



ICC
EVALUATION
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ICC-ES Evaluation Report



ESR-4935

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DIVISION: 09 00 00—FINISHES

Section: 09 29 10—Gypsum Board Accessories

REPORT HOLDER:

ALPHA SYSTEMS, INC.

EVALUATION SUBJECT:

ALPHASEAL 5200 TWO-PART POLYURETHANE FOAM
ADHESIVE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2021, 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)

Properties evaluated:

- Gypsum Board Attachment

2.0 USES

AlphaSeal 5200 adhesive is used in prefabricated construction as an alternative to mechanical fasteners to attach gypsum board to interior wood-framed partitions, ceilings, and the interior face of wood frame exterior load-bearing and nonload-bearing walls with structural sheathing on the exterior face of the walls.

3.0 DESCRIPTION

3.1 AlphaSeal 5200:

The AlphaSeal 5200 is a two-part, rapid-setting polyurethane foam adhesive. It is applied by pumping two components at a 1 to 1 volumetric ratio under pressure through heating equipment to produce one continuous bead. The two components are an "A-ISO" and a "B-RESIN" as shown in Figure 1. The A and B components are available in 330 gallon caged totes as shown in Figure 2 or in 55 gallon steel drums as shown in Figure 3. Storage of the AlphaSeal 5200 components containers must be in an indoor dry place between 40°F (4.4°C) and 110°F (43.3°C). Unopened containers will have a storage life of up to six months in these conditions. The adhesives are to be used immediately once the containers are opened.

AlphaSeal 5200, at a maximum thickness of 1/2 inch (12.7 mm) and maximum width of 2 inches (51 mm), has a flame-spread index of less than 75 and a smoke-developed index of less than 450 when tested in accordance with ASTM E84.

3.2 Gypsum Boards:

The gypsum board must be in compliance with ASTM C1396 for the 2021, 2018, 2015 and 2012 IBC and IRC and ASTM C36 for the 2009 IBC and IRC.

3.3 Wood Framing:

The wood framing must be graded kiln dried prior to the application of the adhesive.

4.0 DESIGN AND INSTALLATION

4.1 General:

The AlphaSeal 5200 adhesive must be applied in accordance with this report and the adhesive manufacturer's installation instructions titled "Alpha Systems Application Instructions". In the event of conflict between the manufacturer's installation instructions and this report, this report governs. The installation instructions and this report must be available at the prefabrication assembly area at all times during construction.

4.2 Preparation and Application:

Prior to application of the adhesive, both substrate surfaces (gypsum board and lumber) must be between temperatures of 50° F (10° C) and 105° F (40.6° C). Surfaces must be clean, dry, and free of dust, ice and loose particles. AlphaSeal 5200 adhesive must be applied in an ambient temperature range of 50° F (10° C) to 105° F (40.6° C). AlphaSeal 5200 is applied using a high-pressure impingement mixing spray gun recommended by Alpha Systems, Inc., in accordance with the manufacturer's published installation instructions. The adhesive temperature at the heating equipment block must be between 100° F (37.8° C) and 125° F (51.7° C). After the last bead is applied, the prefabricated attachment must not be moved for a minimum of two minutes. The prefabricated attachment must remain in the same ambient conditions for the first 24 hours after application.

The adhesive must be applied along prepositioned framing member (lumber) at a 90-degree framing-to-gypsum board interface using a fillet-bead of adhesive as shown in Figure 4. The adhesive must be applied continuously along one side of the interface formed by the wood framing member and the gypsum board and continuously along both sides of the interface at locations where gypsum boards abut to form a joint on the middle of the framing member (gypsum seams). Masking tape may be used to contain the foam adhesive provided it does not interfere with the required adhesive contact area.

AlphaSeal 5200 adhesive must be used on a maximum wood framing spacing of 16-inch (406 mm) on-center for vertical members (walls). Horizontal wood members in

ceilings must be spaced no more than 24 inches (610 mm) on-center and no less than 8 inches (203 mm) on center. The minimum average contact width and height of the adhesive bead must be $\frac{7}{8}$ and $\frac{3}{8}$ inches (22.23 and 9.53 mm), respectively. The bead must never be greater than $2\frac{1}{2}$ inches (63.5 mm) in width.

4.3 Data in accordance with ASTM E72:

The 8 x 8 ft (2.438 x 2.438 m) wall panels in Table 1 and Table 2 were tested under static racking load in accordance with ASTM E72, Section 14. The ultimate shear loads based on the average of three specimens are included in Table 1 and 2 for the tested assemblies. The reported ultimate loads do not include any safety factors. Determination of the allowable design values and applicability for seismic and wind designs are outside the scope of this evaluation report and must be justified to the satisfaction of the code official.

5.0 CONDITIONS OF USE

The AlphaSeal 5200 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** Adhesive use is limited to prefabricated construction. The use of AlphaSeal 5200 adhesive for project site applications is outside the scope of this report.
- 5.2** The adhesive must not be used in installations where a vapor barrier is required between the gypsum board and wood framing.
- 5.3** Application of the AlphaSeal 5200 adhesive is limited to gypsum board manufactured in accordance with ASTM C1396. Application of the adhesive to other gypsums such as water-resistant, moisture resistant, or foil-backed gypsum boards or to other board materials is outside the scope of this report.
- 5.4** AlphaSeal 5200 adhesive must not be used for insulation or be considered insulation.

- 5.5** The adhesive must be separated from the building interior by a thermal barrier of $1\frac{1}{2}$ -inch (12.7 mm) gypsum wallboard installed in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable.
- 5.6** AlphaSeal 5200 is intended to support the gravity loads of the gypsum ceiling or wall board, and a maximum 2.2 pounds per square foot (105 N/m²) of insulation.
- 5.7** The use of AlphaSeal 5200 adhesive to attach gypsum board in a fire-resistance-rated assembly is outside the scope of this report.
- 5.8** The AlphaSeal 5200 adhesive is manufactured in Elkhart, Indiana, under a quality program with inspections conducted by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Two-Part Polyurethane Adhesives Used to Attach Gypsum Board to Wood Framing (AC223), dated August 2012 (editorially revised October 2021).
- 6.2** Engineering Test Reports in accordance with Section 14 of ASTM E72 Standard Methods for Conducting Strength Tests of Panels for Building Construction.

7.0 IDENTIFICATION

- 7.1** Containers of AlphaSeal 5200 adhesive components shall be identified with labels bearing the report holder's name (Alpha Systems, Inc.) and address, product designation (AlphaSeal 5200), component designation, details of shelf life, and the evaluation report number (ICC-ES ESR-4935).
- 7.2** The report holder's contact information is the following:
**ALPHA SYSTEMS, INC.
5120 BECK DRIVE
ELKHART, INDIANA 46516
(574) 295-5206
www.alphasystemsinc.com**

TABLE 1—MAXIMUM WALL SHEAR LOADS FROM RACKING LOAD TESTING (ASTM E72, Section 14) FOR SINGLE SIDED WALLS¹

96 x 96 inch FRAMING ^{2,3}				AVERAGE BEAD SIZE (in.) ⁴		SHEATHING ⁵		MAXIMUM LOAD (plf)	ASTM STANDARD
Top Plate	Bottom Plate	Studs	Studs Spacing	Width	Height	Gypsum Board Orientation	Gypsum Brand		
1 x 3	1 x 3	2 x 3	16 inch O.C.	1	$\frac{1}{2}$	$\frac{5}{16}$ -inch Vertical	Georgia Pacific ⁶	737.5	ASTM E72-80
				1	$\frac{1}{2}$		USG Gypsum ⁶	707.4	
				1	$\frac{5}{8}$		Gold Bond ⁶	656.6	
				$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$ -inch Horizontal	USG Gypsum ⁷	750.9	
				$\frac{7}{8}$	$\frac{1}{2}$		Gold Bond ⁸	727.4	
				$\frac{7}{8}$	$\frac{1}{2}$		Georgia Pacific ⁹	590.4	
				1	$\frac{1}{2}$	$\frac{1}{2}$ -inch Horizontal	SHEETROCK® Brand MH UltraLight Panels Tuf-Base™ ¹⁰	675.0	ASTM E72-10
				1	$\frac{1}{2}$		SHEETROCK® Brand MH UltraLight Ceiling Panels Ultra-Base™ ¹⁰	760.0	

For SI Units: 1 inch = 25.4 mm, 1 plf = N/m

¹ Gypsum boards cover one side of the wall panels with no sheathing on the other side.

² Studs, top plates, and bottom plates are made from Spruce-Pine-Fir sawn lumber. The SPF grade of studs and plates must be determined by a registered design professional in accordance with the applicable codes and to the satisfaction of the code official.

³ The plate is attached to the stud end with two 16 Ga. Staples with $\frac{7}{16}$ -inch crown and 2-inch legs and conforming to requirements of IBC Section 2303.6.

⁴ Height is the average bead's contact height on stud or plate. The width is the average bead's contact width on the board.

⁵ The AlphaSeal 5200 adhesive is applied to attach all boards to the studs and plates in accordance with this table and Section 4.2 of this report.

⁶ 48 x 96-inch gypsum board with seams vertical.

⁷ 48 x 96-inch gypsum board with seams horizontal. A fiberglass mesh tape is applied to the gypsum boards seams followed by one coat of USG Sheetrock Durabond 45 setting type joint compound, mixed and applied per the instructions on the bag.

⁸ 48 x 96-inch gypsum board with seams horizontal. A fiberglass mesh tape is applied to the gypsum boards seams followed by one coat of Gold Bond Sta-smooth HS 45 hi-strength joint compound, mixed and applied per the instructions on the bag.

⁹ 48 x 96-inch gypsum board with seams horizontal. A fiberglass mesh tape is applied to the gypsum boards seams followed by one coat of Georgia-Pacific joint compound, mixed and applied per the instructions on the bag.

¹⁰ 48 x 96-inch gypsum board with seams horizontal. A USG paper joint tape is applied to the gypsum boards seams followed by one coat of 45 minute light weight setting-type joint compound, mixed and applied per the instructions on the bag. The compound meets the requirements of ASTM C475.

TABLE 2—MAXIMUM WALL SHEAR LOADS FROM RACKING LOAD TESTING (ASTM E72, Section 14) FOR DOUBLE SIDED WALLS¹

96 x 96 inch FRAMING ^{2,3}				AVERAGE ALPHASEAL 5200 BEAD SIZE (in.) ⁴		SHEATHING ORIENTATION		MAXIMUM LOAD (plf)	ASTM STANDARD
Top Plate	Bottom Plate	Studs	Studs Spacing	Width	Height	OSB	Gypsum Board ⁷		
2 x 4	1 x 4	2 x 4	16 inch O.C.	1	3/8	7/16-inch Vertical (the rough side is facing the wood framing) ⁵	1/2-inch Horizontal	756.0	ASTM E72-15
2 x 4	1 x 4	2 x 4	16 inch O.C.	1	3/8	7/16-inch Vertical (the rough side is facing the wood framing) ⁶		965.0	

For SI Units: 1 inch = 25.4 mm, 1 plf = N/m

¹ One side of the wall panel is covered with horizontal 1/2-inch Gold Bond® High Strength LITE® gypsum boards (seam is perpendicular to studs) and the other side is covered with vertical 7/16-inch OSB panels (seam is parallel to studs). The OSB panels specifications, including specific gravity, grade, and bond classification, must be determined in accordance with the applicable codes and to the satisfaction of the code official.

² Studs, top plates, and bottom plates are made from Spruce-Pine-Fir sawn lumber. The SPF grade of studs and plates must be at least No. 2 and must be determined in accordance with the applicable codes and to the satisfaction of the code official.

³ The plate is attached to the stud end with five 15 Ga. staples with 7/16-inch crown and 2 1/2-inch legs and conforming to requirements of IBC Section 2303.6.

⁴ Height is the average AlphaSeal 5200 bead's contact height on stud. The width is the average AlphaSeal 5200 bead's contact width on the OSB board.

⁵ OSB panels installation to the framework is as follows:

- Two pieces of OSB sheathing (71 x 48 inches) are attached vertically to the wood framing. The 71-inch butt-joint is in the middle under the center stud. The two OSB boards are offset 3 1/2 inches from the center of the wall frame towards the top, leaving 9 inches at the top and 16 inches along the bottom with no sheathing. AlphaSeal 5200 adhesive is applied in accordance with Section 4.2 of this evaluation report to attach the OSB boards to the wood framing.
- Two 9 x 48-inch strips and two 16 x 48-inch strips of 7/16-inch OSB sheathing are stapled 6-inch on-center along the plates and the studs of the exposed frame at the top and bottom ends of the previously attached sheets of OSB sheathing. The used staples are 15 Ga. staples with 7/16-inch crown and 1 1/2-inch Legs.

⁶ OSB panels installation to the framework is as follows:

- Two pieces of OSB sheathing (71 x 48 inches) are attached vertically to the wood framing. The 71-inch butt-joint is in the middle under the center stud. The two OSB boards are offset 3 1/2 inches from the center of the wall frame towards the top, leaving 9 inches at the top and 16 inches along the bottom with no sheathing. AlphaSeal 5200 adhesive is applied in accordance with Section 4.2 of this evaluation report to attach the OSB boards to the wood framing.
- PEMCO P5101 One-Part Polyurethane Adhesive is applied along the plates and the studs of the exposed frame at the top and bottom ends of the previously attached sheets of OSB sheathing. Two 1/16 – 1/8 inch wide beads are applied to all 2 x framing, and one 1/16 – 1/8 inch wide bead is applied to all 1 x framing.
- Two 9 x 48-inch strips and two 16 x 48-inch strips of 7/16-inch OSB sheathing are then positioned over the exposed framing and stapled 6-inch on-center along the plates and the studs of the exposed frame at the top and bottom ends. The used staples are 15 Ga. staples with 7/16-inch crown and 1 1/2-inch Legs.

⁷ Gypsum board installation details are as follows:

- Pemco P5100 One-Part Polyurethane Adhesive is applied with two 1/16 – 1/8 inch wide beads along all 2 x framework and one 1/16 – 1/8 inch wide bead along all 1 x framework. Evaluation of the Pemco P5100 adhesive is outside the scope of this report.
- Two 48 x 96 inch gypsum boards are immediately placed horizontally on the framework and pressed firmly over the framework members to ensure full adhesive coverage. The gypsum boards are stapled 6-inch on-center around the perimeter and 1 inch from either side of boards butt-joint along all field studs. No fasteners are used in the field of the boards. The used staples are 19 Ga. staples with 3/16-inch crown and 1-inch Legs.

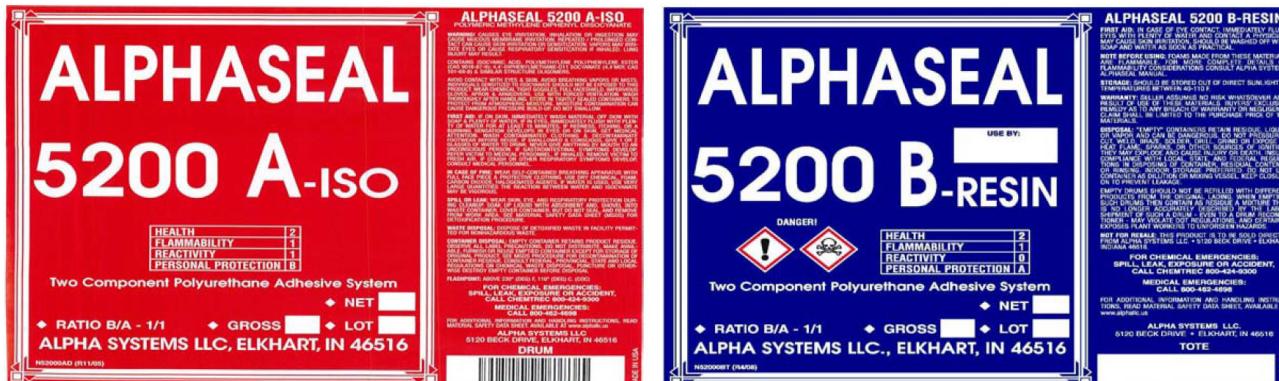


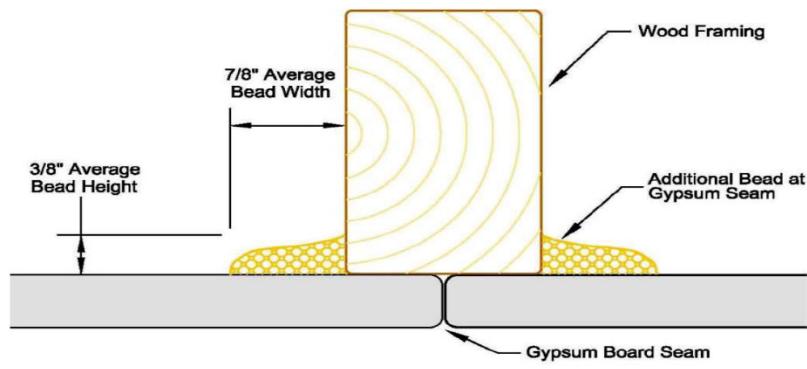
FIGURE 1—ALPHASEAL 5200 COMPONENTS



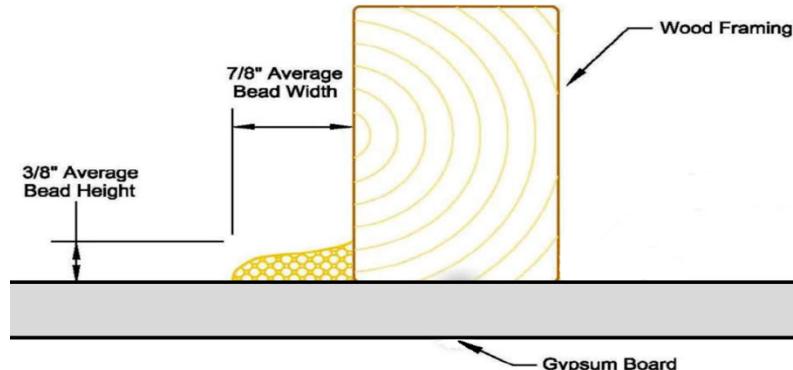
FIGURE 2—ALPHASEAL 5200 330 GALLON CAGED TOTES



FIGURE 3—ALPHASEAL 5200 55 GALLON STEEL DRUMS



(Two beads are required with gypsum board seam)



(One bead is required when no gypsum board seam exists)

For SI: 1 inch = 25.4 mm

FIGURE 4—MINIMUM AVERAGE ALPHASEAL 5200 BEAD SIZE