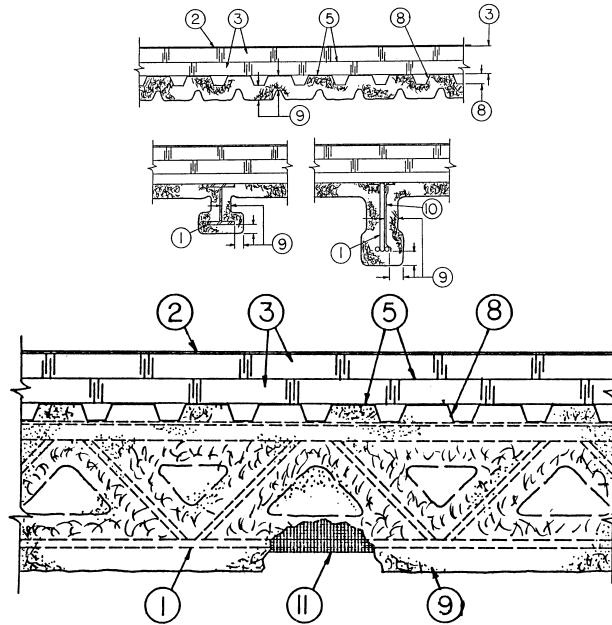


Design No. P819

Restrained Assembly Rating — 1, 1-1/2 or 2 Hr. (see items 3, 9 and 13)
Unrestrained Assembly Rating — 1, 1-1/2 or 2 Hr. (see items 3, 9 and 13)
Unrestrained Beam Rating — 1, 1-1/2 or 2 Hr. (see items 9 and 13)
Load Restricted for Canadian Applications — See Guide BXUV7



1. **Beam** — W6x16 min size, or Steel Joist min size (See Item 9).
2. **Roof Covering** — Consisting of hot mopped or cold application bituminous materials compatible with the 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. **Roof Insulation-Foamed Plastic*** — 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards applied in one or more layers. See Item 9 for min thicknesses with or without the use of gypsum wallboard (Item 13). No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints.
 - ATLAS ROOFING CORP —ACFoam II, ACFoam III, ACFoam-II SL, ACFoam IV.
 - CARLISLE SYNTEC INCORPORATED —Types HP, HP-H, HP-N, HP-W.
 - DOW ROOFING SYSTEMS L L C —"Dow Termico Polyisocyanurate Insulation", "Dow Termico ISO 3000 Insulation", "Dow Termico ISO HP-FR".
 - FIRESTONE BUILDING PRODUCTS CO L L C —"ISO 95+ GL", "ISO 95+ FK", "ISO 95+ GW", "ISO 300", "ISO 95+ CAN", "ISOGARD HD Composite Board" or "RESISTA".
 - GAF MATERIALS CORP —EnergyGuard RH, Tapered EnergyGuard RH
 - GAF MATERIALS CORP —Isotherm R.
 - GENFLEX ROOFING SYSTEMS L L C —"GenFlex ISO"
 - HUNTER PANELS —H Shield.
 - JOHNS MANVILLE —ENRGY 3 25 PSI
 - LOADMASTER SYSTEMS INC —Loadmaster Polyisocyanurate Insulation.
 - RMAX OPERATING L L C —Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, Tapered Therमारoof-3, Tapered Therमारoof FA-3, Tapered Ultra-Max.
 - SIKA SARNAFIL INC —Sarnatherm r, Sarnatherm r Ultra, Sarnatherm r Tapered, Sarnatherm r Ultra Tapered.
 - SOPREMA INC —Colgrip, SOPRA-ISO s, SOPRA-ISO s Tapered, SOPRA-ISO PLUS s, SOPRA-ISO PLUS s Tapered, SOPRA-ISO H PLUS s and SOPRA-ISO H PLUS s Tapered.
- 3A. **Roof Insulation — Building Units*** — (Not Shown) — As an alternate to Item 3, 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards, faced on underside (or both sides) with mineral and fiber boards. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
 - FIRESTONE BUILDING PRODUCTS CO L L C —ISO 95+ Composite.
 - JOHNS MANVILLE —Fesco-Foam.
- 3B. **Building Units*** — (Not Shown) As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board or plywood. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
 - ATLAS ROOFING CORP —ACFoam NailBase Insulation, Vented-R, CrossVent.
 - FIRESTONE BUILDING PRODUCTS CO L L C —Hailgard.
 - GAF MATERIALS CORP —EnergyGuard RH Polyiso Insulation, EnergyGuard RH Tapered Polyiso Insulation
 - HUNTER PANELS —H Shield
 - JOHNS MANVILLE —Nailboard.
 - SOPREMA INC —SOPRA-ISO B s.
- 3C. **Building Units*** — As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
 - FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Wood Fiberboard Composite".
 - JOHNS MANVILLE —ENRGY 2 Plus.
- 3D. **Building Units*** — Not Shown — As an alternate to Item 3, composite polyisocyanurate foamed plastic insulation board with an

adhered nailing surface, nom 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation, min thickness is as stated in Item 3. There is no limit on the max insulation thickness.

JOHNS MANVILLE —Type ISO-VENT.

- 3E. **Building Units*** — As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is as is stated for Item 3, Roof Insulation. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
JOHNS MANVILLE —ENRGY 2 gypsum Composite.
- 3F. **Building Units*** — As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 by 96 in., faced on the top surface with oriented strand board. Min thickness of the polyisocyanurate core is as stated in Item 3, Roof Insulation. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.
- 3G. **Foamed Plastic*** — Optional - (Not Shown) - Maximum 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

FIRESTONE BUILDING PRODUCTS CO L L C —“ISOGARD HD”

- 3H. **Foamed Plastic*** — As an alternate to Item 3 - Polyurethane foamed plastic roof insulation. Formed by the simultaneous spraying of two liquid components applied over the gypsum board (item 13) in accordance with the manufacturer’s instructions. Minimum nominal thickness per Item 9 table with no maximum thickness. When used, gypsum board (Item 13) required.

BASF CORP —Types FE 303 2.7, FE-348, FE348-2.5, FE348-2.7, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81275, ELASTOSPRAY 81285 or ELASTOSPRAY 81305.

BASF CORP —Elastospray 5100-2.0, Elastospray 5100-2.5, Elastospray 81302, Elastospray 81272, Elastospray Alpha System, Elastospray 81252.

- 4. **Vapor Retarder-Sheathing Material*** — (Optional — Not shown) — Vinyl film or paper scrim vapor barrier, applied to steel roof deck with adhesive (Item 5), asphalt (Item 6) or laid loosely, overlapped approximately 2 in. on adjacent sheets. See Sheathing Material (CHIZ) category for names of manufacturers.
- 5. **Adhesive*** — (Optional) — The vapor retarder or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the first layer of insulation to vapor retarder and each additional layer of insulation. Applied in 1/2 in. wide ribbons 6 in. OC at 0.4 gal/100 sq ft. See Adhesives (GYWR) category for name of manufacturers.
- 5A. **Adhesive***—(Optional) — (Bearing the UL Classification Marking for Roof Systems (TGFU)) - The vapor retarder, the gypsum wallboard or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of insulation. Applied at a max rate of 19.8 g/ft². When FAST 100 adhesive is used, additional **Spray-Applied Fire Resistance Materials* (CHPX)** is required on the deck for the 1-1/2 and 2 hr Unrestrained Assembly Ratings. The thickness specified for the deck shall be increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating.

CARLISLE SYNTEC INCORPORATED — FAST 100

- 6. **Asphalt or Coal Tar Pitch*** — (Optional — Not shown) — The vapor retarder or the first layer of roof insulation may be secured with asphalt or coal tar pitch to the steel crest surfaces at a max rate of 15 lbs/100 sq ft. Also used to attach the first layer of insulation to vapor retarder and each additional layer of roof insulation, applied at a max rate of 25 lbs/100 sq ft.
- 7. **Mechanical Fasteners** — (Optional — Not shown) — Mechanical screw-type fastener with metal or plastic washer designed for the purpose may be used to attach one or more layers of insulation to steel roof deck.
- 8. **Steel Roof Deck** — (Unclassified) — Min 1-1/2 in. deep and 30 in. wide galv or painted fluted steel deck. When unclassified painted deck is used, Item 8A must be used. Flutes 6 in. OC with crest width ranging from 3-5/8 to 5-1/16 in. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps at a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC or
Classified Steel Floor Form Units* — Noncomposite, 1-1/2 or 3 in. deep galv units, min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps at a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC.

ASC STEEL DECK, DIV OF ASC PROFILES

INC —24, 30, or 36 in. wide, Types DGB Hi-Form, B Hi-Form, DGB, B, DGN Hi-Form, N Hi-Form, DGN, and N. All units may be galvanized or Prime Shield™.

CANAM STEEL CORP — Type P-3606, P-3615, P-2436, and P-2404, P-2403, and P-2438 noncomposite.

CONSOLIDATED SYSTEMS INC —Types B, BI, F, N, NI. Units may be phos/ptd.

MARLYN STEEL DECKS INC — Types B, F, N, NV.

NEW MILLENNIUM BUILDING SYSTEMS L L C — Types B, BI, F, FD, and N. Units may be phos/painted or galvanized.

VERCO DECKING INC - A NUCOR CO — Types PLB, B, PLN or N Formlok. Units may be phos/ptd. Types PLB, HSB, PLN or N. Units may be ptd/ptd.

VULCRAFT, DIV OF NUCOR CORP —Types 1.5B, 1.5BI, 1.5F, 3N, 3NI. Units may be ptd/ptd.

CANAM STEEL CORP — Types B, N. Units may be phos./ptd or ptd/ptd.

- 8A. **Metal Lath** — Not shown — Required on unclassified painted steel roof deck. Rib lath, galv or painted, min 2.5 lb/sq yd, with ribs facing down, fastened to deck using No. 8 by 1/2 in. wafer head self-drilling, self-tapping coated steel screws spaced max 15 in. OC in both directions with lath edges overlapped approx 3 in.
- 9. **Spray-Applied Fire Resistive Materials*** — Applied to steel surfaces by spraying with water, in one or more coats, to final thicknesses shown in the table below. Steel surfaces should be free of dirt, oil and scale. Use of adhesive is required on the steel roof deck. Tamping is optional. Min avg density of 13 pcf, and min ind density of 11 pcf for Types DC/F and II. Min avg and min ind densities of 22 and 19 pcf, respectively, for Type HP. For method of density determination, refer to Design Information Section, Sprayed Material. The protection material on steel deck shall cover screw tips by min 1/2 in.

Restrained Assembly Rating Hr	Un restrained Assembly Rating Hr	Un restrained Beam Rating Hr	Min Insulation Thkns In.	Wallboard (Item No. 13) Required	Deck#	W6x16 Beam	Protection Thkns In.		
							10K1 Joist	12K3 Joist	10K1 Joist (I)
1	1	1	1	Yes	1/2	5/8	1-1/8	1-1/16	1-1/8
1	1	1	2	Yes	1/2	5/8	1-1/8	1-1/16	1-1/8
1	1	1	0	Yes	5/8	5/8	1-1/8	1-1/16	1-1/8
1	1	1	3	No	13/16	5/8	1-1/8	1-1/16	1-1/8
1	1	1	2	No	15/16	5/8	1-1/8	1-1/16	1-1/8
1	1	1	1	No	1-1/4	5/8	1-1/8	1-1/16	1-1/8
1	1	1	0	No	2-1/16	5/8	1-1/8	1-1/16	1-1/8
1-1/2	1	1	2	Yes	13/16	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1	1	1	Yes	7/8	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1	1	3	No	1-3/8	13/16	1-9/16	1-9/16	1-1/8

Restrained Assembly Rating Hr	Un restrained Assembly Rating Hr	Un restrained Beam Rating Hr	Min Insulation Thkns In.	Wallboard (Item No. 13) Required	Deck#	W6x16 Beam	Protection Thkns In.		
							10K1 Joist	12K3 Joist	10K1 Joist (I)
1-1/2	1	1	2	No	1-3/4	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	2	Yes	13/16	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	1	Yes	7/8	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	0	Yes	1	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	3	No	1-3/8	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	2	No	1-3/4	13/16	1-9/16	1-9/16	1-1/8
1-1/2	1-1/2	1-1/2	0	No	2-5/8	13/16	1-9/16	1-9/16	1-1/8
2	1	1	2	Yes	1-3/16	1	1-5/8	1-5/8	1-3/8
2	1	1	1	Yes	1-3/8	1	1-5/8	1-5/8	1-3/8
2	1	1	3	No	2-1/8	1	1-5/8	1-5/8	1-3/8
2	1	1	2	No	2-5/16	1	1-5/8	1-5/8	1-3/8
2	2	2	2	Yes	1-3/16	1	1-11/16	1-11/16	1-9/16
2	2	2	1	Yes	1-3/8	1	1-11/16	1-11/16	1-9/16
2	2	2	0	Yes	1-9/16	1	1-11/16	1-11/16	1-9/16
2	2	2	3	No	2-1/8	1	1-11/16	1-11/16	1-9/16
2	2	2	2	No	2-5/16	1	1-11/16	1-11/16	1-9/16
2	2	2	0	No	3-1/4	1	1-11/16	1-11/16	1-9/16

#The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating when Item 5A is used.

1 = Thickness of 10K1 joists when spacing is 4 ft. or less OC.

NR = No Rating

ISOLATEK INTERNATIONAL — Type D-C/F, HP or II, Type EBS or Type X adhesive/sealer

9A. **Spray-Applied Fire Resistive Material*** — (Not shown — As an alternate to Item 9) Applied by mixing with water and spraying or troweling in one or more coats to a final thickness as shown in the table below, to steel surfaces which must be clean and free of dirt, loose scale and oil. Thickness beneath floor units measured to face of lath (Item 15). Min avg density of 38 pcf with min ind value of 35 pcf for Type 800. Min avg density of 44 pcf with min ind value of 40 pcf for Type M-II. Min avg density of 44 pcf with min ind value of 42 pcf for Type TG. For method of density determination, refer to Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Min Insulation Thkns In.	Wallboard (Item No. 13) Required	Deck#	W6x16 Beam	Protection Thkns In.		
							10K1 Joist	12K3 Joist	
1	1	1	1	Yes	9/16	11/16	NR	NR	1-1/16
1	1	1	2	Yes	9/16	11/16	NR	NR	1-1/16
1	1	1	0	Yes	11/16	11/16	NR	NR	1-1/16
1	1	1	3	No	13/16	11/16	NR	NR	1-1/16
1	1	1	2	No	15/16	11/16	NR	NR	1-1/16
1	1	1	1	No	1-1/4	11/16	NR	NR	1-1/16
1	1	1	0	No	2-1/16	11/16	NR	NR	1-1/16
1-1/2	1	1	2	Yes	13/16	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1	1	1	Yes	7/8	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1	1	3	No	1-3/8	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1	1	2	No	1-3/4	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	2	Yes	13/16	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	1	Yes	7/8	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	0	Yes	1	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	3	No	1-3/8	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	2	No	1-3/4	13/16	1-9/16	1-9/16	1-9/16
1-1/2	1-1/2	1-1/2	0	No	2-5/8	13/16	1-9/16	1-9/16	1-9/16
2	1	1	2	Yes	1-3/16	1	1-5/8	1-5/8	1-5/8
2	1	1	1	Yes	1-3/8	1	1-5/8	1-5/8	1-5/8
2	1	1	3	No	2-1/8	1	1-5/8	1-5/8	1-5/8
2	1	1	2	No	2-5/16	1	1-5/8	1-5/8	1-5/8
2	2	2	2	Yes	1-3/16	1	1-11/16	1-11/16	1-11/16
2	2	2	1	Yes	1-3/8	1	1-11/16	1-11/16	1-11/16
2	2	2	0	Yes	1-9/16	1	1-11/16	1-11/16	1-11/16
2	2	2	3	No	2-1/8	1	1-11/16	1-11/16	1-11/16
2	2	2	2	No	2-5/16	1	1-11/16	1-11/16	1-11/16
2	2	2	0	No	3-1/4	1	1-11/16	1-11/16	1-11/16

#The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating when Item 5A is used.

NR = No Rating

ISOLATEK INTERNATIONAL — Types 800, M-II or TG investigated for exterior use.

NEWKEM PRODUCTS CORP — Types M-II or TG investigated for exterior use.

LUCKY CORE INSULATING MATERIALS

MANUFACTURING L L C — Types M-II or TG investigated for exterior use.

- Glass Fiber Mesh** — (Optional) — Not Shown — Min 3/32 in. square mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz/sq yd shall be attached to one side of each joist web member. The method of attachment must be sufficient to hold the mesh and fire protection material during application and curing of the material. An acceptable method of attaching the mesh is by embedding the mesh in min 1/4 in. long beads of hot melted glue. The beads of glue shall be spaced min 12 in. OC along the top chord of the bar joists. Another method of attachment is the use of 1-1/4 in. long, 1/2 in. wide hairpin clips formed from 0.064 in. diameter steel wire, alternating from top to bottom of the joist web member.
- Metal Lath** — (Optional) — As an alternate to Item 10 — Metal lath used to facilitate the spray application of the Spray-Applied Fire Resistive Material to the steel joists. Diamond mesh, 3/8 in. expanded steel, min 1.7 lb/sq yd fastened to one side of joists using No. 18 SWG steel wire, located at midheight of every other member or 18 in. OC whichever is less. Both sides of lath must be completely coated with Spray-Applied Fire Resistive Material, but with no min thickness requirements.
- Bridging** — (Not shown) — Min 1-1/4 by 1-1/4 by 1/8 in. thick steel angles welded to top and bottom chords of each joist. Number and spacing of bridging angles per Steel Joist Institute specification. Bridging coated with the same thickness of Spray-Applied Fire Resistive Materials (Item 9) as the joist.
- Gypsum Board** — (Not shown — Classified or Unclassified) — May be used to obtain various Restrained and Unrestrained Assembly Ratings as described in (Item 9). Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in. thick. Min weight 2.2 psf. Applied perpendicular to steel roof deck direction with adhesive (Item 5), hot asphalt (Item 6) or laid loosely. End joints to occur over crests of steel roof and to be staggered 2 ft in adjacent rows. See **Gypsum Board** (CKNX) category for names of manufacturers.
- Building Units*** — (Optional — Not shown) — Nominal 12 by 18 in. or 18 by 24 in. flat or tapered cellular glass blocks or 24 by 48

in. flat or tapered cellular glass boards, applied over the roof insulation (Item 3 or 3A) with asphalt (or coal tar pitch). Joints to be offset from joints of roof insulation.

PITTSBURGH CORNING CORP

15. **Metal Lath** — (For use on steel roof deck with Item 9A) 3/8 in. diamond mesh, min 2.5 lbs per sq yd painted or galv expanded steel. Fastened to steel roof deck with ribs facing down using No. 8 by 1/2 in. wafer head self-drilling, self-tapping, coated steel screws spaced max 15 in OC in both directions for 1 and 1-1/2 hr ratings. Spaced a max 12 in. OC in both directions for 2 hr ratings. Lath edges overlapped approx 3 in.

*Bearing the UL Classification Mark