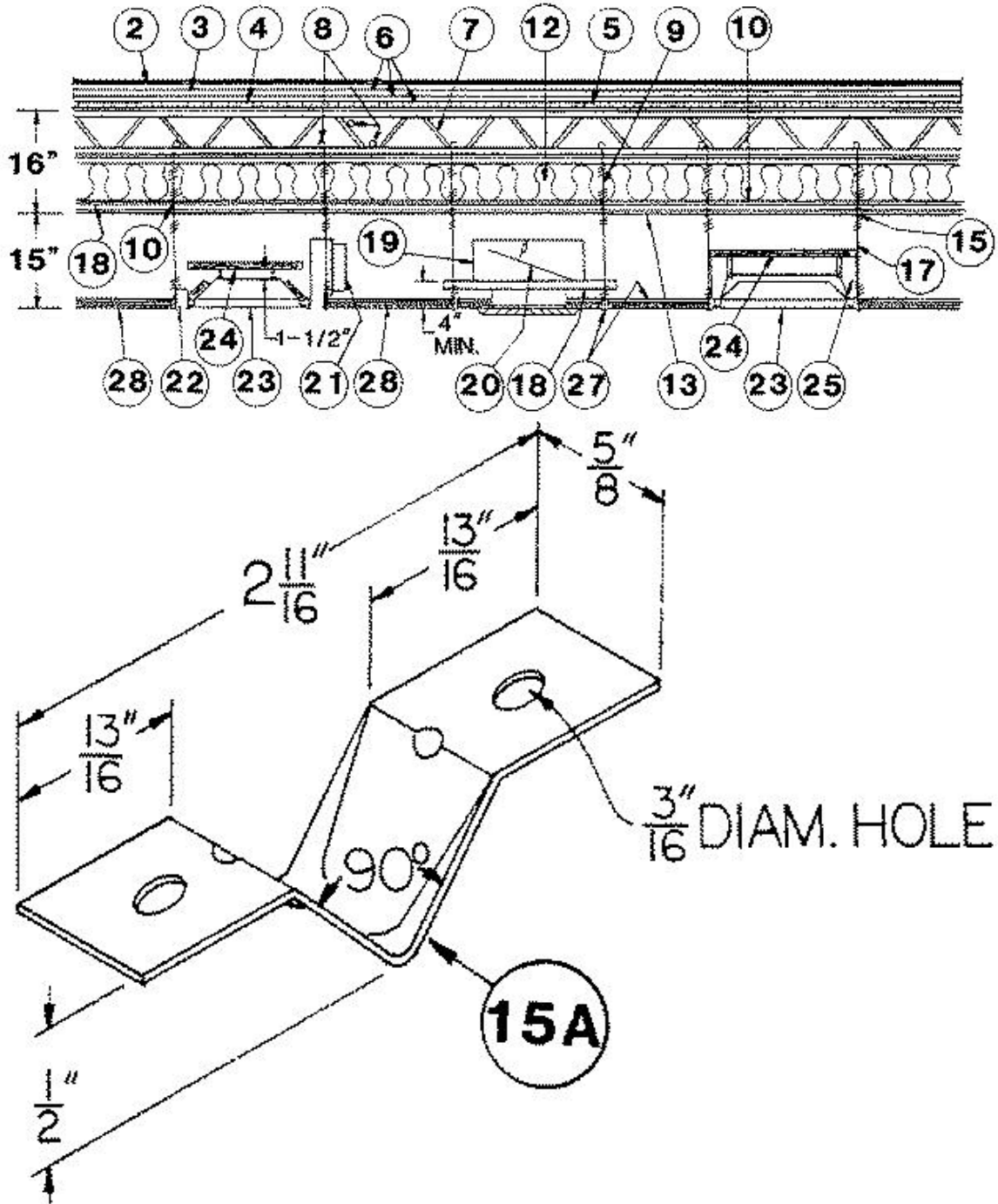


Restrained Assembly Rating - 2 Hr.

Unrestrained Assembly Rating - 2 Hr.

Unrestrained Beam Rating - 2 Hr.



1. Beam — W6x12, min. size (not shown).

2. **Roof Covering\*** — Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT).

2A. **In lieu of Item 2, roof covering consisting of single-ply Roofing Membrane\*** — that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory-Roofing Membranes (CHCI).

2B. **Metal Roof Deck Panels (Not shown)** — In addition to or in lieu of Items 2 or 2A, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory-Metal Roof Deck Panels (CETW).

3. **Mineral and Fiber Boards\*** — 24 by 48 in. or larger, to be applied in one or more layers with adhesive between layers or laid loosely. Boards to be installed perpendicular to steel roof deck direction with end joints staggered 12 in. or more in adjacent rows. When applied in more than one layer, each layer of board to be offset in both directions from layer below a min of 12 in. in order to lap all joints. Min. thickness is 2 in. when Item 2A or 2B is used. Min. thickness is 1 in. otherwise. Max thickness 3 in.

**BMCA INSULATION PRODUCTS INC** — Permalite.

**FIBREX INSULATIONS INC** — FBX Baseboard and FBX Capboard.

**GAF MATERIALS CORP** — GAFTEMP Perlite.

**JOHNS MANVILLE INTERNATIONAL INC** — Square edge boards.

**ROXUL INC** — Toprock.

4. **Sheathing Material\*** — Optional — Vinyl-film vapor barrier, applied with adhesive or laid loosely steel roof deck. Adjacent sheets overlapped 2 in.

**BMCA INSULATION PRODUCTS INC**

4A. **Sheathing Material\*** — (Optional) — In lieu of Item 4, as self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the steel roof deck (Item 5).

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Grace Ice and Water Shield, Grace Select, Grace Ultra, and Grace Basik.

5. **Steel Roof Deck** — Min 1 in. deep, 25 in. wide, fluted galv steel deck, min 24 MSG. Flutes approx 4 in. OC, crests approx 2-3/4 in. wide. Welded to supports with welding washers 12 in. OC, to occur at side laps and at center of deck sections. Side laps of adjacent units to be welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws midway between joists; or

**Classified Steel Floor and Form Units\*** — 1-1/2 in. deep, 30 in. or 36 in. wide, fluted galv steel deck, min 0.028 in. thick (24 gauge). Welded to supports with welding washers 15 in. OC, to occur at side laps and at center of deck sections. Side laps of adjacent units to be welded or secured together with No. 12 by 1/2 in. self-drilling, self-tapping steel screws midway between joists.

**CONSOLIDATED SYSTEMS INC** — 30 in. wide Types B, BI, F.

6. **Adhesive\*** — Optional — May be applied in approx 1/2 in wide ribbons at 0.4 gal per 100 sq ft (approx 6 in OC) between layers of mineral and fiber boards, between vapor barrier and deck and between vapor barrier and mineral and fiber boards.

#### **BMCA INSULATION PRODUCTS INC**

7. **Steel Joists** — Type 8H3 or 10K1, min size, a max 72 in. OC and welded to end supports.

8. **Bridging** — Steel bars, 5/8 in. diam, welded to top and bottom chord of each joist. May be used as support for hanger wires when welded to top of joist bottom chord.

9. **Hanger Wire** — Upper Plenum — No. 12 SWG galv steel wire, twist-tied to bottom chord of joists, bridging bars or cold-rolled channels. Located 24 in OC along main runners and at midspan of all cross tees. Cross tees located 8 in from end joints of wallboard do not require hanger wire at midspan. Additional hanger wires also required on cut cross tees over 2 ft long at walls, and adjacent to main runner splices. Where applicable, hanger wires in upper plenum must be located at points where hanger wires are required in lower plenum.

10. **Steel Framing Members\*** — Upper Plenum —

A. Main Runners — Nom 12 ft long spaced 4 ft OC.

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.

**ARMSTRONG WORLD INDUSTRIES INC** — Type DFR-8000.

**BPB AMERICA INC** — Types PDWH, PDWS. The main runner ends may be riveted or screw attached to the wall molding along one wall and the cross tee ends may be riveted or screw attached to the wall molding along both adjacent walls. The rivets or screws are intended to facilitate the ceiling installation, not to replace hanger wire.

**CHICAGO METALLIC CORP** — Types 650, 650C, 670, 670C. The main runner ends may be riveted or screw attached to the wall molding along one wall and the cross tee ends may be riveted or screw attached to the wall molding along both adjacent walls. The rivets or screws are intended to facilitate the ceiling installation, not to replace hanger wire.

10A. **Alternate Steel Framing Members\*** — Upper Plenum — (Not shown) — 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, 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. 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.

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 INTERIORS, DIV OF CGC INC** — Type DGL or RX.

**USG INTERIORS INC** — Type DGL or RX.

11. **Wall Molding** — Upper Plenum — (Not shown) — No. 26 MSG steel channel, 1-11/16 in high with 15/16 in legs, nailed to walls along perimeter of ceiling with 8d cement coated nails, 12 in OC.

12. **Batts and Blankets\*** — Nom 24 in wide roll by 6 in thick glass fiber insulation. Installed on top of gypsum wallboard and suspension system with long dimension perpendicular to cross tees. Sides of unrolled batts are butted together while the ends overlap approx 6 to 12 in.

**OWENS CORNING HT INC, DIV OF OWENS CORNING**

13. **Gypsum Board\*** — 1/2 in thick, 4 ft wide; installed with long dimension perpendicular to cross tees with end joints centered along cross tees and with side joints centered along main runners. Wallboard fastened to each cross tee with five wallboard screws (Item No. 14) spaced 12 in OC. One screw is located at the midspan of the cross tee, one screw located 12 in from and on each side of the cross tee midspan while the end screws are located 1-1/2 in from wallboard sides. Except at wallboard end joints, screws shall be alternating on opposite 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 in adjacent wallboard courses shall be staggered not less than 2 ft OC. Wallboard sheets screw-attached to flange of wall channel with wallboard screws spaced 12 in OC.

**AMERICAN GYPSUM CO** — Types AG-C, AGX-6, AGX-10, AGX-C.

**BPB AMERICA INC** — Type FRPC, SF3, ProRoc Type C.

**BPB CANADA INC** — ProRoc Type C.

**CANADIAN GYPSUM COMPANY** — Type C.

**G-P GYPSUM CORP, SUB OF GEORGIA-PACIFIC CORP** — Types 5, C, DAP, DA.

**LAFARGE NORTH AMERICA INC** — Types LGFC3, LGFC-C, LGFC-C/A.

**NATIONAL GYPSUM CO** — Types FSK-C, FSW-1, FSW-C or FSW-G.

**PABCO GYPSUM, DIV OF PACIFIC COAST BUILDING PRODUCTS INC** — Types PG-3, PG-C.

**STANDARD GYPSUM L L C** — Type SG-C.

**TEMPLE-INLAND FOREST PRODUCTS CORP** — Type T, VPB-Type T or TG-C.

**UNITED STATES GYPSUM CO** — Type C.

**USG MEXICO S A DE C V** — Type C.

14. **Screw, Gypsum Board** — (Not shown) — No. 6 Phillips-type, Type S self-drilling and self-tapping, 1 in. long.

15. **Hanger Wire Clip** — No. 20MSG (min. 0.034 in. thick) galv steel two-hole pipe strap for 1/2 in electrical thin wall conduit. Oriented diagonally to the upper steel framing members and screws attached to the flange of steel framing members (Item No. 10) through wallboard with steel screws (Item No. 16). Clip locations to coincide with hanger wires (Item 9) supporting the upper steel framing members.

15A. **Alternate Hanger Wire Clip** — Made of 0.034 in. thick galv steel, 5/8 in. wide by 2-11/16 in. overall length, with center section formed down 1/2 in. to allow passage of hanger wire. Oriented diagonally to the upper steel framing members and screw-attached to the flange of the steel framing members through wallboard with steel screws (Item 16). Clip locations to coincide with hanger wires (Item 9) supporting the upper steel framing members.

16. **Screw, Sheet Metal** — (Not shown) — No. 10 pan head self-tapping sheet metal steel screw, Type A, 1-1/4 in. long.

17. **Hanger Wire** — No. 12 SWG galv steel wire, twist-tied to hanger wire clip (Item 15). Located 48 in OC along main runners (Item No. 27) and at midspan of all cross tees. Additional hanger wires are required at all four corners of light fixtures, at all four corners of panels having air duct penetrations, and adjacent to main runner splices. Additional hanger wires also required on cut cross tees over 2 ft long at walls. All hanger wire locations in lower plenum must coincide with hanger wire locations in upper plenum.

18. **Cold Rolled Channels** — Min 0.053 in. thick (16 gauge) cold-rolled steel channels, 1-1/2 in. deep with 9/16 in. flanges placed under air duct and supported by hanger wires at each end, spaced not over 48 in OC and on each side of duct outlet to support air duct. When steel joists are spaced maximum 4 ft OC, single cold-rolled channel may be used as support for hanger wires when placed in a vertical position on top of the bottom chord of joists and cross-tied to the chord with 12 SWG galv steel wire. When steel joists are spaced more than 4 ft OC, two of the above cold-rolled steel channels placed back to back and tied together at 24 in OC and to the bottom chord of the joist with No. 18 double strand galvanized steel wire, or No. 12SWG galv steel wire, spaced at maximum 48 in. OC are required to provide attachment provision for ceiling hanger wires. The wire shall be tightly wound on channels and chord and on itself with a min of three twists.

19. **Air Duct** — No. 24 MSG min galv steel. Total area of duct openings not to exceed 576 sq in. per each 100 sq ft of ceiling area with the total area of each ind duct opening not to exceed 576 sq in. Max dimension of opening is 30 in. Where air duct penetrates through a suspension system member, each cut end of the suspension system member near the duct outlet must be independently supported by a vertical hanger wire.

20. **Damper** — No. 16 MSG galv steel sized to overlap duct drop opening 2 in min. Protected on both surfaces with 1/16 in. thick ceramic fiber paper laminated to the steel damper with adhesive and held open with a **Fusible Link** (Bearing the UL Listing Mark). In lieu of the damper described above, Duct Outlet Protection System A, as described in the Design Information Section may be used with steel ducts. Larger or smaller size prefabricated dampers Classified under the **Ceiling Dampers** category may be substituted for the above damper in accordance with the Classification for the specific damper. Similarly, Classified **Air Terminal Units** may be used in lieu of the above duct drop penetrations in accordance with the Classification for the specific unit.

21. **Air Terminal Units\*** — Linear Air Diffusers — 4 ft long units. Located in openings formed by two cross tees spaced 2 in OC on each side of a 20 by 48 in light fixture when ceiling is composed of nom 24 by 48 in lay-in panels. Linear air diffuser to be located on one side of fixture with a linear air return (Item No. 22) to be located on opposite side of fixture to complete the 2 by 4 ft grid module. Linear air diffusers attached to web of each cross tee with steel sheet metal screw at midpoint. Each linear air diffuser supported by 12 SWG hanger wire at its midpoint. A max of 12 lin ft of linear air diffuser is allowed per each 100 sq ft of ceiling area.

**TEMPMASTER CORP** — Type TBD.

22. **Air Terminal Units\*** — Linear Air Returns — 4 ft long units. Located in openings formed by two cross tees spaced 2 in. OC on each side of a 20 by 48 in light fixture when ceiling is composed of nom 24 by 48 in lay-in panels. Linear air return to be located on one side of fixture with a linear air diffuser (Item No. 21) to be located on opposite side of fixture to complete the 2 by 4 ft grid module. Linear air returns attached to web of each cross tee with steel sheet metal screw at midpoint. Each linear air return supported by 12 SWG hanger wire at its midpoint. A max of 12 lin ft of linear air return is allowed per each 100 sq ft of ceiling area.

**TEMPMASTER CORP** — Type TBDR.

**23. Fixtures, Recessed Light** — (Bearing the UL Listing Mark) — Fluorescent lamp type, steel housing, 1 by 4 ft, 2 by 2 ft, 2 by 4 ft or 20 by 48 in size. The nom 1 by 4 ft, 2 by 2 ft and 2 by 4 ft fixtures may be provided with or without vented sides for air boots (Item No. 25) and with or without vented tops for air return purposes. Air boots must be used in conjunction with fixtures designed for that purpose. Linear air diffusers (Item No. 21) and linear air returns (Item No. 22) may only be used in conjunction with nom 20 by 48 in fixtures. When nom 1 by 4 ft, 2 by 4 ft or 20 by 48 in fixtures are used, aggregate of fixtures not to exceed three per 100 sq ft of ceiling area. When nom 2 by 2 ft fixtures are used, aggregate of fixtures not to exceed four per 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code. Fixtures and ballasts must be considered for these ambient temperature conditions before installation.

**23A. Fixture Stabilizer** — (Not shown) — For use with the Type 1650 metal pans (See Item 10A); one min 0.047 in. thick (16 MSG) galv steel channel yoke per light fixture, secured to the web at midspan of cross tee on each side of fixture.

**23B. Fixture Stabilizer** — (Not shown) (Optional) — Min. 0.020 in. thick (25 MSG) painted steel spacer bar formed as an angle with 1 in. legs and hemmed edges and slots perpendicular to and near the ends of the spacer bar for engaging over the bulb of the tees. Engaged over the bulb at midspan of the cross tees on each side of all light fixtures and over the bulb of the adjacent cross tee.

**23C. Fixtures, Recessed Light** — (Bearing the UL Listing Mark) — (Not Shown) — As an alternate to Item 23, incandescent lamp type, steel housing, nom 6-1/2 in. diam by 7-1/2 in. high. Each fixture provided with a nom 7-3/4 in. by 12-1/2 in. base plate screw-attached to the "high hat" fixture with three steel screws. Base plate to be provided with steel bar hangers designed to span across nom 24 in. spacing of cross tees for fixture support. Fixture secured to cross tees with steel clips provided at the end of the steel bar hangers. A max of two "high hat" fixtures may be substituted for each nom 24 in. by 48 in. fixture permitted in the ceiling (max six "high hat" fixtures per 100 sq ft of ceiling area). For use with USG Interiors, Inc. steel framing members and acoustical materials only. Wired in accordance with National Electrical Code.

**24. Fixture Protection — Batts and Blankets\*** — 1-1/4 in thick mineral wool batts. For nom 24 by 48 in fixtures with air boots and crossover duct, a nom 24 in wide batt is placed directly over the top of the duct and air boots. For the nom 20 by 48 in non-air-handling fixtures, one piece of mineral wool batt 23 in wide and of length equal to the length of the fixture is centered over and spaced 1-1/2 in from the top of fixture housing. The 1-1/2 in clearance shall be provided by scrap pieces of steel framing member tees. Another piece of mineral wool batt equal to the length of the fixture, and 3 in. wide is placed against each side of the fixture. Additional pieces equal to the width of the fixture and of sufficient height to cover the height from the top of the main runner to the top of the batt over the fixture is placed against each end of the fixture and attached to the top batt. Pieces held together by 18 SWG galv steel tie wire. Where the fixtures are butted end to end, the mineral wool batts end pieces at the abutting ends are omitted and the top batts are butted together.

**ROXUL INC** — Type FR.

**24A. Fixture Protection — Acoustical Material\*** — For use with "high hat" light fixtures (Item 23C). Five sided enclosure, rectangular in cross section, cut from the same acoustical material used in the ceiling assembly. Two side pieces measuring 8 in. high by 23-3/4 in. long resting upon ceiling tile, two end pieces measuring 6-3/4 in. high by 16 in. long resting upon steel bar hangers and one top piece measuring 14 in. by 18 in. resting upon side and end pieces with 18 in. dimension parallel with end pieces. Enclosure secured with four 8d nails installed through side pieces into end pieces near the top of the assembly.

**25. Air Boots** — No. 24 MSG galv steel air boots with internal glass fiber insulation are installed in pairs along both sides of air supply light fixtures, and are connected by a 24 MSG galv steel crossover duct.

26. **Air Duct Connector** — (Not shown) — Max diam 6 in. Any Class O or Class I air duct connector (bearing the UL Listing Mark).

27. **Steel Framing Members\*** — The steel framing members are provided with either steel or aluminum caps on the exposed flange, depending upon the steel framing member type. When aluminum capped members are used, additional hanger wires are required along main runners (in addition to those required under Item 9) spaced 24 in OC i.e., one wire at each intersection of main runners and cross tees. Main runners nom 12 ft long, spaced 48 in OC. Cross tees nom 4 ft long installed perpendicular to main runners and spaced 24 in OC. When nom 1 by 4 ft light fixtures are used, additional 4 ft long cross tees installed along length centerline of 2 by 4 ft grid modules; a field-cut nom 12 by 48 in lay-in panel, bearing a min of 3/8 in on suspension members, fills in the remainder of such modules. When nom 20 by 48 in light fixtures and air terminal units (Item Nos. 13 and 14) are used, additional 4 ft long cross tees are installed parallel with and 2 in from the 4 ft cross tees in the 2 by 4 ft grid module where 20 by 48 in light fixture is to be installed. The end tabs of the 4 ft long cross tees forming the sides of the 20 by 48 in grid module shall engage field-punched routes in the web of each main runner. The field-punched routes must be identical to factory-punched routes and shall be effected using a tool designed for that purpose and provided by the steel framing member manufacturer - For 24 by 48 in lay-in panels.

**ARMSTRONG WORLD INDUSTRIES INC** — Type AFG

**BPB AMERICA INC** — Types PAC, PCH, PCS. The main runner ends may be riveted to the wall molding along one wall and the cross tee ends may be riveted to the wall molding along one adjacent wall. The rivets are intended to facilitate the ceiling installation, not to replace hanger wires.

**CHICAGO METALLIC CORP** — Types 250, 260, 1250, 1260, 1850, 1860. The main runner ends may be riveted to the wall molding along one wall and the cross tee ends may be riveted to the wall molding along one adjacent wall. The rivets are intended to facilitate the ceiling installation, not to replace hanger wires.

27A. **Steel Framing Members\*** — The steel framing members are provided with either steel or aluminum caps on the exposed flange, depending upon the steel framing member type. When aluminum capped members are used, additional hanger wires are required along main runners (in addition to those required under Item 9) spaced 24 in OC i.e., one wire at each intersection of main runners and cross tees. Main runners nom 10 or 12 ft long, spaced 48 in OC. Cross tees nom 4 ft long installed perpendicular to main runners and spaced 24 in OC. When nom 1 by 4 ft light fixtures are used, additional 4 ft long cross tees installed along length centerline of 2 by 4 ft grid modules; a field-cut nom 12 by 48 in lay-in panel, bearing a min of 3/8 in on suspension members, fills in the remainder of such modules. When nom 20 by 48 in light fixtures and air terminal units (Item Nos. 13 and 14) are used, additional 4 ft long cross tees are installed parallel with and 2 in from the 4 ft cross tees in the 2 by 4 ft grid module where 20 by 48 in light fixture is to be installed. The end tabs of the 4 ft long cross tees forming the sides of the 20 by 48 in grid module shall engage field-punched routes in the web of each main runner. The field-punched routes must be identical to factory-punched routes and shall be effected using a tool designed for that purpose and provided by the steel framing member manufacturer - For 24 by 48 in lay-in panels.

**CGC INTERIORS, DIV OF CGC INC** — Type DXL, DXLA, DXLZ, DXLZA, SDXL, SDXLA or ZXLA.

**USG INTERIORS INC** — Type DXL, DXLA, DXLZ, DXLZA, SDXL, SDXLA or ZXLA.

27B. **Steel Framing Members\*** — **Metal pans** — (Not shown) (Optional) — Channel-shaped metal pans in various colors and finishes, installed perpendicular to cross tees or main runners and spaced 4 or 6 in. O.C. The flange edges of the metal pans engage and interlock with the vertical tabs of the corresponding grid adapters with tabs 4 or 6 in. O.C. (See Item 27B). End laps joints of the metal pans shall occur adjacent to main runners or cross tees. The metal pans shall each be supported by at least two main runners or cross tees.

**CHICAGO METALLIC CORP** — Type 1650.

27C. **Steel Framing Members\*** — **Grid adapter** — (Not shown) (Optional) — For use with Type 1650 metal pans (See Item 27A). Angle shaped adapter with a looped return flange; installed parallel to cross tees or main runners by engaging return flange of adapter to the flange of the cross tee or main runner. The 48 or 24 in. long adapters are intended for use with cross tees or main runners, respectively.

**CHICAGO METALLIC CORP** — Type 1650.

27D. **Steel Framing Members\*** — **Filler strips** — (Not shown) (Optional) — For use with Type 1650 metal pans. Filler strips are 0.018 to 0.024 in. thick, steel or aluminum, 13/32 or 5/8 in. deep by 3/4 in. wide, placed between the metal pans.

**CHICAGO METALLIC CORP** — Type 1650.

28. **Acoustical Material\*** — Nom 24 by 48 in. by 5/8 in thick lay-in panels. Border panels supported at walls by min 0.016 in. thick painted steel angle with 7/8 in. legs or min. 0.016 in. thick painted steel channel with a 1 by 1-9/16 by 1/2 in. profile.

**EMCO LTD** — Type FR-4.

**USG INTERIORS INC** — Type FR-4.

28A. **Acoustical Material\*** — As an alternate to Item 28, for use with Types DXL, DXLA or ZXLA steel framing members - Nom 24 by 48 by 5/8 or 3/4 in. thick lay-in panels. Border panels supported at walls by min 0.016 in. thick painted steel angle with 7/8 in. legs or min. 0.016 in. thick painted steel channel with a 1 by 1-9/16 by 1/2 in. profile.

**EMCO LTD** — 5/8 in. or 3/4 in. Type FR-83 ; 3/4 in. thick Type FR-X1. See **Acoustical Materials** (BYIT), EMCO Ltd. for specific tile details.

**USG INTERIORS INC** — 5/8 in. or 3/4 in. Type FR-83. 3/4 in. thick Type FR-X1. See **Acoustical Materials** (BYIT), USG Interiors, Inc., for specific tile details.

29. **Speaker Assemblies\*** — (Not Shown) Optional. The speaker assemblies consist of speakers, speaker enclosures and their accessories. The ceiling penetration for the speaker enclosure shall not exceed 11-7/8 by 11-7/8 in. for the square speaker enclosures and 12 in. in diam for the round speaker enclosures. The speaker assemblies are installed in accordance with the installation instructions provided. A maximum of two 144 sq. in. speaker assemblies per 100 sq ft of ceiling area is allowed.

**ATLAS/SOUNDOLIER, DIV OF AMERICAN TRADING & PRODUCTION CORP**

See **Speaker Assemblies For Fire Resistance (CHML)**, Atlas/Soundolier, Div of American Trading & Production Corp. for specific Types.

\*Bearing the UL Classification Mark

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