



**PARASOLEIL, LLC**  
 6510 W. 91<sup>st</sup> Avenue  
 Westminster, CO 80031  
 (303) 589-4524  
[www.parasoleil.com](http://www.parasoleil.com)

## DECORATIVE PERFORATED METAL PANELS (DPMP)

### CSI Sections:

- 07 42 13 Metal Wall Panels
- 10 71 10 Exterior Sun Control Devices
- 32 31 00 Fences & Gates

### 1.0 RECOGNITION

The Decorative Perforated Metal Panels (DPMP) recognized in this report have been evaluated for use as non-load-bearing interior or exterior cladding, horizontal sun control, or wall panels. The structural performance properties of the panels comply with the intent of the provisions of the following codes and regulations:

- 2018, 2015, 2012, and 2009 International Building Code<sup>®</sup> (IBC)
- 2017 Florida Building Code, Building (FBC, Building) – attached Supplement

### 2.0 LIMITATIONS

Use of the Decorative Perforated Metal Panels (DPMP) recognized in this report is subject to the following limitations:

**2.1** Installation of the panels shall be in accordance with this report, the project details, the manufacturer’s installation procedure, and the applicable code as evaluated by the FEA program results. Where conflicts occur, the more restrictive shall govern.

**2.2.** The capacities of the supporting wall panels, exterior cladding, horizontal sun control, framing members, and connections for the project being evaluated, shall be equal to or greater than the allowable transverse load pressures shown in Table 1 of this report and analyzed by the computer-based finite element analysis (FEA) program. The FEA program results shall be submitted to the building official demonstrating compliance with the Aluminum Design Manual: Part 1 (ADM1), IBC Chapter 16, ASCE/SEI 7 and the provisions of this report.

**2.3** The Decorative Perforated Metal Panel (DPMP) applications not complying with the boundary limitations stated in Sections 3.0 and 4.0 of this report are beyond the scope of this report.

**2.4** Parasoleil engineers shall provide project-specific details and design all connection elements adequately per the design procedures contained in the FEA program model imported into ANSYS Mechanical (Version R19.2 or later).

**2.5** The Decorative Perforated Metal Panel recognized in this report are produced by Parasoleil in Denver, CO.

### 3.0 PRODUCT USE

**3.1 General:** The Decorative Perforated Metal Panels are used as interior or exterior noncombustible non-load-bearing panels used for screening, railing, cladding, and horizontal sun control applications.

**3.2 Design:** The structural design of the Decorative Perforated Metal Panels (DPMP) shall be analyzed using the computer-based finite element analysis (FEA) program. The analysis will compare the designs against the full-scale structural data and shall comply with the Aluminum Design Manual: Part 1 (ADM1), IBC Chapter 16 and ASCE/SEI 7.

The FEA program for the DPMP’s shall maintain calibration to comply with the allowable transverse loads and material properties shown in Table 1 and Figures 1 and 3 of this report. The stress equivalent to the allowable positive transverse loads in Table 1 of this report, shall not exceed the yield strength of 28,000 psi (193 MPa).

**3.2.1 FEA Program Data Inputs:** The FEA program data inputs for analysis will be based on the following:

- The design pressures based on ASCE/SEI 7 transverse loading requirements
- DPMP Input Variables
  - (a) Applicable perforation geometry up to 60 percent open
  - (b) Fastening method including hardware and spacing
  - (c) Material properties and thicknesses within the range of the boundary limitations in Section 4.0 of this report
  - (d) Details relating to the model geometry related to the actual geometry of the panel
  - (e) Structural Shell (SHELL181) elements model in ANSYS Mechanical (Version R19.2 or later) should be consistent with the full-scale structural data of the model. Different types of shell elements outside the scope of this report shall be designed by a registered design professional and approved by the building official

**3.2.2 DPMP FEA Model:** The FEA program model shall be imported into ANSYS Mechanical (Version R19.2 or later) with all the appropriate fasteners, hardware or substructure faces included in the model including boundary conditions specified in Section 4.0 of this report. The report containing the results from the FEA Model shall document compliance for material stress under the allowable loads in Table 1 and demonstrating compliance with the Aluminum Design Manual: Part 1 (ADM1), IBC Chapter 16, ASCE/SEI 7 and the provisions of this report.

*The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.*





**3.3 Installation:** Installation of the Decorative Perforated Metal Panels (DPMP) shall be in accordance with this evaluation report and the manufacturer’s installation procedure. A copy of the evaluation report, the manufacturer’s installation procedure and specifications of the FEA program shall be available at the jobsite for quality control purposes.

**3.3.1** The fastening method of the DPMP to subframe or substructure shall be consistent with those used in the full-scale structural data resulting with the values shown in Table 1 and Figures 1 and 3 of this report and limited to the following options:

- Directly mounted to the subframe using only specific hardware and fastener types included in the full-scale structural data may be used. Any new fasteners or hardware introduced shall be evaluated separately.
- Installation hardware fastening method utilizing factory cut hardware installation holes provided by the manufacturer.

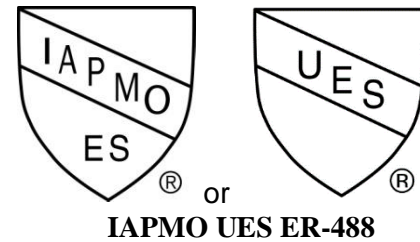
#### 4.0 PRODUCT DESCRIPTION

The structural analysis of the Decorative Perforated Metal Panels (DPMP) can be based on a computer-based FEA program. The analysis will compare the designs against the full-scale structural data using the following boundary limitations:

- The material used for the panels shall be limited to uncoded 5000 series aluminum alloy
- The aluminum panels shall have a thickness ranging from 1/8 -inch and 3/8-inch (3.18 and 9.53 mm)
- The aluminum panels shall be limited to a maximum width up to 5 feet (1.52 m) and lengths up to 10 feet (3.05 m)
- The opening percentage of the panel shall be limited to a range between 0 and 60 percent.
- The minimum distance between openings shall be 1/2 -inch (12.7 mm).
- The average maximum stress resulting from applied pressures shall not exceed the tested yield strength of 28,000 psi (193 MPa).
- The fasteners used to attach to subframe, or substructure shall be consistent with the full-scale structural data as shown in Figure 1 of this report. If the spacing of the fasteners exceeds that of the tested application, it would need to be evaluated separately.
- The edge distance of any hole opening to the panel edge shall be limited to 3/8-inch (9.53 mm).
- The method of restraining the panel shall be indicated and justified based on the installation procedures and calibrated model.

#### 5.0 IDENTIFICATION

An identification label shall be affixed on the product packaging and included on the project specific FEA report that documents compliance with this report. The label shall include the Parasoleil, LLC logo or trademark, the screen, building cladding and horizontal applications; and evaluation report number (ER-488). The identification shall include the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown as follows:



#### 6.0 SUBSTANTIATING DATA

**6.1** Data in accordance with the Aluminum Design Manual, 2015, Section 1.2 “Test Loading and Deflections”.

**6.2** Data in accordance with ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

**6.3** Data in accordance with ASTM B557, Standard Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products.

**6.4** FEA software analysis.

**6.5** Test reports are from laboratories in compliance with ISO/IEC 17025.

#### 7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Decorative Perforated Metal Panels to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.5 of this report under a quality control program with periodic inspection under the surveillance of IAPMO UES.

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)



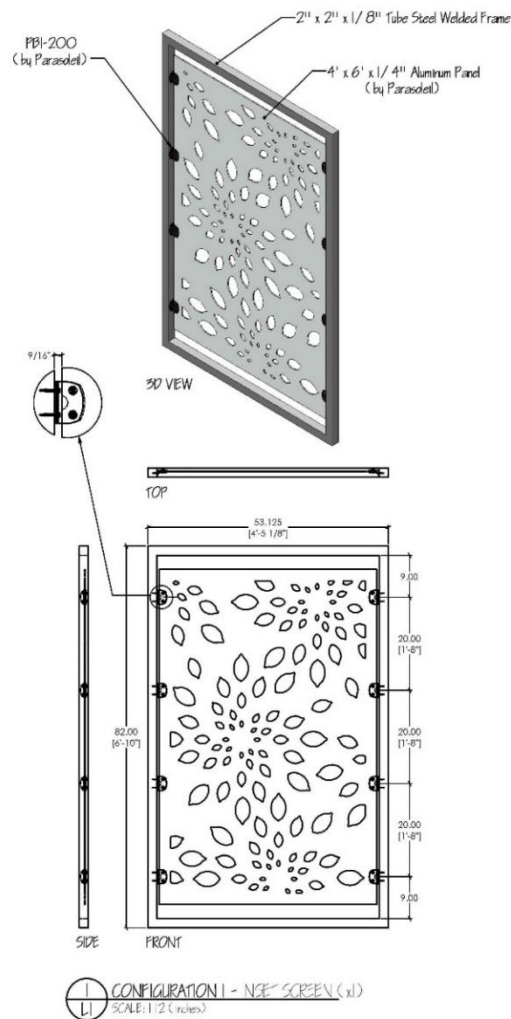
**Table 1 – Allowable Transverse Loads <sup>1</sup>**

Panel Configuration	Maximum Support Spacing (inch) <sup>2</sup>	Allowable Positive Load (psf)	Average Positive Deflection (inch) <sup>2</sup>	Allowable Negative Load (psf)	Average Negative Deflection (inch) <sup>2</sup>
No.1	48	113	2.64	104	2.3
No.3	25	141	0.83	122	0.88

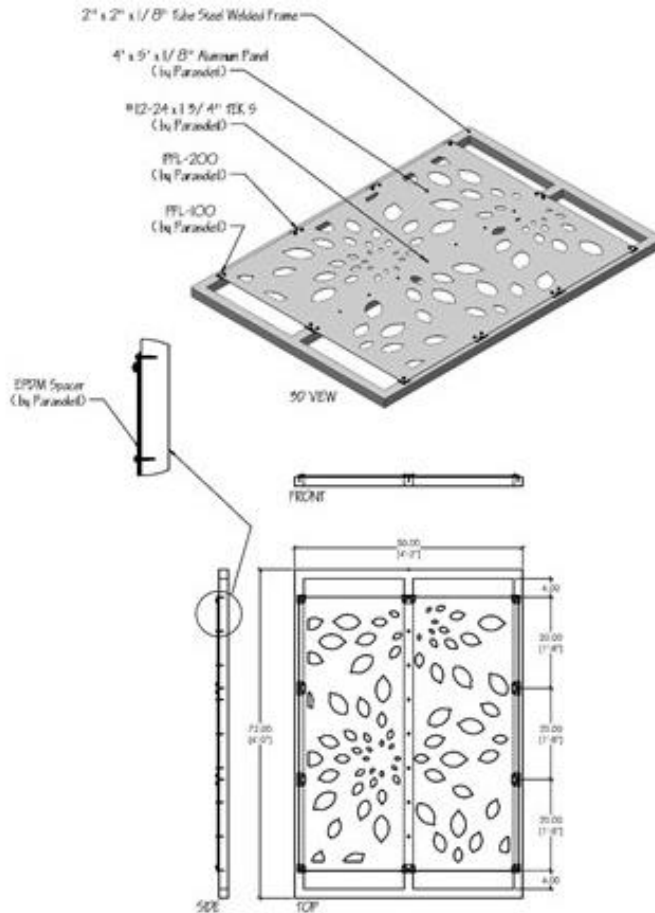
SI: 1 inch = 25.4 mm, 1 psf = 47.9 N/m<sup>2</sup>

1 Maximum allowable positive and negative transverse load capacities determined from tests in accordance with ASTM E330.

2 Maximum deflection at allowable load, at center of span.



**Figure 1**



Configuration #3 Horizontal Application

Figure 3



## FLORIDA SUPPLEMENT

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Commission), to provide oversight and determine that the products are being manufactured as described in this evaluation report to establish continual product performance.

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)

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### 1.0 RECOGNITION

The Decorative Perforated Metal Panels (DPMP) described in ER-488 and this supplement have been evaluated for use as nonload-bearing interior and exterior cladding, horizontal sun control, or wall panels. The panels have been evaluated for structural performance properties, subject to the requirements in ER-488 and this supplement report and comply with the intent of the provisions of the following codes and regulations:

- 2017 Florida Building Code, Building (FBC, Building)

### 2.0 LIMITATIONS

Use of the Decorative Perforated Metal Panels (DPMP) recognized in ER-488 and this report supplement is subject to the following limitations:

**2.1** Load combinations shall be in accordance with Sections 1605.2 or 1605.3 of the FBC-Building, as applicable.

**2.2** For installations in accordance with FBC-Building Section 1403.8 the Decorative Perforated Metal Panels (DPMP), shall provide clearance between the exterior wall panels and final earth grade on the exterior of a building of not less than 6 inches (152 mm) in order to provide for inspection for termite infestation or in accordance with the Exceptions to Section 1403.8 of the FBC, Building, as applicable.

**2.3** Use of the Decorative Perforated Metal Panels (DPMP) for compliance with the high-velocity hurricane zone provisions of the FBC-Building have not been evaluated and is outside the scope of this evaluation report.

**2.4** For products falling under Florida Rule 9N-3.008, verification that the report holder's quality assurance program is audited by a quality assurance entity, approved by the Florida Building Commission (or the building official when the report holder does not possess an approval by the