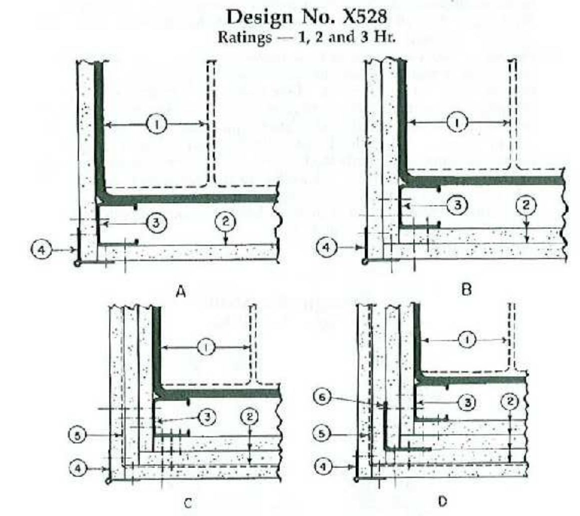
RENOVATIONS TO RUTHERFORD COUNTY COURTHOUSE TAX OFFICES
Rutherfordton, North Carolina

Design No. X528
Ratings — 1, 2 and 3 Hr.



CORNER DETAILS OF WALLBOARD SUPPORT SYSTEMS WITHOUT STEEL COVERS

1. **Steel Column** — Min sizes of W-shaped and tubular steel columns which appear in the AISC Steel Construction Manual as shown under Item 2.
2. **Gypsum Board*** — For 1 Hr rating, any 5/8 in. or 1/2 in. thick gypsum wallboard Classified for use in fire resistance assemblies. For 2 Hr and 3 Hr ratings, any 5/8 in. or 1/2 in. thick gypsum wallboard Classified for use in other 2 Hr, 3 Hr or 4 Hr Column Designs. Min total thickness of layers in inches for the various ratings and min column sizes are as follows:

W Shaped Column Min Column Size	Rating (Hr) 1	2	3	Corner Details For Various Rating 1 Hr	2 Hr	3 Hr
	Total thickness (In.)					
W4x13	1	1-1/2	2-1/4	B	C	D
W6x15.5	1	1-1/2	2-1/4	B	C	D
W10x49	1/2	1-1/8	1-7/8	A	B	C
	Tube Shaped columns					
TS 4 by 4 by 0.188	1	1-5/8	2-1/2	B	C	D
TS 8 by 8 by 0.250	5/8	1-5/8	2-1/2	A	C	D

Applied in layers as noted in the above illustrations. Boards are to be applied vertically without horizontal joints.
See **Gypsum Board (CKNX)** category for names of manufacturers.

2A. **Gypsum Board*** — As an alternate to Item 2- 3/4 in. thick gypsum wallboard. For 2 Hr rating, 1-1/2 in. total thickness, installed in accordance with corner detail B. For 3 Hr rating, 2-1/4 in. total thickness installed in accordance with corner detail C. Boards are to be applied vertically without horizontal joints.
CANADIAN GYPSUM COMPANY —Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX.
UNITED STATES GYPSUM CO —Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX.
YESO PANAMERICANO S A DE C V —Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX.

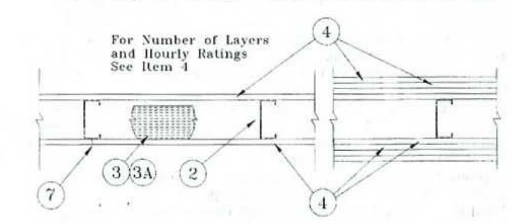
3. **Steel Stud** — 1-5/8 in. wide with 1-5/16 and 1-7/16 in. legs having a 1/4- in. folded flange, fabricated from No. 25 MSG galv steel. Length to be 1/2 in. less than the assembly height.

3A. **As an alternate to Item 3 Steel Framing Members*** — galv. steel clips spaced 4 ft OC and 1-1/4 in. from top and bottom of column. A No. 28 MSG galv steel support angle with 1-1/4 in. legs length shall be placed over clips and secured with screws attaching the wallboard. The angle cut 1 in. less than assembly height splices in angle to occur over clips. The clips for use with wide flange columns only.
COLUMN & BEAM INC —Types CB, CB1Clips.

4. **Corner Beads** — No. 28 MSG galv steel, 1-1/4 in. legs to be attached to the wallboard with No. 6 by 1 in. screws spaced 12 in. OC max.
5. **Tie Wire** — No. 18 SWG steel wire spaced 24 in. OC used with second layer of wallboard.
6. **Screws** — For attaching first layer of wallboard to steel studs, and third layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1 in. (or 1-1/4 in. for 3/4 in. thick wallboard) Phillips head self-drilling, self-tapping double lead screws spaced 24 in. OC For attaching second layer of wallboard to steel studs and fourth layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1-3/4 in. (or 2-1/4 in. for 3/4 in. thick wallboard) steel screws of the same type spaced 12 in. OC For attaching third layer of wallboard to steel studs to be No. 8 by 2-1/4 in. screws of the same type spaced 12 in. OC
7. **Finishing System** — (Not Shown) — Joint compound applied over corner beads to a thickness of 1/16 in.

*Bearing the UL Classification Mark

Design No. U419
Nonbearing Wall Ratings — 1, 2, 3 or 4 Hr (See Items 3 & 4)



1. **Floor and Ceiling Runners** — (Not shown) — Channel shaped, fabricated from min 25 MSG (min 20 MSG when Item 4A is used) corrosion-protected steel, min width to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners 24 in. OC max.
2. **Steel Studs** — Channel shaped, fabricated from min 25 MSG (min 20 MSG when Item 4A is used) corrosion-protected steel, min width as indicated under Item 4, min 1-1/4 in. flanges and 1/4 in. return, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
3. **Batts and Blankets*** — (Required as indicated under Item 4) — Mineral wool batts, friction fitted between studs and runners. Min nom thickness as indicated under Item 4. See **Batts and Blankets (BKNV or BZJZ) Categories** for names of Classified companies.

3A. **Batts and Blankets*** — (Optional) — Placed in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. See **Batts and Blankets (BKNV or BZJZ) Categories** for names of Classified companies.

4. **Gypsum Board*** — Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

Wallboard Protection on Each Side of Wall

Rating	Min Stud Depth	No. of Layers & Thkns of Panel	Min Thkns of Insulation (Item 3)
1	3-1/2	1 layer, 5/8 in. thick	Optional
1	2-1/2	1 layer, 1/2 in. thick	1-1/2 in.
1	1-5/8	1 layer, 3/4 in. thick	Optional
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
2	3-1/2	1 layer, 3/4 in. thick	3 in.
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	2 layers, 3/4 in. thick	Optional
3	1-5/8	3 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional
4	2-1/2	2 layers, 3/4 in. thick	2 in.

CANADIAN GYPSUM COMPANY —1/2 in. thick Type C, IP-X2 or IPC-AR; WRC, 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX or WRC; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX
UNITED STATES GYPSUM CO —1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type SCX, SHX, WRX, IP-X1, AR, C, WRC, FRX-G, IP-AR, IP-X2, IPC-AR; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX
YESO PANAMERICANO S A DE C V —1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, WRC or; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHX or ULTRACODE WRX.

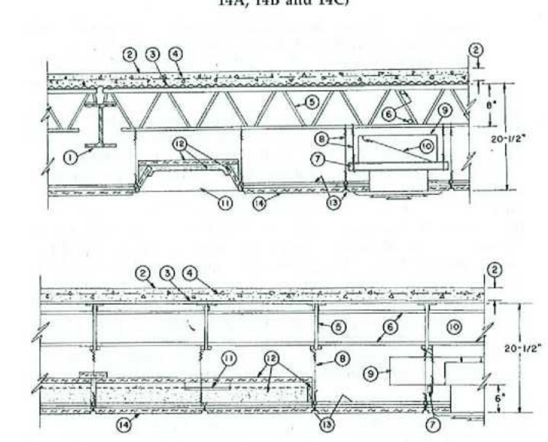
4A. **Gypsum Board*** — (As an alternate to Item 4) — 5/8 in. thick gypsum panels, installed as described in Item 4 with Type S-12 steel screws. The length and spacing of the screws as specified under Item 5.
CANADIAN GYPSUM COMPANY —Type FRX
UNITED STATES GYPSUM CO —Type FRX

4B. **Gypsum Board*** — (As an alternate to Items 4 and 4A) — 5/8 in. thick, 2 ft. wide, tongue and groove edge, applied horizontally as the outer layer to one side of the assembly. Secured as described in Item 5. Joint covering (Item 7) not required.
CANADIAN GYPSUM COMPANY — Type SHX.
UNITED STATES GYPSUM CO —Type SHX.
YESO PANAMERICANO S A DE C V — Type SHX.

5. **Fasteners** — (Not shown) — Type S or S-12 steel screws used to attach panels to studs (Item 2) or furring channels (Item 6). **Single layer systems:** 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 12 in. OC when panels are applied vertically. Two layer systems: First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer. **Three-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 12 in. OC Screws offset min 6 in. from layer below. **Four-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 24 in. OC. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels or 3 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below.
6. **Furring Channels** — (Optional, not shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 steel screws. Not for use with Item 4A.
7. **Joint Tape and Compound** — Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over all joints of outer panels.
8. **Siding, Brick or Stucco** — (Optional, not shown) — Aluminum, vinyl or steel siding, brick veneer or stucco, meeting the requirements of local code agencies, installed over gypsum panels. Brick veneer attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.
9. **Caulking and Sealants*** — (Optional, not shown) — A bead of acoustical sealant applied around the partition perimeter for sound control.
UNITED STATES GYPSUM CO —Type AS

*Bearing the UL Classification Mark

Design No. G205
Restrained Assembly Ratings — 1, 1-1/2, 2 & 3 Hr (See Items 2, 5, 13, 13A, 14A, 14B and 14C)
Unrestrained Assembly Ratings — 1, 1-1/2, 2 & 3 Hr (See Items 2, 5, 13, 13A, 14A, 14B, and 14C)
Unrestrained Beam Ratings — 1, 1-1/2, 2 & 3 Hr (See Items 5, 13, 13A, 14A, 14B and 14C)



1. **Beam** — W6 x 12, min size. As an alternate to beam, steel joist girders of 20 in. min depth, 14 lbs per lin ft min weight with min area of steel of 1.12 sq in. for chord members. Min distance from bottom of the joist girder to bottom of the ceiling is 10 in. For lowering the ceiling, the suggested method of using intermediate supports described under Suspension Systems in the Design Information Section General should be followed.
2. **Normal-Weight Concrete** — Carbonate or silicous aggregate, 150 + or -3 pcf unit weight, 3500 psi compressive strength. For the 2 hr Restrained and Unrestrained Assembly Ratings, min concrete topping thickness is 2-1/2 in. For the 3 hr Restrained and Unrestrained Assembly Ratings, min concrete topping thickness is 3-1/2 in. The concrete topping thickness shall be measured from the surface of the concrete to the top plane of the steel deck corrugations.
3. **Steel Form Units** — Min 9/16 in. deep corrugated units, min 28 MSG galv steel. Welded to supports with 1/2 in. puddle welds through welding washers. Welds located at each joist along the side laps and 48 in. O.C. along the center valley of the units. End overlaps centered on joists and welded to joist a max of 15 in. O.C. Adjacent units overlapped one corrugation at the sides and a min of 3 in. at the ends.
4. **Welded Wire Fabric** — 6x6-W1.4xW1.4 or heavier per AISC specifications.

4A. **Fiber Reinforcement*** — As an alternate to Item 4, for 1 or 2 hr assembly ratings only. Engineered synthetic fibers added to concrete mix to control shrinkage cracks in concrete. Fibers added to concrete mix at rate of 1.5 lb of fiber for each cubic yard of concrete.
CANADA CORDAGE INC —Type Promesh
SYNTHETIC INDUSTRIES INC —Type FM 1.5, Fibermix
EUCLID CHEMICAL CO —Type Fiberstrand 100

5. **Steel Joists** — Type 8J2 or 10K1 min size, spaced 48 in. O.C. max, welded to end supports. Type 8H2 min size, may be covered for the 1 and 2 hr Restrained and Unrestrained Assembly Ratings only. As an alternate, any LH-Series steel joist spanning no more than 60 ft may be used. For spans exceeding 60 ft, LH-Series joists, may be used provided that the deflection under published total load shall not be greater than 1/277 of the joist spans. For the 1 and 2 hr ratings only, joist spacings may be increased to 72 in. max.
6. **Bridging** — 1/2 in. diam steel bars, welded to top and bottom chords of each joist.
7. **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 on top of the bottom chord of joists and secured with a double strand of 18 SWG galv steel wire. Located as required to provide hanger wire attachment points. For the 1 and 2 hr Ratings only when the joist spacing is greater than 48 in. O.C., two cold-rolled channels placed back-to-back and tied together with double strand of 18 SWG galv steel wire at 24 in. O.C. are used for support of hanger wires. The double channels are installed perpendicular to the joists and spaced either 24 or 48 in. O.C. as required. Channels, placed on top of the joists' bottom chord and tied to each joist with a double strand of 18 SWG galv steel wire. Alternately, the channels may be hung from the joists with 12 SWG galv steel wire wrapped around the cold-rolled channels, and with the other end of the wire wrapped around the bottom chord of the joists.
8. **Hanger Wire** — No. 12 SWG galv steel wire twist-tied to steel joists or cold-rolled steel channels. Hanger wires spaced max of 48 in. O.C. on main runners, adjacent to cross tee intersections. One hanger wire to occur at all four corners of light fixtures, at midspan of cross tees adjacent to 4 ft light fixtures and air duct outlets, and adjacent to each main runner splice.
9. **Air Duct** — Min 0.023 in. thick (24 gauge) min galv steel. Total area of duct openings not to exceed 576 sq in. per each 100 sq ft of ceiling area. Area of ind duct opening not to exceed 576 sq in. Max dimension of opening 30 in.
10. **Damper** — Min 0.056 in. thick (16 gauge) galv steel, sized to overlap duct opening 1 in. min. Protected on both surfaces with 1/16 in. thick ceramic fiber paper 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 General Information Section, may be used with steel ducts.
11. **Fixtures, Recessed Light** — (Bearing the UL Listing Mark). Fluorescent lamp type, steel housing, 2 by 4 ft size. Fixtures spaced so their area does not exceed 24 sq ft per 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

11A. **Fixtures, Recessed Light** — (Bearing the UL Listing Mark) — (Not shown) — As an alternate to Item 11, for use with Item Nos. 14 and 14A, 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 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" fixture 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). Wired in accordance with the National Electrical Code.

12. **Fixture Protection-Acoustical Material*** — 5/8 in. thick, cut to form a five-sided enclosure, trapezoidal in cross-section, approx 1/2 in. longer and wider and with a min 5/8 in. clearance to the top of the light fixture housing. The fixture protection consists of a 23-3/4 in by 47-3/4 in. top piece, two 6-3/4 (or wider) by 47-3/4 in. side pieces, and two 5 (or wider) by 23-3/4 in. end pieces. The top edge of each fixture protection side piece may be provided with a 1 in. deep by max 20 in. long notch near its midpoint. The side and top pieces are laid in place and the end pieces are held in place with three 8d nails spaced 8 in. O.C. When fixtures are installed end-to-end, no end pieces are used where the fixtures abut. Instead, a 5 by 23-3/4 in. piece is placed on top of and centered over the gap between the top pieces.
EMCO LTD —5/8 in. thick Types FR-4, FR-83, GR-1.
USG INTERIORS INC —5/8 in. thick Types GR-1, FR-4, or FR-83

12A. **Fixture Protection — Acoustical Materials*** — For use with "high hat" light fixtures (Item 11A). 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 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.
EMCO LTD —5/8 in. thick Types FR-4, FR-83, GR-1.
USG INTERIORS INC —5/8 in. thick Types GR-1, FR-4, or FR-83

13. **Steel Framing Members*** — Main runners nom 12 ft long spaced 4 ft OC. Cross tees nom 4 ft long installed perpendicular to main runners and spaced 2 ft OC. When the ceiling is composed of nom 24 by 24 in lay-in panels, cross tees nom 2 ft long installed perpendicular to 4 ft cross tees and spaced 4 ft OC. When DXLA, DXLZA and SDLZA are used, the assembly ratings are 2 hr.
CGC INTERIORS, DIV OF
CGC INC —Types DXL, DXLA, DXLZ, DXLZA, SDXL, SDXLA
USG INTERIORS INC —Types DXL, DXLA, DXLZ, DXLZA, SDXL, SDXLA

13A. **Steel Framing Members*** — Main runners, nom 12 ft long spaced 4 ft OC. Cross tees, nom 4 ft long, installed perpendicular to main runners and spaced 2 ft OC. Cross tees, nom 2 ft long, installed perpendicular to 4 ft cross tees and spaced 4 ft OC. For use with, nom 24 in. by 24 in. square edge lay-in panels. When Type DXLT steel framing members are used, **the assembly ratings are 1-1/2 hr.**
CGC INTERIORS, DIV OF
CGC INC —Types DXLT, DXLTA, DXLTZ, DXLTZA
USG INTERIORS INC —Types DXLT, DXLTA, DXLTZ, DXLTZA

13B. **Steel Framing Members*** — Main runners nom 10 ft long spaces 4 ft OC. Cross tees nom 4 ft long installed perpendicular to main runners and spaced 2 ft OC. When ceiling is composed of nom 24 by 24 in. lay-in panels, cross tees nom 2 ft long installed perpendicular to 4 ft cross tees and spaced 4 ft OC.
USG INTERIORS INC —Type DXL.

14. **Acoustical Material*** — Nom 24 by 24 or 24 by 48 or 5/8 or 3/4 in. thick. Border panels supported by min 0.016 in. thick (26 MSG) painted steel angle with 1 in. legs, or min 0.016 in. thick (26 MSG) painted steel channel, 1-1/2 in. deep with 1 in. bottom flange and 3/4 in. top flange.
EMCO LTD —Types FR-83, GR-1. See **Acoustical Materials** (BYIT), EMCO Ltd., for specific tile details.
USG INTERIORS INC —Type FR-83, FR-X1 or GR-1. See **Acoustical Materials (BYIT)**, USG Interiors Inc. for specific tile details.

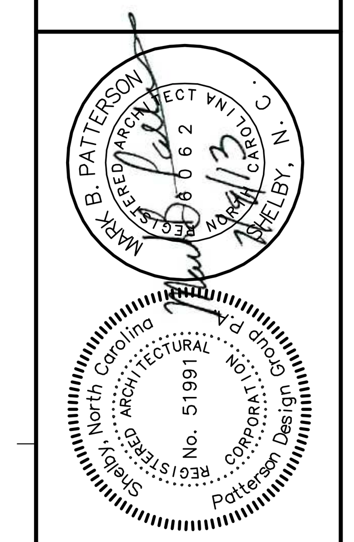
14A. **Acoustical Material*** — (Not Shown) — As an alternate to Item 14 - Nom 24 by 24 or 24 by 48 by 5/8 thick. Border panels supported as described in Item 14. When used maximum Ratings are 2 Hr.
EMCO LTD —Type FR-4. See **Acoustical Materials (BYIT)**, EMCO Ltd., for specific tile details.
USG INTERIORS INC —Type FR-4. See **Acoustical Materials** (BYIT), USG Interiors Inc. for specific tile details.

14B. **Gypsum Board*** — (Not Shown) — As an alternate to Item 14 - Nom 24 by 24 by 1/2 thick. Border panels supported as described in Item 14. When used maximum Ratings are 1-1/2 Hr.
EMCO LTD —Type FR-4. See **Acoustical Materials** (BYIT), EMCO Ltd., for specific tile details.
USG INTERIORS INC —Type FR-4. See **Acoustical Materials** (BYIT), USG Interiors Inc. for specific tile details.

14C. **Gypsum Board*** — (Not Shown) — As an alternate to Item 14 - Nom 24 by 48 by 1/2 thick. Border panels supported as described in Item 14. When used maximum Ratings are 1 Hr.
USG INTERIORS INC —Type FC-CB

*Bearing the UL Classification Mark

CONSULTANTS



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AIA

REVISIONS	
MARK	DATE

SHEET TITLE: UL ASSEMBLIES
PROJECT NO: 3089
ISSUE DATE: 7-9-13
SHEET LS1.2 OF 11