

August 2003 JLC article - When quality is a more important consideration than price, spray-applied polyurethane foam is emerging as the first choice of a growing number of builders. Although it costs up to several times as much as its competitors – an R-11 application of low-density foam goes for at least \$1.00 per square foot of wall, compared to about 65¢ for spray cellulose, and 25¢ to 55¢ for fiberglass batts – foam eliminates many of the installation headaches associated with fibrous insulating materials.

First, foam has exceptional air-sealing ability. When sprayed or injected into a framing cavity, it sticks tight to the sheathing and framing and rapidly expands to fill every crack and opening in the exterior shell. This is especially valuable around rim joists and other difficult-to-seal areas. Some types of foam are also effective vapor retarders, so it's often possible to omit the separate poly or kraft-paper vapor retarder.

Finally, going with foam can provide added flexibility in designing a framing package: Because dense varieties of foam offer a lot of insulating value per inch of thickness, it's often possible to size studs and rafters based on structural loads rather than the amount of space needed for insulation.

With most common building materials, lower density translates into higher insulating value. That's why fiberglass batts insulate better than wood and wood insulated better than concrete. But the opposite is true of foam. A ½ pound foam such as Icynene, for example, has an R-value of about 3.5 per inch – roughly the same as fiberglass batts or loose-fill cellulose.

A denser, 1.8 pound foam, on the other hand, has an R-value of about 7. But because the 1.8-pound foam contains nearly four times the amount of chemicals per unit of volume as the ½-pound material, the square-foot cost is substantially higher.

***Tiny bubbles.*** Dense foams have what's known as a closed-cell structure, which means that the gas bubbles that form during the application process remain permanently locked into the cured foam. The result is something like a three-dimensional bubble wrap with extremely tiny bubbles. Because there are no interconnections between individual bubbles, the foam absorbs little water and also resists the passage of water vapor. According to most building codes, a vapor retarder must have a perm rating of less than 1.0, and some dense foams meet this standard.

***Trading places.*** Proponents of foam claim that it's an ideal insulating material for mixed climates, where the warm and cold sides of the building envelope reverse during the year. During the heating season, the vapor retarder belongs on the inside of the wall, but when the air conditioning kicks on during the summer, it belongs on the outside. This is a practical impossibility with permeable insulating materials. But because foam is uniformly solid, it resists the passage of vapor equally well in either direction.

## Foam Manufacturers

Manufacturer	Product	Density	R-Value Per Inch	Phone	Website
<b>Corbond Corporation</b>	Corbond II	1.8	7.3	888/949-9089	<a href="http://www.corbond.com">www.corbond.com</a>
<b>Demilec</b>	Heat Lok 217-4	1.8	7.0	450/437-0123	<a href="http://www.demilec.com">www.demilec.com</a>
	Sealection 500	0.5	3.8		
<b>Foam Enterprises</b>	Comfort Foam	1.7	7	800/796-9743	<a href="http://www.comfortfoam.com">www.comfortfoam.com</a>
<b>FOAM-TECH</b>	Supergreen Foam	2.2-2.5	7	802/333-4333	<a href="http://www.foam-tech.com">www.foam-tech.com</a>
<b>Bio-Baed Systems, LLC</b>	GSC Biobase 500	0.5	3.7	479/246-9520	<a href="http://www.gscsite.com">www.gscsite.com</a>
	GSC Biobase 1700	1.7	6.8		
<b>HealtySeal</b>	HealthySeal	0.5	3.8	800/769-3626	<a href="http://www.healthyseal.com">www.healthyseal.com</a>
<b>Icynene Inc. North Carolina Foam Industries</b>	Icynene	0.5	3.6	888/946-7325	<a href="http://www.icynene.com">www.icynene.com</a>
	NCFI 2020 plus	1.7-2.0	6.7-7.0	800/346-8229	<a href="http://www.ncfi.com">www.ncfi.com</a>
	NCFI Sealite	0.5	3.5		
<b>Resin Technology Division</b>	Permax RT-2041	2	6.5	800/729-0795	<a href="http://www.permax.com">www.permax.com</a>
	RT -5090	0.5	3.4		