

# ICC-ES Evaluation Report


**ESR-5008**

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<p><b>DIVISION: 06 00 00— WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 05 23.10— Adhesives</b></p> <p><b>DIVISION: 09 00 00— FINISHES</b></p> <p><b>Section: 09 29 10— Gypsum Board Accessories</b></p>	<p><b>REPORT HOLDER:</b></p> <p><b>FSI</b></p>	<p><b>EVALUATION SUBJECT:</b></p> <p><b>ONEPART-20 AND ONEPART-47 POLYURETHANE STRUCTURAL ADHESIVE</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2018, 2015, and 2012 [International Building Code® \(IBC\)](#)
- 2018, 2015, and 2012 [International Residential Code® \(IRC\)](#)

**Properties evaluated:**

- Gypsum Board Attachment

## 2.0 USES

The OnePart-20 adhesive is limited for use in prefabricated construction of gypsum board to interior wood-framed partitions, ceilings, and the interior face of wood-framed exterior load-bearing and nonload-bearing walls with structural sheathing on the exterior face of the walls.

The OnePart-47 adhesive is limited for use in the factory fabrication of laminated sandwich panels. The adhesive is used for bonding oriented strand board (OSB) or steel facing to core materials of expanded polystyrene foam plastic (EPS).

## 3.0 DESCRIPTION

### 3.1 General:

OnePart-20 and OnePart-47 are moisture cure polyurethane adhesives. They are shipped in 1,000 pound pressurized cylinders, 250-gallon totes or 55-gallon drums. Storage of these containers should be in an indoor dry place between 50°F. and 90°F. Their shelf-life is six (6) months from date of manufacture when stored in the original, unopened containers.

### 3.2 OnePart-20 Adhesive:

For use of the OnePart-20 adhesive, the gypsum board must be in compliance with ASTM C1396.

### 3.3 OnePart-47 Adhesive:

For use of the OnePart-47 adhesive, the facing material is steel or OSB complying with US DOC PS 2 and the core material is Type I EPS in compliance with ASTM C578.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

The OnePart-47 is Type II, Class 2, adhesive for structural use where high resistance to moisture is required in roof, wall and floor sandwich panels subject to sustained loadings. Based on creep test results, the maximum allowable design shear stress for the OnePart-47 adhesive is limited to a maximum of 40 psi (276 kPa).

### 4.2 Installation:

**4.2.1 General:** The OnePart-20 and OnePart-47 adhesives must be applied and cured in accordance with this report and the FSI application instructions. In the event of conflict between the manufacturer's installation instructions and this report, this report governs.

**4.2.2 Preparation and Application:** Prior to application of the OnePart-20 and OnePart-47 adhesives, both systems substrate surfaces must be clean, dry, and free of dust, wax, ice, loose and/or free particulates. Application of OnePart-20 and OnePart-47 must be applied at an ambient temperature of 50°F (10°C) or higher. Each adhesive is applied using pressurized dispensing equipment, roll coat, or manual coating methods according to FSI's application instructions. The adhesively bonded substrates shall not be shifted, lifted, or otherwise moved for 15 minutes after the last bead is applied. The adhesively bonded substrates shall stay in the same ambient conditions for a minimum of 12 hours. See [Table 1](#) for nominal application specifications and [Table 2](#) for nominal curing specifications for each of the OnePart-20 and OnePart-47 adhesives.

### 4.3 Data in Accordance with ASTM E72:

Wall panels consisted of gypsum boards and Spruce-Pine-Fir sawn lumber framing, which were attached to each other by staples and OnePart-20 adhesive. The panels were tested under static racking load in accordance with ASTM E72, Section 14. The ultimate shear loads in [Table 3](#) are based on the average of three specimens 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 OnePart-20 and OnePart-47 Polyurethane Adhesives described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Use of adhesives is limited to prefabricated construction. The adhesives are meant to be used in an indoor manufacturing facility and must not be applied in an outdoor uncontrolled environment.
- 5.2 The adhesives are limited to use in other than Group H and I Occupancies. Use of the adhesives with fire-retardant or preservative-treated wood products is outside the scope of this report.
- 5.3 A vapor barrier must not be used between the adhesives and their substrates.
- 5.4 The adhesives 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.
- 5.5 The use of OnePart-20 and OnePart-47 adhesives in fire-resistance-rated assemblies is outside the scope of this report.
- 5.6 Application of the OnePart-20 adhesive is limited to gypsum board manufactured in accordance with ASTM C1396. Application of the OnePart-20 adhesive to other gypsum such as water-resistant, moisture resistant, or foil-backed gypsum boards or to other board materials is outside the scope of this report.
- 5.7 The constructed panels using the OnePart-20 adhesive must comply with the requirements of Section 803.14 of the 2018 IBC (Section 803.12 of the 2015 or Section 803.10 of the 2012 IBC).
- 5.8 The OnePart-47 adhesive application must be limited to sandwich panels specifically recognized in a current ICC-ES evaluation report and evaluated in accordance with Section 4.0 of the [ICC-ES Acceptance Criteria for Sandwich Panels \(AC04\)](#).
- 5.9 The OnePart-20 and OnePart-47 adhesives are manufactured in Earth City, Missouri under a quality program with inspection by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Data for the OnePart-47 Adhesive in accordance with the applicable sections of the [ICC-ES Acceptance Criteria for Sandwich Panel Adhesives \(AC05\)](#), dated June 2009 (editorially revised July 2020).
- 6.2 Engineering Test Report for the OnePart-20 Adhesive in accordance with ASTM C557 Standard Specifications for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- 6.3 Engineering Test Reports for the OnePart-20 Adhesive in accordance with Section 14 of ASTM E72 Standard Methods for Conducting Strength Tests of Panels for Building Construction.

## 7.0 IDENTIFICATION

- 6.4 Each cylinder, drum, or tote of OnePart-20 or OnePart-47 adhesives must have an attached label including the name and address of the report holder (FSI), the product name, date of manufacture, lot number, shelf-life information, the ICC-ES mark of conformity, and the evaluation report number, ESR-5008. ICC-ES ESR-5008 may be used in lieu of the mark of conformity.
- 6.5 The report holder’s contact information is the following:

**FSI**  
**13389 LAKEFRONT DRIVE**  
**EARTH CITY, MISSOURI 63045**  
**(314) 344-3330**  
[www.fsi.co](http://www.fsi.co)  
[info@fsi.co](mailto:info@fsi.co)

**TABLE 1—NOMINAL APPLICATION SPECIFICATIONS**

ADHESIVE	APPLICATION METHOD	ADHESIVE COVERAGE (g/ft <sup>2</sup> )	WATER (MIST) APPLIED (g/ft <sup>2</sup> )	AMBIENT TEMPERATURE	AMBIENT RELATIVE HUMIDITY
OnePart-20	Bead or Roll Coat	12	2	73°F	50%
OnePart-47	Bead or Roll Coat	12	2	73°F	50%

For SI Units: 1 g/ft<sup>2</sup> = 0.0353 oz/ft<sup>2</sup>= 10.76 g/m<sup>2</sup>

**TABLE 2—NOMINAL CURING SPECIFICATIONS**

ADHESIVE	OPEN TIME <sup>1</sup>	CLOSED TIME <sup>2</sup>	PRESS TIME <sup>3</sup>	PRESS PRESSURE
OnePart-20	1.25 min	10 Min	67.0 min	3 psi
OnePart-47	3.0 min	27.0 min	300 min	3 psi

For SI Units: 1 psi = 6.895 kPa.

<sup>1</sup> Open time is defined as the maximum amount of time elapsed from adhesive application until the adhesive is covered with another substrate.

<sup>2</sup> Closed time is the maximum cumulative amount of time elapsed from the adhesive application, when its covered with another substrate, until the assembly is under pressure.

<sup>3</sup> Press time is the minimum amount of time the assembly is maintained under pressure.

**TABLE 3—MAXIMUM WALL SHEAR LOADS FROM RACKING LOAD TESTING (ASTM E72, SECTION 14) USING ONEPART-20 ADHESIVE**

96 x 96 inch FRAMING <sup>1,2</sup>				SHEATHING <sup>3</sup>			MAXIMUM LOAD (plf)	ASTM STANDARD
Top Plate	Bottom Plate	Studs	Studs Spacing	Gypsum Board Orientation	Gypsum Brand	Single or Double <sup>4</sup>		
1 x 3	1 x 3	2 x 3	16 inch O.C.	<sup>5</sup> / <sub>16</sub> -inch Vertical <sup>5</sup>	USG Board	Single	448.3	ASTM E72-80
					USG Sheetrock MH	Single	677.6	
					National Gypsum, Gold Bond	Single	622.0	
					Georgia-Pacific Gypsum	Single	620.3	
					American Gypsum, EagleRoc	Double	1035.0	
					National Gypsum, Gold Bond	Double	969.9	
				<sup>1</sup> / <sub>2</sub> -inch Horizontal <sup>6</sup>	USG Sheetrock MH	Single	644.8	ASTM E72-98
					Gold Bond	Single	649.0	
				<sup>1</sup> / <sub>2</sub> -inch Horizontal <sup>7</sup>	USG Sheetrock® Brand MH UltraLight Panels Tuf-Base™	Single	671.0	ASTM E72-10
						Double	1082.0	
2 x 3	2 x 3	2 x 3	16 inch O.C.	<sup>1</sup> / <sub>2</sub> -inch Horizontal <sup>7</sup>	USG Sheetrock® Brand MH UltraLight Panels Tuf-Base™ <sup>7</sup>	Single	687.0	ASTM E72-10
						Double	1297.0	

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

<sup>1</sup> Studs, top plates, and bottom plates were Spruce-Pine-Fir sawn lumber, No. 2 grade. 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.

<sup>2</sup> 1 x 3 plate attached to the stud end with two 16 Ga. staples with <sup>7</sup>/<sub>16</sub>-inch crown and 2-inch legs. 2 x 3 plate attached to the stud end with two 16 Ga. Staples with <sup>7</sup>/<sub>16</sub>-inch crown and 2<sup>1</sup>/<sub>2</sub>-inch legs. Staples comply with IBC Section 2303.6.

<sup>3</sup> All gypsum boards were attached to the framing members with staples and OnePart-20 adhesive.

<sup>4</sup> Single sided: Gypsum boards cover one side of the wall panel with no sheathing on the other side. Double sided: Gypsum boards cover both sides of the wall panel.

<sup>5</sup> 48 x 96-inch gypsum board with seams vertical. Gypsum board installation details per Section 4.2 of this report and the following:

- OnePart-20 Adhesive was applied with two <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch-wide beads along all 2 x 3 framework members and one <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch wide bead along all 1 x 3 framework members.
- Two 48 x 96 inch gypsum boards were immediately placed on the framework and pressed firmly over framework members to ensure full adhesive coverage.
- Gypsum boards were stapled to the framework with 19 Ga staples with <sup>1</sup>/<sub>4</sub>-inch crown and <sup>3</sup>/<sub>4</sub>-inch legs:
  - Along field studs: at 12, 48, and 84 inches from the stud's end.
  - Along gypsum parameter studs: at 18 inches on-center.
  - Along top and bottom plates: at 6 inches on-center.
- A minimum adhesive cure time of 5 days.

<sup>6</sup> 48 x 96-inch gypsum board with seams horizontal. Gypsum boards installation details per Section 4.2 of this report and the following:

- OnePart-20 Adhesive was applied with two <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch-wide beads along all 2 x 3 framework members and one <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch wide bead along all 1 x 3 framework members.
- Two 48 x 96 inch gypsum boards were immediately placed on the framework and pressed firmly over framework members to ensure full adhesive coverage.
- Gypsum boards were stapled to the framework with 19 Ga staples with <sup>1</sup>/<sub>4</sub>-inch crown and <sup>3</sup>/<sub>4</sub>-inch legs:
  - Along perimeter and field studs: at 12, 30, 47<sup>1</sup>/<sub>4</sub>, 48<sup>3</sup>/<sub>4</sub>, 66, and 84 inches from the stud's end.
  - Along top and bottom plates: at 6 inches on-center.
- After 24 hours from applying the OnePart-20 Adhesive, a 2-inch-wide fiberglass mesh joint tape applied to the gypsum boards seams followed by joint compound coating, mixed and applied per the instructions on the bag. Joint compounds per the following:
  - For USG Sheetrock MH Gypsum Boards, two coats of USG Lightweight setting-type joint compound, Easy Sand 45.
  - For Gold Bond Gypsum Boards, two coats of Gold Bond Sta-Smooth HS 30 joint compound.
- A minimum adhesive cure time of 3 days.

<sup>7</sup> 48 x 96-inch gypsum board with seams horizontal. Gypsum board installation details per Section 4.2 of this report and the following:

- OnePart-20 Adhesive was applied with two <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch-wide beads along all 2 x 3 framework members and one <sup>1</sup>/<sub>16</sub> – <sup>1</sup>/<sub>8</sub> inch wide bead along all 1 x 3 framework members.
- Two 48 x 96 inch gypsum boards were immediately placed on the framework and pressed firmly over framework members to ensure full adhesive coverage.
- Gypsum boards were stapled to the framework with <sup>3</sup>/<sub>16</sub>-inch crown x 1-inch legs x 0.031 thick staples:
  - Along perimeter and field studs: at 12, 30, 47<sup>1</sup>/<sub>4</sub>, 48<sup>3</sup>/<sub>4</sub>, 66, and 84 inches from the stud's end.
  - Along top and bottom plates: at 6 inches on-center.
- After 24 hours from applying the OnePart-20 Adhesive, a 2-inch-wide standard weight paper joint tape applied to the gypsum boards seams followed by one layer of 45 Minute Lightweight Setting-Type joint compound coating that meets ASTM C475. Joint compound was permitted 24 hours of drying time.
- A minimum adhesive cure time of 7 days.



FIGURE 1—TYPICAL SPRAY APPLICATION EQUIPMENT