

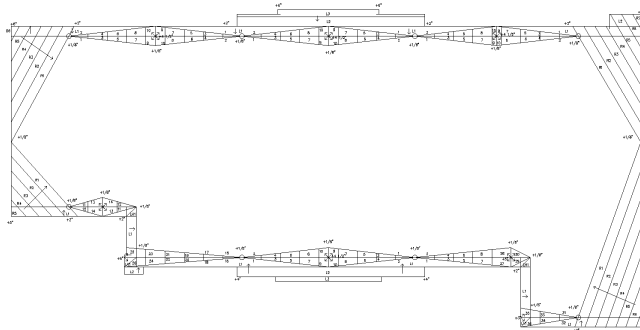
THERMAL FOAM ROOF INSULATION FLAT AND TAPERED

Constant R-Value

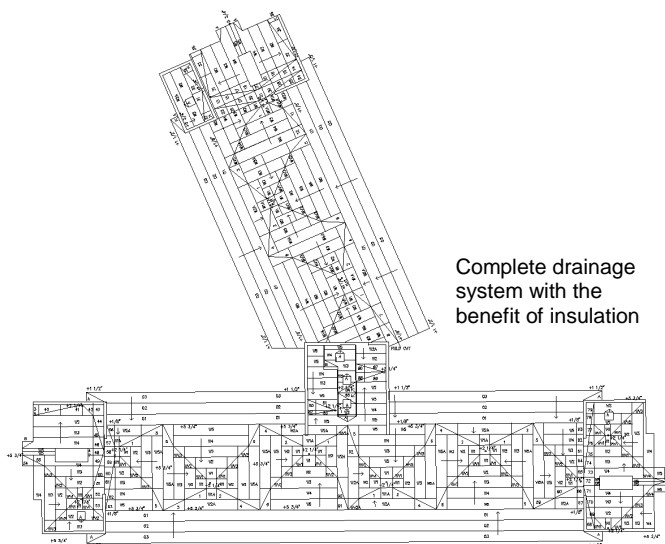


Custom Engineered

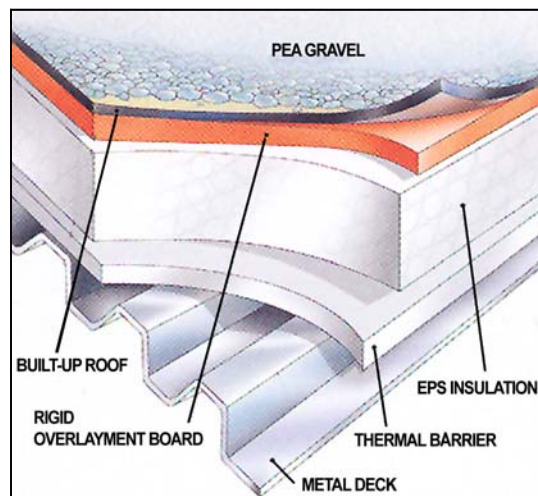
Crickets provide positive drainage



Factory pre-cut Tapered Thermal Foam EPS



Complete drainage system with the benefit of insulation



Thermal Foam EPS Insulation in Roofing Applications

Thermal Foam EPS roof insulation products offer the design versatility to meet a wide range of job conditions and is approved for use under virtually all roofing membranes. Equally suited to new construction and re-roofing applications, Thermal Foam EPS insulation products provide the greatest R-value at the lowest cost in asphaltic built-up and single-ply membrane roofs.

Flat, Tapered, Composite and Flute Fill

Thermal Foam flat EPS board is available in thicknesses to meet today's stringent energy requirements. Providing maximum dimensional stability and high thermal efficiency at a low cost, Thermal Foam EPS insulation is ideal for single-ply membrane systems and economically adds R-value in built-up systems. It may be factory or job-site laminated to structural board, providing greater strength and durability. Thermal Foam Tapered EPS insulation is custom designed for each roof layout providing the slope required for positive drainage. Use Thermal Foam tapered EPS to reduce framing costs and to eliminate ponding often associated with premature roof failure. Thermal Foam Expanded Polystyrene insulation is widely used as flute fills to provide additional dimensional stability to roofing assemblies.

Field Study Highlights¹

Of the 32 existing EPS roofs surveyed - age range from 2 to 15 years - "no wet insulation was found in the EPS or wood fiberboard overlayment".

"EPS insulation can and will perform as a satisfactory element, both mechanically and thermally."

"The moisture content of EPS insulation samples - ranging in age from 6 to 15 years - was found to be very low, i.e., a maximum of 0.04% by volume."

"Test results for R-value of EPS insulation samples taken from roof systems of various ages indicated no deterioration in R-value over time."

Laboratory Study Highlights

- Consistent Performance - "All EPS densities tested in this study can be successfully adhered with asphalt (Type II used in test program) in this temperature range (200F-250F)."
- Water Resistance - "When the interior relative humidity is 80% or less at 70F, with cold exterior conditions, no moisture will occur in the EPS insulation."
- Permanent R-Value - "Results of this testing indicate that EPS insulation will provide long term thermal performance. EPS thermal resistance values (R-values) may be used without adjustment for aging."
- Dimensional Stability - "Moisture appears to have little or no effect on the dimensional stability of EPS insulation."

TECHNICAL DATA

Long Term Insulation Value

R-Value means the resistance to heat flow. The higher the R-value, the greater the resistance to heat flow. Thermal Foam EPS insulation (0.90 pcf) provides a typical R-value of 3.60 per inch at a mean temperature of 75 degrees F and typical R-value of 4.00 per inch at a mean temperature of 40 degrees F. When properly installed and protected from moisture, the R-value of Thermal Foam EPS insulation remains constant. This is because the closed cell structure of Thermal Foam EPS contains only air. The R-value of EPS will not decrease with age. As a result, the thermal resistance or R-value of Thermal Foam EPS may be used without any adjustment for age.

Moisture Resistance

Water vapor transmission through insulation materials is the passage of water through the material in vapor phase. In comparison to other common building material, EPS insulation has moderate water vapor permeability per unit of thickness.

Each roof application should be studied to determine the need for a vapor retarder to control internal condensation. Based on NRCA/MRCA-sponsored studies, vapor retarder placement for EPS insulated roof systems is less critical than for other types of roof insulations.

Temperature Cycling

EPS is able to withstand the rigors of temperature cycling, assuring long-term performance. In a series of tests conducted by the Dynatech Research and Development Co., Cambridge, MA, core specimens removed from existing freezer walls, some as old as 16 years, demonstrate EPS withstands freeze-thaw cycling without loss of structural integrity or other physical properties.

Strength Characteristics

The resilience of Thermal Foam EPS insulation board provides reasonable absorption of building movement without transferring stress to the outer skins at the joints. In most roofing applications, Type I Thermal Foam EPS insulation material provides the dimensional stability and compressive strength necessary to withstand normal roof traffic and equipment weight. If greater rigidity and strength are needed, as a result of design loads, higher density Thermal Foam EPS insulation products are available. For recommendations, contact Thermal Foams, Inc.

Combustibility

Like many construction materials, EPS is combustible. EPS products are manufactured with a flame retardant, however, EPS insulation will burn upon exposure to flame or heat sources, including, but not limited to, open flames, welder's torches, or other sources of heat. EPS insulation should be covered with a thermal barrier or otherwise installed in accordance with applicable building code requirements. It is the responsibility of the purchaser to ensure that EPS insulation is properly handled and stored on the jobsite.

Solvent Attack

EPS is subject to attack by some petroleum-based solvents. Care should be taken to prevent contact between EPS and these solvents and their vapors.



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Application Temperatures

In roof construction requiring hot asphalt, temperatures should not exceed 250 degrees F at the time of direct contact with EPS insulation. Avoid contact between Thermal Foam EPS and high-temperature equipment, such as asphalt kettles and flame sealers.

Installation Exposure

Prolonged exposure to sunlight will cause slight discoloration and surface dusting of Thermal Foam EPS insulation. The insulating properties will not be significantly affected under normal usage. Thermal Foam EPS stored outside should be protected with a light-colored opaque material.

Quality Control and Third Party Agency Evaluations

Thermal Foam EPS is UL Classified in file No. R9699. Underwriters Laboratories (UL) also acts as our independent, third party certification agency for physical properties of our EPS insulation manufactured to meet ASTM C578-01. UL listed EPS roof insulation is noted in Roof Constructions 219, 237, and 374. Thermal Foam EPS roof insulation is FM approved. Consult Thermal Foams, Inc. or the FM approval guide.

Standards Compliance

Thermal Foam EPS insulation is manufactured to meet or exceed the requirements of ASTM C578-01 and applicable building codes.

PROPERTY	UNITS	ASTM TEST	TYPE I	TYPE VIII	TYPE II	TYPE IX
Density	Pcf, minimum	C303	0.90	1.15	1.35	1.80
Thermal Resistance Values (R)	Per inch thickness	C518				
At 25F (-3.9C)			4.20	4.40	4.60	4.80
At 40F (4.4 C)			4.00	4.20	4.40	4.60
At 75F (23.9 C)			3.60	3.80	4.00	4.20
Compressive Resistance 10% Deformation	psi, minimum	D1621	10	13	15	25
Flexural Strength	psi, minimum	C203	25	30	35	50
Water Vapor Permeability	perm-in., maximum	E96	5.0	3.5	3.5	2.0
Water Absorption By Total Immersion	% by Vol Max	C272	4.0	3.0	3.0	2.0

References

¹"Report on Expanded Polystyrene Insulation for Use In Built-Up And Single Ply Roofing Systems", Rene M. Dupuis and Jerome G Dees, August 1984.

"Moisture Absorption and its Effect on Thermal Properties of EPS Insulation for Foundation Applications," Underground Space Center, University of Minnesota, October 1986.

"The Apparent Thermal Conductivity and Thermal Resistance of an Expanded Polystyrene Foam Specimen Removed From a Refrigerated Warehouse", Andre O. Desjarlais, Dynatech Research and Development, March 1979.

C578-01 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation, ASTM International, 2001.

"Development of Experimental Data on Expanded Polystyrene Roofing Insulation Under Simulated Winter Exposure Conditions," R.P. Tye and C.F. Baker, The Energy Materials Testing Laboratory, 1984.

Grand, Kaplan, and Harzell, EPS Executive Summary, pp 86-102, "A Literature Review of Combustion Toxicity of Expanded Polystyrene," SwRI Project NO. 01-8818-507, Southwest Research, May 1986.

Though the information presented in this literature is offered in good faith and believed to be accurate, ALL STATEMENTS AND SUGGESTIONS ARE MADE WITHOUT WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OF FITNESS FOR ANY PURPOSE. The typical values contained herein are properties believed to be representative of all EPS insulation meeting ASTM C578-01 specifications, and were obtained using test specimens prepared in the laboratories of NOVA Chemicals, Inc., Huntsman Corporation, Styrochem International, Inc., and BASF Corporation. Thermal Foams, Inc. or Thermal Foams/Syracuse Inc. should be consulted prior to using Thermal Foam EPS for any and all applications.