

POLYISO PERFORMS AGAIN: NEW STUDY SHOWS SIGNIFICANT ENERGY AND CONSTRUCTION SAVINGS

Polyisocyanurate (polyiso) roof insulation continues to be a cost-effective insulation product delivering dependable year after year energy efficiency benefits, excellent LTTR-value, and superior performance in fire tests. In fact, polyiso roof insulation is the insulation of choice in 70% of all new roof construction and at least 50% of re-roofing applications. A new study released by the Polyisocyanurate Insulation Manufacturers Association shows that increasing the thickness of polyiso roof insulation significantly reduces energy costs while providing a positive rate of return on the cost of installation.

THE STUDY

The Energy Services Provider Group and EBL Engineers, independent energy analysis firms, performed two case studies to assess the economic and environmental effect of using additional thicknesses of polyiso insulation on a roof system, over the minimum code requirement, in two types of facilities: a retail building and an elementary school. Building energy costs were calculated for structures in six U.S. cities: Atlanta, Boston, Chicago, Dallas, Denver and Los Angeles.

THE METHODOLOGY

A computer model for each facility was built using a statistical database of 25 years of energy simulations. Additionally, the current ASHRAE 90.1 – 2001 standards for roof insulation were used as the baseline for the minimum insulation requirements.

RETAIL BUILDINGS

The computer model defined a typical retail building as a single story, 100,000 square foot structure (two to five length/width ratio) with 30% glazing. The building was cooled to 78° F in the summer and 72° F in the winter. Unoccupied temperatures were maintained at 90° F in summer and 55° F in winter. The polyisocyanurate insulation thermal resistance values used for this study represent the Long Term Thermal Resistance (LTTR) values, which equates to an R-6 per inch of insulation. Due to the current fluctuations in the gas market, a price of \$1/therm for all simulations was used. Construction cost data was from the 2004 RS MEANS *Building Construction Cost Data* reference publication.

The Results

In each city, except for Los Angeles, the ASHRAE-specified minimum insulation value equates to 2.5" of polyiso roof insulation. In Los Angeles, the ASHRAE-specified minimum insulation value equates to 2" of polyiso roof insulation. Using this baseline case, the study found that increasing the thickness by 1" or more:

- Provides a significant rate of return to users for the financial investment of installing additional polyiso insulation;
- Reduces the costs to facilities on average per year; and
- Reduces CO₂ emissions by thousands of pounds, SO₂ emissions by thousands of grams, and NO_x emissions by thousands of grams per year.

The study demonstrated that polyiso insulation provided significant energy and construction savings while reducing the impact on the environment.

Retail Building				
City	ASHRAE 90.1-2001	Thickness of polyiso in inches Energy Cost Savings/IRR % Internal Rate of Return		
Atlanta	R-15, 2.5"	3" \$1,601/7.1	3.5" \$3,007/14	4.8" \$5,155/7.1
Boston	R-15, 2.5"	3" \$2,660/10.9	3.5" \$4,639/17.9	4.8" \$8,210/10.3
Chicago	R-15, 2.5"	3" \$3,273/14.3	3.5" \$5,592/22.2	4.8" \$9,774/13.2
Dallas	R-15, 2.5"	3" \$1,451/6.1	3.5" \$2,537/11.7	4.8" \$4,158/4.8
Denver	R-15, 2.5"	3" \$2,433/12.2	3.5" \$4,078/18.9	4.8" \$7,397/11.3
Los Angeles	R-10, 2"	2.5" \$538/14.6	3.5" \$1,249/1.2	4.8" \$1,571/>0.0

ELEMENTARY SCHOOL

The computer model defined the typical elementary school as a single-story 65,000 square-foot structure (two to five length/width ratio) with 30% glazing. The structure was cooled to 75° F in the summer, and heated to 72° F in the winter. Unoccupied temperatures were maintained at 90° F in the summer and 60° F in the winter. The polyisocyanurate insulation thermal resistance values used for this study represent the Long Term Thermal Resistance (LTTR) values, which equate to an R-6 per inch of insulation. Due to the current fluctuations in the gas market, a price of \$1/therm for all simulations was used. Construction cost data was from the 2004 RS MEANS *Building Construction Cost Data* reference publication.

The Results

In each city, except for Los Angeles, the ASHRAE-specified minimum insulation value equates to 2.5" of polyiso roof insulation. In Los Angeles, the ASHRAE-specified minimum insulation value equates to 2" of polyiso roof insulation. The study concluded that the environmental impact of the energy savings in elementary school equates to significant reductions in CO₂ emissions, SO₂ emissions and NO_x emissions. Although the overall energy savings for school buildings is somewhat less than the savings for retail buildings (due to school being unoccupied for longer periods of time in the summer months), the savings in operating costs and energy use are still significant as are the rates of return on investment.

School Building

City	ASHRAE 90.1-2001	Thickness of polyiso in inches		
		Energy Cost Savings/IRR % Internal Rate of Return		
Atlanta	R-15, 2.5"	3" \$727/3.5	3.5" \$1,299/8.7	4.8" \$2,291/3.2
Boston	R-15, 2.5"	3" \$1,358/8.1	3.5" \$2,229/13.7	4.8" \$3,919/6.8
Chicago	R-15, 2.5"	3" \$1,329/8.3	3.5" \$2,585/16.1	4.8" \$4,997/10.0
Dallas	R-15, 2.5"	3" \$592/1.6	3.5" \$1,013/6	4.8" \$1,758/.9
Denver	R-15, 2.5"	3" \$854/5.1	3.5" \$1,728/12.3	4.8" \$3,116/6.3
Los Angeles	R-10, 2"	2.5" \$378/15.8	3.5" \$920/2.4	4.8" \$1,312/>0.0

PIMA is the national trade organization that advances the use of polyiso insulation, one of the nation's most widely used and cost-effective insulation products. PIMA's membership consists of manufacturers and marketers of polyiso insulation, as well as suppliers to the industry.

PIMA

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Insulation Manufacturers
Association

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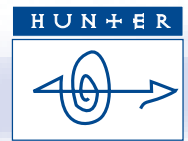
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