BXUV.G802 -

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. G802

May 07, 2018

Restrained Assembly Ratings — 1, 1-1/2, 2 or 3 Hr

(See Items 1, 3, 3A, 3C and 4)

Unrestrained Assembly Ratings — 1, 1-1/2 or 2 Hr

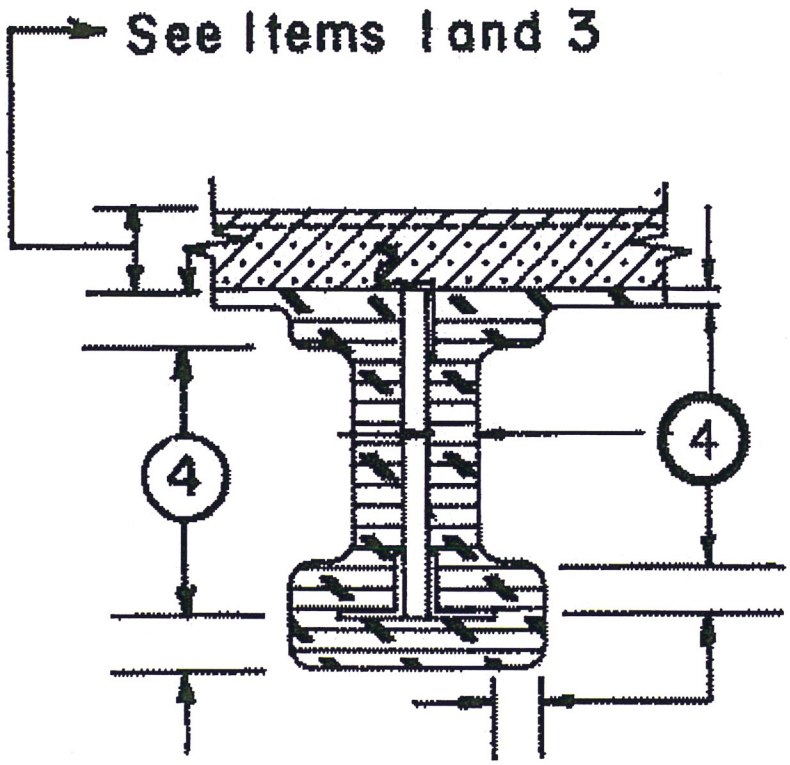
(See Items 1, 3, 3C and 4)

Unrestrained Beam Ratings — 1, 1-1/2 or 2 Hr

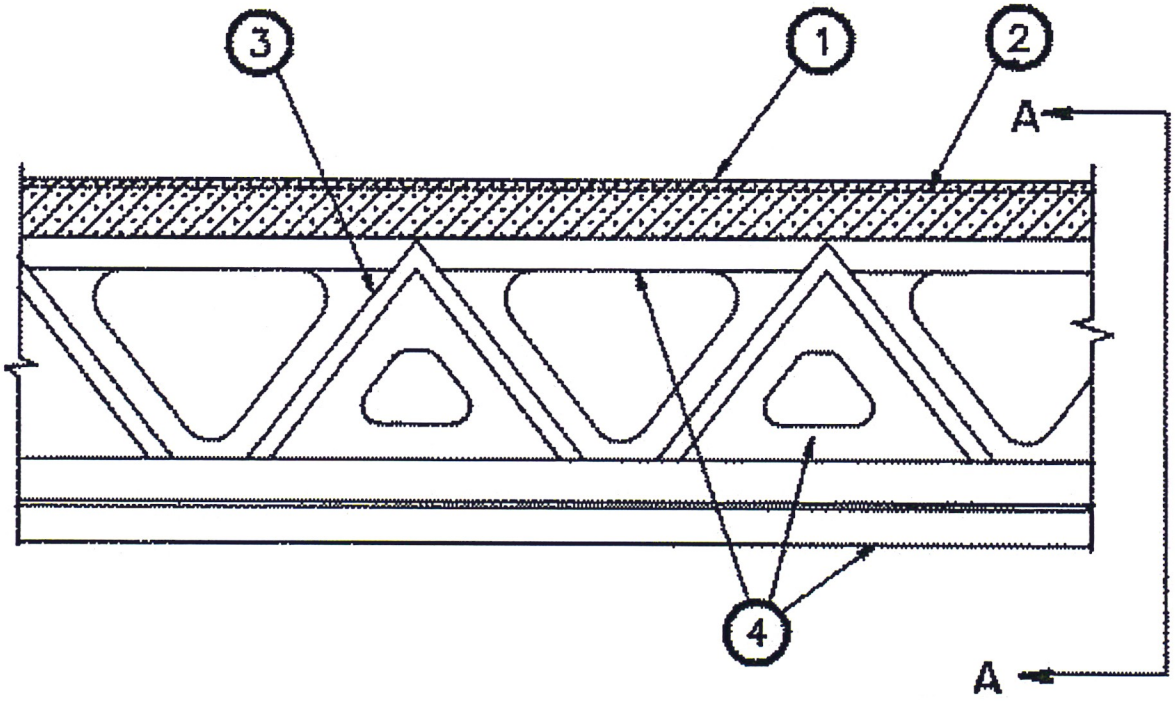
(See Items 3, 3C and 4)

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

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



Sec. A A



1. **Normal — Weight Or Lightweight Aggregate Concrete —** Normal weight concrete carbonate or siliceous aggregate, 150 pcf unit weight, 3500 psi compressive strength, vibrated. Lightweight concrete expanded shale, clay, or slate aggregate by rotary-kiln method, 117 pcf unit weight, 3500 psi compressive strength, vibrated, 2 oz air entrainment per bag of cement. Concrete may be cast over removable plywood forms for all ratings or over steel deck forms (Item 3A) for 2 h or lesser ratings. Minimum thickness of concrete topping over plywood forms is 3 in. when joists are spaced 50-1/2 in. O.C. maximum, and 4-1/2 in. when joists are spaced 66 in. O.C. maximum. Minimum thickness over top of corrugated steel forms (Item 3A) is 2-3/4

in. with Types D500, D510 joists, or mini joists Types TC, RTC or SRTC. Min concrete thickness, as measured from the bottom of the steel floor units with Types MD2000, MD and RMD joists is 4 in. When concrete slabs are used without protection material the Restrained and Unrestrained Assembly ratings depend on the type of concrete aggregate and joist spacing as shown below:

	Normal Weight * Concrete Slab Thk In		Lightweight * Concrete Slab Thk In		
Restrained or Unrestrained Assembly Rating Hr	**Joist Spacing 50-1/2 In. OC Max**	**Joist Spacing 66 In. OC Max**	**Joist Spacing 50-1/2 In. OC Max**	**Joist Spacing 66 In. OC Max**	**Min Concrete Cover on Wire Fabric From Bottom of Slab In.**
1 h	3-3/4	4-1/2	3	4-1/2	1
1-1/2 h	4-1/2	4-1/2	3-1/2	4-1/2	1-1/8
2 h	5-1/4	5-1/4	4	4-1/2	1-1/4

*Thicknesses of slab are measured from top of steel form units or top of plywood forms.

2. **Welded Wire Fabric —** As required for structural capacity of the slab, but not less than the minimum areas required by the latest ACI specifications.

3. **Structural Steel Members* —** Hambro joists with top chord embedded in concrete spaced 50-1/2 in. O.C. maximum with protected floors and 66 in. O.C. maximum with unprotected concrete slabs (see Item 1). Minimum area of joist members spaced greater than 50-1/2 in. O.C. shall be a 0.594 sq in. for bottom chord angles and 0.277 sq in. for the web. The protection material used to protect the steel joists shall extend 3 in. onto the bottom of the exposed slab beyond the sides of the joist web. The joists are of two types The open web type designated D-500 and MD2000, or fabricated from single sheet of steel designated D-510. For short spans, mini joists, Types TC, RTC, SRTC, MD or RMD may be used as alternates to above joists. **Max hourly rating with Type D-510 joist is 1-1/2 H.** Min nom depth of Types D-500, D-510 or MD2000 is 8 in. For D-500 or MD2000 Joists, min area of bottom chord and web members depends on the thickness of the protection material on the joist as shown in Item 4 below.
HAMBRO STRUCTURAL SYSTEMS, DIV OF CANAM STEEL CORP — Types D-500, D500LH, D-510 or MD2000. Mini joists Types TC, RTC, SRTC, MD or RMD for short spans.

3A. **Steel Form Units —** (Not Shown) — For use in 2 H or less rated assemblies only. 1-1/2 in. deep, 22 gauge galv fluted steel floor and form units for use with Types MD2000, MD and RMD joists. Optional — min 9/16 in. deep corrugated steel form units 2-1/2 in. pitch, 28 galv or uncoated for use with Types D-500, D510, TC, RTC or SRTC joists. Steel form units are not considered in calculating the load carrying capacity of the slab.

3B. **Permanent Roll Bars —** (Not Shown) — Optional — Installed perpendicular to joists to support corrugated steel forms (Item 3A). Hat-shaped steel section, 1/2 in. wide, 2 or 2-1/2 in. deep, 18 gauge steel. Ends engaged into slots near top of joists, spaced 30 in. O.C. max.

3C. **Steel Joists —** As an alternate to Structural Steel Members*, Item 3, Types 14K3 and 12K5 min size joists may be used. For the **1 H Restrained and Unrestrained Assembly and Unrestrained Beam Ratings,** 12K1 min size joists may be used.

3D. **Horizontal Bridging —** (Not shown) — For use with noncomposite joists (Item 3C). Min 1-1/4x1-1/4x1/8 in. thick steel angles. Number and spacing per SJI Specifications. Welded to top and bottom chords of joists. Min thickness of protection material on bridging angles shall be the same as on joists.

4. **Spray-Applied Fire Resistive Materials —** Applied by spraying with water in one untamped coat to the thickness shown in the table below, to all surfaces which must be free of dirt, oil and scale. Use of adhesive is optional. Min avg untamped density of material is 13 pcf with min ind untamped density of 11 pcf for Types II, II HS, or DC/F. Min avg and min ind densities of 22

and 19 pcf, respectively, for Type HP. For method of density determination see Design Information Section. The required thickness of Spray-Applied Fire Resistive Materials on the joists and permanent roll bars (Item 3B) are tabulated below:

Required Min Thickness On Joists And Roll Bars

Type of Joist	Min Area of Joist Bottom Chord Sq In.	Min Area of Web Sq In.	Thk of Spray Applied Fire Resistive Mtl In.	Hr Rating
D-500,	0.594	0.277	2-1/2	3 h or less Restrained
MD2000, 14K3				Assembly 2 h or less
or 12K5,				Unrestrained Assembly
min size				2 h or less
				Unrestrained Beam
D-500,	0.594	0.277	2	2 h or less Restrained
MD2000, 14K3				or Unrestrained Assembly
or 12K5,				2 h or less
min size				Unrestrained Beam
D-500,	0.443	0.222	1-1/2	1 h Restrained or
MD2000, or 12K1,				Unrestrained Assembly
min size				1 h Unrestrained Beam
D-510	—	—	1-5/8	1-1/2 h or less
				Restrained Assembly
				1 h Unrestrained
				Assembly and Beam

Material applied in one or thinner multiple coats to underside of steel form units, to a final thickness of 5/8 in. following the contour of the form units. When the thickness of flat reinforced-concrete slab is a min 3 or 4-1/2 in. for the 50-1/2 in. or the 66 in. joist spacing, respectively, per Item 1, but less than the tabulated min thicknesses in Item 1, the underside of the concrete slab shall be protected with Spray-Applied Fire Resistive Materials according to the table below:

Required Min Thickness On Underside Of Floor, in.

Concrete Type	1 Hr Restrained Assembly Rating	2 Hr Restrained Assembly Rating	3 Hr Restrained Assembly Rating
Normal weight	3/8	3/4	1-1/4
Light weight	None	3/8	1

For 2 h Unrestrained Assembly Rating with flat normal weight reinforced-concrete slab with min 3/4 in. concrete cover to the reinforcing steel, and 3/8 in. thickness of protection material on the bottom of the slab, the slab thicknesses and joist protection shall be according to the table below:

Concrete Type	Concrete Slab Thkns In.	Type of Joist	Min Bottom Chord Steel Area Sq In.	Min Area of Joist Web Sq In.	Thkns of Mtl on Joist In.
Carbonate	3-1/4	D-500	0.594	0.277	2-1/2
Aggregate					
Siliceous	3-3/4	D-500	0.594	0.277	1-5/8
Aggregate					
Carbonate	3-1/4	D-510	—	—	1-5/8
Aggregate					
Siliceous	3-3/4	D-510	—	—	1-5/8
Aggregate					

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

5. **Metal Lath —** (Not Shown, Optional) — Diamond mesh, 3/8 in. expanded steel lath, 1.7 to 3.4 lb per sq yd. Lath secured to one side of each steel joist with No. 18 SWG galv steel wire at joist web and bottom chord members, spaced 15 in. O.C. max.

6. **Glass Fiber Mesh —** (Not Shown) Optional — Square mesh, 3/32 to 3/16 in. fiberglass scrim fabric, weighing approx 1.9 to 2.5 oz/sq yd shall be attached to one side of each joist web member. The method of attaching the mesh must be sufficient to hold the mesh and spray-applied sprayed-fiber material in place during application and until it has cured. An acceptable method to attach the mesh is by embedding it in minimum 1/4 in. long beads of hot melted glue. The beads of glue shall be spaced minimum 12 in. O.C. along th top chord of the bar joists.

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

Last Updated on 2018-05-07