

ICC-ES Evaluation Report

ESR-1470

Reissued June 1, 2009

This report is subject to re-examination in two years.

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07410—Metal Roof and Wall Panels
REPORT HOLDER:
PATIO ENCLOSURES, INC.
 720 EAST HIGHLAND ROAD
 MACEDONIA, OHIO 44056
 (330) 468-0700
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EVALUATION SUBJECT:
SUPER-FOAM ROOF SYSTEM
1.0 EVALUATION SCOPE
Compliance with the following code:

 2006 *International Residential Code*® (IRC)

Properties evaluated

- Structural
- Fire classification

2.0 USES

The Patio Enclosures, Inc., Super-Foam Roof System, described in this report, is used to construct roofs for patio covers complying with Appendix H of the IRC.

3.0 DESCRIPTION
3.1 General:

The Patio Enclosures, Inc., Super-Foam roof system consists of roof panels which are interconnected by aluminum splines field-installed in the longitudinal joints of the panels. Each roof panel is a factory-assembled sandwich panel consisting of aluminum facings adhered to an expanded polystyrene foam plastic core. The panels are 36 inches (914 mm) wide and have nominal thicknesses of 3, 4⁵/₈ and 6 inches (76, 117 and 152 mm), with longitudinal square-cut edges.

3.2 Materials:

3.2.1 Panel Core: The core material is 1.5 pcf (24 kg /m³) nominal density, Type II, expanded polystyrene (EPS) foam plastic board complying with ASTM C 578. The board, specified in the ICC-ES approved Patio Enclosures, Inc., quality control documentation, is recognized in a current ICC-ES evaluation report. The foam plastic has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84.

3.2.2 Panel Facings: The facing material on both sides of the panel is 0.024-inch-thick (0.61 mm) aluminum with an alloy designation of 3105-H274, conforming to the requirements for 3105-H16 as designated in ASTM B 209, with a minimum tensile strength of 25 ksi (170 MPa) and a minimum yield strength of 21 ksi (145 MPa).

3.2.3 Panel Adhesive: The facings are factory-adhered to the core with an adhesive, described in the approved Patio Enclosures, Inc., quality control documentation, that is a Type II, Class 2, adhesive complying with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05) and recognized in a current ICC-ES evaluation report.

3.2.4 Splines: Splines supplied by Patio Enclosures, Inc., which are field-installed in the longitudinal joints of adjacent roof panels, are solid, extruded, I-shaped aluminum members. The nominal dimensions of the I-shaped members are as follows: for the 3-inch-thick (76.2 mm) panel, flange width is 3.0 inches (76.2 mm), flange and web thickness is 0.062 inch (1.57 mm), and member depth is 3.2 inches (81.3 mm). For the 4⁵/₈-inch-thick (117.5 mm) panel, flange width is 3.0 inches (76.2 mm), flange and web thickness is 0.062 inch (1.57 mm), and member depth is 4.8 inches (121.9 mm). For the 6-inch-thick (152.4 mm) panel, flange width is 3.0 inches (76.2 mm), flange and web thickness is 0.090 inch (2.29 mm), and member depth is 6.2 inches (157.5 mm). The aluminum alloy and temper designation of 6063-T6, complying with ASTM B 209.

3.2.5 Fasteners: The fasteners used to attach the splines to the longitudinal edges of the roof panels must be 1/2-inch-long (12.7 mm), No. 8 hex-head, self-tapping, self-drilling, stainless steel sheet metal screws complying with ASTM C 1513. The screws must have a nominal shear strength (P_{ss}) of 1000 pounds (4448 N), and a nominal tensile strength (P_{ts}) of 1575 pounds (7006 N), in accordance with a current ICC-ES evaluation report. The screws must connect the top flange of the I-beam splines to the top aluminum facing at each side of the longitudinal joint of adjacent roof panels. Refer to Section 4.2 for screw spacing and distance to panel supports.

4.0 DESIGN AND INSTALLATION
4.1 Design:

Maximum allowable gravity and wind loads, based on strength and deflection considerations, are set forth in Table 1. The loads noted in Table 1 are the allowable total superimposed transverse loads for the roof panels, which must be greater than the applied loads determined in accordance with accepted engineering practice, including

load combinations such as those noted in IBC (*International Building Code*[®]) Section 1605.3. For load combinations using more than one basic load condition, such as roof live load, wind load or snow load, the lesser of the allowable spans for each loading condition included in the load combinations under investigation, shall be used for the allowable panel span.

Use of the roof panel system to resist any other loading conditions, such as axial compression or tension forces on the panels due to horizontal wind loads, or use of the system as a roof diaphragm to resist lateral forces such as seismic or horizontal wind loads, is outside the scope of this report.

4.2 Installation:

The panels must be installed as the roof of a patio cover with the panel length perpendicular to the supporting members and continuous in the direction of the roof slope, without transverse joints. The roof panel longitudinal seam must be located a minimum of 24 inches (608 mm) from the inside face of the wall, parallel to the panel length. To prevent ponding, the panels must be installed at the minimum roof slope noted in Table 1. Supports of the panel and longitudinal spline assembly must provide a minimum 1-inch-wide (25.4 mm) continuous bearing width at support locations, for gravity loads and upward and downward wind loads. As an alternative for wind uplift loads, the panels can be supported by connecting the splines or the panels to the supporting structure with connections designed and detailed to the satisfaction of the code official. Connections of the longitudinal splines to the supporting structure must be substantiated to the satisfaction of the code official.

The longitudinal edges of adjacent panels must be interconnected to the top flange of the splines, with fasteners described in Section 3.2.5 of this report, and located at a maximum spacing of 28 inches (711 mm) and a maximum end distance of 6 inches (152 mm) from the panel supports.

All roof panel edges are encapsulated with a nonstructural aluminum fascia.

5.0 CONDITIONS OF USE

The Super-Foam roof system described in this report complies with, or is a suitable alternative to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 The system shall be limited to use as roof panels of patio covers regulated by Appendix H of the IRC.
- 5.2 Panel fabrication, identification and installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published instructions, this report governs.
- 5.3 Panel connections to the supporting structure shall be designed to resist the applicable loads in accordance with the applicable code.
- 5.4 The remaining portions of the structure are outside the scope of this report and shall be designed and constructed in accordance with the applicable code.
- 5.5 Calculations and drawings demonstrating compliance with this report shall be submitted to the code official. The calculations and drawings must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.6 Recognition under the IRC is limited to installations permitting a nonclassified roof covering under IRC Section R902.1, unless evidence of testing in accordance with ASTM E 108 or UL790 is provided.
- 5.7 The panels are fabricated at the Patio Enclosures, Inc., facility in Macedonia, Ohio, with follow-up inspections by CI Professional Services, Inc. (AA-656).

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated June 2007 (editorially revised April 2008).
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated May 2008, including reports of room fire tests.

7.0 IDENTIFICATION

Each roof panel, and the packaging of the aluminum spline members, is identified by a label bearing the name and address of Patio Enclosures, Inc., the system name (Super-Foam Roof Panel System), the statement "For Use in One- and Two-Family Dwellings Only", the evaluation report number (ESR-1470) and the name of the inspection agency (CI Professional Services, Inc.).

TABLE 1—SUPER-FOAM ROOF SYSTEM ALLOWABLE PANEL SPANS^{1,2,3,4,5}

APPLIED UPLIFT WIND PRESSURE FOR DESIGN (psf)	3.0 INCH - 0.024" - 1.5 pcf EPS - 0.024" Applied Downward Pressure for Design Basic Load Case					
	Patio Live Load		Snow Load			
	10 psf	20 psf	20 psf	30 psf	40 psf	50 psf
15	17'-5"	14'-10"	13'-7"	11'-8"	10'-5"	9'-6"
20	15'-7"	14'-10"	13'-7"	11'-8"	10'-5"	9'-6"
25	14'-3"	14'-3"	13'-7"	11'-8"	10'-5"	9'-6"
30	13'-3"	13'-3"	13'-3"	11'-8"	10'-5"	9'-6"
35	12'-6"	12'-6"	12'-6"	11'-8"	10'-5"	9'-6"
40	11'-10"	11'-10"	11'-10"	11'-8"	10'-5"	9'-6"
APPLIED UPLIFT WIND PRESSURE FOR DESIGN (psf)	4.625 INCH - 0.024" - 1.5 pcf EPS - 0.024" Applied Downward Pressure for Design Basic Load Case					
	Patio Live Load		Snow Load			
	10 psf	20 psf	20 psf	30 psf	40 psf	50 psf
15	19'-0"	19'-0"	19'-0"	14'-3"	12'-6"	11'-2"
20	19'-0"	19'-0"	19'-0"	14'-3"	12'-6"	11'-2"
25	19'-0"	19'-0"	19'-0"	14'-3"	12'-6"	11'-2"
30	17'-9"	17'-9"	17'-9"	14'-3"	12'-6"	11'-2"
35 ⁶	16'-4"	16'-4"	16'-4"	14'-3"	12'-6"	11'-2"
40 ⁷	14'-8"	14'-8"	14'-8"	14'-3" ⁶	12'-6" ⁵	11'-2" ⁵
APPLIED UPLIFT WIND PRESSURE FOR DESIGN (psf)	6.0 INCH - 0.024" - 1.5 pcf EPS - 0.024" Applied Downward Pressure for Design Basic Load Case					
	Patio Live Load		Snow Load			
	10 psf	20 psf	20 psf	30 psf	40 psf	50 psf
15	19'-0"	19'-0"	19'-0"	17'-2"	14'-11"	13'-5"
20	19'-0"	19'-0"	19'-0"	17'-2"	14'-11"	13'-5"
25	19'-0"	19'-0"	19'-0"	17'-2"	14'-11"	13'-5"
30 ⁶	18'-6"	18'-6"	18'-6"	17'-2" ⁵	14'-11" ⁵	13'-5" ⁵
35 ⁷	17'-0"	17'-0"	17'-0"	17'-0"	14'-11" ⁶	13'-5" ⁵
40 ⁷	14'-11"	14'-11"	14'-11"	14'-11"	14'-11"	13'-5" ⁶

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

¹The tabulated panel spans are based on the panels subjected to uniform loading conditions and installed under single span conditions with a maximum cantilevered roof overhang of 24 inches, unless noted otherwise in Footnotes 5, 6 and 7, below. Consideration must be give to nonuniform loads such as those associated with snow drift and buildup and areas of discontinuity for wind loads.

²The tabulated panel spans are based on the lesser of strength limits and deflection limits. The deflection limits are L/120 of the span for gravity loads and L/120 of the span for wind uplift loads. A maximum temperature differential between the two panel skins of 10°F (5.56°C) shall be maintained.

³For use under the IRC, the wind and snow loads must be determined in accordance with IRC Section R301.2. Refer to Section 4.1 for allowable loads corresponding to each applicable load combination.

⁴The minimum roof panel slope must be 1/2 inch/foot. The minimum roof slopes are based on panel deflection only. Increased slopes are required where panel accessories, such as splines or flashing, increase ponding caused by irregularities in the water flow path.

⁵Unless otherwise noted, the maximum eave projection (roof overhang) of the roof panels is 24 inches.

⁶Unless otherwise noted, the maximum eave projection (roof overhang) of the roof panels is 12 inches.

⁷Unless otherwise noted, the maximum eave projection (roof overhang) of the roof panels is 6 inches.