



DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23.10—Adhesives

DIVISION: 09 00 00—FINISHES

Section: 09 29 10—Gypsum Board Accessories

REPORT HOLDER:

HOLCIM SOLUTIONS AND PRODUCTS US, LLC

EVALUATION SUBJECT:

MIRACLE FOAMSEAL F-2100 TWO-PART POLYURETHANE FOAM ADHESIVE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

Properties evaluated:

- Gypsum board attachment
- Surface-burning characteristics

2.0 USES

The Miracle Foamseal F-2100 Two-Part Polyurethane Foam Adhesive is used to attach various gypsum board to wood framing in walls and ceilings without the use of mechanical fasteners.

3.0 DESCRIPTION

The Miracle Foamseal F-2100 is a two-part polyurethane foam adhesive system. It is applied by pumping two components at a volumetric ratio of 1 to 1 under pressure through heating equipment to produce one continuous bead. The two components are an "A ISO" and a "B Resin". The A and B components are shipped in 2700 - 3250 lb. (1225-1474 kg) caged totes or in 450 - 550 lb. (204-249.5 kg) steel drums. Storage of these containers shall be in an indoor dry place between 65°F and 95°F (18.3°C and 35°C). Unopened containers have a storage life of up to 12 months in these conditions.

The Miracle Foamseal F-2100 Two-Part Polyurethane Foam Adhesive has a flame-spread index not exceeding 75 and a smoke-developed index not exceeding 450 when tested at a thickness of 1 1/2 inches (38 mm) in accordance with ASTM E84.

4.0 INSTALLATION

4.1 Installation:

Gypsum board being used shall comply with ASTM C1396. All substrate surfaces shall be clean, dry and free of dust, wax, ice and loose particles and shall have a surface temperature greater than or equal to 50°F (10°C). Miracle Foamseal F-2100 adhesive shall be applied in an ambient temperature range of 50°F to 100°F (10°C to 37.8°C). Adhesive is applied along the intersection of the gypsum and wood framing according to Holcim Solutions and Produits US, LLC Application Instructions. The adhesive temperature at the heater block and application hose shall be between 105°F and 120°F (40.6°C and 48.9°C), while the proportioning pumps must be accurately metered to a volumetric ratio of 1 to 1 and develop at least an 800-psi hydraulic pressure when in use. After the last bead is applied, the structure shall not be moved for a minimum of two minutes.

Miracle Foamseal F-2100 adhesive shall be used on wood framing with maximum spacing of 16 inches (406 mm) on center for walls and 24 inches (610 mm) on center for ceiling applications. The beads produced shall be sized per Figure 1 and a bead shall not be greater than 1 1/8 inches (29 mm) in size. The adhesive beads are applied along one side of field framing and along both sides at gypsum/sheathing seams.

5.0 CONDITIONS OF USE

The Miracle Foamseal F-2100 Two-Part Polyurethane Foam Adhesive described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Materials and methods of installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 5.2** Miracle Foamseal F-2100 is to be applied in an indoor manufacturing facility and shall not be applied in an outdoor uncontrolled environment.
- 5.3** Use of Miracle Foamseal F-2100 adhesive in a fire-resistance rated assembly is outside the scope of this report.
- 5.4** A vapor barrier shall not be used between the adhesive and the substrates.

- 5.5 The adhesive must be separated from the building interior by a thermal barrier of 1/2-inch (12.7 mm) gypsum wallboard installed in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable.
- 5.6 Application of Miracle Foamseal F-2100 adhesive is limited to the back side of gypsum board complying with ASTM C1396. Application of the adhesive to foil backed, moisture resistant or water-resistant gypsum boards is outside the scope of this report.
- 5.7 Miracle Foamseal F-2100 adhesive is to be manufactured at the Holcim Solutions and Products US, LLC plant in Rockland, MA under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Report of Figure 1 testing in accordance with ASTM C557 testing.
- 6.2 Reports of racking load testing in accordance with Section 14 of ASTM E72.
- 6.3 Report of surface-burning characteristics testing in accordance with ASTM E84.
- 6.4 Reports of fire test of interior finish material in accordance with UL 1715.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4927) along with the name, registered trademark, or registered logo of the report holder must be included in the product label. [Electronic labeling is ICC-ES web address (www.icc.es.org), specific URL related to the report, or the ICC-ES machine-readable code placed on the aforementioned items].
- 7.2 In addition, product labeling shall include, the name of the report holder (Holcim Solutions and Products US, LLC) and address, the product name, date of manufacture, shelf-life information, and the ICC-ES mark of conformity. The evaluation report number (ICC-ES ESR-4927) may be used in lieu of the mark of conformity.
- 7.3 The report holder's contact information is the following:

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TABLE 1: IN-PLANE SHEAR LOADING ON WOOD FRAME (SECTION 14 OF ASTM E72)

ASSEMBLY NUMBER	TOP PLATE / BOTTOM PLATE	STUDS / STUD SPACING ²	SINGLE / DOUBLE SIDED	SIDE A	SIDE B	F-2100 ADHESIVE SIZE	ULTIMATE LOAD (PLF) ¹
1	2x4 SPF ungraded	2x4 stud grade SPF, 16" on center	Single	5/16" Vertical, USG Blendtex	NA	on side of stud: 5/8" on side of plates: 5/8" on gypsum: 7/8"	376.7
2				5/16" Vertical, USG Blendtex		on side of stud: 11/16" on side of plates: 11/16" on gypsum: 11/16"	458.3
3 ³				5/16" Vertical, USG Blendtex		on side of stud: 3/4" on side of plates: 13/16" on gypsum: 1"	513.8
4				5/16" Vertical, Georgia Pacific		on side of stud: 5/8" on side of plates: 11/16" on gypsum: 15/16"	461.7
5				5/16" Vertical, Georgia Pacific		on side of stud: 5/8" on side of plates: 5/8" on gypsum: 13/16"	630.4
6 ³				5/16" Vertical, Georgia Pacific		on side of stud: 9/16" on side of plates: 11/16" on gypsum: 15/16"	627.9
7				5/16" Vertical, National Gypsum Gold Bond		on side of stud: 7/8" on side of plates: 3/4" on gypsum: 1"	652.1
8 ³				5/16" Vertical, National Gypsum Gold Bond		on side of stud: 5/8" on side of plates: 11/16" on gypsum: 15/16"	557.1
9				5/16" Vertical, USG Blendtex		on side of stud: 5/8" on side of plates: 3/4" on gypsum: 1"	584.6
10 ³				5/16" Vertical, USG Blendtex		on side of stud: 3/4" on side of plates: 3/4" on gypsum: 1"	588.8
11 ⁴			Double	5/16" Vertical, National Gypsum Gold Bond	5/16" Vertical, National Gypsum Gold Bond	on side of stud: 5/8" on side of plates: 11/16" on gypsum: 1"	680.0
12			Single	1/2" Vertical, James Hardie Gypsum Board	NA	on side of stud: 3/4" on side of plates: 1" on gypsum: 1"	546.8
13 ⁴			Double	1/2" Vertical, James Hardie Gypsum Board	1/2" Vertical, James Hardie Gypsum Board	on side of stud: 3/4" on side of plates: 1" on gypsum: 1"	781.4
14 ⁵			Single	1/2" Horizontal, USG SHEETROCK	NA	on side of stud: 11/16" on side of plates: 3/4" on gypsum: 7/8"	452.5
15 ⁵				1/2" Horizontal, USG SHEETROCK		on side of stud: 5/8" on side of plates: 11/16" on gypsum: 7/8"	592.5
16 ⁵				1/2" Horizontal, Georgia Pacific		on side of stud: 11/16" on side of plates: 3/4" on gypsum: 15/16"	542.5
17 ⁵				1/2" Horizontal, Georgia Pacific		on side of stud: 11/16" on side of plates: 5/8" on gypsum: 11/16"	632.9
18 ⁵				1/2" Horizontal, National Gypsum Gold Bond		on side of stud: 5/8" on side of plates: 9/16" on gypsum: 15/16"	556.3
19 ⁵				1/2" Horizontal, National Gypsum Gold Bond		on side of stud: 11/16" on side of plates: 5/8" on gypsum: 7/8"	667.1
20 ⁵				1/2" Horizontal, USG Blendtex		on side of stud: 5/8" on side of plates: 3/4" on gypsum: 1"	688.8

TABLE 1: IN-PLANE SHEAR LOADING ON WOOD FRAME (SECTION 14 OF ASTM E72) (Continued)

ASSEMBLY NUMBER	TOP PLATE / BOTTOM PLATE	STUDS / STUD SPACING ²	SINGLE / DOUBLE SIDED	SIDE A	SIDE B	F-2100 ADHESIVE SIZE	ULTIMATE LOAD (PLF) ¹
21 ⁵	2x4 SPF ungraded	2x4 stud grade SPF, 16" on center	Single	¹ / ₂ " Horizontal, American Gypsum	NA	on side of stud: 1" on side of plates: 1 ¹ / ₂ " on gypsum: 1 ³ / ₈ "	650.8
22 ⁵				¹ / ₂ " Horizontal, USG Sheetrock MH UltraLight Panels Tuf-Base		on gypsum along plates: 1 ⁵ / ₈ ' on side of plates: 1 ¹ / ₈ ' on gypsum along studs: 1 ¹ / ₄ " on side of the stud:1"	508.3
23 ⁵	2x4 stud grade SPF	2x4 stud grade SPF, 16" on center		¹ / ₂ " Horizontal, USG Sheetrock MH UltraLight Panels Tuf-Base		on gypsum along plates: 1 ³ / ₈ " on side of plates: 1 ¹ / ₄ " on gypsum along studs: 1" on side of stud:1"	576.8
24 ⁵	2x4 SPF ungraded	2x4 stud grade SPF, 16" on center		¹ / ₂ " Horizontal, USG Sheetrock UltraLight Panels Tuf-Base		on gypsum along plates: 1 ¹ / ₄ " on side of plates: 1" on gypsum along studs: 1 ¹ / ₈ " on side of stud:1"	618.1
25	2x4 stud grade SPF / 1x4 stud grade SPF	2x4 stud grade SPF, 16" on center		⁵ / ₁₆ " Vertical, CertainTeed ProRoc		on side of stud: 1 ¹ / ₄ " on side of plates: 1 ¹ / ₂ " on gypsum: 1 ¹ / ₂ "	598.0
26 ⁵	2x4 stud grade SPF / 1x4 stud grade SPF	P/C: 2x4 stud grade SPF, Field: 1x4 SPF ungraded, 16" on center		¹ / ₂ " Horizontal, USG Fiberock Brand MH		on side of stud: ⁷ / ₈ " on side of plates: 1" on gypsum: 1 ¹ / ₈ "	489.9
27				¹ / ₂ " Vertical, USG Fiberock Brand MH		on side of the stud: ⁷ / ₈ " on side of the plates: 1" on the gypsum: 1 ¹ / ₁₆ "	595.5
28	2x4 SPF ungraded	2x4 stud grade SPF, 16" on center		¹ / ₂ " Vertical, James Hardie Gypsum Board		on side of the stud: ⁵ / ₈ " on side of the plates: ¹¹ / ₁₆ " on the gypsum: ¹⁵ / ₁₆ "	535.9
29	2x4 SPF ungraded	2x4 stud grade SPF, 24" on center		⁵ / ₁₆ " Vertical, Georgia Pacific		on side of the stud: 1" on side of the plates: 1 ³ / ₄ " on the gypsum: 1 ¹ / ₈ "	415.9
30	2x4 SPF ungraded / 2x4 stud grade SPF	2x4 stud grade SPF, 24" on center		⁵ / ₁₆ " Vertical, National Gypsum Gold Bond		on side of field stud: 1 ¹ / ₂ " on side of center stud: 2 ¹ / ₈ " on side of plates: 2 ¹ / ₈ " on gypsum: 2 ¹ / ₈ "	610.0
31	2x4 SPF ungraded / 2x4 stud grade SPF	2x4 stud grade SPF, 24" on center		⁵ / ₁₆ " Vertical, National Gypsum Gold Bond		on side of field stud: 1 ¹ / ₂ " on side of center stud: 2 ¹ / ₈ " on side of plates: 2 ¹ / ₈ " on gypsum: 2 ¹ / ₈ "	782.6
32				⁵ / ₁₆ " Vertical, National Gypsum Gold Bond		on side of field stud: 1 ¹ / ₂ " on side of center stud: 2 ¹ / ₈ " on side of plates: 2 ¹ / ₈ " on gypsum: 2 ¹ / ₈ "	696.3
33	2x4 SPF ungraded	P/C: 2x4 stud grade SPF, Field: 1x4 SPF ungraded, 24" on center		⁵ / ₁₆ " Vertical, National Gypsum Gold Bond		on side of stud: 1" on side of plates: 1 ¹ / ₈ " on gypsum: 1 ³ / ₁₆ "	442.3
34				⁵ / ₁₆ " Vertical, USG Blendtex		on side of stud: 1 ¹ / ₄ " on side of plates: 1 ⁵ / ₁₆ " on gypsum: 1 ¹ / ₈ "	482.4
35 ⁵	2x4 stud grade SPF	2x4 stud grade SPF, 16" on center		¹ / ₂ " Horizontal, USG Sheetrock UltraLight Panels Tuf-Base		on gypsum along plates: 1 ¹ / ₂ " on side of plates: 1 ¹ / ₈ " on gypsum along studs: 1 ¹ / ₈ " on side of stud: ⁷ / ₈ "	717.1

¹Ultimate load values does not include any safety factors.²Stud P/C: perimeter and center of tested specimen.³Gypsum board seam treated with 3/4" wide masking tape.⁴Side B attachment: one 1/8" bead of PR-32 adhesive and 1/4" C. x 1" lg. 18 Ga. staples 12 on center along the plates and 24" on center along the studs.⁵Gypsum board seam treated with joint tape and joint compound.

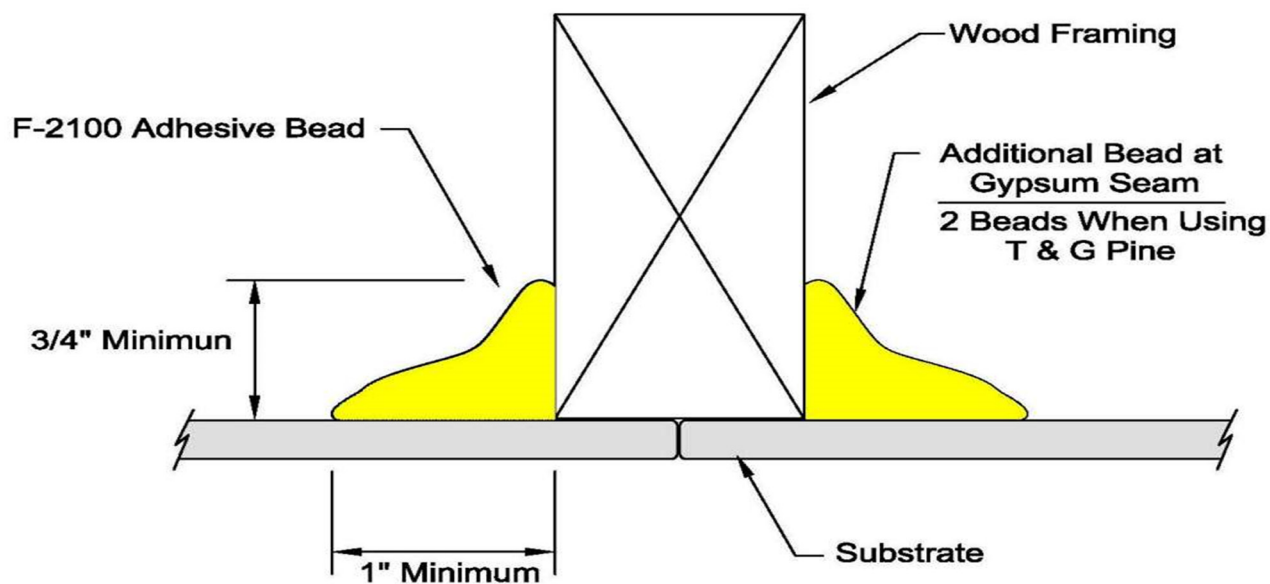


FIGURE 1—APPLICATION OF MIRACLE FOAMSEAL F-2100

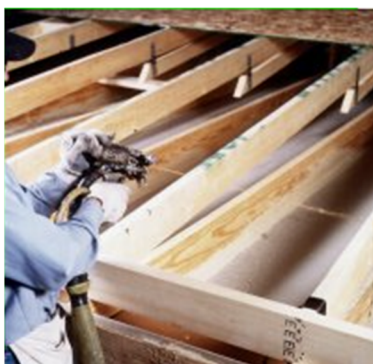


FIGURE 2—APPLICATION OF MIRACLE FOAMSEAL F-2100



FIGURE 3—55 GALLON STEEL DRUMS



FIGURE 4—MIRACLE FOAMSEAL F-2100 ISO NT BLACK TOTE



FIGURE 5—MIRACLE FOAMSEAL F-2100 RESIN NT BLUE TOTE