

# ICC-ES Evaluation Report

## ESR-1801

Reissued April 1, 2010

This report is subject to re-examination in one year.

[www.icc-es.org](http://www.icc-es.org) | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

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

**DIVISION: 10—SPECIALTIES**  
**Section: 10530—Protective Covers**

**REPORT HOLDER:**

**TEMO, INC.**  
20400 HALL ROAD  
CLINTON TOWNSHIP, MICHIGAN 48038  
[www.temosunrooms.com](http://www.temosunrooms.com)

**EVALUATION SUBJECT:**

**LAMINATED PATIO COVER ROOF PANELS**

**1.0 EVALUATION SCOPE**

**Compliance with the following code:**

2006 *International Residential Code*®

**Properties evaluated:**

- Structural
- Fire resistance

**2.0 USES**

The Temo, Inc., laminated roof panels, described in this report, are used as structural roof panels of patio covers complying with Appendix H of the IRC.

**3.0 DESCRIPTION**

**3.1 General:**

The Temo, Inc., roof panels are factory-assembled, laminated sandwich panels with aluminum facing material laminated to both faces of an expanded polystyrene (EPS) foam plastic core. The panels have nominal thicknesses of 3, 4<sup>1</sup>/<sub>4</sub> and 6 inches (76, 108 and 152 mm), a width of 4 feet (1219 mm) and a maximum length of 24 feet (7315 mm). See Table 1 for applicable combinations of panel thickness, and aluminum facing thickness. The panels have a longitudinal sidejoint as depicted in Figure 1. Temo, Inc., supplies the cleats to be installed along the longitudinal panel joints, also depicted in Figure 1.

**3.2 Materials:**

**3.2.1 Panel Core:** The core material of the panels is foam plastic insulation boards supplied by manufacturers identified in the Temo, Inc., quality control documentation and recognized in a current ICC-ES evaluation report. The

foam plastic boards have a nominal density of 2.0 pcf (32.0 kg/m<sup>3</sup>), and are Type IX expanded polystyrene (EPS) complying with ASTM C 578. The foam plastic boards have a flame spread index of 25 or less and a maximum smoke-developed index of 450 or less when tested in accordance with ASTM E 84.

**3.2.2 Panel Facings:** The panel facing material is either 3105-H254 aluminum having a nominal base-metal thickness of 0.019 inch (0.48 mm), or 3105-H14 aluminum complying with ASTM B 209 and having a nominal base-metal thickness of 0.031 inch (0.81 mm). The facing materials have minimum yield and tensile strengths of 22.5 ksi (155 MPa) and 25.5 ksi (176 MPa), respectively.

**3.2.3 Panel Adhesive:** The facings are factory-laminated to the panel core with adhesives, described in the approved Temo, Inc., quality control documentation, that are Type II, Class 2, adhesives complying with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05) and recognized in a current ICC-ES evaluation report. The letters (A) and (M) in the panel identification numbers in Table 1 are code for the adhesive used to laminate the panels.

**3.2.4 Cleats:** The cleats supplied by Temo, Inc., for installation along the longitudinal joints of the panels, at both the top and bottom faces of the panel, are extruded from 6063-T5 aluminum complying with ASTM B 221. See Figure 1.

**3.2.5 Fasteners:** Fasteners used to attach the cleats to the roof panels at the jobsite must be No. 8-18 by 1/2-inch-long (12.7 mm), self-tapping, hot-dip galvanized or electrogalvanized steel sheet metal screws complying with ANSI/ASME B 18.6.4.

**4.0 INSTALLATION AND DESIGN**

**4.1 Design:**

For use in allowable stress design, the allowable uniform superimposed loads due to gravity (live or snow) and upward wind loads for the roof panels are as set forth in Table 2. An engineering design in accordance with IRC Section R301.1.3 is required. The tabulated allowable loads must be greater than the applied loads determined in accordance with accepted engineering practice including load combinations, such as those described in 2006 IBC Section 1605.3. The use of the roof panels to resist any other load conditions (such as axial compression or tension forces on the panels due to horizontal wind loads, or use as a roof diaphragm to resist seismic or horizontal-wind loads) is outside the scope of this report.

**4.2 Installation:**

The roof panels must be installed as the roof of the patio cover, with the panel length perpendicular to the supporting members and continuous in the direction of the roof slope, without transverse joints. See Table 2 for the minimum roof slope. The top and bottom cleats must be installed at the longitudinal panel joints. The top cleat is attached to each panel with the fasteners described in Section 3.2.5, spaced at 6 inches (152 mm) on center. The bottom cleat is attached to each panel with the fasteners described in Section 3.2.5, spaced at 24 inches (610 mm) on center. Panel supports must provide a minimum 2-inch-wide (51 mm) continuous bearing width at support points for both gravity and wind uplift loads. As an alternative, to restrain panels subject to wind uplift, the panels must be attached in accordance with Table 2. For installations that provide other methods of panel support or restraint, the effects of the installation method on the panel performance must be substantiated to the satisfaction of the code official. The design of all installation details must be substantiated to the satisfaction of the code official.

**5.0 CONDITIONS OF USE**

The Temo, Inc., laminated patio cover roof panels described in this report comply with, or are suitable alternatives to what is specified in, the code listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 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 installation instructions, this report governs.
- 5.2 The roof panels are limited to use as the roof panels of patio covers regulated under Appendix H of the IRC.
- 5.3 The roof panels are limited to installations where a nonclassified roof covering is permitted.

- 5.4 Panel connections to the supporting structure must be designed in accordance with the applicable code.
- 5.5 The remaining portions of the structure must be designed and constructed in accordance with the applicable code.
- 5.6 Calculations and drawings demonstrating compliance with this report must be submitted to the code official for approval. 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.
- 5.7 The panels are manufactured at the Temo, Inc., facility in Clinton Township, Michigan, under a quality control program with 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 October 2009 (editorially revised April 2008), including reports of transverse and concentrated load tests.
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2009, including a report of a room corner fire test.

**7.0 IDENTIFICATION**

A label must be affixed to each panel that bears the name and address of Temo, Inc., the panel product designation, the evaluation report number (ESR-1801), the name of the inspection agency (CI Professional Services, Inc.) and the statement “For use under the IRC.” The designation (A) or (M), indicating the adhesive type, must appear on the foam plastic core at one end of each panel.

The cleats must be identified by a Temo, Inc., bill of materials enclosed in the cleat packaging.

**TABLE 1—PANEL DESCRIPTION**

PANEL DESIGNATION	PANEL THICKNESS (inches)	FACING BASE-METAL NOMINAL THICKNESS (inch)
T-2I-3-32 (A)	3	0.031
T-2I-3-32 (M)	3	0.031
T-2I-4.25-32 (A)	4 <sup>1</sup> / <sub>4</sub>	0.031
T-2I-4.25-32 (M)	4 <sup>1</sup> / <sub>4</sub>	0.031
T-2I-3-19 (A)	3	0.019
T-2I-4.25-19 (A)	4 <sup>1</sup> / <sub>4</sub>	0.019
T-2I-6-32(A)	6	0.031

For SI: 1 inch = 25.4 mm.

**TABLE 2—ALLOWABLE PANEL SPANS, ROOF SLOPES AND UPLIFT FASTENER SPACING<sup>1</sup>**

<b>T-2I-3-32(A)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	18'-0"	—	14'-9"	—	—	—	—	—	—	—	<sup>3</sup> / <sub>8</sub> " / foot
Wind Uplift	18'-0"	17'-1"	15'-4"	14'-1"	13'-1"	12'-4"	11'-6"	10'-10"	10'-3"	9'-9"	n/a
Snow	—	—	13'-11"	12'-6"	11'-6"	10'-8"	10'-0"	9'-5"	9'-0"	8'-7"	<sup>1</sup> / <sub>2</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	12"	10"	9"	8"	7"	6"	6"	6"	5"	
<b>TR-2I-3-32(M)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	18'-0"	—	14'-9"	—	—	—	—	—	—	—	<sup>3</sup> / <sub>8</sub> " / foot
Wind Uplift	18'-0"	17'-8"	15'-6"	13'-11"	12'-9"	11'-9"	11'-0"	10'-3"	9'-8"	9'-2"	n/a
Snow	—	—	13'-11"	12'-8"	11'-8"	10'-10"	10'-2"	9'-7"	9'-1"	8'-7"	<sup>1</sup> / <sub>2</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	12"	10"	9"	8"	7"	7"	6"	6"	6"	
<b>T-2I-4.25-32(A) and T-2I-4.25-32(M)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	20'-0"	—	18'-3"	—	—	—	—	—	—	—	<sup>3</sup> / <sub>8</sub> " / foot
Wind Uplift	20'-0"	20'-0"	19'-3"	17'-5"	16'-0"	14'-11"	14'-0"	13'-3"	12'-6"	11'-11"	n/a
Snow	—	—	17'-6"	16'-0"	14'-10"	13'-11"	13'-1"	12'-5"	11'-10"	11'-3"	<sup>1</sup> / <sub>2</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	11"	8"	7"	6"	6"	5"	5"	5"	4"	
<b>T-2I-6-32(A)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	23'-0"	—	23'-0"	—	—	—	—	—	—	—	<sup>1</sup> / <sub>4</sub> " / foot
Wind Uplift	23'-0"	23'-0"	23'-0"	22'-2"	20'-2"	18'-7"	17'-4"	16'-4"	15'-6"	14'-9"	n/a
Snow	—	—	20'-8"	18'-8"	17'-1"	15'-11"	14'-11"	14'-1"	13'-5"	12'-10"	<sup>3</sup> / <sub>8</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	10"	7"	6"	5"	5"	4"	4"	4"	4"	
<b>T-2I-3-19(A)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	15'-5"	—	12'-3"	—	—	—	—	—	—	—	<sup>3</sup> / <sub>8</sub> " / foot
Wind Uplift	16'-0"	14'-0"	12'-7"	11'-6"	10'-9"	10'-1"	9'-3"	8'-2"	7'-4"	6'-8"	n/a
Snow	—	—	11'-9"	10'-11"	10'-3"	9'-7"	8'-10"	7'-11"	7'-2"	6'-6"	<sup>1</sup> / <sub>2</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	12"	12"	11"	9"	8"	8"	8"	7"	7"	
<b>T-2I-4.25-19(A)</b>											
Loading Type	Applied Pressure for Design										Minimum Roof Slope <sup>4</sup>
	10 psf	15 psf	20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	
Live	16'-0"	—	14'-7"	—	—	—	—	—	—	—	<sup>3</sup> / <sub>8</sub> " / foot
Wind Uplift	16'-0"	16'-0"	15'-1"	13'-11"	12'-11"	12'-2"	11'-5"	10'-8"	9'-7"	8'-8"	n/a
Snow	—	—	14'-0"	12'-7"	11'-6"	10'-8"	10'-0"	9'-5"	9'-0"	8'-5"	<sup>1</sup> / <sub>2</sub> " / foot
Fastener Spacing <sup>3</sup>	12"	12"	11"	9"	8"	7"	6"	6"	6"	6"	

For **SI**: 1 psf = 47.88 Pa, 1 foot = 304.8 mm, 1 inch = 25.4 mm, 1 inch/foot = 0.083 percent.

<sup>1</sup>The panel spans noted in the table are based on simply supported, single span conditions and uniform loads. Consideration must be given to nonuniform loading, such as that associated with drifting snow and areas of discontinuity for wind loads.

<sup>2</sup>The allowable spans are based on the lesser of strength limits and maximum gravity load deflection of <sup>1</sup>/<sub>120</sub> of the span, or wind uplift load deflection of <sup>1</sup>/<sub>120</sub> of the span.

<sup>3</sup>The fastener spacings noted in this table are for attachment of the panels to underlying supports to resist wind uplift loads with panels installed with a 12-inch maximum eave projection. The fasteners must be used with 2-inch-diameter washers. Analysis of the connection details must be provided with the engineering design associated with the panels' specific installation, and must be submitted to the code official for approval.

<sup>4</sup>The minimum roof slope values noted in the table are based on panel deflection only. Increased roof slopes will be required where panel accessories, such as flashing, can increase water ponding due to irregularities in the water flow path.

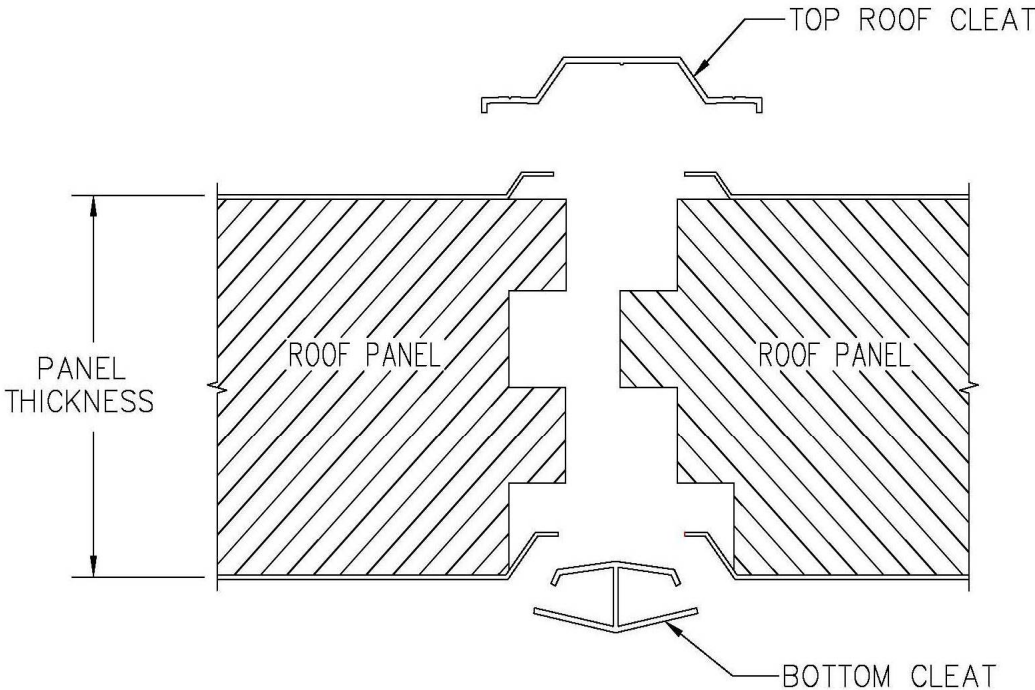


FIGURE 1