



EPS VS POLYISO

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Benefits of EPS Roof Insulation

The increase in use of EPS as a roof insulation over the past several years has to do with its cost and installation advantages, combined with its stable and long-term performance.

Cost & R-Value Warranty Analysis:

Insulation	R-25 Thickness	R-25 Cost* Square foot	Warranty (% of Published R-Value)	Warranty Term
Type II EPS	5.50"	\$1.15/SF	100%	20 Years
Type 2 ISO	5.50"	\$1.70/SF	80%	10 Years
Type IV XPS	5.50"	\$1.70/SF	90%	15 Years

*As of March 2011. Subject to current & location pricing.

There is a significant cost savings to use EPS instead of Polyiso or XPS. Architects and building owners can then consider spending some of these cost savings on a thicker membrane or a coverboard – both upgrades would improve the performance and extend the life of the roof.

	TYPE II EPS	TYPE 2 Polyisocyanurate
Density	1.5 pcf	2.0 pcf
Compressive Strength	15 psi	20 psi
R-value per inch	4.6	5.0
Cost per BF(flat)*	\$0.20	\$0.32
Cost per BF (taper)*	\$0.215	\$0.43

Other Advantages of EPS over ISO

Tapered EPS roof insulation is particularly appealing because the installation is faster due to fewer pieces and less cutting. In addition there is less jobsite waste. Polyiso is manufactured in limited thicknesses, therefore when it is installed in a tapered system, multiple layers of polyiso must be used to achieve the same taper thickness as one piece of EPS.



In The NRCA Roofing Manual: Membrane Roof Systems – 2011, NRCA updated its design R-value recommendations for Polyiso, taking into account Polyiso’s loss of R-value as the material voluntarily emits low conductance gas after it is manufactured.

Confusion has existed over the years as to the actual in service R-value of Polyiso (ISO) when used as insulation in roof systems. Polyiso manufacturers have advertised a calculated R-value, which may be inflated as explained below. After the initial point of manufacture, Polyiso contains some of the low conductance gas used during the extruding process. However, this gas is only present in the material temporarily. Over a short period of time the gas emits from the material (off-gasses) leaving air as the insulating medium. The end result is that Polyiso has the same R-value per inch as other rigid foam insulations at similar densities.

The advertised R value of EPS is not inflated which is why EPS retains 100% of its published R-value indefinitely and why the R-value warranty for EPS is 100% of published R-value for 20 years. In comparison, the Polyiso warranty is only for 80% of the published R-value for 10 years. Building owners who are paying the energy bills and design professionals who size HVAC equipment should be aware of this very important information. EPS manufacturers are pleased with the new recommendations from NRCA.

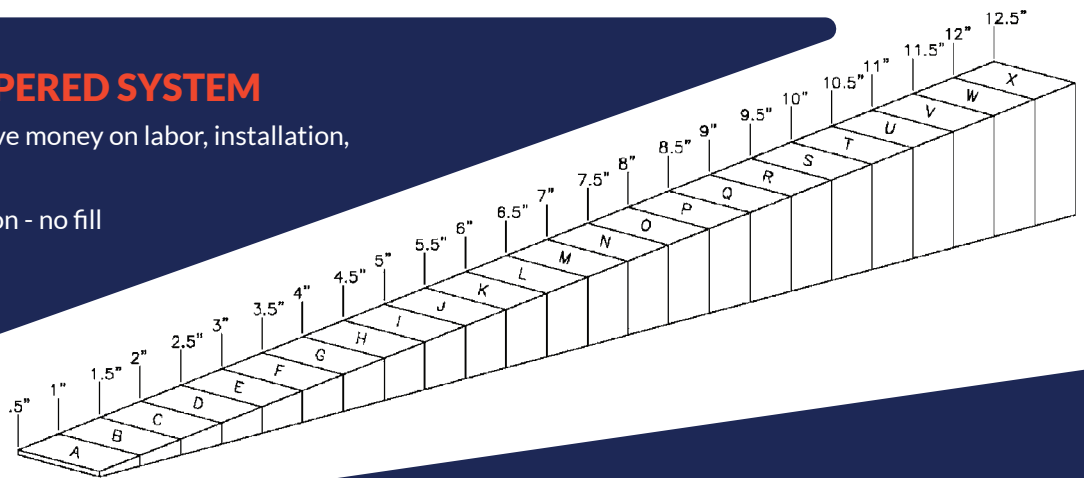
In December 2010, Professional Roofing.net published an article written by Mark S. Graham, the NRCA’s Associate Executive Director of Technical Services. Graham makes clear the issue of changing R-values: “In 2009, NRCA conducted R-value testing at various temperatures.” “NRCA’s testing of polyisocyanurate insulation at 25F, 40F, 75F and 110F showed actual R-values less than LTRR values.” Graham continues, “Although the LTRR method of R-value determination and reporting may be appropriate for laboratory analysis, research comparison and procurement purposes, NRCA does not consider LTRR use to be appropriate for roof system design purposes when actual in-service R-value can be an important aspect of roof system performance.”

NRCA’s 2011 manual recommends designers using polyisocyanurate insulation determine thermal insulation requirements using an in-service R-value of 5.0 per inch thickness in heating conditions and 5.6 per inch thickness in cooling conditions. NRCA also recommends designers specify polyisocyanurate by its desired thickness – not its R-value – to avoid possible confusion during procurement.

POLYMOLDING EPS TAPERED SYSTEM

Use Poly Tapered Insulation and save money on labor, installation, adhesives and material costs.

- ◆ 0-36” in a single layer application - no fill pieces needed
- ◆ No limitations on slope



TYPICAL POLYISO TAPERED SYSTEM

Due to the limitations on slope and thickness, typical Polyiso Tapered Systems are comprised of multiple layers of fill and sloped panels. When comparing this system to an Insulation EPS Tapered System the differences are:

- ◆ Less expensive fill material
- ◆ Fewer installed panels
- ◆ Less complex system
- ◆ Labor, material and adhesive savings

