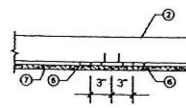
Design No. P531
Unrestrained Assembly Rating – 1 Hr.
Finish Rating – 20 Min.



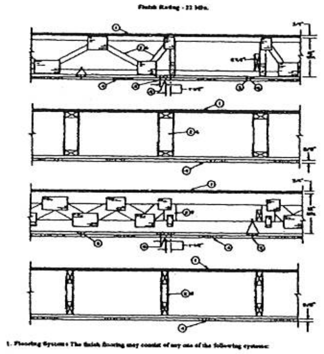
1. ROOFING SYSTEM* – Any UL Class A, B, or C Roofing System (TGFU) or Prepared Roof Covering (TFWZ) acceptable for use over nom 15/32 in. thick wood structural panels, min. grade "C-D" or "Sheathing". Nom 15/32 in. thick wood structural panels secured to trusses with construction adhesive and No. 6d ringed shank nails. Nails spaced 12 in. OC along each truss. Staples having equal or greater withdrawal and lateral resistance strength may be substituted for the 6d nails.
2. TRUSSES – Pitch or Parallel chord trusses, spaced max of 24 in. OC, fabricated from nom 2 by 4 lumber, with lumber oriented vertically or horizontally. Truss members secured together min. 0.0356 in. thick galv steel plates. Plates have 5/16 in. long teeth projecting perpendicular to the plane of the plate. The teeth are in pairs facing each other (made by the same punch), forming a split tooth type plate. Each tooth has a chisel point on its outside edge. These points are diagonally opposite each other for each pair. The top half of each tooth has a twist for stiffness. The pairs are repeated on approximately 7/8 in. centers with four rows of teeth per inch of plate width. Where the truss intersects with the interior face of the exterior walls, the min truss depth shall be 5-1/4 in. with a min roof slope of 3/12 and a min. area in the plane of the truss of 21 sq. ft. Where the truss intersects with the interior face of the exterior walls, the min truss depth may be reduced to 3 in. if the batts and blankets (Item 3) are used as shown in the above illustration (Alternate Insulation Placement) and are firmly packed against the intersection of the bottom chords and the plywood sheathing.
3. BATTS AND BLANKETS* (Optional) – Glass fiber insulation, secured to the wood structural panels with staples spaced 12 in. OC or to the trusses with 0.090 in. diam galv steel wires spaced 12 in. OC. Any glass fiber insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance, having a min density of 0.5 pcf. As an option, the insulation may be fitted in the concealed space, draped over the resilient channel / gypsum wallboard ceiling membrane when resilient channels and gypsum wallboard attachment is modified as specified in Items 6 and 7. The finished rating has only been determined when the insulation is secured to the decking.

3A. LOOSE FILL MATERIAL* As an alternate to Item 3 – Any thickness of loose fill material bearing the UL Classification Marking for Surface Burning Characteristics, having a min density of 0.5 pcf, fitted in the concealed space, draped over the resilient channel / gypsum wallboard ceiling membrane when resilient channels and gypsum wallboard attachment is modified as specified in Items 6 and 7. The finished rating when loose fill material is used has not been determined.

4. AIR DUCT* – Any UL Class 0 or Class 1 flexible air duct installed in accordance with the instructions provided by the damper manufacturer.
5. DAMPER* – Max nom 20 in. long by 18 in. wide by 2-1/8 in. high, fabricated from galvanized steel. Plenum box maximum size nom. 21 in. long by 18 in. wide by 16 in. high fabricated from either galvanized steel or Classified Air Duct Materials bearing the UL Class 0 or Class 1 rigid air duct material. Installed in accordance with the instructions by the manufacturer. Max damper openings not to exceed 360 sq. in. per 100 sq. ft. of ceiling area.
   - ATLAS AIR CONDITIONING CO L P – Types 0856, 0856D, 0857, 0857D, 0857FP, 0857DFP.
   - MANUFACTURED AIR PRODUCTS – Models CRD-7, -8, -9, -10, -11, followed by suffix AA, NI RM, or SM.
   - NAILOR INDUSTRIES INC – Types 0755, 0755A, 0756, 0756D, 0757, 0757D, 0757FP, 0757DFP, 0758, 0759, 0760, 0761, 0762, CR05, CR05D, CRD6, CRD6D, CRD6FP, CRD6DFP.
   - ROYAL METAL PRODUCTS INC – Models 241FRD, 243FRD, 505RD, 507RD, 509.
   - SHERER MFG INC – Models FRDB, TTRDB, RDB Type T, SRDB, RDB Type S.
6. FURRING CHANNELS – Resilient channels, nom 1/2 in. deep by 2-3/8 in. wide at the base and 1-3/8 in. wide at the face, formed from 0.020 in. thick galv steel, spaced 16 in. OC, installed perpendicular to trusses. When batt and blanket material, Item 3, is draped over the resilient in. OC. Channels secured to each truss with 1-1/4 in. long Type S steel screws. Channels overlapped 4 in. at splices. Channels oriented opposite at wallboard butt joints (spaced 6 in. OC) as shown in the above illustration.
7. WALLBOARD, GYPSUM* – Nom 5/8 in. thick, 48 in. wide, installed with long dimension perpendicular to resilient channels with 1 in. long Type S screws spaced 12 in. OC and located a min of 1/2 in. from side joints and 3 in. from the end joints. At end joints, two resilient channels are used, extending a min of 6 in. beyond both ends of the joint. When batt and blanket insulation, Item 3, is draped over the resilient channel / gypsum wallboard ceiling membrane, screws shall be installed at 8 in. OC.
   - CANADIAN GYPSUM COMPANY – Types C, IP-X2, IPC-AR.
   - UNITED STATES GYPSUM CO – Types C, IP-X2, IPC-AR.
   - USG MEXICO S A DE C V, MEX – Types C, IP-X2, IPC-AR.
8. FINISHING SYSTEM (Not Shown) – Vinyl, dry, or premixed joint compound, applied in two coats to joints and screw-heads; paper tape, 2 in. wide, embedded in first layer of compound over all joints. As an alternate, nom 3/32 in. thick veneer plaster may be applied to the entire surface of gypsum wallboard.
9. STEEL FRAMING MEMBERS –
   a. MAIN RUNNERS Installed perpendicular to trusses – Nom 12 ft. long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC. Main runners hung a min of 2 in. from bottom chord of trusses with 12 SWG galv steel wire. Wires located a max of 48 in. OC.
   b. CROSS TEES OR CHANNELS – Nom 4 ft. long, 15/16 in. or 1-1/2 in. wide face or cross channels, nom 4 ft. long, 1-1/2 wide face, installed perpendicular to the main runners, spaced 16 in. OC. Additional cross tees or channels used at 8 in. from each side of butted wallboard end joists. The cross tees or channels may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.
   c. WALL ANGLES OR CHANNELS Used to support steel framing member ends and for screw-attachment of the gypsum wallboard – Painted or galv steel angles with 1 in. legs or channels with 1 in. legs and 1-9/16 in. deep, attached to walls at perimeter of ceiling with fasteners 16 in. OC.
      - CGC INC – Type DGL or RX.
      - USG INTERIORS INC – Type DGL or RX.
10. GYPSUM BOARD* For use with STEEL FRAMING MEMBERS* (Item 9) when BATTS AND BLANKETS* (Item 3) are not used – One layer of nom 5/8 in. thick by 48 in. wide boards, installed with long dimension parallel to the main runners. Wallboard fastened to each cross tee or channel with five wallboard screws, with one screw located at the midspan of the cross tee or channel, one screw located 12 in. from and on each side of the cross tee or channel midspan, and one screw located 1-1/2 in. from each wallboard side joint. Except at wallboard end joints, wallboard screws shall be located on alternating sides of cross tee flange. At wallboard end joints, wallboard screws shall be located 1/2 in. from the joint. Wallboard fastened to main runners with wallboard screws 1/2 in. from side joints, midway between intersections with cross tees or channels (16 in. OC). End joints of adjacent wallboard sheets attached to leg of wall angle with wallboard screws spaced 12 in. OC. Joints treated as described in Item 7. -- For use with STEEL FRAMING MEMBERS* (Item 9) when BATTS AND BLANKETS* (Item 3) are used – Ratings limited to 1 Hour – 5/8 in. thick, 4 ft. wide; installed with long dimension perpendicular to cross tees with side joints centered along main runners and end joints centered along cross tees. Fastened to cross tees with 1 in. long steel wallboard screws spaced 8 in. OC in the field and 8 in. OC along end joints. Fastened to main runners with 1 in. long wallboard screws spaced midway between cross tees. Screws along sides and ends of boards spaced 3/8 to 1/2 in. from board edge. End joints of the sheets shall be staggered with spacing between joints on adjacent boards not less than 4 ft. OC.
    - CANADIAN GYPSUM COMPANY – Types C, IP-X2, IPC-AR.
    - UNITED STATES GYPSUM CO – Types C, IP-X2, IPC-AR.
    - USG MEXICO S A DE C V, DF – Types C, IP-X2, IPC-AR.

*Bearing the UL Classification Mark

SYSTEM DESCRIPTION	SKETCH AND DESIGN DATA
GYPSUM BOARD, WOOD JOISTS, ROOF COVERING Base layer ⅝" type X gypsum wallboard applied at right angles to 2 x 10 wood joists 24" o.c. with 1¼" Type W or G drywall screws 24" o.c. Face layer ⅝" type X gypsum wallboard or gypsum veneer base applied at right angles to joists with 1⅞" Type S drywall screws 12" o.c. at joints and intermediate joists and 1½" Type G drywall screws 12" o.c. placed 2" back on either side of end joints. Joints offset 24" from base layer joints. Wood joists supporting ½" plywood with exterior glue applied at right angles to joists with 6d nails. Appropriate roof covering. Ceiling provides one hour fire resistance protection for wood framing, including trusses.	1 HOUR FIRE  Approx. Ceiling Weight: 5 psf Fire Test: FM FC 172, 2-25-72



[illegible]

Finish Flooring — Floor Topping Mixture* — Foam concentrate mixed 40:1 by volume with water and expanded at 100 psi through nozzle. Mix at rate of 1.4 cu ft of preformed foam to 94 lbs Type I Portland cement and 300 lbs of sand with 5-1/2 gal of water. Cast density of floor topping mixture 100 plus or minus 5 pcf. Min compressive strength 1000 psi. Thickness 1-1/2 in.

ELASTIZELL CORP OF AMERICA — Type FF.

Vapor Barrier — (Optional)— Commercial asphalt saturated felt, 0.030 in. thick.

Subflooring — 23/32 in. thick wood structural panels, min grade "C-D" or "Sheathing". Long dimension of panels (strength axis) or face grain of plywood to be perpendicular to joists with joints staggered.

System No. 6.

Finish Flooring — Floor Topping Mixture* — Foam concentrate mixed 40:1 by volume with water and expanded at 100 psi through nozzle. Mix at rate of 1.2 cu ft of preformed foam to 94 lbs Type I Portland cement and 300 lbs of sand with 5-1/2 gal of water. Cast density of floor topping mixture 100 plus or minus 5 pcf. Min compressive strength 1000 psi. Thickness 1-1/2 in.

CELLULAR CONCRETE L L C

Vapor Barrier-(Optional) — Commercial asphalt saturated felt, 0.030 in. thick.

Subflooring — 23/32 in. thick wood structural panels, min grade "C-D" or "Sheathing". Long dimension of panels (strength axis) or face grain of plywood to be perpendicular to joists with joints staggered.

System No. 7

Finish Flooring — Floor Topping Mixture* — Foam concentrate mixed 40:1 by volume with water and expanded at 100 psi through nozzle. Mix at rate of 1.4 cu ft of preformed foam to 94 lbs Type I Portland Cement, 42.5 lb of pea gravel and 312.5 lbs of sand, with approx 5.5 gal of water. Cast density of Floor Topping Mixture 100 (+ or -) 5 pcf. Min compressive strength 1000 psi. Thickness 1 in.

LITE-CRETE INC — Type I.

Vapor Barrier-(Optional) — Commercial asphalt saturated felt, 0.030 in. thick.

Subflooring — 23/32 in. thick wood structural panels, min grade "C-D" or "Sheathing". Long dimension of panels (strength axis) or face grain of plywood to be perpendicular to joists with joints staggered.

System No. 8

Finish Flooring — Floor Topping Mixture* — Foam concentrate mixed 40:1 by volume with water and expanded at 100 psi through nozzle. Mix 94 lbs cement, 300 lbs sand, approx 5.4 gal water, 1.2 cu ft preformed foam, 5 oz Type M fiber and 4 oz Component Z. Cast density of floor topping mixture 105 (+ or -) 5 pcf min compressive strength 1200 psi. Min thickness 3/4 in.

ELASTIZELL CORP OF AMERICA — Type ZC.

Subflooring — 23/32 in. thick wood structural panels, min grade "C-D" or Sheathing. Long dimension of panels (strength axis) or face grain of plywood to be perpendicular to the joists with joints staggered.

System No. 9

Finish Flooring — Floor Topping Mixture* — 2.95 cu ft of stabilized preformed foam to 94 lb of Portland cement premixed with 6 gal of water. Cellular concrete to have a dry density of 31.3 (+ or -) 3.0 pcf and a 28-day compressive strength of 190 to 350 psi, as determined in accordance with ASTM C495-66. Thickness to be 3/4 in. min.

CELLUFOAM CONCRETE SYSTEMS, DIV OF

CELLUFOAM CONCRETE OF — Type Cellufoam.

Vapor Barrier — (Optional)— Commercial asphalt saturated felt, 0.030 in. thick.

[illegible]

UNITED STATES GYPSUM CO — Type USG Sound Mat

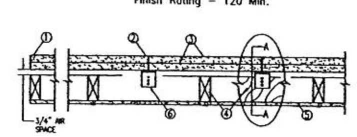
UL LISTING– L528

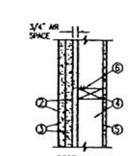
[illegible]

UNITED STATES GYPSUM CO — Type USG Sound Mat

2. Trusses Parallel chord trusses spaced a max 24 in. OC fabricated from nom 2 by 4 in. lumber with lumber oriented either vertically (2A) or horizontally (2B). Truss members secured together with [illegible] MSG galv steel truss plates. Plates have 5/16 in. long teeth projecting perpendicular to the plane of the plate. The teeth are in pairs facing each other (made by the same punch), forming a split-tooth-type plate. Each tooth has a chisel point on its outside edge. These points are diagonally opposite each other for each pair. The top half of each tooth has a twist for stiffness. The pairs are repeated on [illegible] centers with four rows of teeth per in. of plate width.

Design No. U336
Exposed to fire from separation Wall side only
Non-Bearing Wall Rating – 2 HR.
Finish Rating – 120 Min.





SECTION A–A

SEPARATION WALL: (Max. Height – 44 ft)

1. Floor, Intermediate or Top Wall– 2 in. wide channel shaped with 1 in. long legs formed from No. 25 MSG galv steel, secured with suitable fasteners spaced 24 in. O.C.
2. Metal Studs– Steel members formed from No. 25 MSG galv steel having "H"-shaped flanged spaced 24 in. OC; overall depth 2 in. and flange width 1-3/8 in.
3. Wallboard, Gypsum*– Two layers of 1 in. thick gypsum wallboard liner panels, supplied in nom 24 in. widths. Vertical edges of panels friction fitted into "H"-shaped studs.
   - UNITED STATES GYPSUM CO. – Type SLX

PROTECTION WALL: (Bearing or Non-Bearing Wall)

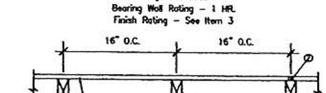
4. Wood Studs– Nom 2 by 4 in. max spacing 24 in OC. Studs cross braced at mid-height where necessary for clip attachment. Min 3/4 in. separation between wood framing and fire separation wall.
5. Wallboard, Gypsum– Classified or Unclassified – Min 1/2 in. thick, 4 ft wide, applied either horizontally or vertically. Wallboard attached to studs with 1-1/4 in. long steel drywall nails spaced 8 in. OC. Vertical joints located over studs. (Optional) Joints covered with paper tape and joint compound. Nail heads covered with joint compound.
6. Attachment Clips– Aluminum angle, 0.063 in. thick, 2 in. wide with 2 in. and 2-1/4 in. legs. Clips secured with Type S screws 3/8 in. long to "H" studs and with Type W screws 1-1/4 in. long to wood framing through holes provided in clip.

6A. Clip placement (Item 6) for separation walls up to 23 ft high. Space clips a max of 10 ft OC vertically between wood framing and "H" studs.

6B. Clip placement (Item 6) for separation walls up to 44 ft high. Space clips as described in Item 6A for upper 24 ft. Remaining wall area below required clips spaced a max of 5 ft OC vertically between wood framing and "H" studs.

*Bearing the UL Classification Marking

Design No. U305
Bearing Wall Rating – 1 HR.
Finish Rating – See Item 3



1. NAILHEADS– Exposed or covered with joint compound.
2. JOINTS– Exposed or covered with fiber tape and joint compound, except where required for specific edge configuration. For tapered, rounded-edge wallboard, joints covered with joint compound or fiber tape and joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced.
3. WALLBOARD, GYPSUM*–5/8 in. thick wallboard paper or vinyl surfaced, with beveled, square, or tapered edges, applied either horizontally or vertically. Wallboard nailed 7 in. OC with 6d cement coated nails 1-7/8 in. long, 0.0915 in. shank diam and 1/4 in. diam heads. When used in widths other than 48 in., wall board is to be installed horizontally.
   - BORAL GYPSUM INC.
   - CANADIAN GYPSUM CO., LTD.
   - CELOTEX CORP.
   - CONTINENTAL GYPSUM COMPANY
   - DOMTAR GYPSUM INC.
   - EAGLE-GYPSUM PRODUCTS
   - GEORGIA-PACIFIC CORP., GYPSUM DIV.
   - JAMES HARDIE GYPSUM
   - NATIONAL GYPSUM CO., CHARLOTTE, NC
   - NATIONAL GYPSUM CO., RIYADH, SAUDI ARABIA
   - PABCO GYPSUM
   - REPUBLIC GYPSUM CO.
   - STANDARD GYPSUM CORP.
   - TEMPLE-INLAND FOREST PRODUCTS CORP.
   - UNITED STATES GYPSUM CO.
   - WESTROC INDUSTRIES LTD.

*See actual Fire Resistance Directory for additional information of approved manufacturers.

3a. WALLBOARD, GYPSUM*–(As an alternate to Item 3)–Nom 3/4 in. thick, installed as described in Item 3
   - United States Gypsum Co.–Type AR.

3b. WALLBOARD, GYPSUM*–(As an alternate to Item 3 and 3a)–5/8 in. thick, 4 ft wide, square edge, applied vertically. Wallboard nailed 8 in OC with 1-3/4 in. long galvanized roofing nails. Joint covering (Item 2) not required.
   - United States Gypsum Co.–Type AR.

4. STEEL CORNER FASTENERS–(optional)–For use at wall corners. Channel shaped, 2 in. long by 1 in. high on the back side with two 1/8 in. wide cleats protuding into the 5/8 in. wide channel, fabricated from 24 gauge galv. steel. Fasteners applied only to the end or cut edge (not along tapered edges) of the wallboard, no greater than 2 in. from corner of the wallboard, max spacing16 in. OC. Nailed to adjacent stud through tab using one No. 6d cement-coated nail per fastener. Corners of wallboard shall be nailed to top and bottom plate using No. 6d cemet-coated nails.
5. BATTS and BLANKETS*–(optional, not shown)– Glass fiber or mineralwool insulation.
   - CERTAINTEED CORP.
   - KNAUF FIBER GLASS GmbH
   - MANVILLE SALES CORP.
   - OWENS-CORNING FIBERGLASS CO.
   - UNITED STATES GYPSUM CO.
   - USG INTERIORS INC.

*Bearing the UL Classification Marking

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DATE DRAWN: June 05, 2006
PROJECT NO.: 2530
ISSUED FOR: PERMIT & CONSTRUCTION
5 JUNE 2006

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