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 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.

Fire Resistance Ratings - ANSI/UL 263

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

Design No. M515

July 25, 2012

Unrestrained Assembly Ratings – 1 Hr.

<table>
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<tr>
<th>Joist</th>
<th>Factored Resistance</th>
<th>Allowable Strength</th>
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<tr>
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<td>$V_r$ (kip)</td>
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**Notation**

$M_b$ - flexural resistance in accordance with Allowable Stress Design

$V_a$ - shear resistance in accordance with Allowable Stress Design at gross section (solid web)

$V_{ah}$ - 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

$V_r$ - 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 1-3/4 in. long by minimum 0.100 in. diameter fasteners installed with an air-powered nailer or with #10 flat head, self drilling, self tapping screws 1-3/4 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. Screws shall be spaced ½ in. from end joints and 1 in. from side joints.

   1B. **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

2. **System B**

   1A. **Structural Cement-Fiber Units** — (Not Shown) — In lieu of the wood sub-flooring described in System A, structural cement-fiber units may be installed. Nominal 19 mm (3/4 in.) thick tongue and groove structural cement-fiber units fastened to the steel joists with #10 self drilling, self tapping cement board screws 1-3/4 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. Screws shall be spaced 1/2 in. from end joints and 1 in. from side joints.

   **ECTEK INTERNATIONAL INC** — Armoroc Panel
B. 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 1.0 to 2.1 cu ft of sand.

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

System C

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 1.0 to 2.1 cu ft of sand.

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

2. Structural Steel Members* — Total Joist™ - Minimum 7.5 in. deep, 20 GA minimum thickness, spaced maximum 24 in. OC. Total Joist™ end connectors screwed to both ends of joists using 6-No.12-14, 1 in. long, self drilling screws, and to steel C-shaped rim track using 3-No.12-14, 1 in. long, self drilling screws.

ISPAN SYSTEMS LP — Total Joist™

3. Bridging* — Total Joist™ snap-on bridging, 1-7/8 in. by 5/8 in. by minimum 20 GA, bridging attached to bottom chords on each joist and located 8 ft - 0 in. apart or at mid-point of joist for shorter spans. Bridging attached to chords of each joist using 1-No.12-14, 3/4 in. long, self drilling screw.

Optional Bridging® — Total Joist™ 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 - 0 in. 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, clip angle. Clip angle fastened to joist web and to bridging using 1 hex head, self-drilling, self-tapping #10 screw, 3/4 in. long.

ISPAN SYSTEMS LP — Total Joist™ Snap-On Bridging, Total Joist™ Bridging.

4. Blocking* — Total Joist™ Blocking, 18 GA. Blocking attached to every fifth bridging location between joists using 2-No.12-14, 1 in. long, self drilling screws

4A. Alternative Blocking (not shown) — Total Joist™ cut to fit the space between the two adjacent joists and attached to joists with 16 ga. 6 in. by 3 in. Angle connected to blocking and joist with 2-#12-14, 1 in. long. self drilling screws on each leg of the angle.

ISPAN SYSTEMS LP — Total Joist™ Blocking

5. Batts and Blankets* — UL Classified, Unfaced Glass fiber insulation, nominal 3.5 in. thick, nominal density 0.5 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.

6. Resilient Channels — Minimum 25 GA galvanized steel. Channels shall be spaced maximum 12 in. apart and attached to the bottom flange of each joist with one #7-3/4 in. long pan head self-drilling, self-tapping 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 center of the first channel is 3 in. and from the board end to the center 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 end joints, screws shall be located 1-1/2 in. and 4 in. from the board edge. At the side 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

8. **Joint System** — (Not shown) — Paper tape embedded in joint compound over joints and covered with 2 layers of compound with edges feathered out. Wallboard screw heads covered with 2 layers of compound.

*Bearing the UL Classification Mark

_Last Updated_ on 2012-07-25

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