

Design No. G525

March 10, 2020

Restrained Assembly Ratings — 2 and 3 Hr.

(See Items 4A, 4C and 11)

Unrestrained Assembly Ratings — 2 and 3 Hr.

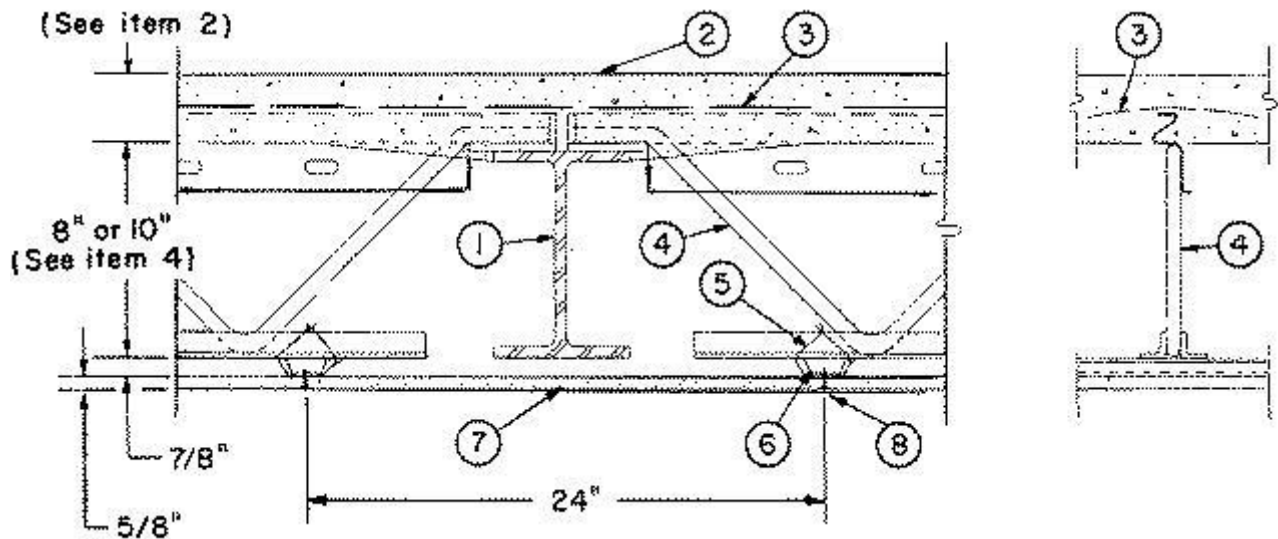
(See Items 4A, 4C and 11)

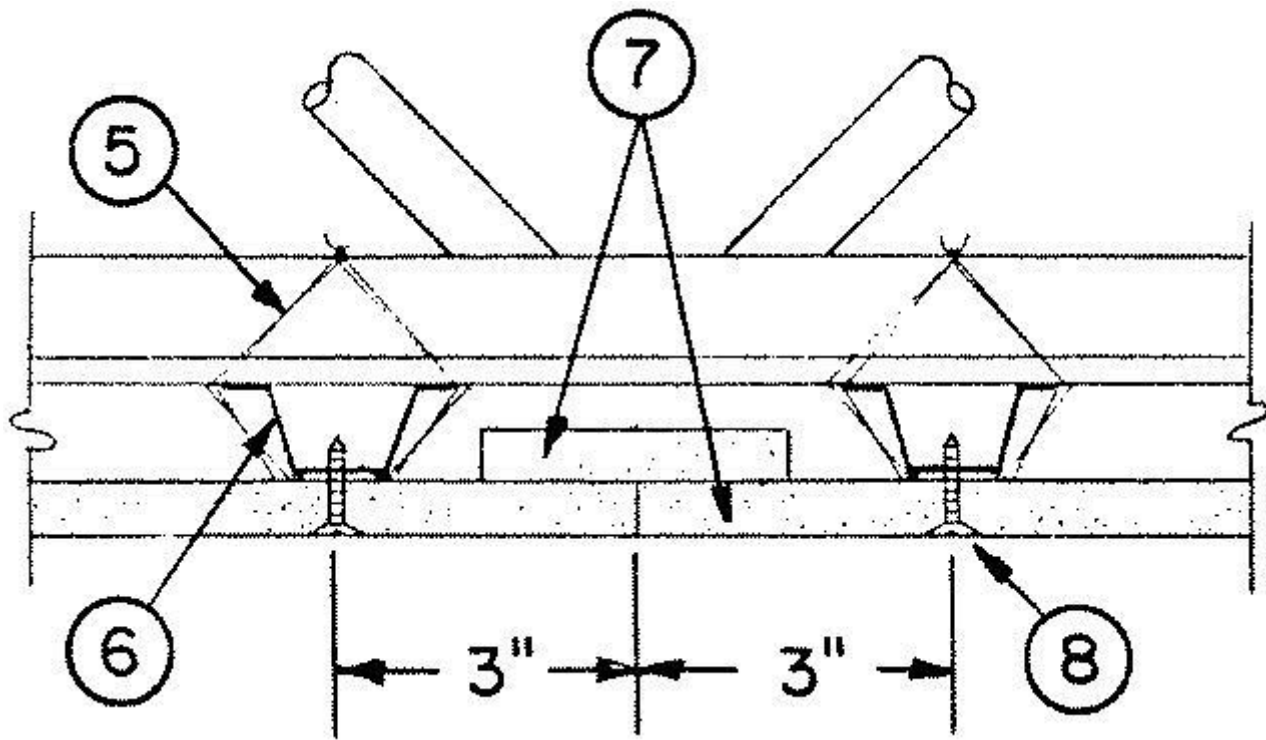
Unrestrained Beam Ratings — 2 and 3 Hr.

(See Items 4A, 4C and 11)

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide [BXUV](#) or [BXUV7](#)

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





1. **Beam** — W8x24, min size.

2. **Normal-Weight Concrete** — Carbonate or siliceous aggregate, 150 +or-3 pcf unit weight, 3000 psi compressive strength. For Canam-Hambro joist System, the concrete slab thickness shall be a min. of 3-1/4 in. with the 10 in. or deeper joists and 3-1/2 in. with the 8 in. deep joist. For the Vescom joist system, the concrete topping thickness, to the top of the 1-5/16 in. deep steel deck shall be 2-5/16 in. for the 10 in. or deeper joists and 2-9/16 in. with 8 in. deep joist.

3. **Welded Wire Fabric** — Min. 6x6 in., No. 8/8 SWG, or as required by the latest ACI code.

4. **Structural Steel Members*** — Hambro joists, 8 or 10 in. nominal min depth, max spacing 49-1/4 in. O.C. and min spacing 24 in. O.C. When the ceiling is suspended directly from the floor by means of hanger clips (Item 4D), the joist spacing is unlimited.

HAMBRO STRUCTURAL SYSTEMS, DIV OF CANAM STEEL CORP — Types D500, D500LH.

4A. **Steel Form Units** — (Not shown), Optional-For use in 2 Hr Rated Assemblies only. Nom 5/8 in. deep. corrugated steel form units, nom 2-1/2 in. pitch, 28 gauge galv., painted or uncoated. For floors employing steel form units, concrete thickness is measured from the top of the form units.

4B. **Permanent Roll Bars** — (Not shown), Optional for use with Type D500 joists only -Installed perpendicular to joists to support corrugated steel forms, Item 4A. Hat-shaped steel section, 1/2 in wide, 2 or 2-1/2 in. deep 18 gauge steel. Ends engaged into slots near top of joists, spaced max 30 in. O. C.

4C. **(Not shown)** — As an alternate to Items 4 and 4B, the following components may be used:

(1) **Structural steel members*** — (Not shown) — Vescom Composite joists, minimum nominal depth 8 in. When furring channels are directly tied to or suspended from the bottom chord, maximum spacing of joists shall be 48 in. O.C. Greater joist spacings may be used when hanger clips (Item 4 D) are used

VESCOM STRUCTURAL SYSTEMS INC — Type V.

(2) **Steel form units** — (Not shown) — for use in 2 or 3 Hr rated Assemblies with Vescom joists only. 1-5/16 in. deep corrugated steel, 24 minimum gauge, painted or uncoated. Welded to supports 15 in. O.C. using welding washers.

4D. **Hanger clips** — (Not shown) — for use when ceiling is directly suspended from concrete floor (Canam-Hambro System) or from the corrugated deck and the concrete floor (Vescom System) — galvanized steel angles, 3/4 in. long, 3/32 in. thick with 1-1/8 in. horizontal and 7/8 in. vertical legs. Vertical leg provided with a 5/16 in. diam hole to accommodate hanger wire. Horizontal leg provided with a 3/16 in. diam hole for insertion of fastener. Hanger clip secured to underside of concrete floor or through the crest of the form units into the concrete, using nominal 1-3/8 in. long, 0.145 in. diam shank with 0.300 in. diam head, powder-driven galvanized steel fastener.

4E. **Cold Rolled Channels** — (Not shown) — for use with joist spacings greater than 49-1/4 in. O.C for Canam Hambro Systems, or greater than 48 in. O.C for Vescom System. Minimum No. 16 MSG cold-rolled steel, 1-1/2 in. deep with 1/2 in. legs, spaced 48 in. O.C and suspended from hanger clips or from bottom chord of joist with hanger wires.

4F. **Hanger wire** — (Not shown) — Minimum No. 12SWG galvanized steel wire tied to hanger clips or bottom chord of joists to support cold-rolled channels. Maximum spacing of hanger wires 48 in. O.C.

5. **Hanger Wire** — (Not Shown) — For use with Steel Framing Members* No. 12 SWG galv steel wire spaced a max of 48 in. OC on main runners. Twist-tied to bottom chord of joists and to hanger wire hole closest to the joist (in the web of main runner), to minimize splaying of wires. Additional hanger wires required at center of cross tees adjacent to air duct outlets.

6. **Furring Channels** — No. 25 MSG galv steel, 7/8 in. high, 2-9/16 in. or 2-3/4 in. or 2-23/32 in. base width, 1-3/8 in. face width and 12 ft long. Installed perpendicular to steel joists 24 in. OC. At wallboard end joints, one channel approx 60 in. long located on each side and 3 in. from end joint. All furring channels tied to bottom chord of each joist or to cold rolled channel with double strand of tie wire looped around bottom chord. At splices, channels overlapped 6 in. and tied together with double strand of tie wire near each end of overlap.

6A. **Steel Framing Members*** — (Not Shown) — For the 2 Hr Assembly and Beam Ratings only, as alternate to Furring Channels (item 6), the following suspension system may be used:

- a. Main runners-Nom. 12 ft. long spaced 4 ft OC perpendicular to steel joists.
- b. Cross Tees-Nom. 4 ft. long spaced 24 in. OC perpendicular to main runners with one additional cross tee located 8 in. on each side of each end joint of wallboard.

ROXUL USA INC. D/B/A ROCKFON — Types 650, 650C, 670, 670C.

6B. **Wall Molding** — (Not Shown) — For use with Items 6A and 6C, min 0.019 in. thick steel channel, 1-11/16 in. with 15/16 in. legs, nailed to walls along perimeter of ceiling.

6C. **Steel Framing Members*** — As an alternate to Items 6 and 6A. Main runners, cross tees, cross channels and wall angle as listed below:

a. **Main Runners** — Nom 10 or 12 ft. long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC.

b. **Cross Tees** — Nom 4 ft. long, 15/16 in. or 1-1/2 in. wide face or 15/16 in. wide face installed at sides of light fixtures, installed perpendicular to the main runners, spaced 24 in. OC. When Batts and Blankets* (Item 13) are used, cross tees spaced 16 in. OC. Additional cross tees or cross channels used at 8 in. from each side of butted wallboard end joints. The cross tees or cross channels may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation.

c. **Cross Channels** — Nom 4 ft. long, installed perpendicular to main runners, spaced 24 in. OC. When Batts and Blankets* (Item 13) are used, cross channels spaced 16 in. OC.

d. **Wall Angle or Channel** — Painted or galv steel angle with 1 in. legs or channel with 1 in. legs, 1-9/16 in. deep attached to walls at perimeter of ceiling with fasteners 16 in. OC. To support steel framing member ends and for screw-attachment of the gypsum wallboard.

CGC INC — Type DGL or RX.

USG INTERIORS LLC — Type DGL or RX.

6D. **Steel Framing Members*** — (optional, not shown) — alternate method to attach furring channels (Item 6) to joists (Item 4). Clips spaced 48 in. OC., and secured to alternating joists with cup washer installation kit provided by manufacturer. On underside of bottom chord, 1-1/2 in. dia x 3/8 in. deep No. 16 galv steel cup washer is placed to surround the rubber insert. Clip attached to the bottom chord with a 1/4 in. dia. zinc plated bolt inserted through the center grommet and between the chord members; depth of bolt determined as 1-1/2 in. plus the depth of the bottom chord of the joist. Fastened on the top side of the bottom chord with a second cup washer placed open side up, and a 1/4 in. zinc plated "Nyloc" nut. Furring channels are friction fitted into clips. RSIC-1 clip for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) clip for use with 2-23/32 in. wide furring channels. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping No. 6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Additional clips required to hold furring channel that supports the wallboard butt joints, as described in Item 7.

PAC INTERNATIONAL L L C — Types RSIC-1, RSIC-1 (2.75).

6E. **Steel Framing Members*** — (Optional, Not Shown) - Used as an alternate method to attach furring channels (Item 6) to joists (Item 4). Clips spaced at 48" OC and secured to the bottom of the joists with cup washer installation kit provided by manufacturer. On underside of bottom chord, 1-1/2 in. dia x 3/8 in. deep No. 16 galv steel cup washer is placed to surround the rubber insert of clip. Clip attached to the bottom chord with a 1/4 in. dia zinc plated bolt inserted through the center grommet and between the chord members; depth of bolt determined as 1-1/2 in. plus the depth of the bottom chord of the joist. Fastened on the top side of the bottom chord with a second cup washer placed open side up, and a 1/4 in. zinc plated "Nyloc" nut. Furring channels are then friction fitted into clips. Ends of channels are overlapped 6" and tied together with double strand of No. 18 AWG galvanized steel wire. Additional clips are required to hold the Gypsum Butt joints as described in Item 7.

STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips - Type A237R

6F. **Steel Framing Members*** — (Not Shown) - As an alternate to Items 6 through 6E - Main runners nom 12 ft long, spaced 72 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. The main runners and cross tees may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation.

USG INTERIORS LLC — Type DGL or RX. **When Type DGL or RX Steel Framing Members with 6 ft long cross tees are used, assembly and beam ratings are limited to 2 hr.**

6G. **Framing Members*** — (Not Shown) — As an alternate to Items 6 through 6F. Main runners nom 12 ft long, spaced 72 in. OC. Main runners suspended by min 12 SWG galv steel hanger wires spaced 48 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. The main runners and cross tees may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation.

ROXUL USA INC. D/B/A ROCKFON — Type 670C

7. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, installed with long dimension perpendicular to furring channels and side joints located between steel joists. Over end joints, a 3 in. wide strip of wallboard to be inserted for entire length of end joint. End joints in adjacent rows to be staggered min. of 2 ft.

For use with Item No. 6A and 6C only — 5/8 in. thick, 4 ft wide; installed with long dimension perpendicular to cross tees with end joints centered along main runners. Wallboard fastened to each cross tee with five wallboard screws (Item No. 8) with one screw located at the midspan of the cross tee, one screw located 12 in. from and on each side of the cross tee 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, 3/8 to 1/2 in. from side joints, midway between intersections with cross tees (24 in. OC). End joints of the wallboard sheets shall be staggered with joints in adjacent wallboard courses not less than 4 ft OC. Wallboard sheets screw-attached to flange of wall molding with wallboard screws spaced 12 in. OC.

When **Steel Framing Members** (Item 6D) are used, wallboard butt joints shall be staggered min. 2 ft. within the assembly, and occur between the main furring channels. Edge joints may occur beneath the joists. At the wallboard butt joints, each end of the gypsum board shall be supported by a single length of furring channel equal to the width of the wallboard plus 6 in. on each end. The furring channels shall be spaced approximately 3-1/2 in. OC, and be attached to underside of the joist with one RSIC-1 clip at each end of the channel. Gypsum board attached to the furring channels using 1 in. long Type S bugle-head steel screws spaced 8 in. OC along butted end joints and 12 in. OC in the field of the board.

When **Steel Framing Members** (Item 6E) are used, one layer of nom 5/8 in. thick, 4 ft wide gypsum board is installed with long dimensions perpendicular to furring channels. Gypsum board secured to furring channels with nom 1 in. long Type S bugle-head steel screws spaced 8 in. OC in the field of the board. Gypsum board butted end joints shall be staggered minimum 48 in. and centered over main furring channels. At the gypsum board butt joints, each end of

each gypsum board shall be supported by a single length of furring channel equal to the width of the gypsum board plus 3 in. on each end. The two supporting furring channels shall be spaced approximately 3 in. in from end joint. Screw spacing along the gypsum board butt joint and along both additional furring channels shall be 8 in. OC. Additional screws shall be placed in the adjacent section of gypsum board into the aforementioned 3 in. extension of the extra butt joint channels as well as into the main channel that runs between. Butt joint furring channels shall be attached with one RESILMOUNT Sound Isolation Clip at each end of the channel.

When **Steel Framing Members*** (Item 6F and 6G) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. OC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide pieces of gypsum board are to be laid atop the cross tee flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip with hold down clips to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to cross tees with 1 in. drywall screws spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board.

AMERICAN GYPSUM CO — Type AG-C

CERTAINTED GYPSUM INC — Type C

CGC INC — Types C, IP-X2, ULIX.

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC-C/A.

GEORGIA-PACIFIC GYPSUM L L C — Types 5, DAPC, TG-C.

NATIONAL GYPSUM CO — Type FSW-C.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type C.

PANEL REY S A — Type PRC

THAI GYPSUM PRODUCTS PCL — Type C

UNITED STATES GYPSUM CO — Types C, IP-X2, ULIX.

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Types C, IP-X2.

7A. **Gypsum Board*** — For use when **Batts and Blankets*** (Item 13) and **Steel Framing Members*** (Item 6C) are used - 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.

CGC INC — Types C, IP-X2, ULIX.

UNITED STATES GYPSUM CO — Types C, IP-X2, ULIX.

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Types C, IP-X2.

8. **Screws, Wallboard** — If not described under Item 7 - No. 6 Phillips-head self-drilling and self-tapping 1 in. long, steel screws. Spaced 12 in OC on each furring channel. At end joints, screws located 3 in. on each side of joint. One additional screw driven through the boards adjacent to the end joint, approx. 1-1/2 in. from the side joint into each end of the short channels. Along side joints, fasteners located 3/4 in. from joint.

For use with Item No. 6A, No. 6 Phillips head, Type S, self-drilling and self-tapping, 1 in. long, steel screws, located as described under Gypsum Board (Item 7) located 3 in. on each side of joint. One additional screw driven through the boards adjacent to the end joint, approx. 1-1/2 in. from the side joint into each end of the short channels. Along side joints, fasteners located 3/4 in. from joint.

9. **Joint System** — (Not shown) — Paper tape embedded in joint compound over joints, and covered with two layers of compound with edges feathered out. Wallboard screw heads covered with two layers of compound.

10. **Air Duct and Damper** — (Not shown) — Optional. Duct made of min 0.023 in. thick (24 gauge) galv steel. Total area of duct openings not exceed 113 sq in. per 100 sq ft of ceiling area. Area of ind duct opening not to exceed 113 sq in. Max dimension of opening 12 in. Duct supported by 1 1/2 in. deep, min 0.053 in. thick (16 gauge) cold-rolled steel channels spaced not over 48 in. O.C. and on each side of duct opening. Channels suspended from upper chord of joists by 12 SWG galv steel wire. Min clearance of 4 in. required between back of ceiling membrane and bottom of air duct.

Damper made of min 0.056 in. thick (16 gauge) galv steel protected on both surfaces with 1/16 in. ceramic fiber paper. Located over each duct outlet, attached to bottom of duct with corrosion resistant hinges and held open with a **Fusible Link** (Bearing the UL Listing Mark). Damper to overlap duct outlet 1 in. min.

11. **Mineral and Fiber Boards*** — (Optional, not shown) — Applied over concrete floor with no limit on overall thickness. When the insulation is used, the Restrained and Unrestrained Assembly Ratings are 2 hr and the Unrestrained Beam Rating is 2 hr.

See Mineral and Fiber Board (CERZ) category for names of manufacturers.

12. **Roof Covering** — (Not shown, for use with insulation described in Item 11.) — Class A, B, or C **Built-Up Roof Covering Materials*** consisting only of felt and asphalt (or coal tar pitch) materials in alternate layers. See Building Materials Directory.

13. **Batts and Blankets*** — Optional - Not Shown - When used Ratings are limited to 1 Hr. - For use with **Steel Framing Members*** (specifically Item 6C) and **Gypsum Board*** (specifically Item 7A) - Any thickness mineral wool or glass fiber insulation bearing the UL Classification Marking for Surface Burning Characteristics, having a flame spread value of 25 or less and a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over steel framing members/gypsum wallboard ceiling membrane.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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