PIMA Technical Bulletin #502

The R-value Advantage of HD Polyiso Cover Boards

About Polyiso Insulation

Polyiso is a rigid foam insulation used in more than 70% of commercial roof construction and offers a continuous insulation solution for commercial and residential wall assemblies. As one of North America's most widely used and readily available building products, Polyiso is a cost-effective insulation option for reducing building energy use and improving the overall service-life of roofs and walls.

The benefits of using Polyiso include:

- High R-value per inch of thickness
- Excellent fire test performance
- Extensive building code approvals
- Cost-effective continuous insulation (ci) solution
- Compatible with most roof and wall systems
- Dimensional stability
- Compressive strength
- Moisture resistance
- Thinner walls and roofs with shorter fasteners
- Long service life
- Preferred insurance ratings
- Virtually no global warming potential
- Zero ozone depletion potential
- Recyclable through reuse
- Recycled content (amount varies by product)
- Regional materials (nationwide production network)

POLYISO

Surround yourself with the best.

Understanding R-value and Roof Cover Boards

High-density (HD) polyiso cover boards combine protection and thermal resistance in a single product. Unlike traditional gypsum cover board materials that provide minimal resistance to heat transfer when used in a roof system, HD polyiso cover boards are a rated insulating material and **provide an R-value of R-2.5 at the typical thickness of 0.5-inch.** This performance can be combined with polyiso roof insulation boards to meet the energy code's prescriptive minimum R-values for roof assemblies with insulation installed entirely above deck (IEAD).

Image 1. HD polyiso cover board with coated glass facer. Image courtesy of Atlas Roofing Corporation.

The additional R-value can be especially important for roof replacement scenarios where existing rooftop conditions present height limitations for increasing insulation levels. In this scenario, maximizing the R-value of each component (insulation and cover board) can deliver an energy-efficient roof system in a thinner profile. Manufacturers may also provide composite products that deliver an HD polyiso cover board and insulation board in a single product, reducing install time and costs when compared to installing multiple products.

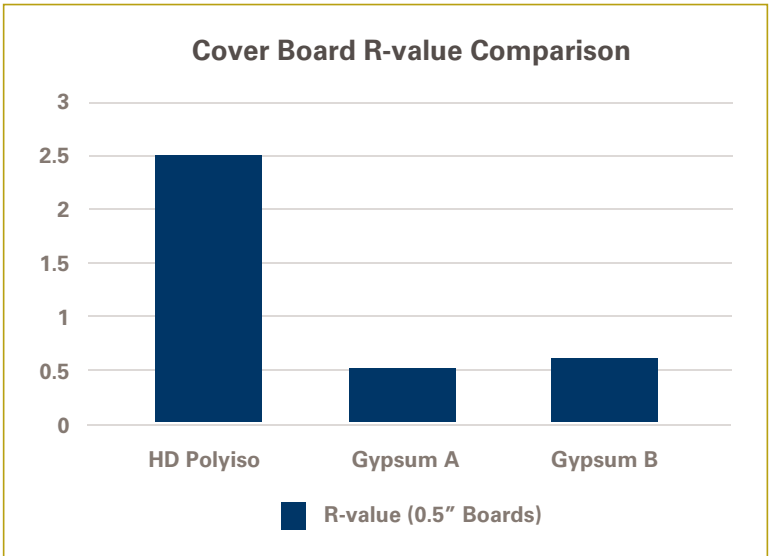


Figure 1. Comparison of R-values for cover board products (0.5-inch-thick boards).

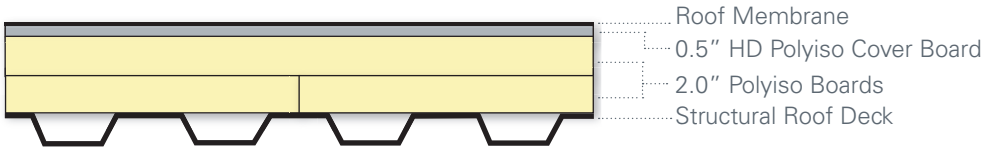
Energy Code Compliance with HD Polyiso Cover Boards

Under current versions of the International Energy Conservation Code and ASHRAE Standard 90.1, roof assemblies with insulation installed entirely above deck (IEAD) are required to meet minimum continuous insulation requirements. The minimum insulation requirements apply to both new construction and roof replacement projects on existing buildings. For roof replacement projects, maximizing the R-value per inch can be critical when existing rooftop conditions present thickness limitations.

Image 2. HD polyiso cover board installation. Image courtesy of GAF.

Minimum R-value requirements for roof assemblies typically range from R-25 to R-35 depending on the climate zone. The assembly configurations below demonstrate how HD polyiso cover boards can be combined with polyiso roof insulation to meet these minimum energy code requirements. Figures 2a-2c also include the thickness savings when HD polyiso cover boards are installed compared to assemblies that use insulation with a traditional gypsum cover board to meet the applicable energy code requirements.

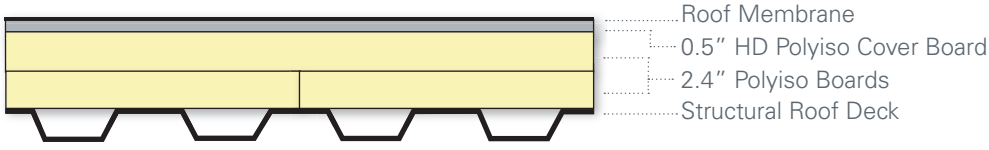
R-25ci Roof Assembly



Two layers of 2.0" polyiso	R-22.8
0.5" HD polyiso cover board	R-2.5
Total R-value	**R-25.3**
Total Thickness	**4.5"**
Thickness (Savings)	(0.4")

Figure 2a. Meeting minimum energy code R-value requirements for roof assemblies with IEAD and HD polyiso cover board.

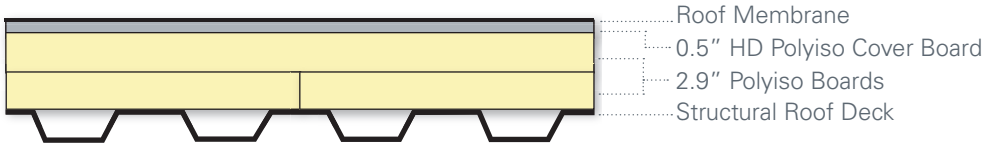
R-30ci Roof Assembly



Two layers of 2.4" polyiso	R-27.6
0.5" HD polyiso cover board	R-2.5
Total R-value	**R-30.1**
Total Thickness	**5.3"**
Thickness (Savings)	(0.4")

Figure 2b. Meeting minimum energy code R-value requirements for roof assemblies with IEAD and HD polyiso cover board.

R-35ci Roof Assembly



Two layers of 2.9" polyiso	R-33.6
0.5" HD polyiso cover board	R-2.5
Total R-value	**R-36.1**
Total Thickness	**6.3"**
Thickness (Savings)	(0.4")

Figure 2c. Meeting minimum energy code R-value requirements for roof assemblies with IEAD and HD polyiso cover board.

Why R-value Matters in Cover Boards

Optimized Design: Cover boards that are rated as an insulating material can reduce the thickness of insulation required to meet minimum energy code requirements.

Thickness Limitation: Roof replacement projects can present unique challenges when energy codes require the installation of increased insulation levels on existing buildings. Installing HD polyiso cover boards with an R-value of 2.5 maximizes energy efficiency on a per inch basis when compared to traditional cover board products.

Energy Loss: Mechanically attached roof systems installed with conductive fasteners create thermal bridges and reduce the overall energy efficiency performance of the roof system. HD polyiso cover boards can be installed with adhesives on top of mechanically attached polyiso insulation base layers effectively burying the fasteners below a thermal layer. This can reduce the impact of thermal bridges and increase the performance of the roof system.

Additional Benefits

HD polyiso cover boards deliver enhanced roof protection and energy savings all in one product, but the advantages go beyond energy efficiency:

- Widely available from more than 40 manufacturing sites in the U.S. and Canada.
- Reduced freight with single source shipping of both insulation and cover board products.
- Available in various compressive strengths, facers and board sizes to meet your project specific needs.
- Lightweight boards for ease of installation.
- Easy to cut without the need for special tools and virtually dust free.

Before installing HD polyiso cover boards, project teams should always consult manufacturer data sheets for information on product performance and installation instructions.

ABOUT PIMA

Since 1987, PIMA has served as the voice of the North American rigid polyiso insulation industry. PIMA is a leading advocate for safe, cost-effective, sustainable, and energy-efficient construction. The Association is comprised of polyiso manufacturers and industry suppliers, and represents the public policy interests of its membership at the local, national, and international levels to advance high-performance building practices.

PIMA produces technical bulletins to address key topics related to polyiso insulation. These publications inform architects, specifiers, and contractors about the performance characteristics of polyiso insulation. Always consult individual manufacturers for product specific information, including product data sheets and installation instructions.

For more information on polyisocyanurate insulation, visit www.polyiso.org

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