

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](#)

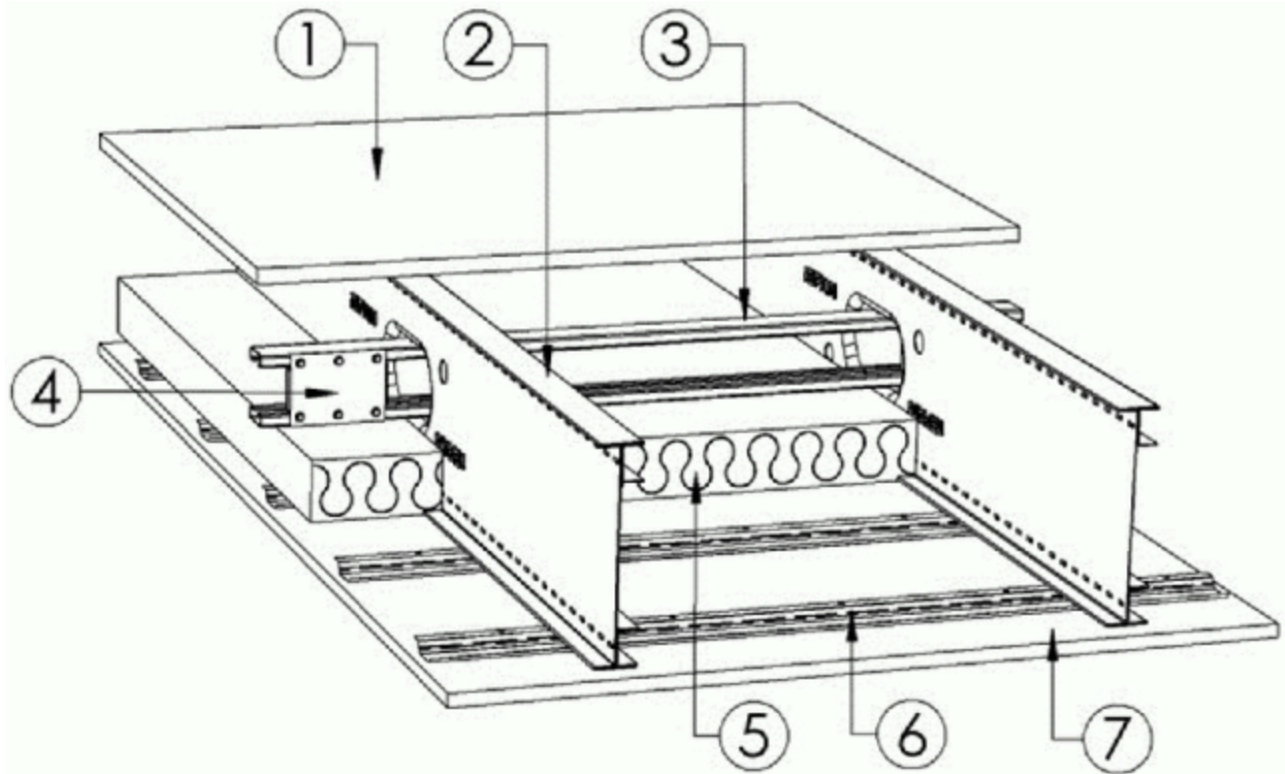
Design No. **M515**

May 20, 2025

Unrestrained Assembly Ratings — 1 Hr.

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.**



Factored Resistance

Allowable Strength

Joist	M_r (k-ft)	V_r (kip)	V_{rh} (kip)	M_a (k-ft)	V_a (kip)	V_{ah} (kip)
9.5-i-2	6.58	2.87	2.01	4.15	1.89	1.32
9.5-i-3	8.51	4.48	3.14	5.36	2.95	2.06
9.5-i-4	10.6	7.00	4.90	6.68	4.61	3.22
10-i-2	6.87	2.87	2.01	4.33	1.89	1.32
10-i-3	8.90	4.48	3.14	5.61	2.95	2.06
10-i-4	11.1	7.00	4.90	7.00	4.61	3.22
11.875-i-2	8.57	2.87	2.01	5.40	1.89	1.32
11.875-i-3	11.1	4.48	3.14	7.01	2.95	2.06
11.875-i-4	14.0	7.00	4.90	8.80	4.61	3.22
12-i-2	8.67	2.87	2.01	5.47	1.89	1.32
12-i-3	11.3	4.48	3.14	7.10	2.95	2.06
12-i-4	14.1	7.00	4.90	8.91	4.61	3.22
14-i-2	10.3	2.87	2.01	6.52	1.89	1.32
14-i-3	13.5	4.48	3.14	8.49	2.95	2.06
14-i-4	17.0	7.00	4.90	10.7	4.61	3.22
16-i-2	12.0	2.87	2.01	7.58	1.89	1.32

16-i-3	15.7	4.48	3.14	9.88	2.95	2.06
16-i-4	19.8	7.00	4.90	12.5	4.61	3.22

Notation

M_a - 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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. Optional Sound Mat - Floor Mat Materials* — Loose laid over sub-floor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

MAXXON CORP — Type Encapsulated Sound Mat.

Floor Mat Reinforcement — (Optional) Refer to manufacturer's instructions regarding minimum thickness of floor topping for use with floor mat

Metal Lath — (Optional) — 3/8 in. expanded galvanized steel diamond mesh, 3.4 lbs/sq yd loose laid over the floor mat material.

Fiber Glass Reinforcement — (Optional) 0.015 in. thick PVC coated non-woven fiberglass mesh, 0.368 lbs./sq. yd loose laid over the floor mat material.

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 1500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

MAXXON CORP — Types Maxxon Standard and Maxxon High Strength

System B

1A. Building Units* — (Not Shown) — In lieu of the wood sub-flooring described in System A, building units may be installed. Nominal 19 mm (3/4 in.) thick tongue and groove building 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 — Type MegaBoard

1B. Optional Sound Mat - Floor Mat Materials — Loose laid over sub-floor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

MAXXON CORP — Type Encapsulated Sound Mat.

Floor Mat Reinforcement — (Optional) Refer to manufacturer's instructions regarding minimum thickness of floor topping for use with floor mat reinforcement.

Metal Lath — (Optional) 3/8 in. expanded galvanized steel diamond mesh, 3.4 lbs/sq yd loose laid over the floor mat material.

Fiber Glass Reinforcement — (Optional) 0.015 in. thick PVC coated non-woven fiberglass mesh, 0.368 lbs./sq. yd loose laid over the floor mat material.

1C. 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 1500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

MAXXON CORP — Types Maxxon Standard and Maxxon High Strength

System C

1A. Building Units* — (Not Shown) — In lieu of the wood sub-flooring described in System A, steel deck and building 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 building 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 — Type MegaBoard

1B. Optional Sound Mat - Floor Mat Materials* — Loose laid over sub-floor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

MAXXON CORP — Type Encapsulated Sound Mat.

Floor Mat Reinforcement — (Optional) Refer to manufacturer's instructions regarding minimum thickness of floor topping for use with floor mat reinforcement.

Metal Lath — (Optional) 3/8 in. expanded galvanized steel diamond mesh, 3.4 lbs/sq yd loose laid over the floor mat material.

1C. 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 1500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

MAXXON CORP — Types Maxxon Standard and Maxxon High Strength

System D

1A. Sub-flooring — (Not Shown) — In lieu of the wood sub-flooring described in System A, 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. Optional Finish Flooring - Floor Topping Mixture* — (Not Shown) — Minimum 3/4 in. thickness of floor topping mixture having a min compressive strength of 1800 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

UNITED STATES GYPSUM CO — Types LRK, HSLRK, CSD

USG MEXICO S A DE C V — Types LRK, HSLRK, CSD

1C. Floor Mat Materials* — (Optional, Not Shown) - Floor mat material loose laid over the subfloor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

UNITED STATES GYPSUM CO — Types SAM, LEVELROCK® Brand Sound Reduction Board, LEVELROCK® Brand Floor Underlayment SRM-25

System E

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 structural cement-fiber units, with long edges tongue and grooved, fastened to the steel joists with #8 self-drilling, self-tapping cement board screws 1-5/8 in. long. Long dimension of panels to be perpendicular to joists with end joints staggered a min of 2 ft and centered over the joists. 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.

UNITED STATES GYPSUM CO — Types STRUCTO-CRETE, USGSP

1B. **Optional Finish Flooring - Floor Topping Mixture*** — (Not Shown) — Minimum 3/4 in. thickness of floor topping mixture having a minimum compressive strength of 1800 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

UNITED STATES GYPSUM CO — Types LRK, HSLRK, CSD

USG MEXICO S A DE C V — Types LRK, HSLRK, CSD

1C. **Floor Mat Materials*** — (Optional, Not Shown) - Floor mat material loose laid over the subfloor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

UNITED STATES GYPSUM CO — Types SAM, LEVELROCK® Brand Sound Reduction Board, LEVELROCK® Brand Floor Underlayment SRM-25

System F

1A. **Steel Deck** — (Not Shown) - 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. An ethalene vinyl acetate adhesive may be applied to the steel deck prior to the installation of the floor topping mixture at a maximum application rate of 0.025 lbs/ft².

1B. **Floor Topping Mixture*** — (Not Shown) - Minimum 3/4 in. thickness of floor topping mixture having a minimum compressive strength of 3000 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

UNITED STATES GYPSUM CO — Types LRK, HSLRK, CSD

USG MEXICO S A DE C V — Types LRK, HSLRK, CSD

1C. **Floor Mat Materials*** — (Optional, Not Shown) - Floor mat material loose laid over the subfloor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

UNITED STATES GYPSUM CO — Types SAM, LEVELROCK® Brand Sound Reduction Board, LEVELROCK® Brand Floor Underlayment SRM-25

System G

1A. **Steel Deck** — 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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. **Floor Mat Materials* — (Optional)** — Floor mat material nom 1/8 in. (3mm) thick loose laid over the subfloor. Floor topping thickness shall be a min of 3/4 in. (19mm)

HACKER INDUSTRIES INC — FIRM-FILL SCM 125

Alternate Floor Mat Materials - (Optional) — Floor mat material nom 1/4 in. (6mm) thick loose laid over the subfloor. Floor topping thickness shall be a min of 1 in. (25mm)

HACKER INDUSTRIES INC — Types FIRM-FILL SCM 250 and FIRM-FILL SCM 250+

Alternate Floor Mat Materials - (Optional) — Floor mat material nom 3/8 in. (10mm) thick loose laid over the subfloor. Floor topping thickness shall be a min of 1-1/4 in. (32mm)

HACKER INDUSTRIES INC — Types FIRM-FILL SCM 400 and FIRM-FILL SCM 400+

Alternate Floor Mat Materials - (Optional) — Floor mat material nom 3/4 in. (19mm) thick loose laid over the subfloor. Floor topping thickness shall be a min of 1-1/2 in. (38mm)

HACKER INDUSTRIES INC — Types FIRM-FILL SCM 750 and FIRM-FILL SCM 750+

Alternate Floor Mat Materials - (Optional) — Floor mat material nom 5/64 in. (2 mm) thick adhered to subfloor with Hacker Floor Primer. Primer to be applied to the surface of the mat prior to the placement of floor-topping mixture. Floor topping thickness a min 1 in. over the floor mat.

HACKER INDUSTRIES INC — Type Hacker Sound-Mat.(HSM1.02)

Alternate Floor Mat Materials - (Optional) — Floor mat material nom 1/4 in. (6mm) thick adhered to subfloor with Hacker Floor Primer. Primer to be applied to the surface of the mat prior to the placement of a min 1-1/4 in. (32mm) of floor-topping mixture.

HACKER INDUSTRIES INC — Type Hacker Sound-Mat II. (HSM2.06)

1C. **Metal Lath (Optional)** — For use with 3/8 in. (10 mm) or greater floor mat materials, 3/8 in. expanded steel diamond mesh, 3.4 lbs/sq yd placed over the floor mat material. Hacker Floor Primer to be applied prior to the placement of the metal lath. When metal lath is used, floor topping thickness a nom 1-1/4 in. over the floor mat.

1D. **Finish Flooring - Floor Topping Mixture*** — Min 3/4 in. thickness of floor topping mixture having a min compressive strength of 1100 psi. Mixture shall consist of 6.8 gal of water to 80 lbs of floor topping mixture to 1.9 cu ft of sand.

HACKER INDUSTRIES INC — Firm-Fill Gypsum Concrete, Firm-Fill 2010, Firm-Fill 3310, Firm-Fill 4010, Firm-Fill High Strength, Gyp-Span Radiant

System H

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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. **Vapor Barrier** — (Optional) — Commercial asphalt saturated felt, 0.030 in. thick.

Alternate Vapor Barrier — (Optional) — Nom 0.010 in. thick commercial rosin-sized building paper.

1C. **Finish Flooring*** — (Optional) — Min 3/4 in. thickness of any Floor Topping Mixture bearing the UL Classification Marking as to Fire Resistance. See Floor- and Roof-Topping Mixtures (CCOX) category for names of Classified Companies.

1D. **Floor Mat Materials*** — (Optional) — Nom. 1/4 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 55/025 and Quiet Qurl 55/025 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 3/8 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 1 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 60/040 and Quiet Qurl 60/040 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 3/4 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 1-1/2 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 65/075, Quiet Qurl 65/075 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 1/8 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 52/013 and Quiet Qurl 52/013 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 1/4 in. entangled net core with a compressible fabric attached to the bottom loose laid over the subfloor. Floor topping thickness shall be a minimum of 1 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 55/025 MT and Quiet Qurl 55/025 N MT

System I

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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. **Vapor Barrier** — (Optional) — Nom 0.030 in. thick commercial asphalt saturated felt.

1C. **Finish Flooring — Floor Topping Mixture*** — (Optional) — Min 3/4 in. thickness of floor topping mixture, having a min compressive strength of 1000 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

DEPENDABLE LLC — GSL M3.4, GSL K2.6 and GSL RH

1D. **Floor Mat Materials*** — (Optional) — Nom. 1/4 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 55/025 and Quiet Qurl 55/025 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 3/8 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 1 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 60/040 and Quiet Qurl 60/040 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 3/4 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 1-1/2 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 65/075, Quiet Qurl 65/075 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 1/8 in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 52/013 and Quiet Qurl 52/013 N

Alternate Floor Mat Materials* — (Optional) — Floor mat material Nom. 1/4 in. entangled net core with a compressible fabric attached to the bottom loose laid over the subfloor. Floor topping thickness shall be a minimum of 1 in.

KEENE BUILDING PRODUCTS CO INC — Types Quiet Qurl 55/025 MT and Quiet Qurl 55/025 N MT

System J

1A. **Subflooring** — 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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. **Finish Flooring — Floor Topping Mixture*** — (Optional, Not Shown) Minimum 3/4 in. thickness of floor topping mixture having a min compressive strength of 1500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

FORMULATED MATERIALS LLC — Types FR-25, FR-30, SiteMix, and Treadstone Advantage

1C. **Floor Mat Materials*** — (Optional, Not Shown) Floor mat material loose laid over the subfloor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

FORMULATED MATERIALS LLC — Types M1, M2, M3, Elite, Duo, R1, and R2

System K

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 nail 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 1/2 in. from end joints and 1 in. from side joints.

1B. **Vapor Barrier** — (Optional) - Nom 0.030 in. thick commercial asphalt saturated felt.

1C. **Finish Flooring - Floor Topping Mixture*** — Min 3/4 in. thickness of any Floor Topping Mixture bearing the UL Classification Marking as to Fire Resistance. See Floor- and Roof-Topping Mixtures (CCOX) category for names of Classified Companies. Refer to the manufacturer's instructions accompanying the material and/or contact the manufacturer's technical support for specific mix design and minimum thickness recommended for use with eligible floor mat(s).

1D. **Floor Mat Materials*** — (Optional, Not Shown) - Floor mat material loose laid over the subfloor. Refer to manufacturer's instructions regarding the minimum thickness of floor topping over each floor mat material.

Freudenberg Performance Materials LP — EnkaSonic® by Colbond a member of the Low & Bonar group Types 125, 250, 250 Plus, 400, 400 Plus, 750 and 750 Plus.

1E. **Floor Mat Reinforcement** — (Optional) - Refer to manufacturer's instructions regarding minimum thickness of floor topping for use with floor mat reinforcement.

1F. **Metal Lath** — (Optional) — Expanded steel diamond mesh, 2.5 lb / sq yd loose laid over floor mat material.

1G. **Fiberglass Mesh Reinforcement** — (Optional) — Coated non-woven glass fiber mesh grid loose laid over floor mat material.

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.

Bailey Metal Products Limited — 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 8ft- 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.

Bailey Metal Products Limited — 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.

Bailey Metal Products Limited — 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) — When it is desired to drop the ceiling below the bottom plane of the structural steel members (Item 2), a suspension system may be used in lieu of the resilient channels. Main runners, cross tees, cross channels and wall angle as listed below:

a. **Main Runners** — Nom 10 or 12 ft long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC. Main runners suspended by min 12 SWG galv steel hanger wires spaced 24 in. OC a min of 4 in. below bottom flange of joists, twist tied to #10 - 3/4 in. long screws installed in the web, 1/2 in. from the bottom flange of the steel joists. Hanger wires to be located adjacent to main runner/cross tee intersections.

b. **Cross Tees** — Nom 4 ft long, 1-1/2 in. wide face, installed perpendicular to the main runners, spaced 16 in. OC. Additional cross tees or cross channels used at 8 in. from each side of butted gypsum panel end joints. The cross tees or cross channels may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation.

c. **Cross Channels** — Nom 4 ft long, installed perpendicular to main runners, spaced 16 in. OC.

d. **Wall Angle or Channel** — Painted or galv steel angle with 1 in. legs or channel with 1 in. legs, 1-9/16 in. deep attached to walls at perimeter of ceiling with fasteners 16 in. OC. To support steel framing member ends and for screw-attachment of the gypsum panel.

CGC INC — Type DGL

USG INTERIORS LLC — Type DGL

6B. Steel Framing Members* — (Optional, Not Shown) — As an alternate to Item 6 — Furring channels and **Steel Framing Members*** as described below:

a. **Furring channels** — Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced 12 in. OC, perpendicular to joists. Channel secured to joists as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. 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.

b. **Steel Framing Members*** — Used to attach furring channels (Item a) to joists (Item 2). Clips spaced 48 in. OC and secured to the bottom chord of joists with min 1-5/8 in. long No. 8 self-drilling, self-tapping, bugle, flat or hex head screw through the center grommet. Furring channels are friction fitted into clips. Additional clips required to hold furring channel that supports the gypsum board butt joints.

PLITEQ INC — Type Genie Clip

6C. Alternate Steel Framing Members* — (Optional, Not Shown) — As an alternate to Items 6 to 6B, furring channels and Steel Framing Members as described below.

a. **Furring channels** — Formed of No. 25 MSG galv steel. 2-9/16 in. or 2-23/32 in. wide by 7/8 in. deep, spaced 12 in. OC, perpendicular to joists. Channels secured to joists as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap.

b. **Steel Framing Members*** — Used to attach furring channels (Item a) to the steel joists (Item 2). Clips spaced a max of 48 in. OC. RSIC-1 and RSIC-1 (2.75) clips secured to alternating joists with No. 8 x 2-1/2 in. coarse drywall screw through the center grommet. Furring channels are friction fitted into clips. RSIC-1 clips for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) clips for use with 2-23/32 in. wide furring channels. Adjoining channels are overlapped as described in Item a. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping No. 6 framing screws, min. 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Additional clips required to hold furring channel that supports the wallboard butt joints, as described in Item 7.

PAC INTERNATIONAL L L C — Types RSIC-1 or RSIC-1 (2.75)

7. Gypsum Board* — Nominal 5/8 in. thick, 48 in. wide gypsum board installed with long dimension perpendicular to resilient/furring channels. Gypsum board shall be attached to resilient/furring 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. When **Steel Framing Members** (Item 6B or 6C) are used, the butt joints in the gypsum board shall be supported by two furring channels. The two furring channels shall be spaced approximately 3-1/2 in. OC, and be attached to underside of the joist with one RSIC-1, RSIC-1 (2.75) or Genie clip at each end of the channel.

CERTAINTED GYPSUM INC — Type C

CGC INC — Type C

UNITED STATES GYPSUM CO — Types C and ULIX

USG MEXICO S A DE C V — Type C

7A. Gypsum Board* — For use when Steel Framing Members* (Item 6A) are used - One layer of 5/8 in. thick, 4 ft wide, installed with long dimension perpendicular to cross tees with side edges centered over main runners and joints centered over cross tees or channels. Fastened to cross tees or channels with 1 in. long Type S screws bugle-head screws spaced 8 in. OC with the screws located 4 in. from the mid-span of the cross tee or channel, and 1-1/2 in. from side edges of gypsum panel. Fastened to main runners with 1 in. long Type S bugle-head screws spaced midway between cross tees or channels. End joints of gypsum panels shall be staggered not less than 4 ft OC with adjacent gypsum panels end joints.

CERTAINTED GYPSUM INC — Type C

CGC INC — Type C

UNITED STATES GYPSUM CO — Types C and ULIX

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.

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

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