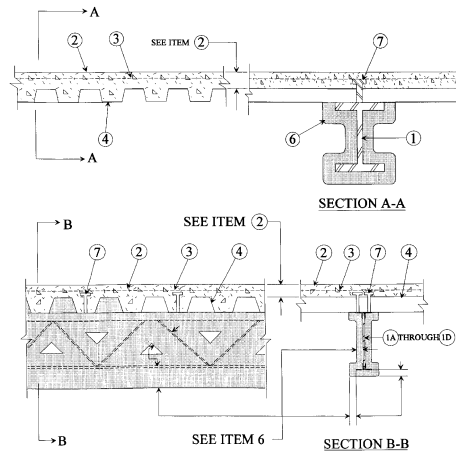


Design No. D902

Restrained Assembly Ratings — 1, 1-1/2, 2 and 3 Hr.
Unrestrained Assembly Ratings — 0, 1, 1-1/2, 2 or 3 Hr. (See Items 4 & 6)
Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr.
Load Restricted for Canadian Applications — See Guide BXUV7



1. **Beam** — W12X14, W8X28, W8x24 or W6x12, min size, see Items 6A through 6E.
- 1A. **Steel Joists** — (Not shown) — As an alternate to Item 1 — Composite or noncomposite min 8k1 or min depth and weight shall be 8 in. and 4.9 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. The top chords shall consist of two angles measuring 1-1/4 by 1-1/4 by 0.127 in. thick. Bottom chords shall consist of two round bars measuring 0.566 in. in diam. or two angles measuring 1 by 1 by 0.125 in. thick. Bearing plates shall consist of two angles measuring 1-1/2 by 2 by 0.188 in. thick and 5-1/16 in. long. Web members shall consist of 0.565 in. diam bars.
- 1B. **Steel Joists** — (Not shown) — As an alternate to Item 1 — Composite or noncomposite min 12k5 or min depth and weight shall be 12 in. and 7.1 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. Top chords shall consist of two angles measuring 1-1/2 by 1-1/2 by 0.156 in. thick. Bottom chords shall consist of two round bars measuring 0.675 in. in diam. or two angles measuring 1 by 1 by 0.125 in. thick. Bearing plates shall consist of two angles measuring 2 by 2 by 0.192 in. thick and shall be min 4-15/16 in long. The second web member at each end shall consist of 0.654 in. diam round bar. All remaining web members, including the end web members, shall consist of 0.774 in. diam round bars. Bridging per S.J.I. specifications is required when noncomposite joists are used.
- 1C. **Steel Joists** — (Not shown) — As an alternate to Item 1 — Composite or noncomposite min 12k5 or min depth and weight shall be 12 in. and 7.1 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. Top chords shall consist of two angles measuring 1-1/2 by 1-1/2 by 0.156 in. thick. Bottom chord shall consist of two round bars measuring 0.675 in. in diam. or two angles measuring 1 by 1 by 0.125 in. thick. The second web member at each end shall consist of 0.654 in. diam round bar. All remaining web members, including the end web members, shall consist of 0.774 in. diam round bars. Bridging per S.J.I. specifications is required when non-composite joists are used.
- 1D. **Steel Joists** — (Not shown) — As an alternate to Item 1 — Composite or noncomposite min 8k1 or min depth and weight shall be 8 in. and 4.9 lb/ft respectively. May be uncoated or provided with a shop coat of paint. Designed per S.J.I. specifications for a max design stress of 30,000 psi (30 ksi). Welded or bolted to end supports. The top chords shall consist of two angles measuring 1-1/4 by 1-1/4 by 0.127 in. thick. Bottom chords shall consist of two round bars measuring 0.566 in. in diam. or two angles measuring 1 by 1 by 0.125 in. thick. Bearing plates shall conform to S.J.I. specifications. Web members shall consist of 0.565 in. diam bars.
2. **Normal Weight or Lightweight Concrete** — Normal weight concrete, carbonate or siliceous aggregate, 3500 psi compressive strength, vibrated. Lightweight concrete, expanded shale or slate aggregate by rotary-kiln method or expanded clay aggregate by rotary-kiln or sintered-grate method, 3000 psi compressive strength, vibrated, 4 to 7 per cent entrained air.

Restrained Assembly Rating Hr	Concrete (Type)	Concrete Unit Weight pcf	Concrete Thkns In.
1	Normal Weight	147-153	3-1/2
1-1/2	Normal Weight	147-153	4
2	Normal Weight	147-153	4-1/2
3	Normal Weight	147-153	5-1/4
1	Lightweight	107-113	2-1/2
1	Lightweight	107-120	2-5/8
1-1/2	Lightweight	107-113	3
2	Lightweight	107-113	3-1/4
2	Lightweight	107-116	3-1/4*
2	Lightweight	114-120	3-1/2
3	Lightweight	107-113	4-3/16
3	Lightweight	114-120	4-7/16

*With 2 and 3 in. deep steel floor units only.

3. **Welded Wire Fabric** — 6x6 10/10 SWG.
- 3A. **Negative Reinforcement** — (Not Shown) - Optional - Used in lieu of Item 3 and with Items 3B or 3C. For floor spans with concrete cast continuous over the supporting beams. Deformed bars designed to resist the support moments of the concrete slab in accordance with the latest ACI Building Code Specifications.
- 3B. **Fiber Reinforcement*** — (Not Shown) - Required with Item 3A. Engineered synthetic fibers added to concrete mix to control shrinkage cracks in concrete. Fibers added to concrete mix at rate of 1 lb of fiber for each cubic yard of concrete.
PROPEX OPERATING COMPANY L L C —Fibermesh 150 and Fibermesh 300.
- 3C. **Fiber Reinforcement*** — (Not Shown) - Required with Item 3A. Any fiber reinforcement bearing the UL Classification Marking for Fire Resistance, Classified for use in lieu of welded wire fabric.
 See **Fiber Reinforcement (CBXQ)** Category for names of manufacturers.
4. **Steel Floor and Form Units*** — Composite 1-1/2, 1-5/8, 2 or 3 in. deep galv units or 4-1/2 in. deep non-composite galv units.

Fluted units may be phos/ptd. Min gauges are 22 MSG for fluted and 20/20 for cellular and partial cellular units. The following combinations of units may be used:

- (1) All 24, 26, 28 or 36 in. wide cellular or partial cellular.
- (2) All fluted.
- (3) One or two 3 in. deep, 12 in. wide, 18/18 MSG min cellular alternating with 3 in. deep fluted or other cellular.
- (4) Any blend of fluted and 24, 26, 28 or 36 in. wide cellular or partial cellular.
- (5) Corrugated, nom 1-5/16 or 2 in. deep, 30 in. wide, 24 MSG min galv units with shear wires factory welded to deck corrugations. Welded to supports 12 in. OC through welding washers. For shear wire spacing of 8 in. or less the steel deck stress shall not exceed 20 KSI. For shear wire spacing greater than 8 in. OC but less than or equal to 12 in. OC steel deck stress shall not exceed 12 KSI.

ASC STEEL DECK, DIV OF ASC PROFILES

INC —24, 30, or 36 in. wide, Types B Hi-Form, BF Hi-Form, BMOD Hi-Form, BR Hi-Form, BR MOD Hi-Form, N Hi-Form, NF Hi-Form, 2W Hi-Form, 2WF Hi-Form, 3W Hi-Form, 3WF Hi-Form, B, BF, BR, BR MOD, B MOD, N, NF, 2W, 2WF, 3W, 3WF
BR Hi-Form, BMOD Hi-Form, BRMOD Hi-Form, DGB, DGBF, DGN, DGNF, DG2W, DG2WF, DG3W, DG3WF, DGB Hi-Form, DGBF Hi-Form, DGN Hi-Form, DGN32 Hi-Form, DGNF Hi-Form, DGNF32 Hi-Form, DG2W Hi-Form, DG2WF Hi-Form, DG3W Hi-Form, and DG3WF Hi-Form: 32 in. wide Type N-32, NF32, DGN-32, DGNF32; 24 or 30 in. wide Types ASC2, ASC3. All units may be galvanized or Prime Shield.

CANAM STEEL CORP —24 in. wide Type P-2432 composite or 36 in. wide Type P-3623, P-3606, P-3615 and 24 in wide Type P-2432 composite, Type P-3606 and P-3615 non-composite

CENTRIA —QL Types, 24 in. wide, 3 or 3 inverted, UKX, 21 or 21 inverted, 2 in. 99, 121, AKX, NKX, TKX; 24 or 30 in. wide GKX, GKXH, GKX-A; 36 in. wide 2 in. 99, AKX, WKX; 12 in. wide NKC, TKC; 12 in. wide non-composite Sec 12. Side joints of 99, 121, TKC, TKX, WKX may be welded together 60 in. OC. Side joints of 99, AKX, WKX, GKX, GKX-A, TKX may be fastened together with min 1 in. long No. 12x14 self-drilling, self-tapping steel screws 36 in. OC.

CHIA TEH CONSTRUCTION MATERIAL CO LTD —24 or 36 in. wide Mac-Lok 3; 24 in. wide CFD-3.

CANAM STEEL CORP —12 or 24 in. wide, Types 1-1/2, 2, or 3 in. LOK-Floor and LOK-Floor Cell; 36 in. wide, Types 2 or 3 in. LOK-Floor and LOK-Floor Cell; 24, 30 or 36 in. wide, Type 1-1/2 in. B-LOK and B-LOK Cell; 24 in. wide, Types N-LOK and N-LOK Cell.

CONSOLIDATED SYSTEMS INC —24 in. wide Types CFD-2, CFD-3; 24, 30 or 36 in. wide Type CFD-1.5; 24 or 36 in. wide Types Mac-Lok 2, Mac-Lok 3; 24 in. wide Types B2C, B2FC, NC, NFC; 30 in. wide, Type B3C; 12 in. wide Mac-Way Cellular 45 MDW, 2-633 MTWA, 3-633 MTWA+. 30 in. wide, Mac-Cor Types 1 and 2

DECK WEST INC —36 in. wide Type B-DW, Inverted B-DW, BA-DW, Inverted BA-DW, 2-DW or 3-DW. Side joints of Type 2-DW and 3-DW may be fastened together with min 1 in. long No. 12 x 14 self-drilling, self-tapping steel screws 36 in. OC.

DESIGN ASSISTANCE CONSTRUCTION

SYSTEMS INC —36 in. wide Type DACS1.5CD, or 24 in. wide Type DACS2.0CD, or DACS3.0CD.

EPIC METALS CORP —24 in. wide Types EC150, EC150 inverted, EC300, EC366, ECP150, ECP300, ECP366, ECA; 30 in. wide Types ECB150, ECBR150; 36 in. wide Types EC156, EC266, ECP266.

GENS METALS INC —12 or 24 in. wide Types LF2, LF3.

MARLYN STEEL DECKS INC — Type 1.5 CF, 2.0 CF or 3.0 CF.

MORIN CORP —24, 30 or 36 in. wide Types LXR-B, LXR-B inverted; 24 or 36 in. wide Type LXR-3W; 36 in. wide Type LXR-2W.

NEW MILLENNIUM BUILDING SYSTEMS L L C — Type 1.5CD, 1.5CDI, 1.5CDR, 2.0CD, or 3.0CD. Units may be phos/ painted or galvanized.

ROOF DECK INC —36 in. wide Types LOK-1-1/2, LOK-1-1/2R; 24 in. wide Types LOK-2, LOK-3.

VERCO DECKING INC - A NUCOR CO — 24, 30 or 36 in. wide Types PLB, PLBCD, B, BCD, BR; 24 or 36 in. wide Types PLW2, PLW2CD, W2, W2CD, PLW3, PLW3CD, W3, W3CD; 24 in. wide Types PLN, PLNCD, N, NCD . 12 in. wide PLW2, W2, PLW3 or W3 units may be blended with 24 or 36 in. wide PLW2, W2, PLW3 or W3 units, respectively. Fluted units may be phos/ptd.

VALLEY JOIST — 24 or 36 in. wide Types WVC 1-1/2 or WVC 2.

VULCRAFT, DIV OF NUCOR CORP —24, 30 or 36 in. wide, Type 1.5 VL, 1.5VLI, 1.5VLP; 24 or 36 in. wide, Types 2VLI, 3VLI, 2VLP, 3VLP.

WIREMOLD CO —24 in. wide, Types 2 or 3 in. WDR.

Spacing of welds attaching units to supports shall be 12 in. OC for 12, 24, 36 in. wide units, four welds per sheet for 30 in. wide units. 6 in. OC for 18 in. wide and Sec. 12 units. Unless specified otherwise for specific units types, adjacent units button-punched or welded together 36 in. OC along side joints. For **3 Hr Rating**, units with overlapping type side joints welded together 24 in. OC max.

When a superimposed load of 250 PSF is desired the spacing of welds or button-punches shall not exceed 24 in. OC along side joints.

+12 in. wide, 1-1/2 in. deep Mac-Way units may be blended with 24 in. wide B2C or 30 in wide B3C units in a blend of one cell to one or more fluted units. 12 in. wide, 2 in. deep Mac-Way units may be blended with 24 or 36 in. wide Mac-Lock units in a blend of one cell to one or more fluted units. 12 in. wide, 3 in. deep Mac-Way units may be blended with 24 or 36 in. wide Mac-Lock 3 units in a blend of one cell to one or more fluted units. The side edge of the fluted units is placed on the top of the side edge of the Mac-Way unit and the two are welded together with welding washers spaced a max. of 32 in. OC for Mac-Lock 2 or 3 units and a max of 24 in. OC for the B2C or B3C units.

Alternate Construction — Noncomposite units of the same type listed above may be used provided allowable loading is calculated on the basis of noncomposite design.

The Unrestrained Assembly Rating is equal to the Unrestrained Beam Rating (See Item 6) for a max 3 Hr and is limited to the following units and limitations:

- (a) 1-1/2, 2 and 3 in. deep, 24 in. wide, 22 MSG or thicker fluted with clear spans not more than 7 ft, 8 in.
- (b) 1-1/2, 2 and 3 in. deep, 24 in. wide, 20 MSG or thicker fluted with clear spans not more than 8 ft, 8 in.
- (c) 1-1/2 and 2 in. deep, 24 in. wide, 16 MSG or thicker fluted and 18/18 MSG or thicker cellular with clear spans not more than 9 ft, 11 in.
- (d) 3 in. deep, 36 in. wide, 18 MSG or thicker fluted and 24 in. wide, 20/18 MSG or thicker cellular with clear spans not more than 13 ft, 2 in.

For assemblies utilizing 3-1/4 in. lightweight concrete topping with a max Restrained Assembly Rating of 2 Hr, the Unrestrained Assembly Rating is equal to the Unrestrained Beam Rating (See Item 6) and is limited to the following floor units and spans:

- (a) 1-1/2, 2 and 3 in. deep, 24 or 36 in. wide, 22 MSG fluted and 20/20 MSG cellular with clear spans not more than 9 ft, 6 in.
- (b) 2 and 3 in. deep, 24 or 36 in. wide, 20 MSG fluted and 20/20 MSG cellular with clear spans not more than 10 ft, 0 in.
- (c) 3 in. deep, 24 in. wide, 20 MSG fluted and 20/20 MSG cellular with clear spans not more than 13 ft, 2 in.

5. **Joint Cover** — (Use with fluted units optional — Not Shown) — 2 in. wide cloth adhesive tape applied following the contour of the units.

6. **Spray-Applied Fire Resistive Materials*** — Applied by spraying with water, in one coat to a final thickness as shown above and in table below to steel beam surface which is free of dirt, oil or scale. When fluted steel deck is used and the fire protection thickness selected is based on all fluted deck, the area between the steel deck and the top flange of the steel beam shall be filled. When fluted steel deck is used and the steel beam is sprayed with the thicknesses applicable to cellular or blended units, the area between the

steel deck and the top flange of the steel beam shall be plugged. Use of adhesive is optional. Min avg untamped density is 13 pcf with min ind untamped density of 11 pcf for Types II or DC/F. Min avg and min ind untamped densities of 22 and 19 pcf, respectively, for Type HP. Tamping is optional. For method of density determination, refer to Design Information Section. The thickness of the Spray-Applied Fire Resistive Materials on the Structural Members (Item 1, 1A, or 1B) shall be as follows:

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Concrete Type	Protection Mtl Thkns on Structural Member In.				
			W8x28 When Deck Is All Fluted	W8x28 When Deck Is Blend or All Cellular	W12x14 When Deck Is All Fluted	Joist Item 1A When Deck Is Fluted Cellular or Blend	Joist Item 1B When Deck Is Fluted Cellular or Blend
1	1	NW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	1++	—
1-1/2	1	NW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	1-9/16	—
2	1	NW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	2-1/16	—
2	2	NW	3/4	1-3/8+	1-1/16	2-1/16	—
2	3	NW	1-3/16	2-1/8+	1-11/16	—	3-1/4
3	1-1/2	NW	1/2	7/8*	3/4	—	3-1/4
3	2	NW	3/4	1-3/8+	1-1/16	—	3-1/4
3	3	NW	1-3/16	2-1/8+	1-11/16	—	3-1/4
1	1	LW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	1-1/8++	—
1-1/2	1	LW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	1-3/4	—
2	1	LW	3/8,5/8**	1/2+,11/16**	9/16,15/16**	2-1/4	—
2	2	LW	1	1-3/8+	1-7/16	2-1/4	—
2	3	LW	1-9/16+	2-1/8+	2-1/4	—	3-1/4
3	1-1/2	LW	11/16	7/8*	1	—	3-1/4
3	2	LW	1+	1-3/8+	1-7/16	—	3-1/4

*May be reduced to 3/4 in. for the 1-1/2 hr Unrestrained Beam Rating when the material is sprayed 2 in. beyond the beams's top flange and no reduction in thickness is made at the tips of the bottom flange.

**This thickness applies when optional Item 12 or 13 are used over 3-1/4 in. lightweight concrete topping.

+Thickness of Spray-Applied Fire Resistive Materials may be reduced to one half of this thickness on the lower flange tips of the steel beam.

++ - When bottom chords consist of 1 by 1 by 0.125 in. thick steel angles, the thickness of spray-applied fire resistive material shall be increased by 1/4 in. on the bottom chord only.

ISOLATEK INTERNATIONAL —Type D-C/F, HP, Type II, Type EBS or Type X adhesive which may also be used as a surface sealer.

6A. **Spray-Applied Fire Resistive Materials*** — Alternate to Item 6. See table below for appropriate thicknesses. When fluted steel deck is used and the fire protection thickness selected is based on all fluted deck, the area between the steel deck and the top flange of the steel beam shall be filled. When fluted steel deck is used and the steel beam is sprayed with the thicknesses applicable to cellular or blended units, the area between the steel deck and the top flange of the steel beam shall be plugged. Prepared by mixing with water and spray-applied in one or more coats to beam surfaces which must be clean and free of dirt, loose scale and oil. Min average density of 17.5 pcf with min individual value of 17.0 pcf. For method of density determination, see Design Information Section, Sprayed Material.

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Thkns on W8x28, In.	
		When Deck Is All Fluted	When Deck Is Blend or All Cellular
1, 1-1/2, 2	1	5/16, 7/16*	5/16, 7/16*
2	2	11/16	13/16
2	3	1-1/16	1-5/16
3	1-1/2	1/2	9/16
3	2	11/16	13/16
3	3	1-1/16	1-5/16

*This thickness applies when optional Items 12, 13 are used over 3-1/4 in. lightweight concrete topping.

+ ++ - When bottom chords consist of 1 by 1 by 0.125 in. thick steel angles, the thickness of spray-applied fire resistive material shall be increased by 1/4 in. on the bottom chord only.

ISOLATEK INTERNATIONAL —Type 280.

6B. **Spray-Applied Fire Resistive Materials*** — Alternate to Item 6 or 6A. Applied by mixing with water according to instructions on each bag of material. Mixture can be spray or trowel applied in one or more coats. The thickness of the mixture is dependent on the type of floor unit. See table below for appropriate thickness. When fluted steel deck is used and the fire protection thickness selected is based on all fluted deck, the area between the steel deck and the top flange of the steel beam shall be filled. When fluted steel deck is used and the steel beam is sprayed with the thicknesses applicable to cellular or blended units, the area between the steel deck and the top flange of the steel beam shall be plugged. The steel surfaces must be clean and free of dirt, loose scale and oil. Minimum average density of 38 pcf and minimum individual density 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, Sprayed Material.

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Thkns on W8x28, In.	
		When Deck Is All Fluted	When Deck Is Blend or All Cellular
1, 1-1/2, 2	1	3/8, 1/2*	7/16, 9/16*
2	2	15/16	1-1/4
2	3	1-5/16	1-1/2
3	1-1/2	5/8	1
3	2	15/16	1-1/4
3	3	1-5/16	1-1/2

*This thickness applies when optional Item 12 or 13 are used over 3-1/4 in. lightweight concrete topping.

BERLIN CO LTD —Types M-II or TG. Types M-II and TG Investigated for exterior use.

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

LUCKY CORE INSULATING MATERIALS

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

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

6C. **Spray-Applied Fire Resistive Materials*** — Alternate to Items 6A or 6B. Applied by mixing with water in accordance with instructions on each bag and applied in one or more coats to a final thickness as shown in table below to steel beam surface which is free

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of dirt, oil or scale. When fluted steel deck is used and the fire protection thickness selected is based on all fluted deck, the area between the steel deck and the top flange of the steel beam shall be filled. When fluted steel deck is used and the steel beam is sprayed with the thicknesses applicable to cellular or blended units, the area between the steel deck and the top flange of the steel beam shall be plugged.

Min average and min individual density is 15 and 14 pcf, respectively. For method of density determination, refer to Design Information Section. The thickness of the material on the Structural Members (Item 1, 1C, or 1D) shall be as follows:

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns on Structural Members In.				Joist (Item 1C or 1D) When Deck Is Fluted Cellular or Blend
		W8x28 When Deck Is All Fluted	W8x28 When Deck Is Blend or All Cellular	W12x14 When Deck Is All Fluted	W12x14 When Deck Is All	
1	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	9/16	
1-1/2	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	1	
2	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	1-3/8	
2	2	11/16	13/16	1	1-3/8	
2	3	1-1/16	1-5/16	1-1/2	2-1/4	
3	1-1/2	1/2	9/16	3/4	2-1/4	
3	2	11/16	13/16	1	2-1/4	
3	3	1-1/16	1-5/16	1-1/2	2-1/4	

*This thickness applies when optional Item 12 or 13 are used over 3-1/4 in. lightweight concrete topping.

BERLIN CO LTD —Type 300, Type 300ES, Type 300N or Type SB.

ISOLATEK INTERNATIONAL —Type 300, Type 300AC, Type 300ES, Type 300HS, Type 300N, or Type SB.

LUCKY CORE INSULATING MATERIALS

MANUFACTURING L L C —Type 300, Type 300ES, Type 300N, or Type SB.

NEWKEM PRODUCTS CORP —Type 300, Type 300ES, Type 300N, or Type SB.

6D. **Spray-Applied Fire Resistive Materials*** — Alternate to Items 6A, 6B or 6C. Applied by mixing with water in accordance with instructions on each bag and applied in one or more coats to a final thickness as shown in table below to steel beam surface which is free of dirt, oil or scale. When fluted steel deck is used and the fire protection thickness selected is based on all fluted deck, the area between the steel deck and the top flange of the steel beam shall be filled. When fluted steel deck is used and the steel beam is sprayed with the thicknesses applicable to cellular or blended units, the area between the steel deck and the top flange of the steel beam shall be plugged.

Min average and min individual density is 17.5 and 16 pcf, respectively, for 300TW. Min average and min individual density of 22 and 19 pcf, respectively, for Type 400. For method of density determination, refer to Design Information Section. The thickness of the material on the Structural Members (Item 1, 1C, or 1D) shall be as follows:

Restrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns on Structural Members In.			Joist (Item 1C or 1D) When Deck Is Fluted Cellular or Blend
		W8x28 When Deck Is All Fluted	W8x28 When Deck Is Blend or All Cellular	W12x14 When Deck Is All Fluted	
1	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	9/16
1-1/2	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	1
2	1	5/16, 7/16*	5/16, 7/16*	1/2.5/8*	1-3/8
2	2	11/16	13/16	1	1-3/8
2	3	1-1/16	1-5/16	1-1/2	2-1/4
3	1-1/2	1/2	9/16	3/4	2-1/4
3	2	11/16	13/16	1	2-1/4
3	3	1-1/16	1-5/16	1-1/2	2-1/4

*This thickness applies when optional Item 12 or 13 are used over 3-1/4 in. lightweight concrete topping.

BERLIN CO LTD —Type 400.

ISOLATEK INTERNATIONAL — Type 300TW, Type 400.

LUCKY CORE INSULATING MATERIALS

MANUFACTURING L L C —Type 400

NEWKEM PRODUCTS CORP —Type 400.

6E. **Mastic and Intumescent Coatings*** — As an alternate to Items 6 through 6D. For use with fluted steel floor and form units only. Min. size W8x24 or W6x12 beams shall be primed with a phenolic modified alkyd primer, a metal alkyd primer, an acrylic primer or an epoxy primer at a nominal thickness of 2 mil. Coating spray or brush applied in accordance with the manufacturer's instructions at the min dry thickness as shown in the table below. The thickness shown below includes the primer thickness. Flutes above beam to be completely filled with minimum 6 pcf mineral wool insulation, or the top flange of the beam to be protected with the same thickness of coating as required on the beam.

Minimum Dry Thickness mils	Minimum Dry Thickness mm	Beam Size	Unrestrained Beam Rating Hr	Restrained Assembly Rating Hr
53	1.34	W8x24	1	2
95	2.41	W8x24	1-1/2	3
73	1.83	W6x12	1	2
123	3.10	W6x12	1-1/2	3

BERLIN CO LTD —Type WB 3. Investigated for Interior General Purpose. Type WB 4, Investigated for Interior General Purpose. Type WB4, Investigated for Exterior Use with top coat as described in Item 6F.

ISOLATEK INTERNATIONAL —Type SprayFilm-WB 3 and Type WB 3. Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB 4, Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB4, Investigated for Exterior Use with top coat as described in Item 6F.

6F. **Mastic and Intumescent Coatings*** — As an alternate to Items 6 through 6E. For use with normal weight concrete. Min. size W8x28 beams shall be primed with a phenolic modified alkyd primer a metal alkyd primer, an acrylic primer or an epoxy primer at a nominal thickness of 2 mil. Coating spray or brush applied in accordance with the manufacturer's instructions at the min dry thickness as shown in the table below. The thickness shown below includes the primer thickness. The top surface of the top flange where fluted units are used must be protected with the coating material at the same min dry thickness at a min distance of 1 in. (25 mm) inward from the flange tip on both sides of the beam. Mineral wool insulation optional above top surface of the beam.

Minimum Dry Thickness mils	Minimum Dry Thickness mm	Steel Floor Units	Unrestrained Beam Rating Hr	Restrained Assembly Rating Hr
103	2.62	Fluted or Cellular	1-1/2	2
179	4.55	Cellular	1-1/2	3
341	8.67	Cellular	2	3

BERLIN CO LTD —Type WB 3. Investigated for Interior General Purpose. Type WB 4. Investigated for Interior General Purpose. Type WB 4, Investigated for Exterior Use with top coat as described in Item 6G.

ISOLATEK INTERNATIONAL — Type SprayFilm-WB 3 and Type WB 3. Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB 4, Investigated for Interior General Purpose. Type SprayFilm-WB 4 and Type WB 4, Investigated for Exterior Use with top coat as described in Item 6G.

6G. **Top Coat** — Type SprayFilm - TOPSEAL and Type TOPSEAL required for Exterior Use, applied at a minimum dry thickness of 14 mils (0.34 mm) over the intumescent material. See Classification information in the Mastic and Intumescent Coating (CDWZ) category, Isolatek International, for mixing requirements.

6H. **Mastic and Intumescent Coatings*** — As an alternate to Items 6 through 6F. For use with normal weight concrete and fluted steel floor and form units only. Min size W6x12 beams shall be primed with a phenolic modified alkyd primer at a thickness of 1 mil. Coating spray or brush applied in accordance with the manufacturer's instructions at the thickness shown below. The thickness includes the 1 mil of primer.

Minimum Dry Thickness mils	Minimum Dry Thickness mm	Unrestrained Beam Rating Hr.	Restrained Assembly Rating Hr.
60	1.5	1	1

ISOLATEK INTERNATIONAL —Type SprayFilm-WB 2. Investigated Interior General Purpose.

6I. **Mastic and Intumescent Coatings*** — As an alternate to Items 6 through 6F and 6H. For use with normal weight concrete and fluted steel floor and form units only. Min size W8x24 beams shall be primed with a phenolic modified alkyd primer at a thickness of 2 mils. Coating spray or brush applied in accordance with the manufacturer's instructions at the thicknesses shown below. The thickness includes the 2 mils of primer. The top surface of the top flange where fluted units are used must be protected with the coating material at the same min dry thickness or filled with nominal 4 pcf mineral wool.

Minimum Dry Thickness mils	Minimum Dry Thickness mm	Unrestrained Beam Rating Hr.	Restrained Assembly Rating Hr.
35	0.88	1	2

ISOLATEK INTERNATIONAL —Type SprayFilm-WB 5. Investigated Interior General Purpose.

7. **Shear Connector Studs** — Optional — Studs, 3/4 in. diam by 3 in. long, for 1-1/2 in. deep form units to 5-1/4 in. long for 3 in. deep form units, headed type or equivalent per AISC specifications. Welded to the top flange of the beam through the steel form units.
8. **Lath Hanger** — (Not Shown) — Optional - For use in caged beams with Items 6, 6A, 6B or 6C Galv steel 6 SWG min diam spaced 27 in. O. C.
9. **Clips** — (Not Shown) — Optional - For use in caged beams with Items 6, 6A, 6B or 6C No. 24 MSG spring steel pushed on to top and bottom flanges of beam spaced 6 in. O. C. max.
10. **Metal Lath** — (Not Shown) — Optional - For use in caged beams with Items 6, 6A, 6B or 6C 3/8 in. diamond mesh or rib lath, 3.4 lbs per sq yd expanded steel attached to beam with clips spaced 6 in. OC max; or tied to lath hangers with 18 SWG galv steel wire spaced 6 in. OC max.
11. **Electrical Inserts** — (Not Shown) — Classified as "Outlet Boxes and Fittings Classified for Fire Resistance" .*
12. **Mineral and Fiberboards*** — (Optional, not shown). Applied over concrete floor with no restriction on board thickness. When mineral and fiber boards are used, the unrestrained beam rating shall be increased by a minimum of 1/2 hr. See **Mineral and Fiber Board** (CERZ) category for names of manufacturers.
13. **Foamed Plastic*** — (Optional, not shown). Consisting of polyisocyanurate or urethane roof insulations. Applied over concrete floor with no restrictions on thickness. When polyisocyanurate or urethane insulation is used, the unrestrained beam rating shall be increased by a minimum of 1/2 hr. See **Foamed Plastic** (CCVW) for list of manufacturers.
14. **Insulating Concrete** — (Optional, not shown) — Various types of insulating concrete prepared and applied as follows:
 - A. Vermiculite Concrete - Blend 6 to 8 cu ft of Vermiculite Aggregate* to 94 lb Portland cement and air entraining agent. Min thickness of 2 in. as measured to the top surface of the structural concrete or foamed plastic (Item 15) when it is used. See Vermiculite Aggregate (CJZZ) category for names of Classified companies.
 - B. Cellular Concrete-Roof Topping Mixture* - Concentrate mixed with water and Portland cement per manufacturer's specifications. Cast dry density and 28-day min compressive strength of 190 psi as determined with ASTM C495-66.
 - CELCORE INC** — Type Celcore with cast dry density of 31 (+ or - 3.0) pcf or Type Celcore MF with cast dry density of 29 (+ or - 3.0) pcf.
 - CELLULAR CONCRETE L L C** — Cast dry density of 37 (+ or -) 3.0 pcf.
 - ELASTIZELL CORP OF AMERICA** —Type II, with a cast dry density of 39 (+ or - 3.0) pcf.
 - LITE-CRETE INC** —Cast density of 29 (+ or -) 3.0 pcf.
 - SIPLAST INC** —Mix #1, Cast dry density of 32 (+ or -) 3 pcf.
 - SIPLAST INC** —Mix #2, Cast dry density of 36 (+ or -) 3 pcf.
 - C. Cellular Concrete-Roof Topping Mixture* - Foam concentrate mixed with water, Portland cement and UL Classified Vermiculite Aggregate per manufacture's application instructions. Cast dry density of 33 (+ or -) 3 pcf and 28 day compressive strength of min 250 psi as determined in accordance with ASTM C495-86.
 - CELLULAR CONCRETE L L C** — Mix #3.
 - ELASTIZELL CORP OF AMERICA** —Type II. Mix #1 of cast dry density 39 (+ or -) 3.0 pcf, Mix #2 of cast dry density 40 (+ or -) 3.0 pcf, Mix #3 of cast dry density 47 (+ or -) 3.0 pcf.
 - SIPLAST INC** —Mix #3.
 - D. Perlite Concrete - 6 cu ft of Perlite Aggregate* to 94 lb of Portland Cement and 1-1/2 pt air entraining agent. Min thickness 2 in. as measured to the top surface of structural concrete or foamed plastic (Item 15A) when it is used. See Perlite Aggregate (CFFX) in Fire Resistance Directory for names of Classified companies.
15. **Foamed Plastic*** — (Optional-not shown) — For use only with vermiculite (Item 14A) or cellular (Item 14B) concretes-Rigid polystyrene foamed plastic insulation having slots and/or holes sandwiched between vermiculite concrete slurry which is applied to the normal or lightweight concrete surface and vermiculite concrete topping (Item 14A). Max thickness to be 8 in. See Foamed Plastic* (BRYX) category in Building Materials Directory or Foamed Plastic* (CCVW) Category in Fire Resistance Directory for list of Classified companies.
- 15A. **Foamed Plastic*** — (Not Shown) — For use only with cellular or perlite concrete. Nominal 24 by 48 by max 8 in. thick polystyrene foamed plastic insulation boards having a density of 1.0 (+ or - 0.1) pcf, encapsulated within concrete topping. Each insulation board

shall contain six nominal 3 in. diameter holes oriented in two rows of three holes each with the holes spaced 12 in. OC transversely and 16 in. OC longitudinally.

See Foamed Plastic* (BRYX) category in Building Materials Directory or Foamed Plastic* (CCYW) category in Fire Resistance Directory for list of Classified companies.

16. **Roof Covering Materials*** — (Optional, not shown) — Consisting of materials compatible with insulations described herein which provide Class A, B or C coverings. See Built-Up Roof Covering Materials in Building Materials Directory.
17. **Insulated Concrete** — (Optional, not shown) — various types of insulated concrete prepared and applied in the thickness indicated.
 - A. **Vermiculite Concrete** — Mix consists of 6 cu ft of Vermiculite Aggregate*, 94 lbs of Portland cement and 6 ox of air entraining agent. Thickness to be 2 in min from the top plane of steel roof deck.

ELASTIZELL CORP OF AMERICA —Types MS16-U, MSV 200.
 - B. **Perlite Concrete** — Mix consists of 6.2 cu ft Perlite Aggregate* to 94 lbs of Portland cement and 1-1/2 pt air entraining agent. Compressive strength 80 psi min.

See Perlite Aggregate (CFFX) category for names of Classified companies.

*Bearing the UL Classification Mark