

# Study Highlights Dramatic First Cost Advantage of Polyiso Roof Insulation

Savings Between \$40,000 and \$146,000 Compared to Extruded and Expanded Roof Insulation Products

## PIMA Technical Bulletin #111

*Polyiso insulation presents many superior features that designers need when specifying insulation for use in roof systems:*

- Quality Mark<sup>SM</sup> Certified LTRR-values
- Highest thermal performance available
- Excellent fire test performance
- Dimensional stability
- Superior compressive strength
- Moisture resistance
- Extensive building code approvals
- Zero ozone depletion potential
- Negligible global warming potential
- Cost effective
- Preferred insurance ratings
- Recycled content
- Compatible with most roofing system

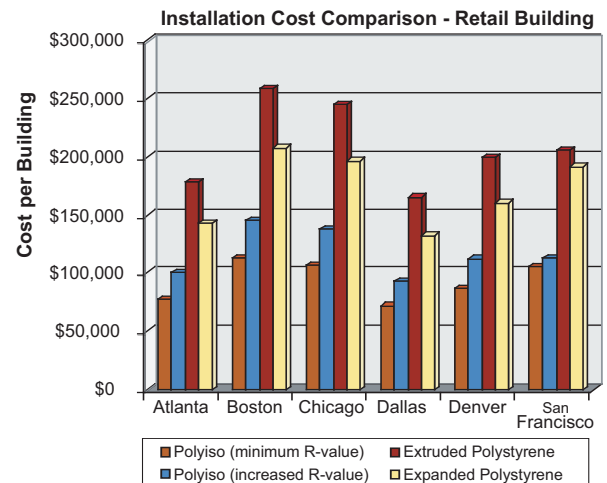
*PIMA and polyiso products have received many environmental awards. These include an honorable mention in the Sustainable Buildings Industry Council's (SBIC) 2003 "Best Practice" Sustainability Awards Program and the U.S. EPA's Climate Protection Award for the association's leadership in promoting energy efficiency and climate protection. The EPA also awarded PIMA and its members the Stratospheric Ozone Protection Award for "leadership in CFC phase-out in polyiso insulation and in recognition of exceptional contributions to global environmental protection."*



A study by the Energy Service Provider Group (ESPG) analyzed the cost to insulate the roofs of standard retail and elementary school buildings. The study shows that **polyiso insulation can save tens of thousands of dollars in installed costs** when compared to other roof insulation materials. The study additionally illustrates that a roof system using additional polyiso, **exceeding the standard ASHRAE R-value requirements, is still more affordable to install** than minimum levels of extruded and expanded polystyrene insulation products, while offering increased energy efficiency.

*The Retail Building Study with **Minimum R-values** Showed Installed Cost Savings of:*

- **\$93,000 to \$146,000** when polyiso is used instead of extruded polystyrene
- **\$60,000 to \$95,000** when polyiso is used instead of expanded polystyrene.

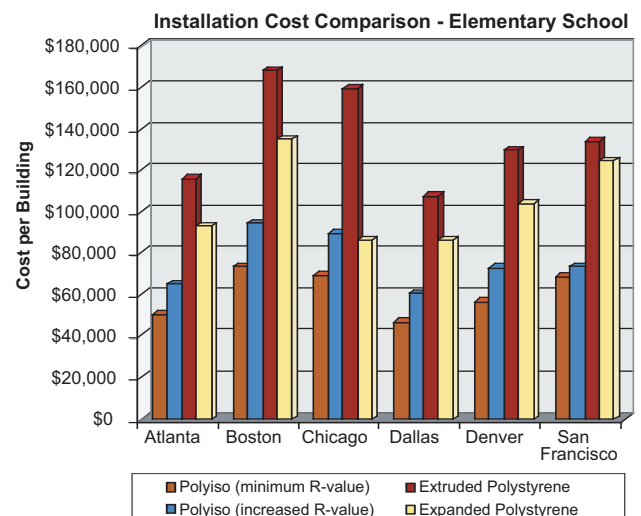


*The Retail Building Study with **Increased Polyiso** Showed Installed Cost Savings of:*

- **\$72,000 to \$113,000** when higher levels of polyiso are used instead of standard levels of extruded polystyrene
- **\$40,000 to \$79,000** when higher levels of polyiso are used instead of standard levels of expanded polystyrene.

*The Elementary School Study with **Minimum R-values** Showed Installed Cost Savings of:*

- **\$65,000 to \$95,000** when polyiso is used instead of extruded polystyrene



***This study illustrates why polyiso remains the leading insulation product on the market and the preferred choice for specifiers, architects and contractors.***

- **\$39,000 to \$62,000** when polyiso is used instead of expanded polystyrene

*The Elementary School Study with **Increased Polyiso** Showed Installed Cost Savings of:*

- **\$47,000 to 73,000** when increased levels of polyiso are used instead of minimum levels of extruded polystyrene
- **\$27,000 to \$51,000** when increased levels of polyiso are used instead of minimum levels of expanded polystyrene.

## **The Study**

The Energy Services Provider Group (ESPG) in Baltimore, Maryland conducted energy simulations in six different U.S. cities to determine the comparable economic effects associated with replacing expanded and extruded polystyrene roof insulation with polyiso roof insulation.

A computer model compared the costs of insulating typical elementary schools and retail strip malls in six U.S. cities: Atlanta, Boston, Chicago, Dallas, Denver, and San Francisco. The study examined the costs of installing polyiso, extruded polystyrene, and expanded polystyrene to meet minimum ASHRAE 90.1 compliance standards. (The ASHRAE 90.1 R-value standard for Atlanta, Boston, Chicago, Dallas, and Denver is 15. The minimum R-value for San Francisco is 10.) The research also compared the cost to install an extra inch of polyiso – for an increased R-value – to the cost to install the minimum R-value of extruded and expanded polystyrene.

The study defined the retail building as a single story, strip shopping mall structure of 100,000 square feet with 30% glazing and a two to five length/width ratio. During occupied periods the structure was cooled to 78 °F (summer), 72 °F (winter) and 90 °F (summer), 55 °F (winter) during unoccupied periods. Lighting, including display lighting, was set to 1.9 watts per square foot, per ASHRAE 90.1 standards for retail spaces. The analysis contains two distinct comparisons, which are as follows:

1. Comparison of the minimum thicknesses of polyisocyanurate and extruded and expanded polystyrene insulation complying with the ASHRAE 90.1 standard (R-15 continuous insulation above the roof decking in Atlanta, Boston, Chicago, Dallas, and Denver. R-10 for San Francisco.)
2. Increased Polyisocyanurate insulation thickness (1" increase over the minimum required) compared to the minimum extruded and expanded polystyrene insulation.

For both comparisons, a 1/2" layer of gypsum board was added to the roof structure beneath the polystyrene products in order to attain FM-4450 compliance.

The study defined the typical elementary school as a single story 65,000 square foot structure with 30% glazing and a two to five length/width ratio. During occupied periods the structure was cooled to 75 °F (summer), 72 °F (winter) and 90 °F (summer), 60 °F (winter) during unoccupied periods. The analysis contains two distinct comparisons, which are as follows:

1. Comparison of the minimum thicknesses of polyisocyanurate and extruded and expanded polystyrene insulation complying with the ASHRAE 90.1

standard (R-15 continuous insulation above the roof decking in Atlanta, Boston, Chicago, Dallas, and Denver. R-10 for San Francisco.)

2. Increased polyisocyanurate insulation thickness (1" increase over the minimum required) compared to the minimum extruded and expanded polystyrene insulation.

For both comparisons, a 1/2" layer of gypsum board has been added to the roof structure beneath the polystyrene product in order to attain FM-4450 compliance.

## **PIMA**

*As an award-winning association, PIMA has been a leader of programs and supporter of legislation, playing an important role in a variety of public initiatives including:*

- *Education: PIMA publishes technical bulletins and other educational materials to increase the building industry's understanding of product benefits.*
- *Product Development: PIMA, in partnership with other organizations, has performed joint research and development of standards and product improvements.*
- *Recognized Leadership: PIMA is both a national and international advocate of energy efficiency programs. PIMA members and staff serve in leadership roles in key energy efficiency advocacy organizations, and PIMA staff have served in advisory roles to key governmental agencies on issues ranging from ozone depletion to climate change.*
- *Legislative Support: PIMA has been a tireless advocate for enhanced state energy codes and other government policies that motivate building owners and contractors to heighten building envelope performance and has strongly supported legislative policy to encourage federal tax incentives for energy efficient commercial buildings.*
- *Partnering for a sustainable future: PIMA works with representatives from all sectors of the building industry and a variety of trade organizations and environmental advocates to support policies that promote safe, cost-effective, sustainable, and energy-efficient construction.*

For more information visit [www.polyiso.org](http://www.polyiso.org) or [www.pima.org](http://www.pima.org).



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