David F Ramsey, P E – G C
R&S Engineering and Construction Corporation
CA 26032

434 Skinner Boulevard, Suite 105
Dunedin, Fl 34698

102 Braswell Road
Newland, NC 28657

Webpage: www.ramseyengineering.com
727 409-4639 e-mail david@ramseyengineer.com

Professional Engineer Ohio-Florida-N Carolina-S Carolina-Louisiana
General Contractor Class A Florida CGC 010310 North Carolina 44555

PRODUCT EVALUATION REPORT NEXGEN MgO Roof Panels (SIP)

- Product Manufacturer: NEXGEN Building Products, LLC
- Manufacturer Address: 1904 Manatee Avenue West, Suite 300
  Bradenton, Fl 34205
  Phone 855 639-4361
  email address support@nexgenbp.com

- Evaluation entity: David F Ramsey, Professional Engineer 15307
  R&S Engineering and Construction Corporation CA 26032
  434 Skinner Boulevard, Suite 105
  Dunedin, Fl 34698
  Phone 727 409-4639
  email address david@ramseyengineering.com

- Test Laboratory: Construction Research Laboratory, INC
  7600 N. W. 79th Avenue
  Miami, Florida 33166
  Phone 305 592-922 Fax 305 598-3148
  email address crlmiami@bellsout.net

- Product Name: 8" MgO Roof Panel (SIP) fabricated with 8 11/16" thick, EPS foam (Expanded Polystyrene) core with Interior and exterior sheathing of 12 mm (Nominal ½") Magnesium Oxide Board manufactured by Nexgen BP/Maxterra.

SCOPE OF VALUATION:

This Product Evaluation Report is being issued by David F Ramsey, Professional Engineer 15307 President of R&S Engineering and Construction Corporation, in accordance with FAC 61G20-3 and the requirements of the Florida Department of Business and Professional Regulation for Product Evaluation and Quality Assurance for State Approval. The Code Compliance Method being followed is Method 1 d.

The product listed above has been tested and/or evaluated as summarized in this report to show compliance with the 2023 Florida Building Code EIGHTH EDITION and is to the best of our knowledge at least equivalent to that required by the Code, for the purpose intended. Continuing re-evaluation of this product shall be completed as required following pertinent Florida Building Code modifications or revisions.

COMPONENT SPECIFICATIONS: MgO (Magnesium Oxide Board:

A non-combustible (ASTM E136) and tested by ICC Evaluation Service ESR-2880, Adhesive ESR-1023, Magnesium Oxide Backing Panels ESR-5193

POLYSTYRENE:

Description

InsulFoam XV is a high-performance insulation consisting of a superior closed-cell, lightweight and resilient expanded polystyrene (EPS). InsulFoam XV meets or exceeds the requirements of ASTM C578, Type XV, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation. InsulFoam XV has a nominal density of 3.0 lbs./ft^3. In addition, InsulFoam XV offers a long-term stable R-Value and has excellent dimensional stability, compressive strength and water resistance properties.

InsulFoam® XV

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Uses

InsulFoam XV is a high-performance EPS product and is used in numerous applications requiring an insulation or fill material with a high compressive strength.

Construction Applications: InsulFoam XV is used in below-slab, perimeter and plaza deck applications; road-fill, bridge approaches and numerous other geofoam applications; pre-stressed and pre-cast structural concrete panels, siding backer board, building sheathing, and numerous other construction applications.

Roofing Applications: InsulFoam XV is well suited for single ply roof applications employing mechanically fastened or ballasted TPO, PVC, EPDM and CSPE as well as low-sloped built-up, modified bitumen and fully adhered single ply roofs incorporating a cover board or slip sheet. InsulFoam XV can be provided in flat and tapered panels as well as a custom cut flute-fill piece. Please consult local building codes and membrane manufacturers for system requirements.

Advantages

- InsulFoam XV contains no formaldehyde or ozone-depleting CFC's or HCFC's, contains recycled material and is 100% recyclable if ever removed or replaced.
- Designers are well served knowing the product's thermal properties will remain stable over the entire service-life. There is no thermal "drift" so the product is eligible for an Insulfoam 20-year thermal performance warranty.
- The same fundamental EPS chemistry has been in use since the mid-1950s so the actual performance of the product is well known.
- InsulFoam XV does not readily absorb moisture from the environment.
- InsulFoam XV has numerous code approvals. Please contact your local Insulfoam representative for details.

Sizes

InsulFoam XV is typically available in 4' x 4' and 4' x 8' sizes with thickness from 1/4" to 40" and readily available in custom lengths and widths with little or no impact on lead time.

Typical Tested Physical Properties*

Property	Test Method	Value
Density (nom. pcf)	ASTM C303	3.0
C-Value (Conductance) - per inch BTU/(hr•ft²•°F) @ 25 °F @ 40 °F @ 75 °F	ASTM C518 or ASTM C177	0.196 0.198 0.217
R-Value (Resistance) - per inch (hr•ft²•°F)/BTU @ 25 °F @ 40 °F @ 75 °F	ASTM C518 or ASTM C177	5.10 5.05 4.60
Compressive Strength (psi, 10% deformation)	ASTM D1621	60
Flexural Strength (min. psi)	ASTM C203	75
Dimensional Stability (maximum %)	ASTM D2126	2.0
Water Vapor Permeance (max. perm., 1 inch)	ASTM E96	2.5
Water Absorption (max. % vol.)	ASTM C272	2.0
Capillarity	–	none
Flame Spread	ASTM E84	< 20
Smoke Developed	ASTM E84	150-300

*Properties are based on data provided by resin manufacturers, independent test agencies and Insulfoam.

Insulfoam LLC • 6004 N.Westgate, Suite 120 • Tacoma, WA 98406 • USA • Phone: (253) 572-5111 • Toll Free: (800) 248-5995 • www.insulfoam.com

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DESIGN ADHESIVE: ESR-1023

As described in ESR-1023 "Betafuse™ Structural Adhesive are Type II, Class 2, structural adhesive in accordance with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05), The allowable shear stress base on creep is limited to a maximum of 40 psi (276 kPa)."

SUBSTANTIATING DATA:

Test Reports: Tests were performed on the subject product according to the guidelines laid out in ASTM standards as outlined in the Engineering Methodology below. The testing and subsequent reports were completed and/or prepared by Construction Research Laboratory, Inc, 7600 N. W. 79th Avenue, Miami, Florida 33166, phone number 305 592-9222, email crlmiami@bellsouth.net.

The test report conclusions:

- **Roof Mockup: 48”x 84” Resulted in No Impact Fails.**
- **ASTM E1886-02 & E1996-17: Cyclic Wind** **Wall Mockup: 48”x 96”** **DL -267 PSF & -400 PSF**
- **ASTM E330-14/FBC/TAS 202 Wind+** **Wall Mockup: 48”x 96”** **Max Test Load -220 PSF**
- **ASTM E 330-14/FBC/TAS 202 Wind-** **Wall Mockup: 48”x 144”** **Max Test Load -250 PSF**
- **ASTM E330-14/FBC/TAS 202 Wind+** **Wall Mockup: 48’’x 216”** **Max Test Load 280 PSF**
- **ASTM E72-22 Wall Racking Load** **Wall Mockup: 48”x 216”** **Max Test Load 6250 lbs.**

- **Construction Research Laboratory Conclusion on the product.**

CONCLUSION: Following testing specimens were disassembled. No failures were observed in the panels, fastenings or anchorages except as noted in those deliberately tested to failure. This product complies with ASTM E 1886-02 the Standard Specification for Performance of building materials Impacted by Windborne Debris in Hurricanes at Missile Energy Level D for High Velocity Wind Zones. This product was tested in accordance with and meets the requirements to comply with the Florida Building Code 2023, 8th Edition, Section 1609.1.3

Product Installation Instructions: Drawings and instructions prepared, signed, and sealed by David F Ramsey, Florida Professional Engineer 15307, President R&S Engineering and Construction Corporation are included as data in support of this report.

Engineering Methodology: The methodology used to design the test program for this product was based on the results from initial test and performance data used to qualify for the Florida Product Number. These initial results prompted further investigation into the following areas:

- Boundary Conditions: The boundary conditions were changed from the initial configuration in order to better resemble the end conditions that are employed in actual construction details.
- In-Plane Shear Load: Additional testing was completed to verify the behavior of the panels subjected to this load type.
- Vertical Compressive and Tensile Load: Additional testing was completed to verify the behavior of the panels subjected to this load type.

All further testing was conducted according to the guidelines outlined in ASTM E1803 and ASTM E72, including testing for bending, transverse load/racking, compression, and tension.

WIND LOAD RESISTANCE:

The subject wall panels have been designed to resist wind loads as indicated in the pressure test data in the Testing Reports.

IMPACT RESISTANCE:

The subject wall panels were qualified by this testing to meet impact resistance criteria.

INSTALLATION:

The subject product shall be installed in strict compliance with the Installation Instructions included as supporting documentation with this Evaluation Report. All components or connections related to this product shall also be installed accordingly.

This product component shall be of the material specified in the Installation Instructions and verified by the results of the testing, disclosed in the Testing Report. All relevant documents have been included with the product approval application.

LIMITATIONS AND CONDITIONS OF USE:

Use of this product shall be in strict accordance with the Evaluation Report, Installation Instructions, and all other supporting documentation as noted herein. All supporting host structures shall be designed to resist all superimposed loads and shall be of a material listed in each product's respective guidelines.

Individual project usage of this product shall be designed on a site-specific basis by a registered professional engineer. All components that are permanently installed shall be protected against corrosion, contamination and all other such damage at all times. This product meets the requirements of the 8th edition of the Florida Building Code outside the HVHZ.

R&S Engineering and Construction Corporation, CA 26032

David F Ramsey, P E
Florida Engineer 15307dated 09-19-23