Design No. M511
BXUV.M511
Fire Resistance Ratings - ANSI/UL 263

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- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified 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 as Classified, Listed, or Recognized.

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See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. M511
April 05, 2012

Unrestrained Assembly Ratings – 1 Hr.

<table>
<thead>
<tr>
<th>Joist</th>
<th>Allowable Strength</th>
<th>Factored Resistance</th>
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<tbody>
<tr>
<td></td>
<td>Weight</td>
<td>M_a</td>
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<tr>
<td></td>
<td>(plf)</td>
<td>(k-ft)</td>
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<tr>
<td>10-i-2</td>
<td>4.16</td>
<td>3.49</td>
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<tr>
<td>10-i-3</td>
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**Notation**

- $M_a$ - flexural resistance in accordance with Allowable Stress Design
- $V_o$ - shear resistance in accordance with Allowable Stress Design at gross section (solid web)
- $V_{sh}$ - shear resistance in accordance with Allowable Stress Design at net section (hole location)
- $M_r$ - flexural resistance in accordance with Load and Resistance Factor Design
- $V_f$ - shear resistance in accordance with Load and Resistance Factor Design at gross section (solid web)
- $V_{rh}$ - shear resistance in accordance with Load and Resistance Factor Design at net section (hole location)

1. **Flooring Systems**

   **System A**

   **1A. Sub-flooring** — Minimum 3/4 in thick tongue-and-groove plywood or oriented-strand board, minimum grade "underlayment". Long edges of board to be perpendicular to joists with ends staggered. The board is to be fastened to the steel joists with 1-1/2 in. long by 0.140 in. diameter ITW Ramset GypFast fasteners installed with an air-powered nailer or with #10 wafer head, self drilling, self tapping screws 1-1/2 in. long. Screws shall be spaced 6 in. OC along the perimeter of each sheet and 12 in. OC in the field of each sheet.

   **1B. Wall and Partition Facings and Accessories** — (not shown) - Min 1-1/2 in. long fastener pins used to attach sub-flooring (Item 1) to joists. Fasteners spaced 6 in. OC at the perimeter of the boards and 12 in. OC in the field.

   **ITW RAMSET** — Type GypFast Fastener

   **1C. Optional Finish Flooring - Floor Topping Mixture** — Placed over the Sub-Flooring Item 1A. Min 3/4 in. thickness of floor topping mixture having a min compressive strength of 1000 psi. Mixture shall consist of 3 to 7 gal of water mixed with 80 lbs of floor topping mixture and 1.0 to 2.1 cu ft of sand.

   **MAXXON CORP** — Types D-C, GC, GC 2000, L-R, T-F, CT

   **System B**

   **1A. Structural Cement-Fiber Units** — (Not Shown) — In lieu of the wood sub-flooring described in System A, steel deck and structural cement-fiber units may be installed. The deck is to consist of corrugated or fluted steel form units, minimum 9/16 in. deep, 22 MSG painted or galv steel, mechanically attached to the top flange of the Joist (Item 2) using self-drilling, self-tapping # 14 screws 1.0 in. long spaced 16 in. apart. Deck overlapped by one corrugation at each splice location. Nominal 19 mm (3/4 in.) thick
structural cement-fiber units installed over the steel deck and fastened to the steel joists with #8 self drilling, self tapping cement board screws 1-5/8 in. long. Screws shall be spaced 1/2 in. from end joints and 8 in. OC along the end joints, and 1 and 2 in. from side joints and 12 in. OC in the field of each sheet.

ECTEK INTERNATIONAL INC — Armoroc Panel

1B. Optional Finish Flooring - Floor Topping Mixture* — Placed over the Structural Cement-Fiber Units, Item 1A. Min 3/4 in. thickness of floor topping mixture having a min compressive strength of 1000 psi. Mixture shall consist of 3 to 7 gal of water mixed with 80 lbs of floor topping mixture and 1 to 2.5 cu ft of sand.

MAXXON CORP — Types D-C, GC, GC 2000, L-R, T-F, CT

System C

1A. Steel Deck — Pitch 2.5 in., 0.875 in. deep with 0.030 in. thickness (22 Ga). Attached to joists using self-drilling, self-tapping # 14 screws 1.0 in. long spaced 16 in. apart. Deck overlapped by one corrugation at each splice location.

1B. Concrete — Normal weight concrete, carbonate or siliceous aggregate, 150 psi unit weight, 2900 psi compressive strength. Minimum slab thickness 2-3/4 in., minimum deck cover 1-7/8 in.

1C. Welded Wire Fabric — Minimum 6 in. by 6 in. MW13.3 x MW13.3 placed in the concrete to prevent shrinkage cracks.

System D

1A. Steel Deck — Pitch 2.5 in., 0.875 in. deep with 0.030 in. thickness (22 Ga). Attached to joists using self-drilling, self-tapping # 14 screws 1.0 in. long spaced 16 in. apart. Deck overlapped by one corrugation at each splice location.

1B. Concrete — Light weight concrete, minimum 105 psi unit weight, 2900 psi compressive strength. Minimum slab thickness 2-3/4 in., minimum deck cover 1-7/8 in.

1C. Welded Wire Fabric — Minimum 6 in. by 6 in. MW13.3 x MW13.3 placed in the concrete to prevent shrinkage cracks.

System E

1A. Steel Deck — Min 9/16 in. deep, 22 MSG galv corrugated fluted steel deck. Overlapped one corrugation at each side and attached to each joist with 3/4 in. long #10-16 TEK screws 10 in OC max.

1B. Floor Topping Mixture* — Compressive strength to be 3000 psi min. Minimum thickness to be 1 in. as measured from the top plane of the deck. Refer to manufacturer's instructions accompanying the material for specific mix design. An acrylic provided by the floor-topping manufacturer shall be applied to the steel deck prior to the installation of the floor topping mixture at a maximum application rate of 300 ft²/gallon.

MAXXON CORP — Type D-C

2. Structural Steel Members* — iSPAN® Joist - Minimum 10 in. deep, 18 GA, spaced maximum 24 in. OC. Web stiffeners screwed to both ends of joists using 6 hex head, self drilling, self tapping #12 steel screws 1.0 in long and to steel C-shaped assembly tracks using 3 hex-head, self drilling, self tapping #12 steel screws 1.0 in. long.

ISPN SYSTEMS LP — iSPAN® Joist

3. Bridging* — iSPAN® bridging, 1-7/8 in. by 5/8 in. by minimum 20 GA. Bridging installed perpendicular to joists through web holes and located 8 ft apart or at mid-point of joist for shorter spans. Bridging attached to flange of web hole in each joist using 1 hex head, self-drilling, self-tapping #10 screw, 3/4 in. long. Alternatively, bridging may be attached to joists using minimum 3/4 in. by 3/4 in. by 20 GA, dip angle. Clip angle fastened to joist web and to bridging using 1 hex head, self-drilling, self-tapping #10 screw, 3/4 in. long.

Optional Bridging* — Used as an alternative to iSPAN® bridging, iSPAN® Snap-In bridging, 1-7/8 in. by 5/8 in. by minimum 20 GA. Bridging attached to top and bottom chords on each joist and located 8 ft apart or at mid-point of joist for shorter spans. Bridging attached to chords of each joist using 1 hex head, self-drilling, self-tapping #10 steel screw, 3/4 in. long.

ISPN SYSTEMS LP — iSPAN® Bridging, iSPAN® Snap-In Bridging

4A. Alternative Blocking (not shown) — ISPAN® Joist, minimum 18 GA (Item 2). Solid blocking to be installed at every second bridging location. Blocking attached to each adjacent joist using 3 in. by 6 in. 16 GA. Connector using 2 hex head self-drilling, self-tapping 1/4 in. screws, 1 in. long. Connector attached to blocking using 3 hex head, self-drilling, self-tapping 3/16 inch screws, 1 inch long.

ISPAN SYSTEMS LP — ISPAN® Blocking

5. Batts and Blankets* — Mineral wool insulation, nominal 3 in. thick, nominal density 3.0 lb/cu. ft. Insulation shall rest on the top of the bottom flange of each joist and the top of the resilient channels, and surround the wings on the bottom flange. Joints between batts in adjacent joist spaces shall be staggered and shall line up with resilient channels.

ROXUL INC — Acoustical Fire Batt

6. Resilient Channels — Minimum 26 GA galvanized steel. Channels shall be spaced maximum 12 in. apart and attached to the bottom flange of each joist with one 3/4 in. long pan head self-drilling, self-tapping #10 steel screw. At locations where gypsum board end joints occur, additional resilient channels shall be installed to provide screw attachments for the gypsum board ends. These additional channels shall be positioned so that the distance from the end of the board to the centre of the first channel is 3 in. from the board end to the centre of the next channel is 12 in.

6A. Steel Framing Members* — (Optional, Not Shown) — Used as an alternate method to attach min. 1/2 in. deep resilient channels (Item 6) to structural steel members (Item 2). Resilient channels are friction fitted into clips, and then clips are secured to the bottom flange of each structural steel member with a min. 1-1/4 in. long pan head self-drilling, self-tapping #10 steel screw through the center hole of the clip and the resilient channel flange. Adjoining resilient channels are overlapped 4 in. under structural steel members. The clip flange is opened slightly to accommodate the two overlapped channels. Additional clips required to hold resilient channel that supports the gypsum board butt joints, as described in Item 7.

KEENE BUILDING PRODUCTS CO INC — Type RC Assurance

7. Gypsum Board* — Nominal 5/8 in. thick, 48 in. wide gypsum board installed with long dimension perpendicular to resilient channels. Gypsum board shall be attached to resilient channels using 1 in. long Type S drywall screws, spaced 8 in. OC in the field of each board. At the side joints, screws shall be located 1-1/2 in. and 4 in. from the board edge. At the end joints, screws shall be located 3 in. and 12 in. from the board end.

CGC INC — Type C

UNITED STATES GYPSUM CO — Type C

USG MEXICO S A DE C V — Type C


*BEARING THE UL CLASSIFICATION MARK

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