

**ICC Evaluation Service, Inc.**  
[www.icc-es.org](http://www.icc-es.org)

**Business/Regional Office** ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543  
**Regional Office** ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800  
**Regional Office** ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

**DIVISION: 07—THERMAL AND MOISTURE PROTECTION**  
**Section: 07410—Metal Roof and Wall Panels**

**REPORT HOLDER:**

**BLUE RIBBON MANUFACTURING, INC.**  
9140 STELLAR COURT, UNIT A  
CORONA, CALIFORNIA 92883  
(951) 277-2435  
[www.blueribbonmfg.com](http://www.blueribbonmfg.com)

**EVALUATION SUBJECT:**

**BRM STRUCTURAL WALL PANELS**

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2003 *International Building Code*® (IBC)
- 1997 *Uniform Building Code*™ (UBC)

**Properties evaluated:**

Structural

## 2.0 USES

The BRM Structural Wall Panels are limited to use in Type V-B (IBC) or Type V-N (UBC) (combustible and nonfire-resistance-rated) construction for Group S and Group U Occupancies (farm buildings) under the IBC, and Group U, Divisions 1 and 3, and Group S, Division 2, Occupancies under the UBC.

## 3.0 DESCRIPTION

### 3.1 General:

The BRM structural wall panels are factory-assembled panels fabricated in two configurations: panels without a door opening and panels with a 45<sup>3</sup>/<sub>4</sub>-inch-wide-by-93<sup>1</sup>/<sub>4</sub>-inch-high (1162 mm by 2319 mm) door opening centered on the panels' length. Both configurations of panels are 12 feet (3658 mm) long by 8 feet (2438 mm) high. The panels without a door opening are constructed from three 4-foot-long-by-8-foot-high (1219 mm by 2438 mm) plywood panels, covered on both sides with sheet metal, installed in a steel perimeter frame. Where sheet-metal-faced plywood panels in the panels without a door opening adjoin, two perimeter channels are welded back-to-back. The panels with a door opening are constructed from two sheet-metal-faced plywood panels, as described above, with a 4-foot-wide (1219 mm) door opening between them. The edges of the sheet-metal-faced plywood panels are inserted in a steel C-channel perimeter frame to form the 12-by-8-foot (3658 mm by 2438 mm) panel. The panels with a door opening have a rectangular tube header and a C-channel sill welded at the top and bottom, and a steel frame channel welded at each end of the door jamb. See Figure 1.

## 3.2 Materials:

**3.2.1 Plywood Panels:** Plywood panels are nominally 2<sup>3</sup>/<sub>32</sub>-inch-thick (19 mm), five-ply, Exposure 1 APA-rated sheathing with a span rating of 48/24, complying with DOC PS-1 or UBC Standard 23-2.

**3.2.2 Steel Frame:** The steel frame of the panels is manufactured from No. 14 gage [0.069 inch (1.75 mm) minimum base-metal thickness] steel conforming to ASTM A 653 SS, Grade 50, having a minimum yield strength of 50 ksi (345 MPa), and a G90 galvanized coating. The frame channels have the following dimensions: 2.06-inch-deep (52.3 mm) web, 1.5-inch-wide (38 mm) flanges, and 0.56-inch-long (14.2 mm) return lips. Where one channel adjoins another (e.g., at corners of the frame of the panel), they are factory-welded together with complete flare bevel groove welds on both sides. Where channels are back-to-back, they are factory-welded with spot welds spaced 6 inches (152 mm) on center.

**3.2.3 Tube Header:** The tube header used in panels with a door opening is manufactured from No. 14 gage [0.069 inch (1.75 mm) minimum base-metal thickness] steel conforming to ASTM A 500, Grade B or C, having a minimum yield strength of 65 ksi (448 MPa), and a G90 galvanized coating. The tube header rectangular channel is 2 inches (50.8 mm) wide by 3 inches (76.2 mm) deep. The tube header ends are rectangular factory-welded to the top of the perimeter frame on the panel with a door opening.

**3.2.4 Sill Channel:** The sill channel is manufactured from No. 14 gage [0.069 inch (1.75 mm) minimum base-metal thickness] steel conforming to ASTM A 653 SS, Grade 50, having a minimum yield strength of 50 ksi (345 MPa), and a G90 galvanized coating. The sill channels have the following dimensions: 2.06-inch-deep (52.3 mm) web and 0.5-inch-wide (12.7 mm) flanges. The sill channel is factory-welded to the bottom of the perimeter frame on the panel with a door opening.

**3.2.5 Jamb Channels:** The jamb channel is manufactured from No. 14 gage [0.069 inch (1.75 mm) minimum base-metal thickness] steel conforming to ASTM A 653 SS, Grade 50, having a minimum yield strength of 50 ksi (345 MPa), and a G90 galvanized coating. The jamb channels have the following dimensions: 2.06-inch-deep (52.3 mm) web, 1.5-inch-wide (38 mm) flanges, and 0.56-inch-long (14.2 mm) return lips. The jamb channels are factory-welded to both sides of the perimeter of the panels with a door opening.

**3.2.6 Bent Saddle with Concrete Insert Hold-down:** The bent saddle is manufactured from No. 12 gage [0.1046 inch (2.66 mm) minimum base-metal thickness] galvanized steel conforming to ASTM A 653 SS, Grade 50, having a minimum yield strength of 50 ksi (345 MPa), and a G90 coating. The bent saddle is 4 inches (102 mm) long by 2.125 inches (54.0 mm) wide, and has flanges 1<sup>1</sup>/<sub>2</sub> inches (38.1 mm) high. The

ES REPORTS™ are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, Inc., express or implied, as to any finding or other matter in this report, or as to any product covered by the report.



bent saddle is factory-welded to a  $1\frac{5}{8}$ -inch-diameter (41.3 mm) round tubing conforming to ASTM A 500, Grade B or C, having a minimum yield strength of 65 ksi (448 MPa), and a G90 coating. The tubing is 18 inches (457 mm) long with two 3-inch-long-by- $1\frac{3}{8}$ -inch-diameter (76.2 mm by 35.0 mm) steel rods conforming to ASTM A 500, Grade B or C, having a minimum yield strength of 65 ksi (448 MPa), and a G90 coating. The tubing is factory-welded to the bottom side of the saddle. The rods are factory-welded at the bottom of the tubing.

**3.2.7 Fasteners:** Fasteners used to connect the perimeter frame of the wall panels to the bent saddle hold-downs are No. 14, 1-inch-long (25.4 mm), self-drilling, corrosion-resistant tapping screws.

**3.2.8 Sheet Metal Panel Facings:** Galvanized, 4-foot-by-8-foot (1219 mm by 2438 mm), No. 26 gage [0.019 inch (0.48 mm) base-metal thickness] steel sheets complying with ASTM A 792 SS, Grade 33, with a AZ60 coating. The steel facings are adhered to both faces of the plywood panels.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

The allowable loads in this report are for use in allowable stress design. The allowable uniform transverse load, allowable axial compression load and allowable racking shear strength are as set forth in Tables 1 and 2. For bearing walls subjected to transverse uniform loads, the sum of the ratios of actual applied loads over the allowable axial and transverse loads noted in Table 1 of this report must not exceed 1.0.

### 4.2 Installation:

**4.2.1 General:** BRM Structural Panels shall be installed in accordance with the manufacturer's published installation instructions and this report. The manufacturer's published installation instructions shall be available at the jobsite at all times during installation. Where differences exist between this report and the published installation instructions, this report shall govern.

**4.2.2 Walls:** The BRM Structural Panels must be connected to each other by the use of the bent saddle hold-downs. The bent saddle hold-down must be designed by a registered design professional to resist the applicable design forces. Panels are connected to the foundation by using bent saddle hold-downs (one at each end of the panel) at the bottom ends of the panels. The bent saddle shall be fastened to the bottom channel of each end of the panel using four fasteners, as described in Section 3.2.7, at each flange. The screws shall be spaced 3 inches (76 mm) apart, with a minimum edge distance of  $\frac{1}{2}$  inch (13 mm). Refer to Figure 1 for typical panel installation details. The top and bottom channel of the panel's steel frame must be designed by a registered design professional, to span the distance between the supports at a deflection limit of L/480.

**4.2.2.1 Load-bearing Walls:** Load-bearing walls are limited to a maximum 8-foot (2438 mm) unsupported height. The wall

panel must be uniformly supported at the base of the panel. The axial compression load shall be applied uniformly along the top of the wall panel. The load-bearing capacity of wall panels with an opening, as described in this report, is outside the scope of this report.

**4.2.2.2 Shearwalls:** A bent saddle hold-down must be installed at each end of each panel when used as a shearwall. The maximum height of the shear wall shall be 8 feet (2438 mm). The minimum length of the shear wall shall be 12 feet (3658 mm), with additional increments of 12-foot-long (3658 mm) panels for longer shearwalls.

## 5.0 CONDITIONS OF USE

The BRM, Inc., Structural Wall Panels 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** Installation of the panels shall comply with this report and the manufacturer's published installation instructions. Where a conflict exists between this report and the manufacturer's published installation instructions, this report shall govern.
- 5.2** The design values shall not exceed the allowable load values in Table 1 of this report.
- 5.3** The panels shall be limited to exterior wall applications in combustible, nonfire-resistive-rated construction in Group S and Group U Occupancies under the IBC (Type V-B), and Group U, Divisions 1 and 3, and Group S, Division 2, Occupancies under the UBC (Type V-N).
- 5.4** Drawings and design details verifying compliance with this report shall be submitted to the building official for approval. The drawings and calculations shall be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is constructed.
- 5.5** The panels shall be fabricated by BRM, Inc., at their manufacturing plant located in Corona, California, with inspections by RI Ogawa and Associates (AA-705).

## 6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated October 2005.
- 6.2** Data in accordance with the ICC-ES Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing Materials Used as Braced Wall Panels (AC269), dated February 2006; including cyclic load tests under Section 4.3.1.

## 7.0 IDENTIFICATION

Each panel shall be labeled with the company name (BRM, Inc.), a serialized label of the inspection agency (RI Ogawa & Assoc.), and the evaluation report number (ESR-1994).

TABLE 1—ALLOWABLE LOADS FOR BRM STRUCTURAL PANELS<sup>1,2,3,4</sup>

PANEL DEFLECTION	ALLOWABLE TRANSVERSE LOAD (psf)						
	Allowable Axial Load (plf)						
	1050	750	625	500	375	250	0
L/90	26	28	29	30	31	31	34
L/120	26	27	28	29	29	30	30
L/180	13	14	14	15	15	15	15

For SI: 1 psf = 47.9 Pa, 1 plf = 14.6 N/m.

<sup>1</sup>The transverse load values are the allowable loads for the metal-faced plywood panels spanning the 8-foot distance between the top and bottom perimeter frame members of the panel assembly. The top and bottom channel of the panel's steel frame must be designed, to span the distance between the supports at a deflection limit of L/480.

<sup>2</sup>The allowable axial compression load is only applicable to panels without an opening, a maximum height of 8 feet, and with the entire length of the bottom of the panels in contact with a continuous concrete footing.

<sup>3</sup>The foundation, anchorage to the concrete, and bent saddle hold-downs must be designed to resist the applied loads.

<sup>4</sup>For bearing walls subjected to transverse uniform loads, the sum of the ratios of actual applied loads over the allowable loads noted in Table 1 of this report must not exceed 1.0.

TABLE 2—ALLOWABLE RACKING SHEAR FOR BRM STRUCTURAL PANELS

PANEL TYPE <sup>1</sup>	CODE <sup>2</sup>	RACKING SHEAR (plf) <sup>3</sup>	
		Seismic	Wind
8-foot-high-by-12-foot-long panel without a door opening	IBC	187	300
	UBC	208	300
8-foot-high-by-12-foot-long panel with a door opening on the center of the panel	IBC	143	201
	UBC	156	201

For SI: 1 plf = 14.6 N/m, 1 ft = 305 mm.

<sup>1</sup>Maximum panel height is 8 feet (2438 mm). Minimum panel length is 12 feet (3658 mm). Door opening dimensions on center of panel shall not exceed 45<sup>3</sup>/<sub>4</sub> inches (1162 mm) wide by 93<sup>1</sup>/<sub>4</sub> inches (2369 mm) high.

<sup>2</sup>For jurisdictions adopting the IBC and the UBC.

<sup>3</sup>The foundation, anchorage to the concrete, and bent saddle hold-downs must be designed to resist the applied loads.

