pressure differential.
  - d. Fire Resistance Ratings: As shown on Drawings, per ASTM E119.

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- 2.1 Shaft Wall Systems: Pre-engineered, performance-tested gypsum board cavity shaft wall systems complying with specified performance requirements and framing members design based on AISI Specification for Cold-Formed Steel Members.

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- 2.2 Framing and Furring Materials: Galvanized steel, complying with ASTM C645, including runners (track), 20 gage (min. base metal); studs to meet performance requirements (but not less than 20 gage before galvanizing); and rigid furring channels.
- 2.3 Ceiling Suspension Materials: Comply with ASTM C754, including the following: Ceiling anchors including caddy beam/flange hanger clamps, brackets, and accessories; Ceiling hangers of 1/4" diameter mild steel round rods, zinc or cadmium-coated; Lather's channels of cold-rolled steel; Cold-formed Steel Joiststural steel joists, cold-formed from ASTM A446 galvanized steel sheet with a G60 class zinc coating, to satisfy AISI Specifications for the Design of Cold-Formed Steel Structural Members.
- 2.4 Gypsum Board: Comply with ASTM C840 as amended by the following:
- Wallboard: ASTM C36; Type X for fire-rated assemblies; 5/8-inch thick.
  - Backing Board: ASTM C442; Type X for fire-rated assemblies; 5/8-inch thick.
  - Core Board: ASTM C442 Type X with square edges and fire-resistant core encased by multi-layered moisture-resistant paper; 1" thick.
  - Water-Resistant (WR) Backing Board: ASTM C630; Type X for fire-rated assemblies; 1/2" thick.
- 2.5 Reinforced Cement (RC) Board: Tested per ASTM E119 and UL-approved for use in 1-hour and 2-hour fire rated construction of the kind required for the Project; glass fiber-reinforced portland cement panel with square-cut edges; 1/2" (nominal) thick x 3' x 6' size.
- 2.6 Auxiliary Materials
- Panel Fasteners: Type S corrosion resistant-treated steel drill screws with bugle heads; ASTM C954 steel drill screws for panel-to-heavy gage metal; ASTM C1002 panel-to-light gage metal.
  - Fire Safing: Incombustible, 4 pcf felted, semi-refractory, asbestos-free fiber with 2000 F (min.) melting point per ASTM C24 and 2-hour (min.) fire resistance per ASTM E119.
  - Acoustical Blankets: ASTM C665 Type I, semi-rigid, unfaced, spun mineral fiber mat; widths required for friction fit between framing members; 1-1/2" thick x 2.5 pcf.
  - Acoustical Sealant: Butyl rubber base, non-hardening, non-bleeding, non-drying.
  - Acrylic Latex Sealant: Complying with ASTM C834.
  - Duct Penetration Sealant:

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1. For Non-Fire Rated Construction: Non-hardening.
  2. For Fire Rated Construction: UL-rated elastomeric, non-sag sealant, classified for use in through-penetration firestop systems rated as required for the Project; tested per UL-1479/ASTM E814 as seals for both floor and wall penetrations, against passage of fire smoke, gases, and water.
- g. Tape Sealant: Double-faced, closed cell foam tape; Norseal V-980 by the Norton Company or approved equal.
- h. Galvanized Steel Sheet and Strip: ASTM A446 structural quality steel sheet, G60 or A60 coating class. At blocking for wall shelving use 6" wide x 20 ga. (min.) galvanized steel sheet.
- 2.7 Accessories: Corner beads, casing beads and control joint covers: ASTM C1047, all-metal bead of galvanized steel.
- 2.8 Gypsum Board Finishing Materials including joint reinforcing tape and joint compound: Comply with ASTM C475.

## CONSTRUCTION REQUIREMENTS

- 3.1 Installation: General
- a. Satisfy specified performance requirements and allowable tolerances.
  - b. Allowable Tolerances:
    1. Line and Plane: 1/4" per 20'-0" or uninterrupted run, whichever is greater; no offset joints or abrupt irregularities.
    2. Plumb and Level: 1/8" per 12'-0"; no offset joints or abrupt irregularities.
- 3.2 Shaft Wall Systems Erection
- a. General:
    1. Install system per manufacturer instructions, to meet specified performance requirements and allowable tolerances. Do not reduce shaft clearances required by elevator installers.

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2. Cut, fit and/or frame openings to accommodate built-in items of other trades/Sections. Provide backing or housing behind built-ins to maintain system performance.
  3. Install acoustical blankets and seals required to meet specified performance requirements.
- 3.3 Ceiling Suspension: Comply with ASTM C754; Install lather's channel bridging and additional anchors, hangers, and braces necessary to span obstructions and keep spans and loads within acceptable limits. Keep hangers and braces at least 2" clear of ducts, pipes and conduits.
- a. Anchorage:
    1. To Concrete Soffits: Secure hangers to cast-in inserts.
    2. To Steel Deck: Secure hangers to integral tabs by means of deck clamps.
    3. To Ceiling Support Joists: Secure hangers to sides of joists by means of screw-applied offset brackets. Hanger wire may be tied directly to joists through holes drilled through joist neutral axes only if hard nylon/plastic grommets are used to protect wire.
    4. Additional Anchors: If additional anchors are required, use beam clamps for structural steel and angle/offset brackets screw-anchored to concrete and metal floor deck. Do not use powder-actuated fasteners.
  - b. Main Runners: Install lather`s channels 48" (max.) o.c. Support channels 36" (max.) o.c. with hanger rods and channel clamps. Sway-brace suspended channels with 12 gage (min.) galvanized steel wire.
  - c. Furring: Cross-furr carrying channels with rigid furring channels, spaced 12" (max.) o.c.
- 3.4 Interior Drywall Framing and Furring: Install work to meet specified performance requirements and allowable tolerances. Comply with ASTM C754.
- a. Stud Construction:
    1. Height: Story-high where not otherwise shown.
    2. Stud Length: Use one-piece-for-length studs up to story height; splice studs only where story height exceeds longest available stock lengths.
    3. Stud Spacing: Space studs adjacent to vertical corners 12" from corner studs. Space intermediate studs 16" (max.) o.c.

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4. Stud Direction: Where not otherwise specified, orient studs so that flanges point in the same direction in each stud-framed assembly.
  5. Chase Wall Cross Bracing: Cross-brace chase wall studs at least 48" o.c. vertically and 24" o.c. horizontally, with 2-1/2" (min.) studs screwed to opposite studs. If studs are not opposite, screw horizontal tracks to stud backs and screw cross braces to tracks.
  6. Openings: Frame openings with studs and track headers and sills. Double studs that frame door openings. Double studs that frame 48" and wider openings. Install cripple studs above and below openings wider than 16". Securely fasten headers, sills, and cripple studs.
  7. Perimeter Relief: Stop studs 1/2" short of webs of head tracks that are anchored to structural soffits or framing. Anchor terminal studs to structural columns/walls; install a friction-fit stud, 1" away, for gypsum board fastening.
- b. Contact Wall Furring: Install furring members vertically. Extend rigid furring channels 6" above ceiling levels and to structural soffits in spaces without ceilings.
  - c. Soffit and Fascia Construction: Frame soffits and fascias with studs and tracks. Brace assemblies with studs and/or tracks to make them rigid in all directions. Fasten all members together with sheet metal screws.
  - d. Control Joints: Leave 1/2" gaps at control joints; do not bridge control joints with framing or furring members. Space vertical control joints 30'-0" o.c. in uninterrupted framing/furring runs, unless otherwise indicated. Space ceiling control joints 50'-0" o.c. both ways where gypsum board has perimeter relief, and 30'-0" o.c. where gypsum board has no perimeter relief. Obtain approval before locating joints not shown on Drawings.
- 3.5 Reinforcement: Install reinforcement as follows, where work of other trades/Sections is anchored to drywall construction. Lightly mark reinforcement locations on panel surfaces.
- a. For toilet stall brackets, install local anchor plates, centered on bracket locations. Fasten plates to adjacent studs with at least 3 pan head screws per stud.
  - b. For wall hung shelves, cabinets, and other items install continuous horizontal anchor plates, centered on anchor locations. Fasten them to framing/furring members with at least 3 pan head screws per member.

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- c. For wall hung counters, install continuous horizontal notched tracks, centered on anchor locations. Fasten tracks to studs with at least 2 pan head screws per stud.
- 3.6 Fire Safing: Pack clearances about duct penetrations. Pack clearances between framing members and ducts, piping, and other casings that penetrate drywall partitions.
- 3.7 Acoustical Blankets: Friction-fit blankets between framing members. Carry blankets continuously behind electrical boxes and other items that penetrate one partition face. Leave no gaps. Staple blankets to gypsum board back at corners and center of each piece. Drive staples through kraft paper squares or folded joint tape, to prevent tear-out. Lay acoustical blankets on gypsum board ceilings where they cross ceiling-high partitions. Install blankets in two layers extending the full length of partition and 48" each side. Stagger all joints.
- 3.8 Sealant: Install sealant per manufacturer's instructions. Use caulking guns with nozzles properly sized and shaped to completely fill joints.
- a. Duct Penetration Sealant: Seal clearances between gypsum board and ducts, piping and other casings that penetrate drywall. Use UL-rated sealant for fire rated partitions and non-hardening compound at non-rated partitions.
  - b. Other Sealant: Seal control joint gaps before installing covers; provide foam rod or other compressible filler to backstop sealant. After facing panels are applied, seal perimeters of partitions, furred finishes, electrical boxes, and other items recessed in panel faces. Use Acoustical Sealant in concealed locations. Use Acrylic Latex Sealant in exposed locations and tool it to form a neat, slightly concave bead.
- 3.9 Drywall Panel Application and Finishing
- a. General: Comply with ASTM C840 as amended herein. Erect panels progressively. Screw-fasten all plies to framing/furring members. Obtain flush joints by fastening panels first to open (unsupported) edges of framing/furring member flanges.
  - b. Panel Type and Location:
    - 1. WR Backing Board: Use WR Backing Board with tapered and featured edges for exposed wall and ceiling surfaces in bathrooms, toilet rooms, and janitor's closets. For two-ply applications, use square edge WR Backing Board and underlayers.
    - 2. Wallboard: Use Wallboard with tapered and featured edges for other exposed surfaces. For two-ply applications, use square edge Backing Board or Wallboard underlayers.

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3. Fire-Rated Assemblies: Use only Type X gypsum board.
  4. Exterior Walls: Use foil-backed gypsum board for panels in direct contact with exterior wall framing and furring. Use WR Backing Board at window and door surrounds where panels tuck behind, or abut frames. Exception: MR Backing Board shall not be foil-backed.
- c. Flat Surfaces:
1. Vertical Surfaces: Apply panels with edges parallel to supports. Locate edges over solid bearing.
  2. Horizontal Surfaces: Apply panels at right angles to supports. Locate end joints over solid bearing; do not float joints between supports.
- d. Panel Joints:
1. Use panels long enough to eliminate end joints in exposed locations of vertical applications up to 14'-0" high. Size face panels of other work to minimize end joints.
  2. Stagger joints of base and face panels. Stagger joints on opposite sides of partitions. Butt-lap outside corners to provide solid backing for corner beads.
- e. Panel Perimeter Relief:
1. Structural Soffits and Framing: Stop gypsum board 1/2" short of structure. Where head track is anchored to structure, omit fasteners into head tracks and locate topmost fasteners in studs, 1/2" clear of track flange.
  2. Structural Walls and Columns: Stop gypsum board 1/4" short of structure. Fasten gypsum board to secondary (free) studs provided for the purpose, but not terminal stud.
  3. Wall-Ceiling Intersections: Construct floating internal angles in non-fire rated work except for ceilings that form parts of above-ceiling plenums.
- f. Openings:
1. Wrap-around Frames: Extend gypsum board into frame throats. Shim panels continuously from behind, if necessary, to close gap between panel face and frame backbend.



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2. Penetrations: Leave 1/2" perimeter clearance between gypsum board and penetrating pipes and conduit. Leave 1" perimeter clearance about penetrating ducts.
  3. Control and Expansion Joints: Leave proper clearance for installing joint covers; do not bridge joints with gypsum board.
  4. Recesses: Construct Type X gypsum board boxes about items recessed in fire-rated partitions, as required to maintain fire rating.
- g. Moisture Sealing WR Board: Coat exposed gypsum core at ends and cuts with WR compound before applying panels.
- h. Casings and Trim:
1. Control Joint Covers: Cover control joint gaps in exposed locations.
  2. Corner Beads: Install at exposed out-corners.
- i. Casing Beads: Trim exposed gypsum board ends and edges where not otherwise specified.
- j. Finishing:
1. Clean panel surfaces. Pre-fill panel joints, spot fastener heads, and fill dents, gouges, and other depressions with ready-mixed drying type all-purpose compound. Finish depressions flush with gypsum board surface.
  2. Tape and finish panel joints and accessories flanges in three coats; Smooth each coat before it hardens, to reduce need for sanding. Sand each coat smooth; do not rough-up panel face paper.

### 3.10 Adjusting, Cleaning, and Protection

- a. Correct noncomplying and damaged work. Replace work that cannot be satisfactorily corrected in place. Leave work clean and ready to receive applied finishes. Protect work from damage.

## REFERENCE

- 4.1 The applicable CSI Specification Section is 09 21 16.