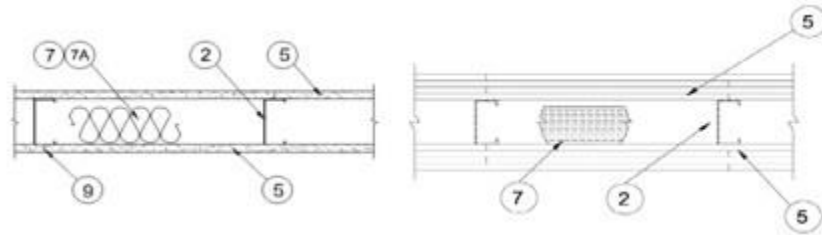


March 17, 2023

**Bearing Wall Ratings — 3/4 Hr, 1, 1-1/2, 2 Hr or 3-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.**



1. **Floor and Ceiling Runners** — (Not Shown) — Channel shaped, fabricated from min 0.0329 in., bare metal thickness (No. 20 MSG) corrosion-protected steel, that provide a sound structural connection between steel studs and adjacent assemblies such as floors, ceilings and/or other walls. Attached to floor and ceiling assemblies with steel fasteners spaced not greater than 24 in. OC.

2. **Steel Studs** — Min 0.0329 in., bare metal thickness (No. 20 MSG) corrosion-protected steel studs, min 3-1/2 in. wide, cold formed, designed in accordance with the current edition of the Specification for the Design of Cold-Formed Steel Structural Members by the American Iron and Steel Institute (AISI). All design details enhancing the structural integrity of the wall assembly, including the axial design load of the studs, shall be as specified by the steel stud designer and/or producer, and shall meet the requirements of all applicable local code agencies. The max stud spacing shall not exceed 24 in. OC (or 16 in. OC when Item 11 is used). Studs attached to floor and ceiling runners with 1/2 in. long Type S-12 steel screws on both sides of the studs or by welded or bolted connections designed in accordance with the AISI specifications.

3. **Lateral Support Members** — (Not shown) — Where required for lateral support of studs, support shall be provided by means of steel straps, channels or other similar means as specified in the design of a particular steel stud wall system.

4. **Wood Structural Panel Sheathing** — (Optional, For use with Item 5, 5A,5B or 5C) — (Not Shown) — 4 ft wide, 7/16 in. thick oriented strand board (OSB) or 15/32 in. thick structural 1 sheathing (plywood) complying with DOC PS1 or PS2, or APA Standard PRP-108, manufactured with exterior glue, applied horizontally or vertically to the steel studs. Vertical joints centered on studs, and staggered one stud space from wallboard joints. Attached to studs with flat-head self-drilling tapping screws with a min. head diam. of 0.292 in. at maximum 6 in. OC. in the perimeter and 12 in.

OC. in the field. When used, gypsum panels attached over OSB or plywood panels and fastener lengths for gypsum panels increased by min. 1/2 in. The maximum loading on the steel studs was evaluated with the steel studs braced at mid-height and not braced by the plywood sheathing.

5. **Gypsum Board** — Gypsum panels with beveled, square or tapered edges applied vertically. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Outer layer of 3 layer or 4 layer construction may be applied horizontally. The thickness and number of layers and percent of design load for the 45 min, 1-1/2 hr, 2 hr and 3 hr ratings are as follows:

**Wallboard Protection on Each Side of Wall**

<b>Rating</b>	<b>No. of Layers &amp; Thkns of Panel</b>	<b>% of Design Load</b>
45 Min	1 layer, 1/2 in. thick	100
1-1/2 hr	2 layers, 1/2 in. thick	100
2 hr	3 layers, 1/2 in. thick	100
3 hr	4 layers, 1/2 in. thick	100

**NATIONAL GYPSUM CO** — 1/2 in. . thick Type FSW-C, eXP-C, FSMR-C, FSK-C, FSW-G, FSK-G

5A. **Gypsum Board** — Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer system) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (2 layer system) need not be staggered. For 3 hr rated walls, when the 5/8 in. thick boards are installed horizontally, all joints to be staggered 8 in. OC between layers. When used in widths other than 48 in., gypsum panels to be installed horizontally. The thickness and number of layers and percent of design load for the 1 hr and 2 hr ratings are as follows:

**Wallboard Protection on Each Side of Wall**

<b>Rating</b>	<b>No. of Layers &amp; Thkns of Panel</b>	<b>% of Design Load</b>
1 hr	1 layer, 5/8 in. thick	100
2 hr	2 layers, 5/8 in. thick	100
3 hr*	3 layers, 5/8 in. thick	100

\*Rating applicable when FSW-C, eXP-C, FSMR-C, FSK-C, FSW-G or FSK-G are used

**NATIONAL GYPSUM CO** — 5/8 in. thick Type FSW, FSK, FSW-3, FSW-5, FSW-6, FSW-C, eXP-C, FSMR-C, FSK-C, FSW-G, FSK-G

5B. **Gypsum Board** — Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal

butt joints on opposite sides of studs need not be staggered. When used in widths other than 48 in., gypsum panels to be installed horizontally. Insulation (Item 7A) required when fasteners spaced 12 in. OC or (Item 7F) when steel studs and fasteners spaced 16 in. OC when using Type FSLX for the 1 hour Rating. The thickness and percent of design load is as follows:

**Wallboard Protection on Each Side of Wall**

<b>Rating</b>	<b>No. of Layers &amp; Thkns of Panel</b>	<b>% of Design Load</b>
1 hr*	1 layer, 5/8 in. thick	100

\*Rating applicable when Batts and Blankets Item 7A or Item 7F are used.

**NATIONAL GYPSUM CO** — 5/8 in. thick Type FSLX

5C. **Gypsum Board\*** — (As an alternate to Item 5A) — 5/8 in. thick, 4 ft. wide, paper surfaced applied vertically only and secured as described in Item 6.

**NATIONAL GYPSUM CO** — Type SBWB

5D. **Gypsum Board\*** — **As an alternate to Item 5A (1-hr)** — Two layers Nom. 5/16 in. thick gypsum panels applied vertically or horizontally. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed by steel framing. Horizontal joints on the same side need not be staggered. When applied horizontally, both layers of gypsum board fastened to each side of framing with 1 in. long Type S steel screws spaced 8 in. OC and staggered 4 in. OC between layers. When applied vertically, both layers of gypsum board fastened to each side of framing with 1 in. long Type S steel screws spaced 8 in. OC along vertical edges and 12 in. OC in the field, staggered 4 in. OC between layers. Screws spaced a max 12 in. along the top and bottom edges of the wall.

**As an alternate to Item 5A (2-Hr)** — Four layers nom. 5/16 in. thick gypsum panels applied vertically or horizontally. When applied horizontally, base layer secured to studs with 1 in. Type S screws spaced 24 in. OC. Second layer installed with joints offset 12 in. from base layer and secured with 1 in. Type S screws spaced 24 in. OC. Third layer installed with joints in line with base layer and secured with 1-1/2 in. Type S screws spaced 16 in. OC. Fourth layer installed with joints in line with second layer and secured with 1-5/8 in. Type S screws spaced 12 in. OC. For all layers, screws offset 4 in. from previous layer. When applied vertically, base layer secured with 1 in. Type S screws spaced 24 in. OC. Second layer secured with joints offset one stud cavity and secured with 1 in. Type S screws spaced 24 in. OC. Third layer installed with joints in line with base layer and secured with 1-1/2 in. Type S screws spaced 12 in. OC. Fourth layer secured with joints in line with second layer and secured with 1-5/8 in. Type S screws spaced 8 in. OC along vertical edges and 12 in. OC in the field. For all layers, screws offset 4 in. from previous layer.

**NATIONAL GYPSUM CO** — 5/16 in. thick Type FSW

6. **Fasteners** — (Not Shown) — For use with Item 5, 5A, 5B or 5C - Type S-12 steel screws used to attach panels to runners (Item 1) and studs (Item 2) or furring channels (Item 8).

**Single layer systems:** 1 in. long, spaced 12 in. OC for 1/2 and 5/8 in. thick panels. For use with Item 5A or Item 5B, when studs (Item 2) spaced a max 16 in. OC, 5/8 in. thick gypsum panels applied vertically or horizontally, 1 in. long spaced 16 in OC along vertical edges and in the field, and 16 in. OC along top and bottom of wall.

**Two layer systems:** First layer- 1 in. long, spaced 12 in. OC for 1/2 in. thick panels or spaced 16 in. OC for 5/8 in. thick panels. Second layer- 1-5/8 in. long, spaced 12" OC for 1/2 in. thick panels or spaced 16 in. OC for 5/8 in. thick panels.

**Three layer system:** (1/2 in. thick panels) First layer- 1 in. long, spaced 12 in. OC. Second layer- 1-5/8 in. long, spaced 12 in. OC. Third layer- 2-1/4 in. long, spaced 12 in. OC. Screws offset min 6 in. from layer below.

**Three layer system:** (5/8 in. thick panels) First layer – 1 in. long, spaced 24 in. OC. Second layer –1-5/8 in. long, spaced 12 in. OC. Face layer – 2-3/8 in. long, spaced 12 in. OC.

**Four layer system:** (1/2 in. thick panels) First layer - 1 in. long, spaced 48 in. OC. Second layer 1-5/8 in. long, spaced 48" OC. Third layer 2-1/4 in. long, spaced 48 in. OC. Fourth layer 2-5/8 in. long, spaced 12 in. OC. Fourth layer (horizontal applied), 2-5/8 in. long, spaced 12 in. OC and 1-1/2 in. long, Type G, steel screws located midway between studs and 1 in. from horizontal edge joint secured to the second and third layers.

7. **Batts and Blankets\*** — (Optional, required when item 10 is used) - Placed in stud cavities, any glass fiber or mineral wool batt material bearing the UL Classification Marking as to Fire Resistance. See **Batts and Blankets\* (BKNV or BZJZ) Category for names of Classified companies.**

7A. **Batts and Blankets\*** — (Required as indicated under Item 5B) — Nom 3-1/2 in. thick glass fiber or mineral wool batts, friction fitted between studs and runners. See **Batts and Blankets (BKNV or BZJZ) Categories for names of Classified companies.**

7B. **Fiber, Sprayed\*** — Not Shown - As an alternate to Batts and Blankets (Item 7) — (100% Borate Formulation) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product with a nominal dry density of 2.7 lb/ft<sup>3</sup>. Alternate Application Method: The fiber is applied without water or adhesive at a nominal dry density of 3.5 lb/ft<sup>3</sup>, in accordance with the application instructions supplied with the product.

**Applegate Greenfiber Acquisition LLC** — INS735, INS745, INS750LD, and Insulmax for use with wet or dry application. INS765LD and INS773LD are to be used for dry application only.

7C. **Fiber, Sprayed\*** — As an alternate to Batts and Blankets (Item 7) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 4.58 lb/ft<sup>3</sup>.

**NU-WOOL CO INC** — Cellulose Insulation

7D. **Fiber, Sprayed\*** — As an alternate to Batts and Blankets (Item 7) — Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft<sup>3</sup>.

**INTERNATIONAL CELLULOSE CORP** — Celbar-RL

7E. **Fiber, Sprayed\*** — As an alternate to Batts and Blankets (Item 7) — Spray applied mineral wool insulation. The fiber is applied with adhesive, at a minimum density of 4.0 pcf, to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. See Fiber, Sprayed (CCAZ).

**AMERICAN ROCKWOOL MANUFACTURING, LLC** — Type Rockwool Premium Plus

7F. Batts and blankets\* - Required as indicated under Item 5B – Nom 3 in. thick mineral wool batts, minimum density 1.7 PCF, friction fitted between studs and runners. See batts and Blankets (BKNV or BZJZ) categories for names of classified companies.

**8. Furring Channels** — (Optional on one or both sides, not shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 panhead steel screws.

**8A. Steel Framing Members (Not Shown)\*** — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 8, 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 max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 6.

b. **Steel Framing Members\*** — Used to attach furring channels (Item 8a) to studs (Item 2). Clips spaced max. 48 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips. RSIC-1 clip for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) clip for use with 2-23/32 in. wide furring channels.  
**PAC INTERNATIONAL L L C** — Types RSIC-1, RSIC-1 (2.75).

**8B. Steel Framing Members\*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 8, 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 max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 6.

b. **Steel Framing Members\*** — Used to attach furring channels to studs (Item 2). Clips spaced max. 48 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips.

**PLITEQ INC** — Type GENIECLIP

**8C. Steel Framing Members\*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 8, furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire. Gypsum board attached to furring channels as described in Item 6.

b. **Steel Framing Members\*** — Used to attach furring channels to studs (Item 2). Clips spaced max. 48 in. OC., and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips.

**STUDCO BUILDING SYSTEMS** — RESILMOUNT Sound Isolation Clips - Type A237R

8D. **Steel Framing Members\*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 8, furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 8Db. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire. Gypsum board attached to furring channels as described in Item 6.

b. **Steel Framing Members\*** — Used to attach furring channels to studs (Item 2). Clips spaced max. 48 in. OC, and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.

**REGUPOL AMERICA** — Type SonusClip

8E. **Steel Framing Members\*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems) — As an alternate to Item 8, resilient channels and Steel Framing Members as described below:

a. **Resilient Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Philips Modified Truss screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 5.

b. **Steel Framing Members\*** — Used to attach resilient channels (Item 8Ea) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw.

**KEENE BUILDING PRODUCTS CO INC** — Type RC+ Assurance Clip

9. **Joint Tape and Compound** — Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over all joints of outer layers. Paper tape and joint compound may be omitted in the four layer system (3 hour) or when gypsum boards are supplied with square edges.

10. **Siding, Brick or Stucco** — (Optional, Not Shown, for use as an additional layer over gypsum board) — Aluminum, vinyl or steel siding, brick veneer or stucco, meeting the requirements of local code agencies. Brick veneer attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.

11. **Cementitious Backer Units\*** — (Optional, Item Not Shown - For Use On Face Of 1 Hr Or 2 Hr Systems With All Standard Items Required) - 7/16 in., 1/2 in., 5/8 in., 3/4 in. or 1 in. thick, min. 32 in. wide.- Applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with cement board screws of adequate length to penetrate stud by a minimum of 3/8 in. for steel framing members spaced a max of 8 in. OC. When 4 ft. wide boards are used, horizontal joints need not be backed by framing.

**NATIONAL GYPSUM CO** — Type DuraBacker, PermaBase, DuraBacker Plus, or PermaBase Plus

11A. **Building Units** – (Optional Item Not Shown – For use over Gypsum Board, Item 5) 1 in., 2 in. or 3 in. thick, 4 ft. wide – Applied vertically or horizontally with vertical joints centered over studs. Fastened to studs and runners with wafer head screws of adequate length to penetrate framing by a minimum of of 3/4 in., spaced a max 8 in. o.c.

**NATIONAL GYPSUM CO – Type PBCI**

**\* 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 2023-03-17