ROOFING INSULATION
by Benchmark Foam

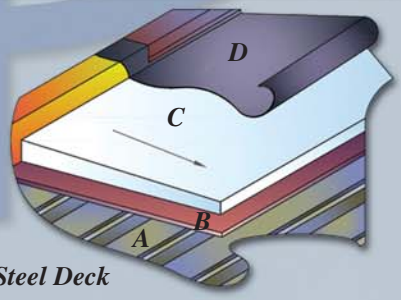
Retain the structural and economic advantages of a flat roof deck and achieve the slopes necessary for drainage with a **Benchmark Foam** tapered roofing insulation system. This cost-effective, environmentally sound, high-quality insulation system provides easy handling during construction and efficient drainage after installation. Benchmark Foam is a Midwestern manufacturer with the only **On-Time Guarantee** in the industry. You can have confidence in our service, quality and value.

BENCHMARK FOAM INC.

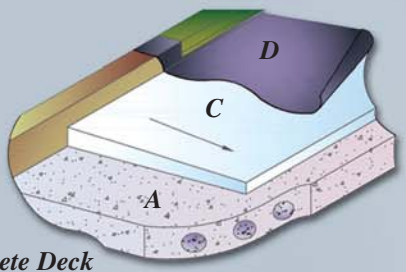
Quick response is our guarantee.

THE BEST COMMERCIAL ROOFING

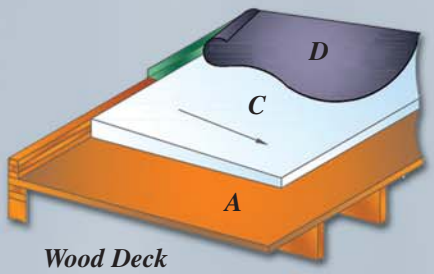
Benchmark Foam's tapered roofing system is the best system you can use for commercial roofing applications. The tapered design provides effective drainage for flat roofs and the high-quality Expanded Polystyrene (EPS) insulation is both easy to handle and offers superb performance. With the custom design and easy-to-follow installation markings and shop drawings, your installation crew can save time and money.



Steel Deck



Concrete Deck



Wood Deck

EPS is not a structural material and must be fully supported on the underside with corrugated steel, concrete or wood decks.

A) Decking Material

B) Thermal barrier (Not required for concrete decks or wood decks using 1/2" sheathing.)

C) Tapered or flat EPS

D) Single-ply roof membrane

CUSTOM-DESIGNED DRAINAGE

Eliminate ponding water in either new or re-roofing applications. Each Benchmark Foam system conforms to design requirements and is custom designed to drain efficiently.

EASY INSTALLATION

The standard 4x4-foot or 4x8-foot insulation boards are easy to handle, are clearly marked according to design drawings and can be easily laid in the predetermined pattern. Benchmark Foam will manufacture your roofing EPS to the specified thickness, so there is no need to build up with "fill" layers.

LOW-COST, QUALITY INSULATION

Benchmark Foam's EPS roofing insulation system costs less than other rigid insulation types. EPS can be manufactured in large sheets and to specific densities and thicknesses, reducing labor costs and speeding installation. Because EPS is made without CFCs, the thermal performance remains stable and permanent, providing the best "cost per R" value while maintaining warranty compliance and meeting the requirements of all membrane manufacturers. Benchmark Foam's EPS provides design flexibility, is moisture resistant and is compatible with all major roofing systems and warranties.

ENVIRONMENTALLY CONSCIOUS

Because caring for the environment is important to us, Benchmark Foam uses no formaldehyde, CFCs, HFCs or HCFCs as blowing agents. You can be confident in the environmental safety of our insulation. Benchmark Foam recycles EPS and accepts used, clean, dry EPS from re-roofing projects to remanufacture into 100 percent recycled products.

ON-TIME GUARANTEE

Benchmark Foam knows that your business depends on our product arriving on time. Our service response is so dependable we back it with Benchmark Foam's On-Time Guarantee. Your product will be shipped and arrive by the agreed-to arrival date or we will discount your invoice 10 percent. We work to accommodate customer needs, giving you confidence when you place an order, even if it needs to be rushed. And we do not have truckload quotas, so no matter how large or small, your order will be shipped on time.

CUSTOMIZED SYSTEM, CUSTOMIZED ACCESSORIES

When you order from Benchmark Foam, we work with your team to customize your roofing system. Each custom-designed Benchmark Foam tapered roofing system comes with everything your crew needs for complete installation.

TAPERED LAYOUT DESIGN SERVICE

Benchmark Foam provides a tapered layout design service for architects, planners and contractors with projects in preliminary or conceptual stages. You provide building dimensions, drain locations and thermal requirements of the proposed roofing system. We help customize your system and submit shop drawings of all tapered insulation projects for your approval before we ship your order.

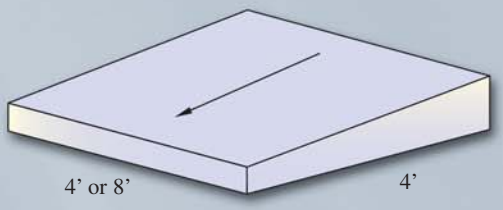
FACTORY-CUT HIPS AND VALLEYS

Benchmark Foam provides 45-degree factory-cut hips or valleys to fit roof corners without waste where a change in roof slope direction is required. The one-piece hip and valley panels further simplify roofing installation.

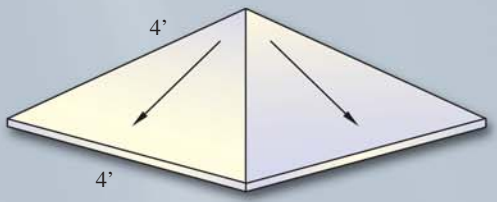
TAPERED CRICKETS AND SADDLES

Benchmark Foam's crickets and saddles are used on structurally sloped roof decks to provide positive drainage to roof scuppers and internal drains, to divert water around rooftop units or obstructions, and to correct differential heights of adjacent roof decks.

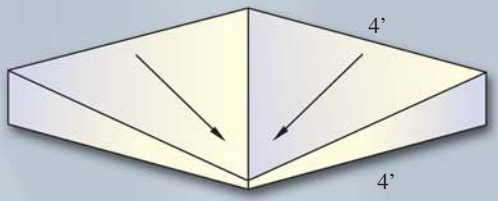
Benchmark Foam's customized tapered roofing system includes specialized design elements like hips, valleys, crickets and saddles.



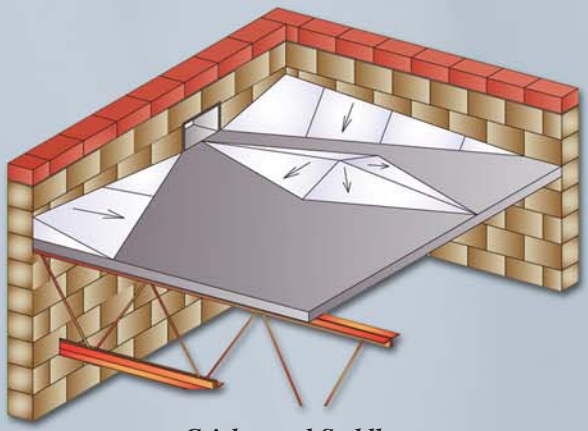
Tapered Design



Hip



Valley



Cricket and Saddle

PHYSICAL PROPERTIES

All types of EPS have specific minimum density requirements. Densities are given in pounds per cubic foot as follows: Type I (1#): .9 pcf; Type II (1 1/2#): 1.35 pcf; Type VIII (1 1/4#): 1.15 pcf; Type IX (2#): 1.8 pcf. See the following table for other physical and thermal values pertaining to specific types of EPS.

TYPICAL PHYSICAL PROPERTIES OF EPS INSULATION

Specification Reference ASTM C578-06				***Type I***	***Type VIII***	***Type II***	***Type IX***
Property		***Units***	***ASTM Test***				
Density, nominal				1#	1 1/4#	1 1/2#	2#
Density, minimum		(pcf)	C303 or D1622	0.90	1.15	1.35	1.80
Thermal Conductivity	at 25F	BTU/(hr.)	C177 or	0.238	0.227	0.217	0.208
KFactor	at 40F	(sq. ft.) (F/in.)	C518	0.250	0.238	0.227	0.217
	*at 75F			0.277	0.263	0.250	0.238
Thermal Resistance	at 25F	at 1 inch		4.20	4.40	4.60	4.80
Values (R)	at 40F	thickness	–	4.00	4.20	4.40	4.60
	*at 75F			3.60	3.80	4.00	4.20
Strength Properties							
Compressive 10% Deformation		psi	D1621	10.0	13.0	15.0	25.0
Flexural		psi	C203	25	32	40	55
Tensile		psi	D1623	16	17	18	23
Shear		psi	D732	18	23	26	33
Shear Modulus		psi	–	280	370	460	600
Modulus of Elasticity		psi	–	180	250	320	460
Moisture Resistance							
WVT (vater vapor transmission)		perm in	E96	2.0-5.0	1.5-3.5	1.0-3.5	0.6-2.0
Absorption (vol.)		%	C272	less than 4.0	less than 3.0	less than 3.0	less than 2.0
Capillarity		–	–	none	none	none	none
Coefficient of Thermal Expansion		in./(in.) (F)	D696	0.000035	0.000035	0.000035	0.000035
Maximum Service Temperature		°F	–				
Long-term				167	167	167	167
Intermittent1				180	180	180	180
Flame Spread		UL®	E84	20	20	20	20
Smoke Develop.		UL®	E84	300	300	300	300

All values based on data available from Flint Hills Resources, NOVA Chemical Company, and BASF Corporation.
*Federal Trade Commission ruling: Use the 75° R-value when calculating R-values for residential construction (fact sheets available upon request).

DESIGN AND INSTALLATION CONSIDERATIONS

How to specify EPS tapered roof systems: Roof insulation shall be Expanded Polystyrene (EPS) as manufactured by Benchmark Foam. EPS "Type" (I, II, VIII, IX), minimum thickness, and average R-value shall be specified according to ASTM C578-06.

Reduce thermal leaks: Apply EPS board in multiple layers with staggered joints to reduce thermal shorts.

Flammability: EPS is combustible and should NOT be exposed to flame or other ignition sources. Current building code requirements should be met for adequate protection or separation from occupied areas.

Ultraviolet exposure: Prolonged exposure of EPS to sunlight will cause a slight discoloration and surface dusting. Insulating properties will not be significantly affected under normal use. Surface dust should be removed before application of adhesives or finishes. For outdoor storage, protect with a light-colored opaque tarp.

Vapor retarders: Each roofing application should be evaluated to determine the need for a vapor retarder to control internal condensation. NRCA/MRCA studies show that vapor retarders are less critical with EPS than other rigid insulation types.

Solvent exposure: EPS is subject to attack by petroleum-based solvents and adhesives, and coal tar pitch products. Care should be taken to prevent EPS direct contact with these products and their vapors. Use only adhesives approved for EPS applications.

Moisture exposure: At the end of each day during installation, temporarily seal all insulation from moisture exposure. Replace any wet insulation or allow it to dry thoroughly before resuming roof application.

BENCHMARK FOAM INC.
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