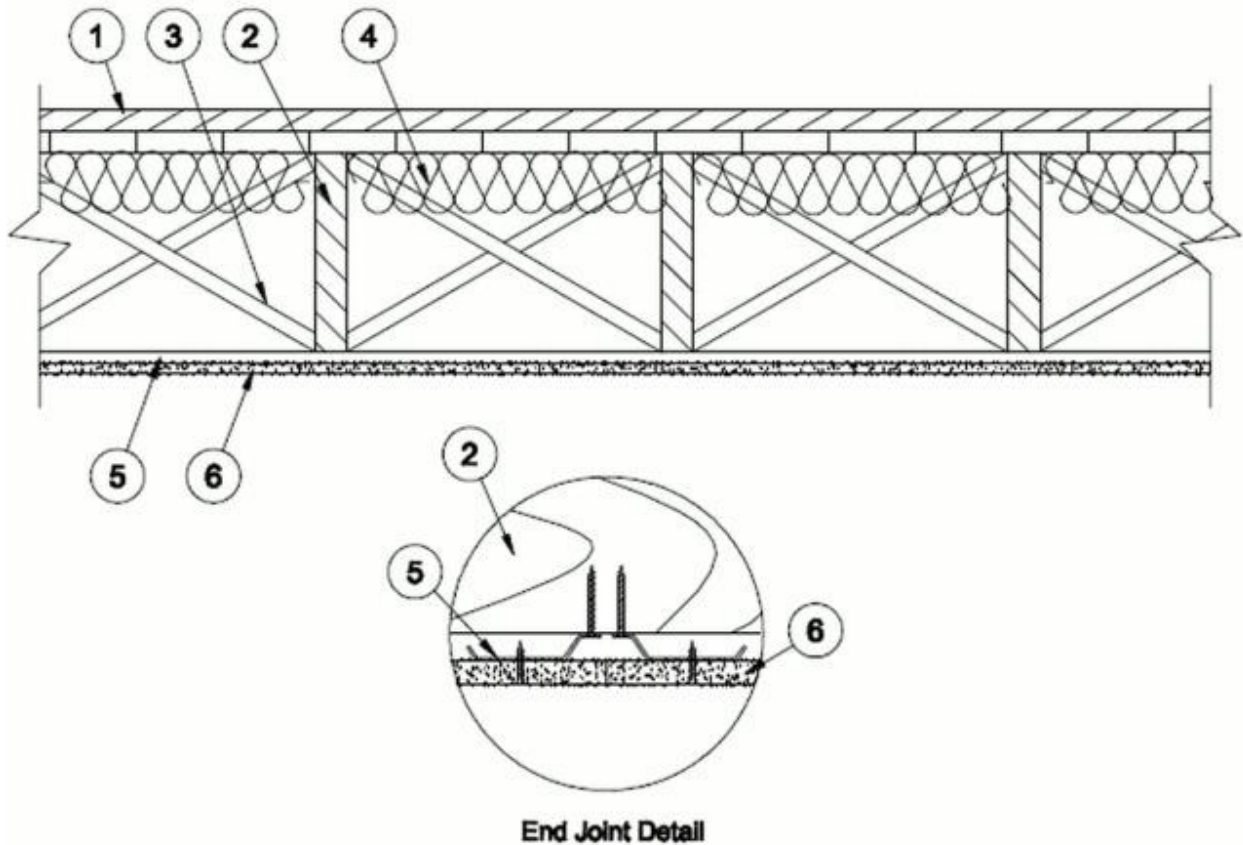


Design No. **M519**  
February 4, 2022

**Unrestrained Assembly Rating - 1 Hr.**  
**Finish Rating - 22 minutes**

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.



1. **Flooring System** — The flooring system shall consist of one of the following:

**System No. 1**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

**Vapor Barrier** — Optional - Nom 0.010 in. thick commercial rosin-sized building paper.

**Finish Flooring** — Min 1 by 4 in. T&G lumber installed perpendicular to joists, or min 19/32 thick wood structural panels, min grade "Underlayment" or "Single-Floor." Face grain of plywood or strength of axis of panels to be perpendicular to joists with joints staggered.

### **System No. 2**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

**Finish Flooring - Floor Topping Mixture\*** — Min 3/4 or 1 in. thickness of floor topping mixture for 19/32 or 15/32 in. thick wood structural panels respectively, having a min compressive strength of 1000 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

**ARCOSA SPECIALTY MATERIALS** — AccuCrete® Types NexGen, Green, Prime and PrePour, AccuRadiant®, AccuLevel® Types G40, G50 and SD30

**DEPENDABLE LLC** — GSL M3.4, GSL K2.6, GSL-CSD or GSL RH

**Floor Mat Material\*** — (Optional) - Floor mat material nominal 2 - 9.5 mm thick loose laid over the subfloor. Floor topping shall be a min of 3/4 in. or 1 in. thick for 19/32 or 15/32 in. thick wood structural panels respectively.

**ARCOSA SPECIALTY MATERIALS** — AccuQuiet® Types D13, D-18, D25, DX38, EM.125, EM.125S, EM.250, EM.250S, EM.375, EM.375S, EM.750, and EM.750S.

### **System No. 3**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

**Floor Mat Materials\* - (Optional)** — Nom 3 mm thick floor mat material 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. When floor mat material is used, min thickness of floor topping mixture is 3/4 in. (19 mm)

**HACKER INDUSTRIES INC** — Type Hacker Sound-Mat

**Alternate Floor Mat Materials\* — (Optional)** — Floor mat material nom 1/4 in. (6 mm) 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. (32 mm) of floor-topping mixture.

**HACKER INDUSTRIES INC** — Type Hacker Sound-Mat II

**Alternate Floor Mat Materials** — (Optional) Floor Mat material Nom. 1/8" (3 mm) loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in. (19 mm)

**HACKER INDUSTRIES INC** — FIRM-FILL SCM-125

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

**HACKER INDUSTRIES INC** — Type FIRM-FILL SCM-250,

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

**HACKER INDUSTRIES INC** — Type FIRM-FILL SCM-400,

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

**HACKER INDUSTRIES INC** — Type FIRM-FILL SCM-750,

**Metal Lath (Optional)** — For use with 3/8 in. or 10 mm 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.

**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** — Types Firm-Fill Gypsum Concrete, Firm-Fill 2010, Firm-Fill 3310, Firm-Fill 4010, Firm-Fill High Strength, Gyp-Span Radiant, Gyp-Span High Strength

#### **System No. 4**

**Subflooring** — — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

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

**Finish Flooring\*** — — 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.

**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** — Type 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** — Type 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** — Type Quiet Qurl 65/075, Quiet Qurl 65/075 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** — Quiet Qurl 55/025 MT and Quiet Qurl 55/025 N MT

### **System No. 5**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

**Finish Flooring - Floor Topping Mixture\*** — Min 3/4 in. thickness of floor topping mixture having a minimum 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

**Floor Mat Materials\* - (Optional)** — 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.

**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.

### **System No. 6**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

**Finish Flooring - Floor Topping Mixture\*** — Min 3/4 in. thickness of floor topping mixture having a minimum 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, and SiteMix.

**Floor Mat Material\*** — (Optional) Floor mat material nominal 2 - 9.5 mm thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 3/4 in.

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

### **System No. 7**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

**Finish Flooring\* — Floor Topping Materials** — Min 3/4 in. to 1-1/2 in. thickness of any Floor Topping Mixture bearing the UL Classification Marking as to Fire Resistance with a minimum compressive strength of 1500 psi.

See **Floor- and Roof-Topping Mixtures** (CCOX) category for names of Classified Companies.

**Floor Mat Materials\*** — (Optional) — Floor mat material nom 1/8 in. to 3/4 in. thick. Loose laid over the subfloor. When used, Acousti-flor CSM (crack suppression mat) is loose laid over the floor mat material. Floor topping material thickness is dependent on thickness of floor mat used.

**WALFLOR INDUSTRIES INC** — Type Acousti-flor, Acousti-flor CSM. Floor topping thickness depends on products used as follows:

Acousti-flor (1/8 in. thick) - Floor topping thickness shall be a minimum of 3/4 in.

Acousti-flor (1/4 in. thick) - Floor topping thickness shall be a minimum of 1 in.

Acousti-flor (3/8 in. thick) - Floor topping thickness shall be a minimum of 1 in.

Acousti-flor (3/4 in. thick) - Floor topping thickness shall be a minimum of 1-1/2 in.

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

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

### **System No. 8**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

**Finish Flooring - Floor Topping Mixture\*** — Min 1 in. thickness of floor topping mixture having a min compressive strength of 4500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

**SIKA DEUTSCHLAND GMBH** — Type SCHONOX AP Rapid Plus

### **System No. 9**

**Subflooring** — Min 15/32 thick plywood, min grade "C-D" or "Sheathing." Face grain of plywood or strength of axis of panel to be perpendicular to joists with joints staggered.

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

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

**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).

**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.

**LOW & BONAR INC** — EnkaSonic® by Colbond a member of the Low & Bonar group Types 125, 250, 250 Plus, 400, 400 Plus, 750 and 750 Plus.

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

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

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

2. **Wood Joists** — 2 by 10 in. spaced 16 in. OC.

3. **Cross Bracing** — Min 1 by 3 in. or min 2 by 10 solid blocking.

4. **Batts and Blankets\*** — (Optional) - Glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. Insulation shall be a max of 3-1/2 in. thick and shall be secured against the underside of the subflooring with staples spaced 12 in. OC.

4A. **Loose Fill Material\*** — (Optional) - As an alternate to Item 4 — For use with resilient channels only, not for use when gypsum board is directly attached to joists. Max 3-1/2 in. thickness of loose fill material bearing the UL Classification Marking for Surface Burning Characteristics, fitted in the concealed space, draped over the resilient channel/gypsum board ceiling membrane when resilient channel attachment is modified as specified in Item 5. The finished rating when loose fill material is used has not been determined.

5. **Resilient Channels** — (Optional) - Formed from min 25 MSG galv steel spaced max 24 in. OC perpendicular to joists. When Loose Fill Material\* is used, channels spaced a maximum 12 in. OC. Channels secured to each joist with min. 1-1/4 in. long, No. 8 steel screws. Channel ends butted and centered under the joists and attached to the joists with one screw at each end. Additional resilient channels positioned so as to coincide with end joints of gypsum board as shown in the above illustration. Additional channels shall extend min 3 in. beyond each side edge of board.

5A. **Framing Members\*** — (Optional) - Used as an alternate method to attach resilient channels to joists (Item 2). A resilient sound isolation accessory shall be used at each attachment point of the resilient channels and spaced max 16 in. O.C. Channel ends butted and centered under the joists and attached to the joists with one accessory at each end. Additional accessories used to hold resilient channels that support the gypsum board end joints, as described in Item 5. The accessory envelops the mounting edge of the resilient channel. The accessory and resilient channel are fastened to the

joists with the screws supplied with the accessory and per the accessory manufacturer's installation instructions.

**PAC INTERNATIONAL L L C** — Types RC-1 Boost, RC Boost Deluxe C-D.

**5B. Steel Framing Members\*** — (Optional, Not Shown) — As an alternate to Item 5.

a. **Furring Channels** — Formed of No. 25 MSG galv steel, nominal 2-1/2 in. wide by 7/8 in. deep, spaced as indicated in Item 5, perpendicular to the joists. Channels secured to Cold Rolled Channels at every intersection with a 3/4 in. TEK screw through each furring channel leg. Ends of adjoining channels overlapped 12 in. and fastened together with two double strand No. 18 SWG galv steel wire ties, one at each end of overlap, or with two 3/4 in. TEK screws in each leg of the overlap section. Two furring channels positioned 3 in. OC, 1-1/2 in. on each side of gypsum board (Item 6) end joints, each extending a min of 6 in. beyond both side edges of the board.

b. **Cold Rolled Channels** — 1-1/2 in. by 1/2 in., formed from No. 16 ga. galv steel, positioned vertically and parallel to joists, friction-fitted into the channel caddy on the Steel Framing Members (Item 5Bc) and secured with two 3/4 in. TEK screws. Adjoining lengths of cold rolled channels lapped min. 12 in. and secured along bottom legs with four 3/4 in. TEK screws and wire-tied together with two double strand 18 SWG galv steel wire ties, one at each end of overlap.

c. **Steel Framing Members\*** — Spaced 48 in. OC. max along joist, and secured to the joist on alternating joists with two, #10 x 1-1/2 in. screws through mounting holes on the hanger bracket.

**PAC INTERNATIONAL L L C** — Type RSIC-SI-CRC EZ Clip

**5C. Steel Framing Members\*** — (Optional, Not Shown) — As an alternate to Item 5.

a. **Furring Channels** — Formed of No. 25 MSG galv steel, nominal 2-1/2 in. wide by 7/8 in. deep, spaced as indicated in Item 5, perpendicular to joists and friction fit into Steel Framing Members (Item 5Cb). 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 or with two TEK screws along each leg of the 6 in. overlap. Two furring channels positioned 6 in. OC, 3 in. on each side of gypsum board (Item 6) end joints. Butt joint channels held in place by strong back channels placed upside down, on top of, and running perpendicular to primary furring channels, extending 6 in. longer than length of gypsum side joint. Strong back channels spaced maximum 48 in. OC. Strong back channels secured to every intersection of primary furring channels with four 7/16 in. pan head screws, two along each of the legs at intersections. Butt joint channels run perpendicular to strong back channels and shall be minimum 6 in. longer than length of joint, secured to strong back channels with 7/16 in. pan head screws, two along each of the legs at intersection with strong back channels.

b. **Steel Framing Members\*** — Used to attach furring channels (Item 5Ca) to joists. Clips spaced 48 in. OC and secured along joist webs at each furring channel intersection with min. 3/4 in. long self-drilling #10 x 1-1/2 in. screws through each of the provided hole locations. Furring channels are friction fitted into clips.

**PAC INTERNATIONAL L L C** — Type RSIC-S1-1 Ultra

**5D. Steel Framing Members\*** — (Not Shown) As an alternate to Item 5, furring channels and Steel Framing Members\* as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-9/16 in. wide by 7/8 in. deep, spaced as described in item 5 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 joists (Item 2). Clips spaced 48 in. OC. RSIC-1 clips secured to 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. 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.

**PAC INTERNATIONAL L L C** — Type RSIC-1

5E. **Steel Framing Members\*** — (Optional, Not Shown) — Used as an alternate method to attach resilient channels to structural members. A resilient sound isolation accessory shall be used at each attachment point of the resilient channels and spaced max 24 in. O.C. Channel ends butted and centered under the structural members and attached with one accessory at each end. Additional accessories used to hold resilient channels that support the gypsum board end joints. The accessory envelops the mounting edge of the resilient channel. The accessory and resilient channel are fastened to the structural members with the screws supplied with the accessory and per the accessory manufacturer's installation instructions.

**PAC INTERNATIONAL L L C** — Type RC-1 Boost

6. **Gypsum Board\*** — (For use with resilient channels) - Nom 5/8 in. thick, 48 in. wide gypsum board. Gypsum board installed with long dimension perpendicular to resilient channels and side edges located between joists. Secured with 1 in. bugle head, high-low thread steel screws spaced max 8 in. OC. End joints of gypsum board similarly fastened to additional resilient channels positioned at end joint locations. Screws shall be spaced 2 in. from end joints and 1 in. from side joints. Adjacent end joints staggered min 24 in.

When **Steel Framing Members** (Item 5B) are used, nom 5/8 in. thick, 4 ft wide gypsum board, installed as described in Item 6. Adjacent butt joints staggered minimum 48 in. OC.

When **Steel Framing Members** (Item 5C) are used, nom 5/8 in. thick, 4 ft wide gypsum board, installed as described in Item 6. Butt joints staggered minimum 24 in. OC.

When **Steel Framing Members** (Item 5D) are used, gypsum panels installed with long dimensions perpendicular to furring channels. Panels attached to the furring channels using 1 in. long Type S bugle-head steel screws spaced 8 in. OC along butted end joints and in the field of the panel. Butted end joints shall be staggered min. 2 ft within the assembly, and occur midway between the continuous furring channels. Each end of each gypsum panel shall be supported by a single length of furring channel equal to the width of the gypsum panel plus 6 in. on each end. The two support furring channels shall be spaced approximately 3-1/2 in. OC, and be attached with one clip at each end of the channel.

**PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM** — Type C.

6A. **Gypsum Board\*** — (As an alternate to Item 6) - (For use with resilient channels) - Nom 3/4 in. thick, 48 in. wide gypsum board. Gypsum board installed with long dimension perpendicular to resilient channels and side edges located between joists. Secured with 1-1/8 in. bugle head, high-low thread steel screws spaced max 8 in. OC. End joints of gypsum board similarly fastened to additional



resilient channels positioned at end joint locations. Screws shall be spaced 2 in. from end joints and 1 in. from side joints. Adjacent end joints staggered min 24 in.

**PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM** — Type PG-13.

6B. **Gypsum Board\*** — (For use when directly attached to joists) -Not Shown -- Nom 5/8 in. thick, 48 in. wide gypsum board, installed with long dimension perpendicular to joists. Gypsum board secured with 1-7/8 in. long, 6d cement coated nails spaced 6 in. OC.

**PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM** — Type C.

7. **Finishing System (Not Shown)** — Paper tape embedded in joint compound over joints and covered with 2 layers of compound with edges feathered out. Gypsum board 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.**

Last Updated on 2022-02-04